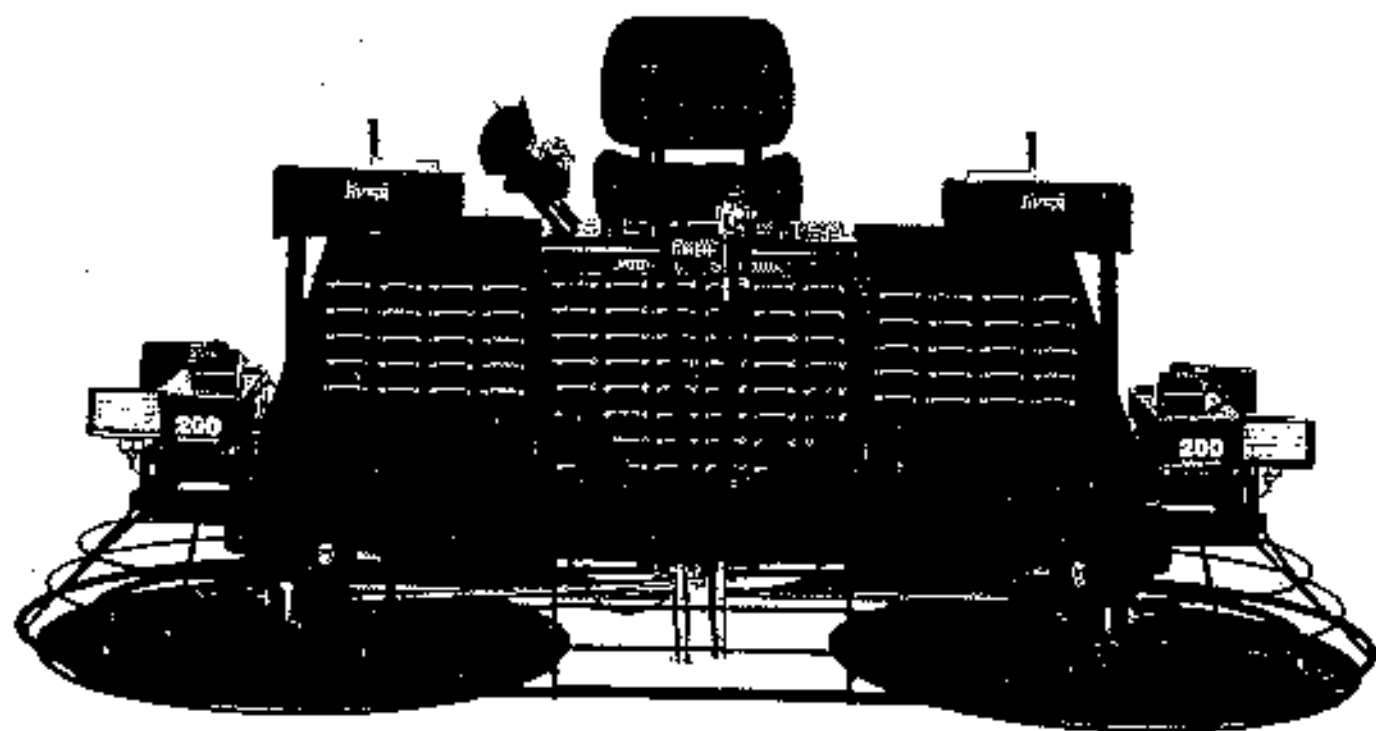


RAZORBACK® RIDERS

OPERATIONS MANUAL AND PARTS BOOK



HP200

HIGH-PERFORMANCE SERIES RIDING TROWEL

allen
ENGINEERING

Riding Trowel

OPERATIONS

MANUAL

PARTS

BOOK

THIS MANUAL COVERS RIDING TROWEL(S) BELOW

MODEL

200-1050-SFC-32KA

034166

200-1200-SD-44KA

035865

Allen Engineering's Razorback Riding Trowels are covered under one or more of the following patent numbers: U.S. Design Patents: 323,510; 341,340; 344,736; 400,542; 402,608; 402,999; 403,332. U.S. Utility Patents: 4,298,565; 5,105,220; 5,480,257; 5,480,258; 5,613,801; 5,685,837; 5,803,098; 5,816,799; 5,890,833; 5,934,823. Canadian Patents: 2,039,693. French Patents: 0202498. German Patents: M9307738.3 With other Patents Pending.

LIMITED WARRANTY

Allen Engineering Corporation warrants its products to be free of defects in material or workmanship for the following periods:

A. All New Machines and Part	6 Months
B. All New Gear Boxes	2 Years
C. All Factory Reconditioned Gear Boxes	1 Year

Warranty period begins on first day of use by End User. This first day of use is established by a completed warranty card or a Bill of Sale to the end user. All warranty is based on the following limited warranty terms and conditions.

1. Allen Engineering Corporation's obligation and liability under this warranty is limited to repairing or replacing parts if, after Allen's inspection, it is determined to be a defect in material or workmanship. Allen Engineering Corporation reserves the choice to repair or replace.
2. If Allen Engineering Corporation chooses to replace the part, it will be at no cost to the customer and will be made available to the Distributor/Dealer from whom the customer purchased the product.
3. Replacement or repair parts, installed in the product, are warranted only for the remainder of warranty period of the product as though they were the original parts.
4. Allen Engineering Corporation's warranty applies only to the products that are manufactured by Allen Engineering and does not cover component parts such as engines and clutches. Allen Engineering Corporation DOES NOT warranty clutches. Engine warranty claims should be made directly to an authorized factory service center for the particular engine make.
5. Allen Engineering Corporation's warranty does not cover the normal maintenance of products or its components (such as engine tune-ups and oil changes). The warranty also does not cover normal wear and tear items (such as belts and consumables).
6. Allen Engineering Corporation's warranty will be void if it is determined that the defect resulted from operator abuse, failure to perform normal maintenance on the product, modification to product, alterations or repairs made to the product without the written approval of Allen Engineering Corporation. Allen Engineering Corporation specifically excludes from warranty any damage to any trowels resulting from an impact to the rotors. Allen Engineering Corporation also excludes from warranty any failure of clutches on any engine driven piece of equipment.
7. If a new gear box has a factory defect within the first year of use, Allen Engineering Corporation will either repair the gear box or replace it with a new gear box. If a new gearbox has a factory defect in the second year of use, Allen Engineering Corporation will either repair it or replace it with a factory reconditioned gear box. Impact damage is NOT covered under the gear box warranty.
8. Allen Engineering Corporation will pay shop labor repair on warranty at the Allen Engineering Shop Labor Rate in existence on the date of the warranty claim. An Allen Engineering Labor Chart will determine the time allowed to complete a repair and will govern the shop labor hours that will be allowed.
9. Allen Engineering Corporation will pay freight on warranty replacement parts at Worldwide standard ground rates. No warranty replacement parts will be shipped air freight at the expense of Allen Engineering Corporation. Allen Engineering only pays outbound freight charges when sending warranty replacement parts to the customer VIA ground service. Allen Engineering does not pay any inbound freight, however, if Allen Engineering determines this to be warranty defect only then will Allen Engineering reimburse the customer for inbound freight at standard ground rates.
10. Allen Engineering Corporation's warranty policy WILL NOT COVER the following; taxes, shop supplies, environmental surcharges, air freight, travel time, loss of rental revenue, or any other charges whatsoever or any liabilities for direct, incidental, or consequential damage or delay.
11. **Allen Engineering Corporation makes no other warranty, expressed or implied. This limited warranty is in lieu of the warranty of merchantability and fitness. There are no other warranties that extend beyond the description on this document.**
12. No Allen Engineering Corporation employee or representative is authorized to change this warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of Allen Engineering Corporation.

OPERATIONS IDENTIFICATION PLATE

1A OPERATIONS

An identification plate listing the Model Number and Serial Number is attached to each unit and is located on the left side of the mainframe. The plate should not be removed.

Please record the information found on this plate below so it will be available should the identification plate become lost or damaged. When ordering parts or requesting service information you will always be asked to specify the model number and serial number of the unit.

Model Number

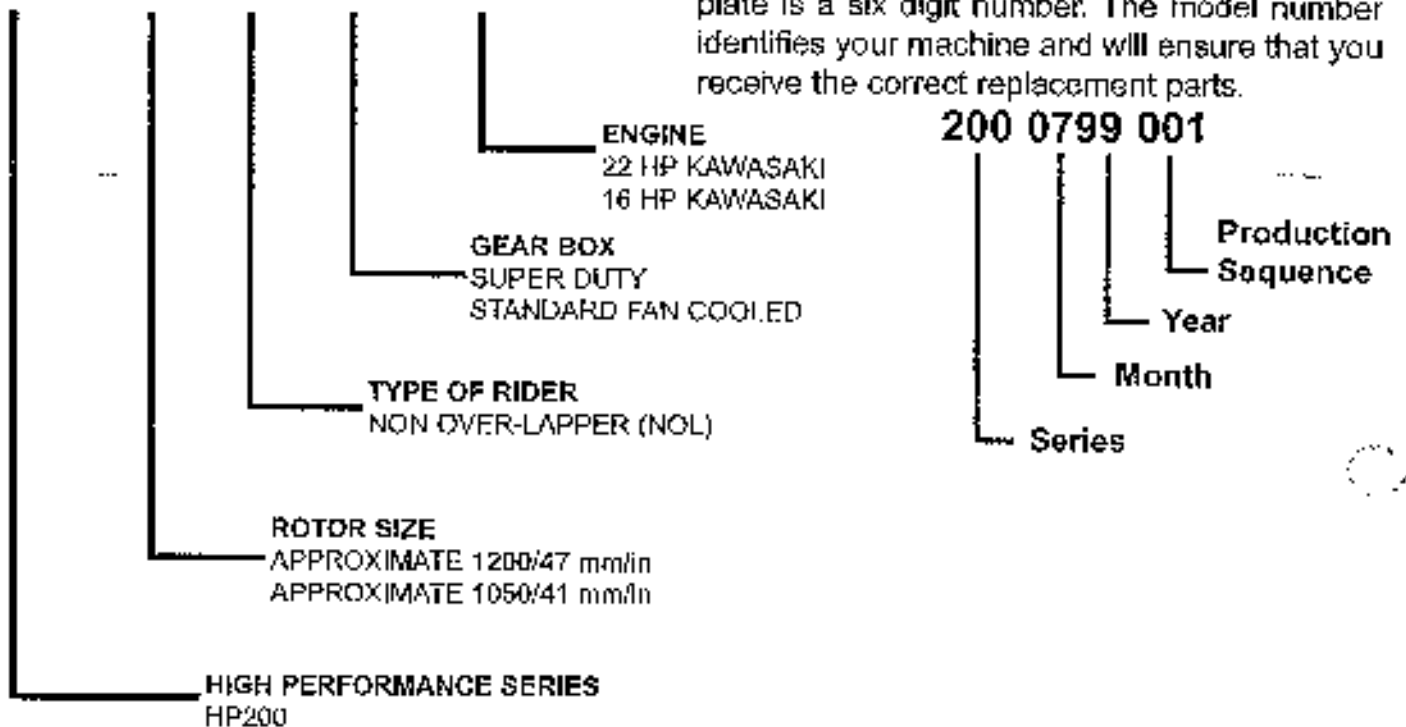
HP200- 1200-NOL-SD 44KA

HP200- 1050-NOL-SFC 32KA

Serial Number

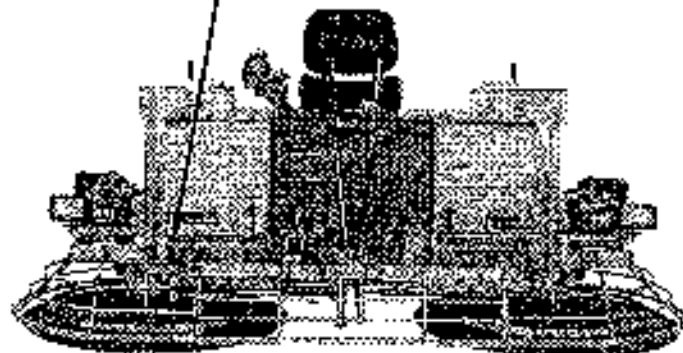
The serial number found on the identification plate is a six digit number. The model number identifies your machine and will ensure that you receive the correct replacement parts.

200 0799 001



Identification Plate Location

The serial number plate is located on the inside edge of the right hand deck channel close to the rear of the trowel.



FILL IN FOR FUTURE REFERENCES

Model Number: _____

Serial Number: _____

Date Purchased: _____

Purchased From: _____

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This machine is built with user safety in mind. However, it can present hazards if improperly operated and serviced. Follow operating instructions carefully!

If you have any questions about operating or servicing this equipment please contact your Allen Engineering Distributor or Allen Engineering Corp. Customer Service at 800-643-0095 or 870-236-7751.

Important Reminder

1A OPERATIONS

Complete any warranty requirements as specified by the engine manufacturer in their instructions found inside the battery box.

Your engine and clutch is not manufactured by Allen Engineering Corp., and therefore is not covered under Allen Engineering warranty.

Your engine manufacturer should be contacted if you wish to purchase a parts manual or a repair manual for your engine.

Refer to enclosed owners engine manual for complete O&M instructions. See your battery manufacturer for battery warranty.

Your Distributor

Your Distributor has Allen Engineering trained mechanics and original Allen Engineering replacement parts. Always contact the Allen Engineering Distributor who sold you this machine for Allen Engineering Certified repairs and replacement parts.

Place distributor information here for future reference.

DISTRIBUTOR NAME: _____		PHONE NUMBER: _____
ADDRESS: _____		
CITY: _____	STATE: _____	ZIP: _____
SALESMAN: _____		
ADDITIONAL INFORMATION: _____		

1A OPERATIONS

THE INFORMATION CONTAINED IN THIS MANUAL WAS BASED UPON THE MACHINES IN PRODUCTION AT THE TIME OF PUBLICATION (BEGINNING WITH SERIAL NUMBERS 2001199002 & 2001199003). ALLEN ENGINEERING RESERVES THE RIGHT TO CHANGE ANY PORTION OF THIS DOCUMENT WITHOUT NOTIFICATION.

Information Contained in This Manual

This manual provides information and procedures to safely operate and maintain the Allen Engineering HP200 Model *Razorback*® *Riding Trowels*.

For your own safety and protection from personal injury carefully read, understand and observe the safety instructions described in this manual.

Always operate and maintain this machine in accordance with the instructions described in this manual. A well maintained piece of equipment will provide many years of trouble free operation. This manual is divided into the sections listed below.

1A
OPERATIONS

2A
PARTS

Ordering Parts

This manual contains an illustrated parts list for help in ordering replacement parts for your machine. Follow the instructions listed below when ordering parts to ensure prompt and accurate delivery. All orders for parts must be made through your local authorized Allen Engineering dealer. All authorized Allen Engineering dealers must fax a copy of the parts order to customer service. The fax number is (870-236-3934). Facsimile orders must contain the following information:

1. On all orders for service parts include SERIAL NUMBER and MODEL number.
2. Shipment may be delayed if this information is not included.
3. Include correct description and part number from part section 2A.
4. **State exact shipping instructions including preferred routing and complete destination address. Also please indicate your preferred freight carrier. If no freight carrier is indicated Allen Engineering reserves the right to ship the shipment the best way possible. Once a shipment leaves Allen Engineering's docks it becomes the responsibility of the freight carrier to insure that it arrives at it's intended destination.**
5. **DO NOT** return parts to Allen Engineering without receiving written authorized Return Goods Authorization (RGA) from Allen Engineering. All authorized returns must be shipped pre-paid. **All unauthorized returns will be shipped back to the addressee at their expense.**

Keep this manual or a copy of it with the machine. If you loose this manual or need an additional copy please contact your Allen distributor or Allen Engineering Corporation at (800) 643-0095 and order literature part number 039347.

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1.1 Safety Notes

This manual contains NOTES, CAUTIONS and WARNINGS which must be followed to reduce the possibility of improper service damage to the equipment or personal injury. Read and follow all NOTES, CAUTIONS and WARNINGS included in this manual.

NOTE Contains additional information important to a procedure.

CAUTION Provides information important to prevent errors which could damage machine or components.

WARNING Warns of conditions or practices which could lead to personal injury or death.

1.2 Laws Pertaining to Spark Arrestors

Notes: Some states require that in certain locations arrestors be used on internal combustion engines. A spark arrestor is a device designed to prevent the discharge of spark or flames from the engine exhaust. It is often required when operating equipment on forested land to prevent the risk of fires. Consult the engine distributor or local authorities and make sure that you comply with regulations regarding spark arrestors.

1A OPERATIONS

1.3 Operating Safety

Familiarity and proper training are required for the safe operation of this equipment! Equipment operated properly by untrained personnel can be dangerous! Read the operating instructions contained in both this manual and the engine manual and familiarize yourself with the location and proper use of all controls.

Safety Precautions

1. Read operating and safety instructions before using the Riding Trowel. Operate the machine in accordance with the manufacturer's instructions.
2. Inspect your Riding Trowel for damage or tampering that can sometimes occur during shipping.
3. **If damage is found file a claim with your carrier immediately! Mark freight bill of lading as damaged shipment.**
4. Do not operate Riding Trowel if any guards have been removed or if the "safety switch" is not operational.
5. Only trained personnel should be allowed to operate your Riding Trowel.
6. Never allow more than one person on the Riding Trowel while it is in operation.
7. No foreign objects such as buckets, tools or materials should ever be attached or allowed to ride on the Trowel during operation.
8. Do not attempt to fill fuel tank or oil sump while the engine is running. Allow engine to cool before refueling.
9. Never attempt to operate the Riding Trowel on steep inclined surfaces.
10. Do not use over the counter hardware to replace manufacturer's hardware.
11. **WARNING: When operating machines with gas engines in confined areas. The fumes MUST be ventilated!**
12. Always wear safety goggles, ear protection, and gloves when operating the Riding Trowel.

1.4 Service Safety

Poorly maintained equipment can become a safety hazard! In order for the equipment to operate safely and properly over a long period of time, periodic maintenance and occasional repairs are necessary.

DO NOT attempt to clean or service machine while it is running. Rotating parts can cause severe injury.

DO NOT crank a flooded engine with the spark plug removed. Fuel trapped in the cylinder will squirt out the spark plug opening.

DO NOT test for spark if engine is flooded or the smell of gasoline is present. A stray spark could ignite the fumes.

DO NOT use gasoline or other types of fuels or flammable solvents to clean parts especially in enclosed areas. Fumes from fuels and solvents can become explosive and can be hazardous to your health.

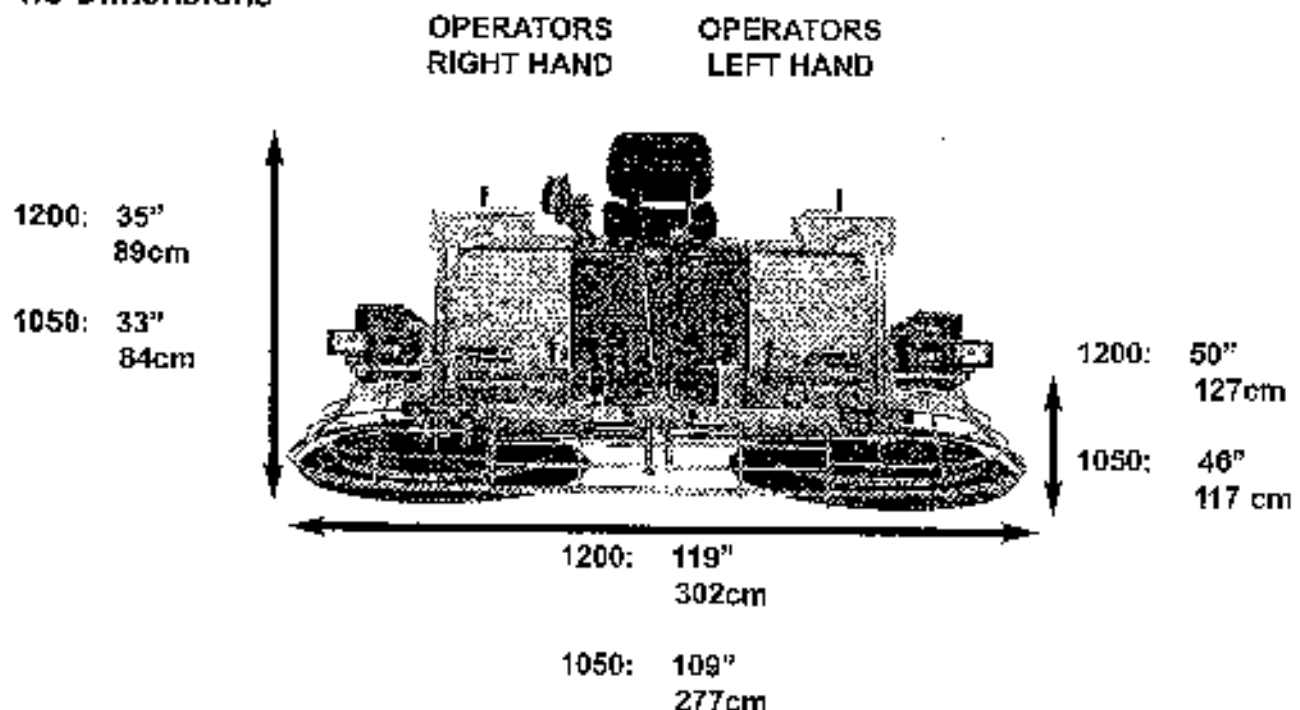
ALWAYS operate machine with all safety devices and guards in place and in working order.

ALWAYS keep area around muffler free of debris such as leaves, paper, cartons, etc. A hot muffler could ignite such items starting a fire.

ALWAYS replace worn or damaged components with spare parts designed and recommended by ALLEN ENGINEERING.

ALWAYS disconnect battery on machines before servicing to avoid accidental start-up.

1.5 Dimensions



MODEL

200-1050-SFC-32KA

200-1200-SD-44KA

Length	109' (277cm)	119' (302 cm)
Width	46" (117cm)	50" (127cm)
Height (w/ Seat, Levers, Pitch Controls)	33' (84 cm)	35' (89 cm)
Detachable Heavy Duty Guard Rings?	Yes	Yes
Painting Path Width	105" (267 cm)	115" (292 cm)
Travel Speed	325 fpm (99 m/min)	350 fpm (107 m/min)
Two Rotors (diameter)	42" (107 cm)	46" (117 cm)
Rotor Speed (RPM)	155	155
Eight Finish Blades	8" x 16"	8" x 18"
Gearboxes (2)	Standard Fan Cooled (SFC)	Super-Duty Fan Cooled (SD)
Steering System	Dual Lever	Dual Lever
Gearbox Rotation	Standard Only	Standard Only
Cruise Control	Standard	Standard
Battery	12 Volt	12 Volt
Safety Shutdown Switch	Foot Pedal	Foot Pedal
Fuel Capacity	8.6 Gal (32.55 L)	8.6 Gal (32.55 L)
Approximate Running Time	2.5 hrs.	2.5 hrs.
Powered Retardant Spray System?	Yes (4.5 Gal (17 L))	Yes (4.5 Gal (17 L))
Centrifugal Clutches (2) (diameter)	8" (103 mm)	8" (103 mm)
Twin Belt Drive?	Yes	Yes
Gearbox Drive System	Short Shaft w/ U-Joint	Short Shaft w/ U-Joint
Horn w/ Light Alerting Low Oil?	Yes	Yes
Horn Alerting Low Coolant	Yes	Yes
Engine Hour and RPM Meter	Digital	Digital

ENGINE OPTIONS:

200-1050-SFC-32KA

200-1200-SD-44KA

Kawasaki Engines (2) HP/WEIGHT	(2)16HP/1,130 lbs (513 kgs)
Number of Lights/Amperage	4/30

(2) 22HP/1,441 lbs (654 kgs)
4/40

OPTIONAL FEATURES:

200-1050-SFC-32KA

200-1200-SD-44KA

Eight Combination Blades	8" x 16"	8" x 18"
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OPTIONAL RIDER ACCESSORIES:

200-1050-SFC-32KA

200-1200-SD-44KA

Two Pans	42" (1,067 mm)	46" (1,168 mm)
Lifting Bridle	Nylon Straps	Nylon Straps
Trowel Cover	HP200	HP200
Dolly Jacks	HP Recommended	HP Recommended
Riding Trowel Trailer	6' x 10' Recommended	6' x 10' Recommended
Trowel Arm Jig	Available	Available
Spider Pulling Tool	Available	Available

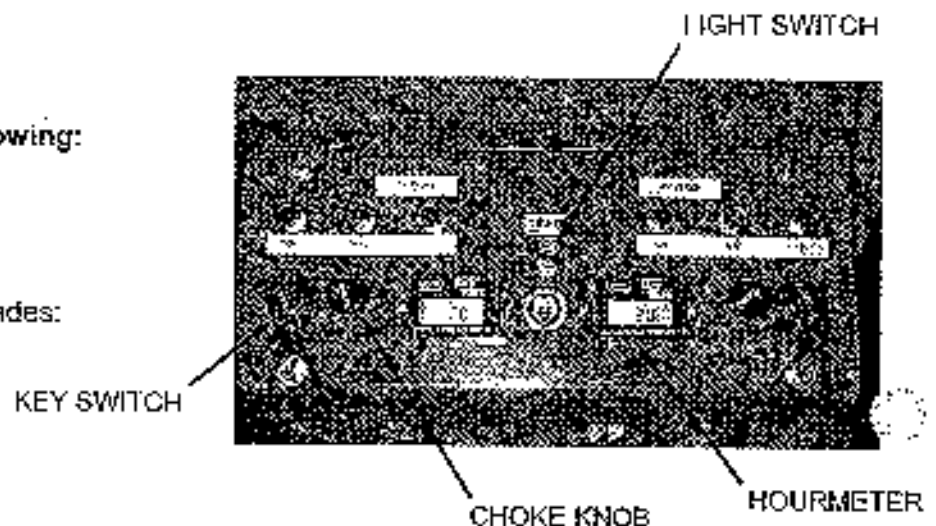
1.7 Description

The Riding Trowel is a modern high production machine. Finishing rate will vary depending on the operators skill and job conditions. The Riding Trowel has eight finishing blades. The Standard Fan Cooled Gearboxes are designed to provide exceptional performance with low maintenance and trouble free use under some of the most worse conditions. All Allen Engineering **Razorback® Riders** are equipped with a safety shutdown switch and a low oil shut down for added job safety and engine protection. Operating time between fuel refills is approximately 2-1/2 hours with a rotor speed of 145 RPM for an HP200. The **Razorback® Riders** are the most technically advanced trowels on the market today. With Proper maintenance and use your Riding Trowel will provide you with exceptional service.

1.8 Before Starting

Before starting trowel check the following:

- * Oil level in engine:
- * Oil level in trowel gearboxes:
- * Fuel level :
- * Condition of air filter:
- * Condition of trowel arms and blades:
- * Grease trowel daily:



1.9 Starting

Before starting trowel refer to drawing above for location and identification of controls.

1. Sit down correctly on the Riding Trowel Seat. DO NOT attempt to start the Riding Trowel with out an operator in the seat.
2. Place left foot on the safety switch pedal located on the operators left hand side. Press down gently engaging the safety switch and maintain slight pressure.
3. If engine is cold pull out the choke lever located on the control panel (refer to drawings above).
4. Press down on throttle pedal (located by the operator's right foot) one to two times. NOTE: To much throttle during start-up will flood the engine.
5. Turn key to the start-position. immediately release key when engine starts. If after two or three attempts the engine has not started push in choke. This will open the choke. Attempt to start trowel again. Allow engine to warm up before operating trowel.

Caution: Operating the starter for more than 5 seconds can damage the starter or engine. If engine fails to start release the switch and wait 10 seconds before operating starter again.

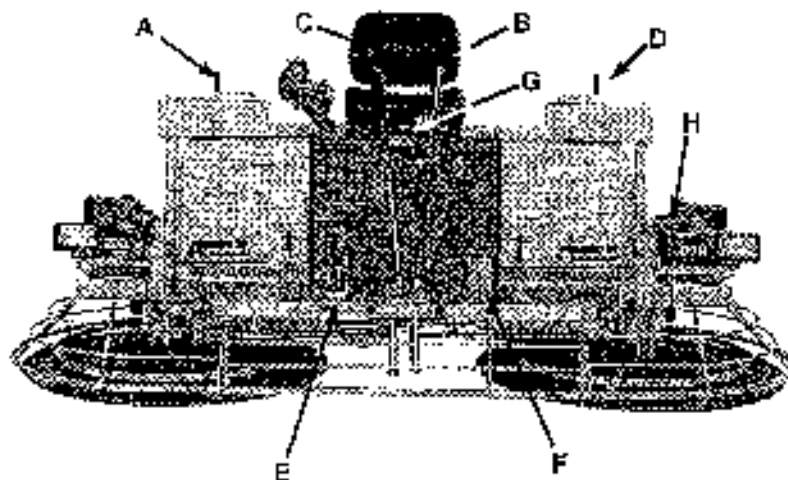
1A OPERATIONS

1.10 Operating

To utilize your Allen Engineering *Razorback® Rider* to its fullest capacity the machine should be driven in the direction the operator is facing. This will finish the widest possible area while giving the operator an excellent view of the slab surface about to be troweled. When the machine reaches the end of the slab make a 180 degree turn and repeat the straight line of direction to the other end of the slab. To familiarize a new operator with the Riding Trowel the following steps should be taken.

1. Point out the location of all Controls

- A. right pitch control
- B. control lever (forward reverse)
- C. control lever (left & right, forward & reverse)
- D. left pitch control
- E. right foot pedal (throttle control)
- F. left foot pedal (safety switch)
- G. seat adjustment
- H. fuel gauge



2. With the operator in the seat, show him the functions of the control levers (B) and (C) and how to start the machine. (refer to page 1A-10)

A hard level concrete slab with water on the surface is an idea place for an operator to practice with the machine. For practice pitch the blades up approximately 1/4" on the leading edge. Start by making the machine hover in one spot and then practice driving the machine in a straight line and making 180 degree turns. Best control is achieved at full RPM.

CAUTION: After starting engine fully engage the throttle. This allows the engine to warm up quicker and also engages the centrifugal clutch to max. RPM'S. **NOTE:** If you start out at a low RPM this will partially engage the clutch, causing it to slip. This will severely damage the clutch, causing clutch failure.

CAUTION: DO NOT use excessive pressure on the control levers. Excessive pressure does not increase the reaction time of the machine and can damage steering controls.

1.11 Stopping

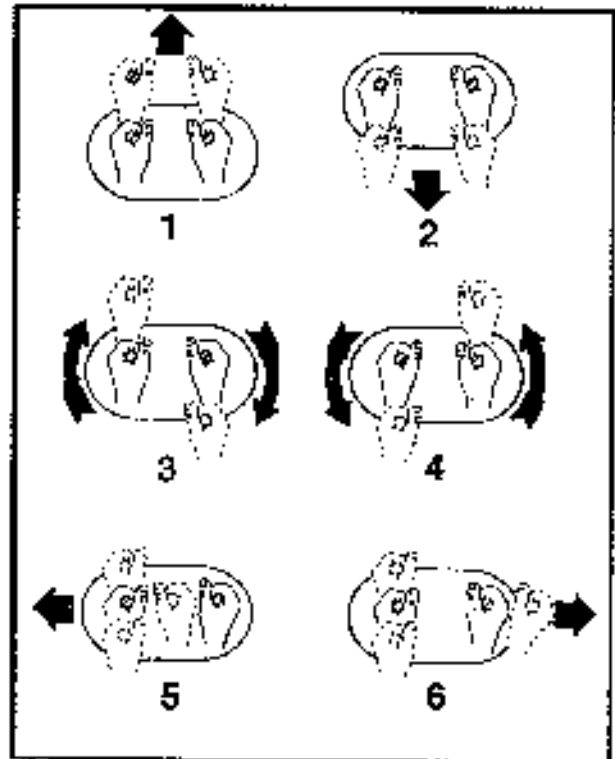
To stop the trowels movement, return the control levers (C) and (B) to their neutral position and release pressure on the right foot pedal (E).

NOTE: On units equipped with an optional cruise control push lever all the way down this will release the right foot pedal and reduce engine speed to disengage the clutch. To stop engine turn the key to the off position.

1.1.2 Steering

A slight "feathering motion" forward and backward with the left hand control lever is required to move the machine in a straight path to the left or right while operating the right hand control lever. See illustration.

- 1 forward
- 2 reverse
- 3 rotate clockwise
- 4 rotate counter clockwise
- 5 left sideways
- 6 right sideways



1.1.3 Pitch Adjustment

Different pitch angles are needed as you work the different stages of the concrete. See the drawing below. When changing or setting pitch (angle of trowel blades), slow the machine down, set the desired degree of pitch on the left side of the machine and then adjust the right side to match.

To increase the pitch, turn the pitch control clockwise (a) use the pitch indicator (b) to adjust pitch equally on both right and left trowel blades.

	Working Conditions of Concrete	Suggested Working Pitch
① Wet surface working stage	Flat (No Pitch)	
② Wet plastic working stage	Slight Pitch	
③ Plastic working stage	Additional Pitch	
④ Semi-hard working stage	Additional Pitch	
⑤ Hard finishing stage (burnishing)	Maximum Pitch	

1A OPERATIONS

1.14 Periodic Maintenance Schedule

The chart below list basic trowel and engine maintenance. Refer to engine manufacturer's Operation Manual for additional information on engine maintenance. A copy of the engine Operator's Manual was supplied with the machine when it was shipped. To Service the engine pull the seal locking pin out and tilt seal back.

	DAILY	EVERY 20 HOURS	EVERY 50 HOURS	EVERY 100 HOURS	EVERY 300 HOURS
GREASE TROWEL ARMS	X				
CHECK OIL LEVEL IN G-BOX	X				
CHECK FUEL LEVEL	X				
INSPECT AIR FILTERS REPLACE AS NEEDED	X				
CHECK AND TIGHTEN EXTERNAL HARDWARE	X				
GREASE CONTROL LINKAGE		X			
CHECK DRIVE BELTS			X		
CHECK VALVE CLEARANCE			X		
CHANGE ENGINE OIL				X	
REPLACE OIL FILTERS				X	
OIL CROSSHEAD				X	
GREASE TROWEL G-BOX					X
REPLACE SPARK PLUG					X

1.15 Trowel Gearbox

1. Check Oil levels in the gearbox daily (every 8 hours) Add oil if oil level is below the check sight glass. To add oil tilt trowel back and remove the side plug. Add Oil through hole opening. Replace plug after proper level has been achieved. DO NOT Fill past the plug. Use only Mobil Oil SHC 634, synthetic ISO VG 460.

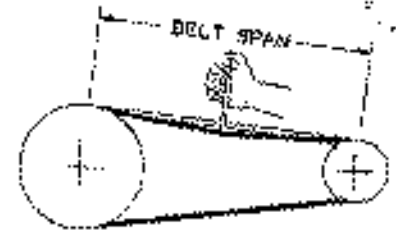
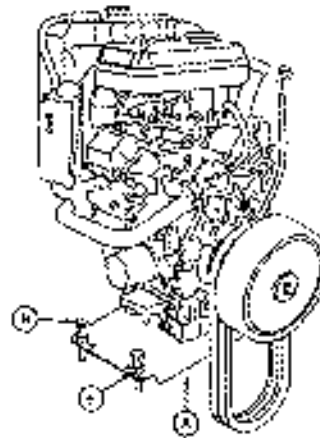
2. Each Gearbox has a grease fitting on top cover that must be greased (2 SHOTS ONLY) every 400 operating hours. Use only Mobilith SHC 220. Extended pressure grease.

1.16 Drive Belts

1A OPERATIONS

To Tighten Belts

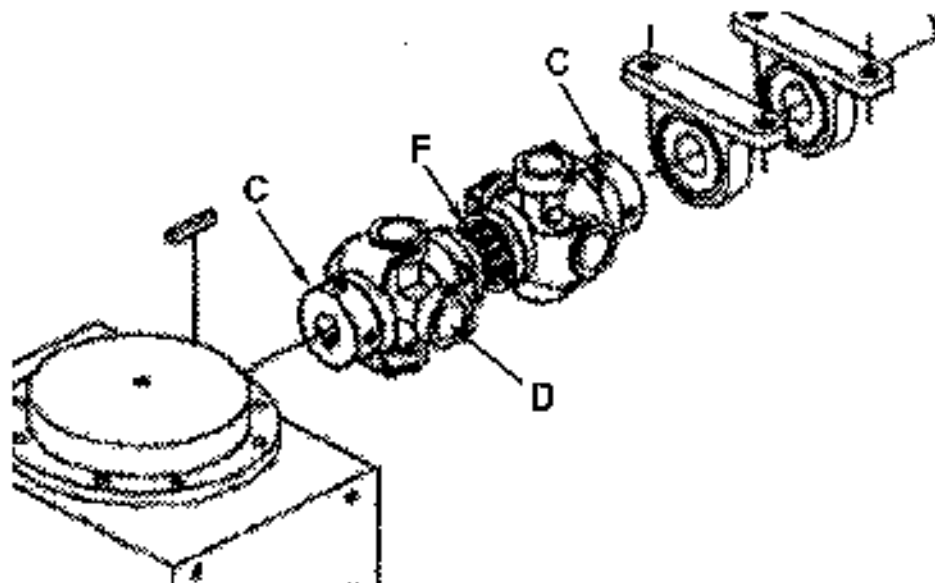
1. Loosen the bolts located on the underside of the engine mounting plate(A).
2. Tighten the engine plate adjustment bolts (B) an equal number of turns until correct belt tension is obtained. Maximum belt play should be from approximately 3/16" at 7.5 ft/lbs for new belts and 4.5-5 ft/lbs. for used belts the center of the span. New belts should be re-tensioned after the first 10-12 hours of operation.
3. Tighten all lock nuts and jam nuts.



- * Check tension frequently during the first 24-48 hours of operation.
- * Over tensioning shortens belt and bearing life.
- * Keep belts free from foreign material which may cause slip.
- * Make V-drive inspection on a periodic basis. Tension when slipping.

To Replace

1. Loosen the four bolts(A) underneath the engine mounting plate. (refer to fig. 1)
2. Loosen Jam nuts(E) and Loosen engine plate adjustment bolts (B) until belt tension is relaxed. (refer to fig 1.)
3. Loosen set screws(C) where the u-joint couples to the drive shaft.
4. Slide u-joint(D) off the drive shaft to create a gap in the drive line to allow removal of belts through gap.
5. Install new belts through gap and reverse process to tighten new belts. **Be sure to reset the gap between the U-Joints to between 3/64 to 3/16(F).**
6. Tighten all nuts and jam nuts.



1.17 Control Linkage Lubrication

The control linkage is equipped with seven grease fittings to lubricate pivot points. Grease control linkage once a week or every 20 hours to prevent wear and ensure free movement and smooth response of control levers.

Use a general purpose grease and add one to two shots of grease to each fitting.

1.18 Control Lever Adjustment

Be sure that the trowel is on a level surface. The control levers should line up evenly. If levers appear out of adjustment they can be re-adjusted forward or backwards as follows:

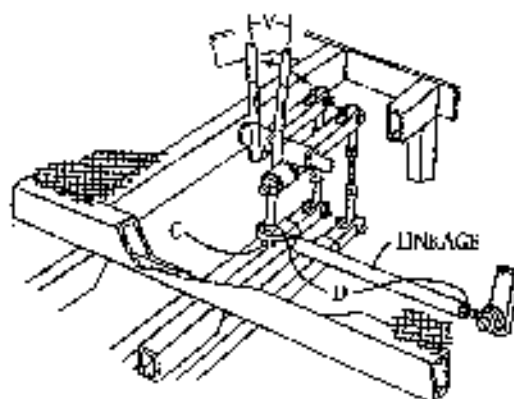
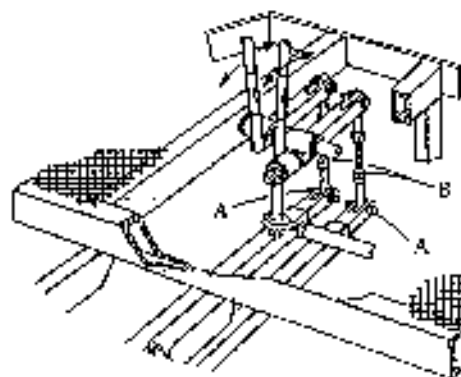
NOTE: Trowel must be placed on flat level surface that fully supports the blades on both rotors.

1. Remove bolts (A).
2. Loosen jam nuts (B).
3. Extend linkage to adjust control levers backward.
4. Shorten linkage to adjust linkage control levers forward.
5. After levers have been adjusted to the desired position, reassemble bolts (A) and tighten jam nuts (B).

1.19 Right Hand Control Lever Adjustment Right or Left

The right hand lever should be set to the same angle as that of the left to form a "V". If levers become out of adjustment adjust the right hand lever as follows:

1. Remove bolt (C).
2. Loosen jam nuts (D).
3. Extend linkage to move control levers to the right.
4. Shorten linkage to move control levers to the left.
5. After control lever has been adjusted to the desired position reassemble bolt (C). And tighten jam nuts (D).



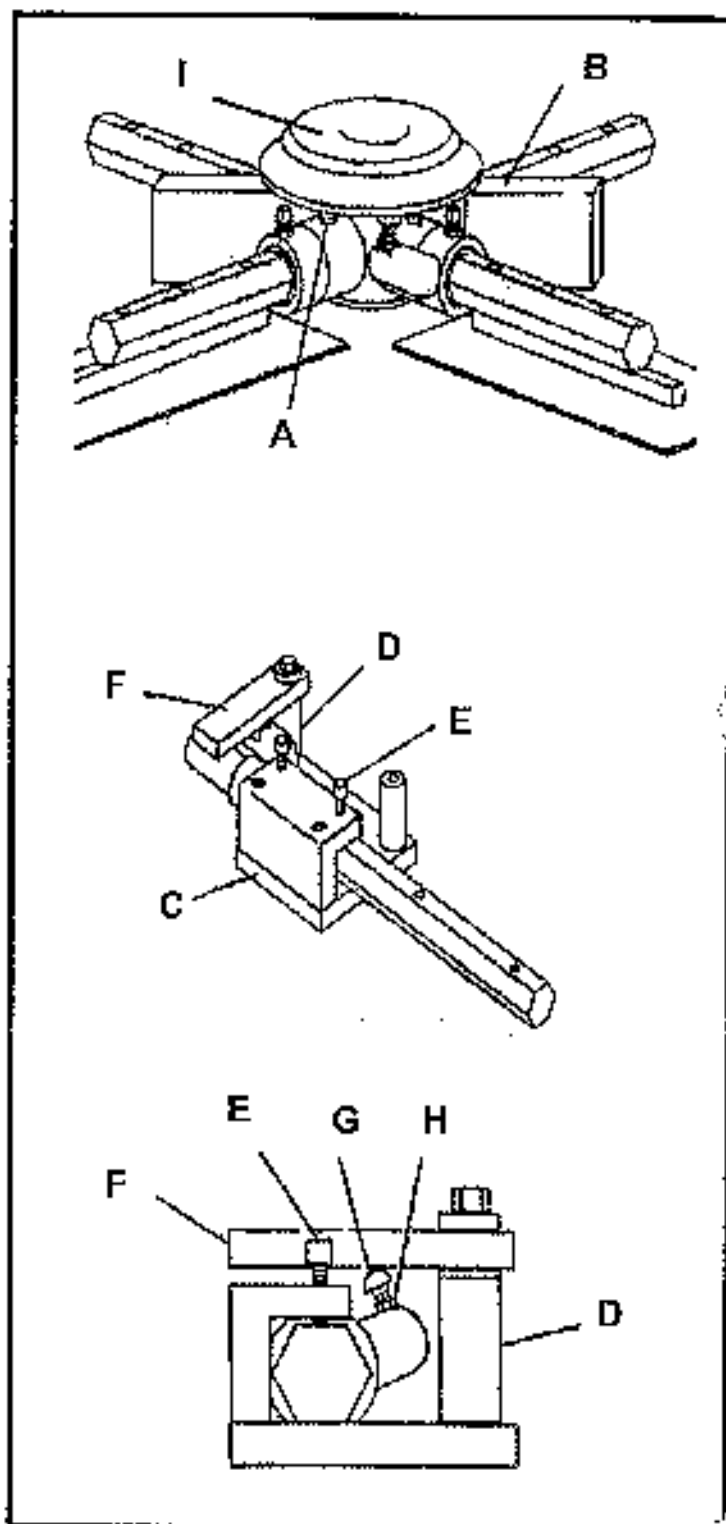
1.20 Lift Lever Adjustment

1A OPERATIONS

Damage to or replacement of a trowel arm can change the adjustment of the lift lever. This can unbalance the trowel arms and cause the trowel to wobble during operation. To operate smoothly the lift lever on all arms must be adjusted the same to ensure that the trowel is balanced correctly. Adjust trowel arms using optional trowel arm jig as described below.

NOTE: Make sure that there is no pitch in the blades before attempting to remove a trowel arm.

1. Block up pressure plate (I) using wooden block (B).
2. Remove stabilizer ring from spider assembly (only on available models).
3. Remove blades from trowel arms.
4. Loosen hex head cap screw (A) and remove it and the external star washer from the spider boss.
5. Remove trowel arms from spider 4-boss with lift levers in place.
6. Clean flats on trowel arm before placing it in the trowel arm jig (PART# 016863).
7. For HP 200 series trowels use the smallest spacer (1-1/4 X 2-1/4) (D).
8. Insert trowel arm into trowel arm jig as shown.
9. Tighten socket head bolts (E) down on the trowel arm to hold in place.
10. Place carriage bolts (G) on lift lever under the trowel arm jig (F) as shown.
11. Loosen jam nut (H) and adjust the carriage bolt so that the top of the bolt is just touching the bottom of the trowel arm jig and tighten jam nut (H).
12. Attach and trowel arm to spider boss and blades to arms.
13. Tighten down hex head cap screw to secure arm in place.
14. Reattach stabilizer ring (only on available models).



1A OPERATIONS

1.21 Transporting Trowel

Optional dolly jacks are available for short moves or to aid in servicing the trowel. Install dolly jacks as follows:

1. Inspect dolly jack for serviceability and damage.
2. Place riding trowel on firm level ground.
3. Tie steering levers (I) to frame to prevent them from tipping forward when trowel is being lifted.
4. With the front dolly jack (J) Fully insert extension tubes in the holes (K) in the mainframe of the riding trowel.

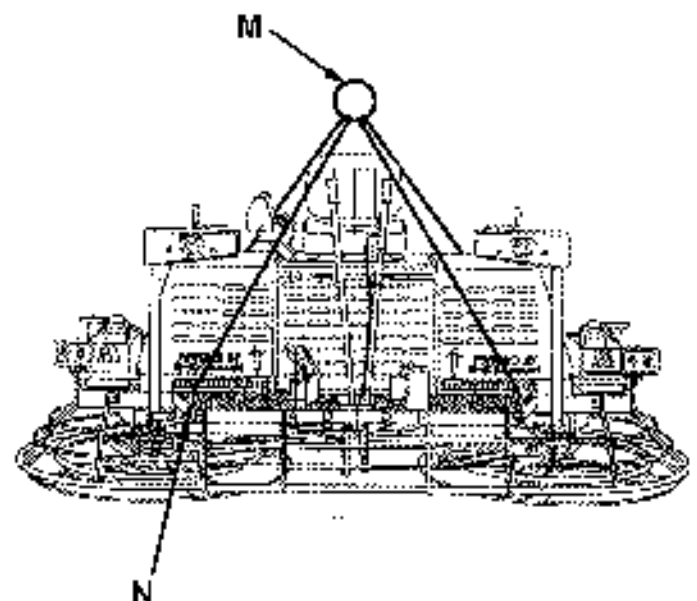
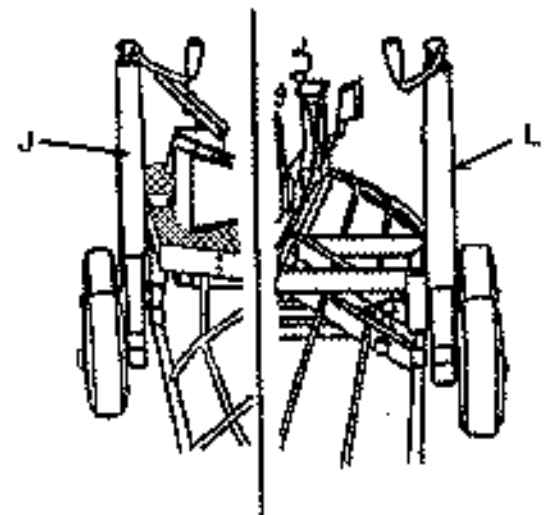
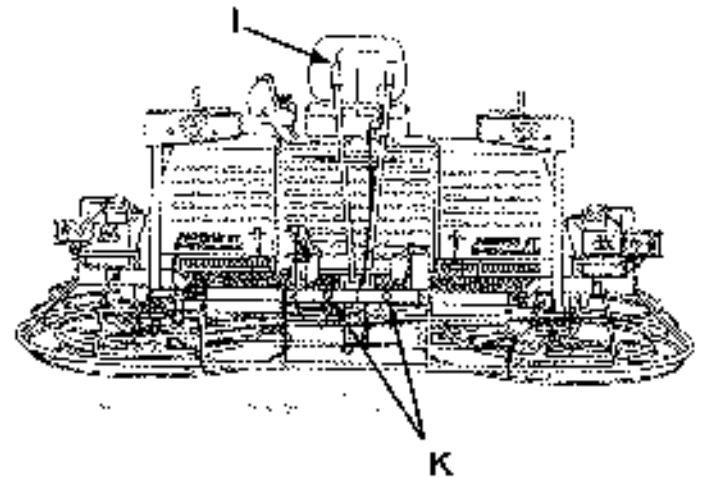
The front dolly jacks are equipped with short lifting tubes while the rear dolly jacks have long lifting tubes.

5. Insert the rear dolly jacks(L) with the long lifting tubes into the holes provided in the rear of the mainframe. The holes in the mainframe are located directly opposite the front holes.

6. Turn jack handles clockwise to lift trowels and counter-clockwise to lower trowel.

CAUTION:

The dolly jack lifting system is designed for short moves and to aid in servicing the trowel. It is not a substitute for a towing system or trailer. An optional lifting bridle (M) is available and recommended for lifting the trowel. Attach the bridle to each of the four lifting eyes (N) on the trowel.



1.22 Battery Jump Start Procedure

1A OPERATIONS

Occasionally it may be necessary to jump start a weak battery. If jump starting is necessary the following procedure is recommended to prevent starter damage, battery damage, and personal injury.

Warning: Jump starting a battery incorrectly can cause the battery to explode resulting in severe personal injury or death. Do not smoke or allow any ignition sources near the battery and do not jump start a frozen battery.

Warning: Electrical arcing can cause severe personal injury. Do not allow positive and negative cable ends to touch.

1. Disengage Clutch.
2. Use a battery of the same voltage (12V) as is used with your engine.
3. Attach one end of the positive booster cable (red) to the positive (+) terminal of the booster battery. Attach the other end of the terminal of your engine battery.
4. Attach one end of the negative booster cable (black) to the negative (-) terminal on the booster. Attach the other end of the negative cable to your engine battery.
5. Jump starting in any other manner may result in damage to the battery or the electrical system.

Caution: Over cranking the engine can cause starter damage. Allow 5 minutes for starter to cool if engaged for more than 15 seconds.

Caution: When using lights or high amperage draw accessories, idle the engine for a period of 20 minutes to bring the battery to charge state.



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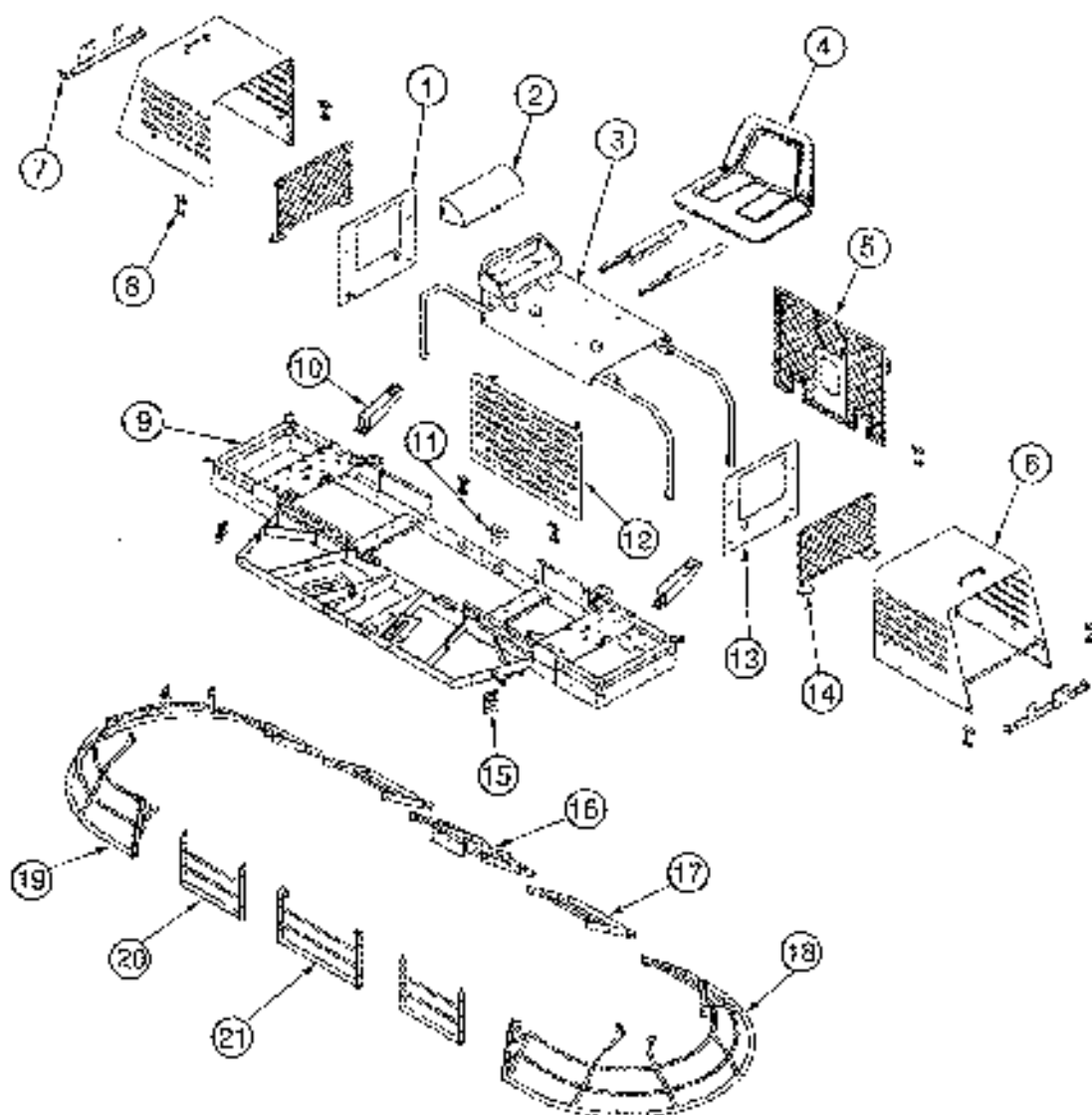
NOTE: All set screws used on MODEL HP 200 SERIES have blue (LOC-TITE™) applied at the factory. If set screw is removed or loosened for any reason re-apply blue (LOC-TITE™).

NOTE: All grease fittings on MODEL HP 200 SERIES are capped with CAP PLUG GC-5 part number #015892 to protect the fitting. If cap becomes missing or damaged replace it as soon as possible.

NOTE: Anti-Seize is applied at the factory to all drive line couplings, gear box main and counter shafts and pitch control threaded rod assemblies. If these parts are disassembled re-apply a light coat of a graphite based anti-seize.

2A OPERATIONS

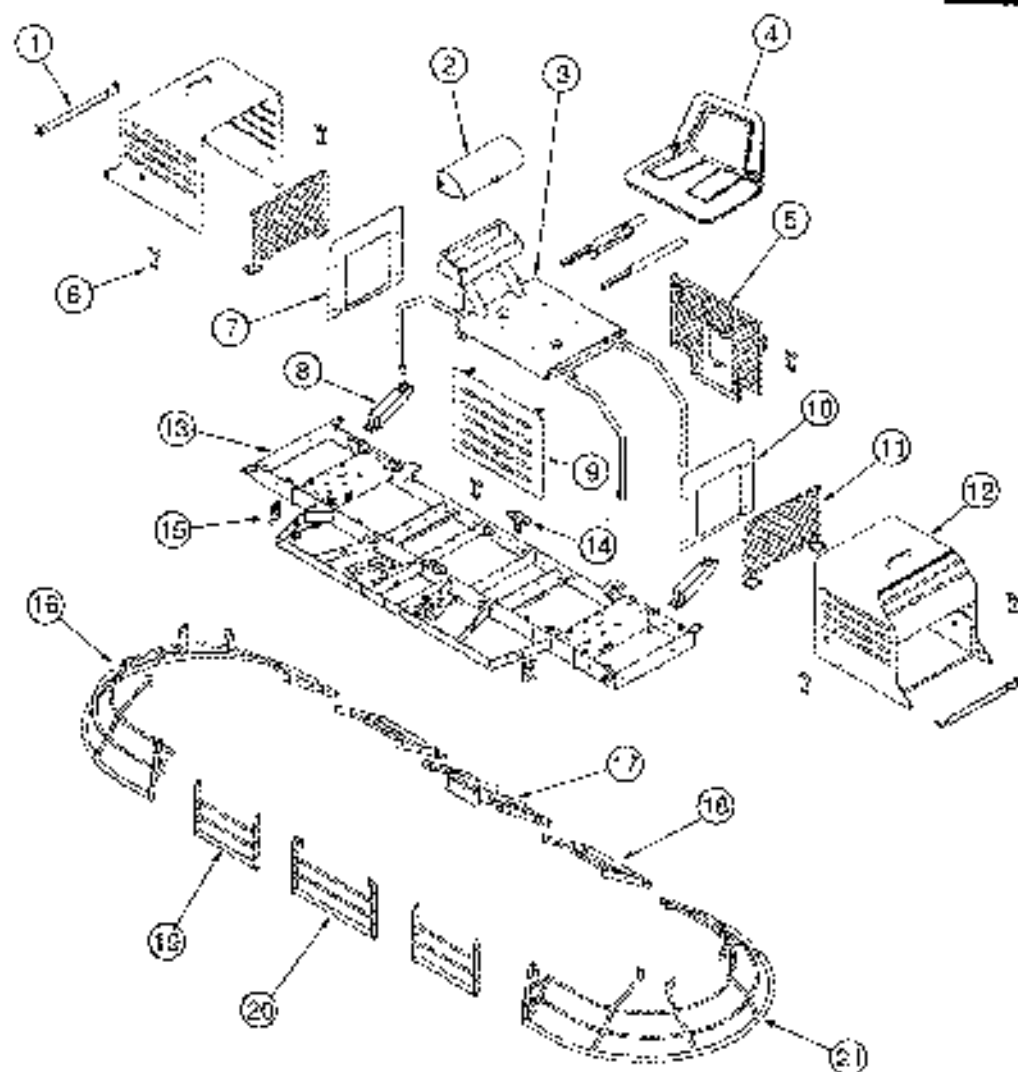
FRAME ASSEMBLY HP200-1200



ILL.	PART #	DESCRIPTION	QTY.
1.	.034338	PLATE, RH AIR DUCT	1
2.	.034356	LID, CONTROL PANEL	1
3.	.034345	SEAT FRAME	1
4.	.037760	SEAT W/ GLIDES	1
5.	.034336	GUARD, REAR	1
6.	.034378	HOOD ASSEMBLY	2
7.	.037081	HINGE BRACKET	2
8.	.022738	LATCH, HOOD	7
9.	.034319	FRAME ASSEMBLY	1
10.	.035283	LUG, LIFTING (REAR)	2
11.	.034602	REAR GUARD HOLD-DOWN	1
12.	.034342	GUARD, FRONT	1
13.	.034339	PLATE, LH AIR DUCT	1
14.	.034327	GUARD, END	2
15.	.020890	LUG, LIFTING (FRONT)	2
16.	.033785	RING, REAR	2
17.	.033758	SPACER, REAR	2
18.	.034268	RING, END LH	1
19.	.034269	RING, END RP	1
20.	.033759	SPACER, FRONT	2
21.	.028981	RING, FRONT	1

FRAME ASSEMBLY HP200-1050

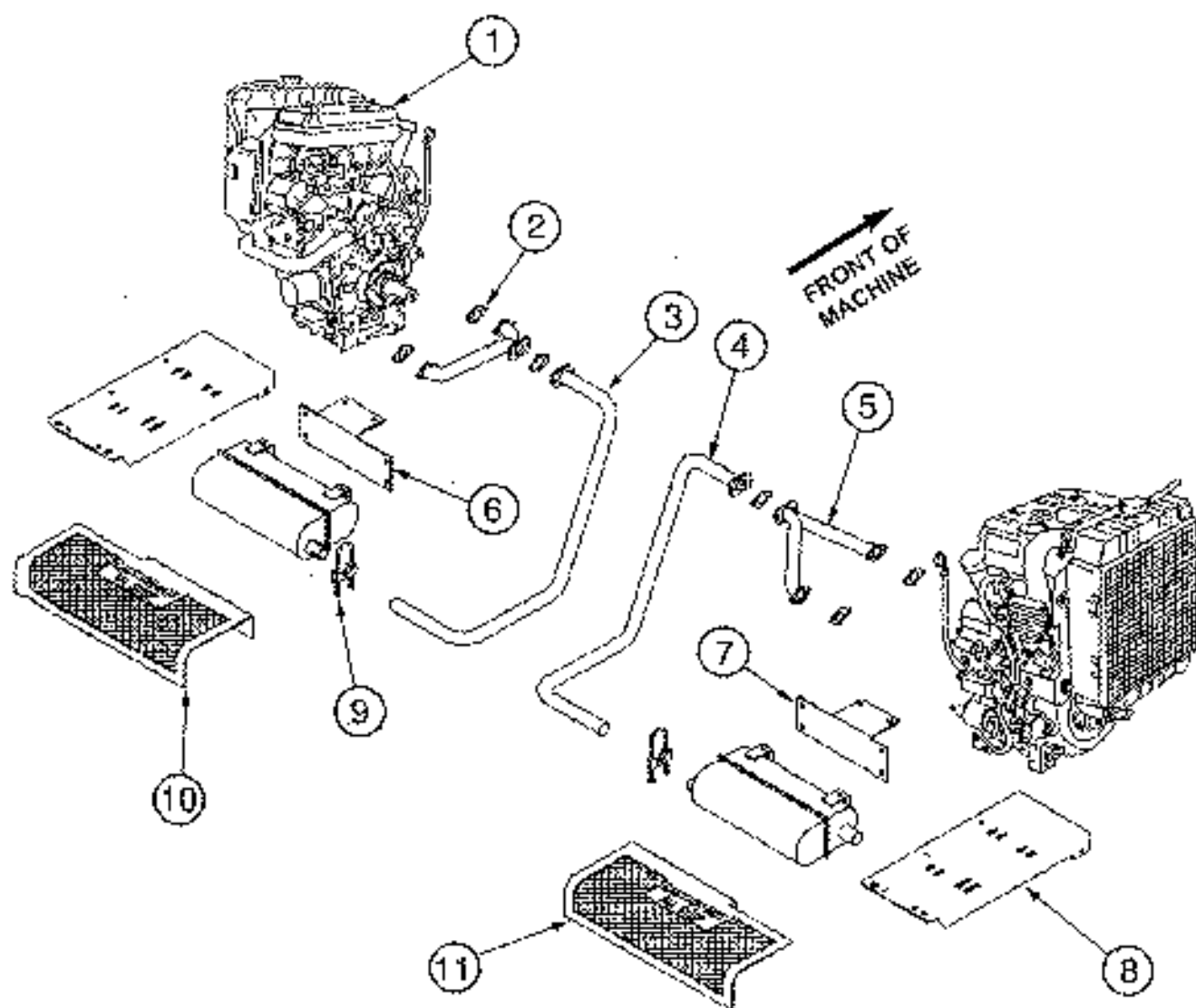
2A OPERATIONS



ILL.	PART #	DESCRIPTION	QTY.
1.	034664	HOOD, PIVOT	2
2.	034366	LID. CONTROL PANEL	1
3.	034647	SEAT FRAME	1
4.	037769	SEAT W/ GLIDES	1
5.	034668	GUARD, REAR	1
6.	022736	HOOD LATCH	6
7.	034672	AIR DUCT, RH	1
8.	035283	LUG, LIFTING (REAR)	2
9.	031365	GUARD, FRONT	1
10.	035298	AIR DUCT, LH	1
11.	034327	GUARD, END	2
12.	034662	HOOD ASSEMBLY	2
13.	034633	FRAME ASSEMBLY	1
14.	034602	REAR GUARD HOLD-DOWN	1
15.	029890	LUG, LIFTING (FRONT)	2
16.	034697	RING, END RH	1
17.	034686	RING, REAR	1
18.	034689	SPACER, REAR	2
19.	034695	SPACER, FRONT	2
20.	034630	RING, FRONT	1
21.	034696	RING, END LH	1

2A OPERATIONS

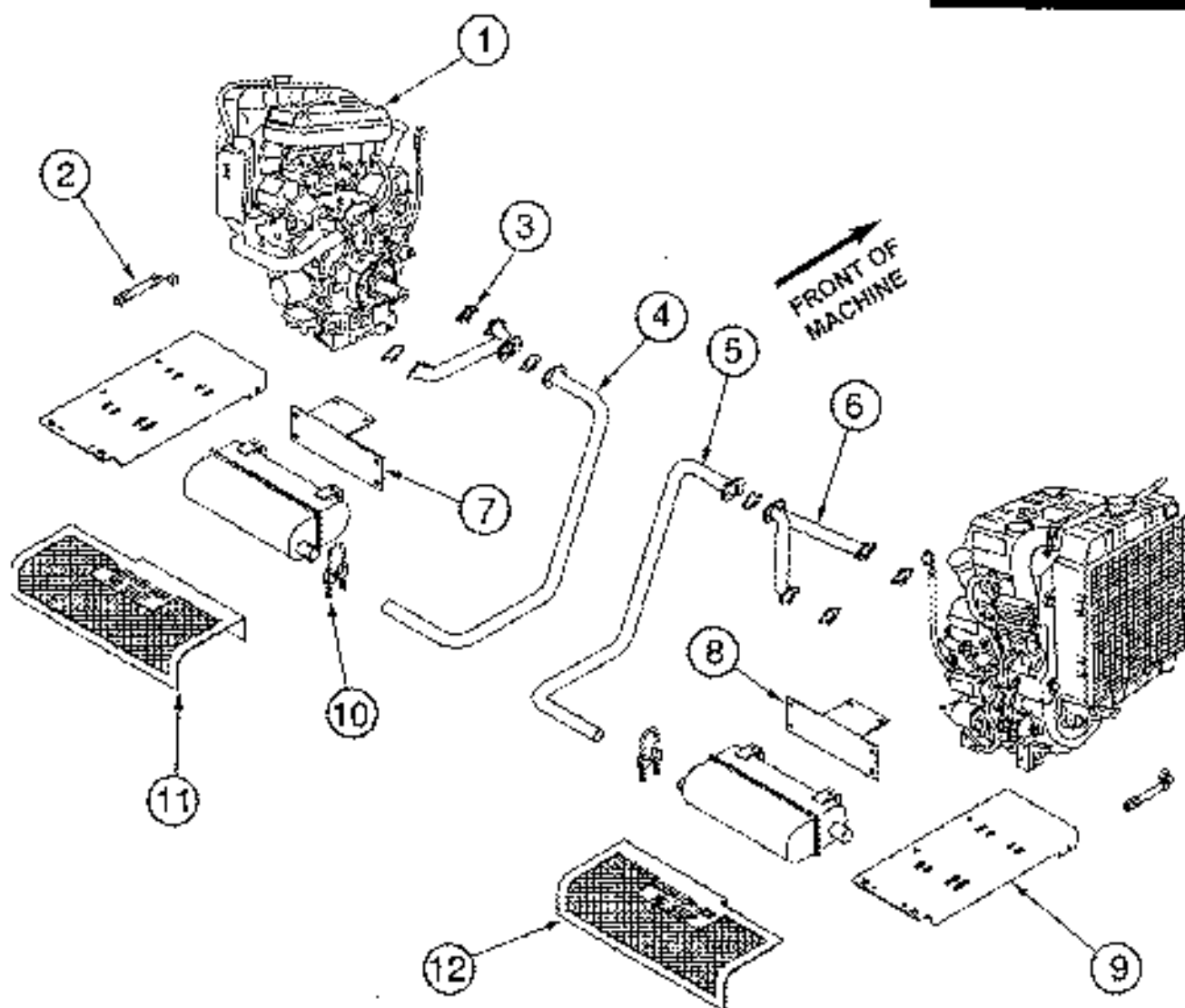
ENGINE MOUNT HP200-1050



ILL.	PART #	DESCRIPTION	QTY.
1.	.034234	ENGINE, KAWASAKI 16 HP	2
2.	.035463	GASKET, MUFFLER	6
3.	.035222	TAILPIPE, LH	1
4.	.035221	TAILPIPE, RH	1
5.	.035220	HEADER	2
6.	.034674	BRACKET, MUFFLER MOUNT (LH)	1
7.	.034673	BRACKET, MUFFLER MOUNT (RH)	1
8.	.036416	PLATE, MOTOR MOUNT	2
9.	.034617	CLAMP, MUFFLER	2
10.	.034401	GUARD, MUFFLER (LH)	1
11.	.034400	GUARD, MUFFLER (RH)	1

ENGINE MOUNT HP200-1200

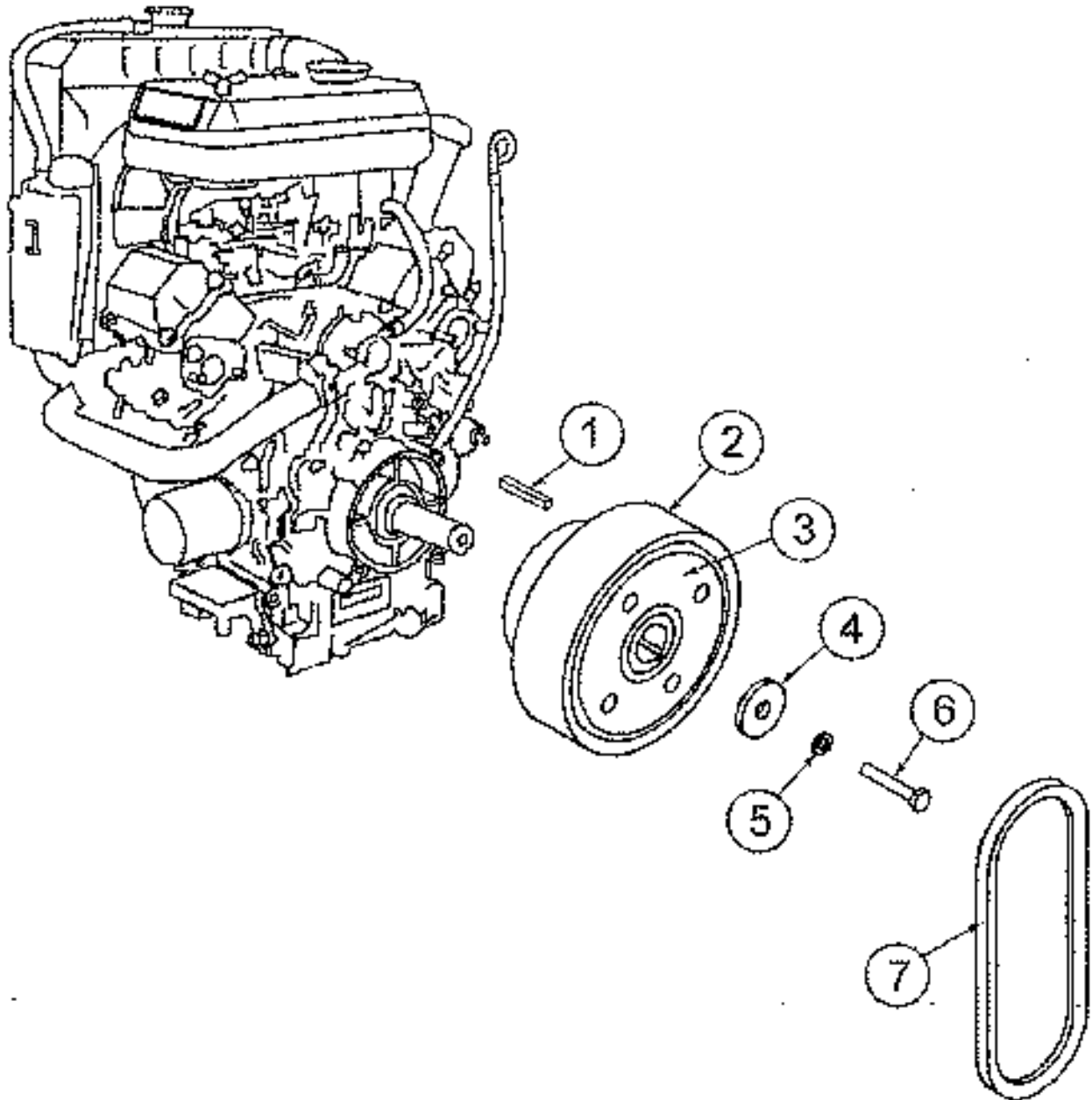
2A OPERATIONS



ILL.	PART #	DESCRIPTION	QTY.
1.	.034235	ENGINE, KAWASAKI 22 HP	2
2.	.036943	HOSE, OIL DRAIN	2
3.	.035463	GASKET, MUFFLER	2
4.	.034415	TAILPIPE, LH	1
5.	.034414	TAILPIPE, RH	1
6.	.034413	HEADER	2
7.	.034376	BRACKET, MUFFLER GUARD (LH)	1
8.	.034374	BRACKET, MUFFLER GUARD (RH)	1
9.	.036416	PLATE, MOTOR MOUNT	2
10.	.034617	CLAMP, MUFFLER	2
11.	.034401	GUARD, MUFFLER (LH)	1
12.	.034400	GUARD, MUFFLER (RH)	1

2A OPERATIONS

CLUTCH ASSEMBLY 8" BLM



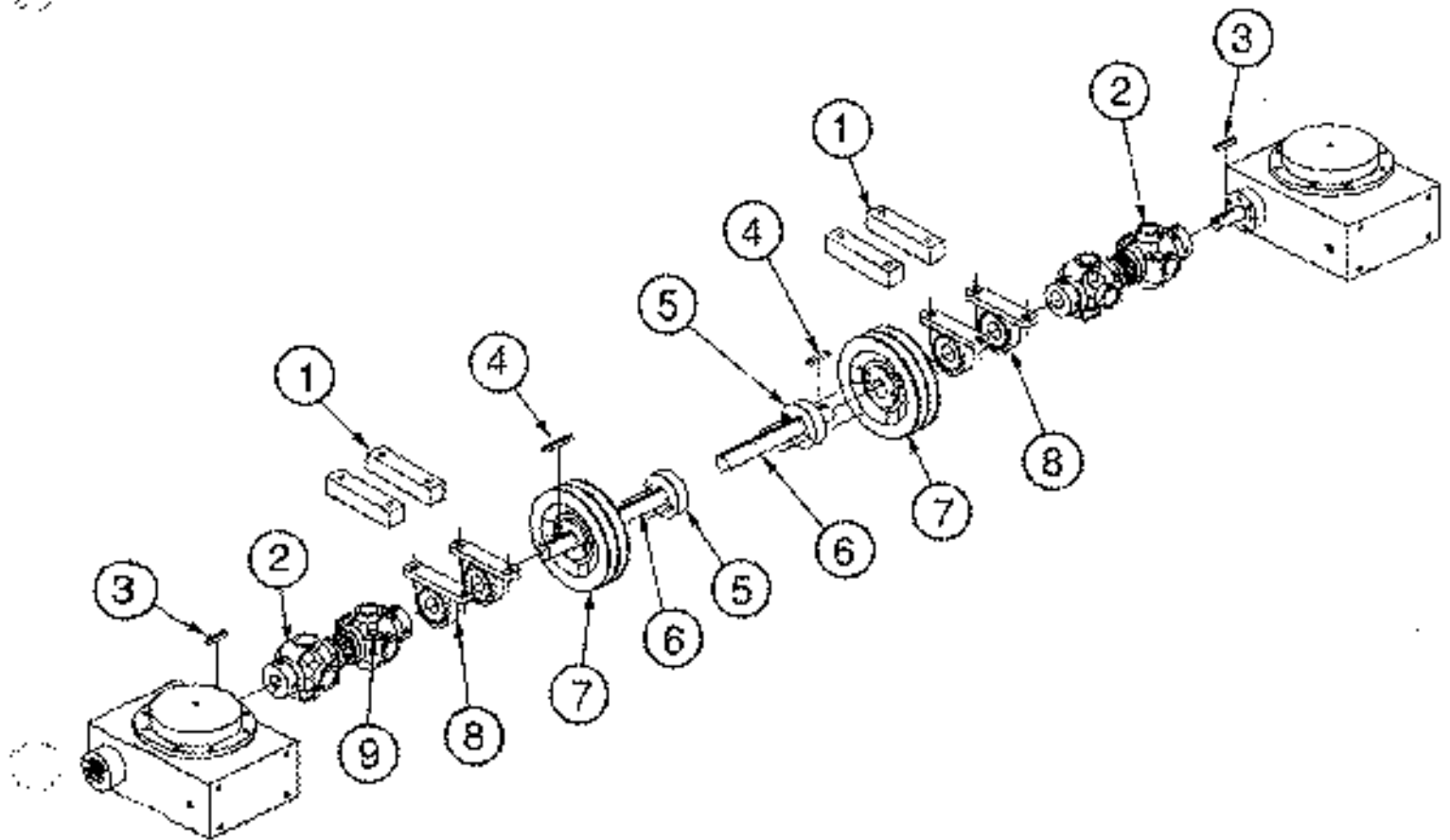
ILL.	PART #	DESCRIPTION	QTY.
1.....	.026992	KEY	1
2.....	.032685	DRIVEN BODY (OUTER CLUTCH BODY)	1
3.....	.033447	INNER CLUTCH ASSEMBLY	1
4.....	.026433	WASHER, PRESSURE	1
5.....	.021672	LW, 10MM	1
6.....	.021364	BOLT, CLUTCH	1
7.....	.020729	V-BELT, B36 (HP200-1050 ONLY)	2
	.032280	V-BELT, B34 (HP200-1200 ONLY)	2

HP200-1050 8" BLM CLUTCH W/ 1" BORE ---PART#: 034223

HP200-1200 8" BLM CLUTCH W/ 1-1/8" BORE ---PART# 034113

DRIVELINE ASSEMBLY

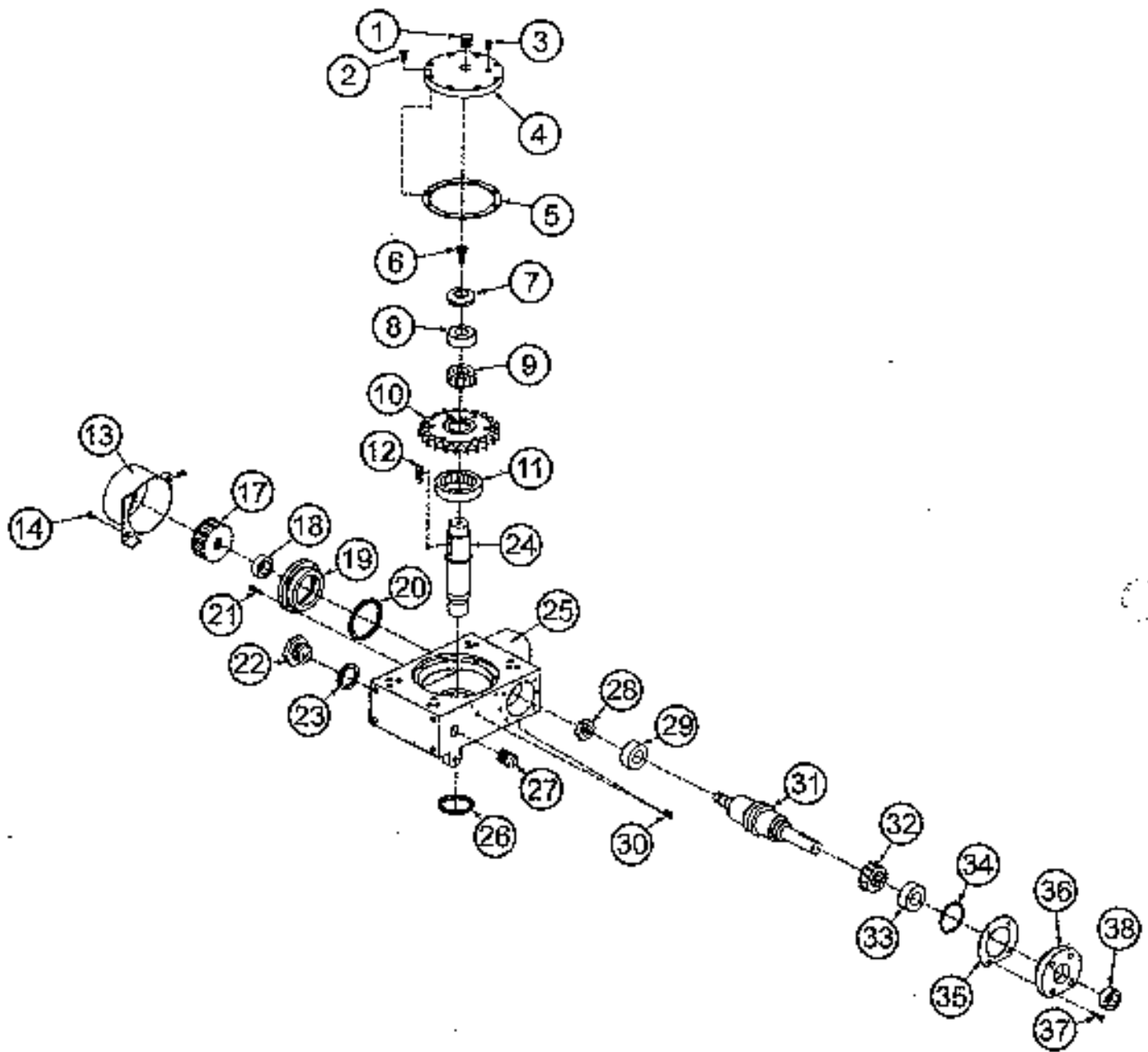
2A OPERATIONS



ILL.	PART #	DESCRIPTION	QTY.
1.....	.034644	BEARING SUPPORT BLOCK (HP200-1050 ONLY)	4
2.....	.028621	U-JOINT ASSEMBLY (HP200-1050 ONLY)	2
	.028622	U-JOINT ASSEMBLY (HP200-1200 ONLY)	2
3.....	.010273	KEY, 3/16" x 2" (HP200-1050 ONLY)	2
	.010307	KEY, 1/4" x 2" (HP200-1200 ONLY)	2
4.....	.024820	KEY, 1/4" x 4"	2
5.....	.010306	BUSHING, H 1"	2
6.....	.035228	SHAFT, DRIVE 9" (HP200-1050)	2
	.034116	SHAFT, DRIVE 8" (HP200-1200)	2
7.....	.026445	PULLEY, 2BK-65H	2
8.....	.032302	BEARING, PULLEY BLOCK	4
9.....	.010513	GREASE FITTING, 1/8-27 NPT	4

2A OPERATIONS

STANDARD FAN COOLED (SFC)
GEARBOX RIGHT HAND SITTING ON
MACHINE (SOM) PART #: 035225
HP 200-1050



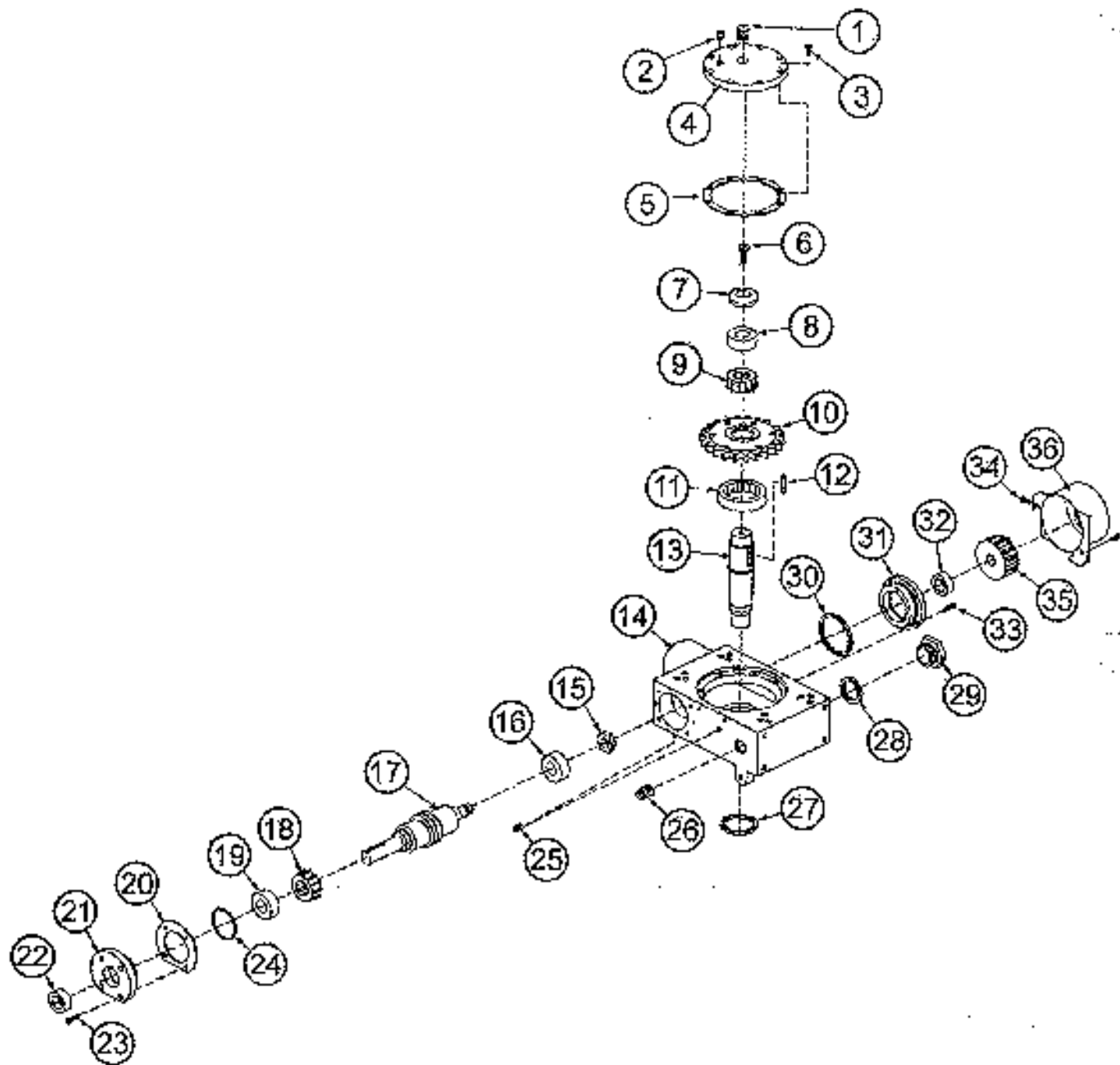
SFC GEARBOX RIGHT HAND SOM
PART#: 035225 (cont'd) HP 200-1050

2A
OPERATIONS

ILL.	PART #	DESCRIPTION	QTY.
1.	.010513	GREASE FITTING 1/4-28 STRAIGHT	.1
2.	.015205	SCREW 5/16-18 x 1	.8
3.	.015209	RELIEF VALVE	.1
4.	.034306	COVER, TOP	.1
5.	.015210	GASKET, .005 THICK	AS REQ.
	.020018	GASKET, .003 THICK	AS REQ.
	.032772	GASKET, .002 THICK	AS REQ.
6.	.013746	SCREW 3/8-16 x 1 RH	.2
7.	.015213	PRESSURE WASHER	.1
8.	.022074	BEARING RACE	.1
9.	.022073	TAPERED ROLLER	.1
10.	.015216	GEAR, BRONZE RH	.1
11.	.015217	BEARING, RADIAL BALL	.1
12.	.015686	KEY, 1/4 x 1-1/4	.1
13.	.035633-R	COVER, FAN SHROUD	.1
14.	.037484	SCREW, 10-32 x 3/8	.2
15.		NOT USED	
16.		NOT USED	
17.	.035591	FAN	.1
18.	.035315	SEAL, OIL	.1
19.	.035590	FLANGE, FAN SIDE	.1
20.	.015660	O-RING, FLANGE CAPS	.1
21.	.017314	BOLT, 1/4-20 x 5/8	.4
22.	.015672	SIGHT GLASS	.1
23.	.015673	O-RING	.1
24.	.015219	SHAFT MAIN DRIVE	.1
25.	.015204	GEAR BOX, MACHINE FINISHED	.1
26.	.015671	OIL SEAL	.1
27.	.012953	PLUG, 3/4 NPT	.1
28.	.015682	JAM NUT 5/8-18	.1
29.	.015683	BEARING, ANGULAR CONTACT	.1
30.	.010498	PLUG, 3/8 NPT	.2
31.	.035593	SHAFT, INPUT	.1
32.	.015668	BEARING, TAPERED ROLLER	.1
33.	.015669	BEARING, RACE	.1
34.	.015660	O-RING, FLANGE CAPS (SAME AS ILL.# 20)	.1
35.	.015222	GASKET, .005 THICK	AS REQ.
	.022185	GASKET, .002 THICK	AS REQ.
	.022186	GASKET, .003 THICK	AS REQ.
36.	.015223	CAP, FLANGE	.1
37.	.017314	BOLT, 1/4-20 x 5/8 (SAME AS ILL.# 21)	.4
38.	.015670	OIL SEAL	.1

2A OPERATIONS

SFC GEARBOX LEFT HAND(SOM)
PART #: 034197 HP 200-1050



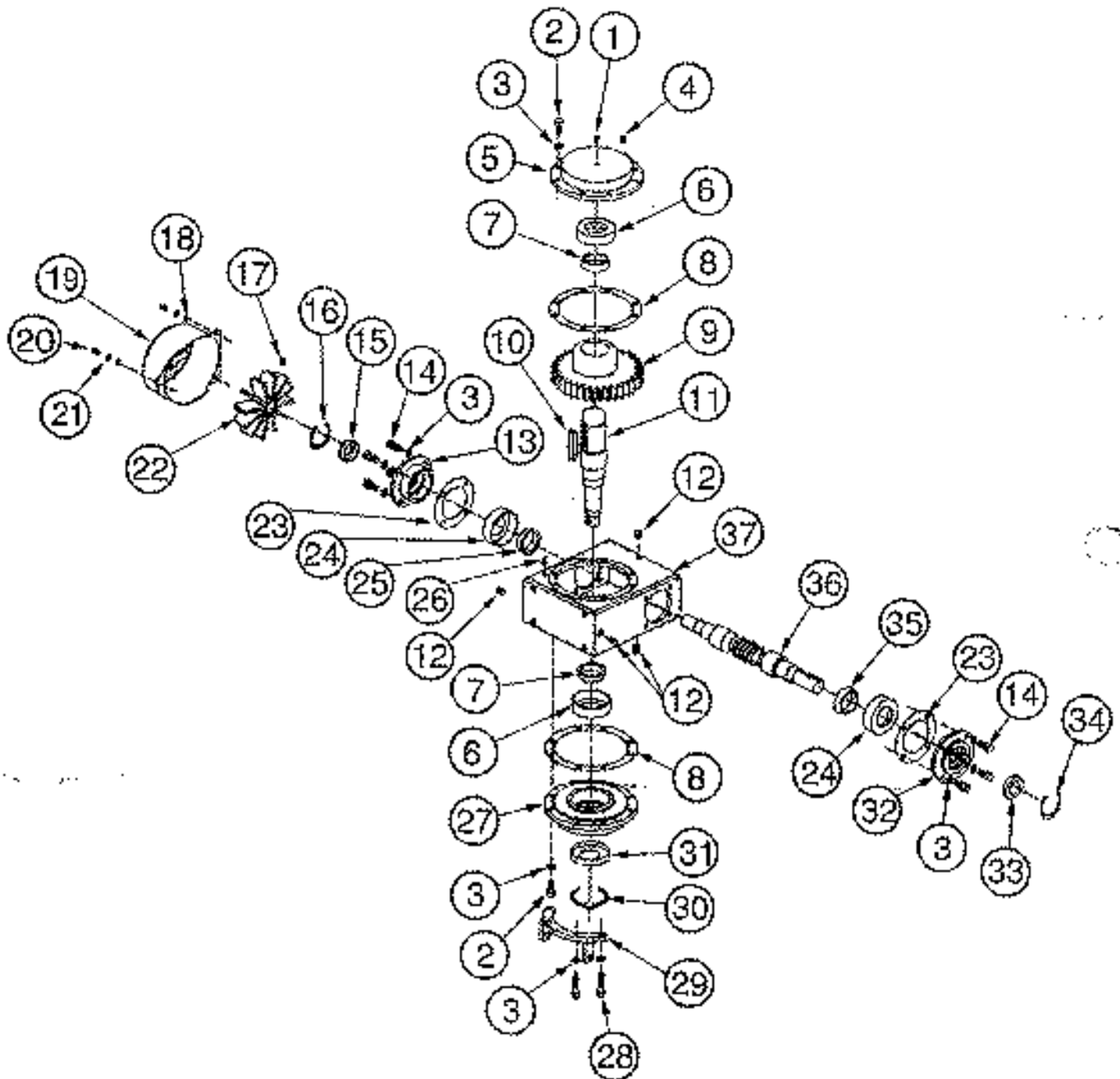
SFC GEARBOX LEFT HAND SOM
PART#: 034197 (cont'd) HP 200-1050

2A
OPERATIONS

ILL.	PART #	DESCRIPTION	QTY.
1.	.010513	.GREASE FITTING 1/4-28 STRAIGHT	1
2.	.015209	.RELIEF VALVE	1
3.	.015205	.BOLT, 5/16-18 x 1	8
4.	.026408	.TOP COVER	1
5.	.015210	.GASKET, .005 THICK	AS REQ.
	.020018	.GASKET, .003 THICK	AS REQ.
	.032772	.GASKET, .002 THICK	AS REQ.
6.	.013746	.SCREW, 5/16-18 x 1	2
7.	.015213	.PRESSURE WASHER	1
8.	.022074	.BEARING, RACE	1
9.	.022073	.BEARING, TAPERED ROLLER	1
10.	.015216	.BRONZE GEAR RH	1
11.	.015217	.BEARING, RADIAL BALL	1
12.	.015696	.KEY 1/4 x 1 1/4	1
13.	.015219	.SHAFT, MAIN	1
14.	.015204	.GEARBOX, MACHINED FINISHED	1
15.	.024388	.JAM NUT 5/8-18	1
16.	.015653	.BEARING, ANGULAR CONTACT	1
17.	.035583	.SHAFT, INPUT	1
18.	.015688	.BEARING, TAPERED ROLLER	1
19.	.015669	.BEARING, RACE	1
20.	.015222	.GASKET, .005 THICK	AS REQ.
	.022185	.GASKET, .002 THICK	AS REQ.
	.022186	.GASKET, .003 THICK	AS REQ.
21.	.015223	.FLANGE, SIDE CAP	1
22.	.015670	.OIL SEAL	1
23.	.017314	.BOLT, 1/4-20 x 5/8	4
24.	.015660	.O-RING, END CAPS	1
25.	.010496	.PLUG, 3/8 NPT	2
26.	.012953	.PLUG, 3/4 NPT	1
27.	.015671	.OIL SEAL	1
28.	.015673	.O-RING	1
29.	.015672	.SIGHT GLASS	1
30.	.015660	.O-RING, END CAPS (SAME AS ILL.# 24)	1
31.	.035580	.FLANGE, FAN SIDE	1
32.	.035315	.OIL SEAL	1
33.	.017314	.BOLT, 1/4-20 x 5/8 (SAME AS ILL.# 23)	4
34.	.037484	.SCREW, 10-32 x 3/8	2
35.	.035592	.FAN	1
36.	.035633-L	.FAN SHROUD	1

2A OPERATIONS

SUPER DUTY (SD) GEARBOX RIGHT
HAND SITTING ON MACHINE (SOM)
PART #: 033282 HP 200-1200



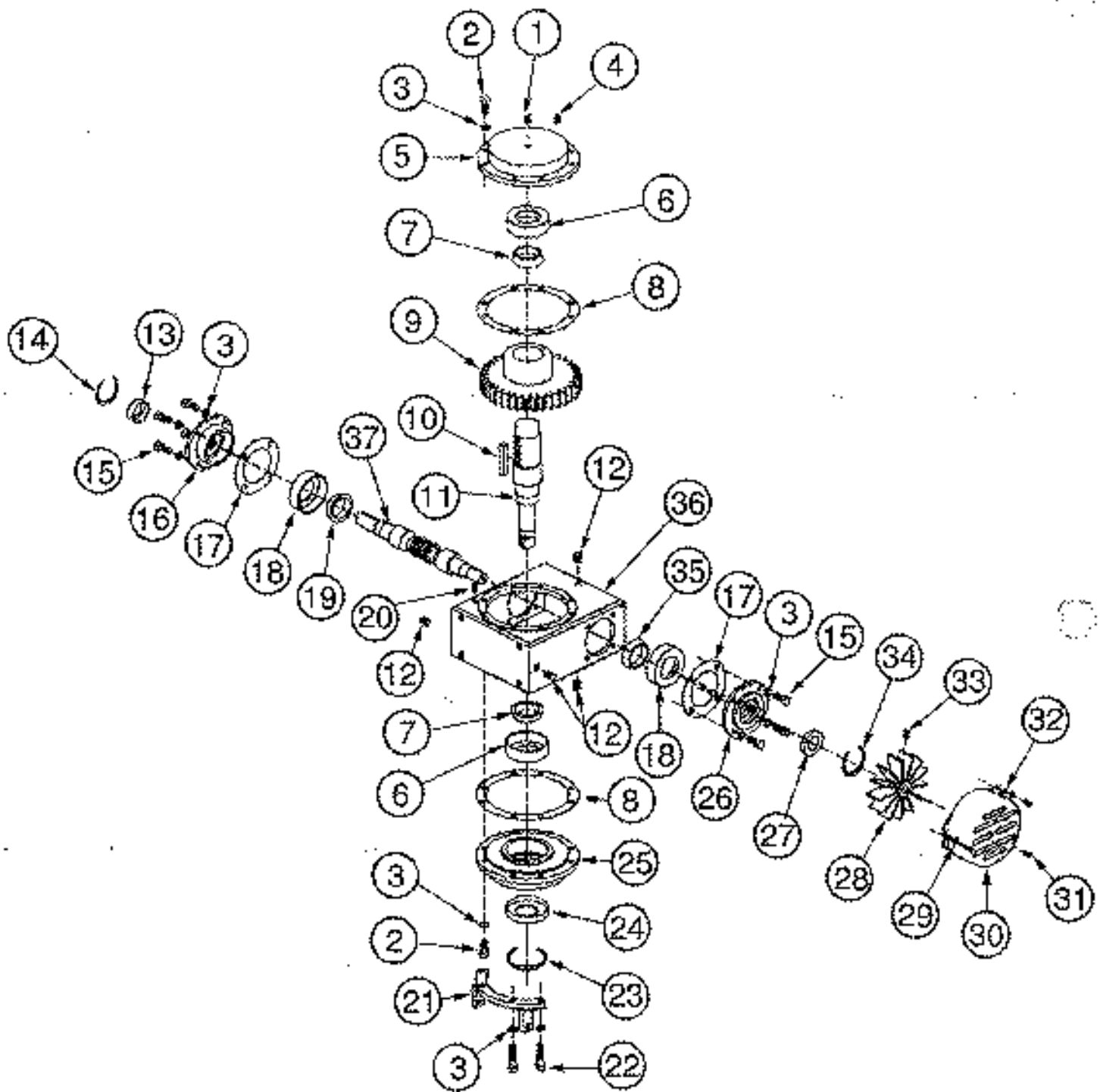
**SD GEARBOX RIGHT HAND (SOM)
PART#: 033282 (cont'd) HP 200-1200**

**2A
OPERATIONS**

ILL.	PART #	DESCRIPTION	QTY.
1.	.010513	GREASE FITTING 1/4-28 STRAIGHT	1
2.	.010038	BOLT, 3/8-16 x 1-1/2"	12
3.	.010091	LW, 3/8	24
4.	.032745	PLUG, PLASTIC 1/8-27	1
5.	.029150	PLATE, TOP	1
6.	.029184	BEARING, RACE (3720)	2
7.	.029183	BEARING, CONE (3780)	2
8.	.028914-2	SHIM, .002 THICK	AS REQ.
	.028914-3	SHIM, .003 THICK	AS REQ.
	.028914-5	SHIM, .005 THICK	AS REQ.
	.028914-10	SHIM, .010 THICK	AS REQ.
9.	.029149	GEAR, BRONZE IRON RH	1
10.	.029146	KEY, GEAR	1
11.	.029152	MAIN SHAFT, RH	1
12.	.010498	PLUG	4
13.	.029147	FLANGE	1
14.	.010037	BOLT, 3/8-16 x 1-1/4"	8
15.	.029181	SEAL (471705)	1
16.	.032713	RING, RETAINING (UR175)	1
17.	.012869	SET SCREW, 1/4-20 x 3/8	1
18.	.018072	FW, 3/16	3
19.	.028703	SHROUD, FAN	1
20.	.013484	SCREW, 10-24 x 1/2	3
21.	.013740	LW, #10	3
22.	.031541	FAN	1
23.	.028915-2	SHIM, .002 THICK	AS REQ.
	.028915-3	SHIM, .003 THICK	AS REQ.
	.028915-5	SHIM, .005 THICK	AS REQ.
	.028915-10	SHIM, .010 THICK	AS REQ.
24.	.029272	BEARING, RACE (HM89410)	2
25.	.029182	BEARING, CONE (HM89443)	1
26.	.029529	VALVE, RELIEF 1/8-27 NPT	1
27.	.029155	PLATE, BOTTOM	1
28.	.028775	BOLT, 3/8-16 x 2"	4
29.	.032716	BRACKET, MOUNT	1
30.	.032715	RING, RETAINING (UR275)	1
31.	.029180	SEAL (472572)	1
32.	.029154	CAP, END	1
33.	.029179	SEAL (473215)	1
34.	.032714	RING, RETAINING (UR237)	1
35.	.029178	BEARING, CONE (HM89448)	1
36.	.029145	SHAFT, COUNTER RH WORM	1
37.	.029143	CASE, GEARBOX	1

2A OPERATIONS

SD GEARBOX LEFT HAND(SOM)
PART #: 029142 HP 200-1200



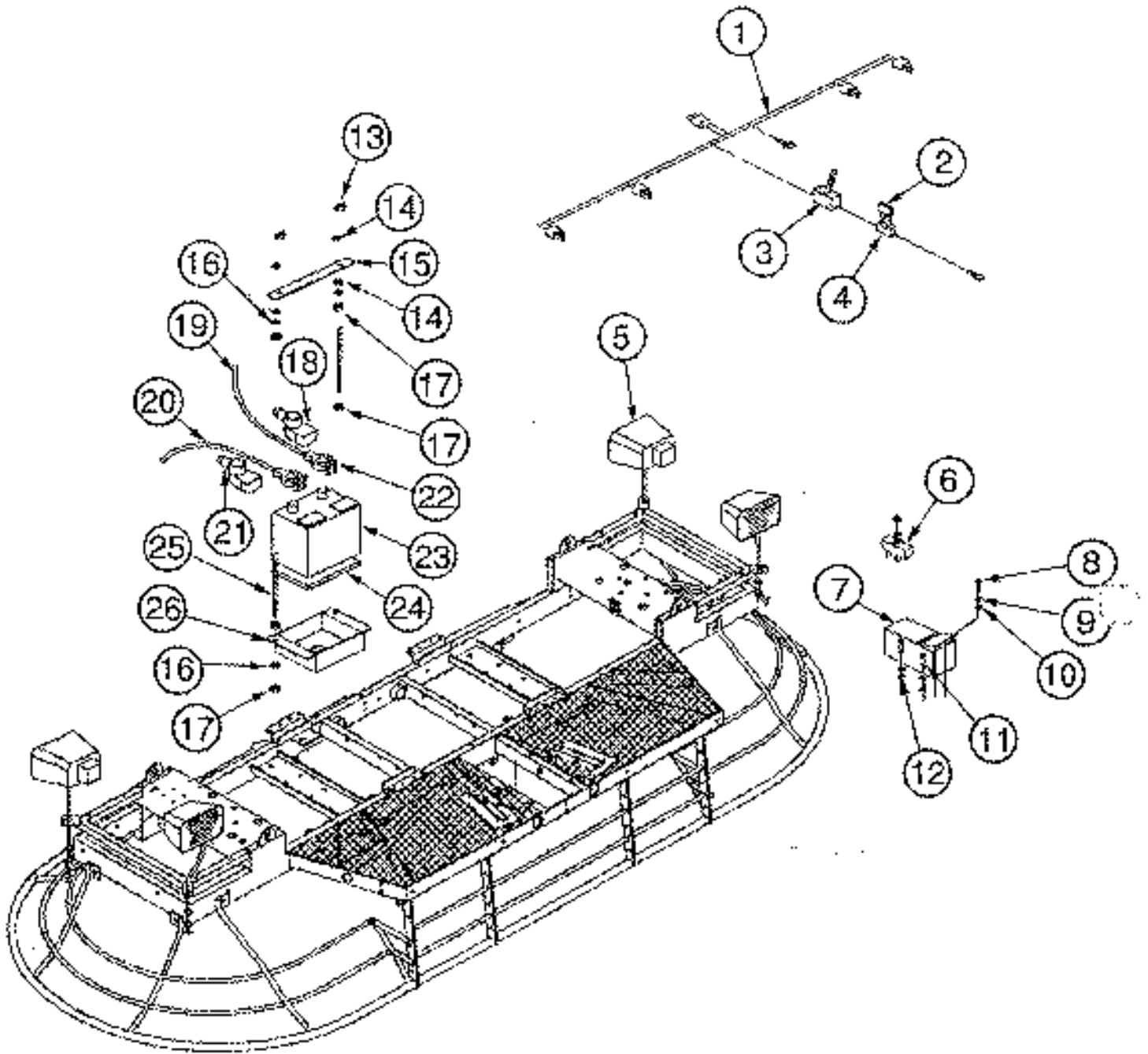
SD GEARBOX LEFT HAND(SOM)
PART #: 029142 (cont'd) HP 200-1200

2A
OPERATIONS

ILL.	PART #	DESCRIPTION	QTY.
1.	.010513	GREASE FITTING 1/4-28 STRAIGHT	1
2.	.010098	BOLT, 3/8-16 x 1-1/2"	12
3.	.010091	LW, 3/8	24
4.	.032745	PLUG, PLASTIC 1/8-27	1
5.	.029150	PLATE, TOP	1
6.	.029184	BEARING, RACE (3720)	2
7.	.029183	BEARING, CONE (3780)	2
8.	.028914-2	SHIM, .002 THICK	AS REQ.
	.028914-3	SHIM, .003 THICK	AS REQ.
	.028914-5	SHIM, .005 THICK	AS REQ.
	.028914-10	SHIM, .010 THICK	AS REQ.
9.	.029149	GEAR, BRONZE IRON RH	1
10.	.029146	KEY, GEAR	1
11.	.029152	MAIN SHAFT, RH	1
12.	.010498	PLUG	4
13.	.029179	SEAL, (473215)	1
14.	.032714	RING, RETAINING (UR237)	1
15.	.010037	BOLT, 3/8-16 x 1-1/4"	8
16.	.029154	CAP, END	1
17.	.028915-2	SHIM, .002 THICK	AS REQ.
	.028915-3	SHIM, .003 THICK	AS REQ.
	.028915-5	SHIM, .005 THICK	AS REQ.
	.028915-10	SHIM, .010 THICK	AS REQ.
18.	.029272	BEARING, RACE (HM89410)	2
19.	.029178	BEARING, CONE (HM89448)	1
20.	.029529	VALVE, RELIEF 1/8-27	1
21.	.032716	BRACKET, MOUNT	1
22.	.026775	BOLT, 3/8-16 x 2	4
23.	.032715	RING, RETAINING (UR275)	1
24.	.029180	SEAL (472572)	1
25.	.029155	PLATE, BOTTOM	1
26.	.029147	FLANGE	1
27.	.029181	SEAL (471705)	1
28.	.034541	FAN	1
29.	.013740	LW, #10	3
30.	.028703	SHROUD, FAN	1
31.	.013494	SCREW, 10-24 x 1/2	3
32.	.018072	FW, 3/16	3
33.	.012869	SCREW, SET 1/4-20 x 3/8	1
34.	.032713	RING, RETAINING (UR175)	1
35.	.029182	BEARING, CONE (HM89443)	1
36.	.029143	CASE, GEAR BOX	1
37.	.029145	SHAFT, COUNTER RH WORM	1

2A OPERATIONS

ELECTRICAL COMPONENTS

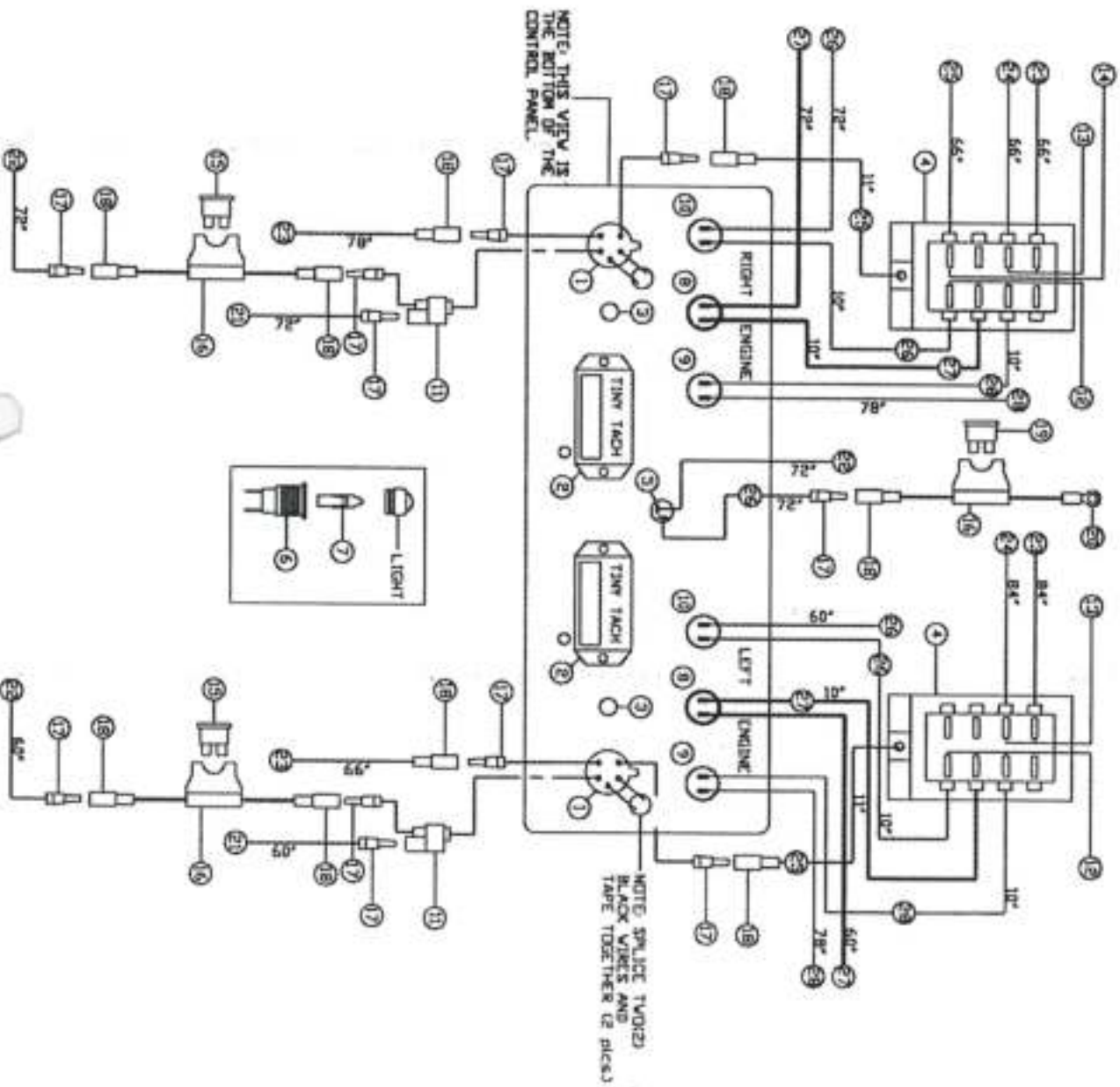


32HP KA

NOTE:
 * ALL WIRES NEED TO BE COPPER
 * ALL FUSE LINKS MUST BE 12 GA. WIRE

WIRING SCHEMATIC FOR
 HP200 - 1050 RIDER
 PART #: 037970

NO.	DESCRIPTION	PART #
1	IGNITION	03095-8005
2	TINY TACH	029473
3	CHOKE CABLE	027928
4	FUSE BOX	036932
5	LIGHT SWITCH	028208
6	LAMP SOCKET	034610
7	LAMP	034611
8	YELLOW LIGHT	034612
9	GREEN LIGHT	034613
10	RED LIGHT	034614
11	2 TO 1 CONNECTION	036673
12	3 AMP FUSE	036553
13	5 AMP FUSE	036554
14	7.5 AMP FUSE	036917
15	25 AMP FUSE	036918
16	FUSE LINK	026461
17	MALE BULLET	038263
18	FEMALE BULLET	038264
19	20 AMP FUSE	034524
20	SMALL EYELET	016137
21	RED 14 GA. WIRE	013278
22	RED 16 GA. WIRE	036928
23	BROWN 16 GA. WIRE	036927
24	WHITE 16 GA. WIRE	036929
25	GREEN 16 GA. WIRE	036930
26	BLUE 16 GA. WIRE	036925
27	YELLOW 16 GA. WIRE	036926
28	BLACK 16 GA. WIRE	036931



ELECTRICAL COMPONENTS (cont'd)

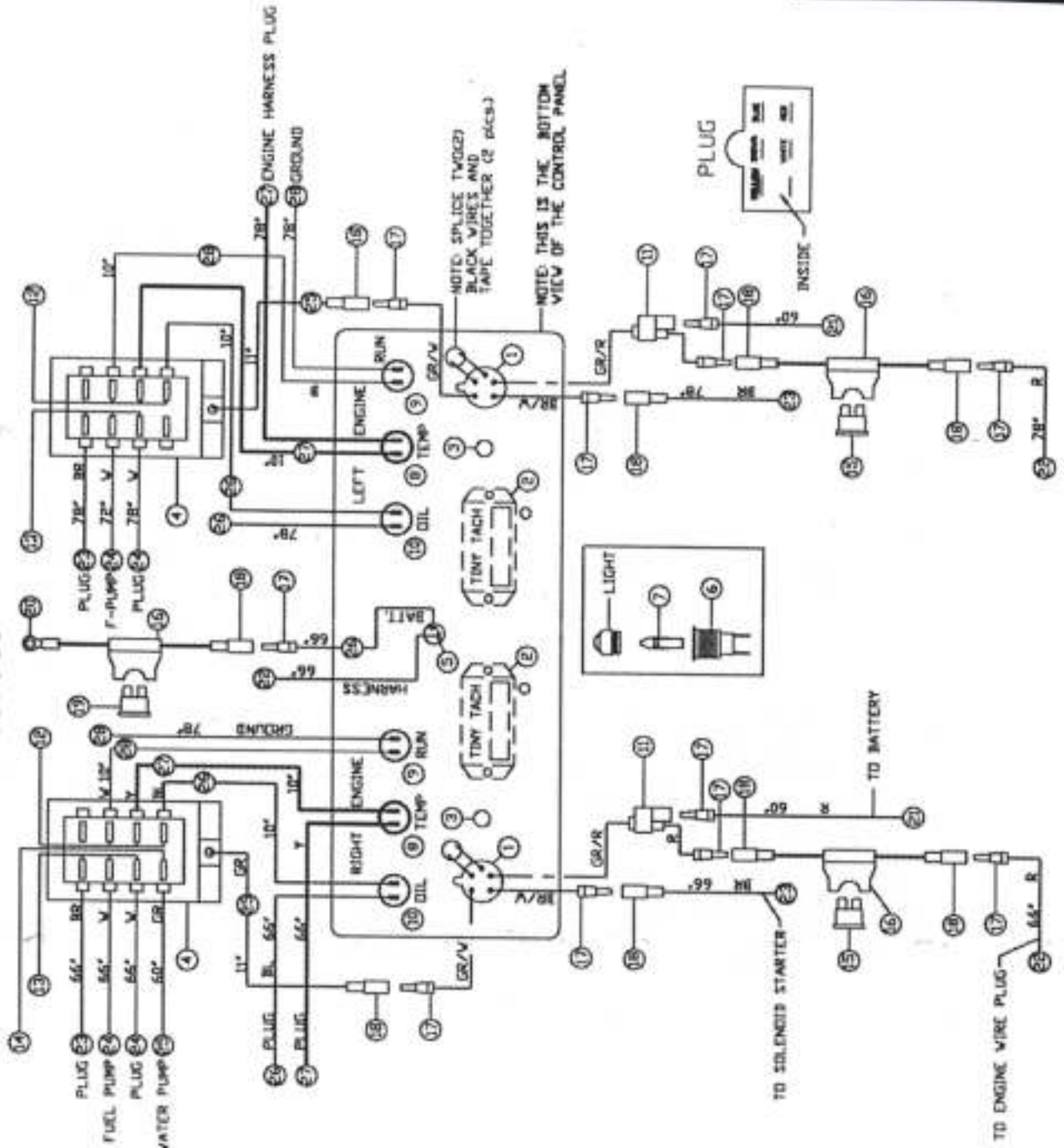
2A
OPERATIONS

ILL	QTY	PART #	DESCRIPTION
1	1	034523	HARNASS, LIGHT #P200 KAWASAKI
2	1	020460	FUSE, 30 AMP
3	1	022028	SWITCH, TOGGLE
4	1	026461	FUSE, HOLDER
5	1	036881	LIGHT, 12 VOLT
6	1	034005	KILL SWITCH
7	1	026103	KILL SWITCH MOUNT
8	2	010019	BOLT, 5/16-18 x 3/4
9	2	010093	TW, 5/16
10	2	010082	FW, 5/16
11	2	010002	BOLT, 1/4-20 x 3/4
12	2	010098	NUT, HEX 1/4-20
13	2	013631	NUT, WING 3/8-18
14	4	017751	FW, HARD 3/8
15	4	033625	CLAMP, BATTERY
16	4	010091	TW, 3/8
17	6	015884	NUT, HEX 3/8-18
18	1	035588	TERMINAL COVER, NEGATIVE
18	1	025435	CABLE, NEGATIVE (BLACK)
AS REQ.	AS REQ.	019490	CABLE, POSITIVE (RED)
21	1	035597	TERMINAL COVER, POSITIVE
22	1	023869	TERMINAL
23	2	029856	BATTERY, 12 VOLT
24	1	026426	CUSHION, BOTTOM
25	2	033420	ROD, THREADED 3/8 x 7
26	1	034360	BOX, BATTERY

20hp KA + 4U HP KA

WIRING SCHEMATIC FOR
HP200 - 1200 RIDER
PART #: 037969

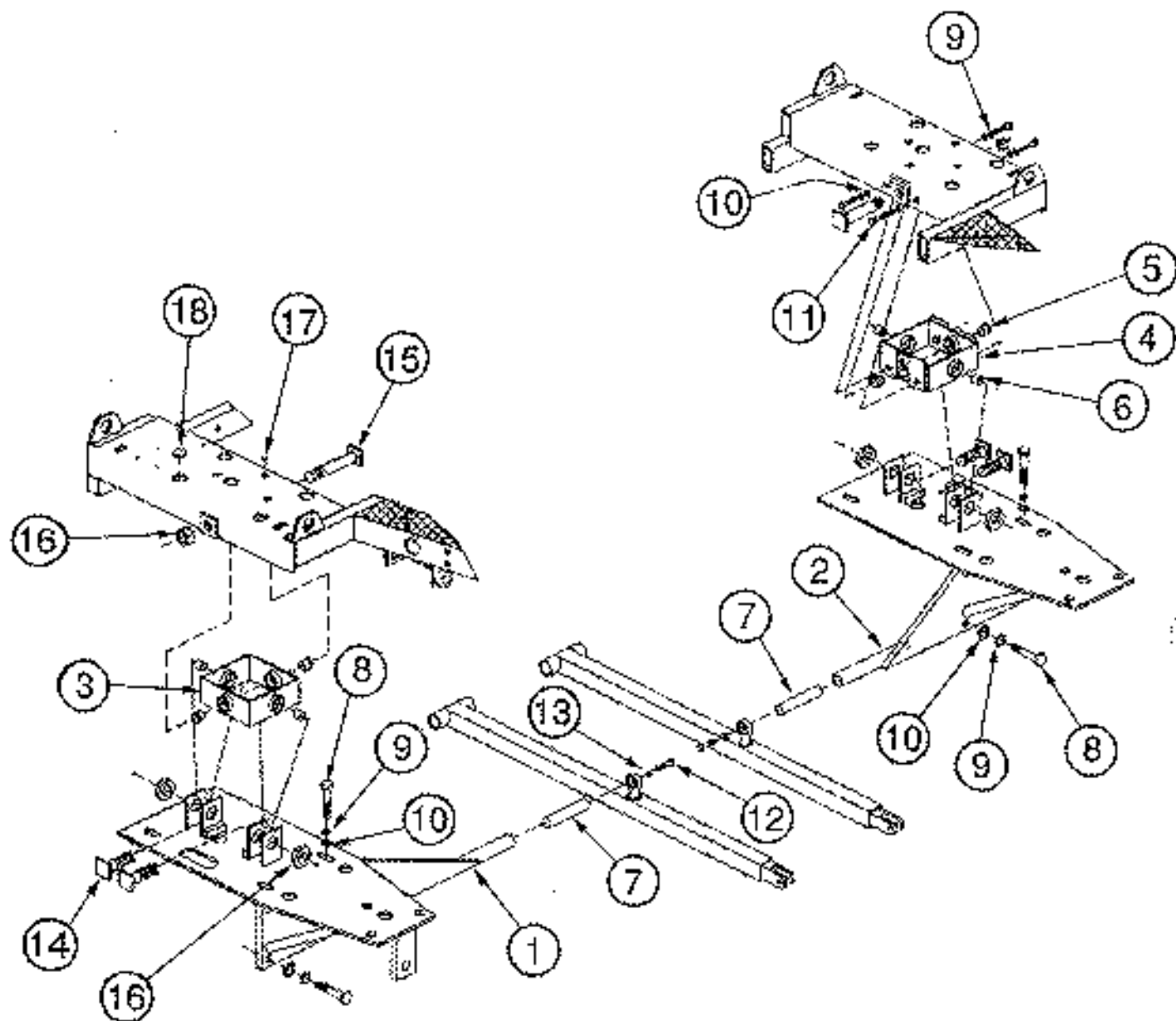
NOTE:
* ALL WIRES NEED TO BE COPPER
* ALL FUSE LINKS MUST BE 12 GA. WIRE



NO.	DESCRIPTION	PART #
1	IGNITION	27023-28255
2	TINY TACH	029473
3	CHOKE CABLE	029928
4	FUSE BOX	036932
5	LIGHT SWITCH	022028
6	LAMP SOCKET	034610
7	LAMP	034611
8	YELLOW LIGHT	034612
9	GREEN LIGHT	034613
10	RED LIGHT	034614
11	2 TO 1 CONNECTOR	036673
12	3 AMP FUSE	036553
13	5 AMP FUSE	036554
14	7.5 AMP FUSE	036517
15	25 AMP FUSE	036518
16	FUSE LINK	026461
17	MALE BULLET	032265
18	FEMALE BULLET	032266
19	20 AMP FUSE	034524
20	SMALL EYELET	056137
21	RED 14 GA. WIRE	012270
22	RED 16 GA. WIRE	036928
23	BROWN 16 GA. WIRE	036927
24	WHITE 16 GA. WIRE	036929
25	GREEN 16 GA. WIRE	036930
26	BLUE 16 GA. WIRE	036925
27	YELLOW 16 GA. WIRE	036926
28	BLACK 16 GA. WIRE	036931

2A OPERATIONS

CROSSHEAD AND PIVOT BOX ASSEMBLY HP200-1050



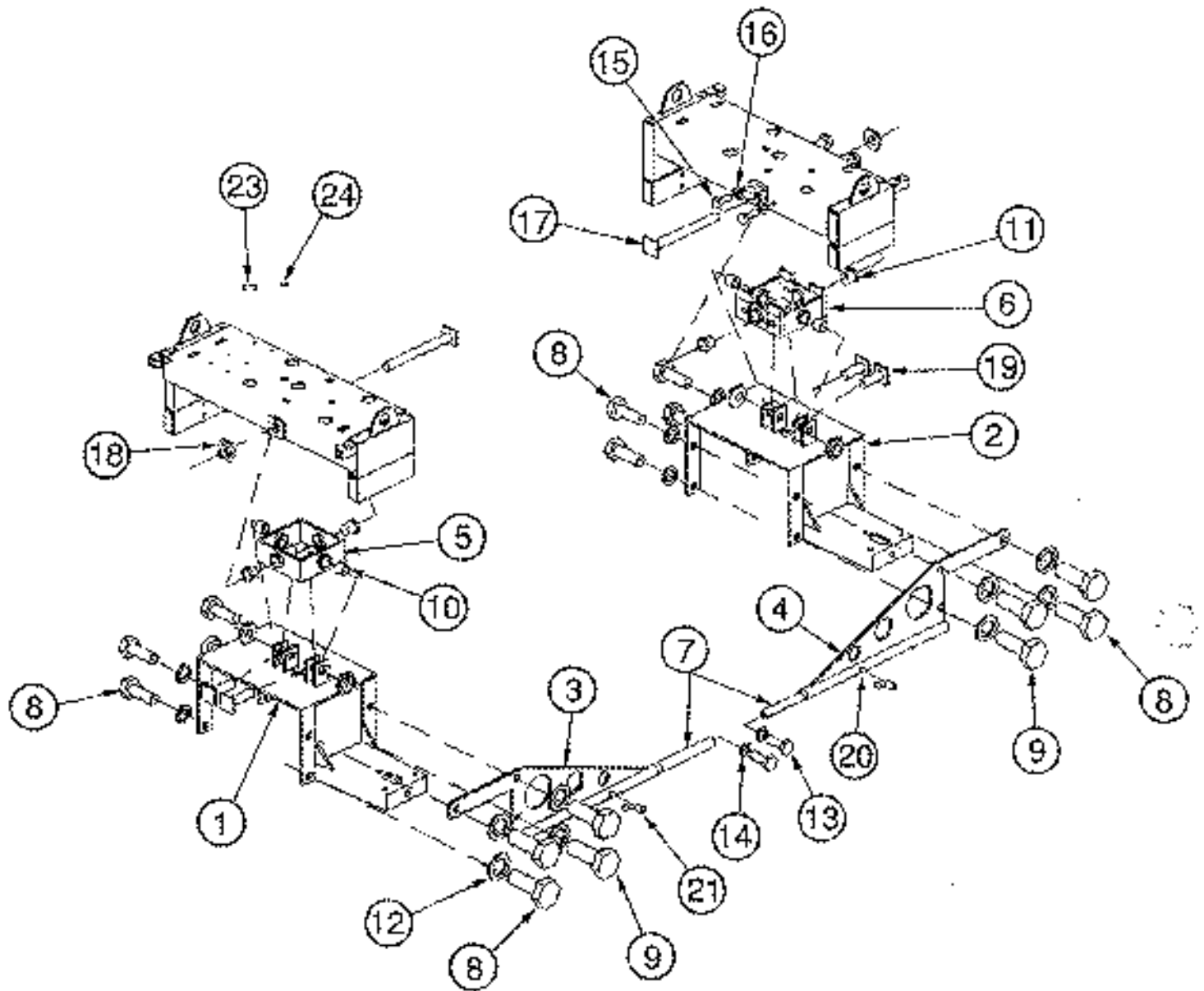
CROSSHEAD AND PIVOT BOX ASSEMBLY
HP200-1050 (cont'd)

2A
OPERATIONS

ILL.	PART #	DESCRIPTION	QTY.
1.	.034631	CROSSHEAD RH	1
2.	.034627	CROSSHEAD LH	1
3.	.038326R	BOX, CROSSHEAD MOUNTING RH	1
4.	.034653	BOX, CROSSHEAD MOUNTING LH	1
5.	.024630	BUSHING, BRASS	4
6.	.026248	BUSHING, BRASS	4
7.	.026238	INSERT, CONTROL ARM	2
8.	.026474	BOLT, 3/8-16 x 7/8	16
9.	.010091	LOCK WASHER 3/8	20
10.	.017751	FLAT WASHER HARD 3/8	20
11.	.019037	BOLT, 3/8-16 x 1 1/4	4
12.	.010070	BOLT, 1/2-13 x 1 3/4	2
13.	.010093	LOCK WASHER 1/2	2
14.	.026175	BOLT, CROSSHEAD MOUNTING	4
15.	.026178	BOLT, CROSSHEAD MOUNTING	2
16.	.026447	NUT, SELF LOCK 3/4-10 NC THIN	6
17.	.026462	PLUG, CHROME 1/2"	8
18.	.026463	PLUG, CHROME 1"	10

2A OPERATIONS

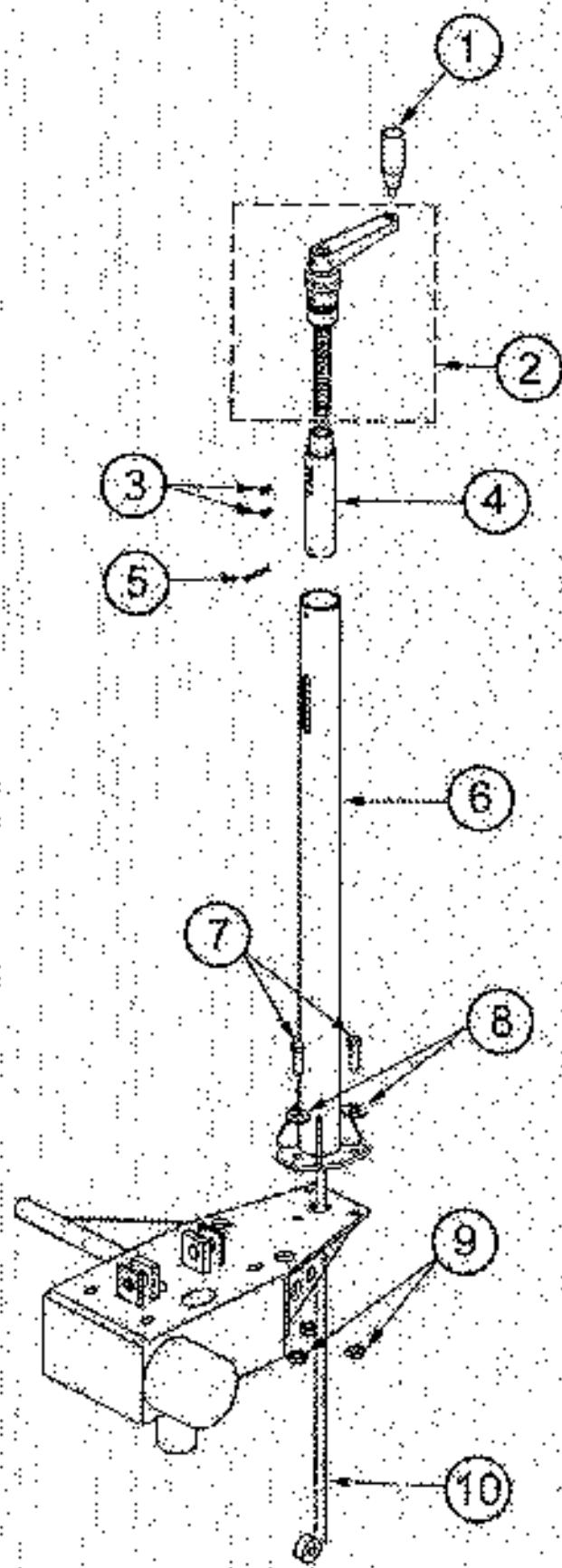
CROSSHEAD AND PIVOT BOX ASSEMBLY HP200-1200



CROSSHEAD AND PIVOT BOX ASSEMBLY
HP200-1200 (cont'd)

2A
OPERATIONS

ILL.	PART #	DESCRIPTION	QTY.
1.	.026945R	CROSSHEAD RIT	1
2.	.026945L	CROSSHEAD L.H.	1
3.	.033094	CROSSHEAD ARM	2
4.	SAME AS #3		
5.	.033927	BOX, CROSSHEAD LH	1
6.	.028326R	BOX, CROSSHEAD RH	1
7.	.026238	INSERT, CONTROL ARM	2
8.	.020915	BOLT, 5/8-11 x 1-1/2"	10
9.	.019969	BOLT, 5/8-11 x 1-3/4"	6
10.	.026248	BUSHING, BRONZE	4
11.	.024630	BUSHING, FLANGE	4
12.	.010095	LW, 5/8	16
13.	.010070	BOLT, 1/2-13 x 1-3/4"	2
14.	.010093	LW, 1/2	2
15.	.010037	BOLT, 3/8-16 x 1-1/4"	4
16.	.010091	LW, 3/8	4
17.	.026178	BOLT, CROSSHEAD 3/4-10 x 7-3/16"	2
18.	.026447	NUT, SELF-LOCK THIN 3/4-10	6
19.	.026175	BOLT, CROSSHEAD 3/4-10 x 1-3/4"	4
20.	.018511	GREASE FITTING, 1/4-28 STRAIGHT	2
21.	.015692	PLUG, PLASTIC P-8 1/8-27	2
22.	NOT USED		
23.	.026463	PLUG, 1" CHROME	10
24.	.026462	PLUG, 1/2" CHROME	8



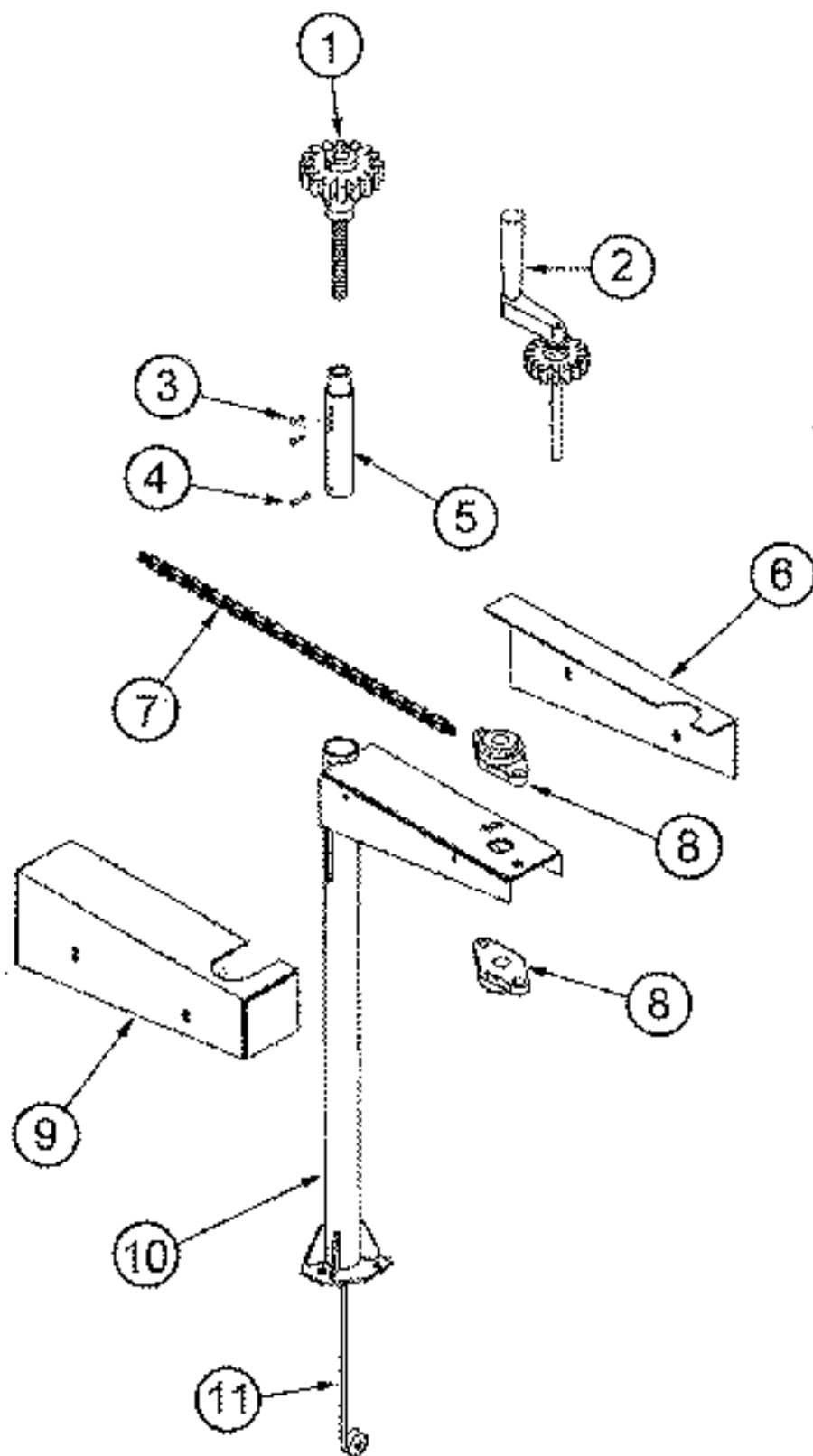
PITCH CONTROL ASSEMBLY
HP200-1050 (cont'd)

2A
OPERATIONS

ILL	PART #	DESCRIPTION	QTY.
1.....	.032115	.....KNOB, PITCH CONTROL	1
2.....	.032157	.....CRANK HANDLE ASSEMBLY	1
3.....	.015788	.....SOCKET HEAD CAP SCREW 1/4-20 X 1/4	2
4.....	.029812	.....BUSHING, SLIDE	1
5.....	.015747	.....PIN, SPIRAL 3/16 X 1-1/2	1
6.....	.026426	.....ASSEMBLY, TUBE AND PLATE	1
7.....	.010036	.....BOLT, 3/8-16 X 1	3
8.....	.011751	.....FW, HARD 3/8	3
9.....	.010464	.....NUT, NYLOK 3/8-16	3
10.....	.029822	.....SHAFT	1

2A OPERATIONS

PITCH CONTROL ASSEMBLY HP200-1200



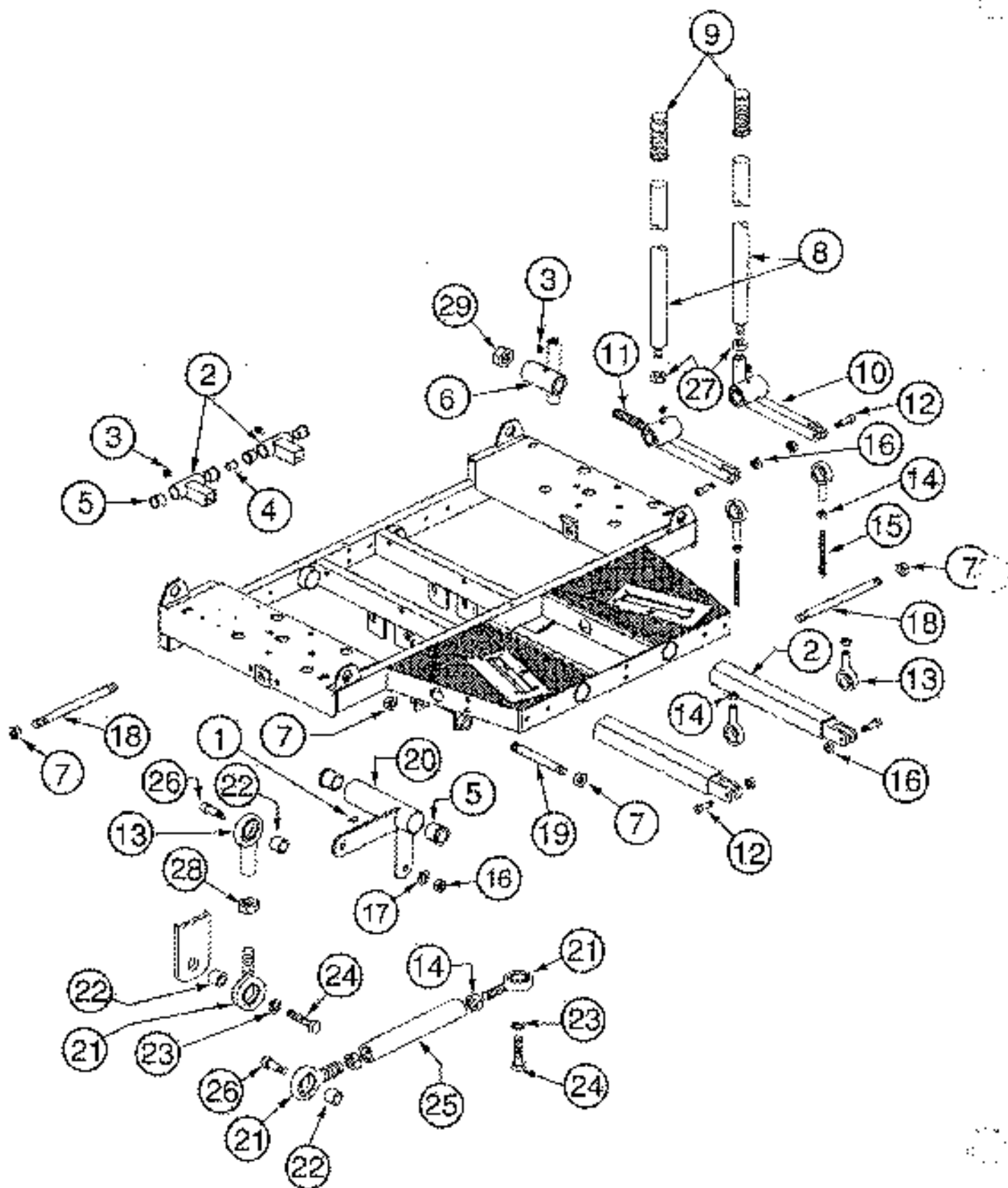
**PITCH CONTROL ASSEMBLY
HP200-1200 (cont'd)**

**2A
OPERATIONS**

ILL.	PART #	DESCRIPTION	QTY.
1	.037132	CRANK ASSEMBLY	1
2	.037133	PITCH CONTROL HANDLE ASSEMBLY	1
3	.015768	SCREW, SET 1/4-20 X 1/4	2
4	.015747	PIN, ROLL 3/16 X 1-1/2"	1
5	.029812	BUSHING, SLIDE	1
6	.033778L	PLATE, COVER (LH)	1
	.033778R	PLATE, COVER (RH)	1
7	.000755	CHAIN #40	2.5 ft
8	.033807	BEARING	2
9	.033779L	COVER (LH)	1
	.033779R	COVER (RH)	1
10	.033822L	TUBE (LH)	1
	.033822R	TUBE (RH)	1
11	.029822	SHAFT	1

033885L -- PITCH CONTROL LEFT HAND ASSEMBLY
033885R -- PITCH CONTROL RIGHT HAND ASSEMBLY

STEERING LEVER ASSEMBLY



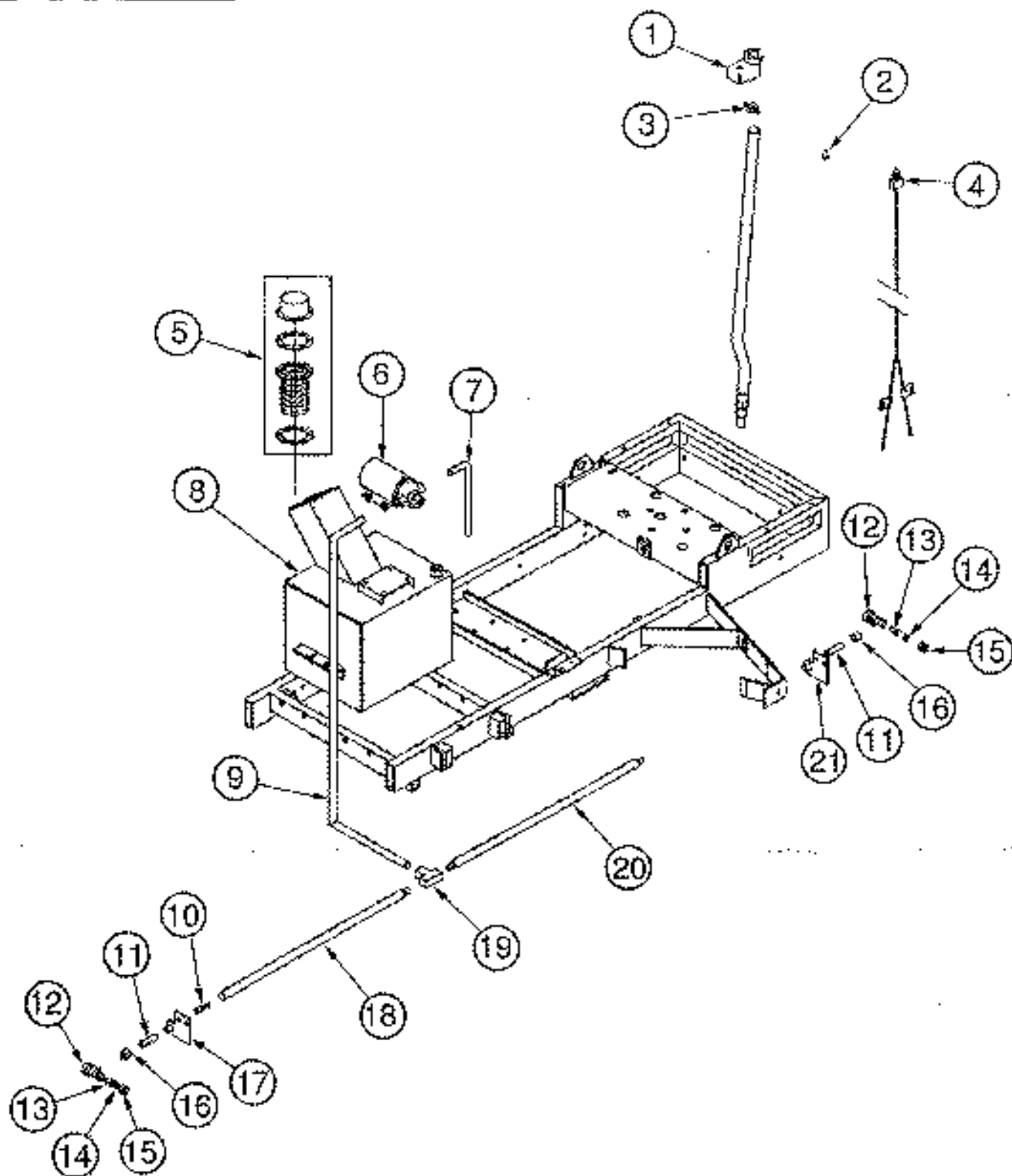
STEERING LEVER ASSEMBLY (cont'd)

2A OPERATIONS

ILL.	PART #	DESCRIPTION	QTY.
1.	.018510	GREASE FITTING 1/4-28 x 45 DEG	1
2.	.034684	LOWER CONTROL ARM (HP200-1050 ONLY)	2
	.028954	LOWER CONTROL ARM (HP200-1200 ONLY)	2
3.	.201163	GREASE FITTING 1/8-27 NPT STRAIGHT	5
4.	.026205	SPACER, CONTROL ARM	2
5.	.024630	BUSHING, FLANGE	12
6.	.037929	OPERATOR LEVER, UPPER RH	1
7.	.076447	NUT, SELFLOCK 3/4-10 NC	6
8.	.038149	OPERATOR LVR, UPPER (HP200-1050 ONLY)	2
	.037931	OPERATOR LVR, UPPER (HP200-1200 ONLY)	2
9.	.037668	GRIP, HANDLE	2
10.	.037971	OPERATOR LVR, LOWER LH (HP200-1050 ONLY)	1
	.037926	OPERATOR LVR, LOWER LH (HP200-1200 ONLY)	1
11.	.034676	OPERATOR LVR, LOWER RH (HP200-1050 ONLY)	1
	.034884	OPERATOR LVR, LOWER RH (HP200-1200 ONLY)	1
12.	.026267	BOLT, SHOULDER 1/2 x 1	4
13.	.019900	ROD END, 1/2 FEMALE (HP200-1050 ONLY)	2
	.221408	ROD END, 1/2 MALE (HP200-1200 ONLY)	2
14.	.010107	NUT, HEX 1/2-20 NF	6
15.	.024562	CONTROL ARM (HP200-1050 ONLY)	2
	.026784	CONTROL ARM (HP200-1200 ONLY)	2
16.	.010484	NUT, NYLON LOCK 3/8-16	6
17.	.017751	LOCK WASHER (HDN) 3/8	2
18.	.034442	SHAFT, CONTROL LEVER MTG.	2
19.	.026277	SHAFT, FULCRUM ARM	1
20.	.026284	FULCRUM	1
21.	.221408	ROD END, 1/2 MALE	7
22.	.026413	SPACER, 1/2" (HP200-1050 ONLY)	1
	.026412	SPACER, 5/16" (HP200-1050)	2
	.026412	SPACER, 5/16" (HP200-1200)	3
23.	.010093	LOCK WASHER 1/2	1
24.	.010070	BOLT, 1/2-13 x 1-3/4	2
25.	.035227	TUBE, CONTROL ARM (HP200-1050 ONLY)	2
	.034601	TUBE, CONTROL ARM (HP200-1200 ONLY)	2
26.	.026268	BOLT, SHOULDER 1/2 x 1-3/4	2
27.	.037933	FASTN, NUT JAM 1"-8	2
28.	.032225	NUT, JAM 1/2-20	1
29.	.011584	NUT, NYLON LOCK 3/4-10	1

2A OPERATIONS

SPRAY SYSTEM ASSEMBLY



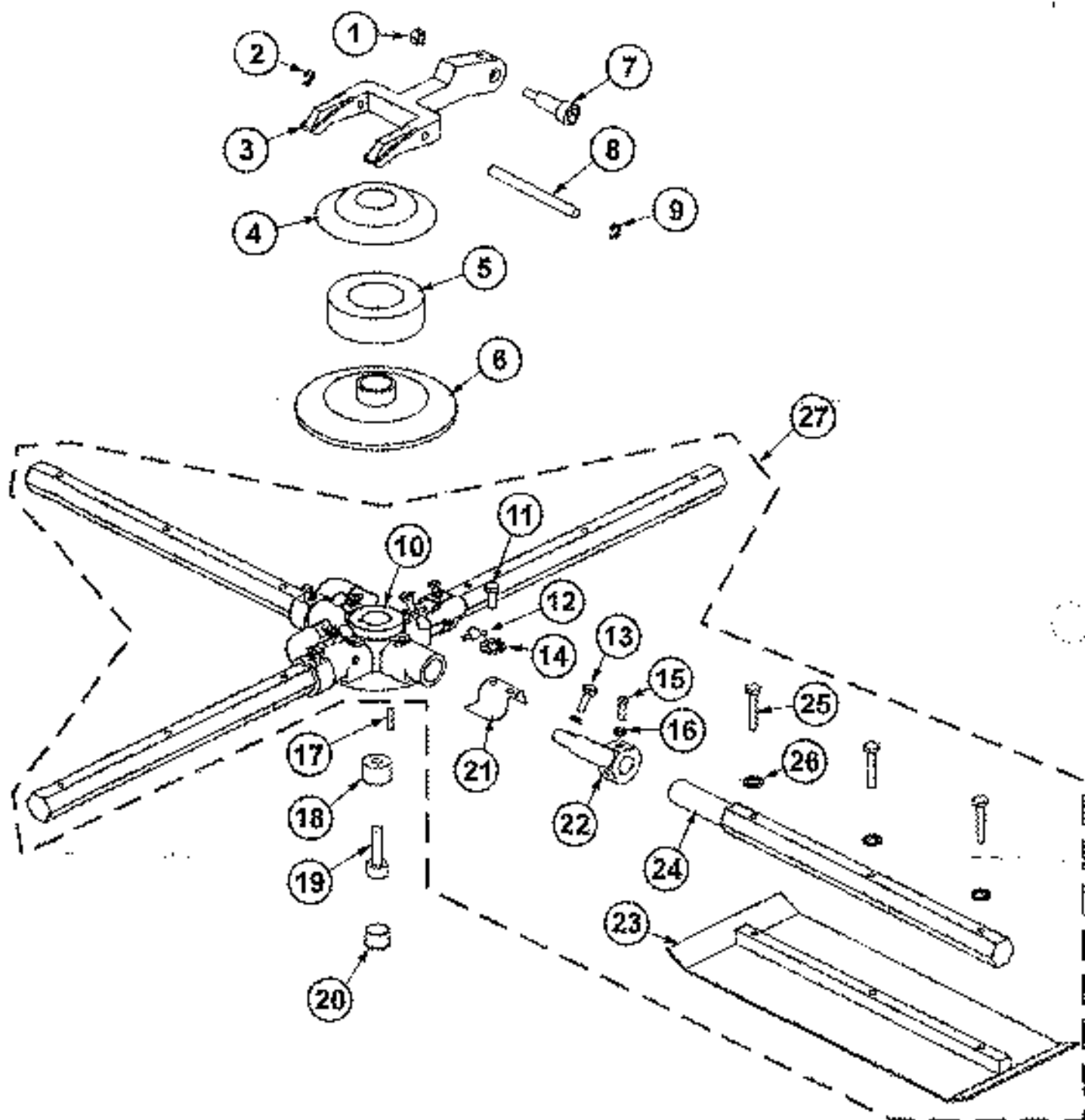
SPRAY SYSTEM ASSEMBLY (cont'd)

2A OPERATIONS

ILL.	PART #	DESCRIPTION	QTY.
1.	.037483	SWITCH MOUNT ASSEMBLY	1
2.	.037480	BOOT, TOGGLE	1
3.	.037681	CLAMP, WIRE	4
4.	.037485	HARNESS, WIRE	1
5.	.023533	CAP, FUEL FILTER ASSEMBLY	1
6.	.033735	PUMP	1
7.	.013392	HOSE, PUSHLOK 3/8"	.58 L/F
8.	.033743	TANK, WATER	1
9.	.013392	HOSE, PUSHLOK 3/8"	1.08 L/F
10.	.010194	FITTING, MALE PUSHLOK	8
11.	.013499	NIPPLE, 1/4 x 2	2
12.	.012704	VALVE, RELIEF	2
13.	.012706	STRAINER, 5053100SS	2
14.	.012702	TIP, SPRAY 8001 FINE	2
15.	.012705	CAP, BRASS CP1325	2
16.	.111001	FITTING, FAIIGUE	2
17.	.035229	BRACKET, NOZZLE RH (HP200-1050 ONLY)	1
	.026930	BRACKET, NOZZLE RH (HP200-1200 ONLY)	1
18.	.013392	HOSE, PUSHLOK 3/8" (HP200-1050 ONLY)	3.08 L/F
	.013392	HOSE, PUSHLOK 3/8" (HP200-1200 ONLY)	3.28 L/F
19.	.036937	TEE, 1/4 BRASS	2
20.	.013392	HOSE, PUSHLOK 3/8" (HP200-1050 ONLY)	1.83 L/F
	.013392	HOSE, PUSHLOK 3/8" (HP200-1200 ONLY)	2 L/F
21.	.035230	BRACKET, NOZZLE LH (HP200-1050 ONLY)	1
	.026931	BRACKET, NOZZLE LH (HP200-1200 ONLY)	1

2A OPERATIONS

SPIDER ASSEMBLY



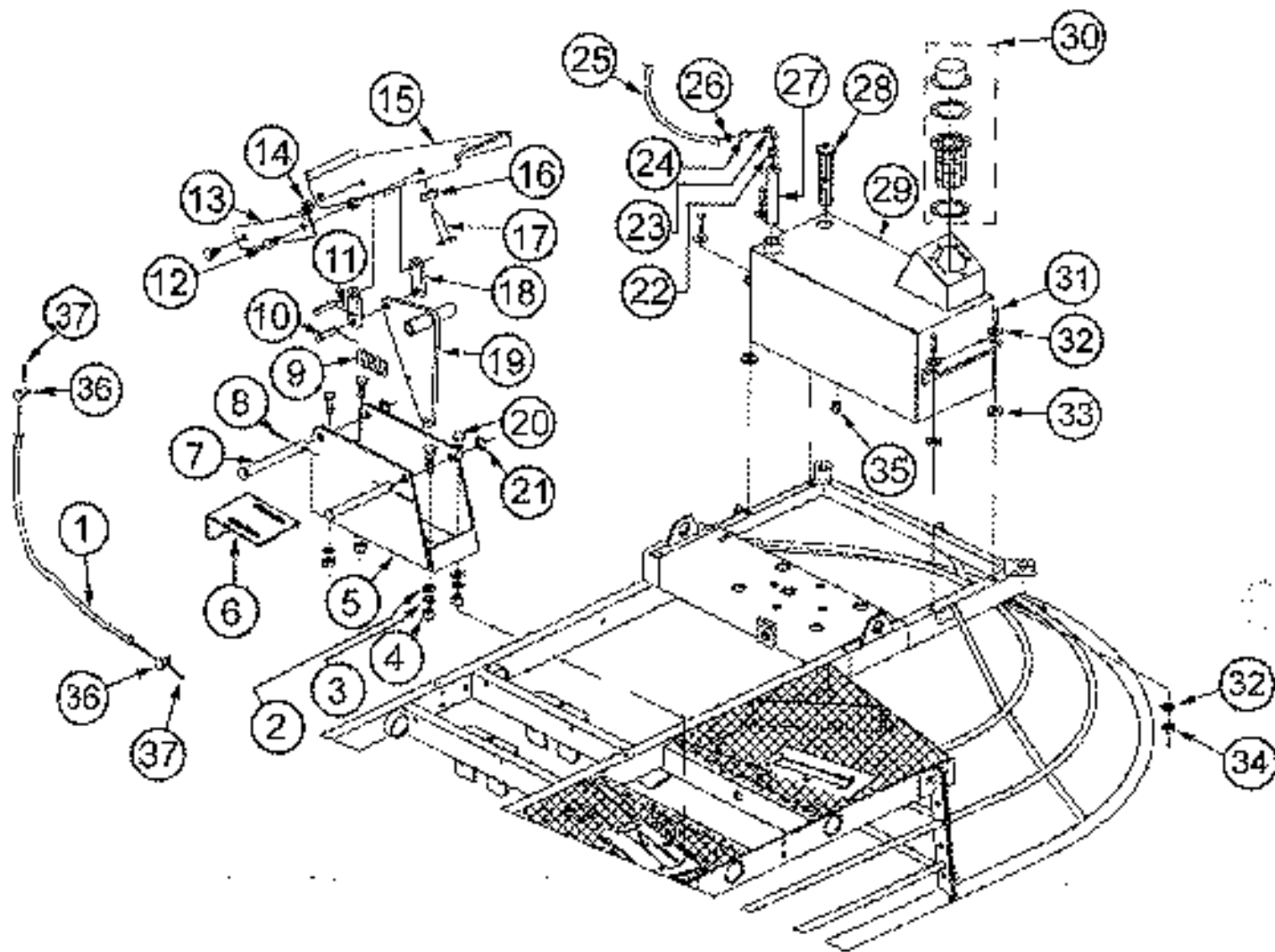
SPIDER ASSEMBLY (cont'd)

2A OPERATIONS

ILL.	PART #	DESCRIPTION	QTY.
1.	.012612	NUT, HEX SELFLOCK 5/16-18	1
2.	.015677	E-RING RETAINER	1
3.	.026215	ARM, YOKE	1
4.	.015821	PRESSURE PLATE CAP	1
5.	.015822	BEARING, THRUST	1
6.	.015824	PLATE, PRESSURE	1
7.	.026504	BOLT, SHOULDER 3/8 x 1-1/4 W/ 5/16-18 THDS	1
8.	.015678	PIN, YOKE ARM RETAINER 7/16 x 7-3/8	1
9.	.015677	E-RING RETAINER (SAME AS ILL # 2)	1
10.	.020572	BOSS RIGHT HAND (HP200-1050 ONLY)	1
	.026943	BOSS RIGHT HAND (HP200-1200 ONLY)	1
	.015816	BOSS LEFT HAND (HP200-1050 ONLY)	1
	.026942	BOSS LEFT HAND (HP200-1200 ONLY)	1
11.	.015883	SCREW, DDOG CAP 3/8-16 x 7/8	4
12.	.024755	GREASE FITTING 1/8-27 NPT 45°	4
	.015692	PLUG, PLASTIC CAP #GC-5 (NOT SHOWN)	4
13.	.012990	BOLT, CARRIAGE 3/8-18 x 1-1/4	4
14.	.015682	LOCK WASHER EXTERNAL STAR 3/8	4
15.	.015686	SET SCREW SQ. HEAD 3/8-16 x 1	4
16.	.015684	NUT, JAM 3/8-16	8
17.	.026227	KEY, 3/8 x 1	1
18.	.015690	WASHER RETAINING	1
19.	.015691	SCREW, SOCKET HEAD 1/2-13 x 1 1/2 LH	1
	.020155	SCREW, SOCKET HEAD 1/2-13 x 1 1/2 RH	1
20.	.015693	PLUG, PLASTIC CAP EC-12	2
21.	.016920	CLIP, SPRING UNIVERSAL	4
22.	.033032	LEVER, LIFT STD (HP200-1050 ONLY)	4
	.033034	LEVER, LIFT SD/SHD (HP200-1200 ONLY)	4
23.	.034421	BLADE, 6 x 16 FINISH (HP200-1050 ONLY)	8
	.015695	BLADE, 6 x 18 FINISH (HP200-1200 ONLY)	8
24.	.034645	ARM, SPIDER RH (HP200-1050 ONLY)	4
	.026944	ARM, SPIDER RH (HP200-1200 ONLY)	4
25.	.010024	BOLT, 5/16-18 x 2 GR. 5	12
26.	.010090	LOCK WASHER 5/16	12
27.	.034198	SPIDER ASSEMBLY F/ 1050 RIGHT HAND	1
	.026230	SPIDER ASSEMBLY F/ 1200 RIGHT HAND	1
	.034199	SPIDER ASSEMBLY F/ 1050 LEFT HAND	1
	.026588	SPIDER ASSEMBLY F/ 1200 LEFT HAND	1

2A OPERATIONS

FUEL SYSTEM ASSEMBLY



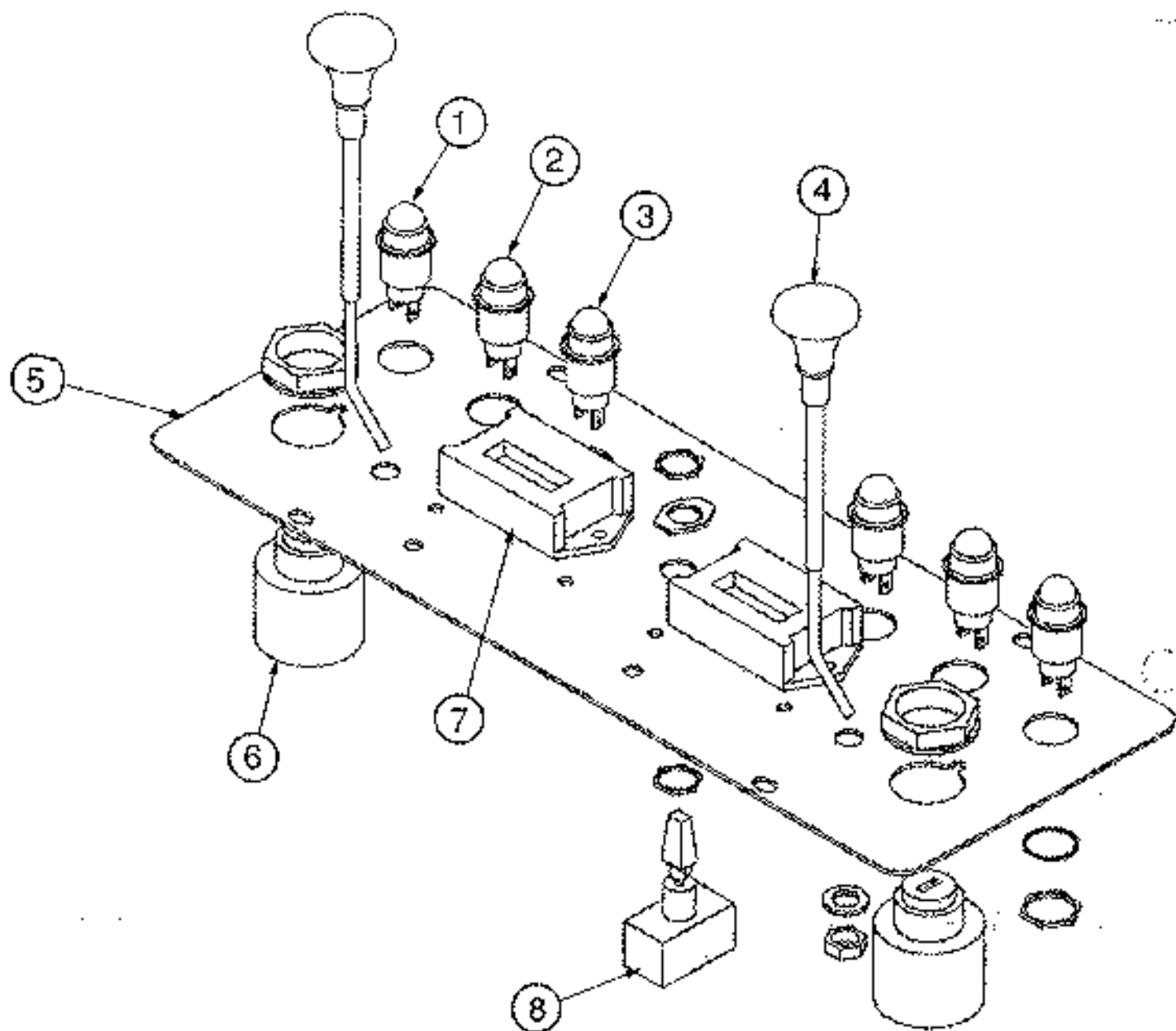
FUEL SYSTEM ASSEMBLY (cont'd)

2A OPERATIONS

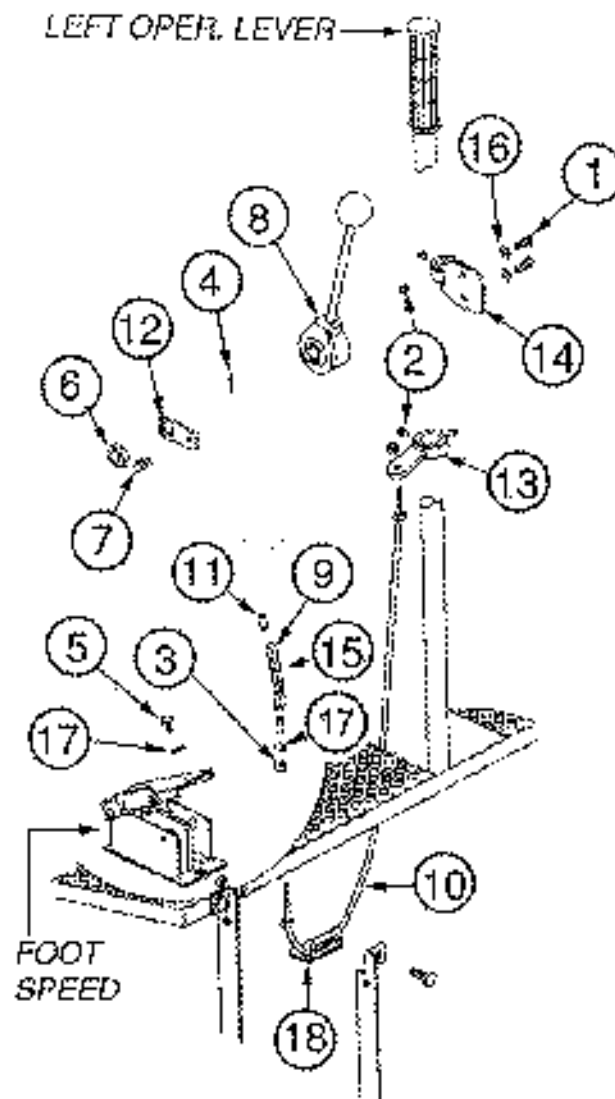
ILL.	PART #	DESCRIPTION	QTY.
1.	.028243	THROTTLE CABLE ASSEMBLY	2
2.	.010081	FLAT WASHER 1/4	10
3.	.010089	LOCK WASHER 1/4	4
4.	.010098	HEX NUT 1/4-20	4
5.	.024851	BASE, FOOT SPEED	1
6.	.037218	BRACKET, LOWER HD THROTTLE CABLE	1
7.	.028895	PIN, CLEVIS 3/8 x 3 1/2	1
8.	.026226	PIN, COTTER 3/32 x 3/4	2
9.	.024981	SPRING	1
10.	.024982	PIN, CLEVIS 1/4 x 51/64	2
11.	.010131	PIN, COTTER 1/16 x 1	2
12.	.010001	BOLT, 1/4-20 x 1/2	2
13.	.024985	PLATE, STOP	1
14.	.020542	NUT, STOVER 1/4-20	2
15.	.024839	PEDAL, FOOT SPEED	1
16.	.010100	NUT, HEX 5/16-18	1
17.	.010021	BOLT, 5/16-18 x 1 1/4	1
18.	.024850	SHACKLE	2
19.	.024847	FULCRUM, FOOT SPEED	1
20.	.010003	BOLT, 1/4-20 x 1	2
21.	.010082	FLAT WASHER 5/16	2
22.	.012941	BUSHING, 1/2 x 1/4 HEX	1
23.	.010220	ELBOW, 1/4 x 1/4 90° STREET	1
24.	.010193	FTG. PUSHLOK 1/4 x 1/4-18	1
25.	.019429	HOSE, FUEL 5/16 DIA.	AS REQ.
26.	.019430	CLAMP, #4 HOSE	4
27.	.037216	TUBE, SUCTION (FUEL TANK)	1
28.	.032295	GAUGE, GAS REMOTE	2
29.	.034411	TANK, FUEL LH	1
	.028399	TANK, FUEL RH	1
30.	.023533	CAP, FUEL FILTER ASSEMBLY	2
31.	.010006	BOLT, 1/4-20 x 1 3/4	8
32.	.010081	FLAT WASHER 1/4	8
33.	.015713	BUSHING, RUBBER	8
34.	.020542	NUT, STOVER 1/4-20	4
35.	.010497	PLUG, 1/4 NPT BI SQ. PIPE	1
36.	.024984	PIVOT, FOOT SPEED CONTROL	2
37.	.010131	PIN, COTTER 1/16 x 1	2

2A OPERATIONS

CONTROL PANEL ASSEMBLY



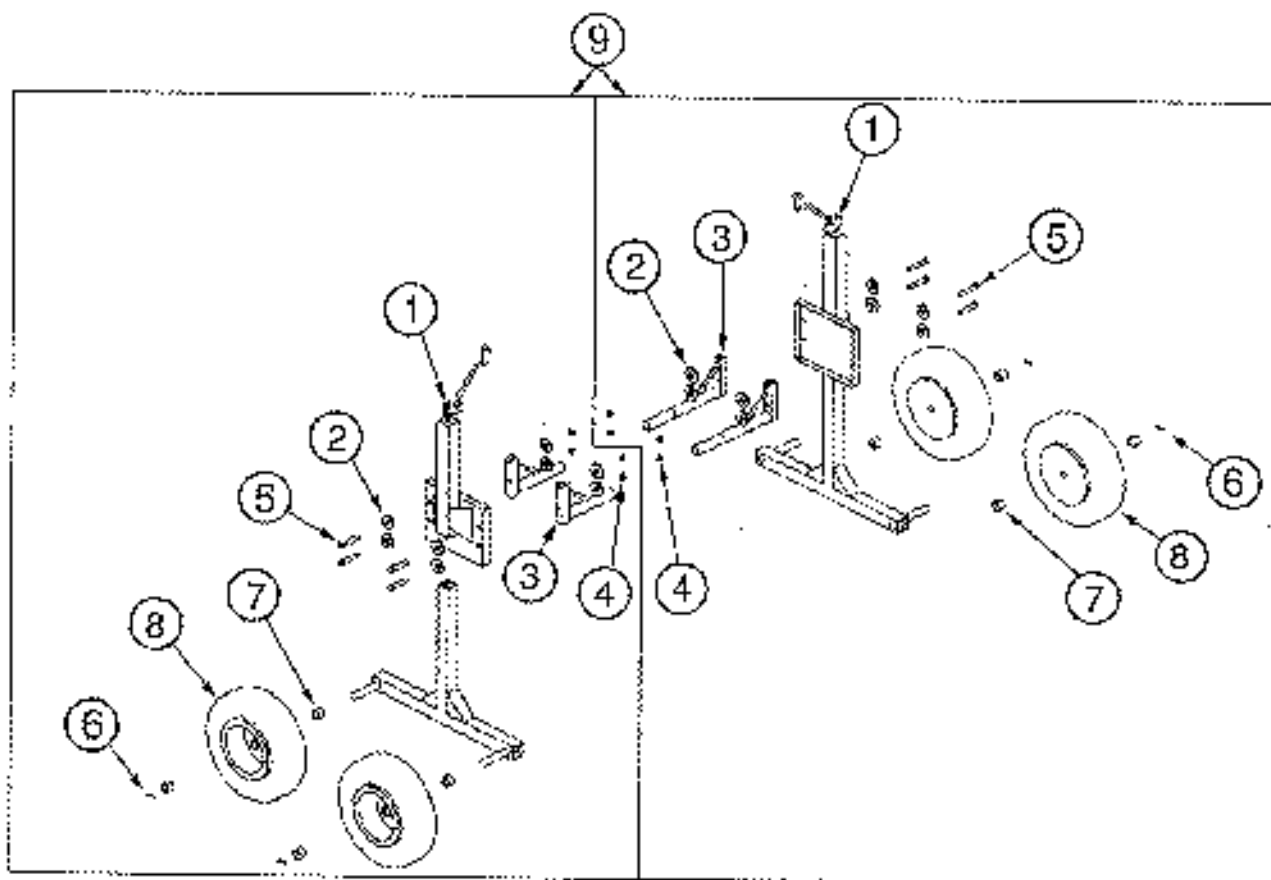
ILL.	PART#	DESCRIPTION	QTY.
1.	.034613	LENS, GREEN	2
2.	.034612	LENS, AMBER	2
3.	.034614	LENS, RED	2
4.	.029028	CHOKE CABLE	2
5.	.034388	PLATE	1
6.	.27006-2055	KEY SWITCH ASSEMBLY	2
7.	.029473	HOUR METER	2
8.	.022028	TOGGLE SWITCH	1



ILL.	PART#	DESCRIPTION	QTY.
1.	.010018	BOLT, 5/16-18 x 1/2	2
2.	.010313	SET SCREW 5/16-18 x 3/8	4
3.	.010570	NUT, HEX 10-32	1
4.	.010972	PIN, COTTER 3/16 x 1-1/2	1
5.	.010362	SCREW, 10-32 x 1	1
6.	.020688	NUT, JAM 5/8-18 RH	1
7.	.024984	PIVOT, FOOT SPEED CONTROL	1
8.	.028018	LOCK, POSITIVE PITCH	1
9.	.028035	LINK, MASTER #35	2
10.	.028243	THROTTLE, HD CABLE ASSEMBLY	1
11.	.028842	END, CRUISE CONTROL CHAIN	1
12.	.028844	SIDE BRACKET, CRUISE CONTROL	1
13.	.028846	BRACKET, CRUISE CONTROL CABIN	1
14.	.028847	BRACKET, CRUISE CONTROL LEVER	1
15.	.028881	CHAIN, CRUISE CONTROL	1
16.	.032337	WASHER, STAR INTERNAL 5/16	2
17.	.032360	WASHER, STAR 10-32	2
18.	.032366	BRACKET, PEDAL END CRUISE CONTROL CABLE	1

2A OPERATIONS

ACCESSORIES DOLLY JACK SYSTEM -- SET PART # 033177



ILL.	PART#	DESCRIPTION	QTY.
1.	.033391	DOLLY JACK	.2
2.	.017751	FW, HARD 3/8	.8
3.	.034267	TUBE, REAR	.2
	.026729	TUBE, FRONT	.2
4.	.010464	NUT, NYLON 3/8-16	.8
5.	.010040	BOLT, 3/8-16 x 2'	.8
6.	.013759	PIN, COTTER 3/16 x 2-1/2'	.4
7.	.024628	WHEEL SPACER	.8
8.	.018958	TIRES	.4
9.	.033177	DOLLY JACK SET	.1

RIDING
TROWEL
VINYL COVER

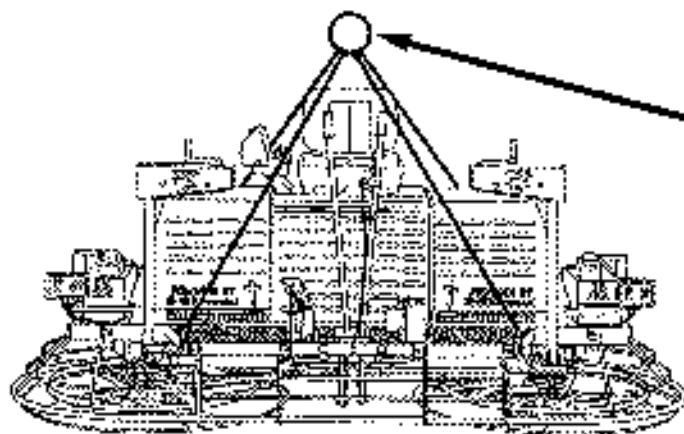
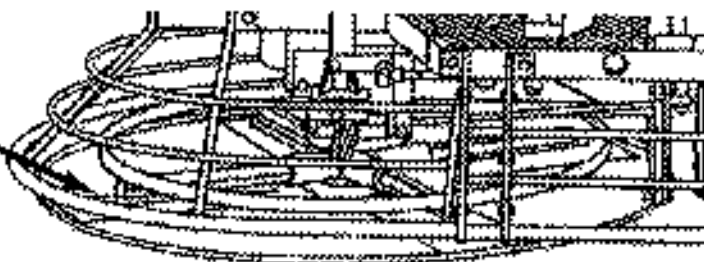
PART #: 034169



FLOATING
DISCS (PANS)

1050: 033997

1200: 026912

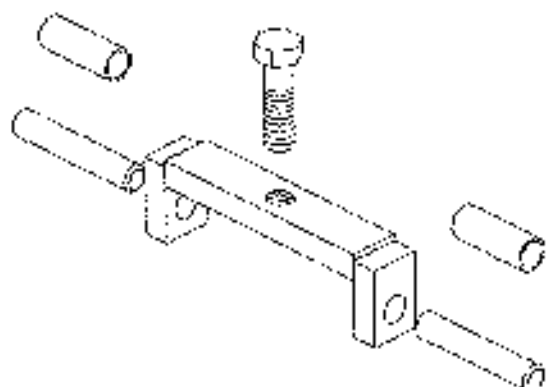


LIFTING
BRIDLE
(SLING TYPE)

PART #: 035461

TROWEL ARM
ALIGNMENT JIG

PART #: 016863



SPIDER
PULLER
ASSEMBLY

PART #: 035688

