

CASED HOLE HOISTMANS DISPLAY PANEL
AMS4A051
AMS4A054
AMS4A055

Operations and Maintenance Manual

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1.0 INTRODUCTION

1.1 GENERAL DESCRIPTION

This panel is designed to acquire and display depth and tension data from a wireline logging winch unit. The panel provides the operator a means to set and make adjustments to the data as necessary.

Depth is displayed from data provided from an encoder mounted on a measuring device. The Quadrature Encoder pulses are passed through to the acquisition system. The tension data is provided by a load pin and is also passed through to the acquisition system.



1.2 FEATURES

- Digital displays for depth, line speed, and tension
- Analog incremental tension meter, 4 inch (108 mm) dia., 270 degree.
- Incremental tension zero push switch.
- Excessive tension alarm setting allows operator to set tension alarm to a predetermined value. Contact closure is provided for winch shutdown.
- Zero Depth button - sets depth to 0. Depressing button again resets depth to previous setting. Only works when line speed is zero
- Approaching surface alarm
- Depth adjust up or down switches. Only works when winch is stopped
- Load cell zero & calibrate controls. Only works when there is no load on cable.
- Depth & tension saved in non-volatile memory at power loss
- Outputs for Tension and Encoder to interface to an acquisition system.
- RS232 Interface for additional control and data outputs.
- Can be set to display either English or Metric units.

1.3 SPECIFICATIONS

Height:	9.25"	23.5 CM
Width:	10.375"	26.35 CM
Depth:	5"	12.7 CM
Input Power:	12 – 24 vdc +/- 10%	

Internal Software coefficients

Wheel Size:

3/16" cable – 2.015 ft.

7/32" cable - 2.017 ft.

1-4" cable – 2.020 ft.

9/32" cable – 2.023 ft.

5/16" cable - 2.026 ft.

3/8" cable – 2.031 ft.

Load Cell Angle

3/16" cable – 1.44

7/32" cable – 1.38

1-4" cable - 1.23

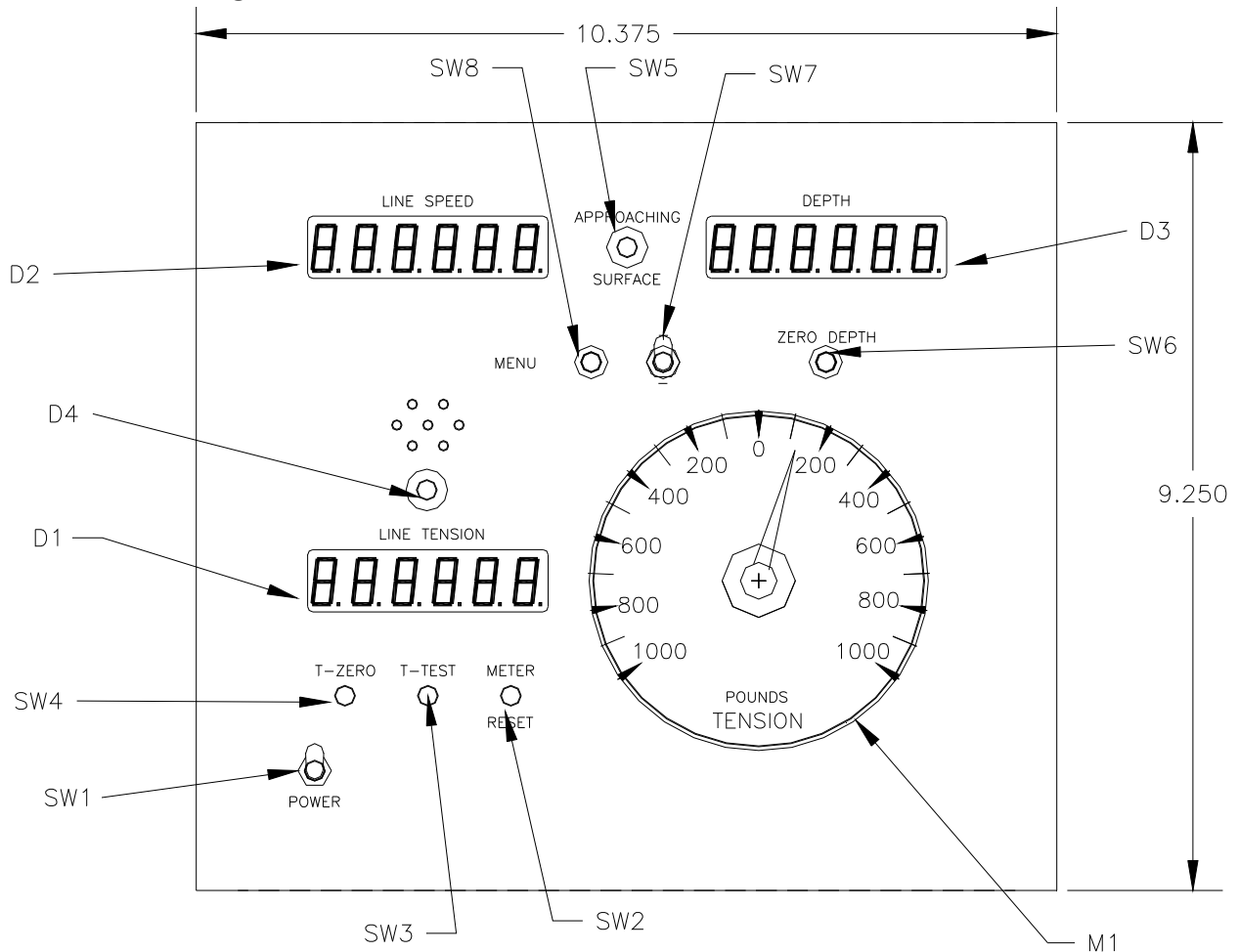
9/32" cable – 1.08

5/16" cable - 1.00

3/8" cable – 0.85

2.0 DETAILED DESCRIPTION OF FEATURES

2.1 FRONT PANEL



2.1.1 INCREMENTAL TENSION METER (M1)

This meter displays the incremental tension. This provides a more visual display of tension change. Switch SW2 will reset the meter to the 0 (center) position.

2.1.2 LINE SPEED DISPLAY (D2)

This meter provides a digital display of line speed.

2.1.3 DEPTH DISPLAY (D3)

This meter provides a digital display of depth.

2.1.4 LINE TENSION DISPLAY (D1)

This meter provides a digital display of total line tension.

2.1.5 ZERO DEPTH (SW6)

Pressing this button will reset the depth to 0. Depressing the button again will reset the depth to the previous setting. The Zero Depth button will only work when the line speed is zero (i.e. winch not moving).

2.1.6 + / - SWITCH (SW 7)

This switch is used for different functions. It is used to change the depth setting in either an up or down direction. The winch must be stopped before the depth can be set. In menu mode (see section 3.0) the switch is used to set menu parameters.

2.1.7 APPROACHING SURFACE LED AND ALARM

This LED and an audible alarm is sounded when the depth is less than 100' (30 m). This is a warning to the hoist operator that they are approaching surface and should take care to get the equipment safely out of the well. When the Cancel button is depressed, the alarm will stop but the LED will continue to blink. Once the depth reading is greater than 100' (30 m), both the alarm and the LED will go off.

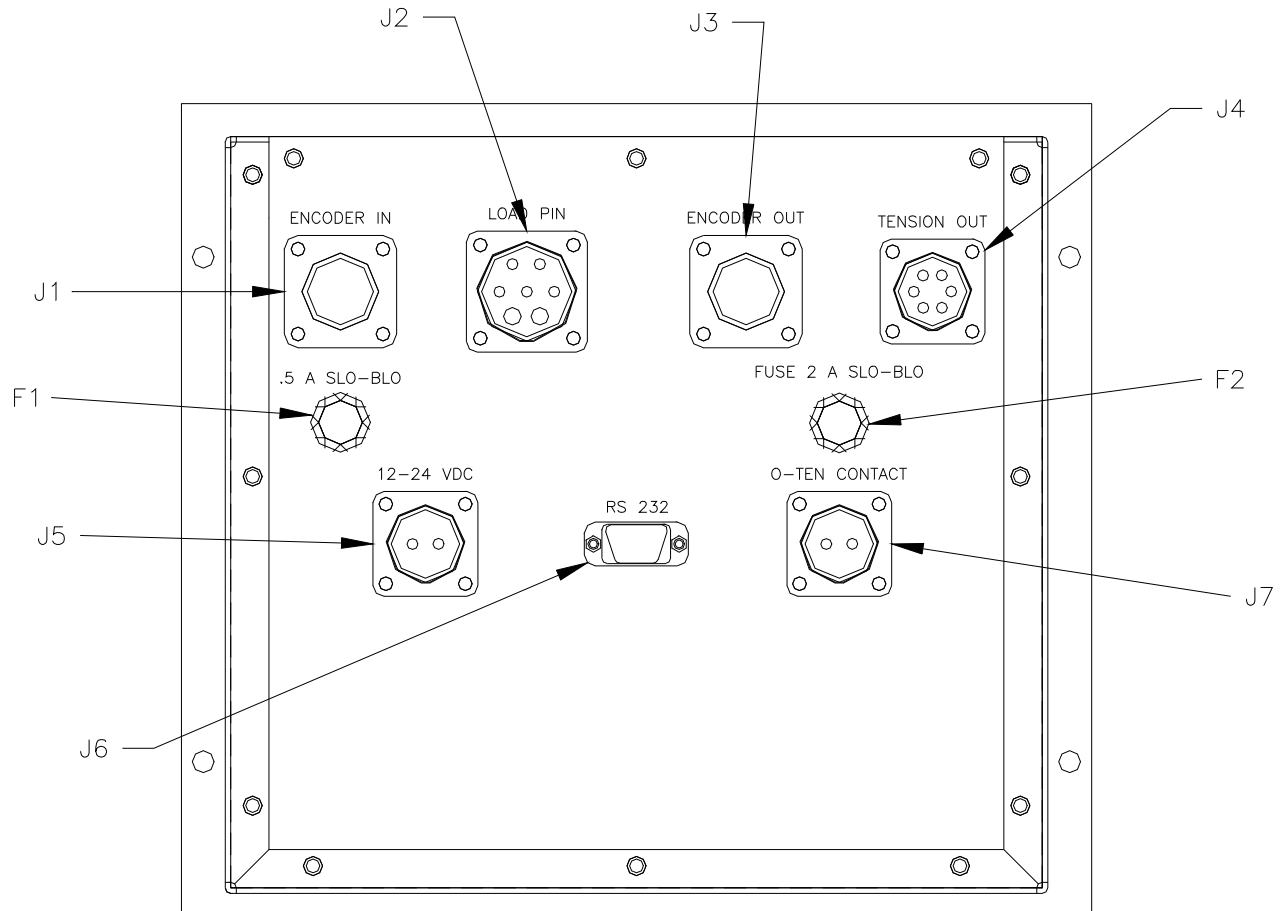
2.1.8 ENGLISH / METRIC UNITS

The panel can be changed from English to Metric by installing a jumper across JP1 or JP2 on the main PCB (refer to 6.4.2). The scale for the incremental tension meter should also be changed.

2.1.9 PROCESSOR REBOOT

In the event of a panel "lock up" or other malfunction, the processor in the panel can be rebooted by turning off the panel, depressing the T-ZERO and T-TEST buttons (SW3 & SW4) simultaneously then turn the power back on while the buttons are depressed. When the panel is rebooted, all the menu settings will be returned to the factory default settings. The tension should be recalibrated at this time (see section 6.0). The panel should be rebooted after new software (eprom) has been installed.

2.2 REAR PANEL



2.2.1 FUSE F1

This is a .5 amp slow blow fuse. It is in series with the 12 – 24 vdc power input.

2.2.2 FUSE F2

This is a 2 amp slow blow fuse. It is in series with the encoder power. It is used to protect the panel from a shorted encoder or cable. If this fuse is blown, test the encoder and encoder cable for a possible problem.

2.2.3 ENCODER IN (J1)

The cable running from the encoder on the measuring head attaches to this connector. From this connector, the panel provides 5 vdc power to the encoder and accepts the encoder quadrature signal input. It is designed to work with standard BEI encoders or any encoder compatible with BEI standards.

2.2.4 LOAD PIN IN (J2)

This connector is used to connect to the load pin. The panel provides +/-15VDC power to the load pin and gets the tension signal input from this connector.

2.2.5 ENCODER OUT (J3)

This connector provides an encoder quadrature data output. This data can be used to provide depth data to the acquisition system. The output data is fixed at 120 PPF regardless of line size, wheel size, or encoder PPR. No encoder power is provided.

2.2.6 TENSION OUT (J4)

This connector provides either a 4-20ma tension signal or a 0-10vdc tension signal output to the acquisition system. The 4-20ma signal is provided on pins D and C (gnd). 4 ma = 0 lbs, 20 ma = 12,500 lbs. The 0-10vdc signal is provided on pins B and C (gnd). 0 vdc = 0 lbs, 5vdc = 6250 lbs, 10vdc = 12,500 lbs.

2.2.7 12 – 24 VDC (J5)

This connector supplies dc power for the panel operation (9 VDC min, 30 VDC max). The panel can operate on either 12 or 24 vdc (12 vdc is U.S. truck standard voltage, 24vdc is European truck standard voltage). Pin A is positive, pin B is negative.

2.2.8 OVER TENSION CONTACT (J7)

This connector provides a connection to the overtension circuit relay. When an overtension condition is active, the two pins are connected together. In a normal position the two pins are open. This feature can be used to interface to the winch unit control

system to provide automatic hoist shutdown when an overtension condition is reached.

2.2.9 RS232 SERIAL INTERFACE (J6)

The PC can be used to display depth, tension, and line speed data from the panel. The PC can also be used to set panel parameters. See section 6.4 for more details.

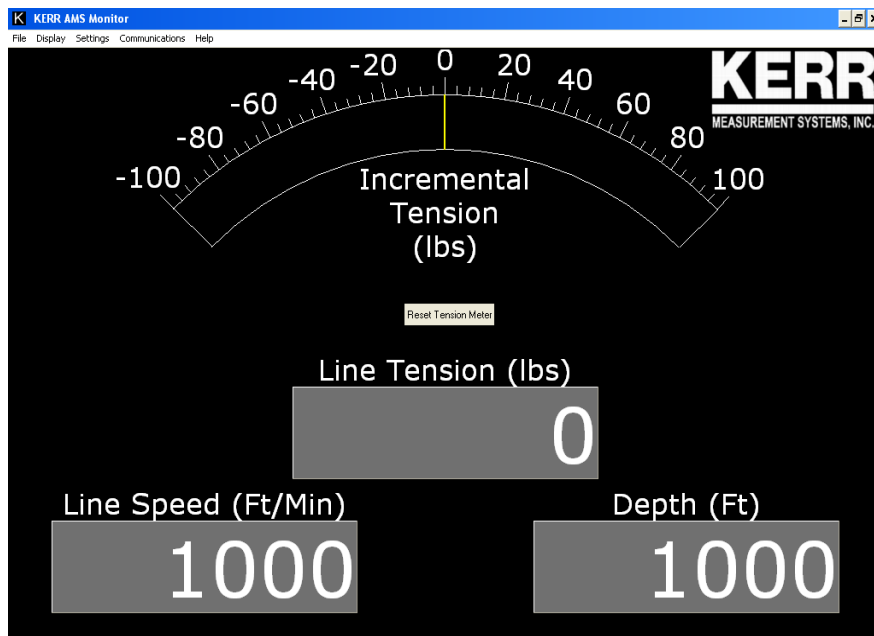
To connect the panel to a PC, connect a serial cable from the PC to J6 on the rear of the panel. The wiring is as follows:

DB9 PIN OUT: 2 = TRANSMIT, 3 = RECEIVE, 5 = GROUND

Run a program such as MS Windows HyperTerm using the following parameters

BAUD	38,400
BITS	8
PARITY	N
STOP	1
HANDSHAKE	N

A program is available from BenchMark to display this data (see figure below).



3.0 MENU COMMANDS

This panel has internal software which allows it to be set for various configurations. To change the settings, press the MENU button. The feature to be set will be displayed on the DEPTH display. Press the MENU button again until the feature you want to set is displayed.

The parameters for each feature will be displayed on the LINE TENSION display. Press the +/- switch (SW7) to cycle through all the available parameters. When the value you want to select is displayed, press the MENU button. ACCEPT will then be displayed. Press + for yes, - for no.

Following is a listing of all the available settings.

3.1 OVER TENSION ALARM

When preset tension value is reached, alarm sounds and tension display flashes value

Use +/- switch to set the tension alarm setting.

TANALM will be displayed on the DEPTH display and the value will be displayed on the TENSION display as it is being set.

Each cable size will have a corresponding Tension Alarm setting. Only the setting for the cable size selected (see menu option 1) can be adjusted.

Default Values

3-16	1500
7-32	2000
1-4	3000
9-32	4000
5-16	4000
3-8	4000
OTHER	4000

3.2 CABLE SIZE

This parameter adjusts the wheel for the proper circumference and the load pin factor for the proper angle. Since the AM3K measuring head is a circumferential device, the cable size will affect both the depth and tension measurements.

Use +/- switch to select size.

CABLE will be displayed on the DEPTH display and the selections will be displayed on the LINE TENSION display.

Cable size selection automatically sets load pin angle and wheel size setting for the selected cable size.

Selection: Cable Size Values available
3-16
7-32
1-4
9-32
5-16
3-8
OTHER

When OTHER is selected, two additional options will be made available. Load Cell Angle (LCFCT) and Wheel Size (WHSZ).

LCFCT is used to provide for different load cell sensitivities. The tension input is multiplied by the Load Cell Factor number entered.

WHSZ is used to change the circumference of the measuring wheel. This option allows the panel to be set for a measuring head that uses different sized measuring wheels. Options are .5 – 4'.

3.3 DELTA TENSION ALARM

When the delta tension setting is reached the alarm sounds. In incremental mode, you must periodically press meter reset or this alarm will sound when the tension reaches the set value. In differential mode, the meter will reset itself and the alarm will only sound on a quick change of tension. The Alarm Reset switch must be pressed to reset the over tension relay.

Use +/- switch to set the Delta Tension setting.

DELTEN will be displayed on the DEPTH display and the value being set will be displayed on the TENSION display as it is being adjusted.

3.4 DIFF / INC TENSION

Incremental tension provides a high resolution tension scale. It must be periodically reset as tension increases or decreases to keep it from pegging out. Incremental tension is useful when working in the well to watch for tool set down or pickup.

Differential tension provides a delta tension reading. The meter will slowly reset itself to 0 so the reset switch is not necessary. Differential tension is useful when running in and out of the well at higher speeds so it is not necessary to continually press the meter reset button.

Use +/- switch to change the analog meter from Incremental tension to Differential tension.

DIFTEN will be displayed on the DEPTH display and either DIFF or INC will be displayed on the TENSION display.

3.5 TENSION SHUTDOWN

When value is reached, alarm sounds, tension display flashes value, and tension contact closure switch is closed. This can be used to provide a signal to automatically stop the winch.

Note: This parameter is derived from the reading on the analog meter. If the T_SHDN value is set to 500 then whenever the tension reading on the meter is 500 greater than the Tension Alarm setting, the winch shutdown relay will be activated.

Use +/- switch to set tension shutdown setting

T_SHDN will be displayed on the DEPTH display and the value will be displayed on the TENSION display as it is being set.

Each cable size will have a corresponding Tension Alarm setting. Only the setting for the cable size selected can be adjusted.

Default Value= 500

3.6 DELTA TENSION SHUTDOWN

When value is reached, alarm sounds, tension display flashes value, and tension contact closure switch is closed. This can be used to provide a signal to automatically stop the winch.

Use +/- switch to set tension shutdown setting

D_SHDN will be displayed on the DEPTH display and the value will be displayed on the TENSION display as it is being set.

Note: This parameter is derived from the reading on the analog meter. If the D_SHDN value is set to 500 then whenever the tension reading on the meter is greater than 500 the winch shutdown relay will be activated.

Note: The RESET or Approaching Surface button needs to be depressed before the winch shutdown relay will de-energize.

3.7 DEPTH ADJUST (Shim)

This feature provides a means to apply an automatic depth correction. This is typically used to compensate for line or wheel wear. Depth can automatically be added or subtracted as it is being acquired.

Use +/- switch to set shim setting

DP_ADJ will be displayed on the DEPTH display and the value will be displayed on the TENSION display as it is being set. The values are feet / thousand.

Each cable size will have a corresponding shim value. Only the value for the cable size selected (see menu option 3.1) can be adjusted. Default value is 0.

The shim amount selected will automatically be added or subtracted from the depth input.

3.8 DEPTH ALARM

This feature provides the operator a means to set a depth alarm. This is typically used as an approaching surface warning to alert the operator to be ready to stop the winch.

Use +/- switch to select the depth when a warning alarm will be sounded.

DP-AL will be displayed on the DEPTH display and the value will be displayed on the TENSION display as it is being set.

Available settings are from 0 - 99999. Default value is 100' (30.5m).

When Alarm depth value is reached, alarm will sound and light will flash. Pressing the Cancel Alarm button will turn off alarm but light will continue to flash.

3.9 ENCODER PULSES PER REVOLUTION

The value selected will automatically be used as the encoder input pulses per revolution (PPR) setting.

Use +/- switch to set the ENCODER Pulse Per Revolution setting.

EN-PPR will be displayed on the DEPTH display and the value will be displayed on the LINE SPEED display as it is being set.

Default value is 1200.

3.10 ENCODER DIRECTION

The value selected will toggle the encoder direction between UP and Down.

Use +/- switch to set the ENCODER direction setting.

ENCDIR will be displayed on the DEPTH display and either UP or DN value will be displayed on the TENSION display.
Default value is UP.

3.11 STRETCH CORRECTION

This command will turn the STRETCH CORRECTION setting ON or OFF.

Use +/- switch to toggle between ON and OFF.

STRTCH will be displayed on the DEPTH display and either ON or OFF will be displayed on the LINE SPEED display.
Default value is OFF.

Stretch is calculated by stretch due to cable weight + stretch due to weight at end of cable

$$\text{stretch due to cable weight} = \text{stretch coefficient} * \text{depth} * \text{cable weight} / 2$$

$$\text{stretch due to weight at end of cable} = \text{stretch coefficient} * \text{depth} * (\text{tension} - \text{cable weight})$$

When tension is less than cable weight, tension measured is due to cable weight alone.

3.12 SYSTEM PULSES PER FOOT

The value selected will be the encoder output to the computer system Pulses Per Foot setting.

Use +/- switch to set the ENCODER Output setting.

SYSPPF will be displayed on the DEPTH display and the value will be displayed on the LINE SPEED display as it is being set.

Default value is 120.

3.13 ENCODER PULSE OUT

This setting determines which encoder pulses that will be output to the acquisition system.

PLSOUT will be displayed on the DEPTH display and either, RAW, Corrected, or UPDATED value will be displayed on the TENSION display.
Default value is UP.

Three options are available, RAW, Corrected, or UPDATED pulses.

RAW will send out encoder pulses identical to the uncorrected pulses coming from the encoder. None of the corrections applied by the panel will be sent to the acquisition system.

CORRECT will send out encoder pulses to the acquisition system that include all the corrections that the panel applies such as Depth Adj (shim), Wheel Size, etc.

UPDATE will send out the same pulses as in CORRECT mode. This mode will also update the computer depth when depth is added or subtracted using the +/- switch or pressing the depth zero button.

Use +/- switch to switch between RAW, CORRECT, UPDATE.

Indication: **RAW** or **CORRECT** or **UPDATE** will be displayed on the DEPTH display.

3.14 DEPTH UNITS

The depth values will be displayed in the units selected.

Use +/- switch to set the DEPTH UNITS setting.

Indication: **DEPTH** will be displayed on the DEPTH display. The selection can be toggled between FEET or METERS. The selection will be displayed on the TENSION display. The ENGLISH (green) LED display will be lit when FEET is selected and the METRIC (red) LED will be lit when METERS is selected.

3.15 TENSION UNITS

The tension value will be displayed in the units selected.

Use +/- switch to set the TENSION UNITS setting.

Indication: **TENSION** will be displayed on the DEPTH display. The selection can be toggled between POUNDS and KILOGM. The selection will be displayed on the TENSION display.

4.0 SYSTEM OPERATING INSTRUCTIONS

4.1 Power up panel and verify it is working properly.

4.2 Set up acquisition system:

Normal mode (using the Benchmark Panel) settings:

Encoder PPR = 120

Wheel Size = 1 ft.

Bypass mode (moving the encoder cable from encoder in directly to the computer system . In this mode the encoder will be powered by the Computer system and the Computer system will need to be set for the proper wheel size + line size.

Bypass mode settings:

Encoder PPR = 1200

Wheel Size:

3/16" cable – 2.015 ft.

7/32" cable - 2.017 ft.

1-4" cable – 2.020 ft.

9/32" cable – 2.023 ft.

5/16" cable - 2.026 ft.

3/8" cable – 2.031 ft.

4.3 Set line size to match cable size installed in head (refer to section 3).

4.4 Install cable in measuring head and lay it slack on the ground.

4.5 Press T-Zero and verify that panel tension reads 0. Verify tension is recorded on acquisition system.

4.6 Press T-Cal and verify that panel tension reads 5000. Verify tension is being properly recorded on acquisition system.

4.7 Set Tension Alarm value (refer to section 3).

4.8 Set depth adjust value (refer to section 3).

4.9 Pull tool to depth 0 position. Press D-Zero and verify that panel depth reads 0. Set acquisition system depth to 0 at this time.

5.0 SPARE PARTS LIST

5.1.1 AMS4A051 PANEL WINCH OPERATOR DISPLAY PANEL

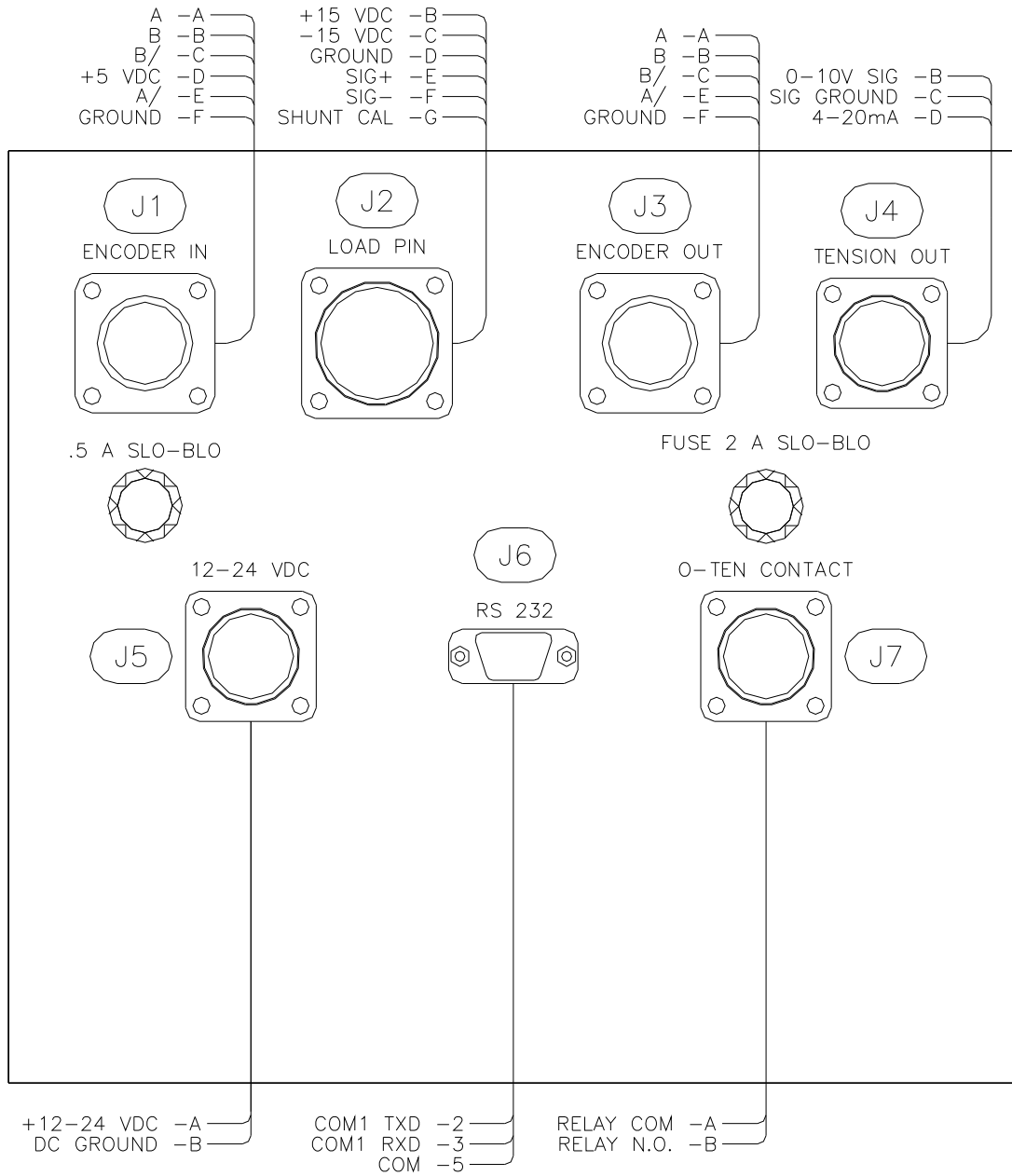
P/N	Description	Qty	Reference
1	AMS4P134E PC BOARD AMS40	1	MOTHER BOARD
2	AMS4P110 METER ANALOG DIFF TENSION (+/- 1000 LBS)	1	M1
4	AMS4P120 DISPLAY LED .5" SERIAL 2"X3.5"	3	D1, D2, D3
6	ACMU1P06 LED RED DIALIGHT 5V	1	APPROACHING SURF
7	ACMU1P11 SONALERT #SC628D MALLORY	1	ALARM
9	AMS4P020 SWITCH MTL-106D ALCO LOCKING	2	POWER ON/OFF
10	AMS4P018 SWITCH MPA-106F ALCO PUSH MOM	5	MENU, T-ZERO, T-TEST, D-ZERO, METER RESET
11	AMS4P044 SWITCH TOGGLE DPDT MOM OFF MOM	1	+ / -
12	AMS4P021 SWITCH CAPS ALCO C-22 BLACK	3	T-ZERO, D-ZERO, METER RESET
13	AMS7P017 SWITCH CAP ALCO C-22 RED	1	D-ZERO, MENU
14	ACMU1P12 FUSE HOLDER #LF342004	2	FUSE HOLDER
16	AMS4P107 FUSE SLO-BLO 1/2 A LITTELFUSE	1	F1 - ENCODER
17	AMS4P125 FUSE 2 AMP 250 VOLT SLO BLO	1	F2 - DC IN
27	AMS7P013 CONN MS3102E-18-9P LOAD CELL	1	J2 - LOAD PIN IN
28	ACMU3P01 CONN MS3102E-14S-9P RECEPT	1	J5 - POWER IN
29	ACMU3P02 CONN MS3102E-14S-9S RECEPT	1	J7 -OVER TENSION OUT
30	AMS7P015 CONNECTOR DE-9S RS232	1	J6 - RS232
31	AMS4P037 CONN MS3102E-16S-1P 7 PIN RCP	1	J3 - ENCODER OUT
32	AMS4P038 CONN MS3102E-16S-1S 7 SOC RCP	1	J1 - ENCODER IN
34	AMS4M004 WINDOW LED SERIAL DCI DISPLAY	3	PLASTIC WINDOW
35	AMS4P039 CONN MS3102E-14S-5P	1	J4 - TENSION OUT
40	AMS4P041 SWITCH PUSHBUTTON LIGHTED SPST	1	APPROACHING SURF
41	AMS4P042 LENS RED C&K SWITCH	1	RED LENS
42	AMS4P043 LED RED FOR C&K PUSHBUTTON SW	1	RED LED

6.1 BACK PANEL CONNECTOR PINOUT (AMS4A051)

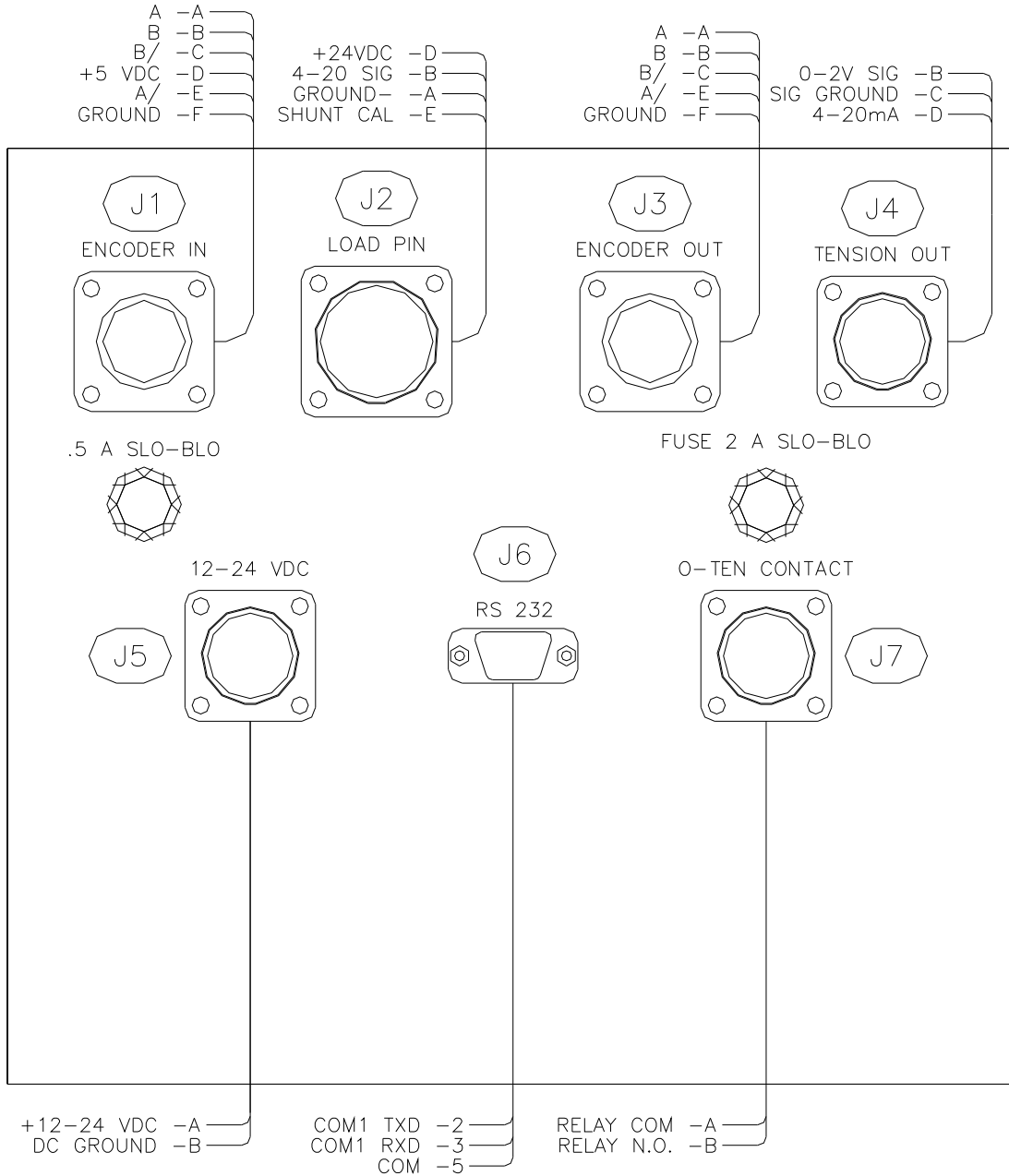
J1 A	ENCODER QUADRATURE IN PHASE A
J1 B	ENCODER QUADRATURE IN PHASE B
J1 C	ENCODER QUADRATURE IN PHASE B*
J1 D	ENCODER POWER - +5 VDC
J1 E	ENCODER QUADRATURE IN PHASE A*
J1 F	ENCODER IN GROUND
J2 B	+15 VDC LOAD PIN POWER
J2 C	-15 VDC LOAD PIN POWER
J2 D	GROUND
J2 E	LOAD PIN SIGNAL+
J2 F	LOAD PIN SIGNAL-
J2 G	SHUNT CAL
J3 A	ENCODER QUADRATURE OUT - PHASE A
J3 B	ENCODER QUADRATURE OUT - PHASE B
J3 C	ENCODER QUADRATURE OUT - PHASE B*
J3 E	ENCODER QUADRATURE OUT - PHASE A*
J3 F	ENCODER OUT GROUND
J4 B	0-10 VDC TENSION SIGNAL OUT
J4 C	TENSION OUTPUT SIGNAL GROUND
J4 D	4-20MA TENSION SIGNAL
J5 A	12 - 24 VDC IN
J5 B	DC GROUND
J6 2	RS232 TRANSMIT
J6 3	RS232 RECEIVE
J6 5	RS232 GND
J7 A	TENSION CONTACT RELAY COMMON
J7 B	TENSION CONTACT RELAY N.O.

6.2 BACK PANEL WIRING DIAGRAM

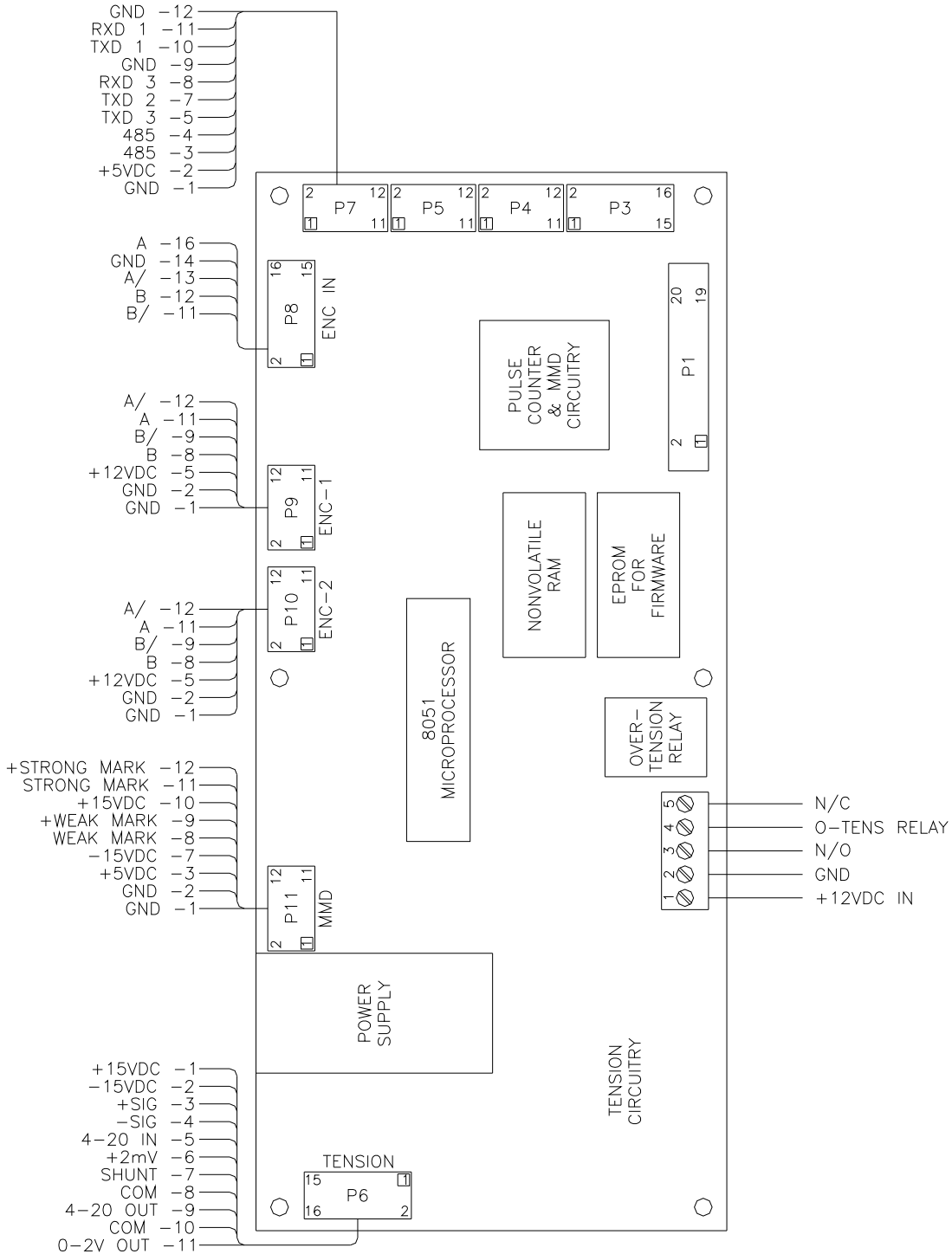
6.2.1 AMS4A051 0-1.5VDC TENSION SIGNAL



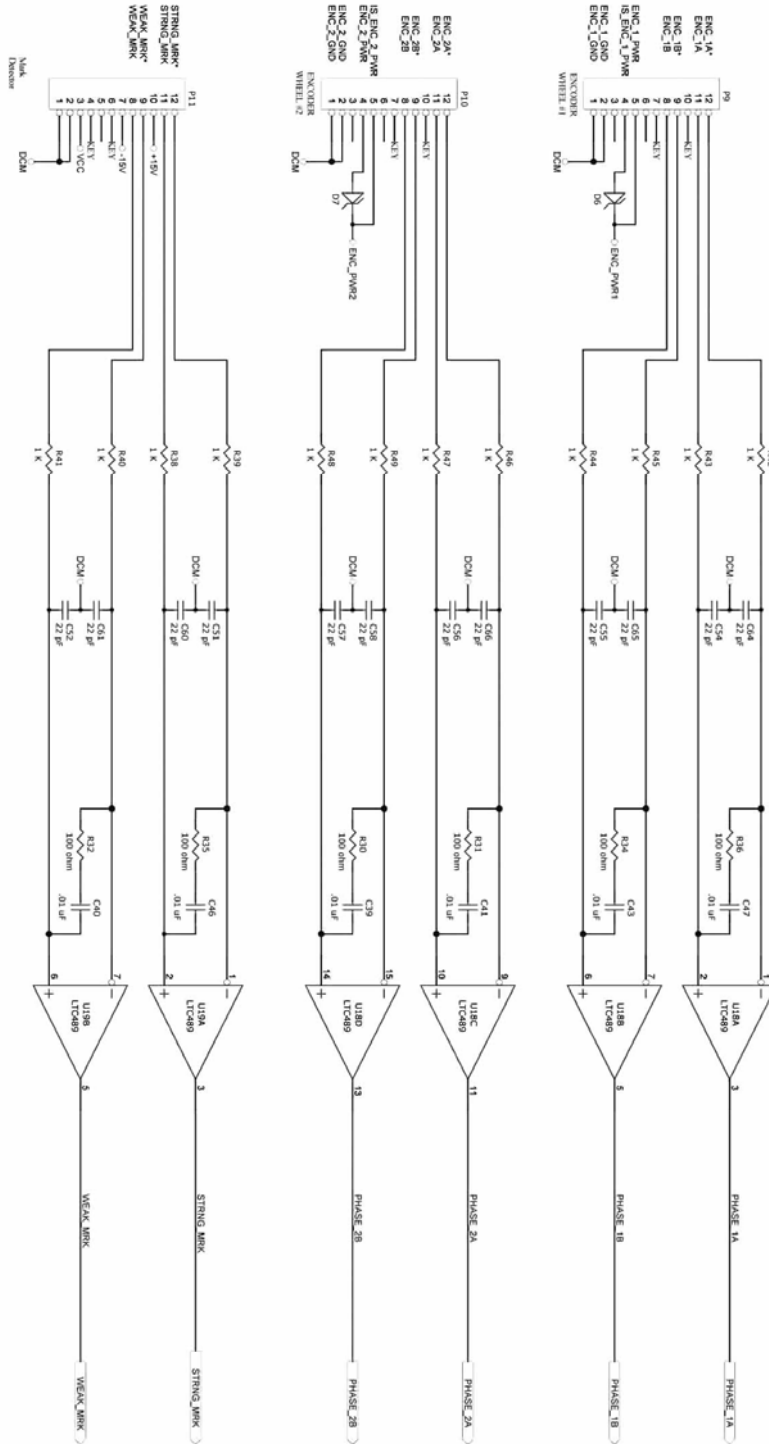
6.2.2 AMS4A055 – 4-20MA TENSION SIGNAL



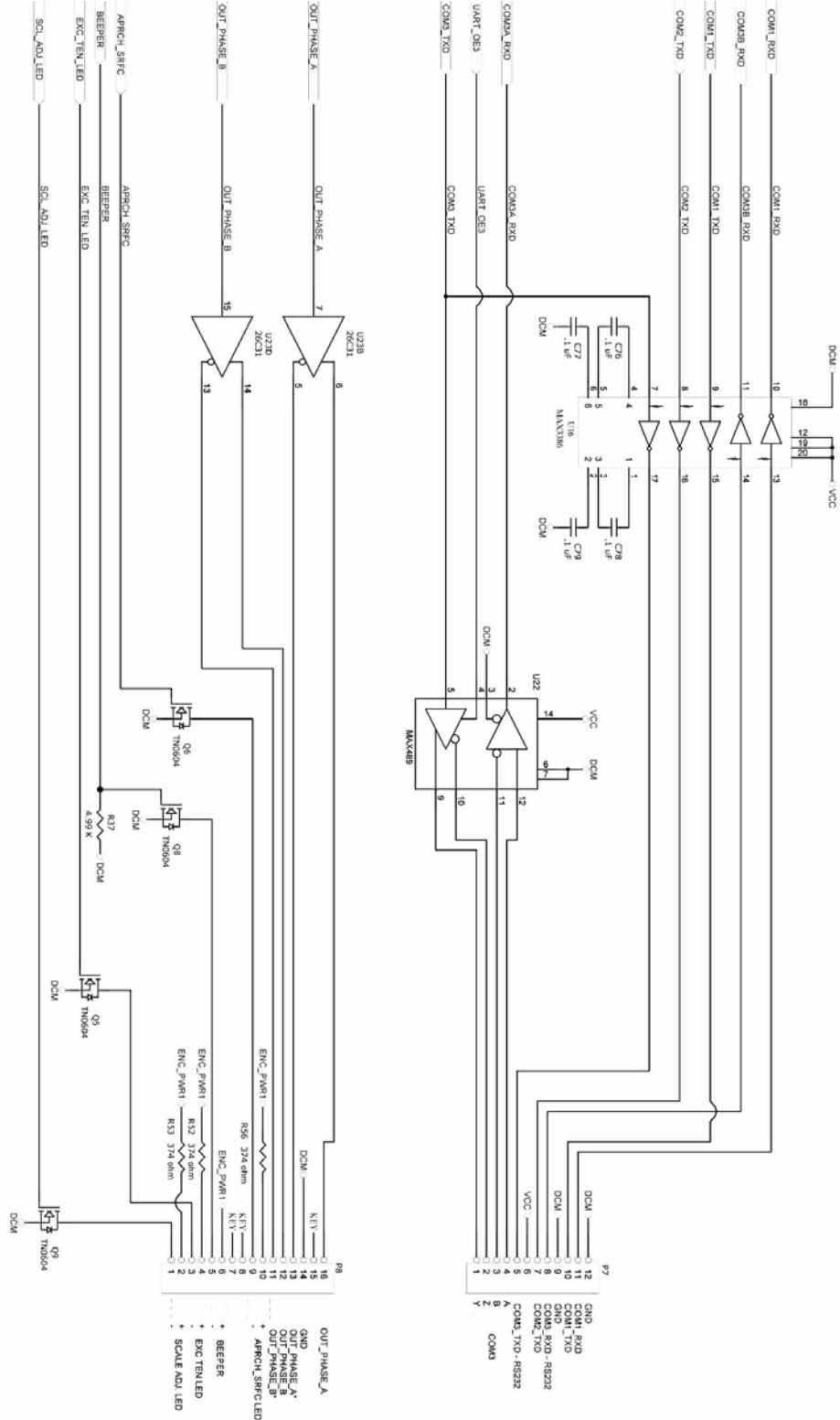
6.3 MAIN PROCESSOR BOARD



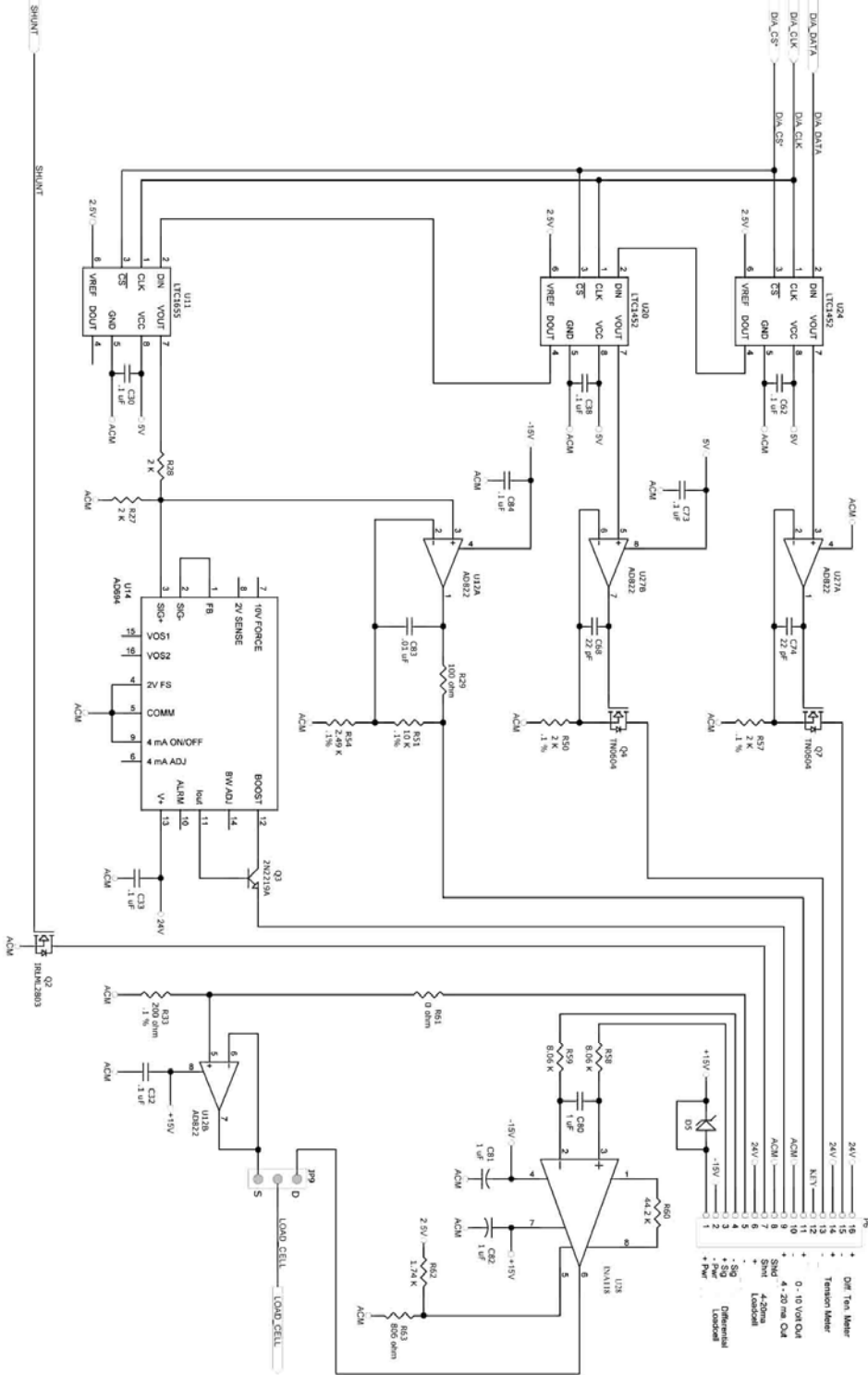
6.3.1 ENCODER INPUTS



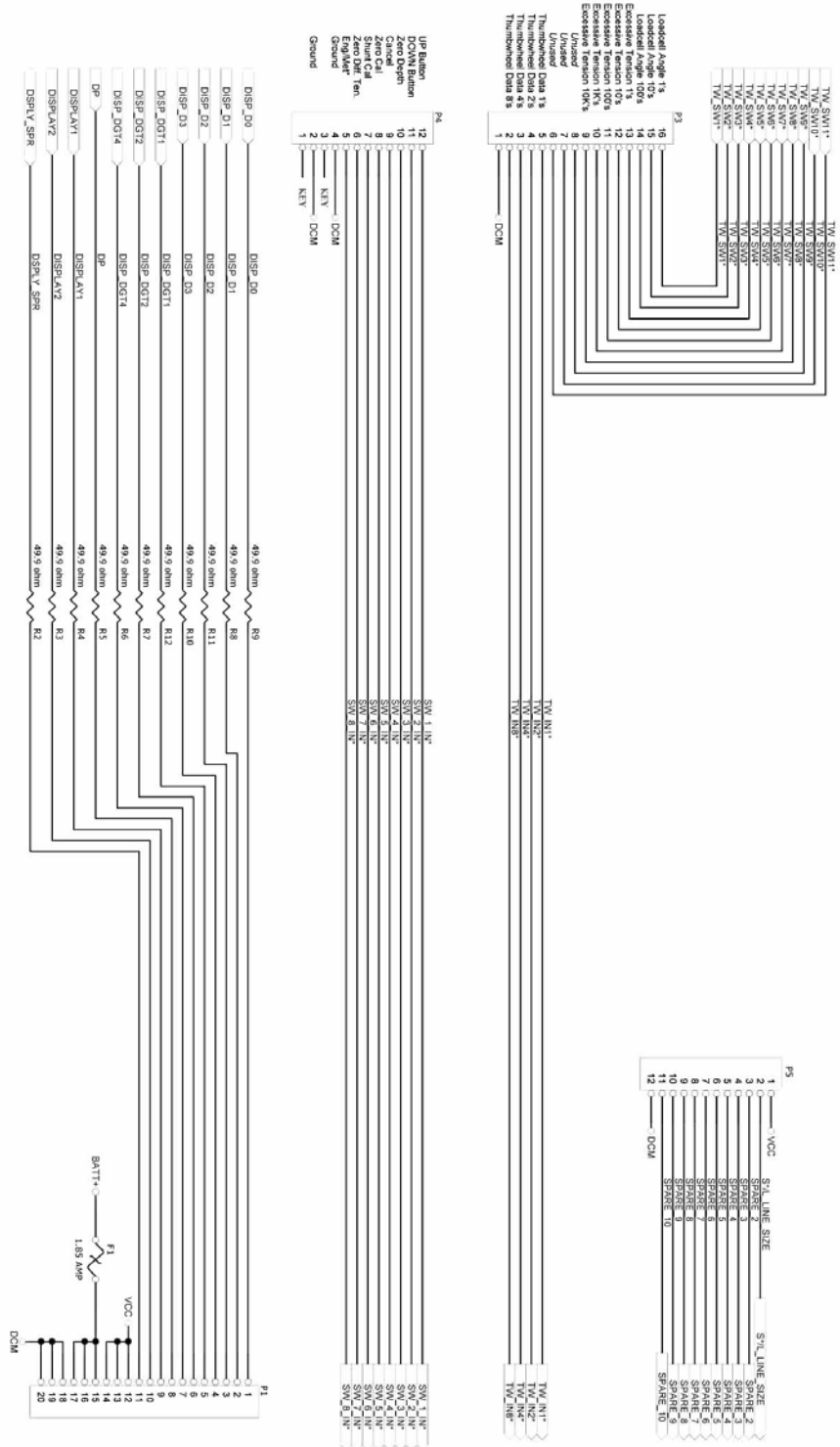
6.3.2 ENCODER OUTPUT AND COM PORT I/O



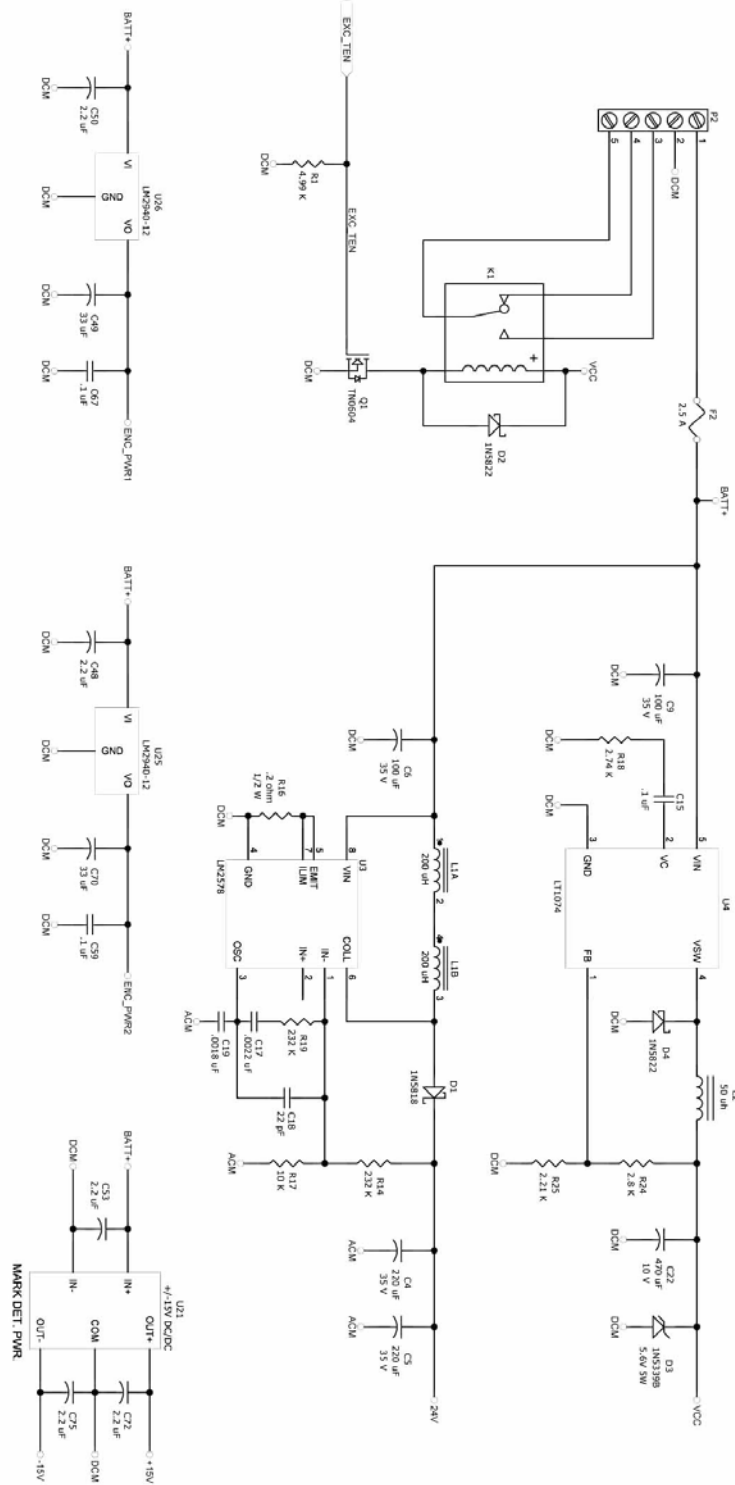
6.3.3 LOAD PIN AND TENSION



6.3.4 JUMPERS – BUTTONS

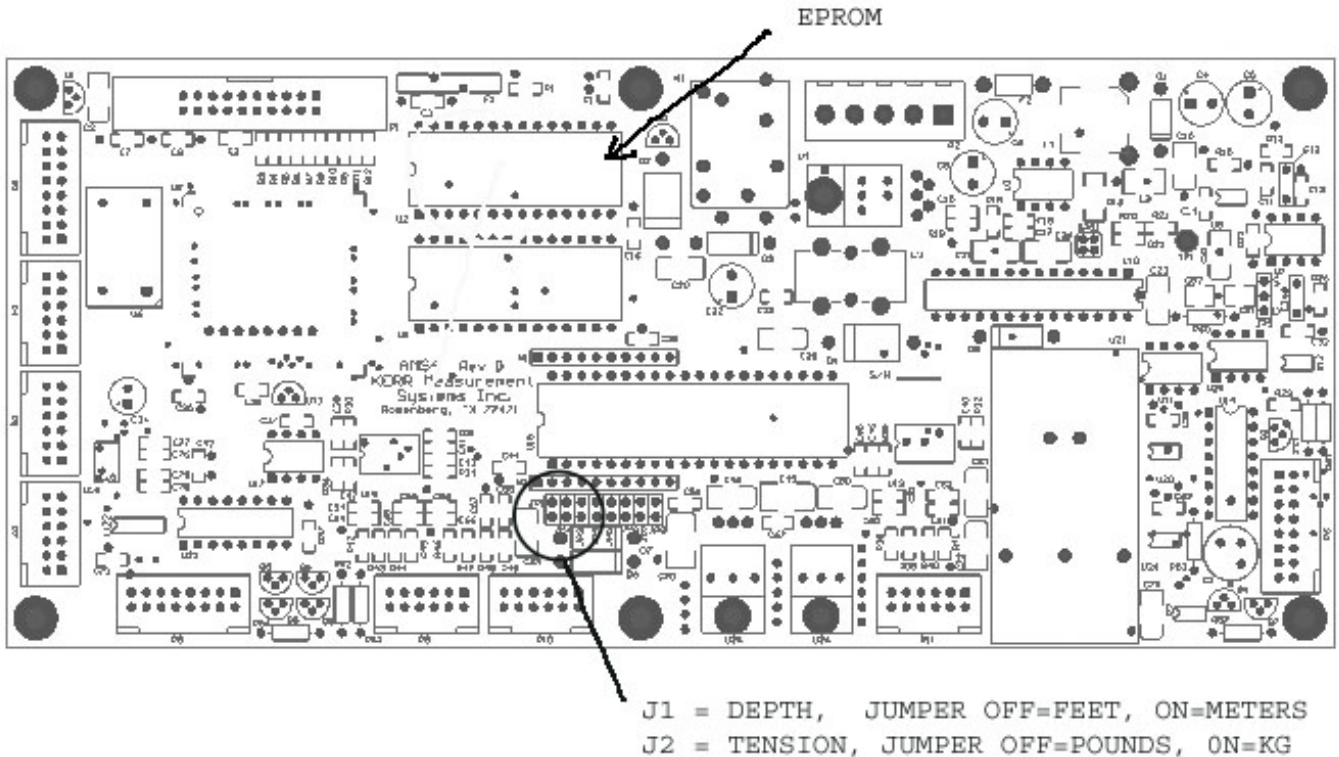


6.3.5 POWER SUPPLIES



6.4 MAIN PROCESSOR BOARD SETTINGS

Changes to the internal processor board are required in two instances.
 Changing software and changing the default depth and tension unit settings.



6.4.1 Software Modification

The software that controls this panel is stored either in an EPROM Integrated Circuit located at U2 or inside the microprocessor memory. To upgrade the software to a new version, simply remove the eprom I.C. and install a new eprom I.C. (be careful not to bend the legs during installation) or load the software following the procedure in section 6.7.

After new software is installed, make sure and "reboot" the panel (refer to step 6.4.3).

6.4.2 Jumpers are used to select default depth and tension units. These units can also be set with the menu commands (see section 3) but when the panel is rebooted, it will be reset to the Jumper settings.

Jumper J1 determines the depth units.

A shorting bar across J1 will set the units to meters
No shorting bar will set the units to feet.

Jumper J2 determines the tension units

A shorting bar across J2 will set the units to Kilo Grams
No shorting bar will set the units to pounds.

Jumper J4 determines the type of load pin.

A shorting bar across J4 will configure the panel for a non amplified non linearized load pin.
No shorting bar will configure the panel for an amplified a linearized load pin.
This jumper also sets the default encoder PPR to 300.

6.4.3 PROCESSOR REBOOT

In the event of a panel "lock up" or other malfunction, the processor in the panel can be rebooted by turning off the panel, depressing the T-ZERO and T-TEST buttons simultaneously then turning the power back on while the buttons are depressed. Keep buttons the depressed for at least five seconds after power is restored.

When the panel is rebooted, all the menu settings will be returned to the factory default settings.

The panel should always be rebooted after new software (eprom) has been installed.

Changes to the internal processor board are required in two instances. Changing software and changing depth and tension units between English and metric.

The panel should always be rebooted after new software has been installed. When the panel is rebooted, all the menu settings will be returned to the factory default settings.

6.5 DIGITAL DISPLAY SETUP

The three digital displays can be set for address, baud rate, and brightness

Three buttons are located on the rear of the display which are used to change these settings.



SELECT PARAMETER

INCREMENT UP

INCREMENT DOWN

The button nearest the connector selects the parameter (address, baud rate, brightness).

The center button increments the parameter up

The end button increments the parameter down.

After the parameter is set, press the parameter button again to store it.

The addresses should be set as follows:

Line Tension = 1

Line Speed = 2

Depth = 3

Set Baud Rate to 9600

Set Brightness to 15

Digital Display Pinout

PINS 1, 2, 7, 9	GND
PINS 4, 6, 8, 10	+5 VDC
PIN 3	TXD
PIN 5	RXD

6.6 RS232 SERIAL INTERFACE

To connect the panel to a computer, connect a serial cable from the PC to J6 on the rear of the panel. The wiring is as follows:

DB9 PIN OUT: 2 = TRANSMIT, 3 = RECEIVE, 5 = GROUND

Run a program such as MS Windows HyperTerm using the following parameters

BAUD	38,400
BITS	8
PARITY	N
STOP	1

Press H or ? to display the help screen

* * * AMS51 Help Screen * * *

H,? - This screen.
D - Display units, direction, depth, speed, and tension.
L - Modify load cell angle (factor) Usage: L1.2
P - Modify encoder pulses/revolution. Usage: P600
V - Verify WDDU setup status.
W - Modify wheel size (line other) (feet) Usage: W4.0
Z - Preset depth.Usage: Z0.0 |_|--> New depth.
U - Modify units of measure UE or UM
A - Depth Alarm. Usage: A100 |_|--> Depth Alarm.
N - Line Size N0 7/32; N1 9/32; N2 5/16; N3 3/8;N4 7/16;
N5 15/32; N6 15/32HT; N7 SLAM N8 SLAMHT; N9 SSLAM
M - Tension Alarm. Usage: 'M2500' for 2500 pound alarm.
J - Depth Adjust. Usage: 'J-1' for -1 ft per 1000 feet
S - System PPF Usage: 'S125' for 125 PPFoot to system
p - Display depth and stretch data

Press V to display the Verification Screen

* * * AMS4A051 Setup Status * * *

Software revision	S5100.00
Line Size =	5-16
Depth Units =	Feet
Depth Units =	Pounds
Depth alarm =	100 ft
Tension alarm =	2400 lbs
Tension shutdown =	3500 lbs
Encoder PPR =	1200

Depth Adjust = 0.0
Wheel Circumference = 2.000 feet
Load Cell Angle Factor = 1.00
System Pulse per Foot = 600.0

Press D to display the Data Screen

DATA STRING DESCRIPTION
12345678901234567890123456
U D Zdddd.d ssss.s ttttt<CR><LF>

WHERE:

U - UNITS (Depth, Tension)
 'E' - English, English, 'G' - English, Metric,
 'M' - Metric, Metric, 'F' - Metric, English
D - DIRECTION ('U' - UP; 'D' - DOWN; 'S' - STOPPED)
Z - ZERO DEPTH REF. ('+' BELOW GROUND; '-' ABOVE GROUND)
d - DEPTH
s - LINE SPEED
t - TENSION
<CR> - CARRIAGE RETURN, <LF> - LINEFEED

6.7 INSTALLING NEW SOFTWARE USING SERIAL PORT

Instructions for programming the DS89C450 MicroController's internal Flash memory with the real-time data acquisition program.

PREREQUISITES:

1. The real-time data acquisition board must have a socket for the MicroController and a CPU piggy-back PCB installed in that socket with a DS98C450 MicroController installed.
2. A computer with a serial port, and installed Hyperterminal program.
3. The new revision real-time data acquisition HEX file program.

PROCEDURE:

1. Transfer the new revision HEX file to the PC.
2. Turn power on to the Hoistman's panel.
3. Open a Hyperterminal session. Use the following settings:

Serial Port: COM1
Baud Rate: 57600
Data Bits: 8
Parity: None
Stop Bits: 1
Flow Control: None
4. Set the switches on the CPU PCB to PROGRAM mode as follows:

1 - AWAY FROM CPU
2 - AWAY FROM CPU
3 - TOWARD CPU
5. Open the Hyperterminal connection and then press the keyboard ENTER key. The MicroController ROM Loader will respond with a banner and then a '>' prompt.

6.8 DETAILED WIRING LIST (AMS4A051)

6.8.1 (AMS4A051)

P2 - Screw Terminal Block			
P2 -1	BATT +	SW1 N.O.	F2-B Red 18GA J5-A
SW1 COM	12-24 VDC	F2 A	F2 - (Fuse 2A Slo-Blo)
F2 B		J5 A	J5 12-24 VDC Conn. Back Panel
P2 -2	BATT -	J5 B	
P2 -3	CONTACT CLOSURE N.O.	J7 B	Tension Contact Closure Back Panel
P2 -5	CONTACT CLOSURE COM	J7-A	Tension Contact Closure Back Panel

P4 - USER SWITCHES			
P4 - 2	DCM BLK		One side of SW2, SW3, SW4, SW5, SW6
P4 - 4	DCM BLK	SW7 N.C. CNTR	Center contact of SW7
P4 - 6	ZERO DIFF. TENSION	SW2 N.O.	
P4 - 7	TEN TEST	SW3 N.O.	
P4 - 8	ZERO CAL	SW4 N.O.	
P4 - 9	CANCEL DEPTH ALARM	SW5 N.O.	
P4 - 10	ZERO DEPTH	SW6 N.O.	
P4 - 11	ADJ DEPTH DOWN	SW7 N.O. UP	Up Contact of SW7
P4 - 12	ADJ DEPTH UP	SW7 N.O. DN	Dn Contact of SW7

P5 - SPARE			
P5 - 1	+5V	D1 4	DISPLAY POWER
P5 - 2	MENU	SW8 NO	MENU
P5 - 12	DCM	SW8 COM	MENU

P6 - ANALOG IN/OUT			
P6 - 1	+15V	P1 3 ENCDR BRD	LOAD PIN POWER
P6 - 2	-15V	P1 1 ENCDR BRD	LOAD PIN POWER
P6 - 3	DIFF LOAD PIN IN+	J2 E	LOAD PIN SIGNAL+
P6 - 4	DIFF LOAD PIN IN-	J2 F	LOAD PIN SIGNAL-
P6 - 7	SHUNT CAL ENABLE	J2 G	SHUNT CAL
P6 - 8	ACM	J2 D	GROUND
P6 - 9	4-20ma OUT	J4 D	4-20 MA OUT
P6 - 10	GND	J4 C	Tension Out Ground
P6 - 11	0 - 10 VOLT OUT	J4 B	ANALOG TENSION OUT
P6 - 15	DIFF TENSION METER -	M1 -	
P6 - 16	DIFF TENSION METER +	M1 +	

P7 - COMMUNICATIONS - 38,400 8,N,1			
P7 - 7	COM2 TXD	D1-5+D2-5+D3-5	DISPLAY DATA - THREE WIRES CONNECTED TOGETHER
P7 - 9	GND	J6 5	RS232 GND
P7 - 10	COM1 TXD	J6 2	RS232 TRANSMIT
P7 - 11	COM1 RXD	J6 3	RS232 RECEIVE
P7 - 12	GND	D1 1	DISPLAY GND

P8 - QUADRATURE OUT / INDICATORS			
P8 - 3	EXCESSIVE TENSION LED	DS 1	TO BE ADDED
P8 - 4	EXCESSIVE TENSION LED	DS 1	TO BE ADDED
P8 - 5	ALARM -	ALM1 -	Beeper
P8 - 6	ALARM +	ALM1 +	Beeper
P8 - 9	APPROACHING SURFACE LED -	SW 5	+1 (inline with silver plate)
P8 - 10	APPROACHING SURFACE LED +	SW 5	-1 (opposite silver plate)
P8 - 11	PHASE 1B*	J3 C	Quadrature Out - PHASE B*
P8 - 12	PHASE 1B	J3 B	Quadrature Out - PHASE B
P8 - 13	PHASE 1A*	J3 E	Quadrature Out - PHASE A*
P8 - 14	DCM	J3 F	Quadrature Out - GROUND
P8 - 16	PHASE 1A	J3 A	Quadrature Out - PHASE A

P9 - ENCODER IN - J1			
P9 - 7	KEY		
P9 - 8	ENCODER 1B	J1 B+P1 8 ENCNDR_BRD	ENCODER IN PHASE B
P9 - 9	ENCODER 1B *	J1 C + P1 10 ENCNDR BRD	ENCODER IN PHASE B*
P9 - 10	KEY		
P9 - 11	ENCODER 1A	J1 A+ P1 6 ENCNDR BRD	ENCODER IN PHASE A
P9 - 12	ENCODER 1A*	J1 E + P1 7 ENCNDR BRD	ENCODER IN PHASE A*

P11 +/- 15 VDC			
P11-1	DCM	J1 F + P1 9 ENCNDR BRD	ENCODER COMMON
P11 - 3	ENCODER PWR - TO FUSE	F1 + P1 11 ENCNDR BRD	FUSE F1 ON BACK PANEL
F1	FUSE ON BACK PANEL	J1 D	ENCODER POWER

D1 DISPLAY			
D1-2	GND	D2 1	GND OUT
D1-6	+5V OUT	D2 4	POWER OUT

D2 DISPLAY			
D2-2	GND	D3 1	GND OUT
D2-6	+5V OUT	D3 4	POWER OUT

D3 DISPLAY			
D3-1	GND		GND IN FROM D2 - 2
D3-4	+5V		POWER IN FROM D2 - 6

PULL UP BOARD			
P1-2	LC -15 FUSED	J2 C	
P1-4	LC +15V FUSED	J2 B	

6.8.2 DETAILED WIRING LIST (AMS4A055)

P2 - Screw Terminal Block			
P2 -1	BATT +	SW1 N.O.	F2-B Red 18GA J5-A
SW1 COM	12-24 VDC	F2 A	F2 - (Fuse 2A Slo-Blo)
F2 B		J5 A	J5 12-24 VDC Conn. Back Panel
P2 -2	BATT -	J5 B	
P2 -3	CONTACT CLOSURE N.O.	J7 B	Tension Contact Closure Back Panel
P2 -5	CONTACT CLOSURE COM	J7-A	Tension Contact Closure Back Panel

P4 - USER SWITCHES			
P4 - 2	DCM BLK		One side of SW2, SW3, SW4, SW5, SW6
P4 - 4	DCM BLK	SW7 N.C. CNTR	Center contact of SW7
P4 - 6	ZERO DIFF. TENSION	SW2 N.O.	
P4 - 7	TEN TEST	SW3 N.O.	
P4 - 8	ZERO CAL	SW4 N.O.	
P4 - 9	CANCEL DEPTH ALARM	SW5 N.O.	
P4 - 10	ZERO DEPTH	SW6 N.O.	
P4 - 11	ADJ DEPTH DOWN	SW7 N.O. UP	Up Contact of SW7
P4 - 12	ADJ DEPTH UP	SW7 N.O. DN	Dn Contact of SW7

P5 - SPARE			
P5 - 1	+5V	D1 4	DISPLAY POWER
P5 - 2	MENU	SW8 NO	MENU
P5 - 12	DCM	SW8 COM	MENU

P6 - ANALOG IN/OUT			
P6 - 5	4-20MA SIG	J2 B	4-20MA SIG IN

P6 - 6	24V	P1 3 PULL UP BRD	LOAD PIN POWER
P6 - 7	SHUNT CAL ENABLE	J2 E	SHUNT CAL
P6 - 8	ACM	J2 A	GROUND
P6 - 9	4-20ma OUT	J4 D	4-20 MA OUT
P6 - 10	GND	J4 C	Tension Out Ground
P6 - 11	0 - 10 VOLT OUT	J4 B	ANALOG TENSION OUT
P6 - 15	DIFF TENSION METER -	M1 -	
P6 - 16	DIFF TENSION METER +	M1 +	

P7 - COMMUNICATIONS - 38,400 8,N,1			
P7 - 7	COM2 TXD	D1-5+D2-5+D3-5	DISPLAY DATA - THREE WIRES CONNECTED TOGETHER
P7 - 9	GND	J6 5	RS232 GND
P7 - 10	COM1 TXD	J6 2	RS232 TRANSMIT
P7 - 11	COM1 RXD	J6 3	RS232 RECEIVE
P7 - 12	GND	D1 1	DISPLAY GND

P8 - QUADRATURE OUT / INDICATORS			
P8 - 3	EXCESSIVE TENSION LED	DS 1	TO BE ADDED
P8 - 4	EXCESSIVE TENSION LED	DS 1	TO BE ADDED
P8 - 5	ALARM -	ALM1 -	Beeper
P8 - 6	ALARM +	ALM1 +	Beeper
P8 - 9	APPROACHING SURFACE LED -	SW 5	+1 (inline with silver plate)
P8 - 10	APPROACHING SURFACE LED +	SW 5	-1 (opposite silver plate)
P8 - 11	PHASE 1B*	J3 C	Quadrature Out - PHASE B*
P8 - 12	PHASE 1B	J3 B	Quadrature Out - PHASE B
P8 - 13	PHASE 1A*	J3 E	Quadrature Out - PHASE A*
P8 - 14	DCM	J3 F	Quadrature Out - GROUND
P8 - 16	PHASE 1A	J3 A	Quadrature Out - PHASE A

P9 - ENCODER IN - J1			
P9 - 7	KEY		
P9 - 8	ENCODER 1B	J1 B+P1 8 ENCDR_BRD	ENCODER IN PHASE B
P9 - 9	ENCODER 1B *	J1 C + P1 10 ENCDR BRD	ENCODER IN PHASE B*
P9 - 11	ENCODER 1A	J1 A+ P1 6 ENCDR BRD	ENCODER IN PHASE A
P9 - 12	ENCODER 1A*	J1 E + P1 7 ENCDR BRD	ENCODER IN PHASE A*

P11 +/- 15 VDC			
P11-1	DCM	J1 F + P1 9 ENCDR BRD	ENCODER COMMON
P11 - 3	ENCODER PWR - TO FUSE	F1 + P1 11	FUSE F1 ON BACK PANEL

		ENCDR BRD	
F1	FUSE ON BACK PANEL	J1 D	ENCODER POWER

D1 DISPLAY			
D1-2	GND	D2 1	GND OUT
D1-6	+5V OUT	D2 4	POWER OUT

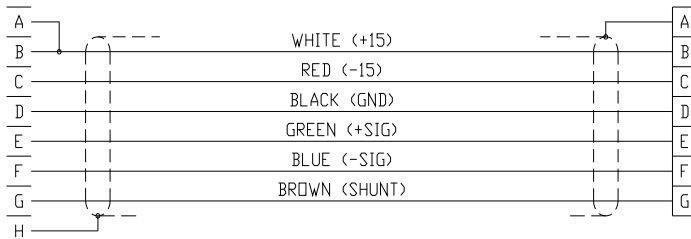
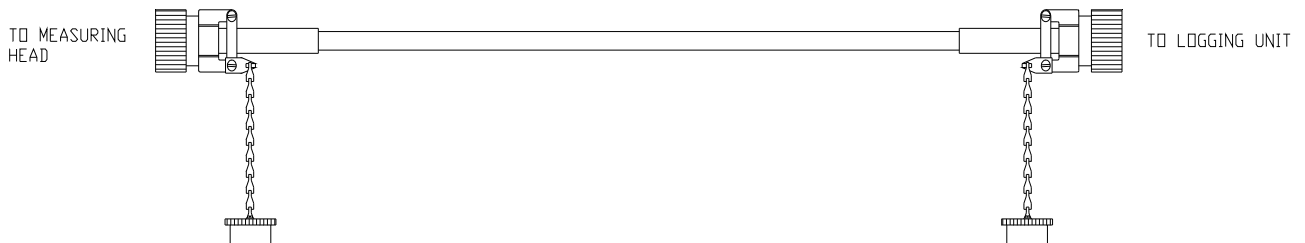
D2 DISPLAY			
D2-2	GND	D3 1	GND OUT
D2-6	+5V OUT	D3 4	POWER OUT

D3 DISPLAY			
D3-1	GND		GND IN FROM D2 - 2
D3-4	+5V		POWER IN FROM D2 - 6

PULL UP BOARD			
P1-4	LC +24V FUSED	J2 D	LOAD PIN +24V FUSED

7.0 CABLE DRAWINGS AND WIRING DIAGRAMS

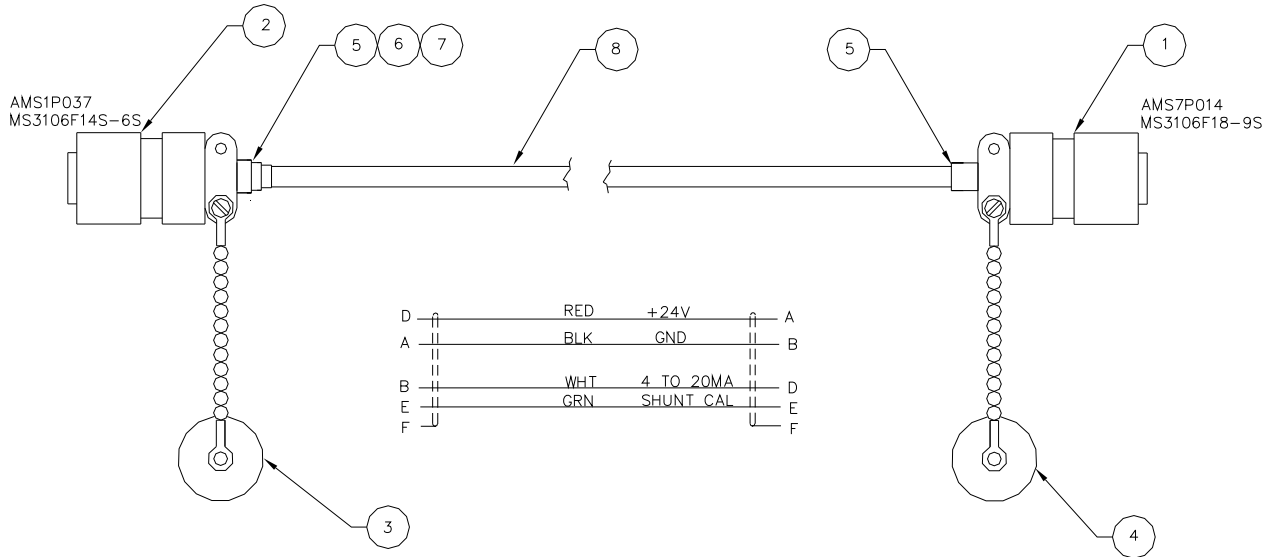
7.1 AMS8A024CABLE ASSEMBLY – TENSION FROM MEASURING HEAD TO PANEL



P/n	Description	Qty	Ref
AMS4P221	CABLE 20/8C ALPHA -20DEG	20 FT	
AMS8P057	CONN KPT06A16-8S STR PLUG	1 EA	LOAD PIN END
AMS7P014	CONN MS3106E-18-9S LOAD PIN	1 EA	PANEL END
AMS8P059	CLAMP CONN MS3057-10A W/BUSH	1 EA	
AMS8P060	DUST CAP CANNON SHELL SIZE 16	1 EA	
AMS1P029	DUST CAP MS25042		

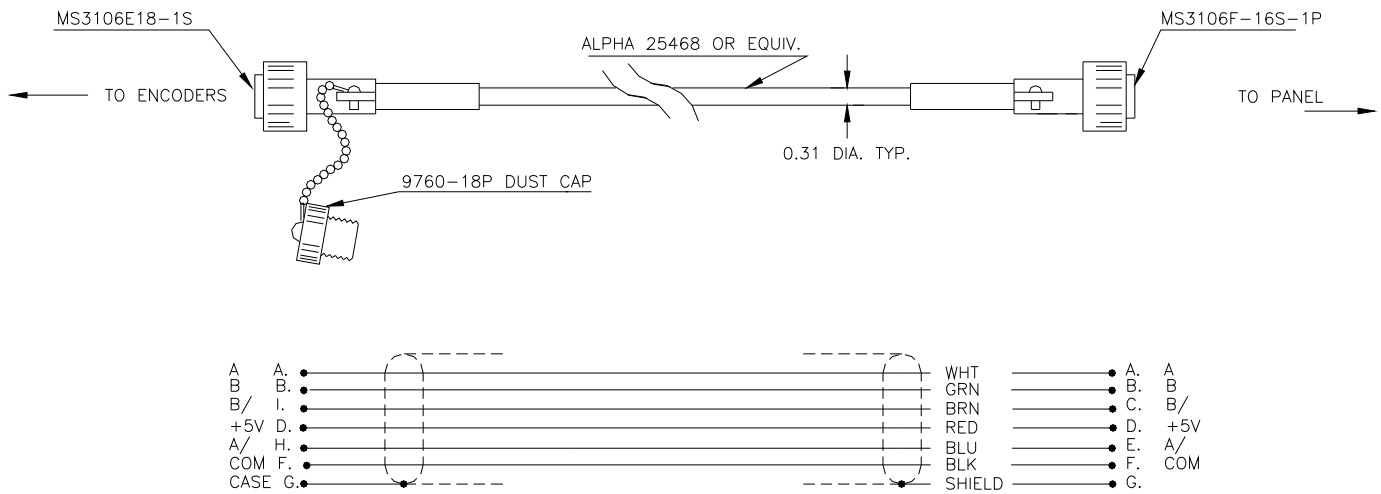
7.2 AMS7A033 CABLE ASSEMBLY – TENSION FROM MEASURING HEAD TO PANEL

Load Pin to Panel



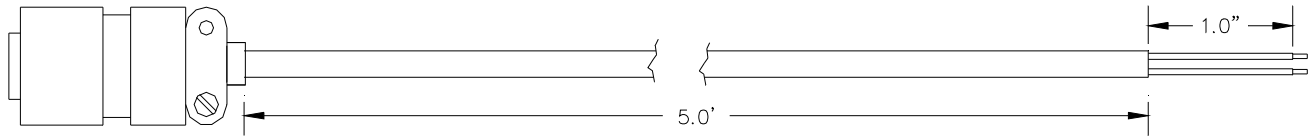
Component	Description	Qty
AMS7P014	CONN MS3106F-18-9S LOAD CELL	1 HEAD END
AMS4P185	CONN MS3106F-14S-5P 5 PINS	1 PANEL END
AMS7P042	DUST CAP MS25042-14DA	1
AMS1P029	DUST CAP MS25042-18DA	1
AMS7P063	BUSHING #9779-513-6 AMPHENOL	2
AMS7P064	BUSHING #9779-513-8 AMPHENOL	1
ACMU2P23	BUSHING #9779-513-10 AMPHENOL	1
AMS4P222	CABLE 20/4C ALPHA 25154 BLACK	30 FT

7.3 AMS4A105 – CABLE ASSY ENCODER TO PANEL



P/n	Description	Qty	Ref
AMS1P028	CONN MS3106F-18-1S ENCODER	1	ENCODER END
AMS4P183	CONN MS3106F-16S-1P	1	PANEL END
AMS4P221	CABLE 20/8C ALPHA 25468 BLACK	20	F'T
AMS7P040	DUST CAP AMPHENOL 97-60-18	1	

7.4 AMS7A022 - CABLE ASSEMBLY – DC POWER IN

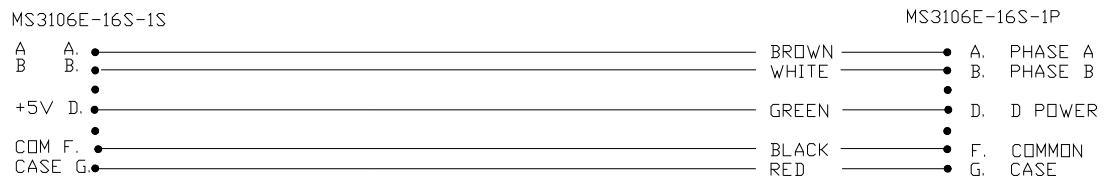
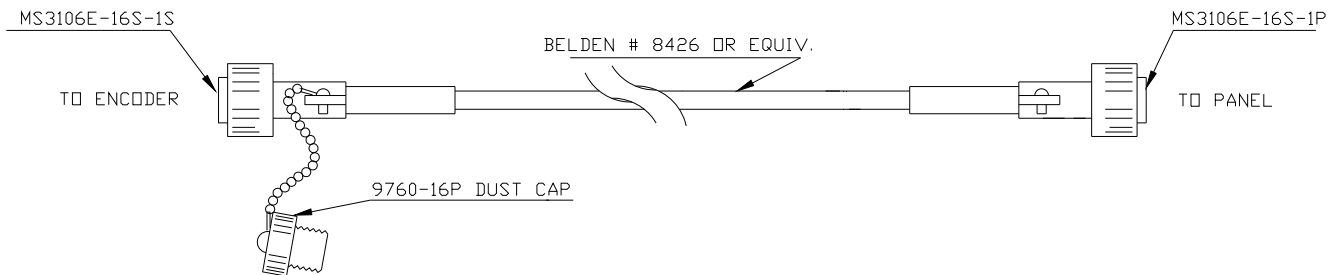


A - WHITE
 B - BLACK

A = +
 B = -

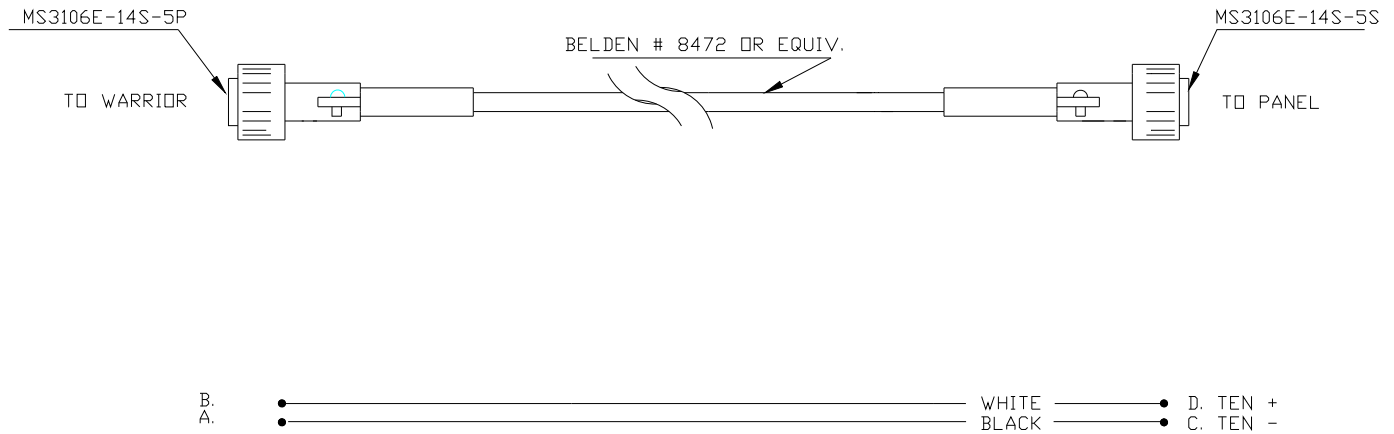
P/n	Description	Qty
AMS7P061	CABLE 16-2 SJ CORD BELDEN 8472	5 FT
AMS7P044	CONN MS3106E-14S-9S	1 EA
AMS7P063	BUSHING #9779-513-6 AMPHENOL	1 EA

7.5 AMS4A107 – CABLE ASSY ENCODER FROM PANEL TO WARRIOR



P/n	Description	Qty	Ref
AMS4P184	CONN MS3106E-16S-1S	1 EA	ENCODER END
AMS4P183	CONN MS3106E-16S-1P	1 EA	PANEL END
AMS4P221	CABLE 20/8C ALPHA	20 FT	
AM5KP113	DUST CAP MS25042-16DA	1 EA	
AMS7P064	BUSHING #9779-513-8 AMPHENOL	2 EA	

7.6 AMS4A111 CABLE ASSEMBLY – TENSION FROM PANEL TO WARRIOR



P/n	Description	Qty	Ref
AMS4P186	CONN MS3106E-14S-5S	1 EA	TO PANEL
AMS4P185	CONN MS3106E-14S-5P 5 PINS	1 EA	TO WARRIOR
AMS4P221	CABLE 20/8C ALPHA	20 FT	
AMS7P064	BUSHING #9779-513-8 AMPHENOL	2 EA	