BenchMark Wireline Products
36220 FM 1093
P. O. BOX 850
Simonton,Texas 77476
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AMSLA426A – MEGAMOUTH

COMBINED DEPTH/TENSION
HEAVY DUTY SLICKLINE MEASUREMENT DEVICE
ZONE 2 – CLASS 1 DIV 2

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SAFETY WARNINGS

This apparatus is suitable for use in ATEX Zone 2 Locations.

This apparatus is suitable for use in Class I, Division 2, Groups A, B, C, & D Hazardous (Classified) or Unclassified Locations.

WARNING – EXPLOSION HAZARD – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR ATEX Zone 2 LOCATIONS.

AVERTISSEMENT – RISQUE D'EXPLOSION – LA SUBSTITUTION DE COMPOSANT PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES ATEX Zone 2 LOCALES.

WARNING - EXPLOSION HAZARD – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2;

AVERTISSEMENT - RISQUE D'EXPLOSION – LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE I, DIVISION 2

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOW TO BE NON-HAZAROUS;

AVERTISSEMENT – RISQUE D'EXPLOSION – AVANT DE DECONNECTER L'EQUIPMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DESIGNE NON DANGEREUX.

WARNING - PROTECTION MAY BE IMPAIRED IF THIS DEVICE IS USED IN AN APPLICATION OR MANNER NOT SPECIFIED IN THE MANUAL

NOTE – The safe ambient temperature operating range for this equipment is -20 to 40C or -4 to 104F.

BenchMark measuring equipment will frequently be operated in hazardous environments. Appropriate safety precautions need to be taken.

Training - Operators shall be trained in the proper and safe use of the device.

Do not exceed the tension limit specified for this device in this manual.

SAFETY WARNINGS continued

Flammable Substances - Flammable and explosive substances are often found in the proximity of the equipment operations. Proper venting should take place where practicable. Avoid open flames, sparks and other ignition sources.

Electric Shock – Depending on the equipment being used, both AC and DC current may be present. Frequently in wellsite operations conductive fluids and chemicals are used. Use extra caution when working with BenchMark equipment and follow manufacturer warnings to avoid electric shock.

Do not separate any electrical connector, while powered, in a hazardous area. Separate only when power is removed, and/or in a safe area.

Safe Operating Temperatures – BenchMark Wireline equipment is designed to operate safely within these temperature ranges. Do not try to operate this equipment in conditions that outside these temperature limits.

The safe ambient temperature operating range for this equipment is -20 to 40C or -4 to 104F.

Hazardous Equipment Marking - See General Assembly drawings for hazardous equipment marking.

ALL WARNING LABELS ON THE EQUIPMENT MUST BE OBSERVED AND FOLLOWED.

Installation Instructions - Install measuring device onto the spooling mechanism per the unit manufacturer instructions. Take care to avoid pinching or cutting of electrical cables when the measuring device moves during the spooling operation.

Take care to thread the wire through the device properly to prevent the wire from rubbing the frame during operation. The Table of Contents of this manual will list where the threading procedure is located.

Rotating Equipment – BenchMark Wireline measuring equipment is often attached to rotating industrial machinery. This may include winches, pulleys, rigging, rotating drums plus moving cable and wire. Though BenchMark's measuring equipment does not normally present a safety hazard when in operation provided it is used within the design parameters of the equipment, the heavy equipment used in this type of work in proximity to BenchMark's equipment may. Never attempt to use BenchMark equipment in any way or for any other purpose than for which it was designed.

Use every precaution to keep a safe distance from dangerous equipment when it is in operation. Never approach the measuring device while the cable drum is turning.

CONTENTS

1.0 GENERAL DESCRIPTION & FEATURES

1.1 PRODUCT DESCRIPTION & INTENDED USE OF EQUIPMENT

The "MEGA MOUTH" Slickline Measuring Device is a heavy duty two wheeled device which accurately measures both wireline depth and tension. It minimizes wire abrasion and fatigue by using a non reverse bend configuration.

The device is designed to be mounted in front of the wireline drum on a spooling mechanism. Linear bearings in the mount allow it to slide back and forth in front of the drum so the wire can be spooled evenly. Spooling rollers and pressure wheels are provided to keep the wire in the wheels at low or no tension. The head can be pivoted 90 degrees for storage when not in use.

This measuring head is different from previous versions in that the wireline can be removed from the measuring head without cutting off the cable head. The wireline can be removed from the side. The guide rollers are slotted so they can be slid out of the way to remove the wireline.

Tension is measured from a load pin which also serves as the axle for the tension wheel. Since the two wheels are opposite each other, the wire completely wraps around both wheels. This creates a relatively high signal at the load pin which provides a very accurate tension measurement.

With the BenchMark Winchman's Panel, depth can be accurately measured on different sized lines without changing wheels. This is done electronically by the panel using the depth information provided by an encoder. Changes in wire size are accounted for by the panel software. Wire stretch can also be automatically calculated by the panel. An adapter is provided to drive a standard mechanical counter.

1.2 CERTIFICATES

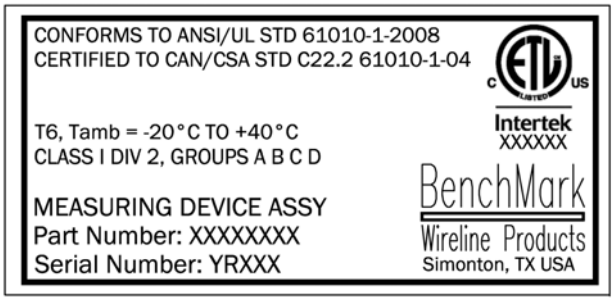
1.2.1 RESERVED FOR SAFETY STANDARDS & ATEX REQUIREMENTS

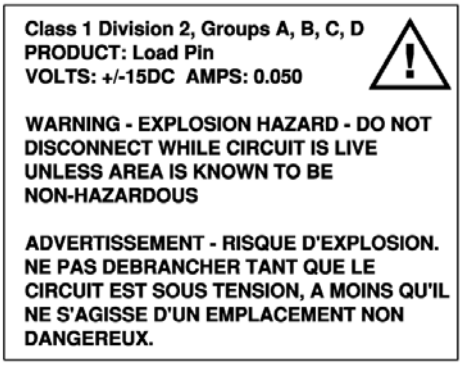
NOTE – this information will be added after certificates are issued.

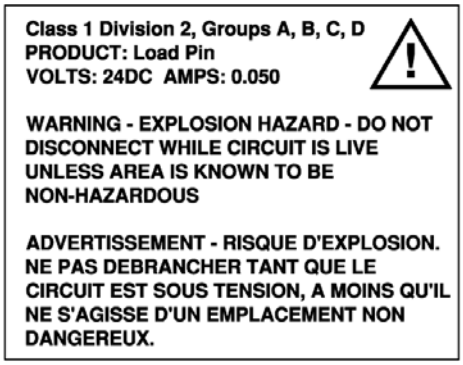
1.2.2 RESERVED FOR CLASS 1 DIVISION 2 CERTIFICATE

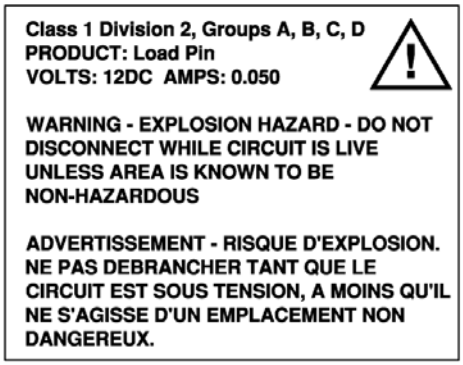
NOTE – this information will be added after certificates are issued.

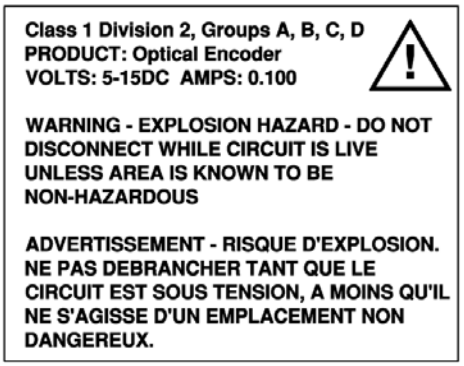
1.3 TYPE EXAMINATION CERTIFICATES AND LABELS

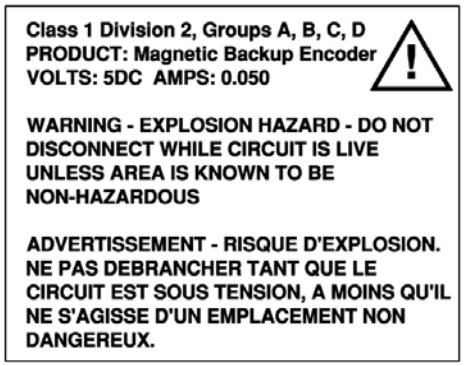












1.4 TECHNICAL SPECIFICATIONS

1.4.1 WIRE PATH

The wire runs from the well around the measure wheel (wheel nearest drum) then around the tension wheel and back across the top of the measuring wheel onto the drum. Even though the wire runs side by side across the top of the measure wheel, the system is designed to prevent wire to wire rub. The tension wheel is tilted slightly with respect to the measuring wheel so that the wire enters the wheel on one side of the groove and exits the wheel on the opposite side of the groove. Guide rollers are aligned to assist in keeping the wire on the proper side of the groove.

The wire runs through a non reversed bend configuration (i.e. the wire is always bent in the same direction). This minimizes wire fatigue due to bending the wire in opposite directions each time it passes through the measuring head. The large wheel radius minimizes the effects of fatigue and promotes longer wire life, especially with larger diameter wirelines.

Guide rollers are installed on the tension wheel to keep the wire in the groove. A spring mounted guide roller is used on the measure wheel to ensure the wire is always pressed tightly against the measure wheel to prevent wire slippage at low tension to minimize measurement error. The spring tightly presses the wire against the wheel regardless of wire size. The spring force keeps the wire turning the wheel even with sudden changes of direction during jarring action. A composite guide roller is mounted above the measure wheel to keep the wire in the groove when wireline tension is relaxed such as during transport and rigup.

1.4.2 DEPTH MEASUREMENT

Depth measurement is made by wrapping the wire around the measuring wheel which has a precision machined groove. The wheel groove has a circumference of 4 feet with .125 wire installed. The wheel is hardened to greater than Rockwell 58 by using a special heat treat process. This minimizes wheel wear to maximize wheel life.

This measuring head is capable of providing three completely independent depth measurements, a mechanical counter, an optical encoder, and a magnetic pickup.

The optical encoder provides a high resolution measurement to the BenchMark Wireline Products hoistman's panel. With this panel depth and line speed can be accurately measured on different sized lines without changing wheels. This is done electronically by the panel. Changes in wire size are accounted for by the panel software. Wire stretch can also be automatically calculated by the panel. The panel operates on 12v and supplies the necessary power to the encoder and load pin.

A backup depth system is available to provide another independent depth measurement. Depth is measured by a frictionless magnetic pickup mounted in the measuring head. The pickup consists of magnets imbedded in the measure wheel coupling and two hall affect devices mounted next to the shaft. This provides a quadarature type measurement. A small display panel is mounted inside a wireline unit. The panel is designed to be connected to an external AC or DC supply or operate off internal batteries for up to 15 hours between charges. In the event of an external power interruption, the unit automatically switches to battery power. The system is designed to operate without intervention from the user. When external power fails, the depth display is maintained by the batteries. A switch on the front of the panel allows different sizes of wire to be measured accurately without changing the measuring wheels.

The mechanical measurement is made by connecting a "speedometer" cable to the hub of the measuring wheel. A "Veedor Root" type counter can be used. Step down adapters are available to convert from a 1:4 to a 1:1 measurement (adapters on the wheel and in the counter). The mechanical system cannot be adjusted for different wire sizes so a wheel with a different sized groove must be installed to make the mechanical measurement correct.

1.4.3 TENSION SPECIFICATIONS

The wheel nearest the well rotates on an axle pin that is instrumented with strain gauges. These strain gauges produce an electrical signal proportional to the magnitude of line tension. The wire always makes a complete 180 degree wrap around the tension wheel so rigup angle does not affect the tension measurement.

The tension wheel is mounted on a self aligning bearing which allows the wheel to properly align itself. This reduces any side forces that may be present which increases the tension measurement accuracy.

1. PASSIVE LOW VOLTAGE

Power Requirement - 12 vdc excitation

Interface – None – passive bridge only

2. DIFFERENTIAL VOLTAGE

Power Requirements - +/– 15 vdc input power

Interface - Proprietary circuit board which amplifies the load pin signals and provides a 1.5v differential output.

0 vdc = 0 lbs (0 kg)
.75 vdc = 5,000 lbs (2,268 kg) - shunt cal
1.5 vdc = 10,000 lbs (4,536 kg)

1.4.3 TENSION SPECIFICATIONS continued

3. 4-20MA CURRENT LOOP

Power Requirements - +24vdc input power

Interface - Proprietary circuit board which amplifies the load pin signals and provides a 4-20ma current loop output.

4 ma = 0 lbs (0 kg)
12 ma = 5,000 lbs (2,268 kg) - shunt cal
20ma = 10,000 lbs (4,536 kg)

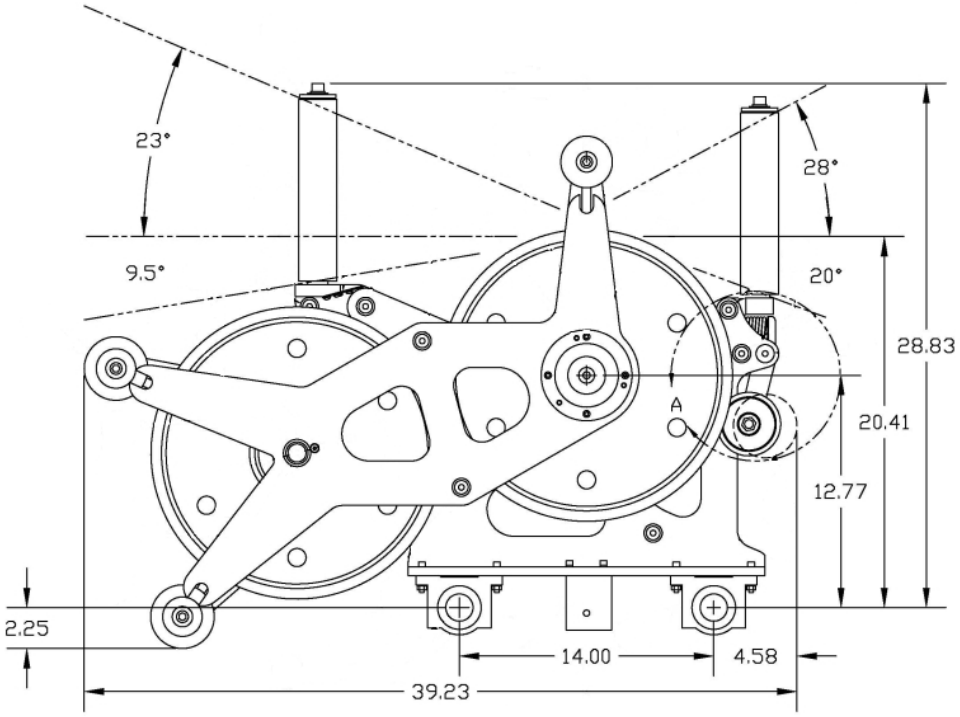
COMMON SPECIFICATIONS

Temperature Stability
<= .015% full scale / deg F on zero
<= .02% full scale / deg F on output

Accuracy 1% full scale nominal
Maximum Rated Load 9,000 lbs (4,082 kg)

1.4.4 GENERAL SPECIFICATIONS

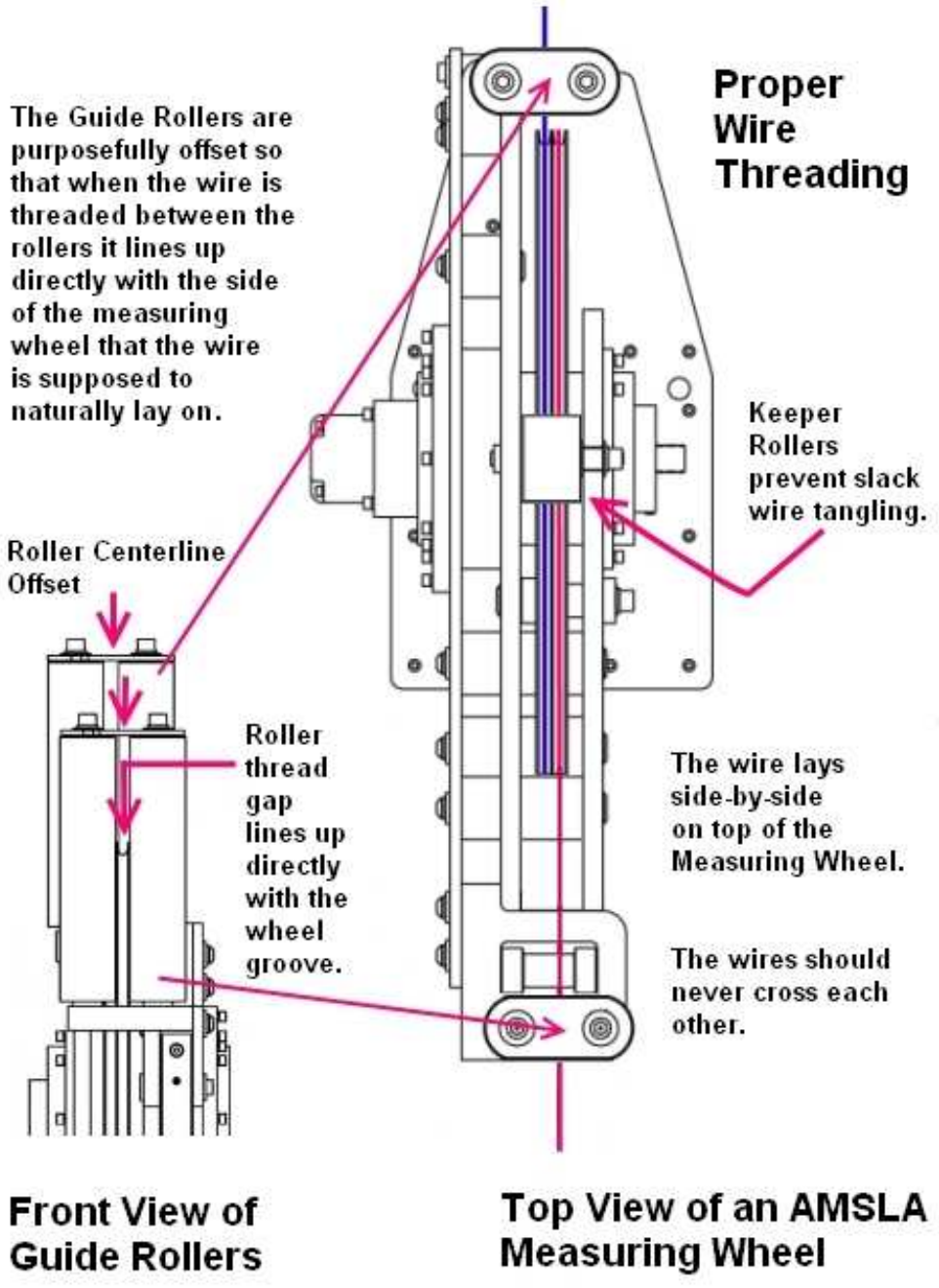
Height:	31.25"	.793 m
Length	39.25"	.997 m
Width:	11.5"	.292 m
Weight:	110 lbs	54.4 kg
Maximum Tension:	9,000 lbs	4,536 kg
Line Sizes:	.092" – 1/4”	2.3 mm – 6.35 mm
Encoder:	1,200 PPR	
Backup Counter:	4 PPR Quadarature	
Load Pin:	Passive low voltage, Differential voltage, 4-20ma current loop	



1.5 HARDWARE FEATURES

- **Cable sizes** .092 to .125 slickline & 3/16" to 1/4" e-line/braided line
- **Tension load axle** & amplifier can be configured to different outputs
- **3 fully independent depth measurements** - 1. mechanical counter 2. optical encoder 3. magnetic pickup
- **Backup depth system** – reduces drag on measuring wheel by eliminating mechanical drive cable
- **Encoder & tension amplifier** certified for Zone II area use
- **Anodized aluminum frame** – all steel parts are plated or SST
- **Line removal** from the side without cutting off Cable Head
- **Minimizes wire abrasion & fatigue** by using non-reverse bend configuration
- **Wires run side-by-side** across top of measuring wheel to prevent wire rub
- **Large diameter wheel** radius minimize wire fatigue
- **Spooling rollers** and pressure wheels keep wire in wheel at low/no tension
- **Sprung pressure wheel** keeps wire turning with wheel even with sudden direction change or jarring action
- **Pivots 90 degrees** – measuring device pivots 90 degrees for easy storage

1.6 USER INTERFACE FEATURES



1.6.1 SLICKLINE WIRE THREADING - WITH CABLE HEAD

Loosen the bolts on the top of both sets of guide rollers. Swing the guide roller plate away leaving top access to the space between the guide rollers.

Loosen the keeper roller, move it to the top of its slot and retighten the bolt.

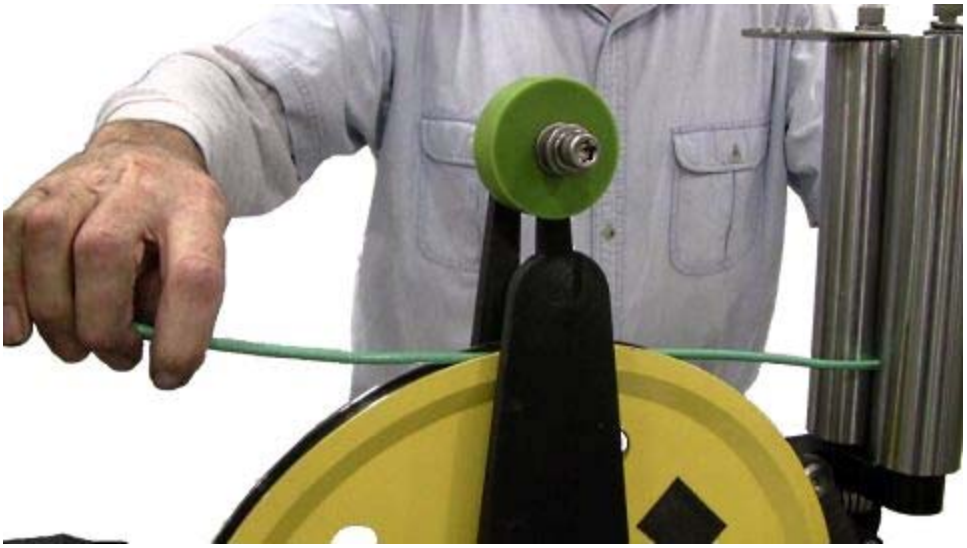
1.6.1 SLICKLINE WIRE THREADING - WITH CABLE HEAD continued

Loosen the upper pressure roller, move it to the end of its slot and retighten the bolt.

Loosen the lower pressure roller, move it to the end of its slot and retighten the bolt

1.6.1 SLICKLINE WIRE THREADING - WITH CABLE HEAD continued

Thread the wire between the 1st set of guide rollers then over the top of the measuring wheel under the under the keeper roller.

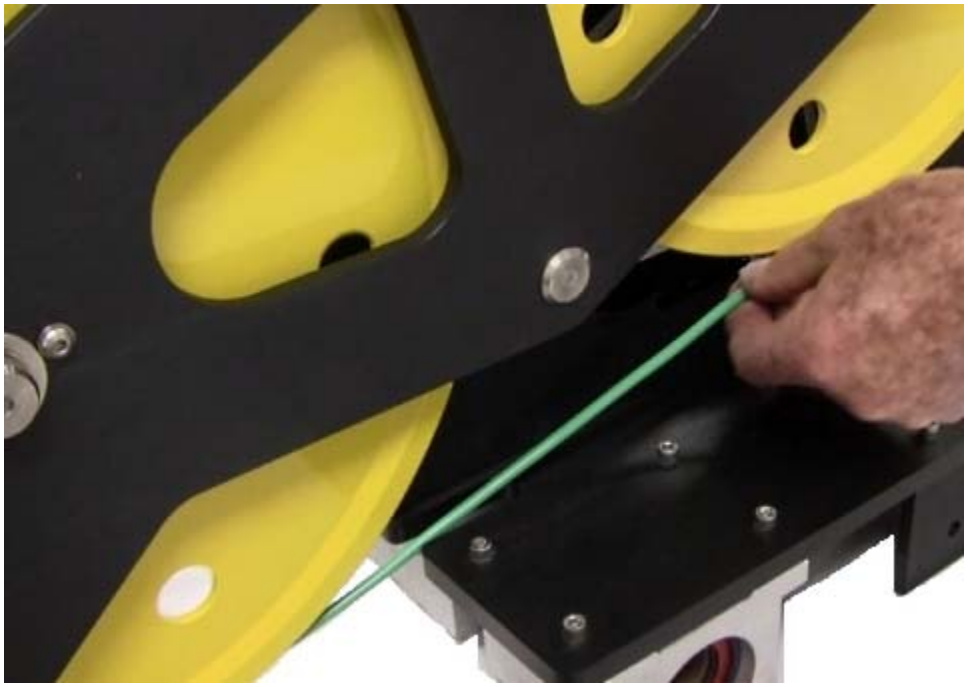


Thread the wire below the wear plate on the top of the tension wheel.

1.6.1 SLICKLINE WIRE THREADING - WITH CABLE HEAD continued

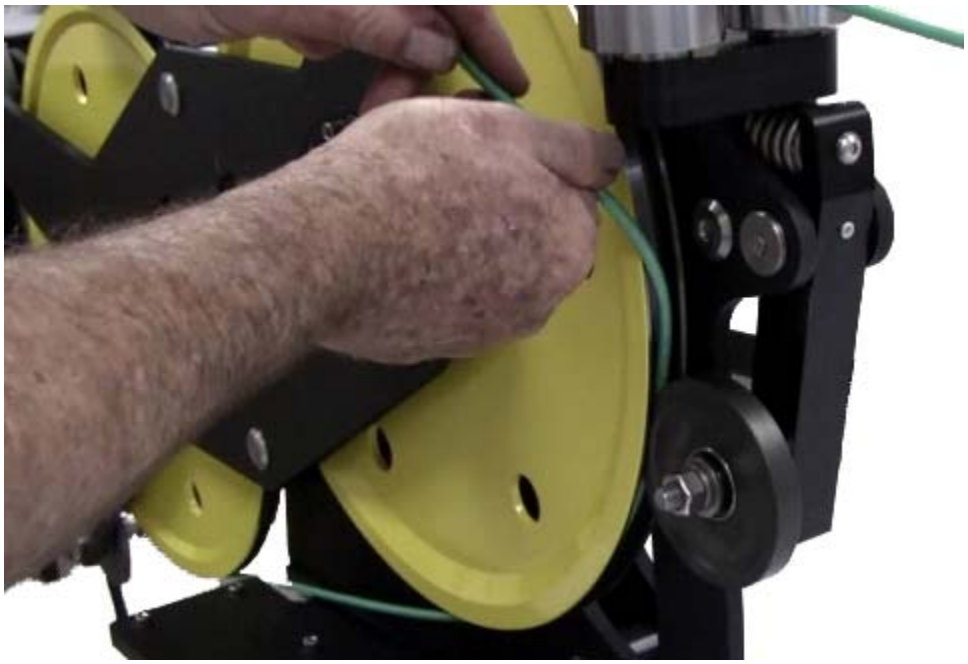
Then around the back of the wheel.

The wire then goes underneath both wheels.

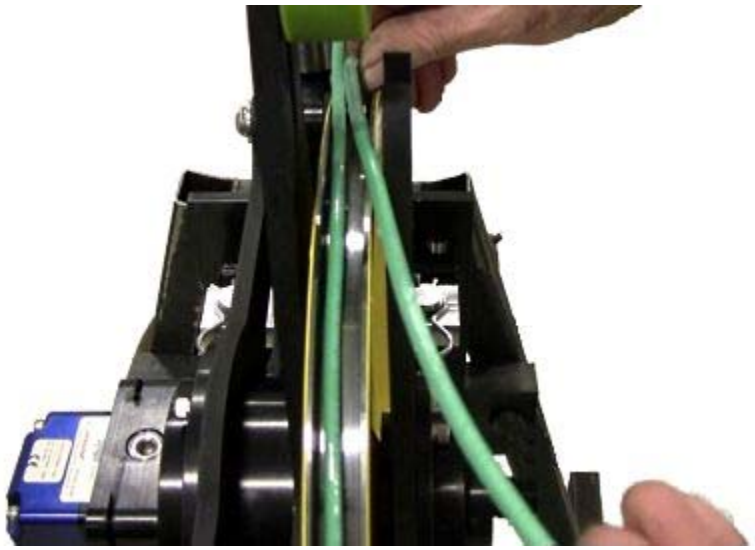


1.6.1 SLICKLINE WIRE THREADING - WITH CABLE HEAD continued

With a wrench or bar spring the pressure wheel away and thread the wire the pressure wheel and the measuring wheel.



As the wire is brought over the top of the wheel make sure it is now pulled towards the mechanic on the close side of the wheel.



1.6.1 SLICKLINE WIRE THREADING - WITH CABLE HEAD continued

The wire now is threaded between the 2nd set of guide rollers.

The keeper roller is now repositioned to keep the 2 rows of wires from crossing in the measuring wheel groove.

Replace the guide roller plates making sure that they are positioned between the flat washers on the tightening bolts

Reposition the upper and lower pressure rollers and tighten them.

Position the roller to run inside the grooves of the tension wheel.

There should be no heavy contact between the roller and the tension wheel as this can interfere with accurate measurements

1.6.2 SLICKLINE WIRE THREADING - WITHOUT CABLE HEAD

This process for threading a wire without a Cable Head attached is very similar to the procedure described above.

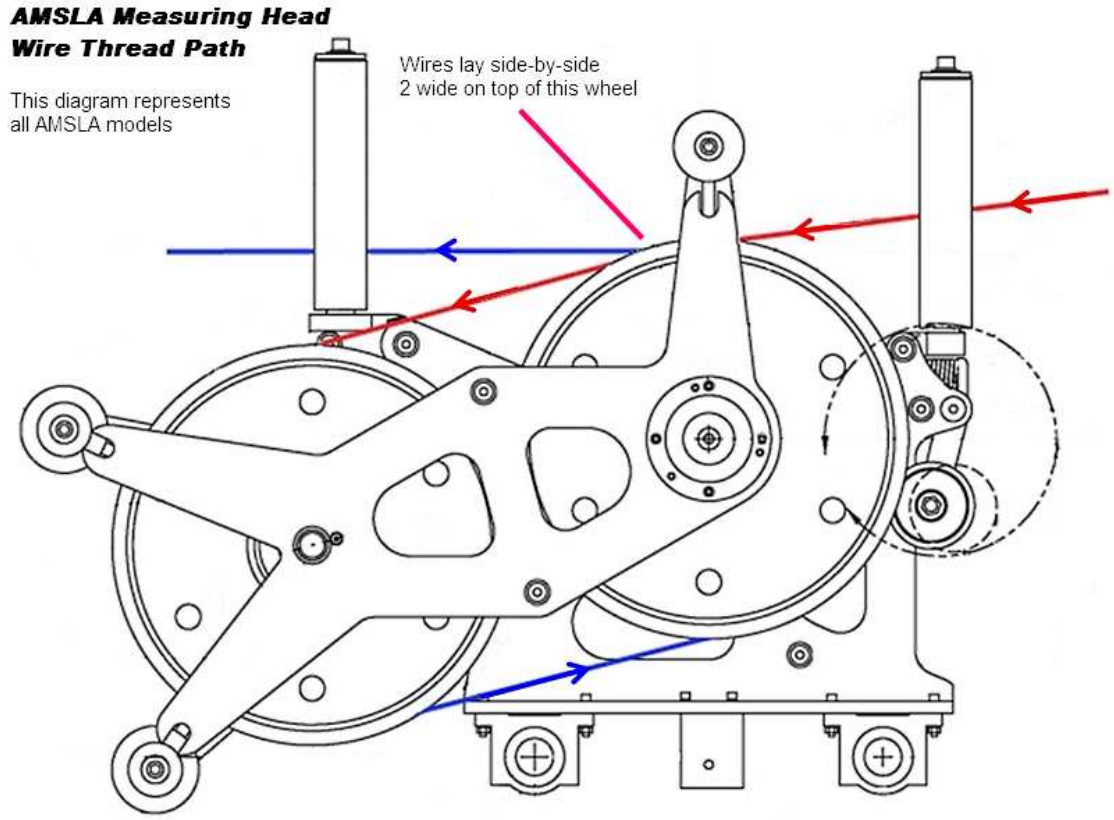
However…

- the guide roller plates on top of the guide rollers DO NOT have to be loosened or moved.

1.6.3 SLICKLINE WIRE THREADING – FINAL RESULT

This is what an AMSLA measuring head should look like with the wire properly threaded.

Final Thread Path is the same whether threaded with or without cable head attached.



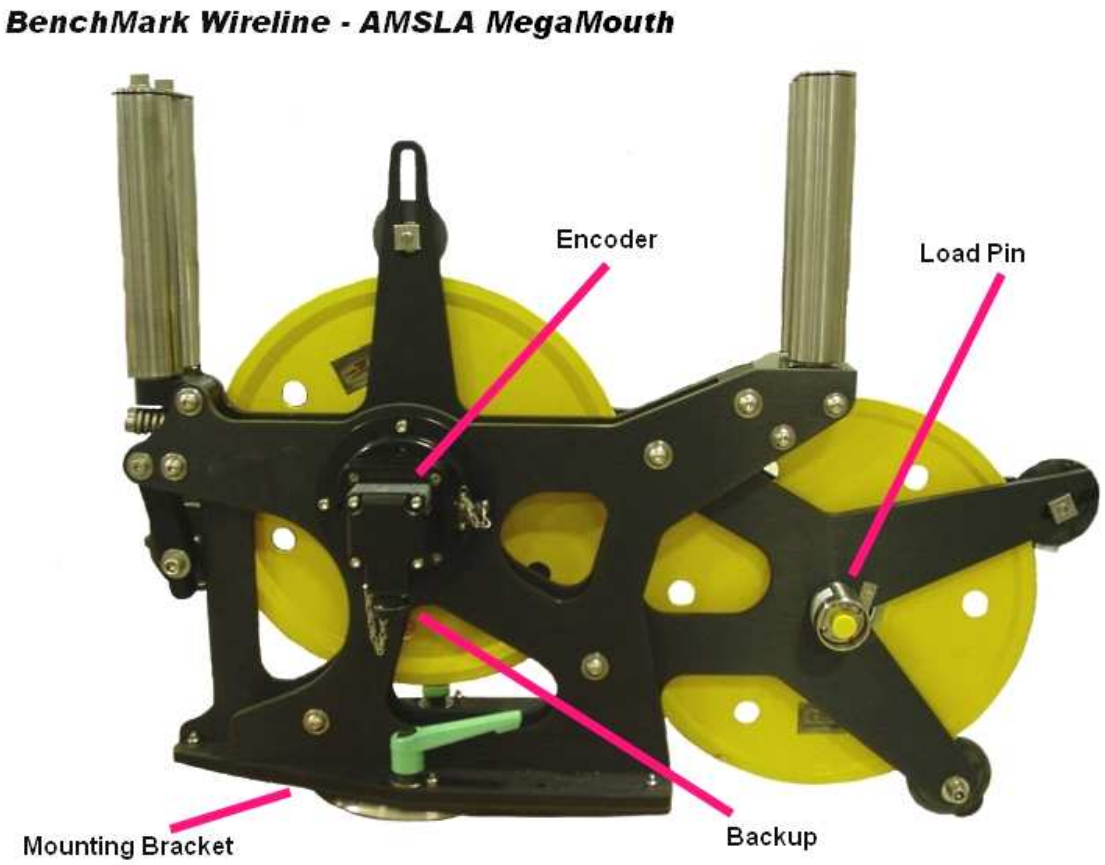
1.7 HAZARDOUS AREA INSTALLATION STANDARDS & REQUIREMENTS

This equipment is to be installed only by personnel who are suitably trained and qualified to local/national codes.

1. Install the measuring head on the wireline equipment.
   Bolt the mounting bracket to the wireline equipment.
   Connect the measuring head to the mounting bracket.

2. Connect the cables from the panel to the encoder, backup and load pin on the measuring head.

Make sure you use the correct cable for each connection as described in this manual.



1.8 OBTAINING TECHNICAL ASSISTANCE

Call BenchMark Wireline Products Inc. at +1 281 346 4300
Or contact by email mail@benchmarkwireline.com
Or fax in request at +1 281 346 4301

Information is also available on website www.benchmarkwireline.com

Parts can be ordered by email, phone, or fax.

Equipment can be returned for repair and maintenance.
Please notify us by Phone, email, or fax before sending any equipment.

To return equipment to BenchMark, ship it to:
BenchMark Wireline Products
36220 FM 1093
Simonton, Texas 77476
U.S.A.

Note – For better response, please have the Part Number available.

2.0 WELLSITE OPERATING SUMMARY

2.1 WELLSITE OPERATION

Power up the panel connected to the measuring head and verify it is working properly.

Verify the panel is configured to match the system
- Line size
- Measurement units
- Encoder settings

Install the line in measuring head and set the line size parameter on the panel.

Set Tension Alarm value.

Set depth adjust value if necessary.

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.

Rig up through sheaves, install tool, and slack off weight.

Set depth to zero.

Press T-Zero to set tension to zero.

Press T-CAL and verify that panel tension reads 4,000 or 5,000 lbs (depending on type of measuring head selected)

Pull tool to depth 0 position.
Press D-Zero to reset the panel depth to 0.

2.1 WELLSITE OPERATIONS continued

Determine wireline size to be used – .092" to 1/4”

Since the wireline wraps around the depth wheel, the circumference of the depth wheel will change with a change in wire size. The wheel size needs to be corrected for wireline size in order to accurately measure depth.

These corrections are automatically made in the BenchMark hoistman's panel by selecting the proper cable size using the menu. If a different panel is used, the wheel size will need to be entered at this time.

3.0 SOFTWARE OPERATING INSTRUCTIONS

NOTE - The measuring heads do not contain any software. The software is in the display panel. A variety of display panels can be used with this measuring head.

To view the Software Operating Instruction, refer to the manual for the Display Panel being used with this head.

4.0 SOFTWARE UPDATE PROCEDURES

NOTE - The measuring heads do not contain any software. The software is in the display panel. A variety of display panels can be used with this measuring head.

To view the Software Update Procedures, refer to the manual for the Display Panel being used with this head.

5.0 MAINTENANCE, ASSEMBLY DRAWINGS & PARTS LIST

5.1.1 PRE AND POST JOB CHECKS

Between jobs, check the measuring and guide wheels for looseness, play, out-of-roundness, worn or rough sounding bearings, or other mechanical conditions that could affect measurement accuracy.

Visually inspect the interiors of the electrical connectors for the encoders and electronic load axle for dirt and evidence of insulation breakdown. Clean or replace as necessary. Install dust caps on the connectors if the cables are removed.

Manually rotate each wheel by hand to verify its condition. Inspect the depth measuring wheel for signs of abnormal wear diameter changes, or shaft play that can affect measurement accuracy. The wheel should be replaced if it is grooved more than .005".

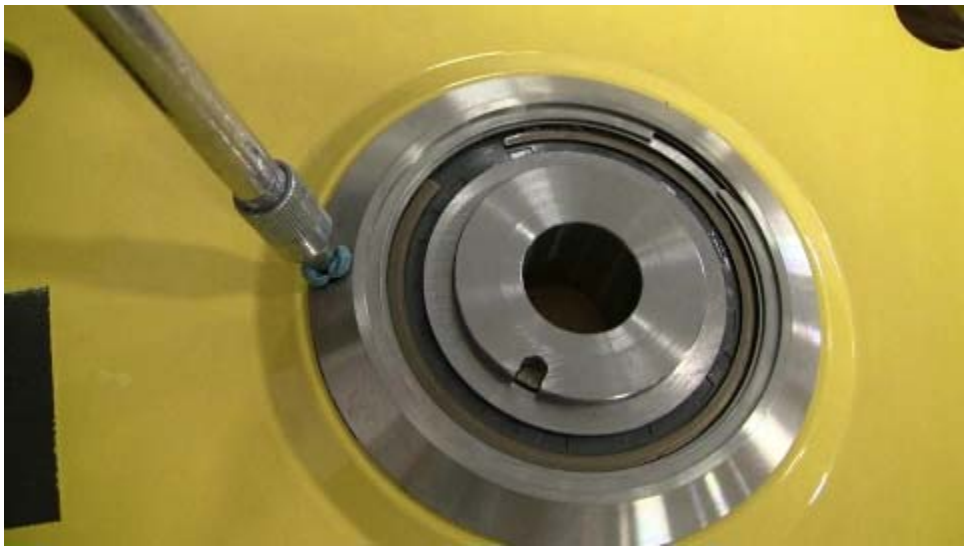
Inspect the tension wheels for signs of abnormal wear, diameter changes, or shaft and bearing play that could affect measurement accuracy. It should also be replaced if it is grooved more than .005".

Do not pressure wash bearings or electrical parts

5.1.2 LUBRICATION

Lubrication – use waterproof marine grease and a straight necked grease gun. Use the grease nozzle that comes with the measuring head (in the small plastic bag zip-tied to the frame).

Press the nozzle into the fitting and apply 3 squirts. Repeat same lubrication schedule each month.



DO NOT pressure wash the machine as it will force the grease out of the bearings and they will fail.

5.2 FIELD MAINTENANCE PROCEDURES

TENSION WHEEL MAINTENANCE

There are 3 field maintenance procedures for the Tension Wheel.

- Load Pin Replacement – 5.2.1
- Wheel Replacement – 5.2.2
- Wheel Bearing Replacement – 5.2.3

MEASURING WHEEL MAINTENANCE

There are 3 field maintenance procedures for the Measuring Wheel.

- Encoder Replacement – 5.3.1
- Wheel Replacement – 5.3.2
- Wheel Bearing Replacement – 5.3.3

5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT

The 1st step is to remove the spiral lock from the load pin shaft.
If the lock has not been damaged it can be used again on reassembly.

Hold the tension wheel with one hand.

5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT continued

Gently remove the load pin from the wheel hub.
The load pin shaft holds the tension wheel in place.

With the load pin removed gently let the tension wheel rest in the frame.

Put anti-seize compound on shaft of the new load pin.

5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT continued

Position the tension wheel so that the load pin can be placed through the wheel hub.

Note that the load pin has a flat notch on one side.

5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT continued

The flat side of the load pin will flange up to the guide plate on the frame.

Insert the load pin and rotate it so that the flat side of the pin butts up to the guide plate.

5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT continued

The bearing in the tension wheel has a slot for an anti rotation screw.

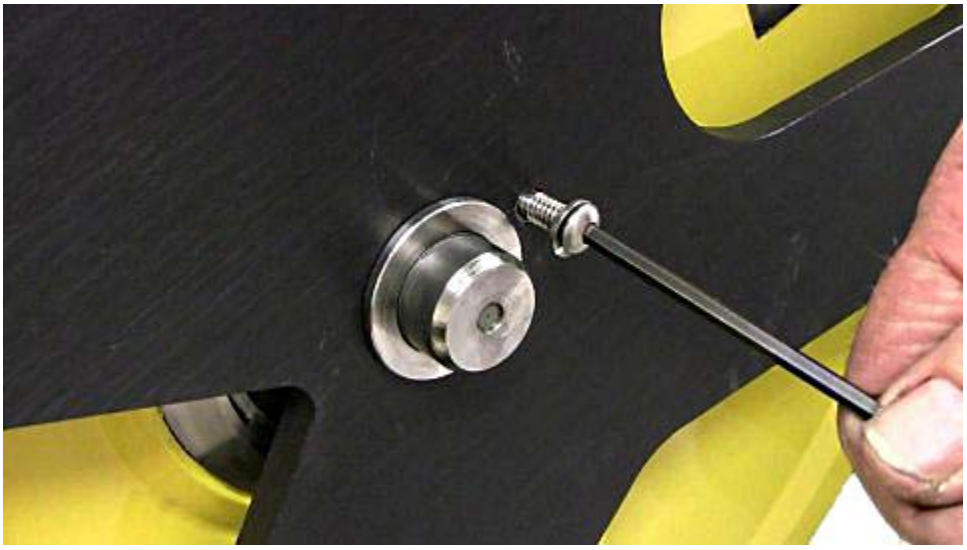
*Note - depending on position of the wheel, if during this procedure the tension wheel stays in place, there is no need to remove the anti rotation screw.

If the wheel moves too much, the bearing may slide off the anti-rotation screw. In that case you must remove the anti-rotation screw for proper reinstallation.

5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT continued

Spin the wheel until the anti rotation slot on the bearing can be seen through the anti rotation screw hole.

Replace the anti rotation screw and tighten it firmly.



5.2.1 TENSION WHEEL - LOAD PIN REPLACEMENT continued

Replace the spiral lock.

5.2.2 TENSION WHEEL – WHEEL REPLACEMENT

For this maintenance, we assume that the load pin has been removed. 5.2.1

Loosen and completely move the pressure roller to the end of its slot and retighten.

Pull the wheel up and out of the frame.

If bearing replacement is needed see 5.2.3

Reposition the wheel back in the frame and follow the load pin installation instructions in 5.2.1.

Then replace and adjust the pressure roller.

5.2.3 TENSION WHEEL - BEARING REPLACEMENT

For this maintenance, it is assumed that both the wheel and the bearing have already been removed. The bearing is held in the wheel hub by 2 snap rings.

An Arbor press is being used to demonstrate this replacement.

The anti-rotation bushing will be pressed into the bearing. Place the new bearing on the press.

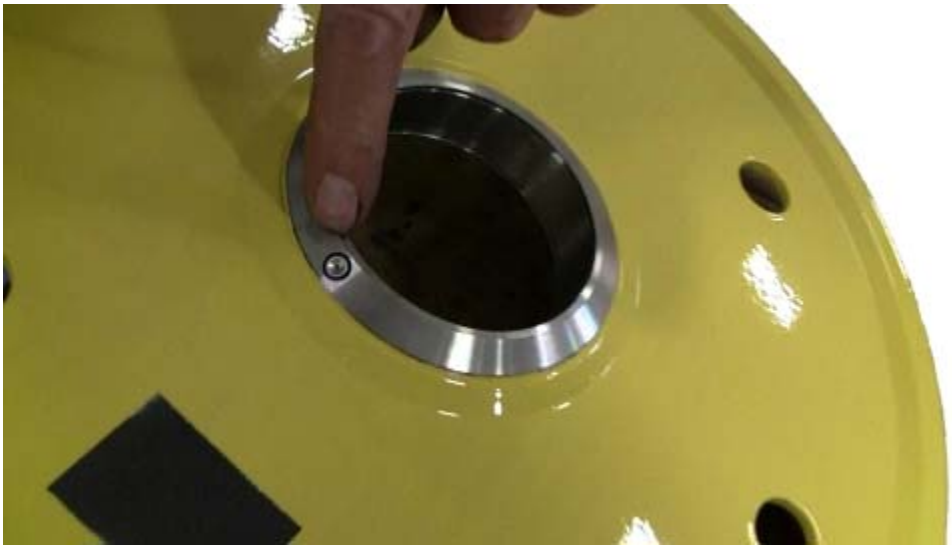
5.2.3 TENSION WHEEL - BEARING REPLACEMENT continued

On the first stroke, the bushing may not go all the way into the bearing. Add a spacer on the bottom of the bearing as the bushing will protrude below the bottom bearing.

The bushing is properly installed when approximately equal amounts stick out both above and below the bearing assembly.

5.2.3 TENSION WHEEL - BEARING REPLACEMENT continued

Take the Tension Wheel. 2 snap rings will hold the bearing assembly in place. The front of the wheel is the side with the grease fitting.



5.2.3 TENSION WHEEL - BEARING REPLACEMENT continued

On the BACK of the wheel, install the 1st snap ring.

Then turn the wheel over. You should be able to simply insert the bearing assembly into the center hub. **NOTE make sure the small grease hole on the outside of the bearing assembly is placed directly in front of the grease fitting of the bearing or it will not be properly lubricated and the bearing will fail.

5.2.3 TENSION WHEEL - BEARING REPLACEMENT continued

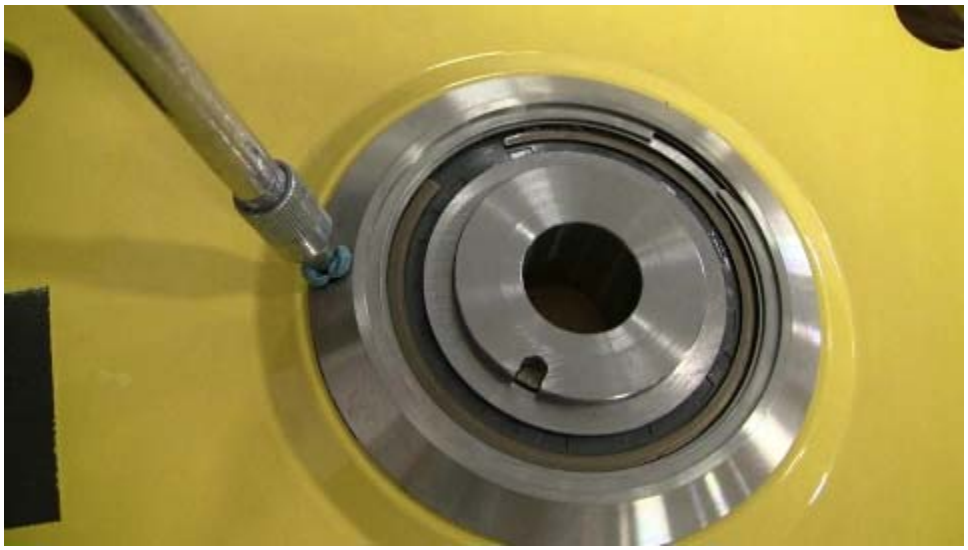
Install the 2nd snap ring to hold the bearing in place.

Manually tug on the bearing assembly to make sure it is firmly in place.

5.2.3 TENSION WHEEL - BEARING REPLACEMENT continued

Lubrication – use waterproof marine grease and a straight necked grease gun. Use the grease nozzle that comes with the measuring head (in the small plastic bag zip-tied to the frame).

Press the nozzle into the fitting and apply 3 squirts. Repeat same lubrication schedule each month.



DO NOT pressure wash the machine as it will force the grease out of the bearings and they will fail.

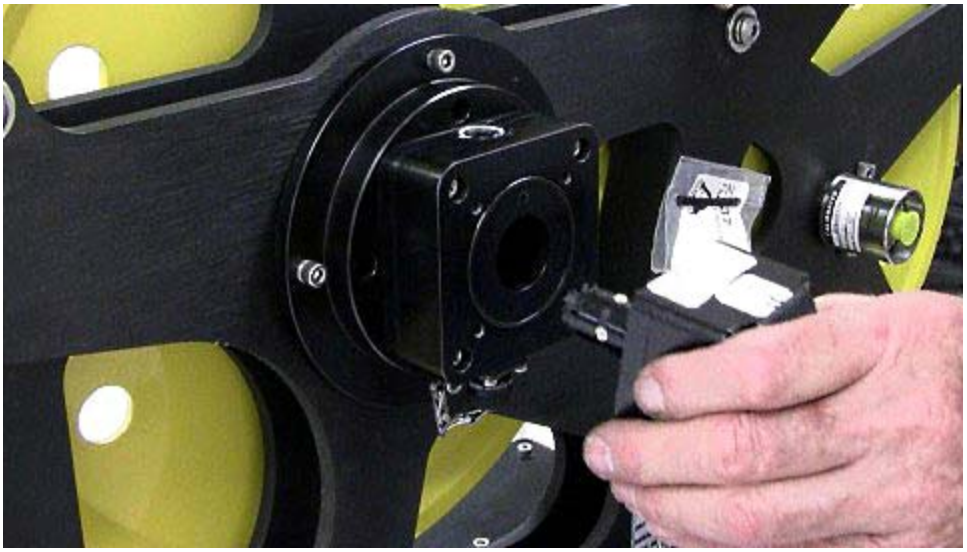
5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT

The first step is to remove the Plug.
The plug covers an access hole used to maintain the equipment.

Next remove the 4 encoder screws.
Hold the encoder as the last screw is removed or it will fall from the adapter body.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Carefully pull the encoder straight out avoiding contact between the couplings and the adapter.



If the plastic coupling is attached to the coupling stack, remove it.
If it is still inside the adapter body, with a pair of needle nose pliers, reach in and extract it.

*Note - If you drop the plastic coupling inside the adapter, you may have to remove the adapter to retrieve it.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Carefully remove the O Ring.

Note the size of the gap between the coupling and the encoder body.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

With the small Allen wrench, loosen the 2 set screws that hold the coupling on the shaft of the encoder.

Remove the coupling stack from the shaft.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Replace the existing coupling stack on the shaft of the new encoder.
Note that the shaft has a flat side. Place the coupling on the shaft so that the tangs on the coupling and one set screw are aligned to the flat side of the shaft.

When tightening, leave the same gap on the shaft between the coupling and the encoder. Snug up but DO NOT fully tighten the set screw on the flat side of the shaft.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Use DC111 or equivalent and apply a thin layer to the plastic coupling.
Press the plastic on top of the coupling stack. The DC111 will temporarily hold it in place.

The top of the encoder has the OEM labels. Rotate the coupling stack so that the slot on the top of the plastic coupling is oriented vertically.

Look though the hole in the adapter body and you will see the coupling half.
Rotate the measuring wheel so that the tang on the coupling half is vertical.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Carefully replace the encoder watching to not jar the coupling stack.
Hold it against the adapter body.

Using a flashlight look in the hole to verify that the plastic coupling has engaged the tang on the measuring wheel.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Temporarily replace the 2 screws to hold the encoder and coupling in place.

Place the Allen wrench in a set screw hole and exerting force, lever the encoder stack away from you towards the measuring wheel, snug up the set screw.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Remove the temporary screws remembering to hold on to the encoder.
Carefully remove the encoder taking care to not jar the encoder stack.

Firmly tighten the 2 set crews on the coupling.

Lubricate the O ring using the DC111 and carefully replace the O ring in the adapter body.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Position the coupling on the encoder so that the slot is vertical.

Carefully position the encoder in the adapter body.

Holding the encoder firmly in place, Rotate the measuring wheel and if properly engaged, as you look down through the plug hole, you should see the white dots on the coupling stack move as the coupling spins.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Replace the 4 screws and tighten them firmly.

The last step in the process is to replace the plug.
Put a half a bead of Teflon sealant on the leading threads of the plug.

5.3.1 MEASURING WHEEL - ENCODER REPLACEMENT continued

Replace the plug and tighten it firmly.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT

For this maintenance we will remove both the Encoder and the wheel hubs.

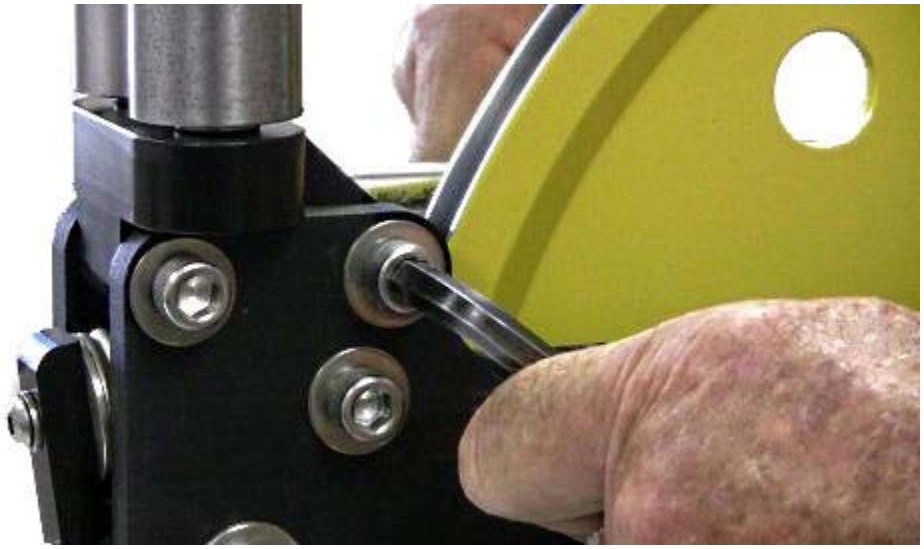
Completely remove the pressure wheel.

Remove the keeper roller on top of the measuring wheel.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Note that the keeper roller has a flat washer one on each side of the roller that will be used again when the wheel is replaced.

We will now swing the front guide roller out of the way.
First loosen the front bolt.
Now completely remove the rear bolt.



5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Simply push on the top of the guide roller to swing it out of the way.

There is now clearance to remove the measuring wheel from the frame.

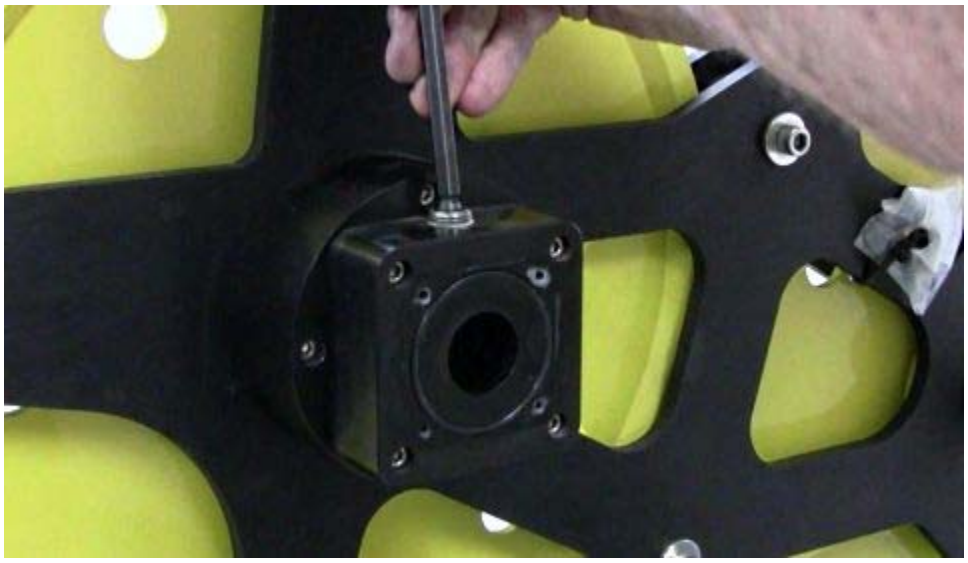
5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

We will now remove the encoder and the wheel hubs.
Remove the 4 screws holding the encoded to the adapter.
Hold on to the encoder as you remove the last screws to make sure that it does not fall and get damaged.

Pull the encoder straight out taking care not to jar the coupling.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Remove the plug in the top of the adapter.



Remove the 4 screws that hold the adapter in place.

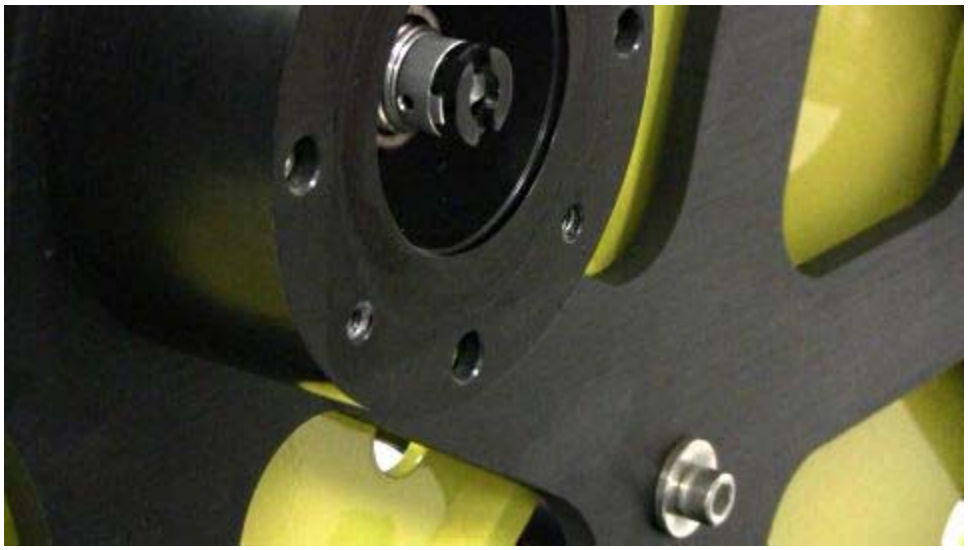
5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

The adapter fits snugly into a recess on the hub and often needs a nudge to come loose.
Use a rubber hammer and gently tap on the corner to break it loose.

The O ring may come loose when the adapter is removed.
Note the lip on the back of the adapter – it aligns with the groove on the hub.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

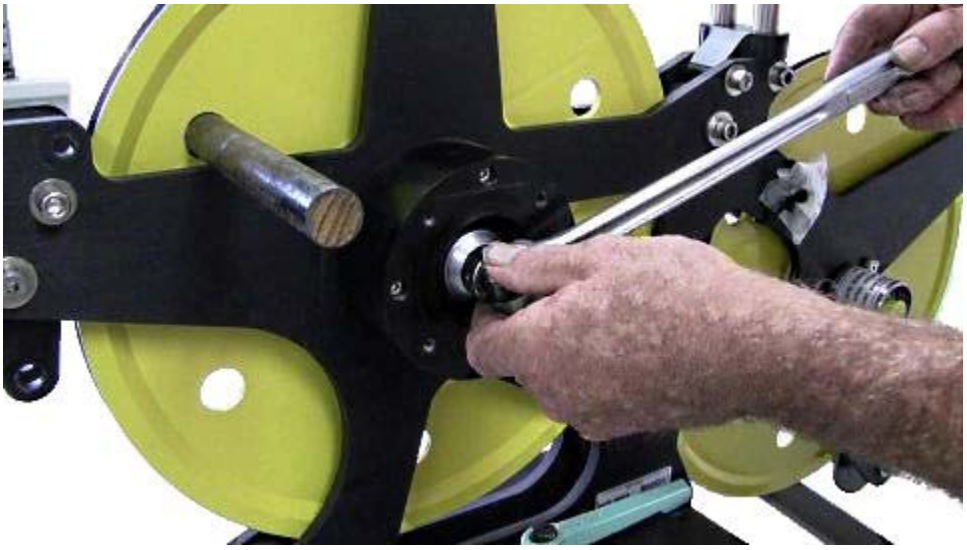
With the adapter removed we can now see the shaft inside the hub.



Next we need to remove the encoder coupling.
Use the small Allen wrench to loosen the 2 set screws that hold the coupling on the shaft and slide the coupling off the shaft.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Take a wooden dowel about the size of a broom handle and put it through a hole in the measuring wheel to stop it from rotating while the large nut is removed from the shaft. Use the 1 7/16 socket and loosen and remove the nut.

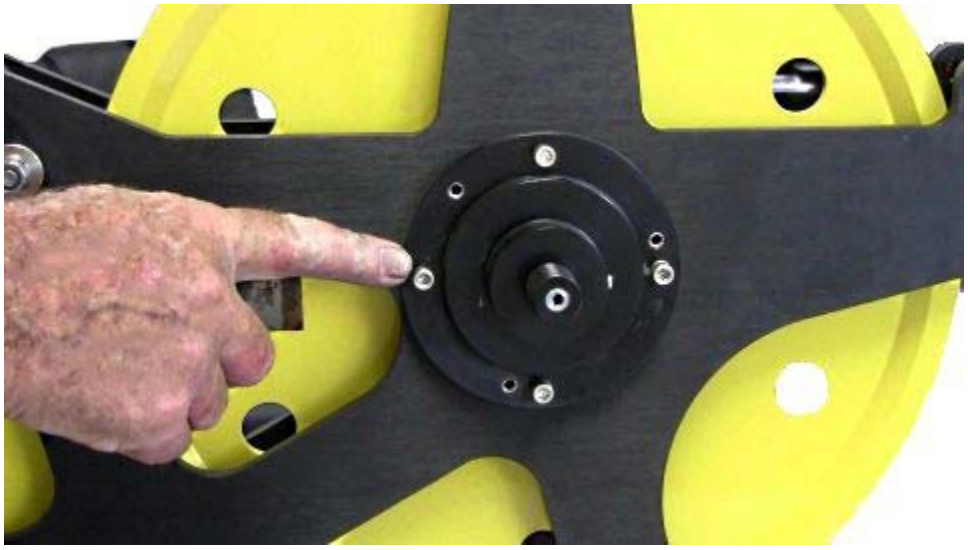


NOTE - If you're **NOT** replacing the bearings, leave this hub in place and after the shaft is removed simply remove the wheel.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

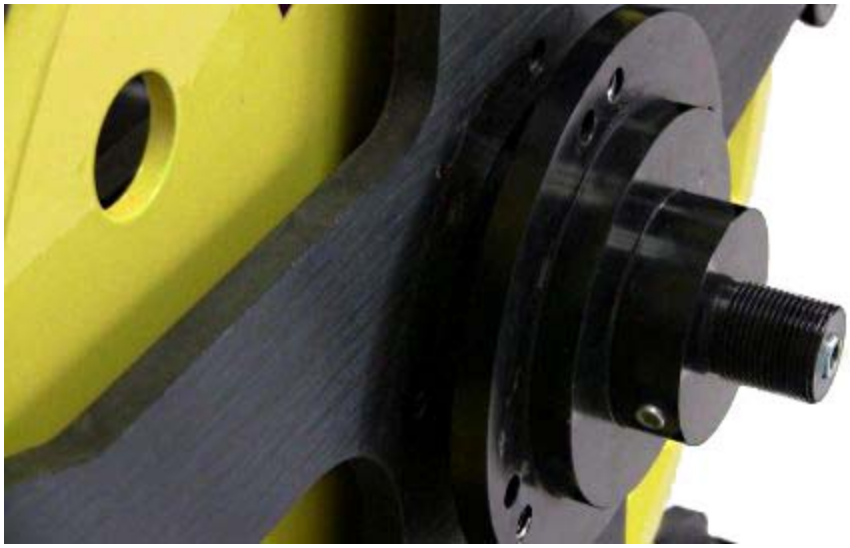
If you **ARE** replacing the bearings, loosen and then remove all 4 screws and then remove the hub from the frame.

The other half of the hub assembly is on the other side of the frame.
Take the dowel out of the wheel.
Loosen and remove all 4 screws that attach the hub to the frame.



5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

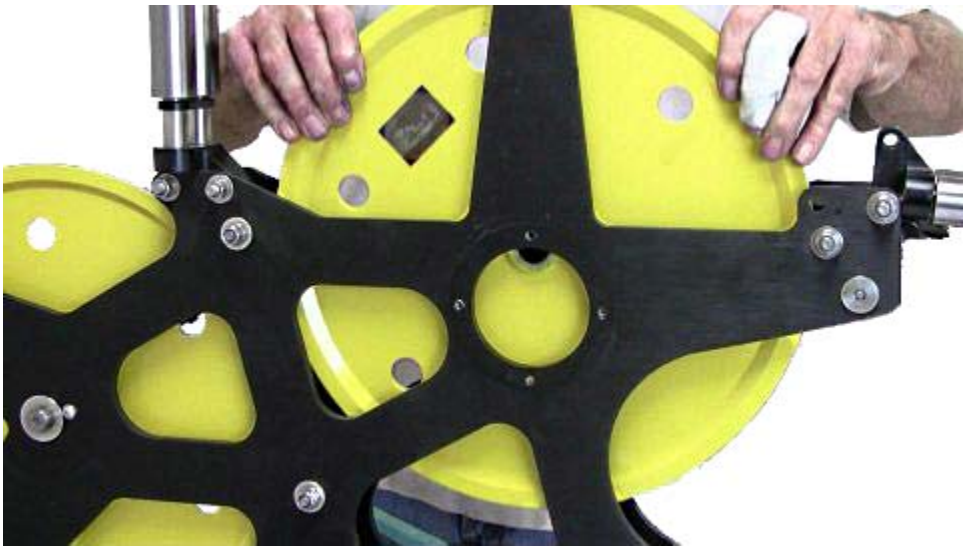
Hold the measuring wheel and remove the hub and shaft assembly – you will probable have to tap on the shaft from the encoder side to get it to come out.



Remove the shaft from the wheel.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

The measuring wheel is now free to be removed if necessary.



NOTE - While the wheel is free, it may be advisable to replace the wheel bearing. That procedure is described in detail in 5.3.3

The next steps show how to **Reinstall** the wheel.
Place the wheel in the frame and allow it to rest there.
Note the keyway in the wheel hub and the key on the shaft.

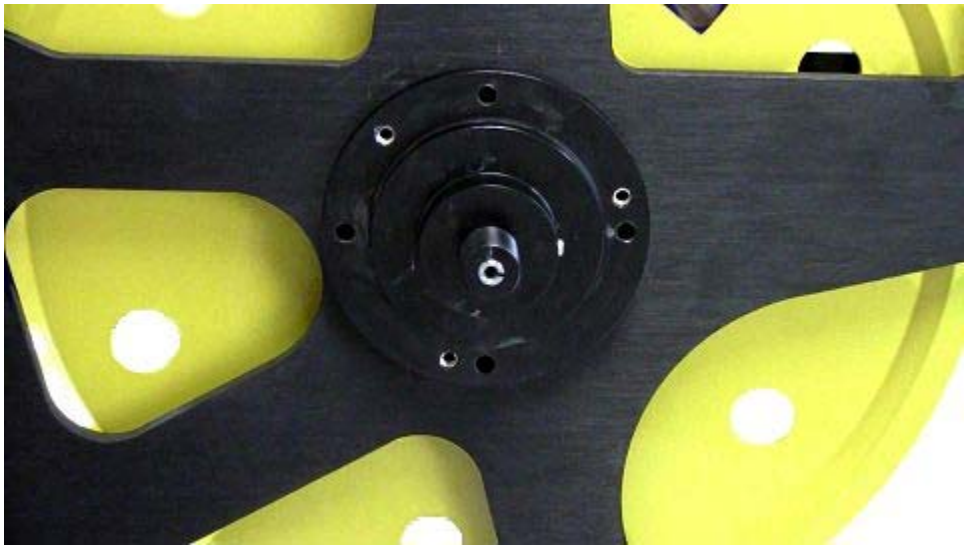
5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

When reinstalling the shaft, rotate it so that the key goes in the keyway.

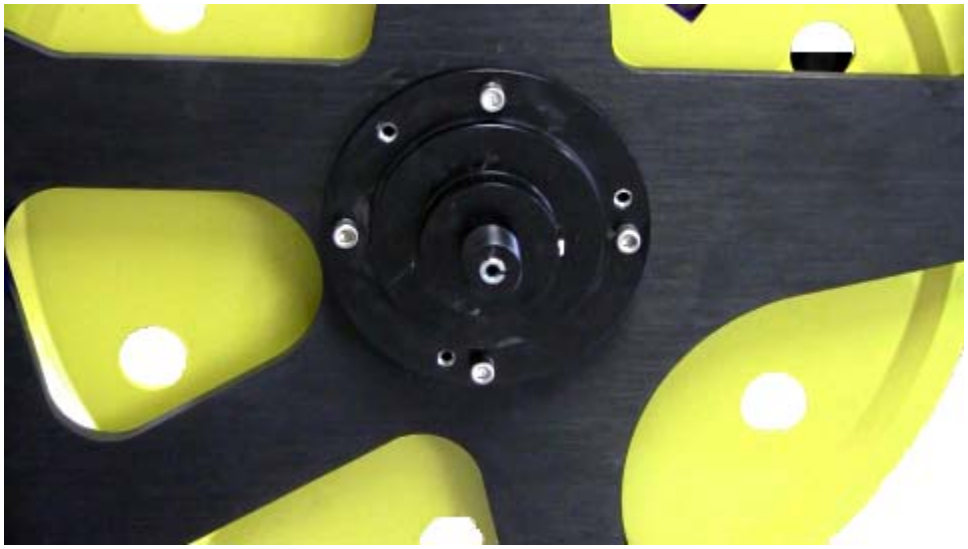
Now place the hub into the frame.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Rotate the hub so that the grease fitting faces to the right and the 4 screw holes on the hub align with the holes on the frame.



Insert the 4 screws finger tight only at this time.



5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

On the encoder side of the frame, if the hub was removed, you'll need to reinstall it. Rotate the hub to align the screw holes on the hub and the frame.

Reinstall and tighten the 4 screws on the hub.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

On the other side of the frame, tighten the 4 screws holding that hub in place.
Back on the encoder side replace the large retainer nut on the shaft.
Reinsert the large wooden dowel in the wheel and tighten the nut with the wrench.

Remove the wooden dowel and rotate the measuring wheel to verify proper installation.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Note that the small end of shaft has a flat side.

Replace the coupling on the small shaft.
Align one of the set screws to the flat side of the shaft.
Tighten both set screws.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Lubricate and replace the O ring on the adapter – DC111 lubricant works well in this application.

Replace the adapter and all 4 screws – tighten the screws firmly.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

NOTE – if you are reinstalling the **Same Encoder**, use this procedure.
If you are installing a **New Encoder** use the procedure in 5.3.1

Rotate the measuring wheel so that the tang on the coupling is horizontal.

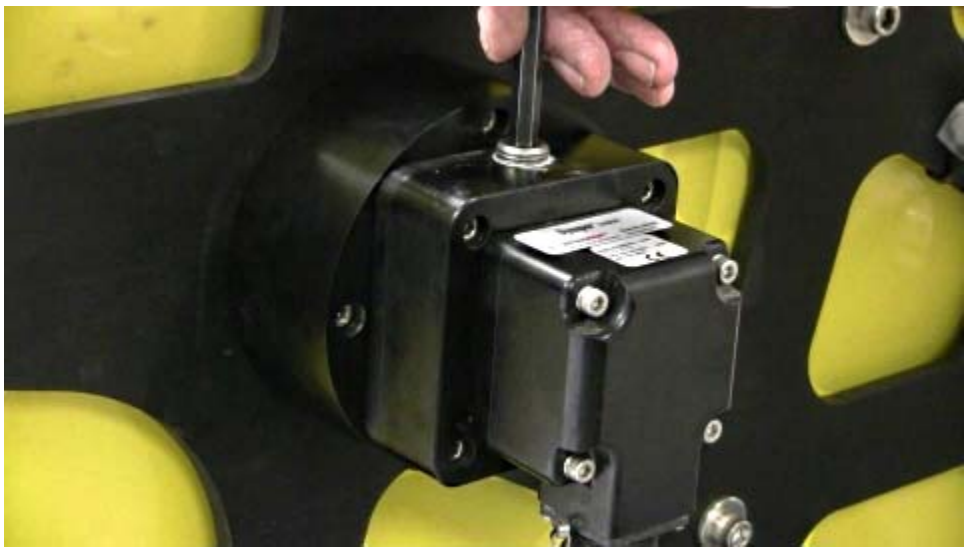
Rotate the other end of the coupler on the encoder to vertical.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Replace the encoder while looking through the plug hole on the top and rotating the measuring wheel as necessary to get the 2 parts of the coupling to mesh.

Replace and tighten the 4 screws holding the encoder in place.

Replace the plug in the adapter.



5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Reposition the guide rollers.

Replace the bolt and tighten both bolts.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

When replacing the keeper roller, make sure you have a flat washer on each side of the roller.

When replacing the pressure wheel, you must compress the tensioner to allow the bolt to go into the wheel – tighten the bolt.

5.3.2 MEASURING WHEEL - WHEEL REPLACEMENT continued

Test the installation by rotating the wheels.

5.3.3 MEASURING WHEEL - BEARING REPLACEMENT

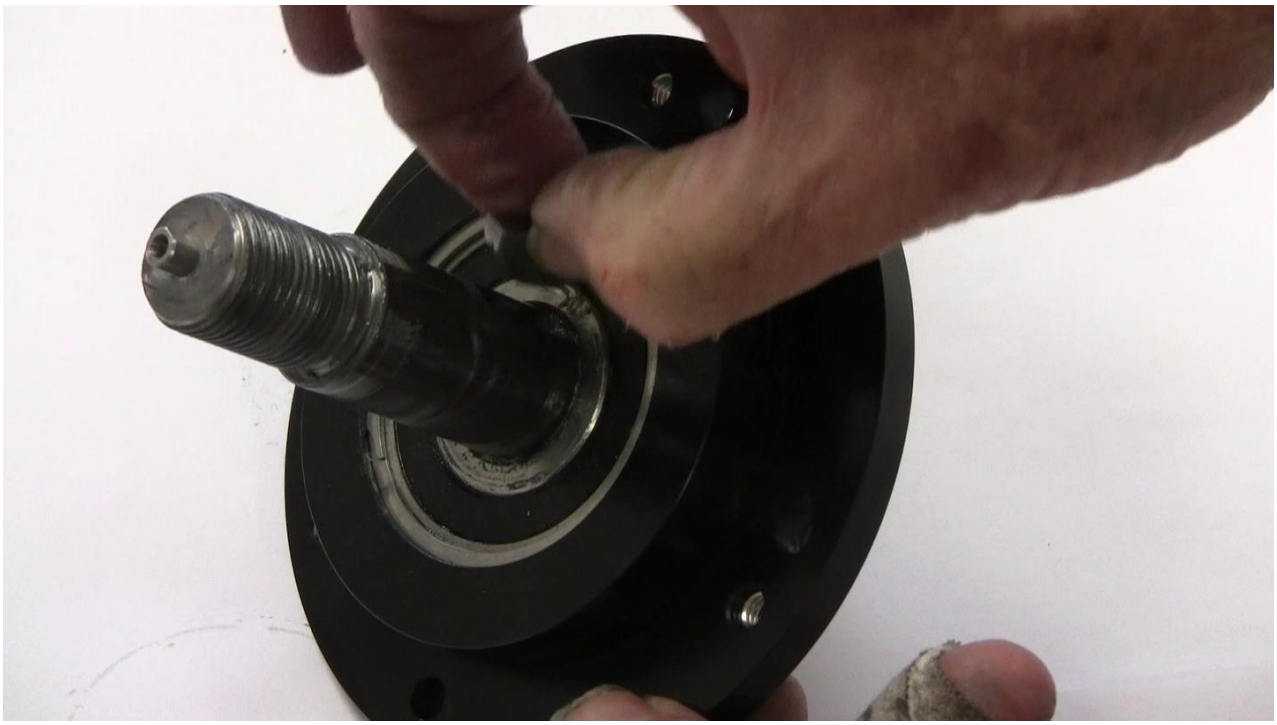
There are 2 bearings in the measuring wheel. 1 is on the shaft and the other is inside this hub. Both will need to be replaced.

Remove the retainer clip that holds the bearing in place in the hub.
It can normally be removed and replaced with no special equipment.
Install the new bearing and the retainer clip.

NOTE – make sure that the small lubrication hole on the outside bearing race is lined up with the grease fitting on the hub or the bearing won't be lubricated and will fail.

5.3.3 MEASURING WHEEL - BEARING REPLACEMENT continued

The other bearing is on the shaft.
First remove the key from the shaft.



Now remove the retainer clip for this bearing.

5.3.3 MEASURING WHEEL - BEARING REPLACEMENT continued

You now need to press the shaft and the bearing out of the hub.
You will usually need a press to both remove and reinstall the bearing and shaft.
Set up your press to allow pressing the shaft and bearing out through the bottom of the hub.

Get a punch of smaller diameter than the shaft and press out the shaft.

5.3.3 MEASURING WHEEL - BEARING REPLACEMENT continued

Be sure to catch the shaft – clean off any lubricant on the bearing and shaft.

Protect the small threaded end of the shaft by putting a nut over it to press on. Press the shaft out of the bearing.

Place the new bearing on the shaft and snug as much as possible manually.

5.3.3 MEASURING WHEEL - BEARING REPLACEMENT continued

NOTE – make sure that the small lubrication hole on the outside bearing race is lined up with the grease fitting on the hub or the bearing won't be lubricated and will fail.

Place the shaft and bearing in the hub so that you can see the small end of the shaft protruding out of the hub…this will indicate that the shaft is properly aligned in the hub.

You will now press the bearing with the shaft in it, into the hub.

5.3.3 MEASURING WHEEL - BEARING REPLACEMENT continued

Verify that the shaft is properly aligned in the hub.
If the shaft spins easily, then it is properly installed.

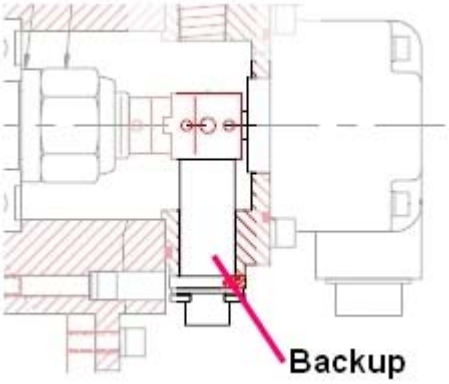
Now replace the key in the shaft.
The shaft is ready to be inserted in the wheel hub.

For instructions on reinstalling the shaft in the wheel, go to 5.3.2

5.3.4 BACKUP DEPTH MAGNETIC PICKUP REMOVAL AND INSTALLATION

The backup depth magnetic pickup is mounted to the encoder adapter. It is held in place by four screws. Remove the screws and the pickup can then be removed. The pickup must be properly oriented to work correctly. The slot should be oriented to the top. The top side is the encoder side. Ensure that an o-ring is inserted between the plastic housing and the mount. An additional o-ring is used between the connector and the housing to keep moisture out.

If the backup display is counting backward (i.e. counting negative when going down hole), simply rotate the pickup 180 degrees to change the direction.



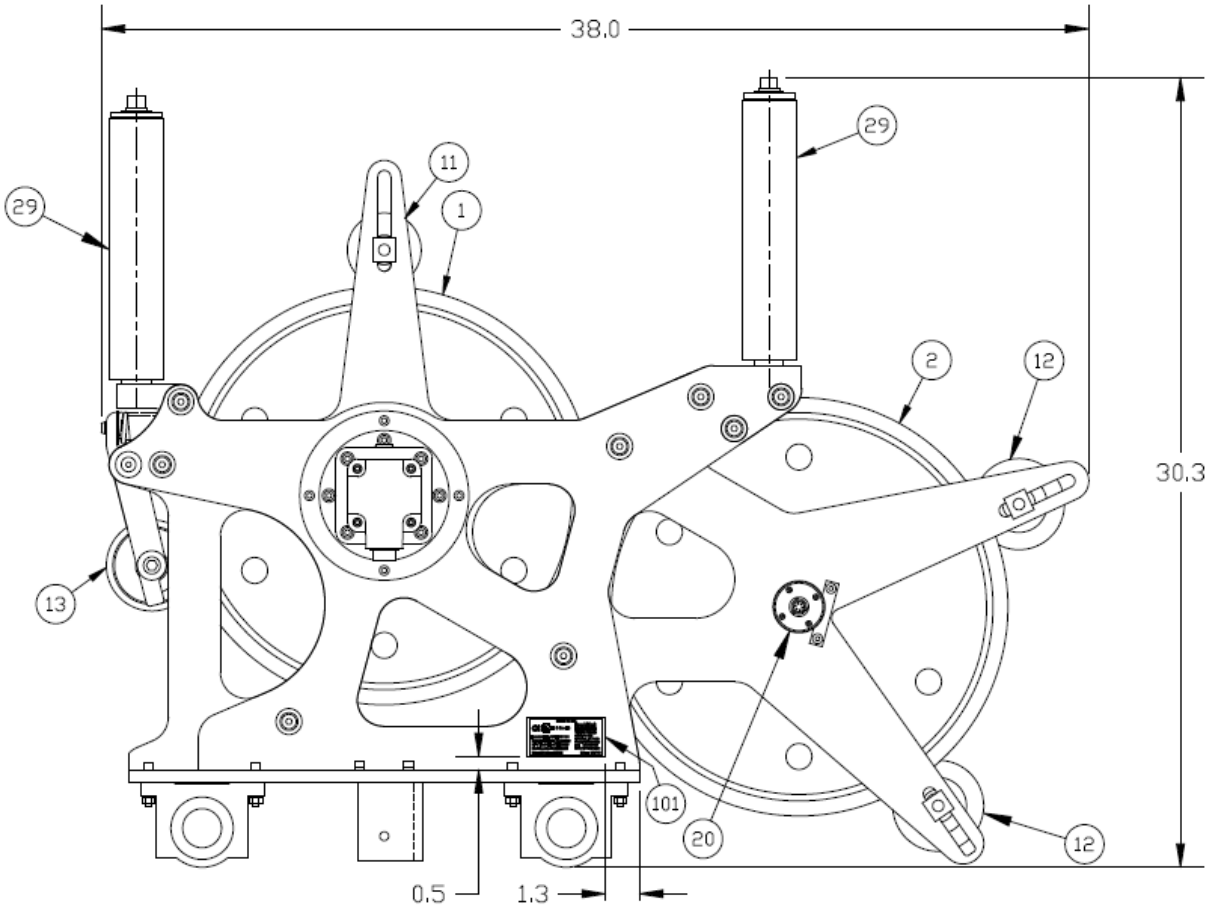
5.4 DRAWINGS – PARTS LISTS – SPARE PARTS

5.4.1 GENERAL ARRANGEMENT PARTS LIST - AMSLA MEGAMOUTH

ITEM	P/N	DESCRIPTION	QTY.	REF
0	AMSLA400	COUNTER ASSY 2 WHL 4 FT MMOUTH 9000# BASE MODEL	1	
1	AMSLM059	WHEEL MEASURING 4FT 0.092-1/4	0	OPTION
1	AMSLM410	WHEEL MEASURING 1.25M 0.105/ 0.108 30MM SHAFT MEGAMOUTH	0	OPTION
1	AMSLM412	WHEEL MEASURING 1.25M 0.125 30MM SHAFT MEGAMOUTH	0	
1	AMSLM419	WHEEL MEASURING 1.25M 3/16 30MM SHAFT MEGAMOUTH	0	OPTION
2	AMSLA160	WHEEL ASSY TENS 4FT 1/4 BR LIN 2 WHEEL COUNTER	1	
4	AM3KM040	ADAPTER ENCODER H25D/H20 MAG BACKUP	0	OPTION
4	AM5KM057	ADAPTER ENCODER H37C/H25D	0	OPTION
11	AMSLM433	ROLLER KEEPER MEGAMOUTH	1	
12	AMSLA162	WHEEL ASSY PRESS RLR 1/4 TENSN W/BEARING	2	
13	AMSLA163	WHEEL ASSY PRESS RLR 1/4 MEASR W/BEARING	1	
20	AMSLA110B	ASSY LOAD AXLE 0-1.5V 1 IN DIA 0-9000# KPT 16 8 PIN Exn	0	OPTION
20	AMSLA115B	ASSY LOAD AXLE 4-20mA 1 IN DIA 9K# LINE PULL 2WIR Exn	0	OPTION
20	AMSLA132A	ASSY LOAD AXLE 2MV/V 1"DIA Z2 KP16-8P PASSIVE 09ATEX41118	0	OPTION
20	AMSLA133A	ASSY LOAD AXLE 2MV/V 1" DIA Z2 P10-6P PASSIVE 09ATEX41118	0	OPTION
20	AMSLA137B	ASSY LOAD AXLE 2MV/V 1"DIA Z2 MS14S 6P PASSIVE 09ATEX41118	0	OPTION
20	AMSLA138A	ASSY LOAD AXLE 2MV/V 1"DIA Z2 CWL18 10P PASSIVE 09ATEX41118	0	OPTION
20	AMSLA187B	ASSY LOAD AXLE 2MV/V 1"DIA Z2 CWL18 10P PASSIVE 09ATEX41118	0	OPTION
21	AM3KM050	COUPLING ENCDR W/BKUP MAGNETS	0	OPTION
29	AMSLM219	ROLLER GUIDE VERT LEVELWIND	4	
49	AM5KA055	ASSY ENCODER BACKUP MAGNETIC	0	OPTION
49	AM5KA058	ASSY ENCDR BACKUP MAG EEx nA	0	OPTION
50	AM5KA068B	ASSY ENCDR 1200 PPR OPTICAL MS16 HES Ex nA ETL09ATEX41123	0	OPTION
50	AM5KA070B	ASSY ENCDR 512/780 PPR OPTICAL KP14 Ex nA ETL09ATEX41123	0	OPTION
50	AM5KA074B	ASSY ENCDR 1200 PPR OPTICAL MS18 Ex nA ETL09ATEX41123	0	OPTION
50	AM5KA079B	ASSY ENCDR 1200 PPR OPTICAL MS16 STD Ex nA ETL09ATEX41123	0	OPTION
50	AM5KA080B	ASSY ENCDR 1200 PPR OPTICAL MS16 BLUE Ex nA ETL09ATEX41123	1	
51	AMS1P090	COUPLING OLDHAM ENCODER *C123 10/26/++15	1	OPTION
101	AMSLM640	LABEL MSR HD SLICKLINE Ex nA ETL10ATEX11131	1	

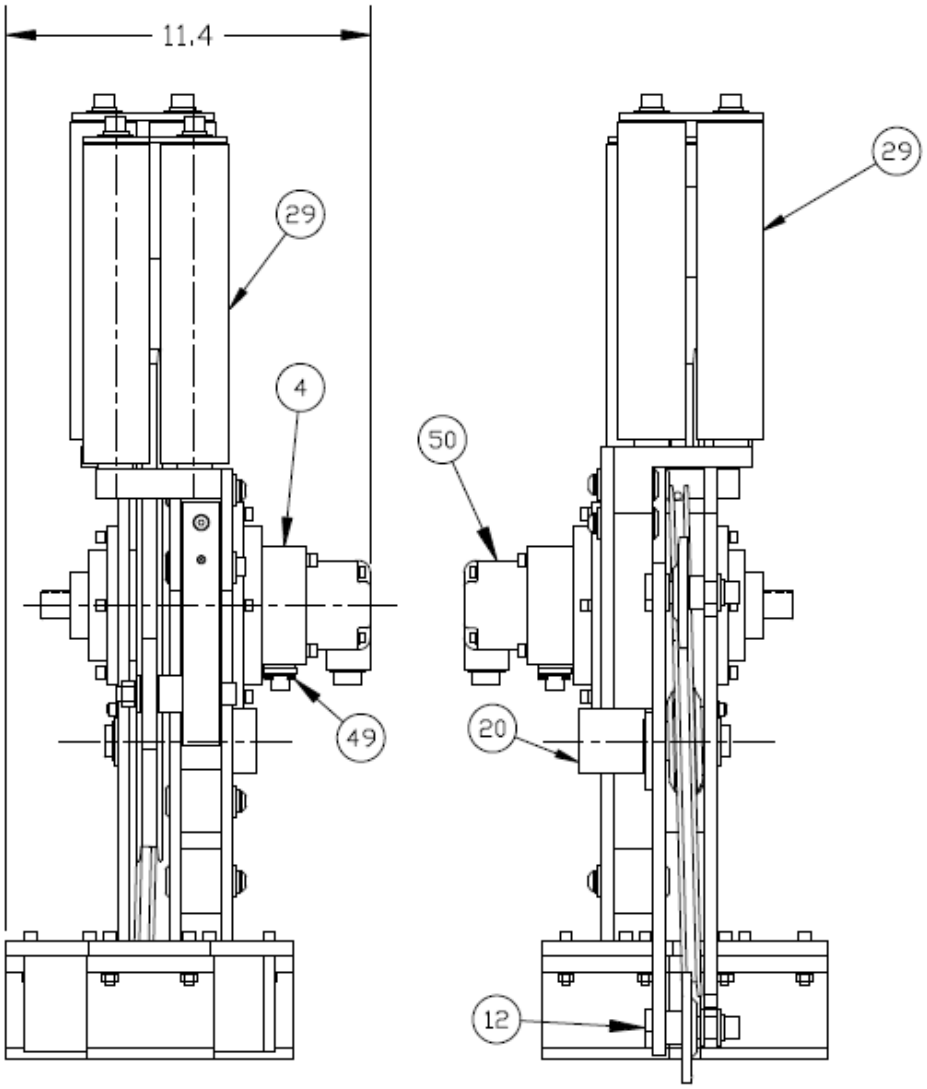
5.4.2 GENERAL ARRANGEMENT DRAWINGS - MEASURING HEAD

AMSLA MEGAMOUTH – ENCODER SIDE VIEW



5.4.2 GENERAL ARRANGEMENT DRAWINGS - MEASURING HEAD continued

AMSLA MEGAMOUTH – END VIEWS



5.4.3 ASSEMBLY DRAWINGS BILL OF MATERIALS - AMSLA MEGAMOUTH

ITEM	P/N	DESCRIPTION	QTY.	REF
1	AMSLM059	WHEEL MEASURING 4FT 0.092-1/4	0	OPTION
1	AMSLM159	WHEEL MEASURING 4FT 0.092-5/16	0	OPTION
2	AMSLA060	WHEEL ASSY TENS 4FT 5/16 2 WHEEL COUNTER	0	OPTION
2	AMSLA160	WHEEL ASSY TENS 4FT 1/4 BR LIN 2 WHEEL COUNTER	0	OPTION
2	AMSLA161	WHEEL ASSY TENSION 4 FT HHD	0	REF
3	AMSLM216	ADAPTER MEASURING WHL SHAFT 30MM ENCODER SIDE MEGAMOUTH	1	
4	AM3KM040	ADAPTER ENCODER H25D/H20 MAG BACKUP	0	OPTION
4	AM5KM057	ADAPTER ENCODER H37C/H25D	0	OPTION
5	AMSLA463	KIT 2ND ENCDR MOUNT MMOUTH	0	OPTION
5	AMSLM122	ADAPTER COUNTER HD RT ANGL DRV 1/4 2 WHL COUNTER	1	
6	AMSLM148	MOUNT GUIDE ROLR FRONT MMOUTH	1	
7	AMSLM239	PLATE BASE OPEN 2-WHL	1	
8	AMSLM221	PLATE SPACER GUIDE ROLLER VERT LEVELWIND SLOTTED	2	
9	AMSLA430	SWIVEL ASSY TURNTABLE W/O LINR BRGS FLAT BTM NO PLAS Z1 MMTH	0	OPTION
9	AMSLA439	SWIVEL ASSY TURNTABLE W/0 LINR BEARINGS MEGAMOUTH	0	OPTION
9	AMSLM044	BRACKET LEVELWIND CHAIN	2	
11	AMSLM433	ROLLER KEEPER MEGAMOUTH	1	
12	AMSLA162	WHEEL ASSY PRESS RLR 1/4 TENSN W/BEARING	0	OPTION
13	AMSLA163	WHEEL ASSY PRESS RLR 1/4 MEASR W/BEARING	0	OPTION
13	AMSLA263	WHEEL ASSY PRESS RLR 5/16 MEAS W/BEARING	0	OPTION
14	AMSLM228	NUT 7/16-14 TEE SLOT SST	3	
15	AMSLM449	GUIDE SPRING PRESS WHL 2WC MEGAMOUTH	2	
16	AMSLM150	MOUNT GUIDE ROLR REAR MMOUTH	1	
17	AMSLM251	MOUNT PIVOT PRESS WHEEL 2WC 11/16 WRENCH	1	
18	AMSLM115	SHAFT MEAS WHL 30MM ENCDR/RT ANGLE DR 1/4 2 WHEEL COUNTER	1	
19	AMSLM085	PLATE ORIENTATION LOAD PIN	1	
20	AMSLA110B	ASSY LOAD AXLE 0-1.5V 1 IN DIA 0-9000# KPT 16 8 PIN Exn	0	OPTION
20	AMSLA115B	ASSY LOAD AXLE 4-20mA 1 IN DIA 9K# LINE PULL 2WIR Exn	0	OPTION
20	AMSLA132A	ASSY LOAD AXLE 2MV/V 1"DIA Z2 KP16-8P PASSIVE 09ATEX41118	0	OPTION
20	AMSLA133A	ASSY LOAD AXLE 2MV/V 1" DIA Z2 P10-6P PASSIVE 09ATEX41118	0	OPTION
20	AMSLA137B	ASSY LOAD AXLE 2MV/V 1"DIA Z2 MS14S 6P PASSIVE 09ATEX41118	0	OPTION
20	AMSLA138A	ASSY LOAD AXLE 2MV/V 1"DIA Z2 CWL18 10P PASSIVE 09ATEX41118	0	OPTION
20	AMSLA187B	ASSY LOAD AXLE 2MV/V 1"DIA Z2 CWL18 10P PASSIVE 09ATEX41118	0	OPTION

5.4.3 ASSEMBLY DRAWINGS BILL OF MATERIALS - AMSLA MEGAMOUTH cont'd

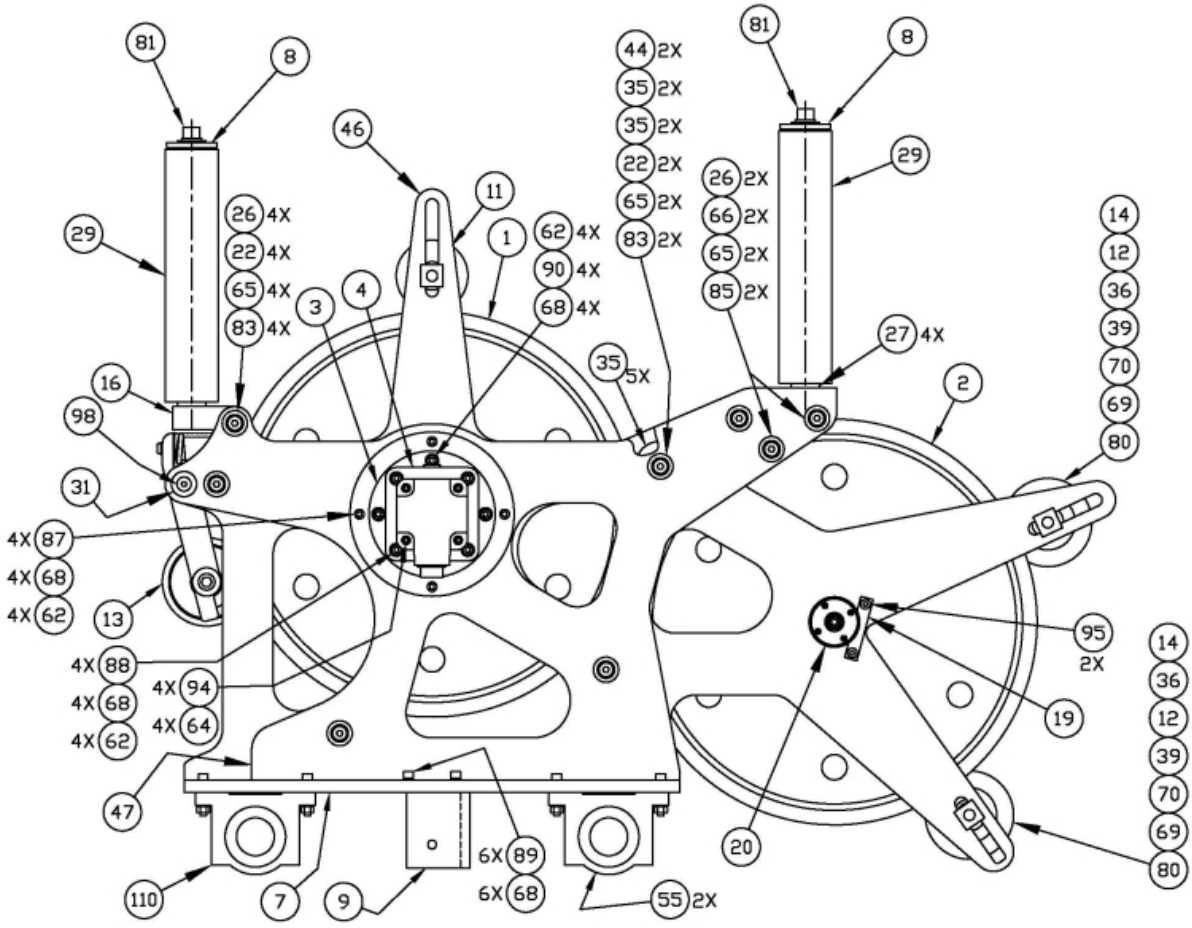
ITEM	P/N	DESCRIPTION	QTY.	REF
21	AM3KM050	COUPLING ENCDR W/BKUP MAGNETS	0	OPTION
22	AMSLM030	BUSHING FRAME 2 WHEEL COUNTER	6	
23	AMSLM131	BUSHING TENSION WHEEL 1 IN L/P	2	
24	AMSLM065	BUSHING L/P 1IN W/ANTI-ROTATN 1/4 BRAIDED LINE	1	
25	AMSLM114	SPACER .90ID X 1.50D X .250W M WHL SHAFT SST	1	
26	AMSLM230	BUSHING FRAME 3/8-16 SHARK	6	
27	AMSLM217	SHAFT GUIDE ROLLER VERT LVLWND	4	
28	AMSLM218	TBG SPACER GUIDE ROLLER LVLWND	4	
29	AMSLM219	ROLLER GUIDE VERT LEVELWIND	4	
30	AMSLM084	SCREW ANTI-ROTATION TENS WHEEL	1	
31	AMSLM053	BUSHING FLANGE PRESS WHEL 3/8 ID X 3/4 OD SST	1	
32	AMSLM055	BUSHING FLANGE PRESS WHEL 5/16 -18 THD X 3/4 OD SST	1	
33	AMS1P072	PLUG 3/8 NPT SS	1	
34	AMSLM434	SPACER KEEPER ROLLER UNIVERSAL	1	
35	AMSLM040	SPACER FRAME 2 WHEEL COUNTER	5	
36	AMSLM480	SPACER PRESSURE WHEEL 0.52 THK	2	
38	AMSLP112	BEARING BALL 12MM SST 2X EXTENDED INNER RING	0	REF, PRESS WHLS
39	AMSLM283	SPACER KEEPER ROLLER 0.34 THK 0.69 OD SST	3	
40	AMSLM282	SPACER PRESSURE WHEEL 0.76 THK 1-1/8 OD M WHL SST	1	
41	AMSLM134	PLATE WEAR MEGAMOUTH	1	
44	AMSLM229	BUSHING FRAME TUBE	2	
45	AMSLM145	PLATE FRAME OPEN SIDE MMOUTH	1	
46	AMSLM146	PLATE FRAME MIDDLE MMOUTH	1	
47	AMSLM147	PLATE FRAME OUTER MMOUTH	1	
48	AMSLP022	RING RETNG INT 3.562 LT DUTY .039 THICK SST	2	
49	AM5KA055	ASSY ENCODER BACKUP MAGNETIC	0	OPTION
49	AM5KP046	PLUG FREEZE 3/4 DIA BRASS	0	OPTION
50	AM5KA068B	ASSY ENCDR 1200 PPR OPTICAL MS16 HES Ex nA ETL09ATEX41123	0	OPTION
50	AM5KA070B	ASSY ENCDR 512/780 PPR OPTICAL KP14 Ex nA ETL09ATEX41123	0	OPTION
50	AM5KA074B	ASSY ENCDR 1200 PPR OPTICAL MS18 Ex nA ETL09ATEX41123	0	OPTION
50	AM5KA079B	ASSY ENCDR 1200 PPR OPTICAL MS16 STD Ex nA ETL09ATEX41123	0	OPTION
50	AM5KA080B	ASSY ENCDR 1200 PPR OPTICAL MS16 BLUE Ex nA ETL09ATEX41123	1	
51	AM5KM073	COUPLING MOD ENCDR 0.250/0.375	0	OPTION
51	AMS1P090	COUPLING OLDHAM ENCODER C123 10/26/++15	0	OPTION
52	AMSLP040	BEARING SPHERE-ROL 50MM ID MCGILL W/SEALS	1	
53	AMSLP030	BEARING BALL 30MM 2-ROW SST	2	
54	AM3KP204	BEARING BALL 20MM SST ABEC-1 REPLACES C276P002	8	
55	AMSLP005	BEARING PILLOW BLOCK 1-1/2 COMPENSATED	2	

5.4.3 ASSEMBLY DRAWINGS BILL OF MATERIALS - AMSLA MEGAMOUTH cont'd

ITEM	P/N	DESCRIPTION	QTY.	REF
56	AMSLP009	BEARING BRZ FLANGED 3/8" ID X 1/4L OIL IMPREGNATED	2	
57	AMSLP100	RING RETNG EXT 1.000 SHAFT SST	1	
58	AM5KP168	RING RETNG INT 2.875 LT DUTY .039 THICK SST	2	
59	AMSLP278	SPRING COMP 2.00 OAL 1.218 OD GROUND ENDS SST	1	
60	AMSLP015	KEY 1/4 X 7/8 WOODRUFF SST 807	1	
61	AM5KP250	INSERT 1/4-20 HELI-COIL #R1185 -250	3	
62	C276P014	INSERT 1/4-20 HELI-COIL #R1185 -375	7	
63	C276P046	WASHER #6 LOCK SS	4	
64	C276P035	WASHER #10 LOCK SS	8	
65	AMS1P058	WASHER 3/8 LOCK SS	8	
66	C276P513	WASHER 3/8 FLAT SST	2	
67	C276P036	WASHER 1/4 LOCK SS	5	
68	AM5KP144	WASHER 1/4 LOCK SS HIGH COLLAR 0.363 OD X .093 THK	2	
69	AMSLP047	WASHER 7/16 LOCK SST	8	
70	AMSLP247	WASHER 7/16 HEAVY FLAT SST	7	
71	AMS1P014	O-RING 2-152 BUNA N ENC ADPTR 3-1/4 X 3-7/16 X 3/32	1	ENCODER ADAPTER
72	AM5KP071	O-RING 2-141 BUNA N H25 ENCDR 2 5/16 x 2 1/2 x 3/32	1	ENCODER
73	C276P042	O-RING 2-016 BUNA N 5/8 X 3/4 X 1/16	0	BACKUP CONNECTOR
74	C276P041	O-RING 2-017 BUNA N 11/16 X 13/16 X 1/16	0	BACKUP HOUSING
75	C276P016	NUT 1/4-20 HEX SST	2	
77	AMSLP059	NUT 7/16-14 SST	1	
78	C276P021	NUT 7/8-14 ELASTIC STOP SST 1-1/4 HEX 63/64 HIGH	1	
79	AMSLP242	SCREW 7/16-14 X 3-1/2 SOC HD CAP SST	1	
80	AMSLP057	SCREW 7/16-14 X 2-1/2 SOC HD CAP SST	3	
81	AMSLP058	SCREW 7/16-14 X 1 SOC HD CAP SST	4	
83	AMSLP067	SCREW 3/8-16 X 2-1/4 BUT HD SS	6	
85	AMSLP069	SCREW 3/8-16 X 1-3/4 BUT HD SS	2	
87	AMS1P048	SCREW 1/4-20 X 3/4 SOC HD SST	4	
88	AM3KP027	SCREW 1/4-20 X 1-1/2 SOC HD SS	3	
89	AMSLP025	SCREW 1/4-20 X 1 SOC HD SST	6	
90	AM3KP026	SCREW 1/4-20 X 2 SOC HD CAP SS	4	
91	ACMU2P31	WASHER 1/4 FLAT 5/8OD SST	1	
92	C276P030	SCREW 1/4-20 X 1 FH SOC SST	9	
93	AMS4P870	SCREW 1/4-20 X 3/4 BTN HD SST	1	
94	AMS1P053	SCREW 10-24 X 2 SHCS SST 0.5102	4	
95	AM5KP045	SCREW 10-24 X 1/2 FH SOC SST	2	
96	ALS3P025	SCREW 10-24 X 1/2 BTN HD SST	4	
97	C276P331	SCREW 6-32 X 1/2 PHIL PAN SST	4	
98	AMSLP023	BOLT SHOULDER 3/8 X 1-3/4 SST 5/16-18 THD	1	
99	AM5KP129	FITTING GREASE FLUSH STRAIGHT STL	3	
110	100013033	BEARING PILLOW BLK LINEAR 1.50 ID OIL IMPREGNATED BRONZE	1	
111	AM5KP130	NOZZLE GREASE FITTNG FLUSH	1	NOT SHOWN

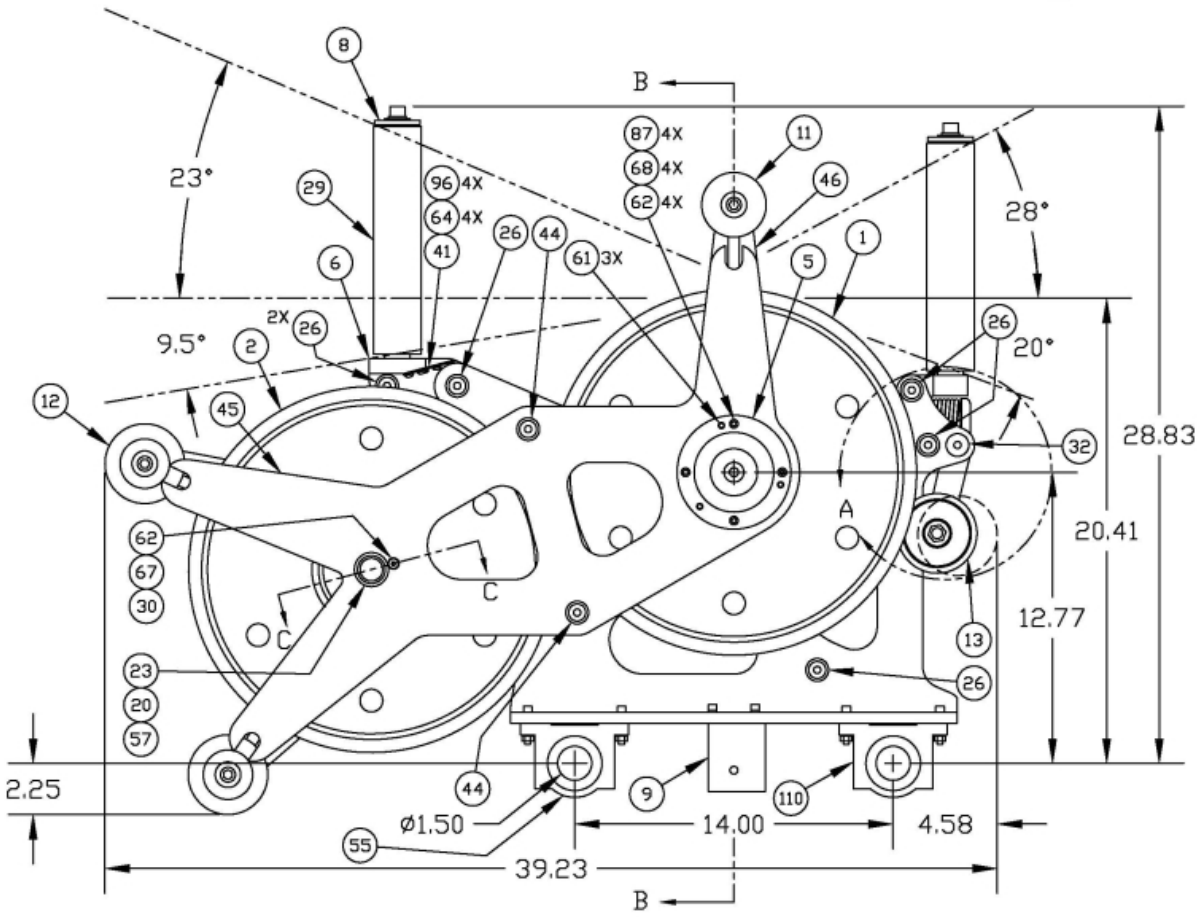
5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD

AMSLA MEGAMOUTH – ENCODER SIDE VIEW



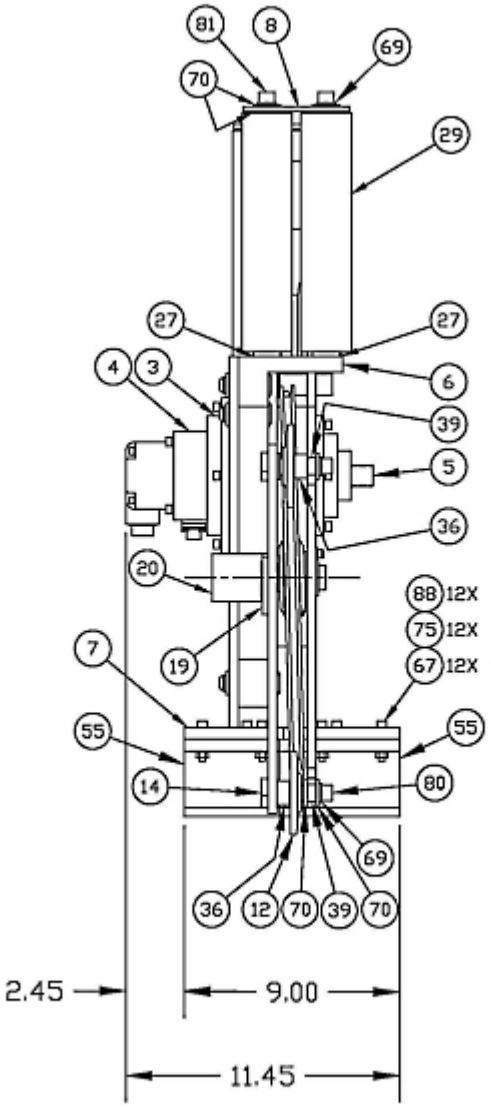
5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA MEGAMOUTH – FLAT SIDE VIEW



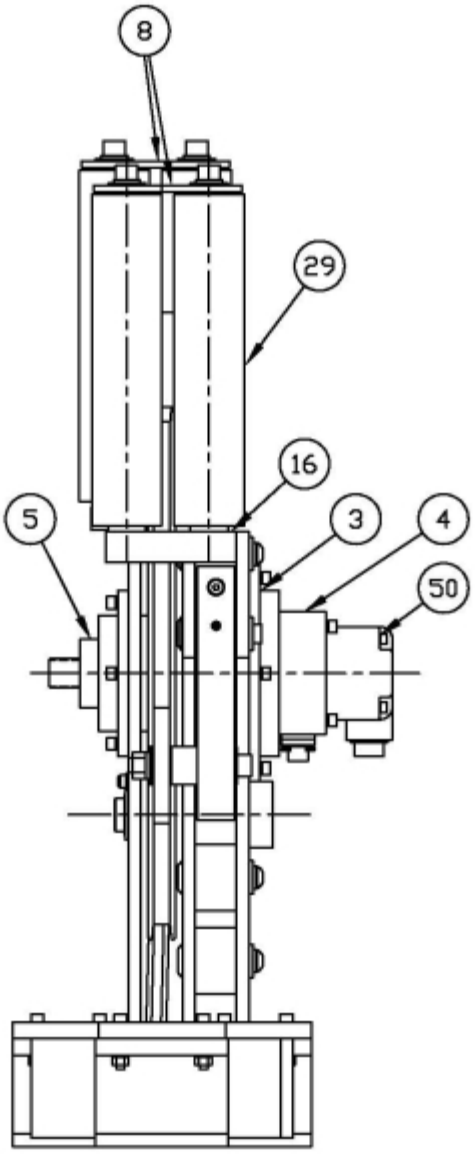
5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA MEGAMOUTH – FRONT VIEW



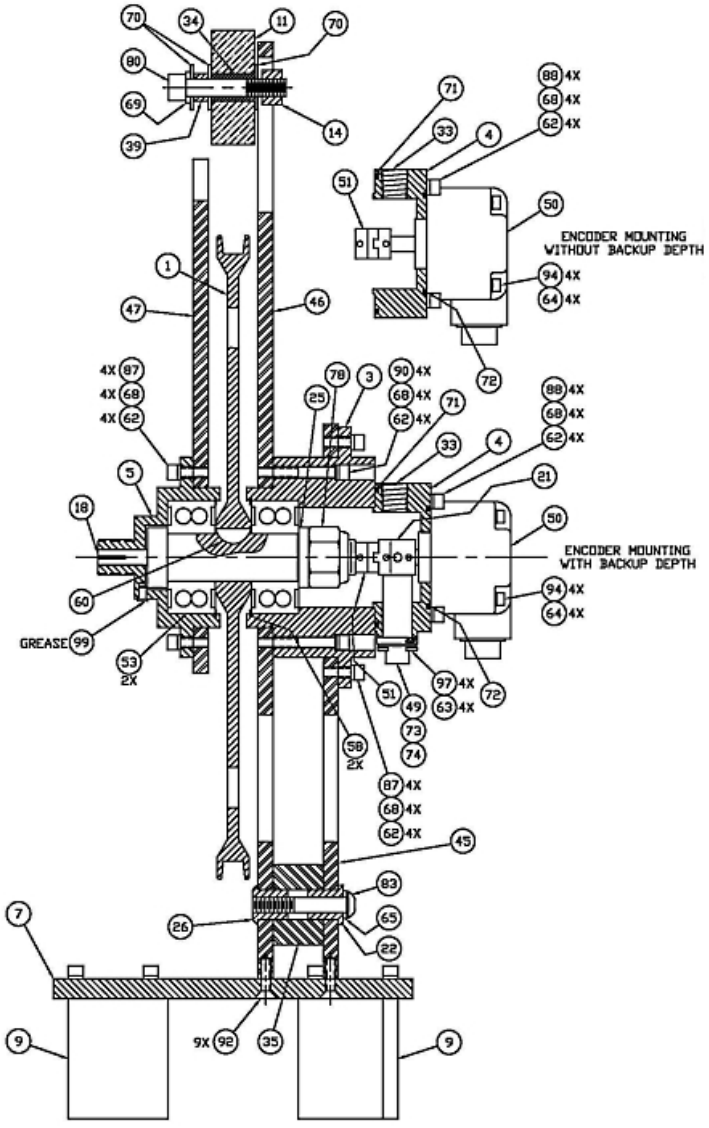
5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA MEGAMOUTH – REAR VIEW



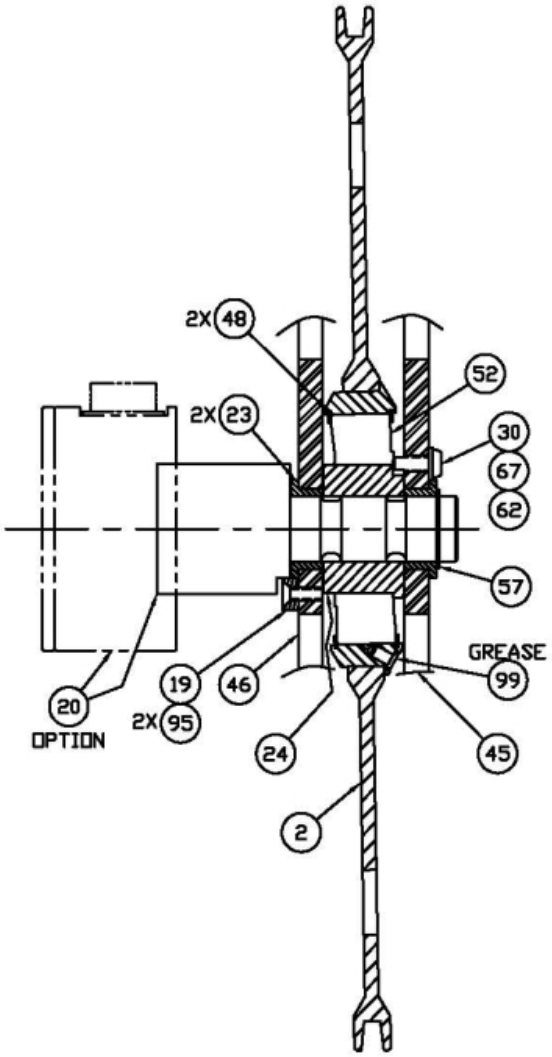
5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA MEGAMOUTH – MEASURING WHEEL



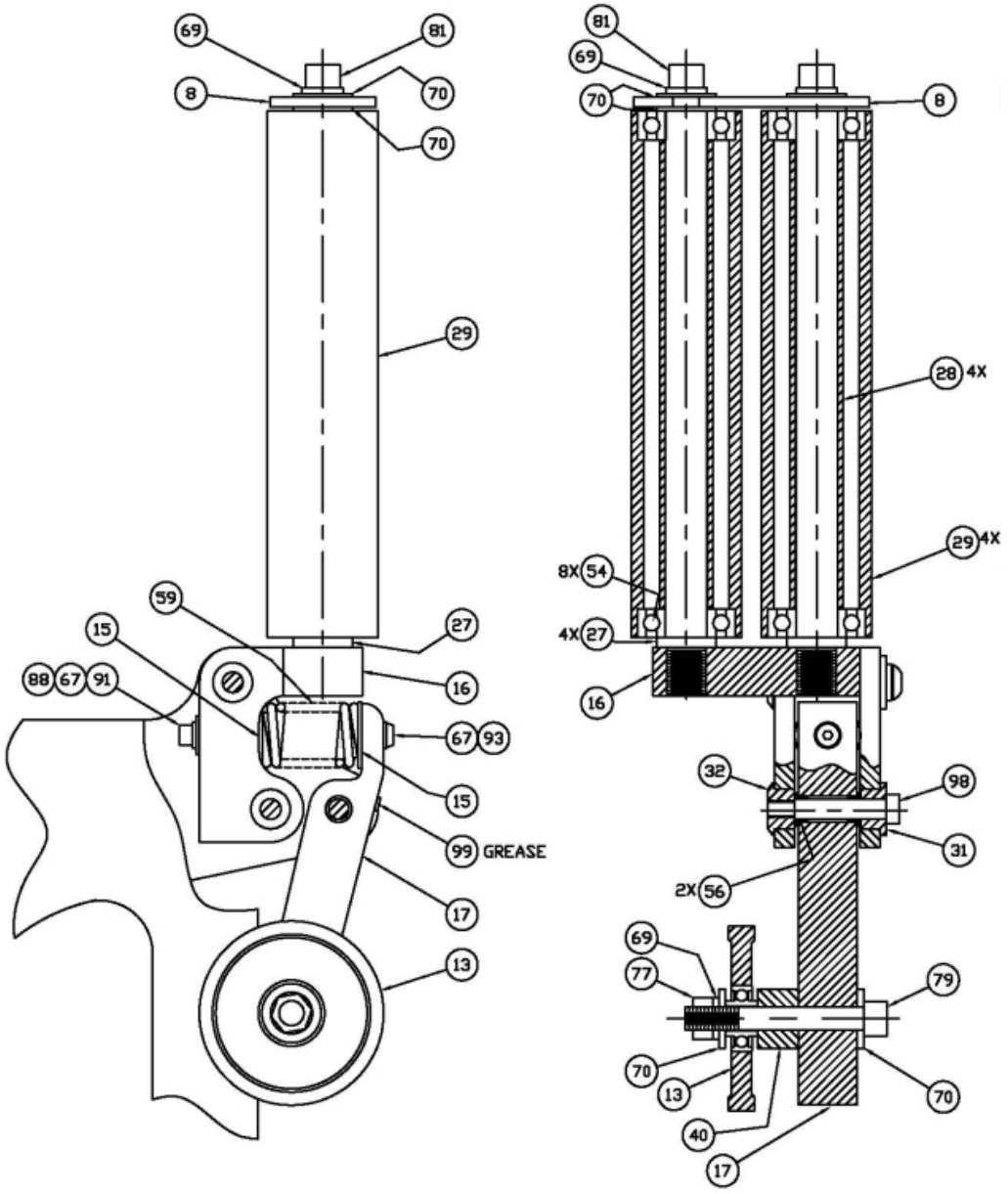
5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA MEGAMOUTH – TENSION WHEEL



5.4.4 ASSEMBLY DRAWINGS - MEASURING HEAD continued

AMSLA MEGAMOUTH – GUIDE ROLLERS

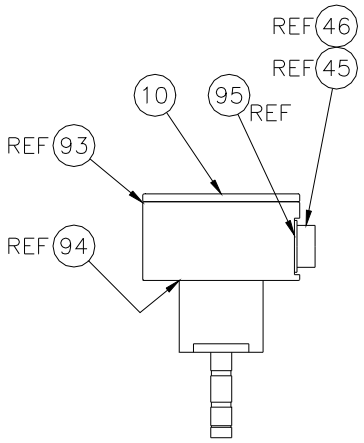


5.4.5 RECOMMENEDED SPARE PARTS – AMSLA MEGAMOUTH

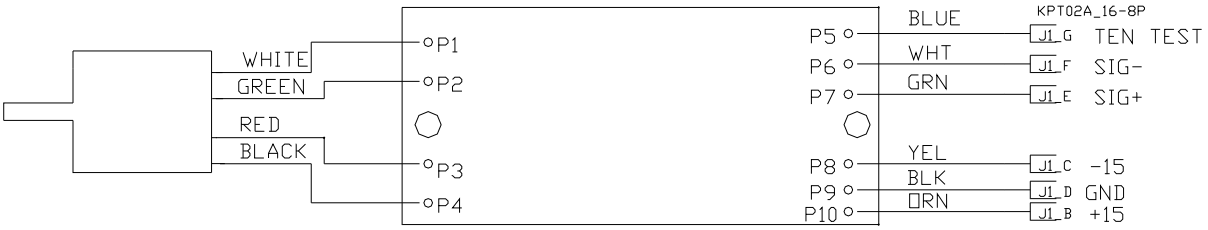
Following is a list of recommend spare parts. Stocking parts designated as REMOTE is recommended only for areas that have a very difficult time getting parts shipped to. For all other areas, it should not be necessary to stock the REMOTE parts locally.

ITEM	P/N	DESCRIPTION	QTY	REF
1	AMSLM059	WHEEL MEASURING 4FT 0.092-1/4	1	REMOTE
2	AMSLA160	WHEEL ASSY TENS 4FT 1/4 BR LIN	1	REMOTE
4	AM3KM040	ADAPTER ENCODER H25D/H20 MAG	1	
12	AMSLA162	WHEEL ASSY PRESS RLR 1/4 TENSN	1	
13	AMSLA163	WHEEL ASSY PRESS RLR 1/4 MEASR	1	
20	AMSLA110B	ASSY LOAD AXLE 0-1.5V 1 IN DIA 0-9000# KPT 16 8 PIN Exn	0	REMOTE
20	AMSLA115B	ASSY LOAD AXLE 4-20mA 1 IN DIA 9K# LINE PULL 2WIR Exn	0	REMOTE
20	AMSLA132A	ASSY LOAD AXLE 2MV/V 1"DIA Z2 KP16-8P PASSIVE 09ATEX41118	0	REMOTE
20	AMSLA133A	ASSY LOAD AXLE 2MV/V 1" DIA Z2 P10-6P PASSIVE 09ATEX41118	0	REMOTE
20	AMSLA137B	ASSY LOAD AXLE 2MV/V 1"DIA Z2 MS14S 6P PASSIVE 09ATEX41118	0	REMOTE
20	AMSLA138A	ASSY LOAD AXLE 2MV/V 1"DIA Z2 CWL18 10P PASSIVE 09ATEX41118	0	REMOTE
20	AMSLA187B	ASSY LOAD AXLE 2MV/V 1"DIA Z2 CWL18 10P PASSIVE 09ATEX41118	0	REMOTE
21	AM3KM050	COUPLING ENCDR W/BKUP MAGNETS	1	
49	AM5KA055	ASSY ENCODER BACKUP MAGNETIC	0	REMOTE
49	AM5KA058	ASSY ENCDR BACKUP MAG EEx nA	0	REMOTE
50	AM5KA068B	ASSY ENCDR 1200 PPR OPTICAL MS16 HES Ex nA ETL09ATEX41123	0	REMOTE
50	AM5KA070B	ASSY ENCDR 512/780 PPR OPTICAL KP14 Ex nA ETL09ATEX41123	0	REMOTE
50	AM5KA074B	ASSY ENCDR 1200 PPR OPTICAL MS18 Ex nA ETL09ATEX41123	0	REMOTE
50	AM5KA079B	ASSY ENCDR 1200 PPR OPTICAL MS16 STD Ex nA ETL09ATEX41123	0	REMOTE
50	AM5KA080B	ASSY ENCDR 1200 PPR OPTICAL MS16 BLUE Ex nA ETL09ATEX41123	0	REMOTE
51	AMS1P090	COUPLING OLDHAM ENCODER	1	
52	AMSLP040	BEARING SPHERE-ROL 50MM ID	1	
53	AMSLP030	BEARING BALL 30MM 2-ROW SST	1	
54	AM3KP204	BEARING BALL 20MM SST ABEC-1	1	

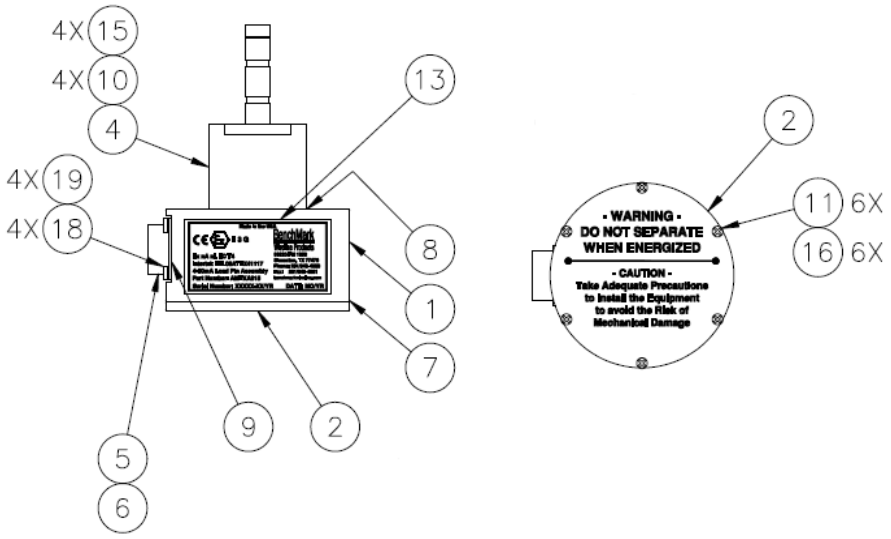
5.5.1 LOAD PIN - DIFFERENTIAL - AMSLA110B



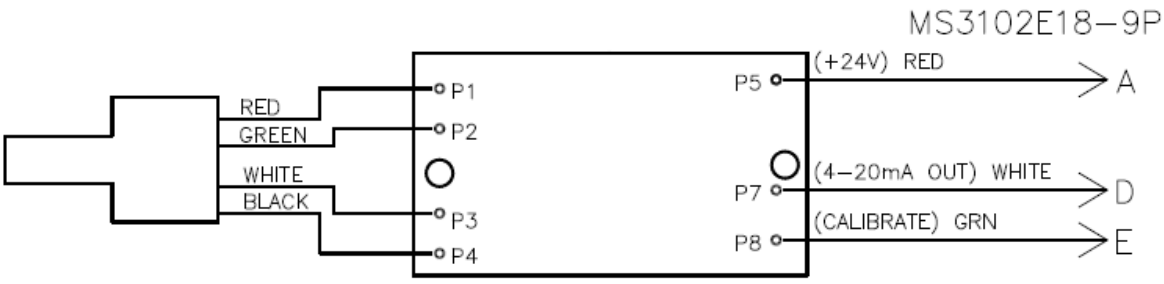
ITEM	P/N	DESCRIPTION	QTY	UM
45	AMS8P055	CONN KPT 02A16-8P	1	EA
46	AMS8P056	DUST CAP KPT81-16C	1	EA
93	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
94	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
95	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA



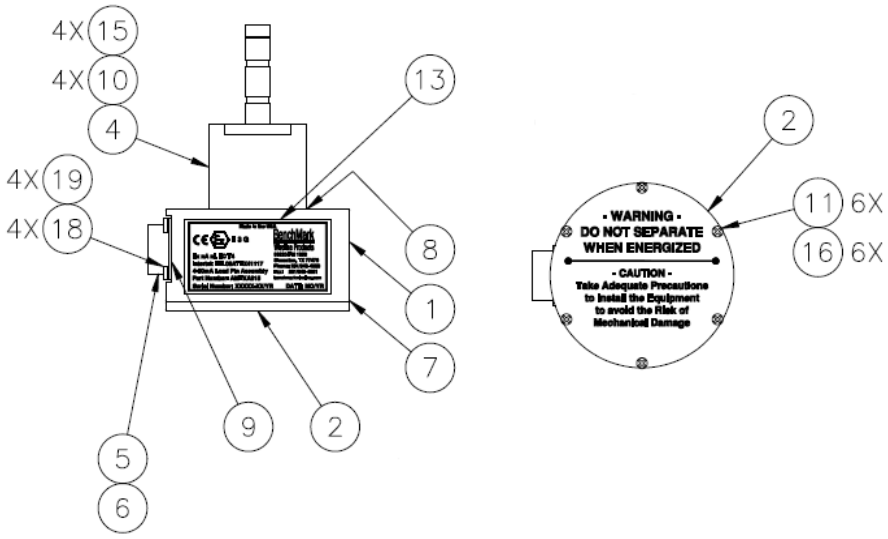
5.5.2 LOAD PIN - 4-20MA CURRENT LOOP - AMSLA115B



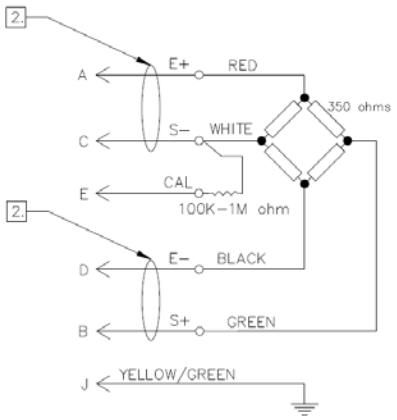
ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AMSLP101	PIN LOAD 12,500# 1"OD 2.0 MV/V 350 OHM 10VDC EXC HEADER	1	EA
5	AMS7P013	CONN MS3102E-18-9P LOAD CELL 7 PIN	1	EA
6	ACMU2P09	DUST CAP MS25043-18DA RECEPT	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
9	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	AMS8P034	SCREW 4-40 X 3/8 SOC HD SST	6	EA
13	AM5KM647	LABEL LOAD PIN Ex nA 4-20mA 09ATEX41117	1	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	6	EA
17	AMS8P090	WASHER #4 FLAT SST	6	EA
18	AMS1P040	SCREW 6-32 X 3/8 PHIL PAN SST	4	EA
19	C276P046	WASHER #6 LOCK SS	4	EA



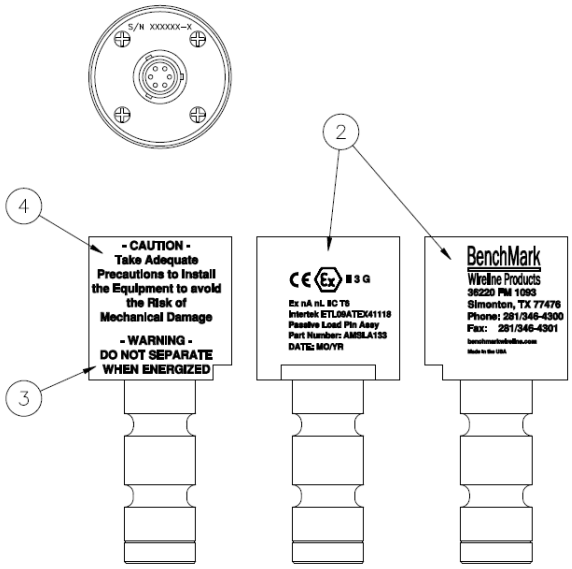
5.5.3 LOAD PIN – PASSIVE – AMSLA132A



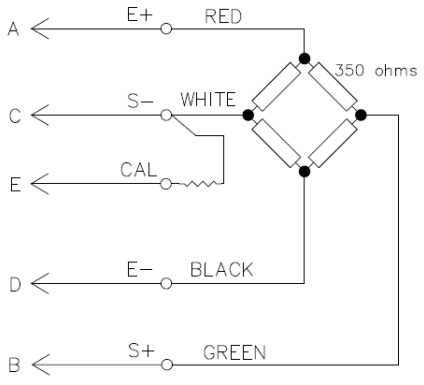
ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AMSLP101	PIN LOAD 12,500# 1"OD 2.0 MV/350 OHM 10VDC EXC HEADER	1	EA
5	AMS8P055	CONN KPT02A16-8P	1	EA
6	AMS8P056	DUST CAP KPT8116C RECEPT	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
9	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	AMS8P034	SCREW 4-40 X 3/8 SOC HD SST	6	EA
12	AM5KP228	STANDOFF 4-40 X 1/2 M/F HEX	2	EA
13	AM5KM648	LABEL LOAD PIN Ex nA PASSIVE 09ATEX41118	1	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	6	EA
17	AMS8P090	WASHER #4 FLAT SST	6	EA



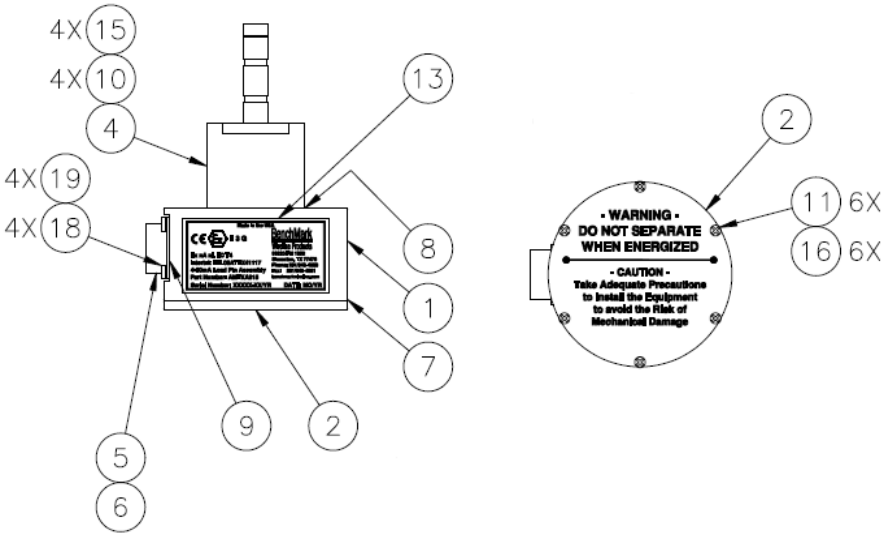
5.5.4 LOAD PIN - PASSIVE - AMSLA133A / AMSLP103



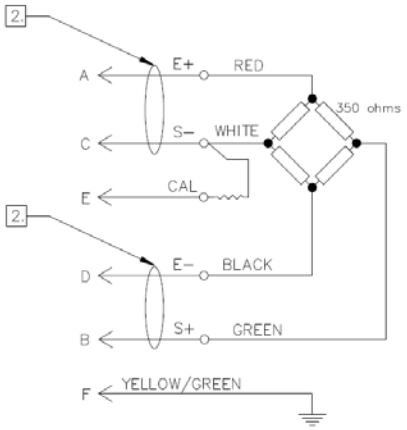
ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMSLP103	PIN LOAD 12,500# 1"OD 2.0mV/V	1	EA
2	AM5KM648	LABEL LOAD PIN Ex nA PASSIVE 09ATEX41118	1	EA
3	AM5KM650	LABEL WARNING LOAD PIN ENCDR DO NOT SEPARATE WHEN ENERGIZED	1	EA
4	AM5KM645	LABEL LOAD PIN CAUTION AVOID MECHANICAL DAMAGE	1	EA



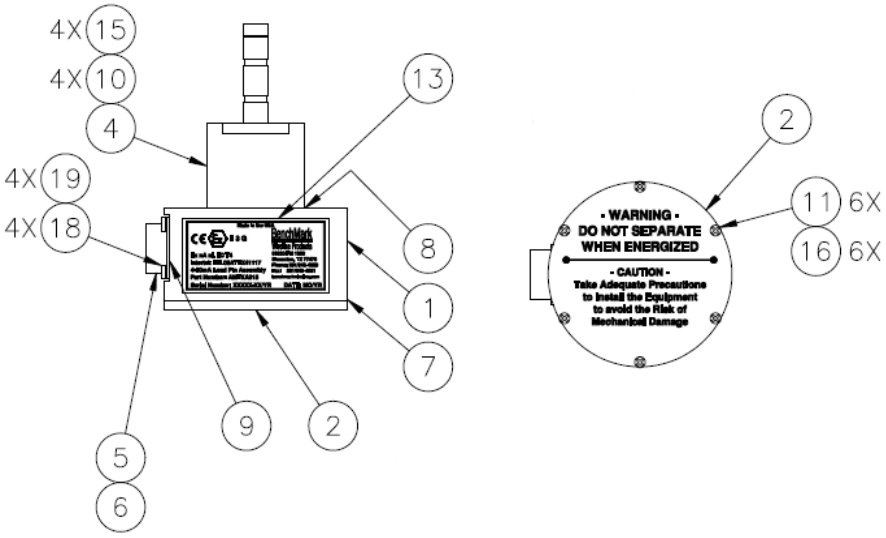
5.5.5 LOAD PIN - PASSIVE - AMSLA137B



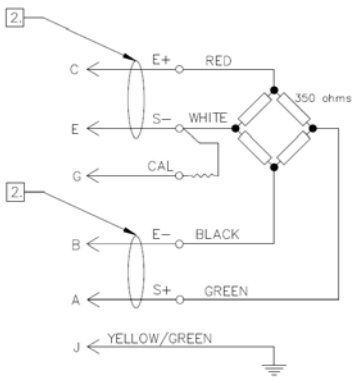
ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AMSLP101	PIN LOAD 12,500# 1"OD 2.0 MV/V 350 OHM 10VDC EXC HEADER	1	EA
5	C276P043	CONN MS3102E-14S-6P LOAD AXLE	1	EA
6	AMS7P041	DUST CAP MS25043-14DA RECEPT POWER IN	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
9	AM5KP219	O-RING 2-019 BUNA N 70D	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	C276P047	SCREW 4-40 X 1/2 PHIL PAN SST	6	EA
13	AM5KM648	LABEL LOAD PIN Ex nA PASSIVE 09ATEX41118	1	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	10	EA
18	C276P143	SCREW 4-40 X 3/8 PHIL PAN SST	4	EA



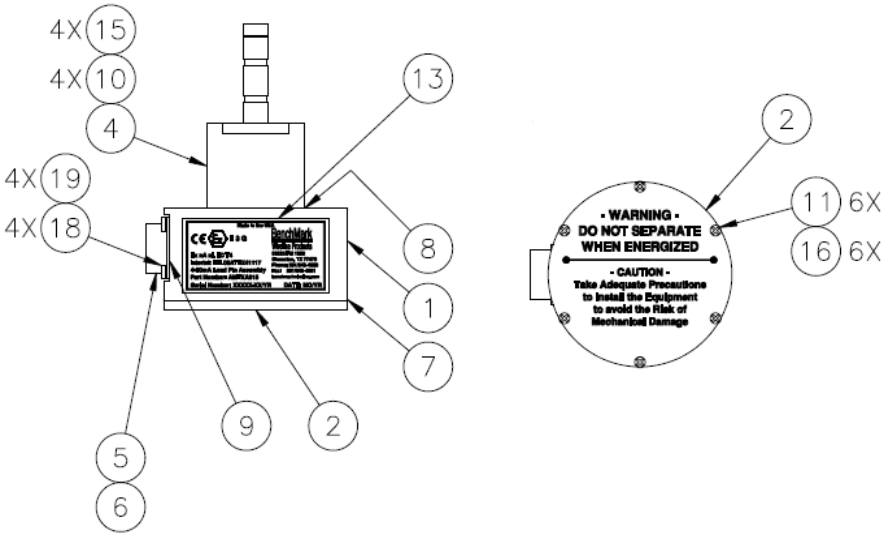
5.5.6 LOAD PIN - PASSIVE - AMSLA138A



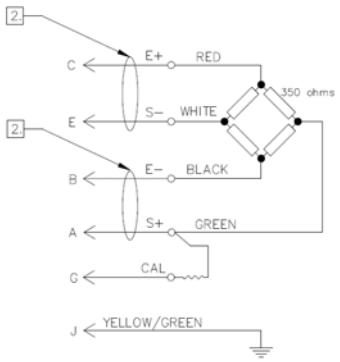
ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AMSLP101	PIN LOAD 12,500# 1"OD 2.0 MV/V 350 OHM 10VDC EXC HEADER	1	EA
5	AM5KP068	CONN 10-107218-1P BENDIX QWL COURSE THREAD 10 PIN	1	EA
6	AM5KP067	DUST CAP KPT8116C RECEPT	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
9	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	C276P047	SCREW 4-40 X 1/2 PHIL PAN SST	6	EA
13	AM5KM648	LABEL LOAD PIN Ex nA PASSIVE 09ATEX41118	1	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	6	EA
18	AM5KP184	SCREW 8-32 X 3/8 PHIL PAN SST	4	EA
19	AMS1P056	WASHER #8 LOCK SST	4	EA



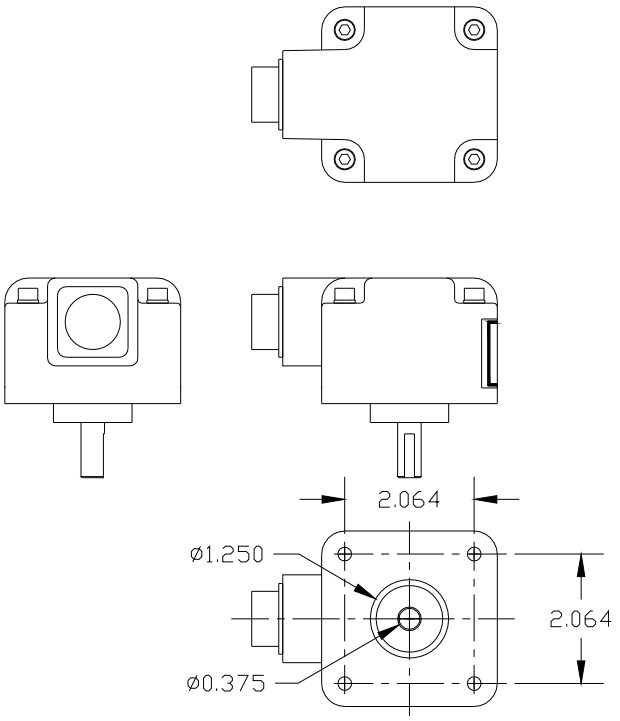
5.5.7 LOAD PIN - PASSIVE - AMSLA187B



ITEM	P/N	DESCRIPTION	QTY	UNIT
1	AMS8M010	HOUSING LOAD PIN AMS80	1	EA
2	AM5KM262	LID LOAD PIN HSG BLACK WARNING	1	EA
4	AMSLP101	PIN LOAD 12,500# 1"OD 2.0 MV/V 350 OHM 10VDC EXC HEADER	1	EA
5	AM5KP068	CONN 10-107218-1P BENDIX QWL COURSE THREAD 10 PIN	1	EA
6	AM5KP067	DUST CAP KPT8116C RECEPT	1	EA
7	C276P040	O-RING 2-235 BUNA N L/P LID 3-1/8 X 3-3/8 X 1/8	1	EA
8	AMS8P066	O-RING 2-136 BUNA N L/P HSG 1.98ID X 2.19OD X 0.103W	1	EA
9	AM5KP118	O-RING 2-023 BUNA N L/P CONN 1-1/16 X 1-3/16 X 1/16	1	EA
10	AM5KP041	SCREW 10-24 X 1-1/4 PHIL PAN	4	EA
11	C276P047	SCREW 4-40 X 1/2 PHIL PAN SST	6	EA
13	AM5KM648	LABEL LOAD PIN Ex nA PASSIVE 09ATEX41118	1	EA
15	C276P035	WASHER #10 LOCK SS	4	EA
16	AMS8P036	WASHER #4 LOCK SST	6	EA
18	AM5KP184	SCREW 8-32 X 3/8 PHIL PAN SST	4	EA
19	AMS1P056	WASHER #8 LOCK SST	4	EA



5.6.1 ENCODER - HI RESOLUTION - AM5KA068B



P/N	DESCRIPTION	QTY	UNIT
AM5KP161	ENCODER H25D-SS-1200-ABC-4469 EEx nA	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-18DA	2	EA

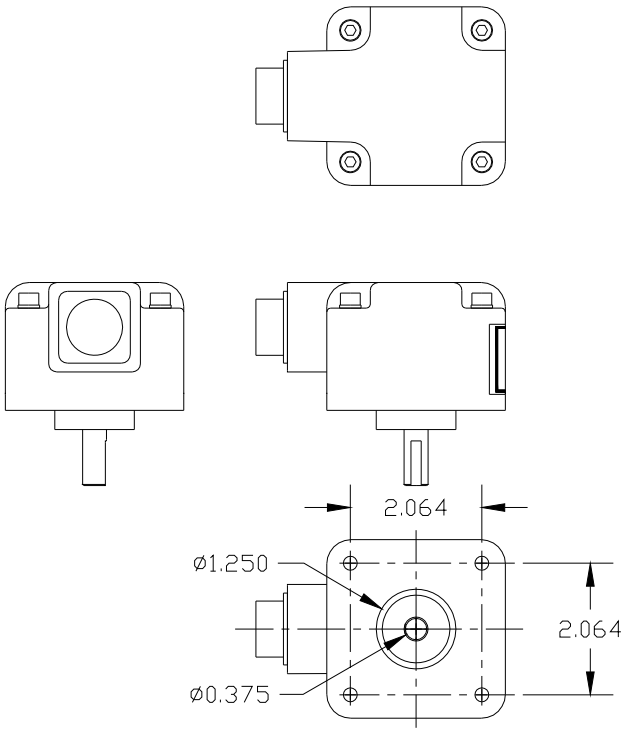
Specifications

1200 Pulses per revolution
+5 to +15 vdc power
Differential Quadrature output (A – A not, B – B not)

Pin Out

E - A
C - A
G - B
D - B
A - +5 to +15 vdc
B - Gnd
F - Case

5.6.2 ENCODER - HI RESOLUTION - AM5KA070B



P/N	DESCRIPTION	QTY	UNIT
AM5KP163	ENCODER H25D-SS-1200-ABC-4469 EEx nA	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-18DA	2	EA

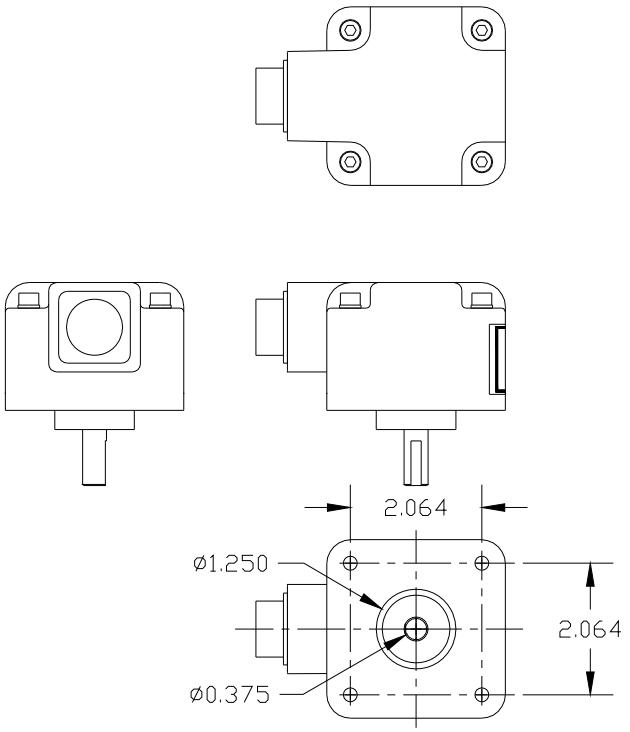
Specifications

1200 Pulses per revolution
+5 to +15 vdc power
Differential Quadrature output (A – A not, B – B not)

Pin Out

A - A
C - A
B - B
E - B
D - +5 to +15 vdc
F - Gnd
G - Case

5.6.3 ENCODER - HI RESOLUTION - AM5KA074B



P/N	DESCRIPTION	QTY	UNIT
AMSLP061	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-18DA	2	EA

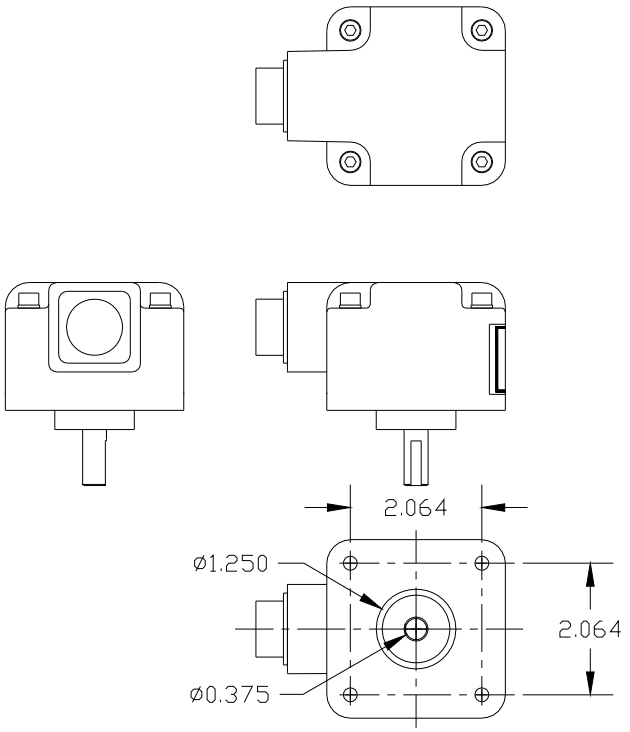
Specifications

1200 Pulses per revolution
+5 to +15 vdc power
Differential Quadrature output (A – A not, B – B not)

Pin Out

A - A
H - A
B - B
I - B
D - +5 to +15 vdc
F - Gnd
G - Case

5.6.4 ENCODER - HI RESOLUTION - AM5KA079B



P/N	DESCRIPTION	QTY	UNIT
AM5KP188	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-18DA	2	EA

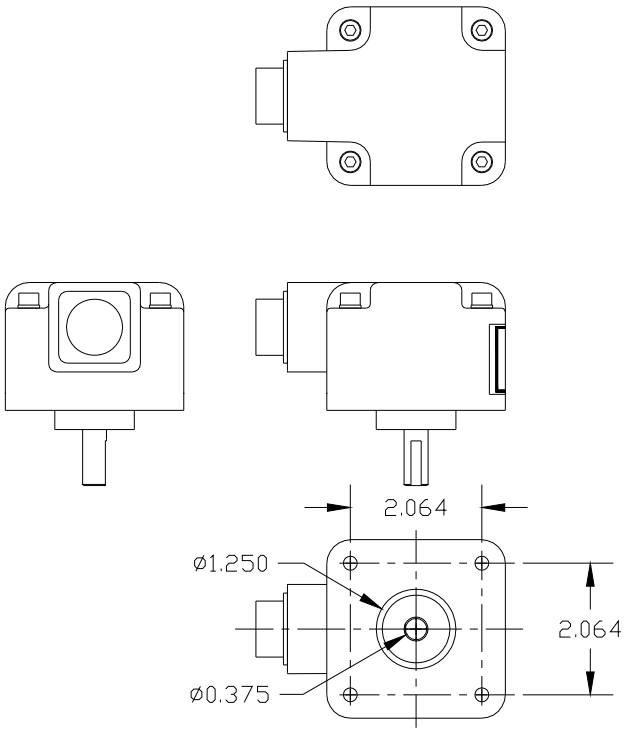
Specifications

1200 Pulses per revolution
+5 to +15 vdc power
Differential Quadrature output (A – A not, B – B not)

Pin Out

E - A
C - A
G - B
D - B
A - +5 to +15 vdc
B - Gnd
F - Case

5.6.5 ENCODER - HI RESOLUTION - AM5KA080B



P/N	DESCRIPTION	QTY	UNIT
AM5KP192	ENCODER H25D-SS-1200-ABC-4469	2	EA
AM5KM073	COUPLING MOD ENCDR 0.250/0.375 BORE	2	EA
AMS1P071	DUST CAP MS25043-18DA	2	EA

Specifications

1200 Pulses per revolution
+5 to +15 vdc power
Differential Quadrature output (A – A not, B – B not)

Pin Out

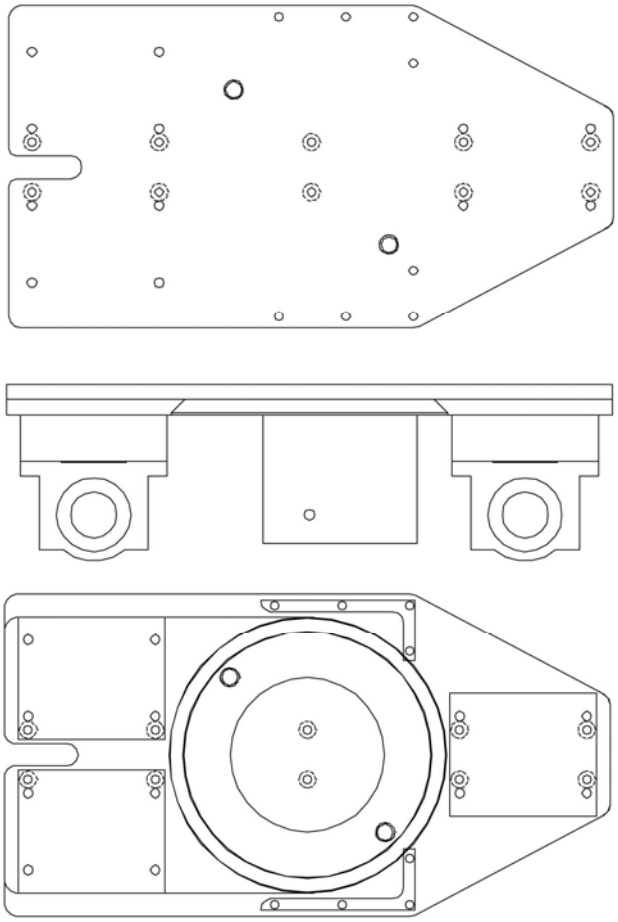
A - A
C - A
B - B
E - B
D - +5 to +15 vdc
F - Gnd
G - Case

5.7 OPTIONAL ACCESSORIES

5.7.1 SWIVEL ASSEMBLY - PIVOT PLATE - AMSLA439 without linear bearings

The pivot plate is designed to allow the measuring head to be pivoted 90 degrees when not in use. This allows it to fit inside a smaller compartment during transport.

It is a two piece assembly that sits between the measuring head and the horizontal spooling bars. The bearings are removed from the bottom of the measuring head and bolted to the bottom of the pivot plate.



5.7.2 DRIP LINE OILER - FSU1A013

This oiler features a Lexan reservoir with self closing filler cap. The flow is regulated by adjusting the valve at the base of the reservoir. A mount is provided on the measuring head. A copper tube channels the fluid to the wireline where it first enters the measuring head.

P/N	DESCRIPTION	QTY	UM
FSU1P051	RESERVOIR DROP FEED 1/2 NPT	1	EA
AMSLM005	MOUNT LINE OILER DRIP TANK	1	EA
FSU1P050	ADPTR 1/4COMP X 1/2MPT 90 BRS	1	EA
FSU1P011	COPPER TBG 1/4 OD	2	FT

6.0 SCHEMATICS, WIRELISTS & SETUP PROCEDURES

6.1 SCHEMATICS

Schematic drawings for load pins and encoders are not provided.
They contain either proprietary information and/or are purchased from 3rd party suppliers.

Additionally, load pins and encoders are not field reparable.

6.2 WIRELISTS

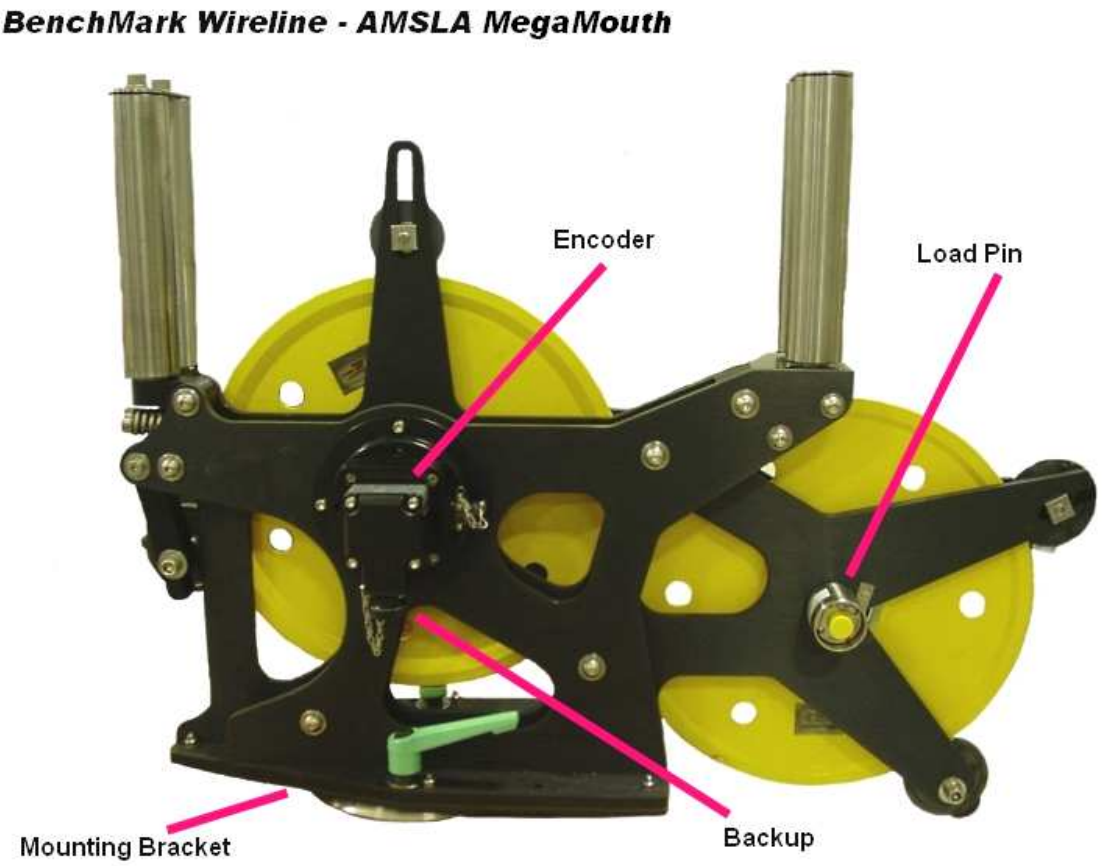
Wirelists do not pertain to this type of equipment.

6.3 SETUP PROCEDURES

This equipment is to be installed only by personnel who are suitably trained and qualified to local/national codes.

1. Install the measuring head on the wireline equipment.
   Bolt the mounting bracket to the wireline equipment
   Connect the measuring head to the mounting bracket

2. Connect the cables for to the encoder, backup and load pin to the measuring head.



6.3 SETUP PROCEDURE continued

Power up the panel connected to the measuring head and verify it is working properly.

Verify the panel is configured to match the system
- Line size
- Measurement units
- Encoder settings

Install the line in measuring head and set the line size parameter on the panel.

Set Tension Alarm value.

Set depth adjust value if necessary.

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.

Rig up through sheaves, install tool, and slack off weight.

Set depth to zero.

Press T-Zero to set tension to zero.

Press T-CAL and verify that panel tension reads 4,000 or 5,000 lbs (depending on type of measuring head selected)

Pull tool to depth 0 position.
Press D-Zero to reset the panel depth to 0.

7.0 CABLE DRAWINGS

NOTE - All Cable Drawings are included in the respective panel manuals.