Product Name	**PACKER MANAGEMENT SYSTEM**		
Document Name	**OPERATIONS AND MAINTENANCE MANUAL**		
Document Number	**For Information Only**		
Revision	**1**	**Revision Date**	**n/a**

CONTENTS

1. TECHNICAL DESCRIPTION

1.1 THE PACKER MANAGEMENT SYSTEM

The Packer Management System consists of

- The Packer Control Box [see 1.2]
- A Remote connected to the box [see 1.3]

Note: The remote is an optional item which may not be part of the system installed.

- Cabling (supplied by end user)
- Two fail closed solenoid valves (supplied by end user or ROMAR International Ltd) [see 1.4]
- One fail open solenoid valve (supplied by end user or ROMAR International Ltd) [see 1.4]
- A pressure transducer (supplied by end user or ROMAR International Ltd) [see 1.5].

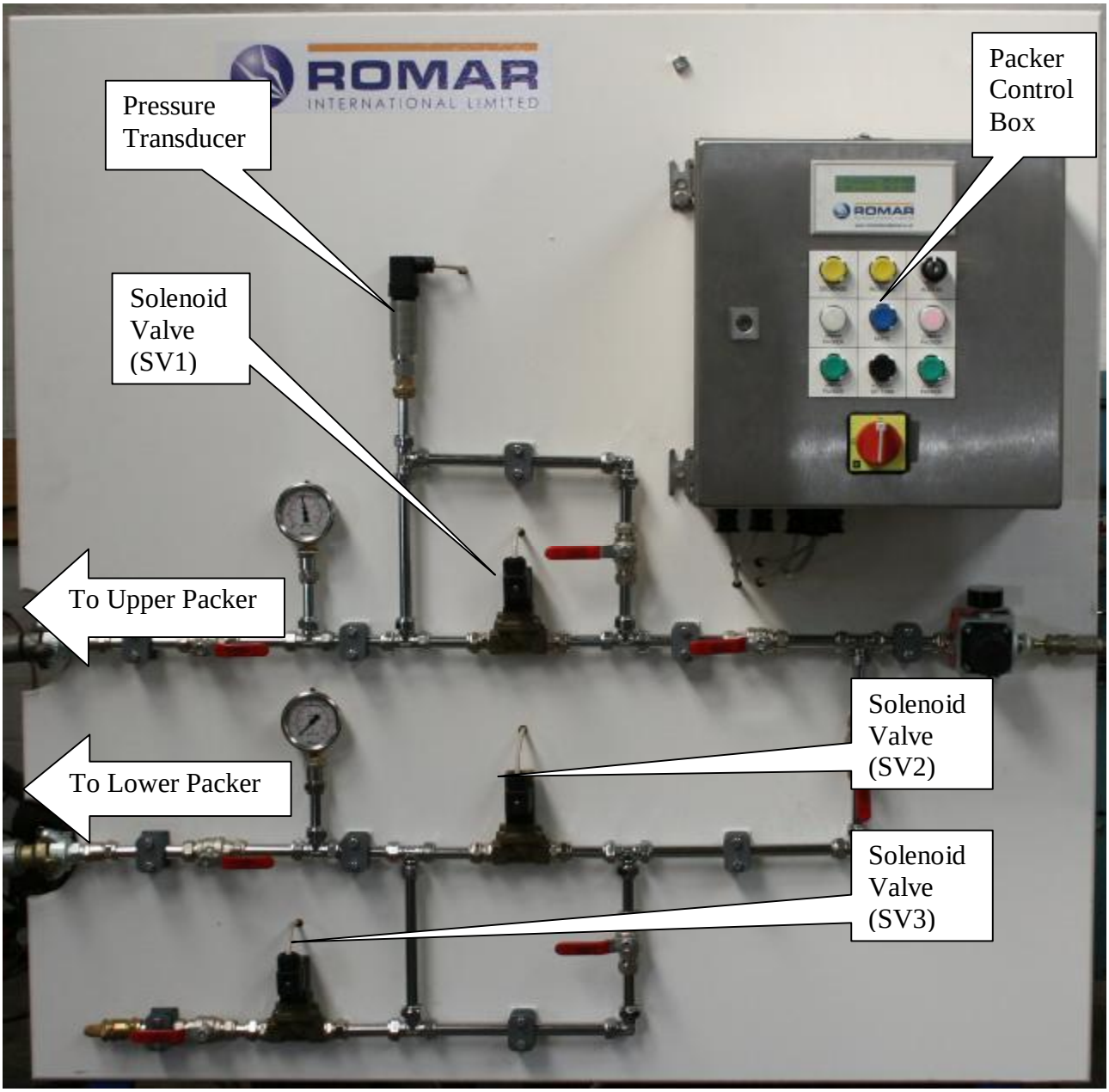

Figure 1 Packer Management System

1.2 PACKER CONTROL BOX

The Packer Control Box consists of a Safe Area cabinet assembly with access door.

Note: The cabinet is also available as a Zone 1 cabinet.

Installed inside the box assembly are:

- A Programmable Logic Controller (PLC)
- Three Relays
- A Power Supply Unit (PSU)
- A Master Circuit Breaker (MCB)
- Control Fuses
- Main Supply Isolator
- Terminal Rail
- Bonding leads between the door and chassis.

Installed to the cabinet assembly are:

- Four attachment brackets
- Cable entries (as required)
- The hard wiring for the remote assembly.

Installed to the access door are:

- A Liquid Crystal Display (LCD) Panel
- Two indicators
- Push buttons
- A key operated three position switch
- The Main Supply Isolator Switch
- Door Lock.

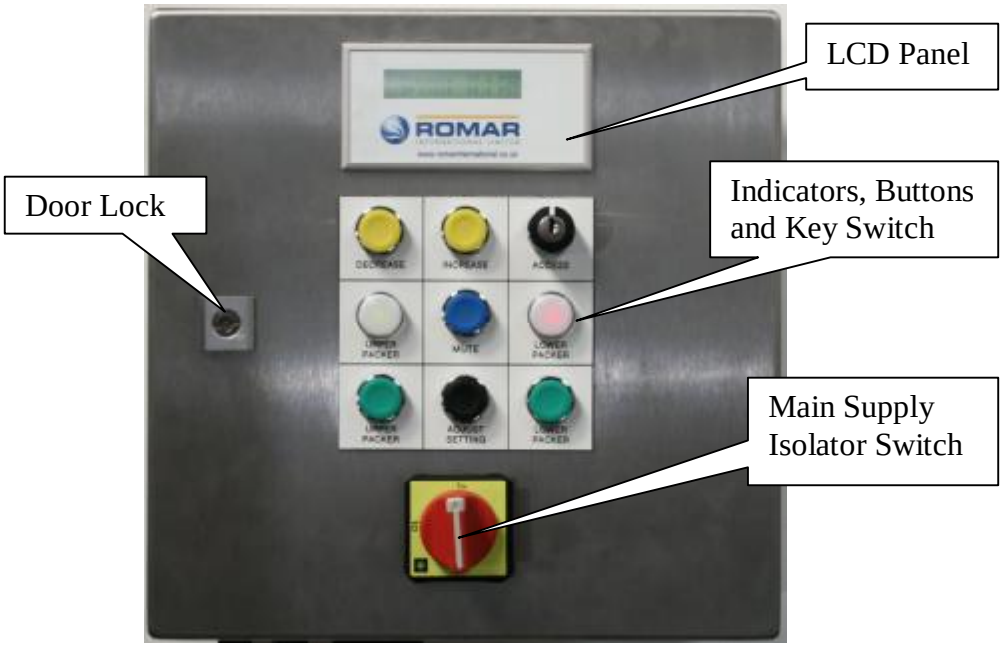

Figure 2 Front of the Packer Control Box

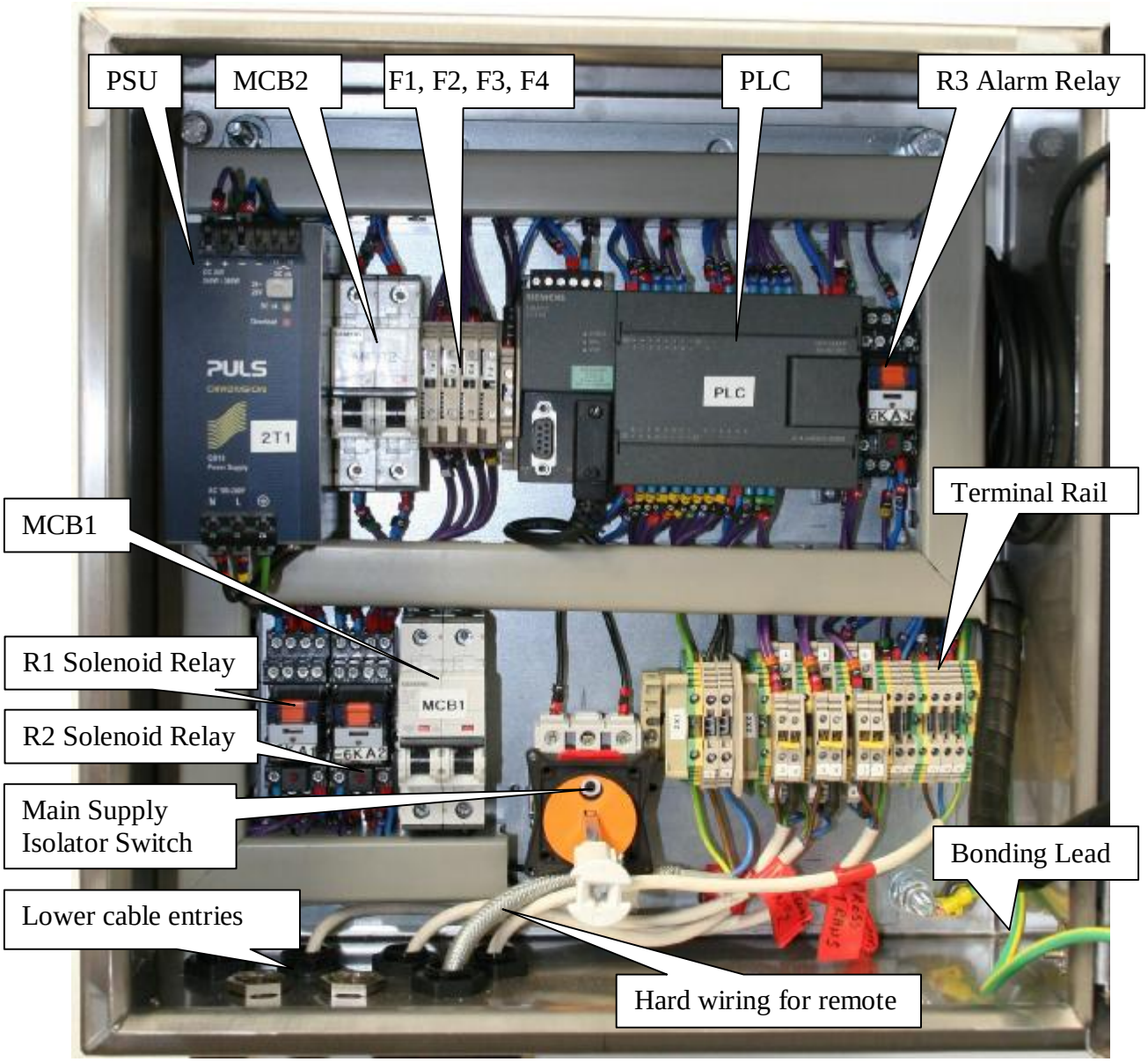

Figure 3 Inside the Packer Control Box

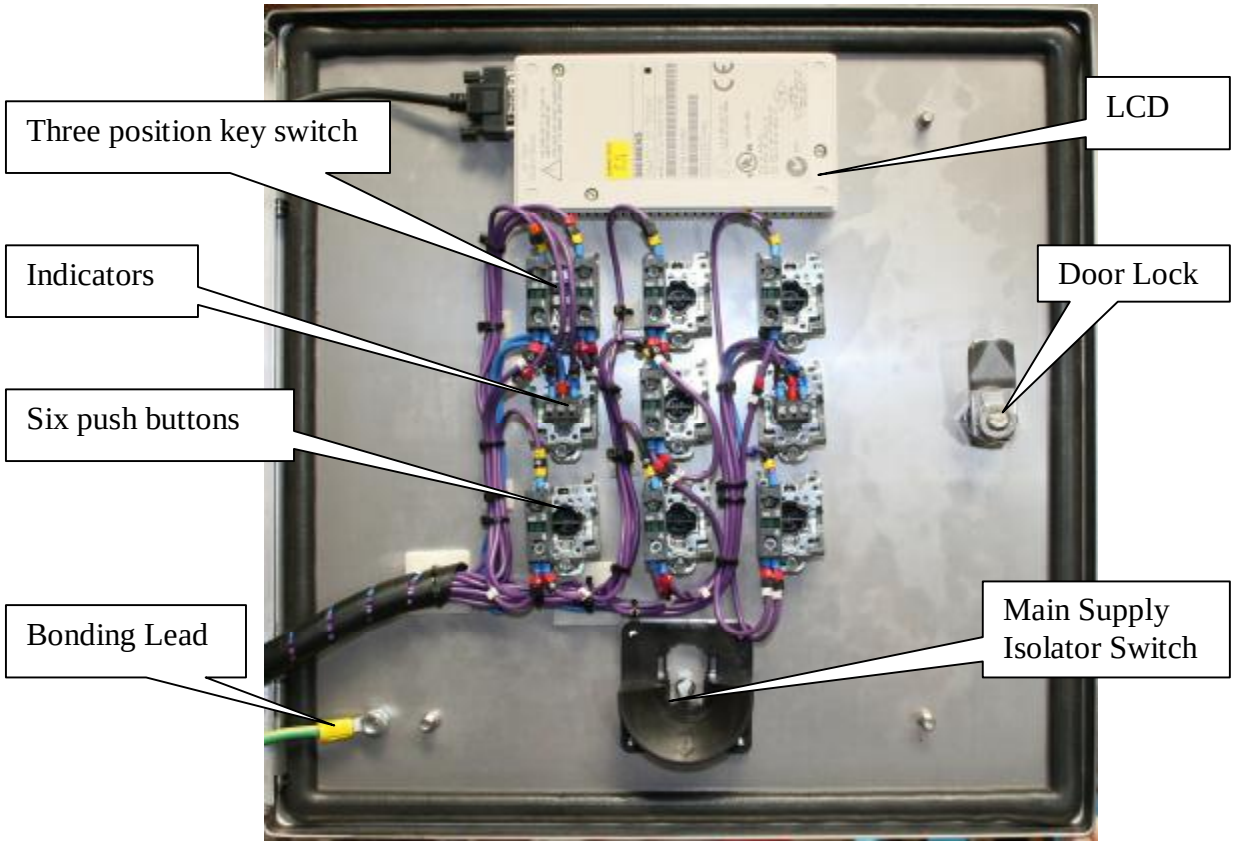

Figure 4 Back of Access Door

1.2.1 The Indicators

The indicators installed on the access door are the:

- Upper Packer red/green indicator, which when illuminated:
  - Red indicates packer inactive
  - Green indicates packer active.
- Lower Packer red/green indicator, which when illuminated:
  - Red indicates packer inactive
  - Green indicates packer active.

Figure 5 The Indicators, Buttons and Key Switch

1.2.2 The Push Buttons

The push buttons installed on the access door are the:

- Increase yellow push button, which when pressed:
  - Causes the menus to scroll up.
  - In combination with the Adjust Setting push button increases the value displayed in the selected menu.
- Decrease yellow push button, which when pressed:
  - Causes the menus to scroll down.
  - In combination with the Adjust Setting push button decreases the value displayed in the selected menu.
- Upper Packer green push button, which when pressed for three (3) seconds changes control to the upper packer.
- Lower Packer green push button, which when pressed for three (3) seconds changes control to the lower packer.
- Adjust Setting black push button, which when pressed:
  - In combination with the Access key switch turned clockwise and the Decrease push button decreases the value displayed in the selected menu.
  - In combination with the Access key switch turned clockwise and the Increase push button increases the value displayed in the selected menu.
  - In combination with the Access key switch turned anticlockwise and the Decrease push button zeros the hour meter displayed in Menus 2 and 3.
  - In combination with adjusting the regulator increases/decreases the pressure displayed in Menu 1 (see Menu 1 Upper Packer Pressure).
- Mute blue push button, which when pressed mutes (i.e. turns off) the alarm. The relevant alarm condition will be displayed on the LCD

1.2.3 The Key Switch

The Access three position key switch installed on the access door, which when turned:

- Clockwise and in combination with pressing:
  - The Adjust Setting and Increase push buttons increases the value displayed in the selected menu.
  - The Adjust Setting and Decrease push buttons decreases the value displayed in the selected menu.
- Anticlockwise and in combination with pressing the Adjust Setting and Decrease push buttons, zeros the hour meter displayed in Menu 2 and 3.

1.2.4 The LCD Panel

The LCD Panel displays the selected menu and when an alarm has occurred the relevant alarm condition.

The 14 menus are:

- Menu 1 Upper Packer Pressure
- Menu 2 Lower Hour Meter
- Menu 3 Upper Hour Meter
- Menu 4 Set Pressure Unit
- Menu 5 Set Limit Type
- Menu 6 Pressure Amount
- Menu 7 Sensor Current
- Menu 8 Sensor Offset
- Menu 9 Display Range Low
- Menu 10 Display Range High
- Menu 11 Minimum Pressure Set Point
- Menu 12 Filter Active
- Menu 13 Filter Deadband
- Menu 14 Filter Samples.

The seven alarm conditions are:

- Sensor Open Circuit Alarm
- Sensor Short Circuit Alarm
- Relay #1 Open Failure Alarm
- Relay #2 Open Failure Alarm
- Relay #3 Open Failure Alarm
- Relay #3 Close Failure Alarm
- Pressure Failure Alarm.

Menu 1 Upper Packer Pressure

Figure 6 Menu 1

Menu 1 displays the pressure of the supply to the Upper Packer and the pressure at which supply pressure will be changed to the Lower Packer should there be a pressure drop in the supply to the Upper Packer.

No adjustment can be made to the values displayed in this menu.

Menu 2 Lower Hour Meter

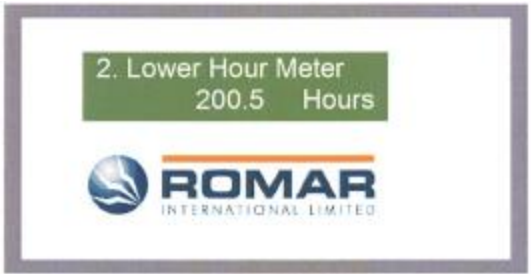

Figure 7 Menu 2

Menu 2 displays the total number of running hours for the Lower Packer.

The value displayed can be either increased or zeroed. The ability to increase the value can be used to restore the value after a power cut or if zeroed accidentally.

The values displayed can be increased by:

1 Turning the Access key switch anticlockwise.

2 Pushing the Adjust Setting and Increase push buttons simultaneously.

For the full procedure see Increasing the displayed value.

The value displayed can be zeroed by:

1 Turning the Access key switch anticlockwise.

2 Pushing the Adjust Setting and Decrease push buttons simultaneously.

For the full procedure see Zeroing the Hour Counter.

Menu 3 Upper Hour Meter

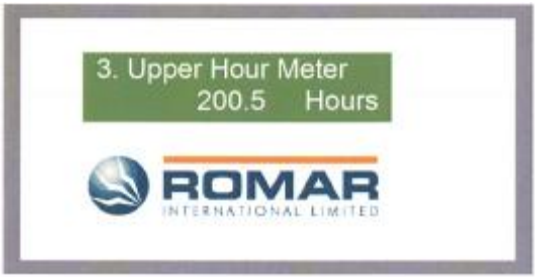

Figure 8 Menu 3

Menu 3 displays the total number of running hours for the Upper Packer.

The value displayed can be either increased or zeroed.

The values displayed can be increased by:

1 Turning the Access key switch anticlockwise.

2 Pushing the Adjust Setting and Increase push buttons simultaneously.

For the full procedure see Increasing the displayed value.

The value displayed can be zeroed by:

1 Turning the Access key switch anticlockwise.

2 Pushing the Adjust Setting and Decrease push buttons simultaneously.

For the full procedure see Zeroing the Hour Counter.

Menu 4 Set Pressure Unit

Figure 9 Menu 4

Menu 4 displays the units in which the pressure is displayed in Menu 1

The unit displayed can be changed between PSI or BAR.

The unit displayed can be changed by:

1 Turning the Access key switch clockwise.

2 Pushing the Adjust Setting and Increase/Decrease push buttons simultaneously.

For the full procedures see Increasing the displayed value and Decreasing the displayed value.

Menu 5 Set Limit Type

Figure 10 Menu 5

Menu 5 displays the method used to calculate the pressure limit, which can either be:

- A fixed amount in PSI/BAR
- A percentage (%) of the packer pressure.

The method displayed can be changed by:

1 Turning the Access key switch clockwise.

2 Pushing the Adjust Setting and Increase/Decrease push buttons simultaneously.

For the full procedures see Increasing the displayed value and Decreasing the displayed value.

Menu 6 Pressure Amount

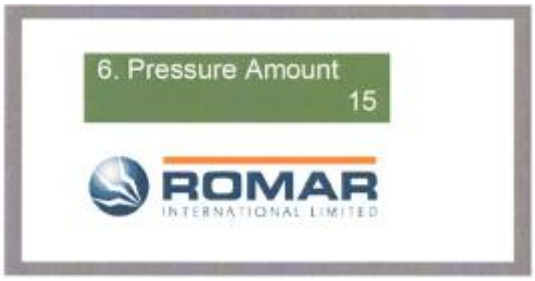

Figure 11 Menu 6

Menu 6 displays the pressure limit value used to calculate the pressure limit allowed below the packer pressure.

The value displayed will be a fixed amount in PSI, BAR or a percentage within the range of 0 – 10,000 depending on the method selected in Menu 5.

The value displayed can be changed by:

1 Turning the Access key switch clockwise.

2 Pushing the Adjust Setting and Increase/Decrease push buttons simultaneously.

For the full procedures see Increasing the displayed value and Decreasing the displayed value.

Menu 7 Sensor Current

Figure 12 Menu 7

Menu 7 displays the type of current output of the pressure transducer and would only be used when calibrating the pressure transducer.

The current output displayed can be changed between 0-20mA and 4-20mA.

The current output displayed can be changed by:

1 Turning the Access key switch clockwise.

2 Pushing the Adjust Setting and Increase/Decrease push buttons simultaneously.

For the full procedures see Increasing the displayed value and Decreasing the displayed value.

Menu 8 Sensor Offset

Figure 13 Menu 8

Menu 8 displays the offset value of the pressure transducer used to calibrate the transducer offset and would only be used when calibrating the pressure transducer.

The value displayed will be a fixed amount within the range of 0 – 100. Normally this value is set to zero (0).

The value displayed can be changed by:

1 Turning the Access key switch clockwise.

2 Pushing the Adjust Setting and Increase/Decrease push buttons simultaneously.

For the full procedures see Increasing the displayed value and Decreasing the displayed value.

Menu 9 Display Range Low

Figure 14 Menu 9

Menu 9 displays the starting point of the transducer range which is the value of the transducer output at minimum current and would only be used when calibrating the pressure transducer.

The value displayed will be a fixed amount within the range of 0 – 1,000.

The value displayed can be changed by:

1 Turning the Access key switch clockwise.

2 Pushing the Adjust Setting and Increase/Decrease push buttons simultaneously.

For the full procedures see Increasing the displayed value and Decreasing the displayed value.

Menu 10 Display Range High

Figure 15 Menu 10

Menu 10 displays the end point of the transducer range which is the value of the maximum transducer output at 20mA and would only be used when calibrating the pressure transducer.

The value displayed will be a fixed amount within the range of 0 – 3,000 PSI or 0 – 207 BAR.

The value displayed can be changed by:

1 Turning the Access key switch clockwise.

2 Pushing the Adjust Setting and Increase/Decrease push buttons simultaneously.

For the full procedures see Increasing the displayed value and Decreasing the displayed value.

Menu 11 Minimum Pressure Set Point

Figure 16 Menu 11

Menu 11 displays the value of the Minimum Pressure Set Point (SP) and would only be used when calibrating the system. This is the minimum pressure required to allow the Upper Packer to be selected.

The value displayed will be a fixed amount within the range of 0 – 50 PSI or 0 – 3 BAR.

The value displayed can be changed by:

1 Turning the Access key switch clockwise.

2 Pushing the Adjust Setting and Increase/Decrease push buttons simultaneously.

For the full procedures see Increasing the displayed value and Decreasing the displayed value.

Menu 12 Filter Active

Figure 17 Menu 12

Menu 12 displays the status of the transducer filter used to filter noisy signals.

The status displayed can be changed between On or Off.

The status displayed can be changed by:

1 Turning the Access key switch clockwise.

2 Pushing the Adjust Setting and Increase/Decrease push buttons simultaneously.

For the full procedures see Increasing the displayed value and Decreasing the displayed value.

Menu 13 Filter Deadband

Figure 18 Menu 13

Menu 13 displays the value of the filter deadband where any change in pressure will be ignored and would only be used when calibrating the system. Only used if the filter is active.

The value displayed will be a fixed amount within the range of 0 – 100.

The value displayed can be changed by:

1 Turning the Access key switch clockwise.

2 Pushing the Adjust Setting and Increase/Decrease push buttons simultaneously.

For the full procedures see Increasing the displayed value and Decreasing the displayed value.

Menu 14 Filter Samples

Figure 19 Menu 14

Menu 14 displays the number of samples to be taken during a filtered reading and would only be used when calibrating the system. The number sets the effectiveness of the filter with a large number making it less responsive to change. Only used if the filter is active.

The number of samples displayed will be a fixed amount within the range of 0 – 1000.

The number displayed can be changed by:

1 Turning the Access key switch clockwise.

2 Pushing the Adjust Setting and Increase/Decrease push buttons simultaneously.

For the full procedures see Increasing the displayed value and Decreasing the displayed value.

Sensor Open Circuit Alarm

Figure 20 Sensor Open Circuit alarm

An alarm ‘Sensor Open Circuit’ displays and flashes across the LCD every 2 seconds when a sensor circuit is open or disconnected.

Sensor Short Circuit Alarm

Figure 21 Sensor Short Circuit alarm

An alarm 'Sensor Short Circuit' displays and flashes across the LCD every 2 seconds when a sensor circuit is shorted.

Relay #1 Open Failure Alarm

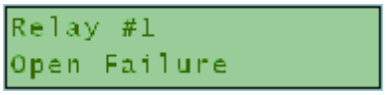

Figure 22 Relay #1 Open Failure alarm

An alarm 'Relay #1 Open Failure' displays and flashes across the LCD every 2 seconds when the contacts of relay 1 (R1) fail to open after deactivation of the coil.

Relay #2 Open Failure Alarm

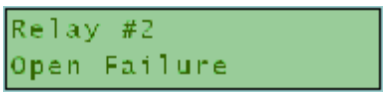

Figure 23 Relay #2 Open Failure alarm

An alarm 'Relay #2 Open Failure' displays and flashes across the LCD every 2 seconds when the contacts of relay 2 (R2) fail to open after deactivation of the coil.

Relay #3 Open Failure Alarm

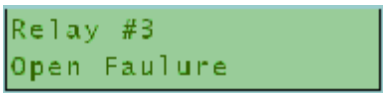

Figure 24 Relay #3 Open Failure alarm

An alarm 'Relay #3 Open Failure' displays and flashes across the LCD every 2 seconds when the contacts of relay 3 (R3) fail to open after deactivation of the coil.

Relay #3 Close Failure Alarm

Figure 25 Relay #3 Close Failure alarm

An alarm 'Relay #3 Close Failure' displays and flashes across the LCD every 2 seconds when the contacts of relay 3 (R3) fail to close after activation of the coil.

Pressure Failure Alarm

Figure 26 Pressure Failure alarm

An alarm 'Pressure Failure' displays and flashes across the LCD every 2 seconds when the pressure drops below the set point. The alarm will be triggered and will continue until the Adjust Setting push button is pressed.

1.2.5 The PLC

The PLC controls the operation of the Packer Management System and also includes a data logging function. This function keeps a rolling record of the last 1000 events and records all settings every 15 minutes and change in settings.

1.3 THE REMOTE

Figure 27 The Remote

The Remote consists of a case with an Adjust Pressure black push button which performs the same function as the Adjust Setting push button (see 1.2.1).

The remote is hard wired to connections inside the cabinet and has a connecting cable of a length sufficient for the operator to take the remote to the regulator providing the supply to the packer.

Note: The length of the connecting cable is dependant on the distance between where the box is installed and the location of the regulator.

1.4 THE SOLENOID VALVES

Two fail closed solenoid valves (SV1 and SV3) and one fail open solenoid valve (SV2) are installed (see Figure 1) and are located as follows:

- Fail close solenoid valve (SV1) is installed in the supply line to the upper packer
- Fail close solenoid valve (SV3) is installed in the vent line of the solenoid valve (SV2) bypass line
- Fail open solenoid valve (SV2) is located in the supply line to the lower packer.

Figure 28 Typical Solenoid Valve

1.5 THE PRESSURE TRANSDUCER

The pressure transducer is installed to the solenoid valve (SV1) bypass line.

Figure 29 Typical Pressure Transducer

2. OPERATION

WARNING: INAPPROPRIATE USE OF THE PMS COULD CAUSE FAILURE OF THE SYSTEM. ALL FUNCTIONS AND SETTINGS ARE MONITORED AND RECORDED BY THE PLC TO ASSIST IN ANY FAILURE INVESTIGATION.

2.1 NORMAL (AUTOMATIC) OPERATION

The Packer Management System function is to ensure that there is one packer available to seal the slip joint to stop any mud leakage from around it. It does this by monitoring the supply pressure to a primary packer (usually the upper packer) and keeping a secondary packer (usually the lower packer) available as a standby to take over should the upper packer fail.

The supply pressure is an indication of the state of the packer. Therefore, a stable pressure indicates a serviceable packer, while a decreasing pressure indicates an unserviceable packer which could be because the packer has burst or has started to leak due to wear.

Therefore, during normal day to day operation, the PMS monitors the supply pressure to the upper packer for any decrease in pressure to a value below a set point. On detecting a loss of pressure, the PMS automatically activates the lower packer to take over from the upper packer and starts the alarm.

If power is lost to the PMS, the PMS will automatically activate the lower packer.

2.2 MANUAL OPERATION

Manual operations include:

- Switching from Upper to Lower Packer
- Switching from Lower to Upper Packer
- Reducing Supply Pressure.

2.2.1 Switching from Upper to Lower Packer

Switch from the upper to lower packer as follows:

Note: The Upper Packer indicator will be illuminated green and the Lower Packer indicator will be illuminated red.

1 Press and hold the Lower Packer push button for three seconds.

The PMS will activate the lower packer, the Upper Packer indicator will illuminate red and the Lower Packer indicator will illuminate green.

2.2.2 Switching from Lower to Upper Packer

Switch from the lower to upper packer as follows:

Note: The Upper Packer indicator will be illuminated red and the Lower Packer indicator will be illuminated green.

1 Increase the supply pressure to the upper packer to a value above Minimum Pressure Set Point displayed in Menu 11.

2 Press and hold the Upper Packer push button for three seconds.

The PMS will activate the upper packer, the Upper Packer indicator will illuminate green and the Lower Packer indicator will illuminate red.

2.2.3 Reducing Supply Pressure

If for operating reasons, the supply pressure has to be reduced this can be done by pressing the Adjust push button and decreasing the Regulator setting.

2.3 PROCEDURES

Procedures are detailed for:

- Navigating through the Menus
- Increasing the displayed value
- Decreasing the displayed value
- Zeroing the Hour Counter.

2.3.1 Navigating through the Menus

The menu displayed can be changed as follows:

1 Press the Increase/Decrease push button.

Note: Push the Increase push button to scroll through the menus from 1 to 14 and the Decrease push button to scroll through the menus from 14 to 1.

The menu displayed will change to the next menu.

2 Hold the Increase/Decrease push button until the menu displayed is the menu required, and then release the button.

2.3.2 Increasing the displayed value

The value displayed can be changed as follows:

1 Insert the key into the Access key switch.

2 Turn the Access key switch clockwise.

3 Press the Adjust Setting and Increase push buttons simultaneously.

The value displayed will start to increase.

4 Hold the Adjust Setting and Increase push buttons simultaneously until the value displayed is the value required, then release the buttons simultaneously.

The value displayed will be the new value.

5 Turn the Access key switch anticlockwise to the middle neutral position.

6 Remove the key from the Access key switch.

2.3.3 Decreasing the displayed value

The value displayed can be changed as follows:

1 Insert the key into the Access key switch.

2 Turn the Access key switch clockwise.

3 Press the Adjust Setting and Decrease push buttons simultaneously.

The value displayed will start to decrease.

4 Hold the Adjust Setting and Decrease push buttons simultaneously until the value displayed is the value required, then release the buttons simultaneously.

The value displayed will be the new value.

5 Turn the Access key switch anticlockwise to the middle neutral position.

6 Remove the key from the Access key switch.

2.3.4 Zeroing the Hour Counter

See Menu 2 Lower Hour Meter and Menu 3 Upper Hour Meter.

The value displayed can be zeroed as follows:

1 Insert the key into the Access key switch.

2 Turn the Access key switch anticlockwise.

3 Press the Adjust Setting and Decrease push buttons simultaneously.

The value displayed will zero.

4 Once the value displayed has zeroed release the buttons simultaneously.

5 Turn the Access key switch clockwise to the middle neutral position.

6 Remove the key from the Access key switch.

3. MAINTENANCE

WARNING: POOR MAINTENANCE OF THE PMS COULD CAUSE FAILURE OF THE SYSTEM. ALL FUNCTIONS AND SETTINGS ARE MONITORED AND RECORDED BY THE PLC TO ASSIST IN ANY FAILURE INVESTIGATION.

If any replacement parts are required see the Parts List.

3.1 WEEKLY

Every week function check the PMS by switching from the upper packer to the lower packer (see Switching from Upper to Lower Packer) and then back to the upper packer (see Switching from Lower to Upper Packer).

3.2 ANNUALLY

Annually, check:

- All connections for:
  - Security
  - Signs of corrosion
  - Overheating
  - Condition.
- Solenoid valves and the pressure transducer for:
  - Secure connections
  - Secure installation
  - Signs of corrosion
  - Overheating
  - Condition.
- The box for:
  - Secure connections
  - Secure installation
  - Signs of corrosion
  - Overheating
  - Condition.
- All cables for:
  - Secure connections
  - Secure installation
  - Signs of corrosion
  - Overheating
  - Condition.

4. INSTALLATION

CAUTION: **BEFORE PROCEEDING WITH INSTALLATION, ENSURE THAT ALL PERSONNEL INVOLVED ARE WEARING THE APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT AND ARE COMPLYING WITH LOCAL SAFETY PROCEDURES AND PERMIT TO WORK REQUIREMENTS.**

WARNING: **ONLY SUITABLE COMPETENT ELECTRICAL PERSONNEL SHOULD CARRY OUT THE ELECTRICAL INSTALLATION.**

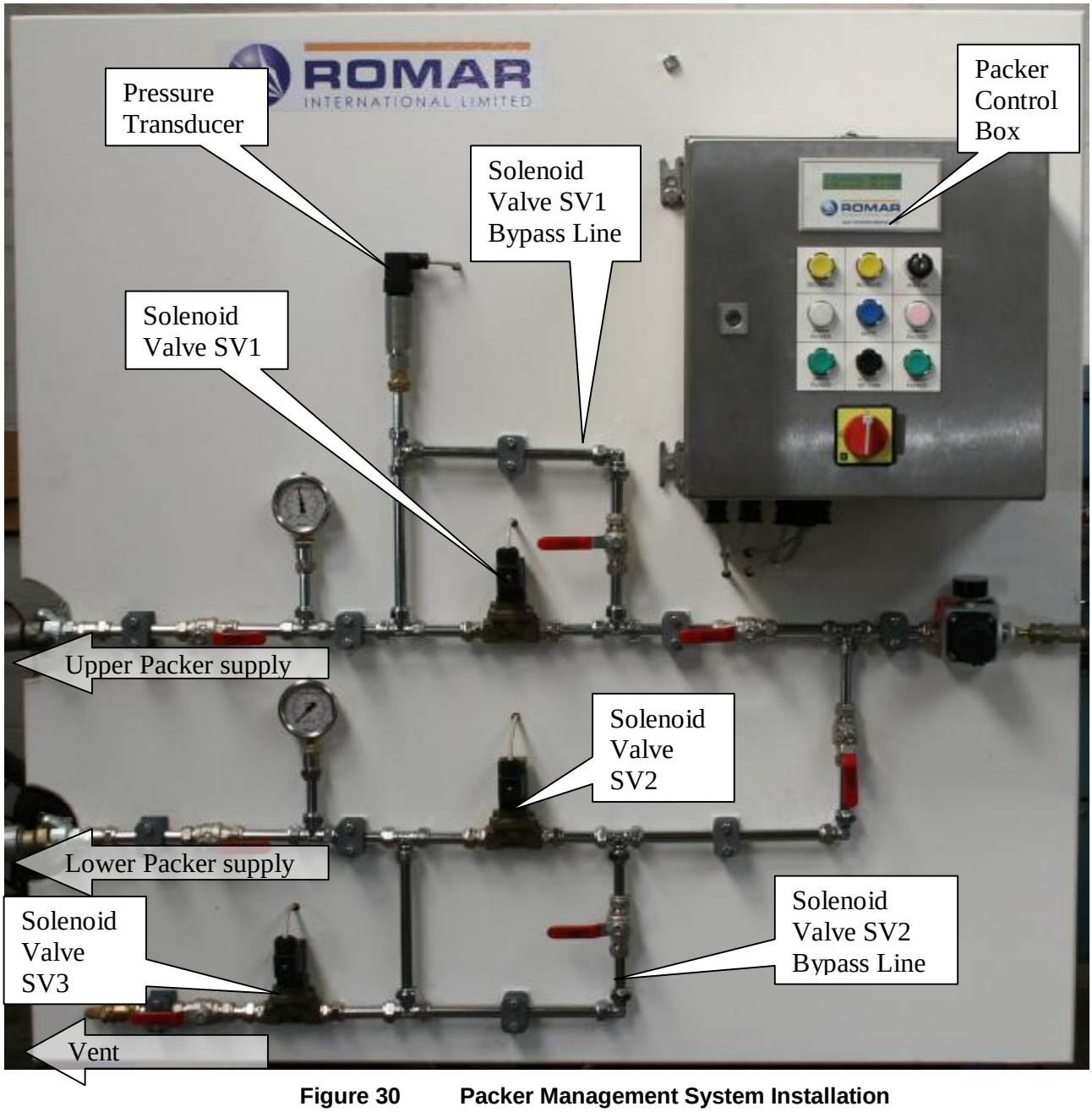

Figure 30 Packer Management System Installation

Install the PMS as follows:

Note: **This procedure is for guidance only. The actual steps may differ from installation to installation and will depend on individual layouts, locations, etc.**

1 Before starting installation:

a Survey the route of the supply line to the upper packer to determine where to install the:

- Fail close solenoid valve (SV1)
- Solenoid valve's (SV1) bypass line
- Pressure Transducer on the solenoid valve's (SV1) bypass line.

b Survey the route of the supply line to the lower packer to determine where to install the:

- Fail open solenoid valve (SV2)
- Solenoid valve's (SV2) bypass and vent lines
- Fail close solenoid valve (SV3) vent line on the solenoid valve's (SV2) bypass line.

c Identify a location to install the box.

The ideal location would be at eye level on a wall/partition/frame in a Safe Area local to the drill pipe packers.

d Identify the nearest and most suitable power supply feed from the Emergency Supply to where the box is to be installed.

e Determine:

- The type of alarm required.

  The alarm can be a horn, bell, flashing light, feed to the Distributed Control System or a combination of any of these.

- Where the alarm is to be located.

f Survey the route the cable will run from the power supply feed's location to the box's location.

g Survey the route a cable will run from the box's location to:

- the alarm's location
- the solenoid valve's (SV1) location
- the pressure transducer's location
- the solenoid valve's (SV2) location
- the solenoid valve's (SV3) location.

Note 1: The cables should not be run alongside any power cables.

Note 2: The cable runs should not be too long as this could cause a volt drop which could affect performance. Any volt drop will have to be calculated before installation

2 Install a fail close solenoid valve (SV1) to the upper packer supply line.

3 Install the solenoid valve's (SV1) bypass line.

4 Install a pressure transducer to the solenoid valve's (SV1) bypass line.

5 Install a fail open solenoid valve (SV2) to the lower packer supply line.

6 Install the solenoid valve's (SV2) bypass and vent lines.

7 Install a fail close solenoid valve (SV3) to the vent line.

8 Install the box as follows:

a Remove any transport packaging.

b If necessary, attach the four mounting brackets to the cabinet.

c Ensure MCB 1 is off/open.

d Drill mounting holes.

e Attach the box to the wall/partition using four bolts.

f If necessary, install a bonding cable/lead between the box and local structure.

g If necessary, hard wire the Remote to its connection terminals inside the box. Connect:

- Live to terminal 14 on the terminal rail
- Neutral to terminal 15 on the terminal rail.

9 Install a cable between the box's location and:

- the alarm
- solenoid valve (SV1)
- the pressure transducer
- solenoid valve (SV2)
- solenoid valve (SV3).

Note 1: Use only screened cable.

Note 2: The cable connecting the box to the alarm does so through the cable gland.

Note 3: The cables connecting the box to the three solenoid valves and the pressure transducer do so through lower cable glands.

WARNING: DO NOT AT THIS POINT CONNECT THE CABLE TO THE POWER SUPPLY.

10 Install a cable between the box's location and the power supply.

11 Feed the cables from:

- The alarm through the upper cable gland.
- The three solenoid valves and the pressure transducer through individual lower cable glands.
- The power supply through a lower cable gland.

12 Connect the alarm cable.

13 Connect the:

- Solenoid valve(SV1) cable:
  - live to terminal 5 on the terminal rail
  - neutral to terminal 6 on the terminal rail.
- The pressure transducer cable:
  - live to terminal 9 on the terminal rail
  - neutral to terminal 11 on the terminal rail.
- Solenoid valve (SV2) cable:
  - live to terminal 1 on the terminal rail
  - neutral to terminal 2 on the terminal rail.
- Solenoid valve (SV3) cable:
  - live to terminal 3 on the terminal rail
  - neutral to terminal 4 on the terminal rail.

WARNING: CHECK THE CABLE IS NOT YET CONNECTED TO THE POWER SUPPLY.

CAUTION: COMPLY WITH LOCAL SAFETY PROCEDURES AND PERMIT TO WORK REQUIREMENTS.

14 Connect the power supply cable live and neutral to the relevant terminals on the Main Supply Isolator.

15 Connect the cable to the power supply.

5. COMMISSIONING

Commission the system as follows:

Note 1: Steps 6 thru 9 would only be used when calibrating the pressure transducer.

Note 2: Steps 11 thru 13 would only be used when calibrating the system.

1 Turn MCB 1 to on/closed.

2 Turn the power supply on.

Wait for the PLC to boot up.

3 Set the pressure units to PSI or BAR. See Menu 4 Set Pressure Unit.

4 Set pressure limit value method to fixed or percentage. See Menu 5 Set Limit Type.

5 Set the pressure limit value. See Menu 6 Pressure Amount.

6 If required, set the current output of the pressure transducer to 0-20mA or 4-20mA. See Menu 7 Sensor Current.

7 If required, calibrate the offset value of the pressure transducer. See Menu 8 Sensor Offset.

8 If required, calibrate the starting point of the transducer range which is the value of the transducer output at minimum current. See Menu 9 Display Range Low.

9 If required, calibrate the end point of the transducer range which is the value of the maximum transducer output at 20mA. See Menu 10 Display Range High.

10 Set the minimum pressure set point. See Menu 11 Minimum Pressure Set Point.

11 If necessary, set filter active to On or Off. See Menu 12 Filter Active.

12 If necessary, set filter deadband. See Menu 13 Filter Deadband.

Only set if filter is activated in step 11.

13 If necessary, set filter sample rate. See Menu 14 Filter Samples.

Only set if filter is activated in step 11.

14 Function check the system.

6. PARTS LIST

The table below details the major parts used in the Packer Control Box [see 1.2] and Remote [see 1.3]. These parts can be sourced form ROMAR International Ltd.

Table 1 Parts List

Item	Quantity	Description	Manufacturer	Part Number
1	1	Isolator	Telemechanique	VCCF1
2	1	Relay Socket, 4PCO	Schrack	437-783
3	1	Relay, 4PCO, 24VDC	Schrack	376-442
4	1	224XP CPU DC/DC/DC Preloaded Software	Siemens	6ES7-214-2AD23-0XB0
5	1	TD200C LCD Display	Siemens	6ES7-272-1AA10-0YA0
6	1	AC-DC Convertor	PULS	Rig Specific
7	1	DP Breaker	Merlin Gerin	C60HD220
8	1	N/O Contact	Telemechanique	ZBEBZ101
9	1	Yellow Push Button	Telemechanique	ZB4BA5
10	1	Black Push Button	Telemechanique	ZB4BA2
11	1	Green Push Button	Telemechanique	ZB4BA3
12	1	Key Switch	Telemechanique	ZB4BG3
13	1	Red/Green LED	Signal	LE 20224
14	1	LED Holder	Signal	DMC 22
15	1	Fuse Holder	Weidmuller	1101000000 00
16	1	Remote Adjust Controller	Marine	
17	1	Pressure Transducer	Vega	14X1FA1