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

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Abstract:

This document describes the software programs for the Programmable Logic Controller and the Data Table Access Module for Pumping Instrumentation and Control skid "M". 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 - Final Safety Analysis Report
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

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

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 "M". The software programs used 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 U-farm skids. This skid "M" program for U-102 is similar to the skid "K" program for U-103. An Acceptance Test Procedure (ATP) and an Operational Test Procedure (OTP) will verify that the software programs meet the specific requirements for U-102 pumping.

This document represents the final PLC and DTAM programs for PIC skid "M" at U-102. 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 document is the official software control document for the PLC and DTAM program for PIC skid "M" that is on tank U-102. Any 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 "M" 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 33 and 34) states the salt well pump is allowed to run in an automatic mode.
- 2.2.2 Section 2.5.2.1.3 (lines 4 and 5) 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 and 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 will result in a visual alarm and pump shutdown causing an audible alarm.

- 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 in the flush or prime positions.

2.3.1.3 Low discharge pressure causes alarm and pump shutdown:

Pressure sensor SALW-PT-6015L 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. The low pressure opens the pump motor control interlock circuit after a 30 second delay causing the pump to shutdown. The high pressure 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-6014L 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 flow rate and 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: *All eight U-farm tanks will pump into a common line going to tank SY-102. 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 skids 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 skids upon timing out.*

2.3.1.7.3 *Skids with JR-1 in flush position; leak detection; and leak detector trouble cause pump shutdowns after a 3-second delay.*

- 2.3.1.8 Leak detectors connected to the skid are interlocked to cause visible 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 U-102, leak detection at the skid monitors the U-102 pump pit and COB U-32.*

- 2.3.1.10 Flammable gas monitoring and automatic interlock to shut down pump upon reaching 25% of LFL. *A relay contact in the Combustible gas monitor (CGM) transmitter provides a discrete input to the PLC. Relay contacts open upon reaching 20% (setpoint is adjustable, but set at 20%) of the LFL and cause the PLC to shutdown the pump after a 3-second delay. 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.*

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- 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 low flow in the recirculation line. There are other conditions monitored by all the skids on a common line causing pump shutdowns. These conditions for U-farm are leaks or detector troubles at Leak Detector station 4 (valve pits U-C, U-D, and COB 30) and Leak Detector station 5 (valve pits U-A, U-B, and COB 33); no dilution water flow; leaks or trouble at the SY-B valve pit; and if the portable exhaustor is on line. All of these conditions for individual and all 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 shutdown.

Administrative Control 5.10.2.c: 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. The relay contact in the CGM opens upon sensing greater than 20% of the Lower Flammability Limit (LFL). The PLC monitors the CGM relay contact. Upon detecting opening of the CGM relay contact, the jet pump will shut down and power is removed from the pump and jumper heat trace.

3.0 SOFTWARE DESCRIPTION

3.1 U-102 SOFTWARE

The software program for the PLC and DTAM for U-102 was based upon the program for U-103. Software changes made specifically for U-102 are identified below.

- 3.1.1 The software program for the PLC was changed to determine the low and high pressure alarm points on the transfer line on the jet pump. The PLC program receives the 4 to 20mA signal from the pressure transducer. A discrete signal is used on U-103 skid "K" for the low and high alarm points. The "pressure switch" has been replaced with a "pressure transducer". The PLC addressing changes from discrete inputs to an analog input. Discrete inputs I:10.1 and I:10.3 were deleted and analog input I:5.2 was added.
- 3.1.2 The flow rate programmed into the DTAM was changed from 4 gal/min to 8 gal/min.
- 3.1.3 A second output is added for the dilution system for the metering pump control. This is a discrete output from the PLC.
- 3.1.4 The time delay on the signal from other skids for a high recirculation flush pressure and high flush pressure alarms is changed from 3 seconds to 20 minutes.
- 3.1.5 Two discrete inputs and an analog input is received from a Combustible Gas Monitor (CGM) which replaces the Flammable Gas Monitor. The CGM analog input is the same as the FGM input which displays the percentage of flammable gas on the DTAM screen. The CGM discrete inputs come in as inputs I:8.2, address N60:28/8 and I:8.4, address N60:28/10. The FGM input on I:8.3 is bypassed within the software program in ladder 5. The two CGM discrete inputs will shutdown the skid upon high LFL or CGM trouble. Alarms 25 and 31 were added to alert operators of the occurrence either of these CGM conditions.

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.

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- 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.
- 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 30 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 inputs from Combustible Gas Monitor (CGM) transmitter. One input for high LFL and the other input for a CGM fault. One contact opens upon flammable gas levels greater than 25% of the LFL and the other contact opens upon a transmitter fault condition. Both conditions cause an alarm, jet pump shutdown and deenergize the pump and jumper heat trace relays.

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- 3.2.2.11 Discrete inputs from the leak detection relays. Contacts from the MTL2313A relay open upon leak detection circuit trouble to cause an alarm and jet pump shutdown. Contacts from the 5300 relay open upon detection of a leak to cause an alarm and jet pump shutdown.
- 3.2.2.12 Discrete input from the recirculation flow meter located in the Water Cabinet. Contact opens upon low flow in the recirculation line to cause an alarm and jet pump shut down.
- 3.2.2.13 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.
- 3.2.2.14 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.
- 3.2.2.15 Discrete input MR-1 from the jet pump motor starter. This contact closes when the motor contactor is energized.
- 3.2.2.16 Thermocouple inputs from the PLC enclosure, air compressor enclosure, jet pump motor bearing and pump jumper assembly.
- 3.2.2.17 Input from the DH-485 line as to the status of other skids and leak detector stations along the waste line transfer path. This input is 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.

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 Dilution ratio setpoint input.

3.3.3 DTAM ALARMS

- 3.3.3.1 Individual alarm screens for each incoming alarm.
- 3.3.3.2 Screens 101 to 153 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 U-102 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 COB U-33 leak
- 3.4.1.2 COB U-33 trouble
- 3.4.1.3 Dilution tank no flow
- 3.4.1.4 Leak detected by any of the seven other U-farm PIC skids
- 3.4.1.5 Any of the seven other U-farm PIC skids with JR-1 in flush position
- 3.4.1.6 Leak detector station #4 trouble
- 3.4.1.7 The 30 minute time out by any of the other seven U-farm PIC skids being shutdown and JR-1 not in the prime position
- 3.4.1.8 Valve pit U-C leak
- 3.4.1.9 Valve pit U-C trouble
- 3.4.1.10 Valve pit U-D leak
- 3.4.1.11 Valve pit U-D trouble
- 3.4.1.12 Any of the other seven U-farm PIC skids with high jumper flush pressure
- 3.4.1.13 Leak station #5 trouble
- 3.4.1.14 Valve pit U-A leak
- 3.4.1.15 Valve pit U-A trouble
- 3.4.1.16 Valve pit U-B leak
- 3.4.1.17 Valve pit U-B trouble
- 3.4.1.18 COB U-30 leak
- 3.4.1.19 COB U-30 trouble
- 3.4.1.20 Any of the other seven U-farm PIC skids with high recirculation line pressure
- 3.4.1.21 Any of the other seven U-farm PIC skids with loss of recirculation flush pressure signal
- 3.4.1.22 Any of the other seven U-farm PIC skids with loss of jumper flush pressure signal
- 3.4.1.23 Portable exhaustor on line
- 3.4.1.24 Leak or trouble alarm from SY-02A and SY-B valve pits

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- 3.4.2 Interlock string monitoring the U-102 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
 - 3.4.2.6 Pump pit leak detector trouble
 - 3.4.2.7 Data communications failure on the DH-485 link
 - 3.4.2.8 Recirculation line low flow
 - 3.4.2.9 CGM greater than 25% of LFL (FGM bypassed on rung 79)
 - 3.4.2.10 CGM fault condition
 - 3.4.2.11 Jumper flush pressure signal loss
 - 3.4.2.12 Pump pit leak detector trouble
 - 3.4.2.13 Recirculation line high flush pressure
 - 3.4.2.14 Leak detector 1(COB 32) trouble
 - 3.4.2.15 Recirculation flush pressure signal loss
 - 3.4.2.16 Leak detector 1 (COB 32) leak
 - 3.4.2.17 Other equipment interlock (the above string)

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
Recirc low flow	30 seconds	Yes
Communications failure	60 seconds	Yes
High flush press on other skids	20 minutes	Yes
Other skids 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	---
CGM greater than 25% LFL	3 seconds	Yes
CGM fault	3 seconds	Yes
High transfer pressure	3 seconds	Yes
Jumper flush pressure greater than 15-psig #	3 seconds	Yes
Pump trouble	3 seconds	Yes
Pit leak #	3 seconds	Yes
Pit leak detector trouble	3 seconds	Yes
Leak detector 1 leak in (COB U-32)	3 seconds	Yes
Leak detector 1 trouble (COB U-32)	3 seconds	Yes
Recirc flush pressure signal loss #	3 seconds	Yes
Another U-farm skid with JR-1 in flush position	3 seconds	Yes
Jumper flush pressure signal loss #	3 seconds	Yes
Another U-farm skid with leak or trouble	3 seconds	Yes
Another U-farm skid with loss of jumper flush pressure signal	3 seconds	Yes
Another U-farm skid with loss of recirculation flush pressure signal	3 seconds	Yes

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CONDITION	TIME DELAY	PUMP SHUTDOWN
Leak Station 4 trouble	3 seconds	Yes
Leak Station 5 trouble	3 seconds	Yes
Valve Pit U-A Leak	3 seconds	Yes
Valve Pit U-A trouble	3 seconds	Yes
Valve Pit U-B Leak	3 seconds	Yes
Valve Pit U-B trouble	3 seconds	Yes
Valve Pit U-C Leak	3 seconds	Yes
Valve Pit U-C trouble	3 seconds	Yes
Valve Pit U-D Leak	3 seconds	Yes
Valve Pit U-D trouble	3 seconds	Yes
COB U-30 Leak	3 seconds	Yes
COB U-30 Trouble	3 seconds	Yes
COB U-33 Leak	3 seconds	Yes
COB U-33 Trouble	3 seconds	Yes
Valve Pits SY-A or SY-B or SY-02A pump pit alarm	3 seconds	Yes
Another U-farm skid with high recirc pressure	20 minutes	Yes
Dilution tank no flow	5 minutes	Yes
Recirc pressure high #	3 seconds	Yes
Portable Exhauster on line (exhauster not physically installed)	3 seconds	Yes
Pump is less than 40 degrees F or the jumper is greater than 225 degrees F	3 seconds	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
Salt well low level	None	No. DOV closes

* If the U-102 skid "M" 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 U-102 must communicate with the computer at 271-U over a DH-485 link. The PLC monitors the link to verify the communications link is functional. This communications link monitoring is tied into the interlock circuit for the jet pump control.

PIC skid status information is sent over the link to the 271-U 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 Leak detector 1 (COB 32) leak or trouble
- 3.6.6 Skid high flush pressure
- 3.6.7 Skid high recirc flush pressure
- 3.6.8 RFPT signal loss
- 3.6.9 JFPT signal loss

When other PIC skids are installed in U-farm, the above information will affect those skid's operation. Should the U-102 skid be shut down due to JR-1 in the flush position, leak detected in the pump pit, high flush pressure in the jumper or recirculation line, or loss of recirculation or jumper flush pressure signals, then other skids connected in U-farm will shut down either immediately or after some delay. Should the U-102 skid shutdown and JR-1 is not placed in the prime position, then other skids connected in U-farm will shut down within 30 minutes. A similar type of condition will exist for the skid at U-102, upon shut down of other U-farm skids; the U-102 skid will shut down.

The software is written such if other skids are not connected, no alarm or shut down conditions exist. Fault conditions from other U-farm skids are provided to the U-102 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. There is also communications between the U-farm OCS and the S/SX-farm OCS computers. This communication is used to send information concerning leak detection alarm or trouble in the SY-02A pump pit and the SY-B valve pit.

4.0 SOFTWARE PROGRAM DESCRIPTION

This section explains the input and output requirements of the PLC. Alarm set points and control system functions are identified. 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 the DTAM program is in Appendix C.

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 "U102NEW1R1" and the DTAM file is "U102NEW."

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-U 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 U-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 U-105 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 is to actuate for temperatures outside these limits. The temperature is to be monitored with thermocouple probes and input to the PLC.

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

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

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

The temperature of the Water Cabinet is not to decrease below 35 degrees F. An alarm is to actuate for temperatures less than 35 degrees F. The alarm is to clear 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 acknowledge 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 U-102 are the same as U-105. Two new set points were added for the transfer pressure transducer as described in paragraph 4.7.5. New set points for the software program were required for the U-102 PLC ladder logic. Each of the set points is identified below along with how the values calculated.

- 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.
- 4.7.4 Water tank level: PIC skid "M" 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 U-farm Skids

Other U-farm skids when installed will interface over the DH-485 data link to the U-102 skid "M". The PLC ladder logic has been set up for these future interfaces. Other future skids in U-farm will be at tanks U-106, U-107, U-108, U-109, U-111, and the emergency skid. The types of interfaces are identified below. The PLC logic is an open contact, which is monitored for a close condition to cause a timer to start and/or skid shut down.

- 4.8.1 Skid JR-1 alarm conditions: When any other skid has JR-1 in the flush, the U-102 skid will shut down after 3 second delay upon receiving the signal over the DH-485 link. If another 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 U-102 skid will shut down after a 3-second delay. The 30-minute timer allows operations personnel 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 U-102 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 skid after a 3-second delay and the shutdown 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 Leak Detector Stations 4 and/or 5 in U-farm, at the SY-02A or SY-B valve pits, and/or at any other on-line skid in U-farm, will cause the U-102 skid to shut down after a 3 second delay upon receiving the signal over the DH-485 link.
- 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 any of the other seven U-farm skids, will cause the U-102 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
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)
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 0-8GPM
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 CONTACTOR
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		N60:28/6	
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(BYPASSED)
I:8.4	DISCRETE INPUT	CGM-F	N60:28/10	CGM FAULT
I:8.5	DISCRETE INPUT		N60:28/11	

APPENDIX A

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	RECIRC	N60:30/10	RECIRC. FLUSH PRESS. ALARM
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	
O:12.0	DISCRETE OUTPUT		N60:32/0	
O:12.1	DISCRETE OUTPUT		N60:32/1	
O:12.2	DISCRETE OUTPUT		N60:32/2	
O:12.3	DISCRETE OUTPUT		N60:32/3	
O:12.4	DISCRETE OUTPUT		N60:32/4	
O:12.5	DISCRETE OUTPUT		N60:32/5	
I:12.0	DISCRETE INPUT		N60:32/6	
I:12.1	DISCRETE INPUT		N60:32/7	

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APPENDIX A

PLC ADDRESSES

TERMINATION	SIGNAL	TAG	ADDRESS	DESCRIPTION
I:12.2	DISCRETE INPUT		N60:32/8	
I:12.3	DISCRETE INPUT		N60:32/9	
I:12.4	DISCRETE INPUT		N60:32/10	
I:12.5	DISCRETE INPUT		N60:32/11	

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APPENDIX A
PLC/DTAM ALARM ADDRESSES

ALARM ADDRESS	ALARM ACK ADDRESS	ALARM WINDOW MESSAGE	DATA DISPLAY MESSAGE	INPUT/OUTPUT SOURCE	DTAM ACK ADDRESS	DTAM DIS. SCREEN #	DTAM ALARM SCREEN	ALARM #
N20:24/0	N20:15/0	SPARE	ACKNOWLEDGE STROBE		N12:0/0	48/1	100, 130	ACK, 30
N20:24/1	N20:15/1	XFR PRESSURE LOW	XFR PRESSURE LOW	I:5.2	N12:0/1	41/1	101	1
N20:24/2	N20:15/2	XFR PRESSURE HIGH	XFR PRESSURE HIGH	I:5.2	N12:0/2	41/2	102	2
N20:24/3	N20:15/3	FLUSH PRESSURE HIGH	FLUSH PRESSURE HI	I:5.1	N12:0/3	41/3	103	3
N20:24/4	N20:15/4	PUMP TROUBLE	JET PUMP TROUBLE	I:11.0	N12:0/4	41/4	104	4
N20:24/5	N20:15/5	JR-1 NON-PROCESS	JR-1 POSITION, NOT-PROCESS	I:10.2	N12:0/5	42/1	105	5
N20:24/6	N20:15/6	PUMP PIT LEAK	PUMP PIT LEAK	I:9.1	N12:0/6	42/2	106	6
N20:24/7	N20:15/7	PUMP PIT TROUBLE	PUMP PIT LEAK TROUBLE	I:9.3	N12:0/7	42/3	107	7
N20:24/8	N20:15/8	JMPR HT TROUBLE	JMPR HEAT TRACE TROUBLE		N12:0/8	42/4	108	8
N20:24/9	N20:15/9	PIC WATER LOW	PIC WATER LEVEL LOW	I:4.2	N12:0/9	43/1	109	9
N20:24/10	N20:15/10	PLC TEMP HIGH	PLC ENCLOSURE HI	I:7.3	N12:0/10	43/2	110	10
N20:24/11	N20:15/11	CMPSR TEMP HIGH	AIR COMPRESSOR TEMP HI	I:7.2	N12:0/11	43/3	111	11
N20:24/12	N20:15/12	JET PUMP SHUTDOWN	JET PUMP SHUTDOWN	I:11.0	N12:0/12	43/4	112	12
N20:24/13	N20:15/13	SGT LEVEL LOW	SGT LOW	I:4.1	N12:0/13	44/1	113	13
N20:24/14	N20:15/14	RFPT SIGNAL LOST	RFPT SIGNAL LOSS ALARM	I:5.0	N12:0/14		114	14
N20:24/15	N20:15/15	NETWORK FAILURE	PLC COMMUNICATIONS FAILURE	S:9/2	N12:0/15	44/2	115	15
N20:25/0	N20:16/0	JFPT SIGNAL LOST	JFPT SIGNAL LOSS ALARM	I:5.1	N12:1/0	44/3	116	16
N20:25/1	N20:16/1	U-FARM LEAK ALARM	U FARM LEAK ALARM	DH-485	N12:1/1	45/1	117	17
N20:25/2	N20:16/2	LEAK 1 COB U32 ALARM	LK DT NO 1 COB U32 LEAK DETECTED	I:9.5	N12:1/2	45/2	118	18
N20:25/3	N20:16/3	LEAK 1 CK ALARM	LK DT NO 1 COB U32 TROUBLE	I:9.0	N12:1/3	45/3	119	19
N20:25/4	N20:16/4	U FLUSH POS ALARM	U TANK IN FLUSH	DH-485	N12:1/4	45/4	120	20
N20:25/5	N20:16/5	RECIRC ALARM	RECIRCULATION FAILURE	I:10.4	N12:1/5	46/1	121	21
N20:25/6	N20:16/6	FGM ALARM	FLAMMABLE GAS HIGH	I:8.3	N12:1/6	46/2	122	22
N20:25/7	N20:16/7	LEAK ST #4 ALARM	LEAK STATION 4 TROUBLE	DH-485	N12:1/7	46/3	123	23
N20:25/8	N20:16/8	U TANK SHUTDOWN ALARM	U TANK SHUTDOWN TIMER ACTIVATED	DH-485	N12:1/8	46/4	124	24
N20:25/9	N20:16/9	HIGH LFL ON CGM	HI LFL CGM	I:8.2	N12:1/9	50/2	125	25
N20:25/10	N20:16/10	PIT U-C LK LEAK	VALVE PIT U-C LEAK	N20:49/0	N12:1/10	48/1	126	26
N20:25/11	N20:16/11	PIT U-C CK ALARM	VALVE PIT U-C TROUBLE	N20:49/1	N12:1/11	48/2	127	27
N20:25/12	N20:16/12	PIT U-D LK LEAK	VALVE PIT U-D LEAK	N20:49/2	N12:1/12	48/3	128	28
N20:25/13	N20:16/13	PIT U-D LEAK CK ALARM	VALVE PIT U-D TROUBLE	N20:49/3	N12:1/13	50/1	129	29
N20:25/14	N20:16/14	CGM FAULT	CGM FAULT	I:8.4	N12:1/14	50/2	131	31
N20:25/15	N20:16/15	LEAK ST #5 ALARM	LEAK STATION 5 TROUBLE	DH-485	N12:1/15	50/3	132	32
N20:51/0	N20:55/0	COB U33 LEAK ALARM	COB U-33 LEAK	N20:50/4	N12:2/0	52/1	133	33
N20:51/1	N20:55/1				N12:2/1	52/2	134	34
N20:51/2	N20:55/2	DILUTION TK ALARM	DILUTION TANK NO FLOW	I:8.1	N12:2/2	52/3	135	35
N20:51/3	N20:55/3	COB U33 CK ALARM	COB U-33 TROUBLE	N20:50/5	N12:2/3	52/4	136	36
N20:51/4	N20:55/4	U FLUSH PRES ALARM	U FARM HIGH FLUSH PRESS	DH-485	N12:2/4	53/1	137	37
N20:51/5	N20:55/5	U RECIRC PRES ALARM	U FARM HIGH RECIRC PRESS	DH-485	N12:2/5	53/2	138	38
N20:51/6	N20:55/6	RECIRC. PRESS ALARM	RECIRC FLUSH PRESS HI	I:5.0	N12:2/6	53/3	139	39
N20:51/7	N20:55/7	PIT U-A LK ALARM	VALVE PIT U-A LEAK	N20:50/0	N12:2/7	53/4	140	40
N20:51/8	N20:55/8	PIT U-A CK ALARM	VALVE PIT U-A TROUBLE	N20:50/1	N12:2/8	54/1	141	41
N20:51/9	N20:55/9	PIT U-B LK ALARM	VALVE PIT U-B LEAK	N20:50/2	N12:2/9	54/2	142	42
N20:51/10	N20:55/10	PIT U-B CK ALARM	VALVE PIT U-B TROUBLE	N20:50/3	N12:2/10	54/3	143	43

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APPENDIX A
PLC/DTAM ALARM ADDRESSES

ALARM	ALARM ACK	ALARM WINDOW MESSAGE	DATA DISPLAY MESSAGE	INPUT/OUTPUT	DTAM ACK	DTAM DIS	DTAM ALARM	ALARM #
N20:51/11	N20:55/11	COB U-30 LEAK	COB U-30 LK ALARM	N20:49/4	N12:2/11	54/4	144	44
N20:51/12	N20:55/12	COB U-30 TROUBLE	COB U-30 CK ALARM	N20:49/5	N12:2/12	55/1	145	45
N20:51/13	N20:55/13	U-FARM RECIRC FLUSH SIGNAL LOSS	RECIRC LOSS ALARM	DH-485	N12:2/13	55/2	146	46
N20:51/14	N20:55/14	U-FARM JUMPER FLUSH SIGNAL LOSS	FLUSH LOSS ALARM	DH-485	N12:2/14	55/3	147	47
N20:51/15	N20:55/15	VALVE PIT SY-B LEAK ALARM	SY-B LEAK AL ALARM	DH-485	N12:2/15	55/4	148	48
N20:52/0	N20:56/0				N12:3/0	56/1	149	49
N20:52/1	N20:56/1				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	EXHAUSTER ONLINE	EXHST ONLINE ALARM	DH-485	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				N12:3/9			
N20:52/10	N20:56/10				N12:3/10			
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
U-FARM NODE ADDRESSES

NODE #	LOCATION
0	
1	
2	U-102, SKID M
3	EMERG SKID
4	U-103, SKID K
5	U-105, SKID L
6	U-106, SKID P
7	U-107, SKID R
8	U-108, SKID Q
9	U-109, SKID N
10	U-111, SKID U
11	271-U, PLC
12	LEAK DET. STATION 4
13	LEAK DET. STATION 5

U-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	
	N20:32/4	SKID LEAK #1	
	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		
	N20:32/10		
	N20:32/11		
	N20:32/12		
	N20:32/13		
	N20:32/14		
	N20:32/15		

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APPENDIX A

U-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	U-102 PRIME	
	N20:34/1	U-102 FLUSH	
	N20:34/2	U-102 SHUTDOWN	
	N20:34/3	U-102 PIT LEAK	
	N20:34/4	U-102 LEAK #1 (COB U-32)	
	N20:34/5	U-102 HI PRESS FLUSH	
	N20:34/6	U-102 HI PRESS RECIRC	
	N20:34/7	U-102 RFPT SIGNAL LOSS	
	N20:34/8	U-102 JFPT SIGNAL LOSS	
	N20:34/9		
	N20:34/10		
	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		

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APPENDIX A

U-FARM ADDRESSES

CONTROL ADD.	CONTROL ADD.	DESCRIPTION	DTAM SCREEN/POSITION
	N20:35/13		
	N20:35/14		
	N20:35/15		
NODE#4	N20:36/0	U-103 PRIME	
	N20:36/1	U-103 FLUSH	
	N20:36/2	U-103 SHUTDOWN	
	N20:36/3	U-103 PIT LEAK	
	N20:36/4	U-103 LEAK 1 (COB 34)	
	N20:36/5	U-103 HI PRESS FLUSH	
	N20:36/6	U-103 HI PRESS RECIRC	
	N20:36/7	U-103 RFPT SIGNAL LOSS	
	N20:36/8	U-103 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	U-105 PRIME	
	N20:37/1	U-105 FLUSH	
	N20:37/2	U-105 SHUTDOWN	
	N20:37/3	U-105 PIT LEAK	
	N20:37/4	U-105 LEAK #1	
	N20:37/5	U-105 HI PRESS FLUSH	
	N20:37/6	U-105 HI PRESS RECIRC	
	N20:37/7	U-105 RFPT SIGNAL LOSS	
	N20:37/8	U-105 JFPT SIGNAL LOSS	
	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	U-106 PRIME	
	N20:38/1	U-106 FLUSH	
	N20:38/2	U-106 SHUTDOWN	
	N20:38/3	U-106 PIT LEAK	
	N20:38/4	U-106 LEAK #1 (COB U-35)	
	N20:38/5	U-106 HI PRESS FLUSH	
	N20:38/6	U-106 HI PRESS RECIRC	
	N20:38/7	U-106 RFPT SIGNAL LOSS	
	N20:38/8	U-106 JFPT SIGNAL LOSS	
	N20:38/9		

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APPENDIX A

U-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	U-107 PRIME	
	N20:39/1	U-107 FLUSH	
	N20:39/2	U-107 SHUTDOWN	
	N20:39/3	U-107 PIT LEAK	
	N20:39/4	U-107 LEAK 1	
	N20:39/5	U-107 HI PRESS FLUSH	
	N20:39/6	U-107 HI PRESS RECIRC	
	N20:39/7	U-107 RFPT SIGNAL LOSS	
	N20:39/8	U-107 JFPT SIGNAL LOSS	
	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	U-108 PRIME	
	N20:40/1	U-108 FLUSH	
	N20:40/2	U-108 SHUTDOWN	
	N20:40/3	U-108 PIT LEAK	
	N20:40/4	U-108 LEAK 1	
	N20:40/5	U-108 HI PRESS FLUSH	
	N20:40/6	U-108 HI PRESS RECIRC	
	N20:40/7	U-108 RFPT SIGNAL LOSS	
	N20:40/8	U-108 JFPT SIGNAL LOSS	
	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	U-109 PRIME	
	N20:41/1	U-109 FLUSH	
	N20:41/2	U-109 SHUTDOWN	
	N20:41/3	U-109 PIT LEAK	
	N20:41/4	U-109 LEAK #1 (COB U-29)	
	N20:41/5	U-109 HI PRESS FLUSH	
	N20:41/6	U-109 HI PRESS RECIRC	

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APPENDIX A

U-FARM ADDRESSES

CONTROL ADD.	CONTROL ADD.	DESCRIPTION	DTAM SCREEN/POSITION
	N20:41/7	U-109 RFPT SIGNAL LOSS	
	N20:41/8	U-109 JFPT SIGNAL LOSS	
	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	U-111 PRIME	
	N20:42/1	U-111 FLUSH	
	N20:42/2	U-111 SHUTDOWN	
	N20:42/3	U-111 PIT LEAK	
	N20:42/4	U-111 LEAK 1	
	N20:42/5	U-111 HI PRESS FLUSH	
	N20:42/6	U-111 HI PRESS RECIRC	
	N20:42/7	U-111 RFPT SIGNAL LOSS	
	N20:42/8	U-111 JFPT SIGNAL LOSS	
	N20:42/9		
	N20:42/10		
	N20:42/11		
	N20:42/12		
	N20:42/13		
	N20:42/14		
	N20:42/15		
		271-U PLC	
NODE#11	N20:43/0		
	N20:43/1	VALVE PIT SY-B LEAK ALARM	
	N20:43/2		
	N20:43/3		
	N20:43/4		
	N20:43/5	LEAK DET. STATION #5 TROUBLE	
	N20:43/6	LEAK DET. STATION #4 TROUBLE	
	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 4	
NODE#12	N20:49/0	VALVE PIT U-C LEAK	
	N20:49/1	VALVE PIT U-C TROUBLE	

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APPENDIX A

U-FARM ADDRESSES

CONTROL ADD.	CONTROL ADD.	DESCRIPTION	DTAM SCREEN/POSITION
	N20:49/2	VALVE PIT U-D LEAK	
	N20:49/3	VALVE PIT U-D TROUBLE	
	N20:49/4	COB U-30 LEAK	
	N20:49/5	COB U-30 TROUBLE	
	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		
		LEAK DETECTOR STATION 5	
NODE#13	N20:50/0	VALVE PIT U-A LEAK	
	N20:50/1	VALVE PIT U-A TROUBLE	
	N20:50/2	VALVE PIT U-B LEAK	
	N20:50/3	VALVE PIT U-B TROUBLE	
	N20:50/4	COB U-33 LEAK	
	N20:50/5	COB U-33 TROUBLE	
	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	ADSL TIE TO SY	

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

LAD 2 - -- Total Rungs in File = 18

LAD 2 - -- Total Rungs in File = 18

0017

(END)

LAD 3 - -- Total Rungs in File = 16

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

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

0012

MOV
Move
Source N15:10
34<
Dest N7:5
34<

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<

COPY FILE TO DOV ADDRESS

0013

COP
Copy File
Source #N14:0
Dest #N60:4
Length 15

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
20<
Mask 003Fh
63<
Dest N17:0
20<

MUL
Multiply
Source A N17:0
20<
Source B 64
64<
Dest N17:1
1280<

MVM
Masked Move
Source N17:1
1280<
Mask 0FC0h
4032<
Dest N60:28
1280<

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<

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

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

GET INPUTS FROM MODULE 10

0005

MVM
Masked Move
Source I:10.0
21<
Mask 003Fh
63<
Dest N17:4
21<

MUL
Multiply
Source A N17:4
21<
Source B 64
64<
Dest N17:5
1344<

MVM
Masked Move
Source N17:5
1344<
Mask 0FC0h
4032<
Dest N60:30
1344<

GET INPUTS FROM MODULE 11

0006

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

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<

LAD 4 - — Total Rungs in File = 10

U102NEW1R1

LAD 5 - -- Total Rungs in File = 109

U102NEW1R1

LAD 5 - -- Total Rungs in File = 109

LAD 5 - --- Total Rungs in File = 109

U102NEW1R1

LAD 5 - — Total Rungs in File = 109

U102NEW1R1

LAD 5 - — Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

LAD 5 - --- Total Rungs in File = 109

LAD 5 - -- Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

0034

ANY OTHER U-FARM LEAK DET. (LEAK OR TROUBLE) ALARM

U-105 LEAK

N20:37

3

U-105 DET 1 LEAK

N20:37

4

EMERG LEAK

N20:35

3

EMERG DET1 LEAK

N20:35

4

U-103 LEAK

N20:36

3

COB U34 LEAK

N20:36

4

U-106 LEAK

N20:38

3

COB U35 LEAK

N20:38

4

U-107 LEAK

N20:39

3

U-107 DET 1 LEAK

N20:39

4

U-108 LEAK

N20:40

3

U-108 DET 1 LEAK

N20:40

4

U-109 LEAK

N20:41

3

TON

Timer On Delay

Timer

T4:17

Time Base

1.0

Preset

3<

Accum

0<

<EN>

<DN>

LAD 5 - --- Total Rungs in File = 109

LAD 5 - -- Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

LAD 5 - -- Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

LAD 5 - — Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

LAD 5 - --- Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

U102NEW1R1

LAD 5 - --- Total Rungs in File = 109

U102NEW1R1

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

U102NEW1R1

LAD 7 - --- Total Rungs in File = 22

LAD 7 - --- Total Rungs in File = 22

U102NEW1R1

LAD 7 - --- Total Rungs in File = 22

LAD 7 - --- Total Rungs in File = 22

U102NEW1R1

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

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

U102NEW1R1

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

LAD 10 - --- Total Rungs in File = 11

U102NEW1R1

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

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

U102NEW1R1

LAD 14 - --- Total Rungs in File = 11

U102NEW1R1

LAD 14 - --- Total Rungs in File = 11

U102NEW1R1

LAD 14 - --- Total Rungs in File = 11

U102NEW1R1

LAD 14 - --- Total Rungs in File = 11

U102NEW1R1

LAD 14 - --- Total Rungs in File = 11

U102NEW1R1

LAD 14 - -- Total Rungs in File = 11

U102NEW1R1

LAD 14 - -- Total Rungs in File = 11

LAD 14 - --- Total Rungs in File = 11

LAD 14 - -- Total Rungs in File = 11

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

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

U102NEW1R1

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

0015

⟨END⟩

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

U102NEW1R1

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

U102NEW1R1

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

U102NEW1R1

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

U102NEW1R1

LAD 17 - — Total Rungs in File = 65

LAD 17 - -- Total Rungs in File = 65

U102NEW1R1

LAD 17 - -- Total Rungs in File = 65

U102NEW1R1

LAD 18 - — Total Rungs in File = 70

U102NEW1R1

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

LAD 18 - -- Total Rungs in File = 70

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

U102NEW1R1

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

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

Address	Operation	Source	Destination	Mask	Length
0000	SBR Subroutine				
0001	MOVE OUTPUT TO MODULE 2 FOR DOV	N20:24	O:2.0	003Fh	2
0002	MOVE OUTPUTS TO MODULE 8	N60:28	O:8.0	003Fh	1280
0003	MOVE OUTPUTS TO MODULE 9	N60:29	O:9.0	003Fh	2762
0004	MOVE OUTPUTS TO MODULE 10	N60:30	O:10.0	003Fh	1344

U102NEW1R1

LAD 19 - — Total Rungs in File = 9

LAD 20 - -- Total Rungs in File = 11

LAD 20 - --- Total Rungs in File = 11

DTAM Plus
PROGRAM FILE DOCUMENTATION
Allen-Bradley Company, Inc.

SLC TYPE: DTAM Plus AB DH485
PROGRAM MEMORY USED: 12916 BYTES
NUMBER OF SCREENS USED: 102

CONFIGURATION PARAMETERS

UPDATE DELAY: 2.00 Seconds
MASTER SECURITY CODE: 00000000
COM PORT PARAMETERS: 19200 Baud, EVEN Parity, EIGHT Data Bits
PRINTER PORT PARAMETERS: 9600 Baud, EVEN Parity, EIGHT Data Bits

SLC 500 CONFIGURATION OPTIONS

SLC 500 NODE ADDRESS: 1
DTAM Plus NODE ADDRESS: 0
MAX NODE ADDRESS: 3
ADVISOR UPDATE RATE: 2.00 Seconds

DTAM Plus ADVISOR: NOT USED

TIME SYNC REGISTER: NOT USED

BACKGROUND REGISTER USAGE

BACKGROUND REGISTER 1: MONITORS BIT DATA. 16 OF 16 BITS ARE USED.
BACKGROUND REGISTER 2: MONITORS BIT DATA. 16 OF 16 BITS ARE USED.
BACKGROUND REGISTER 3: MONITORS BIT DATA. 16 OF 16 BITS ARE USED.
BACKGROUND REGISTER 4: MONITORS BIT DATA. 9 OF 16 BITS ARE USED.

aa

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

aa

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

aa

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

aa

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)	157
1	ON (1)	150	9	THIS BIT IS NOT MONITORED	
2	ON (1)	151	10	THIS BIT IS NOT MONITORED	
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	

6 ON (1) 155 14 THIS BIT IS NOT MONITORED RPP-5446 REV 0 APPENDIX C
7 ON (1) 156 15 THIS BIT IS NOT MONITORED

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PAGE 3

SCREEN#	TYPE	SCREEN#	TYPE
---------	------	---------	------

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115 ALARM
116 ALARM
117 ALARM

[illegible][illegible][illegible][illegible][illegible]

° *RESTRICTED ACCESS* °

° ENTER CODE °

0 : 0

○ ○ ○

[illegible]

~~~~~

SCREEN #001: MAIN MENU

SCREEN MEMORY USED: 88 BYTES

```

1eeeeeeeeeeeeeeeeeeeeeeeeeeeeee;
°                U-102                °
°1. Pump      4. Alarms°
°2. Util      5. Clear °
°3. HtTrace  6. Dratio°
aeef

```

```
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 035
Item/Key # 7 links to screen 024
Item/Key # 8 is unlinked
```

[illegible]

SCREEN #010: SUB-MENU

```
SCREEN MEMORY USED:    86 BYTES
PREVIOUS MENU:    001
```

```

iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii;
°1  Pump On/Off °
°2  DOV Sub-Menu °
°3  CVT, WFT, & SPGT °
°4  DOV Manual Output °
ääääääääääääääääääääääääääääääääääf

```

```
Item/Key # 1 links to screen 011
Item/Key # 2 links to screen 012
Item/Key # 3 links to screen 013
Item/Key # 4 links to screen 022
```

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

~~~~~

SCREEN #011: DATA ENTRY

SCREEN MEMORY USED: 98 BYTES

```
PREVIOUS MENU:      010
NEXT SCREEN:       015
PREVIOUS SCREEN:    UNLINKED
```

```

f=====;
o      Pump is P1P      o
o                        o
o   Enter 1 for On,     o
o       0 for Off2     o
a=====f

```

DATA POSITION #1: BIT DISPLAY

```
REGISTER:      N60:31
BIT NUMBER:    6
TEXT LENGTH:   3
```

OFF BIT TEXT: OFF
ON BIT TEXT: ON

DATA POSITION #2: BIT ENTRY

REGISTER: N20:17
BIT NUMBER: 0

ENTRY FORMAT: 1 & 0 KEYS
DEFAULT: NONE

~~~~~

SCREEN #012: SUB-MENU

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

```

1eeeeeeeeeeeeeeeeeeeeeeeeeeeeee;
°1  Auto/Manual          °
°2  DOV Setpoint         °
°3  PID Tuning           °
°4  Manual Output        °
aeeeeeeeeeeeeeeeeeeeeeeeeeeef

```

```
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
```

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

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: 1

NO SIGN PLACE

LEADING ZEROS NOT SHOWN

REGISTER LOW: 3277

REGISTER HIGH: 16384

DISPLAY LOW: 0.000

DISPLAY HIGH: 8.000

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

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

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

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

DATA POSITION #3: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER: N20:18

DECIMAL RIGHT: 1

DECIMAL LEFT: 2

NO SIGN PLACE

LEADING ZEROS NOT SHOWN

REGISTER LOW: 0

REGISTER HIGH: 16383

DISPLAY LOW: 0.0

DISPLAY HIGH: 20.0

DATA POSITION #4: 16 BIT UNSIGNED INTEGER ENTRY

REGISTER: N20:18

DECIMAL RIGHT: 1

DECIMAL LEFT: 2

NO SIGN PLACE

DEFAULT: NONE

REGISTER LOW: 0

REGISTER HIGH: 16383

DISPLAY LOW: 0.0

DISPLAY HIGH: 20.0

LOW INPUT LIMIT: 4.0

HIGH INPUT LIMIT: 9.0

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

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

REGISTER:
BIT NUMBER:

N20:17
6

ENTRY FORMAT:
DEFAULT:

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1 & 0 KEYS
NONE

~~~~~

SCREEN #016: SECURITY

SCREEN MEMORY USED: 61 BYTES

```

PREVIOUS MENU:          012
NEXT SCREEN:            017
PREVIOUS SCREEN:        UNLINKED
SECURITY CODE #1:       18??????
SECURITY CODE #2:       22??????
SECURITY CODE #3:       44??????

```

```

1éèèèèèèèèèèèèèèèèèèèèèèèèèèèèè;
°*RESTRICTED ACCESS*°
° ENTER CODE °
° : °
° °
ääèèèèèèèèèèèèèèèèèèèèèèèèèèèèf

```

~~~~~

SCREEN #017: SUB-MENU

```
SCREEN MEMORY USED:  70 BYTES
PREVIOUS MENU:      012
```

```
fēēēēēēēēēēēēēēēēēēēēēēē;
° DOV PID SUBMENU °
°1 Prop Gain °
°2 Reset °
°3 Derivative °
āēēēēēēēēēēēēēēēēēēēēēf
```

```
Item/Key # 1 links to screen 018
Item/Key # 2 links to screen 019
Item/Key # 3 links to screen 021
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
```

~~~~~

SCREEN #018: DATA ENTRY

SCREEN MEMORY USED: 185 BYTES

```
PREVIOUS MENU:      017
NEXT SCREEN:       019
PREVIOUS SCREEN:    UNLINKED
```

```

iiiiiiiiiiiiiiiiiiiiii;
° Gain (0.01-327.67) °
°DOV OUTPUT:    b1b% °
°Prop. Gain     bbb2bb°
°Enter          bbb3bb°
aaaaaaaaaaaaaaaaaaaaaa f

```

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:     16383
DISPLAY LOW:       0
DISPLAY HIGH:      100
```

DATA POSITION #2: 16 BIT UNSIGNED INTEGER DISPLAY

```
REGISTER:          N20:19
DECIMAL RIGHT:     2
DECIMAL LEFT:      3
NO SIGN PLACE
LEADING ZEROS NOT SHOWN
```

```
REGISTER LOW:      1
REGISTER HIGH:     16383
DISPLAY LOW:       0.01
DISPLAY HIGH:      327.67
```

DATA POSITION #3: 16 BIT UNSIGNED INTEGER ENTRY

```
REGISTER:          N20:19
DECIMAL RIGHT:     2
DECIMAL LEFT:      3
NO SIGN PLACE
DEFAULT:           NONE
```

```
REGISTER LOW:      1
REGISTER HIGH:     16383
DISPLAY LOW:       0.01
DISPLAY HIGH:      327.67
LOW INPUT LIMIT:   0.01
HIGH INPUT LIMIT:  327.67
```

aa

SCREEN #019: DATA ENTRY

SCREEN MEMORY USED: 177 BYTES

PREVIOUS MENU: 017

NEXT SCREEN: 021

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: 16383

DISPLAY LOW: 0

DISPLAY HIGH: 100

DATA POSITION #2: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER: N20:20

DECIMAL RIGHT: 2

DECIMAL LEFT: 3

NO SIGN PLACE

LEADING ZEROS NOT SHOWN

REGISTER LOW: 1

REGISTER HIGH: 16383

DISPLAY LOW: 0.01

DISPLAY HIGH: 327.67

DATA POSITION #3: 16 BIT UNSIGNED INTEGER ENTRY

REGISTER: N20:20

DECIMAL RIGHT: 2

DECIMAL LEFT: 3

NO SIGN PLACE

DEFAULT: NONE

REGISTER LOW: 1

REGISTER HIGH: 16383

DISPLAY LOW: 0.01

DISPLAY HIGH: 327.67

LOW INPUT LIMIT: 0.01

HIGH INPUT LIMIT: 327.67

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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

DECIMAL RIGHT: 1

DECIMAL LEFT: 2

NO SIGN PLACE

LEADING ZEROS NOT SHOWN

REGISTER LOW: 3277

REGISTER HIGH: 16384

DISPLAY LOW: 0.0

DISPLAY HIGH: 62.0

DATA POSITION #2: 16 BIT SIGNED INTEGER DISPLAY

REGISTER: N60:27

DECIMAL RIGHT: 0

DECIMAL LEFT: 3

SHOW SIGN

LEADING ZEROS NOT SHOWN

REGISTER LOW: -454

REGISTER HIGH:

DISPLAY LOW: -454

DISPLAY HIGH: 752

DATA POSITION #3: 16 BIT SIGNED INTEGER DISPLAY

REGISTER: N60:26

DECIMAL RIGHT: 0

DECIMAL LEFT: 3

SHOW SIGN

LEADING ZEROS NOT SHOWN

REGISTER LOW: -454

REGISTER HIGH:

DISPLAY LOW: -454

DISPLAY HIGH: 752

DATA POSITION #4: 16 BIT SIGNED INTEGER DISPLAY

REGISTER: N60:24

DECIMAL RIGHT: 0

DECIMAL LEFT: 3

SHOW SIGN

LEADING ZEROS NOT SHOWN

REGISTER LOW: -454

REGISTER HIGH:

DISPLAY LOW: -454

DISPLAY HIGH: 752

aa

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

DECIMAL RIGHT: 0

DECIMAL LEFT: 5

NO SIGN PLACE

LEADING ZEROS NOT SHOWN

REGISTER LOW: 0

REGISTER HIGH: 16383

DISPLAY LOW: 0

DISPLAY HIGH: 100

DATA POSITION #2: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER: N20:21

DECIMAL RIGHT: 2

DECIMAL LEFT: 3

NO SIGN PLACE

LEADING ZEROS NOT SHOWN

REGISTER LOW: 1

REGISTER HIGH: 16383

DISPLAY LOW: 0.01

DISPLAY HIGH: 327.67

DATA POSITION #3: 16 BIT UNSIGNED INTEGER ENTRY

REGISTER: N20:21

DECIMAL RIGHT: 2

DECIMAL LEFT: 3

NO SIGN PLACE

DEFAULT: NONE

REGISTER LOW: 1

REGISTER HIGH: 16383

DISPLAY LOW: 0.01

DISPLAY HIGH: 327.67

LOW INPUT LIMIT: 0.01

HIGH INPUT LIMIT: 327.67

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aa

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

DECIMAL RIGHT: 0

DECIMAL LEFT: 3

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: N60:24

DECIMAL RIGHT: 0

DECIMAL LEFT: 3

SHOW SIGN

LEADING ZEROS NOT SHOWN

REGISTER LOW: -454

REGISTER HIGH: 752

DISPLAY LOW: -454

DISPLAY HIGH: 752

DATA POSITION #3: 16 BIT SIGNED INTEGER DISPLAY

REGISTER: N60:25

DECIMAL RIGHT: 0

DECIMAL LEFT: 3

SHOW SIGN

LEADING ZEROS NOT SHOWN

REGISTER LOW: -454

REGISTER HIGH: 752

DISPLAY LOW: -454

DISPLAY HIGH: 752

DATA POSITION #4: 16 BIT SIGNED INTEGER DISPLAY

REGISTER: N60:27

DECIMAL RIGHT: 0

DECIMAL LEFT: 3

SHOW SIGN

LEADING ZEROS NOT SHOWN

REGISTER LOW: -454

REGISTER HIGH: 752

DISPLAY LOW: -454

DISPLAY HIGH: 752

~~~~~

```

SCREEN #026: DATA DISPLAY
SCREEN MEMORY USED:      239 BYTES
PREVIOUS MENU:           UNLINKED
NEXT SCREEN:             001
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  16 BIT UNSIGNED INTEGER DISPLAY

```

```

REGISTER:          N60:6          REGISTER LOW:      3277
DECIMAL RIGHT:     0              REGISTER HIGH:     16383
DECIMAL LEFT:      3              DISPLAY LOW:        0
NO SIGN PLACE
LEADING ZEROS NOT SHOWN          DISPLAY HIGH:      300

```

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

REGISTER:          N60:15          REGISTER LOW:          3277
DECIMAL RIGHT:     2                REGISTER HIGH:         16383
DECIMAL LEFT:      1                DISPLAY LOW:             0.00
NO SIGN PLACE
LEADING ZEROS NOT SHOWN            DISPLAY HIGH:           8.00
```

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

REGISTER:          C5:2.2          REGISTER LOW:          0
DECIMAL RIGHT:     0                REGISTER HIGH:         9999
DECIMAL LEFT:      4                DISPLAY LOW:            0
NO SIGN PLACE                                     DISPLAY HIGH:         9999
LEADING ZEROS NOT SHOWN
```

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

REGISTER:	C5:1.2	REGISTER LOW:	0
DECIMAL RIGHT:	0	REGISTER HIGH:	9999
DECIMAL LEFT:	4	DISPLAY LOW:	0
NO SIGN PLACE		DISPLAY HIGH:	9999
SHOW LEADING ZEROS			

```
DATA POSITION #5: 16 BIT UNSIGNED INTEGER DISPLAY
```

REGISTER:	N60:2	REGISTER LOW:	3277
DECIMAL RIGHT:	1	REGISTER HIGH:	16383
DECIMAL LEFT:	2	DISPLAY LOW:	0.0
NO SIGN PLACE		DISPLAY HIGH:	30.0
LEADING ZEROS NOT SHOWN			

Jan 19 00

FILE: U102NEW1.CFG

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SCREEN #027: DATA DISPLAY

SCREEN MEMORY USED: 241 BYTES

PREVIOUS MENU: UNLINKED

NEXT SCREEN: 028

PREVIOUS SCREEN: UNLINKED

DATA POSITION #1: 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 #2: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER:	N60:6	REGISTER LOW:	3277
DECIMAL RIGHT:	0	REGISTER HIGH:	16383
DECIMAL LEFT:	3	DISPLAY LOW:	0
NO SIGN PLACE		DISPLAY HIGH:	300
LEADING ZEROS NOT SHOWN			

DATA POSITION #3: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER:	N60:15	REGISTER LOW:	3277
DECIMAL RIGHT:	2	REGISTER HIGH:	16383
DECIMAL LEFT:	1	DISPLAY LOW:	0.00
NO SIGN PLACE		DISPLAY HIGH:	8.00
LEADING ZEROS NOT SHOWN			

DATA POSITION #4: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER:	C5:2.2	REGISTER LOW:	0
DECIMAL RIGHT:	0	REGISTER HIGH:	9999
DECIMAL LEFT:	4	DISPLAY LOW:	0
NO SIGN PLACE		DISPLAY HIGH:	9999
LEADING ZEROS NOT SHOWN			

DATA POSITION #5: 16 BIT UNSIGNED INTEGER DISPLAY

REGISTER:	C5:1.2	REGISTER LOW:	0
DECIMAL RIGHT:	0	REGISTER HIGH:	9999
DECIMAL LEFT:	4	DISPLAY LOW:	0
NO SIGN PLACE		DISPLAY HIGH:	9999
LEADING ZEROS NOT SHOWN			

~~~~~

```

SCREEN #028: DATA DISPLAY
SCREEN MEMORY USED:      169 BYTES
PREVIOUS MENU:           UNLINKED
NEXT SCREEN:             029
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  16 BIT UNSIGNED INTEGER DISPLAY

```

```

DATA POSITION #2:  16 BIT UNSIGNED INTEGER DISPLAY

REGISTER:          N60:3          REGISTER LOW:          3277
DECIMAL RIGHT:     1              REGISTER HIGH:         16383
DECIMAL LEFT:      2              DISPLAY LOW:            0.0
NO SIGN PLACE                               DISPLAY HIGH:         30.0
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 #031: DATA ENTRY

SCREEN MEMORY USED:      111 BYTES

PREVIOUS MENU:           030
NEXT SCREEN:             001
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  BIT DISPLAY

```

```
1ēēēēēēēēēēēēēēēēēēē;
◦      U-102 Jmp Htr           ◦
◦Jmp Htr is PlP               ◦
◦Enter 1 for On                ◦
◦       0 for OFF:2            ◦
āēēēēēēēēēēēēēēēēēēēf
```

REGISTER:	N20:17	OFF BIT TEXT:	OFF
BIT NUMBER:	4	ON BIT TEXT:	ON
TEXT LENGTH:	3		

DATA POSITION #2: BIT ENTRY

REGISTER:	N20:17	ENTRY FORMAT:	1 & 0 KEYS
BIT NUMBER:	4	DEFAULT:	NONE

~~~~~

```

SCREEN #032: DATA ENTRY

SCREEN MEMORY USED:      167 BYTES

PREVIOUS MENU:           030
NEXT SCREEN:             001
PREVIOUS SCREEN:         UNLINKED
DATA POSITION #1:  16 BIT SIGNED I

```

```

1ēēēēēēēēēēēēēēēēēēē;
°JumperTemp:   BBB1BBF°
°Old Setpoint:BBB2BB °
°New Setpoint:BBB3BBF°
āēēēēēēēēēēēēēēēēēēf

```

```

REGISTER:          N60:25          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:          N31:4          REGISTER LOW:      -454
DECIMAL RIGHT:     0              REGISTER HIGH:     752
DECIMAL LEFT:      5              DISPLAY LOW:       -454
SHOW SIGN                                     DISPLAY HIGH:     752
LEADING ZEROS NOT SHOWN

```

DATA POSITION #3: 16 BIT SIGNED INTEGER ENTRY

```

REGISTER:          N31:4          REGISTER LOW:      -454
DECIMAL RIGHT:     0              REGISTER HIGH:     752
DECIMAL LEFT:      5              DISPLAY LOW:       -454
SHOW SIGN                                DISPLAY HIGH:      752
DEFAULT:           NONE           LOW INPUT LIMIT:    50
                                      HIGH INPUT LIMIT: 200

```

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DISPLAY HIGH: 752

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SCREEN #035: DATA ENTRY

SCREEN MEMORY USED: 133 BYTES

PREVIOUS MENU: 001

NEXT SCREEN: 001

PREVIOUS SCREEN: UNLINKED

DATA POSITION #1: 16 BIT SIGNED INTEGER DISPLAY

REGISTER: N30:3

DECIMAL RIGHT: 0

DECIMAL LEFT: 2

NO SIGN PLACE

SHOW LEADING ZEROS

REGISTER LOW: 0

REGISTER HIGH: 50

DISPLAY LOW: 0

DISPLAY HIGH: 50

DATA POSITION #2: 16 BIT SIGNED INTEGER ENTRY

REGISTER: N30:3

DECIMAL RIGHT: 0

DECIMAL LEFT: 2

NO SIGN PLACE

DEFAULT: NONE

REGISTER LOW: 0

REGISTER HIGH: 50

DISPLAY LOW: 0

DISPLAY HIGH: 50

LOW INPUT LIMIT: 0

HIGH INPUT LIMIT: 50

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

SCREEN #040: SUB-MENU

SCREEN MEMORY USED: 88 BYTES

PREVIOUS MENU: 001

iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii;

° ALARMS °

°1. 1-4 | 4. 13-16 °

°2. 5-8 | 5. 17-20 °

°3. 9-12 | 6. 21-UP °

iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii;

Item/Key # 1 links to screen 041

Item/Key # 2 links to screen 042

Item/Key # 3 links to screen 043

Item/Key # 4 links to screen 044

Item/Key # 5 links to screen 045

Item/Key # 6 links to screen 046

Item/Key # 7 is unlinked

Item/Key # 8 is unlinked

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

SCREEN #041: DATA DISPLAY

SCREEN MEMORY USED: 181 BYTES

PREVIOUS MENU: 040
NEXT SCREEN: 042
PREVIOUS SCREEN: UNLINKEDiiiiiiiiiiiiiiiiiiiiiiiiii;
° XFR Pressure pp1p °
° XFR Pressure pp2p °
° Flush Press pp3p °
° Pump pp4ppp °
aaaaaaaaaaaaaaaaaaaaaaaaaaf

DATA POSITION #1: BIT DISPLAY

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

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:24
BIT NUMBER: 2
TEXT LENGTH: 4OFF BIT TEXT: norm
ON BIT TEXT: HIGH

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:24
BIT NUMBER: 3
TEXT LENGTH: 4OFF BIT TEXT: norm
ON BIT TEXT: HIGH

DATA POSITION #4: BIT DISPLAY

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

~~~~~

```

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	OFF BIT TEXT:	norm
BIT NUMBER:	9	ON BIT TEXT:	LOW
TEXT LENGTH:	4		

DATA POSITION #2: BIT DISPLAY

```

REGISTER:      N20:24      OFF BIT TEXT:      norm
BIT NUMBER:    10          ON BIT TEXT:      HIGH
TEXT LENGTH:   4

```

DATA POSITION #3: BIT DISPLAY

```

REGISTER:          N20:24          OFF BIT TEXT:      norm
BIT NUMBER:        11              ON BIT TEXT:         HIGH
TEXT LENGTH:       4

```

DATA POSITION #4: BIT DISPLAY

REGISTER:	N20:24	OFF BIT TEXT:	norm
BIT NUMBER:	12	ON BIT TEXT:	SHUTDOWN
TEXT LENGTH:	8		

aa

SCREEN #044: DATA DISPLAY

SCREEN MEMORY USED: 181 BYTES

PREVIOUS MENU: 040

NEXT SCREEN: 045

PREVIOUS SCREEN: UNLINKED

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:24

BIT NUMBER: 13

TEXT LENGTH: 4

OFF BIT TEXT: norm

ON BIT TEXT: LOW

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:24

BIT NUMBER: 14

TEXT LENGTH: 4

OFF BIT TEXT: norm

ON BIT TEXT: LOST

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:24

BIT NUMBER: 15

TEXT LENGTH: 7

OFF BIT TEXT: norm

ON BIT TEXT: FAILURE

DATA POSITION #4: BIT DISPLAY

REGISTER: N20:25

BIT NUMBER: 0

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: LOST

iiiiiiiiiiiiiiiiiiiiiiiiiiiiii;
° SGT Level bb1b°
° RFPT SIGNAL bb2b °
° Network bbb3bbb°
° JFPT SIGNAL bb4bb °
aaaaaaaaaaaaaaaaaaaaaaaaaaaaaf

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```

ïëëëëëëëëëëëëëëëëëëë;
• Recirc Loop    PP1PP •
• FGM            PP2PP •
• Leak ST#4      PP3PP •
• U Shtdown      PP4PP •
äëëëëëëëëëëëëëëëëëëf

```

```
OFF BIT TEXT:      norm
ON BIT TEXT:       Alarm
```

```
OFF BIT TEXT:      norm
ON BIT TEXT:       Alarm
```

```
OFF BIT TEXT:      norm
ON BIT TEXT:       Alarm
```

```
OFF BIT TEXT:      norm
ON BIT TEXT:       Alarm
```

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aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

SCREEN #048: DATA DISPLAY

SCREEN MEMORY USED: 176 BYTES

PREVIOUS MENU: UNLINKED

NEXT SCREEN: 050

PREVIOUS SCREEN: UNLINKED

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:25

BIT NUMBER: 9

TEXT LENGTH: 4

OFF BIT TEXT: norm

ON BIT TEXT: HIGH

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:25

BIT NUMBER: 10

TEXT LENGTH: 4

OFF BIT TEXT: norm

ON BIT TEXT: Leak

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:25

BIT NUMBER: 11

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #4: BIT DISPLAY

REGISTER: N20:25

BIT NUMBER: 12

TEXT LENGTH: 4

OFF BIT TEXT: norm

ON BIT TEXT: Leak

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

SCREEN #050: DATA DISPLAY

SCREEN MEMORY USED: 146 BYTES

PREVIOUS MENU: UNLINKED

NEXT SCREEN: 052

PREVIOUS SCREEN: 048

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:25

BIT NUMBER: 13

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:25

BIT NUMBER: 14

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:25

BIT NUMBER: 15

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

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

iiiiiiiiiiiiiiiiiiiiiiiiii;
° COB U33 Leak bb1bb °
° Unused bb2bb °
° Dilution tk bb3bb °
° COB U33 ck bb4bb °
aaaaaaaaaaaaaaaaaaaaaaaaaaaa

~~~~~

SCREEN #053: DATA DISPLAY

SCREEN MEMORY USED: 182 BYTES

PREVIOUS MENU: UNLINKED

NEXT SCREEN: 054

PREVIOUS SCREEN: 052

DATA POSITION #1: BIT DISPLAY

REGISTER: N20:51

BIT NUMBER: 4

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #2: BIT DISPLAY

REGISTER: N20:51

BIT NUMBER: 5

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #3: BIT DISPLAY

REGISTER: N20:51

BIT NUMBER: 6

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

DATA POSITION #4: BIT DISPLAY

REGISTER: N20:51

BIT NUMBER: 7

TEXT LENGTH: 5

OFF BIT TEXT: norm

ON BIT TEXT: Alarm

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ON BIT TEXT: Alarm

.....,

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OFF BIT TEXT: norm
ON BIT TEXT: Alarm

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~~~~~

```

SCREEN #058: DATA DISPLAY

SCREEN MEMORY USED:      53 BYTES

PREVIOUS MENU:           UNLINKED
NEXT SCREEN:             UNLINKED
PREVIOUS SCREEN:         057
DATA POSITION #1:  BIT DISPLAY

```

[illegible]

```
REGISTER:      N20:52
BIT NUMBER:    8
TEXT LENGTH:   5
```

OFF BIT TEXT: norm
ON BIT TEXT: Alarm

~~~~~

SCREEN #100: ALARM

SCREEN MEMORY USED: 68 BYTES

```

1eeeeeeeeeeeeeeeeeeeeeee;
° ACKNOWLEDGE STROBE °
°                               °
°                               °
° PRESS 'Y' TO CLEAR °
ääeeeeeeeeeeeeeeeeeeeeee f

```

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

~~~~~

SCREEN #101: ALARM

SCREEN MEMORY USED: 79 BYTES

```

iiiiiiiiiiiiiiiiiiiiii;
o      Alarm 1          o
o XFR Pressure LOW     o
o                      o
o PRESS 'Y' TO CLEAR   o
äääääääääääääääääääääf

```

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

~~~~~

SCREEN #102: ALARM

SCREEN MEMORY USED: 81 BYTES

[illegible]

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

~~~~~

SCREEN #103: ALARM

SCREEN MEMORY USED: 81 BYTES

```
ïëèèèèèèèèèèèèèèèèèè;
°           Alarm 3          °
° Flush Pressure HI        °
°                           °
° PRESS 'Y' TO CLEAR      °
äèèèèèèèèèèèèèèèèèèf
```

ACKNOWLEDGE ALARM TO REGISTER: N12:0

BIT NUMBER: 3

BIT WILL BE: SET.

[illegible]

SCREEN #104: ALARM

SCREEN MEMORY USED: 81 BYTES

[illegible]

ACKNOWLEDGE ALARM TO REGISTER: N12:0

BIT NUMBER: 4

BIT WILL BE: SET.

~~~~~

SCREEN #105: ALARM

SCREEN MEMORY USED: 93 BYTES

[illegible]

ACKNOWLEDGE ALARM TO REGISTER: N12:0

BIT NUMBER: 5

BIT WILL BE: SET.

[illegible]

SCREEN #106: ALARM

SCREEN MEMORY USED: 79 BYTES

```

íëèèèèèèèèèèèèèèèèèèèèèèèè;
°      Alarm 6 °
°    PUMP PIT LEAK °
°                °
° PRESS 'Y' TO CLEAR °
äèèèèèèèèèèèèèèèèèèèèèèèèf

```

ACKNOWLEDGE ALARM TO REGISTER: N12:0

BIT NUMBER: 6

BIT WILL BE: SET.


```
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#####
```

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[illegible]

Alarm 11

°Air Compressor Temp °

HI

° PRESS 'Y' TO CLEAR °

[illegible]

BIT NUMBER: 11

BIT NUMBER: 11

BIT WILL BE: SET.

[illegible]

íëêëêëêëêëêëêëêëêë;

Alarm 12

° JET PUMP SHUTDOWN °

0 0

° PRESS 'Y' TO CLEAR °

aeeeeeeeeeeeeeeeeeee f

BIT NUMBER: 12

BIT NUMBER: 12

BIT WILL BE: SET.

[illegible][illegible]

Alarm 13

° SGT LOW °

° PRESS 'Y' TO CLEAR °

[illegible]

BIT NUMBER: 13

BIT NUMBER: 13

BIT WILL BE: SET.

~~~~~

[illegible]

Alarm 14

Alarm 14

° RFPT SIGNAL LOSS °

ALARM

°Press 'Y' to Clear °

[illegible]

BIT NUMBER: 14

BIT NUMBER: 14

BIT WILL BE: SET.

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~~~~~

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[illegible]

```

o      ALARM 15      o
o  PLC Communications o
o      FAILURE       o
o  Press 'Y' to Clear o
o  ~~~~~f

```

BIT NUMBER: 15
BIT WILL BE: SET.

SCREEN #116: ALARM

```

1eeeeeeeeeeeeeeeeeeeeee;
o      Alarm 16      o
o  JFPT SIGNAL LOSS  o
o      ALARM         o
o  PRESS 'Y' TO CLEAR o
aeeeeeeeeeeeeeeeeeeeeef

```

```

BIT NUMBER:          0
BIT WILL BE:         SET.

```

SCREEN #117: ALARM

```

1eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee;
o      Alarm 17                      o
o      U FARM LEAK                   o
o      ALARM                         o
o      PRESS 'Y' TO CLEAR            o
aeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee f

```

```

BIT NUMBER:      1
BIT WILL BE:     SET.

```

SCREEN #118: ALARM

```

iiiiiiiiiiiiiiiiiiiiii;
o      Alarm 18          o
o    LK DT NO.1 COB U32  o
o      LEAK DETECTED     o
o    PRESS 'Y' TO CLEAR  o
aaaaaaaaaaaaaaaaaaaaaa~f

```

BIT NUMBER: 2
BIT WILL BE: SET.

[illegible]

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íëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëëë;

```

o      Alarm 19      o
o  LK DT NO.1 COB U32 o
o      TROUBLE      o
o  PRESS Y TO CLEAR  o
aeeeeeeeeeeeeeeeeeeef

```

BIT NUMBER: 3
BIT WILL BE: SET.

[illegible]

```
íëëëëëëëëëëëëëëëëëë;

```

```

o      Alarm 20      o
o      U TANK IN FLUSH  o
o                      o
o      PRESS 'Y' TO CLEAR o
aeeeeeeeeeeeeeeeeeeeeef

```

BIT NUMBER: 4
BIT WILL BE: SET.

[illegible][illegible]

```

o      Alarm 21      o
o      RECIRCULATION  o
o      FAILURE       o
o  PRESS 'Y' TO CLEAR o
aeeeeeeeeeeeeeeeeeeef

```

BIT NUMBER: 5
BIT WILL BE: SET.

[illegible][illegible]

```
o      Alarm 22          o  
o    FLAMMABLE GAS HIGH   o  
o                          o  
o    PRESS 'Y' TO CLEAR  o  
ooooooooooooooooooooooo
```

BIT NUMBER: 6
BIT WILL BE: SET.

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[illegible]

```

ïëèèèèèèèèèèèèèèèèèèè;
°      ALARM BIT 24          °
°    U TANK SHUTDOWN        °
°   TIMER ACTIVATED         °
° PRESS 'Y' TO CLEAR       °
äèèèèèèèèèèèèèèèèèèèèf
```

[illegible][illegible]

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[illegible]

SCREEN #127: ALARM

SCREEN MEMORY USED: 91 BYTES

```
iēēēēēēēēēēēēēēēēēēēēēēēē;
°      ALARM 27              °
°    VALVE PIT U-C          °
°    TROUBLE                °
° PRESS 'Y' TO CLEAR       °
āēēēēēēēēēēēēēēēēēēēēēēēf
```

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

[illegible]

SCREEN #128: ALARM

SCREEN MEMORY USED: 91 BYTES

[illegible]

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

~~~~~

SCREEN #129: ALARM

SCREEN MEMORY USED: 91 BYTES

[illegible]

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

~~~~~

SCREEN #130: ALARM

SCREEN MEMORY USED: 63 BYTES

```

ïèèèèèèèèèèèèèèèèèèèèèèè;
°          ALARM 30             °
°                               °
°                               °
° PRESS 'Y' TO CLEAR           °
äèèèèèèèèèèèèèèèèèèèèèèèf

```

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

```

o          ALARM 31          o
o      CGM TROUBLE          o
o                               o
o  PRESS 'Y' TO CLEAR      o
o aaaaaaaaaaaaaaaaaaaaaa f

```

~~~~~

```

o      ALARM 32      o
o      LEAK STATION 5  o
o      TROUBLE      o
o      PRESS 'Y' TO CLEAR  o
o      aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaf

```

~~~~~

```

      ALARM 33
      COB U-33 LEAK

      PRESS 'Y' TO CLEAR
      aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaef

```

~~~~~

```

o          ALARM 34          o
o                               o
o                               o
o  PRESS 'Y' TO CLEAR  o
aeeeeeeeeeeeeeeeeeeeeeeef

```

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~~~~~

SCREEN #139: ALARM

SCREEN MEMORY USED: 92 BYTES

[illegible]

```
ACKNOWLEDGE ALARM TO REGISTER: N12:2  
BIT NUMBER: 6  
BIT WILL BE: SET.
```

ॐ नमो भगवते वासुदेवाय

SCREEN #140: ALARM

SCREEN MEMORY USED: 90 BYTES

```

ïëëëëëëëëëëëëëëëëëëëëëëë;
°          ALARM 40                °
°    VALVE PIT U-A                 °
°      LEAK                        °
° PRESS 'Y' TO CLEAR              °
äëëëëëëëëëëëëëëëëëëëëëëëf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:2  
BIT NUMBER: 7  
BIT WILL BE: SET.
```

~~~~~

SCREEN #141: ALARM

SCREEN MEMORY USED: 89 BYTES

```

1eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee;
o          ALARM 41                      o
o    VALVE PIT U-A                      o
o    TROUBLE                          o
o    PRESS 'Y' TO CLEAR                o
aeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee f

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:2  
BIT NUMBER: 8  
BIT WILL BE: SET.
```

[illegible]

SCREEN #142: ALARM

SCREEN MEMORY USED: 89 BYTES

[illegible]

```
ACKNOWLEDGE ALARM TO REGISTER: N12:2  
BIT NUMBER: 9  
BIT WILL BE: SET.
```

[illegible]

SCREEN #143: ALARM

SCREEN MEMORY USED: 88 BYTES

```

iiiiiiiiiiiiiiiiiiiiiii|
o      ALARM 43          o
o    VALVE PIT U-B       o
o     TROUBLE            o
o   PRESS 'Y' TO CLEAR  o
aaaaaaaaaaaaaaaaaaaaaaaf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:2  
BIT NUMBER: 10  
BIT WILL BE: SET.
```

[illegible]

SCREEN #144: ALARM

SCREEN MEMORY USED: 78 BYTES

```
iëèèèèèèèèèèèèèèèèèèèèèèèè;
o      ALARM 44 o
o    COB U-30 LEAK o
o                                     o
o   PRESS 'Y' TO CLEAR o
äèèèèèèèèèèèèèèèèèèèèèèèèf
```

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

~~~~~

SCREEN #145: ALARM

SCREEN MEMORY USED: 90 BYTES

```
iëèèèèèèèèèèèèèèèèèè;
o      ALARM 45    o
o      COB U-30   o
o      TROUBLE     o
o PRESS 'Y' TO CLEAR o
äèèèèèèèèèèèèèèèèèèf
```

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

~~~~~

SCREEN #146: ALARM

SCREEN MEMORY USED: 97 BYTES

```
iēēēēēēēēēēēēēēēēēēē;
°       ALARM 46                °
° U FARM RECIRC FLUSH          °
°   SIGNAL LOSS                 °
° PRESS 'Y' TO CLEAR           °
āēēēēēēēēēēēēēēēēēēf
```

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

~~~~~

SCREEN #147: ALARM

SCREEN MEMORY USED: 97 BYTES

```

1ēēēēēēēēēēēēēēēēēēēēēēē;
◦       ALARM 47 ◦
◦ U FARM JUMPER FLUSH◦
◦     SIGNAL LOSS ◦
◦ PRESS 'Y' TO CLEAR ◦
āēēēēēēēēēēēēēēēēēēēēēēf

```

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

~~~~~

SCREEN #148: ALARM

SCREEN MEMORY USED: 94 BYTES

```

1ēēēēēēēēēēēēēēēēēēē;
o      ALARM 48                o
o    VALVE PIT SY-B          o
o     LEAK ALARM              o
o PRESS 'Y' TO CLEAR        o
āēēēēēēēēēēēēēēēēēēf
```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:2  
BIT NUMBER: 15  
BIT WILL BE: SET.
```

[illegible]

SCREEN #149: ALARM

SCREEN MEMORY USED: 62 BYTES

[illegible]

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

[illegible]

SCREEN #150: ALARM

SCREEN MEMORY USED: 62 BYTES

```

ïèèèèèèèèèèèèèèèèèèèèèèè;
  °          ALARM 50           °
  °                               °
  °                               °
  ° PRESS 'Y' TO CLEAR        °
äèèèèèèèèèèèèèèèèèèèèèèèf

```

```
ACKNOWLEDGE ALARM TO REGISTER: N12:3  
BIT NUMBER: 1  
BIT WILL BE: SET.
```


[illegible]

ALARM ACKNOWLEDGE WILL NOT BE SENT

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