

Ergonomic Solutions

OWNERS MANUAL

PALLET STACKER BPMPS SERIES

Contents			
Warning and safety Instructions	1	Parts Identification	11
Receiving Instructions	1	Periodic Maintenance Instructions	12
Loading Instructions	2	Foot Pump Operation	13
Operating Instructions	2	Warning Label identification	14
Electrical Schematic	3	Material Safety Data Sheets	15-18
Battery Charger Operations	4-5	Warranty	19
Hydraulic Operations and Schematic	6-7	Warranty Registration Card	19
Troubleshooting Guide	8-9	Ergonomic Solutions	20
Exploded Parts Drawing	10		

WARNINGS & SAFETY INSTRUCTIONS

Read owner's manual completely before operating unit!

- Not a personnel lift.
- Never go under forks if there is weight on unit.
- Remove weight & disconnect power before working on unit.
- Use only maintenance parts supplied or approved by the manufacturer.
- Do not change pressure relief valve setting.
- Do not clamp hydraulic cylinder in a vise as you may distort the barrel.
- Never operate the lift unless you are watching it.
- Do not go near leaks - high pressure oil easily punctures skin causing injury, gangrene, or death.
- Load tight against the bulkhead within the rated capacity.
- Transport loads in the lowered position only.
- Do not continue to operate the UP control if unit is not raising.
- Relieve system pressure by operating the DOWN control after the unit has come to rest.
- Consult factory if adding or performing any modification to the original equipment.
- Do not use brake fluids or jack oils. Use AW-32 Hydraulic oil or equal.
- Make sure all operator safety labels (see p. 14) and guards are in place.

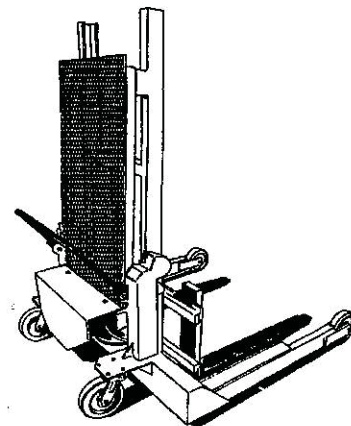
RECEIVING INSTRUCTIONS

Every unit is thoroughly tested and inspected prior to shipment. However, it is possible that the unit may incur damage during transit. If you see damage when unloading make a note of it on the SHIPPER RECEIVER.

Remove all packing and strapping material, inspect for damage. IF DAMAGE IS EVIDENT, FILE A CLAIM WITH THE CARRIER IMMEDIATELY! Also, check the platform size, type of power unit, etc., to ensure that the unit is correct for the intended application.

MODEL NUMBER AND CAPACITY

The model number, serial number and capacity are inscribed on the nameplate. Please remember to include these numbers in any correspondence with your dealer or the factory.



**PALLET STACKER
BPMPS SERIES**

ENGLISH

ESPANOL

FRANCAIS

LOADING INSTRUCTIONS

The load capacity rating as inscribed on the nameplate of your unit designates the net capacity for an evenly distributed load. This capacity must never be exceeded, as permanent damage or injury may result.

When loading the lift always follow these guidelines:

- 1.) Always load tightly against the bulkhead.
- 2.) Transport loads in the lowered position only.

OPERATING INSTRUCTIONS

The *Pallet Server* is furnished with a pushbutton control as standard equipment.

In order to operate the unit, the appropriate pushbutton must be held down to raise or lower the forks. On releasing either button, the forks will remain in that particular position until a button is depressed again.

Attempting to operate the battery powered lift when low on voltage will cause the protective device to prevent operation of the motor relay. This feature can help prevent injury to the operator and/or damage to the battery, the equipment, and the load. This switch does not affect the operation of either the battery charger that we offer.

Responsibilities of Owners/Users

It is the responsibility of the owner/user for the following:

- 1.) The lift must be inspected and maintained in accordance with the guidelines in this manual.
- 2.) Any lift not in safe operating condition must be removed from service until it is returned to proper operating condition.

Unsafe condition may include, but is not limited to the following : excessive hydraulic fluid or air leakage; missing rollers, pins, or fasteners; any cracked or deformed structural members; cut or frayed hydraulic, electric or air lines, and; damaged controls or safety devices.

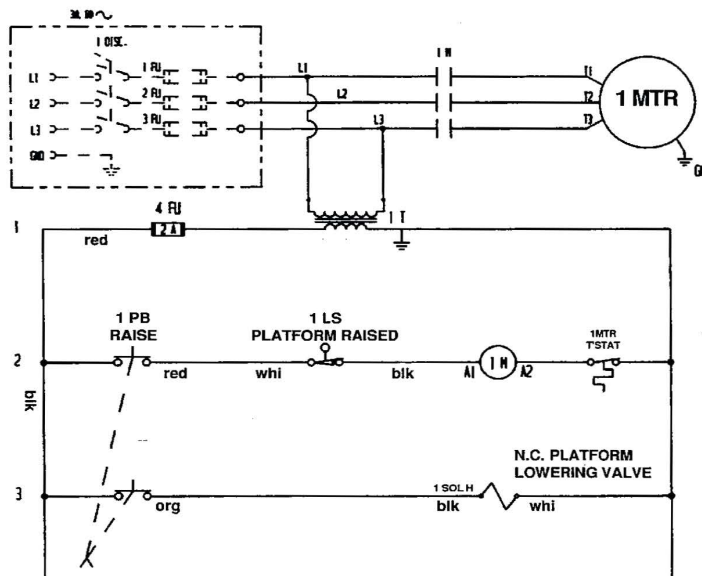
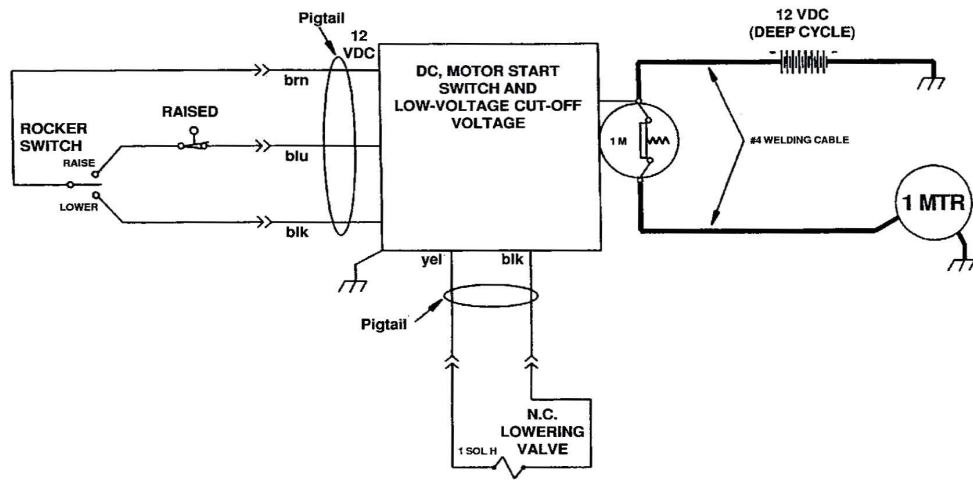
All repairs and maintenance must be performed by trained and qualified personnel.

- 3.) Lift may only be used by trained and authorized personnel. All lift operators must have read and understood all operating procedures and safety guidelines in this Owner's Manual.
- 4.) Lift must never be overloaded.
- 5.) Operator must ensure that all safety features of the lift are functioning properly before each use.
- 6.) Any modifications to the lift must be approved in writing by the manufacturer.

Ordering Replacement or Extra Parts

Our company takes pride in using the finest available parts for our equipment. We are not responsible for equipment failure resulting from the use of unapproved replacement parts. To order replacement or some parts for your equipment contact Customer Service at the factory. In any correspondence with the factory please include the **Serial Number** which is inscribed on the nameplate of the equipment. Use only the part numbers provided in this Owner's Manual. When ordering parts for AC power units please indicate the motor phase and voltage that the equipment is operating on.

ELECTRICAL SCHEMATIC



E N G L I S H



BE SURE ALL POWER IS OFF BEFORE ATTEMPTING TO WORK ON THIS EQUIPMENT!
CAUTION: SERVICE WORK SHOULD BE PERFORMED ONLY BY TRAINED & QUALIFIED PERSONNEL

OPERATING INSTRUCTIONS FOR OPTIONAL BENCH TOP STYLE BATTERY CHARGER

(for DC models equipped with our Bench Top Charger)

WARNING!

Working with or near lead acid batteries is dangerous. Batteries contain sulfuric acid and produce explosive gases. A battery explosion could result in loss of eyesight or serious burns.

Do not smoke or allow a spark or flame near batteries. Charge batteries in locations which are clean, dry, and well ventilated. Do not lay tools or anything metallic on top of any battery. All repairs to a battery must be made by experienced and qualified personnel.

When working with batteries, remove personal items such as rings, bracelets, necklaces, and watches. A battery can produce enough voltage to weld jewelry to metal causing a severe burn.

Always have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.

Operating the battery with a low battery voltage can cause premature motor contact failure.

OPERATING INSTRUCTIONS

Even if you did not purchase an optional battery charger, your new *Pallet Master/Server* has been fitted with a matching plug which will connect directly to the *Bench Top Charger* we offer. Contact your distributor if you wish to purchase a battery charger.

Do's and Don'ts

DO NOT leave charger connected for an indefinite length of time.

DO NOT smoke, strike a match or cause a spark in the vicinity of battery during charging.

DO make sure all battery connections are tight and clean.

DO NOT expose to rain or adverse conditions.

DO replace defective cords and wires immediately.

DO locate charger at least 24" above floor while charging.

DO NOT overcharge battery (*manual* position only)

OPERATING INSTRUCTIONS FOR STANDARD ON BOARD STYLE BATTERY CHARGER

(for DC models equipped with our On Board Charger)

WARNING!

Working with or near lead acid batteries is dangerous. Batteries contain sulfuric acid and produce explosive gases. A battery explosion could result in loss of eyesight or serious burns.

Do not smoke or allow a spark or flame near batteries. Charge batteries in locations which are clean, dry, and well ventilated. Do not lay tools or anything metallic on top of any battery. All repairs to a battery must be made by experienced and qualified personnel.

When working with batteries, remove personal items such as rings, bracelets, necklaces, and watches. A battery can produce enough voltage to weld jewelry to metal causing a severe burn.

Always have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.

Operating the battery with a low battery voltage can cause premature motor contact failure.

Our *On Board* charger is equipped with an external ground wire (small green). During installation the charger must be grounded to the equipment which it is connected to. Be sure this wire is always connected to the chassis, frame, or other metallic surface considered to be ground.

OPERATING INSTRUCTIONS

- 1.) Plug charger into a receptacle known to have approximately 115V and 60 Hz. If an extension cord must be used, keep it short and as large as possible. A small cord will decrease the output of the charger due to the voltage drop in the line. This will increase the charging time.
- 2.) When properly connected, the charge LED will indicate the status of charge current flowing to the battery.
- 3.) With only the red LED lit, the charger is providing full output to the battery.
With both the red and green LED's lit the charger is "topping off" the battery.
When only the green LED is on, the unit is providing a "float" or maintenance, charge.
- 4.) Remember to unplug the charger before moving equipment. Failure to do so could cause damage to cords, receptacles and other equipment.

ADDITIONAL INFORMATION

The *On Board* charger is current limited and will not exceed its rated output, even if loads are placed on the battery while the battery is charging.

The *On Board* chargers fuse will blow if the charger is connected in reverse polarity

TROUBLESHOOTING

- 1) Make sure battery connections are electrically and mechanically sound.
- 2) Check AC source for power.
- 3) Check fuse. Replace only with a fuse having the same rating as originally supplied.
- 4.) Check battery condition. A highly sulfated battery may take some time before current begins to flow through it.

DO'S AND DON'TS

DO NOT leave charger connected for an indefinite length of time.

DO NOT smoke, strike a match or cause a spark in the vicinity of battery during charging.

DO make sure all battery connections are tight and clean.

DO NOT expose to rain or adverse conditions.

DO replace defective cords and wires immediately.

HYDRAULIC OPERATION FOR AC/DE

When the operator wants to raise the unit, he/she depresses the **UP** button. This starts the electric motor which turns the hydraulic pump. Oil from the reservoir is drawn in through the suction filter and into the pump.

The pump delivers pressurized oil through a check valve before it enters the cylinders.

The function of the check valve is to allow the oil to flow in one direction, (towards the cylinders), and prevents the flow of oil back into the pump circuit when the pump stops running. This holds the oil in the cylinders and will maintain any particular barrel elevation, for extended periods of time.

If the load is excessive, and the **UP** button is still depressed, excessive pressure will build up in the circuit between the pump and the cylinders. This forces the relief valve to unseat allowing the pump flow to circulate to the reservoir preventing hydraulic or structural damage.

When the operator desires to lower the unit, he/she depresses the **DOWN** button. This energizes the lowering solenoid valve coil, unseating the poppet valve and allowing oil return from the cylinders through the pressure-compensated flow control valve, to the reservoir.

Releasing the **DOWN** button will de-energize the solenoid, closing the valve poppet. This and the check valve prevents the oil from returning to the reservoir and the cylinders will stop retracting. The unit will maintain that particular elevation until the operator chooses to move it once again.

CARTRIDGE VALVES

The lowering valve, as discussed above, is of cartridge construction and is virtually maintenance-free. If there is a faulty operation, check Trouble Shooting Section. To clean the cartridge valve, follow this procedure:

- 1.) **WARNING!** Lower forks completely before removing cartridge valve.
- 2.) Use a sharp object to push poppet in from the bottom to open the valve.
- 3.) Repeat several times while valve is immersed in kerosene or mineral spirits. Blow dry.
- 4.) Blow compressed air through valve while holding the valve open as described in step 2.
- 5.) Inspect "o" rings and the teflon washer. If either shows nicks, tears, or cuts, replace.
- 6.) Reinstall. The valve should be tightened to approximately 20 ft. lbs.

VELOCITY FUSE

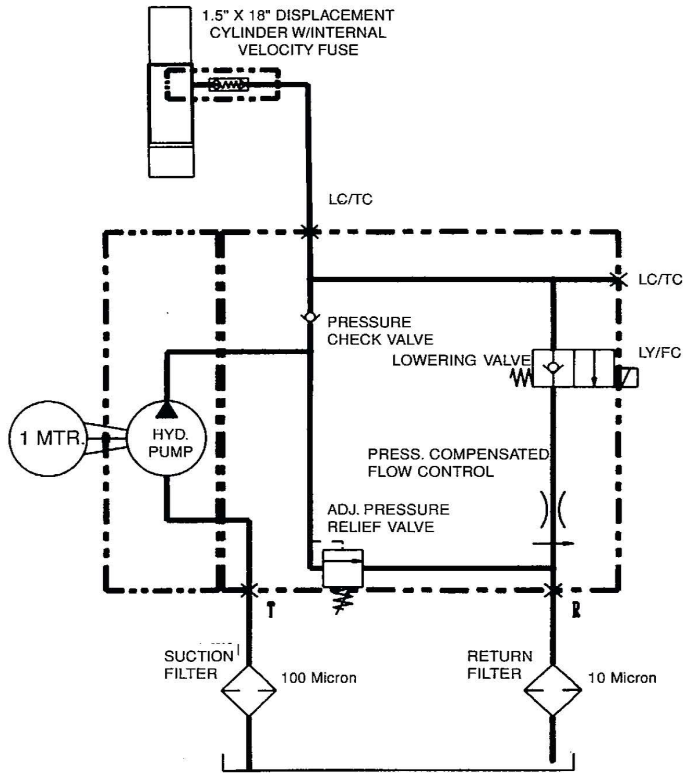
There is a brass velocity fuse with a stainless steel spring in the base of each cylinder (Item 10). In the event of a hydraulic hose or fitting failure, the platform starts to lower at a fast rate. As soon as the descent speed exceeds the preset speed, the Velocity Fuse will shut off the oil flow and the platform will remain nearly stationary until pressure is re-applied after repairs are done. This safety feature reduces the possibility of accidental personal injury or damage to the table or contents. If air is introduced into the system, the velocity fuse can lock up even though no failure has occurred. To reset the velocity fuse just activate the pump by jogging the **UP** button. Remove the load and cycle the unit several times to purge air.

AIR BLEED PROCEDURE

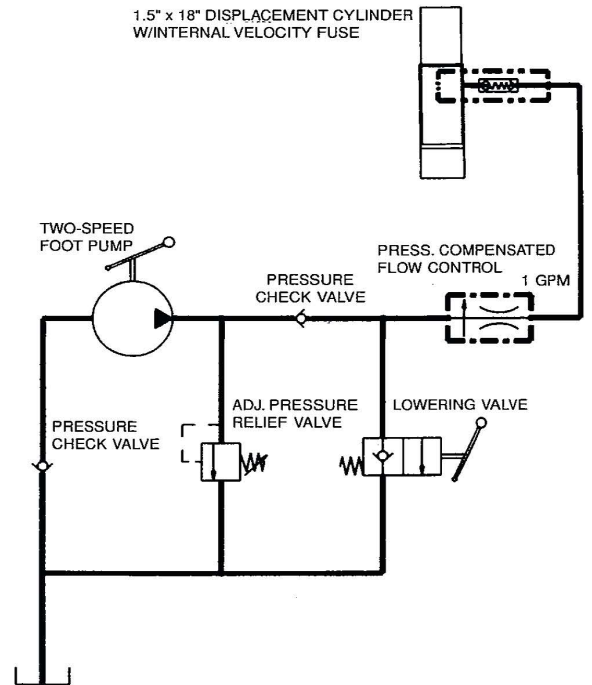
If the forks descend very slowly or will not descend at all, air is likely trapped in the hydraulic circuit and must be bled from the system. The Pallet Server utilizes a bleeder screw at the top of the cylinder. To bleed air from the hydraulic circuit, follow these directions.

- 1.) Remove the drum from the cradle.
- 2.) Loosen the bleeder screw at the top of the cylinder approximately 1/4 to 1/2 turn to allow trapped air to escape. Depress the foot pump treadle or job the motor to push the out of the system.
- 4.) When the cylinder is free of air only clear hydraulic fluid will be visible at the bleeder screw. Tighten the hose fitting.

HYDRAULIC SCHEMATIC



**ELECTRIC POWER UNIT
HYDRAULIC DIAGRAM**



**MANUAL FOOT PUMP
HYDRAULIC DIAGRAM**

E N G L I S H

HYDRAULIC EQUIPMENT

DC Troubleshooting Quick Reference Guide

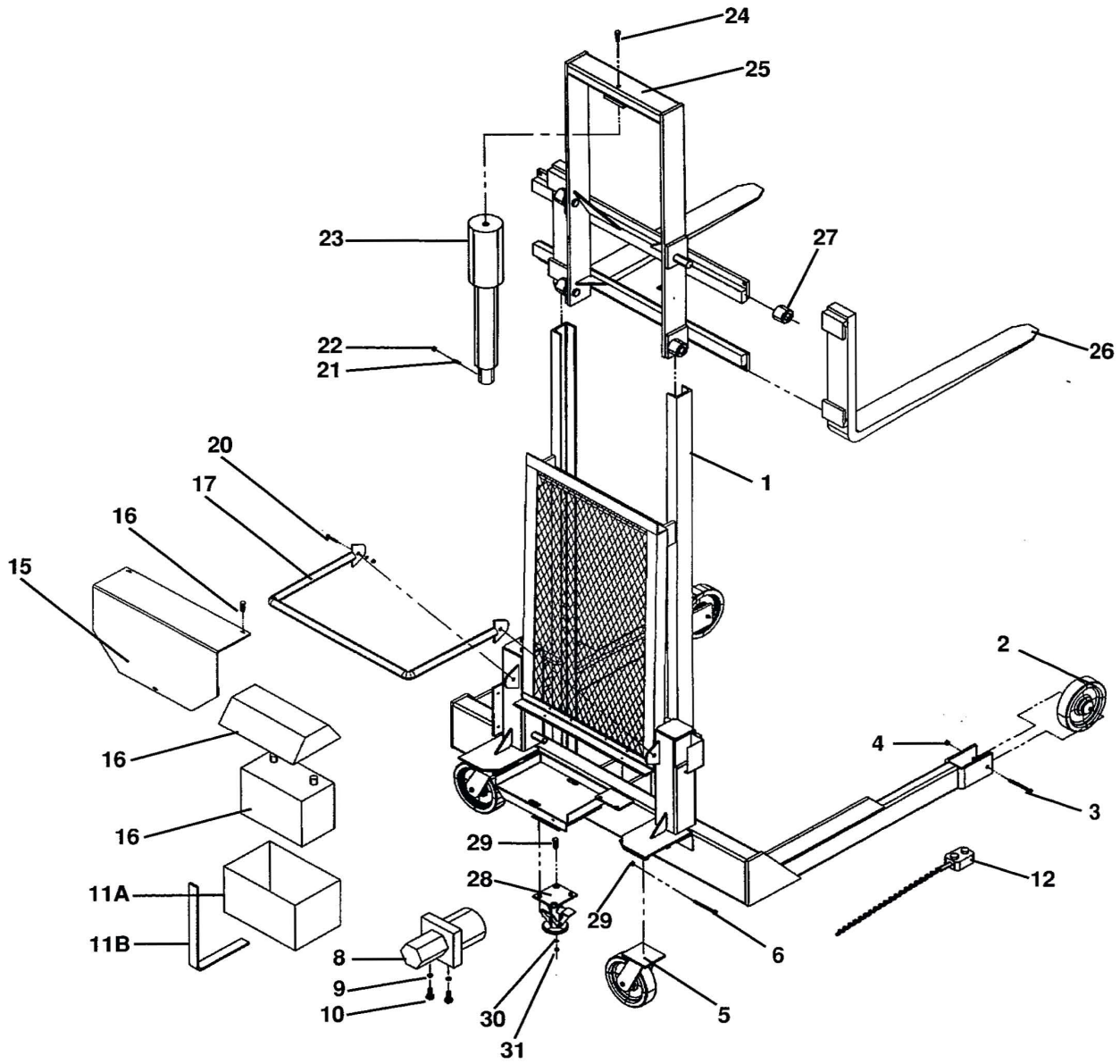
(For further information contact the factory)

WARNING! BEFORE PERFORMING ANY MAINTENANCE WORK ALWAYS UNLOAD AND COMPLETELY LOWER THE LIFT BOOM.

Observation	Possible Cause	Remedy
1. Unit does not raise, motor does not run.	a. Low battery voltage. (Check light)	a. Recharge battery
	b. All chassis connections to negative post of battery not made well.	b. Check and tighten or clean connections if necessary.
2. Unit does not raise but motor is running or humming.	a. Motor wired backwards.	a. Positive battery terminal to motor relay, negative connected to chassis.
	b. Voltage at motor terminals may be too low to run pump at existing load.	b. Measure voltage at motor terminals or as near as possible, while pump is running under load. Check for loose connections..
	c. Hose or hydraulic line is leaking.	c. Inspect floor for signs of fluid. Correct as necessary.
	d. Fluid level in reservoir is low.	d. Add fluid. Refer to Owner's Manual for proper fluid levels.
	e. Load exceeds capacity requirements. Relief valve is bypassing the fluid back into the reservoir.	e. DO NOT CHANGE RELIEF VALVE SETTING. Instead, reduce the load to rated capacity.
	f. Suction filter is clogged, starving pump.	f. Remove and clean.
	g. Suction line may be leaking air, due to loose fittings.	g. Inspect all fittings for proper tightness.
	h. Filter/Breather cap on tank may be clogged.	h. Remove and clean.
	i. Down solenoid valve may be energized by faulty wiring or stuck open.	i. Remove down solenoid valve. Check and clean. (Refer to Hydraulic Section of Owners Manual).
	j. Hydraulic pump may be inoperative.	j. Disconnect hydraulic line at power unit. Put pressure line in a large container and operate the pump. If no output, check the pump motor coupling which may be defective, and correct as necessary. If pump is worn, consult factory for replacement parts.
3. Unit raises too slowly.	a. Foreign material stuck in down solenoid valve, causing some fluid to bypass back into tank.	a. Lower the deck. Remove the down solenoid valve and clean. (Refer to Hydraulic Section of Owners Manual).
	b. Foreign material clogging suction filter, breather cap, or a pinched hose.	b. Correct as necessary. (See also, 2(f), (h)).
	c. Low motor voltage.	c. See 2 (b)
	d. Unit overloaded.	d. See 2 (e)
	e. Pump is inoperative.	e. See 2 (j)
4. Motor labors, or is excessively hot.	a. Voltage may be low.	a. See 2 (b)
	b. Oil starvation causes pump to bind. High internal heat is developed. If this occurs, pump may be permanently damaged.	b. See 2 (d), (f), (g), (h), (j)
	c. Binding cylinders.	c. Align cylinders correctly.
5. "Spongy" or "Jerky" unit operation.	a. Fluid starvation.	a. See 2 (d), (f), (g), (j)
	b. Air in system.	b. See air bleed procedure.

Observation	Possible Cause	Remedy
6. Unit lowers too slowly when loaded.	a. Down solenoid valve filter screen clogged.	a. Remove down solenoid valve and clean filter screen.
	b. Pinched tube or hose.	b. Correct as necessary.
	c. Foreign material in flow control valve.	c. Remove and clean flow control valve. (Refer to Hydraulic Section of Owner's Manual).
	d. Binding cylinders.	d. Align cylinders correctly.
	e. Foreign material in velocity fuse.	e. Remove and clean velocity fuse. (Refer to Hydraulic Section of Owner's Manual).
7. Unit lowers too quickly.	a. Leaking hoses and/or cracked fittings.	a. Inspect floor for signs of fluid. Correct as necessary or see 2 (c).
	b. Foreign material stuck in flow control valve. (In this case, unit lowers initially at a normal rate then speeds up as the platform descends).	b. Remove flow control valve from the valve block and clean. (Refer to Hydraulic Section of Owner's Manual).
8. Unit raises then lowers slowly.	a. Down solenoid valve may be incorrectly wired or is stuck open due to dirt.	a. See 3 (a).
	b. Check valve may be stuck open.	b. Remove and clean check valve. (Refer to Hydraulic Section of Owner's Manual).
	c. Check for leading hoses, fittings, pipes.	c. See 2 (c).
	d. Cylinder packings may be worn or damaged.	d. Replace packings. (Consult factory for replacement parts).
9. Unit has raised, but does not lower.	a. Incorrect down solenoid valve wiring.	a. Correct per diagram.
	b. Down solenoid valve is stuck.	b. Lightly tap down the solenoid coil body to seat it properly. (DO NOT hit coil hard as it will permanently damage the internal system. DO NOT remove the down solenoid valve from the block as the unit will come down at a dangerous speed.
	c. Faulty down solenoid coil.	c. Remove and replace. DO NOT remove the down solenoid valve from the block as the unit will come down at a dangerous speed.
	d. Binding cylinders.	d. See 4 (c).
	e. In case of excessive down speeds air being present in the hydraulic system, the velocity fuse will become operative and shut off the oil flow from the cylinders, thus the dock will remain stationary.	e. To unlock, repressurize the hydraulic system.

EXPLODED PARTS DRAWING Pallette Server • Series PM/PS



PARTS LIST

Pallet Server • Series PM/PS

KIT NO.	ITEM NO.	DESCRIPTION	ENGINEER NO.	PART NO.	QTY.
	1	Base Assembly	15-514-024	n/a	1
A	2	Front Wheel	16-132-036	PMPS-FW	2
A	3	1/2-13 x 4-1/4 HHCS	a/k	a/k	2
A	4	1/2-13 Hex Lock Nut	a/k	a/k	2
B	5	Swivel Caster	16-132-034	PMPS-CAS	2
B	6	3/8-16 x 5 Carriage Bolt	a/k	a/k	2
B	7	3/8-16 Hex Lock Nut	a/k	a/k	2
	8	DC Motor/Hyd. Pump Assy.	15-137-001	PMPS-DCPU	1
		DC Motor Only (not shown)	01-135-041	PMPS-MOT	1
		Hydraulic Pump Only (not shown)	01-143-015	PMPS-PMR	1
		Motor Start Solenoid (not shown)	01-034-026	PMPS-SOL	1
		Cartridge Valve Assembly (not shown)	01-153-009	PMPS-CVA	1
	9	3/8" USS Plate Lock Washer	a/k	a/k	2
	10	3/8-16 Plated Hex Nut	a/k	a/k	2
	11A	Battery Box (includes lid & strap)	15-139-002	PMPS-BX	1
	11B	Battery Box Strap	a/k	a/k	1
	11C	Battery Box Lid	a/k	a/k	1
	12	2 Botton Hand Control w/Coil Cord	01-522-019	PMPS-HDCNT	1
	13	Battery	15-139-001	PMPS-BAT	1
	14	On-Board Battery Charger (not shown)	15-139-003	PMPS-BATCHR	1
	15	Power Unit Shroud	15-024-001	PMPS-CVR	1
	16	3/16-18 x 3/4" Plate HHCS	a/k	a/k	3
C	17	Handle	15-525-001	PMPS-HDL	1
C	18	1/2-13 Plated Hex Nut	a/k	a/k	2
C	19	1/2" Tension Cup Spring Washer	a/k	a/k	4
C	20	1/2-13 x 1-1/2" Plated HHCS	a/k	a/k	2
D	21	Cylinder Rod Set Screw	01-118-001	PMPS-CRB	1
D	22	1/2-13 Hex Lock Nut	a/k	a/k	1
D	23	Hydraulic Cylinder	See Below	See Below	
		50 - Telescopic	15-021-012	PMPS-CYL50	1
		60 - Telescopic	15-021-013	PMPS-CYL60	1
D	24	1/2-13 x 3-1/4" HHCS	a/k	a/k	1
	25	Carriage Assembly	15-538-003	n/a	1
	26	Fork	15-028-007	PMPS-FK	2
	27	Carriage Roller w/Bushings	15-027-004	PMPS-RLR	4
G	28	Floor Lock	16-132-080	PMPS-FLLK	1
G	29	3/8-16 x 1 Hex Head Bolt	a/k	a/k	4
G	30	3/8" Flat Washer	a/k	a/k	4
G	31	38-16 Hex Lock Nut	a/k	a/k	4
	A	Front Wheel Kit (includes 2-4)	15-154-003	PMPS-KIT-A	2
	B	Swivel Caster Kit (includes 5-7)	15-154-004	PMPS-KIT-B	2
	C	Handle Kit (includes 17-20)	15-154-005	PMPS-KIT-C	1
	D	Hydraulic Cylinder Kit			
		50 (includes 21-24)	15-154-006	PMPS50-KIT-D	1
		60 (includes 21-24)	15-154-007	PMPS60-KIT-D	1
	E	Hydraulic Cylinder Seal Repair Kit			
		50 - Telescopic Cylinder	15-136-404	PMPS50-KIT-E	1
		60 - Telescopic Cylinder	15-136-404	PMPS60-KIT-E	1
	F	Carriage Roller Kit	15-154-008	PMPS-KIT-F	1
	G	Floor Lock Kit (includes 28-31)	15-154-009	PMPS-KIT-G	1

a/k Available only with purchase of kit
n/a Not Available

PERIODIC MAINTENANCE INSTRUCTIONS

WARNING! REMOVE LOAD AND COMPLETELY LOWER FORKS BEFORE PERFORMING ANY MAINTENANCE.

(A) Before Each Use Check For The Following :

- 1.) Frayed wires (*Powered models only*)
- 2.) Oil leaks
- 3.) Proper caster condition operation
- 4.) Pinched or chafed hoses, loose fittings
- 5.) Structural deformation of forks or frame
- 6.) Unusual noise or binding

Do not use if there are any of the above!

(B) Monthly Inspections

- 1.) Check oil level. Oil should be 1" to 1-1/2" below the top of the tank with the lift in the fully lowered position. Add as necessary.
- 2.) Check for oil leaks. See Trouble Shooting Section and correct as necessary.
- 3.) Check water level in battery. (*DC models only*)
- 4.) Check clevis and pivot points for wear.
- 5.) Check for worn or damaged hydraulic hoses, electrical wires, and cords. Repair as necessary.
- 6.) Check rollers for looseness and wear. See Trouble Shooting.
- 7.) Check retaining rings at load rollers and clevis.
- 8.) Check for unusual noise. See Trouble Shooting section.
- 9.) Make sure all warning labels are in place and in good condition.
- 10.) Clean off dirt and debris.

(C) Yearly Inspection

Hydraulic oil should be changed at least once a year, or sooner if the oil darkens or becomes gritty. Flush reservoir before refilling. Presence of water is indicated if the oil turns milky. Recommended oil: Purity ISO AW-32 Hydraulic fluid or equal.

All maintenance work must be performed by qualified personnel with training in the repair of electrical and hydraulic components.

OPERATING INSTRUCTIONS FOR TWO-SPEED HYDRAULIC FOOT PUMP

Features:

Your new lift equipment has been supplied with an exclusive two-speed foot pump. The internal features of your pump include a primary pressure relief valve, pressure compensated return flow control valve, and an integrated lowering valve.

Replaceable bushings, valve components, and seals have been utilized in the construction of the pump in the event that replacements are necessary.

Operating Instructions:

Stay clear of moving parts. The platform will rise as the foot pedal is pumped. Depressing the release lever will lower the table at a controlled rate of descent.

In the event the platform has been overloaded, the pressure relief will open because of excessive pressure build-up in the hydraulic system. Oil will bypass into the reservoir. **Never** change the pressure relief setting. **Do not** exceed the rated capacity of your lift equipment.

Speed Selection for Two-speed Pumps:

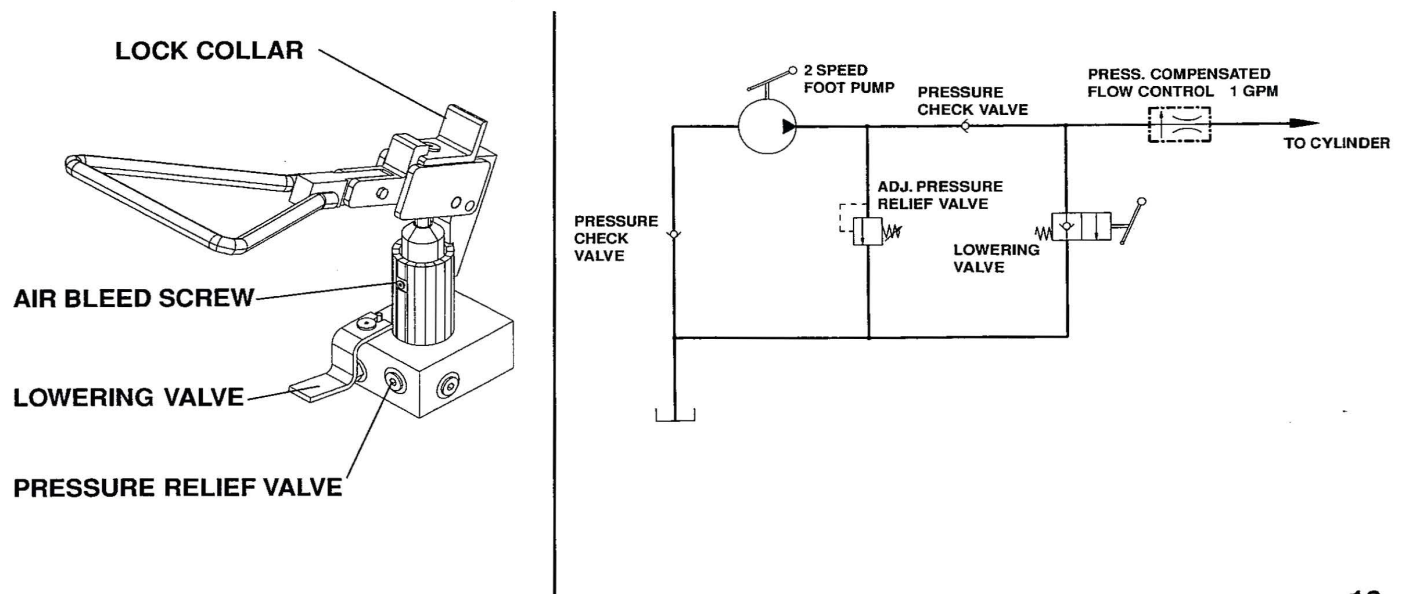
This pump offers two "speeds". The low speed produces *low volume/high pressure*. The high speed produces *high volume/low pressure*. The operator has the option of selecting the optimum pump speed for the application at hand. Pump speeds are selected by sliding the "lock collar" (See item # 2A on the parts identification) in or out. An occasional drop of oil will keep the collar working freely.

Air Bleed Procedure:

Whether your pump is a new installation, or has been recently serviced, air has likely entered the hydraulic system. The design of this pump includes an "air bleed screw" which will aid in the removal of unwanted air from the foot pump area of the hydraulic system. Use the following steps to remove this air from the system.

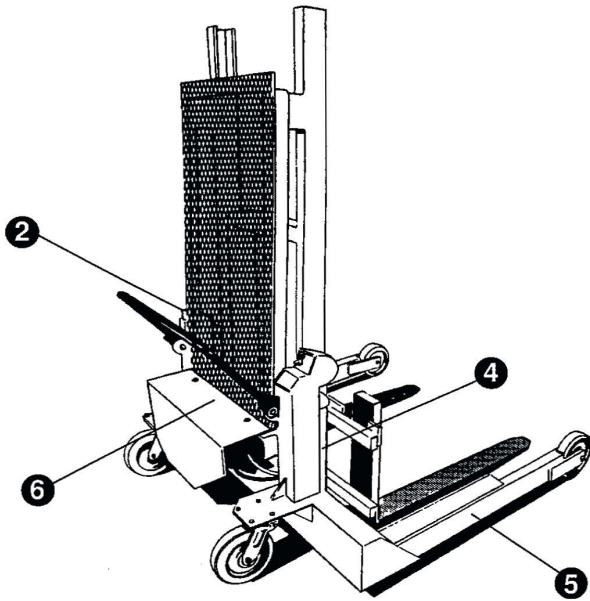
1) Check all fittings to be sure they are tight. Ensure that the oil is filled to within 1" of the top of the reservoir when the lift is in the fully lowered position.

2) Locate the "air bleed screw" (See item # 33 on the pump body) and loosen approximately 1/2 turn counterclockwise. As soon as you have loosened the screw, slowly depress the foot pedal. This will force the air out of the pump chamber. Before you let the pump pedal return to the "up" or "home" position, tighten the air bleed screw. This will prevent air from re-entering the pump chamber. Repeat the above procedure until the pump chamber is completely filled with oil and a "spongy" feel is no longer present. If the air bleeding procedure has been successful, the feel of the pump pedal will be firm and the complete stroke of the pump will produce fluid flow.



WARNING LABEL IDENTIFICATION

MAKE SURE ALL WARNING LABELS ARE IN PLACE!



*Product safety signs or labels should be periodically inspected and cleaned by the product users as necessary to maintain good legibility for safe viewing distance . . .

ANSI 535.4 (10.21)

Contact manufacturer for replacement labels if needed.

① LOCATED ON A/C POWER UNIT

NOTICE	NOTA	AVIS
POWER SUPPLY: 115 V/1 Phase/60 HZ		
CONTROL VOLTAGE: 24 V AC		
CORRIENTE: 115 Volt/1 Fase/60 HZ		
VOLTAJE DE CONTROL: 24V CA		
ALIMENTATION ÉLECTRIQUE: 115 V/1 Monophase/ 60 HZ		
VOLTAGE DE CONTRÔLE: 24V AC		

248

②

ISO AW-32
HYDRAULIC OIL OR EQUIVALENT
ACEITE HIDRÁULICO O EQUIVALENTE
HUILE HYDRAULIQUE OU ÉQUIVALENT

206

③ LOCATED ON A/C POWER UNIT

③

DANGER ⚠	SHUT POWER OFF AND CONSULT OWNERS MANUAL BEFORE WORKING ON THIS EQUIPMENT
PELIGRO ⚠	CORTE LA ELECTRICIDAD Y CONSULTE EL MANUAL DEL PROPIETARIO ANTES DE TRABAJAR EN ESTE EQUIPO
DANGER ⚠	COUPER LE COURANT ET CONSULTER LE MANUEL D'UTILISATION AVANT DE TRAVAILLER SUR CET ÉQUIPEMENT

221

⑥

DANGER
CORROSIVE MATERIAL
PELIGRO
MATERIAL CORROSIVO
DANGER
MATIÈRES CORROSIVES
T & S Equipment Company Ph (219)665-9521 Fax (219)665-1339

295

④ BOTH SIDES & FRONT END

⚠ WARNING	⚠ AVISO	⚠ AVERTISSEMENT
KEEP CLEAR OF PINCH POINT	MANTENGASE ALEJADO DE PUNTO DE CORTE	SE TENIR À DISTANCE DU POINT DE PINCEMENT

208

⑤ BOTH SIDES & FRONT END

⚠ WARNING	⚠ AVISO	⚠ AVERTISSEMENT
KEEP CLEAR WHEN IN USE	MANTENGASE ALEJADO CUANDO SE ESTA OPERANDO	SE TENIR À DISTANCE DU POINT DE PINCEMENT

208

U.S. DEPARTMENT OF LABOR
Occupational Health and Safety Administration
MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME DR LUBRICANTS, INC.		EMERGENCY TELEPHONE NUMBER (219) 422-3240
ADDRESS 2701 S. Coliseum Blvd., Suite 1139, Fort Wayne, IN 46803		
CHEMICAL NAME AND SYNONYMS Not applicable		TRADE NAME AND SYNONYMS HO 150/200/300/500/1000
CHEMICAL FAMILY Hydraulic Oil	FORMULA Complex Mixture	

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS Not applicable			BASE METAL Not applicable		
CATALYST "			ALLOYS "		
VEHICLE "			METALLIC COATINGS "		
SOLVENTS "			FILLER METAL "		
ADDITIVES "			OTHERS "		
OTHERS "				%	TLV (Units)
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES					
Note: Ethyl Corp. has reported to the U.S. EPA that in preliminary tests, certain zinc dialkydithiophosphates, when applied to the skin of male rabbits over a period of time, adversely effected spermatogenic activity.					
Exxon Chemicals Americas has reported to the U.S. EPA that in preliminary test, certain calcium salts of alkylated phenol sulfides, when applied to the skin of male rabbits over a period of time, adversely effected spermatogenic activity.					

ENGINEERING

SECTION III - PHYSICAL DATA

BOILING POINT (°F)	ND	SPECIFIC GRAVITY (H ₂ O = 1)	0.88
VAPOR PRESSURE (mm Hg)	NIL	PERCENT VOLATILE BY VOLUME (%)	NIL
VAPOR DENSITY (AIR = 1)	ND	EVAPORATION RATE (H ₂ O = 1)	NIL
SOLUBILITY IN WATER	NIL		
APPEARANCE AND ODOR	Bright and clear with little or no odor.		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) 228° C (COC)	FLAMMABLE LIMITS	Lel ND	Uel ND
EXTINGUISHING MEDIA Dry chemical, water fog, foam, carbon dioxide			
SPECIAL FIREFIGHTING PROCEDURES Wear self-contained breathing apparatus if serious chemical fire			
UNUSUAL FIRE AND EXPLOSION HAZARDS None			

Form OSHA 20

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE 8 Hr. time weighted permissible exposure 5.0 mg/m ³ as oil mist
EFFECTS OF OVEREXPOSURE EYE: may cause slight irritation
INHALATION - none expected
SKIN - See notes in Section II
INGESTION - If large amount of material is swallowed, call physician.
EMERGENCY AND FIRST AID PROCEDURES
EYE CONTACT - Flush with water for 15 minutes. See a physician if irritation persists.
SKIN CONTACT - Wash with soap and water.
INGESTION - If large amount of material is swallowed, call physician.

SECTION VI - REACTIVITY DATA

STABILITY	STABLE		CONDITIONS TO AVOID
	UNSTABLE	X	Heat and flame
INCOMPATIBILITY (Materials to avoid) Strong oxidizing agents			
HAZARDOUS DECOMPOSITION PRODUCTS Carbon Monoxide and asphyxiants			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	None known

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Consult local spill plan. Contain spilled liquid and absorb on suitable medium.
WASTE DISPOSAL METHOD Incinerate in an approved manner or use approved land fill facility. Conform to local disposal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Usually not required		
VENTILATION	LOCAL EXHAUST Usually not required in open area.	SPECIAL NA
	MECHANICAL (General) As needed to comply with exposure limit.	OTHER NA
PROTECTIVE GLOVES Neoprene or Nitrile Rubber	EYE PROTECTION Safety glasses, goggles optional	
OTHER PROTECTIVE EQUIPMENT None		

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE Normal handling and storage of petroleum products. Do not weld, heat, or drill container. Recap or bung, empty container still contains material which may ignite with explosive violence if heated suffuciently.
OTHER PRECAUTIONS

U.S. DEPARTMENT OF LABOR
Occupational Health and Safety Administration
MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing,
Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME CROWN BATTERY MANUFACTURING COMPANY		EMERGENCY TELEPHONE NUMBER (800) 645-8265 OR (800) OIL-TANK	
ADDRESS 1445 MAJESTIC DRIVE, P.O. BOX 990, FREMONT, OHIO 43420		TELEPHONE NUMBER (FOR INFORMATION) (419) 334-7181	
CHEMICAL NAME AND SYNONYMS BATTERIES, WET, FILLED WITH ACID		TRADE NAME AND SYNONYMS N/A	

SECTION II - MATERIAL IDENTIFICATION AND INFORMATION

COMPONENTS - Chemical Name and Common Names (Hazardous Components 1% or greater; Carcinogens 0.1% or greater)	%	OSHA PEL	OSHA PEL	OTHER LIMITS RECOMMENDED
LEAD/LEAD OXIDE/LEAD SULFATE CAS# 7439-92-1	60%	0.05 mg/m ³	0.05 mg/m ³	N/A
ANTIMONY CAS# 7440-36-0	1-5%	0.05 mg/m ³	0.05 mg/m ³	N/A
ARSENIC CAS# 7440-38-2	< 1%	0.50 mg/m ³	0.50 mg/m ³	N/A
SULFURIC ACID CAS# 7664-93-9**	3-12%	1.00 mg/m ³	1.00 mg/m ³	N/A
OTHERS				

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

**Note: ELECTROLYTE (water plus 25-40% sulfuric acid by weight) CONSTITUTES 3-12% OF TOTAL BATTERY WEIGHT

E
N
G
L
I
S
H

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT (°F)	203°	SPECIFIC GRAVITY (H ₂ O = 1)	1.245-1.295 BATTERY ELECTROLYTE
VAPOR PRESSURE (mm Hg)	14@37%@80°F	MELTING POINT	-35°F TO +10.6° F
VAPOR DENSITY (AIR = 1)	>1	WATER REACTIVE	YES, PRODUCES HEAT
SOLUBILITY IN WATER	100%		
APPEARANCE AND ODOR	CLEAR LIQUID WITH SHARP PUNGENT ODOR		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) NOT COMBUSTIBLE	FLAMMABLE LIMITS IN AIR % BY VOLUME N/A	AUTO IGNITION TEMPERATURE N/A	LeI/UeI NOT COMBUSTIBLE
EXTINGUISHING MEDIA For fires in area, Dry chemical, water fog, water, carbon dioxide			
SPECIAL FIREFIGHTING PROCEDURES Sulfuric acid fume, sulfur dioxide gas or carbon monoxide may be released when acid decoposes: Wear NIOSH approved self-contained breathing apparatus.			
UNUSUAL FIRE AND EXPLOSION HAZARDS Water applied to sulfuric acid generates heat and causes acid to spatter: wear full-cover sulfuric acid resistant clothing. Sulfuric acid reacts violently with metals, nitrates, chlorates, carbides, fulminates, picrates and other organic materials. Reacts with most metals to yield explosive/flammable hydrogen gas: this reaction is intensified when sulfuric acid is diluted with water, to form battery electrolyte.			

PB-470

SECTION V - HEALTH HAZARD DATA

PRIMARY ROUTES OF ENTRY INHALATION: YES SKIN: YES INGESTION: YES
HEALTH HAZARDS ACUTE: EYES, SKIN, RESPIRATORY SYSTEM AND DIGESTIVE SYSTEM
CHRONIC: EYES, SKIN, RESPIRATORY SYSTEM AND DIGESTIVE SYSTEM
SIGNS AND SYMPTOMS OF EXPOSURE IRRITATION OF EXPOSED AREA, BURNS, AND RESPIRATORY PROBLEMS. NO POSSIBILITY OF OVER EXPOSURE OF LEAD WILL OCCUR UNLESS BATTERY IS DESTROYED.
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE EXPOSURE TO MIST MAY CAUSE LUNG DAMAGE AND AGGRAVATE PULMONARY CONDITON
EMERGENCY AND FIRST AID PROCEDURES SEEK MEDICAL ASSISTANCE FOR FURTHUR TREATMENT, OBSERVATION AND SUPPORT IF NECESSARY
EYE CONTACT - WASH WITH COPIOUS QUANTITIES OF COOL WATER FOR AT LEAST 15 MINUTES.
SKIN CONTACT - FLUSH AREA WITH LARGE AMOUNTS OF COOL WATER FOR AT LEAST 15 MINUTES.
INHALATION - REMOVE TO FRESH AIR, IF BREATHING IS DIFFICULT - GIVE OXYGEN
INGESTION - GIVE MILK TO DRINK, DO NOT INDUCE VOMITING, CALL PHYSICIAN

SECTION VI - REACTIVITY DATA

STABILITY	STABLE	X	CONDITIONS TO AVOID N/A
	UNSTABLE		
INCOMPATIBILITY (Materials to avoid) AVOID COMBUSTIBLES, ORGANIC MATERIALS, AND STRONG REDUCING AGENTS			
HAZARDOUS DECOMPOSITION PRODUCTS SULFUR TRIOXIDE, CARBON MONOXIDE, SULFURIC ACID FUMES, AND SULFUR DIOXIDE			
HAZARDOUS POLYMERIZATION	MAY OCCUR	X	CONDITIONS TO AVOID N/A
	WILL NOT OCCUR		

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED CONTAIN SPILL USING NON-COMBUSTIBLE MATERIALS; VERMICULITE, DRY SAND, AND EARTH. NEUTRALIZE WITH LIME, SODA ASH, SODIUM BICARBONATE, ETC.
WASTE DISPOSAL METHOD CONSULT STATE ENVIRONMENTAL AGENCY. INDIVIDUAL STATE REGULATIONS VARY.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE SEPARATE FROM INCOMPATIBLE MATERIALS, KEEP AWAY FROM FIRE, SPARKS AND HEAT
OTHER PRECAUTIONS AND/OR SPECIAL HAZARDS CONTACT WITH METALS MAY PRODUCE TOXIC SULFUR DIOXIDE FUMES AND MAY ALSO RELEASE FLAMMABLE HYDROGEN GAS. THIS REACTION IS INTENSIFIED WHEN DILUTED.
NFPA RATING: HEALTH: 3 FLAMMABILITY: 0 REACTIVITY: 2 SPECIAL: 0
HMIS RATING: HEALTH: 3 FLAMMABILITY: 0 REACTIVITY: 2 PERSONAL PROTECTION: X

SECTION VIII - CONTROL AND PROTECTIVE MEASURES

RESPIRATORY PROTECTION (Specify type) ABOVE P.E.L.: NIOSH APPROVED, FITTED, FULL FACE RESPIRATOR		
VENTILATION	LOCAL EXHAUST VENTILLATED AREA PREFERRED	SPECIAL MUST BE ACID AND EXPLOSIVE RESISTANT
	MECHANICAL (General) IF BELOW P.E.L.	OTHER MUST BE ACID AND EXPLOSIVE RESISTANT
PROTECTIVE GLOVES ACID RESISTANT	EYE PROTECTION FULL FACE PROTECTION	
OTHER PROTECTIVE EQUIPMENT ACID RESISTANT CLOTHING AND BOOTS		

LIMITED WARRANTY

ONE YEAR LIMITED WARRANTY. The manufacturer warrants for the original purchaser against defects in materials and workmanship under normal use one year after date of purchase. (Not to exceed 15 months after date of manufacture.) Any part which is determined by the manufacturer to be defective in material or workmanship and returned to the factory, shipping costs prepaid, will be, as the exclusive remedy, repaired or replaced at our option. Labor costs for warranty repairs and/or modifications are not covered unless done at manufacturer's facilities. Any modifications performed without written approval of the manufacturer may void warranty. This limited warranty gives purchaser specific legal rights which vary from state to state.

LIMITATION OF LIABILITY. To the extent allowable under applicable law, the manufacturer's liability for consequential and incidental damages is expressly disclaimed. The manufacturer's liability in any event is limited to, and shall not exceed, the purchase price paid. Misuse or modification may void warranty.

WARRANTY DISCLAIMER. Our company has made a diligent effort to illustrate and describe the products shown accurately; however, such illustrations and descriptions are for the sole purpose of identification, and do not express or imply a warranty that the products are merchantable, or fit for a particular purpose, or that the products will necessarily conform to the illustrations or descriptions.

The provisions of the warranty shall be construed and enforced in accordance with the UNIFORM COMMERCIAL CODE and laws as enacted in the State of Indiana.

DISPOSITION. Our company will make a good faith effort for prompt correction or other adjustment with respect to any product which proves to be defective within the Limited Warranty. Warranty claims must be made in writing within said year.

SERVICE RECORD

DATE OF SERVICE: ____/____/____
WORK DONE BY: _____
SERVICE PERFORMED: _____

DATE OF SERVICE: ____/____/____
WORK DONE BY: _____
SERVICE PERFORMED: _____

DATE OF SERVICE: ____/____/____
WORK DONE BY: _____
SERVICE PERFORMED: _____

DATE OF SERVICE: ____/____/____
WORK DONE BY: _____
SERVICE PERFORMED: _____

DATE OF SERVICE: ____/____/____
WORK DONE BY: _____
SERVICE PERFORMED: _____

DATE OF SERVICE: ____/____/____
WORK DONE BY: _____
SERVICE PERFORMED: _____

E
N
G
L
I
S
H