

OPERATIONS AND MAINTENANCE MANUAL WIRELINE WINCH OPERATORS PANEL

**AMS4A062 – Differential Load Pin
AMS4A063 – 2 mv/v Load Pin
AMS4A064 – 4-20ma Load Pin**

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1.0 INTRODUCTION

1.1 GENERAL DESCRIPTION



This panel is designed to acquire and display depth and tension from a wireline winch unit. The panel uses a menu system to set and make adjustments to the data as necessary.

When first powered up, each of the menu settings are displayed on the depth and line speed displays.

Depth is displayed from data provided from an encoder mounted on a measuring device. The tension data is provided by a load pin. Depth and tension data can be stored in an internal memory board for playback at a later time. The panel can also be connected to a PC through a serial port for real time acquisition and playback of data.

The system is designed to operate properly from conventional automotive 12-24 vdc electrical power.

Loss of power to the panel during operation will not cause a loss of depth data. The panel continuously stores depth data every 100 milliseconds in an internal battery backed up memory device. When power is applied, the last "Depth" is displayed.

The panel is designed to be mounted in a hoist console



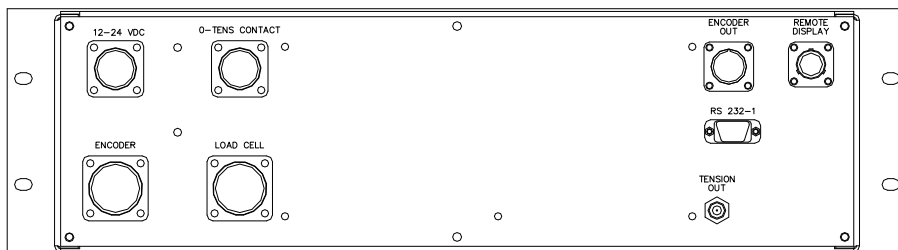
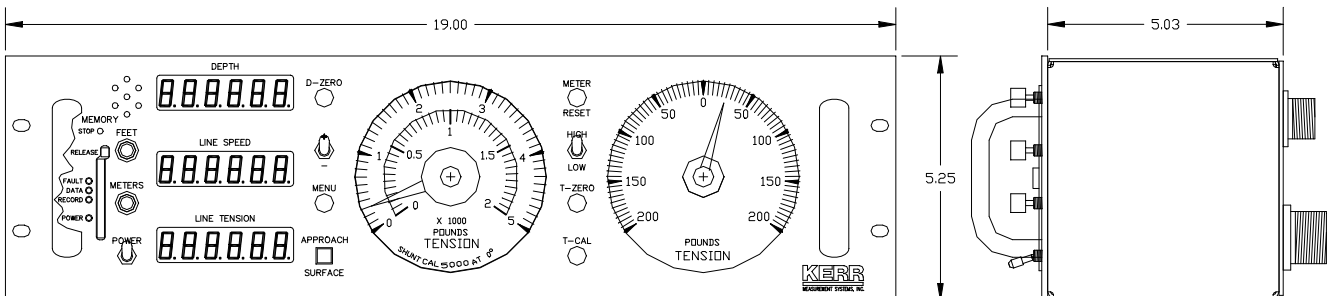
Or on a bracket that allows to panel to be mounted overhead or against a wall.



1.2 FEATURES AND SPECIFICATIONS

- Digital displays for depth, line speed and tension
- Analog tension meters, 4 inch (108 mm) dia., 270 degree
- 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 pin zero & calibrate controls. Only works when there is no load on the cable and the depth is at zero.
- Depth & tension saved in non-volatile memory at power loss
- RS232 Interface for additional control and data outputs.
- Can be set to display either English or Metric units.
- Data recorder which records both depth and tension data to a solid state memory device

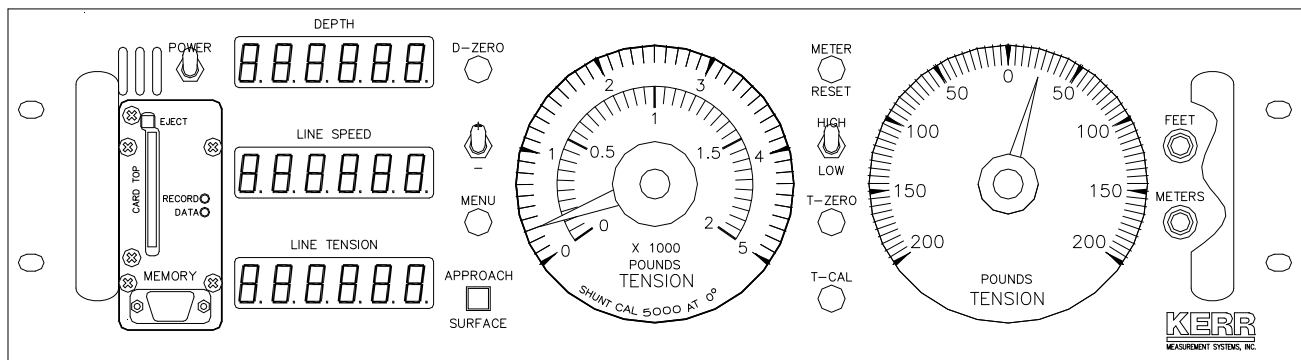
1.3 SPECIFICATIONS



| | | |
|-------|----------------------|--|
| 1.3.1 | TEMPERATURE RATING | -20 to 140 |
| 1.3.2 | POWER SUPPLY | 9 – 30 VDC @ 2 AMP MAX |
| 1.3.3 | MAXIMUM LINE SPEED | 3000 FT/MIN @ 600 PULSES/FT |
| 1.3.4 | MINIMUM LINE SPEED | .6 FT / MINUTE |
| 1.3.5 | MAXIMUM LINE TENSION | 8000 LBS |
| 1.3.6 | DIGITAL TENSION | 6 DIGITS WITH 1 LB OR 1KG RESOLUTION |
| 1.3.7 | DIGITAL LINE SPEED | 6 DIGITS WITH .1 FT OR .1 M RESOLUTION |

2.0 DETAILED DESCRIPTION OF FEATURES

2.1 FRONT PANEL



2.1.1 POWER ON / OFF SWITCH

This switch turns the panel on (UP position) or also starts the automatic shutdown process (DOWN position). There is a built in delay when powering down which gives the system time to close the media card data files. After the files are closed, the panel will turn itself off.

2.1.2 ANALOG INCREMENTAL TENSION METER

This meter displays incremental tension. This provides a more visual display of tension change.

Incremental tension provides a high resolution tension scale. It must be periodically reset as tension increases or decreases to keep the needle centered.

2.1.3 METER RESET SWITCH

This switch will reset the incremental tension meter to the 0 (center) position.

2.1.4 ANALOG TENSION METER

This meter displays total tension. This provides a visual display of tension which corresponds to the digital tension meter.

This meter is dual scale. A switch is provided to change scales.

If the switch is set to HIGH the outer scale (0-5000 pound) is used.
If the switch is set to LOW the inner scale (0-2000 pound) is used.

Note: Analog meter faces are available with kg increments.

2.1.5 DEPTH DISPLAY

This meter provides a digital display of depth.

2.1.6 LINE SPEED DISPLAY

This meter provides a digital display of line speed. It can be set in feet or meters per minute or per hour.

2.1.7 LINE TENSION DISPLAY

This meter provides a digital display of total line tension.

2.1.8 ZERO DEPTH

Pressing this button will reset the depth to 0. Pressing 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). If depth is not at zero you can not calibrate tension.

2.1.9 + / - SWITCH

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.

2.1.10 MENU

Pressing this button will activate the menu software. The software feature to be set will be displayed on the DEPTH display. The features can be toggled through by pressing the menu button until the desired feature is displayed.

2.1.11 APPROACHING SURFACE LED AND ALARM

This LED is lit 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 LED 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 turn off.

2.1.12 ENGLISH / METRIC UNITS

These LEDs will indicate if the panel is in English or metric mode. If units are set to English, the English LED will be lit. If units are set to Metric the Metric LED will be lit.

2.1.13 T-ZERO SWITCH

Use this switch to set the tension to 0 at the start of a run. This will zero out the tension circuit. The line should be slack through the head at this time. Depth must be at zero before this switch and the T-CAL switch will function.

2.1.14 T-CAL SWITCH

This switch will activate the shunt cal circuit in the load pin. 4000 lb will be displayed on the tension display if it is set for the Shark measuring head. 5000 lb will be displayed if the panel is set for Hammerhead or AM3K. 10000 lb will be displayed if the panel is set for AM5K or MAK0.

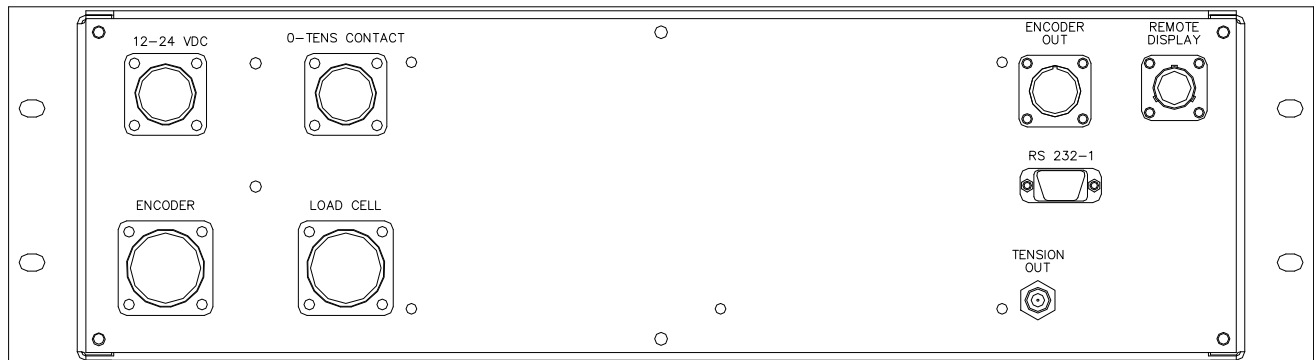
Refer to section 6.8.3 for more information.

2.1.15 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-CAL buttons simultaneously then turn the power back on while the buttons are depressed. Keep the buttons depressed for at least 5 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.

2.2 REAR PANEL



2.2.1 12 – 24 VDC

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 (white wire), pin B is negative (black wire).

2.2.2 OVER TENSION CONTACT

This connector provides a connection to the overtension circuit relay. When an overtension condition is active, the two pins are connected together. In 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.

2.2.3 ENCODER IN

The cable running from the encoder on the measuring head attaches to this connector. From this connector, the panel provides 12 vdc power to the encoder and accepts the encoder quadrature signal input. It is designed to work with standard encoders.

2.2.4 LOAD CELL

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 REMOTE DISPLAY

This connector provides an interface to a remote display/pressure display system. The connector provides power, depth, and tension information to the remote unit and reads pressure data from the remote unit. This pressure data can be stored on the internal data recorder and also appended to the end of the D string at the RS232 output.

2.2.6 ENCODER OUTPUT

This connector provides an encoder quadrature output signal. This signal can be used to drive a computer system without requiring a second encoder to be installed on the measuring head. The encoder output signal includes all the corrections made by the panel such as wire and wheel size, stretch correction, shim, etc.

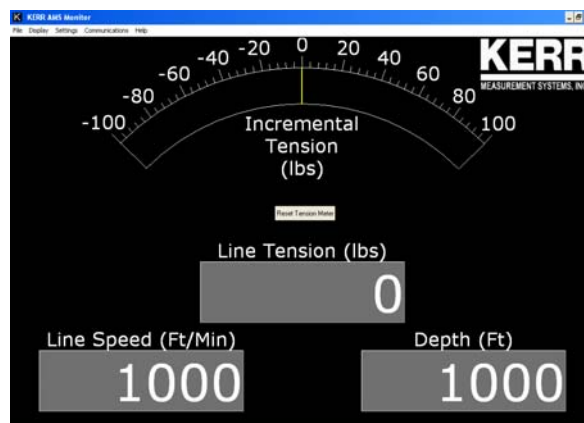
2.2.7 TENSION OUTPUT

This connector provides a tension output signal. This signal can be used to record pressure on a computer system. The signal output can be configured for either 4-20ma output or a 0-10vdc output.

2.2.8 RS232 SERIAL INTERFACE

This connector provides an RS232 interface from the panel to an external computer. A 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.

To connect the panel to a computer, connect a serial cable from the PC to J6 on the rear of the panel. A program is available from Benchmark Wireline Products 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 SPEED display. Press the +/- switch 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 TEN ALARM

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

Procedure: Use +/- switch to set the tension alarm setting. **This setting does not need to be accepted when changed.**

TALARM 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 300 lbs

3.2 LINE SIZE

Line size selection in conjunction with the wheel size sets the wheel circumference value. The depth must be at 0 before this setting can be changed.

Use +/- switch to select line size.

LINESZ will be displayed on the DEPTH display and the selections will be displayed on the LINE SPEED display.

Line Size Values available for SHARK OR HAMMERHEAD

.092
.108 (default setting)
.125
3-16
7-32
5-16
OTHER

Line Size Values available for MAKO

.092
.108 (default setting)
.125
3-16
7-32
5-16
.140
.160
OTHER

When OTHER is selected, two more options will be available:

Line diameter: inches (default value = .125)
Line Weight: lbs / 1000' (default value = .023)

Stretch Coefficient: feet of stretch per thousand feet per
thousand pounds. (default value = 5.9628)

The wireline weight and stretch coefficient can be entered at this
time. This data should be available for the manufacturers wireline
data sheet.

Line Size Values available – AM3K HEAD

3-16
7-32
1/4
9-32
5-16 – (default setting)
3-8

Line Size Values available – AM5K HEAD

3-16
7-32
1/4
9-32
5-16 – (default setting)
3-8
7-16
15-32
.472 – HT
.484 – HT
.492 - HT

3.3 DEPTH ALARM

When depth alarm value is reached, the alarm will sound and LED will flash. Pressing the LED will turn off alarm but the light will continue to flash. The light is reset whenever the depth zero button is depressed.

Use +/- switch to set the depth alarm value.

DALARM 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 100'

3.4 DEPTH ADJUST (Shim)

This parameter is used to correct depth readings for situations such as extremely worn measurement wheels.

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

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

DP-ADJ will be displayed on the DEPTH display and the value will be displayed on the LINE SPEED display as it is being set. The values are feet / thousand or meters / thousand. The smallest increment is .1 foot per thousand.

Default value is 0.

3.5 ENCODER DIR

This command will set the encoder direction to UP or Down.

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

ENCDIR will be displayed on the **DEPTH** display and either **UP** or **DN** will be displayed on the **LINE SPEED** display.

Default value is **DN**.

3.6 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.

3.7 ENCODER OUTPUT

The value selected will be the encoder out Pulse Per Foot setting.

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

EN-OUT 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 600.

3.8 LINE SPEED

This command will set the line speed to either feet/meters per minute or feet/meters per hour.

Use +/- switch to toggle the LINE SPEED setting.

LSPEED will be displayed on the DEPTH display and either MIN or HOUR will be displayed on the LINE SPEED display.

Default value is MIN.

3.9 STRETCH CORRECTION

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

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

D-CORR will be displayed on the DEPTH display and either ON or OFF will be displayed on the LINE SPEED display.

Default value is ON.

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

stretch due to cable weight =
stretch coefficient * depth * cable weight / 2

stretch due to weight at end of cable =
stretch coefficient * depth * (tension – cable weight)

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

3.10 DEPTH UNITS

The depth values will be displayed in the units selected.

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

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.

3.11 TENSION UNITS

The tension value will be displayed in the units selected.

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

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.

Note: Analog meter faces are available with kg increments.

3.12 PRESSURE

This option controls the optional pressure display (if connected).

If Y is selected, the following options are available.

PRESS1

Selecting **N** will blank the PRESS 1 display.

PRESS2

Selecting **N** will blank the PRESS 2 display.

ZEROP1

Selecting **Y** will set the PRESS 1 display to 0 (if the transducer is connected to the PRESS 1 input). This should be performed when no pressure is applied to the transducer.

ZEROP2

Selecting **Y** will set the PRESS 2 display to 0 (if the transducer is connected to the PRESS 2 input). This should be performed when no pressure is applied to the transducer.

REC_PR

Selecting **Y** will append the pressure data to the internal data recorder.

SER_PR

Selecting **Y** will append the pressure data to the end of the D string. This data will then be available at the rear serial port

3.13 HEAD TYPE

Five options are available:

| | |
|-------|---|
| SHARK | SHARK SLICK LINE HEAD |
| HHEAD | HAMMERHEAD SLICK LINE / BRAIDED LINE HEAD |
| MAKO | MAKO SLICK LINE / BRAIDED LINE HEAD |
| 3K | AM3K BRAIDED LINE / E LINE HEAD |
| 5K | AM5K BRAIDED LINE / E LINE HEAD |
| OTHER | |

This selection determines the tension scale and tension K factor.

| | |
|-------------|------------------|
| SHARK: | 1.5V = 4000 LBS |
| HAMMERHEAD: | 1.5V = 9000 LBS |
| MAKO: | 1.5V = 10000 LBS |

| | | |
|--------|-------|------|
| AM3K = | 3/16" | 1.45 |
| | 7/32" | 1.38 |
| | 1/4" | 1.22 |
| | 9/32" | 1.08 |
| | 5/16" | 1.00 |
| | 3/8" | .85 |

| | | |
|--------|--------------|------|
| AM5K = | 15/32" and > | 1.00 |
| | 7/16" | 1.10 |
| | 5/16" | 1.42 |
| | 9/32" | 1.48 |
| | 1/4" | 1.68 |
| | 7/32" | 1.88 |

This selection also determines the measuring wheel size used in depth calculation.

HAMMERHEAD AND SHARK = 15.153 INCHES DIA.

MAKO = 20.0593 INCHES DIA.

Wheel size circumference with wireline installed is calculated by:
 $(\text{Wheel dia.} + \text{Line dia.} \cdot 108) \cdot \pi$

Example: Shark with .125 wireline:
 $(15.153" + .125) \cdot \pi = 47.997$ inches circumference

AM3K = 7.639" (194 mm) diameter wheel (2.0' circumference)
+ line diameter + cable factor

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.

AM5K = 7.639" (194 mm) diameter wheel (2.0' circumference)

OTHER

When OTHER is selected the WHLCIR can be entered 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. Data entered is in feet.

The wheel size will be forced to this value regardless of wireline size selections.

The default value is 1.00 ft.

4.0 SYSTEM OPERATING INSTRUCTIONS

4.1 WELLSITE OPERATION

- 4.1.1 Power up panel and verify it is working properly.
- 4.1.2 Verify the panel is configured to match the system
 - Line size
 - Measurement units
 - Encoder settings
- 4.1.3 Install line in measuring head and set the line size parameter.
- 4.1.4 Set Tension Alarm value.
- 4.1.5 Set depth adjust value if necessary.
- 4.1.6 Ensure that memory card is installed in data recorder. Turn power to panel off then on again. This will write the operating parameters to the memory card.
- 4.1.7 Rig up through sheaves, install tool, and slack off weight.
- 4.1.8 Set depth to zero.
- 4.1.9 Press T-Zero to set tension to zero.
- 4.1.10 Press T-CAL and verify that panel tension reads 4000 or 5000 lbs (depending on type of measuring head selected)
- 4.1.11 Pull tool to depth 0 position. Press D-Zero to reset the panel depth to 0.

4.2 INTERNAL DATA RECORDER OPERATION

This device records depth and tension data along with other job parameters onto a compact flash card.

4.2.1 DATA FORMAT

Data is stored as:

DATE (mm/dd/yy)

TIME

UNITS (E=English, M=Metric)

DIRECTION (U=Up, D=Down, S=Stopped)

DEPTH nnnnn.n

SPEED nnnn.n

TENSION nnnnnn

<CR> - CARRIAGE RETURN, <LF> - LINEFEED

4.2.2 DATA RECORD

Data is written to the board 10 times per second. Data is stored in ASCII TEXT format. Each line terminates with CR and LF characters.

To minimize the amount of data written to the board, a write only occurs when depth is changed by more than 0.1' or when tension changes by more than 10 pounds. Interpolation can be used to fill in non written records since a DATE and TIME stamp is recorded as a part of each data record,

The RECORD LED on the front of the DATA RECORDER board indicates that it is in RECORD mode.

The DATA LED flashes each time a data record is written.

The first record written after the panel is powered on is the

verification screen (see first 14 lines below).

```
08/26/03 11:24:25 AMS4A06234   VERSIONS62340.xx
Line Load Cell Factor   1.000
Wheel Size:   UNIVSL
Encoder PPR:   1200
Line size:    .092
Units:        English
Depth_adjust:  0.0
Tension Alarm: 5045
Depth Alarm:   100
Stretch Correction Enabled
Panel Number:  1

08/26/03 11:24:27
08/26/03 11:24:27 E S + 1019.0 0.0 3570
08/26/03 11:25:16 E S + 1018.8 0.0 3534
08/26/03 11:25:17 E S + 1008.9 0.0 1796
08/26/03 11:25:18 E S + 997.3 0.0 145
08/26/03 11:25:20 E S + 997.8 0.0 48
08/26/03 11:25:21 E S + 998.7 0.0 261
08/26/03 11:25:22 E S + 1002.7 0.0 834
08/26/03 11:25:23 E S + 1009.3 0.0 2065
08/26/03 11:25:24 E S + 1014.6 0.0 2934
08/26/03 11:25:25 E S + 1018.9 0.0 3559
08/26/03 11:25:26 E S + 1017.6 0.0 3343
```

Before removing the CompactFlash card, turn the panel power off. There is a delay when turning off the power while the data files are being closed. After a short delay, the panel will power itself off.

To continue recording on a new flash card, insert the card then turn the panel off then on. This will put the panel into record mode and write a new header file on the CompactFlash card.

4.2.3 DATA EXPORT

The memory board can be removed and data moved onto a PC using a standard CompactFlash Media Reader. The data can be imported into programs such as MS Excel or MS Access.

To remove the compact flash card, Press the release button to eject the flash card.

4.2.4 MEDIA CARD

The CompactFlash media device used in the data recorder may be ordered using part number AMS4P232. Additionally it may be acquired from any number of other retail sources. 1 GB is the minimum recommended size.

4.3 PANEL CONTROL AND OPERATION USING RS232 SERIAL PORT

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 |
| HANDSHAKING | NONE |

Type H to get the following help screen

*** AMS4A06X Help Screen ***

```
H,? - This screen.
D - Display units, direction, depth, speed, and tension.
P - Modify encoder pulses/revolution. Usage: P600
V - Verify AMS4A063 status.
Z - Preset depth.Usage: Z0.0 |__|--> New depth.
A - Depth Alarm. Usage: A100 |__|--> Depth Alarm.
W - Wheel Size.
N - Line Size N0 .092; N1 .108; N2 .125; N3 3/16;
    N4 7/32; N5 5/16
U - Modify units of measure
    F(feet);UM(meters);UP(pounds);UK(kg)
M - Tension Alarm. Usage: 'M2500' for 2500 pound alarm.
J - Depth Adjust. Usage: 'J-1' for -1 ft per 1000 feet
X - Encoder Direction. X+ or X-
0 - Tension Zero Cal
T - Tension Shunt Cal
I - Enable/Disable Stretch Correction
R - Toggles data recorder on or off
# - Set the serial number of the panel. Usage #n
```

Type V to get the following verification screen

```
* * * AMS4A06X Setup Status * * *

Load Cell Angle-Factor      1.000
Wheel Size:                  4'
Encoder PPR:                 600
Line size =                  .108
Serial Number =              1
Units =                      English
Depth_adjust =               0.0
Linespeed =                  0
Tension Alarm =              2500
Depth Alarm =                100
Data Recorder is            ON
Stretch Correction           Enabled
```

Type D to get a data string.

```
DATA STRING DESCRIPTION

12345678901234567890123456

U D Zdddd.d ssss.s tttttt<CR><LF>

WHERE:
U - UNITS (Depth and 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
```

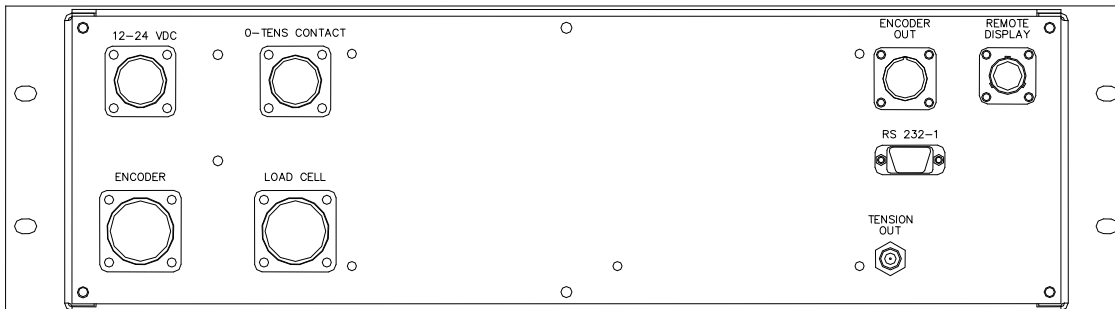
5.0 SPARE PARTS LIST

AMS4A063 PANEL WINCH OPERATOR DISPLAY PANEL

| | | | | | |
|----|------------|-----------------------------------|----|----|------------------------|
| 1 | SW-623406 | SOFTWARE FOR THE AMS4A062/6364 | 1 | EA | |
| 2 | AMS4P134E | PC BOARD AMS40 REV E W/2xRS232 | 1 | EA | |
| 3 | AMS7P080 | METER DIFF TENSION | 1 | EA | |
| 4 | AMS7P081 | METER TENSION POUND DUAL SCALE | 1 | EA | |
| 5 | AMS4P128 | DISPLAY LED RED 0.5" 14 SEGMNT | 3 | EA | |
| 6 | ACMU1P06 | LED RED DIALIGHT 5V | 1 | EA | METRIC |
| 7 | AMS4P211 | SONALERT PS-580 MALLORY | 1 | EA | |
| 8 | AMS4P028 | SWITCH DPDT TOGGLE LOCKING | 1 | EA | POWER |
| 9 | AMS4P020 | SWITCH SPDT TOGGLE LOCKING | 1 | EA | METER HI/LO |
| 10 | AMS4P018 | SWITCH SPDT PUSH MOM MPA-106F | 4 | EA | |
| 11 | AMS4P044 | SWITCH DPDT TOGGLE MOM OFF MOM | 1 | EA | + / - |
| 12 | AMS4P021 | SWITCH CAP ALCO C-22 BLACK | 4 | EA | SHUNT, ZERO , MENU |
| 13 | AMS7P017 | SWITCH CAP ALCO C-22 RED | 1 | EA | D-ZERO |
| 23 | AMS7P013 | CONN MS3102E-18-9P LOAD CELL | 1 | EA | J4 - LOAD PIN INPUT |
| 24 | AMS4P264 | CONN KPSE02E10-6S RECEPTACLE | 1 | EA | J7 - REMOTE DISPLAY |
| 25 | AMS7P068 | SCREW JACK D-CONNECTOR KEYSTON | 4 | EA | |
| 26 | ACMU3P01 | CONN MS3102E-14S-9P RECEPT | 1 | EA | J1 - POWER IN |
| 27 | ACMU3P02 | CONN MS3102E-14S-9S RECEPT MAG | 1 | EA | J3 -OVER TENSION OUT |
| 28 | AMS4P164 | CONN DB9S CRIMP AMP USED WITH | 1 | EA | J6 - RS232 |
| 29 | ACMU2P06 | CONN MS3102E-18-1P 10 PIN | 1 | EA | J2 - ENCODER IN |
| 30 | AMS4P198 | SPACER UNTHREADED RND NYLON #4 | 12 | EA | |
| 31 | AMS4M076 | WINDOW LED RECESSED SERIAL | 3 | EA | |
| 32 | F244889000 | HANDLE OVAL 1-1/2 X 3 AL | 2 | EA | |
| 34 | C276P165 | FERRULE 18 AWG WHITE ALTECH | 21 | EA | |
| 35 | AMS4M063 | PANEL FRONT SLICKLINE OP PNL | 1 | EA | |
| 36 | AMS4M168 | PANEL REAR SLICKLINE W SIG OUT | 1 | EA | |
| 37 | AMS4M062 | PANEL TOP WINCH OP SLICKLINE | 1 | EA | |
| 38 | AMS4M061 | CHASSIS WINCH OP PNL SLICKLINE | 1 | EA | |
| 39 | AMS4P167 | PIN AMP M39029/64-369 USED | 9 | EA | 205089-1 |
| 40 | AMS4A166 | ASSY MEM CARD FCB COMP FLASH | 1 | EA | OPTION |
| 41 | AMS4M069 | PLATE CVR MEM CARD SLOT SLICK | 0 | EA | OPTION |
| 42 | C276P152 | LED GREEN DIALIGHT 12V | 1 | EA | ENGLISH |
| 43 | AMS4P041 | SWITCH SPST PB NO MOM LIGHTED | 1 | EA | APPROACHING SURFACE |
| 44 | AMS4P042 | LENS RED C&K SWITCH | 1 | EA | |
| 45 | AMS4P043 | LED RED FOR C&K PUSHBUTTON SW | 1 | EA | 1.90691.026 |
| 46 | AMS4A102 | PCB ASSY FUSE BOARD | 1 | EA | |
| 47 | C276P402 | DIODE ZENER 6.8V 5W 1N5342B | 1 | EA | |
| 50 | AMS4P170 | CONN KPSE02E12-10P RECEPTACLE | 1 | EA | J5 - ENCODER OUT |
| 51 | ALS1P029 | CONN AMP BNC FRONT MOUNT | 1 | EA | J8 - TENSION OUT |
| 53 | AMS4A204 | PCB ASSY IN CIRCUIT PROGRAMMG | 1 | EA | |
| 54 | ALS2P008 | SWITCH DPDT MOM PB MPA206R | 1 | EA | T-CAL (SW5) |

6.0 CONNECTOR PINOUTS AND PANEL WIRING DIAGRAMS

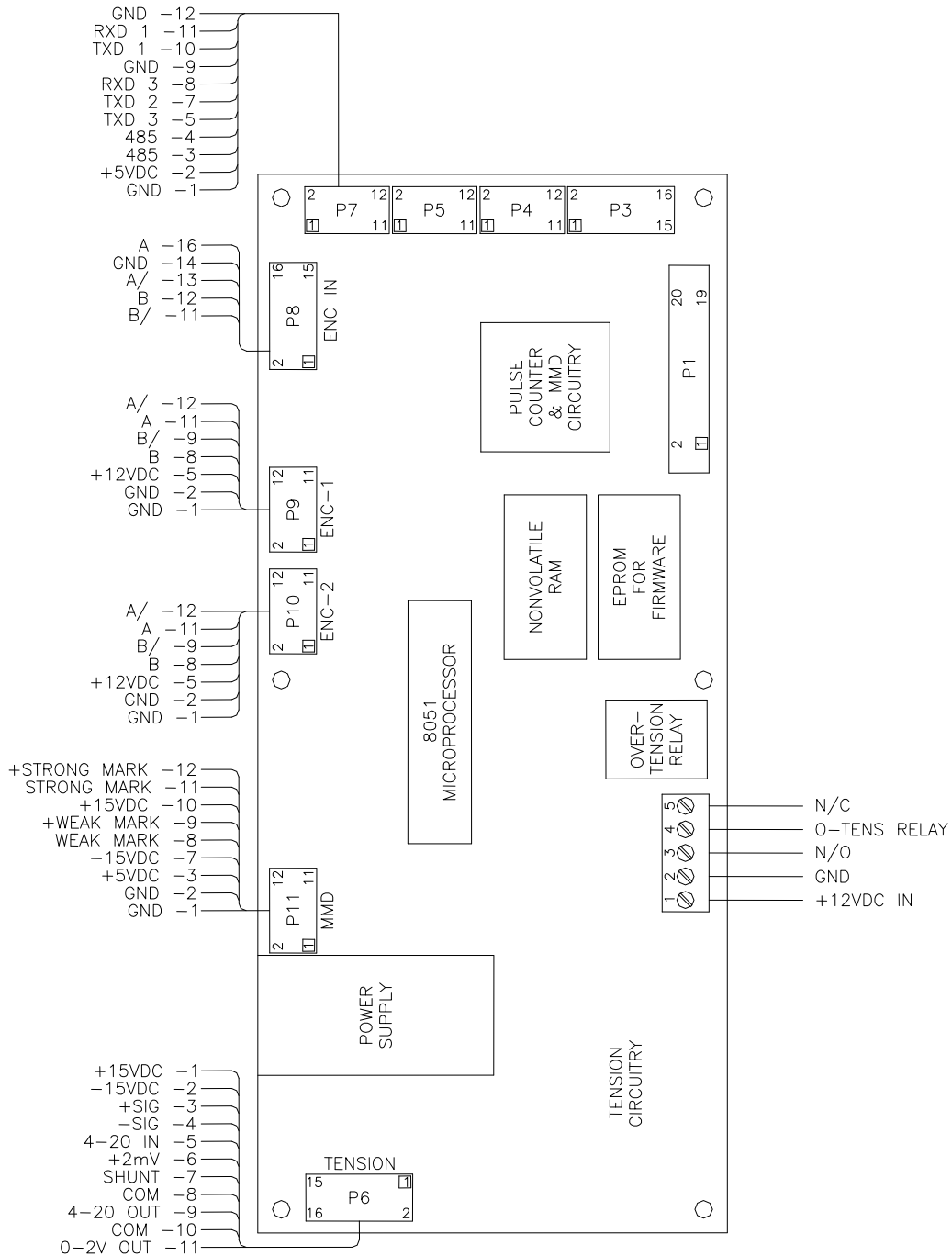
6.1 BACK PANEL CONNECTOR PINOUT



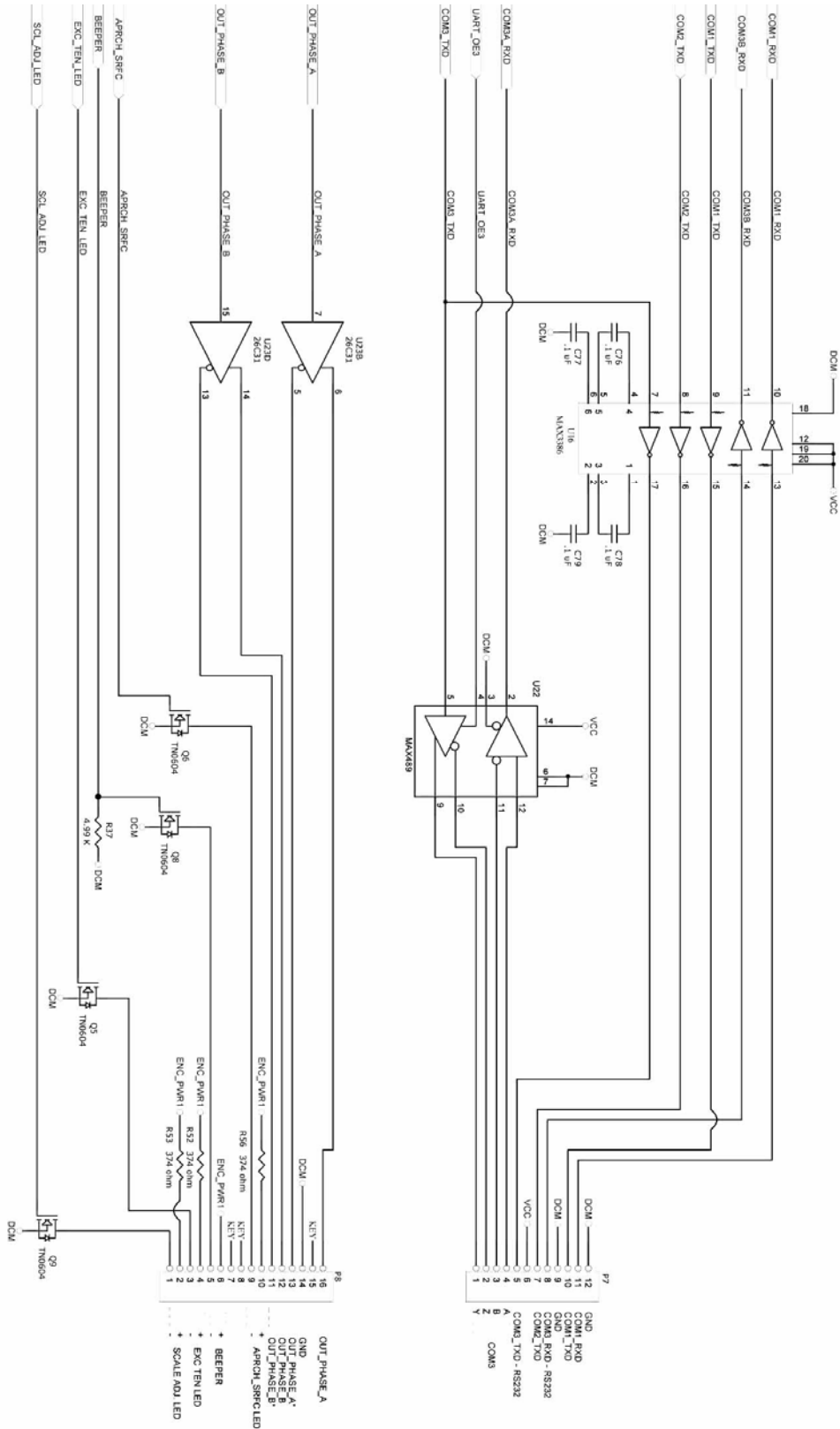
| | |
|-------------|--------------------------------|
| J1-A | 12VDC POWER IN |
| J1-B | 12VDC POWER GROUND |
| | |
| J2-A | ENCODER 1A |
| J2-B | ENCODER 1B |
| J2-D | ENCODER POWER (+12 VDC) |
| J2-F | ENCODER GROUND |
| J2-H | ENCODER 1A NOT |
| J2-I | ENCODER 1B NOT |
| | |
| J3-A | HOIST SHUTDOWN CONTACT CLOSURE |
| J3-B | HOIST SHUTDOWN CONTACT CLOSURE |
| | |
| J4-A | SIGNAL IN+ |
| J4-B | LOAD PIN GROUND |
| J4-C | LOAD PIN EXCITE + |
| J4-E | SIGNAL IN - |
| J4-F | SHUNT CAL |
| | |
| J5-C & J5-J | ENCODER OUT GROUND |
| J5-D | ENCODER OUT PHASE A |
| J5-E | ENCODER OUT PHASE A\ |
| J5-G | ENCODER OUT PHASE B |
| J5-H | ENCODER OUT PHASE B\ |

| | |
|---------|---|
| | |
| J6-2 | COM1 RS232 TXD |
| J6-3 | COM1 RS232 RXD |
| J6-5 | GND |
| | |
| J7-GND | COMMON (BNC) |
| J7-CNTR | TENSION OUT (BNC) either 0-10vdc or 4-20ma |
| | |
| J8-A | 12V POWER (SWITCHED) |
| J8-B | 12V GROUND |
| J8-C | 24V POWER TO REMOTE DISPLAY |
| J8-D | COM2 TXD |
| J8-E | PRESSURE SIG FROM REMOTE DISPLAY |
| J8-F | DIGITAL GROUND |

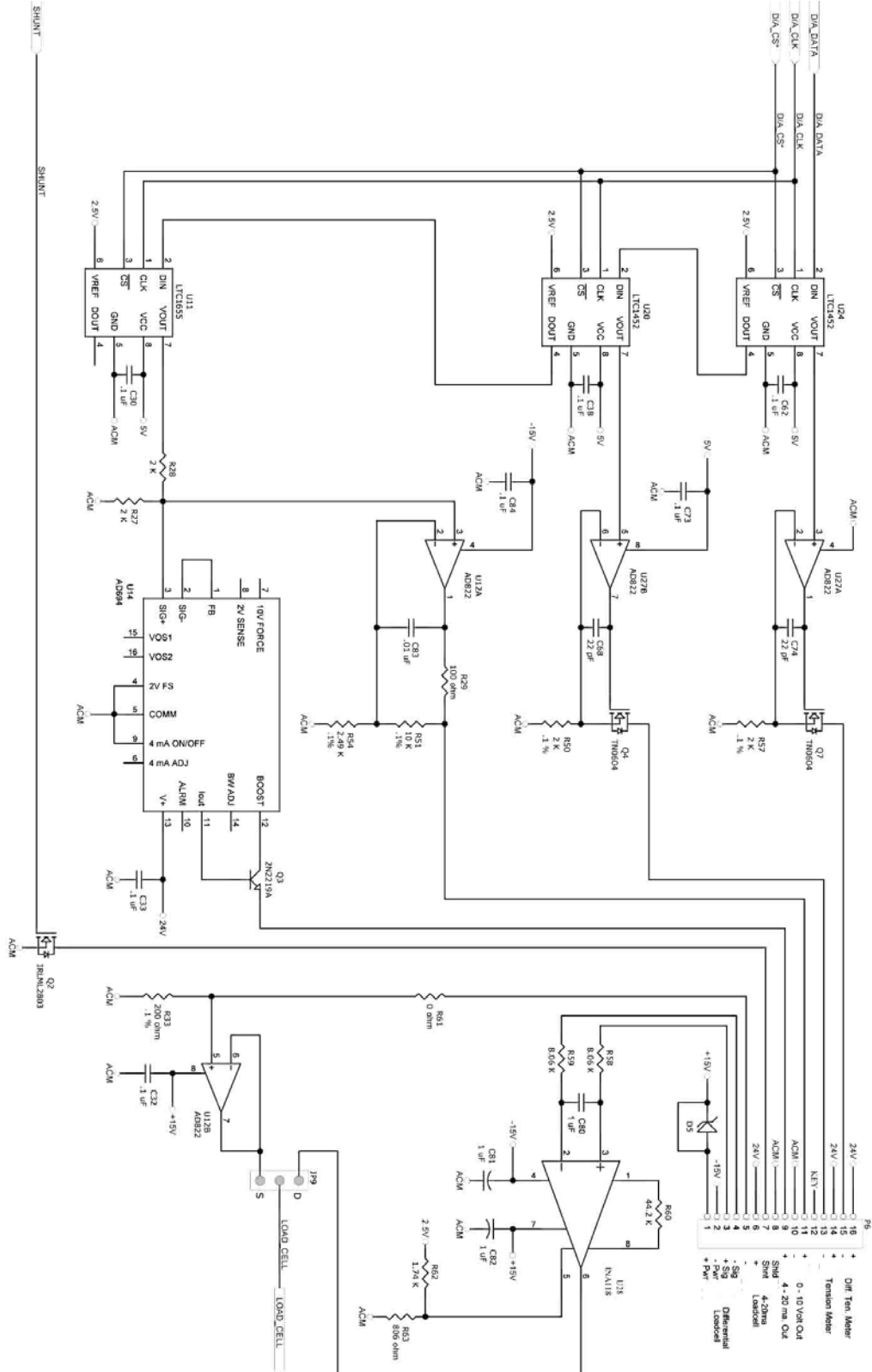
6.2 INTERNAL PROCESSOR BOARD PINOUT



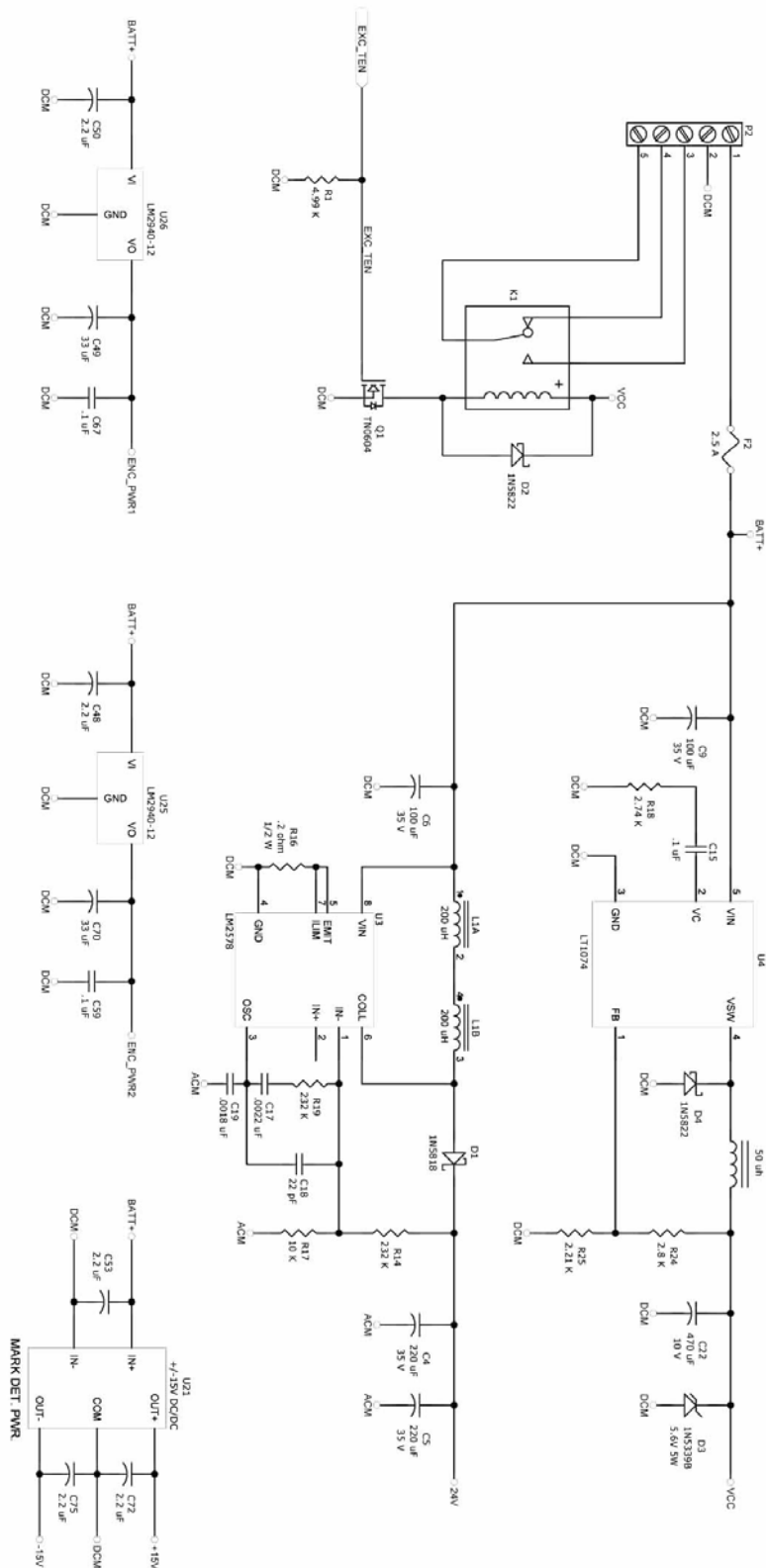
6.4 ENCODER OUTPUT AND COM PORT I/O



6.5 LOAD PIN AND TENSION I/O

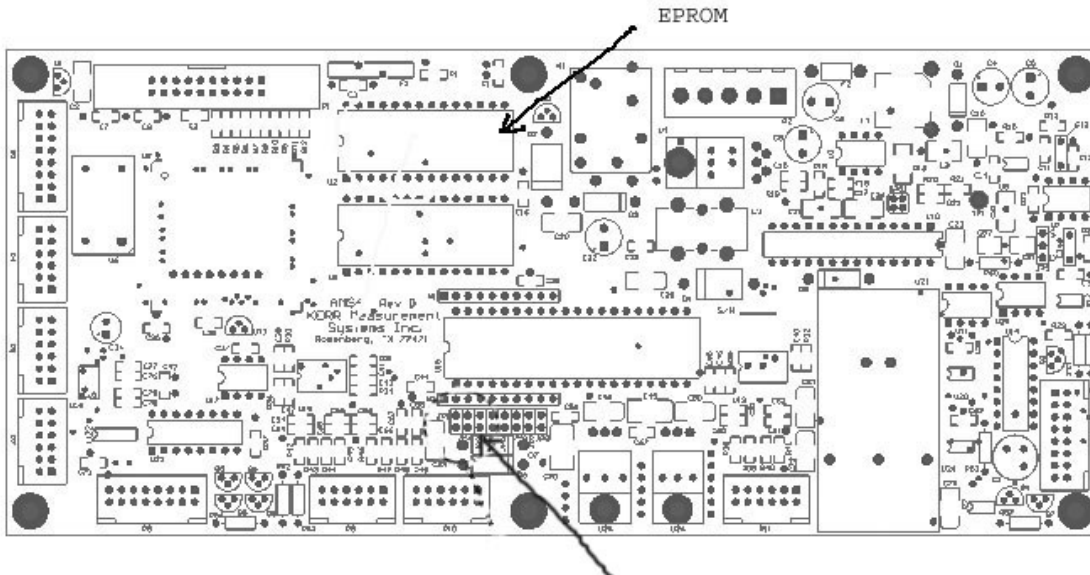


6.7 POWER SUPPLIES



6.8 PROCESSOR BOARD SETTINGS SOFTWARE CHANGES

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



J4 ON = AMS4A063 PANEL
 J4 OFF = AMS4A062/64 PANEL

6.8.1 Software Modification

The software that controls this panel is stored in an EPROM Integrated Circuit located at U2 (see drawing on next page). To upgrade the software to a new version, simply remove the eeprom I.C. and install a new eeprom I.C. (be careful not to bend the legs during installation).

The software can also be modified by downloading a new file directly to the microprocessor using the serial port (refer to section 6.9).

6.8.2 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-CAL buttons simultaneously then turn the power back on while the buttons are depressed. Keep buttons depressed for at least five seconds after power is restored. When the panel is rebooted, all the menu settings will be returned to the default settings. The panel **MUST** always be rebooted after new software has been installed.

6.8.3 TENSION VALUE SETUP FOR SHARK OR HAMMERHEAD

The two primary measuring heads this panel is configured for is the Shark (AMSLA102) and the HammerHead (AMSLA112)

One of the differences between these two heads is the tension range.

The Shark has a range of 0 – 4000 lbs.

The HammerHead has a range of 0 – 10000 lbs.

When Shark is selected from the menu (refer to section 3.12) 1.5vdc signal from the load pin is equal to 4000 lbs. When T-CAL button is depressed, the load pin will return a 1.5v signal and 4000 lbs should be displayed on the tension display.

When HammerHead is selected, a 1.5vdc signal from the load pin is equal to 10000 lbs. When T-CAL button is depressed, the load pin will return a .75v signal and 5000 lbs should be displayed on the tension display.

If 2000 is displayed on the tension display when T-CAL is depressed it is a good indication that the panel is set for Shark but connected to a HammerHead.

If 10000 lbs is displayed on the tension display when T-CAL is depressed it is a good indication that the panel is set for Hammerhead but connected to a Shark.

NOTE: The depth must be set to 0 to be able to read the T-CAL value from the load pin.

6.9 SOFTWARE MODIFICATION USING THE REAR SERIAL PORT

6.9.1 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 PC with a serial port, and a terminal program such as Hyperterminal. Hyperterminal can usually be found under START - ALL PROGRAMS – ACCESSORIES - COMMUNICATIONS,
3. The new revision .HEX file program.

6.9.2 PROCEDURE:

1. Transfer the new revision HEX file to the PC to be used.
2. Turn power on to the Hoistman's panel.
3. Connect your PC to the serial port at the rear of the panel.
4. Open a Hyperterminal session.

Enter any name
Select one of the Icons
Select connect using – COM1

Use the following settings:

Serial Port: COM1
Baud Rate: 57600
Data Bits: 8
Parity: None
Stop Bits: 1
Flow Control: None

5. Set the switches on the CPU PCB to PROGRAM mode as follows:
 - 1 - AWAY FROM CPU
 - 2 - AWAY FROM CPU
 - 3 - TOWARD CPU
6. Open the Hyperterminal connection and then press the keyboard ENTER key. The MicroController ROM Loader will respond with a banner and then a '>' prompt.

6.10 DIGITAL DISPLAY SETUP

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

Two 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 |

6.11 PANEL WIRING DIAGRMS

| | |
|----|---------------------------|
| J1 | 12 - 24 VDC IN |
| J2 | ENCODER IN |
| J3 | OVER TENSION OUT |
| J4 | LOAD CELL IN |
| J5 | ENCODER OUT |
| J6 | RS232 SIGNAL |
| J7 | REMOTE DISPLAY / PRESSURE |
| J8 | TENSION OUT |

| P2 - Screw Terminal Block | | MAIN PC BOARD | | |
|---------------------------|----------------------|---------------|---------------------------|--|
| P2 - 1 | BATT + | RED | P1 - 7 (FUSE BRD), J7 - A | SWITCHED POWER |
| P2 - 2 | BATT - | BLK - B | J1 - B, J7 - B | 12 V GROUND |
| P2 - 3 | CONTACT CLOSURE N.O. | GRN - B | J3 - A | Tension Contact Closure Back Panel |
| P2 - 5 | CONTACT CLOSURE COM | BRN - A | J3 - B | Tension Contact Closure Back Panel |
| | | | | Power Switch - When switch is up the 2 bottom pins should read together - up 0-red 0-red |

| P4 - USER SWITCHES | | | | |
|--------------------|------------------------|-----|-------------|--|
| P4 - 2 | DCM BLK | BLK | | FEET LED, SW4, SW2, SW6, SW5, SW9, SW7, SW8, SW10, |
| P4 - 5 | HI / LO DIFF TEN RANGE | VIO | SW2 N.O. | RANGE SWITCH FOR DIFFERENTIAL TENSION |
| P4 - 6 | METER RESET | GRY | SW4 N.O. | |
| P4 - 7 | T CAL | GRN | SW5A - N.O. | SW5 (DPDT) |
| P4 - 8 | T ZERO | BRN | SW6 N.O. | |
| P4 - 9 | CANCEL DEPTH ALARM | BLU | SW10 N.O | |
| P4 - 10 | ZERO DEPTH | YEL | SW9 N.O. | |
| P4 - 11 | DEPTH ADJ DOWN (+) | WHT | SW7 N.O. DN | Dn Contact of SW7 |

| | | | | |
|---------|------------------|-----|-------------|-------------------|
| P4 - 12 | DEPTH ADJ UP (-) | ORN | SW7 N.O. UP | Up Contact of SW7 |
|---------|------------------|-----|-------------|-------------------|

| P5 - SPARE | | | | |
|------------|------|-----|----------|---------------|
| P5 - 1 | +5V | RED | D1 - 4 | DISPLAY POWER |
| P5 - 2 | MENU | VIO | SW8 N.O. | MENU SELECT |
| P5 -12 | DCM | BLK | D1 - 1 | DISPLAY GND |

| P6 - ANALOG IN/OUT – AMS4A063 PANEL | | | | |
|-------------------------------------|---------------|-----|--------|-----------------------------|
| P6 - 3 | LOAD PIN SIG+ | RED | J4 - A | LOAD PIN SIGNAL+ |
| P6 - 4 | LOAD PIN SIG- | GRN | J4 - E | LOAD PIN SIGNAL- |
| P6 - 6 | LOAD CELL 24V | BLU | J7 - C | 24V TO PRESSURE TRANSDUCERS |
| P6 - 7 | SHUNT CAL | GRN | J4 - F | SHUNT CAL |
| P6 - 8 | ACM | BLK | J4 - B | LOAD PIN COMMON |

| P6 - ANALOG IN/OUT – AMS4A062 PANEL | | | | |
|-------------------------------------|------------------|-----------------|------------------|--|
| P6 - 1 | LOAD PIN POWER + | P1 12 ENCDR BRD | LOAD PIN POWER | |
| P6 - 2 | LOAD PIN POWER - | P1 11 ENCDR BRD | LOAD PIN POWER | |
| P6 - 3 | LOAD PIN SIG+ | J3 E | LOAD PIN SIGNAL+ | |
| P6 - 4 | LOAD PIN SIG- | J3 F | LOAD PIN SIGNAL- | |
| P6 - 7 | SHUNT CAL ENABLE | J3 G | SHUNT CAL | |
| P6 - 8 | ACM | J3 D | LOAD PIN COMMON | |

| P6 - ANALOG IN/OUT - AMS4A064 PANEL | | | | |
|-------------------------------------|------------------|---------------------|--|--------|
| P6 - 5 | 4to20IN | J4 - D | 4 TO 20 TESNION SIGNAL | |
| P6 - 6 | LOAD CELL 24V | P1-10, P1-3 FUS BRD | 2 WIRES, 4 TO 20 MA POWER & REMOTE 24V | |
| P6 - 7 | SHUNT CAL ENABLE | J4-E | SHUNT CAL | |
| P6 - 8 | ACM | J4-B | GND | P6 - 8 |

| | | | | |
|---------|----------------------|-----|-------------|-------------------------------------|
| | | | | |
| P6 - 9 | 4to20OUT | BRN | J8 - N/C | TIE WIRE NEAR J8 BUT DO NOT CONNECT |
| P6 - 10 | ACM | BLK | J8 - GND | TENSION OUT GROUND |
| P6 - 11 | 0-10V OUT (TENSION) | BLU | J8 - CENTER | TENSION OUT |
| P6 -13 | TENSION METER- | VIO | M2- | |
| P6 -14 | TENSION METER+ | ORN | M2+ | |
| P6 - 15 | DIFF TENSION METER - | YEL | M1 - | |
| P6 - 16 | DIFF TENSION METER + | BLU | M1 + | |

| P7 - COMMUNICATIONS | | | | |
|----------------------------|-------------------------|-----|--------------------------------|---|
| P7 - 1 | RS485 TX+ | GRY | J7 | |
| P7 - 2 | RS485 TX- | BLK | J7 | |
| P7 - 3 | RS485RX- | GRN | J7 | |
| P7 - 4 | RS485RX+ | BLU | J7 | |
| P7 - 5 | COM3 TXD | GRN | CARD READER DATA PORT J1 - 2 | |
| P7 - 6 | 5V ENCDR PWR - FUSE BRD | YEL | P1 - 2 FUSE PCB | FUSE BOARD P1-2 |
| P7 - 7 | COM2 TXD | ORN | D1 - 5, D2 - 5, D3 - 5, J7 - D | DISPLAY DATA - THREE WIRES CONNECTED TOGETHER |
| P7 - 8 | COM3 RXD | WHT | J7 - E | PRESSURE SIGNAL IN FROM REMOTE DISPLAY |
| P7 - 9 | GND | BLK | CARD READER DATA PORT J1 - 3 | RS485 GND (2 WIRES) |
| P7 -10 | COM1 TXD | BRN | J6 - 2 | RS232 TRANSMIT |
| P7 - 11 | COM1 RXD | WHT | J6 - 3 | RS232 RECEIVE |
| P7 - 12 | GND | BLK | J6 - 5 | RS232 GND |

| P8 - QUADRATURE OUT / INDICATORS | | | | |
|---|------------|-----|-----------------------------|---|
| P8 - 1 | METRIC LED | BRN | | METRIC LED CATHODE (-) |
| P8 - 2 | ENC_PWR1 | ORN | METRIC LED+ & 6.8VZ Cathode | METRIC LED ANODE & 6.8VZ Cathode 6.8VZ Anode to ENGLISH LED + |

| | | | | |
|---------|------------------|---------------|--------|--|
| P8 - 5 | BEEPER | GRN Beeper | ALM1 - | BEEPER |
| P8 - 6 | ENC_PWR1 | YEL | ALM1 + | BEEPER |
| P8 - 9 | APPROACHING SURF | VIO | SW10 | APPROACHIN SURF LED- +1 (inline with silver plate) |
| P8 - 10 | ENC_PWR1 | BLU | SW10 | APPROACHING SURFACE LED+ -1 (OPPOSITE with silver plate) |
| P8 - 11 | PHASE 1B\ | WHT | J5 - H | ENCODER OUT |
| P8 - 12 | PHASE 1B | GRY | J5 - G | ENCODER OUT |
| P8 - 13 | PHASE 1A\ | ORN | J5 - E | ENCODER OUT |
| P8 - 16 | PHASE 1A | BRN | J5 - D | ENCODER OUT |

| | | | | |
|-----------------------|-----------------------|-----|------------------------|-------------------------------------|
| P9 - ENCODER 1 | | | | |
| P9 - 1 | DCM | BLK | J2 - F | Encoder Ground |
| P9 - 2 | DCM | BLK | J5 - J, J5 - C, J7 - F | DIGITAL GROUND (Encoder + RS232) |
| P9 - 5 | ENCODER PWR - TO FUSE | YEL | P1 -10 FUSE PCB | |
| P9 - 8 | ENCODER 1B | BLU | J2 - B | Encoder input |
| P9 - 9 | ENCODER 1B \ | GRN | J2 - I | Encoder input |
| P9 - 11 | ENCODER 1A | ORN | J2 - A | Encoder input |
| P9 - 12 | ENCODER 1A\ | RED | J2 - H | Encoder input |

| | | | | |
|------------------------|--|-----|--------------------|--------|
| P10 - ENCODER 2 | | | | |
| P10 - 1 | | BLK | CARD READER J3 - 1 | GND |
| P10 - 5 | | WHT | CARD READER J3 - 2 | +12VDC |

| | | | | |
|---------------------------|---------|-----|--------|-----------|
| D1 DISPLAY - DEPTH | | | | |
| D1 - 2 | GND | BLK | D2 - 1 | GND |
| D1 - 6 | +5V OUT | RED | D2 - 4 | POWER OUT |

| D2 DISPLAY - LINE SPEED | | | | |
|--------------------------------|---------|-----|--------|---------|
| D2 - 2 | GND | BLK | D3 - 1 | GND |
| D2 - 6 | +5V OUT | RED | D3 - 4 | +5V OUT |

| POWER SWITCH | | | | |
|---------------------|---------------------|-----|-----------------|--|
| SW1A - NO | MAIN POWER ON/OFF | RED | J1 - A | |
| SW1A - C | WIPER TO FUSE BOARD | RED | FUSE PCB P1 - 1 | |

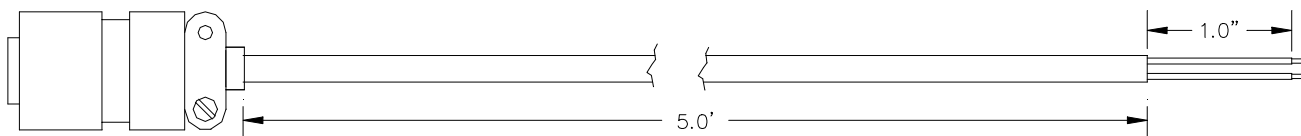
| FUSE BOARD | | | | |
|-------------------|--------------------|-----|--------------------|---------------------------------|
| P1 - 4 | ENCODER1 PWR FUSED | YEL | J2 - D | FUSED LOAD CELL POWER OUT (24V) |
| P1 - 12 | 12VDC (FUSED) | RED | J4 - C, SW5B - COM | LOAD PIN EXCITATION |

| SWITCH 5 (DPDT PUSH BUTTON) | | | | |
|------------------------------------|----------------------|-----|--------|--------------------|
| SW5B - NO | 12 VDC POWER (FUSED) | RED | J4 - G | SHUNT CAL (12 VDC) |

| J2 - CARD READER | | | | |
|-------------------------|--|-----|-----------------------------|----------|
| J2 - 1 | | BRN | DB9F - 2 ON THE FRONT PANEL | RS232 RX |
| J2 - 2 | | WHT | DB9F - 3 ON THE FRONT PANEL | RS232 TX |
| J2 - 3 | | BLK | DB9F - 5 ON THE FRONT PANEL | GND |

7.0 CABLE DRAWINGS AND PARTS LISTS

7.1 AMS7A022 CABLE ASSEMBLY – DC POWER IN

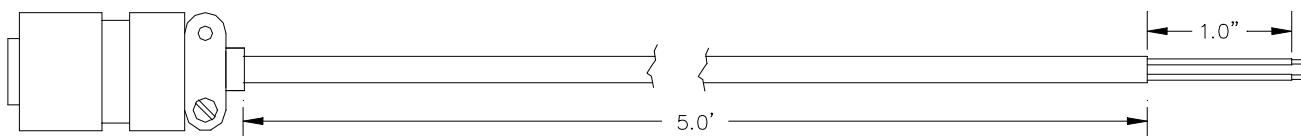


A – WHITE
 B – BLACK

A = +
 B = -

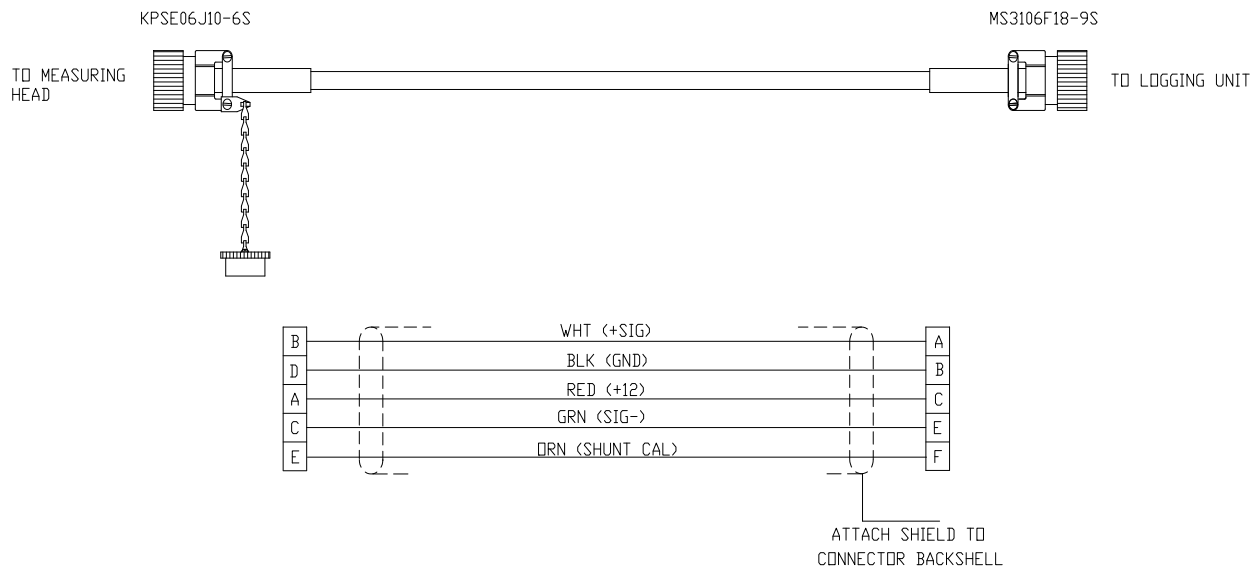
| P/N | Description | Qty |
|----------|--------------------------------|------|
| AMS7P061 | CABLE 16-2 SJ CORD BELDEN 8472 | 5 FT |
| AMS7P044 | CONN MS3106E-14S-9S | 1 EA |
| AMS7P063 | BUSHING #9779-513-6 AMPHENOL | 1 EA |

7.2 AMS7A023 CABLE ASSEMBLY – OT SHUTDOWN



| P/N | Description | Qty |
|----------|--------------------------------|------|
| AMS7P061 | CABLE 16-2 SJ CORD BELDEN 8472 | 5 FT |
| AMS7P045 | CONN MS3106E-14S-9P | 1 EA |
| AMS7P063 | BUSHING #9779-513-6 AMPHENOL | 1 EA |

7.3 AMS4A353 2mv / v CABLE ASSEMBLY – LOAD PIN



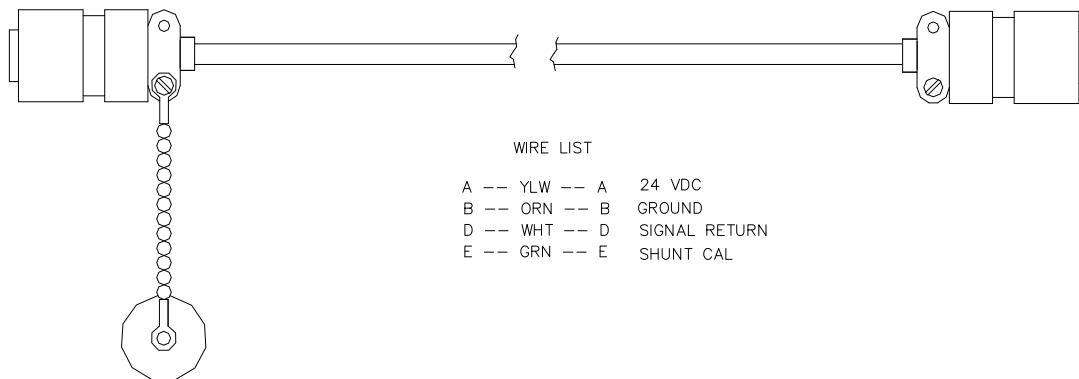
| P/N | Description | Qty | |
|----------|-------------------------------|-----|----|
| AMS4P266 | CONN KPSE06J10-6S STR PLUG | 1 | EA |
| AMS7P014 | CONN MS3106F-18-9S LOAD CELL | 1 | EA |
| AMS4P221 | CABLE 20/8C ALPHA 25468 BLACK | 20 | FT |
| AMS4P209 | TUBING SHRINK 0.75 ADH LINED | 1 | IN |
| AM5KP059 | DUST CAP KPT8010C CANNON | 1 | EA |
| AMS7P063 | BUSHING #9779-513-6 AMPHENOL | 1 | EA |
| ACMU1P89 | TUBING SHRINK 1.50 ADH LINED | 1 | EA |
| C276P318 | TERMINAL #RA18-6 #6 RING | 1 | EA |

7.4 AMS8A024 1.5v DIFFERENTIAL TENSION CABLE ASSEMBLY – LOAD PIN



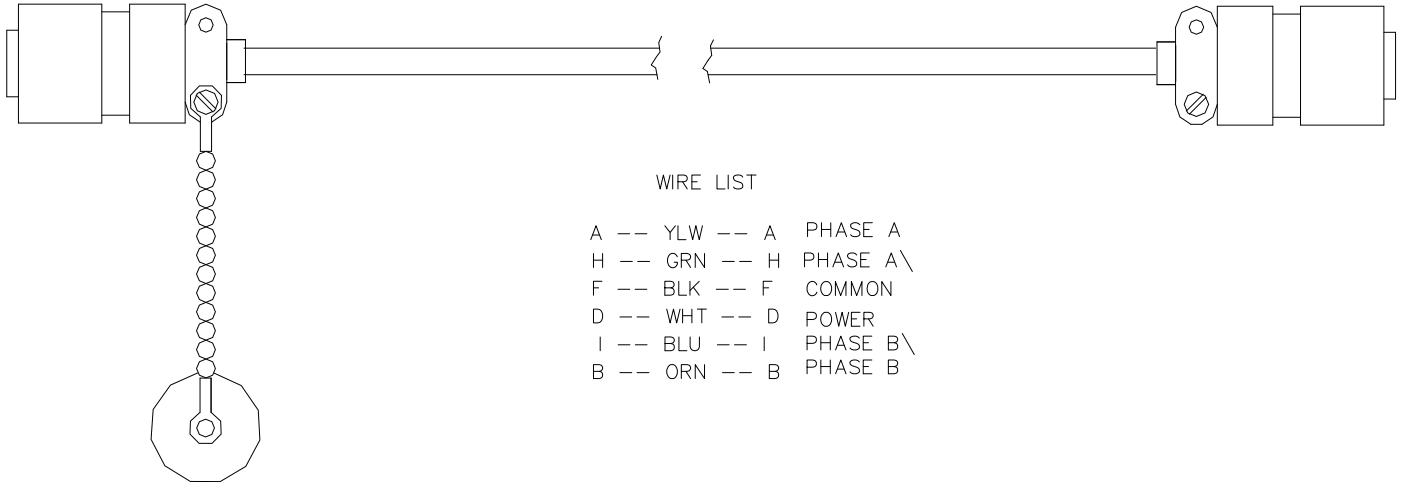
| P/N | Description | Qty | Ref |
|------------|--|------------|------------|
| AMS4P221 | CABLE 20/8C ALPHA 25468 BLACK SHIELDED | 20 FT | |
| AMS8P057 | CONN KPT06A16-8S STR PLUG | 1 EA | PIN END |
| AMS7P014 | CONN MS3106E-18-9S LOAD PIN | 1 EA | PNL END |
| AMS8P060 | DUST CAP CANNON SHELL SIZE 16 | 1 EA | |

7.5 AMS7A031 4-20MA CABLE ASSEMBLY – LOAD PIN



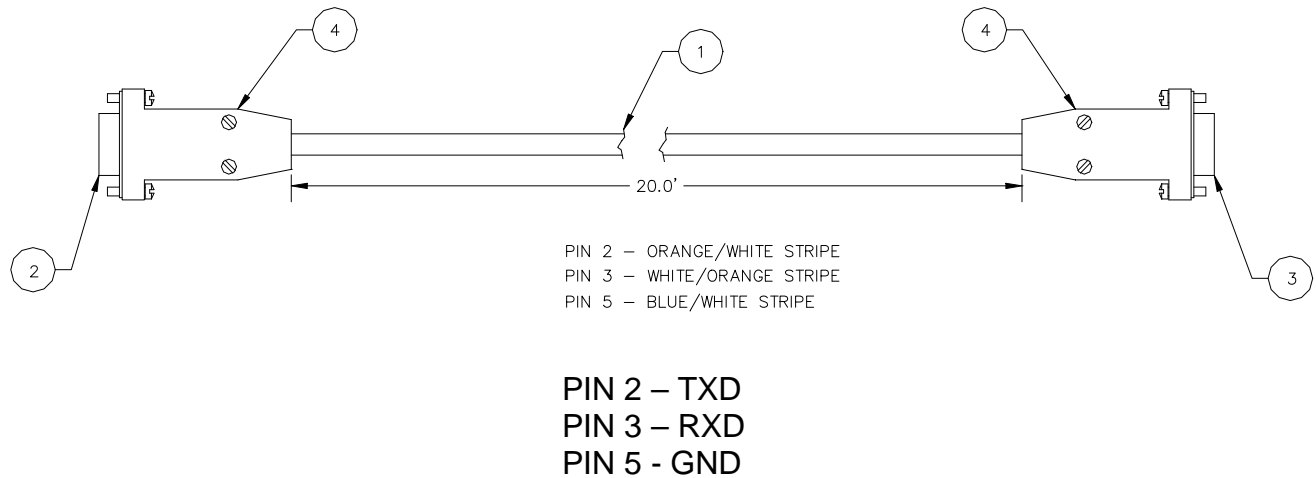
| P/N | Description | Qty | |
|------------|-------------------------------|------------|----|
| AMS7P014 | CONN MS3106F-18-9S LOAD CELL | 2 | EA |
| AMS1P029 | DUST CAP MS25042-18DA | 1 | EA |
| AMS7P063 | BUSHING #9779-513-6 AMPHENOL | 4 | EA |
| AMS7P064 | BUSHING #9779-513-8 AMPHENOL | 2 | EA |
| ACMU2P23 | BUSHING #9779-513-10 AMPHENOL | 2 | EA |
| AMS4P221 | CABLE 20/8C ALPHA 25468 BLACK | 20 | FT |

7.6 AMS4A125 CABLE ASSEMBLY - ENCODER



| P/N | Description | Qty |
|------------|--|------------|
| AMS1P028 | CONN MS3106E-18-1S | 2 EA |
| AMS1P029 | DUST CAP MS25042-18DA | 1 EA |
| AMS4P221 | CABLE 20/8C ALPHA 25468 BLACK SHIELDED | 20 FT |

7.7 AMS7A024 CABLE ASSEMBLY – RS232



| P/N | Description | Qty |
|----------|---------------------------|-------|
| AMS7P062 | CABLE 24/2P STNDED PE/PVC | 20 FT |
| AMS7P016 | CONN DE-9P | 1 EA |
| AMS7P015 | CONN DE-9S | 1 EA |
| AMS7P067 | CONNECTOR AMP CABLE CLAMP | 2 EA |