

Permanent Monitoring Operations and Quality Control Manual

Huracan Pty Ltd



Permanent Monitoring Operations and Quality Control Manual Revision Details

Rev	Author	Reviewer	Date	Revision Comments
1.0	J. Hollingworth	S. Shumski	23-Jul-2017	First Edition of Operations & QC Manual
1.1	J. Hollingworth	G. Humphreys	6-Aug-2018	Manual Review and minor changes
1.2	J. Hollingworth	M. Auld	12-Aug-2020	Manual Review

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1.0 DOCUMENT CONTROL

1.1 REVIEW AND UPDATE PROCEDURES

This document is a 'live' document that shall be updated during the course of operations. As such, the document is to be reviewed annually to incorporate initiatives from any improvement plans.

It is also to be reviewed immediately after any of the following occur;

- Major operational incident (i.e. increased apparent risk)
- Significant operational, procedural, work practice or technology change

Huracan Management is responsible for the review and revision of this document. Updated pages or sections are to carry a new revision date, and are circulated once the revision has been approved, by the following levels of Management:

- Operations Manager – Huracan.

1.2 REDISTRIBUTION OF DOCUMENT

Requested changes to the Distribution List are to be addressed to Huracan Management.

Copy	Name	Position	Company
1	Jon Hollingworth	Operations Manager	Huracan Pty Ltd

1.3 DOCUMENT UPDATES

Only registered copies of the document shall be updated. This document becomes uncontrolled when printed.

1.4 DOCUMENT PUBLICATION AND DISPLAY

This document shall be available for display at the following locations;

- Huracan Office
- Huracan Intranet – Document Control

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2.0 OVERVIEW

2.1 INTRODUCTION

The AnTech 4-20mA Gauge has been selected for permanent monitoring based on its superior QA/QC process during manufacturing. The gauge should always be transported with care and all procedures should be undertaken when installing and preparing the gauge.

2.2 4-20MA GAUGE SPECIFICATIONS & DIMENSIONS

Gauge Specifications

- Gauge ¾" OD (Without Corrosion Sleeve)
- Pressure Range: 0 – 1500 psia
- Gauge Maximum Temperature Rating: 105 °C
- Pressure Accuracy: ±0.25%
- Pressure Resolution: 16 Bit
- Short Term Shock Resistance: 10g 20-2000 Hz p-p
- Maximum Shock: 500g
- Temperature rating: -30° to 100°C (-22°F to 212°F)
- Bottom Connection ¼" NPT
- Input Voltage 8-30 VDC
- Dual Cablehead

Tubing Encapsulated Conductor Specification

- Outside Dimension: 11mm Square Encapsulation
- Tubing OD ¼"
- Material 316 Stainless Steel
- Conductor 16 AWG

2.3 PURPOSE OF DOCUMENT

The purpose of this document is to detail the operating procedure and quality control for Huracan Employees whilst performing a permanent gauge installation. The document aims to provide procedures and standards to reduce the risks of a service quality incident during gauge installation to "as low as reasonably practicable", (ALARP). Violation or deviation from this manual could result in a catastrophic service quality or service delivery incident and must be managed by a risk assessment approved by the documents Responsible Person.

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3.0 OVERVIEW

Permanent Monitoring Gauge Installation Procedure. Please ensure the appropriate SOP and JSA is reviewed with the Rig, OCR and Huracan personnel. All personnel are to sign the Huracan Sign Off sheet prior to running in hole.

3.1 INSTALL GAUGE ON TEC CABLE

Cablehead installation, gauge function test and pressure test can be performed off the critical path when using cannon style or PCP5000 pup joint gauge carrier.

1. Cut TEC cable and strip sufficient encapsulation to install the gauge.
2. Install socket and boot, connect gauge and function test gauge.
3. Torque dual cable head and function test gauge.
4. Remove both 1/8" NPT plugs from upper cable head. Flush air and install 1/8" NPT plug.
5. Pressure cable head to 1500 psi and hold for 3 min recording pressure.
6. Pressure cable head to 5000 psi and hold for 15 min recording pressure.

3.2 PRE-JOB SAFETY MEETING

The TEC cable is very fragile. You must mind its position at all times, especially in the sheave wheel. Always cover the hole when installing bands or clamps.

Make sure that any cabling connected from the spooling unit and slip ring is well marked so that personnel do not trip over it.

Watch all pinch points while installing the bands and/or clamps.

Wear the proper PPE for the job at all times.

Anytime the cable is being cut, always wear hand gloves.

Make sure that the location of all personnel is known at all times.

Do not stand next to the cable or the spooling unit unless absolutely necessary. The spooling unit can turn at any time.

3.3 RIGGING UP OF SPOOLING UNIT, TEC SHEAVE AND SLIP RING

1. Locate the spooling unit so that the TEC sheave is in the centre of the spool and the ends of the spool are parallel to the TEC sheave.
2. Connect the air lines from the spooling unit to the air supply on the rig.
3. Actuate the spooling unit in both directions fully to ensure proper functionality of the spooling unit. Make sure that the TEC is tied down properly so that it will not come off the reel.
4. Attach the rope to the TEC. Loop the rope around the TEC and use duct tape around the loops. Tape the end of the cable thoroughly so that the end of the cable slides through the sheave smoothly.
5. Test the conductive side of the connection and the ground side of the connection with an ohmmeter to ensure that the connection was made correctly.

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6. Connect the SRO (Surface Readout) to the slip ring.

3.4 RUNNING IN HOLE AND INSTALLATION OF CROSS COUPLING PROTECTORS

Always align the rotary table so that the groove on the bushing is oriented so that the TEC will pass through the groove.

Note the location of liner hanger tops and any other potential tight spots, restrictions prior to running in hole and slow to 10m/min while watching the weight indicator when gauge carrier is within 10m of restriction.

1. Pick up completion equipment below gauge and set in slips.
2. Make up gauge and gauge carrier;
 - a. For PCP5000/5500 Pup Joint Gauge Carrier
 - i. Connect gauge pup joint onto tubing and torque
 - ii. Cover hole, grease O-ring on gauge and installing gauge into carrier
 - iii. Install upper gauge clamp block and torque
 - iv. Check gauge function before proceeding
 - b. For PCP4000/4000 Pup Joint Gauge Carrier
 - i. Connect gauge pup joint onto tubing and torque
 - ii. Cover hole, grease O-ring on gauge and installing lower gauge housing into carrier
 - iii. Connect socket and boot onto gauge
 - iv. Connect upper and lower cable head ensuring to hand tight fitting nut, then torque 1-1/4 turns.
 - v. Remove both 1/8" NPT plugs from upper cable head. Flush air and install 1/8" NPT plug.
 - vi. Pressure cable head to 1500 psi and hold for 3 min recording pressure.
 - vii. Pressure cable head to 5000 psi and hold for 15 min recording pressure.
 - c. Cannon style gauge carrier.
 - i. Connect tubing joint and torque
 - ii. Position gauge on and gauge carrier on tubing
 - iii. Close lower clamp and install wedge
 - iv. Close upper clamp and install wedge
3. Note position of the gauge pressure port in the completion.
4. RIH with completion installing cross coupling protectors on each coupling;
 - a. Banded Cross Coupling Protectors
 - i. Install Encapsulation in Wiper Blade assembly
 - ii. Ensure personnel are clear
 - iii. Tighten lower band and secure and cut using pneumatic tool
 - iv. Tighten upper band secure and cut.
 - b. Forged Cross Coupling Protectors
 - i. Install Encapsulation in Cross Coupling assembly

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- ii. Close cage and tighten locking screws with pneumatic tool
 - iii. Torque to specification
5. Do not put any back tension on the spool unit until at least 4 cross coupling protectors have been installed.
6. Once the tubing is lowered and the slips are set, pull and hold the TEC back out of the way so that the next tubing joint can be installed and the tubing tongs do not damage the cable.
7. Once the tubing is lowered and the slips are set, pull and hold the TEC back out of the way so that the next tubing joint can be installed and the tubing tongs do not damage the cable.
8. Ensure you have communication with the gauge while RIH, log gauge data vs time.

3.5 TUBING WRAP PROCEDURE

1. Shut the air off at the spooling unit and bleed the pressure off so that the drum can spin freely.
2. Determine the length of cable needed outside the well head with a minimum length of 1 meter.
3. Multiply that number by 3.
4. Mark the cable at the tubing hanger or well head outlet.
5. Measure off a length of cable equal to the value of step 2.
6. Assemble the tubing hanger or well head flange onto the tubing.
7. Raise the tubing to a height equal to step 2.
8. Place a band or clamp on the tubing string below where the wraps will be oriented.
9. Tightly wrap the cable around the tubing so that the length of cable is 2 time the step one measurement.
10. If there is a connection on the bottom of the tubing hanger or well head outlet, slide the compression fitting over the cable and double check the ferrule configuration.
11. Torque fitting and tighten compression fitting.
12. Repeat sequence for upper tubing hanger fitting.
13. Wrap TEC cable around landing joint and secure.
14. Lower hanger into position ensuring to keep central so as to not damage TEC cable.
15. Land hanger, close tie down bolts and pressure test.
16. Nipple down BOP.
17. Feed the TEC cable through the well head outlet.
18. Place a compression fitting or TEC and screw into well head outlet.
19. Pressure test wellhead outlet.
20. Perform final verification of gauge reading.
21. Power of the surface unit and terminate the TEC cable.

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4.0 PERMANENT MONITORING QUALITY CONTROL

Gauge QC is to be recorded on the Gauge Installation Record and provided to the client prior to departing the wellsite. All non-conformance is to be recorded in HIMS as a Service Quality Incident and actioned to the Operations Manager.

4.1 PRE-JOB QUALITY CONTROL CHECK

1. Inspect all components for machining swarf.
2. Check gauge components complete as per manufacturers checklist.
3. Check TEC cable insulation ($>20M\Omega$) and continuity ($\approx 13.6 \Omega/km$)
4. Install gauge onto TEC cable and ensure Gauge reads correct pressure reading at surface.
5. Make up cablehead and confirm the function of the gauge.
6. Install additional gauge protection as required.

4.2 QC WHILE RUNNING IN HOLE WITH GAUGE

1. Ensure that once the gauge is in fluid that the pressure changes in proportion to the tubing length.
2. Ensure no back tension on the cable for the first 4 joints.
3. Insure all cross coupling protectors are correctly installed.
4. Take pressure reading prior to cutting the cable for termination.

4.3 FINAL GAUGE CHECK

1. Perform Wellhead Outlet Gauge termination
2. Perform final reading on the gauge in the presence of the OCR and record on the Gauge Installation Record.

4.2 POST INSTALLATION WELLSITE CHECK

1. Arrive location and open right panel of VSD and disconnect/unplug gauge from Ground Loop Isolator.

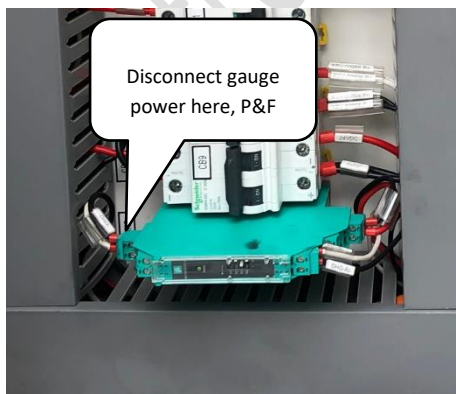


Figure 1 - P&F Ground Loop Isolator

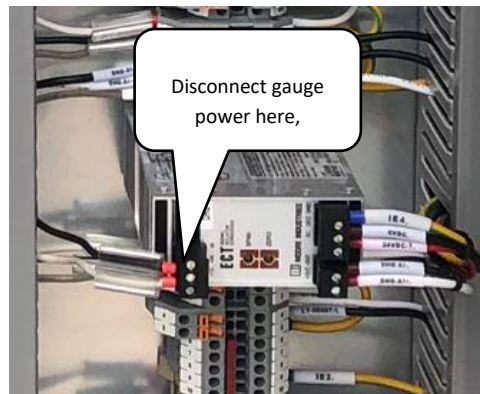


Figure 2 - Moore's Ground Loop Isolator

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2. Unscrew the rear nut from the Ex gland nut, then unscrew the middle nut from the Ex gland.



Figure 3 - Ex Gland Nut

3. Remove the Allen screw from AnTech wellhead outlet and open from bulkhead (Ex Gland should rotate on cable without torquing up). Pull housing out to expose terminal block and remove black and white wire from terminal block using screwdriver.
4. Check the following and ensure to measure the units for resistance (k, M)
 - a. Resistance +ve polarity and -ve polarity.
 - b. Measure / record DC voltage
 - c. Measure gauge mA reading
 - d. Measure cable length with Time Domain Reflector.

Resistance +ve	
Resistance -ve	
DC Voltage	
mA	
TDR cable length	

5. Reconnect wires and slide housing over terminal block and screw and secure with Allen key.
6. Tighten middle nut then rear nut.
7. Reconnect gauge to ground loop isolator.

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