



Technical Manual

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

	I 10.5	
	I 10.6	
	I 10.7	
	I 11.0	
	I 11.1	
	I 11.2	
	I 11.3	
	I 11.4	
	I 11.5	
	I 11.6	
	I 11.7	
SLOT 7		
	I 12.0	
	I 12.1	
	I 12.2	
	I 12.3	
	I 12.4	
	I 12.5	
	I 12.6	
	I 12.7	
	I 13.0	
	I 13.1	
	I 13.2	
	I 13.3	
	I 13.4	
	I 13.5	
	I 13.6	
	I 13.7	
	I 14.0	
	I 14.1	
	I 14.2	
	I 14.3	
	I 14.4	
	I 14.5	
	I 14.6	
	I 14.7	
	I 15.0	
	I 15.1	
	I 15.2	
	I 15.3	
	I 15.4	
	I 15.5	
	I 15.6	
	I 15.7	
SLOT 8		
	I 16.0	
	I 16.1	
	I 16.2	
	I 16.3	
	I 16.4	
	I 16.5	
	I 16.6	
	I 16.7	
	I 17.0	
	I 17.1	
	I 17.2	
	I 17.3	
	I 17.4	
	I 17.5	
	I 17.6	
	I 17.7	
	I 18.0	
	I 18.1	
	I 18.2	
	I 18.3	
	I 18.4	
	I 18.5	
	I 18.6	
	I 18.7	
	I 19.0	
	I 19.1	
	I 19.2	
	I 19.3	
	I 19.4	
	I 19.5	
	I 19.6	
	I 19.7	
SLOT 9		
	I 20.0	
	I 20.1	
	I 20.2	
	I 20.3	
	I 20.4	
	I 20.5	
	I 20.6	
	I 20.7	
	I 21.0	
	I 21.1	
	I 21.2	
	I 21.3	
	I 21.4	
	I 21.5	

CATERPILLAR GLOBAL MINING, LLC.
ELECTRICAL ADJUSTMENTS FOR BLAST HOLE DRILLS
USING SIEMENS DC MOTION CONTROL DRIVES

ROTARY DRIVE START UP ADJUSTMENTS WITH POWER ON

PARAM. INDEX		PARAM	DEFAULT	MDV810 ROTARY	
<u>NO.</u>	<u>NO.</u>	<u>DESC.</u>	<u>VALUE</u>	<u>STD. VALUE</u>	<u>ACTUAL VALUE</u>
P664	1	SOURCE FOR CONTROL WORD 1, BIT 6	1	16	
P665	1	1ST SOURCE FOR CONTROL WORD 1, BIT 7	0	10	
P750	0	OUTPUT VALUE SOURCE, ANALOG OUTPUT 1	0	292	
P752	0	ANALOG OUTPUT 1 FILTER TIME	0	100	
P753	0	NORMALIZATION OF ANALOG OUTPUT 1	10	10.38	
P755	0	OUTPUT VALUE SOURCE, ANALOG OUTPUT 2	0	266	
P757	0	ANALOG OUTPUT 2 FILTER TIME	0	100	
P758	0	NORMALIZATION OF ANALOG OUTPUT 2	10	15	
P760	0	OUTPUT VALUE SOURCE, ANALOG OUTPUT 3	0	117	
P762	0	ANALOG OUTPUT 3 FILTER TIME	0	100	
P763	0	NORMALIZATION OF ANALOG OUTPUT 3	10	6.8	
P771	0	OUTPUT VALUE SOURCE, BINARY OUTPUT 1	0	107	
P820	7	DISABLE FAULT MONITORING	0	38	
P820	8	DISABLE FAULT MONITORING	0	42	
P820	9	DISABLE FAULT MONITORING	0	48	
P820	10	DISABLE FAULT MONITORING	0	40	
P825	1	FIELD FEEDBACK ANALOG OFFSET	19139	*	
P825	2	FIELD FEEDBACK ANALOG OFFSET	19139	*	
P825	3	FIELD FEEDBACK ANALOG OFFSET	19139	*	
P826	1	AC LINE ZERO CROSSING CORRECTION	0	**	
P826	2	AC LINE ZERO CROSSING CORRECTION	0	**	
P826	3	AC LINE ZERO CROSSING CORRECTION	0	**	
P826	4	AC LINE ZERO CROSSING CORRECTION	0	**	
P826	5	AC LINE ZERO CROSSING CORRECTION	0	**	
P826	6	AC LINE ZERO CROSSING CORRECTION	0	**	
U580	0	CONTROL WORD FOR COMMUTATION MONITORING	7	4	
U962	99	FUNCTION BLOCK PROCESSING SEQUENCE	299	0	
U962	100	FUNCTION BLOCK PROCESSING SEQUENCE	300	299	

* AUTOMATICALLY DETERMINED BY THE DRIVE DURING THE PARAMETER DEFAULT PROCEDURE.

** AUTOMATICALLY DETERMINED BY THE DRIVE IF ARMATURE CURRENT CONTROLLER SELF TUNING IS PERFORMED.

COPYRIGHTED

BULKHEAD LOCATIONS

CONNECTION DIAGRAM FOR BULKHEAD CONNECTORS

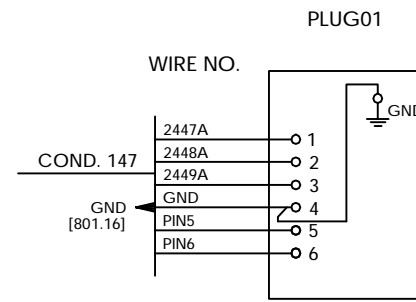
DISCONNECT PLUG / RECEPTACLE LOCATIONS

BULKHEAD PLUG CONNECTOR BULK01

PIN	PAGE.LINE
1	[24.47]
2	[24.48]
3	[24.49]
4	[24.45]
5	
6	

PLUG MASTER PIN OUT PLUG01

PIN	PAGE.LINE
1	[24.47]
2	[24.48]
3	[24.49]
4	[24.45]
5	
6	



PLUGS

HPBMDP

PIN	LINE
1	[27.13]
2	[27.14]
3	[27.15]
GND	[27.16]

RECEPTACLES

HPBMDR

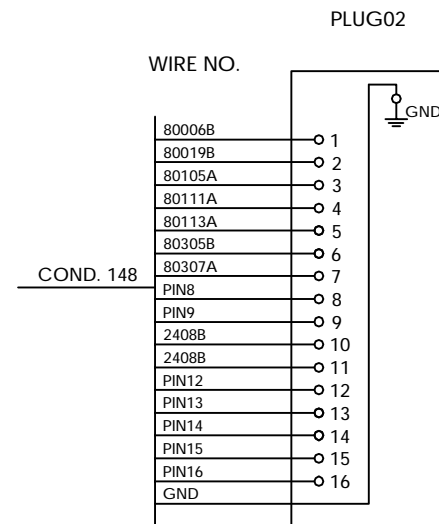
PIN	LINE
1	[27.13]
2	[27.14]
3	[27.15]
GND	[27.16]

BULKHEAD PLUG CONNECTOR BULK02

PIN	PAGE.LINE	PIN	PAGE.LINE
1	[800.06]	9	
2	[800.19]	10	[800.11]
3	[801.05]	11	[801.05]
4	[801.11]	12	
5	[801.11]	13	
6	[803.28]	14	
7	[803.28]	15	
8		16	

PLUG MASTER PIN OUT PLUG02

PIN	PAGE.LINE	PIN	PAGE.LINE
1	[800.06]	9	
2	[800.19]	10	[800.11]
3	[801.05]	11	[801.05]
4	[801.11]	12	
5	[801.11]	13	
6	[803.28]	14	
7	[803.28]	15	
8		16	



PLUGS

RBMDP

PIN	LINE
1	[27.04]
2	[27.05]
3	[27.06]
GND	[27.07]

RECEPTACLES

RBMDR

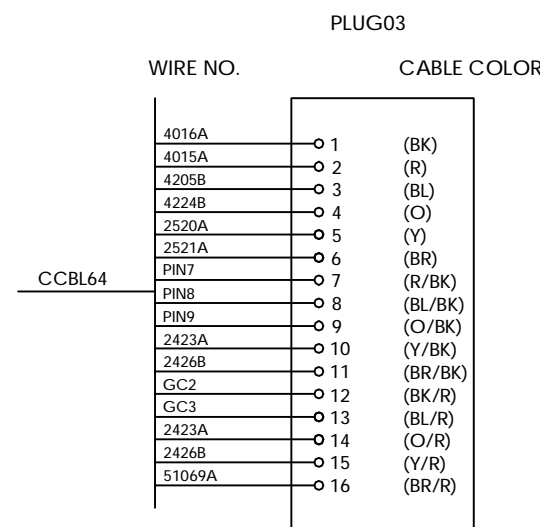
PIN	LINE
1	[27.04]
2	[27.05]
3	[27.06]
GND	[27.07]

BULKHEAD PLUG CONNECTOR BULK03

PIN	PAGE.LINE	PIN	PAGE.LINE
1	[40.25]	9	
2	[40.25]	10	[24.40]
3	[42.05]	11	[24.39]
4	[42.24]	12	[20.09]
5	[26.07]	13	[20.09]
6	[26.04]	14	[815.06]
7		15	[815.06]
8		16	[510.69]

PLUG MASTER PIN OUT PLUG03

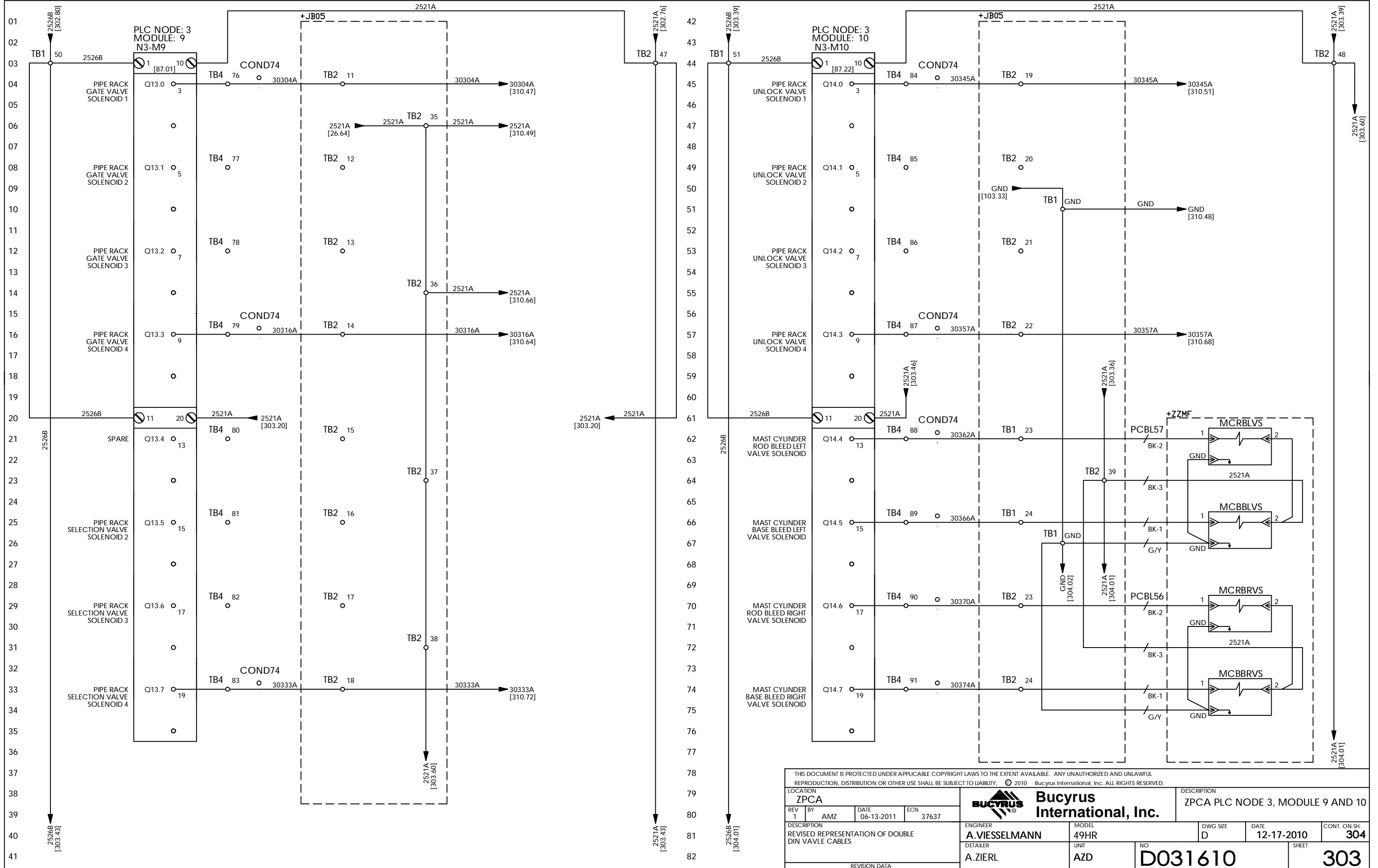
PIN	PAGE.LINE	PIN	PAGE.LINE
1	[40.26]	9	
2	[40.26]	10	[24.40]
3	[42.05]	11	[24.39]
4	[42.24]	12	[20.09]
5	[26.07]	13	[20.09]
6	[26.04]	14	[815.06]
7		15	[815.06]
8		16	[510.69]



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY. © 2010 Bucyrus International, Inc. ALL RIGHTS RESERVED.

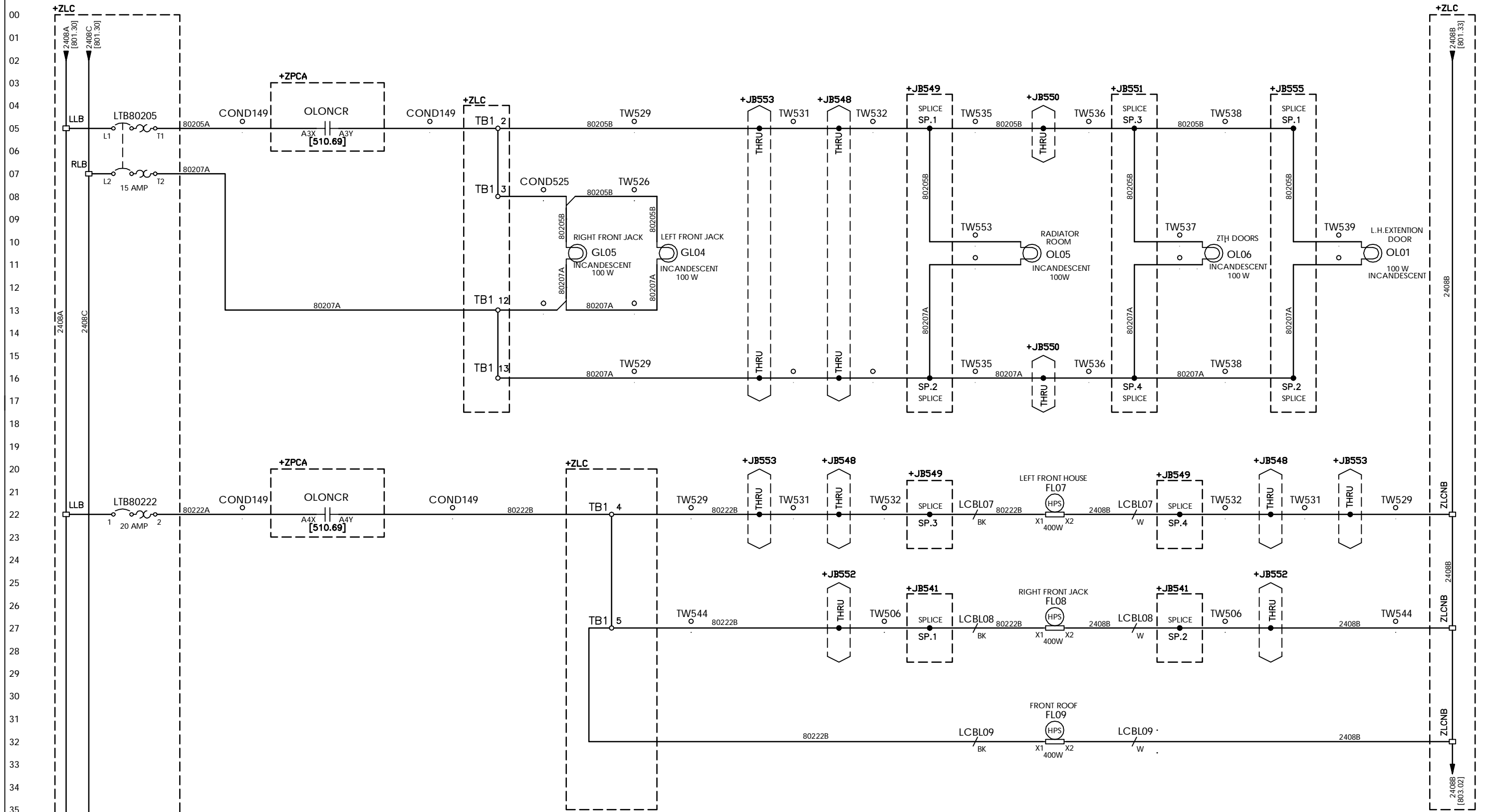
LOCATION						DESCRIPTION			
CONNECTION LOCATIONS									
REV 1	BY AMZ	DATE 06-13-2011	ECN 37637	ENGINEER A. VIESSELMANN	MODEL 49HR	DWG SIZE D	DATE 12-17-2010	CONT. ON SH. 8	
DESCRIPTION				DETAILER A. ZIERL	UNIT AZD	NO. D031610		SHEET 7	
REVISION DATA									

COPYRIGHTED



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY. © 2010 Bucyrus International, Inc. ALL RIGHTS RESERVED.

LOCATION ZPCA				Bucyrus International, Inc.		DESCRIPTION ZPCA PLC NODE 3, MODULE 9 AND 10	
REV 1	BY AMZ	DATE 06-13-2011	ECN 37637	ENGINEER A.VIESELMANN	MODEL 49HR	DWG SIZE D	DATE 12-17-2010
DESCRIPTION REVISED REPRESENTATION OF DOUBLE DIN VAVLE CABLES				UNIT A.ZIERL	NO. D031610	CONT. ON SH. 304	SHEET 303
REVISION DATA							



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY. © 2010 Bucyrus International, Inc. ALL RIGHTS RESERVED.

LOCATION ZZMF				DESCRIPTION LIGHT PLANT, OUTSIDE / FRONT FLOODLIGHTS				
REV 0	BY			DATE	ECN	ENGINEER A.VIESELMANN	MODEL 49HR	DWG SIZE D
DESCRIPTION		DETAILER A.ZIERL		UNIT AZD	NO. D031610	SHEET		802
REVISION DATA								

TABLE OF CONTENTS

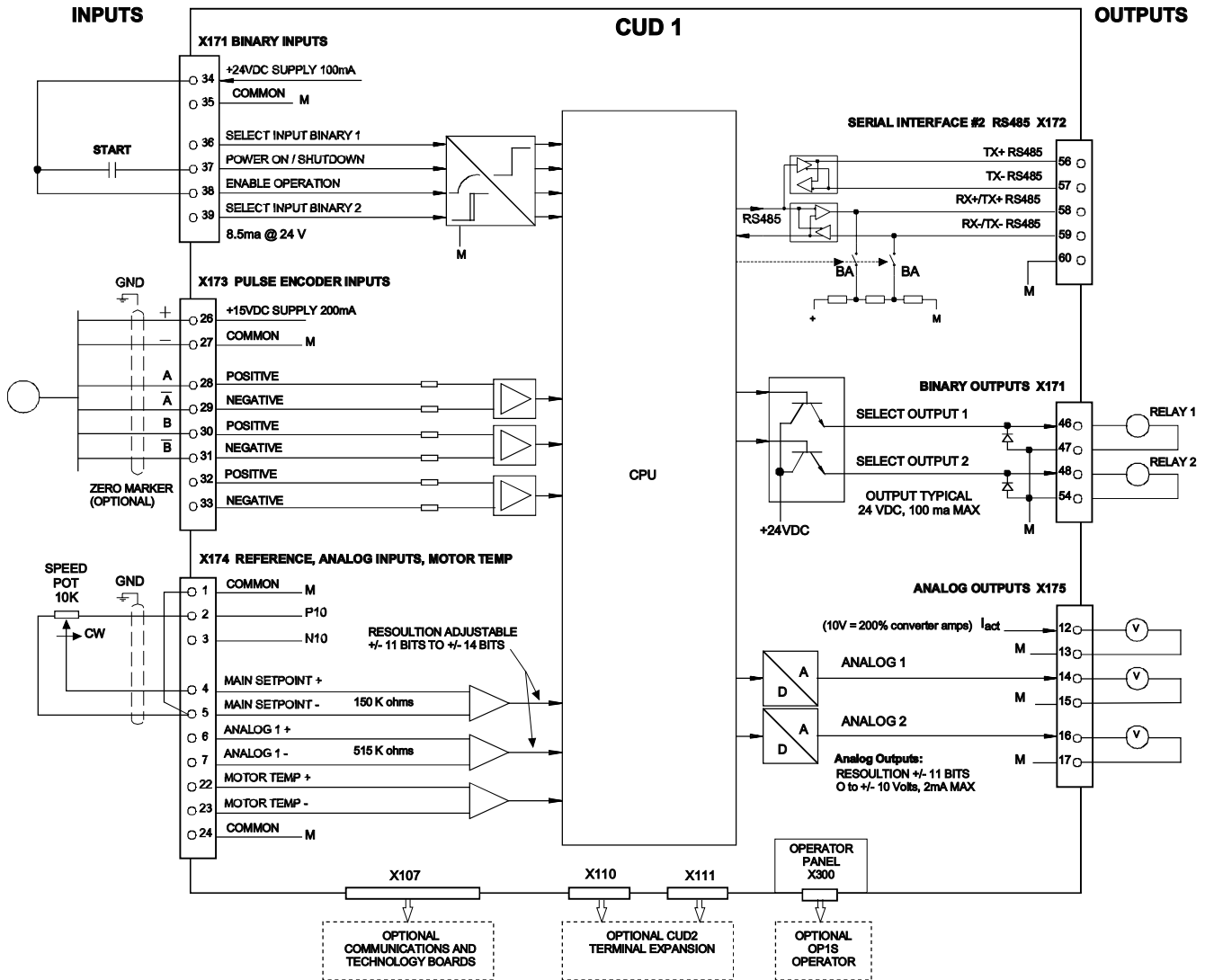
<u>Section</u>	<u>Page #</u>
1. G. Simoreg 6RA70 DC Drives	3
2. O. Simoreg 6RA70 Rotary & Hoist/Pulldown Drive Start-Up	8
 <u>Appendix</u>	
A. Simoreg 6RA70 Outline and Connection Diagrams	21
B. Simoreg 6RA70 Simplified Block Diagrams	22

- g) The field current value displayed on Operator Display should be within +/- 0.1 ADC of the value measured at the shunt.
 - h) If the rotary drive is being tested, put the RSCS speed switch in its medium speed position. The field current measured with the shunt millivoltmeter should be within +/- 0.1 ADC of the C-Sheet medium field value for the rotary drive. If the field current is outside this range, adjust parameter P402.01.
 - i) The field current value displayed on Operator Display should be within +/- 0.1 ADC of the value measured at the shunt.
 - j) Perform a final verification of the field current regulator setup by re-checking the field current values displayed on Operator Display at each speed switch position for the drive under test. The values displayed should be consistent with the C-Sheet values.
 - k) Press the CSS control off pushbutton.
- 21) The RMS rotary and HPMS hoist/pulldown master switch reference pots are supplied with +/- 10 VDC from the drive control power supplies. The pot wiper signal voltages are fed into the PLC analog input card. The PLC processes these signals and sends reference voltages to the drives via the PLC analog output card. The reference pot circuits should be checked as follows:
- a) Put the HPSS and RSCS hoist/pulldown and rotary speed switches in their high speed positions.
 - b) Press the Setup F1 (F7 on color display) button on Operator Display, and then press the COS control on pushbutton.
 - c) If the drive under test is rotary, move the RMS rotary master switch pot to its maximum position for clockwise bit rotation. If the drive under test is hoist/pulldown, move the HPMS hoist/pulldown master switch pot to its maximum position for hoist operation.
 - d) Check the value of main masterswitch setpoint terminals 4 and 5 by observing the value of parameter r001. The master switch pot position in step c above should result in a reading of 199.99 +/- 1%, which corresponds to +10 VDC +/- 0.1 VDC. If the polarity is wrong, measure the pot signal voltage at the operator console terminal blocks. Rotary master switch pot wire R6A should be negative with respect to wire R8, or hoist/pulldown master switch pot wire H6A should be negative with respect to wire H8. If the polarity is incorrect at this point, reverse wires R7 and R9 on the rotary pot or wires H7 and H9 on the hoist/pulldown pot. If the polarity is correct at the master switch pot, reverse the wiring at drive terminals 4 and 5.

7.2 Control Connections CUD1

TYPICAL CONTROL CONNECTIONS

Also see Start-up 8.4.1 and 8.4.2



Sheet 7 USS Interface 2 (X172)

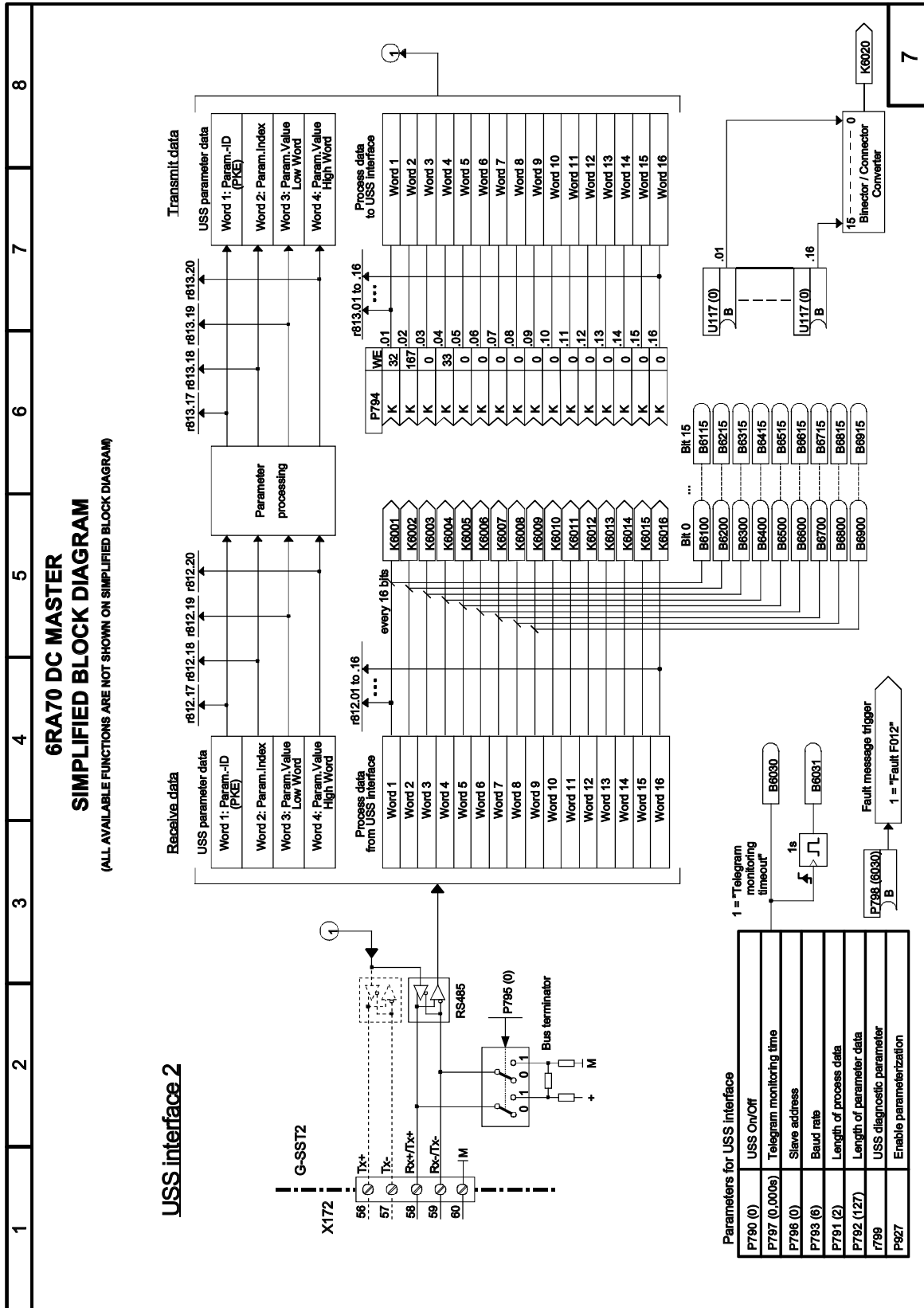


TABLE OF CONTENTS

OVERVIEW	7
HARDWARE	8
OVERVIEW	8
<i>Touch Screen and Keyboard</i>	8
<i>File Storage</i>	8
<i>Ethernet Communication</i>	9
<i>Power</i>	9
<i>Display Configuration and Setup</i>	9
<i>Opening the Display</i>	9
SOFTWARE OVERVIEW	10
BOOTUP (POWER UP)	10
NAVIGATION, PROGRAM CONTROL, AND DATA ENTRY	10
ICON AND NAVIGATION HELP SCREENS.....	10
SECURITY	11
DRILL OPERATION SCREENS	13
SCREEN LAYOUT	13
<i>Active Alarm Indicator (Screen Item 1)</i>	13
<i>Main Menu Buttons (Screen Item 2)</i>	14
<i>Languages Button (Screen Item 3)</i>	14
<i>Configuration Button (Screen Item 4)</i>	14
<i>Active Alarm Banner (Screen Item 5)</i>	14
<i>Clock (Screen Item 6)</i>	14
<i>Title Screen Button (Screen Item 7)</i>	14
<i>Help Button (Screen Item 8)</i>	14
<i>Display Name and Revision Date (Screen Item 9)</i>	14
MAIN MENU	15
<i>Status Screen Button</i>	15
<i>Calibration Screen Button</i>	15
<i>Active Logic Screen Button</i>	15
<i>PLC I/O Screen Button</i>	15
<i>Alarms History Screen Button</i>	15
<i>Hour Meters and Fault Counters Screen Button</i>	15
<i>Test Analog I/O Screen Button</i>	15
<i>Field Test Screen Button</i>	15
<i>Timers and Counters Screen Button</i>	16
<i>Programmed Drill Control (PDC) Screen Button</i>	16
STATUS SCREEN	16
<i>Limits</i>	17
<i>Rotary Current Bar Graph</i>	18
<i>Rotary Speed Bar Graph</i>	18
<i>Bailing Air Pressure Bar Graph</i>	18

DRILL OPERATION SCREENS

Screen Layout

There are a few areas of the display application that will be visible on most screens for information and navigation. These include the alarm banner, current time, icon help button, configuration button, language change button, active alarms indicator and main menu.

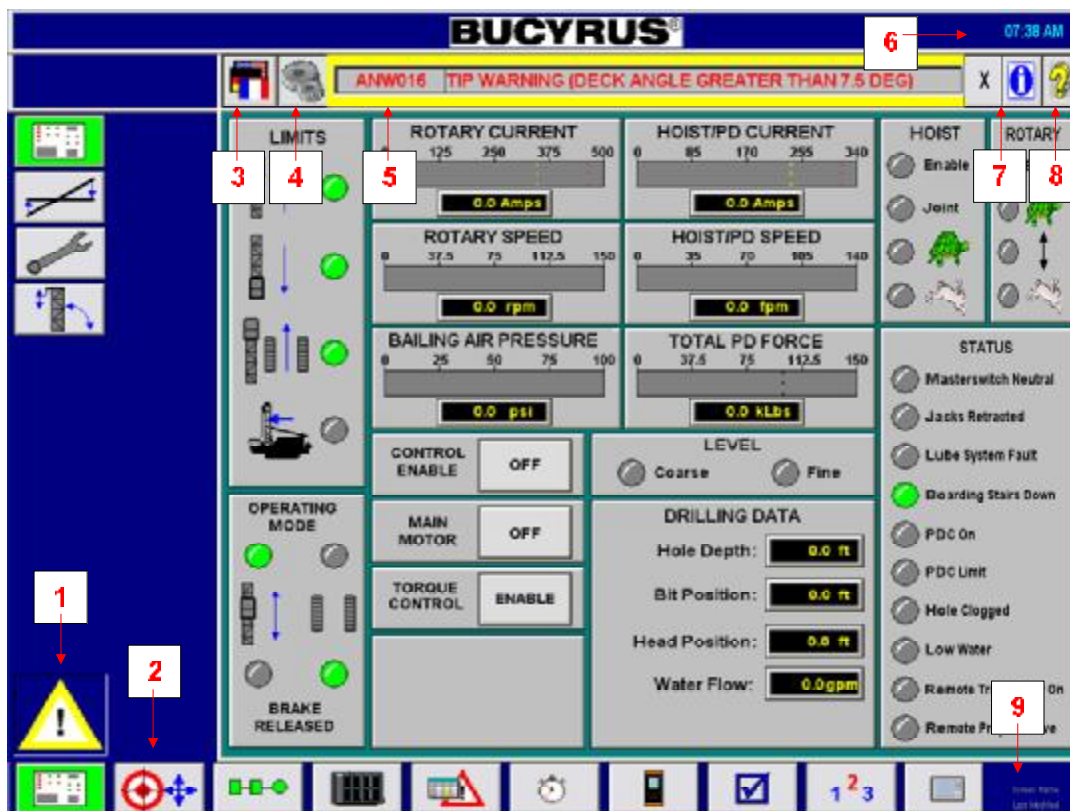


Figure 6 - Screen Layout

Active Alarm Indicator (Screen Item 1)

The Active Alarm indicator is a three-state icon indicator that is a triangle shape with an exclamation point in the middle, located in the lower left corner of the screen. It displays the current status of any alarms, faults, or messages on the drill. Its states are as follows:

NO ACTIVE ALARMS – When there are no alarms, faults, or messages currently active on the drill, a green light indicator appears in place of the triangle.

NEW ALARM (Illuminated/Flashing) – One or more alarm, fault, or message conditions on the drill have been detected but not yet acknowledged by the operator. Touching this button will acknowledge any new alarms, silence the audio alarm, and navigate to the Active Alarms Screen. See the Alarms section of this manual for more information.

Leveling Screen

The Leveling Screen is accessible from the Status Screen by pressing the button located in the left side submenu (see Figure 9). It provides more detail on the machine's level and jack status. This screen shows the right and rear views of the drill with information presented on jack operation, tilt status, and machine operational status. The information is presented in the form of graphical indicators, numeric displays and multi-state indicators.

Each element on the Leveling Screen will be discussed in detail in the following subsections. As on most screens, the current time is shown in the upper right corner. Refer to the Setup section of this manual for information on changing the time format.

The Leveling screen will come on automatically from any other screen whenever the drill is in an active Propel mode of operation or a manual/automatic leveling sequence is active.

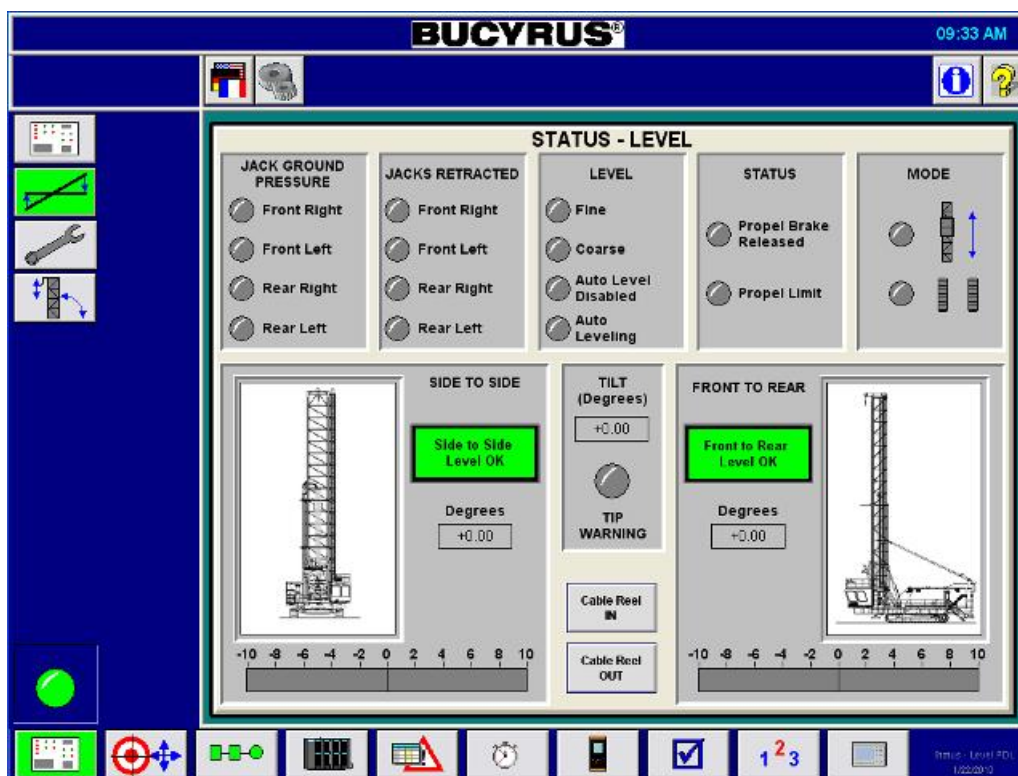


Figure 9 - Leveling Screen

Front to Rear Level Graph

The Front to Rear Level Graph is located on the bottom right of the screen. This gives a relative indication of the machine's front/rear tilt angle. A moving indicator bar shows the approximate angle of the drill deck in the front/ rear axis. When the indicator is displaying a negative angle it means that the rear end of the machine is low. When the drill is level, the indicator will be centered. In Fine Level mode, the machine can be up to 0.5° off center. In Coarse Level mode, the machine can be up to 2° off center.

Lubrication Setup Button

Below the lubrication timer table is the Lubrication Setup Button. Pressing this button toggles the lubrication setup mode which performs two functions. First, it performs the same function as holding the manual lube button down continuously. Second, this mode disables the lube system low pressure and vent pressure faults. When active, the background of this button will turn green.

Hour Meters and Fault Counters Screen

The Operating Hours & Fault Counters screen shows the length of time certain machine functions have been operating, as well as some cumulative hole and fault data (see Figure 16). This data can provide the maintenance and service personnel with a cumulative fault count of areas that may be experiencing problems. The accumulation interval can be controlled by manually resetting the counters at pre-established intervals and keeping records of machine performance during those intervals.

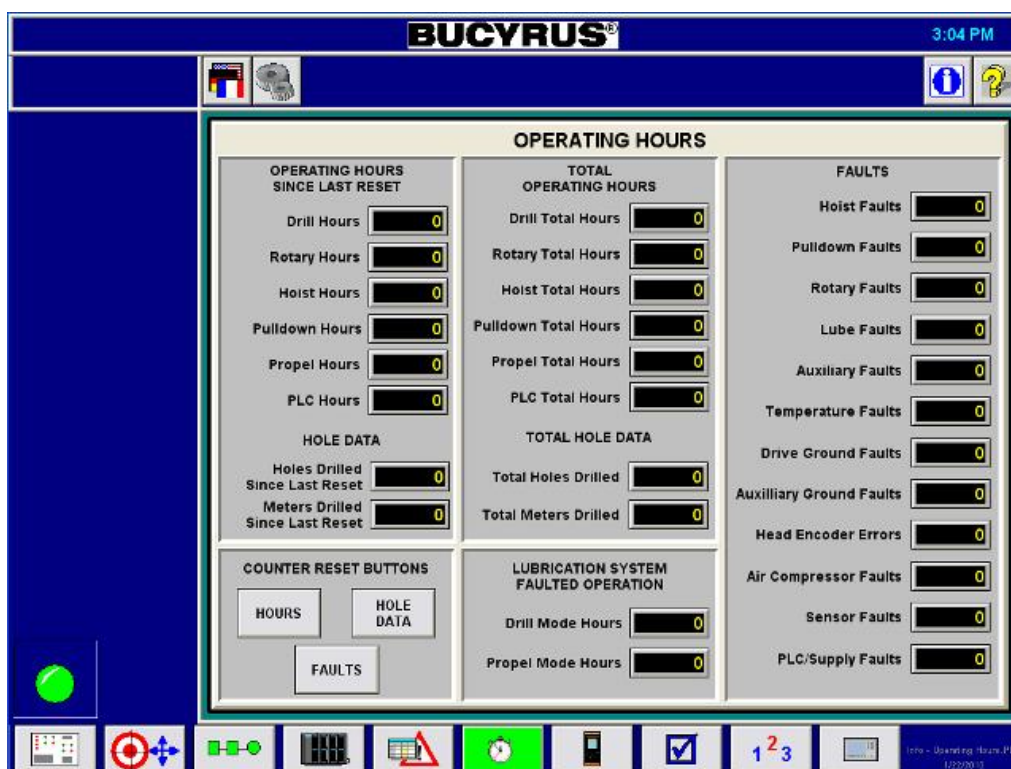


Figure 16 - Hour Meters & Fault Counters Screen

Total Operating Hours Section

The top middle section of the screen shows the total number of hours the drill has been powered on, the total number of hours spent operating the hoist and rotary motors, total hours propelling and the total number of hours the PLC has been turned on. The total number of holes drilled and total distance drilled is also displayed. It is not possible for the user to reset these values, however, they may be lost if the PLC program is reloaded.

Test 7

This test disables the under speed and over speed sense circuits on machines with the water injection option. It also removes some of the interlocks so the water injection can be tested independent of the air compressor. This test is primarily used during water injection setup.

Test 8

This test will allow the drill to propel without the jacks retracted.

Hydraulic Cards Setup

The Hydraulic Cards Setup Screen allows service personnel to force outputs to the proportional hydraulic cards in the initial setup of these cards (see Figure 22). Refer to the “Electrical Operation and Troubleshooting Manual” for the complete procedure. This screen should only be accessed by qualified Bucyrus personnel, but is discussed in this manual for completeness.

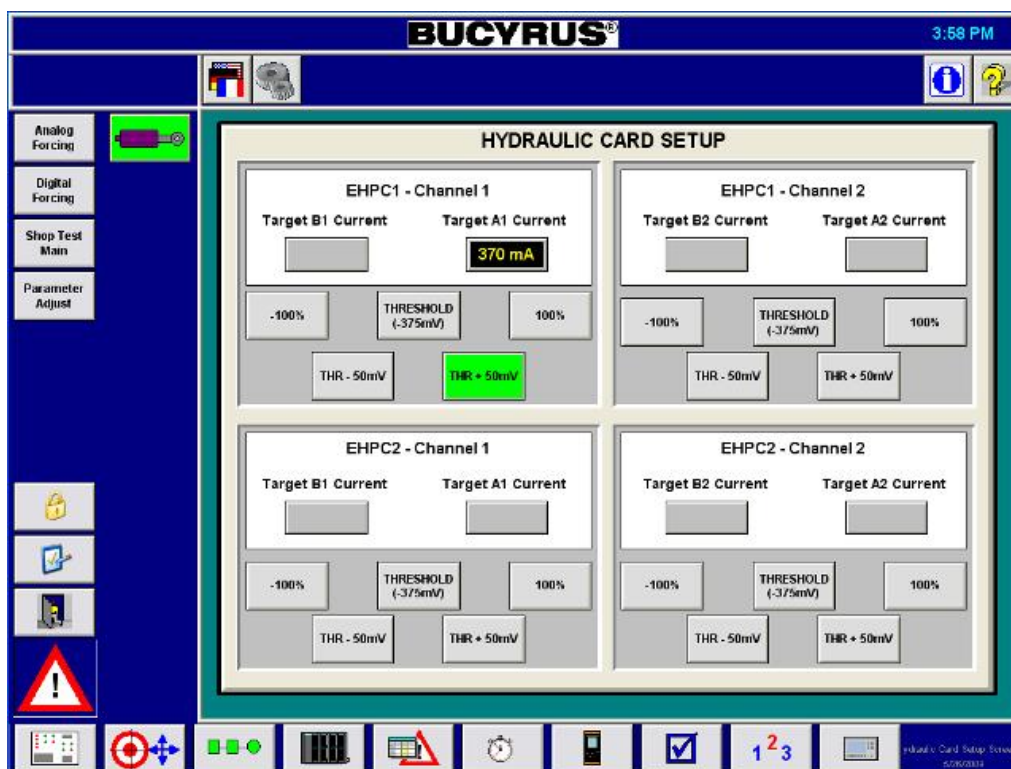


Figure 22 - Hydraulic Card Setup

Valve Output Buttons

Refer to the “Electrical Operation and Troubleshooting Manual” and machine C-Sheets for the complete procedure for setting up the proportional hydraulic cards as well as the most recent settings. Each button on this display forces an output value on proportional hydraulic card EHPC1 or EHPC2 that is necessary in setting the correct current ramp for each signal. The optimum threshold voltage for each signal, as well as all necessary ramp voltages for setting up these devices, are provided on this screen. After pressing a button to produce one of the ramp setting voltages, the ideal current output for that setting will be displayed under the target output label. Consult C-Sheets to verify these values as they represent the setup of a typical machine and are for reference only.

the information box. Refer to Appendix D of the "49HR Electrical Operation and Troubleshooting Manual" for an explanation of these codes.

Processor Scan Data

To the right of the Profibus information box is the scan time information. This shows the current amount of time it takes the PLC to execute the program once. It also shows the maximum and minimum times. Note that the maximum time usually occurs during the power-up cycle when system tests are performed. A high number here does not necessarily indicate a problem.

Processor LED Status

To the right of the screen, is a box that shows the LED status on the front of the PLC processor. Refer to Appendix B of the "49HR Electrical Operation and Troubleshooting Manual" for the meaning of these LED's. Note that in many error cases, it will be necessary to view the processor directly, since the display is not operational if the processor is not running.

PLC Diagnostic Buffer

The bottom right section of the screen shows the most recent codes in the PLC's diagnostic buffer. These codes sometimes refer to errors and other times are acknowledgements of certain functions. Note that these codes are shown in decimal format. It may be necessary to convert them to hexadecimal when checking their meaning. Refer to Appendix C of the "49HR Electrical Operation and Troubleshooting Manual".

Password Setup

Each password is listed in the Password section on the screen, along with the screens that can be accessed by each user. The Password Screen can be accessed through the left side submenu when on the Configuration Screen (see Figure 36).

To change a password, touch the desired entry box and enter the new password using the keypad that appears. Once this is done, the white box will change to reflect your entry. Passwords are numbers only, in the range of 100 to 32000. The following table shows each of the screens with security attached and the users that may access each screen.

	Admin	User 1	User 2	User 3	User 4	User 5	User 6
Configuration	X						
Calibration	X	X	X				
PDC Parameters	X	X		X			
Drive Tests	X	X			X		
Field Tests	X	X				X	
Operating Hours	X	X					X

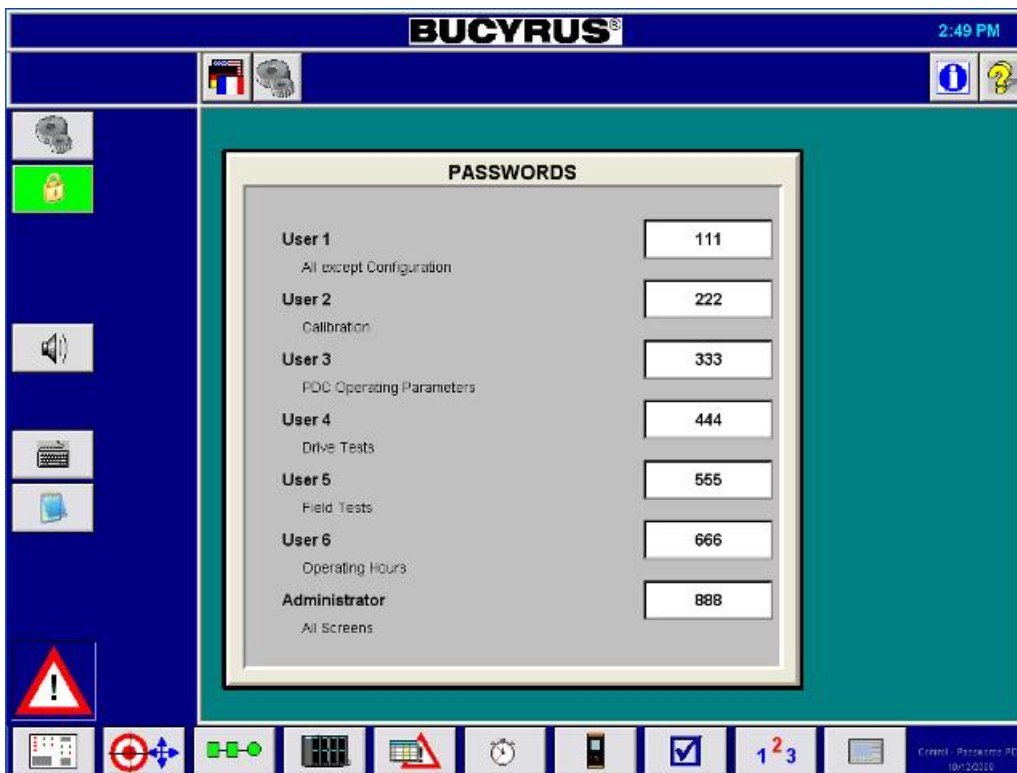


Figure 36 - Password Configuration Screen

WARNING: Do not forget the Administrator password. Without it, this screen cannot be accessed. It cannot be recovered without a service call from Bucyrus.

OVERVIEW

The 49HR is an electric drill designed by Bucyrus International Inc.® This instruction discusses its electrical control system. A separate instruction covers the operation of the operator display. Please refer to the hydraulic and mechanical documentation for help with other features of the drill.

This manual is written to help the user understand the workings and general operation of the 49HR electrical control system. Certain objects referred to in this manual and in the schematics as “options” are only present on drills where that particular feature has been purchased. On other systems, those items are either not wired or not functioning.

It is important to read this manual with respect to the actual schematics supplied with your drill. Certain design enhancements may have been made to your machine, which improve the operation of various systems. Therefore, there may be some differences between the operation described in this manual and the actual operation of the drill.

NOTICE: If at anytime the machine is operating in an unexpected and unsafe manner, pressing any of the EMERGENCY STOP pushbuttons located throughout the machine will interrupt control and set all PLC outputs to zero.

Console Controls

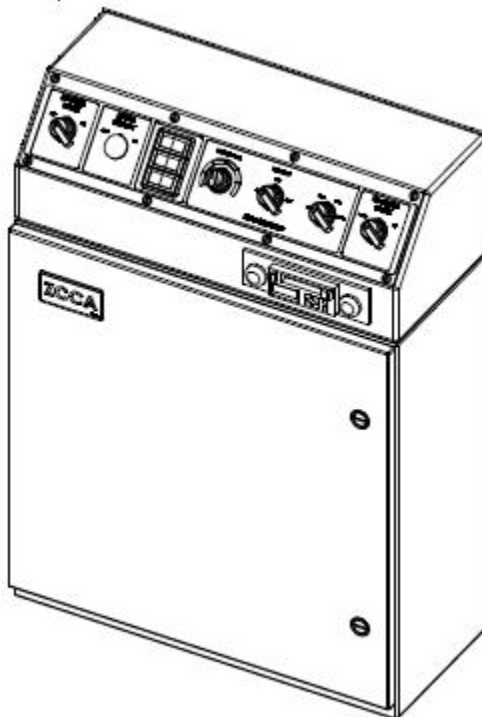


Figure 3 – Control Console

Ground Test Pushbutton – GTPB

This pushbutton is located on the left side of the control console within reach of the operator from the operator's chair. When pressed the power source to the machine will drop out via the ground check circuit.

Exterior Lights Selector Switch – ELSS

This two-position selector switch is used to control a relay inside the ZPCA cabinet that turns on all outside, ground, and flood lights when in the ON position. Note that different light plant configurations may result in different lights being controlled by this switch.

Thermostat Control – HVACTC

The thermostat control is used for the cab heating/cooling system. The temperature of the air coming out of the HVAC unit will be warmer as the thermostat is turned towards the maximum (red) position.

HVAC Fan Selector Switch – HVACFSS

This three-position selector switch controls the speed of the fan, directing air from the cab heating/cooling system. The operator can adjust the level at which the fan will run. At the HIGH setting, more air movement is created.

HVAC Mode Selector Switch – HVACMSS

This three-position selector switch controls which heating/cooling option the operator wants in the cab. The system includes modes for Heat, Cool, Vent and Defog. The Vent option allows the fan to operate

Mast Brace Pins

These hydraulically actuated pins are used to lock the mast brace in place during drilling operation. On angle hole drilling machines, the pins lock the mast brace at different positions to allow various operating angles on the mast. To function, the hydraulic pump motor must be on (ACM running) and the DPMSS (Drill/Propel/Mast Selector Switch) must be in the MAST/WINCH position. At this point, the mast brace pins can operate in the LOCK direction. To function in the UNLOCK direction the rotary head assembly must be at the lower limit point. On machines that incorporate the angle hole drilling option, the additional restriction of having the head at the lower limit is removed from the PLC logic. When controlling these pins through the operator display, pressing the Lock or Unlock Button will move both pins in the appropriate direction for 10 seconds, or until limit switches within the mast brace pin cylinders indicate that the pins are fully in the desired position.

A-Frame Lock Pins (Angle Hole Drilling Option)

These hydraulically actuated pins are used only on angle hole drilling capable machines. These pins are in the unlock position while the machine is drilling with the mast at an angle. To function, the hydraulic pump motor must be on (ACM running) and the DPMSS (Drill/Propel/Mast Selector Switch) must be in the MAST/WINCH position. In addition, the mast must first be vertical (indicated by a limit switch that is installed on angle hole drills) and the mast lock pins must be in place before the A-frame lock pin functions are allowed to operate. When controlling these pins through the operator display, pressing the Lock or Unlock Button will move both pins in the appropriate direction for 10 seconds, or until limit switches within the A-frame lock pin cylinders indicate that the pins are fully in the desired position.

Oil Coolers

Overview

The drill is equipped with oil coolers as described below. These are automatically controlled by the machine's status and do not require operator input to turn on or off. Refer to the hydraulic and air compressor documentation for more information.

Hydraulic Oil Cooler

This cooler is designed to maintain the temperature of the operational hydraulic fluid. A switch in the hydraulic oil tank monitors the temperature and turns this cooler on and off, based on preset temperatures. Refer to the schematics for the settings of this switch. The switch has hysteresis built in, so the cooler will turn off at a lower temperature than that at which it turns on. Note that control must be enabled (see above) for the cooler to energize.

Compressor Oil Cooler

This cooler is designed to maintain the temperature of the air compressor oil. It is controlled from the PLC, based on feedback from a temperature-monitoring device. Initial settings turn the cooler on at 68°C (155°F) and off at 63°C (145°F). However, these settings may be different due to design enhancements or customizations for a specific environment. Note that control must be enabled (see above) for the cooler to energize.

Pipe Handling

Overview

The standard 49HR has one pipe rack that can contain one additional pipe for use in drilling operations. As many as four pipe racks can be purchased for multiple pipe storage. The pipe rack swings pipes into position under the drill head so that they can be added to the drill string. During drilling, or if storing a pipe that is not currently being used for drilling, the racks can be moved back into a stored position that is out of the way of drill head movement.

Hardware

Overview

This subsection gives a brief overview of each of the original major components in the control system. It should be noted that some of these may differ on a specific drill due to customer request, design enhancements, or options.

Standard “Nodes”

All PLC nodes on the 49HR use a standard DIN rail rack configuration. In this setup, there is no separate backplane device. Rather, all modules are simply mounted to a large DIN rail with a “U” type connector linking the backplane of each device together. Figure 11 shows this connector by itself. Figure 12 shows it attached to an I/O card with the right card removed from the rack.



Figure 11 – “U” Connector



Figure 12 – “U” Connector with Right Card Removed

To remove a card, first disconnect its wiring arm (in the case of I/O modules) or its communication and power connections. Then, loosen the screw on the bottom-rear of the module, which holds the card to the DIN rail. Note that the processor and certain other devices may have two such screws. Then, swing the module up to disconnect it from the “U” connector and lift the module off the DIN rail. To replace a module, simply reverse the process. Note that if you are adding a module to the end or replacing more than one module, it may be necessary to add or move one of the “U” connectors. They snap into slots on the back of each module, and are bidirectional so that installing them backwards is not possible.

WARNING: Never remove a card with power applied. Always remove power from the rack you are working on before disconnecting or adding a card. Failure to follow this warning may result in damage to the system or card.

- d. Put the DPMSS (Drill/Propel/Mast Selector Switch) in the DRILL position.
- e. Put the HPSS (Hoist/Pulldown Selector Switch) in its PIPE RACK/JOINT position.
- f. If there are no pipes in the racks, pipe rack gate valves PRGVS1, PRGVS2, PRGVS3, and PRGVS4 should be energized. These valves are controlled by pipe position switches located in the pipe rack cups. The pipe position switch contacts are open when a pipe is stored in the rack. Manually operate each of the pipe position switches in the table below, and verify that the associated gate valve turns off.

Pipe Switch	PLC Input	PLC Output	Valve
PIRLS1	I26.0	Q13.0	PRGVS1
PIRLS2	I26.1	Q13.1	PRGVS2
PIRLS3	I26.2	Q13.2	PRGVS3
PIRLS4	I26.3	Q13.3	PRGVS4

If there are pipes in the racks, pipe rack gate valves PRGVS1, PRGVS2, PRGVS3, and PRGVS4 should be de-energized. To test the gate valves, it will be necessary to jumper across the wires for each of the pipe position switches in the table above and verify that the associated gate valve is energized.

- g. Place the PRSS (Pipe Rack Selector Switch) in the positions shown in the table below, and verify that the associated pipe rack selection valves are energized.

PRSS Position	PLC Input	PLC Output	Valve
Pipe rack 1	-----	-----	-----
Pipe rack 2	I42.0	Q13.5	PRSVS2
Pipe rack 3	I42.1	Q13.6	PRSVS3
Pipe rack 4	I42.2	Q13.7	PRSVS4

- h. Lifting the handle on the PORMS (Propel Right Master Switch), immediately unlatches the selected pipe rack locking mechanism. Test this logic by lifting the master switch handle for each of the conditions given in the table below and verifying that the proper unlatch valve is energized.

PRSS Position	PLC Output	Valve
Pipe rack 1	Q14.0	PRUVS1
Pipe rack 2	Q14.1	PRUVS2
Pipe rack 3	Q14.2	PRUVS3
Pipe rack 4	Q14.3	PRUVS4

- i. The number of pipe racks on a machine is optional, and the valves used on a particular drill will depend upon what was ordered. Refer to the machine schematics and PLC ladder logic report for details on the PRSS selector switch wiring and control logic if the machine does not have four racks.

7. The digital hydraulic valves for the machine leveling jacks can be electrically tested using a procedure similar to step 4.

- a. Display the Leveling Screen on the operator display.

- iii. Put the ACUSS switch in its CLOSE position, and verify that the ACVVS is energized while the ACDAVS is de-energized.
10. Checks required in the mechanical engineering test procedure for the compressor/hydraulic system must be performed before proceeding further.
11. Stop the compressor motor by pressing the ACSTOPPB.
12. Reconnect the valve cables disconnected in step 1 of this section. This will enable all hydraulic functions. Test gauges or instruments required for the hydraulic system check out must be installed before proceeding further.
13. Press the ACSTARTPB to start the compressor motor.
14. Verify that the hydraulic oil cooler fan is free of obstructions and that all personnel are clear.
 - a. Close the HOCMCB (Hydraulic Oil Cooler Motor Circuit Breaker) in the MCC-ZLV low voltage cabinet.
 - b. If the hydraulic oil temperature is greater than 100 degree F, the oil cooler should start.
 - c. If the temperature is less than 100 degrees F, put the DPMSS on the operator console in the DRILL position and momentarily move any of the manual jack control switch out of neutral. The hydraulic oil cooler should start and remain on for two minutes.
 - d. The oil cooler motor direction of rotation was checked previously and should be correct.
15. Check the auxiliary on-off hydraulic functions by verifying that they operate correctly for each position of their control switch. The auxiliary functions and their associated switches and valves are listed below.

Function	Switch	Valves
Breakout wrench	BOWSS	BOWEVS and BOWRVS
Tool wrench	TWSS	TWEVS and TWRVS
Pipe positioner	DPPSS	PPSVS and PPOHVS
Dust seal slider	DSSSS	DSSFVS and DSSRVS
Bit viewing hatch	Op.Display	DDHVS
Boarding stair	BSCSS	BSVS1
Dust curtain	DCSS	DCRVS and DCLVS

The electrical operation of the on-off hydraulic valves was checked in the Digital Hydraulic Valves Electrical Checks. If problems occur at this point, they are most likely hydraulic in nature.

16. Check the mast on-off hydraulic functions by verifying that they operate correctly for their corresponding operator display button. The mast functions and their associated switches and valves are listed below. A-frame functions are used only on drills supplied with the angle hole drilling option.

Function	Switch	Valves
Mast lock	Op. Display	MPLVS and MPUVS

- a. Enable the setup test by pressing the Setup Test Button on the Drive Test Screen of the operator display.
 - b. Make the following temporary parameter settings which will result in 100 ADC of stall test current:
 - P100 = 225
 - P180 = 44.4
 - P181 = -44.4
 - c. Disable the drive setup test.
 - d. Put the HPSS and the RSCSS in their high speed positions.
 - e. If the drive under test is hoist/pulldown, the HPBSS (Hoist/Pulldown Brake Selector Switch) must be in the RELEASE position.
 - f. Enable the stall test by pressing the Stall Test Button on the Drive Test Screen of the operator display.
 - g. Ask the operator to move the master switch pot for the drive under test to its maximum position. The motor armature current measured with the test shunt should be about 100 ADC. If the value displayed on Operator Display is within +/- 1 ADC of the value measured at the shunt, go to step i.
 - h. If the armature current value displayed on Operator Display is outside of the required range, adjust parameter P763. This parameter determines the voltage at drive terminal 18 which is the armature current signal sent to the PLC. The scaling for this voltage is 10 VDC = 750 ADC.
 - i. Ask the operator to move the master switch to its maximum position in the other direction. Verify that the armature current polarity reverses. The current value displayed on Operator Display should be within +/- 1 ADC of the value measured at the shunt.
 - j. Ask the operator to put the master switch in neutral and disable the stall test.

This testing is done at a reduced value of stall current, and the test time can be extended up to 30 seconds if this is required for calibration.
29. Set drive parameters P100, P180, and P181 back to their C-sheet values. The rest of the testing will be performed at full motor stall current, and all of the precautions mentioned in step 1 must be observed.
30. The stall settings of the drive need to be checked at each of the drive speed switch positions for both directions of master switch potentiometer maximum travel. Use the following procedure:
- a. If the drive under test is hoist/pulldown, the HPBSS must be in the RELEASE position.
 - b. Press the Stall Test Button on Drive Test Screen of the operator display to enable the stall test function and energize the drive under test.
 - c. Ask the operator to move the master switch pot for the drive under test to maximum. He should record the stall armature current value displayed on the operator display.

Fault	Message	Description / Effect	Recommended Action	Critical Fault
ANF028	Water Injection Low Water Level	This fault occurs when low water level is detected when water injection selector switch is ON.	<ol style="list-style-type: none"> 1. Fill the water tank. 2. Check the operation and/or wiring of the water tank level sensor. 	
ANF029	Drill Mode Low Lube Pressure	This fault occurs when the drill mode is selected and the drill mode lube pressure is not reached after a certain delay.	<ol style="list-style-type: none"> 1. Check the operation of the lubrication system. 2. Check for lube oil leaks in the lubrication system. 	
ANF030	Propel Mode Low Lube Pressure	This fault occurs when the propel mode is selected and the propel mode lube pressure is not reached after a certain delay.	<ol style="list-style-type: none"> 1. Check the operation of the lubrication system. 2. Check for lube oil leaks in the lubrication system. 	
ANF031	Lubrication System Vent Fault	This fault occurs if the pressure switch does not reset, indicating the release of pressure, after a certain time interval following a lubrication cycle.	<ol style="list-style-type: none"> 1. Check the operation of the lubrication system. 2. Check for leaks in the system. 3. Check the operation of the pressure switches. 	
ANF032	Drill Bit Lube Level Low	This fault occurs when the drill bit lube level is too low for proper operation.	<ol style="list-style-type: none"> 1. Fill the drill bit lube tank and check for leaks in the system. 2. Verify the operation and/or wiring of the level switch. 	
ANF033	Jacks Not Retracted in Propel Mode	The drill is in propel mode, but the jacks are not fully retracted. Propel is disabled.	<ol style="list-style-type: none"> 1. Fully retract all jacks before propelling to prevent damage to the drill. 	
ANF034	Air Compressor Oil Pump Start Failure	Compressor oil circulating pump failed to start thereby preventing the drill's main motor to start. (Sullair Compressor Only)	<ol style="list-style-type: none"> 1. Check the motor starter breaker (ACOPMCB) in the MCC-ZLV cabinet. 2. Check the motor overloads (ACOPMOL) in the MCC-ZLV cabinet. 	
ANF035	Air Compressor Failure	This fault occurs when the air compressor air temperature has risen above 100°C and the temperature difference between the air temperature and the oil temperature is more than 40°C. This will prevent the main air compressor motor from operating.	<ol style="list-style-type: none"> 1. Check the operation of the air compressor. 2. Verify the operation of the air temperature transducer and the oil temperature transducer. 	

Fault	Message	Description / Effect	Recommended Action	Critical Fault
ANW000	Air Compressor Starts Per Hour Exceeded.	To prolong motor life no more than three start requests are allowed per hour. This warning will not allow the compressor to receive any more start requests until an hour from the initial start.	1. Wait at least one hour from the first start request before attempting to start the main motor.	
ANW001	Hoist / Pulldown Drive Ground Fault	This warning occurs when the hoist / pulldown ground fault detection circuit is triggered.	1. Check the wiring and condition of the hoist/pulldown drive panel.	
ANW002	Rotary Drive Ground Fault	This warning occurs when the rotary ground fault detection circuit is triggered.	1. Check the wiring and condition of the rotary drive panel.	
ANW003	Hoist/Pulldown Motor Overload	This warning occurs when the current exceeds maximum limit due to motor overload.	1. Adjust the speed of the hoist/pulldown motor.	
ANW004	Rotary Motor Overload	This warning occurs when the current exceeds maximum limit due to motor overload.	1. Adjust the speed of the rotary motor.	
ANW005	Auto Lube Not Enabled	This warning is set if the auto lube mode is not enabled	1. Assure the automatic lubrication system is working properly. 2. Turn on automatic lubrication through the use of the Lubrication Screen on the operator display.	
ANW006	Head Limit Data Out of Range	Head calibration, upper limit, lower limit, pipe rack limit, or propel limit are outside the allowable range.	1. Use the calibration Screen on the operator display to fix the calibration or limits.	
ANW007	Air Compressor Air Over Temperature	This warning occurs if the air compressor air temperature is above 100°C and the other compressor temperature faults are inactive.	1. Check the operation of the air compressor. 2. Verify operation of the air and oil temperature transducers.	
ANW008	Hydraulic Tank Valve Closed	This warning occurs if the hydraulic tank valve is closed or partially opened.	1. Open the hydraulic tank valve. 2. Check the operation and/or wiring of the valve limit switch.	

Decimal	Hexadecimal	Description
17157	4305	HOLD: breakpoint reached
17158	4306	HOLD: breakpoint exited
17159	4307	Memory reset started by PG operation
17160	4308	Memory reset started by switch setting
17161	4309	Memory reset started automatically (power on not backed up)
17162	430A	HOLD exited, transition to STOP
17165	430D	STOP caused by other CPU in multicomputing
17166	430E	Memory reset executed
17167	430F	STOP on the module due to STOP on a CPU
17239	4357	Module watchdog started
17240	4358	All modules are ready for operation
17328	43B0	Firmware update was successful
17363	43D3	STOP on standby CPU
17372	43DC	Abort during link-up with switchover
17374	43DE	Updating aborted due to monitoring time being exceeded during the n-th attempt, new update attempt initiated
17375	43DF	Updating aborted for final time due to monitoring time being exceeded after completing the maximum amount of attempts. User intervention required.
17376	43E0	Change from solo mode after link-up
17377	43E1	Change from link-up after updating
17378	43E2	Change from updating to redundant mode
17379	43E3	Master CPU: change from redundant mode to solo mode
17380	43E4	Standby CPU: change from redundant mode after error-search mode
17381	43E5	Standby CPU: change from error-search mode after link-up or STOP
17382	43E6	Link-up aborted on the standby CPU
17383	43E7	Updating aborted on the standby CPU
17384	43E8	Standby CPU: change from link-up after startup
17385	43E9	Standby CPU: change from startup after updating
17393	43F1	Reserve-master switchover
17394	43F2	Coupling of incompatible H-CPU's blocked by system program
17680	4510	STOP violation of the CPU's data range
17696	4520	DEFECTIVE: STOP not possible
17697	4521	DEFECTIVE: failure of instruction processing processor
17698	4522	DEFECTIVE: failure of clock chip
17699	4523	DEFECTIVE: failure of clock pulse generator
17700	4524	DEFECTIVE: failure of timer update function
17701	4525	DEFECTIVE: failure of multicomputing synchronization
17703	4527	DEFECTIVE: failure of I/O access monitoring
17704	4528	DEFECTIVE: failure of scan time monitoring
17712	4530	DEFECTIVE: memory test error in internal memory
17714	4532	DEFECTIVE: failure of core resources
17718	4536	DEFECTIVE: switch defective
17728	4540	STOP: Memory expansion of the internal work memory has gaps. First memory expansion too small or missing.
17729	4541	STOP caused by priority class system
17730	4542	STOP caused by object management system
17731	4543	STOP caused by test functions
17732	4544	STOP caused by diagnostic system
17733	4545	STOP caused by communication system

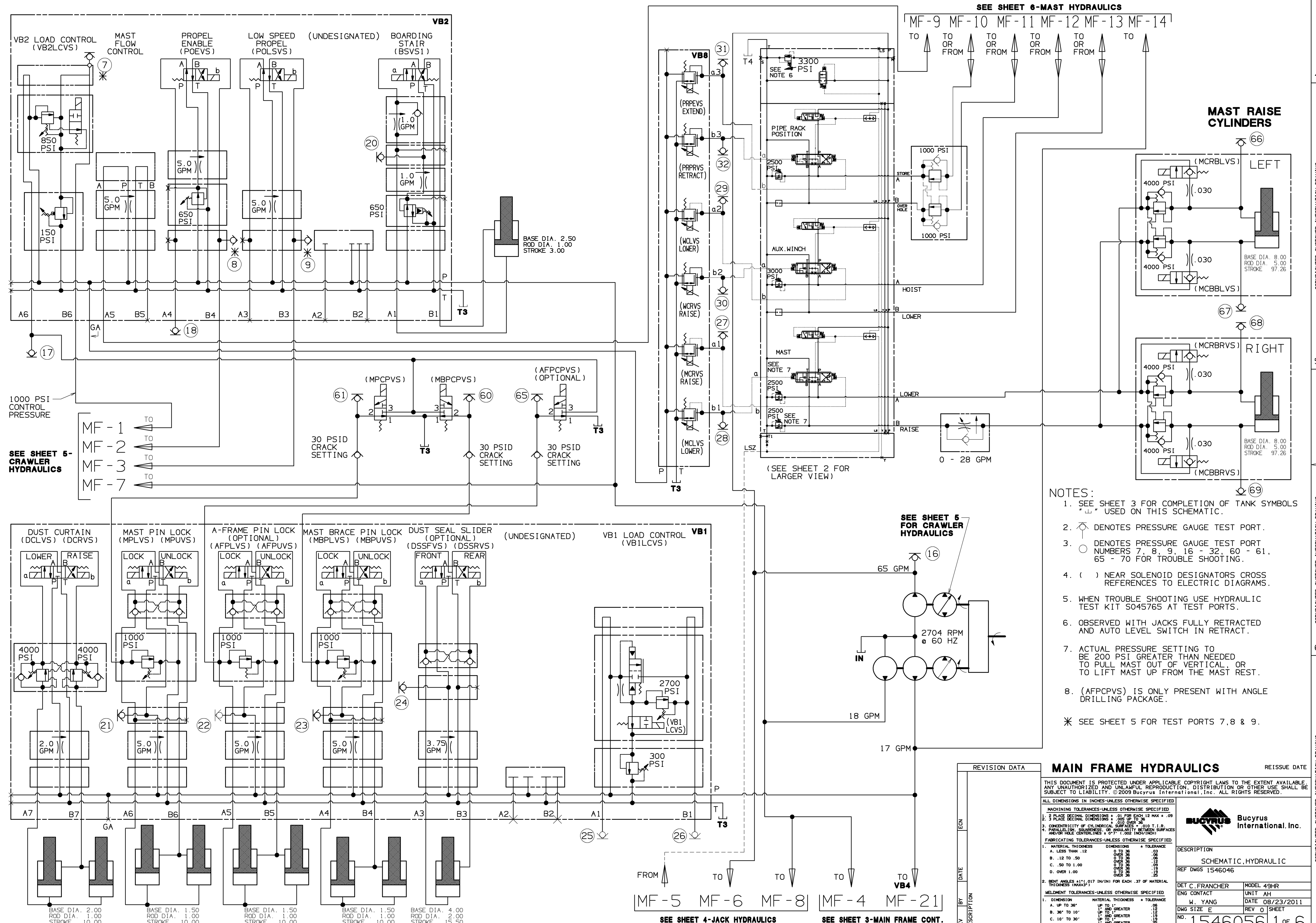
Decimal	Hexadecimal	Description
34128	8550	Configuration/parameter assignment error
34129	8551	Common mode error
34130	8552	Short circuit to phase
34131	8553	Short circuit to ground
34132	8554	Wire break
34133	8555	Reference channel error
34134	8556	Below measuring range
34135	8557	Above measuring range
34144	8560	Configuration/parameter assignment error
34145	8561	Common mode error
34146	8562	Short circuit to phase
34147	8563	Short circuit to ground
34148	8564	Wire break
34149	8565	Reserved
34150	8566	No load voltage
34160	8570	Configuration/parameter assignment error
34161	8571	Chassis ground fault
34162	8572	Short circuit to phase (sensor)
34163	8573	Short circuit to ground (sensor)
34164	8574	Wire break
34165	8575	No sensor power supply
34176	8580	Configuration/parameter assignment error
34177	8581	Chassis ground fault
34178	8582	Short circuit to phase
34179	8583	Short circuit to ground
34180	8584	Wire break
34181	8585	Fuse tripped
34182	8586	No load voltage
34183	8587	Excess temperature
34224	85B0	Counter module, signal A faulty
34225	85B1	Counter module, signal B faulty
34226	85B2	Counter module, signal N faulty
34227	85B3	Counter module, incorrect value passed between the channels
34228	85B4	Counter module, 5.2 V sensor supply faulty
34229	85B5	Counter module, 24 V sensor supply faulty
34304	8600	Module fault/OK
34305	8601	Internal error
34306	8602	External error
34307	8603	Channel error
34308	8604	No external auxiliary voltage
34309	8605	No front connector
34310	8606	No parameter assignment
34311	8607	Incorrect parameters in module
34352	8630	User submodule incorrect/not found
34353	8631	Communication problem
34354	8632	Operating mode: RUN/STOP (STOP: entering state, RUN: leaving state)
34355	8633	Time monitoring responded (watchdog)
34356	8634	Internal module power failure
34357	8635	BATTF: battery exhausted
34358	8636	Total backup failed

APPENDIX E – CAB RACK ANALOG DIAGNOSTICS

This table lists the meaning of each bit in the diagnostic word for analog signals in the Cab Rack. These values are generally displayed on the PLC Diagnostics screen on the operator display (Main Menu – PLC/Profibus – PLC Status). The descriptions in this table were taken directly from the documentation supplied by the PLC manufacturer.

Bit 0 is the least significant bit. It occurs in the right most position of the word.

Bit	Description
0	Module Fault
1	Internal Error
2	External Error
3	Channel Error
4	No External Auxiliary Voltage
5	No Front Connector
6	No Parameter Assignment
7	Wrong Parameters in Module



SEE SHEET 6-MAST HYDRAULICS

MAST RAISE CYLINDERS

- NOTES:**
1. SEE SHEET 3 FOR COMPLETION OF TANK SYMBOLS "山" USED ON THIS SCHEMATIC.
 2. DENOTES PRESSURE GAUGE TEST PORT.
 3. DENOTES PRESSURE GAUGE TEST PORT NUMBERS 7, 8, 9, 16 - 32, 60 - 61, 65 - 70 FOR TROUBLE SHOOTING.
 4. () NEAR SOLENOID DESIGNATORS CROSS REFERENCES TO ELECTRIC DIAGRAMS.
 5. WHEN TROUBLE SHOOTING USE HYDRAULIC TEST KIT S04576S AT TEST PORTS.
 6. OBSERVED WITH JACKS FULLY RETRACTED AND AUTO LEVEL SWITCH IN RETRACT.
 7. ACTUAL PRESSURE SETTING TO BE 200 PSI GREATER THAN NEEDED TO PULL MAST OUT OF VERTICAL, OR TO LIFT MAST UP FROM THE MAST REST.
 8. (AFPCPVS) IS ONLY PRESENT WITH ANGLE DRILLING PACKAGE.
- * SEE SHEET 5 FOR TEST PORTS 7, 8 & 9.

MAIN FRAME HYDRAULICS

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY. ©2009 Bucyrus International, Inc. ALL RIGHTS RESERVED.

ALL DIMENSIONS IN INCHES-UNLESS OTHERWISE SPECIFIED.

MACHINING TOLERANCES-UNLESS OTHERWISE SPECIFIED.

1. 2 PLACE DECIMAL DIMENSIONS ± .01 FOR EACH 12 MAX ± .09
2. 3 PLACE DECIMAL DIMENSIONS ± .005 UP TO .25
3. CONCENTRICITY OF CYLINDRICAL SURFACES ± .010 T.I.B.
4. PARALLELISM, SQUARENESS, OR ANGLE/ITY BETWEEN SURFACES AND/OR HOLE CENTERLINES ± .017 (1.000 INCH)

FABRICATING TOLERANCES-UNLESS OTHERWISE SPECIFIED

MATERIAL THICKNESS	DIMENSIONS	TOLERANCE
A. LESS THAN .12	0 TO .25	± .03
B. .12 TO .50	0 TO .25	± .06
C. .50 TO 1.00	0 TO .25	± .09
D. OVER 1.00	0 TO .25	± .18

2. BENT ANGLES ±1°.017 IN/IN FOR EACH .37 OF MATERIAL THICKNESS (MAX±3°)

MELDING TOLERANCES-UNLESS OTHERWISE SPECIFIED

DIMENSION	MATERIAL THICKNESS	TOLERANCE
A. UP TO 28°	UP TO 1"	± .06
B. 30° TO 10°	UP AND GREATER	± .12
C. 10° TO 30°	UP AND GREATER	± .18
D. OVER 30°	ALL AND GREATER	± .25

REVISION DATA

REV	BY	DATE	DESCRIPTION

DESCRIPTION

SCHEMATIC, HYDRAULIC

REF DWGS 1546046

DET C. FRANCHER UNIT AH

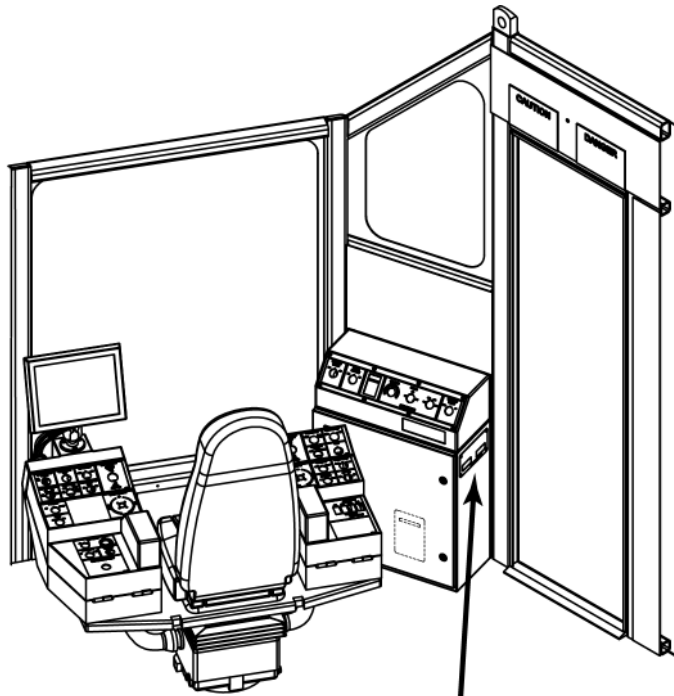
ENG CONTACT DATE 08/23/2011

W. YANG REV 0 SHEET

DWG SIZE E NO. 1546056 1 OF 6

BUCYRUS Bucyrus International, Inc.

49HR Blast Hole Drill



Model Cross Reference	
Bucyrus Model	CAT MODEL
49HR	MD6640
59HR	MD6750



Serial and Model Number Plate

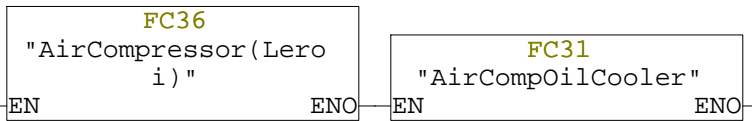


CB141381
SNIM
OB1

Network: 12 Air Compressor Control (Standard Leroi)

The networks called in this logic control the standard 3000CFM Leroi compressor on the 49HR.

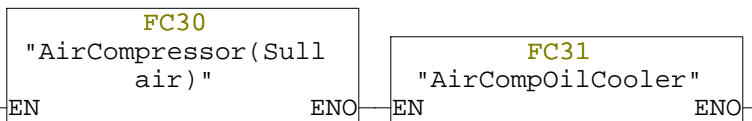
DB190.DBX3
.2
SULLAIR
COMPRESSOR
OPTION
INSTALLED
"OptionsIn
stalled".
SCOI



Network: 13 Air Compressor Control (Sullair)

The networks called in this logic control the optional Sullair compressor.

DB190.DBX3
.2
SULLAIR
COMPRESSOR
OPTION
INSTALLED
"OptionsIn
stalled".
SCOI



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
OB1

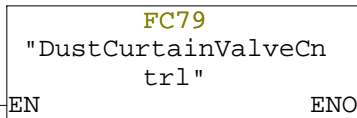
Network: 39 Window Guard Control (Optional)

DB190.DBX1
.7
WINDOW
GUARD
OPTION
INSTALLED
"OptionsIn
stalled".
WGOI



Network: 40 Hydraulic Dust Curtain Control (Optional)

DB190.DBX1
.6
DUST
CURTAIN
OPTION
INSTALLED
"OptionsIn
stalled".
DUSTCI



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC3

```

L      "FilterDB_RCPFC".filtered_out_R          DB260.DBD10
eal
T      "AnalogInputsScaledData".RCPFC_        DB607.DBD8
SCALED                                     -- (PIW260) ROTAR
                                           Y CONTROL FIELD CU
                                           RRENT (-20 TO +20
                                           ADC)
T      "DisplayWords_PLC2HMI".RFC             DB1002.DBD312
                                           -- Rotary Field C
                                           urrent
    
```

Down References

```

ALWAYS_ON  OB1:1/S
ORFT260    FC3:3/FR
RMFTR      FC43:6/SD
    
```

Up References

```

ORFT260    FC3:3/O
    
```

Network: 4 PIW262 HCPAV_SCALED

HOIST CONTROL ARMATURE VOLTAGE

INPUT: -10 TO +10 VDC
OUTPUT: -600 TO +600 VDC

```

CALL  "SCALE"                                FC191          -- Sc
                                           aling Values
IN    := "HCPAV"                             PIW262        -- HO
                                           IST CONTROL ARMATURE VOL
                                           TAGE

HI_LIM :=6.000000e+002
LO_LIM :=-6.000000e+002
BIPOLAR:="ALWAYS_ON"                       M0.1          -- Al
                                           ways On

RET_VAL:=#RETVAL
OUT    :=#PIW262_R

L      #RETVAL
L      0
<>I
FR    "ORFT262"                             T160          -- OU
                                           T OF RANGE FAULT TIMER P
                                           IW262
L      "Timers".t160                         DB911.DBW318  -- OR
                                           FT262 (1 s)
SD    "ORFT262"                             T160          -- OU
                                           T OF RANGE FAULT TIMER P
                                           IW262
    
```

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC3

```

O      "ORFT276"                                T167          -- OU
                                              T OF RANGE FAULT TIMER P
                                              IW276

S      "FaultedConditions".ANF090              DB1.DBX11.2   -- PI
                                              W276 INPUT OUT OF RANGE
                                              (AIR COMPRESSOR AIR TEMP
                                              TRANSMITTER)

CALL  "Filter" , "FilterDB_ACATT"              FB501 / DB276
  raw_R      :=#PIW276_R
  time_K     :=20
  feedback_Real :="FilterDB_ACATT".filtered_out_Real DB276.DBD10
  filtered_out_Real:= "FilterDB_ACATT".filtered_out_Real DB276.DBD10

L      "FilterDB_ACATT".filtered_out_Real      DB276.DBD10
T      "AnalogInputsScaledData".ACATT_SCALED  DB607.DBD40   -- (P
                                              IW276) AIR COMPRESSOR AI
                                              R TEMPERATURE (-50 TO 15
                                              0 DEG C)

O      "DisplayBits_HMI2PLC".UTF              DB1001.DBX7.3 -- Un
                                              its Temperature Fahrenhe
                                              it

JC     D276
T      "DisplayWords_PLC2HMI".ACATT           DB1002.DBD80  -- Co
                                              mpressor Air Temperature
                                              Transducer

JU     E276
D276: L      "FilterDB_ACATT".filtered_out_Real DB276.DBD10
      L      1.800000e+000
      *R
      L      3.200000e+001
      +R
      T      "DisplayWords_PLC2HMI".ACATT     DB1002.DBD80  -- Co
                                              mpressor Air Temperature
                                              Transducer

E276: NOP  0
  
```

Down References

ALWAYS_OFF OB1:2/R
ORFT276 FC3:11/FR

Up References

ORFT276 FC3:11/O

Network: 12 PIW278 WIMS_SCALED

WATER INJECTION MOTOR SPEED FEEDBACK

COMMENT: INSTRUCTIONS FOR FAULTEDCONDITIONS ANF091 INCLUDING // TO AVOID FAULT WHEN WATER INJECTION SYSTEM IS TURNED TO ON (JUNE 08 2010). THIS VALUE IS NOT CRITICAL TO OPERATION SO FAULT MONITORING IS NOT NECESSARY.

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.



CB141381
SNIM
FC3

```

SD      "ORFT292"                                T175
-- OUT OF RANGE F
AULT TIMER PIW292
O      "ORFT292"                                T175
-- OUT OF RANGE F
AULT TIMER PIW292
S      "FaultedConditions".ANF098                DB1.DBX12.2
-- PIW292 INPUT O
UT OF RANGE (SIDE
- SIDE LEVEL MONIT
OR)

CALL   "Filter" , "FilterDB_SSLM"                FB501 / DB292
  raw_R      :=#PIW292_R
  time_K     :=10
  feedback_Real :="FilterDB_SSLM".f
iltered_out_Real
  filtered_out_Real:= "FilterDB_SSLM".f
iltered_out_Real
L      "FilterDB_SSLM".filtered_out_Re
al      DB292.DBD10
T      "AnalogInputsScaledData".SSLS_S
CALED   DB607.DBD72
-- (PIW292) SIDE
TO SIDE LEVEL (-20
to +20 DEG, - = L
EFT LOW)
T      "DisplayWords_PLC2HMI".SSI                DB1002.DBD72
-- Side to Side I
ncline
    
```

Down References

ALWAYS_OFF OB1:2/R
ORFT292 FC3:19/FR

Up References

ORFT292 FC3:19/O

Network: 20 PIW294 FRLM_SCALED

FRONT to REAR LEVEL MONITOR

Input: 4 - 20mA

Ouput: -20 to +20 DEG FROM HORIZONTAL

```

CALL   "SCALE" // S7 Scale function FC191
-- Scaling Values
IN      := "FRLM" PIW294
-- FRONT TO REAR
LEVEL MONITOR

HI_LIM :=2.000000e+001
LO_LIM :=-2.000000e+001
    
```

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC4

Down References

PSHTR FC75:13/SD

Up References

SHO

Network: 5

M0.1

Always On

"ALWAYS_
ON"

< SAVE >

Down References

ALWAYS_ON OB1:1/S

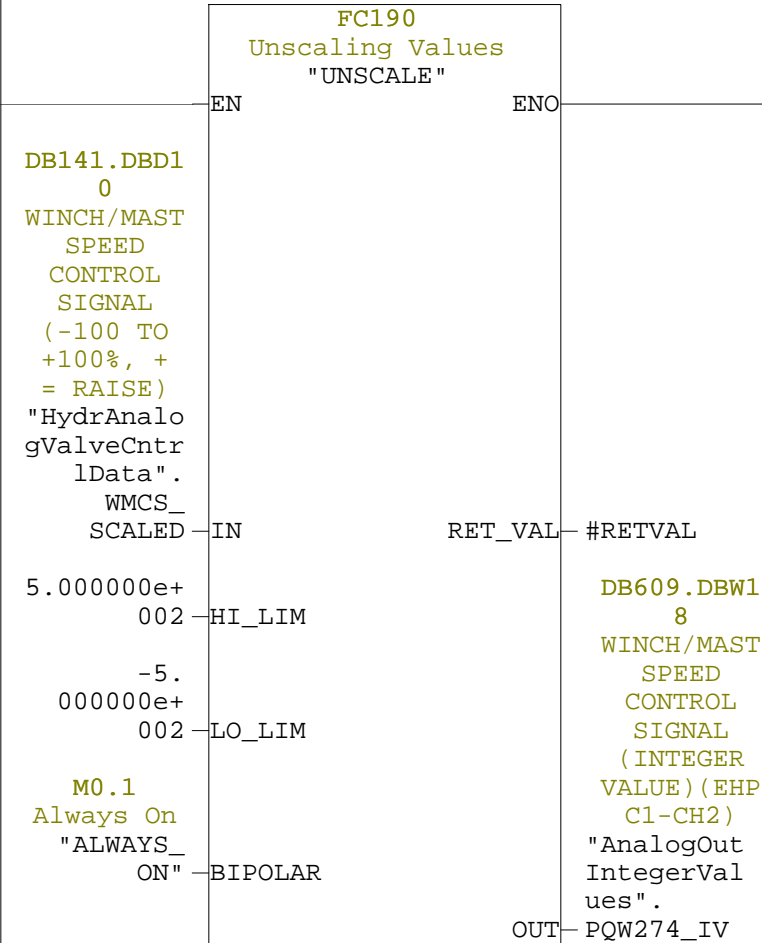
THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC6

Network: 10 UNSCALE REAL VALUE FOR WINCH/MAST SPEED OUTPUT (PQW274)

The hydraulic proportional control card this output is sent to requires a +/- 2V signal while the analog output module puts out +/- 10V. Therefore the scaling limits are set to +/- 500% which will effectively give a 2V analog output signal based on a 100% scaled input value.



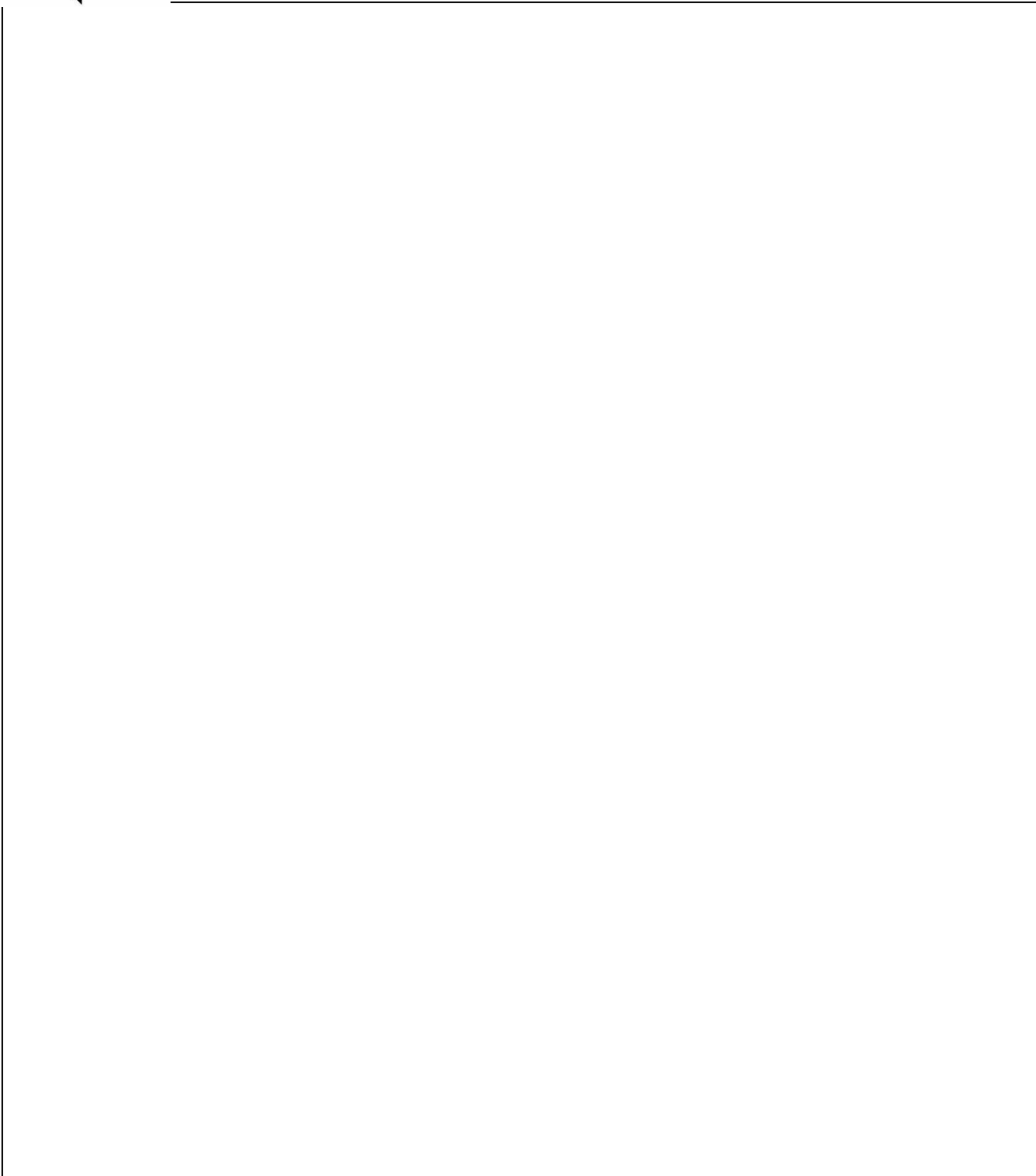
Down References

ALWAYS_ON OB1:1/S

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC7





MD6640

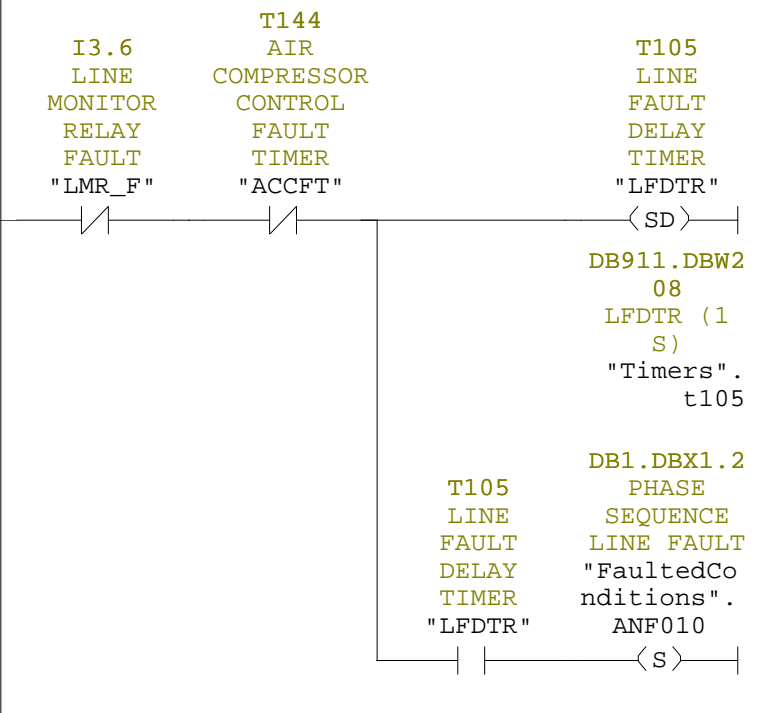
CB141381
SNIM
FC9

Network: 7 24VDC UTILITY POWER FAULT



Network: 8 PHASE SEQUENCE LINE FAULT

THIS FAULT IS TEMPORARILY DISABLED WHEN THE MAIN MOTOTR (AIR COMPRESSOR) IS STARTING BECAUSE OF THE FLUCTUATIONS THE INRUSH MAY CAUSE.



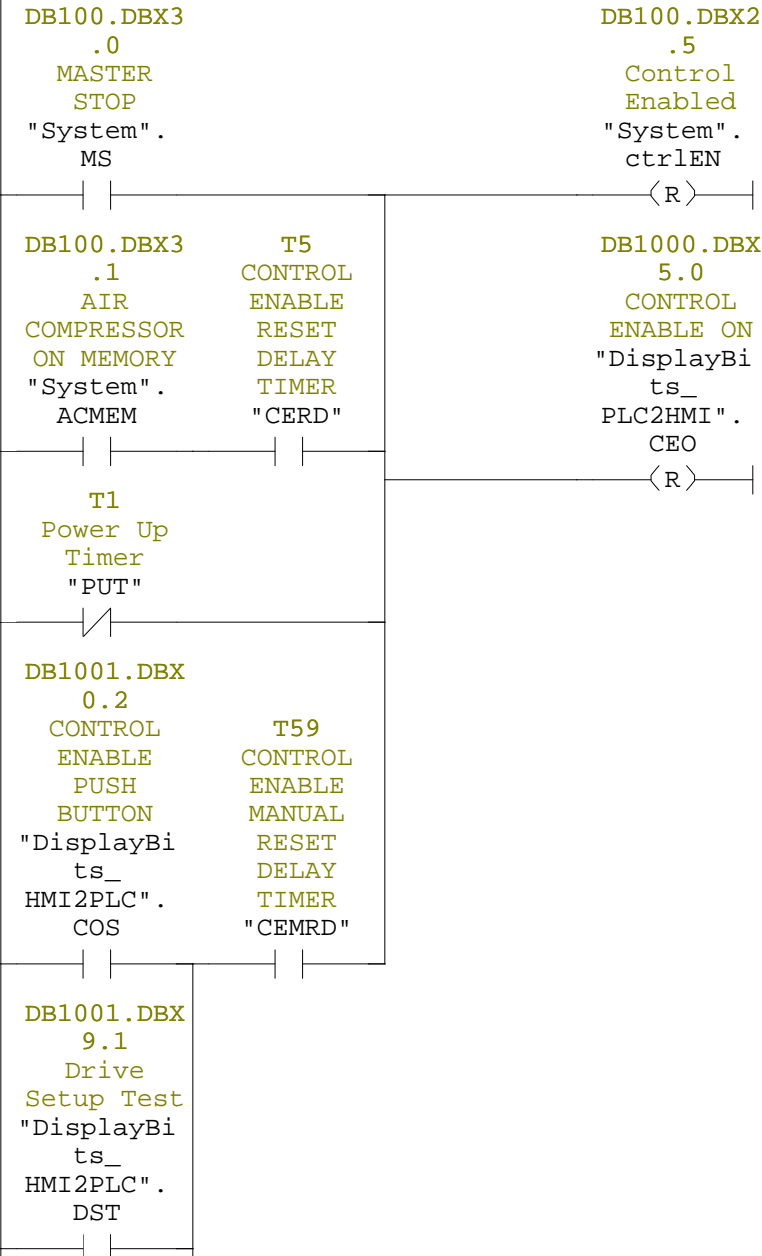
THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC9

Network: 17 Control Enabled Reset

IF THE AIR COMPRESSOR HAS BEEN OPERATING AND IS SHUT DOWN (EITHER MANUALLY OR BY A FAULT) THE CONTROL ENABLE BIT IS RESET AND MUST BE RE-ENABLED (I.E, ALL MASTER SWITCHES MUST BE IN NEUTRAL AND NO CRITICAL ALARMS)
THE OPERATOR CAN ALSO MANUALLY DISABLE CONTROL BY PRESSING THE CONTROL ENABLE BUTTON WHILE IT IS IN THE "ON" STATE.



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

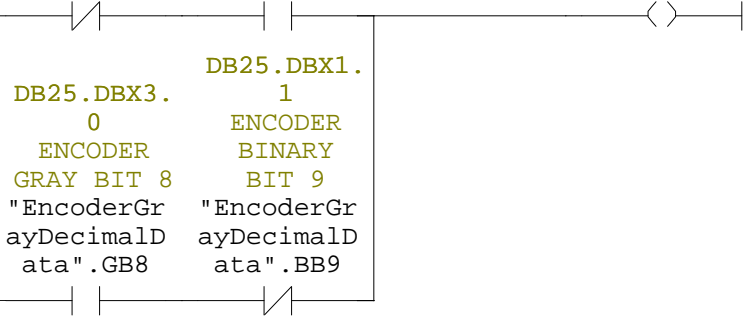
MD6640



CB141381
SNIM
FC10

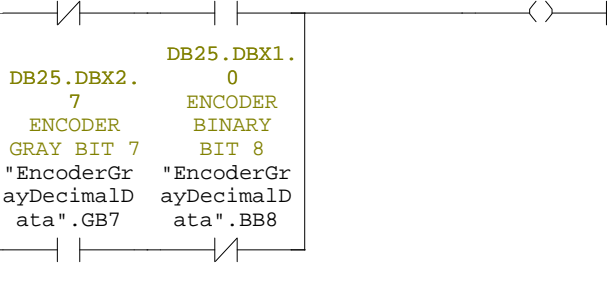
Network: 18 ENCODER BIT BINARY BIT 8

DB25.DBX3. 0 ENCODER GRAY BIT 8 "EncoderGr ayDecimalD ata".GB8	DB25.DBX1. 1 ENCODER BINARY BIT 9 "EncoderGr ayDecimalD ata".BB9	DB25.DBX1. 0 ENCODER BINARY BIT 8 "EncoderGr ayDecimalD ata".BB8
--	---	---



Network: 19 ENCODER BIT BINARY BIT 7

DB25.DBX2. 7 ENCODER GRAY BIT 7 "EncoderGr ayDecimalD ata".GB7	DB25.DBX1. 0 ENCODER BINARY BIT 8 "EncoderGr ayDecimalD ata".BB8	DB25.DBX0. 7 ENCODER BINARY BIT 7 "EncoderGr ayDecimalD ata".BB7
--	---	---

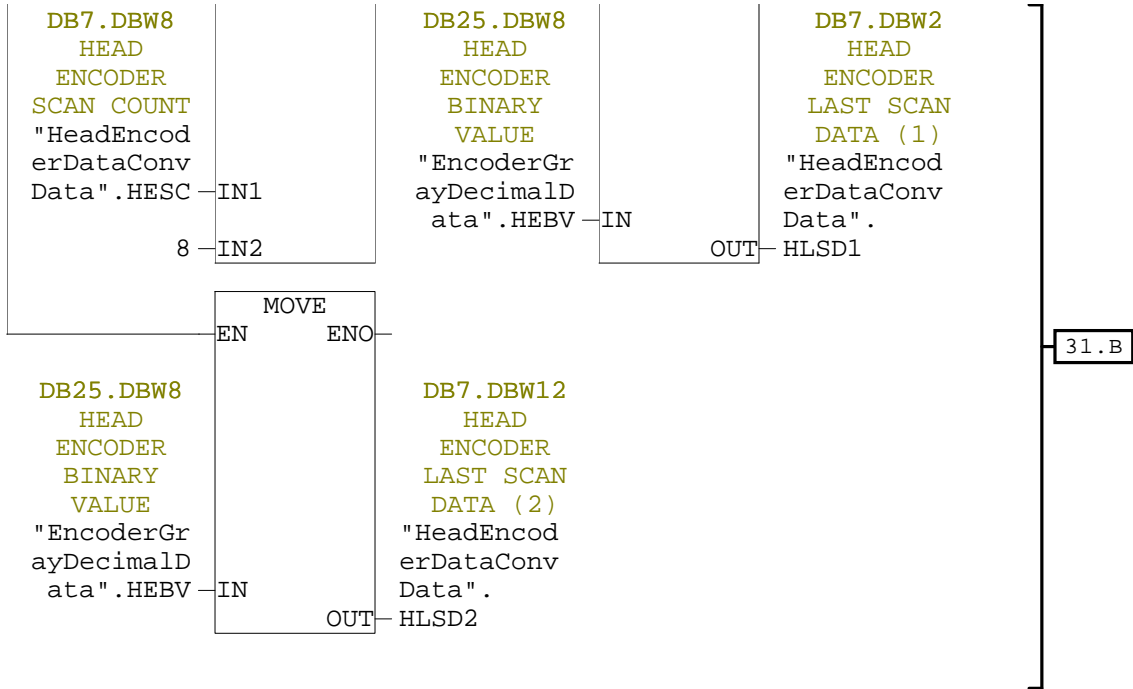


THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

MD6640



CB141381
SNIM
FC10



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



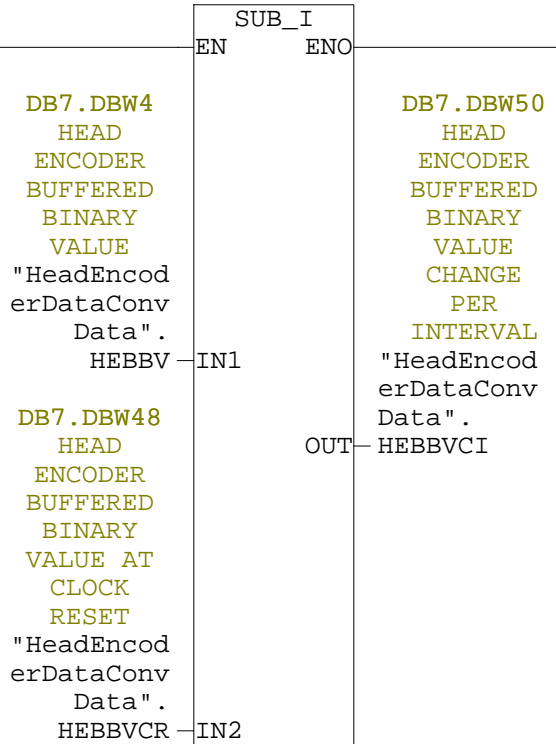
CB141381
SNIM
FC10

Network: 39 Head Overspeed Fault

If the encoder changes 7 counts within the interval timed above (75ms) then a head overspeed fault is set. This equates to a head speed of approximately 1.6ft/s.

To avoid overspeed faults when the head encoder binary value jumps from 0 to 8192 or 8192 to 0 (13 bit encoder) in a rollover situation, the change in encoder value must be less than 8000 counts in order to throw an overspeed fault.

DB7.DBX38.
0
HEAD
OVERSPEED
INTERVAL
CLOCK DONE
"HeadEncoderDataConv
Data".
HOIC_DN



39.A

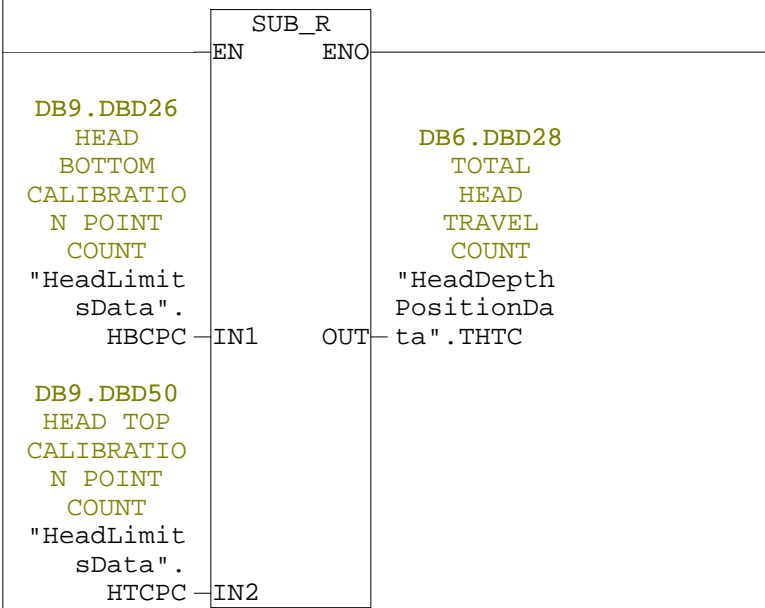
THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



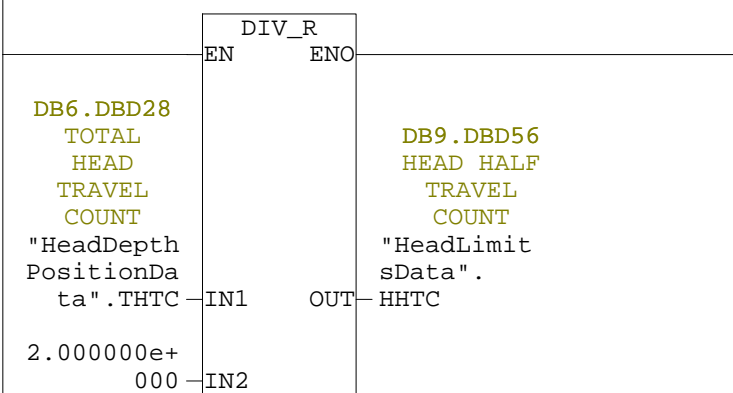
CB141381
SNIM
FC11

Network: 5 Total Head Travel Count

When both top and bottom calibration points are known the total available head travel count is calculated



Network: 6 Head Half Travel Count



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

MD6640



CB141381
SNIM
FC11

3
HEAD
LOWER
LIMIT OUT
OF RANGE
"HeadDepth
PositionDa
ta".ANI002
(R)

10.B

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

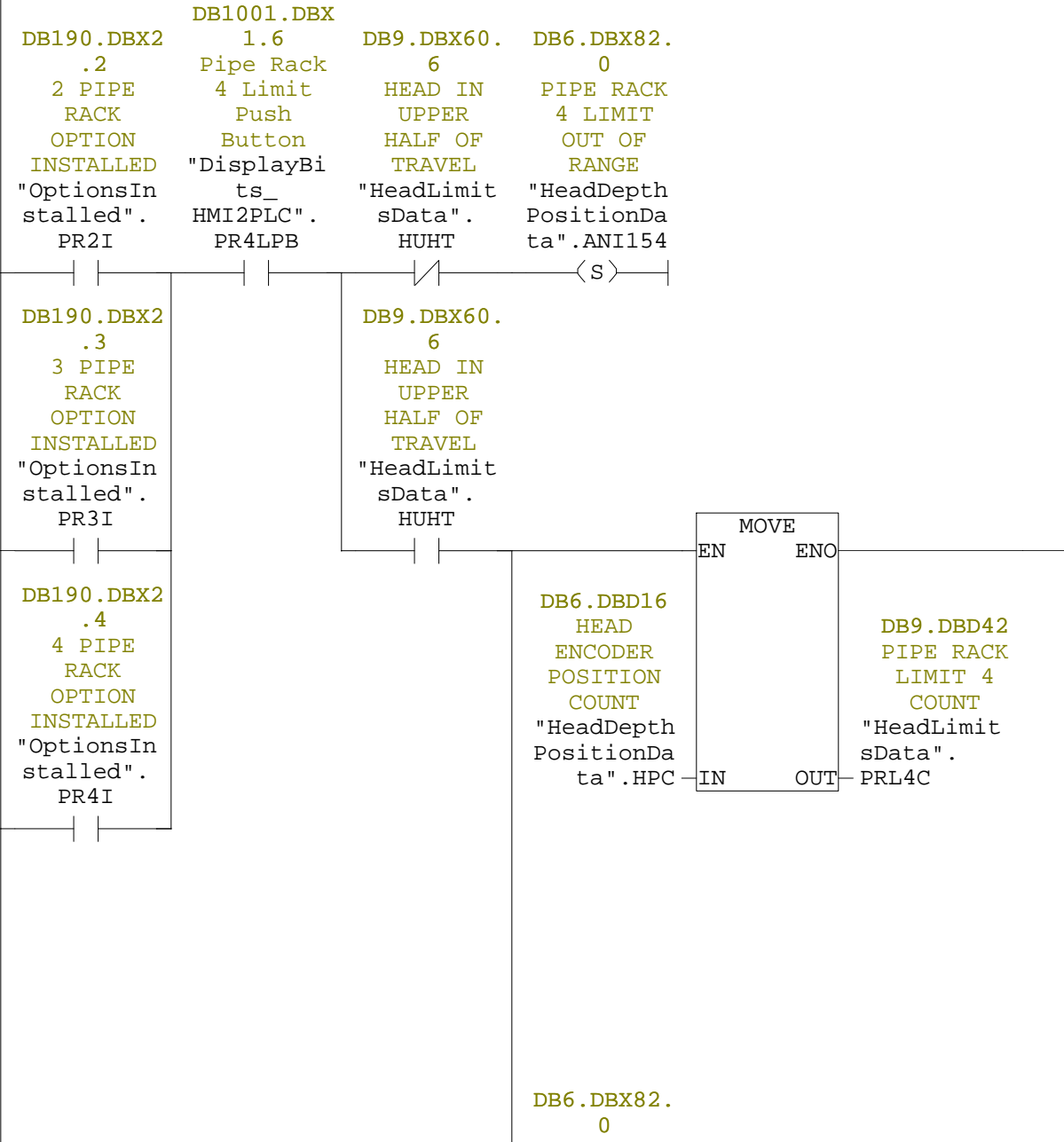
MD6640



CB141381
SNIM
FC11

Network: 13 HEAD PIPE RACK 4 LIMIT

If multiple pipe racks are present on the machine and the pipe rack limit 4 button on the calibration screen is pressed while the head is in the upper half of the mast, the current encoder position count is moved into the pipe rack 4 limit count. This count is then translated into engineering units for display.



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

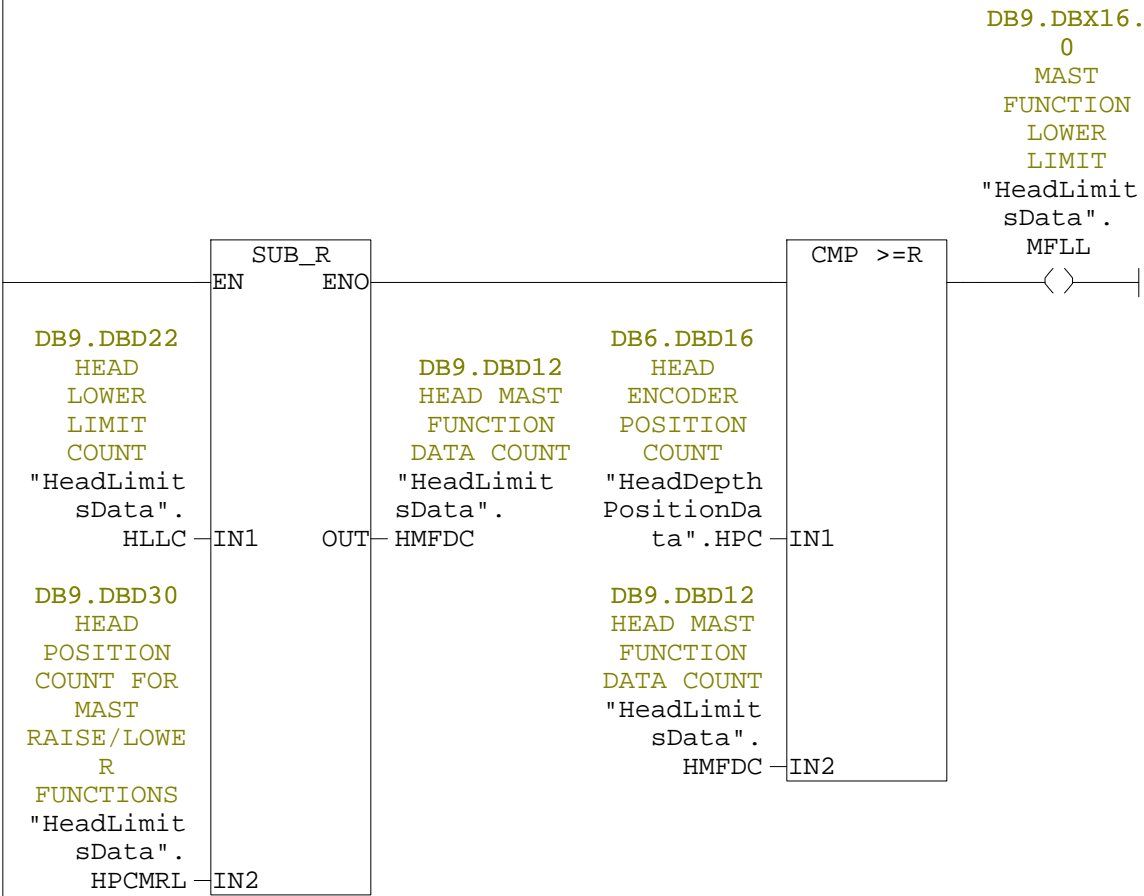
MD6640



CB141381
SNIM
FC11

Network: 19 Mast Function Lower Limit

Head Position Count for Mast Raise/Lower Functions represents the decimal value of the encoder count above the encoder bottom calibration point at which mast raise/lower functions are allowed to occur.



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC11

Network: 27 Tool wrench extended delay to retract

I40.2
TOOL
WRENCH
SELECTOR
SWITCH
DIS-ENGAGE
"TWSS_D"

T60
TOOL
WRENCH
RETRACT
DELAY
TIMER
"TWRDT"

<SD>

DB911.DBW1
18
TWRDT (1
S)
"Timers".
t60

T60
TOOL
WRENCH
RETRACT
DELAY
TIMER
"TWRDT"

DB8.DBX0.0
TOOL
WRENCH
EXTENDED
"HoleDepth
Data".TWE

<R>

Down References

TWRDT FC11:27/SD

Up References

TWRDT FC11:27/A

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

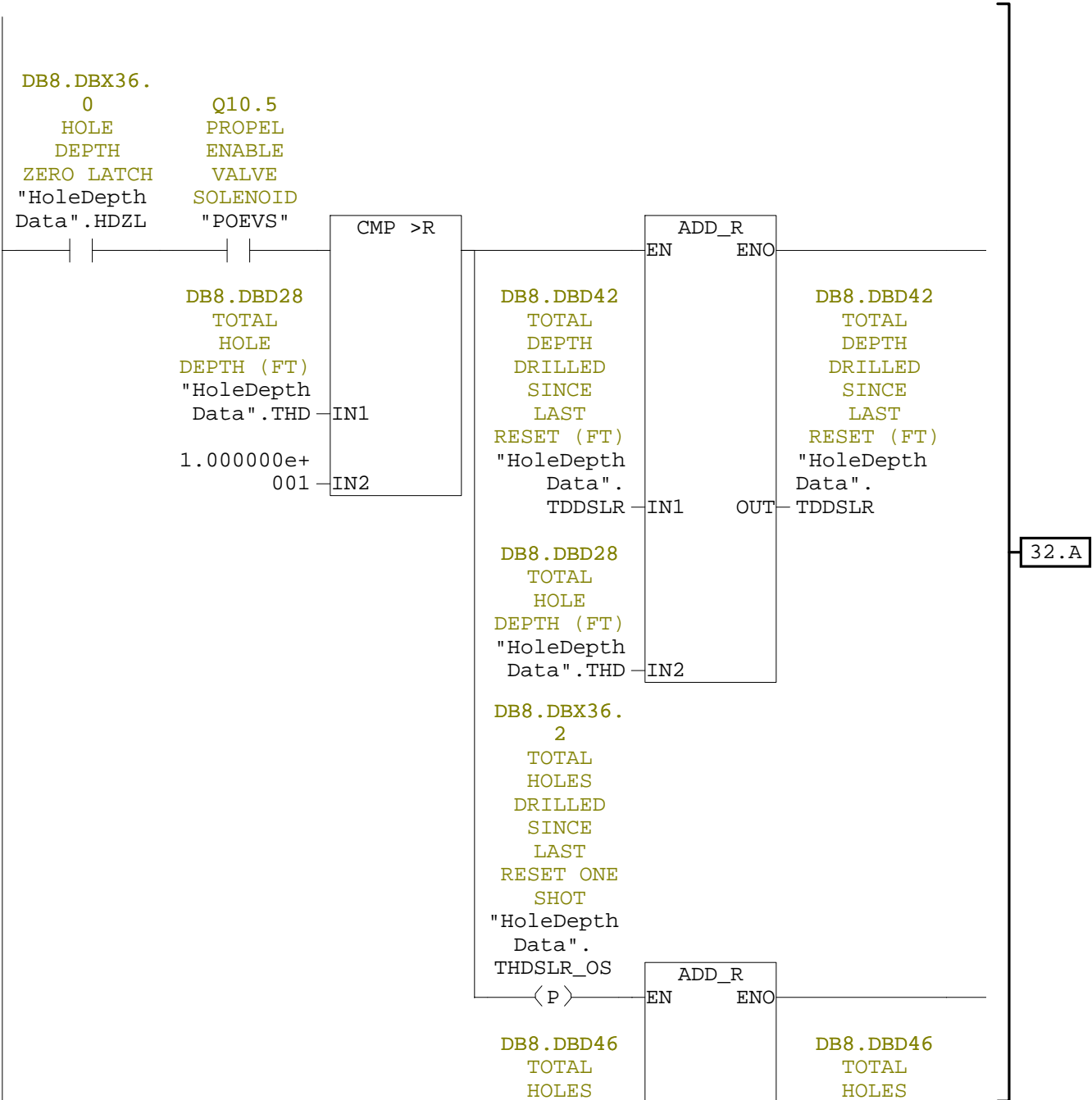
MD6640



CB141381
SNIM
FC11

Network: 32 UPDATE TOTAL DEPTH AND HOLES DRILLED SINCE LAST RESET

WHEN HOLE IS COMPLETE AND THE DRILL IS PLACED IN PROPEL MODE, UPDATE THE "SINCE LAST RESET" DRILL DEPTH AND NUMBER OF HOLES VALUES. IF REQUIRED, CONVERT TO METERS BEFORE DISPLAY.



32.A

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC11

33.D

Down References

ALWAYS_OFF OB1:2/R
POEVS FC75:10/=

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



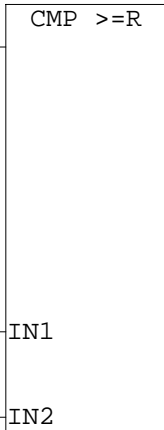
CB141381
SNIM
FC12

Network: 3

DB190.DBX2
.3
3 PIPE
RACK
OPTION
INSTALLED
"OptionsIn
stalled".
PR3I

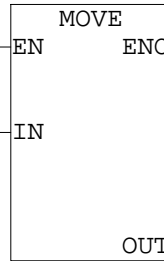
DB190.DBX2
.4
4 PIPE
RACK
OPTION
INSTALLED
"OptionsIn
stalled".
PR4I

DB1003.DBD
16
Number of
Pipes
Input
"DisplayWo
rds_
HMI2PLC".
NOPI IN1
3.000000e+
000 IN2



I26.1
PIPE IN
RACK
LIMIT
SWITCH
POSITION 2
"PIRLS2"

1.000000e+
000



DB170.DBD4
PIPE #2
IN RACK
"DrillPipe
DetectForc
eData".P2V

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC25

FC25 - <offline>

"Display Active Logic"

Name: **Family:**
Author: **Version:** 0.1
Block version: 2
Time stamp Code: 11/09/2010 03:21:17 PM
Interface: 11/25/2003 11:12:59 AM
Lengths (block/logic/data): 00422 00300 00000

Name	Data Type	Address	Comment
IN		0.0	
OUT		0.0	
IN_OUT		0.0	
TEMP		0.0	
RETURN		0.0	
RET_VAL		0.0	

Block: FC25 Display Active Logic

```
//
// Manufacture: Bucyrus South Milwaukee
//
// VERSION    CHANGES    DATE
//           CHANGE DESCRIPTION    NAME
// -----
//      Org.          2008-January-29    D. Bintz
//
//
```

This routine handles the display of Operation Conditions. The screen is manually setup, so any changes to the control structure will need to be reflected here as well. Generic output bits are used for the display. The bit is on for the green condition.

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC30

Down References

ACSST FC36:1/SD FC30:1/SD

Up References

ACSST FC36:1/A FC30:1/A

Network: 2 AIR COMPRESSOR CONTACTOR SIGNAL DELAY

THE AIR COMPRESSOR CONTACTOR SIGNAL IS PUT ON A 500MS DELAY TIMER IN THIS INSTANCE SO THAT IF ANY BOUNCE OCCURES THE COUNTER IN THE NEXT RUNG WILL NOT INCREMENT MORE THAN ONCE.

I2.7
AIR
COMPRESSOR
CONTACTOR
AUX
"ACC_AUX"

T58
AIR
COMPRESSOR
CONTACTOR
DELAY
TIMER
"ACCDT"

<SD>

DB911.DBW1
14
ACCDT
(500 mS)
"Timers".
t58

Up References

ACCDT FC30:3/A FC36:3/A

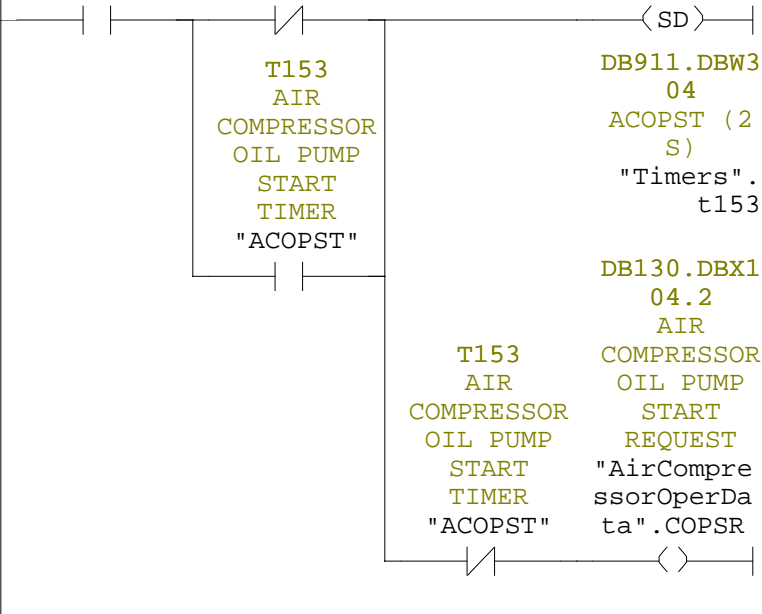
THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC30

Network: 9 AIR COMPRESSOR OIL PUMP START REQUEST

DB130.DBX1 04.4 AIR COMPRESSOR RUN ENABLE "AirCompre ssorOperDa ta".ACSTL	DB130.DBX1 6.6 COMPRESSOR START DRIVE SHUTDOWN "AirCompre ssorOperDa ta".DASL	T153 AIR COMPRESSOR OIL PUMP START TIMER "ACOPST"
---	---	---



Down References

ACOPST FC30:9/SD

Up References

ACOPST FC30:11/A FC30:9/AN

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

MD6640

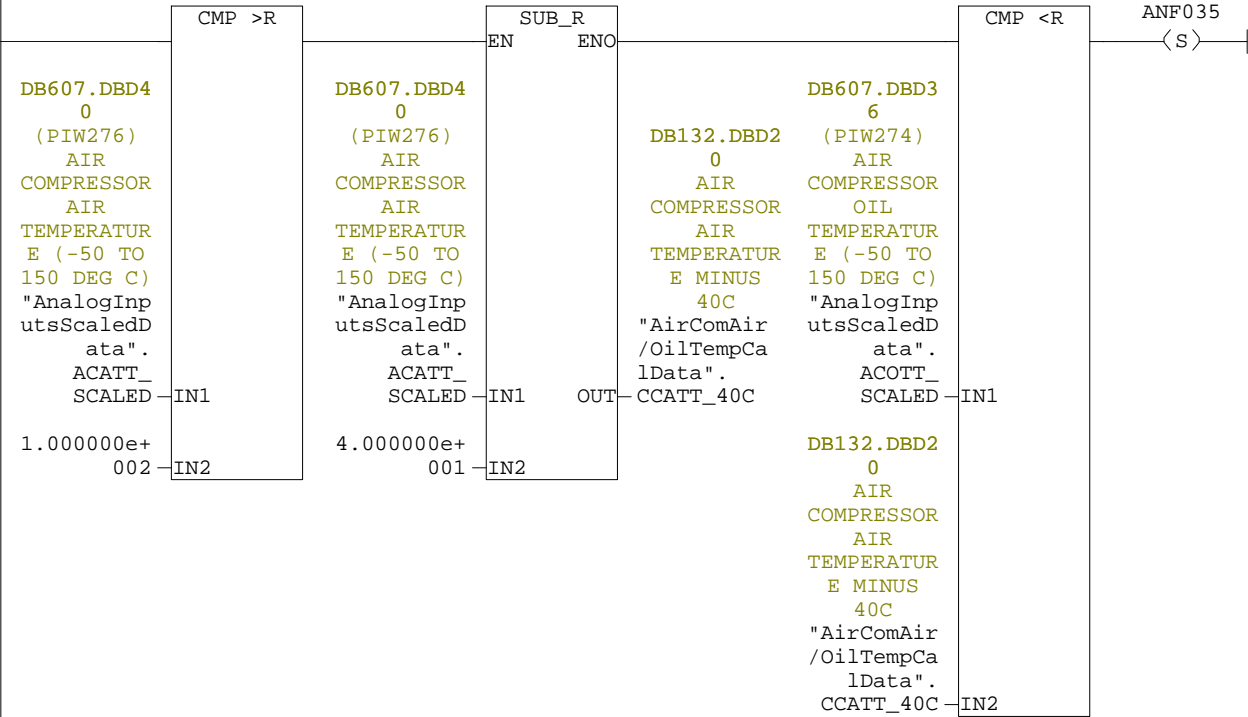


CB141381
SNIM
FC30

Network: 20 COMPRESSOR FAILURE (SHUTDOWN)

CATT > 100 DEGREES C (212F), COTT < (CATT - 40C)

DB1.DBX4.3
AIR
COMPRESSOR
FAILURE
(SHUTDOWN)
"FaultedCo
nditions".
ANF035



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

MD6640



CB141381
SNIM
FC31

Network: 5 AIR COMPRESSOR OIL TEMP HIGH WARNING

ACOTT > 88 deg. C (190 deg. F)

DB1000.DBX
9.4
AIR
COMPRESSOR
OIL TEMP
HIGH
WARNING
"DisplayBi
ts_
PLC2HMI".
ACOTHW

CMP >R

< >

DB607.DBD3
6
(PIW274)
AIR
COMPRESSOR
OIL
TEMPERATUR
E (-50 TO
150 DEG C)
"AnalogInp
utsScaledD
ata".
ACOTT_
SCALED IN1
8.800000e+
001 IN2

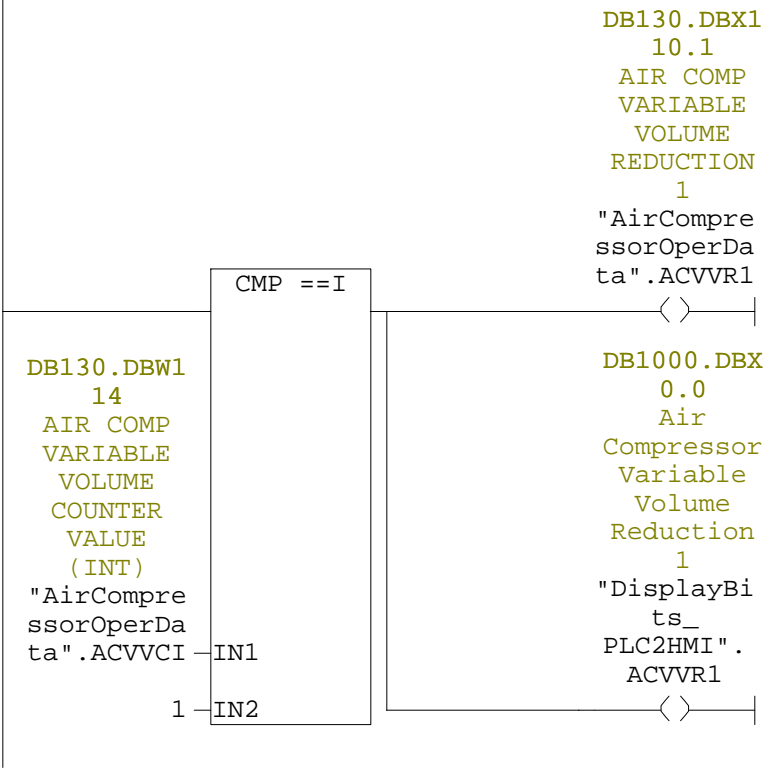
THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

MD6640



CB141381
SNIM
FC33

Network: 3 COMPRESSOR REDUCTION 1



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC34

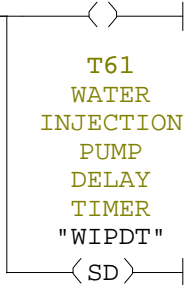
Up References

MAVODT

Network: 5 WATER INJECTION DRIVE CONTACTOR

WHEN WATER INJECTION IS SELECTED BY THE OPERATOR, A RELAY IS ENERGIZED TO BRING POWER TO THE WATER INJECTION VARIABLE FREQUENCY DRIVE. A FIVE SECOND DELAY IS THEN STARTED BEFORE THE SIGNAL TO RUN THE PUMP IS GIVEN.

	DB26.DBX0.		
	2		
DB100.DBX2	DRILL	I37.7	Q5.2
.5	MODE	WATER	WATER
Control	SELECTED	INJECTION	INJECTION
Enabled	"MOTION_	SELECTOR	DRIVE
"System".	CONTROL".	SWITCH	CONTACTOR
ctrlEN	DMS	"WISS"	"WIDC"



```

DB911.DBW1
20
WIPDT (5
S)
"Timers".
t61
  
```

Up References

WIDC
WIPDT FC34:6/A

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



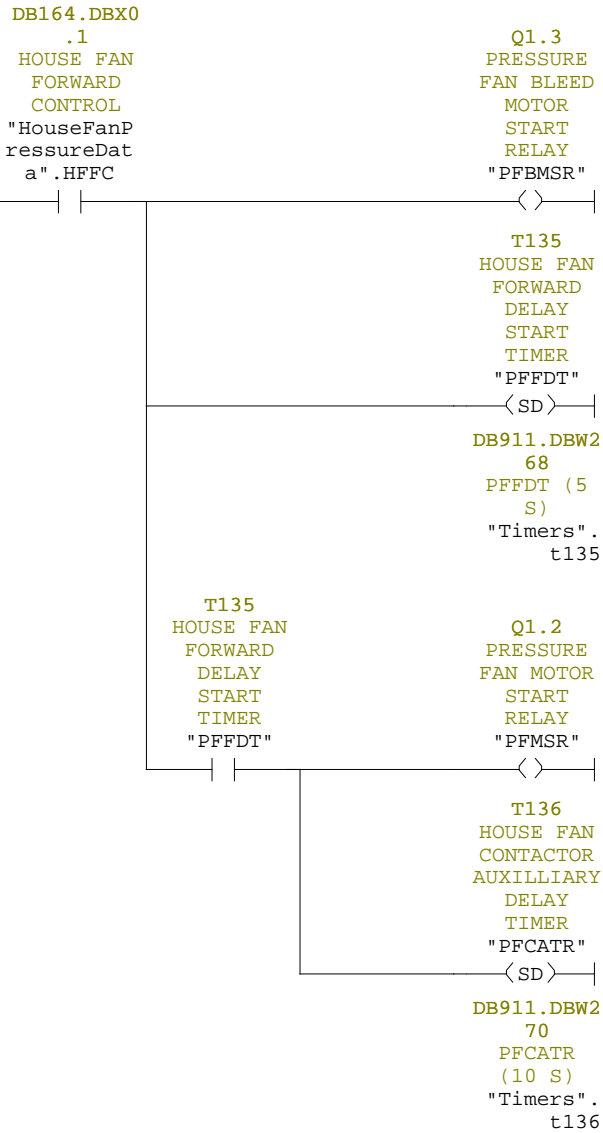
CB141381
SNIM
FC35

Up References

HFRT FC35:2/ON

Network: 4 PRESSURE FAN MOTOR START RELAYS

The Bleed Motor starter is energized 5 sec. (T135) before the main Pressure Fan Motor. T136 times a short delay before checking that both starters have pulled in.



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

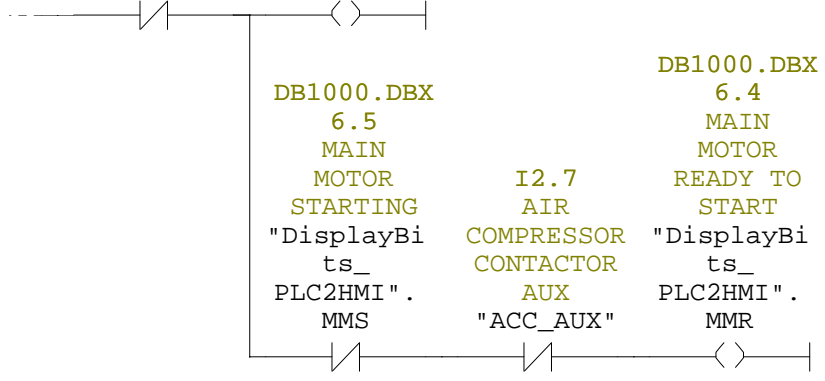
MD6640



CB141381
SNIM
FC36

DB1.DBX4.5
AIR
COMPRESSOR DB130.DBX1
HIGH AIR 7.0
TEMPERATUR NO AIR
E COMPRESSOR
(SHUTDOWN) FAULTS
"FaultedCo "AirCompre
nditions". ssorOperDa
ANF037 ta".NACF

6.B



DB1000.DBX
6.4
MAIN
MOTOR
READY TO
START
"DisplayBi
ts_
PLC2HMI".
MMR

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC36

Down References

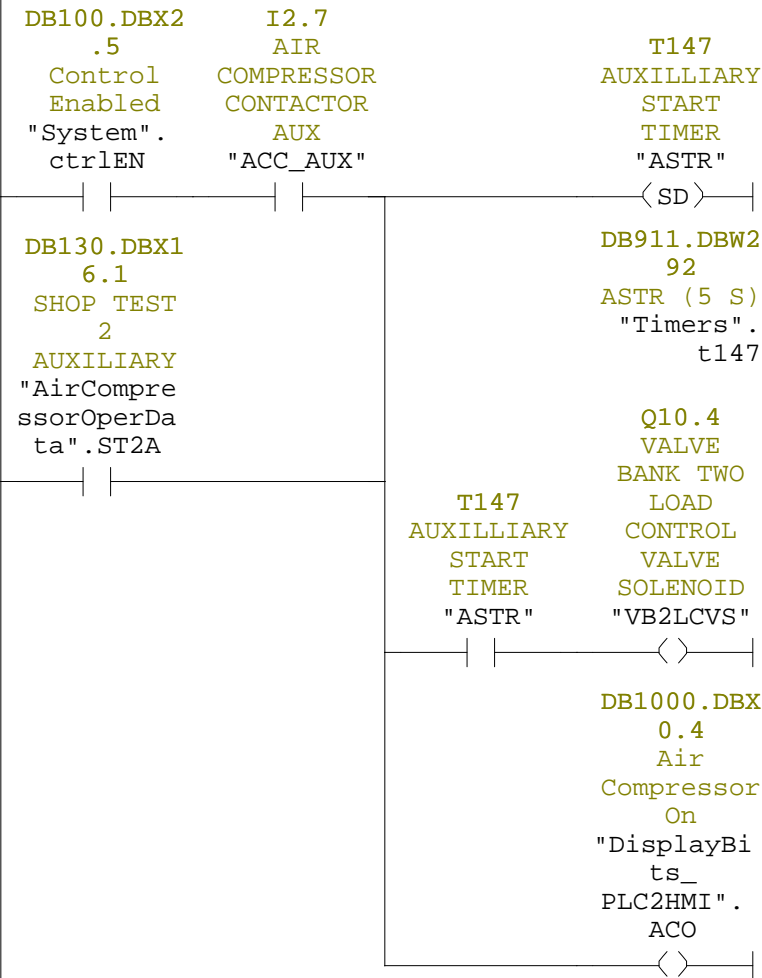
ACMSR FC30:13/= FC36:13/=

Up References

ACDAVS FC30:18/AN FC54:4/A
ACVVS

Network: 16 VALVE BANK 2 CONTROL VALVE

TIME DELAY AFTER COMPRESSOR STARTS BEFORE HYDRAULIC CONTROL VALVE TURNS ON



Down References

ASTR FC30:16/SD FC36:16/SD

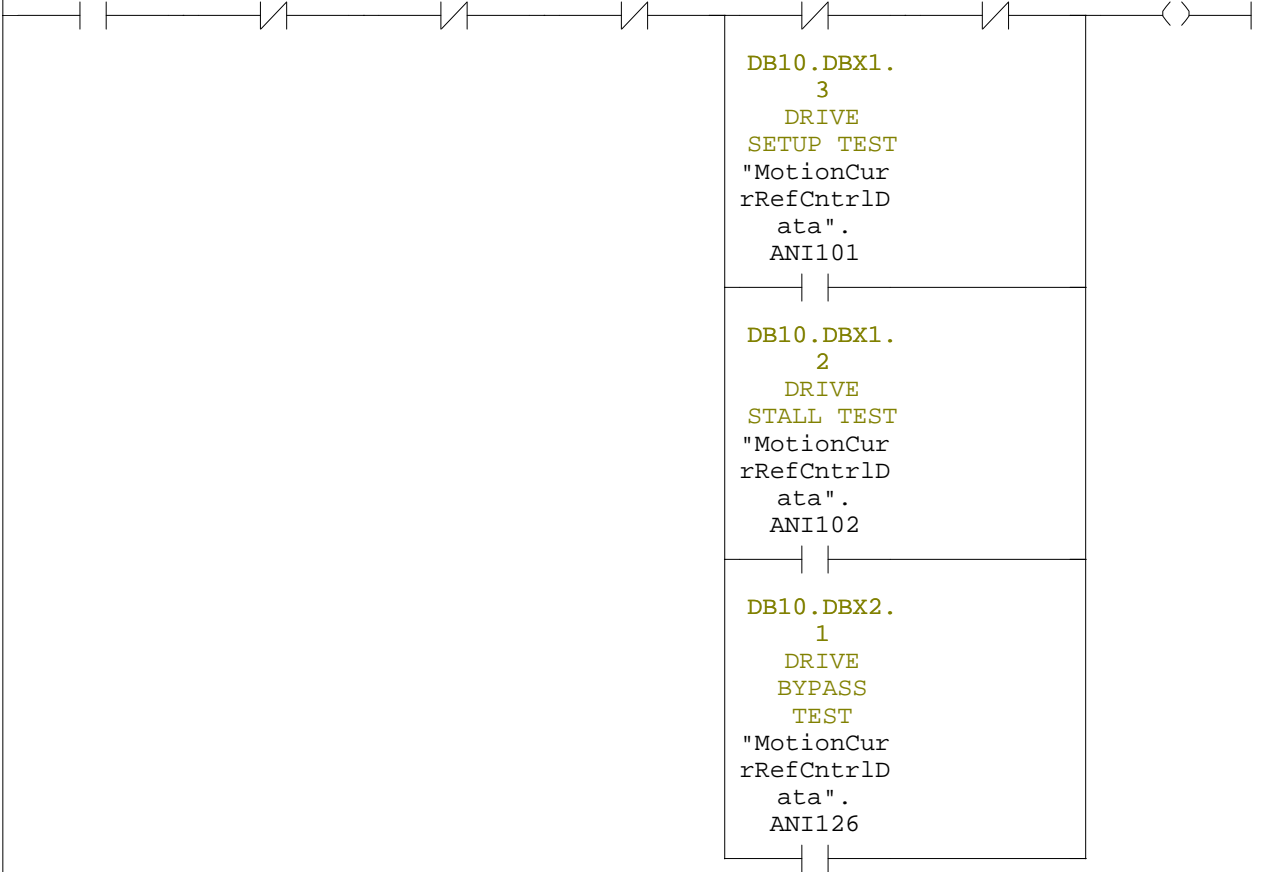
THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC41

Network: 1 DRIVE TEST ENABLE

DB26.DBX0. 2 DRILL MODE SELECTED "MOTION_ CONTROL". DMS	I2.7 AIR COMPRESSOR CONTACTOR AUX "ACC_AUX"	DB1.DBX0.0 EMERGENCY STOP ACTIVE (SHUTDOWN) "FaultedCo nditions". ANF000	T88 DRIVE CONTROL OFF TIMER 1 "DCOTR1"	Q4.1 ROTARY CONTROL POWER CONTACTOR "RCPC"	Q4.2 HOIST/PULL DOWN CONTROL POWER CONTACTOR "HPCPC"	DB15.DBX0. 0 DRIVE TEST ENABLE "MotionDCD riveTestDa ta".DTE
--	--	---	---	---	--	---



Down References

DCOTR1 FC43:3/SD
HPCPC FC43:7/=
RCPC FC43:5/=

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC42

Down References

RMSNT FC42:1/SD

Up References

RMSNT FC42:1/A

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

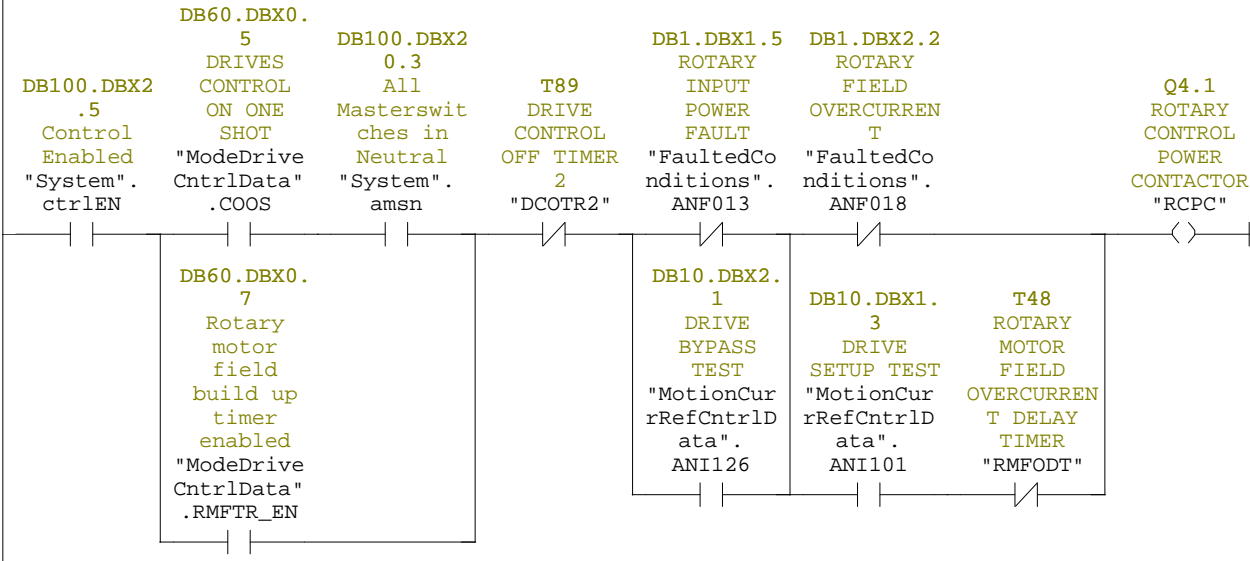
MD6640



CB141381
SNIM
FC43

Network: 5 ROTARY CONTROL POWER CONTACTOR

WHEN THE ONE SHOT IS GIVEN, THE MASTER SWITCHES ARE IN NEUTRAL AND THERE ARE NO DRIVE FAULTS THE DRIVE IS GIVEN A START SIGNAL. THE SIGNAL IS LATCHED TO STAY ON AFTER THE ONE SHOT AND WHEN THE MASTER SWITCHES ARE MOVED.



Down References

DCOTR2 FC43:3/SD
RMFODT FC60:5/SD

Up References

RCPC FC41:1/AN FC43:15/O FC43:6/A

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC43

Down References

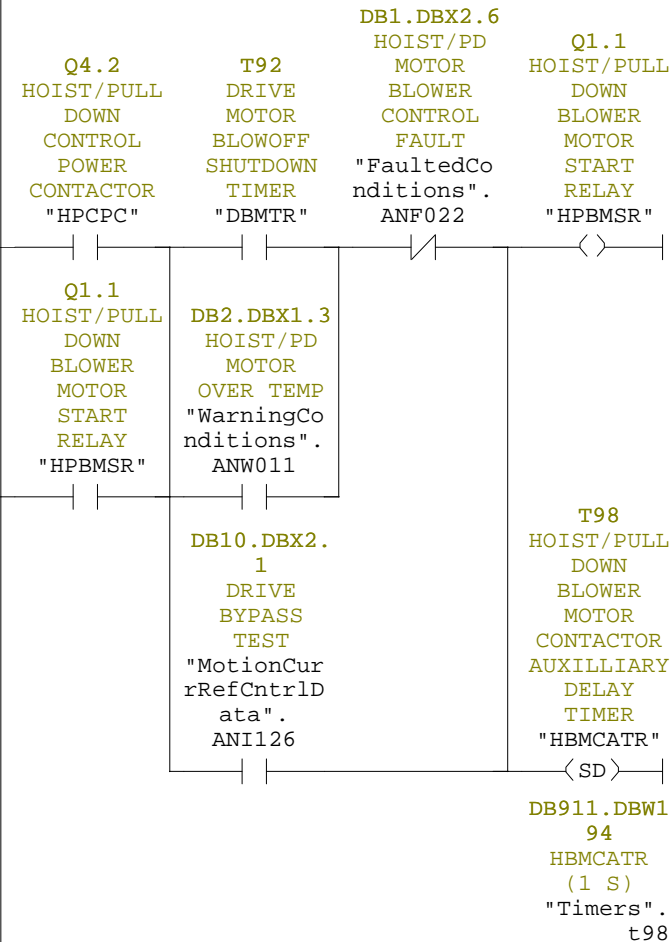
DBMTR FC43:9/SF
RBMSR FC43:15/=
RCPC FC43:5/=

Up References

RBMCATR FC43:18/A
RBMSR FC43:15/O

Network: 16 HOIST/PULLDOWN BLOWER MOTOR START RELAY

WHEN THE START SIGNAL IS GIVEN TO THE DRIVES, THEIR COOLING BLOWERS ARE ALSO SIGNALLED TO START. T97 AND T98 TIME SHORT DELAYS BEFORE CHECKING TO SEE IF THE AUX CONTACTS FROM THE STARTERS HAVE CLOSED. THE BLOWERS WILL CONTINUE TO RUN FOR AT LEAST 8 MIN. (T92) AFTER THE DRIVES SHUT OFF OR UNTIL THEIR ASSOCIATED OVERTEMP SWITCHES HAVE OPENED.



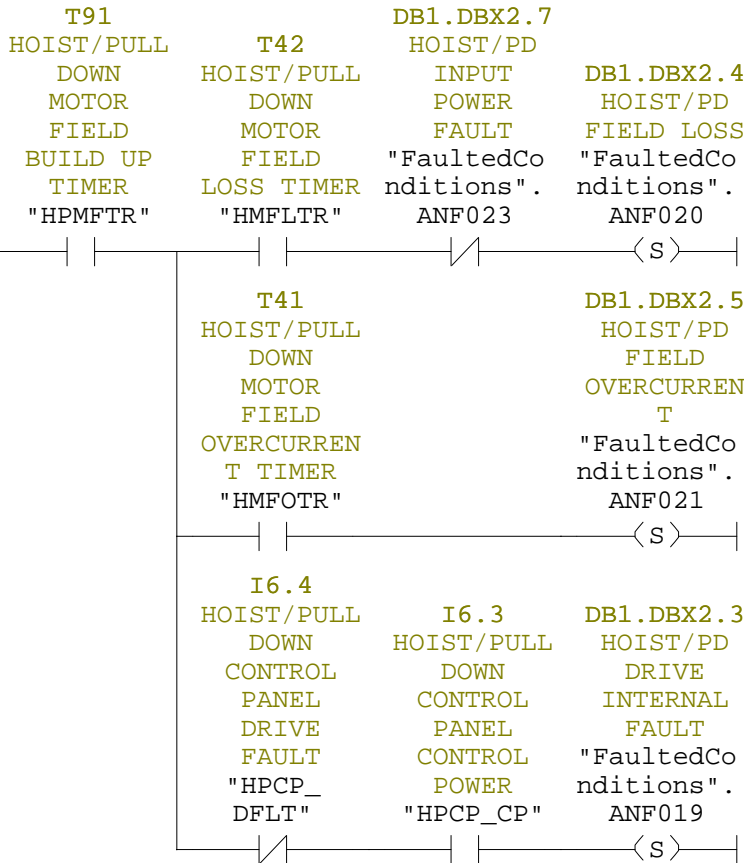
THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC50

Network: 4 HOIST/PD DRIVE FAULTS

AFTER ALLOWING TIME FOR THE FIELD CURRENT TO BUILD UP THE FOLLOWING FAULTS ARE CHECKED.



Down References

HMFLTR FC50:2/SD
HMFOTR FC50:3/SD
HPMFTR FC43:8/SD

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

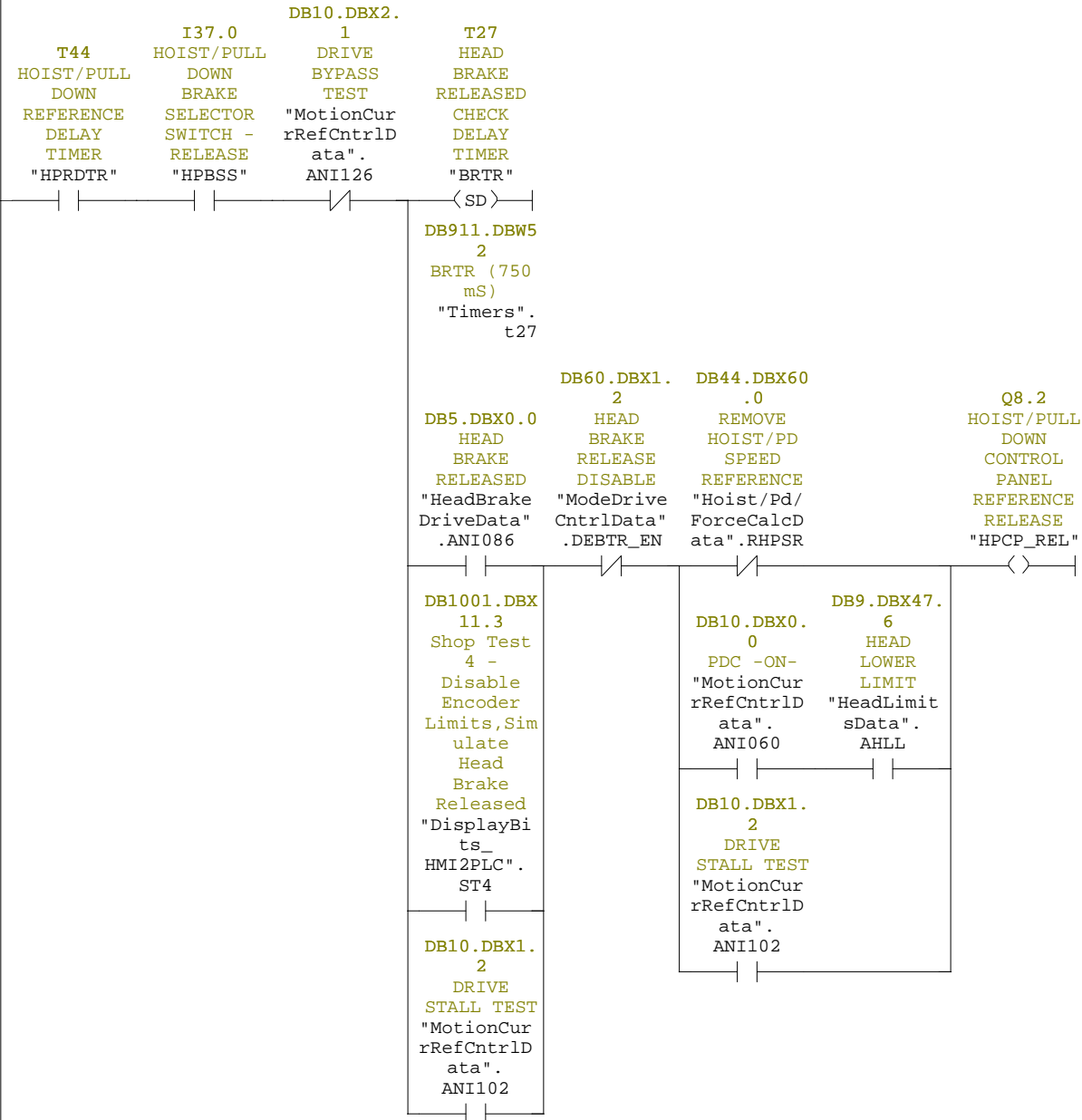
MD6640



CB141381
SNIM
FC50

Network: 10 HEAD BRAKE RELEASED CHECK DELAY TIMER

IF EVERYTHING IS FUNCTIONING PROPERLY, ALLOW THE SPEED REFERENCE OUTPUT TO THE DRIVE. THE HEAD BRAKE SHOULD BE RELEASED AT THIS TIME AND T27 TIMES A SHORT DELAY BEFORE CHECKING TO SEE IF ALL THREE LIMIT SWITCHES AGREE THAT IT ACTUALLY HAS.



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

MD6640

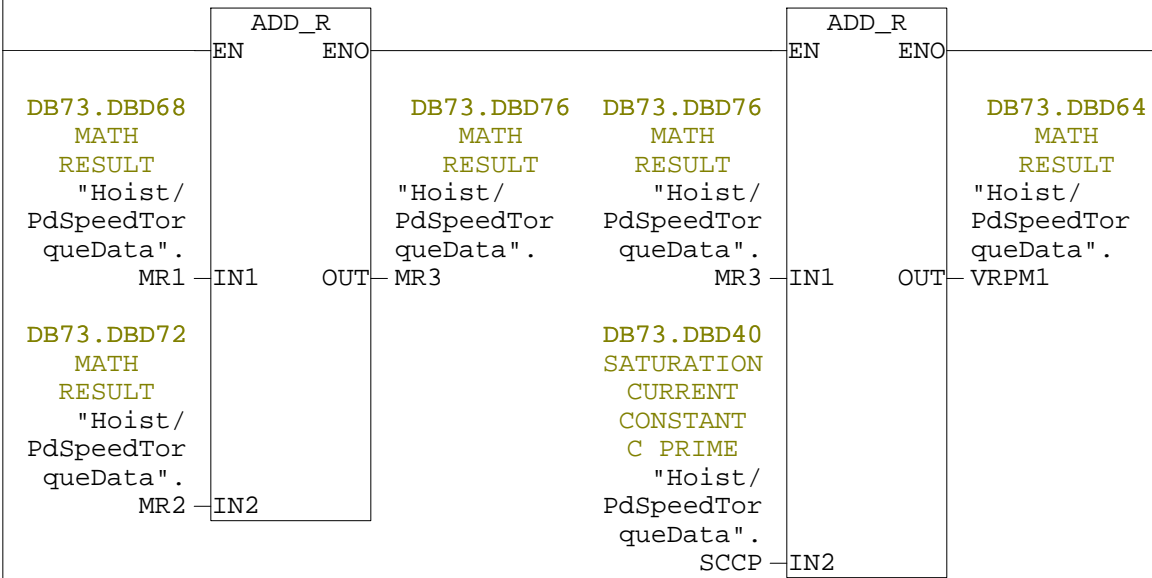


CB141381
SNIM
FC51

Network: 5

$$\text{RESULT} = A'(IF^2) + B'(IF)$$

$$\text{RESULT} = A'(IF^2) + B'(IF) + C = \text{VRPM1}$$



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

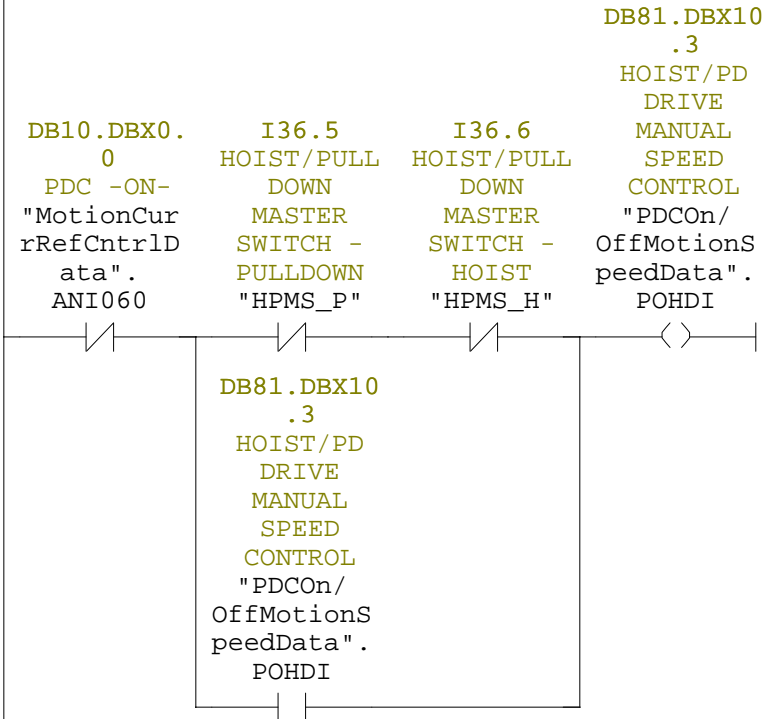
MD6640



CB141381
SNIM
FC52

Network: 1 PDC OFF HOIST/PD DRIVE INTERLOCK

WHEN SWITCHING FROM PDC MODE, THE HOIST/PD MASTER SWITCH MUST BE PLACED IN ITS OFF (NEUTRAL) POSITION TO LATCH IN PDC OFF (MANUAL) MODE.



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

MD6640



CB141381
SNIM
FC53

Network: 1 Pulldown quadrant

VERIFIES THAT THE DRIVE IS IN PULLDOWN OPERATION.

DB44.DBX0.
1
PULLDOWN
QUADRANT
"Hoist/Pd/
ForceCalcD
ata".PDQ

DB607.DBD1
2
(PIW262)
HOIST
CONTROL
ARMATURE
VOLTAGE
(-600 TO
+600 VDC,
+ = HOIST)
"AnalogInp
utsScaledD
ata".
HCPAV_
SCALED

CMP <R

DB607.DBD1
6
(PIW264)
HOIST
CONTROL
ARMATURE
CURRENT
(-750 TO
+750 ADC,
+ = HOIST)
"AnalogInp
utsScaledD
ata".
HCPAC_
SCALED

CMP <R

0.000000e+
000

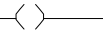
IN1

IN2

-2.
500000e+
000

IN1

IN2



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC53

Down References

ALWAYS_ON OB1:1/S

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

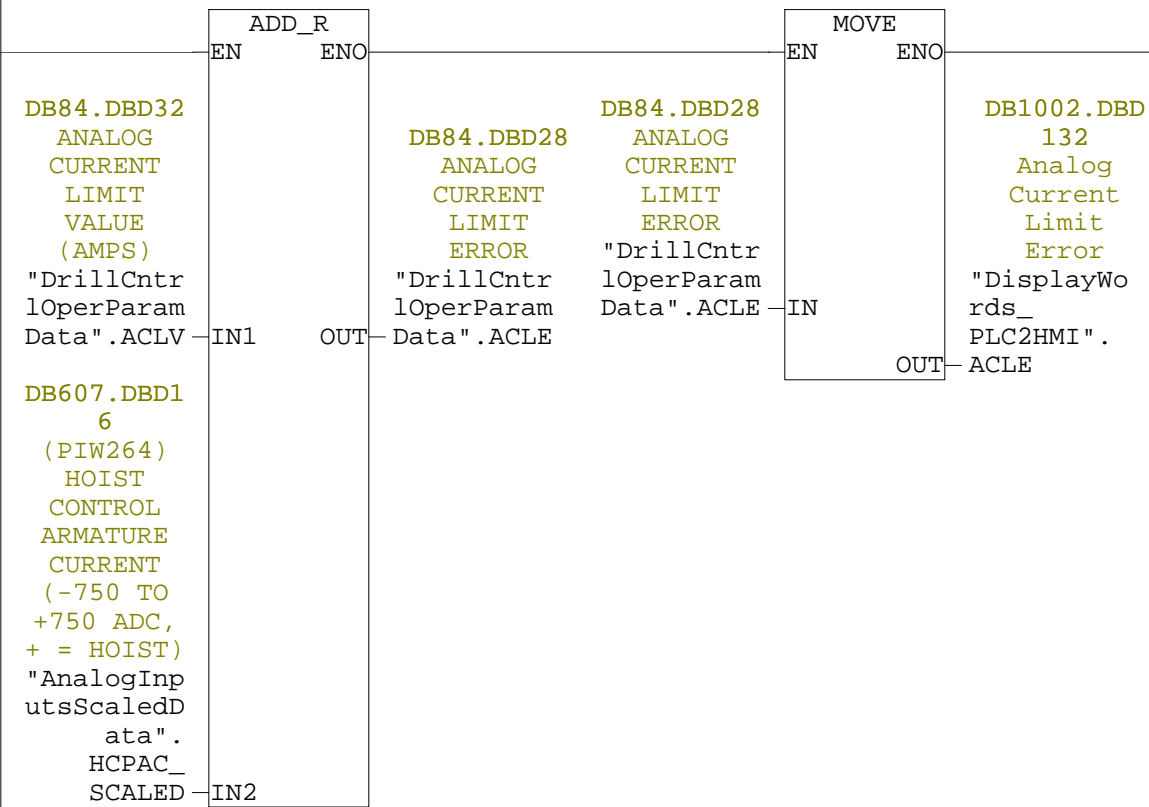
MD6640



CB141381
SNIM
FC54

Network: 10 ANALOG CURRENT LIMIT ERROR

THE ACTUAL ARMATURE CURRENT (WHICH WILL BE NEGATIVE IN PULLDOWN) IS ADDED TO THE SCALED AMP VALUE (POSITIVE) BEING REQUESTED, TO GET AN ERROR VALUE.



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381

SNIM

FC55

Down References

BRTR FC50:10/SD

BSTR FC55:5/SD

DEBTR FC43:3/SD

EHBCR FC55:4/=

Up References

BSTR FC55:6/A FC55:5/A

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

MD6640



CB141381
SNIM
FC60

DB1.DBX2.0		DB1.DBX8.2	DB70.DBX14
ROTARY	DB1.DBX1.6	ROTARY	.4
DRIVE	ROTARY	MOTOR	NO ROTARY
INTERNAL	STALL	OVERTEMP	DRIVE
FAULT	FAULT	FAULT	FAULTS
"FaultedCo	"FaultedCo	"FaultedCo	"RotaryDri
nditions".	nditions".	nditions".	veCntrlDat
ANF016	ANF014	ANF066	a".RDF



6.A

DB10.DBX1.
3
DRIVE
SETUP TEST
"MotionCur
rRefCntrlD
ata".
ANI101

Down References

RMFODT FC60:5/SD

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

MD6640

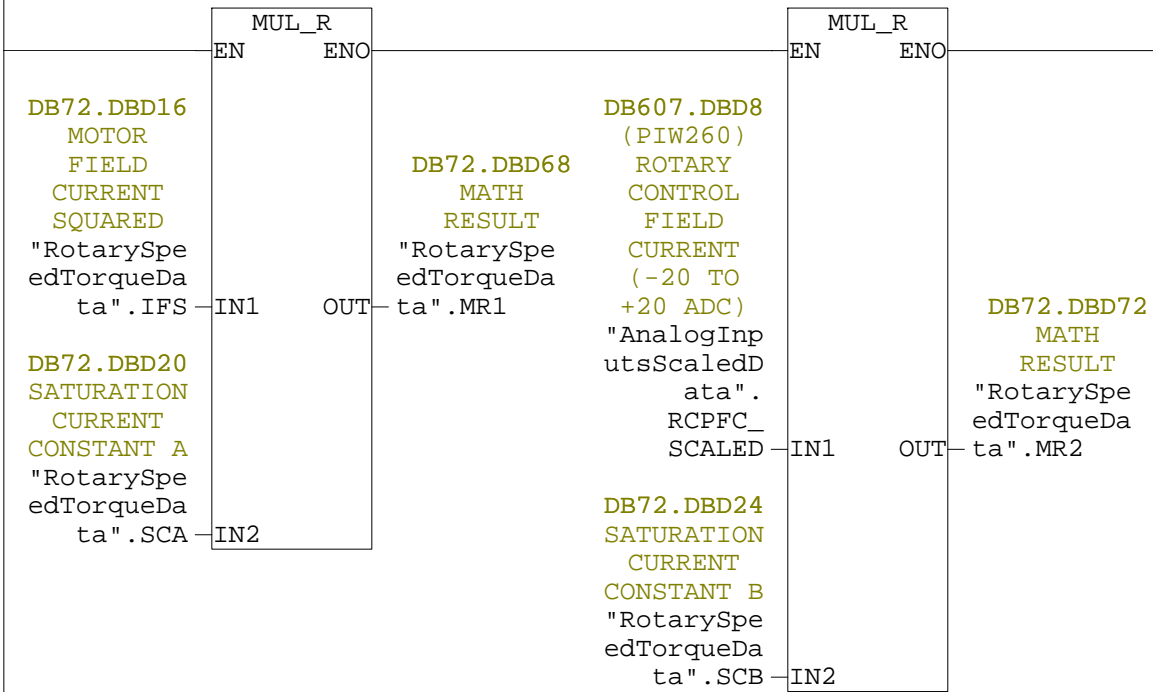


CB141381
SNIM
FC61

Network: 2

A(IF ^2) = RESULT

B(IF) = RESULT



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

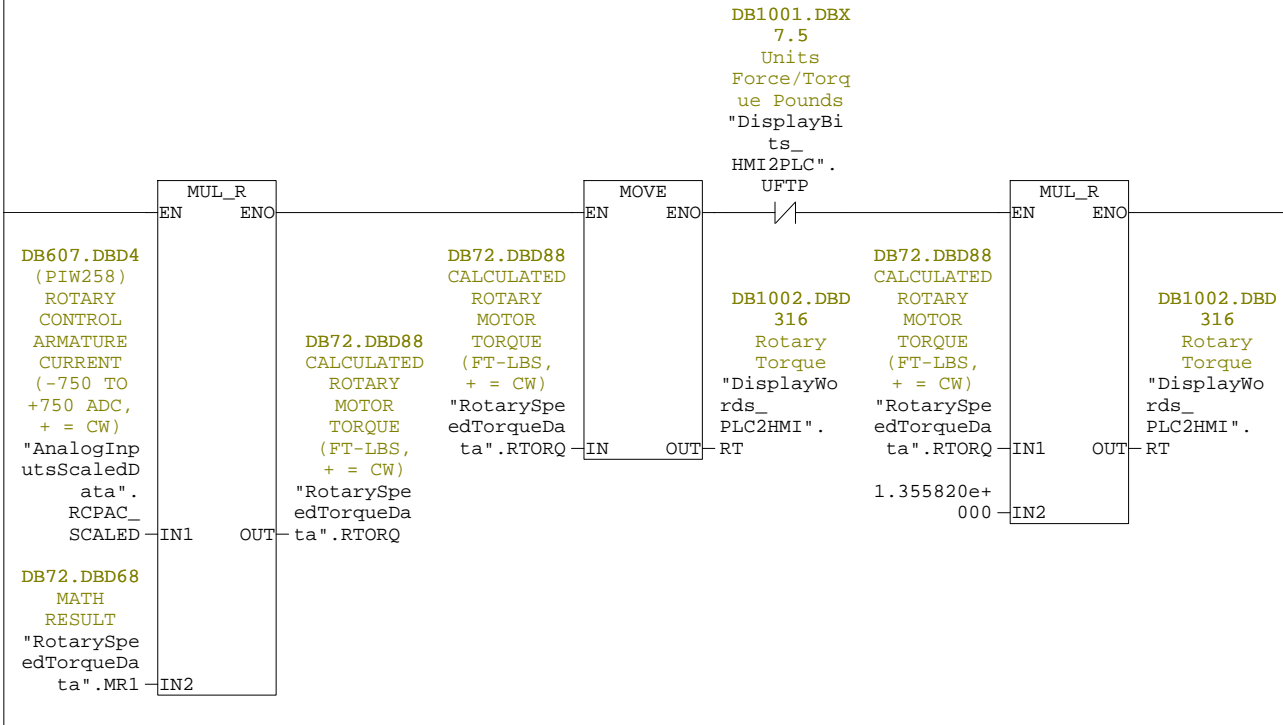
MD6640



CB141381
SNIM
FC61

Network: 16

RESULT = (TORQUE FACTOR)(IA) = MOTOR TORQUE (FT-LBS) = (1.35582 N-M)



Network: 17



Down References

ALWAYS_ON OB1:1/S

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

MD6640



CB141381
SNIM
FC71

Down References

VB2LCVS FC30:16/= FC36:16/=

Up References

PPSVS

Network: 8 PIPE POSITION OVER HOLE VALVE SOLENOID

		DB190.DBX2		
		.7	I41.5	
	Q10.4	ANGLE	DRILL	
	VALVE	HOLE	PIPE	Q15.6
DB100.DBX2	BANK TWO	DRILLING	POSTION	PIPE
.5	LOAD	OPTION	SELECTOR	POSITION
Control	CONTROL	INSTALLED	SWITCH -	OVER HOLE
Enabled	VALVE	"OptionsIn	OVER THE	VALVE
"System".	SOLENOID	stalled".	HOLE	SOLENOID
ctrlEN	"VB2LCVS"	AHOI	"DPPSS_OH"	"PPOHVS"

Down References

VB2LCVS FC30:16/= FC36:16/=

Up References

PPOHVS

Network: 9 DUST SEAL SLIDE REAR VALVE

		DB190.DBX2		
		.7	I41.7	Q10.1
	Q10.4	ANGLE		
	VALVE	HOLE	DUST SEAL	DUST SEAL
DB100.DBX2	BANK TWO	DRILLING	SLIDER	SLIDER
.5	LOAD	OPTION	SELECTOR	RETRACT
Control	CONTROL	INSTALLED	SWITCH -	VALVE
Enabled	VALVE	"OptionsIn	REAR	SOLENOID
"System".	SOLENOID	stalled".	"DSSSS_R"	"DSSRVS"
ctrlEN	"VB2LCVS"	AHOI		

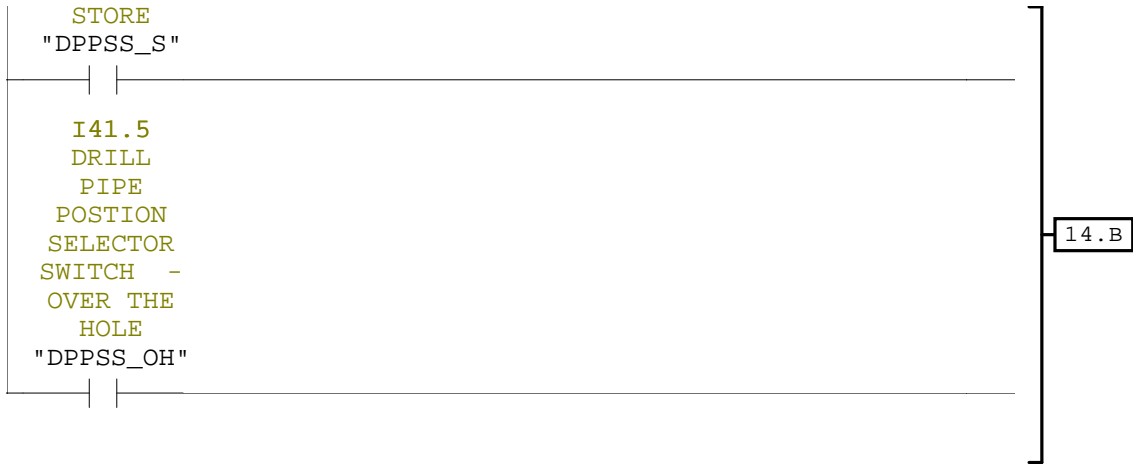
THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

MD6640



CB141381
SNIM
FC71



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC72

1.800000e+
001

DB607.DBD2
4
(PIW268)
RADIO
REMOTE
RECIEVER
RIGHT
MASTER
SWITCH
(-100 TO
+100%, +
= FORWARD)
"AnalogInp
utsScaledD
ata".
RRRRMS_
SCALED

5.B

-1.
800000e+
001

		DB190.DBX2	DB1001.DBX	
I37.6	.6	3.4	I4.0	
DRILL/PROP	REMOTE	Remote	REMOTE	
EL MASTER	WINCH	Winch	WINCH	
SELECTOR	INSTALLED	Enable	DIRECTION	
SWITCH -	"OptionsIn	"DisplayBi	SELECTOR	
MAST	stalled".	ts_	SWITCH	
"DPMSS_M"	RWOI	HMI2PLC".	DOWN	
		RWE	"RWDSS_D"	

I4.1
REMOTE
WINCH
DIRECTION
SELECTOR
SWITCH UP
"RWDSS_U"

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

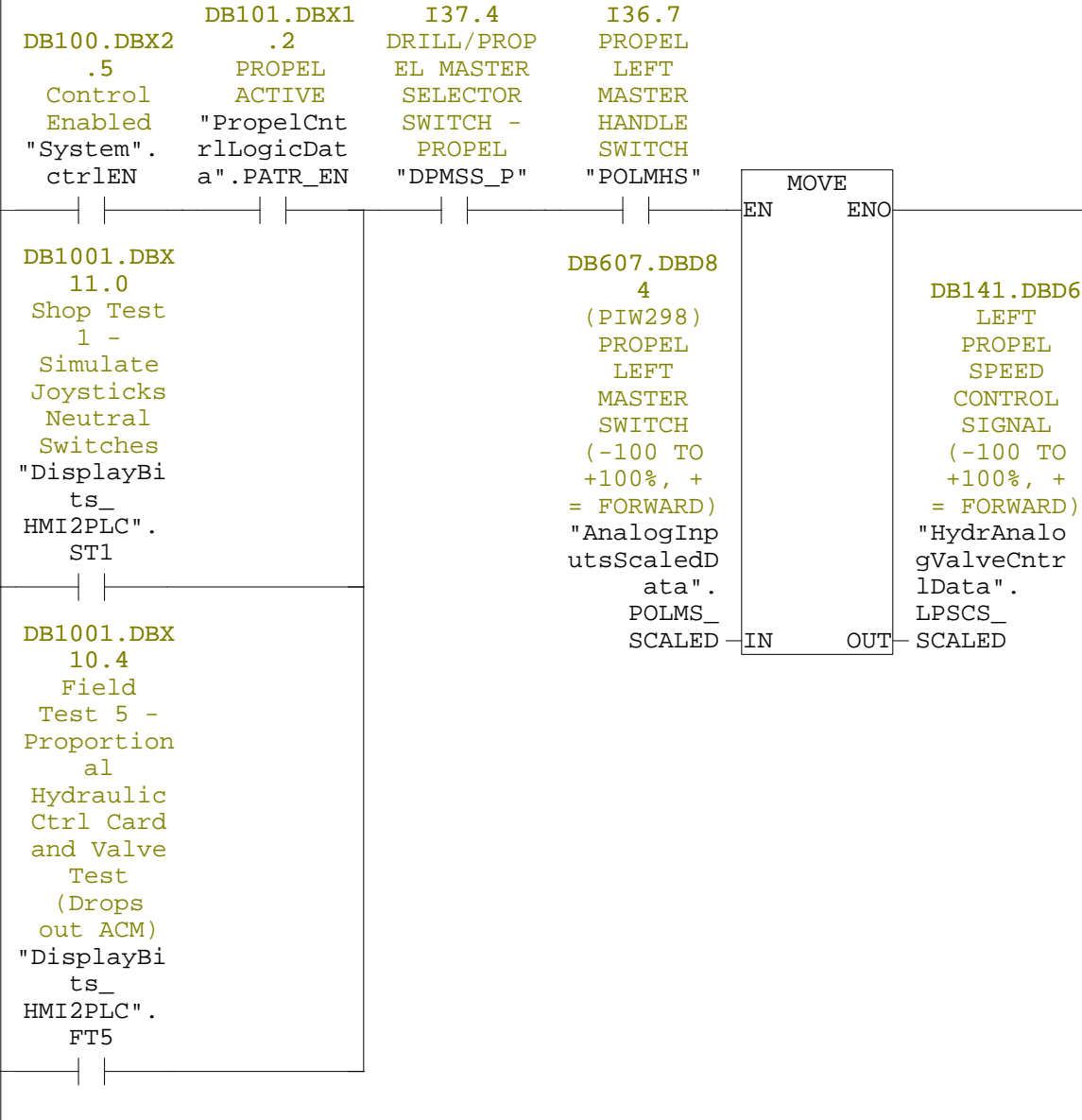
MD6640



CB141381
SNIM
FC72

Network: 14 Cab Propel Left Control Signal

If propel movement is allowed, send the scaled signal from the master switch to the address used by the unscale function (FC6)

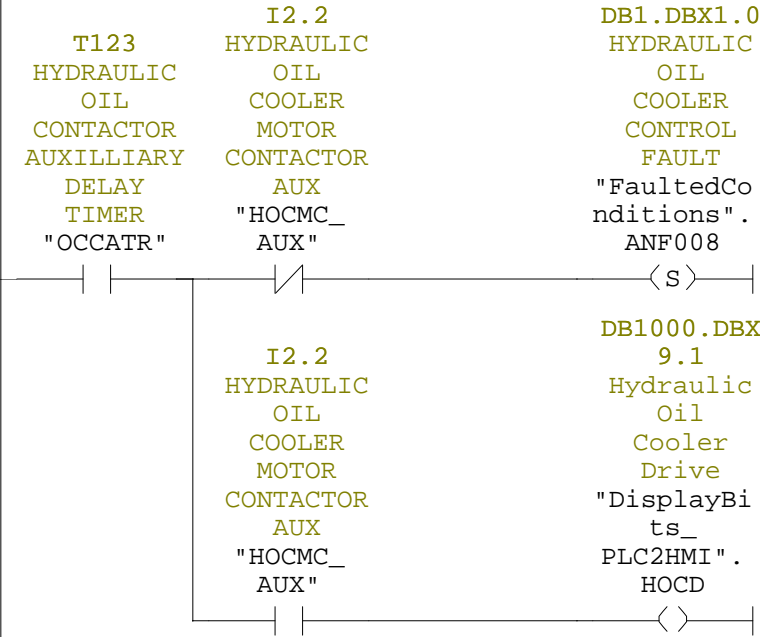


THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC73

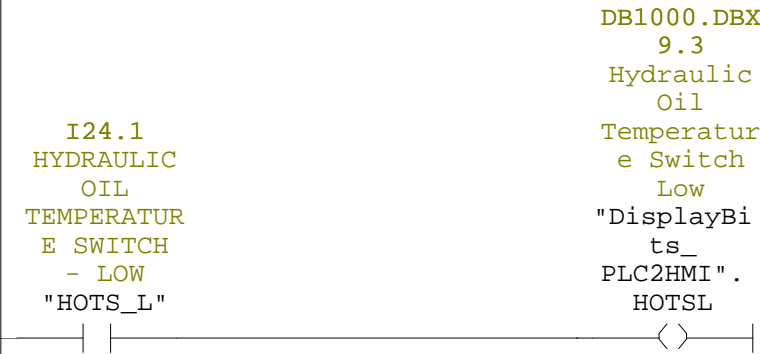
Network: 4 HYDRAULIC OIL COOLER CONTROL FAULT



Down References

OCCATR FC73:3/SD

Network: 5 Display Hydraulic Oil Temperature Switch Low



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC75

FC75 - <offline>

"PropelControl"

Name: **Family:**
Author: **Version:** 0.1
Block version: 2
Time stamp Code: 11/09/2010 04:44:20 PM
Interface: 05/27/2009 09:39:19 AM
Lengths (block/logic/data): 00734 00616 00002

Name	Data Type	Address	Comment
IN		0.0	
OUT		0.0	
IN_OUT		0.0	
TEMP		0.0	
RETURN		0.0	
RET_VAL		0.0	

Block: FC75

THIS MODULE CONTROLS OUTPUTS TO ALLOW PROPELLING OF THE DRILL.

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

MD6640



CB141381
SNIM
FC75

9.B

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

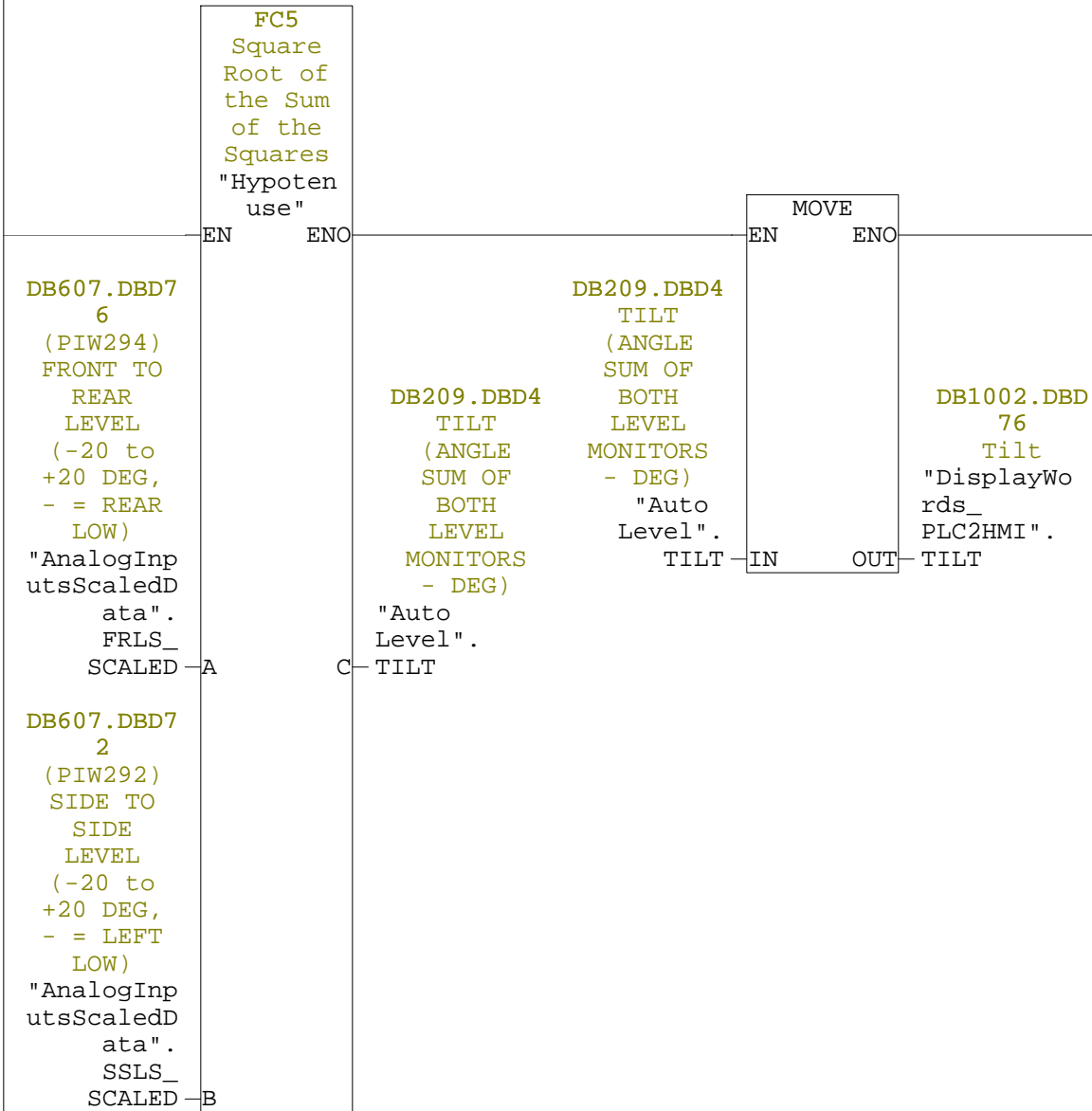
MD6640



CB141381
SNIM
FC76

Network: 2 Calculate Tilt

Tilt is the square root of the sum of the squares of the two angle sensor.



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC76

Down References

ALET FC76:9/SD
ARJRT FC76:34/SD

Network: 11 AUTO LEVELING IN PROGRESS
FOR HMI INDICATION.

<p>DB209.DBX0 .5 AUTO EXTEND ACTIVE "Auto Level".AES</p>	<p>DB1000.DBX 3.2 AUTO LEVELING IN PROGRESS "DisplayBi ts_ PLC2HMI". AL</p>
--	---

<p>DB209.DBX0 .4 AUTO RETRACT ACTIVE "Auto Level".ARS</p>	<p>< ></p>
---	------------------

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381

SNIM

FC76

Down References

RST FC76:21/SD

Up References

RST FC76:29/O FC76:24/AN FC76:21/A

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.



CB141381
SNIM
FC76

Down References

FLT FC76:27/SD
JRLLVS FC76:39/R FC76:38/S
LST FC76:20/SD
RET FC76:22/SD
RLJGPT FC76:15/SD
SSLT FC76:26/SD

Network: 31 JACKS RETRACTED FOR PROPEL SET

The operator must fully retract jacks before allowing propel. Otherwise ANF033 will be displayed.

NOTE: This is a set bit because the pressure condition that signifies the jacks to be fully retracted may not be present after hydraulic power is removed from the jacks, even though the jacks are physically fully retracted.

If the fack retract limit switch option is installed, it overrides the pressure switch signals by setting the bit every cycle while the jack is in the retracted position.

I8.1	I8.5	I9.1	I9.3	DB209.DBX1
JACK	JACK	JACK REAR	JACK REAR	1.6
FRONT	FRONT	RIGHT	LEFT FULL	JACKS
RIGHT	LEFT FULL	FULL	RETRACT	RETRACTED
FULL	RETRACT	RETRACT	RETRACT	FOR PROPEL
RETRACT	PRESSURE	PRESSURE	PRESSURE	"Auto
PRESSURE	SWITCH	SWITCH	SWITCH	Level".
SWITCH	"JFLFRPS"	"JRRFRPS"	"JRLFRPS"	JRFP
"JFRFRPS"				<S>

DB190.DBX3	I19.0	I19.1	I19.2	I19.3
.7	JACK	JACK	JACK REAR	JACK REAR
JACK	FRONT	FRONT	RIGHT	LEFT
RETRACT	RIGHT	LEFT	RETRACT	RETRACT
LIMIT	RETRACT	RETRACT	LIMIT	LIMIT
SWITCHES	LIMIT	LIMIT	SWITCH	SWITCH
OPTION	SWITCH	SWITCH	"JRRRLS"	"JRLRLS"
INSTALLED	"JFRRLS"	"JFLRLS"		
"OptionsIn				
stalled".				
JRLSOI				

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC76

Down References

ARJRT FC76:34/SD
JFLRVS FC76:39/R FC76:38/S
JFRRVS FC76:39/R FC76:38/S
JRLRVS FC76:39/R FC76:38/S
JRRRVS FC76:39/R FC76:38/S

Up References

ARJRT FC76:34/AN FC76:10/AN

Network: 35

IF A AUTO RETRACT IS ACTIVE, JUMP AROUND THE NEXT NETWORK.

DB209.DBX0

.4

AUTO

RETRACT

ACTIVE

"Auto

Level".ARS

AUTO

< JMP >

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC77

FC77 - <offline>

"MastPins/BleedValves"

Name: **Family:**
Author: **Version:** 0.1
Block version: 2
Time stamp Code: 11/09/2010 04:44:37 PM
Interface: 05/26/2009 03:40:47 PM
Lengths (block/logic/data): 01726 01554 00002

Name	Data Type	Address	Comment
IN		0.0	
OUT		0.0	
IN_OUT		0.0	
TEMP		0.0	
RETURN		0.0	
RET_VAL		0.0	

Block: FC77

THIS MODULE CONTROLS THE OUTPUTS FOR THE SOLENOID VALVES INVOLVED IN THE OPERATION OF THE FOLLOWING

- 1) MAST LOCK PINS
- 2) MAST BRACE LOCK PINS
- 3) A-FRAME LOCK PINS
- 4) CONSTANT PRESSURE VALVES ASSOCIATED WITH THE LOCK PINS
- 5) MAST CYLINDER BLEED VALVES.

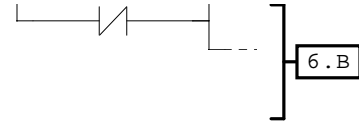
NOTE: A-FRAME PIN LOGIC IS ONLY USED WHEN THE ANGLE HOLE DRILLING OPTION IS INSTALLED.

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

MD6640



CB141381
SNIM
FC77



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

MD6640



CB141381
SNIM
FC77

Network: 18 RH MAST LOCK PIN UNLOCKED

I26.7
MAST PIN
UNLOCKED
RIGHT
HAND
LIMIT
SWITCH
"MPURHLS"

DB50.DBX1.
5
RH MAST
LOCK PIN
UNLOCKED
"MastLockR
H/
LHData".
ANI109

DB1000.DBX
12.5
RIGHT
MAST LOCK
PIN
UNLOCKED
"DisplayBi
ts_
PLC2HMI".
RMLPU



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC77

Network: 30 PIN STATUS SCREEN ACTIVE

DB50.DBX1. DB50.DBX2.
1 7
AUDIO PIN
TIMER UNLOCK
AUXILLIARY AUXILLIARY
RELAY RELAY
"MastLockR "MastLockR
H/ H/
LHData". LHData".
ATAR PUAR

Q10.4
VALVE
BANK TWO
LOAD
CONTROL
VALVE
SOLENOID
"VB2LCVS"

T19
MAST PIN
AUDIO
TIMER
"MPAT"

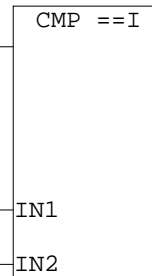
DB50.DBX1.
2
MAST PIN
FUNCTION
SELECTED
"MastLockR
H/
LHData".
MPFS

I36.7
PROPEL
LEFT
MASTER
HANDLE
SWITCH
"POLMHS"

MW2
Operator
Screen
Display
"OD_DSN"

1009

DB911.DBW3
6
MPAT
(1200 mS)
"Timers".
t19



DB190.DBX2 DB50.DBX1.
.7 1
ANGLE AUDIO
HOLE TIMER
DRILLING AUXILLIARY
OPTION RELAY
INSTALLED "MastLockR
"OptionsIn H/
stalled". LHData".
AHOI ATAR

I42.5
PROPEL
RIGHT
MASTER
HANDLE
SWITCH
"PORMHS"

I37.6
DRILL/PROP
EL MASTER
SELECTOR
SWITCH -
MAST
"DPMSS_M"

DB50.DBX1.
1
AUDIO
TIMER
AUXILLIARY
RELAY
"MastLockR
H/
LHData".
ATAR

I42.5
PROPEL
RIGHT
MASTER
HANDLE
SWITCH
"PORMHS"

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC78

Network: 1 PIPE RACK HYDRAULIC PERMIT

	Q10.4	DB26.DBX0.		DB141.DBX0
	VALVE	2		.4
DB100.DBX2	BANK TWO	DRILL	DB209.DBX2	PIPE RACK
.5	LOAD	MODE	.5	HYDRAULIC
Control	CONTROL	SELECTED	JACKS NOT	PERMIT
Enabled	VALVE	"MOTION_	OPERATING	"HydrAnalo
"System".	SOLENOID	CONTROL".	"Auto	gValveCtr
ctrlEN	"VB2LCVS"	DMS	Level".JNO	lData".
				PRHP

DB1001.DBX
10.3
Field
Test 4 -
Mast/Winch
/Pipe
Rack
Enable
During
Jack
Operation
(Disable
JLVS)
"DisplayBi
ts_
HMI2PLC".
FT4

Down References

VB2LCVS FC30:16/= FC36:16/=

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED



CB141381
SNIM
FC79

FC79 - <offline>

"DustCurtainValveCntrl"

Name: **Family:**
Author: **Version:** 0.1
Block version: 2
Time stamp Code: 11/09/2010 04:45:33 PM
Interface: 05/27/2009 12:52:53 PM
Lengths (block/logic/data): 00248 00150 00002

Name	Data Type	Address	Comment
IN		0.0	
OUT		0.0	
IN_OUT		0.0	
TEMP		0.0	
RETURN		0.0	
RET_VAL		0.0	

Block: FC79 DUST CURTAIN VALVE CONTROL

THIS MODULE CONROLS THE OUTPUTS FOR RAISING AND LOWERING THE DUST CURTAIN

THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.

© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

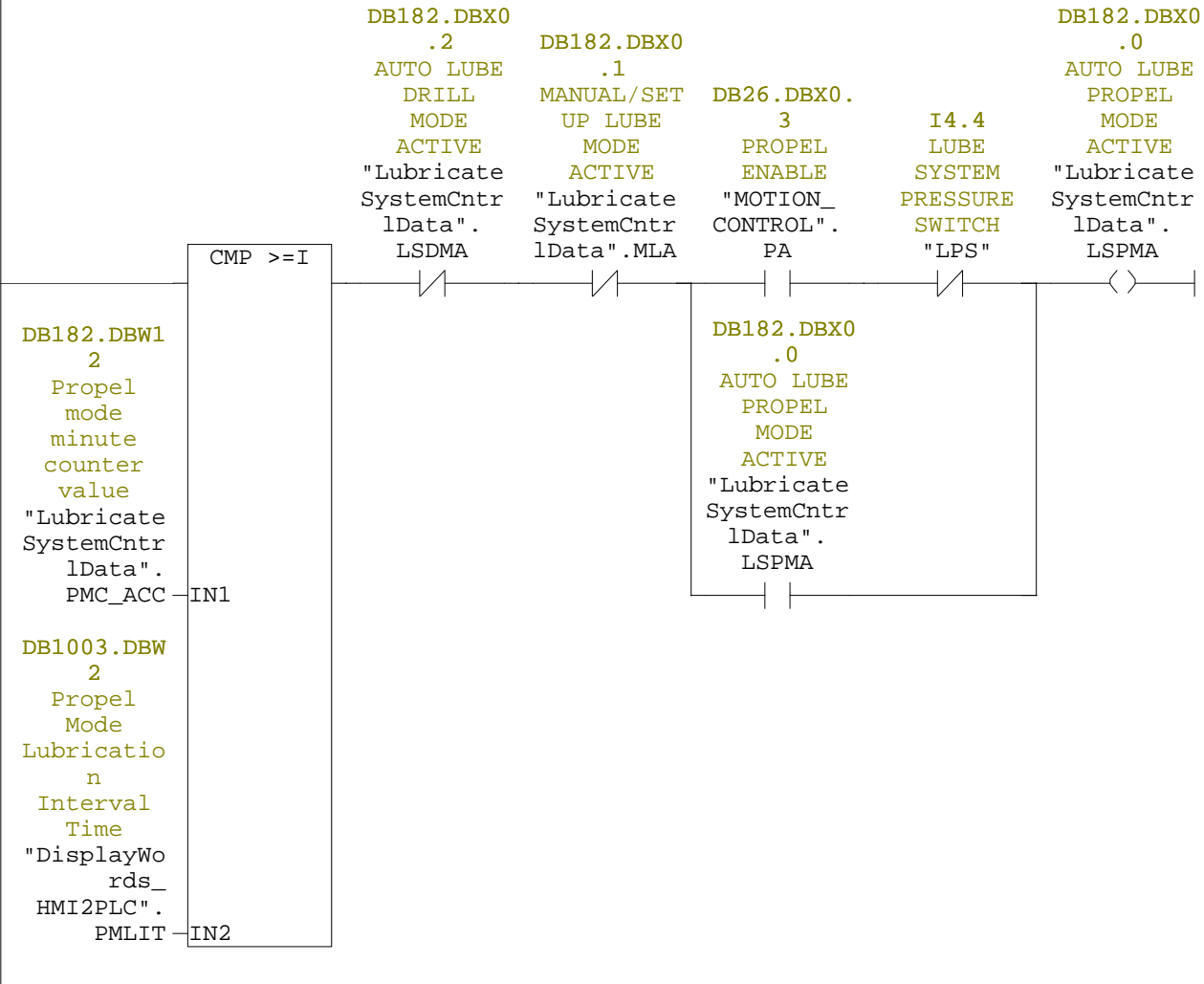
MD6640



CB141381
SNIM
FC81

Network: 7 AUTO LUBE PROPEL MODE ACTIVE

IF AUTO LUBE IS ENABLED AND THE TIME THE DRILL HAS BEEN IN PROPEL MODE EQUALS IT'S SETPOINT VALUE, START A PROPEL MODE AUTO LUBE CYCLE. THE ACTIVE BIT IS LATCHED IN UNTIL THE LUBE PRESSURE SWITCH IS TRIPPED.



THIS DOCUMENT IS PROTECTED UNDER APPLICABLE COPYRIGHT LAWS TO THE EXTENT AVAILABLE. ANY UNAUTHORIZED AND UNLAWFUL REPRODUCTION, DISTRIBUTION OR OTHER USE SHALL BE SUBJECT TO LIABILITY.
© 2012 Bucyrus International, Inc. ALL RIGHTS RESERVED

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL

- Thank you very much for reading the preview of the manual.
- You can download the complete manual from: www.heydownloads.com by clicking the link below



- Please note: If there is no response to CLICKING the link, please download this PDF first and then click on it.

CLICK HERE TO **DOWNLOAD** THE COMPLETE MANUAL