BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton, Texas 77476
Phone: 281.342.6415
Fax: 281.342.4848
benchmarkwireline.com

OPERATIONS AND MAINTENANCE MANUAL
WIRELINE WINCH OPERATORS PANEL

Kerr p/n AMS4A067

TABLE OF CONTENTS

BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton, Texas 77476
Phone: 281.342.6415
Fax: 281.342.4848
benchmarkwireline.com

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 and internal battery backed up memory device. When power is applied, the last "Depth" is displayed.

BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton, Texas 77476
Phone: 281.342.6415
Fax: 281.342.4848
benchmarkwireline.com

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.

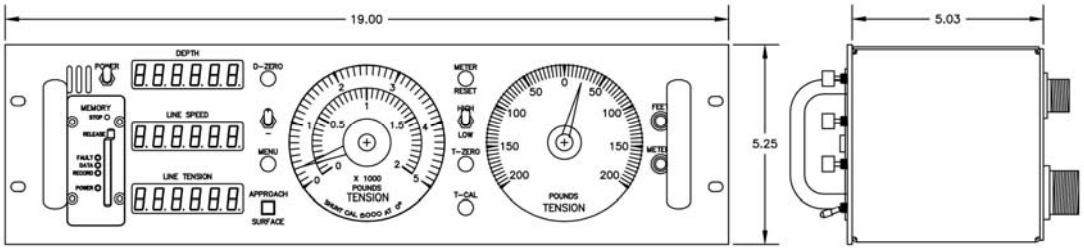
-- Depth & tension saved in non-volatile memory at power loss

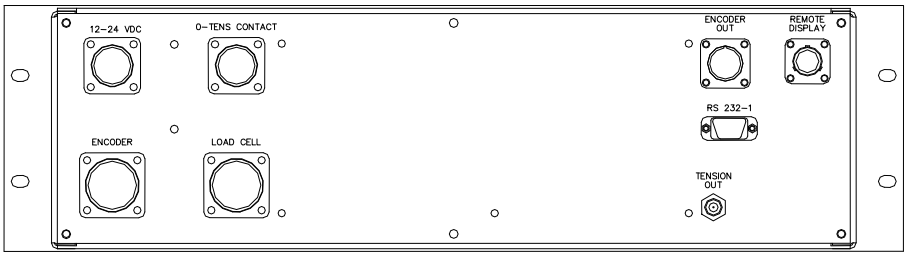
-- RS232 Interface for additional control and data outputs.

-- 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

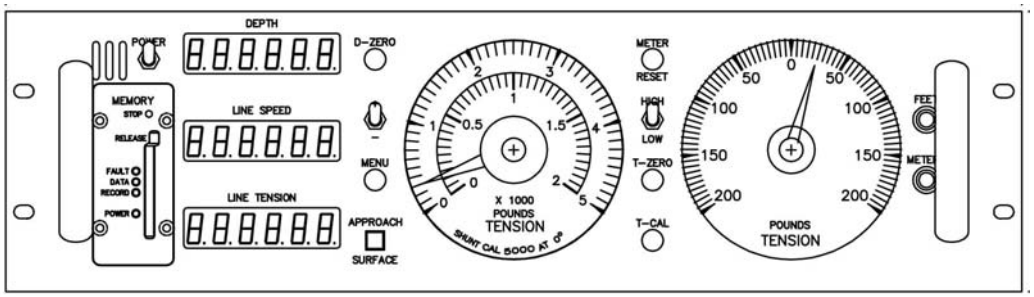




1.3.1	TEMPERATURE RATING	-20 to 140
1.3.2	POWER SUPPLY	9 – 30 VDC @ 2 AMP MAX
1.3.3	MAXIMUM LINE SPEED	3000 FT/MIN @ 600 PULSES/FT
1.3.4	MINIMUM LINE SPEED	.6 FT / MINUTE
1.3.5	MAXIMUM LINE TENSION	8000 LBS
1.3.6	DIGITAL TENSION	6 DIGITS WITH 1 LB OR 1KG RESOLUTION
1.3.7	DIGITAL LINE SPEED	6 DIGITS WITH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

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 Mega Mouth or AM3K. 10000 lb will be displayed if the panel is set for AM5K.

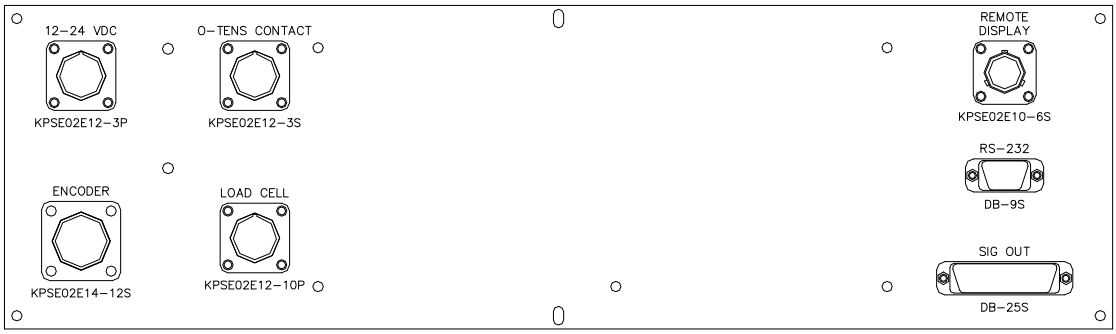
Refer to section 6.8.3 for more information.

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.

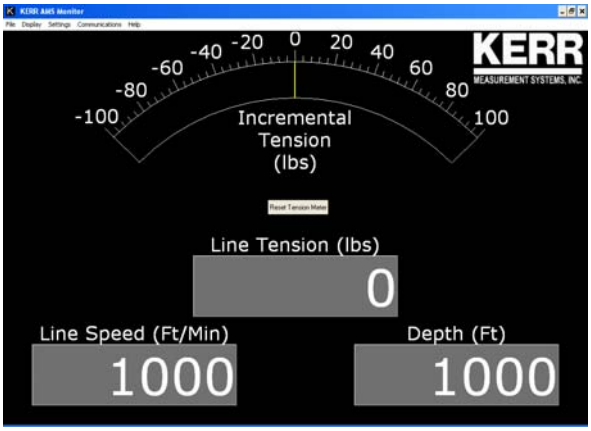
2.2.7 TENSION OUTPUT

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 Kerr Measurement Systems 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

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 of 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

3.12 HEAD TYPE

Five options are available:

SHARK SLICK LINE HEAD
MEGAMOUTH SLICK LINE / BRAIDED LINE HEAD
AM3K BRAIDED LINE / E LINE HEAD
AM5K BRAIDED LINE / E LINE HEAD
OTHER

The selection determines the measuring wheel size used in depth calculation.

MEGA MOUTH AND SHARK = 15.153

AM3K = 7.639” (194 mm) diameter wheel (2.0’ circumference) + line diameter

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 lbs.

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 (hhmmss.ss
UNITS (E=English, M=Metric)
DIRECTION (U=Up, D=Down, S=Stopped)
DEPTH nnnnn.n
SPEED nnnn.n
TENSION nnnnnn
PRESSURE 1 nnnn (if REC_PR is enabled – refer to page 16)
PRESSURE 2 nnnn (if REC_PR is enabled – refer to page 16)

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

See following example

```
20091202  151415.00 E S + 41.7 0.0 2317
20091202  151416.00 E S + 42.7 0.0 2317
20091202  151417.00 E S + 43.7 0.0 2317
20091202  151418.00 E S + 44.7 0.0 2317
20091202  151419.00 E S + 45.7 0.0 2317
20091202  151420.00 E S + 52.1 0.0 2317
20091202  151555.00 E S + 57.1 0.0 2317
20091202  151556.00 E S + 57.6 0.0 2317 0 0
20091202  151557.00 E S + 57.7 0.0 2317 0 0
20091202  151558.00 E S + 58.7 0.0 2317 0 0
20091202  151559.00 E S + 59.7 0.0 2317 0 0
20091202  151600.00 E S + 60.7 0.0 2317 0 0
20091202  151601.00 E S + 61.7 0.0 2317 0 0
20091202  151616.00 E S + 64.7 0.0 2317 0 0
```

4.2.2 DATA RECORD

Data is written to the board 1 time 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, the panel can be set (see 3.1) to write data only 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 panel can also be set to write data continuously so that no interpolation is necessary. This is recommend when if you want to correlate surface depth and tension readings with memory gauge readings.

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.

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. 2 GB is the minimum recommended size.

4.2.5 SETTING RECORDER PARAMETERS

To set the parameters, connect a serial cable to the DB9 port on the front 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	19,200
BITS	8
PARITY	N
STOP	1
HANDSHAKING	NONE

When everything is set up, turn the panel power off then back on. At this time you will be given the opportunity to set the parameters by pressing any key. If no key stroke is detected during the panel bootup process the data recorder will enter the record mode.

In record mode, the same data that is written onto the CF card will also be written to the serial port.

If a keystroke is detected, you will be prompted to enter the unit number. This number can represent the hoist unit or well or other designator. The previously entered unit number will be displayed and if a new number is not entered it will remain.

Next you will be prompted to enter s to set time or rtn to keep the current time. If s is pressed:

Enter the day: 1 – 7 where 1 = Sun and 7 = Sat

To set the year, first enter the tens digit then enter the ones digit (i.e. for 2006 first enter 0 then 6).

To set the month, first enter the tens digit then enter the ones digit (i.e. for Dec. first enter 1 then 2, for Jan. first enter 0 then 1).

To set the day, first enter the tens digit then enter the ones digit (i.e. for the 15th first enter 1 then 5, for the 5th first enter 0 then 5).

To set the hours (24 hour format), enter 0 for 12:00AM to 9:00, 1 for 10:00 to 19:00, 2 for 20:00 to 23:00. Next enter actual hour (i.e. to set the hour to 17:00 first enter 1 then next enter 7, to set the hour to 09:00 first enter 0 then next enter 9).

To set the minutes, first enter the tens digit then enter the ones digit (i.e. for 21 minutes past the hour first enter 2 then 1, for 9 minutes past the hour first enter 0 then 9). Seconds are set in the same manner.

At this time the system is ready to record data.

4.3 PANEL CONTROL & OPERATION USING REAR 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

*** AMS4A067 Help Screen ***

```
H,? - This screen.
D   - Display units, direction, depth, speed, and tension.
P   - Modify encoder pulses/revolution. Usage: P600
V   - Verify AMS4A067 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

```
* * * AMS4A067 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 Zddddd.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

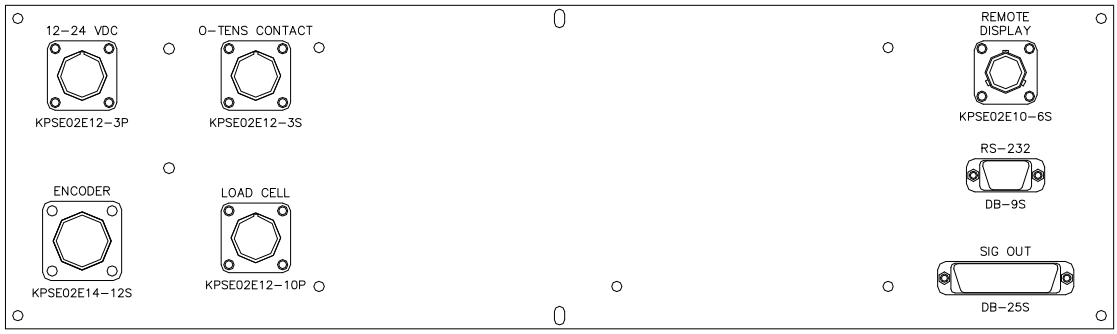
AMS4A067 PANEL WINCH OPERATOR DISPLAY PANEL

SW-6700XX	SOFTWARE FOR THE AMS4A067	1	EA	
AMS4P134E	PC BOARD AMS40 REV E W/2xRS232	1	EA	
AMS7P080	METER DIFF TENSION	1	EA	
AMS7P081	METER TENSION POUND DUAL SCALE	1	EA	
AMS4P128	DISPLAY LED RED 0.5" 14 SEGMNT	3	EA	
ACMU1P06	LED RED DIALIGHT 5V	1	EA	METRIC
AMS4P211	SONALERT PS-580 MALLORY	1	EA	
AMS4P028	SWITCH DPDT TOGGLE LOCKING	1	EA	POWER
AMS4P020	SWITCH SPDT TOGGLE LOCKING	1	EA	METER HI/LO
AMS4P018	SWITCH SPDT PUSH MOM MPA-106F	5	EA	
AMS4P044	SWITCH DPDT TOGGLE MOM OFF MOM	1	EA	+ / -
AMS4P021	SWITCH CAP ALCO C-22 BLACK	4	EA	
AMS7P017	SWITCH CAP ALCO C-22 RED	1	EA	
AMS7P021	CONN 102398-4 AMP 12 POS PCB	11	EA	40 BRD
AMS7P023	CONN 102536-4 AMP 12 POS BACK	11	EA	40 BRD
AMS7P024	CONN 102681-1 AMP 12 POS FRONT	11	EA	40 BRD
AMS7P026	CONN 102536-6 AMP 16 POS BACK	2	EA	40 BRD
AMS7P022	CONN 102398-6 AMP 16 POS PCB	2	EA	40 BRD
AMS7P025	CONN 102681-3 AMP 16 POS FRONT	2	EA	40 BRD
AMS4P170	CONN KPSE02E12-10P RECEPTACLE	1	EA	J4 - LOAD PIN IN
AMS4P264	CONN KPSE02E10-6S RECEPTACLE	1	EA	J7 - REMOTE DISPLAY
AMS7P068	SCREW JACK D-CONNECTOR KEYSTON	4	EA	
AMS4P169	CONN KPSE02E12-3P RECEPTACLE	1	EA	J1 - POWER IN
AMS4P179	CONN KPSE02E12-3S RECEPTACLE	1	EA	J3 - HOIST SHUTDOWN
AMS4P164	CONN DB9S CRIMP AMP	1	EA	J6 - RS232 REAR
AMS4P172	CONN KPSE02E14-12S RECEPTACLE	1	EA	J2 - ENCODER IN
AMS4P198	SPACER UNTHREADED RND NYLON #4	12	EA	
AMS4M076	WINDOW LED RECESSED SERIAL	3	EA	
F244889000	HANDLE OVAL 1-1/2 X 3 AL	2	EA	
AMS4P168	SOCKET AMP M39029/63-368 USED	9	EA	
C276P165	FERRULE 18 AWG WHITE ALTECH	21	EA	
AMS4M063	PANEL FRONT SLICKLINE OP PNL	1	EA	
AMS4M172	PANEL REAR SLICKLINE W SIG OUT	1	EA	
AMS4M062	PANEL TOP WINCH OP SLICKLINE	1	EA	
AMS4M061	CHASSIS WINCH OP PNL SLICKLINE	1	EA	
AMS4P167	PIN AMP M39029/64-369 USED	9	EA	
AMS4A166	ASSY MEM CARD FCB COMP FLASH	1	EA	DATA RECORDER
C276P152	LED GREEN DIALIGHT 12V	1	EA	ENGLISH

AMS4P041	SWITCH SPST PB NO MOM LIGHTED	1	EA	APPROACHING SURFACE
AMS4P042	LENS RED C&K SWITCH	1	EA	
AMS4P043	LED RED FOR C&K PUSHBUTTON SW	1	EA	
AMS4A102	PCB ASSY FUSE BOARD	1	EA	
C276P402	DIODE ZENER 6.8V 5W 1N5342B	1	EA	
AMS4P166	CONN DB25S CRIMP AMP USED WITH	1	EA	SIGNAL OUT
AMS4A204	PCB ASSY IN CIRCUIT PROGRAMMG	1	EA	40 BRD PROCESSOR
FSU1P026	NUTPLATE SHELL 10 4-40	1	EA	
FSU1P027	NUTPLATE SHELL 12 4-40	3	EA	
FSU1P028	NUTPLATE SHELL 14 4-40	1	EA	
AMS4P438	CONN 50-57-9002 MOLEX SHS 2CKT	1	EA	
AMS4P446	CONN 16-02-0097 CRIMP TERMINAL	5	EA	
AMS4P439	CONN 50-57-9003 SNGL RW 3CKT P	1	EA	

6.0 CONNECTOR PINOUTS AND PANEL WIRING DIAGRAMS

6.1 BACK PANEL CONNECTOR PINOUT

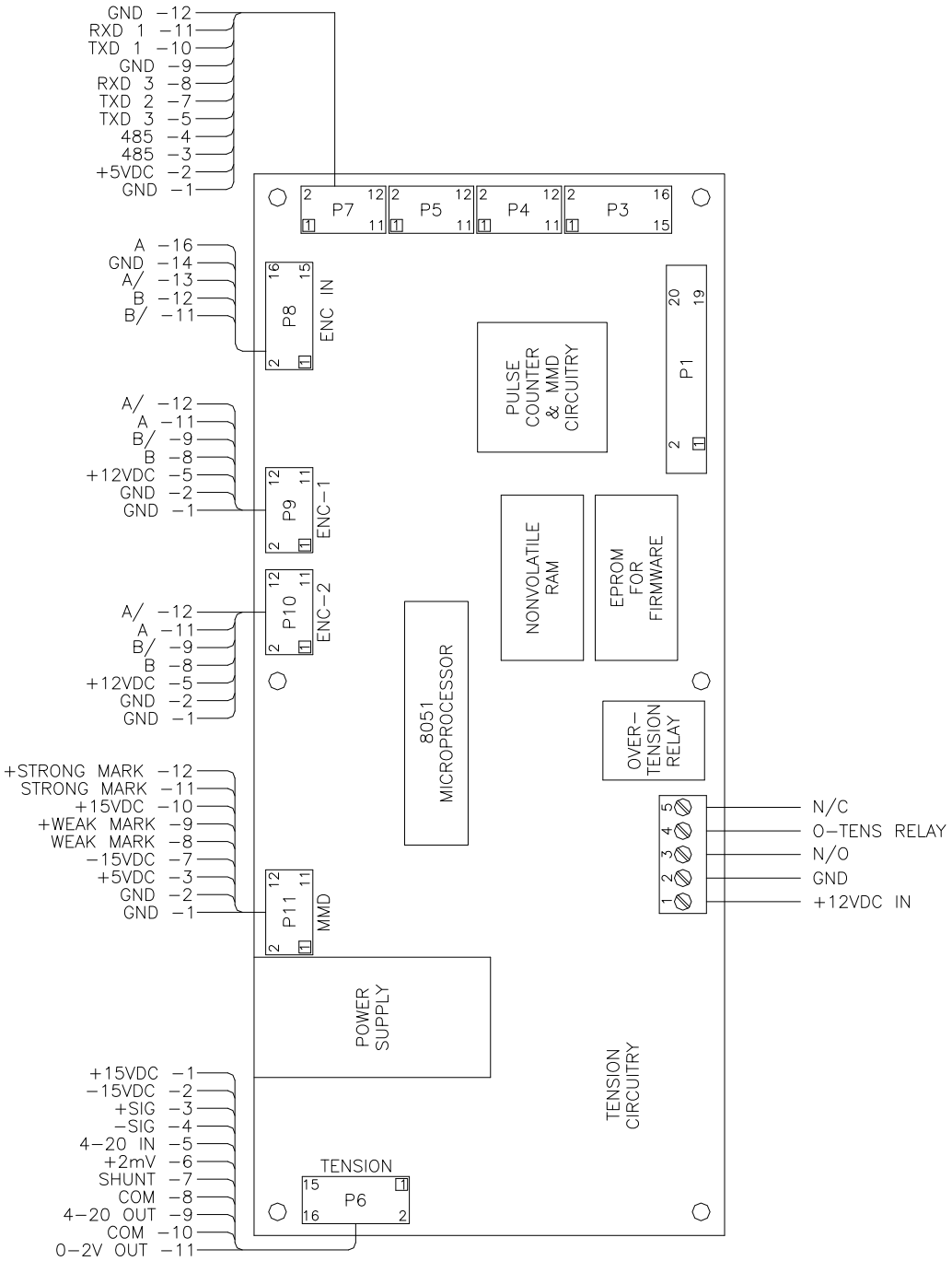


INPUT/OUTPUT CONNECTORS	
J1	12 - 24 VDC IN
J2	ENCODER IN
J3	OVER TENSION OUT
J4	LOAD CELL IN
J5	REMOTE DISPLAY / PRESSURE
J6	RS232 SIGNAL
J7	SIG OUT
J8	RS232 ON THE FRONT PANEL

J1-A	12VDC POWER IN
J1-B	12VDC POWER GROUND
J2-A	ENCODER 1A
J2-B	ENCODER 1B
J2-C	ENCODER 1A NOT
J2-E	ENCODER 1B NOT
J2-J	ENCODER POWER
J2-L	ENCODER GROUND
J3-A	HOIST SHUTDOWN CONTACT CLOSURE
J3-B	HOIST SHUTDOWN CONTACT CLOSURE
J4-A	SIGNAL IN+
J4-B	LOAD PIN GROUND/EXCITE –
J4-C	+12V LOAD PIN EXCITATION
J4-E	SIGNAL IN -
J4-G	SHUNT CAL
J7-15	ENCODER OUT PHASE B\
J7-3	ENCODER OUT PHASE B
J7-14	ENCODER OUT PHASE A\
J7-16	ENCODER OUT PHASE A
J7-13	ENCODER OUT GROUND
J7-12	4-20MA TENSION OUT
J7-21	TENSION OUT GROUND
J7-9	0-10VDC TENSION OUT

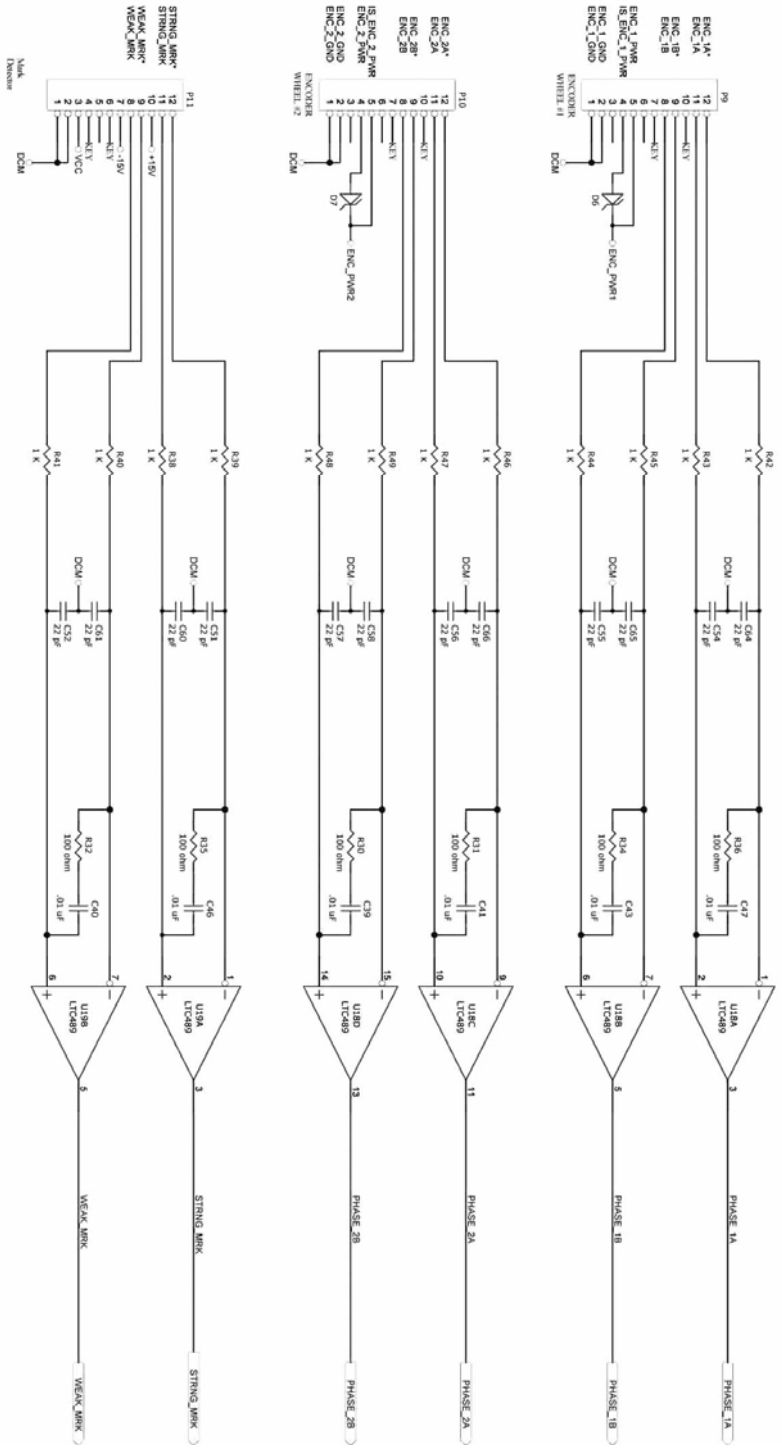
J6-2	COM1 RS232 TXD
J6-3	COM1 RS232 RXD
J6-5	GND
J5-A	12V POWER (SWITCHED)
J5-B	12V GROUND
J5-C	24V POWER TO REMOTE DISPLAY
J5-D	COM2 TXD
J5-E	PRESSURE SIG FROM REMOTE DISPLAY
J5-F	DIGITAL GROUND

6.2 INTERNAL PROCESSOR BOARD PINOUT



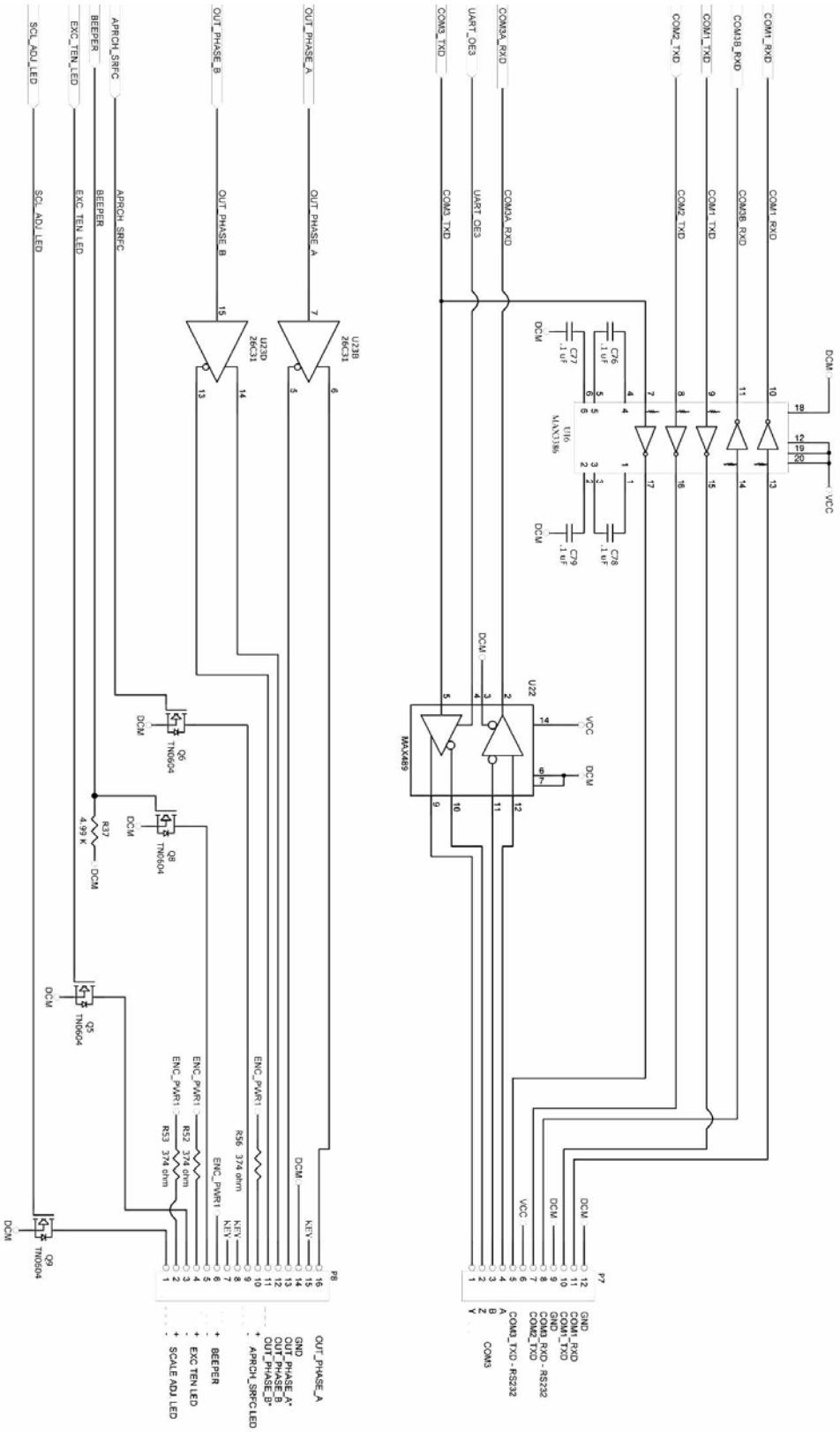
BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton, Texas 77476
Phone: 281.342.6415
Fax: 281.342.4848
benchmarkwireline.com

6.3 ENCODER AND MMD INPUTS



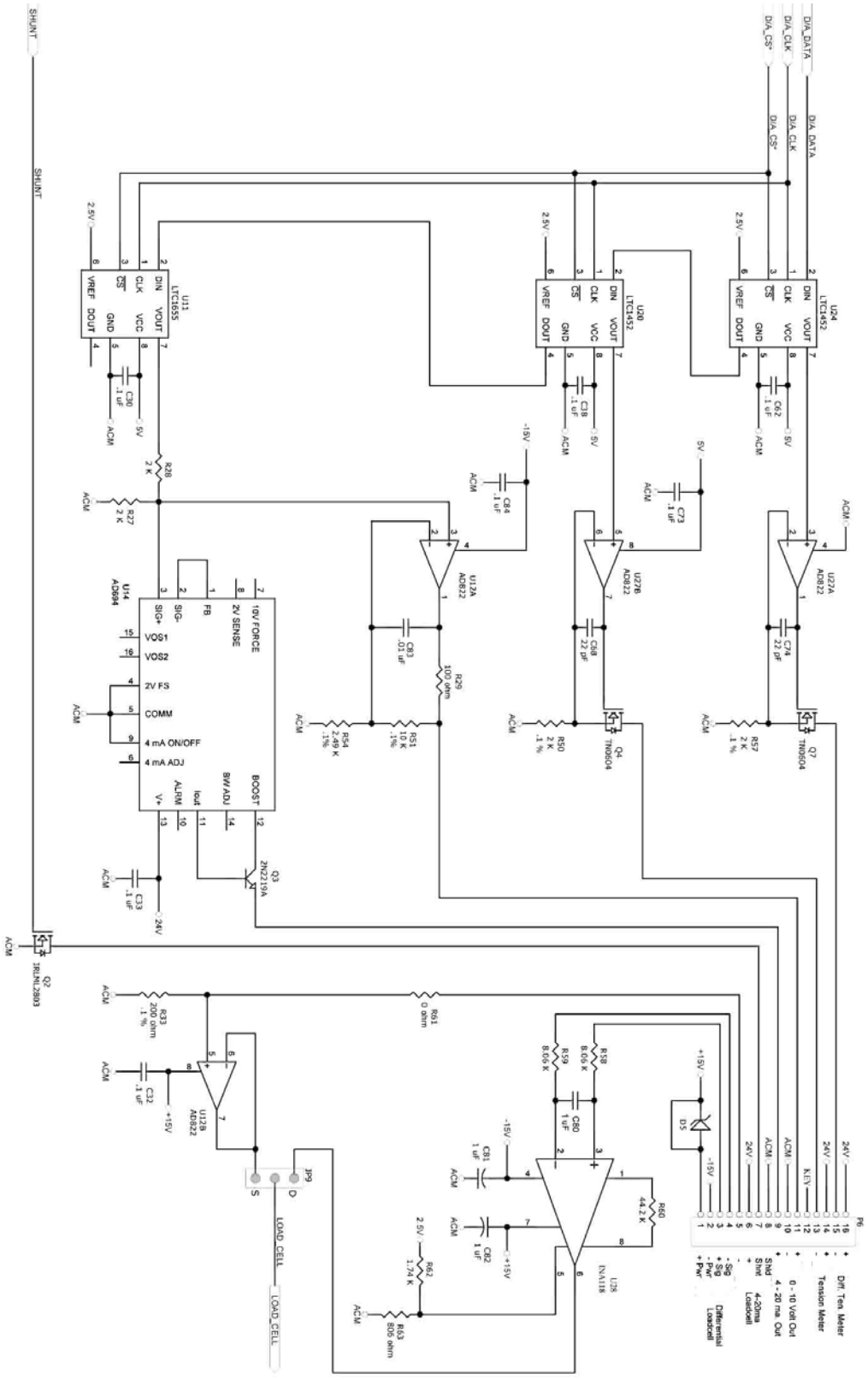
BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton, Texas 77476
Phone: 281.342.6415
Fax: 281.342.4848
benchmarkwireline.com

6.4 ENCODER OUTPUT AND COM PORT I/O



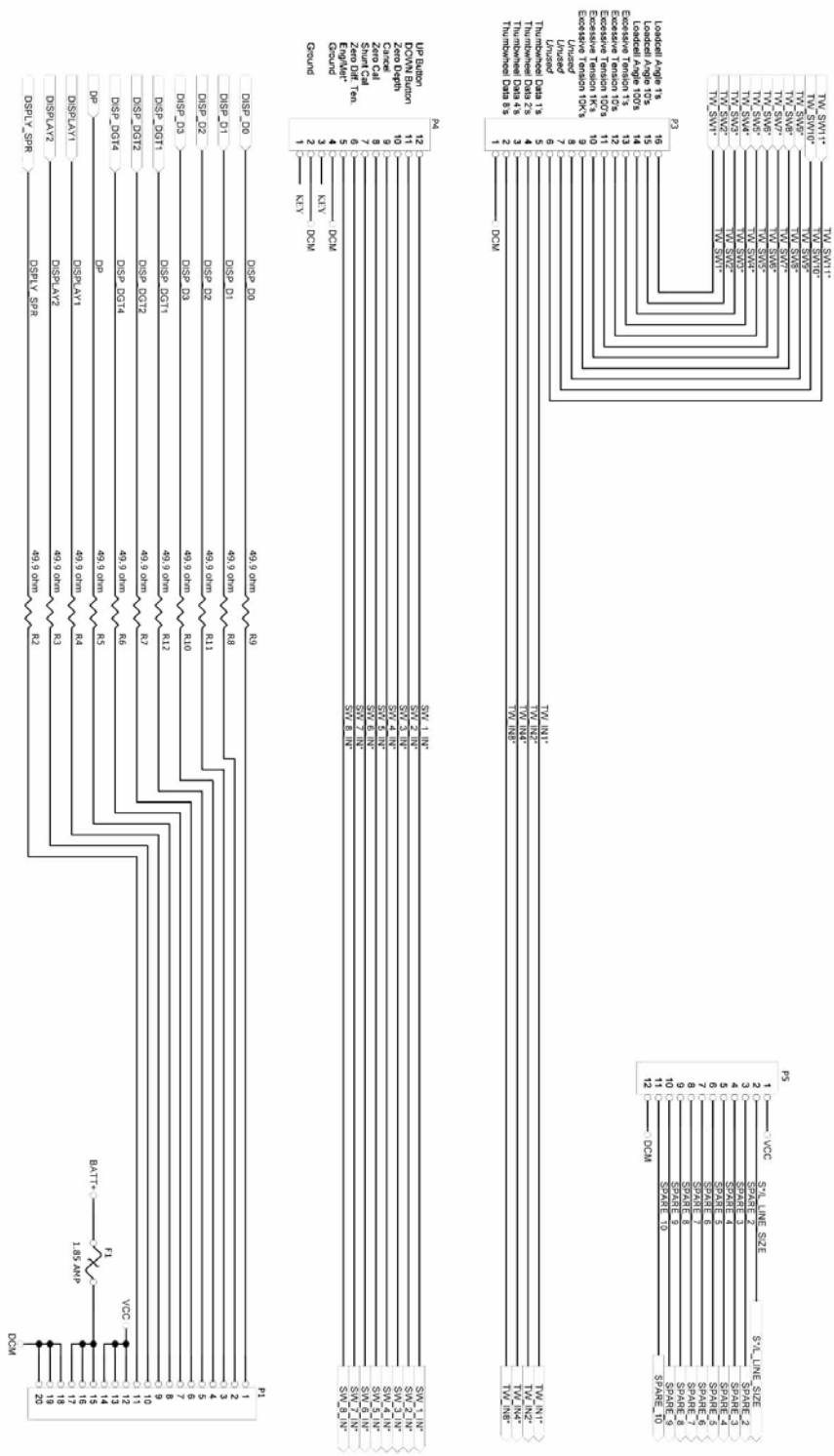
BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton, Texas 77476
Phone: 281.342.6415
Fax: 281.342.4848
benchmarkwireline.com

6.5 LOAD PIN AND TENSION I/O



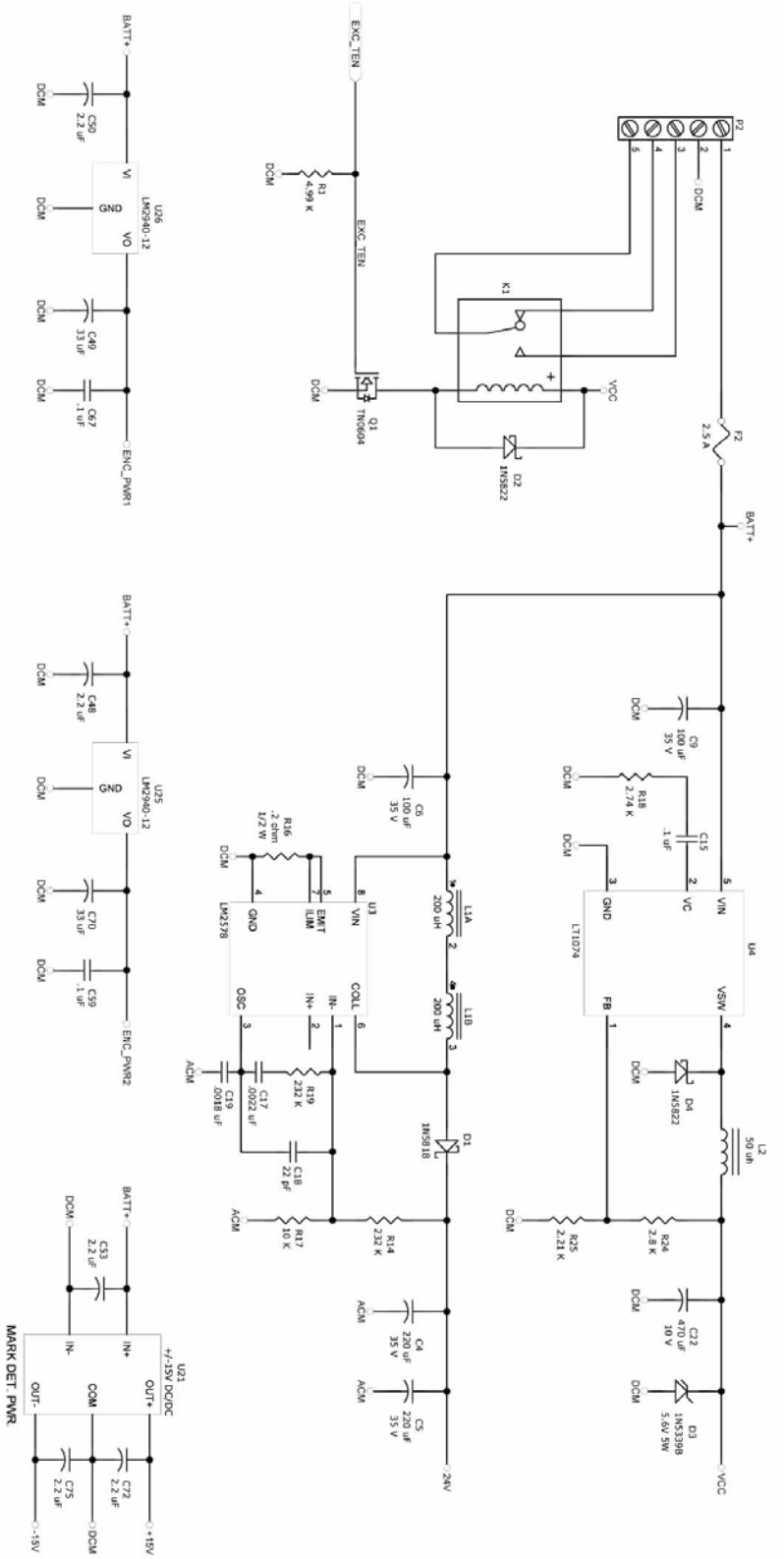
BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton, Texas 77476
Phone: 281.342.6415
Fax: 281.342.4848
benchmarkwireline.com

6.6 JUMPERS – BUTTONS



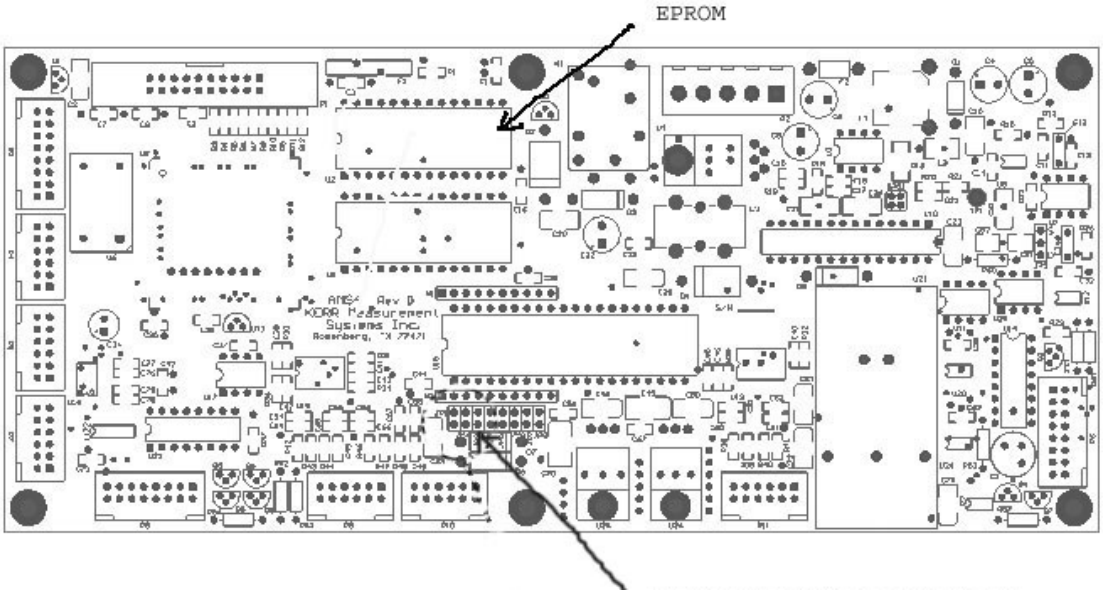
BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton, Texas 77476
Phone: 281.342.6415
Fax: 281.342.4848
benchmarkwireline.com

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.



Jumper J3 off = amplified load pin
Jumper J3 on = un amplified load pin

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 eprom I.C. and install a new eprom 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). The latest software as of the writing of this manual is 670005.

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.

6.9 SOFTWARE MODIFICATION USING THE REAR SERIAL PORT

6.9.1 PREREQUISITES:

1. A PC with a serial port, and a terminal program such as Hyperterminal. Hyperterminal can usually be found under START - ALL PROGRAMS – ACCESSORIES - COMMUNICATIONS,

2. 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.

7. Type an uppercase 'K' and the ROM Loader will Klean-erase the Flash.

8. Type an uppercase 'L' and the ROM Loader will wait to Load a HEX file.

BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton, Texas 77476
Phone: 281.342.6415
Fax: 281.342.4848
benchmarkwireline.com

9. Pull down the Hyperterminal TRANSFER menu and choose: Send Text File. The file browser will open, so ensure that the file filter is set to: Files of type - All files (*.*) and then go to the PC and choose the new revision HEX file to transfer.

10. The ROM Loader will begin programming the Flash and will report a GOOD status for the duration of the programming procedure as follows:
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
GGGGGGGGGGGGGGGGGGG

11. After the ROM Loader is finished programming the Flash set the switches on the CPU piggy-back PCB as follows:

    1 - TOWARD CPU
    2 - TOWARD CPU
    3 - AWAY FROM CPU

12. To operate from an EPROM instead of the Micro-Controllers internal memory, set the switches on the CPU piggy-back PCB as follows:

    1 - TOWARD CPU
    2 – TOWARD CPU
    3 - TOWARD CPU

13. REBOOT THE PANEL AT THIS TIME (refer to section 6.8.2)

6.10 DIGITAL DISPLAY SETUP

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

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. Range is 0(dim) to 15 (bright)

6.11 PANEL WIRING DIAGRMS

CONNECTORS				
J1	12 - 24 VDC IN			
J2	ENCODER IN			
J3	OVER TENSION OUT			
J4	LOAD CELL IN			
J5	REMOTE DISPLAY / PRESSURE			
J6	RS232 SIGNAL			
J7	SIG OUT			
J8	RS232 ON THE FRONT PANEL			
P2 - Screw Terminal Block		**MAIN PC BOARD**		
P2 - 1	BATT +	WHT	P1 - 7 (FUSE BRD), J5 - A	2 WIRES FROM P1 - 7 TO P2 - 1 AND J5 - A
P2 - 2	BATT -	BLK	J1-B(18), J5 - B(22)	12 V GROUND
P2 - 3	CONTACT CLOSURE N.O.	GRN	J3 - A	Tension Contact Closure Back Panel
P2 - 5	CONTACT CLOSURE COM	BRN	J3 - B	Tension Contact Closure Back Panel
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	SW5 N.O.	
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 (+)	GRY	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				
P6 - 3	LOAD PIN SIG+	ORN	J4 - A	LOAD PIN SIGNAL+
P6 - 4	LOAD PIN SIG-	GRN	J4 - E	LOAD PIN SIGNAL-
P6 - 7	SHUNT CAL	GRN	J4 - G	SHUNT CAL
P6 - 8	ACM	BLK	J4 - B	LOAD PIN COMMON
P6 - 9	4 to 20MA OUT	BRN	J7 - 12	
P6 - 10	ACM	BLK	J7 - 21	TENSION OUT GND

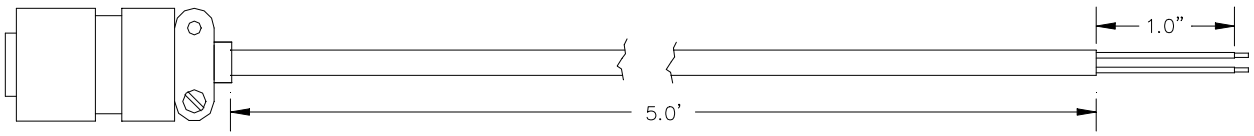
P6 - 11	0-10V OUT (TENSION)	BLU	J7 - 9	TENSION OUT (0-10V)
P6-13	TENSION METER-	VIO	M2-	
P6-14	TENSION METER+	ORN	M2+	
P6 - 15	DIFF TENSION METER -	YEL	M1 -	
P6 - 16	DIFF TENSION METER +	BLU	M1 +	
P7 - COMMUNICATIONS				
P7 - 1	RS485 TX+	GRY	J5 - NC	TIE BACK DO NOT CONNECT
P7 - 2	RS485 TX-	BLK	J5 - NC	TIE BACK DO NOT CONNECT
P7 - 3	RS485RX-	GRN	J5 - NC	TIE BACK DO NOT CONNECT
P7 - 4	RS485RX+	BLU	J5 -NC	TIE BACK DO NOT CONNECT
P7 - 5	COM3 TXD	GRN	CARD READER DATA PORT J1 - 2	DATA
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, J5 - D	DISPLAY DATA - FOUR WIRES CONNECTED TOGETHER (J5 - D press commands)
P7 - 8	COM3 RXD	GRY	J5 - E	PRESSURE SIGNAL IN FROM REMOTE DISPLAY
P7 - 9	GND	BLK	CARD READER DATA PORT J1 - 3	GND
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_PWR	ORN	METRIC LED+ & 6.8VZKathode	METRIC LED ANODE & 6.8VZ Cathode 6.8VZ Anode to ENGLISH LED +
P8 - 3	RLCTRL	BLU	FUSE BRD P2-8	SOFT SHUTDOWN CONTROL
P8 - 4	RLCTRL	ORN	FUSE BRD P2-7	SOFT SHUTDOWN CONTROL
P8 - 5	BEEPER	GRN	ALM1 -	BEEPER
P8 - 6		YEL	ALM1 +	BEEPER
P8 - 9	APPROACHING SURFACE	VIO	SW 10	APPROACHIN SURF LED- +1 (inline with silver plate)
P8 - 10	ENC_PWR1	BLU	SW 10	APPROACHIN SURF LED -1 (opposite silver plate)
P8 - 11	PHASE 1B*	WHT	J7 - 15	ENCODER OUT
P8 - 12	PHASE 1B	GRY	J7 - 3	ENCODER OUT
P8 - 13	PHASE 1A*	ORN	J7 - 14	ENCODER OUT
P8 - 16	PHASE 1A	BRN	J7 - 2	ENCODER OUT
P9 - ENCODER 1				
P9 - 1	DCM	BLK	J2 - L	Encoder Ground
P9 - 2	DCM	BLK	ENC OUT J7 -13, J5 - F	DIGITAL GROUND (Encoder + RS232)
P9 - 5	ENCODER PWR - TO FUSE	RED	P1 -10	FUSEBOARD
P9 - 8	ENCODER 1B	BLU	J2 - B	Encoder input
P9 - 9	ENCODER 1B *	GRN	J2 - E	Encoder input

P9 - 11	ENCODER 1A	ORN	J2 - A	Encoder input
P9 - 12	ENCODER 1A*	GRY	J2 - C	Encoder input
P10 - ENCODER 2				
P10 - 1		BLK	J3 - 1 CARD READER PCB	GND
P10 - 5		WHT	J3 - 2 CARD READER PCB	+12V
P11 - +/- 15V				
P11 - 3	+5V	RED	P1 - 9	FUSEBOARD
D1 DISPLAY - DEPTH				
D1-2	GND	BLK	D2-1	GND OUT
D1-6	+5V OUT	RED	D2-4	POWER OUT
D2 DISPLAY - LINE SPEED				
D2-2	GND	BLK	D3-1	
D2-6	+5V OUT	RED	D3-4	
D3 DISPLAY - LINE TENSION				
POWER SWITCH				
SW1A-NO	MAIN POWER ON/OFF	WHT	J1 - A	
SW1A-C	WIPER TO FUSE BOARD	RED	FUSE BOARD P1 - 1	
FUSE BOARD 1				
P1 - 4	ENCODER1 PWR FUSED	YEL	J2 - J	FUSED LOAD CELL POWER OUT
P1 - 5	24V PWR TO REM SENSR	VIO	J5 - C	
P1 -11	+5V	ORN	J7 - 5	
P1 -12		RED	J4 - C	
J1 - CARD READER				
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

BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton, Texas 77476
Phone: 281.342.6415
Fax: 281.342.4848
benchmarkwireline.com

7.0 CABLE DRAWINGS AND PARTS LISTS

7.1 AMS4A827 CABLE ASSEMBLY – DC POWER IN

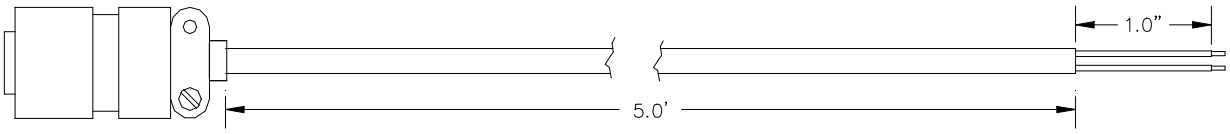


A – WHITE
B – BLACK

A = +
B = -

Part Number	Description	Qty	UM
AMS4P177	CONN KPSE06J12-3S STR PLUG SOCKET	1	EA
AMS7P061	CABLE 16-2 SJ CORD	25	EA

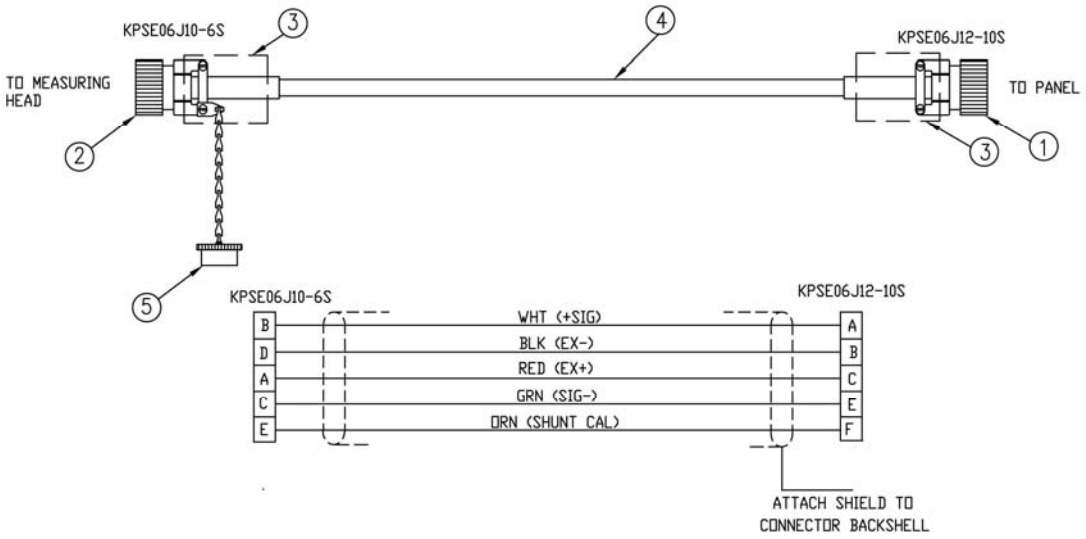
7.2 AMS4A826 CABLE ASSEMBLY – OVER TENSION SHUTDOWN



A – WHITE
B – BLACK

Part Number	Description	Qty	UM
AMS4P178	CONN KPSE06J12-3P STR PLUG PINS	1	EA
AMS7P061	CABLE 16-2 SJ CORD	30	EA

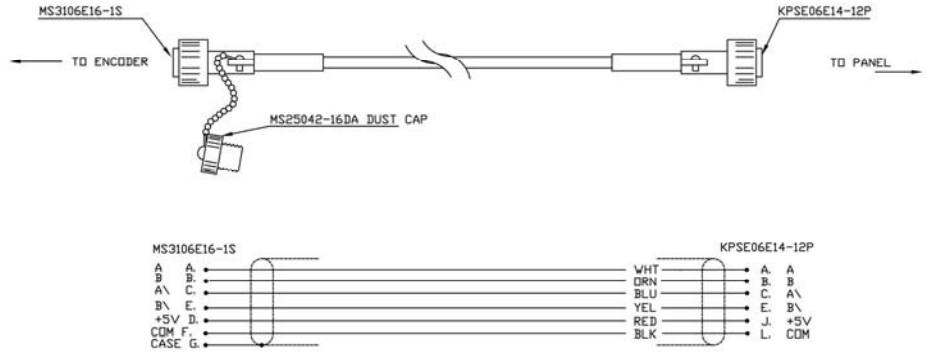
7.3 AMS8A203 LOAD PIN TO PANEL



Part Number	Description	Qty	UM
AMS4P180	CONN KPSE06J12-10S STR PLUG	1	EA
AMS4P266	CONN KPSE06J10-6S STR PLUG	1	EA
ACMU1P88	TUBING SHRINK 1.00 ADH LINED	2	EA
AMS4P221	CABLE 20/8C ALPHA 25468 BLACK	30	FT
AM5KP059	DUST CAP KPT8010C CANNON	1	EA
C276P318	TERMINAL #RA18-6 #6 RING	1	EA
AM5KA034	BUSHING #9779-513-4 AMPHENOL	1	EA

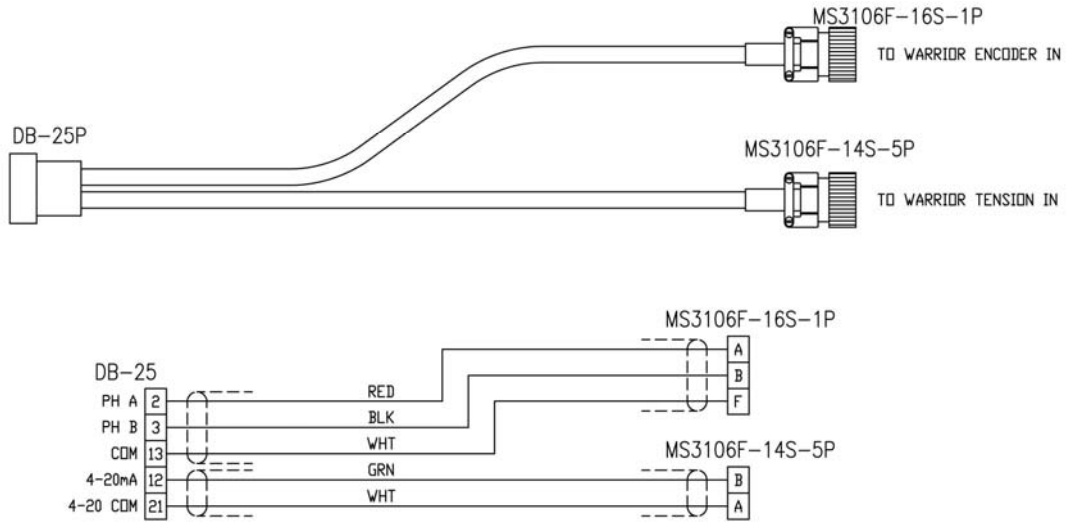
BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton, Texas 77476
Phone: 281.342.6415
Fax: 281.342.4848
benchmarkwireline.com

7.4 AMS4A150 ENCODER IN



Part Number	Description	Qty	UM
AMS4P184	CONN MS3106F-16S-1S 7 SOCKETS	1	EA
AMS4P182	CONN KPSE06J14-12P STR PLUG	1	EA
AMS4P221	CABLE 20/8C ALPHA 25468 BLACK	30	FT
AM5KP113	DUST CAP MS25042-16DA	1	EA
AMS7P064	BUSHING #9779-513-8 AMPHENOL	1	EA
AMS7P063	BUSHING #9779-513-6 AMPHENOL	2	EA

7.5 AMS4A117 SIGNAL OUT TO WARRIOR



Part Number	Description	Qty	UM
AMS4P165	CONN DB25P CRIMP AMP USED WITH	1	EA
AMS4P185	CONN MS3106F-14S-5P 5 PINS	1	EA
AMS4P183	CONN MS3106F-16S-1P	1	EA
AMS4P222	CABLE 20/4C ALPHA 25154 BLACK	40	FT
AMS4P167	PIN AMP M39029/64-369 USED	25	EA
AMS7P063	BUSHING #9779-513-6 AMPHENOL	2	EA
AMS4P209	TUBING SHRINK 0.75 ADH LINED	1	IN
AMS4P462	CONN BACKSHELL DB-25 METAL	1	EA