



Warranty Notification - Installation List Data, and Start Up Check Lists for JGB:V:Z:U and KBB:V:Z:U Reciprocating Compressors

The following forms are designed to ensure a successful start-up of larger Ariel reciprocating compressor models. Ariel warranty coverage requires these completed forms sent to:

Administrative Assistant - Sales, Ariel Corporation
35 Blackjack Road • Mount Vernon, Ohio 43050 USA
Phone: 740-397-0311 • FAX: 740-397-3856

Warranty Notification - Installation List Data

Date: _____ Name: _____

Unassigned Resale Direct Sale Lease-Purchase Rental/Lease Unit

Compressor Frame

Frame Model: _____ Frame Serial #: _____

Frame Lubricant Make and Grade: _____

Package Startup Date: _____

Distributor/Fabricator

Company: _____ Name: _____

Address: _____

City: _____ State: _____ Zip: _____ Country: _____

Fabricator Unit Number: _____

Application

Air/Nitrogen CNG/GNC FPSO Gathering Fuel Gas Booster
 Refrigeration Pipeline PRC Injection Storage/Withdrawal Miscellaneous

Elevation: _____

H₂S%: _____ CO₂%: _____ Specific Gravity: _____ Non-Lube: Yes No

REV	DESCRIPTION	REV	EC	DATE	REV	EC	DATE
4	Page 2: Added commissioning agent info.	4	017941	1-2-12			
		3	015364	9-13-10			
		2	016770	6-9-10			
		1	016316	10-30-09			
		0	016072	6-16-09			



ENGINEERING REFERENCE

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Frame Serial #: _____

Unit Location

Customer Name: _____

Project/Lease Name: _____

Closest Town: _____ State: _____ Country: _____ Offshore: Yes No

Directions to Location or GPS: _____

Customer Contact Person: _____ Contact Phone: _____

Contact Email: _____ OK to contact: Yes No

Driver

Driver Manufacturer: _____ Driver Model: _____

Driver Type: _____ Applied RPM: _____ Name Plate HP (kW): _____

Coupling Manufacturer: _____ Coupling Model: _____

Compressor Cylinders and Operating Conditions

Cylinder Class	Stage Number	Throw Number	Serial Number	Bore Dia. In. (mm)	Inlet Temp. °F (°C)	Inlet Pres. psig (Bar _g)	Disc. Temp. °F (°C)	Disc. Pres. psig (Bar _g)
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

Cylinder Lubricant Make and Grade: _____

Documentation and Accessories

Check all items included in the shipment:

- Technical Manual Yes No
- Start-Up Spare Parts Yes No
- Toolbox w/Ariel Tools Yes No
- Unit Parts List Yes No
- Recommended Spares List Yes No
- Unit Start and Stop Procedures Yes No
- Toolbox with Hydraulic Tools Yes No (Optional)
- Toolbox with SAE Hand Tools Yes No (Optional)

Commissioning Agent

Name: _____ Company: _____

Address: _____

City: _____ State: _____ Zip: _____ Country: _____

Phone: _____ Email: _____



Frame Serial #: _____

START-UP CHECK LIST - ITEMS TO CHECK IN THE FIELD AT COMMISSIONING		
Description	Date Checked	Date Verified
1. Confirm receipt of all Ariel supplied components and protection of all containers and parts against storage related damage.	Customer: _____	Distributor: _____
	Commissioning Agent: _____	
2. Check and verify the top cover data plate of the compressor frame for compressor design limitations such as rod load, maximum and minimum speed, and maximum lube oil temperature.	Commissioning Agent: _____	Distributor: _____
3. Check and verify the availability of correct start-up spares, hand tools, special tools, compressor parts list and drawings, and technical manuals at installation.	Commissioning Agent: _____	Distributor: _____
4. Check and verify the Ariel lube sheet and Lubrication Specification matches the recommended oil grade and viscosity for the service.	Commissioning Agent: _____	Distributor: _____
5. Check and verify all lube oil piping cleanliness per Ariel lubrication specifications (see Technical Manual, Section 4).	Commissioning Agent: _____	Distributor: _____
6. Verify lube oil storage and supply line cleanliness per ER-56.06. Verify crankcase oil supply isolation valve is open.	Commissioning Agent: _____	Distributor: _____
7. Verify prelube piping cleanliness per ER-56.06 and correct circuit operation.	Commissioning Agent: _____	Distributor: _____
8. Verify there is an oil cooler and high temperature shutdown for the oil into the compressor frame.	Commissioning Agent: _____	Distributor: _____
9. Verify whether the temperature control valve installation is blending or diverting (blending preferred). _____	Commissioning Agent: _____	Distributor: _____
10. Check compressor crankcase oil level controller for proper installation, operation, levelness, and venting.	Commissioning Agent: _____	Distributor: _____
11. If applicable, check cooling water circuit cleanliness for the oil cooler and cooled packing per Technical Manual. Verify correct routing and test pump rotation. Set pressure appropriately per Technical Manual and leak test.	Commissioning Agent: _____	Distributor: _____
12. Verify correct filter element installation. Prime the oil filter element and all lube oil piping with oil.	Commissioning Agent: _____	Distributor: _____
13. Verify proper compressor crankcase oil level before starting (about 7/8 full in site glass).	Commissioning Agent: _____	Distributor: _____
14. Verify correct installation of a low oil pressure shutdown tubed to the downstream side of the oil filter.	Commissioning Agent: _____	Distributor: _____
15. Operate pre-lube system.	Commissioning Agent: _____	Distributor: _____
16. Tighten frame hold down bolting (see Technical Manual, Section 2).	Commissioning Agent: _____	Distributor: _____



Frame Serial #: _____

START-UP CHECK LIST - ITEMS TO CHECK IN THE FIELD AT COMMISSIONING		
Description	Date Checked	Date Verified
17. Record "out of plane" readings (pre-grout) - see ER-82. Drive End _____ Auxiliary End _____ _____ _____ Commissioning Agent: _____ Distributor: _____		
18. If applicable, check compressor frame mounting grout or chocks for proper installation to top of base frame. Also check for cracks. Commissioning Agent: _____ Distributor: _____		
19. If applicable, check compressor skid to foundation grouting for proper installation, grout type, and internal support. Commissioning Agent: _____ Distributor: _____		
20. Record soft foot readings. More than 0.002 inches (0.05 mm) pull-down on any frame foot requires correction. See Technical Manual. Drive End _____ Auxiliary End _____ _____ _____ Commissioning Agent: _____ Distributor: _____		
21. If applicable, re-assemble the guide/cylinder components. Commissioning Agent: _____ Distributor: _____		
22. Check and verify connecting rods can move freely without damage before rotating the crankshaft. NOTE: Pre-lube compressor before turning crankshaft. Commissioning Agent: _____ Distributor: _____		
23. Check crosshead guide shimming for correct pre-load and hold down bolt torque. Commissioning Agent: _____ Distributor: _____		
24. Record piston end clearances with feeler gages (see Technical Manual, Section 1, Clearances). Throw 1 2 3 4 5 6 Head End _____ Crank End _____ NOTE: Pre-lube compressor before turning crankshaft. Commissioning Agent: _____ Distributor: _____		
25. Measure and record rod run out (see Technical Manual, Section 5 for maximum acceptable readings). Throw 1 2 3 4 5 6 Vertical: Piston @ CE _____ Mid-Stroke _____ Piston @ HE _____ Horizontal: Piston @ CE _____ Mid-Stroke _____ Piston @ HE _____ NOTE: Pre-lube compressor before turning crankshaft. Commissioning Agent: _____ Distributor: _____		



Frame Serial #: _____

START-UP CHECK LIST - ITEMS TO CHECK IN THE FIELD AT COMMISSIONING																															
Description		Date Checked	Date Verified																												
<p>26. Measure crosshead clearances with cylinders mounted. To check top, insert 0.5 inch (12.7 mm) wide feelers from one side edge across to the opposite side, at both ends. See Technical Manual, Section 1 for limits. To check bottom, insert a 0.0015 inches (0.038 mm) feeler at the four corners; feeler should insert no more than 0.50 (13 mm). Record feeler values below:</p> <table border="1"> <thead> <tr> <th>Throw</th> <th>Top Min.</th> <th>Top Max.</th> <th>Bottom Max. (Corners)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>2</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>3</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>4</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>5</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>6</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table>		Throw	Top Min.	Top Max.	Bottom Max. (Corners)	1	_____	_____	_____	2	_____	_____	_____	3	_____	_____	_____	4	_____	_____	_____	5	_____	_____	_____	6	_____	_____	_____	Commissioning Agent: _____	Distributor: _____
Throw	Top Min.	Top Max.	Bottom Max. (Corners)																												
1	_____	_____	_____																												
2	_____	_____	_____																												
3	_____	_____	_____																												
4	_____	_____	_____																												
5	_____	_____	_____																												
6	_____	_____	_____																												
<p>27. Record "out of plane" readings (post-grout) - see ER-82.</p> <p>_____</p> <p>_____</p> <p>NOTE: If applicable after reassembly, send readings to Ariel.</p>		Commissioning Agent: _____	Distributor: _____																												
<p>28. For electric motor drivers, check and verify the motor shaft is set at its magnetic center before positioning axial clearance. With the coupling disconnected, check and verify driver rotation matches the compressor rotation arrow.</p>		Commissioning Agent: _____	Distributor: _____																												
<p>29. Check coupling bolt torque to coupling manufacturer recommendations.</p>		Commissioning Agent: _____	Distributor: _____																												
<p>30. Check and verify compressor to driver alignment (installed on site, cold). Record dial indicator readings in inches (mm) at the 3, 6, 9 and 12 o'clock positions or attach alignment tool print-out.</p> <div style="text-align: center;"> </div> <p>If using a laser alignment tool, make a print out and attach it to this document.</p>		Commissioning Agent: _____	Distributor: _____																												
<p>31. Check and verify compressor crankshaft thrust clearance. The shaft should remain stationary after thrusting each direction (see Technical Manual, Clearances).</p> <p>_____</p>		Commissioning Agent: _____	Distributor: _____																												



Frame Serial #: _____

START-UP CHECK LIST - PROCESS PIPING VENTS AND DRAINS		
Description	Date Checked	Date Verified
1. Verify the bottle and process pipe installation contains no bolt bound flanges or elevation differences that may stress the compressor cylinders	Commissioning Agent: _____	Distributor: _____
2. Verify cold adjustment of any bottle or cylinder supports.	Commissioning Agent: _____	Distributor: _____
3. Verify correct inlet screen orientation in process piping.	Commissioning Agent: _____	Distributor: _____
4. Check, verify, and record process piping orifice sizes and locations. _____ _____ _____	Commissioning Agent: _____	Distributor: _____
5. Check and verify piping and instrumentation diagrams are "as built". Check all valves for correct position and easy operation and verify correct installation of all identification tag numbers. Verify the tag numbers match the component numbers on the drawing.	Commissioning Agent: _____	Distributor: _____
6. Check and verify routing and diameters of tubing for all vents, drains and instrument air (diameters must equal the full diameter of ports). Check and verify bracketing is according to industry standard and good engineering practices.	Commissioning Agent: _____	Distributor: _____
7. Check and verify vents and drains of the primary and secondary packing-case and the crosshead distance piece are open and tubed to a safe atmosphere.	Commissioning Agent: _____	Distributor: _____
8. Check and verify safety relief valve installation to protect cylinders, piping, and cooler for each compression stage.	Commissioning Agent: _____	Distributor: _____
9. Record method of suction pressure control and valve size. _____	Commissioning Agent: _____	Distributor: _____
10. Check, verify, and record line size, valve type, and diameter of the by-pass line. _____ _____	Commissioning Agent: _____	Distributor: _____
11. Check and verify crankcase breather element is open to atmosphere and clean.	Commissioning Agent: _____	Distributor: _____
12. Check and verify torque to spec on all gas containment and other fasteners where loosening may result in a safety hazard or equipment failure including: gas nozzle flanges, valve caps, cylinder heads, compressor rod packing, and crosshead guide support. See ER-63.	Commissioning Agent: _____	Distributor: _____
13. Perform leak testing on installed piping and vessels.	Commissioning Agent: _____	Distributor: _____



Frame Serial #: _____

14. Record "out of plane" readings (final, after bottle guide shimming) - see ER-82.		
Drive End	_____	Auxiliary End
_____	_____	_____
	Commissioning Agent: _____	Distributor: _____

START-UP CHECK LIST - INSTRUMENTATION		
Description	Date Checked	Date Verified
1. Check and verify correct installation of all required instrumentation and that devices meet applicable codes.	Commissioning Agent: _____	Distributor: _____
2. Check and verify proper grounding of compressor skid to a suitable earth ground.	Commissioning Agent: _____	Distributor: _____
3. Before starting, verify the programmable logic controller (PLC) operates the complete compressor package correctly. Ariel reviewed and approved the full start sequence. NOTE: Send Ariel a copy of the load steps.	Commissioning Agent: _____	Distributor: _____
4. Check and verify operation of required shutdowns. See Packager Standards ER-56.07.	Commissioning Agent: _____	Distributor: _____
5. Check and verify the set point for the high compressor oil temperature shutdown at 190°F (88°C) maximum.	Commissioning Agent: _____	Distributor: _____
6. Check and verify proper vibration shutdown installation and operation. Record alarm and shut down settings. _____ _____ _____	Commissioning Agent: _____	Distributor: _____
7. Verify operation of suction pressure, inter-stage pressure, and discharge pressure shutdowns. Record alarm and shutdown settings. _____ _____ _____	Commissioning Agent: _____	Distributor: _____
8. Verify gas discharge temperature shutdowns operation. Record alarm and shutdown settings. _____ _____ _____	Commissioning Agent: _____	Distributor: _____
9. Check and verify main bearing temperature shutdowns operation.	Commissioning Agent: _____	Distributor: _____



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Frame Serial #: _____

10. Check and verify instrument air supply for adequate pressure and gas back pressure protection.	Commissioning Agent: _____	Distributor: _____
11. Check and verify correct PLC operation of any solenoids.	Commissioning Agent: _____	Distributor: _____
12. If applicable, check and verify flow meters, valves, and gauge positions for water-cooled packing.	Commissioning Agent: _____	Distributor: _____
13. Check, verify, and record the over speed setting. _____	Commissioning Agent: _____	Distributor: _____

START-UP CHECK LIST - FORCE FEED LUBRICATION SYSTEM		
Description	Date Checked	Date Verified
1. Check and verify divider valve outlet ports against Ariel lube sheet to confirm correct routing of lines.	Commissioning Agent: _____	Distributor: _____
2. Check and verify force feed lubricator box for proper oil level.	Commissioning Agent: _____	Distributor: _____
3. Prime the force feed lubrication system through the purge port at the force feed pump discharge manifold. Check and verify each tube connection for tightness	Commissioning Agent: _____	Distributor: _____
4. For independent oil supply, verify a separate lubricator tank overflow exists.	Commissioning Agent: _____	Distributor: _____
5. Check and verify operation of force feed lubrication system no flow shutdowns.	Commissioning Agent: _____	Distributor: _____
6. Record color of force feed blow out discs (see Customer Technical Bulletin CTB-137 for disc ratings). _____	Commissioning Agent: _____	Distributor: _____
7. Check, verify, and record recommended lube feed rates from lubricator data plate or "Parts Book" Cylinder Lubrication sheet. _____	Commissioning Agent: _____	Distributor: _____

FINAL PRE-START CHECK LIST		
Description	Date Checked	Date Verified
1. Operate pre-lube system. Record pre-lube pressure. _____		
2. For engine driven units, disable the ignition and roll the engine with the starter to check and verify the compressor rolls freely. Check and verify oil pressure increases noticeably while rolling on the starter.	Commissioning Agent: _____	Distributor: _____
3. For electric motors, bar the compressor over manually to check and verify it rolls freely.	Commissioning Agent: _____	Distributor: _____
4. For machines compressing a combustible gas, purge the entire system including the piping, by-pass, recycle line, and compressor cylinders of all air.	Commissioning Agent: _____	Distributor: _____



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Frame Serial #: _____

5. Check and verify correct position and operation of all valves. Check and verify operation of all compressor interfaces with the system.	Commissioning Agent: _____	Distributor: _____
6. Review start-up instructions for all other package components.	Commissioning Agent: _____	Distributor: _____
7. Complete the required review of the Start-Up and Operating Instructions for the unit with the unit operator.	Commissioning Agent: _____	Distributor: _____
8. Ensure compressor PLC logic is understood and approved.	Commissioning Agent: _____	Distributor: _____
9. Verify mechanical, electrical, and instrumentation completion and approval.	Commissioning Agent: _____	Distributor: _____

INITIAL POST START-UP CHECK LIST		
Description	Date Checked	Date Verified
1. Check and verify immediate oil pressure increase. Enable oil pressure shutdown and bearing temperature shutdowns. Record initial pressure at operating speed. _____	Commissioning Agent: _____	Distributor: _____
2. Check and verify oil filter pressure gauges. Record initial differential. _____	Commissioning Agent: _____	Distributor: _____
3. Check and verify the low oil pressure shutdown is active and set at 45 psig (3.1 bar _g).	Commissioning Agent: _____	Distributor: _____
4. Check and verify lube oil pressure set at 50 to 60 psig (3.5 to 4.2 bar _g) at operating speed and temperature (see Technical Manual, Section 4). Record final setting. _____	Commissioning Agent: _____	Distributor: _____
5. Record oil filter maximum differential reference value listed on the compressor top cover filter data plate. _____	Commissioning Agent: _____	Distributor: _____
6. Listen and feel for any strange noises or vibration in the compressor or piping. Record any occurrences. _____ _____ _____ _____	Commissioning Agent: _____	Distributor: _____
7. Check and verify high discharge gas temperature shutdowns are set about 10% above normal operating temperature (350 °F (177 °C) maximum) and functioning.	Commissioning Agent: _____	Distributor: _____
8. Check and verify gas pressure shutdowns are set as close as possible and establish them to protect the unit from over rod load and crosshead pin non-reversal.	Commissioning Agent: _____	Distributor: _____



Frame Serial #: _____

INITIAL POST START-UP CHECK LIST		
Description	Date Checked	Date Verified
9. Check and verify distribution block cycle time indicator and set lubricator pump for proper break-in rate.	Commissioning Agent: _____	Distributor: _____
10. For electric motor driven units, Check and verify the magnetic center position. Check and verify the coupling does not "hunt" during normal operation.	Commissioning Agent: _____	Distributor: _____
11. Check and verify the unit and piping is free from any gas or fluid leaks. Record any occurrences. _____ _____ _____	Commissioning Agent: _____	Distributor: _____
12. Check and verify scrubber high level shutdowns operation and check scrubber dumps operation and frequency.	Commissioning Agent: _____	Distributor: _____
13. Check, verify, and record tank levels that indicate the amount of liquids removed from the gas. _____	Commissioning Agent: _____	Distributor: _____
14. Check and verify piston rod packings seal properly in the primary packing vents.	Commissioning Agent: _____	Distributor: _____
15. Check and verify operation of all safety functions to ensure unit shutdown upon indication.	Commissioning Agent: _____	Distributor: _____
16. If applicable, check and verify main bearing temperatures and record. Watch for even bearing temperature increase.	Commissioning Agent: _____	Distributor: _____
17. During various operational conditions, use the Ariel performance program to check and verify operational characteristics of various load steps.	Commissioning Agent: _____	Distributor: _____
18. If applicable, check and verify torsional analysis with on-site monitoring.	Commissioning Agent: _____	Distributor: _____
		Torsional Provider: _____



Frame Serial #: _____

24-HOUR POST START-UP CHECK LIST		
Description	Date Checked	Date Verified
<p>1. Record "hot" alignment readings after reaching normal operating temperatures and components become heat soaked. Shutdown and vent gas system. Within 30 minutes and while components are still hot, record dial indicator readings in inches (mm) at the 3, 6, 9 and 12 o'clock positions on lines provided below:</p> <div style="text-align: center;"> </div> <p>If using a laser alignment tool, make a print out and attach it to this document.</p>	<p>Commissioning Agent: _____</p>	<p>Distributor: _____</p>
<p>2. If using a discharge bottle or head end cylinder supports, adjust when components are heat soaked to ensure no excessive forces exist to cause detrimental cylinder deflection.</p>	<p>Commissioning Agent: _____</p>	<p>Distributor: _____</p>
<p>3. Check and verify torque on gas nozzle flange, valve cap, cylinder head, compressor rod packing flange, and guide to frame bolting.</p>	<p>Commissioning Agent: _____</p>	<p>Distributor: _____</p>
<p>4. Complete Ariel's "Compressor Warranty Notification - Installation List Data" (pages 1 and 2).</p>	<p>Commissioning Agent: _____</p>	<p>Distributor: _____</p>
750-HOUR POST START-UP CHECK LIST		
Description	Date Checked	Date Verified
<p>1. Check and verify the equipment performance design point. If site conditions prevent design point achievement, use a mutually agreed on secondary point.</p>	<p>Commissioning Agent: _____</p>	<p>Distributor: _____</p>
<p>2. Perform a vibration and pulsation survey to validate system design and rectify any issues</p>	<p>Commissioning Agent: _____</p>	<p>Distributor: _____</p>
<p>3. Address all package issues, discrepancies, or deficiencies.</p>	<p>Commissioning Agent: _____</p>	<p>Distributor: _____</p>
<p>4. Check and verify torque on gas nozzle flange, valve cap, cylinder head, and compressor rod packing flange bolting.</p>	<p>Commissioning Agent: _____</p>	<p>Distributor: _____</p>
<p>5. Send completed form and check lists (pages 1-12) to Ariel as noted on page 1.</p>	<p>Commissioning Agent: _____</p>	<p>Distributor: _____</p>