Operation Manual

MODEL: LIGHTSOURCE
50 HZ

Code:

This manual contains important safety information.
Do not destroy this manual.
This manual must be available to the personnel who operate and maintain this machine.

Portable Power
P.O. Box 868 - 501 Sanford Ave
Mocksville, N.C. 27028
www.portablepower.irco.com

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

FOREWORD

Nothing contained in this document is intended to extend any promise, warranty or representation, expressed or implied, regarding the Ingersoll-Rand products described herein. Any such warranties or other terms and conditions of sale of products shall be in accordance with the standard terms and conditions of sale for such products, which are available upon request.

This manual contains instructions and technical data to cover all routine operation and scheduled maintenance tasks by operation and maintenance staff. Major overhauls are outside the scope of this manual and should be referred to an authorized Ingersoll-Rand service department.

Details of approved equipment are available from Ingersoll-Rand Service departments.

The use of repair parts other than those included within the Ingersoll-Rand approved parts list may create hazardous conditions over which Ingersoll-Rand has no control. Therefore, Ingersoll-Rand cannot be held responsible for equipment in which non-approved repair parts are installed.

Ingersoll-Rand reserves the right to make changes and improvements to products without notice and without incurring any obligation to make such changes or add such improvements to products sold previously.

This company accepts no responsibility for errors in translation of this manual from the original English version.

Machine models represented in this manual may be used in various locations worldwide. Machines sold and shipped into European common market countries requires that the machine display the EC Mark and conform to various directives. In such cases, the design specification of this machine has been certified as complying with EC directives. Any modification to any part is absolutely prohibited and would result in the CE certification and marking being rendered invalid. A declaration of that conformity follows:

Declaration of Conformity with EC Directives

98/37/EC, 93/68/EEC, 89/336EEC, 2000/14/EC

CE

Ingersoll-Rand Company
P.O. Box 868
501 Sanford Avenue
Mocksville, North Carolina 27028

We

Represented In EC By:

Ingersoll-Rand Company Limited
Swan Lane, Hindley Green
Wigan WN2 4EZ
United Kingdom

Declare that, under our sole responsibility for manufacture and supply, the product(s)

LT6K Portable Light Tower

To which this declaration relates, is (are) in conformity with the provisions of the directives using the following principal standards

EN29001: EN292, EN60204-1, EN1012-1, PN8NTC2, EN50081, EN50082

Directive	Machine Type	kW	Mean measured value	Guaranteed level	Notified body
2000/14/EC Annex V1 Part 1	LT6K	7.8	90.6 $_{WA}$	91 L_{WA}	A.V. Technology Stockport UK Nr 1067

Issued at Mocksville on 10-1-02

Ric Lunsford
Manager of Quality Control

Issued at Hindley Green on 10-1-02

H. Seddon, Q.A. Manager

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TABLE OF CONTENTS

SECTION 1– SAFETY

SAFETY PRECAUTIONS

General Light Tower Information

Ensure that the operator reads and understands the decals and consults the manuals before maintenance or operation.

Ensure that the Operation and Maintenance manual is available to the operator and maintenance personnel.

Ensure that maintenance personnel are adequately trained, competent and have read the manuals.

This machine is not designed for operating life sustaining equipment. It is equipped with a safety shutdown system that will cause the machine to stop operating whenever a shutdown condition is present.

Hot Pressurized Fluid – Remove cap slowly to relieve PRESSURE from HOT radiator. Protect skin and eyes. HOT water or steam and chemical additives can cause serious personal injury.

Electrical shock hazard will cause severe injury or death. Do NOT position light tower under electric power lines.

Improper operation of this machine can result in severe injury or death.

Hazardous Voltage can cause serious injury or death.

Never inspect or service unit without first disconnecting battery cable(s) to prevent accidental starting.

Wear eye protection while cleaning unit with compressed air, to prevent debris from injuring eyes.

Do not enter ballast box while engine is running. Do not steam clean ballast box. Capacitor/Ballast can cause severe injury.

Do not operate lights with broken or missing lens or broken glass bulb. Ultra violet radiation can cause serious skin burn and eye inflamation.

Do not extend, retract or use tower unless it is in a VERTICAL position with latch and lock pin securely in place.

Do not place hand in tower recess while tower is being lowered or raised. Pinch point can cause severe injury.

Ground equipment in accordance with applicable codes. (Consult local electrician).

Electrical Shock:

Do not operate electrical equipment while standing in water, on wet ground, with wet hands or shoes.

Use extreme caution when working on electrical components. Battery voltage (12V) is present unless the battery cables have been disconnected. Higher voltage (potentially 500 volts) is present at all times when the engine is running.

Always treat electrical circuits as if they were energized.

Before attempting any repair service, disconnect all leads to electrical power loads.

Do NOT connect or disconnect lamps while engine is running.

DO NOT climb on tower. Perform repairs and adjustments with the tower in the down (transport) position.

Before using the Light Tower as a power unit, verify the electrical requirements of the power tools, etc. and do not exceed the rated output shown in General Data section.

General Information

Make sure that all protective covers are in place and that the canopy/doors are closed during operation.

Never operate the engine of this machine inside a building without adequate ventilation. Avoid breathing exhaust fumes when working on or near the machine. Do not alter or modify this machine.

A battery contains sulfuric acid and can give off gases which are corrosive and potentially explosive. Avoid contact with skin, eyes and clothing. In case of contact, flush area immediately with water.

Exercise extreme caution when using booster battery. To jump battery, connect ends of one booster cable to the positive (+) terminal of each battery.

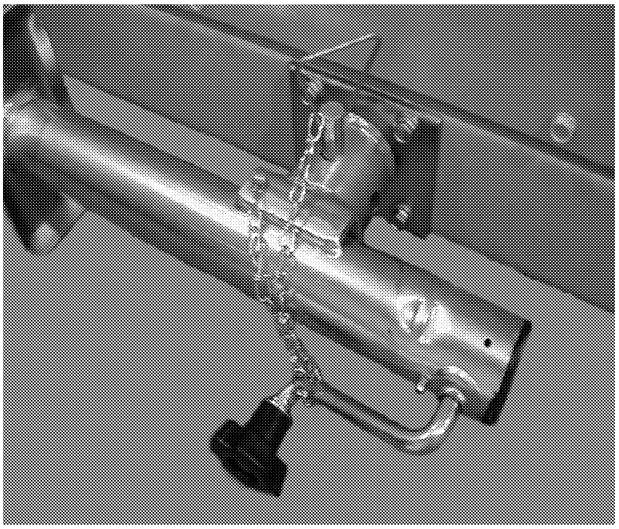
Never operate unit without first observing all safety warnings and carefully reading the operation and maintenance manual shipped from the factory with this machine.

This machine may include such materials as oil, diesel fuel, antifreeze, brake fluid, oil/air filters and batteries which may require proper disposal when performing maintenance and service tasks. Contact local authorities for proper disposal of these materials.

Never inspect or service unit without first disconnecting battery cable(s) to prevent accidental starting.

Make sure wheels, tires and tow bar connectors are in safe operating condition and tow bar is properly connected before towing.

BEFORE TOWING – Store the rear jack and secure the handle by wrapping the jack positioning pin chain around the handle to keep it from being damaged during towing.



TOWING – Do not tow this unit with a vehicle whose towing capacity is less than the shipping weight shown in General Data.

WELDING – Prior to any welding, disconnect alternator relays, voltage regulator, meters, circuit breakers and battery cables. Open all circuit breakers, and remove any external connections. Connect the welding ground as close as possible to the area being welded.

WINCH OPERATION – Before and during all winch operation, ensure the area around each winch is clear of persons and obstructions over a 2 m radius. When the mast has completed its normal travel, or is prevented from travelling, immediately release the control switch, to ensure that no cable overtension occurs.

LAMPS – Inspect lamps and replace broken or missing lamp lens or punctured glass bulbs. Do NOT operate lights with broken or missing lens or broken glass bulb.

FLAMMABLE FUELS – Do not fill fuel tank when engine is running.

Do not smoke or use an open flame in the vicinity of the generator or fuel tank.

Do not permit smoking, or open flame, or sparks to occur near the battery, fuel, cleaning solvents or other flammable substances and explosive gases.

Thoroughly clean up any fuel spills occurring inside this unit.

VOLATILE SUBSTANCE – Ether is extremely volatile. Do NOT use in conjunction with the “Glow plug” PRESTART system furnished on this engine.

SAFETY LABELS

Safety labels are used to warn or identify hazards, consequences of ignoring the warning and explains how to avoid the hazard. The labels are located near where the hazard exists.

DANGER label heading – indicates the presence of a hazard which WILL cause serious injury or death if ignored.

WARNING label heading – indicates the presence of a hazard which CAN cause serious injury or death if ignored.

CAUTION label heading – indicates the presence of a hazard which WILL or CAN cause injury or property damage if ignored.

NOTICE label heading – indicates important set–up, operating or maintenance information.

Do not store or transport hazardous (combustible, etc.) material in or on this unit.

Do not suspend this machine with other equipment hanging from the running gear (undercarriage).

SECTION 2 - WARRANTY

Ingersoll-Rand, through its distributors, warrants to the initial user that each portable light tower manufactured by it, will be free of defects in material and workmanship for a period of the earlier of twelve (12) months from shipment to or the accumulation of 2,000 hours of service by the initial user.

Portable Light Tower Generators- The generator will be free of defects in material and workmanship for a period of twenty-four (24) months from shipment to or the accumulation of 4,000 hours of service by the initial user.

Ingersoll-Rand will provide a new part or repaired part, at its election, in place of any part, which is found upon its inspection to be defective in material and workmanship during the period prescribed above. Such part will be repaired or replaced without charge to the initial user during normal working hours at the place of business of an Ingersoll-Rand distributor authorized to sell the type of equipment involved or other establishment authorized by Ingersoll-Rand. User must present proof of purchase at the time of exercising warranty.

The above warranty does not apply to failures occurring as a result of abuse; misuse, negligent repairs, corrosion, erosion and normal wear and tear, alterations or modifications made to the product without express written consent of Ingersoll-Rand; or failure to follow the recommended operating practices and maintenance procedures as provided in the product's operating and maintenance publications.

Accessories or equipment furnished by Ingersoll-Rand, but manufactured by others, including, but not limited to, engines, shall carry whatever warranty the manufacturers have conveyed to Ingersoll-Rand and which can be passed on to the initial user.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, (EXCEPT THAT OF TITLE),AND THERE ARE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

WARRANTY REGISTRATION

To initiate the machine warranty, fill out the “Warranty Registration” form 85040285 supplied as part of the machine documentation Keep a copy for your records and mail the original to:

Ingersoll-Rand European Sales LTD
Portable Power Business
Swan Lane, Hindley Green
Wigan
Lancashire WN2 4EZ UK

Attention: Customer Service Department

Note: Completion of this form validates the warranty.

PORTABLE POWER
EXTENDED WARRANTY REGISTRATION FORM

Customer Details

Company Name: _____

Contact Name: _____

Signature: _____

Company Address: _____

_____

_____

_____

Post/zip Code: _____

Country: _____

Phone Number: _____

Fax Number: _____

e-mail: _____

Service Provider Details

Service Provider/Distributor: _____

Branch Office: _____

Machine Details

Product Type: _____

Model: _____

Serial Number: _____

Engine Serial Number: _____

Engine Model Number: _____

Airend Serial Number: _____

Alternator Serial Number: _____

Date of start up: _____

- *fold* -

Ingersoll-Rand Company
Portable Compressor Division
P.O. Box 868
Mocksville, North Carolina 27028

Attention: Warranty Department

SECTION 3 – GENERAL DATA

Light Tower Model	Light Source
Rated Power Output–kilowatts	7.0
Number of Lamps	4
Type of Lamps	MH HPS
Kubota Engine Model (Diesel)	D1105
Crankcase Capacity (Quarts/Litres)	5.4 quarts (5.1 litres)
Coolant Capacity (Gallons/Litres)	3.3 quarts (3.1 litres)
Unit Gross Weight (pounds/kilograms) – full	2157 pounds (978 kg)
Unit Gross Weight (pounds/kilograms) – empty	1968 pounds (893 kg)

Unit Generator Frequency (Cycles/Seconds)	50 Hertz
Available Voltages	110/220V AC

Engine Speed	1500 RPM
Engine Electrical System	12 Volts DC
Fuel Tank Capacity	26 U.S. gallons (100 litres)

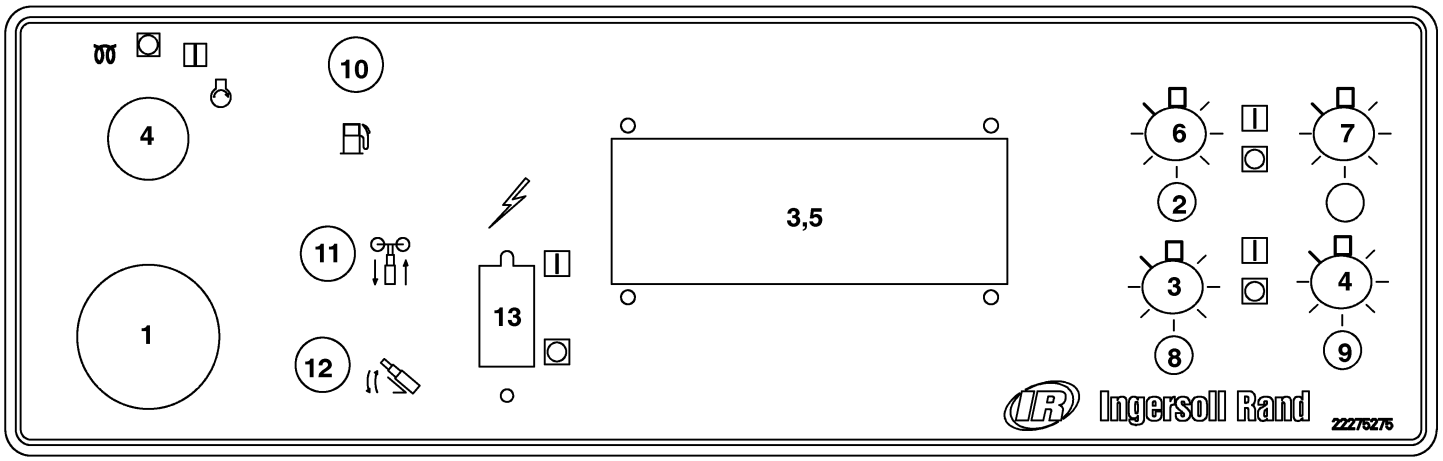
Length	175 inches (4,45 m)
Height	70.5 inches (1,80 m)
Width	58 inches (1,47 m)

Tire Size	P155/80R x 13
Cold Inflation Pressure	35 psi 2.4 bar
Maximum Towing Speed	50 mph (80 km/hr)
Wind Speed Rating (steady State–Maximum) 2 Outriggers (Standard)	65 mph (105 km/hr)

Warning: Modification or alteration of this machine can result in severe injury or death. Do not modify or alter without the express written consent of Ingersoll–Rand Company.

SECTION 4 – OPERATING INSTRUCTIONS

CONTROL PANEL



1. HOURMETER – Records engine operating hours for maintenance purposes.

2. BREAKER LAMP

3. BREAKER COVER

4. IGNITION SWITCH (Positions)

***OFF** – Shuts engine down.

***RUN** – Normal engine operating position.

***START III** – Energizes engine cranking motor.

4. PREHEAT POSITION – Turn rotary switch to preheat position for 5 seconds and then turn to start.

5. MAIN BREAKER – (25 Amp) for all LAMP circuits and all panel RECEPTACLES.

6. SWITCH – Lamp 1

7. SWITCH – Lamp 2

8. SWITCH – Lamp 3

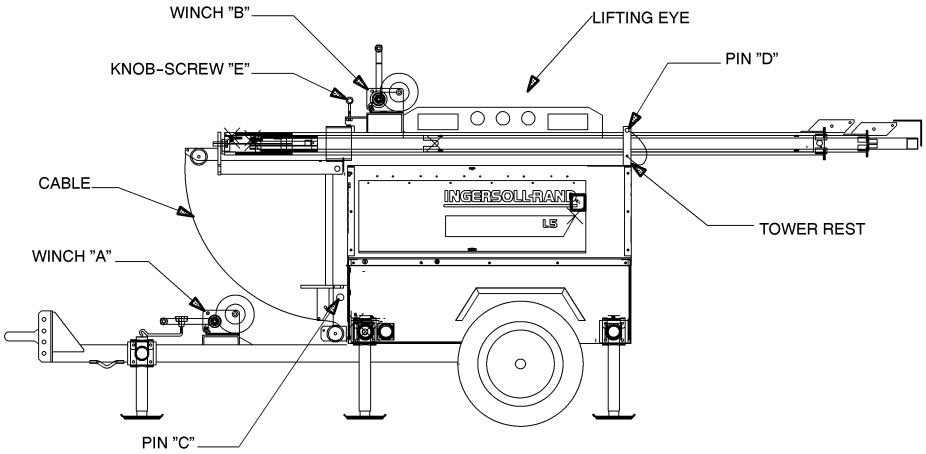
9. SWITCH – Lamp 4

10. Low Fuel Light

11. Lights Up & Down (with electric winch)

12. Tower Up & Down (with electric winch)

13. 70 AMP Breaker (with electric winch)



OPERATION SET-UP (PRIOR TO RAISING TOWER)

1. Inspect cables.

2. Ensure no obstruction overhead within 40 feet.

3. Mount lamps on cross bar and aim as desired.

4. Extend all outriggers fully and insert locking pins fully. Ensure drawbar jack and all outrigger and/or jacks are firmly in contact with ground.

5. Level unit using jacks and bubble level indicator on drawbar.

6. Jacks must support entire unit weight (tires off the ground).

7. Remove pin “D”.

8. Remove pin “C”.

RAISE TOWER

1. Operate winch “A” ,to raise tower.

2. Insert and lock pin “C” to secure tower in upright position.

EXTENDING TOWER FOR UPRIGHT OPERATION

1. With tower in upright position, operate winch “B” to extend tower to desired height.DO NOT extend mast unless vertical and lock pin is secure. DO NOT extend past upright mark on tower (⊥).

2. Loosen screw “E” to rotate tower. Tighten screw “E” after rotating tower.

STOPPING

1. Turn lamps “OFF”.

2. Turn main breaker “OFF”.

3. Disconnect any devices plugged into external power receptacles.

4. Turn rotary switch “OFF”.

LOWERING TOWER

1. Rotate tower to line up arrows.

2. Tighten screw “E”.

3. Operate winch “B” to lower tower.

4. Remove lock pin and pin “C”. Do not remove pin or tilt tower down until fully retracted.

5. Crank winch “A” to lower tower to horizontal position, insert and lock pin “D” before moving or lifting.

WINCH OPERATION

During raising and lowering tower, check that there is no one behind the machine in the area of the tower. Check that no obstruction overhead is within two feet. Before operating the winch, inspect the cable for damage. Replace damaged cables. When operating the winch, do NOT overcrank when cable is tight. This will damage the cable. Do not continue cranking winch when cable becomes loose. This will cause the cable to unwind from winch drum causing cable kinks and knots. When the optional electric winch is installed, before and during all winch operation, ensure the area around each winch is clear of persons and obstructions over a 2m radius. When the mast has completed its normal travel, or is prevented from travelling, immediately release the control switch, to ensure that no cable over extension occurs.

TOWING

Assure tow vehicle has towing capacity for weight of this unit as stated on General Data Decal.

- Chock Wheels.
- Check pintle eye bolts for any looseness or wear. Tighten or replace as required.
- Position tow vehicle to align hitch with pintle eye.

Stand Aside While:

- Operating jack to seat pintle eye onto hitch.
- Securing hitch.
- Attaching Brake actuator breakaway chain /cable (if supplied).
- Connecting lighting plug.
- Removing wheel chocks.
- Testing brakes (if supplied).

Disconnect:

- Chock wheels.

Stand Aside While:

- Disconnecting brake actuator breakaway chain/cable.
- Disconnecting lighting plug.
- Operating jack to raise pintle eye from hitch.
- Moving tow vehicle.
- Leveling machine.

BALL HITCH HOOK-UP

Use only specified ball size.

To unlock – pull locking trigger upward with index finger and tilt locking lever.

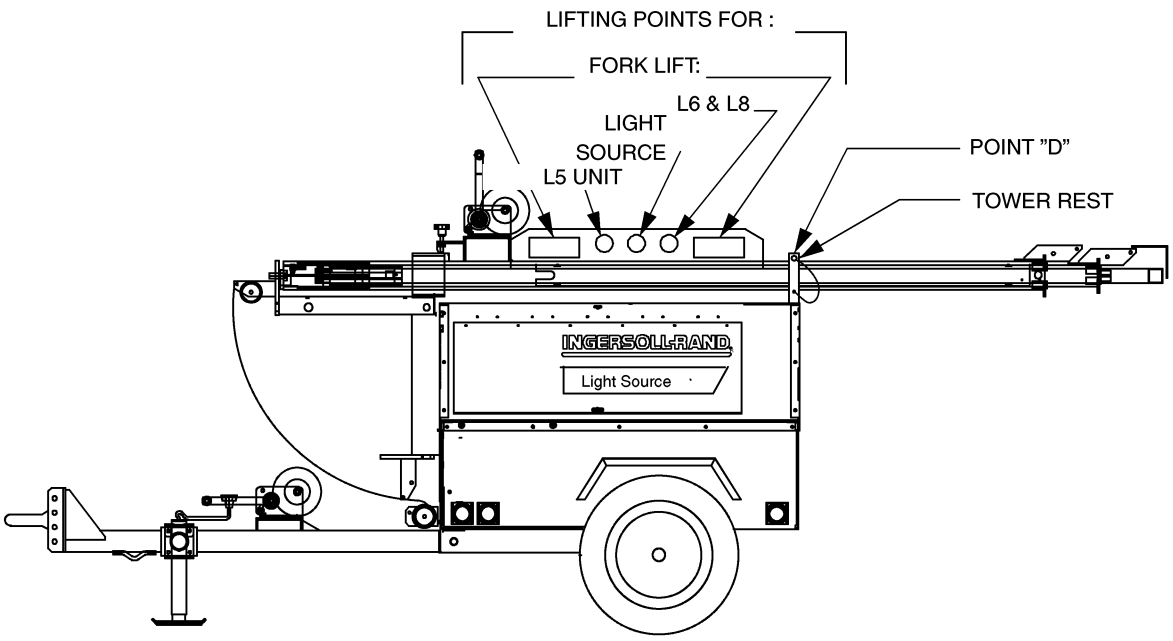
To lock – Push locking lever handle down. The optional locking pin or a padlock may be inserted in the locking lever hole for extra security.

Adjust coupler to ball by raising channel lock and turning nut with fingers. Proper adjustment is obtained when coupler is as tight as possible on ball and locking lever can still be opened and closed. Check adjustment frequently and tighten if necessary.

WARNING – Make certain ball is completely engaged in coupler ball socket and coupler is securely locked. Failure to do so could result in serious personal injury.

MAINTENANCE and REPAIR – Do not use coupler with any bent or otherwise damaged parts.

LIFTING INSTRUCTIONS



BEFORE LIFTING ENSURE :

TOWER HOLDDOWN PIN AT POINT "D" IS FULLY INSERTED THROUGH BOTH SIDES OF TOWER REST AND LOCK PIN "D" IS INSTALLED.

NO LOOSE OBJECTS SHALL BE STORED INSIDE OR ON TOP OF MACHINE.

NO ADDITIONAL EQUIPMENT IS TO BE HUNG ONTO OR UNDER MACHINE.

ANY DEVICE USED FOR LIFTING SHALL BE RATED AT A MINIMUM OF 2 TON WORKING CAPACITY.

NO PERSONNEL SHOULD BE ON OR UNDER MACHINE AT ANY TIME DURING LIFTING.

Ingersoll-Rand Co., Mocksville, N.C. 27028
36531564

WARNING

Damaged cables may break during tower operation allowing the tower to fall. Do not operate tower with damaged cables. Replace damaged cables.

NOTICE

Hazards may exist on the jobsite should this unit shutdown automatically and all lamps be extinguished. Personnel should be advised of this and have additional lighting.

The engine in this unit is protected with sensors for high coolant temperature and low oil pressure. Should either of these conditions occur, the engine will automatically stop causing a loss of power to all lamps (except on control panel) and receptacles. before restarting the unit, check the fuel level and engine/radiator thoroughly and correct the problem. The lamps should not be restarted for approximately fifteen (15 minutes).

BEFORE STARTING

Check the Following:

1. Engine oil level. Add as required.

2. Engine coolant level. Add as required.

3. Fuel filter. Drain any accumulation of water. Clean or replace element as required.

4. Air cleaner service indicator. Service when showing "red".

5. Fuel level in tank – Fill, using CLEAN DIESEL fuel, at the end of the day to minimize condensation.

6. Battery – Keep terminals clean and lightly greased.

7. Engine belts and hoses – Check for proper fit and/or damage. Service as required.

8. Air Vents/Grilles – Both engine radiator and generator cooling air. Check for obstructions (leaves, paper, etc.)

9. Visual inspection – Check for excessive fluid leaks, evidence of arcing around control panel, loose wire-routing clamps, etc.

CAUTION

Call qualified person to make electrical repairs.

STARTING

1. All external loads shall be turned "OFF" or unplugged at the receptacles.

2. Main Circuit Breaker and Lamp switches shall be "OFF".

3. Turn Rotary Switch to "PREHEAT" for 5 seconds prior to starting.

Note: In extreme cold temperatures, this may take up to 10 seconds.

WARNING

Electrical power is present upon cranking engine.

4. Immediately turn Rotary Switch to "START".

Note: Do NOT crank for more than 15 seconds without allowing starter to cool for 30 seconds. If engine does not start after a few attempts, refer to Trouble Shooting.

5. Release Rotary Switch after engine continues to run.

6. Allow the engine to warm-up for 3 to 5 minutes.

7. Turn on main circuit breaker.

8. Lamp Switches and Receptacles may now be used.

WARNING

Keep side doors closed for optimum cooling and safety of unit while running.

STOPPING

1. Turn Lamps "OFF".
2. Turn main breaker "OFF".
3. Disconnect any devices plugged into external power receptacles.
4. Turn Rotary Switch "OFF".

Note: If lights are turned off, a fifteen minute cooldown is required before they will restrike.

SECTION 5 – MAINTENANCE

CAUTION

Any unauthorized modification or failure to maintain this equipment may make it unsafe and out of factory warranty.

WARNING

Before attempting any repair service, disconnect engine battery cables and all leads to electrical power requirements. Failure to do so can result in severe personal injury, death or damage to the equipment.

GENERAL

In addition to periodic inspections, many of the components in this unit requires periodic servicing to provide maximum output and performance. Servicing may consist of pre-operation and post-operation procedures to be performed by the operating or maintenance personnel. The primary function of preventive maintenance is to prevent failure, and consequently, the need for repair. Preventive maintenance is the easiest and the least expensive type of maintenance. Maintaining your unit and keeping it clean at all times will facilitate servicing.

SCHEDULED MAINTENANCE

The maintenance schedule is based on normal operation of the unit. In the event unusual environmental operating conditions exist, the schedule should be adjusted accordingly.

Wire Routing Clamps

Daily check for loose wire routing clamps. Clamps must be secure and properly mounted. Also check wiring for wear, deterioration and vibration abrasion.

Electrical Terminals

Check daily for evidence of arcing around the electrical terminals.

Grounding Circuit

Daily check that the grounding circuit is in accordance with the National Electric Code Article 250 and the local code requirements. As a minimum, the wire size should be American Wire Gauge 6 (AWG#6) from the grounding terminal, when required. Check to ensure continuity between the grounding terminal, frame, generator and engine block.

Hoses

Each month it is recommended that the intake hoses from the air cleaner and all flexible hoses used for water and fuel be inspected for the following:

1. All rubber hose joints and the screw type hose clamps must be tight and the hoses showing no signs of wear, abrasion or deterioration.
2. All flexible hoses must be free of wear, deterioration and vibration abrasion. Routing clamps must be secure and properly mounted.

Wiring Insulation

Daily check for loose, or frayed wiring insulation or sleeving.

Fuel/Water Separator

Daily check for water in the fuel filter/water separator unit. Some engines have a translucent bowl for visual indication, and others have a drain valve below the primary element.

Every six months or 500 hours, or less if fuel is of poor quality or contaminated, replace the bowl element(s).

Air Vents

Daily clean the air vents of any obstructions or debris.

Air Cleaner

Proper maintenance of the air cleaner provides maximum protection against airborne dust. Squeeze the rubber valve (precleaner dirt dump) periodically to ensure that it is not clogged.

To service the air cleaners, proceed as follows:

1. Remove filter element.

2. Inspect air cleaner housing for any condition that might cause a leak and correct as necessary.

3. Wipe inside of air cleaner housing with a clean, damp cloth to remove any dirt accumulation. This will permit better seal for gasket on filter element.

4. Install element.

The air cleaner assembly (housing) should be inspected every three months or 500 hours for any leakage paths.

Note: Make sure the inlet is free from obstruction.

Make sure the air cleaner mounting bolts and clamps are tight and the air cleaner is mounted securely. Check the air cleaner housing for dents or damage to the cleaner, which could lead to a leak.

Tires

Weekly check the condition of the tires, and gauge the air pressure. Tires that have cuts or cracks or little tread should be repaired or replaced.

Engine Radiator

Check the coolant level in the radiator. The coolant must cover the tubes in the top tank (approximately 1 inch high on a clean measuring rod, stuck down filler neck).

Tower Cables

Each week the tower lifting cables should be inspected to ensure the ends are attached securely. The cables should be checked for fraying or other damage and replaced if damaged. Also the pulleys should be checked for unusual wear or damage and replaced if worn excessively or damaged.

Tower Locking Pins

All tower locking pins should be checked weekly. Replace any missing or damaged pins before lifting the unit or raising the tower.

Tower Guides

Every month inspect all of the tower guides for proper operation. Clean and lubricate sliding surfaces. Replace any missing or damaged parts before raising the tower.

WARNING

Remove cap slowly to relieve Pressure from HOT radiator. Protect skin and eyes. Hot water or steam and chemical additives can cause serious personal injury.

The engine coolant system is normally filled with a 50/50 mixture of water and ethylene glycol. This permanent type anti-freeze contains rust inhibitors and provides protection to -35°F (-37°C). The use of such a mixture is recommended for both summer and winter operation. When using water alone, be sure to add a reputable brand of rust inhibitor to prevent internal corrosion.

It is recommended to test the freezing protection of the coolant every six months or prior to freezing temperatures. Replenish with a fresh mixture every twelve months.

Each month, inspect the radiator exterior for obstructions, dirt and debris. If present, blow water or compressed air containing a non-flammable solvent between the fins in a direction opposite the normal air flow. Should the radiator be clogged internally, reverse flushing, using a commercial product and the supplier's recommended procedure, may correct the problem.

Engine Protection Shutdown System

The operation of the engine protection shutdown system should be checked every month, or whenever it appears not to be operating properly. The three switches involved in this protective shutdown system are the engine coolant high temperature switch, the engine oil pressure switch and the low fuel switch. (optional)

The engine oil pressure switch prevents the engine from operating with low oil pressure. Once a month, remove a wire from the engine oil pressure switch to check the shutdown system for proper operation.

Test the engine oil pressure switch by removing it and connecting it to a source of controlled pressure while monitoring an ohmmeter connected to the switch terminals. As pressure is applied slowly from the controlled source, the switch should close at 12 psi (84 kPa) and show continuity through the contacts. As the pressure is slowly decreased to 10 psi (70 kPa) the contacts should open and the ohmmeter should show a lack of continuity through the contacts. Replace a defective switch before continuing to operate the unit. Once a year, the temperature actuated switch should be tested by removing it from the unit and placing it in a bath of heated oil. The engine coolant high temperature switch will require a temperature of approximately 220°F (104°C) to actuate.

Note: The engine temperature switch does NOT offer protection when NO coolant is present. Test the switch operation by connecting an ohmmeter between the two wire terminals. The ohmmeter should show zero ohms. When the switch is placed in the heated oil bath and its contact open, the ohmmeter should indicate infinite ohms. Tap the switch lightly during the checking operation. Replace any defective switch before continuing to operate the unit.

CAUTION

Never operate the unit with a defective safety shutdown switch or by by-passing a switch.

Control Compartment

Every six months or 500 hours with the unit “OFF”, perform visual inspection for loose connections, dirt, arcing, damage to electrical components.

Fuel Tank

In order to minimize condensation inside the fuel tank, refill as soon as possible after every use or at the end of each work day. Use only clean, DIESEL fuel. When using a funnel, ensure that it is clean and free from dust. Every six month, drain any sediment or accumulated condensate.

Battery

Keep the battery posts and cable connections clean and lightly coated with a grease.

Fasteners

Monthly spot check several capscrews and nuts for proper torque. If any are found loose, a more thorough inspection must be made and deficiencies corrected.

Running Gear/Wheels

Check the wheel nut torque 20 miles (30 kilometres) after refitting the wheels.

Lifting jacks should only be used under the axle.

The bolts securing the running gear to the chassis should be checked periodically for tightness (refer to the SERVICE/MAINTENANCE CHART for frequency) and re-tightened where necessary.

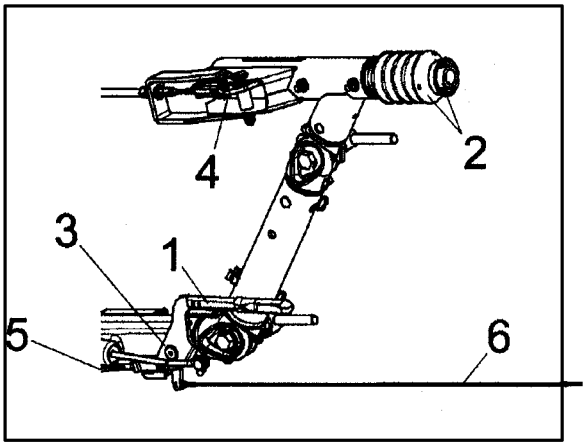
Brakes

Check and adjust the brake linkage at 500 miles (850Km) then every 3000 miles (5000Km) or 3 months (whichever is the sooner) to compensate for any stretch of the adjustable cables. Check and adjust the wheel brakes to compensate for wear.

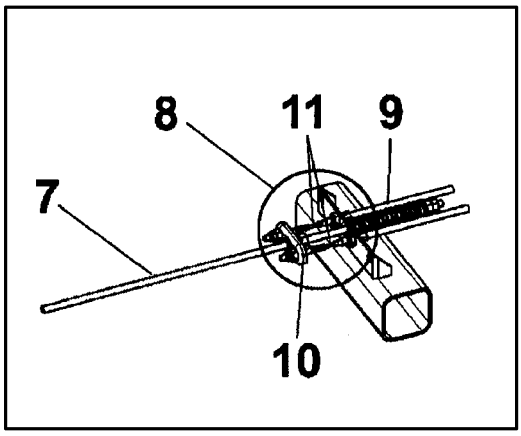
Adjusting the overrun braking system (KNOTT Running Gear)

Preparation:
Jack up the machine
Disengage the handbrake lever [1].

Fully extend the draw bar [2] on the overrun braking system.



1. Handbrake lever
2 Draw bar and bellows
3 Handbrake lever pivot
4 Transmission lever
5 Brake cable
6 Breakaway Cable

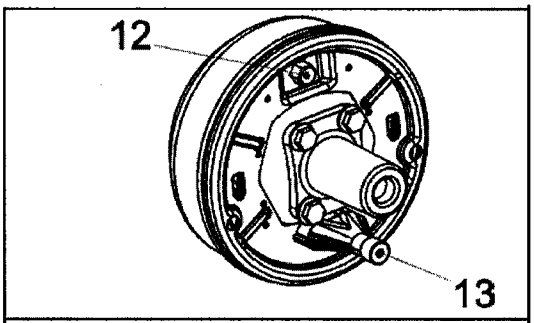


7 Brake Linkage
8 Equalization Assembly
9 Compression Spring
10 Equalizer Plate
11 Cable

Requirements:
During the adjustment procedure always start with the wheel brakes.
Always rotate the wheel in the direction of forward movement.
Ensure that an M10 safety screw is fitted to the handbrake pivot.
The brake actuators must not be pre-tensioned -if necessary loosen the brake linkage [7] on the brake equalisation assembly [8].
Check that brake actuators and cables [11] operate smoothly.

CAUTION
The compression spring [9] must only be lightly pre-tensioned and when operating must never touch the axle tube. Never adjust the brakes at the brake linkage [7].

Brake Shoe Adjustment



12 Adjusting screw

13 Cable entry

Width across flats of adjusting screw [12]

Brake size	Key width
160x35 / 200x50	SW 17
250x40	SW 19
300x60	SW 22

Tighten adjusting screw [12] clockwise until the wheel locks.

Loosen adjusting screw [12] anti-clockwise (approx. V2 turn) until the wheel can be moved freely.

Slight dragging noises that do not impede the free movement of the wheel are permissible.

This adjustment procedure must be carried out as described on both wheel brakes.

When the brake has been adjusted accurately the actuating distance is approximately 5-8mm on the cable [11]

Compensator Assembly Adjustment

Variable Height models

Fit an M10 safety screw to the handbrake pivot.

Disconnect the handbrake cable [5] at one end.

Pre-adjust brake linkage [7) lengthways (a little play is permissible) and re-insert the cable [5], adjusting it to give a small amount of play.

Remove the M10 safety screw from the handbrake pivot.

All Models

Engage the handbrake lever [1] and check that the position of the equaliser plate [10] is at right angles to the pulling direction. If necessary correct the position of the equaliser plate [10] on the cables [11].

The compression spring [9] must only be slightly pre-tensioned and when engaged must not touch the axle tube.

Brake Linkage Adjustment
Adjust the brake linkage [7] lengthways without pre-tension and without play in the transmission lever [4].

Readjustment
Engage the hand brake lever [1] forcefully a number of times to set the brake.

Check the alignment of the equalisation assembly [8], this should be at right angles to the pulling direction

Check the play in the brake linkage [7]

If necessary adjust the brake linkage [7] again without play and without pre-tensioning

There must still be a little play in cable [5] (Variable Height Only)

Check the position of the hand brake lever [1]. The start of resistance should be approximately 1 0-15mm above the horizontal position.

Check that the wheels move freely when the handbrake is disengaged.

Final Test

Check the fastenings on the transmission system (cables, brake equalization system and linkage).

Check the hand brake cable [5] for a small amount of play and adjust if necessary (Variable height only)

Check the compression spring [9] for pre-tensioning.

Test Run
If necessary carry out 2-3 test brake actions.

Test Brake Action
Check the play in brake linkage [7] and if necessary adjust the length of brake linkage (7] until there is no play.

Apply the handbrake while rolling the machine forward, travel of the hand brake lever up to 213 of maximum is allowed.

Re-adjusting the overrun braking system (KNOTT Running Gear)

Re-adjustment of the wheel brakes will compensate for brake lining wear. Follow the procedure described in 2: Brake Shoe Adjustment.

Check the play in the brake linkage [7] and re-adjust if necessary.

Important: Check the brake actuators and cables [11]. The brake actuators must not be pre-tensioned.

Excessive operation of the handbrake lever, which may have been caused by worn brake linings, must not be corrected by re-adjusting (shortening) the brake linkage (7]

Re-adjustment
The handbrake lever [1] should be engaged forcefully several times to set the braking system.

Check the setting of the brake equalisation assembly [8], which should be at right angles to the pulling direction.

Check the play in the brake linkage [7] again, ensuring that there is no play in the brake linkage and that it is adjusted without pre-tension.

Check the position of the hand brake lever [1], cable [5] (with little play) and the compression spring [9] (only slight pre-tension). The start of resistance of the handbrake lever should be approximately 10-15mm above the horizontal position.

Final Test
Check the fastenings on the transmission system (cables, brake equalization system and linkage).

Apply the handbrake while rolling the machine forward, travel of the handbrake lever up to 2/3 of maximum is allowed.

Check the handbrake cable [5] for a small amount of play and adjust if necessary (variable height only).

CAUTION: Check the wheel nut torque 20 miles (30 kilometres) after refitting the wheels (Refer to the TORQUE SETTING TABLE).

Running Gear Wheel Bearings
Wheel bearings should be packed with grease every 6 months. The type of grease used should conform to Specification MIL-G-10924.

Instruments

Inspect the instrument lamps, gauges and switches prior to start-up and during operation to ensure proper functioning. Refer to Instrument and Control Panel for normal readings.

Cleaning Instructions (General)

Keeping the generator set clean of any oil and dirt is recommended for both appearance and maximum service life of the equipment. The frequency of cleaning will be dependent on local conditions and the severity and frequency of operation.

Note: Do not use high pressure water, steam or solvent on the exterior finish of the unit housing.

EXTERIOR FINISH CARE

This unit was painted and heat cured at the factory with a high quality, thermoset polyester powder coating. The following care will ensure the longest possible life from this finish.

1. If necessary to remove dust, pollen, etc. from housing, wash with water and soap or dish washing liquid detergent. Do not scrub with a rough cloth, pad, etc.

2. If grease removal is needed, a fast evaporating alcohol or chlorinated solvent can be used. Note: This may cause some dulling of the paint finish.

3. If the paint has faded or chalked, the use of a commercial grade, non-abrasive car wax may partially restore the color and gloss.

Field Repair of Texture Paint

1. The sheet metal should be washed and clean of foreign material and then thoroughly dried.

2. Clean and remove all grease and wax from the area to be painted using Duponts 3900S Cleaner prior to sanding.

3. Use 320 grit sanding paper to repair any scratches or defects necessary.

4. Scuff sand the entire area to be painted with a red scotch brite pad.

5. Wipe the area clean using Duponts 3900S.

6. Blow and tack the area to be painted.

7. Apply a smooth coat of Duponts 1854S Tuffcoat Primer to all bare metal areas and allow to dry.

8. Apply 2 medium - wet coats of Duponts 222S Adhesion Promoter over the entire area to be painted, with a 5 minute flash in between coats.

9. To apply the texture coat, use Duponts 1854S Tuffcoat Primer. The proper technique to do this is to spray the Tuffcoat Primer using a pressure pot and use about 2-5 pounds of air pressure. This will allow the primer to splatter causing the textured look. Note: you must be careful not to put too much primer on at one time, this will effect the amount of texture that you are trying to achieve. Allow the texture coat to flash for 20 minutes or until dry to touch.

10. Apply any of Duponts Topcoat Finishes such as Imron™ or Centari™ according to the label instructions.

Note: To re-topcoat the textured surfaces when sheet metal repairs are not necessary, follow steps 1, 2, 4, 5, 6, 8 and 10.

Generator Interior

The generator may be cleaned internally following the below listed procedure.

1. Start and operate the engine unloaded.

2. Use dry compressed air (25 psi maximum) to blow loose dirt and debris from the interior of the generator.

WARNING

Wear eye protection to prevent debris from injuring eye (s). Do not allow the blow gun tip to come into contact with rotating or moving parts. Personal injury or equipment damage may result.

Control Box Interior

The generator control box is partially sealed to minimize the entrance of dust and other contaminants and should require little cleaning. If cleaning is required, the following procedure is recommended.

1. Disconnect the battery cables.

2. Open the top and/or front of the generator control box and vacuum out the interior.

CAUTION

The following should only be performed in a a well ventilated area.

3. Spray all switch contacts with a quality commercial electrical contact cleaner. Cycle the switches through all possible positions, spraying at each position. Leave control box door open until completely dry.

The cleaner must have an evaporative carrier agent which leaves no residue after application.

PREVENTIVE MAINTENANCE SCHEDULE

If operating in extreme environments (very hot, cold, dusty or wet), these time periods should be reduced.

	Daily	Wkly	MO.	3 MO. 250 HRS	6 MO. 500 HRS	12 MO. 1000 HRS.
Evidence of Arcing Around Elect. Terminals	C					
Loose Wire Routing Clamps	C					
Engine Oil and Coolant Level	C					
Proper Grounding Circuit	C					
Instruments	C					
Frayed/Loose Fan Belts, Hoses, Wiring Insulation	C					
Obstructions in Air Vents	C					
Fuel/Water Separator	Drain					
Precleaner Dumps		C				
Tires		C				
Battery Connections		C				
Engine Radiator (exterior)			C			
Air Intake Hoses and Flexible Hoses			C			
Fasteners (tighten)			C			
Emergency Stop Switch Operation			C			
Engine Protection Shutdown System			C			
Diagnostic Lamps			C			
Voltage Selector/Direct Hook-up Interlock Switches				C		
Air Cleaner Housing				C		
Control Compartment (Interior)					C	
Fuel Tank (fill at end of each day)					Drain	
Fuel/Water Separator Element					R	
Wheel Bearings & Grease Seals					Repack	
Engine Shutdown System Switches (setting)						C
Exterior Finish	As needed					
Engine	Refer to Engine Operator Manual					
Decals	Replace decals if removed, damaged or missing					

C=Check (and adjust or replace if necessary). WI=OR when indicated.
R = Replace

Ingersoll-Rand

Unit _____ Date: _____

Hours _____ Serviceman _____

SECTION 7 – Trouble Shooting

INTRODUCTION

Trouble shooting for a portable light tower is an organized study of a particular problem or series of problems and a planned method of procedure for investigation and correction. The trouble shooting chart that follows includes some of the problems that an operator may encounter during the operation of a portable generator.

The chart does not attempt to list all of the troubles that may occur, nor does it attempt to give all of the answers for correction of the problems. The chart does give those problems that are most apt to occur. To use the trouble shooting chart:

A. Find the "complaint" depicted as a bold heading.

B. Follow down that column to find the potential cause or causes.

ACTION PLAN

A. Think Before Acting

Study the problem thoroughly and ask yourself these questions:

(1) What were the warning signals that preceded the trouble?
(2) Has a similar trouble occurred before?
(3) What previous maintenance work has been done?
(4) If the generator will still operate, is it safe to continue operating it to make further checks?

B. Do The Simplest Things First

Most troubles are simple and easily corrected.

Always check the easiest and most obvious things first; following this simple rule will save time and trouble.

Note: For trouble shooting electrical problems, refer to the Wiring Diagram Schematic.

C. Double Check Before Disassembly

The source of most troubles can be traced not to one component alone, but to the relationship of one component with another. Too often, a machine can be partially disassembled in search of the cause of a certain trouble and all evidence is destroyed during disassembly. Check again to be sure an easy solution to the problem has not been overlooked.

D. Find And Correct Basic Cause

After a mechanical failure has been corrected, be sure to locate and correct the cause of the trouble so the same failure will not be repeated. A complaint of "premature breakdown" may be corrected by repairing any improper wiring connections, but something caused the defective wiring. The cause may be excessive vibration.

TROUBLE SHOOTING CHART

Bold Headings depict the COMPLAINT – Subheadings depict the CAUSE

Note: Subheadings suggest order to follow in cause of troubleshooting.

Short Air Cleaner Life

- Dirty Operating Conditions
- Inadequate Element Cleaning
- Defective Service Indicator
- Wrong Air Filter Element

Engine RPM Low

- Clogged Fuel Filter
- Incorrect Engine Speed Adjustment
- Dirty Air Filter
- Electrical Output Overload
- Engine Malfunctioning
- Generator Malfunctioning

Excessive Vibration

- Low Engine RPM
- Rubber Mounts Damaged
- Out of Balance Fan
- Engine Malfunctioning
- Generator Malfunctioning

Unit Shutdown

- Out of Fuel
- Engine Oil Pressure Too Low
- Engine Temperature Too High
- Broken Engine Fan Belt
- Loose Wire Connection
- Defective Switches
- Defective Fuel Solenoid
- Malfunctioning Relay
- Blown Fuse
- Engine Malfunctioning

Unit Fails To Shutdown

- Defective Switches
- Defective Fuel Solenoid
- Malfunctioning Relay
- Defective Engine Start Switch

Won't Start/Run

- Low Battery Voltage
- Blown Fuse
- Malfunctioning Engine Start Switch
- Clogged Fuel Filters
- Out of Fuel
- Defective Fuel Solenoid
- Engine Water Temp. Too High
- Engine Oil Pressure Too Low
- Loose Wire Connection
- Defective Switches
- Malfunctioning Relay
- Engine Malfunctioning

No Generator Voltage Output

- Main Circuit Breaker "OFF"
- Panel Circuit Breaker "OFF"
- Loose or Intermittent Wire
- Electrical Output Overload
- Low Engine Power
- Incorrect Electrical Connection
- DefectiveCapacitor
- Defective Generator

High/Low Generator Voltage Output

- Incorrect Electrical Connection
- Incorrect Engine Speed Adjustment
- Unstable Engine Speed (oscillation)
- Unstable Electrical Requirements
- Low Engine Power
- Loose or Intermittent Wire Connection(s)
- Defective Capacitor
- Clogged Air/Fuel Filter(s)

High/Low Generator Frequency Output

Incorrect Engine Speed Adjustment
Incorrect Electrical Connection
Low Engine Power
Unstable Engine Speed (Oscillation)
Unstable Electrical Connection
Electrical Output Overload
Loose or Intermittent Wire Connections
Clogged Air/Fuel Filter(s)

Fluctuating Generator Frequency/Voltage and or Oscillating Engine

Unstable Electrical Requirements
Unstable Engine Speed (oscillation)
Incorrect Engine Speed Adjustment
Low Engine Power
Electrical Output Overload
Clogged Air/Fuel Filter(s)
Loose or Intermittent Wire Connection(s)
Incorrect Electrical Connection
Main Circuit Breaker(s) “OFF”
Defective Generator

Overcurrent Protection Relay Trips

Electrical Output Overload
Loose or Intermittent Wire Connection(s)
Incorrect Electrical Connection
Defective Overcurrent Protection Relay

SECTION 8 - PARTS ORDERING

GENERAL

This publication, which contains an illustrated parts breakdown, has been prepared as an aid in locating those parts which may be required in the maintenance of the unit. Always insist on genuine Ingersoll-Rand Company parts.

NOTICE

Ingersoll-Rand Company can bear no responsibility for injury or damages resulting directly from the use of non-approved repair parts.

DESCRIPTION

The illustrated parts breakdown illustrates and lists the various assemblies, subassemblies and detailed parts which make up this particular machine. This covers the standard models and the more popular options that are available.

ENGINE PARTS

Contact your nearest Kubota Dealer.

MARKINGS AND DECALS

NOTICE

Do not paint over safety warnings or instructional decals. If safety warning decals become illegible, immediately order replacements from the factory.

Part numbers for original individual decals and their mounting locations are shown within Parts List Section. These are available as long as a particular model is in production.

Afterwards, service sets of exterior decals and current production safety warning decals are available.

HOW TO USE PARTS LIST

a. Locate the area in which the desired part is used and find illustration page number.

b. Locate the desired part on the illustration by visual identification and make note of part number and description.

HOW TO ORDER

The satisfactory ordering of parts by a purchaser is greatly dependent upon the proper use of all available information. By supplying your nearest sales office, autonomous company or authorized distributor, with complete information, you will enable them to fill your order correctly and to avoid any unnecessary delays. In order that all avoidable errors may be eliminated, the following instructions are offered as a guide to the purchaser when ordering replacement parts:

a. Always specify the model number of the unit.

b. Always specify the serial number of the unit. THIS IS IMPORTANT. The serial number of the unit will be found stamped on a plate attached to the unit.

c. Always specify the quantity of parts required.

d. Always specify the part number, as well as the description of the part, or parts, exactly as it is given on the parts list illustration.

e. Special order parts may not be included in this manual. Contact the Ingersoll-Rand Parts Department at 1-800-633-5206 with the unit serial number for assistance with these special parts.

In the event parts are being returned to your nearest sales office, autonomous company or authorized distributor, for inspection or repair, it is important to include the serial number of the unit from which the parts were removed.

TERMS AND CONDITIONS ON PARTS ORDERS

Acceptance: Acceptance of an offer is expressly limited to the exact terms contained herein. If purchaser's order form is used for acceptance of an offer, it is expressly understood and agreed that the terms and conditions of such order form shall not apply unless expressly agreed to by Ingersoll–Rand Company ("Company") in writing. No additional or contrary terms will be binding upon the Company unless expressly agreed to in writing.

Taxes: Any tax or other governmental charge now or hereafter levied upon the production, sale, use or shipment of material and equipment ordered or sold is not included in the Company's price and will be charged to and paid for by the Purchaser.

Shipping dates shall be extended for delays due to acts of God, acts of Purchaser, acts of Government, fires, floods, strikes, riot, war, embargo, transportation shortages, delay or default on the part of the Company's vendors, or any other cause beyond the Company's reasonable control.

Should Purchaser request special shipping instruction, such as exclusive use of shipping facilities, including air freight when common carrier has been quoted and before change order to purchase order can be received by the Company, the additional charges will be honored by the Purchaser.