

**INGERSOLL-RAND**

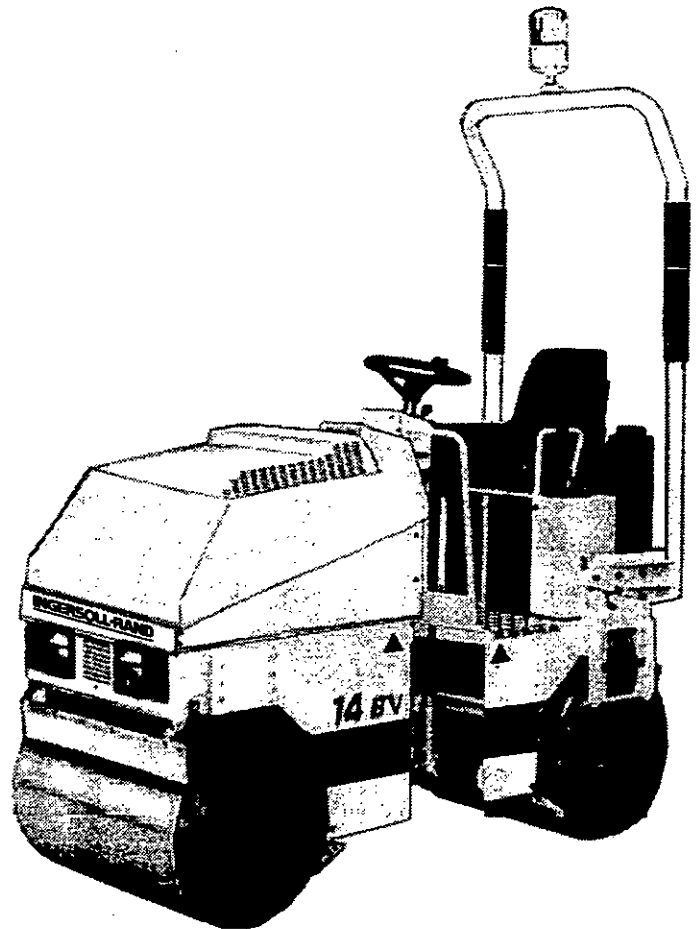
# 10 BS SERIES

## OPERATING & MAINTENANCE INSTRUCTIONS

### Double Drum Vibratory Compactor

Effective S/N.  
10232 upwards

10 OFF EACH  
CHARGE TO  
P. MOONEY.



**Do not remove operation  
manual from machine.  
Replace manual if damaged**

**Please note new company details:**

Ingersoll-Rand European Sales Limited  
PO Box 2, Chorley New Road, Horwich,  
Bolton, Lancashire BL6 6JN  
Tel: 01204 690690 Fax: 01204 690388

Registered in England No. 3275303.  
Registered office, as above. VAT Reg No GB 354 7796 09

NEW  
← COMPANY  
DETAILS.

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**10 BS ENGLISH COMM.NO. 10576411**  
**Revised (10-12)**

**INGERSOLL-RAND**

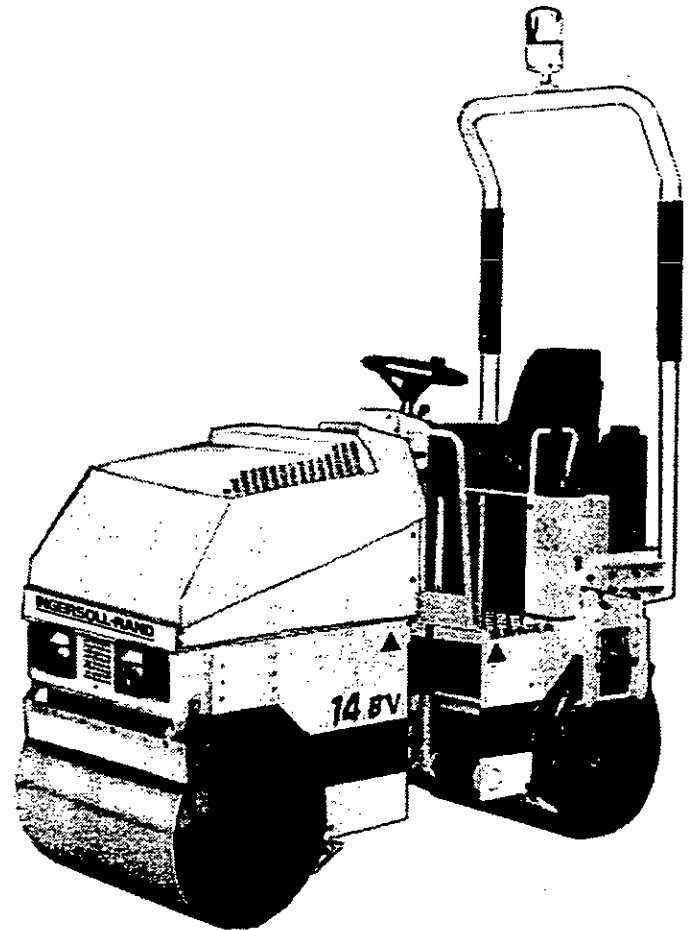
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**10 BS ENGLISH COMM.NO. 10576411**

**10 BS SERIES  
OPERATION AND  
MAINTENANCE INSTRUCTION MANUAL  
Communication Part No. 10576411**

To easily locate the major section in this manual, the first page of each major section is imprinted with a black square in a position corresponding to the section position listed on this page. To use the rapid index, hold the manual and spread the edges of the pages with the right thumb until the square is located which corresponds to the index position of the desired section. Then open the book. The contents of these sections are listed on the first page of each section.

	<b>SECTION</b>
<b>INTRODUCTION</b>	<b>Introduction</b>
<b>SAFETY PRECAUTIONS AND GUIDELINES</b>	<b>1</b>
<b>SYMBOL IDENTIFICATION</b>	<b>2</b>
<b>OPERATING CONTROLS AND INSTRUMENTS</b>	<b>3</b>
<b>OPERATING INSTRUCTIONS</b>	<b>4</b>
<b>MAINTENANCE INSTRUCTIONS</b>	<b>5</b>
<b>TROUBLESHOOTING</b>	<b>6</b>
<b>TECHNICAL SPECIFICATIONS</b>	<b>7</b>
<b>FUEL AND LUBRICANT INSTRUCTIONS</b>	<b>8</b>
<b>TORQUE SPECIFICATIONS</b>	<b>9</b>
<b>ELECTRICAL/HYDRAULIC SCHEMATICS</b>	<b>10</b>
<b>INDEX</b>	<b>11</b>

## INTRODUCTION

The purpose of this instruction manual is to provide the operator and site maintenance personnel with knowledge of the fundamental rules and criteria to be followed for the on-site use and maintenance of this double-drum vibratory roller compactor.

This instruction manual must have been read and fully understood by the operator before operating the machine.

This instruction manual consists of:

Introduction describing the machine

General safety rules

Identification of control and safety symbols.

- Operator controls and instrumentation.
- Operation and use
- Maintenance instructions
- Troubleshooting, control / instrument problems.
- Technical Specifications
- Fuel and Lubrication Instructions
- Torque specifications
- Electrical/Hydraulic Schematics

Always keep the "Operation and Maintenance Instruction Manual" on the machine and within reach of the operating position.

If any part of this manual cannot be understood, contact your supervisor or local Ingersoll-Rand Distributor. This is an essential condition for working safely with this machine.

The correct machine operation, use and regular maintenance are also essential elements to provide the highest performance and safety.

### NOTE:

The present manual is accompanied with an engine instruction manual. You are therefore advised to follow the operation and maintenance instructions as specified in both the engine and the machine instruction manuals.

These symbols call your attention to a safety precaution:



**⚠ DANGER**

**⚠ WARNING**

**⚠ CAUTION**

**NOTICE**

They mean:

**CAUTION!  
BE CAREFUL  
IT CONCERNS YOUR SAFETY!**

### PROCEDURE WHEN RECEIVING THE MACHINE

Your machine has been tested, accurately checked, and prepared for shipment. Every part of the machine, including the detached parts, have been accurately checked before being shipped from the factory.

When you receive the machine, and before unpacking the equipment, check if damage has occurred during transport and if any parts are missing.

Check the equipment by consulting the shipment document

If the goods are damaged, or if parts are missing, inform the freight agent as soon as possible. He will inform you regarding how to proceed in order to make a complaint.

### IDENTIFICATION DATA

An exact description of the model type and its serial number of your machine will facilitate fast and efficient response from our parts and service support operations.

Always provide the model of your machine and its serial number when you contact the local Ingersoll-Rand service parts office.

## INTRODUCTION

We advise you to enter your machine data in the following lines to maintain machine and engine information:

Model.....

Serial no.....

Year of manufacture.....

Engine Serial no. and type of engine.....

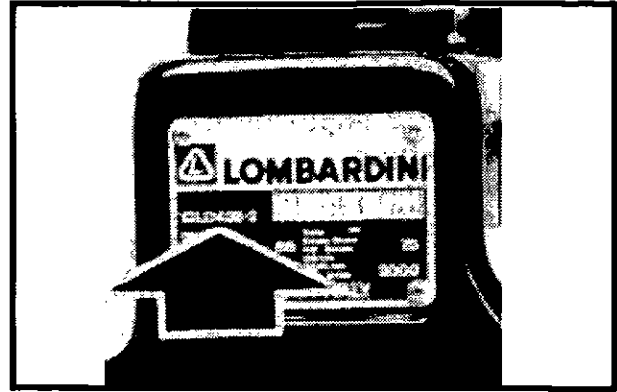


Figure 2

### MACHINE IDENTIFICATION

Machine identification plate location (Figure 1).

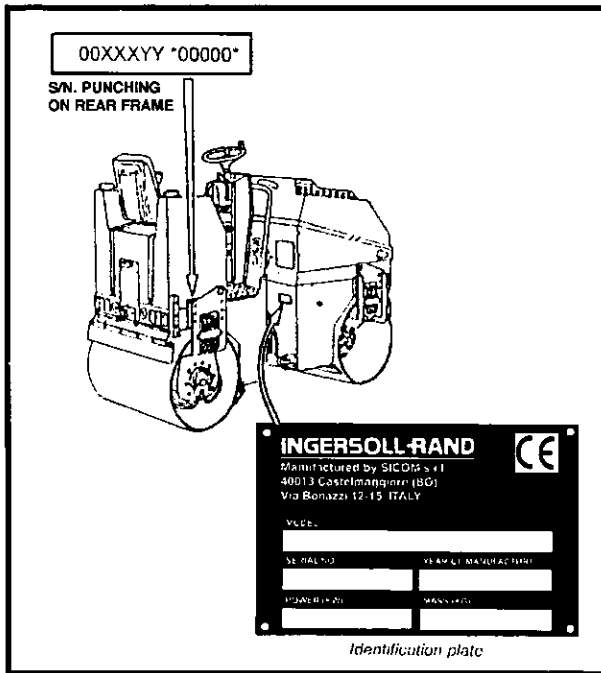


Figure 1

### ENGINE IDENTIFICATION

The engine number can be found on the engine identification plate, located on the crankcase (Figure 2)

### INSTRUCTION MANUAL STORAGE

A manual pouch (Figure 3), located in the engine compartment, provides space for all manuals. This pouch is located within easy reach of the operator's station.

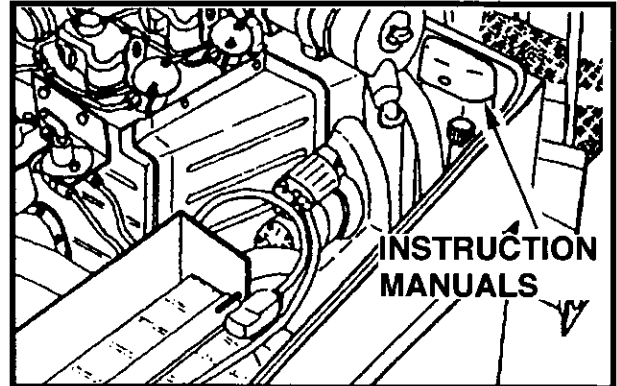


Figure 3

### GENERAL INFORMATION

All safety rules in Section I must be observed.

If further information is required concerning the recommended use on soil and asphalt applications, contact your local Ingersoll-Rand Distributor.

*Ingersoll-Rand Company*  
Customer Service  
Horwich

Tel.: 01204-690690  
Fax: 01204-690388 (Service and Warranty)  
01204-690388 (Customer Service Parts)

## INTRODUCTION

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Ingersoll-Rand reserves the right to make any changes or modifications without prior notice and without incurring any liability to retrofit machines previously shipped from the factory.

### MACHINE DESCRIPTION

This compactor model offers the ideal combination of weight, drum width, frequency, centrifugal force and amplitude. The combination of these specifications result in the most efficient compaction of hot mix asphalt (H.M.A...). This model has a specific drum width which allows you to select the best model to match the job requirement. The 10 BS compactor features the air-cooled, Lombardini 3LD511 Diesel engine, tandem drum hydrostatic propulsion, rear drum vibration, drum offset and centre point articulation steering systems.

On BS Series the rear drum features single vibration frequency of 3000 vpm (50 Hz). For further details refer Section 7, "Technical Specifications"

The propulsion system provides drive to both drums and permits smooth hydrostatic control of travel speed and maximum gradeability. For further details refer Section 7, "Technical Specifications"

### ENGINE

The machine uses 0.511 liter displacement, single cylinder air cooled, diesel engine.

Electric starting and alternator battery charging is standard on all machine models.

An oil bath type air cleaner provides clean air to the engine.

Fuel is gravity feeds through a fuel filter in the base of the fuel tank to the injection pump and on to the injectors.

The engine power/rpm is controlled by the engine speed (throttle) control lever. The engine is shutdown by pulling out the Engine Stop Knob.

### MAIN FRAME

The machine consists of a front frame and rear frame which are connected by a swivel joint providing both articulated steering and drum oscillation.

- The front frame includes the fuel and hydraulic fluid tanks, engine, hydraulic pumps and battery mounting.
- The rear frame includes the water tank, operator station comprising sprung seat and all operating controls within easy reach of the operator's station.

### CONTROLS

All of the controls are positioned for operator convenience. The combined Propulsion and Vibration Control Lever is positioned to left hand side of the operator's seat. Drum vibration is manually controlled by a thumb operated switch on the propulsion lever. Gravity feed water sprinkler system to each drum is standard equipment. Engine speed control lever is located on the Steering console.

### DRUM WATER SYSTEM

A 90 liter capacity, gravity water sprinkler system consists a sprinkler bar for each drum.

### BRAKES

Spring-applied, hydraulically released brakes are incorporated on both drums for safety, reliability and maintenance-free operation. Brakes actuate automatically in the event of power loss or can be activated by the operator.

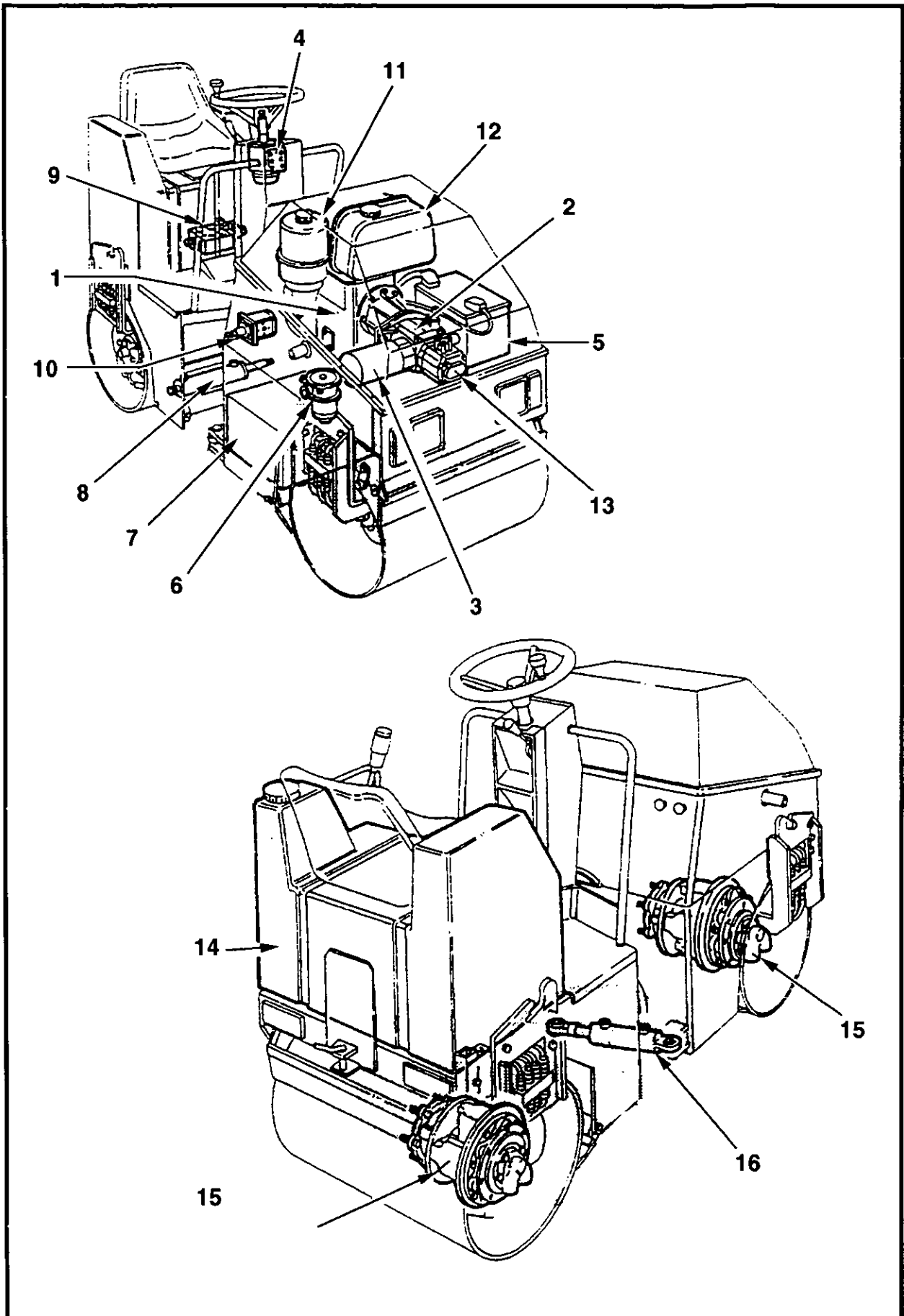
### SERVICEABILITY

A lightweight hood lifts and permits complete access to the engine, filters and hydraulic components: Sprinkler bars are easily cleaned, and spring loaded, self adjusting drum wipers require little maintenance.

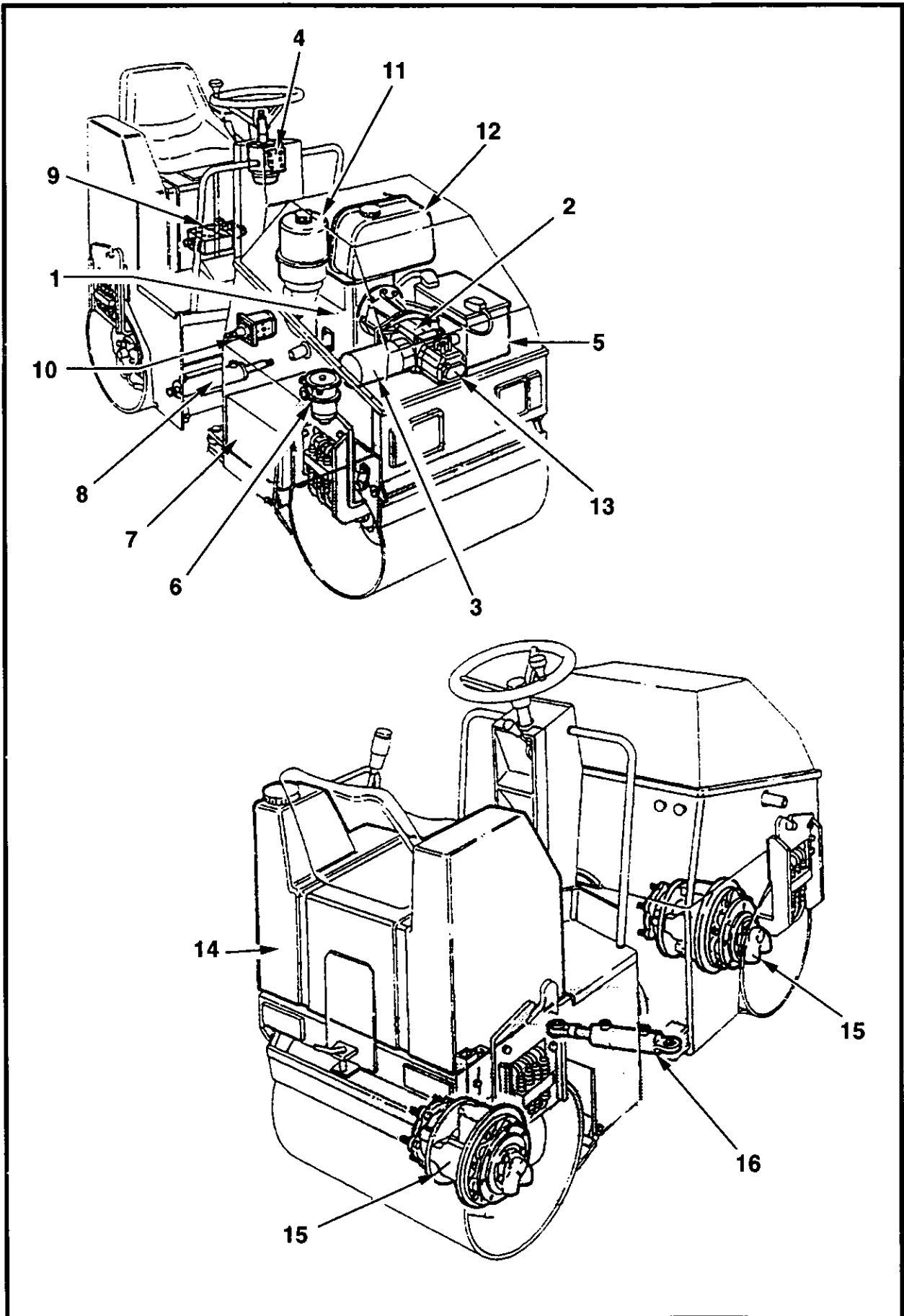
### ROPS

Ingersoll-Rand provides ROPS (rollover protection structures) and seat belts as standard equipment on all compactors. ROPS used in conjunction with seat belts will lessen the possibility of death or serious injury in the event of a rollover.

## INTRODUCTION



## INTRODUCTION





### **Description and Identification of Major Components**

1. Diesel Engine
2. Propulsion Pump
3. Hydraulic Oil Filter
4. Engine Compartment
5. Battery
6. Oil Tank Filter
7. Hydraulic Oil Tank
8. Drum Offset Hydraulic Cylinder
9. Solenoid Control Valve (Priority Valve)
10. Vibration Motor
11. Engine Air Filter
12. Fuel Tank
13. Vibration and Steering Pump
14. Water Tank
15. Propulsion Motors
16. Steering Hydraulic Cylinder

## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

Contents	Page	Contents	Page
Overview (1.1) _____	1	Safety Instructions Governing Operation (1.7) _____	2
Warnings (1.2) _____	1	Warning Of Special Dangers (1.8) _____	5
General (1.3) _____	1	Transporting And Towing -	
Selection And Qualification Of Personnel (1.4) _____	1	Recommissioning (1.9) _____	5
Organizational Measures (1.5) _____	2	Safety Related Decals (1.10) _____	7
Pre-Start Inspection (1.6) _____	2	Hazardous Substance Precaution (1.11) _____	10

### 1.1 OVERVIEW

#### BEFORE YOU OPERATE, MAINTAIN, OR IN ANY OTHER WAY USE THIS COMPACTOR:

READ and STUDY this manual. KNOW how to safely use the compactor's controls and what you must do for safe maintenance.

ALWAYS wear or use the proper safety items required for your personal protection.

If you have ANY QUESTIONS about the safe use or maintenance of this compactor, ASK YOUR SUPERVISOR OR CONTACT ANY INGERSOLL-RAND DISTRIBUTOR. NEVER GUESS-ALWAYS CHECK!

### 1.2 WARNINGS

The following conventions are used in this manual to designate instructions of particular importance.

**NOTE:** Refers to special information on the efficient use of the machine.

**NOTICE:** Denotes special nonhazardous related information.

**CAUTION:** Refers to orders and prohibitions directed towards preventing minor personal injury or product/property damage.

**WARNING:** Refers to orders and prohibitions designed to prevent severe personal injury, death or extensive damage.

**DANGER:** Refers to orders and prohibitions designed to prevent severe personal injury or death.

### 1.3 GENERAL

The machine was built in accordance with state-of-the-art standards and recognized safety rules. Nevertheless, its misuse may constitute a risk to life and limb of the user or

of third parties, and may cause damage to the machine or other material property.

The machine must be used in accordance with its designated use as described in the operating manual. The machine must only be operated by safety-conscious persons who are fully aware of the risks involved in operating the machine. Any functional disorders, especially those affecting the safety of the machine, must be corrected immediately.

The machine is designed exclusively for the compaction of asphaltic road construction materials. Use of the machine for purposes other than that mentioned (such as for towing other vehicles/equipment) is considered contrary to its designated use. The manufacturer/supplier cannot be held liable for any damage resulting from such use. The risk of such misuse lies entirely with the user.

Operating the machine within the limits of its designated use also involves compliance with the inspection and maintenance directives contained in the operating manual.

### 1.4 SELECTION AND QUALIFICATION OF PERSONNEL

Work on and with the machine must be performed by qualified personnel only. Statutory minimum age limits must be observed.

Individual responsibilities of the personnel responsible for operation, setup, maintenance and repair of the machine should be stated clearly.

Define the machine operator's responsibilities - also with regard to observing traffic regulations - the operator should have the authority to refuse instructions by third parties that are contrary to safety.

Do not allow persons being trained or instructed in the operation or maintenance of the machine to work without permanent supervision by an experienced person.

Work on the electrical system and equipment of the machine must be done only by a skilled electrician or by instructed persons under the supervision and guidance of a skilled electrician and must be in accordance with electrical engineering rules and regulations.

## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

Work on the chassis, brake, hydraulic and steering systems must be performed by skilled personnel with special knowledge and training for such work.

### 1.5 ORGANIZATIONAL MEASURES

STOW manuals in the manual pouch provided on the machine. Manuals must always be available at the site where the machine is used.

OBSERVE AND INSTRUCT the user in all other generally applicable legal and mandatory regulations relevant to accident prevention and environmental protection. These compulsory regulations may also deal with the handling of hazardous substances, issuing and/or wearing of personal protective equipment, and traffic regulations.

SUPPLEMENT operating instructions with detailed working instructions covering the methodology of working sequences, individual job responsibilities, and overall supervisory responsibility.

ALWAYS be sure that persons entrusted with work on the machine have read the operating instructions and in particular the chapter on safety before beginning work. Reading the instructions after work has begun is too late. This is especially important for persons who work only occasionally on the machine, e.g. during set up or maintenance.

MAKE CERTAIN personnel are working in compliance with the operating instructions and are alert to risks and safety factors.

ALWAYS tie back or otherwise secure long hair, wear close-fitting garments and avoid wearing jewelry such as rings. Injury may result from clothing, hair, or jewelry being caught up in the machinery.

USE protective equipment wherever required by the circumstances or by law.

OBSERVE all safety instructions and warnings attached to the machine.

BE SURE all safety instructions and warnings attached to the machine are complete and perfectly legible.

STOP the machine immediately in the event of safety relevant malfunction or change in machine behavior during operation. REPORT the malfunction to the proper authority/person.

NEVER provide service or maintenance to the machine unless the drums are adequately chocked, articulation lock bar/pin is in locked position, and parking brake is applied.

NEVER make any modifications to the machine which might affect safety without the manufacturer's approval. This applies to the installation and adjustment of safety devices and valves as well as to welding work on load bearing elements.

ALWAYS ADHERE to prescribed intervals or those specified in the operating instructions for routine checks and inspections.

### 1.6 PRE-START INSPECTION

INSPECT your compactor daily. Ensure that the routine maintenance and lubrication are being dutifully performed. Have any malfunctioning, broken, or missing parts repaired or replaced before use.

VERIFY that all instruction and safety labels are in place and readable. These are as important as any other equipment on the compactor.

NEVER fill the fuel tank with the engine running, while near an open flame, or while smoking. ALWAYS wipe up any spilled fuel.

CHECK for WARNING tags placed on the compactor. DO NOT operate the compactor until repairs have been made and the WARNING tags have been removed by authorized personnel.

CLEAN any foreign material from the operator's platform to reduce the danger of slipping.

KNOW the location of the Emergency Shut-Down Control if compactor is so equipped.

ALWAYS know the capabilities and limitations of your equipment—speed, gradability, steering, and braking.

BE AWARE of the dimensions of your compactor—height and weight—as well as your transporter dimensions and weight.

CHECK for any conditions that could be dangerous—holes, banks, underground culverts, manhole covers, water meter pits, curb and/or street boxes.

### 1.7 SAFETY INSTRUCTIONS GOVERNING OPERATION

AVOID any operational mode that might sacrifice safety.

TAKE all necessary precautions to ensure that the machine is used only when in a safe and reliable condition.

OPERATE the machine only if all protective and safety oriented devices, such as removable safety devices,

## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

emergency shut off equipment, soundproofing elements and exhausts, are in place and fully functional.

START the machine from the driver's seat only and always wear the seat belt.

WATCH the indicators during start up and shutdown procedures in accordance with the operating instructions.

MAKE SURE no one is at danger or risk before starting up or setting the machine in motion.

CHECK that braking, steering, signalling and lighting systems are fully functional before starting work or travelling with the machine.

CHECK that accessories have been safely stowed away before setting the machine in motion.

OBSERVE the valid traffic regulations when traveling on public roads and ways and MAKE SURE the machine is in a condition compatible with these regulations.

ALWAYS SWITCH ON the lighting system in conditions of poor visibility and after dark.

MAKE SURE there is sufficient clearance when crossing underpasses, bridges and tunnels or when passing under overhead lines.

ALWAYS KEEP at a distance from the edges of building pits and slopes.

AVOID any operation that might be a risk to machine stability.

NEVER CHANGE to a lower gear on a slope always change before reaching it. On sloping terrain, always adapt your travelling speed to the prevailing ground conditions.

ALWAYS SECURE the machine against inadvertent movement and unauthorized use before leaving the driver's seat.

### I. STARTING

ALWAYS USE hand rails and steps (if equipped) to get on and off the compactor. ALWAYS MAINTAIN a three-point contact when climbing onto or off of compactor.

READ and FOLLOW ALL instruction decals.

ALWAYS be seated with the seat belt on when operating the machine.

BEFORE starting the engine, ENSURE that the propulsion (travel) control is in the "STOP" position.

BEFORE starting the engine, ENSURE that the parking brake control is in the "Applied" position.

START the engine from the operator's position only.

ALWAYS USE EXTREME CAUTION if you have to jump-start the engine.

### II. OPERATING

ALWAYS make sure that no person or obstruction is in your line of travel before starting the compactor in motion.

NEVER CLIMB on or off the compactor while it is in motion.

ALWAYS remain seated with the seat belt on when operating the compactor whether compacting, traveling, or loading/unloading.

USE EXTREME CAUTION and be very observant when operating in close quarters or congested areas.

NEVER carry passengers.

CLOSE all sound baffles during operation.

KNOW the area in which you are working. Familiarize yourself with work site obstructions and any other potential hazards in the area.

KNOW and USE the hand signals required for particular jobs and know who has the responsibility for signaling.

DO NOT work in the vicinity of overhanging banks or on grades that could cause the compactor to slide or roll over.

AVOID side hill travel. ALWAYS operate up and down slopes. ALWAYS keep the propulsion (travel) control lever in low speed range close to the "STOP" position when climbing or descending hills.

NEVER allow anyone to stand within the compactor's articulation area when the engine is running.

ALWAYS LOOK in all directions BEFORE changing your direction of travel.

DO NOT attempt to control compactor travel speed with the throttle control. When operating the compactor maintain the engine speed at full "Operating rpm."

DO NOT tow or push the compactor except as explained in SECTION 4 of this manual.

## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

DO NOT run the engine in a closed building for an extended length of time. EXHAUST FUMES CAN KILL.

### III. STOPPING

ALWAYS park the compactor off the asphalt and on solid level ground. If this is not possible, always park the compactor at a right angle to the slope and chock the wheels and/or drums.

AVOID leaving the operator's platform with the engine running. ALWAYS move the propulsion (travel) control to "STOP", apply the parking brake, install the articulation lock bar/lock pin, position the throttle control to "idle rpm", pull the fuel shut-off control (if so equipped), turn ignition switch to OFF, and lock all lockable compartments.

USE proper flags, barriers, and warning devices, especially when parking in areas of heavy traffic.

### IV. MAINTENANCE

In any work concerning the operation, conversion or adjustment of the machine and its safety oriented devices or any work related to maintenance, inspection and repair, always observe the start up and shutdown procedures set out in the operating instructions and the information on maintenance work.

Ensure that the maintenance area is adequately secured.

If the machine is completely shut down for maintenance and repair work, it must be secured against inadvertent starting by:

- locking the principal control elements and removing the ignition key and/or
- attaching a warning sign to the main switch

Carry out maintenance and repair work only if the machine is positioned on stable and level ground and has been secured against inadvertent movement and buckling.

USE CARE when attaching and securing lifting tackle to individual parts and large assemblies being moved for replacement purposes to avoid the risk of accidents. USE lifting gear that is in perfect condition and with adequate lifting capacity. NEVER work or stand under suspended loads.

ALWAYS USE the correct tools and workshop equipment when performing maintenance to the machine.

ALWAYS USE specially designed or otherwise safety oriented ladders and working platforms when doing overhead assembly work. Never use machine parts as a climbing aid.

KEEP all handles, steps, handrails, platforms, landings and ladders free from mud, dirt, snow and ice.

CLEAN the machine, especially connections and threaded unions, of any traces of oil, fuel or preservatives before carrying out maintenance/repair. NEVER use aggressive detergents. Use lint free cleaning rags.

Before cleaning the machine with water, steam jet (high pressure cleaning) or detergents, COVER OR TAPE up all openings which - for safety and functional reasons - must be protected against water, steam or detergent penetration. Special care must be taken with electric motors and switch gear cabinets.

ENSURE during cleaning of the machine that temperature sensors do not come into contact with hot cleaning agents.

REMOVE all covers and tapes applied for that purpose after cleaning machine.

After cleaning, EXAMINE all fuel, lubricant and hydraulic fluid lines for leaks, loose connections, chafe marks and damage. REPAIR or REPLACE defective parts immediately.

Always TIGHTEN any screwed connections that have been loosened during maintenance and repair.

Any safety devices removed for setup, maintenance or repair purposes must be refitted and checked immediately upon completion of the maintenance and repair work.

ENSURE that all consumables and replaced parts are disposed of safely and with minimum environmental impact.

AVOID, whenever possible, servicing, cleaning or examining the compactor with the engine running.

AVOID, whenever possible, servicing or providing maintenance to the compactor unless the wheels and/or drums are adequately chocked, the articulation lock bar/lock pin is in the locked position and parking brake is applied.

NEVER fill the fuel tank with the engine running, while near an open flame or while smoking. ALWAYS wipe up any spilled fuel.

DO NOT alter the engine governor settings from those indicated in the engine manual and the engine option plate.

ALWAYS replace damaged or lost decals. Refer to the parts manual for the proper location and part number for all decals.

DISCONNECT the battery cables when working on the electrical system or when welding on the compactor.

## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

BE SURE the battery area is well ventilated (clear of fumes) should it be necessary to connect a jump battery or battery charger. Fumes from the battery can ignite by a spark and explode.

BE SURE the battery charger is "Off" when making the connections if battery charging is required.

Use only original fuses with the specified current rating. Switch off the machine immediately if trouble occurs in the electrical system.

Work on the electrical system or equipment may only be carried out by a skilled electrician or by specially instructed personnel under the control and supervision of an electrician and in accordance with the applicable electrical engineering.

If provided for in the regulations, the power supply to parts of machines, on which inspection, maintenance and repair work is to be carried out, must be cut off.

Before starting any work, check the de-energized parts for the presence of power and ground or short circuit them in addition to insulating adjacent live parts and elements.

The electrical equipment of machines is to be inspected and checked at regular intervals. Defects such as loose connections or scorched cables must be rectified immediately.

Welding, flame cutting and grinding work on the machine should only be done if expressly authorized, as there may be a risk of explosion and fire.

Before beginning welding, flame cutting and grinding operations, clean the machine and its surroundings from dust and other flammable substances and make sure that the premises are adequately ventilated (risk of explosion check all lines, hoses and screwed connections regularly for leaks and obvious damage. Repair damage immediately. Splashed oil may cause injury and fire.

Depressurize all system sections and pressure pipes (hydraulic system, compressed air system) to be removed in accordance with the specific instructions for the unit concerned before carrying out any repair work.

Hydraulic lines must be laid and fitted properly. Ensure that no connections are interchanged. The fittings, lengths and quality of the hoses must comply with the technical requirements.

When handling oil, grease and other chemical substances, observe the product related safety regulations.

Be careful when handling hot consumables (risk of burning or scalding).

### 1.8 WARNING OF SPECIAL DANGERS

When working with the machine, maintain a safe distance from overhead electric lines. If work is to be carried out close to overhead lines, the working equipment must be kept well away from them. **CAUTION! DANGER!** Check out the prescribed safety distances.



If your machine comes into contact with a live wire:

- Do not leave the machine.
- Drive the machine out of the hazard zone.
- Warn others against approaching and touching the machine.
- Have the live wire de-energized.
- Do not leave the machine until the damaged line has been safely de-energized.

Operate internal combustion engines and fuel operated heating systems only in adequately ventilated premises. Before starting the machine in enclosed premises, make sure that there is sufficient ventilation.

### 1.9 TRANSPORTING AND TOWING - RECOMMISSIONING

The machine must be towed, loaded and transported only in accordance with the operating instructions.

For towing the machine, observe the prescribed transport position, admissible speed and itinerary.

Use only appropriate means of transport and lifting gear of adequate capacity.

The fastening of loads and the instructing of crane operators should be entrusted to experienced persons only. The personnel giving the instructions must be within sight or sound of the operator.

**DO NOT** attempt to load the compactor on the transporters without knowledge and experience with the operation of the compactor.

Always use a ramp when loading the compactor on the transporter. Be sure ramps are of adequate strength, low angle, and proper height.

Use proper chock blocks in front and rear of the wheels of the transporter when loading the compactor.

## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

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Be sure the trailer is on level ground and approach the transporter loading ramps squarely to make sure the compactor does not drop off the side of the ramp.

Keep the transporter deck clean of clay, oil, mud, ice, frost and other material that can become slippery.

Use proper chock blocks in front and rear of the compactor drums/wheels once loaded on the transporter.

Shut the engine OFF, apply the parking brake, and lock all lockable compartments.

Always be sure the articulation lock bar/lock pin is secured in the locked position before transporting the compactor.

Always know the overall height of the compactor and hauling vehicle. Observe height and weight regulations and at overhead objects be sure you can safely pass beneath them.

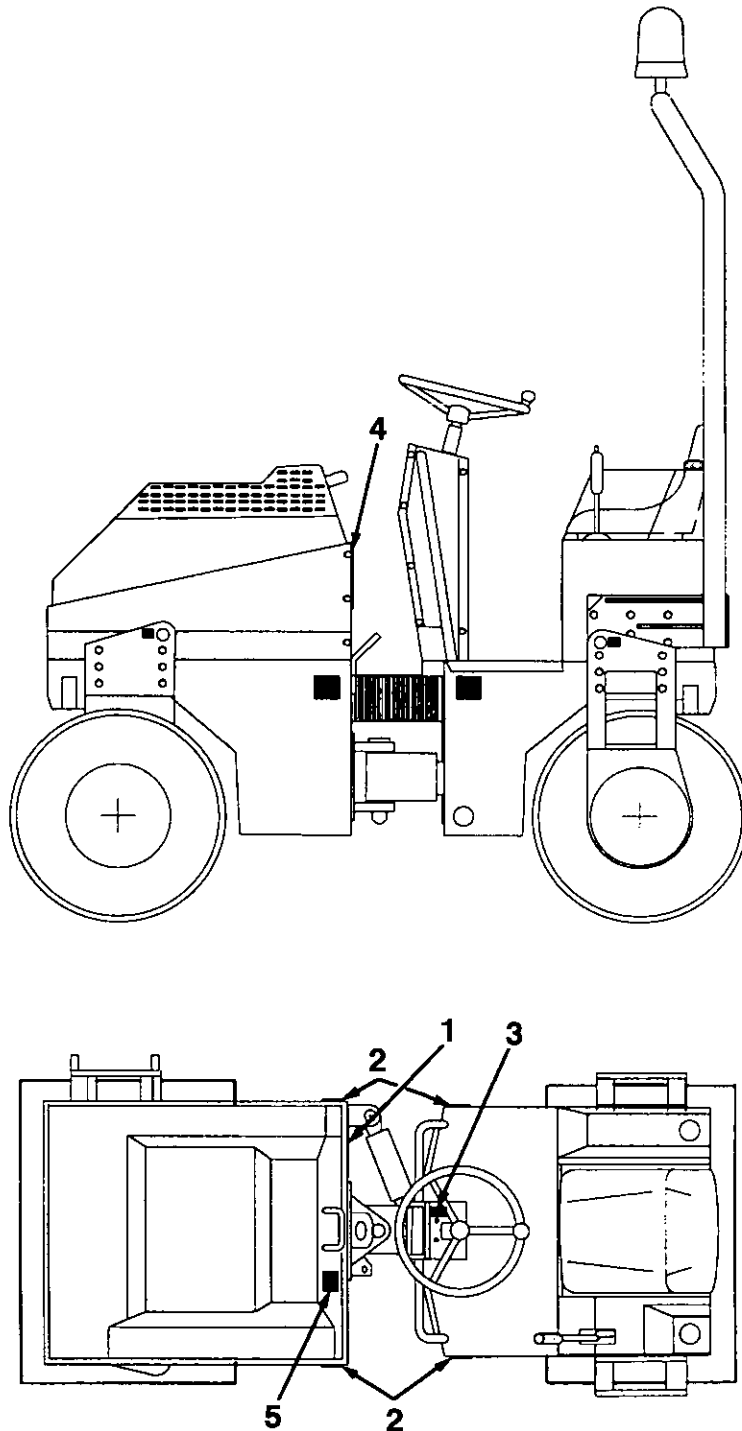
When moving the compactor on public access roads, obey all traffic regulations and be sure that the proper clearance flags, lights, and warning signs, including the "Slow Moving Vehicle" emblem, are properly displayed. Know your approximate stopping distance at any given speed. Never turn corners at excessive speeds. Look in all directions before reversing your direction of travel.

Position the compactor on the transporter or hauling vehicle centered from side to side and apply the brake.

Secure the compactor to the deck of the hauling vehicle or transporter with adequate chains or cables and blocks to meet local regulations.

## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

### 1.10 SAFETY RELATED DECALS





































REF. NO.	DECAL	NO. REQ'D	LOCATION
1	Checklist	1	Engine Canopy
2	DANGER: Crushing Hazard	4	Right & Left Side
3	WARNING: Misoperation	1	Console
4	WARNING: Improper Maintenance	1	Engine Canopy
5	DANGER: Rollover	1	Engine Canopy



## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

### 1. Checklist

PRE-STARTING	OPERATING
<p>Hoses, Safety Shrouds, Muffler, Engine Railings, Fittings - <b>INSPECT FOR DAMAGE</b></p> <p>Fluid Levels - <b>CHECK</b></p> <p><b>DO NOT OPERATE FAULTY EQUIPMENT</b></p>	<p>Articulation Lock Bar - <b>RELEASE AND STOW</b></p> <p> Seat Belt - <b>FASTEN</b></p> <p> Engine Speed - <b>HIGH (Operating) IDLE</b></p> <p> Parking Brake - <b>RELEASE</b> =  = </p> <p> Water Spray Switch - <b>ON</b> = </p>
STARTING	
<p> <b>CONSULT OPERATOR'S MANUAL - SEE YOUR SUPERVISOR.</b></p> <p> Propulsion Control Lever - <b>CHECK IN STOP POSITION</b></p> <p> Engine Speed - <b>LOW IDLE</b></p> <p> Parking Brake - <b>APPLY</b> =  = </p> <p> Emergency Stop Switch - <b>RESET</b> = </p> <p>Work Area - <b>CLEAR</b></p> <p> Ignition Switch - <b>ON</b> =   - <b>BRAKE LIGHT - VERIFY ON</b>  - <b>ENGINE OIL LIGHT - VERIFY ON</b></p> <p>- <b>START</b> =  (30 seconds MAX.)</p> <p><b>Note:</b> Operator must be seated to permit engine start.</p>	<p> Propulsion Control Lever  - Move <b>SLOWLY</b>:     - Move to <b>STOP</b> for <b>NORMAL BRAKING</b></p> <p> Vibration Control - <b>ENGAGE ONLY WHEN IN MOTION</b></p> <p><b>Operation:</b>  Operating - <b>STAY SEATED</b>  - <b>ALLOW NO PASSENGERS</b>  - <b>ALLOW NO BYSTANDERS</b></p> <p>Up and downhill Travel - <b>GO SLOW</b></p>
SHUTDOWN	TRANSPORT
<p>Machine - <b>ON LEVEL SURFACE</b></p> <p> Water Spray Switch - <b>OFF</b> = </p> <p> Vibration ON/Off Switch - <b>OFF</b> = </p> <p> Parking Brake - <b>APPLY</b> =  = </p> <p> Engine Speed - <b>LOW IDLE (For 3-4 mins.)</b></p> <p> Ignition Switch - <b>OFF</b> = </p>	<p>Hauling:  Articulation Lock Bar - <b>LOCK</b></p> <p>Machine - <b>CHOCK</b>  - <b>TIE DOWN SECURELY TO TRAILER</b></p> <p> <b>Towing:</b>  <b>DO NOT TOW UNTIL YOU REFER TO OPERATOR'S INSTRUCTION MANUAL</b></p>

## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

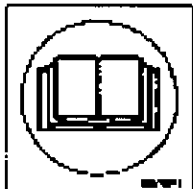
### 2. Crush Area

Crush area. Can cause severe injury or death. Stay clear. Install lock pin before servicing.



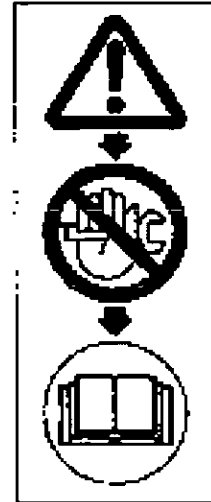
### 3. Misoperation

Improper operation of this equipment can cause severe injury or death. Read and understand the operator's manual and safety instructions before operating or servicing.



### 4. Maintenance

Improper maintenance can be hazardous. Understand maintenance safety prior to working. Consult machine manual or Ingersoll-Rand distributor.



### 5. Rollover

Rollover of this machine can cause severe injury or death. Do not operate this machine near or on an inclined surface. A rollover can occur. If this machine has a Rollover Protective Structure (ROPS), seat belts must be worn to avoid severe injury or death from being thrown out.



## SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES

The following information is provided to assist the owners and operators of Ingersoll-Rand Road Machinery Equipment. Further information may be obtained by contacting your Ingersoll-Rand Road Machinery Equipment Distributor.

The following substances are used in the manufacture of this machine and may be hazardous to health if used incorrectly.

SUBSTANCE	PRECAUTION
Antifreeze (Water-cooled engine)	Avoid ingestion, skin contact and breathing fumes.
Hydraulic Oil	Avoid ingestion, skin contact and breathing fumes.
Engine Lubricating Oil	Avoid ingestion, skin contact and breathing fumes.
Preservative Grease	Avoid ingestion, skin contact and breathing fumes.
Rust Preventative	Avoid ingestion, skin contact and breathing fumes.
Engine Fuel	Avoid ingestion, skin contact and breathing fumes.
Battery Electrolyte	Avoid ingestion, skin contact and breathing fumes.
SAE Gear Oil	Avoid ingestion, skin contact and breathing fumes.

The following substances may be produced during the operation of this machine and may be hazardous to health.

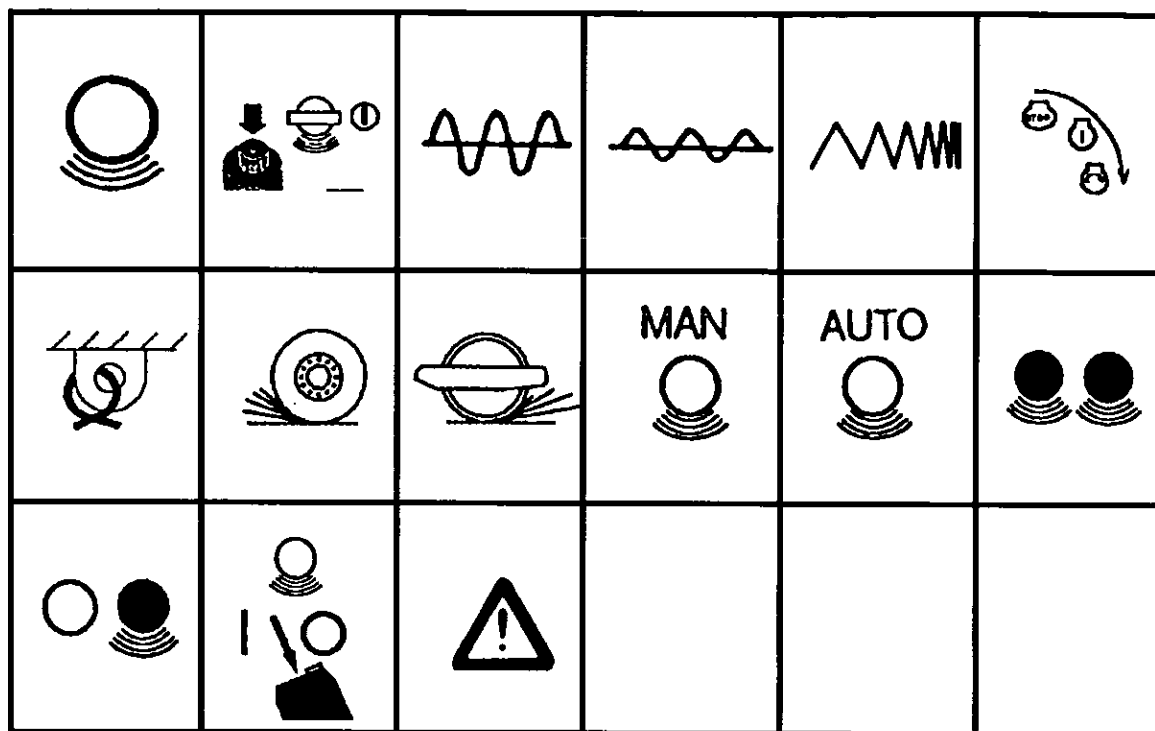
SUBSTANCE	PRECAUTION
Engine Exhaust Fumes	Avoid breathing.
Engine Exhaust Fumes	Avoid buildup of fumes in confined spaces.
Electric Motor Dust (Brushes/Insulation)	Avoid breathing during maintenance.
Brake Lining Dust *	Avoid breathing during maintenance.

\* Only on machines with dry brakes.

## SECTION 2 - SYMBOL IDENTIFICATION

Contents	Page	Contents	Page
INGERSOLL-RAND MACHINE SYMBOLS (2.1)	1	INTERNATIONAL SYMBOLS (2.2)	2















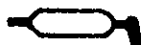



























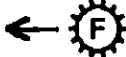
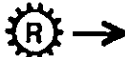


















### 2.1 INGERSOLL-RAND MACHINE SYMBOLS



- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>1. Drum Vibration</li> <li>2. Drum Vibration Control (ON/OFF)</li> <li>3. High Amplitude</li> <li>4. Low Amplitude</li> <li>5. Frequency (Vibration)</li> <li>6. Ignition Switch</li> <li>7. Tiedown Point</li> <li>8. Anti-Wheel Spin</li> </ol> | <ol style="list-style-type: none"> <li>9. Anti-Drum Spin</li> <li>10. Manual Vibration Control</li> <li>11. Automatic Vibration Control</li> <li>12. Double Drum Vibration Mode</li> <li>13. Single Front Drum Vibration Mode</li> <li>14. Vibration Control Mode</li> <li>15. Caution</li> </ol> |
|--|---|

## SECTION 2 - SYMBOL IDENTIFICATION

### 2.2 INTERNATIONAL SYMBOLS

					
1	2	3	4	5	6
					
7	8	9	10	11	12
					
13	14	15	16	17	18
					
19	20	21	22	23	24
					
25	26	27	28	29	30
					
31	32	33	34	35	36
					
37	38	39	40	41	42
					
43	44	45	46	47	48
					
49	50	51	52	53	54
					
55	56	57	58	59	60
					
61	62				

## SECTION 2 - SYMBOL IDENTIFICATION

---

- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| 1. On Start                       | 32. Engine Air Filter               |
| 2. Off/Stop                       | 33. Engine Air Filter - Fault       |
| 3. On/Off                         | 34. Fan Belt - Fault                |
| 4. Plus/Positive                  | 35. Emergency Engine Stop           |
| 5. Minus/Negative                 | 36. Engine Start                    |
| 6. Horn                           | 37. Engine On/Run                   |
| 7. Battery Condition              | 38. Start Switch                    |
| 8. Hourmeter                      | 39. Transmission                    |
| 9. Seat (Lap) Belt                | 40. Transmission Oil Level          |
| 10. Linear Movement               | 41. High Gear                       |
| 11. Rotational                    | 42. Low Gear                        |
| 12. Volume Empty                  | 43. Forward Direction               |
| 13. Volume Half-Full              | 44. Reverse Direction               |
| 14. Volume Full                   | 45. Parking Brake                   |
| 15. Grease                        | 46. Brake On                        |
| 16. Oil Lubrication Point         | 47. Brake Off                       |
| 17. Lift Point                    | 48. Primer (Start Aid)              |
| 18. Jack or Support Point         | 49. Hydraulic Oil                   |
| 19. Filling/Emptying              | 50. Hydraulic Oil Pressure          |
| 20. Read Operator's Manual        | 51. Hydraulic Oil Level             |
| 21. Engine Oil                    | 52. Hydraulic Oil Filter            |
| 22. Engine Oil Pressure           | 53. Hydraulic Oil Temperature       |
| 23. Engine Oil Pressure - Failure | 54. Fuel (Diesel)                   |
| 24. Engine Oil Level              | 55. Fuel Level                      |
| 25. Engine Oil Filter             | 56. Fuel Filter                     |
| 26. Engine Oil Temperature        | 57. Work Light                      |
| 27. Engine Coolant                | 58. Flashing Beacon                 |
| 28. Engine Coolant Level          | 59. Control Lever - Dual Direction  |
| 29. Coolant Temperature           | 60. Control Lever - Multi Direction |
| 30. Engine Rotations (RPM)        | 61. Clockwise Rotation              |
| 31. Gas Inject (Cold Start)       | 62. Counterclockwise Rotation       |

## SECTION 3 - OPERATING CONTROLS AND INSTRUMENTS

Contents	Page	Contents	Page
Articulation Lock Bar (3.1)	1	Seat Adjustment (3.16)	6
Vandalism Protection (3.2)	1	Drum Offset Control Switch (3.17)	6
Propulsion Control (3.3)	4	Ignition Switch (3.18)	6
Engine Starting Indicator Light (3.4)	4	Flashing Beacon Light Switch (3.19)	7
Vibration Control Switch (3.5)	4	Flashing Beacon Light Indicator Light (3.20)	7
Vibration Indicator Light (3.6)	4	Direction Turning Lights Selector Switch (3.21)	7
Water Sprinkler Control Valve (3.7)	4	Direction Turning Lights Indicator Light (3.22)	7
Horn and Driving Light Control Switch (3.8)	5	Hazard Lights Switch (3.23)	7
Parking and Driving Lights Indicator Light (3.9)	5	Hazard Lights Indicator Light (3.24)	7
High Beam Indicator Light (3.10)	5	Low Engine Oil Pressure Indicator Light (3.25)	8
Emergency Stop Switch (3.11)	5	Alternator Discharge Indicator Light (3.26)	8
Parking Brake Control (3.12)	5	Fusebox (3.27)	8
Brake ON Indicator Light (3.13)	5	Fuse Identification (3.28)	8
Engine Speed Control (3.14)	6		
Steering Wheel (3.15)	6		

### **⚠ WARNING**

For your own safety and the safety of others, please ensure you thoroughly read and understand this section before operating the machine.

#### 3.1 ARTICULATION LOCK BAR.

### **⚠ WARNING**

During shipment and before performing any checks or service operations, place the articulation lock bar into its locked position.

For compaction operation the lock bar is to be removed from its locked position and placed in its stowed position.

The articulation lock bar is located on the left side of the swivel joint. It is used to prevent accidental articulation of the compactor.

Prior to shipment and before performing any checks or service operations, place the lock bar in its locked position 'C', refer Figure 3-1.

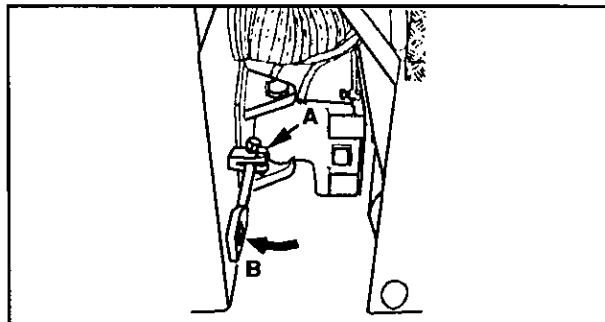


Figure 3-1 Lock bar in locked position

For compactor operation, the lock bar is to be placed into its stowed position 'B', refer Figure 3-2.

After repositioning the lock bar, secure in the required position by inserting the screw 'A'.

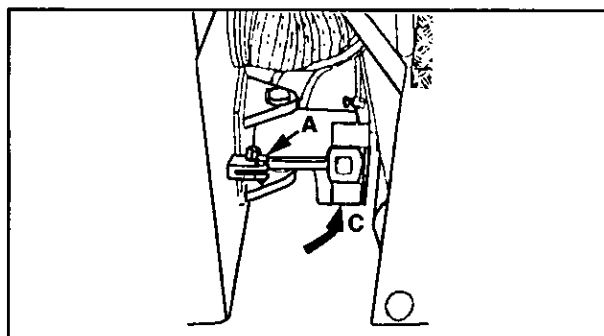


Figure 3-2 Lock bar in stowed position

#### 3.2 VANDALISM PROTECTION.

The compactor may be equipped with an optional vandalism protection equipment. When leaving the compactor unattended, lock all lockable compartments.

- To provide further security a removable key, battery isolator switch is provided in the engine compartment, refer Figure 3-3.

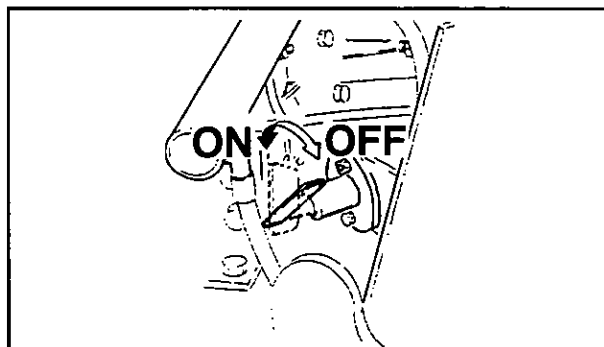


Figure 3-3 Battery Isolator Switch

- The engine canopy is provided with a lockable bonnet lock which can be secured by a padlock.

## SECTION 3 - OPERATING CONTROLS AND INSTRUMENTS

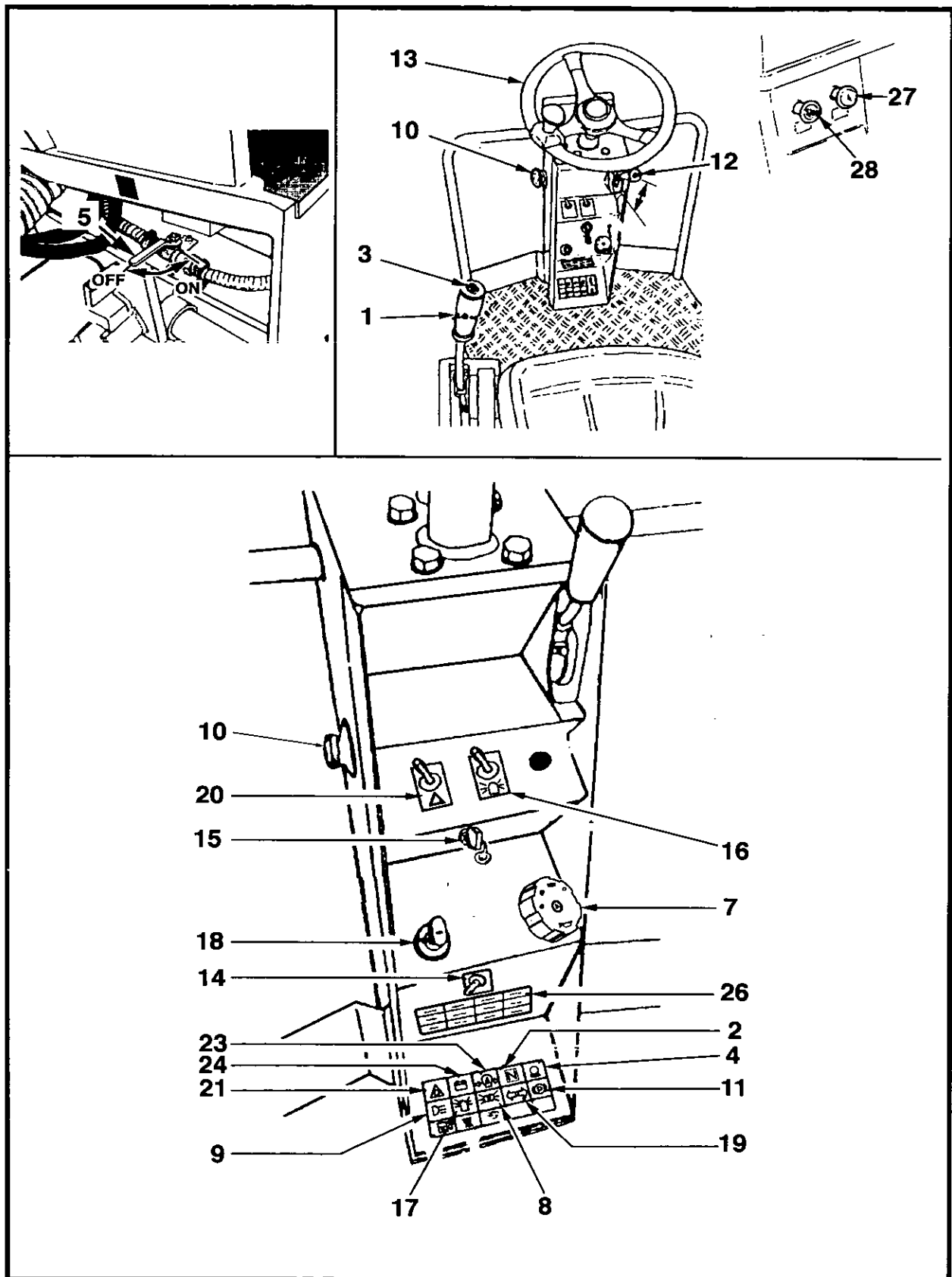


Figure 3-4 Operating Controls and Instruments - (Sheet 1 of 2)



### SECTION 3 - OPERATING CONTROLS AND INSTRUMENTS

---

- |   |  |
|---|--|
| 1. Propulsion Control Lever                           | 17. Flashing Beacon Indicator Light (YELLOW)         |
| 2. Engine Starting Indicator Light (GREEN)            | 18. Direction Turning Lights Selector Switch         |
| 3. Vibration Control ON/OFF Switch                    | 19. Direction Turning Lights Indicator Light (GREEN) |
| 4. Vibration ON Indicator Light (RED)                 | 20. Hazard Lights Indicator Light Switch             |
| 5. Water Flow ON/OFF Valve                            | 21. Hazard Lights Indicator Light (RED)              |
| 7. Horn and Driving Lights Control Switch             | 23. Low Engine Oil Pressure Indicator Light (RED)    |
| 8. Parking and Driving Lights Indicator Light (GREEN) | 24. Alternator Discharge Indicator Light (RED)       |
| 9. High Beam Indicator Light (BLUE)                   | 26. Fuse Box   |
| 10. RED Emergency Stop/Parking Brake Switch           | 27. Excess Fuel Cold Start Control Cable             |
| 11. Parking Brake ON Indicator Light (RED)            | 28. Engine STOP Control Knob (Pull to stop)          |
| 12. Engine Speed Control Lever                        |  |
| 13. Steering Wheel                                    |  |
| 14. Drum Offset Control Switch                        |  |
| 15. Ignition Switch and removable key                 |  |
| 16. Flashing Beacon Switch                            |  |

Figure 3-4 Operating Controls and Instruments - (Sheet 2 of 2)

## SECTION 3 - OPERATING CONTROLS AND INSTRUMENTS

The following controls and instruments are indexed to Figure 3-4.

### 3.3 PROPULSION CONTROL

#### **⚠ WARNING**

**Loss of machine control**

**Moving the propulsion control quickly may cause loss of machine control, lurching or serious injury.**

**Move the propulsion control slowly.**

The propulsion control lever (1, Figure 3-5) is used to select the compactor's direction and travel speed. It also controls service braking. The control has three (3) positions: Forward, STOP, and Reverse, with variable speed ranges in either direction

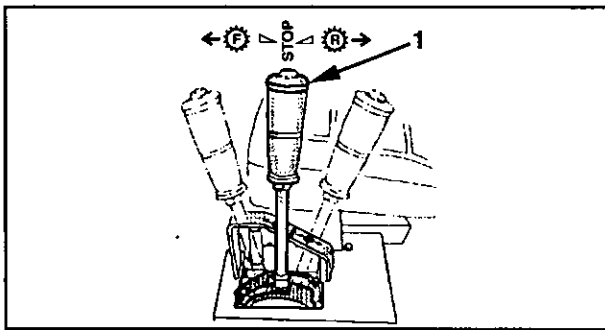


Figure 3-5 Propulsion Control Lever

To propel the machine in either direction, gradually move the propulsion control lever out of the STOP position in the desired direction of travel.

To stop travel of the compactor, gradually move the control toward the STOP position, arriving at the STOP position for a complete halt.

#### **NOTE:**

*Starting of the engine with the propulsion control in any other position other than STOP is not possible.*

### 3.4 ENGINE STARTING INDICATOR LIGHT - (GREEN)



The engine starting indicator light (2, Figure 3-4), illuminates when the propulsion control lever is in the STOP (Neutral) position. The engine can only be started when the green light is illuminated.

### 3.5 VIBRATION CONTROL SWITCH

The vibration ON/OFF control switch (3, Figure 3-6) turns drum vibration ON or OFF depending on switch position.

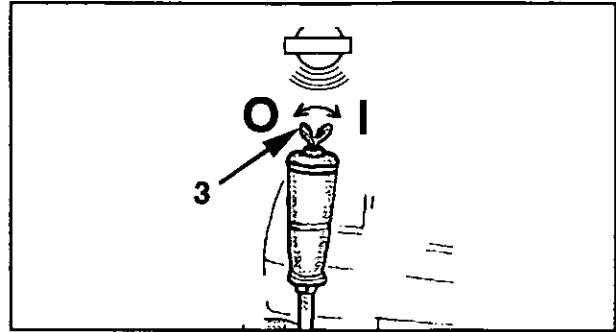
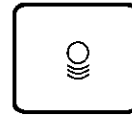


Figure 3-6 Vibration ON/OFF Switch

To engage vibration press the switch into position 'I'. To disengage vibration press the switch into position 'O'.

### 3.6 VIBRATION 'ON' INDICATOR LIGHT - (RED)



The vibration on indicator light (4, Figure 3-4), illuminates when the vibration switches on the vibration system.

### 3.7 WATER SPRINKLER CONTROL VALVE

The water control valve (5a, Figure 3-7) controls the flow of water to the drum sprinkler bars.

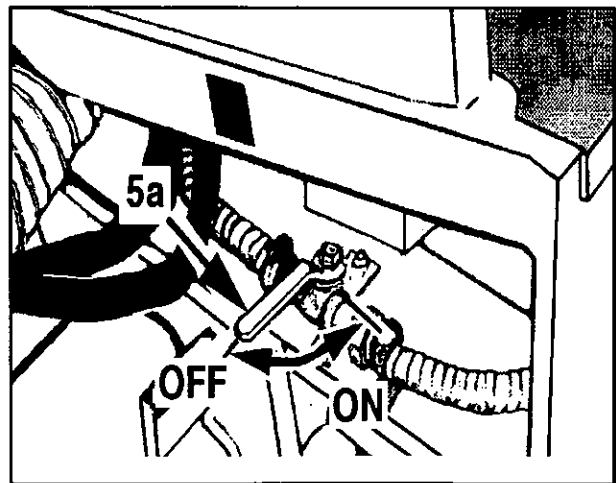



Figure 3-7 Water ON/OFF Control Valve

## SECTION 3 - OPERATING CONTROLS AND INSTRUMENTS

### 3.8 HORN AND DRIVING LIGHTS CONTROL SWITCH

The horn  is sounded by pressing in the combined horn and driving lights control switch (7, Figure 3-8).

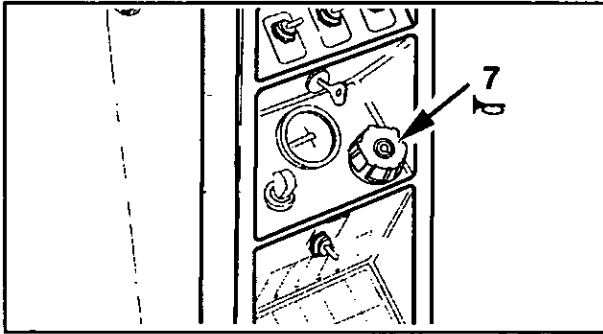


Figure 3-8 Horn Switch

The respective Parking and Driving Lights are selected by rotating this 4-position rotary switch into required position, refer Figure 3-9

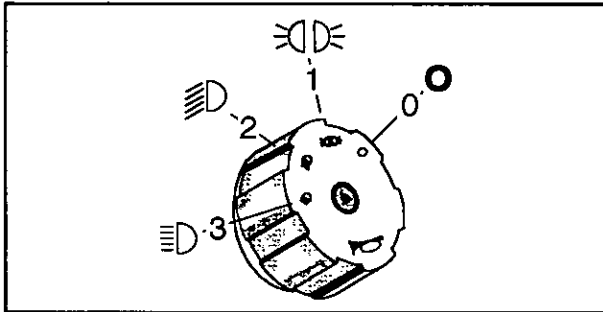
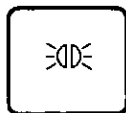


Figure 3-9 Lights Control Switch

- Position 0 = All lights OFF
- Position 1 = Parking lights ON
- Position 2 = Driving Headlights in Low Beam Position ON
- Position 3 = Driving Headlights in High Beam Position ON

### 3.9 PARKING AND DRIVING LIGHTS INDICATOR LIGHT - (GREEN)



The Driving lights indicator light (8, Figure 3-4), illuminates when the parking or low beam driving lights are ON.

### 3.10 HIGH BEAM INDICATOR LIGHT - (BLUE)



The high beam indicator light (9, Figure 3-4), illuminates when the High Beam is selected.

### 3.11 EMERGENCY STOP/PARKING BRAKE SWITCH

The red engine emergency stop/Parking Brake button switch (10 Figure 3-10) may be used to stop movement of the machine in the event of any emergency.

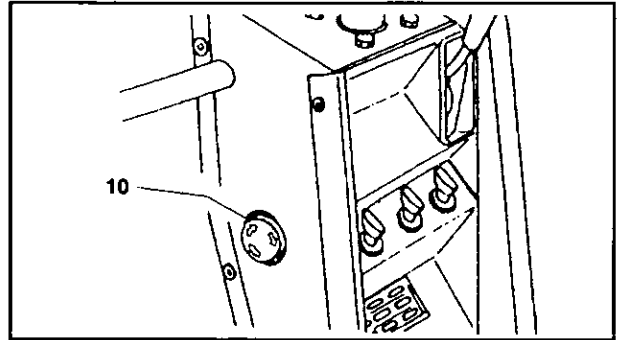


Figure 3-10 Emergency Stop

Before attempting to move the machine again, reset the switch by rotating the red knob until it pops out.

Pressing in this switch, (10, Figure 3-10), will result in automatic application of the disc brakes and bringing the machine to a smooth stop without stopping the engine..

### 3.12 PARKING BRAKE CONTROL

The parking brake is of the hydraulic released, spring applied fail safe, multi-disc type. The 10 BS has a brake on the rear drum.

The parking brake is automatically applied if:

- Operator is no longer seated when the relaxed seat switch will apply the brakes.
- The RED Emergency Stop Switch (10, Figure 3-10), is depressed
- The Ignition Switched is turned to the OFF position= O.
- The engine stops for some reason
- A brake hose leaks pressure.

### 3.14 BRAKE ON INDICATOR LIGHT - (RED)



The brake on indicator (11, Figure 3-4) illuminates when the parking brake is engaged. The parking brake must be released before the compactor can be moved.

## SECTION 3 - OPERATING CONTROLS AND INSTRUMENTS

### 3.14 ENGINE SPEED CONTROL

#### **⚠ WARNING**

Run away machine.

Do not attempt to control machine travel speed with the engine speed control.

Use propulsion control to control travel speed. Maintain engine speed at operating rpm for all machine operations.

The engine speed control (12, Figure 3-13), is used to govern engine speed (rpm).

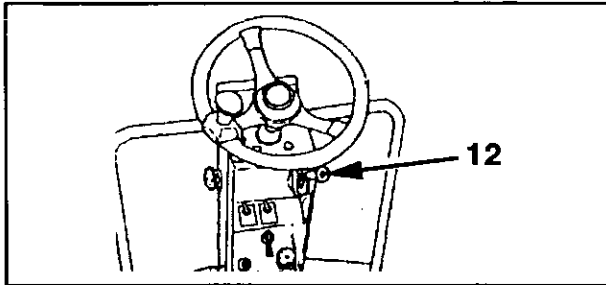


Figure 3-12 Engine Speed Control

Pull the control lever upward to decrease engine rpm. Push the lever downward to increase engine rpm.

#### **NOTE:**

Do not allow the engine to idle for more than 10 minutes

Always ensure engine speed is at Operating rpm to obtain the proper component operation and maximum vpm for greatest efficiency

### 3.15 STEERING WHEEL

The steering wheel (13, Figure 3-13) is used to change the direction of the machine during operation.

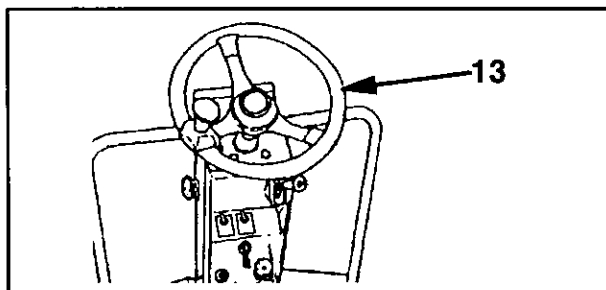


Figure 3-13 Steering Control

### 3.16 SEAT ADJUSTMENT

The operator's seat can be adjusted forward and backward by releasing the stop lever (A, Figure 3-14).

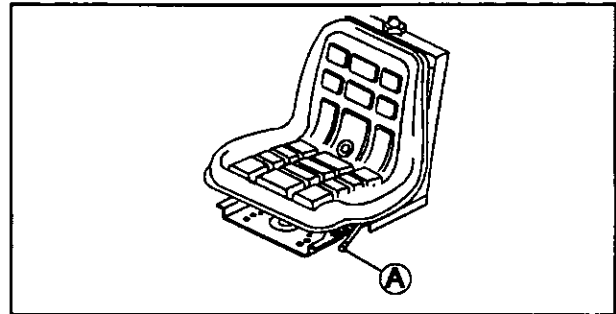


Figure 3-14 Seat Adjustment

When the required seat adjustment has been made, ensure the stop lever is fully engaged again.

### 3.17 DRUM OFFSET CONTROL SWITCH

The Drum offset control switch (14, Figure 3-15), a spring centering 3 position toggle switch controls the drum offset.

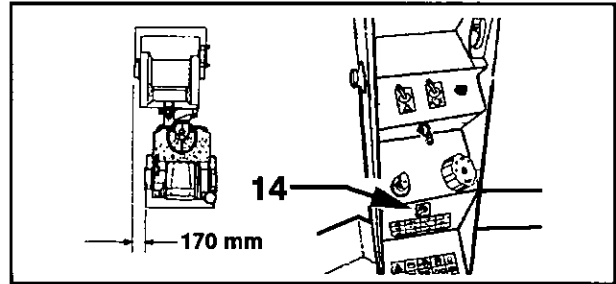


Figure 3-15 Drum Offset Control

- Pressing the switch to the left position, offsets the front drum up to 170 mm the left side of the rear drum path.
- Releasing the switch allows the offset to be hydraulically locked.
- Pressing the switch to the right position similarly offsets the front drum up to 170 mm the right side of the rear drum path.

### 3.18 IGNITION SWITCH

The key operated ignition switch (15, Figure 3-16), is a three position (OFF/ON/START) switch.

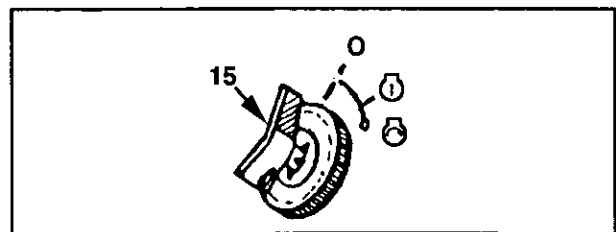


Figure 3-16 Ignition Switch

## SECTION 3 - OPERATING CONTROLS AND INSTRUMENTS

- Turning the key (clockwise), to position **I** energises the machines electrical system and permits check of the control console warning indicator lights.
- Turning the key fully to the right to position **O** will engage the starter motor and start the engine.
- Release the key as soon as the engine starts and the key will go to the ON = **I** position automatically.

If the engine does not start, turn the key to OFF=O position before attempting to start the engine again.

Turning the key to the OFF position **O**, de-energises the electrical system. The key may be removed in position **O**.

### NOTE:

The propulsion control lever must be in the "STOP" position (Figure 3-5) before the engine will start. The GREEN 'N = NEUTRAL' Warning Indicator Light (13, Figure 3-4) will illuminate only when the propulsion control lever is in the "STOP" position.

Always remove the ignition switch key when leaving the machine unattended to prevent unauthorised persons from starting or operating the machine.

### 3.19 FLASHING BEACON LIGHTS SWITCH

The flashing beacon light switch (16, Figure 3-17), a two position toggle switch:

Position 0 = Beacon light OFF  
Position I = Beacon light ON

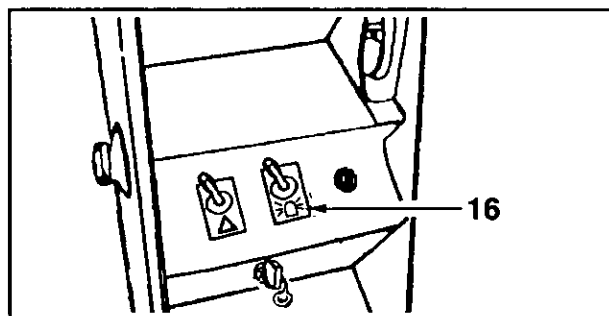


Figure 3-17 Flashing Beacon Light Switch

### 3.20 FLASHING BEACON INDICATOR LIGHT - (YELLOW)



The warning beacon indicator light (17, Figure 3-4), illuminates when the beacon light is switched ON.

### 3.21 DIRECTION TURNING LIGHTS SELECTOR SWITCH

The direction indicator light switch (18, Figure 3-18), a three position toggle switch:

Position "0" = Indicator lights OFF  
Position "L" = Left turn light ON  
Position "R" = Right turn light ON

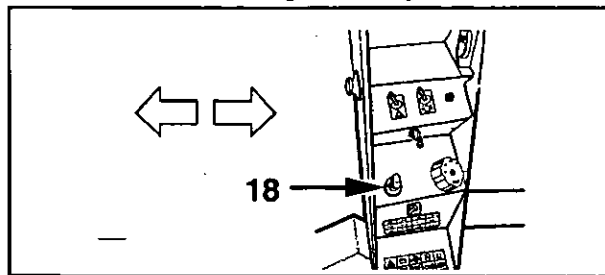
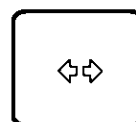


Figure 3-18 Direction Turning Indicator Lights Switch

### 3.22 DIRECTION TURNING LIGHT - (GREEN)



The Direction Turning Lights indicator light (19, Figure 3-4), illuminates when the lights are switch to either Right or Left turn ON position.

### 3.23 HAZARD LIGHTS INDICATOR LIGHT SWITCH

The Hazard Lights Switch (20, Figure 3-19), is used to warn of a hazardous situation, when all the direction lights will flash when the switch is moved to ON position.

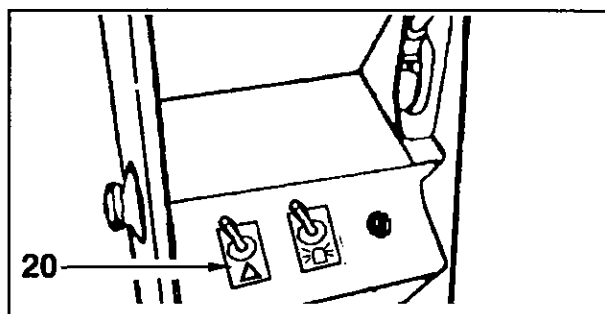


Figure 3-19 Hazard Lights Switch

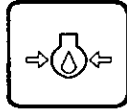
### 3.24 HAZARD LIGHTS INDICATOR LIGHT - (RED)




The hazard lights indicator (21, Figure 3-4), illuminates when the hazard warning light are switched on.

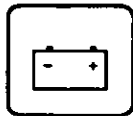
## SECTION 3 - OPERATING CONTROLS AND INSTRUMENTS


### 3.25 LOW ENGINE OIL PRESSURE INDICATOR LIGHT - (RED)



The low oil pressure indicator (23, Figure 3-4) will illuminate when engine oil pressure is too low for safe operation of the engine, or when ignition switch is turned to ON position  (Figure 3-16). If this indicator illuminates during machine operation, immediately shutdown engine and correct the problem before resuming operation.

### 3.26 ALTERNATOR DISCHARGE INDICATOR LIGHT - (RED)



The alternator discharge indicator (24, Figure 3-4) illuminates when alternator is not providing sufficient charge to the battery. The indicator should illuminate when ignition switch is turned to ON position  (Figure 3-16). The indicator light should go out soon after engine starts. If the indicator illuminates during operation, shut down the machine immediately and correct problem before continuing operation.

### 3.27 FUSE BOX

The replaceable fuses protecting the various circuits are located in the main fusebox (26, Figure 3-20).

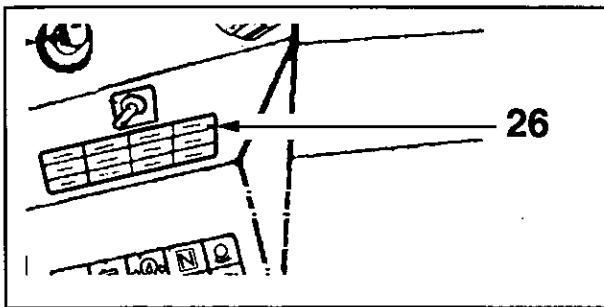


Figure 3-20 Fusebox

### 3.28 FUSE IDENTIFICATION

Each circuit fuse value can be read from the fusebox detail, Figure 3-21). It is important not to exceed the values illustrated.

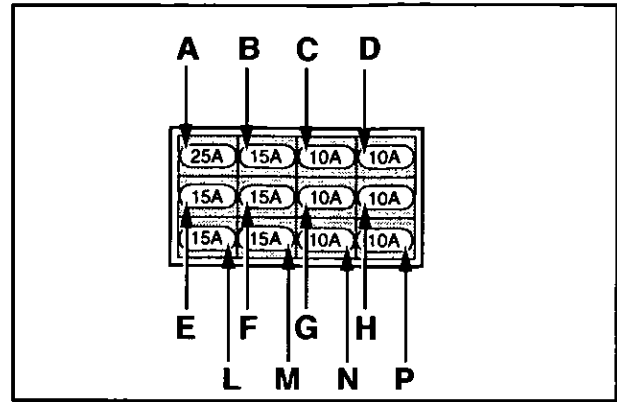


Figure 3-21 Fusebox Detail

The fuse box contains fuses to protect the following circuits:

- A = Not used
- B = Warning Horn
- C = Right side Driving Light
- D = Left side Driving Light
- E = Ignition Switch (Engine Start)
- F = Beacon Light
- G = Right side Low Beam Light
- H = Left side Low Beam Light
- L = Direction Turning Indicator Switch/Seat Switch/Vibration /Steering Flowdivider Valve/ /Parking Brake
- M = Vibration/Drum offset
- N = Parking lights: Front Left and Rear Right sides
- P = Parking lights: Front Left and Rear Right sides + Registration Plate Light

## SECTION 4 - OPERATING INSTRUCTIONS

Contents	Page	Contents	Page
<b>General Information (4.1)</b>	1	<b>Parking, Stopping And Shutting Down Machine (4.5)</b>	7
Operational Hints	1	Parking The Machine	7
<b>Pre-Start Checks/Verifications (4.2)</b>	1	Stopping The Machine	7
Checks/Verifications of Overall Machine	1	Shutting Down The Machine	7
Checks/Verifications of Machine Controls	2	<b>Daily Precautions After Work (4.6)</b>	7
<b>Starting Machine (4.3)</b>	4	<b>Mounting And Dismounting Of Attachments (4.7)</b>	7
Checks/Verifications While Engine Running	4	<b>Movement Of Machine Between Work Sites (4.8)</b>	8
<b>Operating The Machine (4.4)</b>	5	Loading Machine Under Own Power (Drive On)	8
Operating Suggestions and Checks	5	Loading Machine By Lifting Equipment	8
Moving The Machine (Propulsion Control)	6	Securing Machine To Transporter (Tie Down)	8
Using Vibration (Vibration Control)	6	<b>Towing The Machine</b>	9
Adjusting Drum Offset	6	<b>Special Conditions Of Use (4.10)</b>	9
		<b>Preservation And Storage (4.11)</b>	9

If you are not experienced with the machine's operation and control, before operating the machine, read Section 3 - Operating Controls and Instruments.

### **⚠ WARNING**

**Unexpected machine motion or moving parts can cut or crush.**

**Install the articulation lock bar/lock pin, apply the parking brake and shut down the engine before working on the machine.**

### **⚠ WARNING**

**Improper maintenance can cause severe injury or death.**

**Read and understand SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES before you perform any maintenance, service or repairs.**

#### **4.1 GENERAL INFORMATION**

The following operational hints should be observed:

- Do not speed engine when it is cold.
- Always chock the drums/wheels. There is a possibility of uncontrolled movement.
- Do not grease the machine while the engine is running.
- Always perform safety checks prior to starting/using the machine.


- Do not control travel speed using the engine speed control lever (throttle).
- Always operate the machine at full engine power when compacting or traveling the unit.
- Never stop the machine on a slope that is liable to collapse or cause a roll-over risk.
- Always secure the seat belt if one is provided. Note machine equipped with ROPS must utilize a seat belt.
- Before starting engine, always check that propulsion and vibration controls are in Off position and the parking brake is On.
- Always sound the horn before moving the machine in either direction to alert personnel, and to allow sufficient time before putting the machine into motion.
- Always use protective clothing such as gloves, goggles and safety helmet when performing service maintenance. Do not wear oil stained or damaged garments.

#### **4.2 PRE-START CHECKS/VERIFICATIONS**

**I. Checks and verifications of overall machine performed prior to starting. These are in addition to the 10 hour daily routine maintenance.**

1. Fuel tank and fuel lines for any leaks.
2. Condition of engine and machine.
3. Bolted assemblies for tightness.
4. Inspect entire machine for any loose, worn and missing parts. Replace as needed.

## SECTION 4 - OPERATING INSTRUCTIONS

5. Fluid lines, hoses, fittings, filler openings, drain plugs, pressure cap, drums, muffler, engine, safety shrouds and area underneath the machine for signs of leakage.
6. Check fuel tank (1, Figure 4-1) to determine fuel level. If required, add clean, filtered fuel through the fill area marked . Refer to Section 8 - Fuel and Lubricant Specifications.

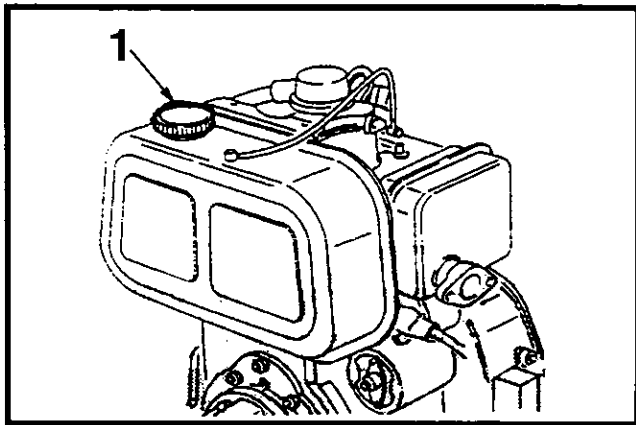


Figure 4-1 Fuel Filler

7. Check engine oil level on dipstick ('A', Figure 4-2). If required, add motor oil through filler ('B', Figure 4-2) to bring to Full level on dipstick. Refer to Section 8 - Fuel and Lubricant Specifications. If no oil is showing on the dipstick, call for service assistance to investigate the cause of oil loss.

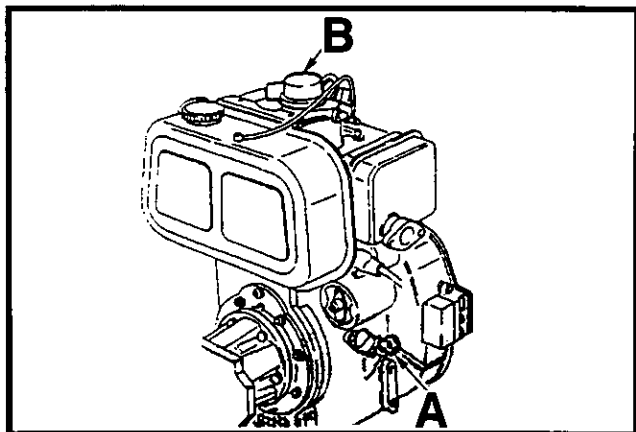



Figure 4-2 Engine Oil Dipstick and Filler

8. Check hydraulic oil tank for oil level using the dipstick ('B', Figure 4-3). The oil level should be between the MAX. and MIN. marks. If necessary, add fresh, clean, anti-wear hydraulic oil through the oil filler tube  ('C', Figure 4-3). Refer to Section 8 - Fuel and Lubricant Specifications.
9. Check water tank and the in-line filter, fill and clean as required..

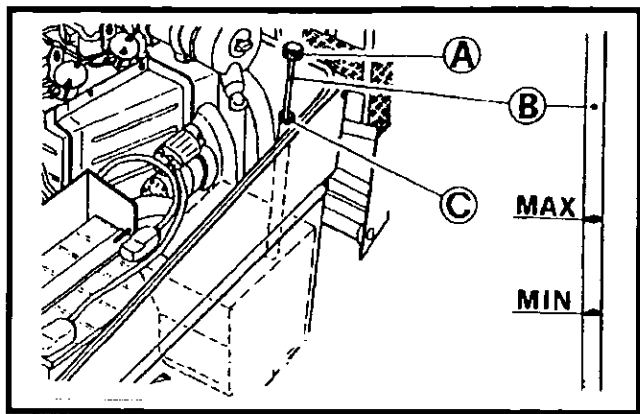


Figure 4-3 Hydraulic Oil Dipstick

### **CAUTION**

Any machine defects should be reported to the proper personnel.

Defects must be corrected before operating the machine.

## II. Checks and verifications of machine controls performed prior to operating the machine.

1. Mount the compactor maintaining a three-point contact.
2. Adjust the seat to a comfortable position ('A', Figure 4-4).

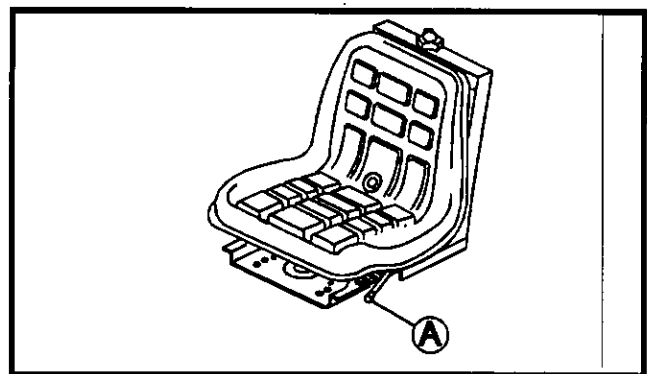


Figure 4-4 Seat Adjustment

### NOTE:

The seat contains a switch that will only allow machine to start provided a seated operator is at the controls. In the event of the operator standing up, the seat switch will automatically bring the machine to a halt by applying the brakes.

3. If machine has a ROPS, then securely fasten seat belt provided.



## SECTION 4 - OPERATING INSTRUCTIONS

4. Position propulsion control lever to the **STOP** position (1, Figure 4-5).

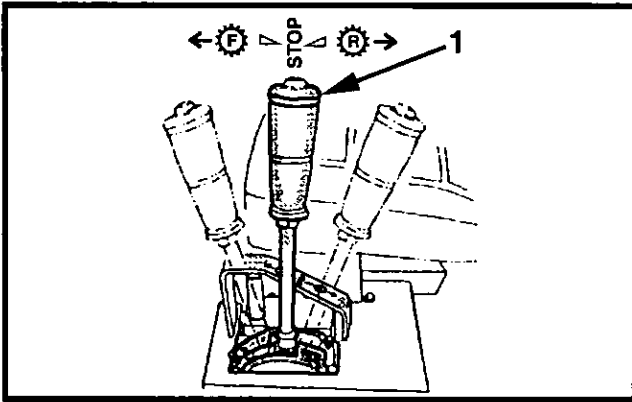


Figure 4-5 Propulsion Lever STOP Position

5. Position engine speed control lever to Low **IDLE** position (12, Figure 4-6).
6. Apply the Emergency /Parking Brake (P), by pressing in the **RED** Button Switch (10, Figure 4-6).

To release the parking brake, rotate the switch when the switch will pop out and provided the engine is running, the parking brake will be released.

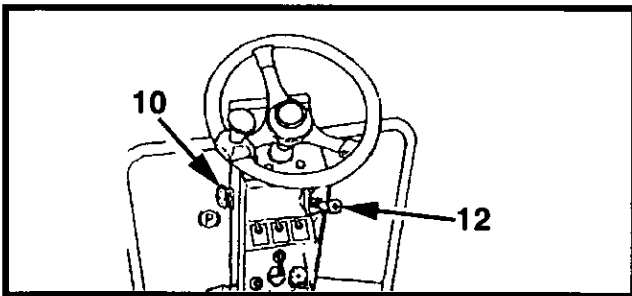


Figure 4-6 Engine Speed Control and Parking Brake Switch

### NOTE:

The red brake on indicator, (4, Figure 4-7), will illuminate when the brake is applied.

7. Turn ignition switch key (15, Figure 4-8) to **I** position, and verify that the following **RED** indicator lights (Figure 4-7) are all illuminated.
  - (1). Vibration ON Indicator (4)
  - (2). Brake on indicator (11) **(P)**
  - (3). Hazard Lights Indicator (21)
  - (4). Low oil pressure indicator (23)
  - (5). Alternator discharge indicator (24)

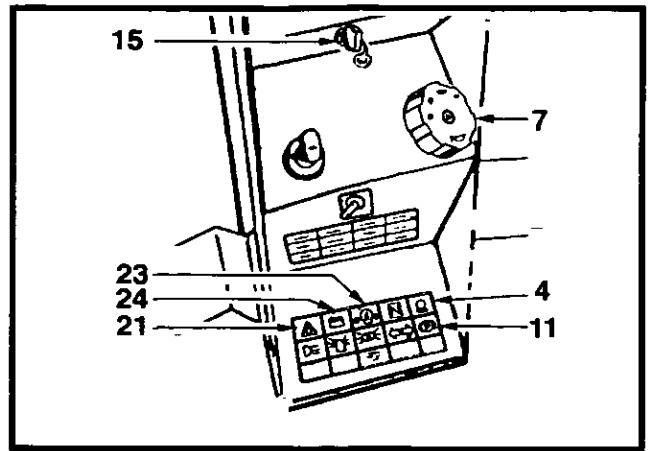


Figure 4-7 Indicator Lights

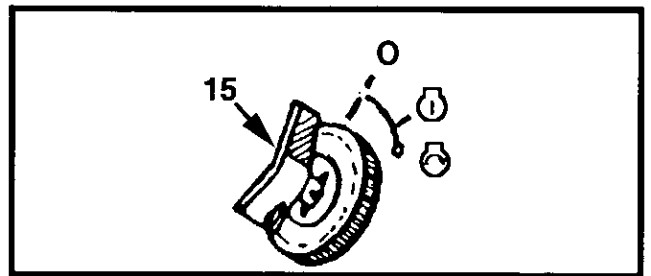


Figure 4-8 Ignition Switch

8. Press to check the operation of the horn button (7, Figure 4-9) to verify that horn does operate.

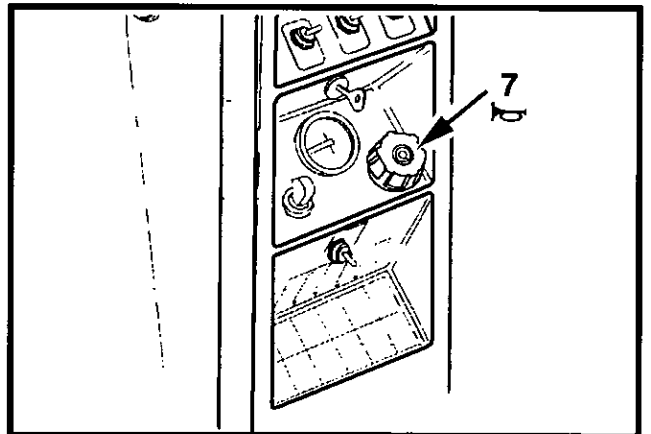


Figure 4-9 Horn Switch

9. To confirm that the engine will only start with propulsion control lever (1, Figure 4-5) in the **STOP** position, move lever from the **STOP** position in any direction.
10. With parking brake applied, turn ignition switch key to position (Figure 4-10).
  - (1). The engine starter motor should **NOT** engage, confirming the engine will only start with propulsion control in **STOP** position.

## SECTION 4 - OPERATING INSTRUCTIONS

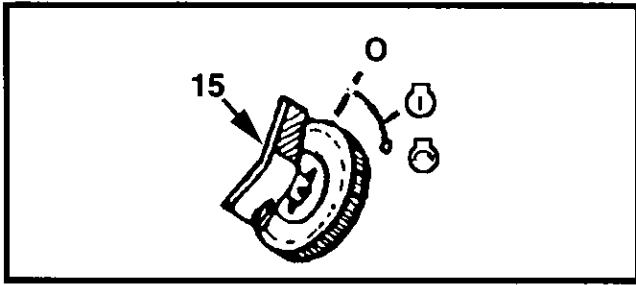


Figure 4-10 Ignition Switch

11. Return ignition switch key to position **O** (Figure 4-10).
12. Return propulsion control lever to **STOP** position (1, Figure 4-11).

### 4.3 STARTING MACHINE AND OTHER CHECKS/VERIFICATIONS

#### I. Starting Procedure and checks and verifications while engine running.

**NOTE:**

*If any controls or devices do not function correctly, refer to Section 6 - Troubleshooting for further instructions.*

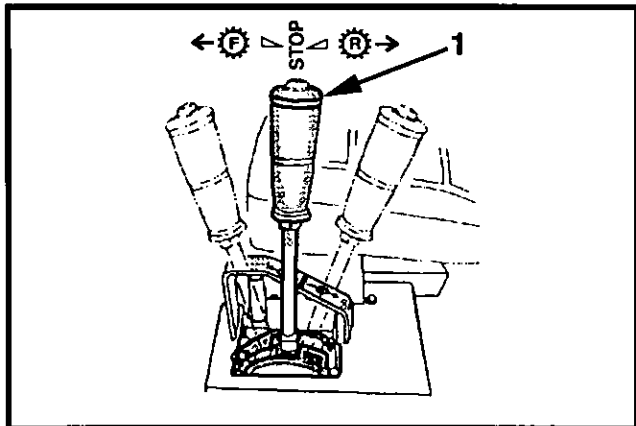


Figure 4-11 Propulsion Control Lever STOP Position

1. Position propulsion control lever (1, Figure 4-11) to the **STOP** position.
2. Position the engine speed control lever 12 to Low IDLE position 'A', (Figure 4-13).

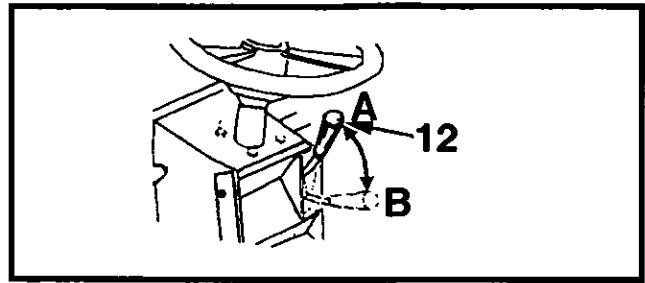


Figure 4-12 Engine Speed Control - Low Idle

3. Ensure the Parking Brake is **ON**. The **RED** Brake Light (11, Figure 4-7), will illuminate to advise the Parking Brake is applied. If not applied press in the Parking Brake Switch (10, Figure 4-13).

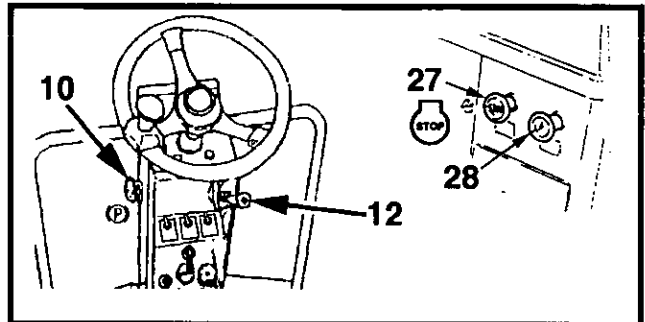


Figure 4-13 Emergency Stop/Parking Brake

- Alternative Emergency Stop can be effected by pulling the Engine Stop Knob (27, Figure 4-13)
4. The engine starting procedure depends on the engine temperature.
  5. When normally starting a cold engine, use the excess fuel control by pulling out the control knob (28, Figure 4-13), located on the right face of the engine canopy, Start engine by turning ignition switch key to **O** position (Figure 4-10). Once engine starts, release switch immediately, and it will return to **I** position (Figure 4-10).

### NOTICE

Starter may overheat if operated longer than 30 seconds.

If the engine fails to start, allow the starter to cool 2 to 3 minutes before trying again.

**NOTE:**

*Once engine is running, with ignition switch in On position **I**, the red indicator lights should only illuminate to indicate a warning of a fault. If any light does illuminate, contact appropriate personnel.*

**NOTE:**

Run engine for short time to warm up the engine and hydraulic systems, but do not run engine at idling speed in excess of 10 minutes. Do not operate the unit until the engine/hydraulic systems have warmed up. Failure to follow this requirement could result in premature failure of engine and hydraulic hardware.

6. Check for correct operation of steering system with engine running by turning steering wheel fully to left and then to right. The movement of the steering should be smooth and without hesitation. If not, notify appropriate personnel.
7. Check wear conditions on the steering cylinder mounting pins and bushings (A, B, Figure 4-14). Any wear in the pins and bushings should be noted and proper personnel notified.

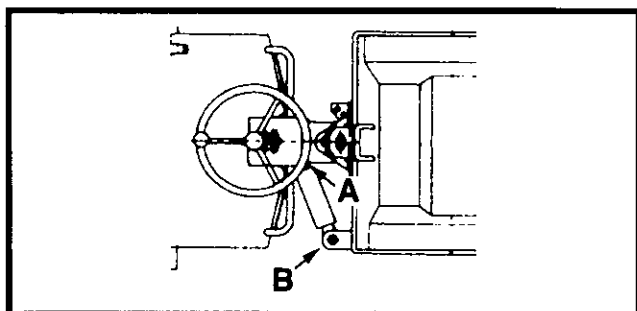



Figure 4-14 Steering Cylinder Pins and Bushings

8. Release parking brake control\* (10, Figure 4-13). Observe area around machine for personnel/obstructions..
9. Check for correct operation of the hydrstatic brake systems by driving machine in forward and reverse directions using propulsion control to alternately accelerate and brake machine movement. If braking system is suspect, contact appropriate personnel.

**NOTE:**

Braking should be smooth and capable of bringing machine to a complete stop when propulsion control is in STOP position.

10. Apply parking brake control when the parking brake light (4, Figure 4-7), should illuminate. Release the parking brake when the parking brake light should extinguish.
11. Check for correct operation of the emergency stop while propulsion control is in the STOP position, and pull the red emergency stop knob  (27, Figure 4-13).

**NOTE:**

The engine should immediately shut down and the parking brake light should illuminate, indicating the brakes are applied.

**NOTE:**

A restart of the machine will be required after performing step 11 above. Also, the emergency stop button must be reset by rotating the knob and releasing.

### 4.4 OPERATING THE MACHINE

#### I. Operating suggestions and checks while operating machine.

1. Always sound horn before moving the machine in either direction to alert persons. Allow sufficient time before putting the machine into motion.
2. Monitor all instruments and warning lights. If instruments or lights indicate a fault or problem, contact appropriate personnel.
3. Monitor and ensure horn and back-up alarm function and that optional working lights give good illumination of the working area.
4. Monitor working area for obstacles and persons.
5. Always remove the ignition switch key and check that the parking brake is applied when leaving the operator station.
6. Always move the steering wheel slowly and monitor the steering action.

#### II. Moving The Machine (Propulsion Control)

1. Check travel and work areas for personnel and obstructions.
2. Relocate the articulation lock bar in its stowed position, Refer Figure 3-2.
3. Position engine speed control to MAXIMUM OPERATING position 'B' (Figure 4-12).

**NOTE:**

Never use engine speed control to control the speed of travel.

**ALWAYS OPERATE WITH ENGINE AT FULL POWER WHEN COMPACTING.** Running at lower engine speed may result in premature shockmount failure.

(Continued)

## Moving The Machine (Propulsion Control) -Continued.

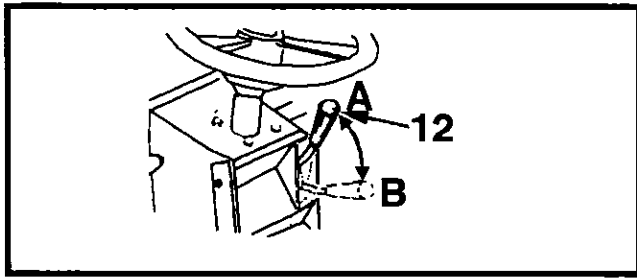


Figure 4-15 Engine Speed Control - B = HIGH IDLE

4. Release parking brake control.
5. Slowly move propulsion control (1, Figure 4-16) to achieve desired direction and safe speed of travel as determined by the conditions. The further the control is moved from STOP position the greater the speed in that direction.

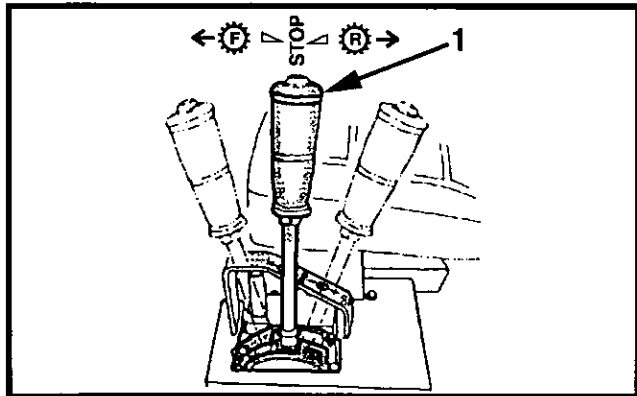


Figure 4-16 Propulsion Control Lever

## III. Using Vibration (Vibration Control)

Ensure engine is running at high idle before using vibration.


### NOTE:

*Only switch on vibration when machine is moving. Always switch off vibration before machine comes to a halt. Never allow machine to vibrate when machine is stationary.*

The following controls on the machine control drum vibration:

1. Vibration ON/OFF control ( 3, Figure 4-17).

Press toggle switch to  = drum vibration ON.

Press toggle switch to  = drum vibration OFF.

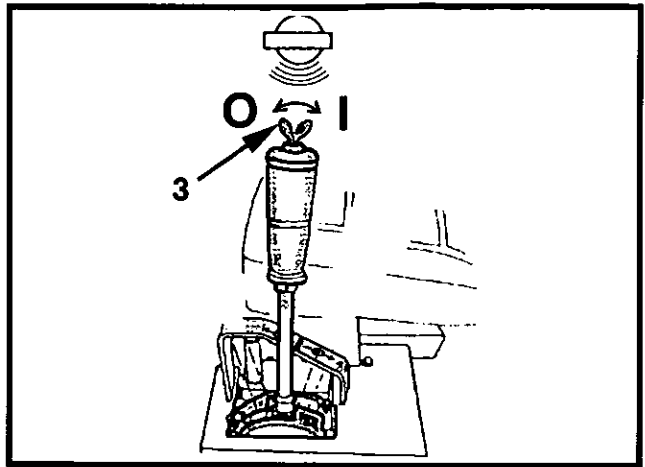


Figure 4-17 Vibration ON/OFF Control Switch

## IV. Adjusting Drum Offset.

The machine is provided with drum offset which permits the operator to offset the front drum by upto 170 mm to either the left or right relative to the rear drum position.

1. To adjust the drum offset, it is recommended to move the machine slowly while operating the Offset control switch (14, Figure 4-18).

- Press the switch 'Left' will offset the Front drum to the left of the rear drum.
- Press the switch 'Right' will offset the Front drum to the right of the rear drum.
- Release the switch when the desired offset has been achieved. The switch will automatically center to maintain the required position.

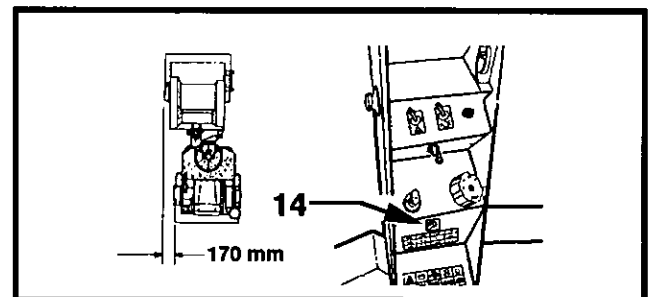


Figure 4-18 Drum Offset Adjustment Control Switch

2. To adjusting the drum offset offers the following advantages:
  - Possible to work closer to obstacles, while maintaining productivity.
  - Offers increased rolling width.
  - Possible to work nearer to edge of embankments while keeping the rear part far away from the slope edge.

### 4.5 PARKING, STOPPING AND SHUTTING DOWN THE MACHINE

#### I. Parking the machine

1. To park the machine, move to firm, level ground. If circumstances require parking the machine on other than level ground, chock the drums.

#### II. Stopping the machine

**To stop the machine upon reaching destination, use the following procedure.**

1. Switch OFF vibration control switch (3, Figure 4-18).
2. For normal stopping, move propulsion control lever slowly to the STOP position (Figure 4-17).
3. To ensure no machine movement after stopping, apply the parking brake switch (P), (10, Figure 4-19).

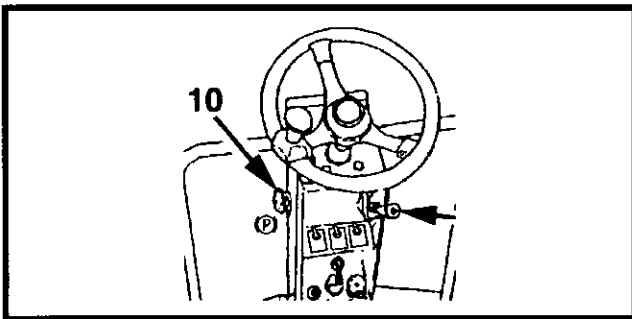


Figure 4-19 Parking Brake Switch

#### III. Shutting down the machine

1. If ON, stop the water flow by turning the water control Valve to OFF position (5a, Figure 4-20).

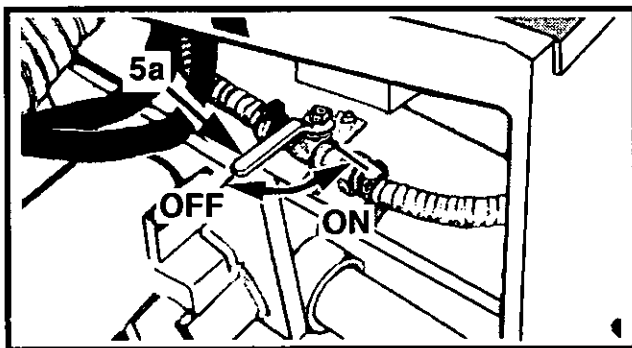


Figure 4-20 Water Control Valve

2. Position the articulation locking bar (Figure 4-21) into the locked position 'C' and insert locking pin 'A'.

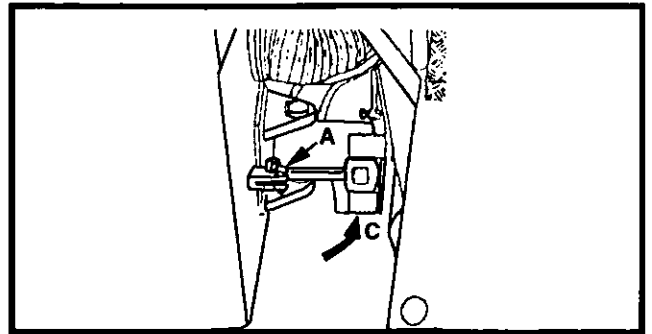


Figure 4-21 Articulation Locking Bar - Locked Position

3. Allow machine to idle for a few minutes before turning ignition switch key (15, Figure 4-22) to **O** position. Remove ignition key.

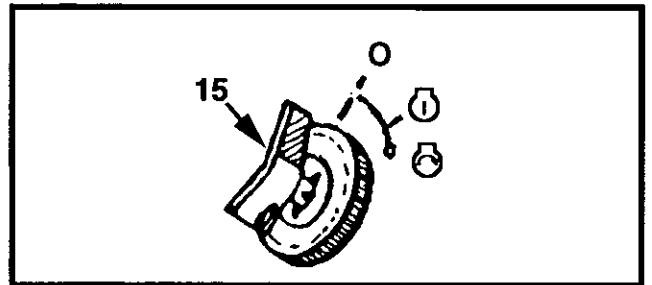


Figure 4-22 Ignition Switch

### 4.6 DAILY PRECAUTIONS AFTER WORK

Perform the following precautions each day after work in addition to the daily routine maintenance on the lubrication chart.

- Fill fuel tank to prevent condensation problems.
- Clean drum scrapers of accumulated material.
- Lock all vandal protection devices on the machine.

### 4.7 MOUNTING AND DISMOUNTING OF ATTACHMENTS

#### NOTE:

*All optional equipment mounting and dismounting on this machine must be only undertaken by trained service personnel.*

## SECTION 4 - OPERATING INSTRUCTIONS

### 4.8 MOVEMENT OF MACHINE BETWEEN WORK SITES

Before driving machine on public roads, check with your supervisor for instructions and information in respect to traffic regulations regarding construction machinery.



**NOTE:**

For more information on transporting, refer to Section 1 - Safety Precautions and Guidelines.

#### I. Loading the machine under its own power (drive on) for transporting.

1. Choose level ground which will solidly support the vehicle.
2. Clean the trailer surface and loading ramps.
3. Before loading machine, chock the wheels of the trailer.
4. A signalman must assist the operator with any necessary warnings.
5. Approach the transporter loading ramps squarely to make sure machine does not drop off side of ramp.
6. Drive machine onto transporter.
7. Shut engine off, apply parking brake and lock all lockable compartments.

#### II. Loading the machine by lifting the equipment for transporting.

1. Always use special single lift point indicated by symbol  and proper appropriate lifting tackle. Refer to weight distribution in Section 7 - Technical Specifications. The total weight is indicated on the machine identification plate located on the machine.
2. Insert the articulation lock bar/pin into the locked position..
3. Connect appropriate lifting tackle to the speical lift point marked with the symbol , (Figure 4-23).
4. Ensure appropriate lifting equipment is rated to the machine before lifting.

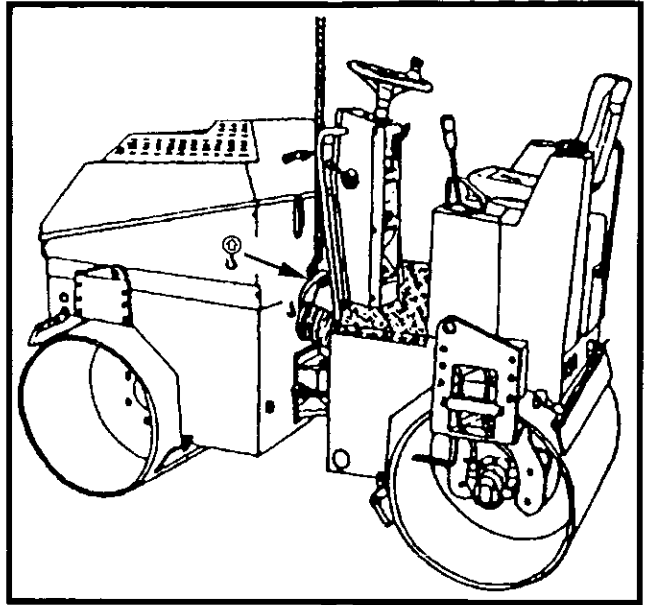



Figure 4-23 Recommended Lift Point

#### III. Securing the machine to the transporter (Tie down).

1. After loading the machine to the transporter, install the articulation lock bar/pin to the locked position.
2. Shut down the engine and remove the ignition switch key.
3. Chock the drums.
4. Attach tie down chains or other appropriate equipment to tie down points marked with symbol , refer Figure 4-24.

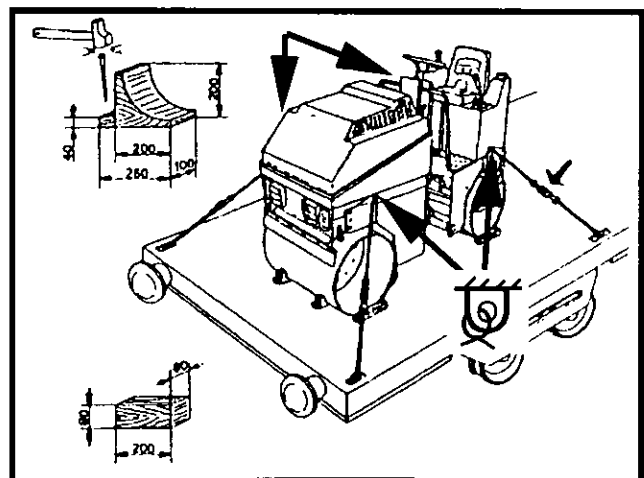


Figure 4-24 Tie Down Points

5. The driver of the transport must be aware of its total weight, load on the axles, and the overall dimensions of the machine. For dimensions, refer to Section 7 -Technical Specifications.

### 4.9 TOWING THE MACHINE

Do not attempt to tow this machine in the event of an onsite mechanical problem. There is no provision for releasing the brakes and by-pass of the propulsion system.

In the event of a breakdown requiring removal from the site, please follow instructions for hoisting onto a trailer as outlined in paragraph 4.8 item II.

#### NOTE:

*For more information on transporting, refer to Section 1 - Safety Precautions and Guidelines.*

### 4.10 SPECIAL CONDITIONS OF USE

#### I. Precautions to be taken for various conditions.

##### 1. Precautions to be taken during cold weather.

- Refer to lubrication instructions in Section 8 - Fuel and Lubricant Specifications regarding lubricants, hydraulic fluids, coolants etc.
- At temperatures below -20 degrees C (-4 degrees F), lubricate the engine flywheel ring gear with low temperature grease from time to time through pinion hole.
- Use winter-grade diesel fuel for operation at sub-zero temperatures.
- Be extremely careful when using cold starting aids. Starting aids are very flammable and should only be used if needed.
- Remove battery and store battery in a warm area to about +20 degrees C (+68 degrees F).

##### 2. Precautions to be taken during hot weather.

- Monitor temperature gauges.
- Keep cooling fins on radiator and oil cooler clean and free of accumulated dirt.

##### 3. Precautions to be taken for use in water and muddy conditions.

- Clean machine of accumulated material and thoroughly grease all grease points. Refer to Lubrication Chart on machine.

##### 4. Precautions to be taken for use in dusty atmospheres.

- Keep air cleaner elements clean and free of accumulation dirt.

- Wear protective mask.

##### 5. Precautions to be taken for high altitude operation.

- Be aware that engine power will be reduced.
- Keep cooling fins on radiator and oil cooler clean and free of accumulated dirt.

### 4.11 PRESERVATION AND STORAGE

#### I. Storage for short periods.

The following should be observed when storing the machine for short periods of time.

1. Replace and secure all weatherproof covers.
2. Change all lubricants and fluids that may have deterioration with use. Refer to lubrication chart in Section 8 - Fuel and Lubricant Specifications.
3. Check that storage site is not subject to flooding or other natural hazards.
4. Wherever practical, run engine and operate all machine motions at regular intervals.

#### II. Storage in excess of 1 month.

The following should be observed to protect the engine from corrosion and damage.

1. Drain the oil from the engine sump and refill it with a specific oil, e.g. RIMUL X 10W (SHELL). Refer to lubrication chart in Section 8 - Fuel and Lubricant Specifications
2. Allow engine to run for 15 min. at 500 - 800 rpm; stop the engine and drain the oil
3. Drain the oil from the in-line injection pump.
4. Fill the engine sump with Protection oil up to the level "MIN" marked on the dipstick. Use oil according to the specifications ENSIS N SHELL.
5. Fill the in-line injection pump with protection oil.
6. After emptying the fuel filters, disconnect pipe from injection system supply and connect it to an appropriate container filled with oil to specification S9365 SHELL ISO 4113.
7. Allow engine to run for 15 min. at 500 - 800 rpm; then using a syringe, slowly (1 min.) inject, 120 gm. of protection oil into the air inlet manifold.

## SECTION 4 - OPERATING INSTRUCTIONS

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8. With hot engine, drain the protection oil from the engine sump and store for re-use (2-3 times), in clean sealed containers.
9. Disconnect the pipe from injection system container filled with CFB oil and reconnect to the fuel tank.
10. Seal, using adhesive tape, all ports of access, induction and breather on the engine and exhaust manifold.
11. Attach to the engine a clearly visible card marked "ENGINE WITHOUT OIL"
12. Disconnect battery and store in a dry location, keeping the battery always in a charged condition.

**IMPORTANT - This treatment must be repeated every 6 months.**



## SECTION 5 - MAINTENANCE INSTRUCTIONS

Contents	Page	Contents	Page
<b>General Maintenance Information (5.1)</b>	<b>1</b>	<b>100 Hour Routine Maintenance (5.7)</b>	<b>8</b>
Observe Instructions	1	Check/Clean Engine Oil Filler Breather	8
Handling Fluids And Oil/Fuel Filters	1	Check/Clean Engine Oil Bath Filter	8
<b>Maintenance Schedule (5.2)</b>	<b>2</b>	Check Battery	9
<b>Initial Break-In Maintenance (5.3)</b>	<b>3</b>	Check Hydraulic Oil Level	9
<b>Routine Maintenance - As Required (5.4)</b>	<b>3</b>	Check Eccentric Oil Level	10
Checking Air Cleaner Connections And Ducts	3	<b>200 Hour Routine Maintenance (5.8)</b>	<b>10</b>
Cleaning The Machine	3	Change Engine Oil	10
Torque Loose Bolted Connections	3	Change Hydraulic Oil Filter	11
Check All Shock Mounts	4	Clean Hydraulic Oil Return Filter	11
<b>10 Hour Or Daily Routine Maintenance (5.5)</b>	<b>4</b>	<b>500 Hour Routine Maintenance (5.9)</b>	<b>12</b>
Check Engine Oil Level	4	Clean/Change Engine Fuel Filter	12
Checking And Cleaning Air Cleaner	4	Check Engine Exhaust Manifold	12
Check Fuel Level	6	Check Hydraulic Systems Hosing	12
Check Water Tank Level	6	Change Hydraulic Oil, Clean Hydraulic Tank	12
Check Water Drum Sprinkler Bars	7	<b>1000 Hour Or Annual Routine Maintenance (5.10)</b>	<b>13</b>
Check Parking Brake	7	Change Eccentric Housing Oil	13
Check Condition Of Drums And Scrapers	7	Check Engine Valve Clearance	14
<b>50 Hour Or Weekly Routine Maintenance (5.6)</b>	<b>7</b>	Drain And Clean Water Tank And Sprinkler Bars	14
Check And Clean Engine Cooling Fins	7		
Grease Drum Offset Guides	8		

### **⚠ WARNING**

Unexpected machine motion or moving parts can cut or crush.

Install the articulation lock bar/pin, apply the parking brake and shut down the engine before working on the machine.

### **⚠ WARNING**

Improper maintenance can be hazardous.

Read and understand SECTION 1 - SAFETY PRECAUTIONS AND GUIDELINES before you perform any maintenance, service or repairs.

#### **5.1 GENERAL MAINTENANCE INFORMATION**

To prevent minor irregularities from developing into serious conditions, several other services or checks are recommended for the same intervals as the periodic lubrication. The purpose of these services or checks are to ensure the uninterrupted and safe operation of the unit by revealing the need for adjustment caused by normal wear.

##### **I. Prior to conducting any maintenance work, ensure that the following instructions are observed:**

1. The machine should be parked on firm level ground.
2. Ensure engine is shut down and allowed to cool.

3. Disconnect battery and cover exposed terminals before working on the machine's electrical system.
4. Stop engine and allow hydraulic oil pressures to fall before working on the hydraulic hose installations.
5. Thoroughly wash all fittings, caps, plugs, etc. with non-flammable, non-toxic cleaning solution before servicing, to prevent dirt from entering while performing the service.

##### **II. Handling fluids and oil/fuel filters**

1. When draining fluids, ensure that adequate sealable containers are available and that every care is taken to prevent spillage.
2. Always ensure waste fluids are disposed of in an environmentally safe manner.
3. Always ensure that used filters are stored in secure containers and disposed of in an environmentally safe manner.

The maintenance chart in this section shows those items requiring regular service and the interval at which they should be performed. A regular service program should be geared to the items listed under each interval. These intervals are based on average operating conditions. In the event of extremely severe, dusty or wet operating condition, more frequent maintenance than specified may be necessary.

## SECTION 5 - MAINTENANCE INSTRUCTIONS

### 5.2 MAINTENANCE SCHEDULE

# MAINTENANCE SCHEDULE

Function	Specification	As Req.	10 Hour	50 Hour	100 Hour	200 Hour	500 Hour	1000 Hour	Page Ref.
Check air cleaner connections and ducts for leaks	refer to section 10	X							5-3
Clean the machine		X							5-3
Torque up any loose bolted connections		X							5-3
Check/replace shock mounts torn or severely cracked		X							5-4
Check engine oil level	dipstick marks		X						5-4
Check Engine Air Cleaner Oil Bath Filter	clean, check oil level		X						5-4
Check fuel level	level gauge		X						5-6
Check water tank level	fill		X						5-6
Check sprinkler bars	test		X						5-7
Check parking brake	test		X						5-7
Check condition of drums and drum scraper bars	clean		X						5-7
Check/clean cooling fins of cylinders and oil cooler	refer engine manual			X					5-7
Grease drum offset guides	high pressure grease			X					5-8
Check/clean Engine Oil Filler Breather	refer engine manual				X				5-8
Check/clean Engine Air Cleaner Oil Bath Filter	refer engine manual				X				5-8
Check batteries and cables, clean and grease terminals	clean and grease				X				5-9
Check hydraulic oil level	dipstick marks				X				5-9
Check eccentric oil level	level to bottom port				X				5-10
Change engine oil	refer to section 8					X			5-10
Change hydraulic filter	refer engine manual					X			5-11
Hydraulic Return Filter	Clean					X			5-11
Clean / Change engine fuel filters	refer engine manual						X		5-12
Check engine exhaust manifold	refer engine manual						X		5-12
Check hosing and components of the hydraulic system	refer parts manual						X		5-12
Change hydraulic oil/clean hydraulic oil tank/strainer	refer to section 8						X		5-12
Change eccentric housing oil	refer to section 8							X	5-13
Check engine valve clearance	refer engine manual							X	5-14
Drain and flush water tank/sprinkler bars	fill tank							X	5-14

## SECTION 5 - MAINTENANCE INSTRUCTIONS

### 5.3 INITIAL BREAK-IN MAINTENANCE

New equipment requires the following initial one time break-in maintenance after 50 to 100 hours of operation. After this initial phase, the regular intervals listed in the maintenance schedule, on the previous page, should be followed.

#### I. The following maintenance must be carried out after 50 - 100 hours:

1. Change the engine oil , refer to page 5-10, for procedure.
2. Change the oil in the eccentrics, refer to page 5-12, for procedure.
3. Clean the engine fuel filter, refer to page 5-11, for procedure.
5. Check the engine valve clearance, refer to engine operation manual for information.

### 5.4 ROUTINE MAINTENANCE - AS REQUIRED

#### I. Check Air Cleaner Connections And Ducts For Leaks

1. Ensure the connection (1, Figure 5-1) between the air cleaner and engine inlet manifold are tight and sealed.
2. Ensure the air duct gasket, (3, Figure 5-1) is free of defects which could result in dust leaking into the engine intake.

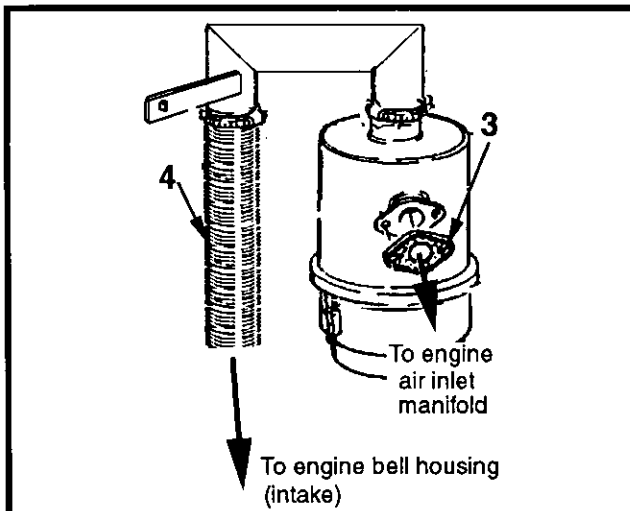


Figure 5-1 Air Cleaner - Engine Inlet Manifold Gasket

3. Ensure the flexible air duct , (4, Figure 5-1) is free of defects and is secure in the engine bell housing.

### II. Cleaning The Machine

#### NOTICE

**Do not use harsh or abrasive cleaners that can damage the painted surfaces on the machine.**

The complete machine must be given a weekly cleaning. Daily cleaning will be required if material is adhering to the drums.

1. Check that no material is jammed between the drum and its scraper.
2. Lubricate the drum offset guides after each washdown, Refer Figure 5-18.
3. After cleaning, check for defects in the air cleaner ducts.
  - Check intake for accumulation of debris that could restrict air flow.
  - Check air cleaner mounting hardware for security.
  - Check all hoses for cracks, chafing, or deterioration, and replace at the first sign of probable failure.

#### NOTE:

*Protect all electric components and control panels against entry of water or steam when using high pressure cleaning methods. Cover the fuel and hydraulic oil fill cap breathers located on each of the tanks.*

### IV. Torque Any Loose Bolted Connections

1. If any loose nuts or bolts are found during daily inspections, ensure they are properly torqued. Refer to Section 9 - Torque Specifications for required torque against bolts size and grade.
2. Always replace self locking nuts if they have been loosened.

## SECTION 5 - MAINTENANCE INSTRUCTIONS

### V. Check All Shock Mounts

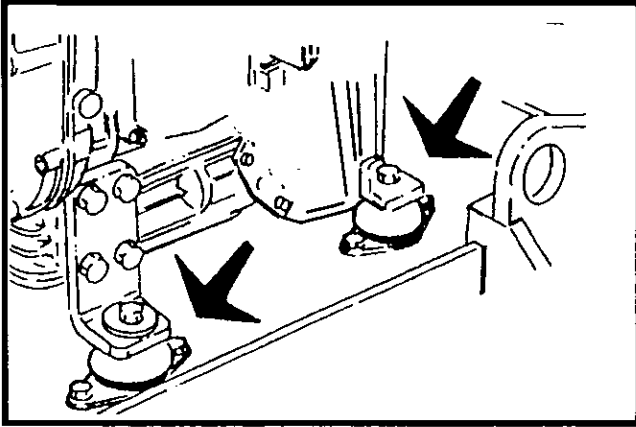


Figure 5-2 Engine Shock Mounts

1. Check all engine shock mounts ( Figure 5-2) and drum shock mounts (Figure 5-3), periodically for looseness or deterioration.
2. Tighten all capscrews and nuts as necessary, and replace shock mounts that have torn or excessively cracked rubber.
3. Always replace self locking nuts if they are loosened.

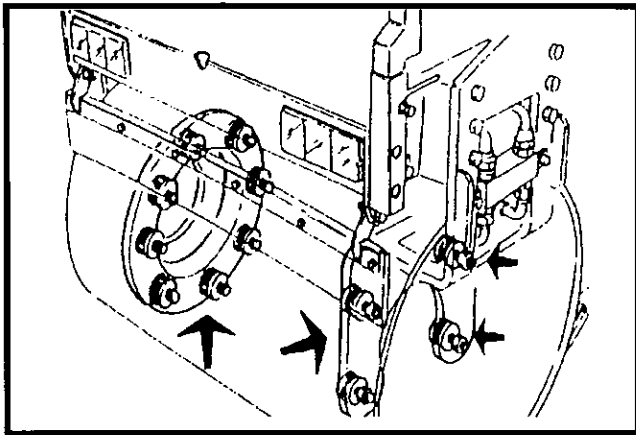


Figure 5-3 Drum Shock Mounts

### 5.5 10 HOUR OR DAILY ROUTINE MAINTENANCE

#### I. Check Engine Oil Level

1. Park machine on level ground and shut down engine.
2. Pull out dipstick (A, Figure 5-4) and wipe clean with a lint-free, dry cloth. Push dipstick back into engine.
3. Pull out the dipstick again. The oil level must be between the full - top mark and low mark.

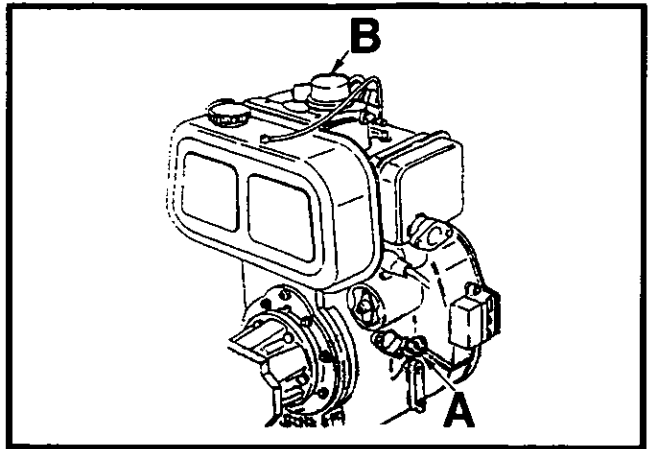


Figure 5-4 Engine Oil Dipstick and Filler

4. If oil level is low, add oil through the filler (B, Figure 5-4) as specified in Section 8 - Fuel And Lubricant Instructions.
5. Check oil level again after engine has run for about 1 minute.

#### II. Checking And Cleaning The Air Cleaner Element

Maintenance of the air cleaner is due when the engine indicates loss of power or emits black smoke. This indicates that the air cleaner element may be choked and needs to be cleaned/replaced. Frequency of cleaning depends on the site conditions and will increase in very dusty conditions.

The air cleaner is an oil bath type with a single element that is replaceable, or can be cleaned.

#### NOTE:

*Dust passing the air cleaner system can often be detected by looking for dust streaks on the air transfer tubing or just inside the intake manifold inlet.*

### CAUTION

**Engine damage.**

**Raw, unfiltered air can cause engine damage.**

**Never service the air cleaner while the engine is running.**

1. Loosen the spring clips (1, Figure 5-5) and remove the oil bath complete with the filter element (2, Figure 5-5). Avoid spilling oil from the oil bath.

## SECTION 5 - MAINTENANCE INSTRUCTIONS

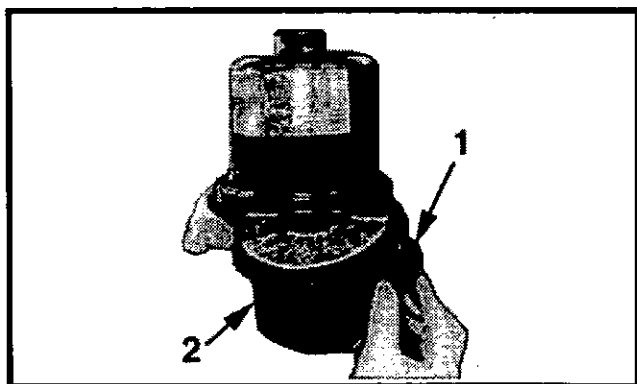


Figure 5-5 Remove Oil Bath and Filter Element

2. Withdraw element (5, Figure 5-6).

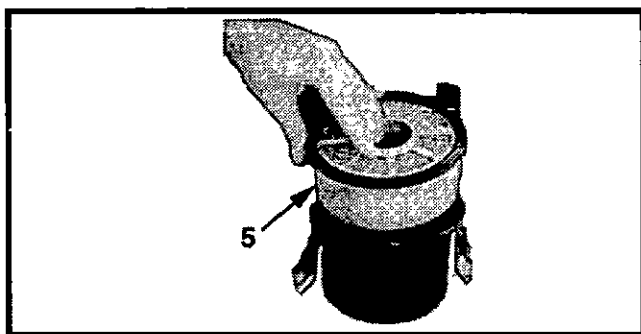


Figure 5-6 Remove Oil Bath Filter Element

### **⚠ WARNING**

Gasoline or solvents are extremely flammable.

May cause serious injury or death.

Never use gasoline or solvents to clean the elements.

3. Using an appropriate brush wash the filter element in clean diesel fuel, taking care to protect the skin from contact with the diesel/oil mix, (Figure 5-7), to remove any dirt accumulation.

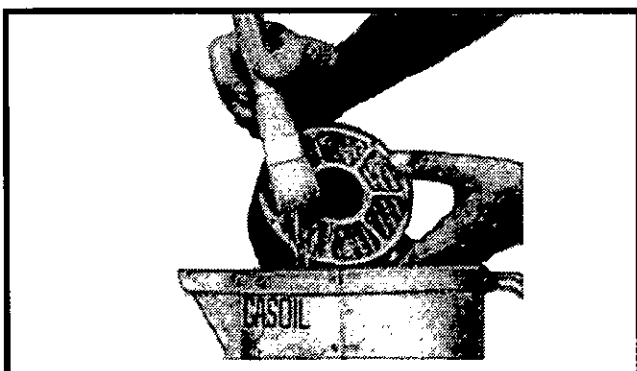


Figure 5-7 Cleaning the Oil Bath Filter Element

4. Check that the element is free of defects.
5. To dry the air cleaner element:

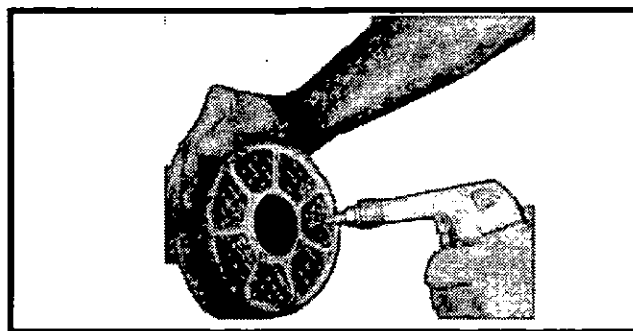


Figure 5-8 Drying the Oil Bath Filter Element

- Carefully direct the compressed air at an angle onto the inside surfaces of the element, (Figure 5-8).
- Move air jet over the element to remove trapped cleaning solvent. Be careful not to rupture the element with the air nozzle.

### **⚠ WARNING**

When using compressed air, water jets, or steam cleaning methods, ensure that appropriate protective clothing is worn to protect eyes and exposed parts of the body

### **⚠ CAUTION**

Excessive air pressure can damage the element.

Pressure at the air nozzle should not exceed 40 psi (2.76 bar).

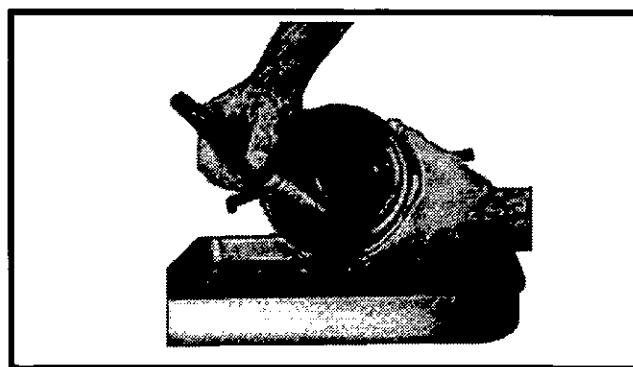


Figure 5-9 Cleaning the Oil Bath Cup

6. Using an appropriate brush wash the oil bath in clean diesel fuel (taking care to protect the skin from contact with the diesel/oil mix), (Figure 5-9) and dry after cleaning with a clean cloth.

(Continued)

## SECTION 5 - MAINTENANCE INSTRUCTIONS

### Checking And Removing The Air Cleaner Element - Continued



Figure 5-10 Refill the Oil Bath Cup

7. Refill the oil bath cup with clean engine oil to the level mark on the inside surface of the cup, (Figure 5-10).
8. Carefully reinstall the clean/replacement element into the clean oil bath cup and secure to the upper air clean body with the two spring clips, refer Figure 5-11. Ensure clips are correctly located and are not cracked or damaged. Replace if required.

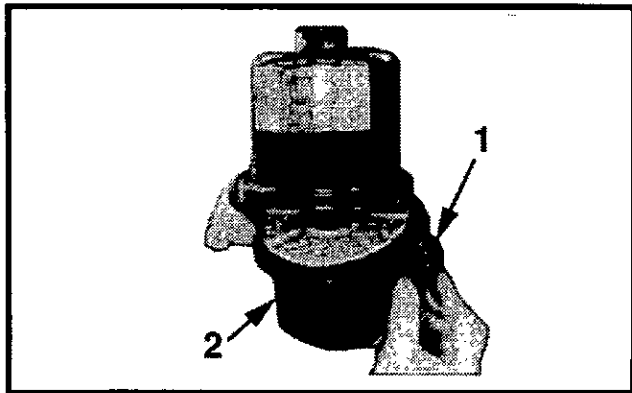


Figure 5-11 Reassemble the Air Cleaner

9. Inspect all air intake piping and joints between air filter and engine air intake to ensure no gaps exist where dust could enter. Visible signs of dust around a joint is a sure sign that there is leakage.

### III Check Fuel Level

1. Check fuel level at filler cap on fuel tank (1, Figure 5-12).
2. Never allow tank to completely empty, otherwise, the entire fuel system will require bleeding.

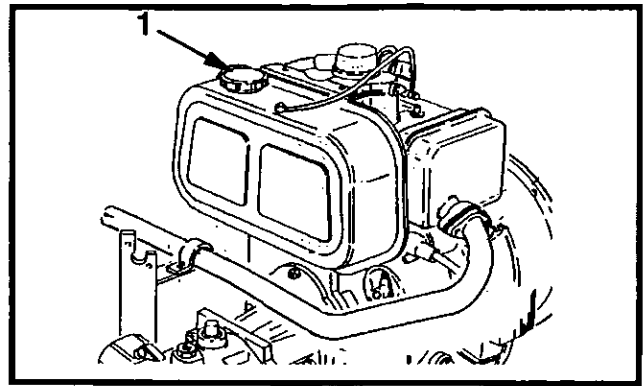


Figure 5-12 Fuel Tank Filler

3. If required, add fuel through the filler (1, Figure 5-12).

### **WARNING**

**Fuel is flammable. May cause severe injury or death.**

**Shut down the engine, extinguish all open flames and do not smoke while filling the tank.**

**Always wipe up any spilled fuel.**

4. Fill tank with correct grade of fuel. Refer to Section 8 - Fuel And Lubricant Instructions for fuel information.

### IV. Check Water Tank Level

The water supply for the water sprinkler system is held in a tank (1, Figure 5-13).

1. Maintain a full tank of clean water at all times. NEVER allow the tank to become empty for any reason other than for cleaning.

**DO NOT OPERATE THE WATER PUMP WITHOUT WATER IN THE TANK.**

2. If water level is low, remove the fill cap (2, Figure 5-13), located on the tank, and add clean water to the full level. Ensure the vent (Figure 5-13) is clear.

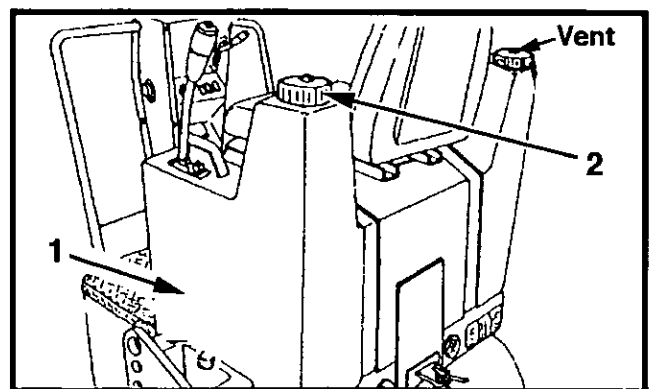


Figure 5-13 Water Tank and Fill Caps

## SECTION 5 - MAINTENANCE INSTRUCTIONS

### NOTE

*In freezing conditions take care to drain the water tank and hoses installation at the end of the working day.*

### V. Check Drum Sprinkler Bar.

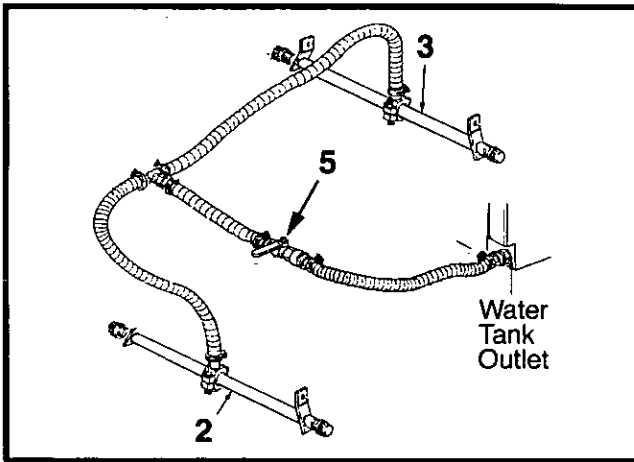


Figure 5-14 Water Sprinkler System.

1. Turn on the main water control valve (5, Figure 5-14).
2. Check that both drum sprinkler bars (2 and 3, Figure 5-14), are correctly functioning. Clean any jets that are blocked.

### VI. Check Parking Brake

1. With the engine running, press in the parking brake control switch (10, Figure 5-15) to apply brakes.
2. When the brakes are applied, the parking brake ON indicator will illuminate.

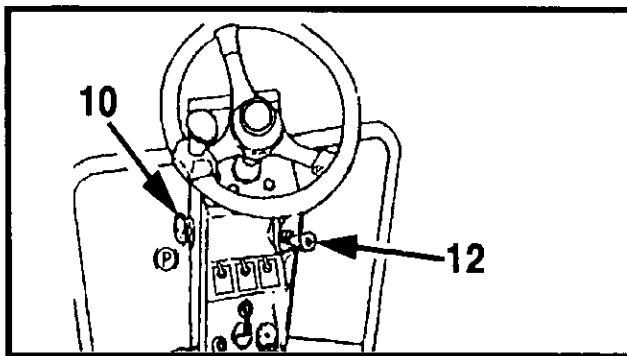


Figure 5-15 Parking Brake Switch

3. Move propulsion control towards Forward position to attempt machine movement. If the parking brake system is functioning, the machine will not move. If machine does move, contact service personnel and do not operate machine.

### VII. Check Conditions Of Drums And Scrapers

1. Perform a visual inspection of the drums (1, Figure 5-16) and remove any material adhering to them.

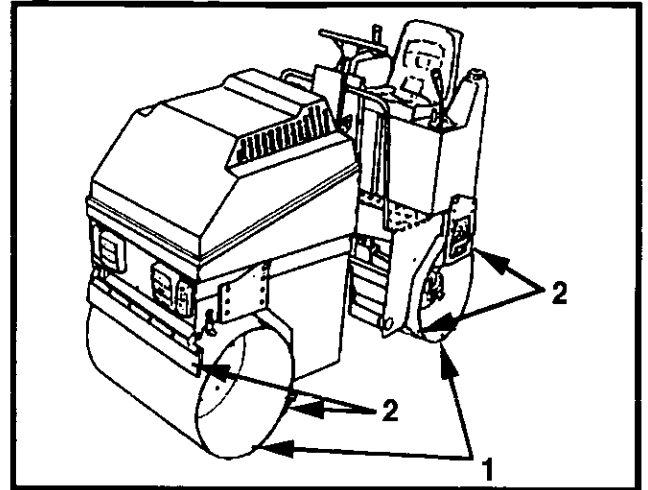


Figure 5-16 Drums and Drum Scrapers

2. Check the drum scrapers (2, Figure 5-16) to ensure they are not damaged. Replace any damaged drum scrapers that require attention.

### 5.6 50 HOUR OR WEEKLY ROUTINE MAINTENANCE

#### I. Check and Clean Engine Cooling Fins

If the machine has suffered leaks of oil or fuel, dirt will tend to adhere to the cooling fins of air cooled engines (Figure 5-17). This accumulation of dirt will reduce the cooling efficiency. Therefore, any leaks of oil or fuel should be immediately repaired and cooling surfaces given a through cleaning.



**When using compressed air, water jets, or steam cleaning methods, ensure that appropriate protective clothing is worn to protect eyes, and exposed parts of the body.**

To clean fins, use compressed air or a steam jet. Steam cleaning is preferred. To clean with compressed air, perform the following:

1. Remove any covers to gain access, (refer engine manual for further information).
2. Use a suitable brush to remove dried on dirt.

(Continued)

## SECTION 5 - MAINTENANCE INSTRUCTIONS

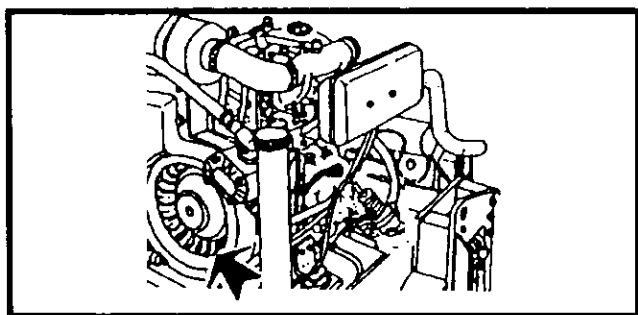


Figure 5-17 Engine Cooling Fins/Fan

3. Use a compressed air jet to remove loosened dirt.
4. In case of severe clogging due to fluid leaks, apply a commercial cleaning detergent. Let it soak in and then wash off with water jet. Dispose of detergent in accordance with local regulations.

### NOTE:

*Refer to engine manufacturer's instruction manual for more detailed information*

## II. Grease Drum Offset Guides

1. Clean the grease fitting ('C', Figure 5-18).
2. Apply three shots of MPG-EP2 grease with a grease gun.

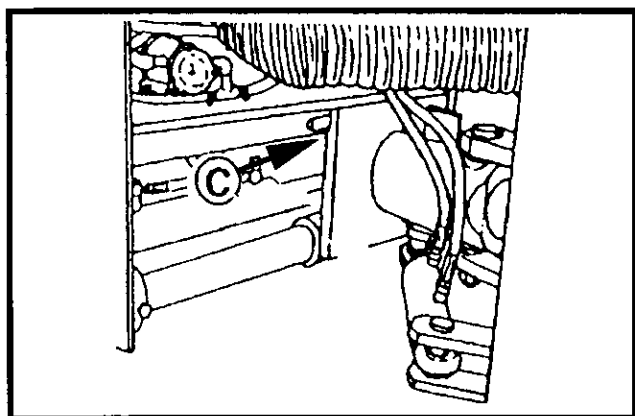


Figure 5-18 Drum Offset Guide Grease Point

## 5.7 100 HOUR ROUTINE MAINTENANCE

### I. Check/Clean Engine Oil Filler Cap Breather

1. Check and clean as necessary, the engine crankcase breather which is combined into the engine oil filler cap (Figure 5-19).

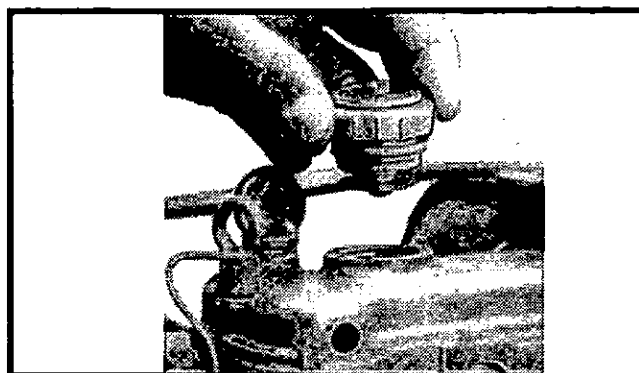


Figure 5-19 Engine Oil Filler/Breather

2. In case of clogging, wash in a commercial cleaning detergent and clean using an appropriate brush, (Figure 5-20).

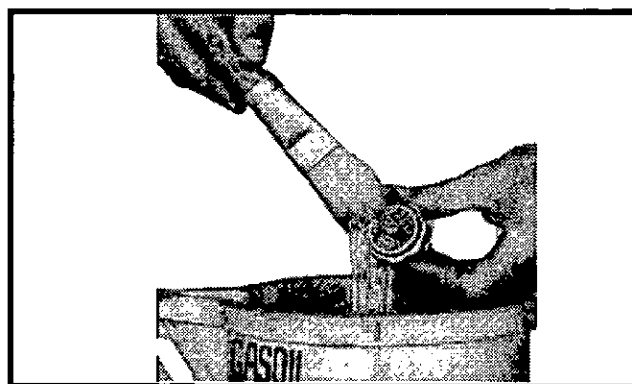


Figure 5-20 Clean the Engine Oil Filler/Breather

3. Use an air jet to remove excess solvent, (Figure 5-21).

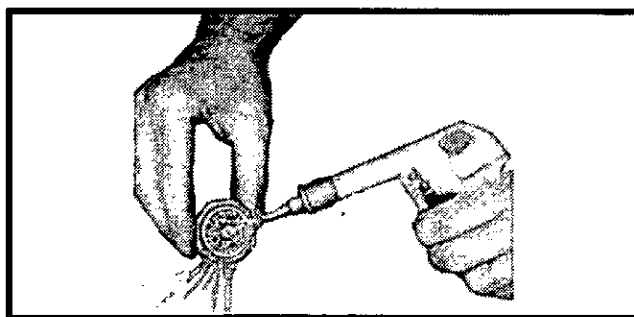


Figure 5-21 Dry the Engine Oil Filler/Breather

## III. Checking And Cleaning The Air Cleaner Element

Maintenance of the air cleaner is due when the engine indicates loss of power or emits black smoke. This indicates that the air cleaner element may be choked and needs to be cleaned/replaced. Frequency of cleaning depends on the site conditions and will increase in very dusty conditions. The air cleaner is an oil bath type with a single element that is replaceable, or can be cleaned. **Refer to 10 hour "Checking and cleaning the Air Cleaner Element" procedures on page 5-4 and engine manual for further information**



## SECTION 5 - MAINTENANCE INSTRUCTIONS

### III. Check Battery

#### **WARNING**

Batteries contain an acid and can cause injury.

Battery fumes can ignite and explode. Skin and eye contact with the battery fluid can cause injury.

Do not smoke when observing battery fluid level. Avoid skin and eye contact with the battery fluid. If contact occurs, flush area immediately with water.

#### (a). Maintenance-Free Battery (Figure 5-22).

1. Clean terminals.
2. Keep battery connections tight.
3. Apply a small amount of grease to the terminals to prevent corrosion.

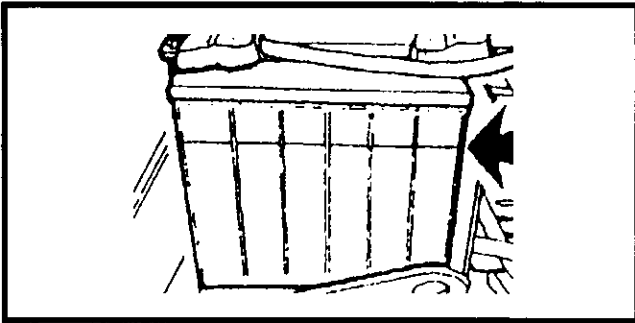


Figure 5-22 Battery

#### (b). Traditional Battery.

1. Clean the battery upper surface before removing any caps to prevent dirt entering the battery.
2. When the battery is still and cool, open the caps.
3. Top up each element cell with distilled water until the separators are covered 1 cm deep.
4. Clean terminals.
5. Keep battery connections tight.
6. Apply a small amount of grease to the terminals to prevent corrosion.

### IV. Check Hydraulic Oil Level

#### **NOTICE**

Dirt in the hydraulic system will lead to premature component failure.

A clean, contaminant-free system is extremely important to the machine's proper function.

Take extra care when working around or on the hydraulic system to ensure its complete cleanliness.

1. Check hydraulic oil level by viewing dipstick ('B', Figure 5-23) located on the hydraulic tank. The fill cap ('A', Figure 5-23) includes a dipstick to check the oil level.
2. The hydraulic oil level should be between the full mark MAX and the minimum mark MIN on the dipstick.

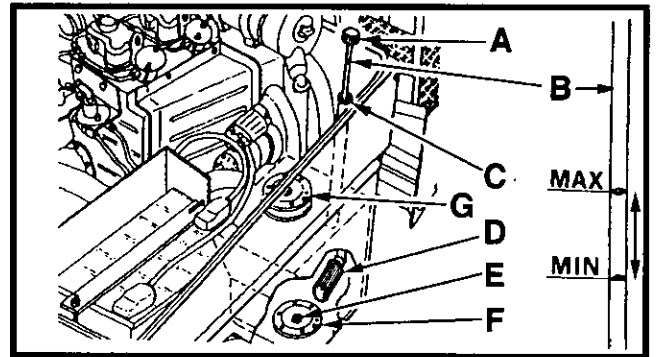


Figure 5-23 Hydraulic Oil Tank, Dipstick

#### **NOTE**

*If no oil is showing on the dipstick, call for service assistance to investigate cause of oil loss.*

3. If necessary, add fresh, clean (filtered through 10 micron filter) anti-wear hydraulic oil through the filler ('C', Figure 5-23). Bring to a full level. It is important to maintain the tank at a full level at all times. Refer to Section 8 - Fuel and Lubricant Instructions for details on hydraulic oil specifications.

#### **NOTE**

*In the event that there is indication of contamination of the hydraulic system due to part failure or ingress of dirt into the hydraulic tank, then remove drain plug ('E', Figure 5-23) and the access cover ('F', Figure 5-18) and thoroughly clean out the tank interior. On later models fitted with the suction strainer/filter ('F', Figure 5-23), clean or replace this filter. Follow refill as above.*

## SECTION 5 - MAINTENANCE INSTRUCTIONS

### V. Check Eccentric Oil Level

1. Ensure machine is positioned on level ground with the plug (1, Figure 5-24) in 3 or 9 o'clock position, parking brake applied, and drums chocked.

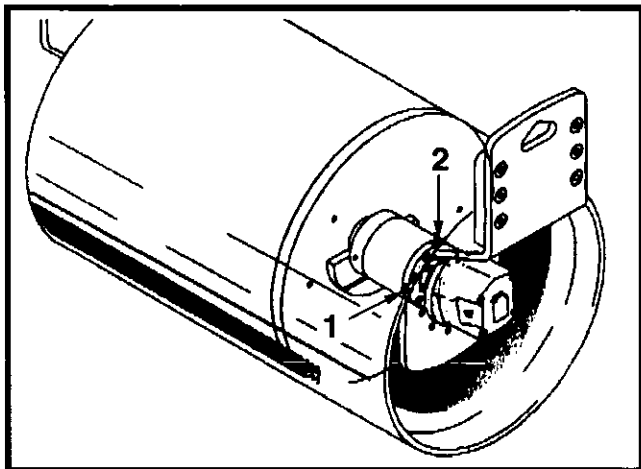


Figure 5-24 Eccentric Oil Fill/Level Plugs

2. Allow eccentric housing to cool before proceeding.
3. Remove the level plug (1, Figure 5-24).
4. The oil should be level with bottom of hole. If required, use appropriate fill equipment to add oil through the breather port 2 until oil appears at the level plug hole.

#### NOTE

*Take care not to over fill as this may cause overheating of the eccentric oil resulting in leakage.*

Refer to Section 8 - Fuel And Lubricant Instructions for details on eccentric housing oil.

5. Allow oil to stop flowing from the level plug hole (1, Figure 5-24)
6. Clean, install and tighten the plug.
7. Remove the eccentric housing breather (2, Figure 19), for checking and cleaning. Reinstall and secure.
8. Repeat same procedure for the other eccentric housing.
9. Operate the machine and check for any leaks.

### 5.8 200 HOUR ROUTINE MAINTENANCE

#### **WARNING**

Hot oil or components can burn.

Oil must be at normal operating temperature when draining.

Avoid contact with hot oil or components.

Do not allow oil to drain into the ground.

#### I. Change Engine Oil

*Refer to Lombardini Engine instruction manual for further details.*

1. Position machine on level ground.
2. Warm engine up until engine oil temperature is 176 degrees F. (80 degrees C.), then shut down engine.
3. Place container with capacity of at least 7.6 liter (2, Figure 5-25), under drain point of engine and remove drain plug (1, Figure 5-25).

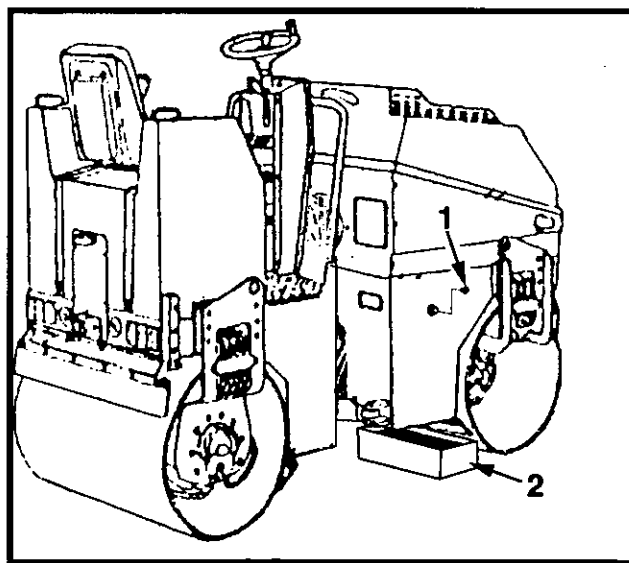


Figure 5-25 Engine Oil Drain Point

4. Remove the engine oil filler cap and clean.
5. Insert the new filter and clean the filter cover.
6. Clean the drain plug (1, Figure 5-25) and install with a new seal ring Torque drain plug to 41 pounds-foot (55 Nm).

## SECTION 5 - MAINTENANCE INSTRUCTIONS

7. Refill crankcase with motor oil through the filler ('B', Figure 5-26). Fill to the full mark on the dipstick ('A', Figure 5-26). Refer to Section 8 - Fuel And Lubricant Instructions for oil details.

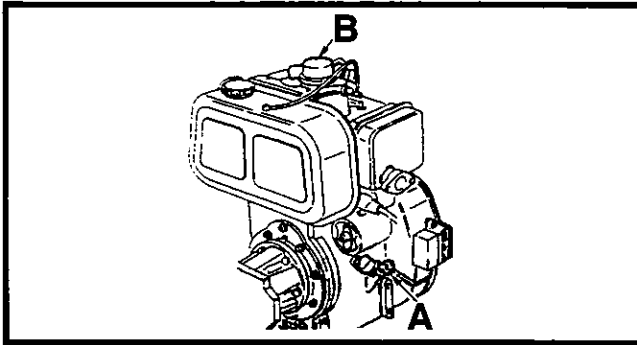


Figure 5-26 Engine Oil Fill Port

8. Start engine and check engine oil pressure (engine oil pressure indicator light should extinguish after several seconds running).

### NOTE

*If the RED indicator light remains illuminated, stop the engine immediately and call for service assistance.*

9. Check engine area for leaks.

## II. Change Hydraulic Oil Filter



**Hot oil or components can burn.**

**Oil must be at normal operating temperature when draining.**

**Avoid contact with hot oil or components.**

**Do not allow oil to drain into the ground.**

There is a spin-on type hydraulic filter located at the right front side of the machine (Figure 5-27). The filter is accessible by lifting up the engine hood.

Use the following procedure to remove the filter. Keep dirt from entering the hydraulic system and causing premature component failure and improper machine function.

1. Clean head of the filter and remove used filter catching any escaping oil in a container. Appropriately discard the used filter. Dispose of used filter in accordance with local regulations.
2. Fill the new replacement filter with clean, hydraulic oil.

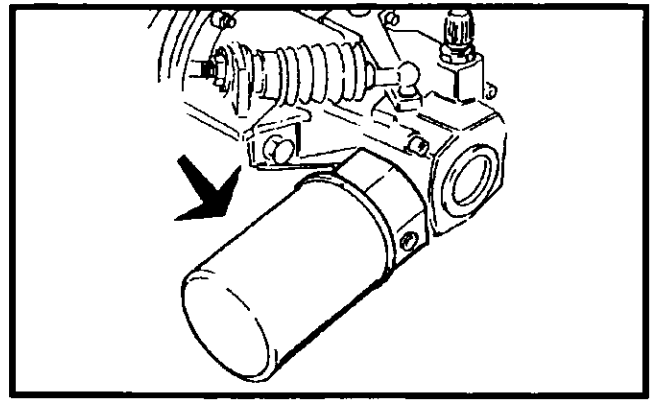


Figure 5-27 Hydraulic Filter - Propulsion System

3. Apply a film of clean oil to the seal gasket of the new filter before installing.
4. Screw new filter into place and tighten one quarter (1/4) turn beyond gasket contact.
5. Start engine and check for proper operation.
6. Check machine for any leaks.

## III. Clean Hydraulic Oil Return Strainer (G, Figure 5-23)

The hydraulic return strainer filter should be also checked and cleaned as necessary. Any debris found indicates part failure and should be reported to your supervisor.

## SECTION 5 - MAINTENANCE INSTRUCTIONS

### 5.9 500 HOUR ROUTINE MAINTENANCE

#### I. Change/Clean Engine Fuel Filters

The 10 BS is equipped with a single strain type fuel filter located in the under surface of the fuel tank.

#### **WARNING**

**Fuel is flammable. May cause severe injury or death.**

**Shut down the engine, extinguish all open flames and do not smoke while filling the tank.**

**Always wipe up any spilled fuel.**

Use the following procedure to service the fuel filter (1, Figure 5-28)

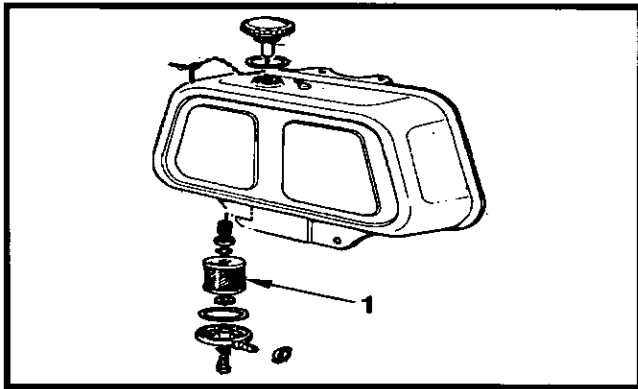


Figure 5-28 Engine Fuel Filter

1. Clean around head of main filter and remove filter catching any escaping fuel in a container. Dispose of used filter and fuel in accordance with local regulations
2. Reassembly the filter components, (refer to Figure 5-28). Replace any defective seals or component.
3. Bleed the fuel system. Because of some variables that affect bleeding the system, refer to the engine operation manual.
4. Check machine for any leaks.

#### II. Check engine exhaust manifold

1. Check exhaust manifold for leaks, loose nuts and fittings .
2. Any defects should be reported to your supervisor.

#### III. Check Hosing and other components of the Hydraulic Systems

1. Check the flexible hoses, fittings and all other components of the hydraulic system for leaks or other defects..
2. Any defects should be reported to your supervisor.

#### IV. Change Hydraulic Oil and Clean Hydraulic Oil Tank / Suction Strainer

##### *NOTE*

*The oil and strainer must also be changed after major hydraulic system repairs in addition to the 500 hour routine maintenance.*

#### **NOTICE**

**Dirt in the hydraulic system will lead to premature component failure.**

**A clean, contaminant-free system is extremely important to the machine's proper function.**

##### *NOTE*

*The Vibration/Steering System suction strainer ('D', Figure 5-29) is screwed onto the suction pipe on:*

*10 BS units effective S/N. 10260*

Use the following procedure to change the hydraulic oil and suction strainer.

#### **WARNING**

**Hot oil or components can burn.**

**Oil must be at operating temperature when draining.**

**Avoid contact with hot oil or components.**

**Do not allow oil to drain into ground.**

1. Place a container capable of holding at least 22 gallons (84 liters) under the drain plug (E, Figure 5-29).
2. Remove the drain plug ('E', Figure 5-29), and drain the hydraulic tank. Dispose of oil in accordance with local regulations.

## SECTION 5 - MAINTENANCE INSTRUCTIONS

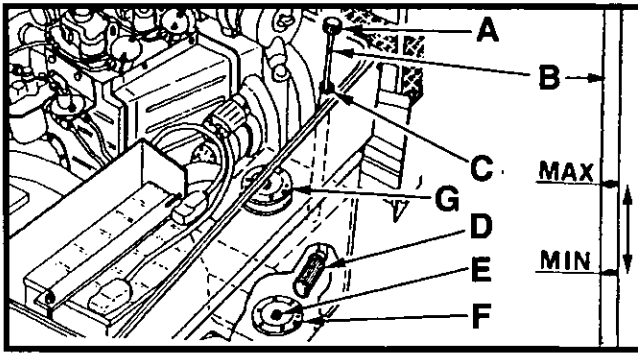


Figure 5-29 Hydraulic Tank

3. Remove the cover plate ('F', Figure 5-29) located in the base of the hydraulic tank.
4. The Vibration/Steering System return strainer ('G', Figure 5-29), is located on the upper surface of the tank. Remove the filter cover to clean the inside strainer gauze..
- 4a. On 10 BS units effective S/N. 10260, the Vibration/Steering System suction strainer is near the bottom inside of the tank. Reach inside tank and remove it.
5. Clean strainer in a solvent using a stiff fiber brush to help remove embedded impurities. If impurities cannot be removed, replace the strainer.

### NOTICE

A partially plugged strainer will lead to cavitation, contamination and a sluggish operating machine.

Ensure that strainer is cleaned or replaced.

### NOTICE

Excessive air pressure can damage the strainer.

Pressure at the air nozzle must not exceed 40 psi. (2.8 bar).

6. Air-blow suction strainer dry from inside out.
7. Install new or cleaned suction strainer back inside the tank.
8. Install the cover plate and gasket. Replace gasket if needed.
9. Clean the drain plug and install it securely.
10. Fill the tank with clean, hydraulic oil from unopened containers. When adding oil, be sure to filter it through a 10 micron filter. For quantity and oil specifications, refer to Section 8 - Fuel And Lubricant Instructions.

11. Ensure oil is at proper level and that all fittings are tight and secure.

12. Operate machine and check for any leaks.

### 5.10 1000 HOUR OR ANNUAL ROUTINE MAINTENANCE

#### I. Change Eccentric Housing Oil

To change eccentric housing oil, use the following procedure.

1. Position the machine on level ground.
2. Position the drum with eccentric plug (1, Figure 5-30) in 6 o'clock position.
3. Apply parking brake and make sure drums are properly chocked.

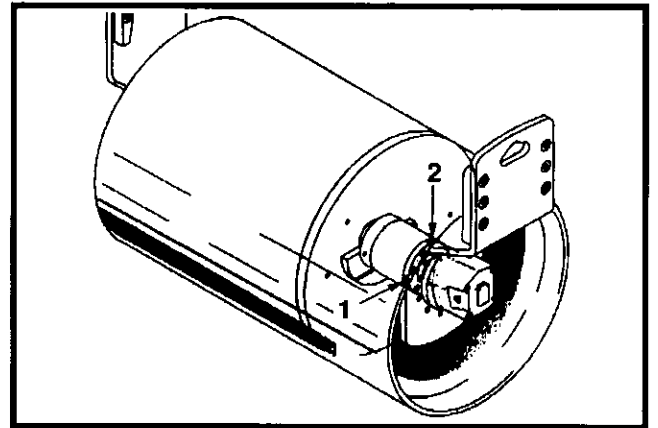


Figure 5-30 Eccentric Oil Fill, Level, Drain ports

4. Ensure oil is at operating temperature before draining.

### WARNING

Hot oil or components can burn.

Oil must be at normal operating temperature when draining.

Avoid contact with hot oil or components.

Do not allow oil to drain into ground.

5. Remove plug (1, Figure 5-30) and allow oil to completely drain from the housing into a container. Dispose of oil in accordance with local regulations.
6. Clean, install and tighten the drain plug.
7. To check or refill, ensure the fill port (1, Figure 5-30) is in the 3 or 9 o'clock position.

(Continued)

## SECTION 5 - MAINTENANCE INSTRUCTIONS

8. Using appropriate filling device, slowly add gear oil through the port (1) until oil overflows. Refer to Section 8 - Fuel And Lubricant Instructions for oil specifications and quantities.
9. Allow oil to stop flowing from the port.
10. Clean, install and tighten the plug.
11. Repeat above procedure for the other drum eccentric.

### NOTE:

*In freezing conditions ensure that water is completely drained from the tank, hoses, and sprinkler bars.*

## II. Check Engine Valve Clearance

### NOTE:

*Please refer to engine operator manual for maintenance instructions. This operation requires a trained service engineer.*

## III. Drain and Clean Water Tank and Sprinkler Bars

At least once a year, more often if conditions warrant, drain and clean the water tank and sprinkler bars.

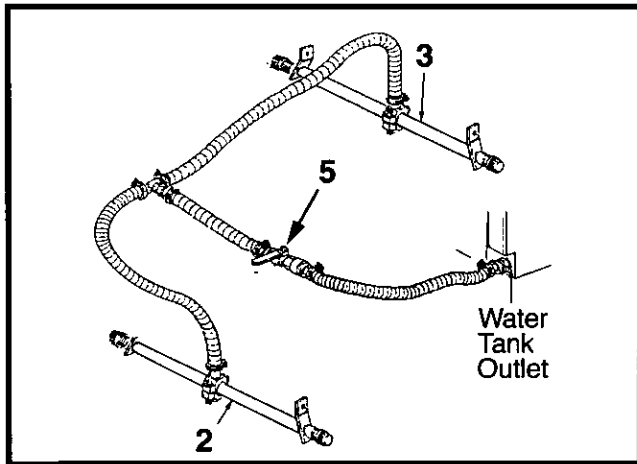


Figure 5-31 Water Sprinkler Bars and Hosing

1. Clear each sprinkler bar jet.
2. Remove each water tubing as necessary by releasing hose clamps (2, Figure 5-31), clean/flush out any sediment buildup.
3. Reinstall all hosing components securely.
4. Fill water tank with clean water.
5. Open water control valve (1, Figure 5-31) and check water flows from all spinkler bar jets to effectively wet the drum width.
6. If gravity flow is satisfactory, close the water control valve.

## SECTION 6 - TROUBLESHOOTING

Contents	Page	Contents	Page
Engine Will Not Start (6.1)	1	Controls Not Functioning (6.7)	3
Engine Difficult To Start And Has Poor And Irregular Performance (6.2)	2	Sluggish Propulsion System Operation (6.8)	3
Engine Making Excessive Fumes (6.3)	2	Propulsion System Does Not Operate In Any Direction (6.9)	4
Engine Overheats (6.4)	2	Hot Operating System (6.10)	5
Low Engine Oil Pressure (6.5)	2	Propulsion Operates In Only One Direction (6.11)	6
Battery Indicator Light ON (6.6)	3	Difficult or Impossible To Find Neutral (STOP) Position At Control Lever (6.12)	6

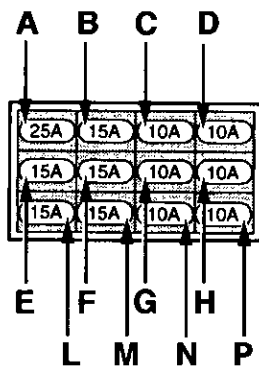
### ⚠ WARNING

When carrying out trouble shooting procedures, it is important to strictly observe the safety precautions and guidelines in Section 1 of this manual.

Improper operation and maintenance is the most frequent cause of machinery failures and problems. In the event of a failure, it is recommended to read through this manual.

If you are unable to determine the cause of the problem or are unable to find a solution when following the troubleshooting chart below, contact your local Ingersoll-Rand service office.

The troubleshooting chart is limited to machine control operational problems which will guide the operator to rectifying the cause of the failure.



The fuse box contains fuses to protect the following circuits:

- A = Not used on Model 10 BS
- B = Warning Horn
- C = Right side Driving Light
- D = Left side Driving Light
- E = Ignition Switch (Engine Start)
- F = Beacon Light
- G = Right side Low Beam Light
- H = Left side Low Beam Light
- L = Direction Turning Indicator Switch/Seat Switch/Vibration / Steering Flowdivider Valve/Engine Shutdown system/ Emergency Shutdown/Parking Brake
- M = Vibration/Drum offset
- N = Parking lights: Front Left and Rear Right sides
- P = Parking lights: Front Left and Rear Right sides + Registration Plate Light

Figure 6-1 Fuse Identification

PROBLEM	CAUSE	CORRECTION
<b>6.1 ENGINE WILL NOT START</b>		
Starter does not rotate	<ul style="list-style-type: none"> <li>Fuse E defective</li> <li>Emergency Stop switch requires resetting.</li> <li>Propulsion control lever not in STOP position</li> <li>Batteries discharged</li> <li>Battery cable connections loose or disconnected.</li> <li>In-line fuse to starter fused</li> <li>Starter relay fault</li> <li>Ignition switch defective</li> <li>Starter solenoid or starter defective</li> </ul>	<ul style="list-style-type: none"> <li>Check console fuse and replace.</li> <li>Check Emergency Stop switch and reset if required.</li> <li>Move to STOP position.</li> <li>Check battery, charge if necessary.</li> <li>Clean and tighten terminal connections.</li> <li>Call for service to correct fault.</li> <li>Call for service to correct fault.</li> <li>Call for service to replace.</li> <li>Call for service to replace.</li> </ul>

## SECTION 6 - TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
<b>6.1 ENGINE WILL NOT START (Continued)</b>		
Starter does rotate	<ul style="list-style-type: none"> <li>• Empty fuel tank</li> <li>• Defective wiring</li> </ul>	<ul style="list-style-type: none"> <li>• Fill</li> <li>• Check with test lamp .</li> </ul>
<b>6.2 ENGINE DIFFICULT TO START AND HAS POOR AND IRREGULAR PERFORMANCE</b>	<ul style="list-style-type: none"> <li>• Low battery power</li> <li>• Batteries discharged</li> <li>• Battery cable connections loose or corroded causing the starter to turn too slowly.</li> <li>• Low ambient temperature, using too high a viscosity oil</li> <li>• Fuel line blockage due to: wax separation in winter</li> <li>• Incorrect valve clearances</li> <li>• Defective fuel injectors</li> <li>• Blocked air cleaner element.</li> <li>• Loose or badly adjusted throttle cable</li> </ul>	<ul style="list-style-type: none"> <li>• Check battery.</li> <li>• Charge battery if necessary.</li> <li>• Clean and tighten terminal connections, cover with acid free grease.</li> <li>• Use appropriate oil grade for the ambient temperature conditions.</li> <li>• Change fuel filters, and bleed fuel system, check for fuel line leaks and loose connections. Always use winter grade fuel in winter.</li> <li>• Call for service to adjust.</li> <li>• Call for specialist service.</li> <li>• Clean or replace element.</li> <li>• Adjust or replace control cable.</li> </ul>
<b>6.3 ENGINE MAKING EXCESSIVE FUMES</b>	<ul style="list-style-type: none"> <li>• Engine oil level too high</li> <li>• Blocked air cleaner element.</li> <li>• Low compression due to poor condition of the valves or incorrect valve clearance</li> </ul>	<ul style="list-style-type: none"> <li>• Drain engine oil to correct level on the dip stick.</li> <li>• Clean or replace element.</li> <li>• Call for specialist service.</li> </ul>
<b>6.4 ENGINE OVERHEATS - STOP ENGINE IMMEDIATELY</b>	<ul style="list-style-type: none"> <li>• Excessive dirt on cooling system</li> <li>• Defective injector nozzles</li> <li>• Incorrect fuel pump calibration</li> <li>• Blocked cooling air flow</li> </ul>	<ul style="list-style-type: none"> <li>• Clean the cooling fins, particularly vertical fins on Lombardini engine cylinder heads.</li> <li>• Call for service to correct fault.</li> <li>• Call for service to correct fault.</li> <li>• Clear blockage.</li> </ul>
<b>6.5 LOW ENGINE OIL PRESSURE</b> (Red warning light on steer console illuminates)	<ul style="list-style-type: none"> <li>• Low engine oil level (low engine oil pressure warning light should illuminate)</li> <li>• Defective relief valve</li> <li>• Worn oil pump</li> <li>• Leaks from lubrication system</li> </ul>	<ul style="list-style-type: none"> <li>• Top up oil level to dipstick mark</li> <li>• Call for service to correct fault</li> <li>• Call for service to correct fault</li> <li>• Stop engine and check for, and tighten any loose fittings on the oil lines</li> </ul>
<b>6.6 BATTERY WARNING LIGHT IS "ON"</b>	<ul style="list-style-type: none"> <li>• Not charging due to defective alternator or regulator</li> </ul>	<ul style="list-style-type: none"> <li>• Call for service to correct fault.</li> </ul>

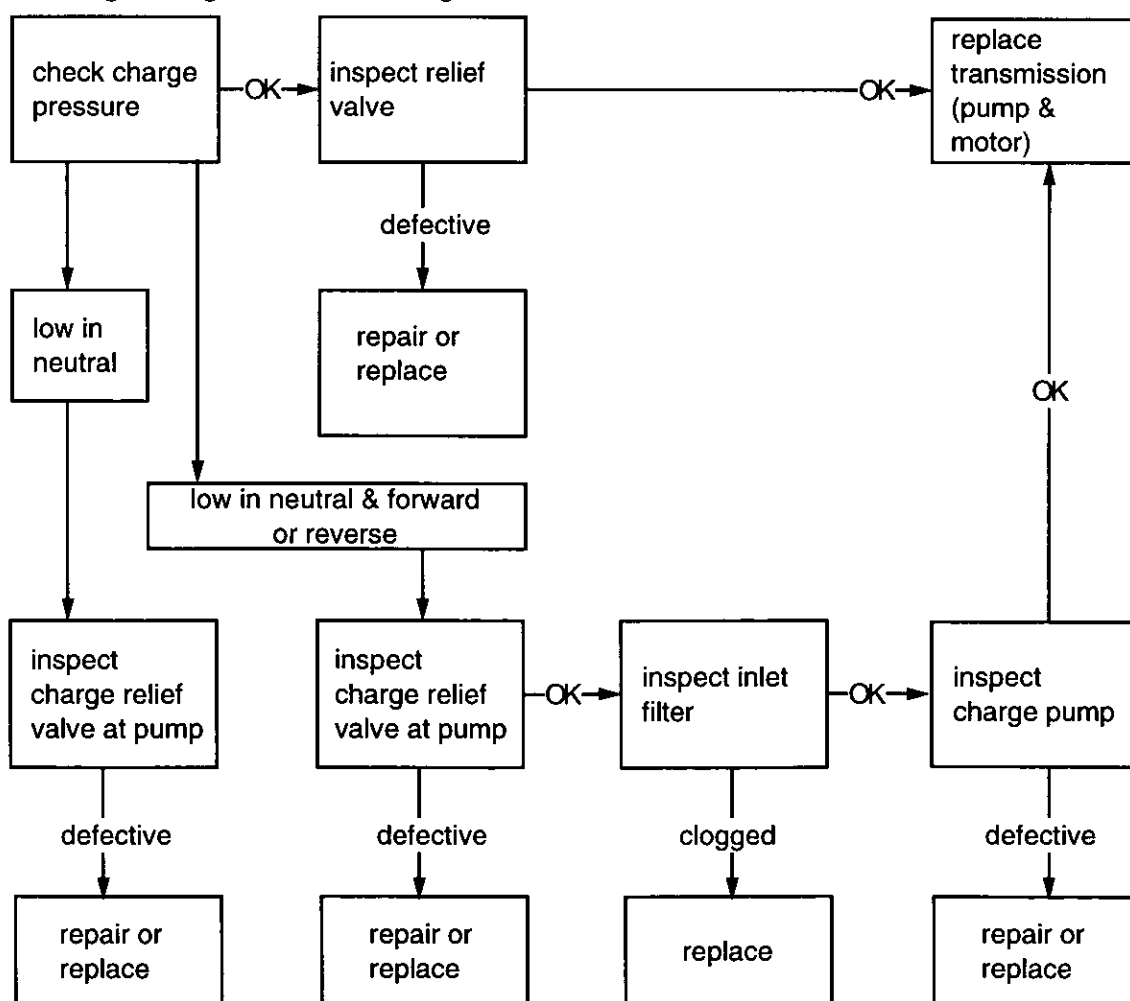


## SECTION 6 - TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
<b>6.7 CONTROLS NOT FUNCTIONING</b>		
Horn does not sound +	• Fuse B defective • Defective wiring / parts	• Check console fuse and replace. • Call for service to correct fault.
Vibration controls not functioning +	• Fuse L defective	• Check console fuse and replace. • Call for service to correct fault.
Warning indicator lights not functioning +	• Fuse L defective	• Check console fuse and replace. • Call for service to correct fault.
Brake indicator lights not functioning +	• Fuse L defective • Defective wiring / parts	• Check console fuse and replace. • Call for service to correct fault.
Gauges not functioning +		
Working lights not functioning +	• Fuse C and D defective • Defective wiring / parts	• Check console fuse and replace. • Call for service to correct fault.
Flashing Beacon not functioning	• Fuse F and D defective	• Check console fuse and replace

### 6.8 SLUGGISH PROPULSION SYSTEM OPERATION

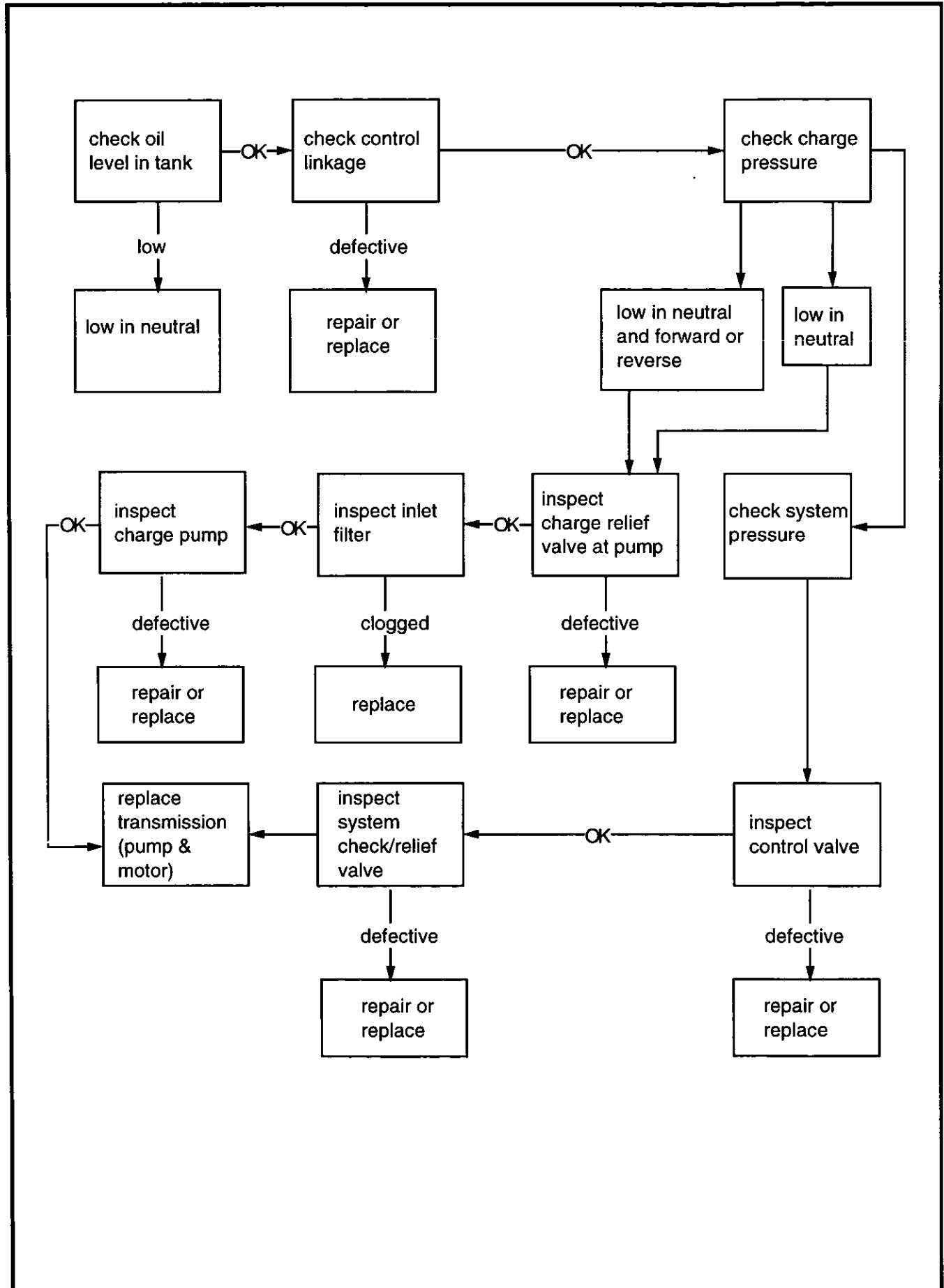
The following charts guide troubleshooting:



## SECTION 6 - TROUBLESHOOTING

### 6.9 PROPULSION SYSTEM DOES NOT OPERATE IN ANY DIRECTION.

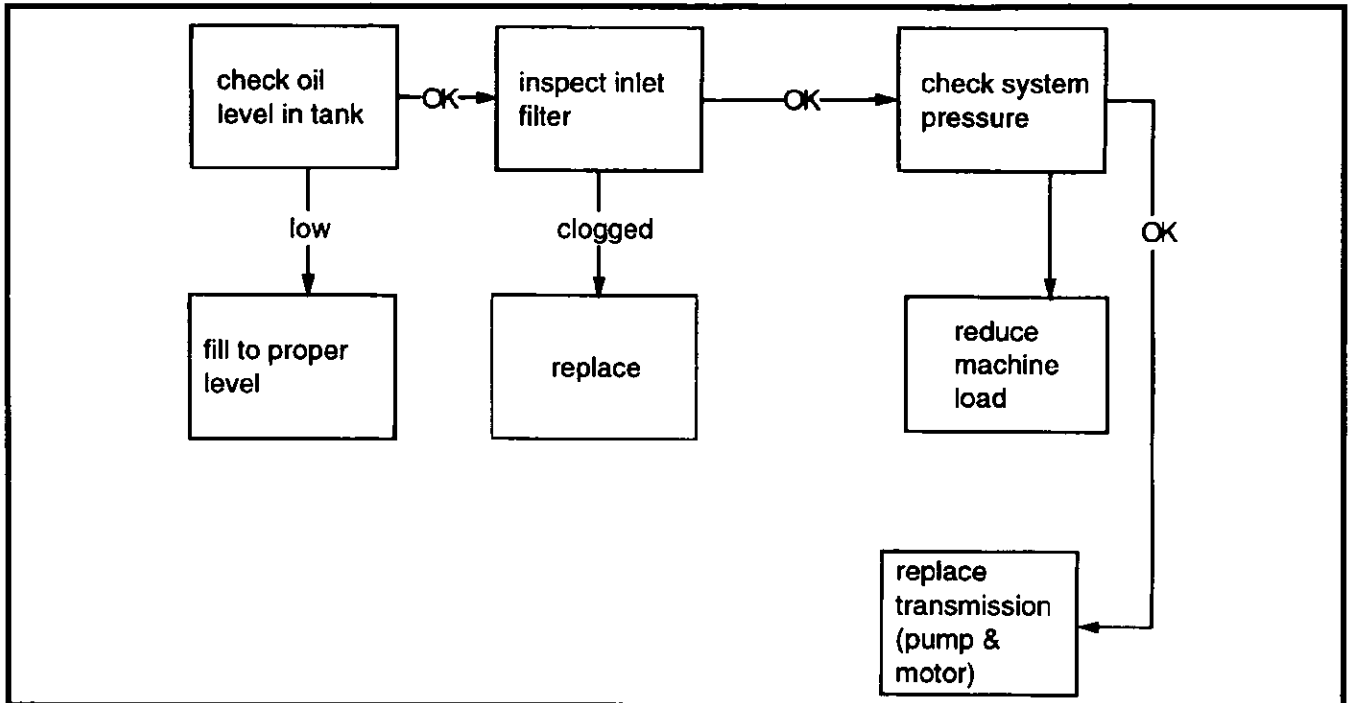
The following charts guide troubleshooting:



## SECTION 6 - TROUBLESHOOTING

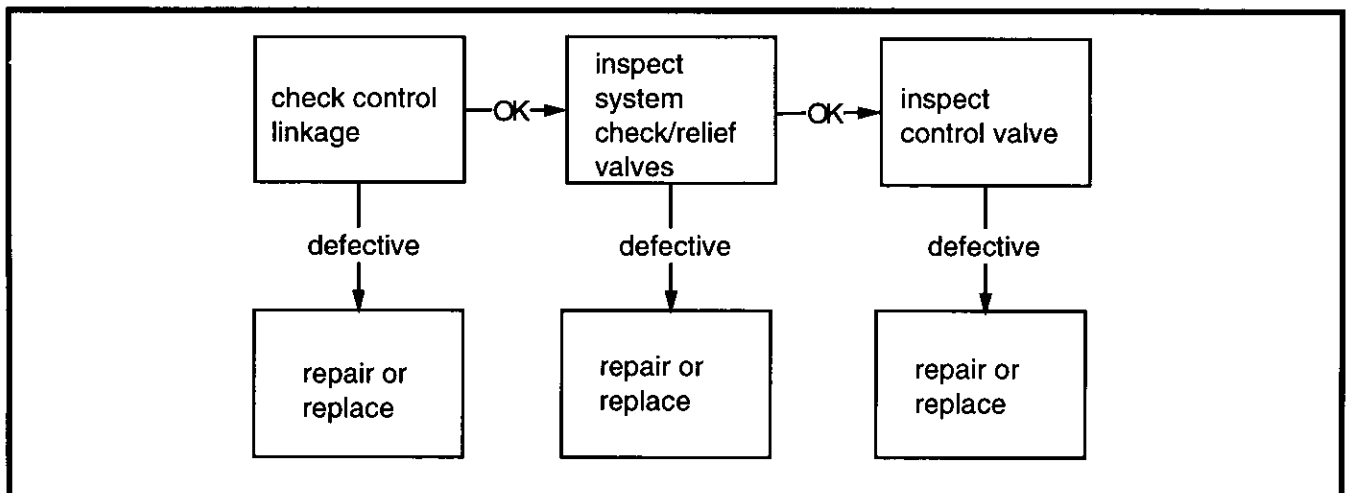
### 6.10 HOT OPERATING SYSTEM.

The following charts guide troubleshooting:



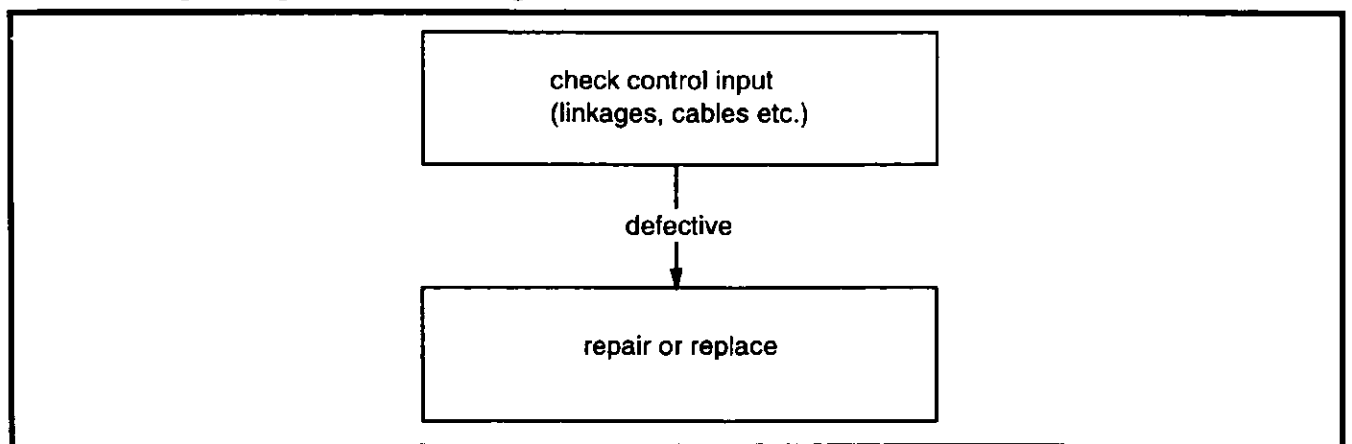
### 6.11 PROPULSION OPERATES IN ONLY ONE DIRECTION.

The following charts guide troubleshooting:



### 6.12 DIFFICULT OR IMPOSSIBLE TO FIND NEUTRAL (STOP) POSITION AT CONTROL LEVER.

The following charts guide troubleshooting:



## SECTION 7 - TECHNICAL SPECIFICATIONS

Contents	Page	Contents	Page
General Identification (7.1)	1	Machine Dimensions (7.3)	2
Environmental Information (7.2)	1	Machine Weights/Figures (7.4)	4

### 7.1 GENERAL IDENTIFICATION

Name of machine: 10 BS Series  
Type of machine: Double drum vibratory compactor  
Serial number and product range: serial number 14245 and above  
Name and address of manufacturer: SICOM s.r.l.  
40013 Castelmaggiore (BO)  
Via Bonazzi 12-15,

### 7.2 ENVIRONMENTAL INFORMATION

Noise emission - 10 BS: At the operators station = L(PA)S = 93.3 dBA  
L(WA) = 102 dBA

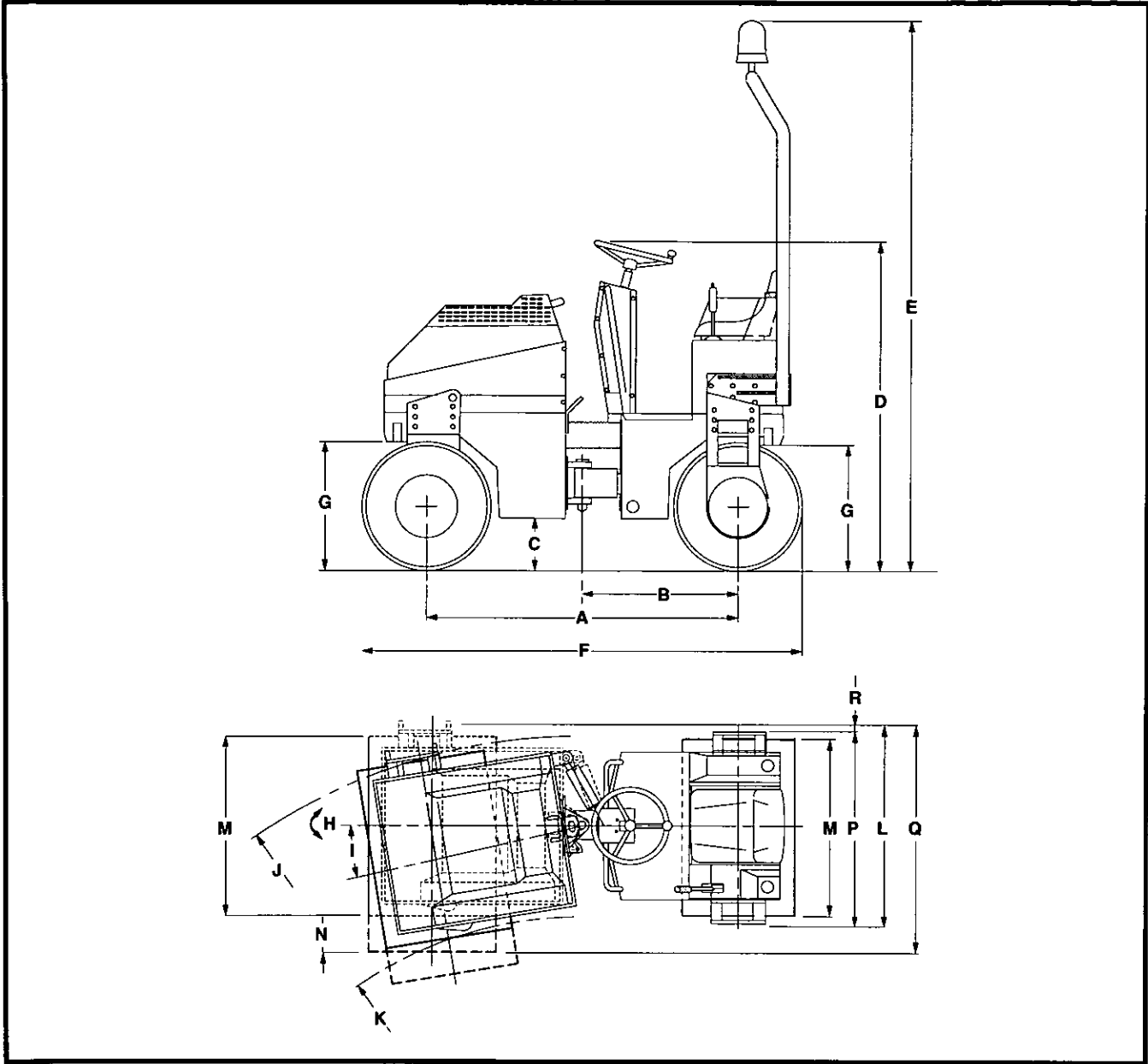
The above machine has been tested at a normal operating engine speed of 3000 rpm. The machine was supported by an asphalt base.

Vibration emission - 10 BS

Weighted root mean square acceleration value to which arms are subjected does not exceed m/s<sup>2</sup>.  
Weighted root mean square acceleration value to which body (feet and posterior) is subjected does exceed m/s<sup>2</sup>.

SECTION 7 - TECHNICAL SPECIFICATIONS

7.3 MACHINE DIMENSIONS



10 BS SERIES											
Units	A	B	C	D	E	F	G	H	I	J	K
mm	1416	708	150	1460	2505	1916	500	RH=17; LH=24;	± 15;	2420	1880
Units	L	M	N	P	Q	R					
mm	800	700	170	760	965	40					

## SECTION 7 - TECHNICAL SPECIFICATIONS

### 7.4 MACHINE WEIGHTS AND FIGURES

	10BS
<b>WEIGHTS WITH ROPS AND NO CAB</b>	
Operating Weight (CECE) kg	1338
Static Weight at Front Drum kg	669
Static Weight at Rear Drum kg	669
Shipping Weight kg	
Static Linear Load (Front Drum) kg/cm	9.5
Static Linear Load (Rear Drum) kg/cm	9.5
<b>PROPULSION (TRANSMISSION)</b>	
Type of System	Hydrostatic
Driven Axles	2
Travel Speed km/h	0 - 7.5
Gradeability (Theoretical) percent	35
<b>BRAKES</b>	
Service	Hydrostatic
Secondary/Parking Brake	S.A.H.R.
<b>STEERING</b>	
Type	Articulated
Control System	Hydraulic
Cylinders	1
Articulation Angle	RH=17° LH=24°
Drum Oscillation Angle	+-15 degrees
<b>VIBRATION</b>	
Vibrating Drums	1
Drive System	Hydraulic/Fixed Frequency
Frequency hz/(vpm)	50 (3000)
Nominal Amplitude mm	0.45
Centrifugal Force/ vibrating drum KN	8.8
<b>ENGINE</b>	
Standard	Lombardini Diesel 3LD511
Cylinders	1
Displacement cc	511
Bore mm	85
Stroke mm	90
Rated Power at 3000 r.p.m. DIN 7020 kW	9.2
Engine Oil Capacity Liter	2
Oil Filtration	Strainer
Fuel Filtration	Strainer
Fuel System Type	Bosch
Type Air Cleaner	Oil Bath
Electrical and Starting System	12 Volt
Cooling System	Air-Cooled
<b>MISCELLANEOUS</b>	
Drum Sprinkler System	Gravity to both drums
Water Tank Capacity Liter	90

## SECTION 8 - FUEL AND LUBRICANT INSTRUCTIONS

Contents	Page	Contents	Page
General Information (8.1) _____	1	Lubricating Oil/Grease (8.5) _____	6
Lubrication Chart (8.2) _____	2	Engine Lubricating Oil	
Fluid Capacities (8.3) _____	4	Specifications (8.6) _____	6
Hydraulic Oil Requirements And		Lombardini Fuel Oil Specifications (8.7) _____	6
Specifications (8.4) _____	5	Transmission Oil Specifications (8.8) _____	6
		Hazardous Substance Precaution (8.9) _____	7

### 8.1 GENERAL INFORMATION

Lubrication is an essential part of preventive maintenance, affecting to a great extent the useful life of the unit. Periodic lubrication of the moving parts reduces to a minimum the possibility of mechanical failures.

Different lubricants are needed and some components in the unit require more frequent lubricant than others. Therefore, it is important that the instructions regarding types of frequency of the application be explicitly followed.

The Lubrication Chart that follows in this section shows those items requiring regular service and the interval at which they should be performed. Details concerning fuel, oil and other lubricants follow the lubrication chart. A regular service program should be geared to the items listed under each interval. These intervals are based on average operating conditions. In the event of extremely severe, dusty or wet operating conditions, more frequent lubrication than specified may be necessary.

Specific recommendations of brand and grade of lubricants are not made here due to regional availability, operating conditions, and the continual development of improved products. Where questions arise, refer to the component manufacturer's manual and a reliable supplier.

All oil levels are to be checked with the machine parked on a level surface and while the oil is cold, unless otherwise specified.

On plug type check points, the oil levels are to be at the bottom edge of the check port.

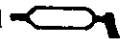
All grease fittings are SAE STANDARD unless otherwise indicated. Grease non-sealed fittings until grease is seen extruding from the fitting. 28 grams of EP-MPG equals one pump on a standard 0.45 kg grease gun.

Over lubrication on non-sealed fittings will not harm the fittings or components, but under lubrication will definitely lead to a shorter lifetime.

Unless otherwise indicated, items not equipped with grease fittings (linkages, pins, levers, etc.) should be lubricated with oil once a week. Motor oil, applied sparingly, will provide the necessary lubrication and help prevent the formation of rust. An anti-seeze compound may be used if rust has not formed. Otherwise, the component must be cleaned first.

Grease fittings that are worn and will not hold the grease gun, or those that have a stuck check ball, must be replaced.

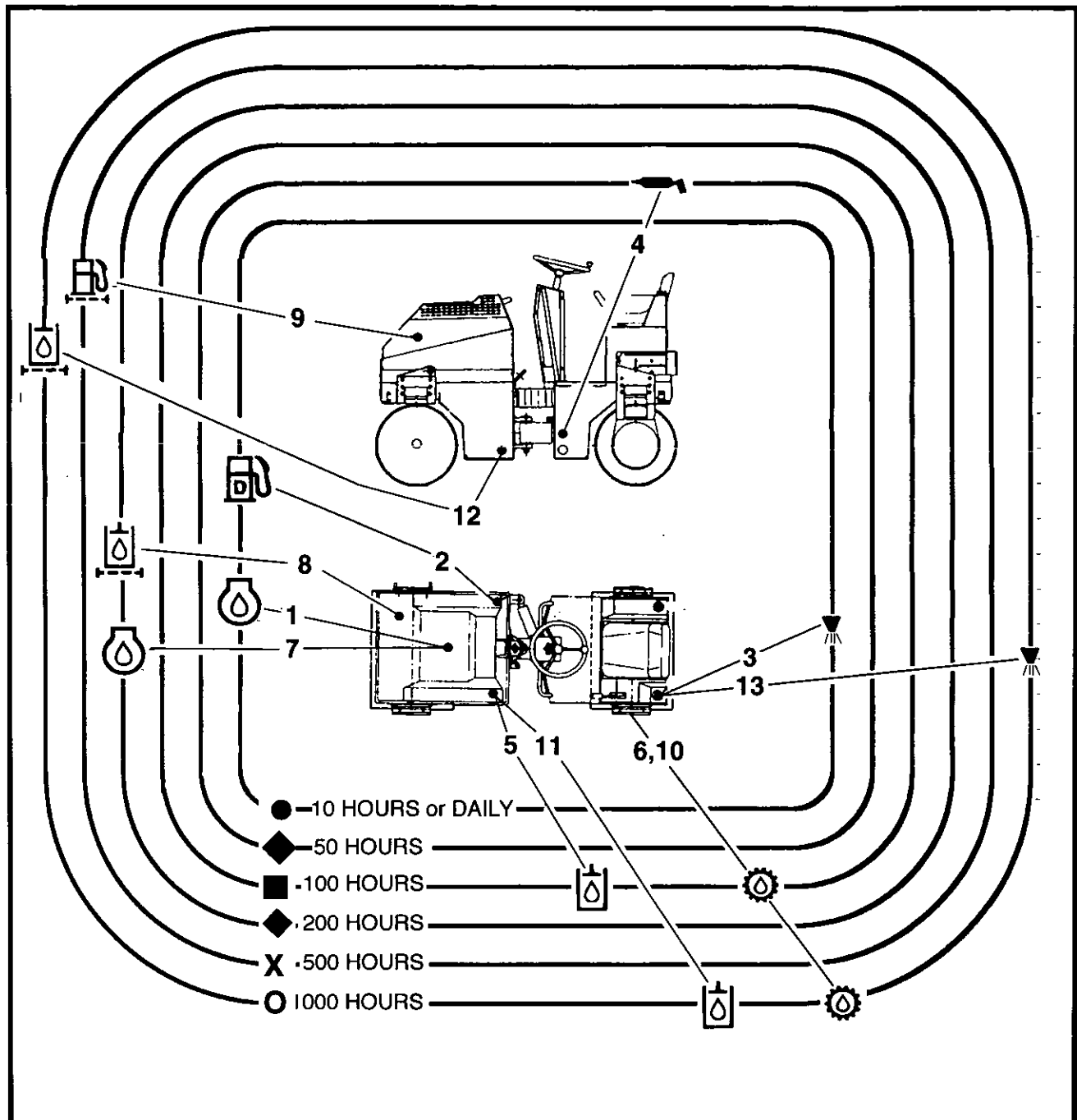
#### I. To prevent minor irregularities from developing into serious conditions several other services or checks are recommended for the same intervals as the periodic lubrication.

1. Thoroughly wash all fittings, caps, plugs, etc. with non-flammable, non-toxic cleaning solution before servicing, to prevent dirt from entering while performing the service.
2. Lubricants must be operating temperature when draining.
3. During regular lubrication service, visually check the entire unit in regard to capscrews, nuts and pins being properly secured.
4. Spot check several capscrews and nuts for proper torque. If any are found loose, a more thorough investigation must be made.
5. If a defect is detected which requires special maintenance service, stop the machine operation until the defect has been corrected. If necessary, contact the local Ingersoll-Rand distributor for assistance.
6. This symbol  represents an area where lubrication is required. Periodic lubrication requirements are listed in the following Lubrication Chart. These requirements include lubricant checks and greasing designated areas of the machine.

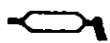
Periodic lubrication requirements are listed in the following Lubrication Chart. These requirements include lubricant checks and greasing designated areas of the machine.

## SECTION 8 - FUEL AND LUBRICANT INSTRUCTIONS

### 8.2 LUBRICATION CHART



### LUBRICATION SCHEDULE CHART



Grease



Engine Oil



Engine Oil Filter



Hydraulic Oil



Hydraulic Oil Filter



Transmission Oil



Fuel Filter






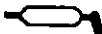

Water (*Drum Spray Bar*)

Refer to Page 8-4 for specific oil grades.

This lubrication schedule is supported by the Maintenance Schedule Chart found in Section 5 of this manual



## SECTION 8 - FUEL AND LUBRICANT INSTRUCTIONS

LUBRICATION CHART					
<b>SERVICE FUNCTION:</b> S-CHECK D-DRAIN  A-ADD  F-FILL  G-GREASE  CL-CLEAN AR-AS REQUIRED C-CHANGE  FTLH-FILL TO LEVEL HOLE					
SERVICE INTERVAL	ITEM REF.	DESCRIPTION	SERVICE	REMARKS	QUANTITY
● 10 HOURS OR DAILY	1 2 3	ENGINE OIL FUEL TANK WATER TANK	S A S A S A	SAE 15W/40 #2 DIESEL FUEL WATER	FILL TO DIPSTICK FULL 5.3 LITER FILL TO NECK
◆ 50 HOURS	4	DRUM OFFSET GUIDES	G	MPG-EP2 GREASE	AR
■ 100 HOURS	5 6	HYDRAULIC OIL ECCENTRIC OIL	G S A	SAE 10 HD SAE 80W/90	FILL TO DIPSTICK FULL FTLH
◆ 200 HOURS	7 8	ENGINE OIL HYDRAULIC FILTERS	D F C	SAE 15W/40 SEE OP./PARTS MAN.	2.0 LITER 1
X 500 HOURS	9	ENGINE FUEL FILTER	C/CL	SEE OP./PARTS MAN.	1
O 1000 HOURS OR ANNUALLY	10 11 12 13	ECCENTRIC OIL HYDRAULIC OIL HYDRAULIC OIL STRAINER WATER TANK	D F D F CL D CL F	HD SAE 80W/90 SAE 10 SEE OP./PARTS MAN. WATER	0.3 LITER 25 LITER FTLH 90 LITER

## SECTION 8 - FUEL AND LUBRICANT INSTRUCTIONS

### 8.3 FLUID CAPACITIES

The following fluid capacities are provided for servicing personnel who must perform machine maintenance in remote locations where complete shop facilities and resources are not available. These capacities will give the servicing personnel an approximation of the fluid capacities of the components to be serviced. Always ensure that the specified method of checking for accurate fluid levels is used.

FLUID/OIL	APPROXIMATE CAPACITY
Diesel Fuel - #2 ASTM no. 2TT Diesel	5.3 Liter
Hydraulic Oil Tank (SAE 10W)	25 Liter
Engine Oil (SAE 15W/40) Lombardini Diesel 3LD 511	2.0 Liter
Water Tank	90 Liter
Eccentric Oil (HD SAE 80W/90)	0.3 Liter (each each housing)

## SECTION 8 - FUEL AND LUBRICANT INSTRUCTIONS

### 8.4 HYDRAULIC OIL REQUIREMENTS AND SPECIFICATIONS

The quality of the hydraulic oil is important to the satisfactory performance of any hydraulic system. The oil serves as the power transmission medium, system coolant, and lubricant. Selection of the proper oil is essential to ensure proper system performance and life.

Note:

As a general guideline the Lubrication Chart on page 8-2 indicates a SAE 10 weight oil may be used in the hydraulic system on this machine.

For the specifications and requirements that hydraulic oil used in this machine should meet, refer to information below.

Viscosity:	60 SUS minimum at operating temperature 7500 SUS maximum at starting temperature 150 to 225 SUS at 100°F (generally) 44 to 48 SUS at 210°F (generally)
Viscosity Index:	90 minimum
Aniline Point:	-175 minimum
API Gravity:	28 minimum Paraffinic oils: 28 or more; Mixed base: 24 to 28; Napthanic or asphaltic base: 24 or less
Recommended Additives:	Rust and oxidation inhibitors Foam depressant
Desirable Characteristics:	Stability of physical and chemical characteristics High demulsibility (low emulsibility) for separation of water, air and contaminants. Resistance to the formation of gums, sludges, acids, tars and varnishes High lubricity and film strength

the following are only a few examples of the commercial brand oils meeting specifications for use at temperatures above 10 degrees F (-12 degrees C).

Mobil Oil Company \_\_\_\_\_ Mobil DTE 25  
Sun Oil Company \_\_\_\_\_ Sun Oil 2105  
Shell Oil Company \_\_\_\_\_ Rimula X SAE 10 W  
CCMC D4

For temperatures below 10°F (-12°C), the following examples meet specifications.

Auto Transmission Fluid \_\_\_\_\_ Type F  
Mobil Oil Company \_\_\_\_\_ Mobil DTE 13  
Shell Oil Company \_\_\_\_\_ Tellus T-27

## SECTION 8 - FUEL AND LUBRICANT INSTRUCTIONS

### 8.5 LUBRICATING OIL/GREASE SPECIFICATIONS (EXCEPT ENGINE)

#### I. Extreme Pressure Multi-Purpose Grease

This is a lithium calcium base grease with a high load carrying capacity. The following properties are recommended:

Timken OK Load	40 Lb. Minimum
Dropping Point Minimum	350°F (177°C)
Oil Viscosity	75 SUS Minimum at 210°F (99°C)
Water Resistance	Excellent

Under normal operating conditions, the following consistency grades are recommended:

NLGI No. 0 for subzero Fahrenheit temperatures.  
NLGI No. 1 or No. 2 for normal ambient temperatures.  
NLGI No. 2 or No. 3 for temperatures over 100 degrees F. (38 degrees C).

Use winter-grade diesel fuel only during the cold season, because with ordinary fuel, paraffin deposits may form at low temperatures and clog the fuel filter. At excessively low temperatures, even winter-grade fuel will tend to cloud. If only summer-grade fuel is available, or if winter-grade fuel is used at very low temperatures, we recommend the following values for the admixture of kerosene or tractor fuel. **The admixture is to be considered as a substitute which must not be used for more than one tank filling.** Refer to the following chart "FUEL SPECIFICATIONS" for information.

### 8.6 ENGINE LUBRICATING OIL SPECIFICATIONS

#### NOTE

*For latest applicable engine lubricating oil specifications, contact engine manufacturer/distributor or your Ingersoll-Rand Distributor.*

### 8.7 LOMBARDINI FUEL OIL SPECIFICATIONS

Always use a reputable branded grade of fuel (gas oil), the sulfur content of which should be below 0.5 percent and observe strict cleanliness when filling. At low ambient temperature, use only winter grade fuel. The fuel must be replenished promptly to prevent the tank from running dry; otherwise the injection pump, fuel filters, and injection lines will need air-venting.

#### FUEL SPECIFICATIONS

Ambient Temperature	Summer Diesel Fuel %	Admixture %	Diesel Fuel %	Admixture %
down to +14°F (-10°C)	90	10	100	—
down to +7°F (-14°C)	70	30	100	—
down to -4°F (-20°C)	50	50	80	20
down to -22°F (-30°C)	—	—	50	50

Here is a simple method for testing the suitability of diesel fuel at low temperatures: Pour some fuel into a small bottle and expose to the cold. Any clouding would mean that the fuel can be used only in summer.

## SECTION 8 - FUEL AND LUBRICANT INSTRUCTIONS

### 8.9 HAZARDOUS SUBSTANCE PRECAUTION



### HAZARDOUS SUBSTANCE PRECAUTION

The following information is provided to assist the owners and operators of Ingersoll-Rand Road Machinery Equipment. Further information may be obtained by contacting your Ingersoll-Rand Road Machinery Equipment Distributor.

The following substances may be produced during the operation of this machine and may be hazardous to health		The following substances are used in the manufacturing of this machine and may be hazardous to health if used incorrectly.	
SUBSTANCE	PRECAUTION	SUBSTANCE	PRECAUTION
Engine Exhaust Fumes	Avoid breathing in	Antifreeze (Water cooled engines)	Avoid ingestion, skin contact and breathing in fumes
Engine Exhaust Fumes	Avoid buildup of fumes in confined spaces.	Hydraulic Oil	Avoid ingestion, skin contact and breathing in fumes
Electric Motor Dust (Brushes/Insulation)	Avoid breathing in during maintenance	Engine Lubricating Oil	Avoid ingestion, skin contact and breathing in fumes
Brake Lining Dust*	Avoid breathing during maintenance	Preservative Grease	Avoid ingestion, skin contact and breathing in fumes
		Engine Fuel	Avoid ingestion, skin contact and breathing in fumes
		Battery	Avoid ingestion, skin contact and breathing in fumes
		SAE Gear Oil	Avoid ingestion, skin contact and breathing in fumes

\* Only on machines with dry axle brakes.

## SECTION 9 - TORQUE SPECIFICATIONS

Contents	Page	Contents	Page
SAE Torque Chart (9.1)	1	Special Torque Values (9.3)	3
ISO Metric Torque Chart (9.2)	2		

### 9.1 SAE TORQUE CHART

Use the following Recommended Torque Chart for bolts and nuts of SAE Grade 5 or better quality. If other torques are required they will be indicated in the text.

BOLT (COURSE)	TORQUE	
	lbs.-ft.	Nm.
1/4 - 20	9	12
5/16 - 18	19	26
3/8 - 16	37	50
7/16 - 14	59	80
1/2 - 13	90	122
9/16 - 12	130	176
5/8 - 11	180	244
3/4 - 10	320	434
7/8 - 9	515	698
1 - 8	775	1051
1 1/8 - 7	1100	1492
1 1/4 - 7	1540	2088
1 3/8 - 6	2020	2739
1 1/2 - 6	2690	3648

#### NOTE:

Use Loctite 271 on all bolts larger than 5/16. Use Loctite 242 on bolts 5/16 and smaller. Apply enough Loctite to fill all gaps between the engaged bolt and nut threads.

#### NOTE:

Torque values are based on plated, yellow zinc, dichromate bolts.

BOLT (COURSE)	TORQUE	
	lbs.-ft.	Nm.
1/4 - 28	11	15
5/16 - 24	21	28
3/8 - 24	42	57
7/16 - 20	66	89
1/2 - 20	100	136
9/16 - 18	145	197
5/8 - 18	205	278
3/4 - 16	355	481
7/8 - 14	570	773
1 - 12	845	1146
1 1/8 - 12	1230	1668
1 1/4 - 12	1710	2319
1 3/8 - 12	2300	3119
1 1/2 - 12	3020	4095

All thread fasteners will be Loctited except the following:

1. Nylon insert nuts.
2. Whizlock bolts and nuts.
3. Fasteners less than 1/4 inch diameter.
4. If instructed not to apply Loctite.

## SECTION 9 - TORQUE SPECIFICATIONS

### 9.2 ISO METRIC TORQUE CHART

Use the following Recommended Torque Chart for bolts and nuts of ISO Metric strength Class 8.8 and 10.9. If other torques are required, they will be indicated in the text.

**NOTE:**

*Torque values are based on plated, yellow zinc, dichromate bolts. Values will be approximately 30% less if lubricated bolts are used.*

BOLT (COURSE)	TORQUE	
	lbs.-ft.	Nm.
M6 x 1,0	9	12
M8 x 1,25	21	28
M10 x 1,5	45	61
M12 x 1,75	79	105
M14 x 2,0	125	170
M16 x 2,0	195	265
M20 x 2,5	380	515
M24 x 3,0	660	895
M3- x 3,5	1310	1780
M36 x 4,0	2290	310

**NOTE:**

*Use Loctite 271 on all bolts larger than M8. Use Loctite 242 on bolts M8 and smaller. Apply enough Loctite to fill all gaps between the engaged bolt and nut threads.*

*All thread fasteners will be Loctited except the following:*

- 1. Nylon insert nuts.*
- 2. Whizlock bolts and nuts.*
- 3. Fasteners less than 1/4 inch diameter.*
- 4. If instructed not to apply Loctite.*

## SECTION 9 - TORQUE SPECIFICATIONS

### 9.3 SPECIAL TORQUE VALUES FOR BS/BV 14/18 SERIES VIBRATORY COMPACTOR

The following are special torque values for specific fasteners that are different from those listed on the Torque Charts on the preceding pages .

#### Engine Area

FUNCTION OF FASTENER	FASTNER SIZE	TORQUE		USE OF LOCTITE #
		lbs-.ft	Nm	
Pump Coupling to Flywheel	M8	20	27	271
Pump Flange to Propulsion Pump	M8	40	54	271
Vibration/Steer Pump to Engine	M8	23	31	271
Propulsion Pump to Engine Flywheel	M14.5x1.5	75	102	271
Side Shock Mounts	M8	55	75	None
ROPS	M12	455	617	None

#### Drum Area

FUNCTION OF FASTENER	FASTNER SIZE	TORQUE		LOCTITE # (if used)
		lbs-.ft	Nm	
Vibration Motor to Drive Bracket	M12	45	61	NO
Shock Mounts to Vibration Leg/Drive Bracket	M12	110	149	NO
Shock Mount to Propulsion Drive Bracket	M12	110	149	NO
Shock Mount to Propulsion Side of Drum	M12	80	108	NO
Propulsion Motor (Sai) to Propulsion Leg	M12	220	298	271
Vibration Leg to Spacer	M12	220	298	271
Propulsion Leg to Spacer	M12	220	298	271
Shock Mounts to Drum	M12	80	108	271
Propulsion Motor (Brevini) to Propulsion Leg	M14 x 1.5	90	122	271

#### Articulation Area

FUNCTION OF FASTENER	FASTNER SIZE	TORQUE		LOCTITE # (if used)
		lbs-.ft	Nm	
Nut on Shaft through Frame Swivel Bracket	M22	260	353	271
Frame Rear Plate through Oscillation Swivel Pin	M20	260	353	271



## SECTION 10 - ELECTRICAL/HYDRAULIC SCHEMATICS

Contents	Page	Contents	Page
Schematics (10.1) _____	1	Electrical Schematic (10.3) _____	5
A.N.S.I. Graphical Symbols (10.2) _____	2	Hydraulic Schematics (10.4) _____	8

### 10.1 SCHEMATICS












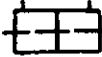



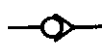





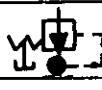












All electrical and hydraulic schematics for the machine are provided here. On page 2 of this section, there is a copy of A.N.S.I. Graphical Symbols to explain the symbols used on the hydraulic schematic.

#### NOTE:

*All schematics are current as of the date of printing and are subject to change without notice.*

## SECTION 10 - ELECTRICAL/HYDRAULIC SCHEMATICS

### 10.2 A.N.S.I. GRAPHICAL SYMBOLS

A		C	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		D	
8			
9		1	
10		2	
11		3	
12		4	
13		5	
14		6	
		7	
		8	
B		9	
		10	
1		11	
2		12	

#### A - LINES AND LINE FUNCTIONS

1. Working Line
2. Pilot Line
3. Drain Line
4. Connector
5. Flexible Line
6. Joining Lines
7. Passing Lines
8. Direction Of Flow
9. Line To Reservoir Above Fluid Level
10. Line To Reservoir Below Fluid Level
11. Line To Vented Manifold
12. Plug Or Plugged Connection
13. Fixed Restriction
14. Variable Restriction

#### B - PUMPS

1. Single, Fixed Displacement
2. Single, Variable Displacement

#### C - ACTUATORS

1. Fixed Displacement Reversible Motor
2. Fixed Displacement Non-Reversible Motor
3. Variable Displacement Reversible motor
4. Single Acting Cylinder
5. Double Acting Cylinder - Differential
6. Double Acting Cylinder - Non-Differential

#### D - VALVES

1. Check
2. On/Off (Manual Shutoff)
3. Pressure Relief
4. Pressure Reducing
5. Flow Control, Adjustable, Non-Compensated
6. Flow Control Adjustable (Temperature and Pressure Compensated)
7. Two Position - Two Connection
8. Two Position - Three Connection
9. Two Position - Four Connection
10. Three Position - Four Connection
11. Two Position - In Transition
12. Valves Capable Of Infinite Positioning

## SECTION 10 - ELECTRICAL/HYDRAULIC SCHEMATICS

A		B	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	

### A - METHODS OF OPERATION

1. Spring
2. Manual
3. Push Button
4. Push-Pull Lever
5. Pedal On Treadle
6. Mechanical
7. Detent
8. Pressure Compensated
9. Single, Winding Solenoid
10. Reversing Motor
11. Pilot Pressure Remote Supply
12. Internal Supply

### B - MISCELLANEOUS

1. Rotating Shaft
2. Enclosure
3. Vented Reservoir
4. Pressurized
5. Pressure Gauge
6. Electric Motor
7. Spring Loaded Accumulator
8. Gas Charged Accumulator
9. Heater
10. Cooler
11. Temperature Controller
12. Strainer Filter

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## SECTION 10 - ELECTRICAL/HYDRAULIC SCHEMATICS

### 10.3 ELECTRICAL SCHEMATIC

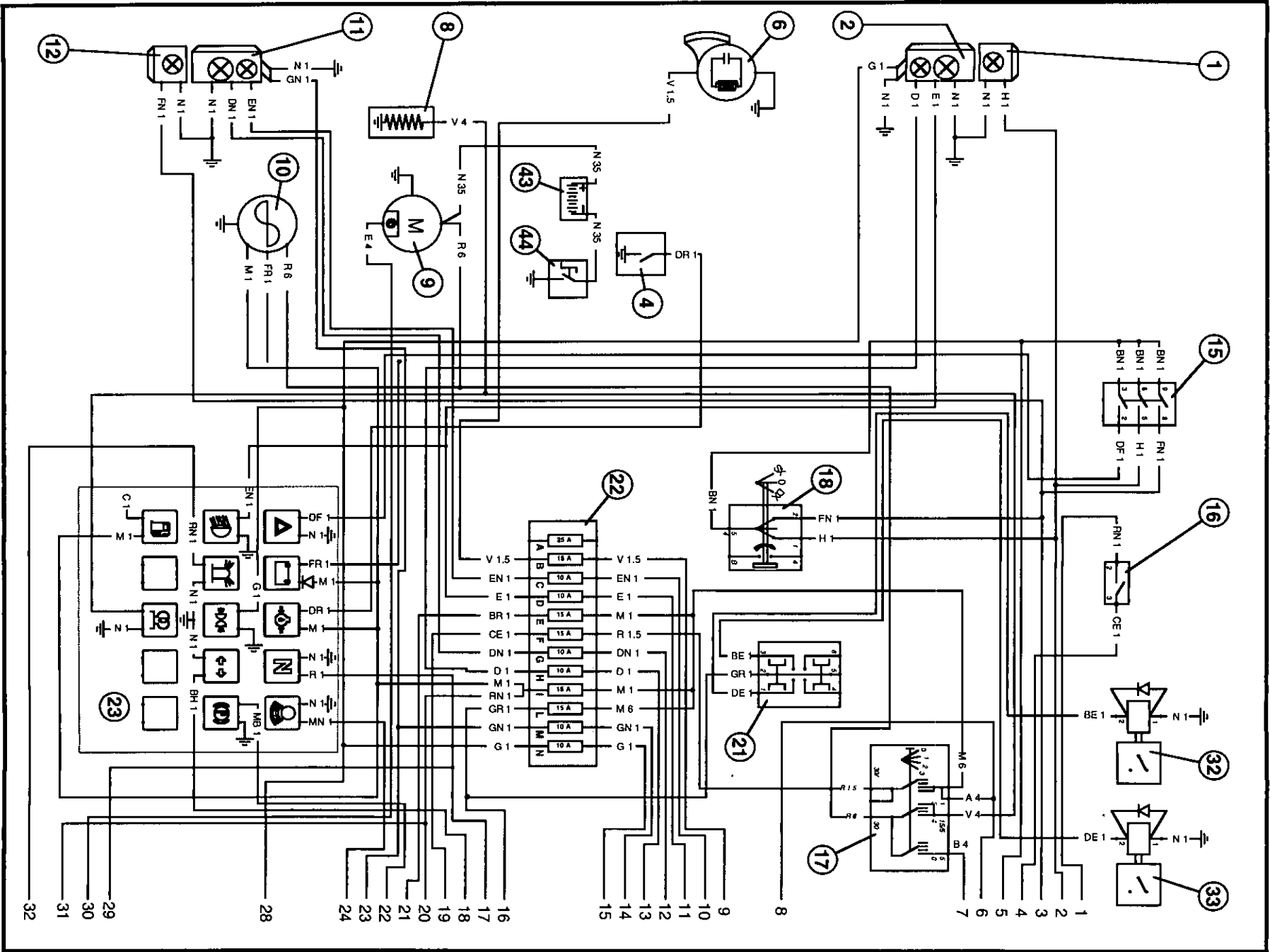
**LEGEND FOR ELECTRICAL SCHEMATIC**

Item Ref	Description	Item Ref	Description
1	Right Turn - Direction Indicator Light	23	Warning Indicator Lights Panel
2	Right side Headlight/Marker Light		
		25	Relay - Starter Motor
4	Engine Oil Pressure Sensor Switch	26	Relay - Seat Switch
6	Horn	28	Relay - Flashing Beacon
		29	Seat Switch
8	Temperature Sensor	30	Neutral Start Switch, Propulsion Lever
9	Starter Motor	31	Emergency Stop Switch
10	Alternator	32	Solenoid Valve, Drum Offset - Left
11	Left side Headlight/Marker Light	33	Solenoid Valve, Drum Offset - Right
12	Left Turn - Direction Indicator Light		
		35	Solenoid Valve, Vibration
		36	Solenoid Valve, Emergency Brake
15	Hazard Warning Light Switch	37	Solenoid Valve, Seat Switch
16	Flashing Beacon Switch	38	Rear Lights Cluster -Right Side
17	Ignition/Starter Switch	39	Flashing Beacon
18	Direction Turn Switch	40	Light, Number Plate
		41	Vibration Switch
20	Horn / Lights Switch	42	Rear Lights Cluster -Left Side
21	Drum Offset Switch	43	Battery
22	Fusebox	44	Battery Isolator Switch
23	Warning Indicator Lights Panel		

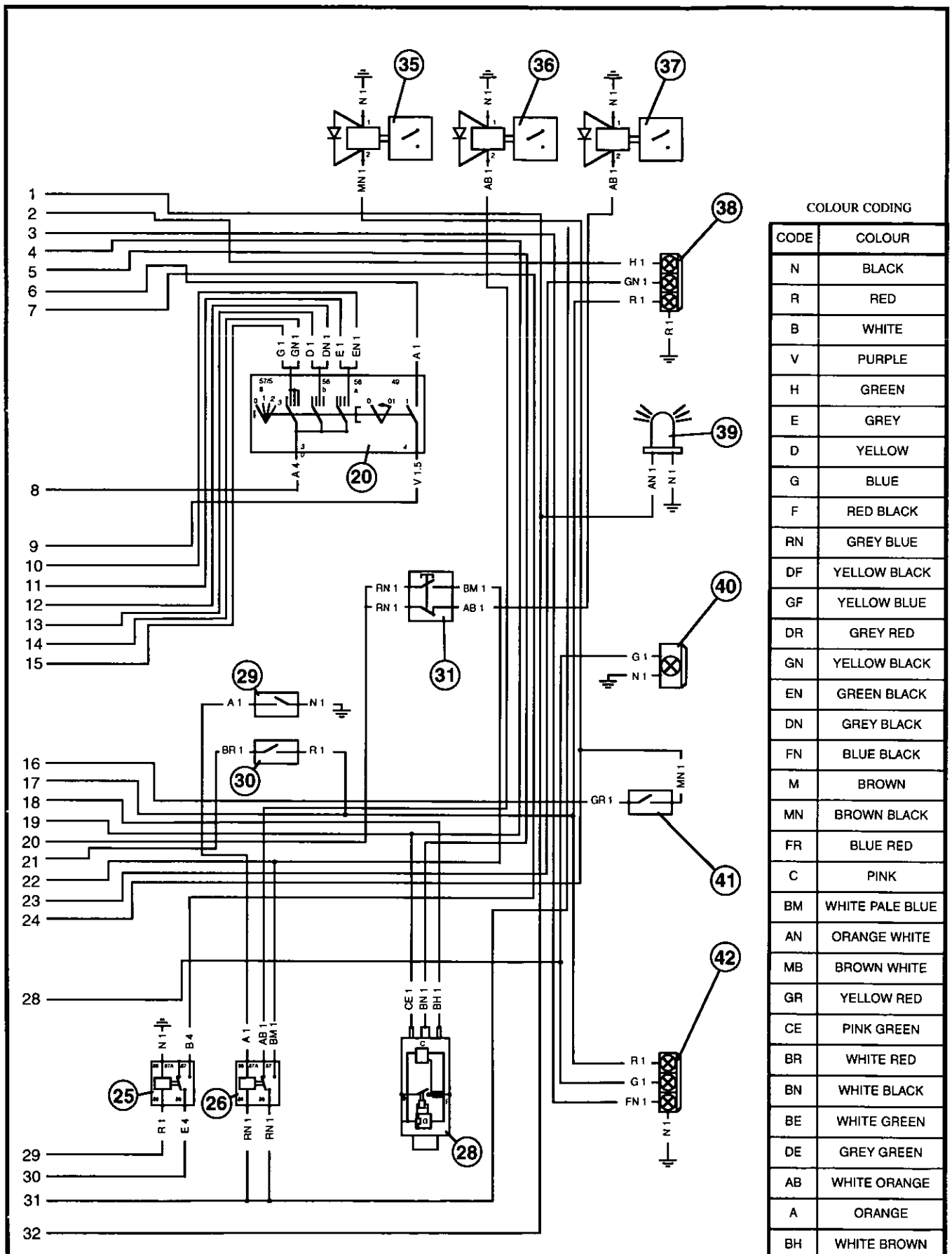
**FUSE IDENTIFICATION TABLE**

Fuse Ref.	Ampere Rating	Circuit
B	15A	Horn
C	10A	Hi Beam Light -Left side
D	10A	Hi Beam Light -Right side
E	15A	Braking and Starter Relay
F	15A	Flashing Beacon and Relay
G	10A	Low Beam Light -Left side
H	10A	Low Beam Light -Right side
I	15A	Warning Indicator Light Panel, Seat Switch, Electric Fan, Engine Stop and Emergency Brake Switch
L	15A	Vibration and Drum Offset
M	10A	Front Left and Rear Right Marker Light
N	10A	Front Right and Rear Left Marker Light, and Registration Plate Light

SECTION 10 - ELECTRICAL/HYDRAULIC SCHEMATICS



# SECTION 10 - ELECTRICAL/HYDRAULIC SCHEMATICS

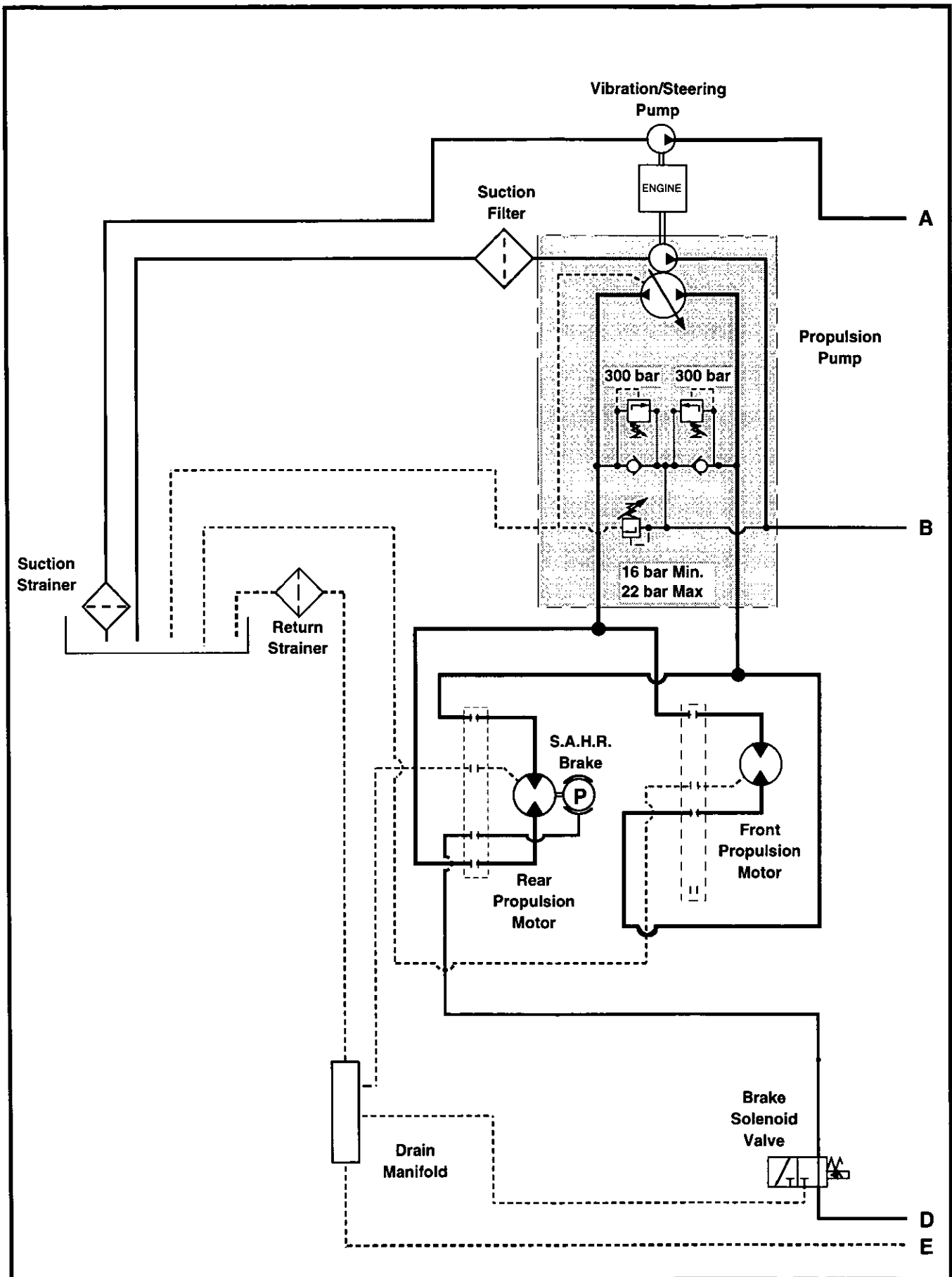


Electrical Schematic - 10 BS Series

(Sheet 3 of 3)

# SECTION 10 - ELECTRICAL/HYDRAULIC SCHEMATICS

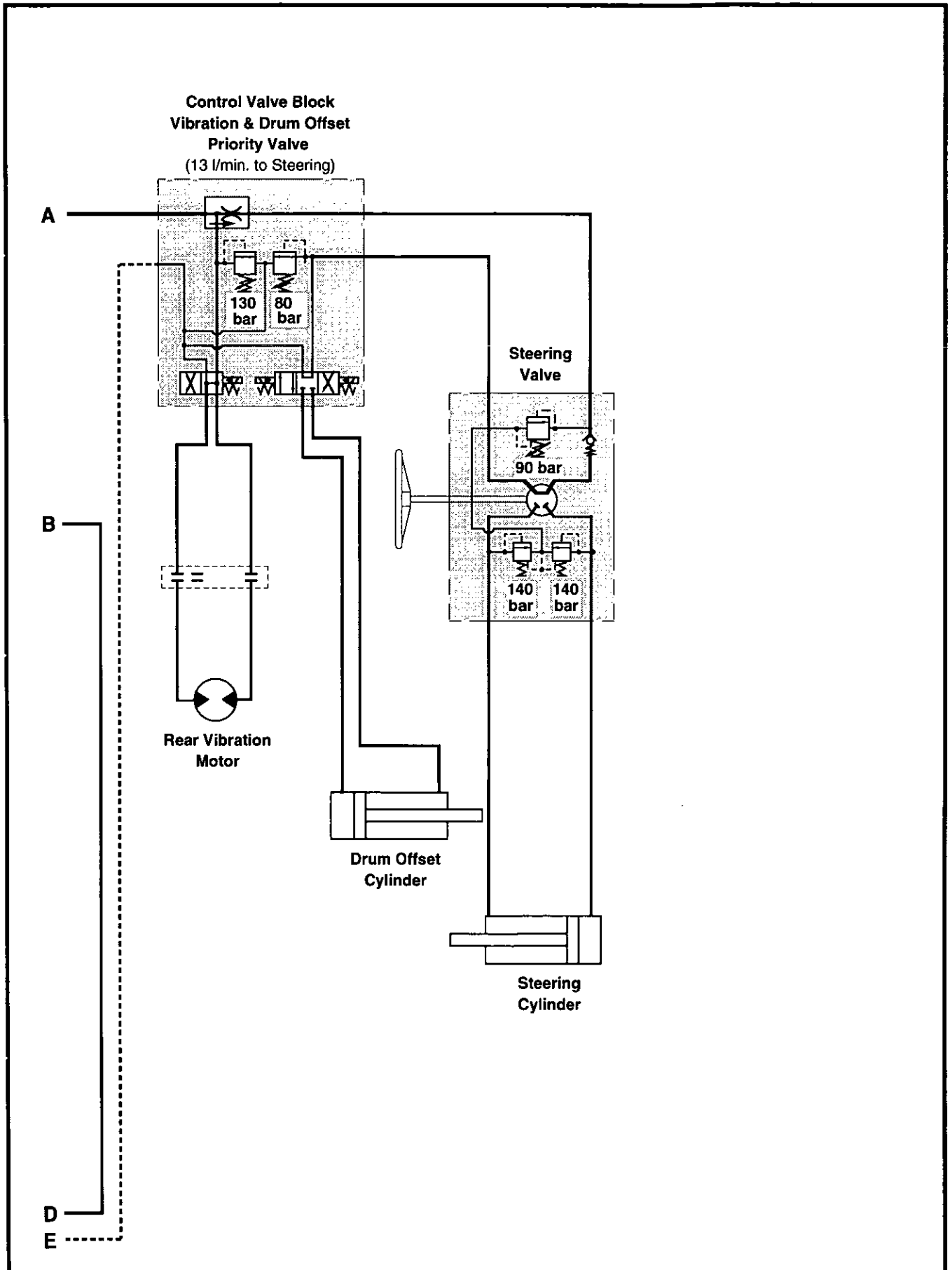
## 10.4 HYDRAULIC SCHEMATICS



Hydraulic Schematic - 10 BS SERIES



# SECTION 10 - ELECTRICAL/HYDRAULIC SCHEMATICS



Hydraulic Schematic - 10 BS SERIES

# INDEX

Contents	Page
10 Hour Or Daily Routine Maintenance (5.5)	5-5
50 Hour Or Weekly Routine Maintenance (5.6)	5-8
100 Hour Routine Maintenance (5.7)	5-8
200 Hour Routine Maintenance (5.8)	5-10
500 Hour Routine Maintenance (5.9)	5-10
1000 Hour/Annual Routine Maintenance (5.10)	5-13

## - A, B, C -

A.N.S.I. Graphical Symbols (10.2)	10-2
Adjusting Drum Offset	4-6
Alternator Discharge Indicator Light (3.28)	3-8
Articulation Lock Bar (3.1)	3-1
Battery Indicator Light ON (6.6)	6-3
Brake ON Indicator Light (3.14)	3-6
Change Drum Drive Gearbox Oil	5-14
Change Eccentric Housing Oil	5-13
Change Engine Fuel Filters	5-12
Change Engine Oil and Clean Engine Oil Filter	5-10
Change Hydraulic Oil Filter	5-11
Change Hydraulic Oil, Clean Hydraulic Tank	5-12
Check Air Cleaner Connections and Ducts	5-3
Check All Shock Mounts	5-5
Check and Clean Engine Cooling Fins	5-8
Check Battery	5-8
Check Condition of Drums and Scrapers	5-7
Check Drum Drive Gearbox Oil Level	5-10
Check Eccentric Oil Level	5-9
Check Engine Exhaust Manifold	5-12
Check Engine Oil Level	5-5
Check Engine Valve Clearance	5-14
Check Fuel Level	5-6
Check Hydraulic Oil Level	5-9
Check Hydraulic Systems Hosing	5-12
Check In-line Water Filter	5-6
Check Parking Brake	5-7
Check Water Pump and Drum Spray Bar	5-6
Check Water Tank Level	5-6
Check, Remove and Clean Air Cleaner Element	5-3
Checks/Verifications of Machine Controls	4-3
Checks/Verifications of Overall Machine	4-1
Checks/Verifications While Engine Running	4-4
Clean Hydraulic Oil Return Filter	5-11
Cleaning the Air Cleaner Element	5-4
Cleaning the Machine	5-4
Controls not Functioning (6.7)	6-3

## - D, E, F -

Daily Precautions after Work (4.6)	4-8
Difficult or Impossible to Find Neutral (STOP) Position at Control Lever (6.12)	6-6
Direction Turning Lights Indicator Light (3.23)	3-8
Direction Turning Lights Selector Switch (3.22)	3-8
Drain and Flush Water Tank and Spray Bars	5-14

Contents	Page
Drum Offset Control Switch (3.18)	3-7
Electrical Schematic (10.3)	10-5
Emergency Stop Switch (3.12)	3-5
Engine Difficult to Start and Has Poor and Irregular Performance (6.2)	6-2
Engine Lubricating Oil Specifications (8.6)	8-6
Engine Making Excessive Fumes (6.3)	6-2
Engine Overheats (6.4)	6-2
Engine Speed Control (3.15)	3-6
Engine Starting Indicator Light (3.4)	3-4
Engine will not Start (6.1)	6-1
Environmental Information (7.2)	7-1
Flashing Beacon Light Indicator Light (3.21)	3-7
Flashing Beacon Light Switch (3.20)	3-7
Fluid Capacities (8.3)	8-4
Fuse Identification (3.31)	3-9
Fusebox (3.30)	3-9

## - G, H, I -

General (1.3)	1-1
General Identification (7.1)	7-1
General Information (4.1)	4-1
General Information (8.1)	8-1
General Maintenance Information (5.1)	5-1
Grease Drum Offset Guides	5-8
Handling Fluids and Oil/Fuel Filters	5-1
Hazard Lights Indicator Light (3.25)	3-8
Hazard Lights Switch (3.24)	3-8
Hazardous Substance Precaution (1.11)	1-10
Hazardous Substance Precaution (8.9)	8-7
High Beam Indicator Light (3.11)	3-5
Horn and Driving Light Control Switch (3.9)	3-5
Hot Operating System (6.10)	6-5
Hourmeter (3.26)	3-8
Hydraulic Oil Requirements and Specifications (8.4)	8-5
Hydraulic Schematics (10.4)	10-8
Ignition Switch (3.19)	3-7
Ingersoll-Rand Machine Symbols (2.1)	2-1
Initial Break-In Maintenance (5.3)	5-3
International Symbols (2.2)	2-2
ISO Metric Torque Chart (9.2)	9-2

## - J, K, L -

Loading Machine By Lifting Equipment	4-8
Loading Machine Under Own Power (Drive On)	4-8
Lombardini Fuel Oil Specifications (8.7)	8-6
Low Engine Oil Pressure (6.5)	6-2
Low Engine Oil Pressure Indicator Light (3.27)	3-8
Low Fuel Level Indicator Light (3.29)	3-8
Lubricating Oil/Grease (8.5)	8-6
Lubrication Chart (8.2)	8-2

# INDEX

Contents	Page
<b>- M, N, O -</b>	
Machine Dimensions (7.3)	7-3
Machine Weights/Specifications (7.4)	7-4
Maintenance Schedule (5.2)	5-2
Mounting and Dismounting of Attachments (4.7)	4-8
Movement of Machine Between Work Sites (4.8)	4-8
Moving the Machine (Propulsion Control)	4-6
Observe Instructions	5-1
Operating Suggestions and Checks	4-5
Operating the Machine (4.4)	4-5
Operational Hints	4-1
Organizational Measures (1.5)	1-2
Overview (1.1)	1-1

## **- P, Q, R -**

Parking and Driving Lights Indicator Light (3.10)	3-5
Parking Brake Control (3.13)	3-6
Parking the Machine	4-7
Parking, Stopping and	
Shutting Down Machine (4.5)	4-7
Pre-Start Checks/Verifications (4.2)	4-1
Pre-Start Inspection (1.6)	1-2
Preservation and Storage (4.11)	4-10
Propulsion Operates In Only One Direction (6.11)	6-6
Propulsion Control (3.3)	3-4
Propulsion System does not Operate in	
any Direction (6.9)	6-4
Replacing the Air Cleaner Element	5-4
Routine Maintenance - As Required (5.4)	5-3

## **- S, T, U -**

SAE Torque Chart (9.1)	9-1
Safety Instructions Governing Operation (1.7)	1-2
Safety Related Decals (1.10)	1-7
Schematics (10.1)	10-1
Seat Adjustment (3.17)	3-6
Securing Machine to Transporter (Tie Down)	4-8
Selection and Qualification of Personnel (1.4)	1-1
Shutting Down the Machine	4-7
Sluggish Propulsion System Operation (6.8)	6-3
Special Conditions of Use (4.10)	4-9
Special Torque Values (9.3)	9-3
Starting Machine (4.3)	4-4
Steering Wheel (3.16)	3-6
Stopping the Machine	4-7
Torque Loose Bolted Connections	5-5
Towing the Machine (4.9)	4-9
Transmission Oil Specifications (8.8)	8-6
Transporting & Towing -Recommissioning (1.9)	1-5
Using Vibration (Vibration Control)	4-6

Contents	Page
<b>- V, W, X, Y, Z -</b>	
Vandalism Protection (3.2)	3-1
Vibration Control Switch (3.5)	3-4
Vibration Indicator Light (3.6)	3-4
Warning of Special Dangers (1.8)	1-5
Warnings (1.2)	1-1
Water Control Switch (3.7)	3-4
Water Spray Pump Indicator Light (3.8)	3-5

INDEX

Contents	Page	Contents	Page
----------	------	----------	------