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PLC/DTAM SOFTWARE PROGRAMS FOR PUMPING INSTRUMENTATION AND CONTROL SKID "P"

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Abstract:

This document describe the software programs for the Programmable Logic Controller and the Datable Access Module for Pumping Instrumentation and Control skid "P". The Appendices contains copies of the printouts of these software programs.

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ACRONYMS AND ABBREVIATIONS

PLC - Programmable Logic Controller
DTAM - Data Table Access Module
OCS - Operator Control Station
FSAR - Basis for Interim Operation
TSR - Technical Safety Requirements
COB - Clean Out Box
LFL - Lower Flammability Limit
LCO - *Limiting Condition for Operation*
DOV - Diaphragm Operated Valve
RFPT - Recirculation Flush Pressure Transducer
JFPT - Jumper Flush Pressure Transducer
FGM - Flammable Gas Monitor
CGM - Combustible Gas Monitor
PXPT - Pump Transfer Pressure Transducer
OTP - Operational Test Procedure
ATP - Acceptance Test Procedure

PLC/DTAM SOFTWARE PROGRAMS FOR PUMPING INSTRUMENTATION AND CONTROL SKID "P"

1.0 INTRODUCTION

1.1 BACKGROUND

This document describes the software programs for the Allen-Bradley SLC 500 programmable logic controller (PLC) and the Allen-Bradley DTAM PLUS operator interface module used on Pumping Instrumentation and Control (PIC) skid "P". The software programs for the SLC 500 and DTAM Plus are based on the core programs provided by Allen-Bradley. The PLC and DTAM software programs on skid "D" for SX-104 are the baseline programs. These baselines have been tailored for A/AX-farm skids. An Acceptance Test Procedure (ATP) and an Operational Test Procedure (OTP) verify that the software programs meet the specific requirements for A-101 pumping.

This document represents the final PLC and DTAM programs for PIC skid "P" at A-101. These programs were printed out after the performance of the OTP. The OTP acts as the final qualification test for the software programs. Functional requirements and details of the PLC ladder logic are described in this document. The final programs entered into the PLC and DTAM Plus are included as Appendices to this document.

1.2 SOFTWARE PROGRAM CONTROL

This is the official software control document for the PLC and DTAM program for PIC skid "P". Changes to the programs shall be documented as changes and/or revisions to this document. This is to comply with HNF-5034 for software configuration control for the PIC skid software programs.

2.0 FUNCTIONAL REQUIREMENTS

2.1 BASICS

The basic functional requirements for the software program are identified below.

- 2.1.1 Control the jet pump and dilution pump
- 2.1.2 *Monitor conditions and provide alarm and pump shutdown for off normal conditions*
- 2.1.3 Provide PIC status information to the Operator Control Station (OCS) and other PIC skids that are on the same transfer line
- 2.1.4 Provide flow information on the amount of waste being pumped

Functional requirements PIC skid "P" must meet are in the Authorization Basis documents which include the Final Safety Analysis Report, HNF-SD-WM-SAR-067, Revision 1; and Technical Safety Requirements, HNF-SD-WM-TSR-006, Revision 1. The applicable sections of the FSAR and TSR are listed below along with the requirements for the PIC skid controls.

2.2 FSAR REQUIREMENTS

FSAR chapter 2, Section 2.5.2, Waste Transfer identifies the following for PIC skid functional characteristics and controls and monitoring that impact the software program for the PIC skid PLC.

- 2.2.1 Section 2.5.2.1 (lines 19 and 20) states the salt well pump is allowed to run in an automatic mode.
- 2.2.2 Section 2.5.2.1.3 (lines 37 through 39) states the JR-1 valve has position indication that is monitored by the control system.
- 2.2.3 Section 2.5.2.1.4 has the following requirements for instrumentation and control.

PUMP DISCHARGE PRESSURE SENSORS: One discharge header pressure sensor provides a signal to the PLC for monitoring low and high pressures. A low or high pressure determined by the PLC will cause an alarm and pump shutdown. (See USQ evaluation TF-99-0830, rev. 0)

FLUSH WATER SUPPLY PRESSURE DETECTION SYSTEM: A pressure switch on the flush water line is activated upon change in pressure in the supply line, which results in an alarm and pump trip.

PROCESS FLOW TRANSMITTER AND TOTALIZER: A flow totalizer displays flow rates and totals gallons pumped.

PUMP SUCTION AND DISCHARGE PRESSURE TRANSMITTERS: Pump suction and discharge pressure transmitters provide pressure readings. The transmitters are connected to the control systems and can be used as a backup to the pressure switches for pressure interlocks.

- 2.2.4 Section 2.5.2.1.5 states that salt well pumps on different tanks pumping into a common line are interlocked with each other. The control is to provide a safe and orderly shutdown of the group of pumps in the event a single pump shuts down.
- 2.2.5 Section 2.5.2.1.5.5 states that leak detectors connected to the skid control system are interlocked such that upon detection of a leak, a pump shutdown occurs along with audible and visual alarms.

- 2.2.6 Section 2.5.2.1.5.6 requires flammable gas monitoring and automatic interlock with the pump controls to shut down the pump upon reaching of 25% of the lower flammability limit (LFL) in the pump pit.

2.3 COMPLIANCE WITH FSAR FUNCTIONAL REQUIREMENTS AND CONTROLS

- 2.3.1 Software design requirements must meet the functional requirements and controls stated above. The paragraphs below describe how these are met.

2.3.1.1 Salt well pump automatic mode:

An Auto/Manual selection is provided on the DTAM, which interfaces, with the PLC ladder logic.

2.3.1.2 JR-1 valve position indication:

Transducers LS-1 and LS-2 input to the PLC. The PLC logic interprets these inputs and the DTAM displays the JR-1 valve position as "PROCESS" or as "NON-PROCESS" when JR-1 is in the flush or prime positions.

2.3.1.3 Low discharge pressure causes alarm and pump shutdown:

Pressure sensor SALW-PT-6015P inputs to the PLC. The PLC processes an alarm for pressures below 15psig or above 140psig. The alarm signal goes to the DTAM and strobe light. A low-pressure condition opens the pump motor control interlock circuit after a 30 second delay causing the pump to shutdown. The high-pressure condition opens the pump motor control interlock circuit after a 3 second delay causing the pump to shutdown.

2.3.1.4 A pressure transducer on the flush water line causes alarm and pump shutdown:

Pressure transducer SALW-PT-6014P inputs to the PLC. The PLC processes an alarm for pressure in the jumper flush line. The alarm must actuate before the pressure reaches 18 psig. The alarm signal goes to the DTAM and strobe light. The high flush pressure opens the pump motor control interlock circuit after a 3 second delay causing the pump to shutdown.

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2.3.1.5 A flow totalizer displays flow rate and total gallons pumped:

A flow head measures the flow in the pump jumper and sends the information to a flow converter inside the Instrument Enclosure. The flow converter sends a 4 to 20mA signal to the PLC. The PLC processes the signal and the flow rate and total gallons are displayed on the DTAM.

2.3.1.6 Pump suction and discharge pressures are displayed: *Signals from transducers are sent to digital display units in the Instrument Enclosure. The discharge pressure signal is also processed by the PLC and displayed on the DTAM.*

2.3.1.7 Salt well pumps on different tanks that pump into a common line are interlocked with each other: *Both A-101 and AX-101 tanks will pump into a common line going to tank AN-101. The following interlocks will be set up between the skids.*

2.3.1.7.1 *A 30-minute timer starts when any skid is shutdown and has JR-1 **not** in the prime position and. Upon timing out, the other skid will shutdown.*

2.3.1.7.2 *High jumper flush pressure and high recirculation pressure on any skid starts a 20-minute timer and shuts down the other skid upon timing out.*

2.3.1.7.3 *Skids with JR-1 in flush position; leak detection; and leak detector trouble, loss of recirculation flush signal, or loss of jumper flush signal will cause pump shutdowns after a 3-second delay.*

2.3.1.8 Leak detectors connected to the skid are interlocked to cause visual and audible alarms upon leak detection: *Leak detector relays provide discrete inputs to the PLC. Upon detection of a leak or leak detector trouble, alarms and pump shutdown occur after a 3 second delay. For A-101, PLC at the skid monitors the A-101 pump pit and the AN-101 pump pit. The leak detector relays at the skid are not used. Tank farm leak detection systems are used and a signal is fed to the PLC on the A-101 skid.*

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- 2.3.1.10 Flammable gas monitoring and automatic interlock to shut down pump upon reaching 25% of LFL.

The Combustible gas monitor (CGM) provides a discrete input to the PLC. Upon reaching 20% of the LFL, the PLC immediately shuts down the pump. The PLC also removes power from the pump and jumper heat trace cables by deenergizing the heat trace relays in the Instrument Enclosure if the heat trace is ON or prevents the heat trace relays from energizing if the heat trace is OFF. A CGM trouble alarm is also monitored by the PLC and shuts down the pump after a 3-second delay when the trouble contact opens.

- 2.3.1.11 There are other conditions that will cause an individual skid to shutdown. These conditions are communications failure with the software, signal loss from the jumper flush and recirculation flush transducers, and high temperature on the jet pump motor. There are other conditions that will be monitored by both A-101 and AX-101 skids on a common line causing pump shut downs. These conditions for A/AX-farm are leaks or detector troubles at Leak Detector station 1 (valve pits A-A, A-B, AX-A, and AX-B); no dilution water flow; and leaks or trouble at the AN-101 valve pit. These conditions for the skids are tied into the interlock circuit in the PLC ladder logic for the pump permissive.

2.4 TSR REQUIREMENTS

2.4.1 The software program meets the following Technical Safety Requirements. A description of how the program meets the requirements is explained.

LCO 3.1.2: Service Water Pressure Detection System. The recirc flush pressure and jumper flush pressure signals from the transducers are fed to the PLC. Upon the jumper flush line pressure reaching 15psig, an alarm activates and the jet pump shuts down. Upon the recirculation flush line pressure reaching 15psig, an alarm activates and the jet pump shuts down.

LCO 3.1.3: Transfer Leak Detection Systems. The primary leak detector for the pump pit is monitored for leaks and/or trouble with the signals being sent to the PLC. The PLC logic activates an alarm and shuts down the jet pump upon receiving leak or trouble signals from the leak detection systems. Leak detection signals from other leak detection systems along the transfer route are also fed to the PLC and cause a jet pump shut down.

Administrative Control 5.10.2.c.6: Ignition Controls, Ignition Source Control Set #2. The jet pump does not meet Class I, Division 2, Group B design. Therefore, the jet pump must be automatically shut down upon detection of combustible gas in the pump pit. The Combustible Gas Monitor (CGM) monitors the pump pit for combustible gas. Contacts in the CGM transmitter open upon sensing greater than 20% of the Lower Flammability Limit (LFL) or CGM trouble. The PLC monitors the CGM contacts. Upon detecting opening of the CGM contacts for high LFL or trouble, the jet pump will shut down and power is removed from the pump and jumper heat trace.

3.0 SOFTWARE DESCRIPTION

3.1 A-101 SOFTWARE

The software programs for the PLC and DTAM at A-101 are based upon the program for U-109. Software changes made specifically for A-101 are identified below.

- 3.1.1 Jet pump motor shutdown upon very high temperature. The PLC monitors the motor bearing temperature. There are two setpoints entered at the DTAM. The first high temperature setpoint when exceeded will cause an alarm. The second very high temperature setpoint when exceeded will cause an alarm and pump shutdown.
- 3.1.2 The recirculation low flow is removed from the PLC logic. The temperature of the motor bearing above is used for protecting the pump motor from an overheating condition.
- 3.1.3 Leak detection for the A-101 and AN-101 pump pits uses farm leak detection systems. A single input from each leak detection system is fed to the PLC. Upon a leak or trouble signal from these detection systems, the pump will shut down. When AX-101 skid is installed, the leak detection system signal for the pump pit will be fed to the A-101 skid over the DH-485 link.

3.2 PLC INPUTS/OUTPUTS

3.2.1 Outputs:

- 3.2.1.1 Current to Pneumatic (I/P) converter control consisting of a 4 to 20mA signal to control airflow to the DOV.
- 3.2.1.2 Dilution metering pump control consisting of a 4 to 20mA signal.
- 3.2.1.3 Motor starter permissive is 120vac power to the jet pump motor contactor to allow the pump to start.
- 3.2.1.4 A 120vac-output power signal is sent as appropriate to the four indicator lights (red, green, blue and amber) on the instrument panel.
- 3.2.1.5 A 120vac-output power to the pump and jumper heat trace relays.
- 3.2.1.6 An 120vac-output signal to the dilution-metering pump control circuit.
- 3.2.1.7 An 120vac-output signal to the dilution contactor.
- 3.2.1.8 A 120vac output power to the strobe when alarms occur.
- 3.2.1.9 A 120vac-output power to the horn when the jet pump shuts down.

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- 3.2.1.10 Output to the DH-485 line as to skid status for JR-1 prime and flush positions, leak detection alarms, skid shutdown, loss of recirculation and/or jumper flush signals, and high recirculation flush or high jumper flush pressures.
- 3.2.2 Inputs:
 - 3.2.2.1 Combustible gas monitor flammability levels are received on a 4 to 20mA signal representing a 0 to 100 percent range of the lower flammability limit.
 - 3.2.2.2 Discharge pressure signal of 4 to 20mA from transducer on jumper representing 0 to 300-psig.
 - 3.2.2.3 Specific gravity signal of 4 to 20mA from transmitter in WFIE cabinet representing 0 to 20 inches.
 - 3.2.2.4 Weight factor signal of 4 to 20mA from transmitter in WFIE cabinet representing 0 to 500 inches.
 - 3.2.2.5 Water tank level signal of 4 to 20mA from transmitter in Water cabinet representing 0 to 62 inches.
 - 3.2.2.6 Flow converter signal of 4 to 20mA from transmitter in Instrument cabinet representing 0 to 8gpm.
 - 3.2.2.7 Recirculation flush pressure signal of 4 to 20mA from transducer on flush line representing 0 to 30psig.
 - 3.2.2.8 Flush line pressure from transducer (old PS-2) of 4 to 20mA representing 0 to 30psig.
 - 3.2.2.9 Discrete input from dilution system. Contact opens on no dilution water flow to provide alarm.
 - 3.2.2.10 Discrete input from Combustible Gas Monitor (CGM) instruments. Two inputs are received. One for flammable gas levels greater than 20% of the LFL and one for CGM trouble. Either will cause an alarm, jet pump shutdown and the deenergizing of the pump and jumper heat trace relays.
 - 3.2.2.11 Discrete inputs from the leak detection relays. Contacts from the A-101 and AN-101 leak detection systems open upon leak detection circuit trouble or detection of a leak to cause an alarm and jet pump shutdown.
 - 3.2.2.12 Discrete inputs from transducers LS-1 and LS-2 located on the pump assembly. These transducers monitor the position of the JR-1 three-way valve. The inputs feed into displays, alarms and/or pump permissive inputs.
 - 3.2.2.13 A 4 to 20mA signal from the transfer line pressure transducer. The PLC uses this signal to monitor for low and high pressures on the transfer line.
 - 3.2.2.14 Discrete input MR-1 from the jet pump motor starter. This contact closes when the motor contactor is energized.

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- 3.2.2.15 Thermocouple inputs from the PLC enclosure, air compressor enclosure, water cabinet, WFIE cabinet, jet pump motor bearing, and pump jumper assembly.
- 3.2.2.16 Inputs from the DH-485 line as to the status of the AX-101 skid when connected and leak detector station 1 along the waste line transfer path. These inputs are used for alarms and jet pump shutdown when appropriate.

3.3 DTAM DISPLAYS, DATA ENTRY AND ALARMS

3.3.1 DTAM DISPLAYS

- 3.3.1.1 Alarm signals from the PLC.
- 3.3.1.2 Analog data inputs from the PLC for specific gravity, discharge pressure, recirculation flush pressure, jumper flush pressure, flammable gas levels, Diaphragm Operated Valve (DOV) parameters, and dilution ratio.
- 3.3.1.3 Temperatures for the Instrument Enclosure, the Air compressor cabinet, WFIE cabinet, Water cabinet, Pump motor, and jumper assembly

3.3.2 DTAM DATA ENTRY

- 3.3.2.1 Signal to turn jumper and pump heat trace ON or OFF.
- 3.3.2.2 Signal to set pump operation to Manual or Automatic.
- 3.3.2.3 Alarm acknowledge signal.
- 3.3.2.4 DOV set point and parameters.
- 3.3.2.5 Pump ON or OFF input.
- 3.3.2.6 Jumper temperature setpoint.
- 3.3.2.7 Pump temperature high and very high setpoints.
- 3.3.2.8 Dilution ratio setpoint input.
- 3.3.2.9 Dilution minimum flow input.

3.3.3 DTAM ALARMS

- 3.3.3.1 Individual alarm screens for each incoming alarm.
- 3.3.3.2 Screens 101 to 159 for individual alarm acknowledge.

3.4 JET PUMP INTERLOCKS

There are two jet pump interlock strings in the ladder diagram. One string is for equipment along the transfer path that monitors or feed into the transfer route. The other interlock string consists of the local PIC skid conditions. These two interlock strings are identified below for the A-101 ladder logic. All the interlock conditions must be satisfied for the jet pump to run or if the pump is running and a condition becomes unsatisfied, the pump is shut down.

3.4.1 Interlock string for other equipment along the transfer route:

- 3.4.1.1 AX-101 leak or trouble
- 3.4.1.2 AN-101 leak or trouble
- 3.4.1.3 Dilution tank no flow
- 3.4.1.4 AX-101 skid with JR-1 in flush position
- 3.4.1.5 Leak detector station #1 trouble
- 3.4.1.6 The 30 minute time out by the AX-101 skid being shutdown and JR-1 not in the prime position
- 3.4.1.7 Valve pit A-A, A-B leak or trouble
- 3.4.1.8 A-101 pit leak or trouble
- 3.4.1.9 Valve pit AX-A, AX-B leak or trouble
- 3.4.1.10 AX-101 PIC skid with high jumper flush pressure
- 3.4.1.11 AX-101 PIC skid with high recirculation line pressure
- 3.4.1.12 AX-101 PIC skid with loss of recirculation flush pressure signal
- 3.4.1.13 AX-101 PIC skid with loss of jumper flush pressure signal

3.4.2 Interlock string monitoring the A-101 PIC skid conditions:

- 3.4.2.1 Low pressure from the PXPT transducer while pump is running
- 3.4.2.2 High pressure from the PXPT transducer
- 3.4.2.3 High jumper flush pressure
- 3.4.2.4 JR-1 in the flush or prime position
- 3.4.2.5 Pump pit leak or trouble (Not used)*
- 3.4.2.6 Data communications failure on the DH-485 link
- 3.4.2.7 Motor very high temperature
- 3.4.2.8 FGM greater than 25% of LFL (Not used, replaced by CGM interlocks.)
- 3.4.2.9 Jumper flush pressure signal loss
- 3.4.2.10 Recirculation line high flush pressure
- 3.4.2.11 Recirculation flush pressure signal loss
- 3.4.2.12 CGM greater than 20% of LFL
- 3.4.2.13 CGM trouble
- 3.4.2.14 Leak detector #1 leak or trouble (Not used)*
- 3.4.2.15 Other equipment interlock (the above string)

*Leak detectors jumpered at terminal block.

3.5 INTERLOCK and ALARM CONDITIONS

Alarms occur at the PIC skid when the above interlocks are not satisfied. Some alarms are immediate while some are delayed. The alarm conditions are listed below along with the response time for the alarm to occur and whether the jet pump shuts down.

CONDITION	TIME DELAY	PUMP SHUTDOWN
Low transfer pressure	30 seconds	Yes
Communications failure	60 seconds	Yes
High flush press on AX-101 skid	20 minutes	Yes
AX-101 skid shutdown and in JR-1 not in prime position	30 minute, then 3 second delay	Yes
JR-1 in flush # or prime*	None	Yes
Pump shutdown*	None	---
FGM greater than 25% LFL	None(not used)	Yes(not used)
High transfer pressure	3 seconds	Yes
Jumper flush pressure greater than 15-psig #	3 seconds	Yes
Pump trouble	3 seconds	Yes
Pit leak # (NOT USED)	3 seconds	(NOT USED)
Pit leak detector trouble (NOT USED)	3 seconds	(NOT USED)
Leak detector 1 (NOT USED)	3 seconds	(NOT USED)
Leak detector 1 trouble (NOT USED)	3 seconds	(NOT USED)
Recirc flush pressure signal loss #	3 seconds	Yes
AX-101 skid with JR-1 in flush position	3 seconds	Yes
Jumper flush pressure signal loss #	3 seconds	Yes
AX-101 skid with leak alarms	3 seconds	Yes
AX-101 skid with loss of jumper flush pressure signal	3 seconds	Yes
AX-101 skid with loss of recirculation flush pressure signal.	3 seconds	Yes
Leak Station 1 trouble	3 seconds	Yes
Valve Pits A-A, A-B Leak or trouble	3 seconds	Yes
A-101 Valve Pit leak or trouble	3 seconds	Yes
Valve Pits AX-A, AX-B Leak or trouble	3 seconds	Yes
AN-101 Leak or trouble	3 seconds	Yes
Motor temperature very high	None	Yes
AX-101 skid with high recirc pressure	20 minutes	Yes

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CONDITION	TIME DELAY	PUMP SHUTDOWN
Dilution tank no flow	5 minutes	Yes
Recirc pressure high #	3 seconds	Yes
CGM high LFL	None	Yes
CGM trouble	3 seconds	Yes
Pump is less than 40 degrees F or the jumper is greater than 225 degrees F	3 seconds	No
Motor High Temperature	None	No
Water tank low level	None	No
Instrument enclosure greater than 130 degrees F	None	No
Air compressor enclosure greater than 130 degrees F	None	No
Water cabinet less than 35 degrees F	None	No
WFIE cabinet less than 35 degrees F	None	No
Salt well low level	None	No. DOV closes

• If the A-101 skid "P" shuts down and the JR-1 valve is not in the prime position, a 30-minute timer starts. Upon timing out, any other skids on the same transfer route will shut down.

These alarms will also cause any other skids on the same transfer route to shut down.

3.6 PIC SKID COMMUNICATIONS

The PIC skid at A-101 communicates with the computer at 241/271-A over a DH-485 link. The PLC monitors the link to verify the communications link is functional. This communications link monitoring ties into the interlock circuit for the jet pump control.

PIC skid status information is sent over the link to the 241/271-A computer. Skid status information monitored is listed below.

- 3.6.1 JR-1 in prime position
- 3.6.2 JR-1 in flush position
- 3.6.3 PIC skid shut down
- 3.6.4 Leak detected or leak detector trouble in pump pit
- 3.6.5 Skid high flush pressure
- 3.6.6 Skid high recirc flush pressure
- 3.6.7 RFPT signal loss
- 3.6.8 JFPT signal loss
- 3.6.9 AN-101 leak or trouble

When the AX-101 PIC skid is installed in AX-farm, the above information will affect that skid's operation. The skid connected in AX-farm will shut down either immediately or after some delay should the A-101 skid be shut down for conditions 3.6.2, or 3.6.4 through 3.6.8 listed above. Should the A-101 skid shut down and JR-1 is not placed in the prime position within 30 minutes, then the skid connected in AX-farm will shut down. A similar type of condition will exist for the skid at A-101 which will shutdown upon shut down of the AX-farm skid.

The software is written such if other skids are not connected, no alarm or shut down conditions exist. Fault conditions from the AX-farm skid are provided to the A-101 skid over the DH-485 link. As explained in the interlock section above, a loss of the DH-485 communications causes jet pump to shut down.

4.0 SOFTWARE PROGRAM DESCRIPTION

This section explains the input and output requirements of the PLC; alarm set points and control system functions. These requirements are used to develop the ladder logic for pump control and alarm actuation. The complete ladder logic is in Appendix B for the PLC and Appendix C for the DTAM program.

4.1 Program locations

The program for the PLC is stored in the CPU located in the PIC skid Instrument Enclosure. The DTAM program is stored in the DTAM unit located on the door of the Instrument Enclosure. The programs for the PLC and DTAM are developed from software on a laptop computer. After the program is written on the laptop, it is downloaded to the PLC and DTAM through an interface link.

Backup copies of the PLC and DTAM programs are stored on 3-1/2" disks. There are two backup copies, one for the design agent and one for file. The backup copies represent the final program in the PLC and DTAM. The PLC file is "A101NEWP" and the DTAM file is "A101SKP."

4.2 Program layout

- 4.2.1 *The program is written where ladder 2 is the main program. Ladders 3 through 20 are subroutines. The main program uses the subroutines as required during running of the program. The subroutines are listed below as to what function each performs.*
- 4.2.2 Subroutine 3: Program initial conditions are set including initializing the thermocouple module to receive inputs.
- 4.2.3 Subroutine 4: Inputs to the PLC modules are gathered and placed into an N60:*/ address location. The rest of the program when needing that particular input uses this address.
- 4.2.4 Subroutine 5: Checks for alarm conditions and has the logic for the main interlock for jet pump control.
- 4.2.5 Subroutine 6: Contains the logic for the interlock logic for other equipment connected to the transfer route.
- 4.2.6 Subroutine 7: Contains the logic for the jet pump and dilution pump controls to run these pumps. The logic for the total flow calculation to be displayed on the DTAM is this subroutine.

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- 4.2.7 Subroutine 8: This subroutine is the master alarm acknowledge logic.
- 4.2.8 Subroutine 9: Heat trace control logic
- 4.2.9 Subroutines 10 and 14: These subroutines are for the DH-485 communications link.
- 4.2.10 Subroutine 11: This subroutine is only used if the jet and dilution pumps are to be run by control from the 271-A computer. (This is not used nor was this function tested.)
- 4.2.11 Subroutine 12: This subroutine handles the inputs for the other equipment status on the transfer route.
- 4.2.12 Subroutines 13 and 16: Flow meter output routines.
- 4.2.13 Subroutine 15: This subroutine is the 30-minute time for the other skids in A/AX-farm when a skid is shut down and in the process position. When the 30-minute timer times out, the skid shuts down unless JR-1 of the shut down skid is placed in the prime position.
- 4.2.14 Subroutine 17: Individual alarm acknowledge routine.
- 4.2.15 Subroutine 18: Alarm output to the strobe light, horn and/or instrument panel amber, blue, green or red indicator lights.
- 4.2.16 Subroutine 19: Sends outputs to the PLC output modules.
- 4.2.17 Subroutine 20: Sends an output to the dilution metering pump controls.

4.3 Inputs and Outputs

Inputs are brought into the PLC through modules 1 through 12. For A-101 the inputs are assigned addresses N60:*. Appendix A lists the addressing for the inputs to the PLC. Outputs are also assigned an N60:* address and can be found in Appendix A.

4.4 Temperature

The jumper and pump temperatures are to remain between 40 degrees F and 225 degrees F when the heat trace is ON. An alarm actuates for temperatures outside these limits. The pump is monitored for very high temperature and will shut down the jet pump when the very high temperature setpoint is exceeded. The temperature is monitored by the PLC through thermocouple probes at the pump and jumper assemblies.

The temperature of the Instrument Enclosure is not to exceed 130 degrees F. An alarm actuates for temperatures equal to or greater than 130 degrees F. The alarm resets when the temperature drops below 125 degrees F.

The temperature of the Air Compressor Enclosure is not to exceed 130 degrees F. An alarm actuates for temperatures equal to or greater than 130 degrees F. The alarm resets when the temperature drops below 125 degrees F.

The temperature of the WFIE Cabinet is not to decrease below 35 degrees F. An alarm actuates for temperatures less than 35 degrees F. The alarm resets when the temperature rises above 40 degrees F.

The temperature of the Water Cabinet is not to decrease below 35 degrees F. An alarm actuates for temperatures less than 35 degrees F. The alarm resets when the temperature rises above 40 degrees F.

4.5 Alarms

Various inputs to the PLC provide information to determine if an alarm condition exists. Alarm conditions are processed in subroutine 5 in the PLC ladder logic program. Addresses N20:15/*, N20:16/*, N20:55/* and N20:56/* are actuated upon alarm conditions and turn on the strobe light (subroutine 18 of the PLC ladder logic) at the Instrument Enclosure. The horn is turned on when a pump shutdown occurs. Addresses N20:24/*, N20:25/*, N20:51/* and N20:52/* provide alarm input to the DTAM.

Alarms are acknowledged at the DTAM on screen #23. Acknowledging the alarm clears the signal to the strobe and horn only (subroutine 17 of the PLC ladder logic). The visual alarm remains on the DTAM screen until the alarm condition clears in the field.

Appendix A lists all the alarm conditions monitored, the addresses and alarm messages. Appendix C is a copy of the DTAM program containing all the alarm screens.

4.6 Pump Control

Subroutine 7 outputs to the motor starter for the jet pump. Three conditions in the software logic must be satisfied to provide the signal for the motor contactor to close. These are: 1) the interlocks must be satisfied. These interlocks include the skid interlocks in subroutine 5 and interlocks to any other tanks on the same transfer line as required in subroutine 6. 2) Pump to the ON position from the DTAM and 3) pump trouble cleared in subroutine 5. Pump trouble clears when the pump is ON from the DTAM and the auxiliary contact at the motor starter is closed.

4.7 Program Set Points

The set points for A-101 are the same as U-109. Each set points is identified below along with the PLC logic values.

- 4.7.1 Jumper flush pressure alarm point: The jumper flush pressure is set to alarm at pressures greater than 15PSI. This is to meet the requirements of LCO 3.1.2 that requires the service water pressure to be less than 20psi. The pressure transducer range is 0 to 30psi, with a 4 to 20mA output signal to the PLC. The internal logic value of the PLC for a 4 to 20mA signal is 3277 to 16384. The PLC logic value for an alarm set point of 15psi is 9830.
- 4.7.2 Recirculation flush pressure set point: The recirculation flush pressure is set to alarm at 15psi. This set point is to meet the same requirements as the jumper flush pressure, but is set to detect any leakage past the check valves in the recirculation line during pumping of the waste. The transducer range is 0 to 30psi, with a 4 to 20mA signal output to the PLC. The PLC logic value for 15psi is 9830.
- 4.7.3 Jumper and recirculation flush pressure signal loss: The input signal from the jumper and recirculation flush pressure transducers is not fail-safe. Therefore, the 4 to 20mA signal is monitored to a signal loss due to a failed transducer, broken wire or failure of the intrinsic safe module. The PLC logic value is set at 2500. This value is selected because the steady state value of the transducer is below the 3277 when the piping has no liquid inside. The 2500 value will prevent nuisance alarms and pump shutdowns.

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- 4.7.4 Water tank level: PIC skid "P" has a 62-inch high water tank. The set points for low water level and reset were calculated to correspond to the relative volume as in the older skids with a 50-inch high tank. The alarm level is set at 12.25 inches and the reset level is set at 15.5 inches. The level transmitter outputs a 4 to 20mA signal to the PLC. The corresponding PLC logic value for 12.25 inches is 5867 and for 15.5 inches is 6554.
- 4.7.5 Low and High pressure: a pressure transducer monitors the pressure on the pump and jumper assembly transfer line. A 4 to 20mA signal is sent to the PLC. The PLC program determines a low and a high pressure alarm point. The low pressure is set at 15psig and the high pressure is set at 140psig. The PLC logic value for 15psig is 3932 and for 140psig is 9394.

4.8 Other A/AX-farm Skids

Other A/AX-farm skids when installed will interface over the DH-485 data link to the A-101 skid "P". The PLC ladder logic is set up for these future interfaces. Future skids in A/AX-farm will be at tank AX-101 and the emergency skid. The types of interfaces are identified below. The PLC logic is an open contact, which is monitored for a closed condition causing a timer to start and/or the skid to shut down.

- 4.8.1 Skid JR-1 alarm conditions: When the AX-101 skid has JR-1 in the flush position, the A-101 skid will shut down after 3 second delay upon receiving the signal over the DH-485 link. If the AX-101 skid has JR-1 in the process position and that skid is in the shut down mode, a 30-minute timer starts. Upon timing out of the timer, the A-101 skid will shut down after a 3-second delay. The 30-minute timer allows operations personnel time to move the JR-1 to the prime position upon skid shut down.
- 4.8.2 High flush pressures: Upon high flush pressure in the jumper of an on-line skid, a 20-minute timer starts. Timing out of the timer will cause the A-101 skid to shut down. The 20-minute timer allows operations personnel time to perform work on an on-line skid without immediately shutting down the other on-line skids. High recirculation pressure on a skid will cause the shut down of the other on-line skids after a 20-minute delay upon receiving the signal over the DH-485 link.
- 4.8.3 Leak detection or leak detector trouble: Leak detection or trouble at AX-101 will cause the A-101 skid to shut down after a 3 second delay upon receiving the signal over the DH-485 link.

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- 4.8.4 Flush pressure signal losses: The loss of signal to the PLC from either the jumper flush pressure or the recirculation flush pressure transducers on the AX-farm skid, will cause the A-101 skid to shutdown after a 3-second delay upon receiving the signal over the DH-485 link.

APPENDICES

APPENDIX A: PLC AND DTAM ADDRESSING

APPENDIX B: PLC LADDER LOGIC PROGRAM

APPENDIX C: DTAM PROGRAM

APPENDIX A

A-101 PLC ADDRESSES

TERMINATION	SIGNAL	TAG	ADDRESS	DESCRIPTION
O:1.0	ANALOG OUTPUT		N60:0	
O:1.1	ANALOG OUTPUT		N60:1	
I:1.0	ANALOG INPUT	CGM	N60:2	CGM ANALOG (PIT)
I:1.1	ANALOG INPUT	FGM	N60:3	FGM ANALOG (DOME)(RESERVED)
O:2.0	ANALOG OUTPUT	EPC	N60:4	OUTPUT TO DOV
O:2.1	ANALOG OUTPUT	DIL	N60:5	OUTPUT TO METERING PUMP
I:2.0	ANALOG INPUT	PDPT	N60:6	PUMP DISCHARGE PRESSURE
I:2.1	ANALOG INPUT		N60:7	
O:3.0	ANALOG OUTPUT		N60:8	
O:3.1	ANALOG OUTPUT		N60:9	
I:3.0	ANALOG INPUT		N60:10	
I:3.1	ANALOG INPUT		N60:11	
I:4.0	4-20mA	SGT	N60:12	SPECIFIC GRAVITY 0-20 IN. H2O
I:4.1	4-20mA	WFT	N60:13	WEIGHT FACTOR 0-500 IN. H2O
I:4.2	4-20mA	LT	N60:14	WATER TANK LEVEL 0-62 INCHES
I:4.3	4-20mA	CNV	N60:15	FLOW METER 0-14GPM
I:5.0	4-20mA	RFPT	N60:16	RECIRC FLUSH PRESSURE
I:5.1	4-20mA	JFPT	N60:17	JUMPER FLUSH PRESSURE (PS-2)
I:5.2	4-20mA	PXPT	N60:18	TRANSFER PRESSURE (PS-1)
I:5.3			N60:19	
I:6.0			N60:20	
I:6.1			N60:21	
I:6.2			N60:22	
I:6.3			N60:23	
I:7.0	T/C	TE-6002	N60:24	PUMP TEMPERATURE
I:7.1	T/C	TE-6003	N60:25	JUMPER TEMPERATURE
I:7.2	T/C	TE-6001	N60:26	AIR COMPR. CABINET TEMPERATURE
I:7.3	T/C	TE-6004	N60:27	INSTRU. CABINET TEMPERATURE
O:8.0	DISCRETE OUTPUT		N60:28/0	
O:8.1	DISCRETE OUTPUT	DIL-P	N60:28/1	DILUTION SOLENOID
O:8.2	DISCRETE OUTPUT		N60:28/2	
O:8.3	DISCRETE OUTPUT	DIL-C	N60:28/3	DILUTION METERING PUMP
O:8.4	DISCRETE OUTPUT		N60:28/4	
O:8.5	DISCRETE OUTPUT		N60:28/5	
I:8.0	DISCRETE INPUT	AN101	N60:28/6	LEAK DET SIGNAL FROM AN-101
I:8.1	DISCRETE INPUT	DIL-F	N60:28/7	DILUTION TANK FLOW
I:8.2	DISCRETE INPUT	CGM-AX	N60:28/8	CGM HIGH LFL
I:8.3	DISCRETE INPUT	FGM	N60:28/9	FGM INTERLOCK(RESERVED)
I:8.4	DISCRETE INPUT	CGM-F	N60:28/10	CGM FAULT
I:8.5	DISCRETE INPUT	A101	N60:28/11	LEAK DET SIGNAL FROM A-101

A-101 PLC ADDRESSES

TERMINATION	SIGNAL	TAG	ADDRESS	DESCRIPTION
O:9.0	DISCRETE OUTPUT		N60:29/0	
O:9.1	DISCRETE OUTPUT	DO2	N60:29/1	JUMPER HEAT TRACE ON
O:9.2	DISCRETE OUTPUT		N60:29/2	
O:9.3	DISCRETE OUTPUT	DO3	N60:29/3	JUMPER HEAT TRACE HIGH SHUTOFF
O:9.4	DISCRETE OUTPUT		N60:29/4	
O:9.5	DISCRETE OUTPUT		N60:29/5	
I:9.0	DISCRETE INPUT	LD3-2	N60:29/6	LEAK DETECTOR #1 TROUBLE
I:9.1	DISCRETE INPUT	LD1-1	N60:29/7	PIT LEAK DETECTOR
I:9.2	DISCRETE INPUT		N60:29/8	
I:9.3	DISCRETE INPUT	LD3-1	N60:29/9	PIT LEAK DETECTOR TROUBLE
I:9.4	DISCRETE INPUT		N60:29/10	
I:9.5	DISCRETE INPUT	LD1-2	N60:29/11	LEAK DETECTOR #1
O:10.0	DISCRETE OUTPUT		N60:30/0	
O:10.1	DISCRETE OUTPUT	BUZZ	N60:30/1	OUTPUT TO HORN
O:10.2	DISCRETE OUTPUT		N60:30/2	
O:10.3	DISCRETE OUTPUT	STRB	N60:30/3	OUTPUT TO STROBE LIGHT
O:10.4	DISCRETE OUTPUT		N60:30/4	
O:10.5	DISCRETE OUTPUT		N60:30/5	
I:10.0	DISCRETE INPUT	LS-1	N60:30/6	PROXIMITY LS-1
I:10.1	DISCRETE INPUT		N60:30/7	
I:10.2	DISCRETE INPUT	LS-2	N60:30/8	PROXIMITY LS-2
I:10.3	DISCRETE INPUT		N60:30/9	
I:10.4	DISCRETE INPUT		N60:30/10	
I:10.5	DISCRETE INPUT		N60:30/11	
O:11.0	DISCRETE OUTPUT	LGTR	N60:31/0	OUTPUT TO RED LIGHT
O:11.1	DISCRETE OUTPUT	LGTA	N60:31/1	OUTPUT TO AMBER LIGHT
O:11.2	DISCRETE OUTPUT	MS-1	N60:31/2	PUMP MOTOR SWITCH ON
O:11.3	DISCRETE OUTPUT	LGTB	N60:31/3	OUTPUT TO BLUE LIGHT
O:11.4	DISCRETE OUTPUT		N60:31/4	
O:11.5	DISCRETE OUTPUT	LGTG	N60:31/5	OUTPUT TO GREEN LIGHT
I:11.0	DISCRETE INPUT	MR-1	N60:31/6	MOTOR POWER MONITOR
I:11.1	DISCRETE INPUT		N60:31/7	
I:11.2	DISCRETE INPUT		N60:31/8	
I:11.3	DISCRETE INPUT		N60:31/9	
I:11.4	DISCRETE INPUT		N60:31/10	
I:11.5	DISCRETE INPUT		N60:31/11	
I:12.0	T/C		N60:32	WATER CAB TEMP
I:12.1	T/C		N60:33	WFIE TEMP
I:12.2	T/C		N60:34	
I:12.3	T/C		N60:35	

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APPENDIX A
A-101 PLC/DTAM ALARM ADDRESSES

ALARM ADDRESS	ALARM ACK ADDRESS	DATA DISPLAY MESSAGE	ALARM WINDOW MESSAGE	INPUT/SOURCE	OUTPUT/DTAM ADDRESS	DTAM ACK ADDRESS	DTAM DIS. SCREEN #	DTAM ALARM SCREEN	ALARM #
N20:24/0	N20:15/0		ACKNOWLEDGE STROBE	I:5.2	N12:0/0				100 ACK.
N20:24/1	N20:15/1	XFR PRESSURE LOW	XFR PRESSURE LOW	I:5.2	N12:0/1	41/1			101
N20:24/2	N20:15/2	XFR PRESSURE HIGH	XFR PRESSURE HIGH	I:5.2	N12:0/2	41/2			102
N20:24/3	N20:15/3	FLUSH PRESSURE HIGH	FLUSH PRESSURE HI	I:5.1	N12:0/3	41/3			103
N20:24/4	N20:15/4	PUMP TROUBLE	JET PUMP TROUBLE	I:11.0	N12:0/4	41/4			104
N20:24/5	N20:15/5	JR-1 NON-PROCESS	JR-1 POSITION, NON-PROCESS	I:10.2	N12:0/5	42/1			105
N20:24/6	N20:15/6	PUMP PIT LEAK	PUMP PIT LEAK	I:9.1	N12:0/6	42/2			106
N20:24/7	N20:15/7	PUMP PIT TROUBLE	PUMP PIT LEAK TROUBLE		N12:0/7	42/3			107
N20:24/8	N20:15/8	JMPR HT TROUBLE	JMPR HEAT TRACE TROUBLE		N12:0/8	42/4			108
N20:24/9	N20:15/9	PIC WATER LOW	PIC WATER LEVEL LOW	I:4.2	N12:0/9	43/1			109
N20:24/10	N20:15/10	PLC TEMP HIGH	PLC ENCLOSURE HI	I:7.3	N12:0/10	43/2			110
N20:24/11	N20:15/11	CMPSR TEMP HIGH	AIR COMPRESSOR TEMP HI	I:7.2	N12:0/11	43/3			111
N20:24/12	N20:15/12	JET PUMP SHUTDOWN	JET PUMP SHUTDOWN	I:11.0	N12:0/12	43/4			112
N20:24/13	N20:15/13	SGT LEVEL LOW	SGT LOW	I:4.1	N12:0/13	44/1			113
N20:24/14	N20:15/14	RFPT SIGNAL LOST	RFPT SIGNAL LOSS ALARM	I:5.0	N12:0/14				114
N20:24/15	N20:15/15	NETWORK FAILURE	PLC COMMUNICATIONS FAILURE	S:9/2	N12:0/15	44/2			115
N20:25/0	N20:16/0	JFPT SIGNAL LOST	JFPT SIGNAL LOSS ALARM	I:5.1	N12:1/0	44/3			116
N20:25/1	N20:16/1	AX-FARM LEAK ALARM	AX FARM LEAK ALARM	DH-485	N12:1/1	45/1			117
N20:25/2	N20:16/2	LEAK 1 ALARM	LEAK DETECTOR No 1 LEAK DETECTED		N12:1/2	45/2			118
N20:25/3	N20:16/3	LEAK 1 CK ALARM	LEAK DETECTOR No 1 TROUBLE		N12:1/3	45/3			119
N20:25/4	N20:16/4	AX FLUSH POS ALARM	AX TANK IN FLUSH	DH-485	N12:1/4	45/4			120
N20:25/5	N20:16/5				N12:1/5	46/1			121
N20:25/6	N20:16/6	FGM ALARM	FLAMMABLE GAS HIGH	I:8.3	N12:1/6	46/2			122
N20:25/7	N20:16/7	LEAK ST #1 ALARM	LEAK STATION 1 TROUBLE	DH-485	N12:1/7	46/3			123
N20:25/8	N20:16/8	AX SHUTDOWN ALARM	AX TANK SHUTDOWN TIMER ACTIVATED	DH-485	N12:1/8	46/4			124
N20:25/9	N20:16/9	HI LFL CGM ALARM	HIGH LFL ON CGM	I:8.2	N12:1/9	50/2			125
N20:25/10	N20:16/10	PIT A-A, A-B LK LEAK	VALVE PIT A-A, A-B LEAK	N20:49/0	N12:1/10	48/1			126
N20:25/11	N20:16/11				N12:1/11	48/2			127
N20:25/12	N20:16/12	PIT AX-A, B LK LEAK	VALVE PIT AX-A, AX-B LEAK	N20:49/1	N12:1/12	48/3			128
N20:25/13	N20:16/13				N12:1/13	50/1			129
N20:25/14	N20:16/14	CGM TROUBLE	CGM TROUBLE	I:8.4	N12:1/14	50/2			131
N20:25/15	N20:16/15	AN101 LK/TB	AN-101 LEAK OR TROUBLE	I:8.0	N12:1/15	50/3			132
N20:51/0	N20:55/0	A-101 LK/TB ALARM	A-101 LEAK DETECTOR LEAK OR TROUBLE	I:8.5	N12:2/0	52/1			133
N20:51/1	N20:55/1				N12:2/1	52/2			134
N20:51/2	N20:55/2	DILUTION TK ALARM	DILUTION TANK NO FLOW	I:8.1	N12:2/2	52/3			135
N20:51/3	N20:55/3				N12:2/3	52/4			136
N20:51/4	N20:55/4	AX FLUSH PRES ALARM	AX FARM HIGH FLUSH PRESS	DH-485	N12:2/4	53/1			137
N20:51/5	N20:55/5	AX RECIRC PRES ALARM	AX FARM HIGH RECIRC PRESS	DH-485	N12:2/5	53/2			138
N20:51/6	N20:55/6	RECIRC. PRESS ALARM	RECIRC FLUSH PRESS HI	I:5.0	N12:2/6	53/3			139
N20:51/7	N20:55/7				N12:2/7	53/4			140
N20:51/8	N20:55/8				N12:2/8	54/1			141
N20:51/9	N20:55/9				N12:2/9	54/2			142
N20:51/10	N20:55/10				N12:2/10	54/3			143

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APPENDIX A
A-101 PLC/DTAM ALARM ADDRESSES

ALARM	ALARM ACK	DATA DISPLAY MESSAGE	ALARM WINDOW MESSAGE	INPUT/OUTPUT	DTAM ACK	DTAM DIS	DTAM ALARM	ALARM #
N20:51/11	N20:55/11				N12:2/11	54/4	144	44
N20:51/12	N20:55/12				N12:2/12	55/1	145	45
N20:51/13	N20:55/13	AX RECIRC LOSS ALARM	AX-FARM RECIRC FLUSH SIGNAL LOSS	DH-485	N12:2/13	55/2	146	46
N20:51/14	N20:55/14	AX FLUSH LOSS ALARM	AX-FARM JUMPER FLUSH SIGNAL LOSS	DH-485	N12:2/14	55/3	147	47
N20:51/15	N20:55/15				N12:2/15	55/4	148	48
N20:52/0	N20:56/0	WTR CAB TEMP LOW	WATER CAB TEMP LOW	I:12.0	N12:3/0	56/1	149	49
N20:52/1	N20:56/1	WFIE TEMP LOW	WFIE TEMP LOW	I:12.1	N12:3/1	56/2	150	50
N20:52/2	N20:56/2				N12:3/2	56/3	151	51
N20:52/3	N20:56/3				N12:3/3	56/4	152	52
N20:52/4	N20:56/4				N12:3/4	57/1	153	53
N20:52/5	N20:56/5				N12:3/5	57/2	154	54
N20:52/6	N20:56/6				N12:3/6	57/3	155	55
N20:52/7	N20:56/7				N12:3/7	57/4	156	56
N20:52/8	N20:56/8				N12:3/8	58/1	157	57
N20:52/9	N20:56/9	PMP HI TEMP	MOTOR TEMP HIGH		N12:3/9	58/2	158	58
N20:52/10	N20:56/10	PMP HIHI TEMP	MOTOR TEMP HI SHUTDOWN		N12:3/10	58/3	159	59
N20:52/11	N20:56/11				N12:3/11			
N20:52/12	N20:56/12				N12:3/12			
N20:52/13	N20:56/13				N12:3/13			
N20:52/14	N20:56/14				N12:3/14			
N20:52/15	N20:56/15				N12:3/15			

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APPENDIX A
A/AX-FARM NODE ADDRESSES

NODE #	LOCATION
0	
1	
2	A-101, SKID P
3	EMERG SKID
4	AX-101, SKID Q
5	
6	
7	
8	
9	
10	
11	
12	LEAK DET. STATION 1
13	

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APPENDIX A
A/AX-FARM ADDRESSES

CONTROL ADD.	CONTROL ADD.	DESCRIPTION	DTAM SCREEN/POSITION
	N20:17/0	MOTOR PERMISSIVE	
	N20:17/1	SUB INTERLOCK	
	N20:17/2	INTERLOCK	
	N20:17/3	SUB INTERLOCK	
	N20:17/4	HEATER ON	31/1 AND 2
	N20:17/5	CLEAR COUNTER	
	N20:17/6	AUTO/MANUAL	13/1, 15/1 AND 2, 22/1
	N20:17/7	SIMULATE	
	N20:17/8	SEND MESSAGE	
	N20:17/9		
	N20:17/10	MASTER ACKNOWLEDGE	23/1
	N20:17/11	TRANSMIT TROUBLE	
	N20:17/12	RETRY MESSAGE	
	N20:17/13		
	N20:17/14		
	N20:17/15	RESET COUNTER	
N10:2	N20:18	PID SET POINT	14/3 AND 4
N10:3	N20:19	PID GAIN	18/2 AND 3
N10:4	N20:20	PID RESET	19/2 AND 3
N10:5	N20:21	PID RATE	21/2 AND 3
N10:28	N20:22	PROCESS VARIABLE	
N10:29	N20:23	PID OUTPUT	13/3, 14/1, 18/1, 19/1, 21/1, 22/2 AND 3
N10:13	N20:26	LOOP UPDATE	
S:9	N20:27	STATION ON DH485	
N15:0	N20:28		
N15:5	N20:29		
C5:1,ACC	N20:30	TOTAL 1	26/4, 27/5
C5:2,ACC	N20:31	TOTAL 2	26/3, 27/6
S:10		WATCH FOR EXHAUST SKID	
	N20:32/0	SKID PRIME	
	N20:32/1	SKID FLUSH	
	N20:32/2	SKID SHUTDOWN	
	N20:32/3	SKID PIT LEAK (NOT USED)	
	N20:32/4	SKID LEAK #1 (NOT USED)	
	N20:32/5	SKID HI PRESS FLUSH	
	N20:32/6	SKID HI PRESS RECIRC	
	N20:32/7	RFPT SIGNAL LOSS	
	N20:32/8	JFPT SIGNAL LOSS	
	N20:32/9	LEAK DET SIGNAL FROM AN-101	FOR SKID P AT A-101 ONLY
	N20:32/10	LEAK DET SIGNAL FROM A-101	FOR SKID P AT A-101 ONLY
	N20:32/11		
	N20:32/12		
	N20:32/13		
	N20:32/14		
	N20:32/15		

RPP-5775 REVISION 0
APPENDIX A
A/AX-FARM ADDRESSES

CONTROL ADD.	CONTROL ADD.	DESCRIPTION	DTAM SCREEN/POSITION
NODE#1	N20:33/0	SPARE	
	N20:33/1		
	N20:33/2		
	N20:33/3		
	N20:33/4		
	N20:33/5		
	N20:33/6		
	N20:33/7		
	N20:33/8		
	N20:33/9		
	N20:33/10		
	N20:33/11		
	N20:33/12		
	N20:33/13		
	N20:33/14		
	N20:33/15		
NODE#2	N20:34/0	A-101 PRIME	
	N20:34/1	A-101 FLUSH	
	N20:34/2	A-101 SHUTDOWN	
	N20:34/3	A-101 PIT LEAK	
	N20:34/4	A-101 LEAK #1	
	N20:34/5	A-101 HI PRESS FLUSH	
	N20:34/6	A-101 HI PRESS RECIRC	
	N20:34/7	A-101 RFPT SIGNAL LOSS	
	N20:34/8	A-101 JFPT SIGNAL LOSS	
	N20:34/9	LEAK DET SIGNAL FROM AN-101	
	N20:34/10	LEAK DET SIGNAL FROM A-101	
	N20:34/11		
	N20:34/12		
	N20:34/13		
	N20:34/14		
	N20:34/15		
NODE#3	N20:35/0	EMERG PRIME	
	N20:35/1	EMERG FLUSH	
	N20:35/2	EMERG SHUTDOWN	
	N20:35/3	EMERG PIT LEAK	
	N20:35/4	EMERG LEAK 1	
	N20:35/5	EMERG HI PRESS FLUSH	
	N20:35/6	EMERG HI PRESS RECIRC	
	N20:35/7	EMERG RFPT SIGNAL LOSS	
	N20:35/8	EMERG JFPT SIGNAL LOSS	
	N20:35/9		
	N20:35/10		
	N20:35/11		
	N20:35/12		

RPP-5775 REVISION 0
APPENDIX A
A/AX-FARM ADDRESSES

CONTROL ADD.	CONTROL ADD.	DESCRIPTION	DTAM SCREEN/POSITION
	N20:35/13		
	N20:35/14		
	N20:35/15		
NODE#4	N20:36/0	AX-101 PRIME	
	N20:36/1	AX-101 FLUSH	
	N20:36/2	AX-101 SHUTDOWN	
	N20:36/3	AX-101 PIT LEAK	
	N20:36/4	AX-101 LEAK 1	
	N20:36/5	AX-101 HI PRESS FLUSH	
	N20:36/6	AX-101 HI PRESS RECIRC	
	N20:36/7	AX-101 RFPT SIGNAL LOSS	
	N20:36/8	AX-101 JFPT SIGNAL LOSS	
	N20:36/9		
	N20:36/10		
	N20:36/11		
	N20:36/12		
	N20:36/13		
	N20:36/14		
	N20:36/15		
NODE#5	N20:37/0		
	N20:37/1		
	N20:37/2		
	N20:37/3		
	N20:37/4		
	N20:37/5		
	N20:37/6		
	N20:37/7		
	N20:37/8		
	N20:37/9		
	N20:37/10		
	N20:37/11		
	N20:37/12		
	N20:37/13		
	N20:37/14		
	N20:37/15		
NODE#6	N20:38/0		
	N20:38/1		
	N20:38/2		
	N20:38/3		
	N20:38/4		
	N20:38/5		
	N20:38/6		
	N20:38/7		
	N20:38/8		
	N20:38/9		

RPP-5775 REVISION 0
APPENDIX A
A/AX-FARM ADDRESSES

CONTROL ADD.	CONTROL ADD.	DESCRIPTION	DTAM SCREEN/POSITION
	N20:38/10		
	N20:38/11		
	N20:38/12		
	N20:38/13		
	N20:38/14		
	N20:38/15		
NODE#7	N20:39/0		
	N20:39/1		
	N20:39/2		
	N20:39/3		
	N20:39/4		
	N20:39/5		
	N20:39/6		
	N20:39/7		
	N20:39/8		
	N20:39/9		
	N20:39/10		
	N20:39/11		
	N20:39/12		
	N20:39/13		
	N20:39/14		
	N20:39/15		
NODE#8	N20:40/0		
	N20:40/1		
	N20:40/2		
	N20:40/3		
	N20:40/4		
	N20:40/5		
	N20:40/6		
	N20:40/7		
	N20:40/8		
	N20:40/9		
	N20:40/10		
	N20:40/11		
	N20:40/12		
	N20:40/13		
	N20:40/14		
	N20:40/15		
NODE#9	N20:41/0		
	N20:41/1		
	N20:41/2		
	N20:41/3		
	N20:41/4		
	N20:41/5		
	N20:41/6		

RPP-5775 REVISION 0
APPENDIX A
A/AX-FARM ADDRESSES

CONTROL ADD.	CONTROL ADD.	DESCRIPTION	DTAM SCREEN/POSITION
	N20:41/7		
	N20:41/8		
	N20:41/9		
	N20:41/10		
	N20:41/11		
	N20:41/12		
	N20:41/13		
	N20:41/14		
	N20:41/15		
NODE#10	N20:42/0		
	N20:42/1		
	N20:42/2		
	N20:42/3		
	N20:42/4		
	N20:42/5		
	N20:42/6		
	N20:42/7		
	N20:42/8		
	N20:42/9		
	N20:42/10		
	N20:42/11		
	N20:42/12		
	N20:42/13		
	N20:42/14		
	N20:42/15		
NODE#11	N20:43/0		
	N20:43/1		
	N20:43/2		
	N20:43/3		
	N20:43/4		
	N20:43/5		
	N20:43/6		
	N20:43/7		
	N20:43/8		
	N20:43/9		
	N20:43/10		
	N20:43/11		
	N20:43/12		
	N20:43/13		
	N20:43/14		
	N20:43/15		
		LEAK DETECTOR STATION 1	
NODE#12	N20:49/0	VALVE PIT A-A, A-B LEAK	
	N20:49/1		

RPP-5775 REVISION 0
APPENDIX A
A/AX-FARM ADDRESSES

CONTROL ADD.	CONTROL ADD.	DESCRIPTION	DTAM SCREEN/POSITION
	N20:49/2	VALVE PIT AX-A, AX-B TROUBLE	
	N20:49/3		
	N20:49/4		
	N20:49/5		
	N20:49/6		
	N20:49/7		
	N20:49/8		
	N20:49/9		
	N20:49/10		
	N20:49/11		
	N20:49/12		
	N20:49/13		
	N20:49/14		
	N20:49/15		
NODE#13	N20:50/0		
	N20:50/1		
	N20:50/2		
	N20:50/3		
	N20:50/4		
	N20:50/5		
	N20:50/6		
	N20:50/7		
	N20:50/8		
	N20:50/9		
	N20:50/10		
	N20:50/11		
	N20:50/12		
	N20:50/13		
	N20:50/14		
	N20:50/15		

LAD 2 - --- Total Rungs in File = 18

LAD 2 - --- Total Rungs in File = 18

0016

5

RPP 5775 REVISION 0 APPENDIX B A101newp

Clear
Dest

C5:1.ACC

LAD 2 - --- Total Rungs in File = 18

---CLR
Clear
Dest

C5:2.ACC
0<

0017

END

LAD 3 - --- Total Rungs in File = 16

LAD 3 - --- Total Rungs in File = 16

LAD 3 - --- Total Rungs in File = 16

MOV	
Move	
Source	N15:10 34<
Dest	N7:25 34<

MOV	
Move	
Source	N15:10 34<
Dest	N7:45 34<

MOV	
Move	
Source	N15:10 34<
Dest	N7:65 34<

MOV	
Move	
Source	N15:10 34<
Dest	N7:85 34<

MOV	
Move	
Source	N15:10 34<
Dest	N7:105 34<

MOV	
Move	
Source	N15:10 34<
Dest	N7:125 34<

LAD 3 - --- Total Rungs in File = 16

LAD 4 - --- Total Rungs in File = 10

LAD 4 - --- Total Rungs in File = 10

GET INPUTS FROM MODULE 8

0003

MVM
Masked Move
Source I:8.0
54<
Mask 003Fh
63<
Dest N17:0
54<

MUL
Multiply
Source A N17:0
54<
Source B 64
64<
Dest N17:1
3456<

MVM
Masked Move
Source N17:1
3456<
Mask 0FC0h
4032<
Dest N60:28
3072<

GET INPUTS FROM MODULE 9

0004

MVM
Masked Move
Source I:9.0
43<
Mask 003Fh
63<
Dest N17:2
43<

MUL
Multiply
Source A N17:2
43<
Source B 64
64<
Dest N17:3
2752<

LAD 4 - --- Total Rungs in File = 10

GET INPUTS FROM MODULE 10

0005

MVM	
Masked Move	
Source	N17:3 2752<
Mask	0FC0h 4032<
Dest	N60:29 2762<

MVM	
Masked Move	
Source	I:10.0 4<
Mask	003Fh 63<
Dest	N17:4 4<

MUL	
Multiply	
Source A	N17:4 4<
Source B	64 64<
Dest	N17:5 256<

MVM	
Masked Move	
Source	N17:5 256<
Mask	0FC0h 4032<
Dest	N60:30 256<

GET INPUTS FROM MODULE 11

0006

MVM	
Masked Move	
Source	#I:11.0 0<
Mask	003Fh 63<
Dest	N17:6 0<

LAD 4 - --- Total Rungs in File = 10

---MUL---	
Multiply	
Source A	N17:6
	0<
Source B	64
	64<
Dest	N17:7
	0<

---MVM---	
Masked Move	
Source	N17:7
	0<
Mask	0FC0h
	4032<
Dest	N60:31
	34<

GET TEMPERATURES FROM MODULE 12

0007

---COP---	
Copy File	
Source	#1:12.0
Dest	#N60:32
Length	4

0008

---RET---	
Return	

0009

<END>

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 ~ --- Total Rungs in File = 88

0024

CHECK IF RFPT SIGNAL
LESS THAN 4mA

LES	
Less Than (A<B)	
Source A	N60:16
	3157<
Source B	2500
	2500<

N16:0
OSR
13

ALARM 13
N20:15
(L)
13

TON

Timer On Delay	(EN)
Timer	T4:9
Time Base	1.0 (DN)
Preset	3<
Accum	0<

0025

3 SEC DELAY

T4:9

DN

RFPT SIGNAL LOSS
INTLK

N20:24
(L)
14

N16:0
OSR
14

ALARM 14
N20:15
(L)
14

STATION ON DH-485 (PRESENT)

0026

AND

Bitwise AND	
Source A	S:9
	1025h<
Source B	N15:5
	0000h<
Dest	N15:2
	0000h<

STATION ON DH-485 (PREVIOUS)

0027

MVM

Masked Move	
Source	N15:0
	0<
Mask	N15:5
	0000h<
Dest	N15:3
	0<

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

LAD 5 - --- Total Rungs in File = 88

INPUT TO WONDERWARE

FLASH FOR ALARM
CONDITIONS

N20:17

0082

NEQ
Not Equal
Source A N20:15
0<
Source B N13:0
0<

NEQ
Not Equal
Source A N20:16
0<
Source B N13:0
0<

NEQ
Not Equal
Source A N20:55
0<
Source B N13:0
0<

NEQ
Not Equal
Source A N20:56
0<
Source B N13:0
0<

9

INPUT TO WONDERWARE

COLOR CHANGE FOR
ALARM CONDITIONS

N20:17

0083

NEQ
Not Equal
Source A N20:24
12288<
Source B N13:0
0<

NEQ
Not Equal
Source A N20:25
-32256<
Source B N13:0
0<

13

LAD 5 - --- Total Rungs in File = 88

-NEQ	
Not Equal	
Source A	N20:51
	0<
Source B	N13:0
	0<

-NEQ	
Not Equal	
Source A	N20:52
	0<
Source B	N13:0
	0<

JET PUMP MOTOR INTERLOCK CIRCUIT

LAD 6 - --- Total Rungs in File = 6

LAD 7 - --- Total Rungs in File = 20

LAD 7 - --- Total Rungs in File = 20

0004

PID

PID	
Control Block	N10:0
Process Variable	N10:28
Control Variable	N10:29
Control Block Length	23
Setup Screen	

0005

SGT LOW
N20:24

13

SCL

Scale	
Source	N10:29
	0<
Rate [/10000]	15239
	15239<
Offset	6242
	6242<
Dest	N60:4
	3277<

0006

SGT LOW
N20:24

13

LEQ

Less Than or Eq (A<=B)	
Source A	N60:12
	3290<
Source B	3277
	3277<

MOV

Move	
Source	3277
	3277<
Dest	N60:4
	3277<

0007

GRT

Greater Than (A>B)	
Source A	N60:12
	3290<
Source B	16384
	16384<

MOV

Move	
Source	16384
	16384<
Dest	N60:4
	3277<

0008

COP

Copy File	
Source	#N20:18
Dest	#N10:2
Length	4

0009

MOV

Move	
Source	N10:28
	16<
Dest	N20:22
	16<

LAD 7 - --- Total Rungs in File = 20

0010	N20:17 6	<div>MOV Move Source N20:23 0< Dest N10:29 0<</div> <div>N10:0 < 1</div>
0011	N20:17 6	<div>MOV Move Source N10:29 0< Dest N20:23 0<</div>
0012		<div>COP Copy File Source #N20:26 Dest #N10:13 Length 1</div>
0013		<div>MOV Move Source S:9 4133< Dest N20:27 4133<</div>
0014		<div>MOV Move Source N20:28 0< Dest N15:0 0<</div>
0015		<div>MOV Move Source N20:29 0< Dest N15:5 0<</div>
0016		<div>MOV Move Source C5:1.ACC 9233< Dest N20:30 9233<</div>

LAD 7 - --- Total Rungs in File = 20

LAD 8 - --- Total Rungs in File = 6

LAD 8 - --- Total Rungs in File = 6

0003	T4:48 DN	FLL Fill File Source N13:0 Dest #N12:0 Length 4
0004		RET Return
0005		<END>

LAD 9 - --- Total Rungs in File = 6

LAD 10 - --- Total Rungs in File = 14

0000	<div>SBR Subroutine</div>	<div>CLR Clear Dest N7:0 0<</div>
0001		<div>CLR Clear Dest N7:20 0<</div>
0002		<div>CLR Clear Dest N7:40 0<</div>
0003		<div>CLR Clear Dest N7:60 0<</div>
0004		<div>CLR Clear Dest N7:80 0<</div>
0005		<div>CLR Clear Dest N7:100 0<</div>
0006		<div>CLR Clear Dest N7:120 0<</div>
0007		<div>CLR Clear Dest N7:140 0<</div>
0008		<div>CLR Clear Dest N7:160 0<</div>
0009		<div>CLR Clear Dest N7:180 0<</div>

LAD 10 - --- Total Rungs in File = 14

LAD 11 - --- Total Rungs in File = 3

LAD 12 - --- Total Rungs in File = 10

LAD 12 - --- Total Rungs in File = 10

LAD 12 - --- Total Rungs in File = 10

LAD 13 - --- Total Rungs in File = 6

LAD 13 - --- Total Rungs in File = 6

LAD 14 - --- Total Rungs in File = 14

LAD 14 - --- Total Rungs in File = 14

LAD 14 - --- Total Rungs in File = 14

LAD 14 - --- Total Rungs in File = 14

LAD 14 - --- Total Rungs in File = 14

LAD 14 - --- Total Rungs in File = 14

LAD 14 - --- Total Rungs in File = 14

LAD 14 - --- Total Rungs in File = 14

LAD 14 - --- Total Rungs in File = 14

LAD 14 - --- Total Rungs in File = 14

LAD 14 - --- Total Rungs in File = 14

N7:60 N7:60 B3:0
12 13 4

N7:80 N7:80 B3:0
12 13 5

N7:100 N7:100 B3:0
12 13 6

N7:120 N7:120 B3:0
12 13 7

N7:140 N7:140 B3:0
12 13 8

N7:160 N7:160 B3:0
12 13 9

N7:180 N7:180 B3:0
12 13 10

B3:7
6

MOV	
Move	
Source	2
	2<
Dest	N15:7
	2<

RET
Return

<END>

LAD 15 - --- Total Rungs in File = 16

LAD 15 - --- Total Rungs in File = 16

LAD 15 - --- Total Rungs in File = 16

0015

⟨END⟩

LAD 16 - --- Total Rungs in File = 6

LAD 16 - --- Total Rungs in File = 6

LAD 17 - --- Total Rungs in File = 65

LAD 17 - --- Total Rungs in File = 65

LAD 17 - --- Total Rungs in File = 65

LAD 17 - --- Total Rungs in File = 65

0036	AX101 SKIDS HI RECIRC PRESS N12:2 5	N20:55 U 5
0037	RECIRC HIGH PRESS N12:2 6	N20:55 U 6
0038	N12:2 7	N20:55 U 7
0039	N12:2 8	N20:55 U 8
0040	N12:2 9	N20:55 U 9
0041	N12:2 10	N20:55 U 10
0042	N12:2 11	N20:55 U 11
0043	N12:2 12	N20:55 U 12
0044	AX101 SKID REPT SIGNAL LOSS N12:2 13	N20:55 U 13
0045	AX101 SKID JFPT SIGNAL LOSS N12:2 14	N20:55 U 14
0046	N12:2 15	N20:55 U 15
0047	WATER CAB TEMP LOW N12:3 0	N20:56 U 0

LAD 17 - --- Total Rungs in File = 65

LAD 17 - --- Total Rungs in File = 65

LAD 18 - --- Total Rungs in File = 70

PUMP SHUTDOWN
N20:15

APP 5775
F N16:5 REVISION 0 APPENDIX B A101newp

OUTPUT TO STROBE
N60:30

LAD 18 - --- Total Rungs in File = 70

LAD 18 - --- Total Rungs in File = 70

LAD 18 - --- Total Rungs in File = 70

LAD 18 - --- Total Rungs in File = 70

LAD 18 - --- Total Rungs in File = 70

LAD 18 - --- Total Rungs in File = 70

LAD 19 - --- Total Rungs in File = 8

0000	<div> <div>SBR</div> <div>Subroutine</div> </div>	<div> <div>COP</div> <div>Copy File</div> <div>Source #N60:4</div> <div>Dest #O:2.0</div> <div>Length 2</div> </div>
0001	<div> <div>MOVE OUTPUT TO MODULE 2 FOR DOV</div> <div>SGT LOW</div> <div>N20:24</div> <div>13</div> </div>	<div> <div>MOV</div> <div>Move</div> <div>Source N13:0</div> <div>0<</div> <div>Dest O:2.0</div> <div>0<</div> </div> <div> <div>MOV</div> <div>Move</div> <div>Source N13:0</div> <div>0<</div> <div>Dest N20:23</div> <div>0<</div> </div>
0002	<div> <div>MOVE OUTPUTS TO MODULE 8</div> </div>	<div> <div>MVM</div> <div>Masked Move</div> <div>Source N60:28</div> <div>3072<</div> <div>Mask 003Fh</div> <div>63<</div> <div>Dest O:8.0</div> <div>0<</div> </div>
0003	<div> <div>MOVE OUTPUTS TO MODULE 9</div> </div>	<div> <div>MVM</div> <div>Masked Move</div> <div>Source N60:29</div> <div>2762<</div> <div>Mask 003Fh</div> <div>63<</div> <div>Dest O:9.0</div> <div>10<</div> </div>
0004	<div> <div>MOVE OUTPUTS TO MODULE 10</div> </div>	<div> <div>MVM</div> <div>Masked Move</div> <div>Source N60:30</div> <div>256<</div> <div>Mask 003Fh</div> <div>63<</div> <div>Dest O:10.0</div> <div>0<</div> </div>

LAD 19 - --- Total Rungs in File = 8

MOVE OUTPUTS TO MODULE 11

0005

MVM	
Masked Move	
Source	N60:31
	34<
Mask	003Fh
	63<
Dest	O:11.0
	34<

0006

RET
Return

0007

⟨END⟩

LAD 20 - --- Total Rungs in File = 12

0000	<div>SBR Subroutine</div>	<div>MOV Move Source N60:15 3281< Dest N30:0 3281<</div>
0001		<div>SUB Subtract Source A N30:0 3281< Source B 3277 3277< Dest N30:1 4<</div>
0002	<div>LES Less Than (A<B) Source A N30:1 4< Source B 0 0<</div>	<div>CLR Clear Dest N30:1 4<</div>
0003	<div>GRT Greater Than (A>B) Source A N30:1 4< Source B 13107 13107<</div>	<div>MOV Move Source 13107 13107< Dest N30:1 4<</div>
0004		<div>MUL Multiply Source A N30:3 50< Source B 100 100< Dest N30:4 5000<</div>
0005		<div>SCL Scale Source N30:1 4< Rate [/10000] N30:4 5000< Offset 0 0< Dest N30:5 2<</div>

LAD 20 - --- Total Rungs in File = 12

SCALE DILUTION UNIT(GPM) TO PLC OUTPUT UNIT (6242-31208) 4-20mA

0006

---SCP---	
Scale w/Parameters	
Input	N30:5
	2<
Input Min.	37
	37<
Input Max.	3745
	3745<
Scaled Min.	6242
	6242<
Scaled Max.	31208
	31208<
Output	N30:2
	18724<

IF CALCULATED DILUTION OUTPUT IS LESS THAN THE MINIMUM FLOW (FROM DTAM), THEN FORCE OUTPUT TO BE MINIMUM FLOW VALUE

0007

---LES---	
Less Than (A<B)	
Source A	N30:2
	18724<
Source B	N30:6
	18724<

---MOV---	
Move	
Source	N30:6
	18724<
Dest	N30:2
	18724<

IF CALCULATED DILUTION OUTPUT IS GREATER THAN 2GPM , THEN FORCE THE OUTPUT TO BE 2GPM.

0008

---GRT---	
Greater Than (A>B)	
Source A	N30:2
	18724<
Source B	18725
	18725<

---MOV---	
Move	
Source	18752
	18752<
Dest	N30:2
	18724<

0009

---MOV---	
Move	
Source	N30:2
	18724<
Dest	N60:5
	18724<

0010

---RET---	
Return	

0011

<END>

[illegible]

[illegible]

BACKGROUND REGISTER 1: BIT DATA

MONITOR REGISTER NUMBER: N20:15

BIT#	ALARM STATE	GOTO SCREEN#	BIT#	ALARM STATE	GOTO SCREEN#
0	ON (1)	100	8	ON (1)	108
1	ON (1)	101	9	ON (1)	109
2	ON (1)	102	10	ON (1)	110
3	ON (1)	103	11	ON (1)	111
4	ON (1)	104	12	ON (1)	112
5	ON (1)	105	13	ON (1)	113
6	ON (1)	106	14	ON (1)	114
7	ON (1)	107	15	ON (1)	115

[illegible]

BACKGROUND REGISTER 2: BIT DATA

MONITOR REGISTER NUMBER: N20:16

BIT#	ALARM STATE	GOTO SCREEN#	BIT#	ALARM STATE	GOTO SCREEN#
0	ON (1)	116	8	ON (1)	124
1	ON (1)	117	9	ON (1)	125
2	ON (1)	118	10	ON (1)	126
3	ON (1)	119	11	ON (1)	127
4	ON (1)	120	12	ON (1)	128
5	ON (1)	121	13	ON (1)	129
6	ON (1)	122	14	ON (1)	131
7	ON (1)	123	15	ON (1)	132

[illegible]

BACKGROUND REGISTER 3: BIT DATA

MONITOR REGISTER NUMBER: N20:55

BIT#	ALARM STATE	GOTO SCREEN#	BIT#	ALARM STATE	GOTO SCREEN#
0	ON (1)	133	8	ON (1)	141
1	ON (1)	134	9	ON (1)	142
2	ON (1)	135	10	ON (1)	143
3	ON (1)	136	11	ON (1)	144
4	ON (1)	137	12	ON (1)	145
5	ON (1)	138	13	ON (1)	146
6	ON (1)	139	14	ON (1)	147
7	ON (1)	140	15	ON (1)	148

a

BACKGROUND REGISTER 4: BIT DATA

MONITOR REGISTER NUMBER: N20:56

BIT#	ALARM STATE	GOTO SCREEN#	BIT#	ALARM STATE	GOTO SCREEN#
0	ON (1)	149	8	ON (1)	158
1	ON (1)	150	9	ON (1)	159
2	ON (1)	151	10	ON (1)	159
3	ON (1)	152	11	THIS BIT IS NOT MONITORED	
4	ON (1)	153	12	THIS BIT IS NOT MONITORED	
5	ON (1)	154	13	THIS BIT IS NOT MONITORED	

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6	ON (1)	155	14	THIS BIT IS NOT MONITORED
7	ON (1)	156	15	THIS BIT IS NOT MONITORED

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SCREEN#	TYPE	SCREEN#	TYPE
001	MAIN MENU	110	ALARM
006	DATA DISPLAY	111	ALARM
007	SUB-MENU	112	ALARM
008	SUB-MENU	113	ALARM
009	SECURITY	114	ALARM
010	SUB-MENU	115	ALARM
011	DATA ENTRY	116	ALARM
012	SUB-MENU	117	ALARM
013	DATA DISPLAY	118	ALARM
014	DATA ENTRY	119	ALARM
015	DATA ENTRY	120	ALARM
016	SECURITY	121	ALARM
017	SUB-MENU	122	ALARM
018	DATA ENTRY	123	ALARM
019	DATA ENTRY	124	ALARM
020	DATA DISPLAY	125	ALARM
021	DATA ENTRY	126	ALARM
022	DATA ENTRY	127	ALARM
023	DATA ENTRY	128	ALARM
024	DATA DISPLAY	129	ALARM
025	DATA DISPLAY	130	ALARM
026	DATA DISPLAY	131	ALARM
027	DATA DISPLAY	132	ALARM
028	DATA DISPLAY	133	ALARM
029	DATA DISPLAY	134	ALARM
030	SUB-MENU	135	ALARM
031	DATA ENTRY	136	ALARM
032	DATA ENTRY	137	ALARM
033	DATA DISPLAY	138	ALARM
034	SUB-MENU	139	ALARM
035	DATA ENTRY	140	ALARM
036	DATA ENTRY	141	ALARM
037	DATA DISPLAY	142	ALARM
038	DATA ENTRY	143	ALARM
039	DATA ENTRY	144	ALARM
040	SUB-MENU	145	ALARM
041	DATA DISPLAY	146	ALARM
042	DATA DISPLAY	147	ALARM
043	DATA DISPLAY	148	ALARM
044	DATA DISPLAY	149	ALARM
045	DATA DISPLAY	150	ALARM
046	DATA DISPLAY	151	ALARM
048	DATA DISPLAY	152	ALARM
050	DATA DISPLAY	153	ALARM
052	DATA DISPLAY	154	ALARM
053	DATA DISPLAY	155	ALARM
054	DATA DISPLAY	156	ALARM
055	DATA DISPLAY	157	ALARM
056	DATA DISPLAY	158	ALARM
057	DATA DISPLAY	159	ALARM
058	DATA DISPLAY	200	ALARM
100	ALARM		
101	ALARM		
102	ALARM		
103	ALARM		
104	ALARM		
105	ALARM		

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106 ALARM
107 ALARM
108 ALARM

[illegible]

P-A/D SECURITY

SCREEN MEMORY USED: 61 BYTES

PREVIOUS MENU: UNLINKED

NEXT SCREEN: UNLINKED

PREVIOUS SCREEN: UNLINKED

SECURITY CODE #1: 12??????

SECURITY CODE #2: 34??????

SECURITY CODE #3: 87??????

```

1ēēēēēēēēēēēēēēēēēēēēēēēē;
◦*RESTRICTED ACCESS*◦
◦ ENTER CODE ◦
◦ : ◦
◦ ◦
āēēēēēēēēēēēēēēēēēēēēēēēf

```

° *RESTRICTED ACCESS* °

ENTER CODE

$$0 \quad : \quad 0$$

0 0

[illegible]

[illegible]

SCREEN #001: MAIN MENU

SCREEN MEMORY USED: 88 BYTES

```

1ēēēēēēēēēēēēēēēēēēēēēēēē;
°                A-101                °
°1. PUMP           4. ALARMS°
°2. UTIL          5. CLEAR °
°3. HtTRACE       6. DL/TMP°
āēēēēēēēēēēēēēēēēēēēēēēēf
```

```
Item/Key # 1 links to screen 010
Item/Key # 2 links to screen 020
Item/Key # 3 links to screen 030
Item/Key # 4 links to screen 040
```

```
Item/Key # 5 links to screen 023
Item/Key # 6 links to screen 008
Item/Key # 7 links to screen 024
Item/Key # 8 is unlinked
```

[illegible]

SCREEN #006: DATA DISPLAY

SCREEN MEMORY USED: 130 BYTES

```
PREVIOUS MENU:      007
NEXT SCREEN:       001
PREVIOUS SCREEN:    UNLINKED
```

```

1ēēēēēēēēēēēēēēēēēēēēēēēē;
◦ MOTOR TEMP SETPNTS ◦
◦                                ◦
◦HI TEMP      BBB1BB F°
◦HI HI TEMP   BBB2BB F°
āēēēēēēēēēēēēēēēēēēēēēēēf
```

DATA POSITION #1: 16 BIT SIGNED INTEGER DISPLAY

```
REGISTER:          N31:30
DECIMAL RIGHT:     0
DECIMAL LEFT:      5
SHOW SIGN
LEADING ZEROS NOT SHOWN
```

```
REGISTER LOW:      -454
REGISTER HIGH:     752
DISPLAY LOW:       -454
DISPLAY HIGH:      752
```

DATA POSITION #2: 16 BIT SIGNED INTEGER DISPLAY

```
REGISTER:          N31:32
DECIMAL RIGHT:     0
DECIMAL LEFT:      5
SHOW SIGN
LEADING ZEROS NOT SHOWN
```

```
REGISTER LOW:      -454
REGISTER HIGH:     752
DISPLAY LOW:       -454
DISPLAY HIGH:      752
```

[illegible]

SCREEN #007: SUB-MENU

```
SCREEN MEMORY USED:    71 BYTES
PREVIOUS MENU:      008
```

```
iëeeeeeeeeeeeeeeeeee;
° MOTOR TEMPERATURE °
°                               °
°1 VIEW TEMP .SETPNTS °
°2 SET SETPOINTS      °
ääeeeeeeeeeeeeeeeeeee f
```

```
Item/Key # 1 links to screen 006
Item/Key # 2 links to screen 009
Item/Key # 3 is unlinked
Item/Key # 4 is unlinked
```

```
Item/Key # 5 is unlinked
Item/Key # 6 is unlinked
Item/Key # 7 is unlinked
Item/Key # 8 is unlinked
```


áâãäåæçèéêëìíîïðñòóôõö÷øùúûüýþÿ

SCREEN #012: SUB-MENU

```
SCREEN MEMORY USED:    76 BYTES
PREVIOUS MENU:      010
```

[illegible]

```
Item/Key # 1 links to screen 015
Item/Key # 2 links to screen 014
Item/Key # 3 links to screen 016
Item/Key # 4 is unlinked
```

```
Item/Key # 5 is unlinked
Item/Key # 6 is unlinked
Item/Key # 7 is unlinked
Item/Key # 8 is unlinked
```

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SCREEN #013: DATA DISPLAY

SCREEN MEMORY USED: 238 BYTES

PREVIOUS MENU: 010

NEXT SCREEN: 022

PREVIOUS SCREEN: UNLINKED

DATA POSITION #1: 16 BIT SIGNED INTEGER DISPLAY

REGISTER: N20:23

DECIMAL RIGHT: 0

DECIMAL LEFT: 3

SHOW SIGN

LEADING ZEROS NOT SHOWN

REGISTER LOW: 0

REGISTER HIGH: 16383

DISPLAY LOW: 0

DISPLAY HIGH: 100

DATA POSITION #2: BIT DISPLAY

REGISTER: N60:31

BIT NUMBER: 6

TEXT LENGTH: 3

OFF BIT TEXT: Off

ON BIT TEXT: On

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:17

BIT NUMBER: 6

TEXT LENGTH: 1

OFF BIT TEXT: M

ON BIT TEXT: A

DATA POSITION #4: 16 BIT SIGNED INTEGER DISPLAY

REGISTER: N60:15

DECIMAL RIGHT: 3

DECIMAL LEFT: 2

NO SIGN PLACE

LEADING ZEROS NOT SHOWN

REGISTER LOW: 3277

REGISTER HIGH: 16384

DISPLAY LOW: 0.000

DISPLAY HIGH: 14.000

DATA POSITION #5: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER: N60:13

DECIMAL RIGHT: 1

DECIMAL LEFT: 3

NO SIGN PLACE

LEADING ZEROS NOT SHOWN

REGISTER LOW: 3277

REGISTER HIGH: 16384

DISPLAY LOW: 0.0

DISPLAY HIGH: 500.0

DATA POSITION #6: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER: N60:12

DECIMAL RIGHT: 2

DECIMAL LEFT: 3

NO SIGN PLACE

LEADING ZEROS NOT SHOWN

REGISTER LOW: 3277

REGISTER HIGH: 16384

DISPLAY LOW: 0.00

DISPLAY HIGH: 20.00

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```

SCREEN #014: DATA ENTRY
SCREEN MEMORY USED:      207 BYTES
PREVIOUS MENU:           012
NEXT SCREEN:             001
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  16 BIT UNSIGNED INTEGER DISPLAY

REGISTER:                N20:23
DECIMAL RIGHT:           0
DECIMAL LEFT:            3
NO SIGN PLACE
LEADING ZEROS NOT SHOWN

REGISTER LOW:            0
REGISTER HIGH:           100
DISPLAY LOW:             0
DISPLAY HIGH:            100

```

```

DATA POSITION #2:  16 BIT UNSIGNED INTEGER DISPLAY

REGISTER:          N60:12          REGISTER LOW:          3277
DECIMAL RIGHT:     2                REGISTER HIGH:         16384
DECIMAL LEFT:      3                DISPLAY LOW:             0.00
NO SIGN PLACE                               DISPLAY HIGH:         20.00
LEADING ZEROS NOT SHOWN

```

```
DATA POSITION #3: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER:          N20:18          REGISTER LOW:          0
DECIMAL RIGHT:     1                REGISTER HIGH:         16383
DECIMAL LEFT:      2                DISPLAY LOW:             0.0
NO SIGN PLACE                               DISPLAY HIGH:         20.0
LEADING ZEROS NOT SHOWN
```

DATA POSITION #4: 16 BIT UNSIGNED INTEGER ENTRY			
REGISTER:	N20:18	REGISTER LOW:	0
DECIMAL RIGHT:	1	REGISTER HIGH:	16383
DECIMAL LEFT:	2	DISPLAY LOW:	0.0
NO SIGN PLACE		DISPLAY HIGH:	20.0
DEFAULT:	NONE	LOW INPUT LIMIT:	4.0
		HIGH INPUT LIMIT:	9.0

[illegible]

```

SCREEN #015: DATA ENTRY
SCREEN MEMORY USED:      114 BYTES
PREVIOUS MENU:           012
NEXT SCREEN:             013
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  BIT DISPLAY

REGISTER:                N20:17
BIT NUMBER:              6
TEXT LENGTH:             6

OFF BIT TEXT:            Manual
ON BIT TEXT:             Auto

```

DATA POSITION #2: BIT ENTRY

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REGISTER:
BIT NUMBER:

N20:17
6

ENTRY FORMAT:
DEFAULT:

1 & 0 KEYS
NONE

[illegible]

SCREEN #019: DATA ENTRY

[illegible]

SCREEN MEMORY USED: 177 BYTES

°Reset 0.1 to 327.67 °

°DOV OUTPUT: B1B% °

PREVIOUS MENU: 017

$$^{\circ}\text{Reset: } \mathbb{P}\mathbb{P}\mathbb{P}2\mathbb{P}\mathbb{P} \text{ in/rp}^{\circ}$$

NEXT SCREEN: 021

°Enter: PPP3PP °

PREVIOUS SCREEN: UNLINKED

aeëeëeëeëeëeëeëeëeëf

DATA POSITION #1: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER: N20:23

REGISTER LOW: 0

DECIMAL RIGHT: 0

REGISTER HIGH: 16383

DECIMAL LEFT: 3

DISPLAY LOW: 0

NO SIGN PLACE

DISPLAY HIGH: 100

LEADING ZEROS NOT SHOWN

DATA POSITION #2: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER: N20:20

REGISTER LOW: 1

DECIMAL RIGHT: 2

REGISTER HIGH: 16383

DECIMAL LEFT: 3

DISPLAY LOW: 0.01

NO SIGN PLACE

DISPLAY HIGH: 327.67

LEADING ZEROS NOT SHOWN

DATA POSITION #3: 16 BIT UNSIGNED INTEGER ENTRY

REGISTER: N20:20

REGISTER LOW: 1

DECIMAL RIGHT: 2

REGISTER HIGH: 16383

DECIMAL LEFT: 3

DISPLAY LOW: 0.01

NO SIGN PLACE

DISPLAY HIGH: 327.67

DEFAULT: NONE

LOW INPUT LIMIT: 0.01

HIGH INPUT LIMIT: 327.67

[illegible]

```

SCREEN #020: DATA DISPLAY
SCREEN MEMORY USED:      203 BYTES
PREVIOUS MENU:           001
NEXT SCREEN:             027
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  16 BIT UNSIGNED INTEGER DISPLAY

```

REGISTER:	N60:14	REGISTER LOW:	3277
DECIMAL RIGHT:	1	REGISTER HIGH:	16384
DECIMAL LEFT:	2	DISPLAY LOW:	0.0
NO SIGN PLACE		DISPLAY HIGH:	62.0
LEADING ZEROS NOT SHOWN			

DATA POSITION #2: 16 BIT SIGNED INTEGER DISPLAY

```
REGISTER:          N60:27          REGISTER LOW:      -454
DECIMAL RIGHT:     0                REGISTER HIGH:     752
DECIMAL LEFT:      3                DISPLAY LOW:       -454
SHOW SIGN                                     DISPLAY HIGH:     752
LEADING ZEROS NOT SHOWN
```

DATA POSITION #3: 16 BIT SIGNED INTEGER DISPLAY

```

REGISTER:      N60:26      REGISTER LOW:      -454
DECIMAL RIGHT: 0          REGISTER HIGH:       752
DECIMAL LEFT:  3          DISPLAY LOW:       -454
SHOW SIGN                                DISPLAY HIGH:       752
LEADING ZEROS NOT SHOWN

```

DATA POSITION #4: 16 BIT SIGNED INTEGER DISPLAY

```
REGISTER:          N60:24          REGISTER LOW:      -454
DECIMAL RIGHT:     0                REGISTER HIGH:     752
DECIMAL LEFT:      3                DISPLAY LOW:       -454
SHOW SIGN                                     DISPLAY HIGH:     752
LEADING ZEROS NOT SHOWN
```

[illegible]

```

SCREEN #021: DATA ENTRY
SCREEN MEMORY USED:      185 BYTES
PREVIOUS MENU:           017
NEXT SCREEN:             018
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  16 BIT UNSIGNED INTEGER DISPLAY

```

REGISTER:	N20:23	REGISTER LOW:	0
DECIMAL RIGHT:	0	REGISTER HIGH:	16383
DECIMAL LEFT:	5	DISPLAY LOW:	0
NO SIGN PLACE		DISPLAY HIGH:	100
LEADING ZEROS NOT SHOWN			

```
DATA POSITION #2: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER:          N20:21          REGISTER LOW:          1
DECIMAL RIGHT:     2                REGISTER HIGH:         16383
DECIMAL LEFT:      3                DISPLAY LOW:             0.01
NO SIGN PLACE
LEADING ZEROS NOT SHOWN             DISPLAY HIGH:         327.67
```

```
DATA POSITION #3:   16 BIT UNSIGNED INTEGER ENTRY
```

REGISTER:	N20:21	REGISTER LOW:	1
DECIMAL RIGHT:	2	REGISTER HIGH:	16383
DECIMAL LEFT:	3	DISPLAY LOW:	0.01
NO SIGN PLACE		DISPLAY HIGH:	327.67
DEFAULT:	NONE	LOW INPUT LIMIT:	0.01
		HIGH INPUT LIMIT:	327.67

[illegible]

```

SCREEN #022: DATA ENTRY
SCREEN MEMORY USED:      157 BYTES
PREVIOUS MENU:           010
NEXT SCREEN:             013
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  BIT DISPLAY

```

REGISTER:	N20:17	OFF BIT TEXT:	Manual
BIT NUMBER:	6	ON BIT TEXT:	AUTO
TEXT LENGTH:	6		

DATA POSITION #2: 16 BIT UNSIGNED INTEGER DISPLAY

```

REGISTER:      N20:23      REGISTER LOW:      0
DECIMAL RIGHT: 0           REGISTER HIGH:     16383
DECIMAL LEFT:  3           DISPLAY LOW:         0
NO SIGN PLACE  DISPLAY HIGH:    100
LEADING ZEROS NOT SHOWN

```

DATA POSITION #3: 16 BIT UNSIGNED INTEGER ENTRY

```

REGISTER:      N20:23      REGISTER LOW:      0
DECIMAL RIGHT: 0           REGISTER HIGH:     16384
DECIMAL LEFT:  3           DISPLAY LOW:         0
NO SIGN PLACE  DISPLAY HIGH:    100
DEFAULT:      NONE        LOW INPUT LIMIT:    0
                                HIGH INPUT LIMIT: 100

```

اَللّٰهُمَّ صَلِّ وَسَلِّمْ وَبَارِكْ عَلَى سَيِّدِنَا مُحَمَّدٍ وَعَلَى اٰلِهِ الطَّيِّبِيْنَ

```

SCREEN #023: DATA ENTRY
SCREEN MEMORY USED:      94 BYTES
PREVIOUS MENU:           001
NEXT SCREEN:             001
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1: BIT ENTRY

```

```

REGISTER:      N20:17      ENTRY FORMAT:    1 & 0 KEYS
BIT NUMBER:    10          DEFAULT:      NONE

```


[illegible]

```

SCREEN #025: DATA DISPLAY
SCREEN MEMORY USED:      210 BYTES
PREVIOUS MENU:           UNLINKED
NEXT SCREEN:             026
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  16 BIT SIGNED INTEGER DISPLAY

```

```

REGISTER:          N60:26          REGISTER LOW:      -454
DECIMAL RIGHT:     0                REGISTER HIGH:     752
DECIMAL LEFT:      3                DISPLAY LOW:       -454
SHOW SIGN                                DISPLAY HIGH:      752
LEADING ZEROS NOT SHOWN

```

DATA POSITION #2: 16 BIT SIGNED INTEGER DISPLAY

```

REGISTER:          N60:24          REGISTER LOW:      -454
DECIMAL RIGHT:     0                REGISTER HIGH:     752
DECIMAL LEFT:      3                DISPLAY LOW:       -454
SHOW SIGN                                     DISPLAY HIGH:     752
LEADING ZEROS NOT SHOWN

```

DATA POSITION #3: 16 BIT SIGNED INTEGER DISPLAY

```

REGISTER:          N60:25          REGISTER LOW:      -454
DECIMAL RIGHT:     0               REGISTER HIGH:     752
DECIMAL LEFT:      3               DISPLAY LOW:       -454
SHOW SIGN                                DISPLAY HIGH:     752
LEADING ZEROS NOT SHOWN

```

DATA POSITION #4: 16 BIT SIGNED INTEGER DISPLAY

```

REGISTER:          N60:27          REGISTER LOW:      -454
DECIMAL RIGHT:     0                REGISTER HIGH:     752
DECIMAL LEFT:      3                DISPLAY LOW:      -454
SHOW SIGN                                     DISPLAY HIGH:     752
LEADING ZEROS NOT SHOWN

```

DISPLAY HIGH: 100.0

[illegible]

SCREEN #028: DATA DISPLAY

[illegible]

SCREEN MEMORY USED: 172 BYTES

°PIT CGM BB1BB % °

°DOME FGM BB2BB % °

°DIL RATIO P3 % °

°TIME 14:37 °

aëèëëëëèëëëëëëëëëëëf

PREVIOUS MENU: UNLINKED

NEXT SCREEN: 029

PREVIOUS SCREEN: UNLINKED

DATA POSITION #1: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER: N60:2

REGISTER LOW: 3277

DECIMAL RIGHT: 1

REGISTER HIGH: 16383

DECIMAL LEFT: 3

DISPLAY LOW: 0.0

NO SIGN PLACE

DISPLAY HIGH: 100.0

LEADING ZEROS NOT SHOWN

DATA POSITION #2: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER: N60:3

REGISTER LOW: 3277

DECIMAL RIGHT: 1

REGISTER HIGH: 16383

DECIMAL LEFT: 3

DISPLAY LOW: 0.0

NO SIGN PLACE

DISPLAY HIGH: 100.0

LEADING ZEROS NOT SHOWN

DATA POSITION #3: 16 BIT SIGNED INTEGER DISPLAY

REGISTER: N30:3

REGISTER LOW: 0

DECIMAL RIGHT: 0

REGISTER HIGH: 50

DECIMAL LEFT: 2

DISPLAY LOW: 0

NO SIGN PLACE

DISPLAY HIGH: 50

SHOW LEADING ZEROS

[illegible]

```

SCREEN #033: DATA DISPLAY
SCREEN MEMORY USED:      211 BYTES
PREVIOUS MENU:           030
NEXT SCREEN:             001
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  16 BIT SIGNED INTEGER DISPLAY

```

```

REGISTER:      N31:2      REGISTER LOW:      -454
DECIMAL RIGHT: 0          REGISTER HIGH:       752
DECIMAL LEFT:  5          DISPLAY LOW:        -454
SHOW SIGN      DISPLAY HIGH:       752
LEADING ZEROS NOT SHOWN

```

```

DATA POSITION #2:  16 BIT SIGNED INTEGER DISPLAY

REGISTER:          N31:5                REGISTER LOW:      -454
DECIMAL RIGHT:     0                    REGISTER HIGH:    752
DECIMAL LEFT:      5                    DISPLAY LOW:      -454
SHOW SIGN                                     DISPLAY HIGH:    752
LEADING ZEROS NOT SHOWN

```

```
DATA POSITION #3: 16 BIT SIGNED INTEGER DISPLAY

REGISTER:          N31:1          REGISTER LOW:          -454
DECIMAL RIGHT:     0              REGISTER HIGH:           752
DECIMAL LEFT:      5              DISPLAY LOW:             -454
SHOW SIGN                                DISPLAY HIGH:           752
LEADING ZEROS NOT SHOWN
```

```
DATA POSITION #4: 16 BIT SIGNED INTEGER DISPLAY

REGISTER:          N31:4          REGISTER LOW:      -454
DECIMAL RIGHT:     0              REGISTER HIGH:     752
DECIMAL LEFT:      5              DISPLAY LOW:         -454
SHOW SIGN                                DISPLAY HIGH:     752
LEADING ZEROS NOT SHOWN
```

[illegible]

```
SCREEN #034: SUB-MENU                                íëëëëëëëëëëëëëëëëëëë;
°      DILUTION MENU                               °
°                                                    °
°  1. DILUTION RATIO                              °
°  2. MIN DIL FLOW                                °
äëëëëëëëëëëëëëëëëëëf
```

Item/Key # 1	links to screen 035	Item/Key # 5	is unlinked
Item/Key # 2	links to screen 036	Item/Key # 6	is unlinked
Item/Key # 3	is unlinked	Item/Key # 7	is unlinked
Item/Key # 4	is unlinked	Item/Key # 8	is unlinked

[illegible]

```

SCREEN #035: DATA ENTRY
SCREEN MEMORY USED:      133 BYTES
PREVIOUS MENU:          034
NEXT SCREEN:            001
PREVIOUS SCREEN:        UNLINKED
DATA POSITION #1:  16 BIT SIGNED INTEGER DISPLAY

```

```

REGISTER:      N30:3      REGISTER LOW:      0
DECIMAL RIGHT: 0          REGISTER HIGH:      50
DECIMAL LEFT:  2          DISPLAY LOW:      0
NO SIGN PLACE   DISPLAY HIGH:      50
SHOW LEADING ZEROS

```

DATA POSITION #2: 16 BIT SIGNED INTEGER ENTRY

```

REGISTER:          N30:3          REGISTER LOW:      0
DECIMAL RIGHT:     0              REGISTER HIGH:     50
DECIMAL LEFT:      2              DISPLAY LOW:       0
NO SIGN PLACE                      DISPLAY HIGH:      50
DEFAULT:           NONE           LOW INPUT LIMIT:      0
                                   HIGH INPUT LIMIT:     50

```

a

```

SCREEN #036: DATA ENTRY
SCREEN MEMORY USED:      131 BYTES
PREVIOUS MENU:           034
NEXT SCREEN:             034
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  16 BIT UNSIGNED INTEGER DISPLAY

```

```

REGISTER:      N30:6      REGISTER LOW:      6240
DECIMAL RIGHT: 2          REGISTER HIGH:      31208
DECIMAL LEFT:  1          DISPLAY LOW:       0.00
NO SIGN PLACE          DISPLAY HIGH:      4.00
SHOW LEADING ZEROS

```

DATA POSITION #2: 16 BIT UNSIGNED INTEGER ENTRY

REGISTER:	N30:6	REGISTER LOW:	6240
DECIMAL RIGHT:	2	REGISTER HIGH:	31208
DECIMAL LEFT:	1	DISPLAY LOW:	0.00
NO SIGN PLACE		DISPLAY HIGH:	4.00
DEFAULT:	0.00	LOW INPUT LIMIT:	0.00
		HIGH INPUT LIMIT:	2.00

[illegible]

```

SCREEN #041: DATA DISPLAY
SCREEN MEMORY USED:      181 BYTES
PREVIOUS MENU:           040
NEXT SCREEN:             042
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  BIT DISPLAY

```

```

REGISTER:      N20:24      OFF BIT TEXT:    norm
BIT NUMBER:    1           ON BIT TEXT:      LOW
TEXT LENGTH:   4

```

DATA POSITION #2: BIT DISPLAY			
REGISTER:	N20:24	OFF BIT TEXT:	norm
BIT NUMBER:	2	ON BIT TEXT:	HIGH
TEXT LENGTH:	4		

DATA POSITION #3: BIT DISPLAY			
REGISTER:	N20:24	OFF BIT TEXT:	norm
BIT NUMBER:	3	ON BIT TEXT:	HIGH
TEXT LENGTH:	4		

```
DATA POSITION #4:  BIT DISPLAY

REGISTER:          N20:24          OFF BIT TEXT:          norm
BIT NUMBER:        4               ON BIT TEXT:          TROUBLE
TEXT LENGTH:       7
```

```

SCREEN #042: DATA DISPLAY

SCREEN MEMORY USED:      191 BYTES

PREVIOUS MENU:           040
NEXT SCREEN:             043
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  BIT DISPLAY

```

REGISTER:	N20:24	OFF BIT TEXT:	norm
BIT NUMBER:	5	ON BIT TEXT:	NON-PROCESS
TEXT LENGTH:	11		

DATA POSITION #2: BIT DISPLAY

REGISTER:	N20:24	OFF BIT TEXT:	norm
BIT NUMBER:	6	ON BIT TEXT:	LEAK
TEXT LENGTH:	4		

DATA POSITION #3: BIT DISPLAY

```

REGISTER:      N20:24      OFF BIT TEXT:      norm
BIT NUMBER:    7           ON BIT TEXT:      TROUBLE
TEXT LENGTH:   7

```

DATA POSITION #4: BIT DISPLAY

```
REGISTER:      N20:24      OFF BIT TEXT:      norm
BIT NUMBER:    8           ON BIT TEXT:      TROUBLE
TEXT LENGTH:   7
```

SCREEN #043: DATA DISPLAY

SCREEN MEMORY USED: 182 BYTES

PREVIOUS MENU: 040

NEXT SCREEN: 044

PREVIOUS SCREEN: UNLINKED

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:24

BIT NUMBER: 9

TEXT LENGTH: 4

OFF BIT TEXT: norm

ON BIT TEXT: LOW

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:24

BIT NUMBER: 10

TEXT LENGTH: 4

OFF BIT TEXT: norm

ON BIT TEXT: HIGH

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:24

BIT NUMBER: 11

TEXT LENGTH: 4

OFF BIT TEXT: norm

ON BIT TEXT: HIGH

DATA POSITION #4: BIT DISPLAY

REGISTER: N20:24

BIT NUMBER: 12

TEXT LENGTH: 8

OFF BIT TEXT: norm

ON BIT TEXT: SHUTDOWN

[illegible]

```

SCREEN #044: DATA DISPLAY

SCREEN MEMORY USED:      180 BYTES

PREVIOUS MENU:           040
NEXT SCREEN:             045
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  BIT DISPLAY

```

```

1ēēēēēēēēēēēēēēēēēēē;
◦ SGT Level      bP1P ◦
◦ RFPT SIGNAL    bP2P ◦
◦ Network        bPb3PbP◦
◦ JFPT SIGNAL    Pb4P ◦
āēēēēēēēēēēēēēēēēēēf

```

```

REGISTER:      N20:24      OFF BIT TEXT:      norm
BIT NUMBER:    13          ON BIT TEXT:      LOW
TEXT LENGTH:   4

```

DATA POSITION #2: BIT DISPLAY

REGISTER:	N20:24	OFF BIT TEXT:	norm
BIT NUMBER:	14	ON BIT TEXT:	LOST
TEXT LENGTH:	4		

DATA POSITION #3: BIT DISPLAY

```

REGISTER:      N20:24      OFF BIT TEXT:      norm
BIT NUMBER:    15          ON BIT TEXT:      FAILURE
TEXT LENGTH:   7

```

DATA POSITION #4: BIT DISPLAY

REGISTER:	N20:25	OFF BIT TEXT:	norm
BIT NUMBER:	0	ON BIT TEXT:	LOST
TEXT LENGTH:	4		

[illegible]

```

SCREEN #045: DATA DISPLAY
SCREEN MEMORY USED:      182 BYTES
PREVIOUS MENU:           040
NEXT SCREEN:             046
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  BIT DISPLAY

```

```

REGISTER:      N20:25      OFF BIT TEXT:    norm
BIT NUMBER:    1           ON BIT TEXT:    alarm
TEXT LENGTH:   5

```

```
DATA POSITION #2:  BIT DISPLAY

REGISTER:          N20:25          OFF BIT TEXT:      norm
BIT NUMBER:        2               ON BIT TEXT:         alarm
TEXT LENGTH:       5
```

DATA POSITION #3: BIT DISPLAY			
REGISTER:	N20:25	OFF BIT TEXT:	norm
BIT NUMBER:	3	ON BIT TEXT:	Alarm
TEXT LENGTH:	5		

DATA POSITION #4: BIT DISPLAY			
REGISTER:	N20:25	OFF BIT TEXT:	norm
BIT NUMBER:	4	ON BIT TEXT:	alarm
TEXT LENGTH:	5		

SCREEN #046: DATA DISPLAY

SCREEN MEMORY USED: 182 BYTES

PREVIOUS MENU: 040

NEXT SCREEN: 048

PREVIOUS SCREEN: UNLINKED

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:25

BIT NUMBER: 5

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:25

BIT NUMBER: 6

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:25

BIT NUMBER: 7

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #4: BIT DISPLAY

REGISTER: N20:25

BIT NUMBER: 8

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm


```

SCREEN #050: DATA DISPLAY

SCREEN MEMORY USED:      182 BYTES

PREVIOUS MENU:           UNLINKED
NEXT SCREEN:             052
PREVIOUS SCREEN:         048
DATA POSITION #1:  BIT DISPLAY

```

```

REGISTER:      N20:25      OFF BIT TEXT:    norm
BIT NUMBER:    13          ON BIT TEXT:      Alarm
TEXT LENGTH:   5

```

DATA POSITION #2: BIT DISPLAY			
REGISTER:	N20:25	OFF BIT TEXT:	norm
BIT NUMBER:	13	ON BIT TEXT:	Alarm
TEXT LENGTH:	5		

DATA POSITION #3: BIT DISPLAY			
REGISTER:	N20:25	OFF BIT TEXT:	norm
BIT NUMBER:	14	ON BIT TEXT:	Alarm
TEXT LENGTH:	5		

DATA POSITION #4: BIT DISPLAY			
REGISTER:	N20:25	OFF BIT TEXT:	norm
BIT NUMBER:	15	ON BIT TEXT:	Alarm
TEXT LENGTH:	5		

[illegible]

SCREEN #052: DATA DISPLAY

SCREEN MEMORY USED: 182 BYTES

PREVIOUS MENU: UNLINKED

NEXT SCREEN: 053

PREVIOUS SCREEN: UNLINKED

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:51

BIT NUMBER: 0

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:51

BIT NUMBER: 1

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:51

BIT NUMBER: 2

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #4: BIT DISPLAY

REGISTER: N20:51

BIT NUMBER: 3

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

áâãäåæçèéêëìíîïðñòóôõö÷øùúûüýþÿ

SCREEN #053: DATA DISPLAY

[illegible]

SCREEN MEMORY USED: 182 BYTES

°AX Flush Pres bb1bb °

°AX Recir Pres pp2pp °

° Recirc Press pp3pp °

° UNUSED PP4PP °

PREVIOUS MENU: UNLINKED

NEXT SCREEN: 054

aeëëëëëëëëëëëëëëëëëëëëf

PREVIOUS SCREEN: 052

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:51

OFF BIT TEXT: norm

BIT NUMBER: 4

ON BIT TEXT: Alarm

TEXT LENGTH: 5

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:51

OFF BIT TEXT: norm

BIT NUMBER: 5

ON BIT TEXT: Alarm

TEXT LENGTH: 5

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:51

OFF BIT TEXT: norm

BIT NUMBER: 6

ON BIT TEXT: Alarm

TEXT LENGTH: 5

DATA POSITION #4: BIT DISPLAY

REGISTER: N20:51

OFF BIT TEXT: norm

BIT NUMBER: 7

ON BIT TEXT: Alarm

TEXT LENGTH: 5

aa

SCREEN #054: DATA DISPLAY

```
íëëëëëëëëëëëëëëëëë;

```

SCREEN MEMORY USED: 182 BYTES

◦ UNUSED PP1PP ◦

° UNUSED PP2PP °

° UNUSED PP3PP °

° UNUSED PP4PP °

PREVIOUS MENU: UNLINKED

NEXT SCREEN: 055

[illegible]

PREVIOUS SCREEN: 053

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:51

OFF BIT TEXT: norm

BIT NUMBER: 8

ON BIT TEXT: Alarm

TEXT LENGTH: 5

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:51

OFF BIT TEXT: norm

BIT NUMBER: 9

ON BIT TEXT: Alarm

TEXT LENGTH: 5

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:51

OFF BIT TEXT: norm

BIT NUMBER: 10

ON BIT TEXT: Alarm

TEXT LENGTH: 5

DATA POSITION #4: BIT DISPLAY

REGISTER: N20:51

OFF BIT TEXT: norm

BIT NUMBER: 11

ON BIT TEXT: Alarm

TEXT LENGTH: 5

[illegible]

SCREEN #055: DATA DISPLAY

SCREEN MEMORY USED: 182 BYTES

PREVIOUS MENU: UNLINKED

NEXT SCREEN: 056

PREVIOUS SCREEN: 054

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:51

BIT NUMBER: 12

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:51

BIT NUMBER: 13

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:51

BIT NUMBER: 14

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #4: BIT DISPLAY

REGISTER: N20:51

BIT NUMBER: 15

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

[illegible]

SCREEN #056: DATA DISPLAY

SCREEN MEMORY USED: 178 BYTES

PREVIOUS MENU: UNLINKED

NEXT SCREEN: 057

PREVIOUS SCREEN: 055

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:52

BIT NUMBER: 0

TEXT LENGTH: 4

OFF BIT TEXT: norm

ON BIT TEXT: LOW

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:52

BIT NUMBER: 1

TEXT LENGTH: 4

OFF BIT TEXT: norm

ON BIT TEXT: LOW

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:52

BIT NUMBER: 2

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #4: BIT DISPLAY

REGISTER: N20:52

BIT NUMBER: 3

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

aa

SCREEN #057: DATA DISPLAY

SCREEN MEMORY USED: 182 BYTES

PREVIOUS MENU: UNLINKED

NEXT SCREEN: 058

PREVIOUS SCREEN: 056

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:52

BIT NUMBER: 4

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:52

BIT NUMBER: 5

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:52

BIT NUMBER: 6

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #4: BIT DISPLAY

REGISTER: N20:52

BIT NUMBER: 6

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

aa

SCREEN #058: DATA DISPLAY

SCREEN MEMORY USED: 139 BYTES

PREVIOUS MENU: UNLINKED

NEXT SCREEN: UNLINKED

PREVIOUS SCREEN: 057

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:52

BIT NUMBER: 8

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:52

BIT NUMBER: 9

TEXT LENGTH: 5

OFF BIT TEXT: NORM

ON BIT TEXT: ALARM

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:52

BIT NUMBER: 10

TEXT LENGTH: 5

OFF BIT TEXT: NORM

ON BIT TEXT: ALARM

[illegible]

SCREEN #100: ALARM

SCREEN MEMORY USED: 68 BYTES

```
i
o ACKNOWLEDGE STROBE o
o
o
o PRESS 'Y' TO CLEAR o
f
```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:0  
BIT NUMBER: 0  
BIT WILL BE: SET.
```

[illegible]

SCREEN #101: ALARM

SCREEN MEMORY USED: 79 BYTES

```

ïëëëëëëëëëëëëëëëëëëëëë;
  °      Alarm 1          °
  ° XFR Pressure LOW    °
  °                     °
  ° PRESS 'Y' TO CLEAR °
äëëëëëëëëëëëëëëëëëëëëëf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:0  
BIT NUMBER: 1  
BIT WILL BE: SET.
```

[illegible]

SCREEN #102: ALARM

SCREEN MEMORY USED: 81 BYTES

[illegible]

```
ACKNOWLEDGE ALARM TO REGISTER: N12:0  
BIT NUMBER: 2  
BIT WILL BE: SET.
```

[illegible]

SCREEN #103: ALARM

SCREEN MEMORY USED: 81 BYTES

[illegible]

```
ACKNOWLEDGE ALARM TO REGISTER: N12:0  
BIT NUMBER: 3  
BIT WILL BE: SET.
```


[illegible]

SCREEN #108: ALARM

SCREEN MEMORY USED: 92 BYTES

```
iēēēēēēēēēēēēēēēēēēēēē;
◦      Alarm 8                      ◦
◦    JMPR HEAT TRACE                ◦
◦      TROUBLE                       ◦
◦  PRESS 'Y' TO CLEAR              ◦
āēēēēēēēēēēēēēēēēēēēēēf
```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:0  
BIT NUMBER: 8  
BIT WILL BE: SET.
```

áâãäåæçèéêëìíîïðñárásátáuávàwaxâyázääåæçèéêëìíîïðñ

SCREEN #109: ALARM

SCREEN MEMORY USED: 81 BYTES

```

ïèèèèèèèèèèèèèèèèèèèèèèè;
°      Alarm 9        °
°PIC Water Level LOW °
°                  °
° PRESS 'Y' TO CLEAR °
äèèèèèèèèèèèèèèèèèèèèèèf
```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:0  
BIT NUMBER: 9  
BIT WILL BE: SET.
```

~~~~~

SCREEN #110: ALARM

SCREEN MEMORY USED: 81 BYTES

```

1ēēēēēēēēēēēēēēēēēēēēē;
◦      Alarm 10          ◦
◦    PLC Enclosure HI   ◦
◦                        ◦
◦ PRESS 'Y' TO CLEAR ◦
āēēēēēēēēēēēēēēēēēēēēēf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:0  
BIT NUMBER: 10  
BIT WILL BE: SET.
```

~~~~~

SCREEN #111: ALARM

SCREEN MEMORY USED: 92 BYTES

```

1ēēēēēēēēēēēēēēēēēēēē;
°      Alarm 11      °
°Air Compressor Temp °
°      HI           °
° PRESS 'Y' TO CLEAR °
āēēēēēēēēēēēēēēēēēēēēf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:0  
BIT NUMBER: 11  
BIT WILL BE: SET.
```

[illegible]

SCREEN #112: ALARM

SCREEN MEMORY USED: 81 BYTES

```
iēēēēēēēēēēēēēēēēēēēē;
o      Alarm 12          o
o    JET PUMP SHUTDOWN   o
o                        o
o    PRESS 'Y' TO CLEAR  o
āēēēēēēēēēēēēēēēēēēēf
```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:0  
BIT NUMBER: 12  
BIT WILL BE: SET.
```

[illegible]

SCREEN #113: ALARM

SCREEN MEMORY USED: 76 BYTES

```
iēēēēēēēēēēēēēēēēēēēēēēē;
o      Alarm 13           o
o      SGT LOW            o
o                          o
o PRESS 'Y' TO CLEAR     o
āēēēēēēēēēēēēēēēēēēēēēēf
```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:0  
BIT NUMBER: 13  
BIT WILL BE: SET.
```

~~~~~

SCREEN #114: ALARM

SCREEN MEMORY USED: 92 BYTES

```
iiiiiiiiiiiiiiiiiii;  
o      Alarm 14          o  
o    RFPT SIGNAL LOSS   o  
o        ALARM           o  
o Press 'Y' to Clear     o  
aaaaaaaaaaaaaaaf
```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:0  
BIT NUMBER: 14  
BIT WILL BE: SET.
```

~~~~~

SCREEN #115: ALARM

SCREEN MEMORY USED: 95 BYTES

```

ïèèèèèèèèèèèèèèèèèèèèèèè;
°      ALARM 15      °
° PLC Communications °
°      FAILURE      °
° Press 'Y' to Clear °
äèèèèèèèèèèèèèèèèèèèèèèèf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:0  
BIT NUMBER: 15  
BIT WILL BE: SET.
```

[illegible]

SCREEN #116: ALARM

SCREEN MEMORY USED: 93 BYTES

```

1ēēēēēēēēēēēēēēēēēēēēēē;
◦      Alarm 16      ◦
◦    JFPT SIGNAL LOSS  ◦
◦      ALARM        ◦
◦ PRESS 'Y' TO CLEAR ◦
āēēēēēēēēēēēēēēēēēēēēēēf

```

ACKNOWLEDGE ALARM TO REGISTER: N12:1

BIT NUMBER: 0

BIT WILL BE: SET.

[illegible]

SCREEN #117: ALARM

SCREEN MEMORY USED: 91 BYTES

```
iëèèèèèèèèèèèèèèèèèèèèè;
o      Alarm 17              o
o     AX-101 LEAK           o
o       ALARM                o
o   PRESS 'Y' TO CLEAR    o
âèèèèèèèèèèèèèèèèèèèèèf
```

ACKNOWLEDGE ALARM TO REGISTER: N12:1

BIT NUMBER: 1

BIT WILL BE: SET.

áâãäåæçèéêëìíîïðñòóôõö÷øùúûüýþÿ

SCREEN #118: ALARM

SCREEN MEMORY USED: 99 BYTES

[illegible]

ACKNOWLEDGE ALARM TO REGISTER: N12:1

BIT NUMBER: 2

BIT WILL BE: SET.

~~~~~

SCREEN #119: ALARM

SCREEN MEMORY USED: 93 BYTES

```

ïëëëëëëëëëëëëëëëëëëë;
°      Alarm 19      °
° Leak Detector No 1 °
°      Trouble       °
° PRESS Y TO CLEAR   °
äëëëëëëëëëëëëëëëëëëf

```

ACKNOWLEDGE ALARM TO REGISTER: N12:1

BIT NUMBER: 3

BIT WILL BE: SET.

[illegible]

SCREEN #120: ALARM

SCREEN MEMORY USED: 80 BYTES

```

1ēēēēēēēēēēēēēēēēēēēēēēē;
◦           Alarm 20          ◦
◦   AX-101 IN FLUSH         ◦
◦                               ◦
◦ PRESS 'Y' TO CLEAR ◦
āēēēēēēēēēēēēēēēēēēēēēēf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:1  
BIT NUMBER: 4  
BIT WILL BE: SET.
```

[illegible]

SCREEN #121: ALARM

SCREEN MEMORY USED: 63 BYTES

```

1ēēēēēēēēēēēēēēēēēēēē;
◦      Alarm 21      ◦
◦                      ◦
◦                      ◦
◦ PRESS 'Y' TO CLEAR ◦
āēēēēēēēēēēēēēēēēēēēēf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:1  
BIT NUMBER: 5  
BIT WILL BE: SET.
```

~~~~~

SCREEN #122: ALARM

SCREEN MEMORY USED: 82 BYTES

```

1ëëëëëëëëëëëëëëëëëë;
°      Alarm 22 °
° FLAMMABLE GAS HIGH °
°                               °
° PRESS 'Y' TO CLEAR °
äëëëëëëëëëëëëëëëëëf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:1  
BIT NUMBER: 6  
BIT WILL BE: SET.
```

~~~~~

SCREEN #123: ALARM

SCREEN MEMORY USED: 93 BYTES

```

1ëèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèè;
°          ALARM 23           °
°    LEAK STATION 1         °
°      TROUBLE              °
° PRESS 'Y' TO CLEAR       °
äèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèèf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:1  
BIT NUMBER: 7  
BIT WILL BE: SET.
```

[illegible]

SCREEN #124: ALARM

SCREEN MEMORY USED: 99 BYTES

```
iēēēēēēēēēēēēēēēēēē;
o      ALARM 24                o
o    AX-101 SHUTDOWN          o
o    TIMER ACTIVATED           o
o   PRESS 'Y' TO CLEAR        o
āēēēēēēēēēēēēēēēēēēf
```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:1  
BIT NUMBER: 8  
BIT WILL BE: SET.
```

[illegible]

SCREEN #125: ALARM

SCREEN MEMORY USED: 79 BYTES

[illegible]

```
ACKNOWLEDGE ALARM TO REGISTER: N12:1  
BIT NUMBER: 9  
BIT WILL BE: SET.
```

~~~~~

SCREEN #126: ALARM

SCREEN MEMORY USED: 93 BYTES

```

1ëèèèèèèèèèèèèèèèèèè;
°          ALARM 26           °
° VALVE PIT A-A, A-B        °
°          LEAK              °
° PRESS 'Y' TO CLEAR       °
äèèèèèèèèèèèèèèèèèèf
```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:1  
BIT NUMBER: 10  
BIT WILL BE: SET.
```

[illegible]

SCREEN #127: ALARM

SCREEN MEMORY USED: 63 BYTES

```
iēēēēēēēēēēēēēēēēēē;
o      ALARM 27          o
o                        o
o                        o
o PRESS 'Y' TO CLEAR   o
āēēēēēēēēēēēēēēēēēf
```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:1  
BIT NUMBER: 11  
BIT WILL BE: SET.
```

[illegible]

SCREEN #128: ALARM

SCREEN MEMORY USED: 94 BYTES

```

1ēēēēēēēēēēēēēēēēēēēēj
◦      ALARM 28             ◦
◦ VALVE PIT AX-A,AX-B◦
◦      LEAK                ◦
◦ PRESS 'Y' TO CLEAR ◦
āēēēēēēēēēēēēēēēēēēēēf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:1  
BIT NUMBER: 12  
BIT WILL BE: SET.
```

áâãäåæçèéêëìíîïðñòóôõö÷øùúûüýþÿ

SCREEN #129: ALARM

SCREEN MEMORY USED: 63 BYTES

[illegible]

```
ACKNOWLEDGE ALARM TO REGISTER: N12:1  
BIT NUMBER: 13  
BIT WILL BE: SET.
```

~~~~~

SCREEN #130: ALARM

SCREEN MEMORY USED: 30 BYTES

```

1eeeeeeeeeeeeeeeeeeeeeee;
o                                     o
o                                     o
o                                     o
o PRESS 'Y' TO CLEAR o
aeeeeeeeeeeeeeeeeeeeef

```

ALARM ACKNOWLEDGE WILL NOT BE SENT

[illegible]

SCREEN #131: ALARM

SCREEN MEMORY USED: 77 BYTES

```

ïèèèèèèèèèèèèèèèèèèèèèèè;
°          ALARM 31              °
°      CGM TROUBLE                °
°                                °
° PRESS 'Y' TO CLEAR            °
äèèèèèèèèèèèèèèèèèèèèèèèf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:1  
BIT NUMBER: 14  
BIT WILL BE: SET.
```

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FILE: A101SKP.CFG

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aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

SCREEN #132: ALARM

SCREEN MEMORY USED: 93 BYTES

```

íëëëëëëëëëëëëëëëëëëëëëëë;
°      ALARM 32      °
°      AN-101 LEAK OR °
°      TROUBLE       °
°      PRESS 'Y' TO CLEAR °
ääëëëëëëëëëëëëëëëëëëëëëëëf
    
```

ACKNOWLEDGE ALARM TO REGISTER: N12:1
 BIT NUMBER: 15
 BIT WILL BE: SET.

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

SCREEN #133: ALARM

SCREEN MEMORY USED: 93 BYTES

```

íëëëëëëëëëëëëëëëëëëëëëëë;
°      ALARM 33      °
°      A-101 LEAK    °
°      OR TROUBLE     °
°      PRESS 'Y' TO CLEAR °
ääëëëëëëëëëëëëëëëëëëëëëëëf
    
```

ACKNOWLEDGE ALARM TO REGISTER: N12:2
 BIT NUMBER: 0
 BIT WILL BE: SET.

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

SCREEN #134: ALARM

SCREEN MEMORY USED: 63 BYTES

```

íëëëëëëëëëëëëëëëëëëëëëëë;
°      ALARM 34      °
°                   °
°                   °
°      PRESS 'Y' TO CLEAR °
ääëëëëëëëëëëëëëëëëëëëëëëëf
    
```

ACKNOWLEDGE ALARM TO REGISTER: N12:2
 BIT NUMBER: 1
 BIT WILL BE: SET.

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

SCREEN #135: ALARM

SCREEN MEMORY USED: 97 BYTES

```

íëëëëëëëëëëëëëëëëëëëëëëë;
°      ALARM 35      °
°      DILUTION TANK °
°      WATER NO FLOW °
°      PRESS 'Y' TO CLEAR °
ääëëëëëëëëëëëëëëëëëëëëëëëf
    
```

ACKNOWLEDGE ALARM TO REGISTER: N12:2
 BIT NUMBER: 2
 BIT WILL BE: SET.

[illegible]

SCREEN #136: ALARM

[illegible]

SCREEN MEMORY USED: 62 BYTES

```

o      ALARM 36      o
o
o
o PRESS 'Y' TO CLEAR o
aeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeef

```

ACKNOWLEDGE ALARM TO REGISTER: N12:2

BIT NUMBER: 3

BIT WILL BE: SET.

[illegible]

SCREEN #137: ALARM

```
íëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëë;

```

SCREEN MEMORY USED: 95 BYTES

```

o      ALARM 37      o
o      AX-101 HIGH   o
o      FLUSH PRESS    o
o      PRESS 'Y' TO CLEAR o
aeeeeeeeeeeeeeeeeeeeeef

```

ACKNOWLEDGE ALARM TO REGISTER: N12:2

BIT NUMBER: 4

BIT WILL BE: SET.

a

SCREEN #138: ALARM

```
íëëëëëëëëëëëëëëëëëëëëëëëëëëë;

```

SCREEN MEMORY USED: 94 BYTES

```

o      ALARM 38      o
o      AX-101 HIGH   o
o      RECIRC PRESS   o
o      PRESS 'Y' TO CLEAR o
aeeeeeeeeeeeeeeeeeeeeef

```

ACKNOWLEDGE ALARM TO REGISTER: N12:2

BIT NUMBER: 5

BIT WILL BE: SET.

[illegible]

SCREEN #139: ALARM

[illegible]

SCREEN MEMORY USED: 92 BYTES

```

o      ALARM 39      o
o  RECIRC FLUSH PRESS  o
o      HI      o
o  PRESS 'Y' TO CLEAR  o
aeeeeeeeeeeeeeeeeeeef

```

ACKNOWLEDGE ALARM TO REGISTER: N12:2

BIT NUMBER: 6

BIT WILL BE: SET.

[illegible]

SCREEN #144: ALARM

SCREEN MEMORY USED: 63 BYTES

```
iíëëëëëëëëëëëëëëëëëëëëëë;
o      ALARM 44                      o
o                                         o
o                                         o
o PRESS 'Y' TO CLEAR                  o
ääëëëëëëëëëëëëëëëëëëëëëëf
```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:2  
BIT NUMBER: 11  
BIT WILL BE: SET.
```

[illegible]

SCREEN #145: ALARM

SCREEN MEMORY USED: 63 BYTES

[illegible]

```
ACKNOWLEDGE ALARM TO REGISTER: N12:2  
BIT NUMBER: 12  
BIT WILL BE: SET.
```

[illegible]

SCREEN #146: ALARM

SCREEN MEMORY USED: 98 BYTES

[illegible]

```
ACKNOWLEDGE ALARM TO REGISTER: N12:2  
BIT NUMBER: 13  
BIT WILL BE: SET.
```

[illegible]

SCREEN #147: ALARM

SCREEN MEMORY USED: 97 BYTES

[illegible]

```
ACKNOWLEDGE ALARM TO REGISTER: N12:2  
BIT NUMBER: 14  
BIT WILL BE: SET.
```


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[illegible]

SCREEN #152: ALARM

SCREEN MEMORY USED: 63 BYTES

```

íëèèèèèèèèèèèèèèèèèèèèèèèè;
  °          ALARM 52              °
  °                                  °
  °                                  °
  ° PRESS 'Y' TO CLEAR            °
äèèèèèèèèèèèèèèèèèèèèèèèèf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:3  
BIT NUMBER: 3  
BIT WILL BE: SET.
```

[illegible]

SCREEN #153: ALARM

SCREEN MEMORY USED: 63 BYTES

[illegible]

```
ACKNOWLEDGE ALARM TO REGISTER: N12:3  
BIT NUMBER: 4  
BIT WILL BE: SET.
```

[illegible]

SCREEN #154: ALARM

SCREEN MEMORY USED: 62 BYTES

[illegible]

```
ACKNOWLEDGE ALARM TO REGISTER: N12:3  
BIT NUMBER: 5  
BIT WILL BE: SET.
```

[illegible]

SCREEN #155: ALARM

SCREEN MEMORY USED: 63 BYTES

```

íëèèèèèèèèèèèèèèèèèèè;
°          ALARM 55          °
°                               °
°                               °
° PRESS 'Y' TO CLEAR °
äèèèèèèèèèèèèèèèèèèèf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:3  
BIT NUMBER: 6  
BIT WILL BE: SET.
```

[illegible][illegible]

BIT WILL BE: SET.

[illegible]

aëèëëëëëëëëëëëëëëëëf

BIT WILL BE: SET.

[illegible]

åëëëëëëëëëëëëëëëëëëf

[illegible]

aẽëëëëëëëëëëëëëëëf

~~~~~

[illegible]

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