Rock 5
Major 50

Installation Manual

Revision History

Rev	Date	Author	Notes
1.0	22 Apr 2024	J. Edwards	Original Installer

Contents

1. BEFORE STARTING

Before you begin, check for all safety procedures that may apply. Follow site specific safety and security guidelines in accordance with the site company's internal safety and security requirements.

A safety harness for working at heights and proper training/certification may be required for this installation.

Check that all the assemblies and parts required for the installation are ready to use. You can check all items with their position, name, and quantity in the installation diagram below.

It is recommended that this document be read entirely before installing. Since many of the drills are of different vintages there may be differences required to the installation than described in this document.

2. Assign Welding Jobs

The following Jobs will need to be completed by a fabricator or welder before commencing install.

2.1 - Hole cut into mast extension for head position laser assembly, welding in supplied steel rectangle mounting plate.

Need to get up closer to measure (will do Thursday)

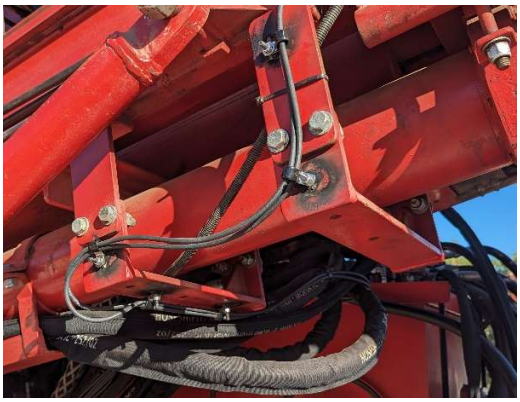
2.2 - Screen plates to be welded into place to mount screen. (possibly future)

Still unknown as they are changing their minds

2.3 - Mast inclino plate welded onto back of mast dump plate.

Please insert Image of plate

2.4 - P clamp mounts on mast for cable runs down mast.



2.5 - Wireline speed mount to wireline drum at top of mast and sensor protection cover.

2.6 - Water sensor Mounting

2.7 - Starlink Mounting

Don’t have kit yet to photograph.

3. INSTALL ENCLOSURES

The Enclosure should be installed as shown below: if this is not possible, every effort to get it into a position similar for the driller to view should be done. The screen enclosure comes with 2 installation legs and bolts. There will also be 2 mounting plates in the kit made available to weld to the drill control box as shown for mounting of screen enclosure and old electrical box this may differ depending on your rig install. The enclosure needs plenty of room below for the cabling and enough room for the screen's functionality (side buttons etc). It should be placed in an ergonomic location for the driller as well as free from danger and damage.

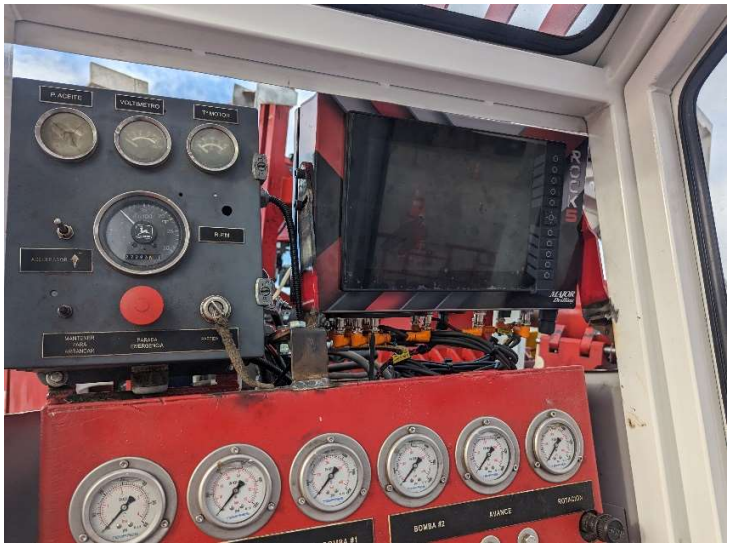


Figure 1 Original Rig Electrical Box (L) New Rock 5 screen assembly mounted (R)

3.1 1090086 Main Enclosure Assembly

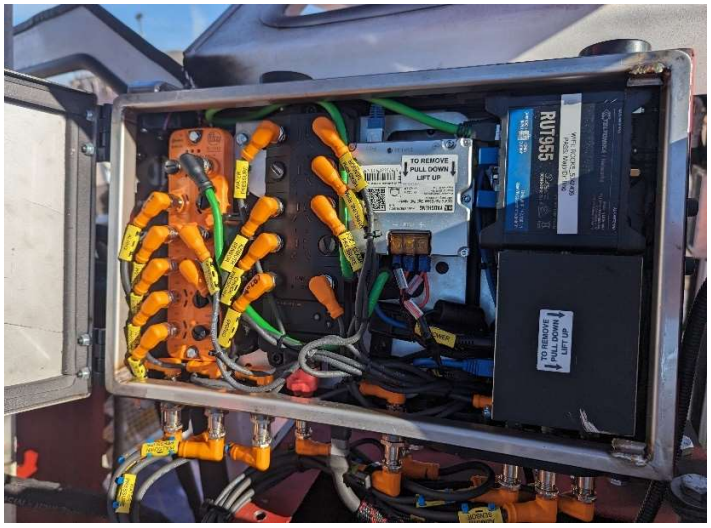


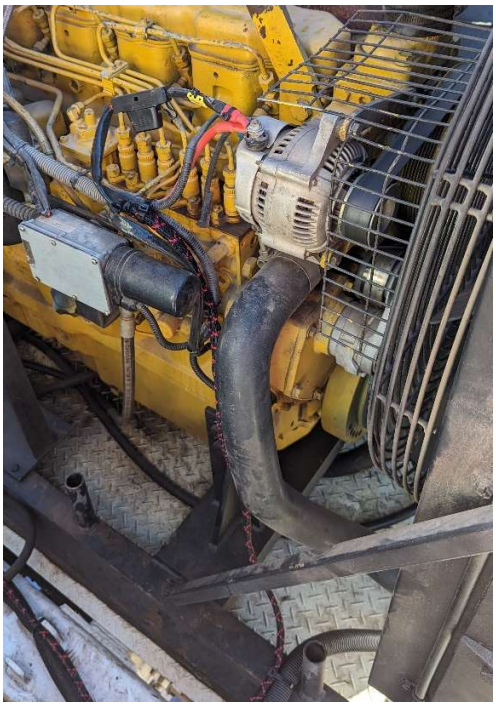
Figure 2 109086 Main Enclosure Assembly Inside View

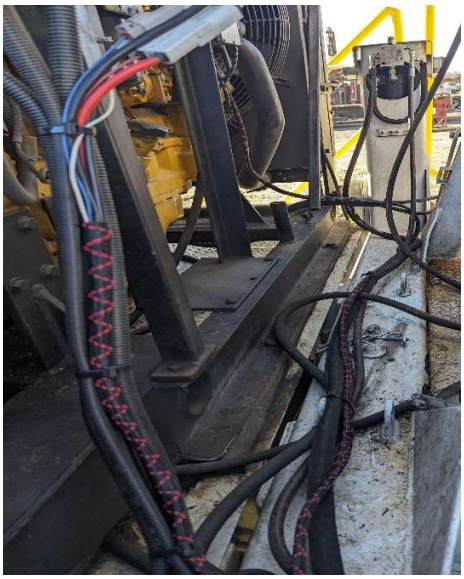
The box assembly is 24v and the screen will receive 24v from the converter instructed below. The screen enclosure will come complete and will not need to be touched on the inside. The box can be opened at any point in the future for diagnostic purposes. A wiring diagram will be provided for further information and connections.

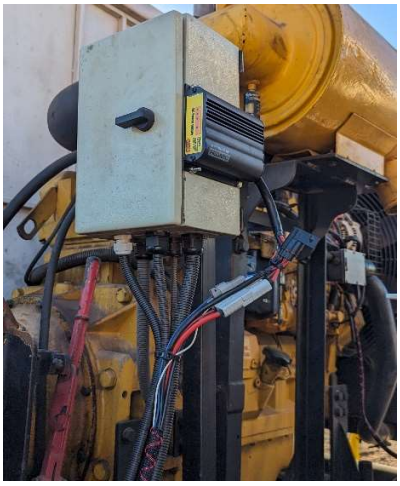
3.2 A00000 Install of Power Harness

The Power Harness should be installed after all the welding jobs have been assigned. The next step is to lay the harness in position on the rig from front to back, with the harness starting at the engine alternator and finishing at the screen mounted on the control cab. The Redarc DC converter should be installed next by drilling 4 x 6mm holes matching the cut outs on the converter, see below image. The harness should be cable tied to the available hosing as you go, if unsure see photos as examples. The harness will then have a lead that goes up to the dc converter mounted to the engine electrical box, cable tying to the upright leg and other electrical leads. The plugs will need to be greased with di-electric grease of a pea size portion into each connection. The harness will follow the hosing running front to back, being careful not to cross over or go under

hosing to eliminate rub throughs. The harness will continue all the way to the control panel entering in the available passenger's top corner. The harness will then split between the old electrical box for an ignition feed and the screen power plug, which is marked on the enclosure. The ignition can be found with continuity on the wiring back from the key/ignition barrel to the splitter board inside. The harness should be secured to available hosing, ensuring not to cable tie to hosing that will excessively move or pull the harness once secure.







4. INSTALL ALL SENSORS AND CABLES

4.1 Holdback, Pulldown and Rotation Sensors (……)

To install these sensors, you will need:

- PV7000 Sensors (A07012)
- In-line Tee (Diagnostic Tee 3/4 JIC MF W/- 1/8 BSP T/PORT) (….)
- Adapter 1/8 BSPP M X 1/4 BSPP F (…..)
- O RING TO SUIT 1/8 BSPP C/W RING (…..)
- M12 Cable Labelled with Wireline Speed. (M12, 4 core, 2 metre, 90 to 90) (….)

Figure 20 Pressure sensor location drivers side of control cab

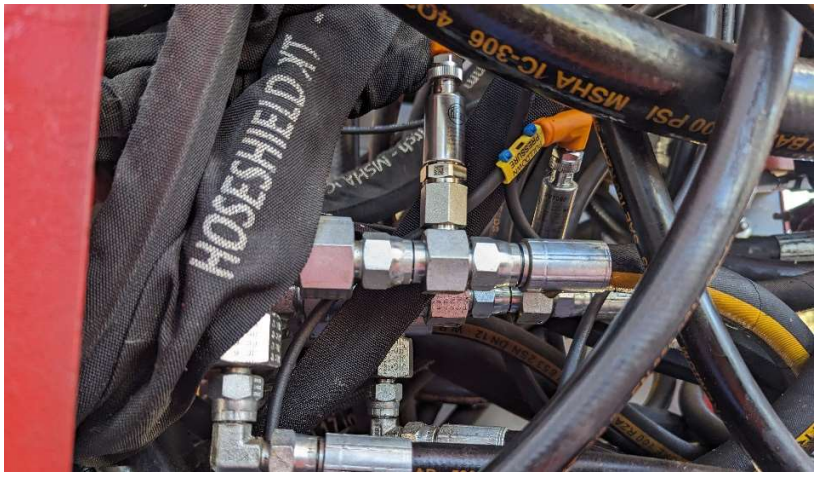


Figure 20 Pulldown Pressure sensor location drivers side of control cab

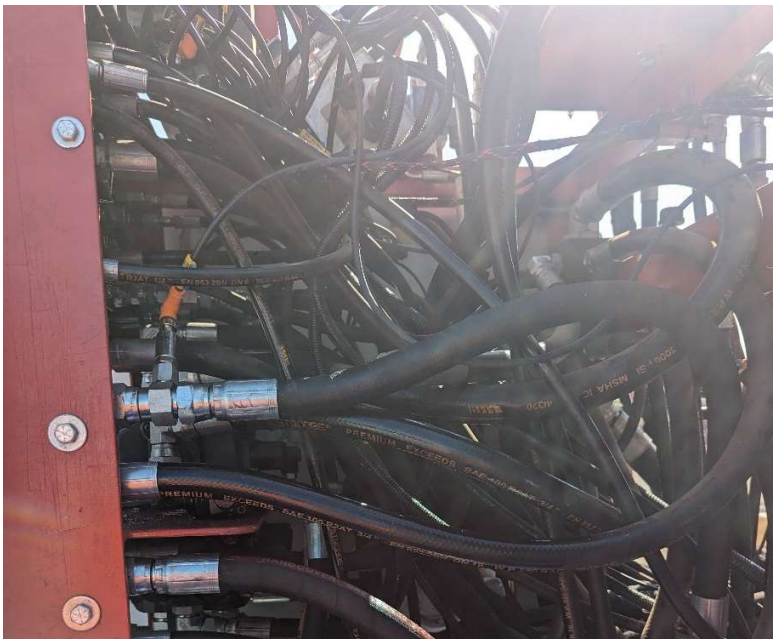


Figure 20 Rotation Pressure sensor location passengers side of control cab

The three sensors will be installed on the outputs of the lever valves, as pictured. The following fittings will need to be installed together before putting on the rig: diagnostic T and 1/8 to ¼ bspp adaptor for sensor ensuring the oring between the adaptor and T is on. These will be installed as shown on the output from the valve. The joiner line will need to be loosened and the diagnostic T inserted in-between as shown. Once installed noting the orientation, the sensor PV7000 with included oring can be inserted into the adaptor on the T, noting to be careful with this connection as the sensor thread can be broken easily. Once installed the M12 cable supplied with the correct name can be installed, applying di-electric grease of about a pea size to the correct plug, locating the tab inside and

screwing together clockwise until hand tight. The lead will run up to the screen box and plug into the corresponding location. The cable should be ran making every effort to keep neat and away from rubbing hazards.

4.2 Chuck and Footclamp Pressure Sensor

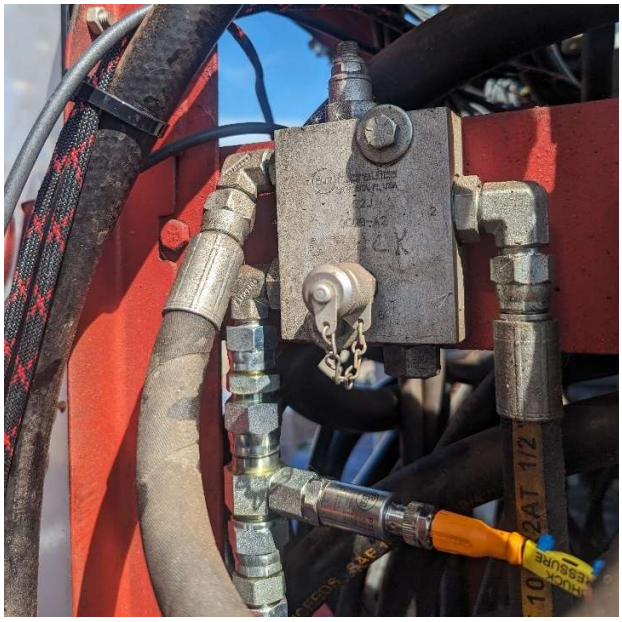


Figure 22 Chuck Pressure Sensor Assembly (….)

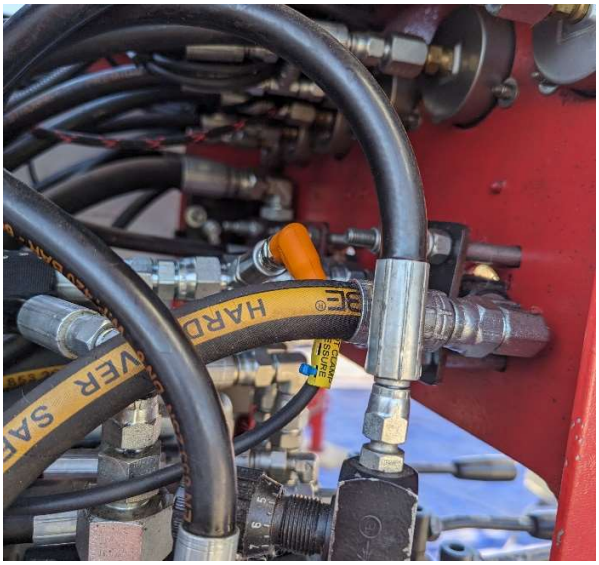


Figure 22 Footclamp Pressure Sensor Assembly (….)

To install this sensor, you will need:

- PT5500 Sensor (….)
- In-line Tee (Diagnostic Tee 3/4 JIC MF W/- 1/8 BSP T/PORT) (….)

- Adapter 1/8 BSPP M X 1/4 BSPP F (…..)
- O RING TO SUIT 1/8 BSPP C/W RING (…..)
- M12 Cable Labelled with Wireline Speed. (M12, 4 core, 2 metre, 90 to 90) (….)

The footclamp like the holdback sensor will locate onto the lever valve output. The chuck should be installed on the output line from the valve block as seen above, they are installed in the same way as above with the diagnostic T, Adaptor, oring, sensor PT5500. The cable just like before will receive a pea size amount of di-electric grease and locate together ensuring its tightened hand tight. The cable will meet the others and run back to the screen box and finish in their corresponding locations.

4.3 A11000 Wireline Pressure Assembly

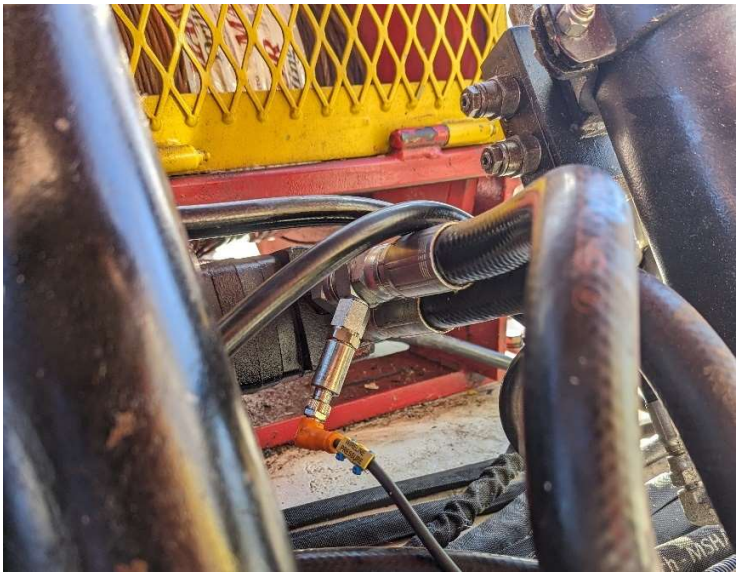


Figure 15 Wireline Pressure Sensor Installed

To install this sensor, you will need:

- PV7000 Sensor (….)
- In-line Tee (Diagnostic Tee JMJFSBPF-08-0802) (….)
- Adapter 1/4 Male ORB X 1/4 Female BSPP9120-04-04 (….)

- O RING TO SUIT 1/8 BSPP C/W RING (….)
- M12 Cable Labelled with Wireline Speed. (M12, 4 core, 5metre, 90 to 90) (….)

Sensor install and Cable run

The following fittings will need to be installed together before putting on the rig, Diagnostic T and 1/8 to ¼ bspp fitting adaptor for sensor ensuring the oring between the adaptor and T is on. These will be installed as shown on the input pressure line to the wireline drum. The joiner line will need to be loosened and the diagnostic T inserted in-between as shown. Once installed noting the orientation, the sensor PV7000 with included oring can be inserted into the adaptor on the T, noting to be careful with this connection as the sensor thread can be broken easily. Once installed the M12 cable supplied with the correct name can be installed, applying di-electric grease of about a pea size to the correct plug, locating the tab inside and screwing together clockwise until hand tight. The lead will run up to the screen box and plug into the corresponding location.

4.4 A12000 Water Flow Sensor and pressure Assembly

Figure 16 A12000 Water Flow and pressure Assembly

To install this sensor, you will need:

- SB1246 Sensor (A12001)
- PT5502 Sensor (…..)
- Gauge saver 1/4 BSPP DOWTY SEAL (….)
- 577 Loctite compound for hydraulic fittings
- Swivel joint …… (….)
- 90's (….)
- Straight joiner (….)
- Plate and clamps (…..)

- M12 Cable Labelled with Water Pressure. (M12, 4 core, 5metre, 90 to 90) (….)
- M12 Cable Labelled with Water Flow. (M12, 4 core, 5metre, 90 to 90) (….)

Sensor install and Cable run

The water flow and pressure assembly will be installed as above. The flow being installed from the output of the water tap inside the cab. The pressure sensor sitting after the flow meter also. 2 hoses should be made to extend the hosing from the tap to the assembly and back to the cab pivot point to meet the old hosing. The flow sensor will be installed after installing the 90 and directed as show, with the arrow flowing up. The supplied swivel join will be inserted next on the other side of the flow meter. The Pressure sensor diagnostic T will be added noting the direction to avoid collision with the flow meter. The adaptor and oring next, with the sensor and oring added after. The last 90 added on top and the output hose added. The assembly will be mounted with the hose clamps to the plate adding the nuts on the back side of the plate. Lastly the cables can be added, noting the locating tabs inside the plug, adding di-electric grease of a pea size and lastly screwing both till hand tight. Both will be run back to the screen enclosuring.

4.5 A12000 Azimuth Sensor (Rig Direction Sensor)

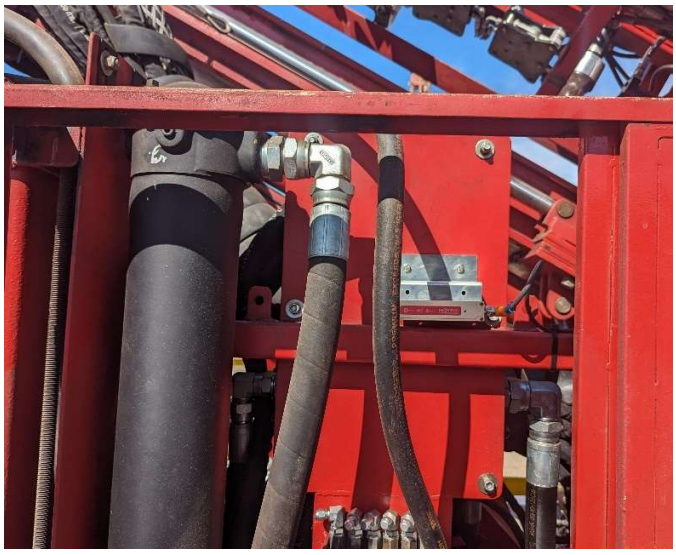


Figure 16 A12000 Azimuth Sensor mounted, drivers side next to hydraulic tank

To install this sensor, you will need:

- HCM508B (A12001)
- M12 Cable Labelled with Azimuth Sensor. (M12, 4 core, 5metre, 90 to 90) (….)

Sensor install and Cable run

the azimuth is the rigs directional sensor and will need to be installed facing, front to back while keeping it away from metal, using the supplied aluminum z shaped plate. Bolt to the holes matching the sensor and then mark the following location on your rig, being installed on the drivers side between the hydraulic tank and control cable on a valve bank plate as seen below. The bolt will be mounted with the supplied m6 stainless bolts. Make sure it is mount where it wont contact other components and metal. The cable will then run along the beam and down with the supplied cable ties. Running ontop of the hosing and into the control cab. The cable will then be installed into the corresponding location on the screen box.

5.1 A08000 Mast Inclinometer Sensor

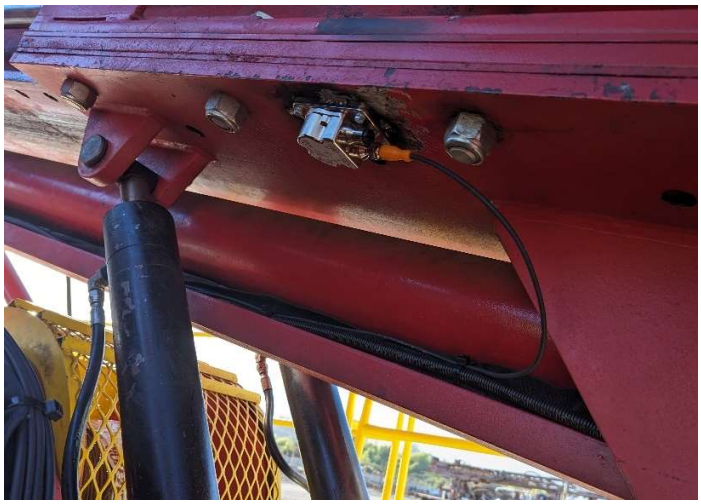


Figure 26 A08000 Mast Inclinometer sensor, mounted on welded plate under drivers side of mast dump plate.

To install the laser assembly, you will require:

- JN2100 (A08009)
- Inclino Mount plate (….)
- M12 Cable Labelled with Wireline Speed. (M12, 4 core, 0.5 metre, 90 to 90) (….)

Sensor install and Cable run

Tells you the mast angle, this sensor once the plate has been welded can be mounted with the supplied M5 bolts x4 installed with the plugs facing the bottom of the mast. The cable in the available location on the sensor keeping the blanking cap on the other output, this will get di-electric grease and be tightened clockwise until hand tight. The cable will join the grease line being cabled tied and then following the head rpm sensor cable down to the cab box being installed in the screen box with di-electric grease in the plug.

5.2 A09000 Head Speed Assembly

Figure 10 Head speed mounted on supplied bracket after being mounted.

To install this sensor, you will need:

- IFM205 Sensor (A09001)
- Sensor bracket and Sensor Mount (A09002)
- M12 Cable Labelled with Head Speed. (M12, 4 core, 10metre, 90 to straight) (….)
- M12 cable labelled with Head Speed. (M12, 4 core, 5metre, straight to 90) (….)

Sensor Bracket mounting

The sensor bracket should be mounted while the mast is in the vertical location. 2 x 5/8 bolts will need to be removed for mounting, see figure below for mounting location. Note the bolts are holding oil in and once removed will leak the head oil out, so you will need to be quick and catch what is dropped out.

Sensor and cable run

Figure 12 Cables ran from head to mast bulkhead

The sensor IFM205 will be supplied with 2 locking nuts. The sensor will pass through the bracket hole as shown and be position about a finger width away from the head nuts. The nuts will go either side of the bracket to lock the sensor in location, keeping in mind the orientation for when the cable is installed. The cable will be connected to the sensor by first adding di-electric grease of no more than a pea size. The locating tab inside the M12 cable should match up to that of the sensor, once found the cable plug will seat and the nut section can be tightened clockwise till hand tight and no more. The cable for the head rpm sensor will follow the closet hydraulic hose and run back to the mast bulkhead and down the mast from there. While running in cable track make sure not to cross over hosing and create rub points, run in a free area inline all the way through. The cable will join up with others at the lower bulkhead before heading to the control panel. The RPM sensor and bracket

should be installed while the mast is horizontal and than laydown to finish running the cable.

5.3 A10000 Wireline Speed Assembly

Figure 13 Wireline RPM Sensor Assembly on bottom right of picture

To install this sensor, you will need:

- IFM205 Sensor (A10000)
- Mounting bracket (A10001)
- M12 Cable Labelled with Wireline Speed. (M12, 4 core, 10metre, 90 to straight) (….)
- M12 cable labelled with Wireline Speed. (M12, 4 core, 5metre, straight to 90) (….)

Sensor Bracket mounting

The wireline bracket is supplied for installation after a 16mm, or bigger hole has been drilled in the below mounting location. The sensor needs to be able to screw through to pickup on the wireline wheel spokes.

Add photo of bracket, didnt get before welded on.

Figure 14 Wireline (Speed) bracket

Sensor install and Cable run

The sensor IFM205 will be supplied with 2 locking nuts. The sensor will screw into the welded bracket, passing through the bracket hole as shown and be positioned about a finger width away from the wireline spokes, do not force this sensor through or put on straight after welding as it will be damaged and made useless. The nuts will go on the back side of the sensor locking against each other and the welded bracket, keeping in mind the orientation for when the cable is installed. The cable will run with the head position sensor down the outside of the mast extension, cable tying as you go to the hosing up the mast. Once past the extension it can be mounted with the supplied P-clamps further down the mast joining more cables at the mast bulkhead and finally finishing at the control cab and screen box.

5.4 A08000 Head Position Laser Assembly

Figure 26 A08000 Laser Distance Assembly

To install the laser assembly, you will require:

- DT50 Laser sensor (A08009)
- DT50 mounting bolts x 2 (…..)
- Laser Mounting plate (Aluminium) (….)

- Outer mast welded plate (A08011).
- Mounting bolts between outer plate and laser plate (Including lock washers) (….)
- M12 Cable Labelled with Head Speed. (M12, 4 core, 10metre, 90 to straight) (….)
- M12 cable labelled with Head Speed. (M12, 4 core, 5metre, straight to 90) (….)
- M12 Cable Labelled with Head Speed. (M12, 4 core, 0.5 metre, 90 to 90) (….)

Sensor install and Cable run

Once the outer plate has been welded and positioned correctly. The laser can be mounted using the supplied m4 bolts to the aluminum bracket to suit. The laser should be positioned as per photo with the cable installed and the joiner also installed, once installed it cannot be adjusted unless taken of again. The short 0.5m cable will need di-electric grease and then tighten to both the plate joiner and laser, locating with the plug tabs and then tightening the outer nut till hand tight. The plate can then be installed into the mast securing with the supplied M6 bolts with lock washers installed. The mast cable can then be installed with di-electric grease of a pea size and secured by lining up the locating tab and tightening the outer nut till hand tight. The cable will follow the wireline speed cable down the mast securing to the hosing on the mast extension and then p-clamps further on down the mast to the mast bulkhead. The cable will follow the others down to the control cab and screen.

6 Starlink

Change photo

Figure 29 Starlink Assembly

Install and Cable run

The starlink unit will come complete minus cable connection to the screen which will need to be done after the unit has been mounted to the cab roof or appropriate area. There will be a small lead already installed in the unit and run out to a waterproof connector, the connector can be pulled apart by unscrewing the gland nut, removing the rubber insert and then unscrewing the gland nut extension. The rj45 cable will go through all 3 items to plug into waterproof plug (note, no electrical grease is needed as it will damage the plugs) the gland rubber insert comes with a cut and will pull apart to get round the cable. The gland will than be screwed back together and cable can be cable tied back to the screen gland, which is the same process to plug in. the excess cable should be stored appropriately. The unit can now be setup for internet.

7 INSPECT THE INSTALLATION

Inspect the installation for water and hydraulic leaks. Repair any leaks if found.

Operate the drill and have a helper check for clearances of the sensor installations:

- Head RPM assembly.
- Laser assembly – move mast and head in various positions and check for position.
- Wireline RPM assembly

8 POWER UP THE SYSTEM

- Power up the drill
- Check the screen for status
- In the diagnostic screen check for any red sensors or lines to be resolved

9. FINAL STEPS

The installation process should end with checks to ensure that all tasks have been completed, that the drill is in a safe condition and that all waste generated during the installation process has been cleaned. When everything is checked and declared safe and clear, the task can be considered complete and ready.

9.1 Clean Up Cables

Ensure that all cables are routed properly and do not interfere with the operation of the drill. Use tie wraps to secure the cables to the drill as required.

9.2 Check for Leaks

After completing the installation of all sensors, the mechanic needs to follow all hydraulic and waterlines to ensure that there are no leaks. All new connections must be leak-free before checking the functionality of the sensors. If the mechanic sees any signs of a leak, he or she should stop the engine and repair the leaking part before proceeding to the next steps.

9.3 Check Clearances

Check no sensor is in danger of contact from components around it, ie setting the speed sensor too close to the component reading. That diagnostic T's are oriented correctly so the sensor isn't rubbing on other hoses or components. Cables are routed so they wont contact or rub through.

10 FINAL INSPECTION

10.1 All Covers are Replaced

Check that all enclosures are securely closed, and the laser enclosure cover is tightened in place.

10.2 All Cables are Secured

Check that all cables are secure, make sure all cables and hoses are properly secured in place to prevent them from being cut, pressured, or strained when moving parts of the drill are in motion during drill operation.

10.3 All Bolts are Tight

The drill can generate great vibrations during transport and operation, this vibration can collaborate to loosen the screws which can culminate in the displacement of the position of the rotation reading sensors, fall of the enclosures and ultimately fall of the HMI. As part of the final check, be sure to verify the tightness of the screws on the enclosures, sensor brackets and HMI brackets.

10.4 All Tools and Parts are Collected

Ensure all tools and unused parts are collected.