

RAZORBACK[®] RIDERS

OPERATIONS MANUAL AND PARTS BOOK



PRO1200C

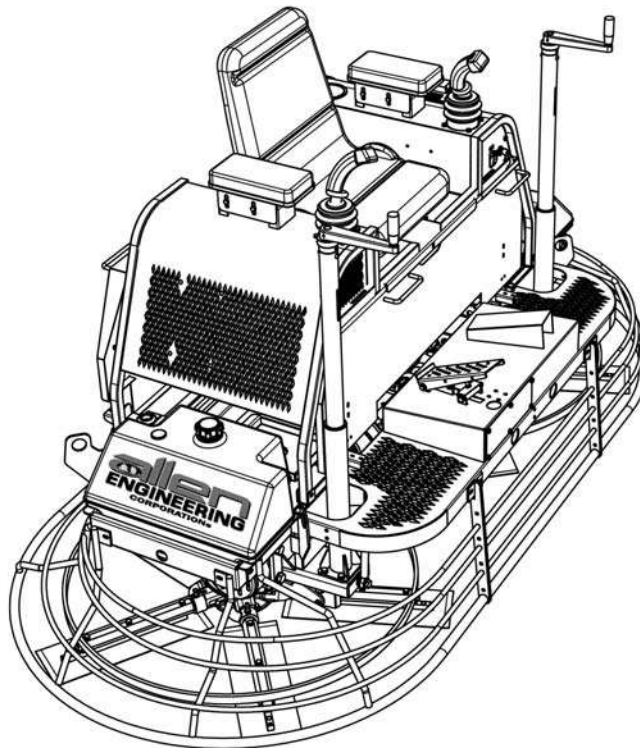
PROFESSIONAL SERIES RIDING TROWEL

allen
ENGINEERING
CORPORATION[®]
CONCRETE IDEAS TO BUILD ON[®]

Riding Trowel

OPERATIONS PARTS

MANUAL BOOK



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THIS MANUAL COVERS RIDING TROWEL(S) BELOW

MODEL

1200C NOL SHD 34VGTD

1200C NOL SHD 34VGG

AEC PART #

045898

046574

Allen Engineering's Razorback Riding Trowels are covered under one or more of the following patent numbers: **U.S. Design Patents:** 323,510; 340,340; 344,736; 400,542; 402,998; 402,999; 403,332. **U.S. Utility Patents:** 4,298,555; 5,108,220; 5,480,257; 5,480,258; 5,613,801; 5,685,667; 5,803,658; 5,816,739; 5,890,833; 5,934,823; 6,053,660. **Canadian Patents:** 2,039,893. **French Patents:** 0293496. **German Patents:** M9007736.9 With other Patents Pending.

THE INFORMATION CONTAINED IN THIS MANUAL WAS BASED UPON THE MACHINES IN PRODUCTION AT THE TIME (BEGINNING WITH SERIAL NUMBER 12C0405001) OF PUBLICATION. ALLEN ENGINEERING RESERVES THE RIGHT TO CHANGE ANY PORTION OF THIS DOCUMENT WITHOUT NOTIFICATION.

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 Parts	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

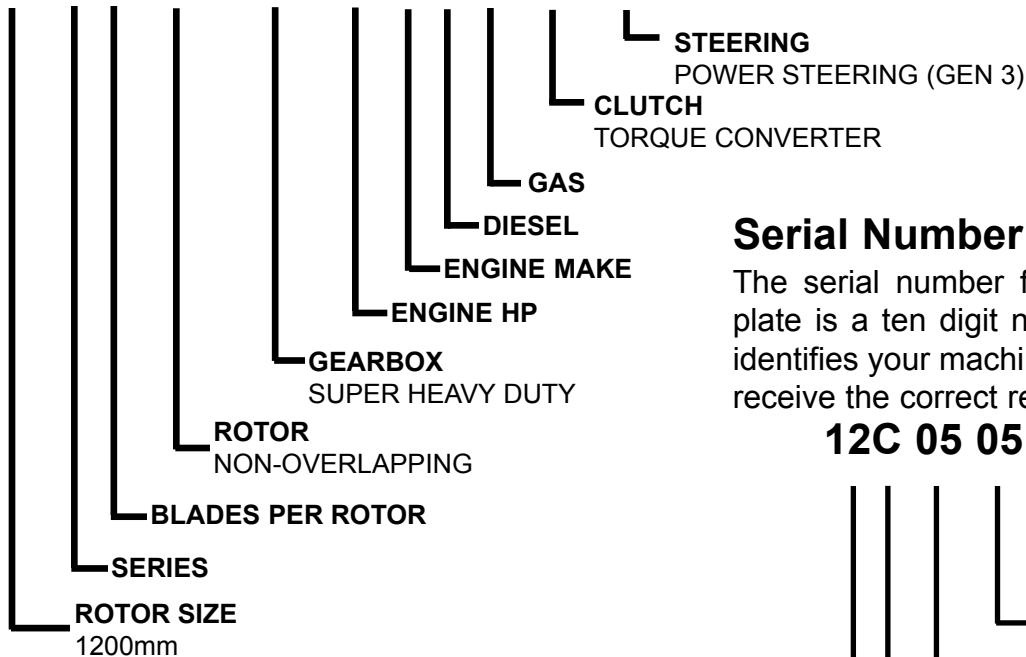
1A OPERATIONS

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.

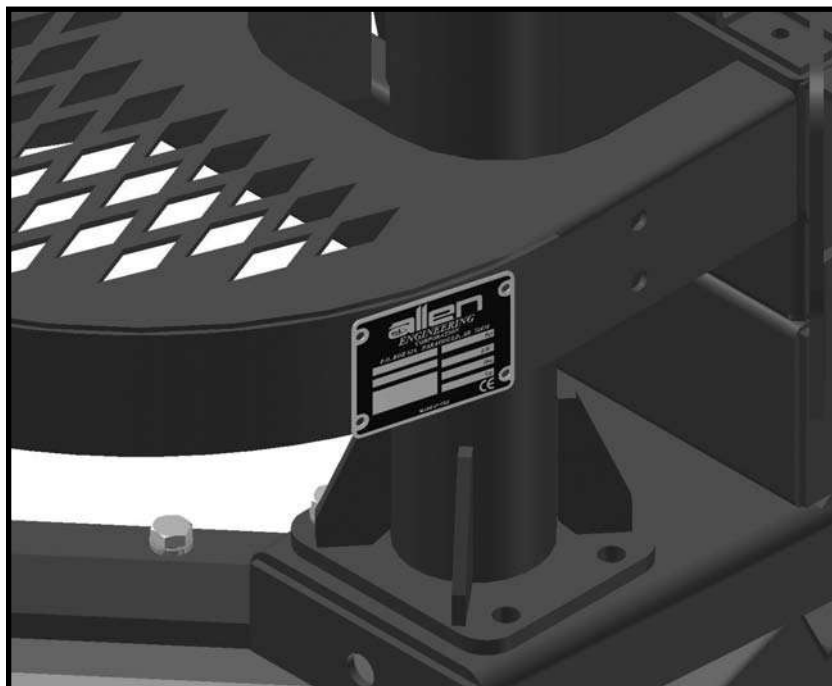
Please record the information found on this plate below so it will be available should the identification plate become lost or damaged. When ordering parts or requesting service information you will always be asked to specify the model number and serial number of the unit.

Model Number

1200C-5-NOL-SHD 34VGD/G-TC-PSIII



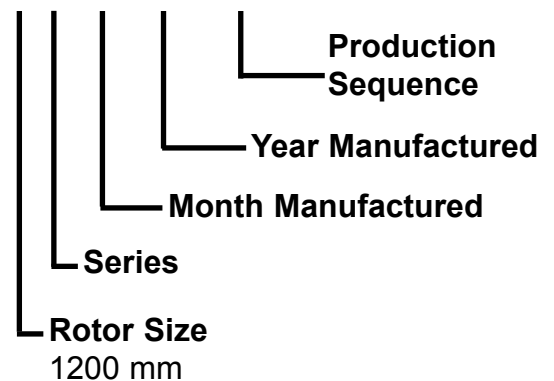
Located on the left hand side (SOM) on mainframe deck.



Serial Number

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

12C 05 05 001



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 manual box on the back of the seat.

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

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Information Contained in This Manual

This manual provides information and procedures to safely operate and maintain the Allen Engineering PRO 1200C 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 distributor. All authorized Allen Engineering distributors must fax a copy of the parts order to customer service. The fax number is (870-236-3934 or 800-643-0097). 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 your parts 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 Returned Goods Authorization (RGA) from Allen Engineering. All authorized returns must be shipped prepaid. **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 lose this manual or need an additional copy please contact your Allen distributor or Allen Engineering Corporation at (800) 643-0095

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1.1 Safety

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**.

DANGER Warns of conditions or practices which **will lead to personal injury or death**.

1.2 Laws Pertaining to Spark Arrestors

Notice: Some states require that in certain locations arrestors be used on internal combustion engines. A spark arrester 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 improperly or 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. **DANGER: When operating machines with engines in confined areas, the fumes MUST be ventilated! (See "Engine Safety" section 1.21 on pages 1A-19-21)**
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.

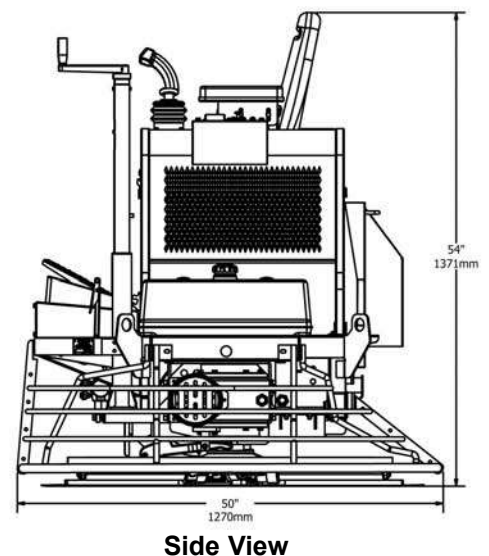
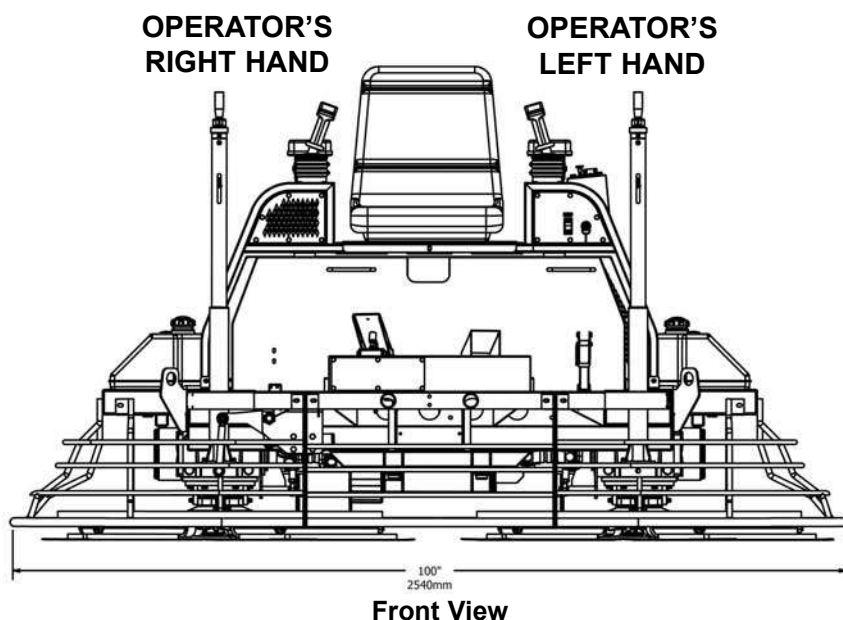
ALWAYS keep area around muffler free of debris such as leaves, paper, cartons, etc. A hot muffler could ignite such items starting a fire.

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.

DO NOT attempt to operate trowel in enclosed areas and/or operate without proper ventilation.

1.5 Dimensions



1A OPERATIONS

1.6 Technical Data

Standard Features:

Dimensions (L x W x H)	NOL-100" X 50" X 54" (254 x 127 x 137 cm)
(guard rings/top of seat)	
Panning Path Width	.95" (241cm)
Two Rotors (diameter)	.46" (1,168 mm)
Rotor Speed (RPM)	.110 to 141
Ten Finish Blades	.6" x 18"
Gearboxes (2)	Super Heavy Duty (SHD)
Detachable Guard Rings	Yes
Seat Frame	Accessed easily after panels removed
Operator Control Panel	Standard
Powered Retardant Spray System Capacity	.6 gal. (22 lit.)
Steering System	Hydraulic Joysticks
Charging System	Alternator (40 amp)
Gearbox Rotation	Standard
Battery	.12 Volt
Safety Shutdown Switch	Seat Mounted
Fuel Capacity	.6 gal. (22 lit.)
Approximate Running Time	.3.25 Hours
Clutch	Torque Converter
Drive Line System	.Rotating Shaft w/ Universal Joints
Engine Hour and RPM Meter	.Digital

Engine Options:

34 HP Liquid Cooled Petrol

Weight	.159.8 lbs (72.4kg) <i>with radiator and mounting hardware</i>
Lights/Amps	.4/20
Temp/Low Oil Alert	.Light

34 HP Liquid Cooled Turbo Diesel

Weight	.214 lbs (97kg) <i>with radiator and mounting hardware</i>
Lights/Amps	.4/20
Temp/Low Oil Alert	.Light

1.6A CE Marking



Data Summary of Sound & Vibration Testing for CE Marking

Test Machine	Engine Type	Avg. Sound Pressure Level (SPL)	Operator Ear SPL	Calculated Sound Power Level	Seat Vibration Overall	Foot Vibration Overall	Hand Vibration Maximum
		dB(A)	dB(A)	dB(A)	m/sec²	m/sec²	m/sec²
1200C-NOL	34 hp Vanguard	101	97	117	1.2	0.5	1.6

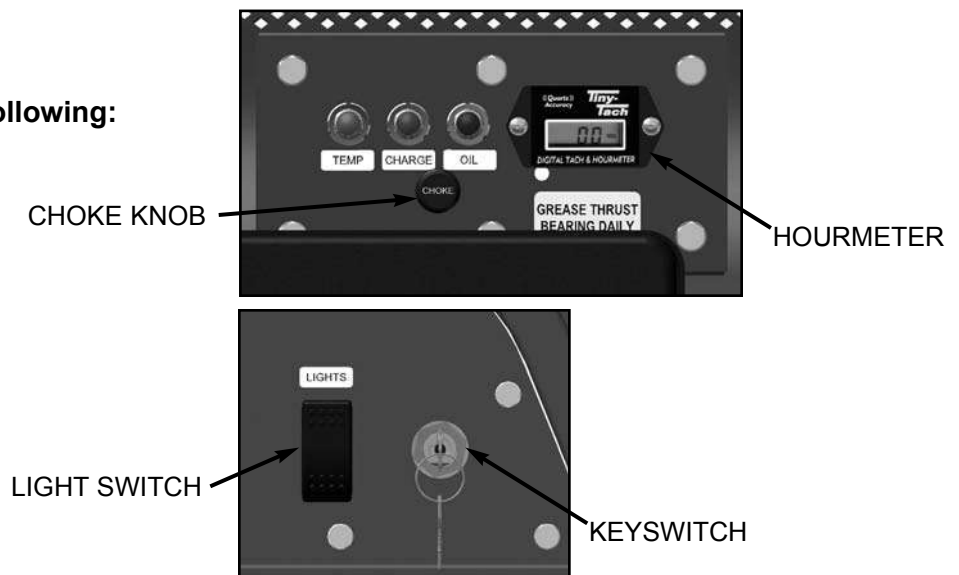
1.7 Description

The Riding Trowel is a modern high production machine. Finishing rate will vary depending on the operators skill and job conditions. This Riding Trowel has ten finishing blades. The Super Heavy Duty Gearboxes are designed to provide exceptional performance with low maintenance and trouble free use under some of the worst conditions. All Allen Engineering **Razorback® Riders** are equipped with a safety shutdown switch and a low oil warning for added job safety and engine protection. *New to this machine is a seat kill switch. This is a great advantage to the operator because it lets them dismount the riding trowel without killing the engine. This is a nice feature that allows the operator to spot finish and will prolong the life of the starter.* Operating time between fuel refills is approximately 2-1/2 to 3-1/4 hours with a rotor speeds of 110 to 141 RPM. 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 and dependability.

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:
- * Sight Glass for hydraulics:
- * Radiator:
- * ALL fasteners:



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. **On the diesel machine:** Turn key to "RUN" position. Timer will allow glow plugs to heat. When glow light goes out and fan comes on, turn key to "START" position.
On the gas machine: If engine is cold pull out the choke lever located on the control panel (refer to illustrations above). 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.
3. 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. If the machine is the diesel model, turn key off to restart timer again placing in the "RUN" position for the glow plugs to heat up. Attempt to start trowel again. Allow engine to warm up for 30 mins. 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 15 seconds before operating starter again.

1A OPERATIONS

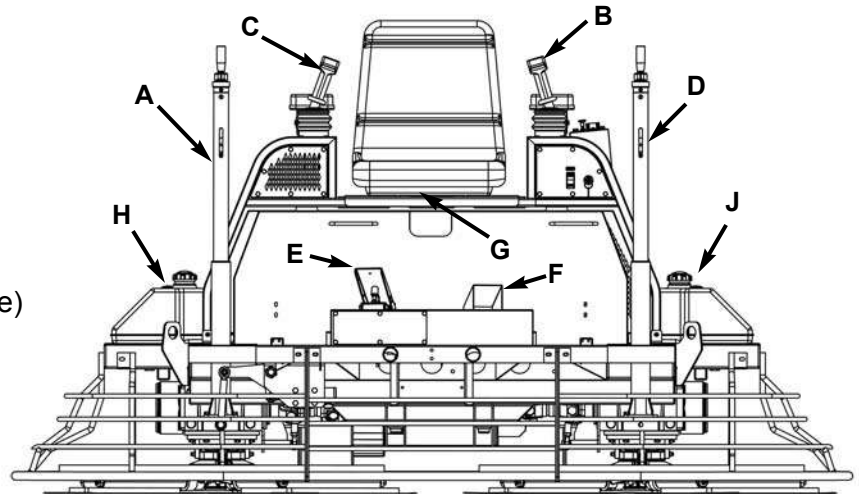
1.10 Operating

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.

NOTE: All items in this manual are described from the operator Sitting on Machine or **SOM** for short.

1. Point out the location of all Controls

- A. right pitch control
- B. joystick (forward & reverse)
- C. joystick (left & right, forward & reverse)
- D. left pitch control
- E. right foot pedal
- F. left foot rest
- G. seat adjustment
- H. fuel gauge
- J. retardant gauge



Front View

2. With the operator in the seat, show him the functions of the joysticks (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 ideal 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 torque converter. At this time the machine's rotors will begin turning.

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

1.11 Stopping

To stop the trowels movement, let go of the joysticks (B) and (C). They will return to their neutral position. Also release pressure on the right foot pedal (E).

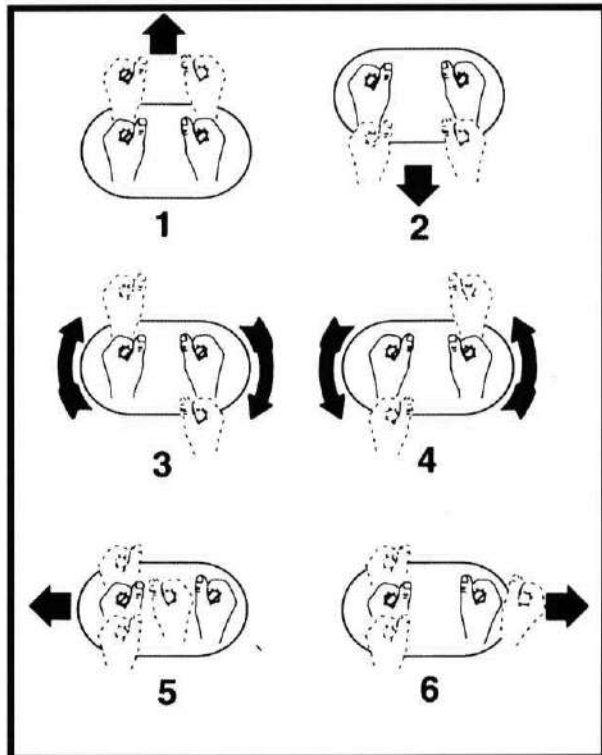
CAUTION:

New to this machine is the seat kill switch mechanism. If in need of an emergency stop, simply turning the key off or raising off the seat while holding the right foot pedal down, will stop the engine from running.

1.12 Steering

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

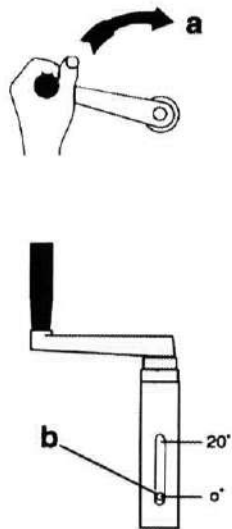
- 1 forward
- 2 reverse
- 3 rotate clockwise
- 4 rotate counter clockwise
- 5 left sideways
- 6 right sideways



1.13 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	5° Slight Pitch
	③ Plastic working stage	10° Additional Pitch
	④ Semi-hard working stage	15° Additional Pitch
	⑤ Hard finishing stage (burnishing)	20° 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 seat locking pin out and tilt seat 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 CROSSHEADS				X	
GREASE TROWEL G-BOX					X
REPLACE SPARK PLUG					X
CHANGE HYDRAULIC FLUID					ANNUALY

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 300 operating hours. Use only Mobilith SHC 220. Extended pressure grease.

To Replace

1. Remove screws from splash guard plate.
2. Remove belt from lower pulley, and then torque converter.
3. Loosen set screws(A) on both the u-joints where they couple to the drive shaft. (refer to fig. 2A)
4. Slide u-joint(B) to the right off the drive shaft to create a gap in the drive line to allow removal of belt through gap. (refer to fig. 2B)
5. Install new belts through gap and reverse process to replace new belt. **Be sure to reset the gap between the U-Joints to between 3/64 to 3/16(C).** (refer to figure 2B)
6. Replace cover and replace all fasteners.

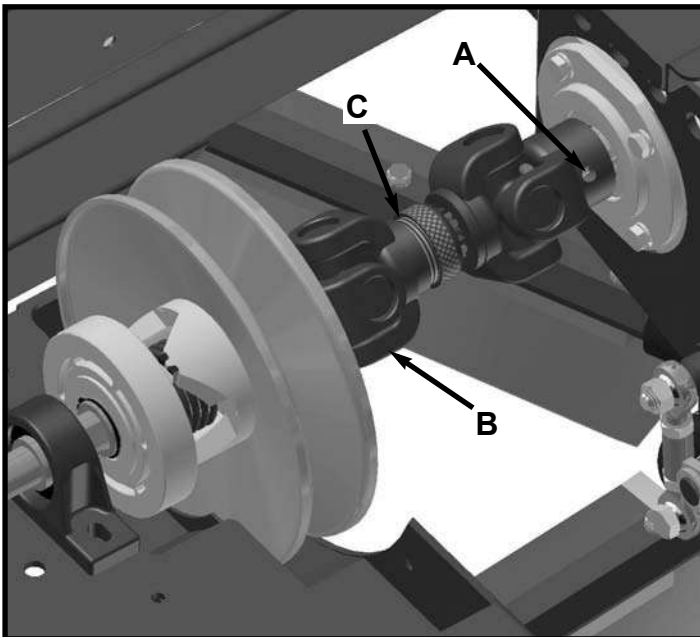


Figure 2A

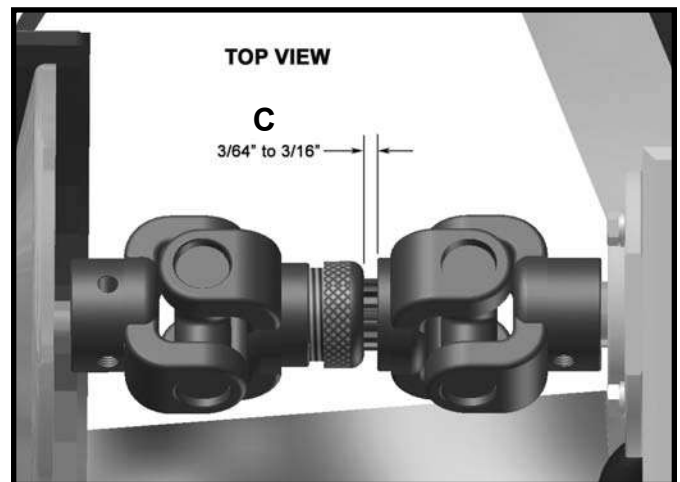
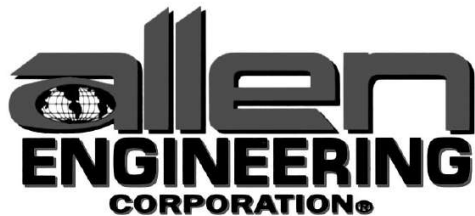
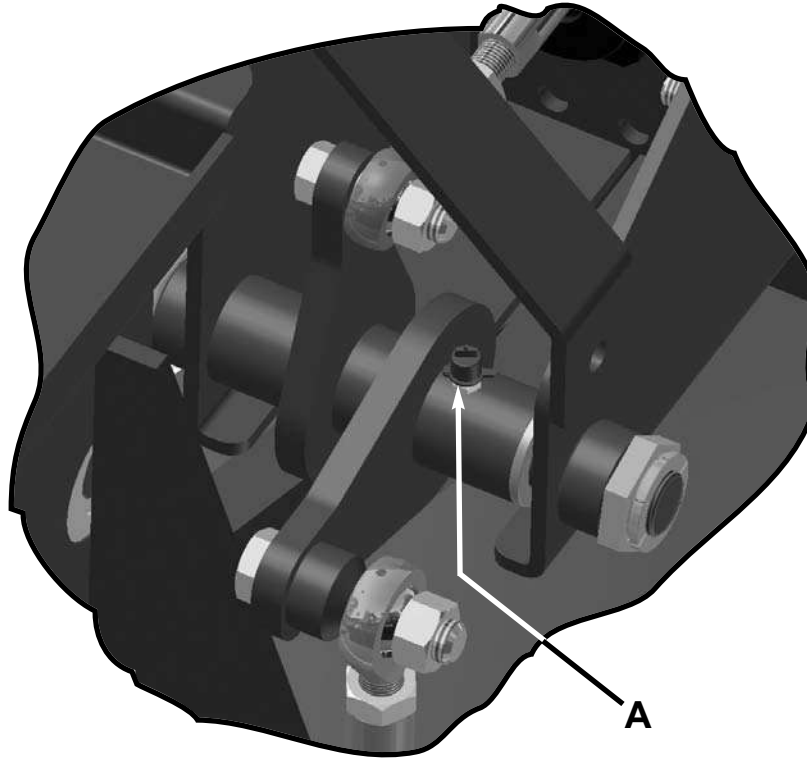


Figure 2B

Refer to 2A-6 for parts breakdown

1.17 Control Lubrication

The control fulcrums are equipped with grease fittings to lubricate pivot points. Grease control fulcrums once a day or every 8 hours of operation to prevent wear and ensure free movement and smooth response of operator joysticks. Use a general purpose grease and add one to two shots of grease to each fitting.



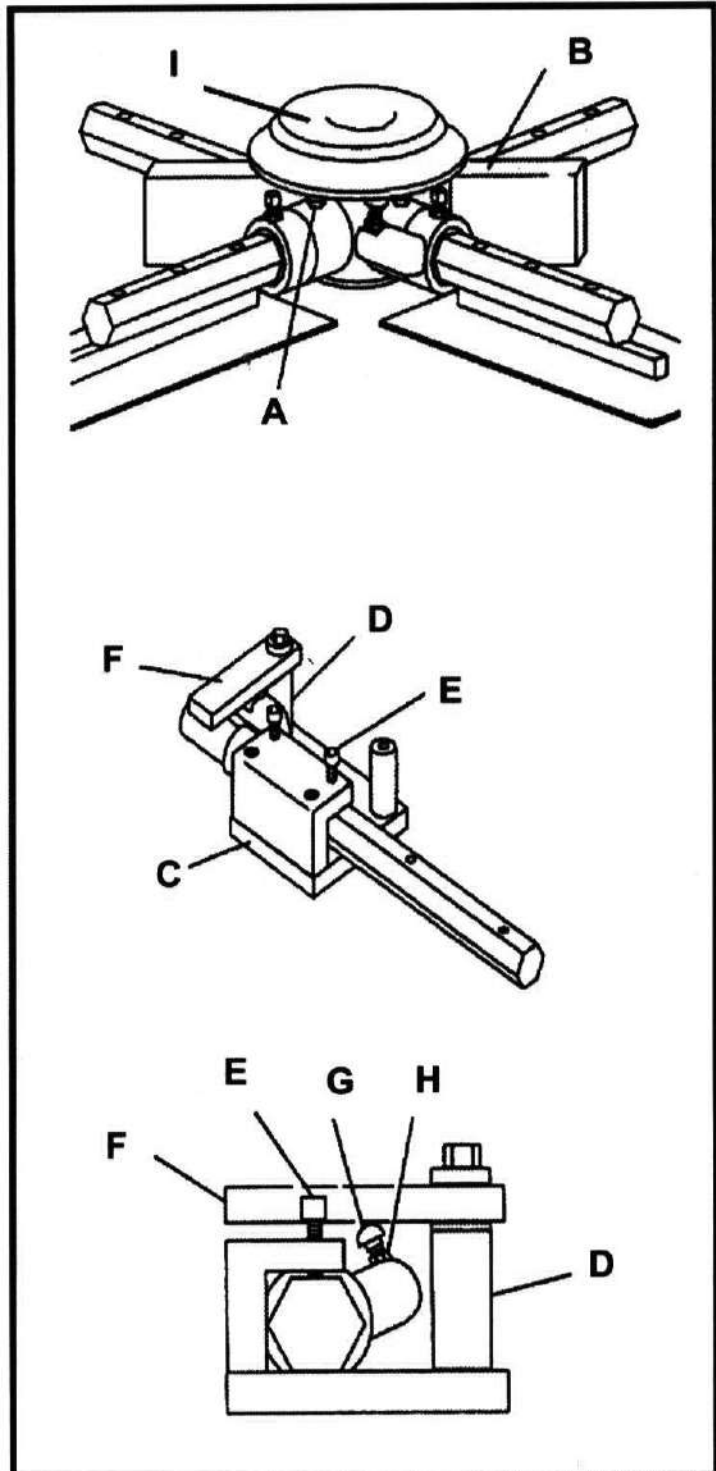
1.18 Lift Lever Adjustment

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 PRO 1200 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

1.19 Transporting Trowel

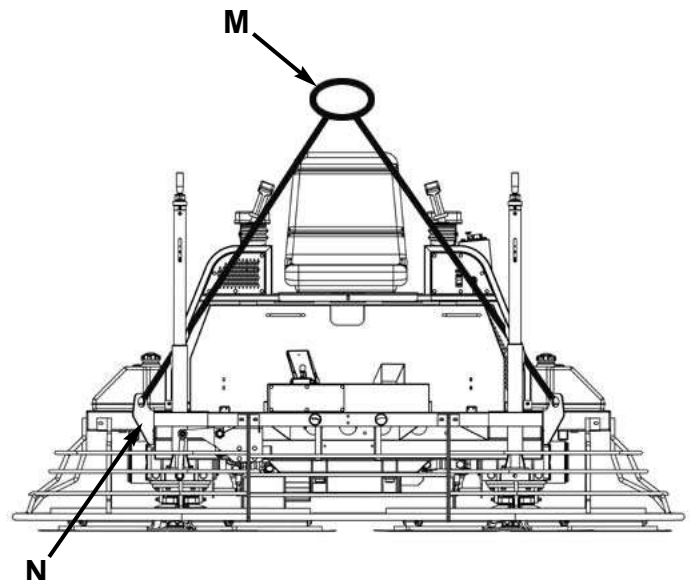
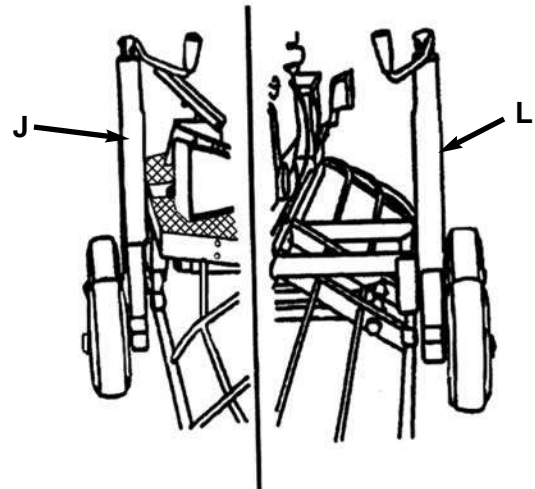
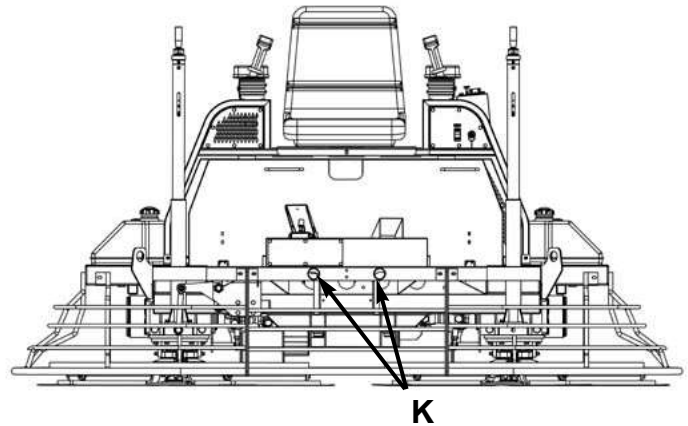
Optional dolly jacks are available for short moves or to aid in servicing the trowel. Install dolly jacks as follows:

1. Inspect dolly jack for serviceability and damage.
2. Place riding trowel on firm level ground.
3. With the front dolly jack (J) Fully insert extension tube 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.
4. 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.
5. 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. Make sure the straps of lifting bridle clear all sensitive components on the trowel before lifting.



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.

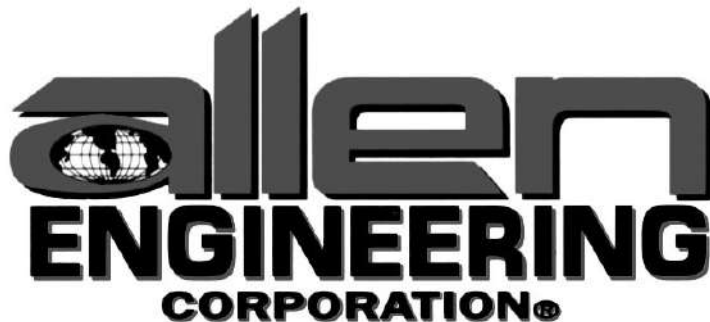
Warning: Jump starting a battery incorrectly can cause the battery to explode resulting in severe personal injury or death. Do not smoke or allow any ignition sources near the battery and do not jump start a frozen battery.

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

1. Turn switch off and remove key.
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 15 seconds for starter to cool if engaged for more than 5 seconds.

Caution: When using lights or high amperage draw accessories, idle the engine for a period of 30 minutes to bring the battery to charge state.



1.21 Engine Safety



BEFORE OPERATING ENGINE

- Read entire Operating & Maintenance Instructions AND the instructions for the equipment this engine powers.*
- Failure to follow instructions could result in serious injury or death.

THE OPERATING & MAINTENANCE INSTRUCTIONS CONTAIN SAFETY INFORMATION TO

- Make you aware of hazards associated with engines
- Inform you of the risk of injury associated with those hazards, and
- Tell you how to avoid or reduce the risk of injury.

The safety alert symbol () is used to identify safety information about hazards that can result in personal injury.

A signal word (DANGER, WARNING, or CAUTION) is used with the alert symbol to indicate the likelihood and the potential severity of injury. In addition, a hazard symbol may be used to represent the type of hazard.



DANGER indicates a hazard which, if not avoided, **will result in death or serious injury.**



WARNING indicates a hazard which, if not avoided, **could result in death or serious injury.**



CAUTION indicates a hazard which, if not avoided, **might result in minor or moderate injury.**

CAUTION, when used **without** the alert symbol, indicates a situation that **could result in damage to the engine.**



The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

HAZARD SYMBOLS AND MEANINGS



Fire



Explosion



Moving Parts



Toxic Fumes



Hot Surface



Shock



Hot Liquid or Steam

THE INTERNATIONAL SYMBOLS USED ON THE ENGINE OR IN THIS MANUAL INCLUDE:



Safety Alert



On Off



Oil



Stop



Read Operating
& Maintenance
Instructions



Fuel Shutoff



Choke



Fuel

Adding Fuel in Gas Engines

 	! WARNING Gasoline and its vapors are extremely flammable and explosive. Fire or explosion can cause severe burns or death.
WHEN ADDING FUEL • Turn engine OFF and let engine cool at least 2 minutes before removing gas cap. • Fill fuel tank outdoors or in well-ventilated area. • Do not overfill fuel tank. Fill tank to approximately 1-1/2 inches below top of neck to allow for fuel expansion. • Keep gasoline away from sparks, open flames, pilot lights, heat, and other ignition sources. • Check fuel lines, tank, cap, and fittings frequently for cracks or leaks. Replace if necessary. WHEN STARTING ENGINE • Make sure spark plug, muffler, fuel cap and air cleaner are in place. • Do not crank engine with spark plug removed. • If fuel spills, wait until it evaporates before starting engine. • If engine floods, set choke to OPEN/RUN position, place throttle in FAST and crank until engine starts. WHEN OPERATING EQUIPMENT • Do not tip engine or equipment at angle which causes gasoline to spill. • Do not choke carburetor to stop engine. WHEN TRANSPORTING EQUIPMENT • Transport with fuel tank EMPTY or with fuel shut-off valve OFF. WHEN STORING GASOLINE OR EQUIPMENT WITH FUEL IN TANK • Store away from furnaces, stoves, water heaters or other appliances that have pilot light or other ignition source because they can ignite gasoline vapors.	

	! WARNING Engines give off carbon monoxide, an odorless, colorless, poison gas. Breathing carbon monoxide can cause nausea, fainting or death.
• Start and run engine outdoors. • Do not start or run engine in enclosed area, even if doors or windows are open.	

 	! WARNING Starting engine creates sparking. Sparking can ignite nearby flammable gases. Explosion and fire could result.
• If there is natural or LP gas leakage in area, do not start engine. • Do not use pressurized starting fluids because vapors are flammable.	

 	! WARNING Running engines produce heat. Engine parts, especially muffler, become extremely hot. Severe thermal burns can occur on contact. Combustible debris, such as leaves, grass, brush, etc. can catch fire.
• Allow muffler, engine cylinder and fins to cool before touching. • Remove accumulated combustibles from muffler area and cylinder area. • Install and maintain in working order a spark arrester before using equipment on forest-covered, grass-covered, brush-covered unimproved land. The state of California requires this (Section 4442 of the California Public Resources Code). Other states may have similar laws. Federal laws apply on federal land.	

	! WARNING Rotating parts can contact or entangle hands, feet, hair, clothing, or accessories. Traumatic amputation or severe laceration can result.
• Operate equipment with guards in place. • Keep hands and feet away from rotating parts. • Tie up long hair and remove jewelry. • Do not wear loose-fitting clothing, dangling drawstrings or items that could become caught.	

1.21 Engine Safety (cont'd)

 **WARNING**



If engine is warm **DO NOT** remove radiator cap.

Escaping steam can cause burns.

- Do not touch hot radiator, or open reservoir when engine is running
- Allow engine to cool before removing radiator cap, changing, or adding coolant.

 **WARNING**




Never remove radiator cap or radiator reservoir cap while the engine is hot or running. Severe thermal burns or injury can occur by escaping steam or hot engine coolant.

- Stop engine and allow to cool before removing radiator or reservoir cap.
- To remove reservoir cap after engine is cool, place a thick cloth over cap and remove it slowly.
- To remove radiator cap after engine is cool, place a thick cloth over cap and rotate it slowly counter-clockwise to the first stop. Pressurized steam may emit from the cap, stand back to avoid injury. Once all pressure is released, rotate cap counter-clockwise while pushing down on cap to remove.

 **WARNING**





Unintentional sparking can result in fire or electric shock.

Unintentional start-up can result in entanglement, traumatic amputation, or laceration.

BEFORE PERFORMING ADJUSTMENTS OR REPAIRS

- Disconnect spark plug wire and keep it away from spark plug.
- Disconnect battery at negative terminal.

WHEN TESTING FOR SPARK

- Use approved spark plug tester.
- Do not check for spark with spark plug removed.

Adding Fuel in Diesel Engines

 **WARNING**




Fuel and its vapors are extremely flammable and explosive.

Fire or explosion can cause severe burns or death.

WHEN ADDING FUEL

- Turn engine OFF and let engine cool at least 2 minutes before removing fuel cap.
- Fill fuel tank outdoors or in well-ventilated area.
- Do not overfill fuel tank. Fill tank to approximately 1-1/2 inches below top of neck to allow for fuel expansion.
- Keep fuel away from sparks, open flames, pilot lights, heat, and other ignition sources.
- Check fuel lines, tank, cap, and fittings frequently for cracks or leaks. Replace if necessary.

WHEN STARTING ENGINE

- Make sure muffler, fuel cap and air cleaner are in place.
- If fuel spills, wipe it off before starting engine.

WHEN OPERATING EQUIPMENT

- Do not tip engine or equipment at angle which causes fuel to spill.

WHEN TRANSPORTING EQUIPMENT

- Transport with fuel tank EMPTY or with fuel shut-off valve OFF.

WHEN STORING FUEL OR EQUIPMENT WITH FUEL IN TANK

- Store away from furnaces, stoves, water heaters or other appliances that have pilot light or other ignition source because they can ignite equipment with stored fuel or fuel source.

**PARTS INFORMATION
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**2A
PARTS**

Upper Unit Assembly	.2A-2
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Pitch Control Assembly	.2A-8
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2A PARTS

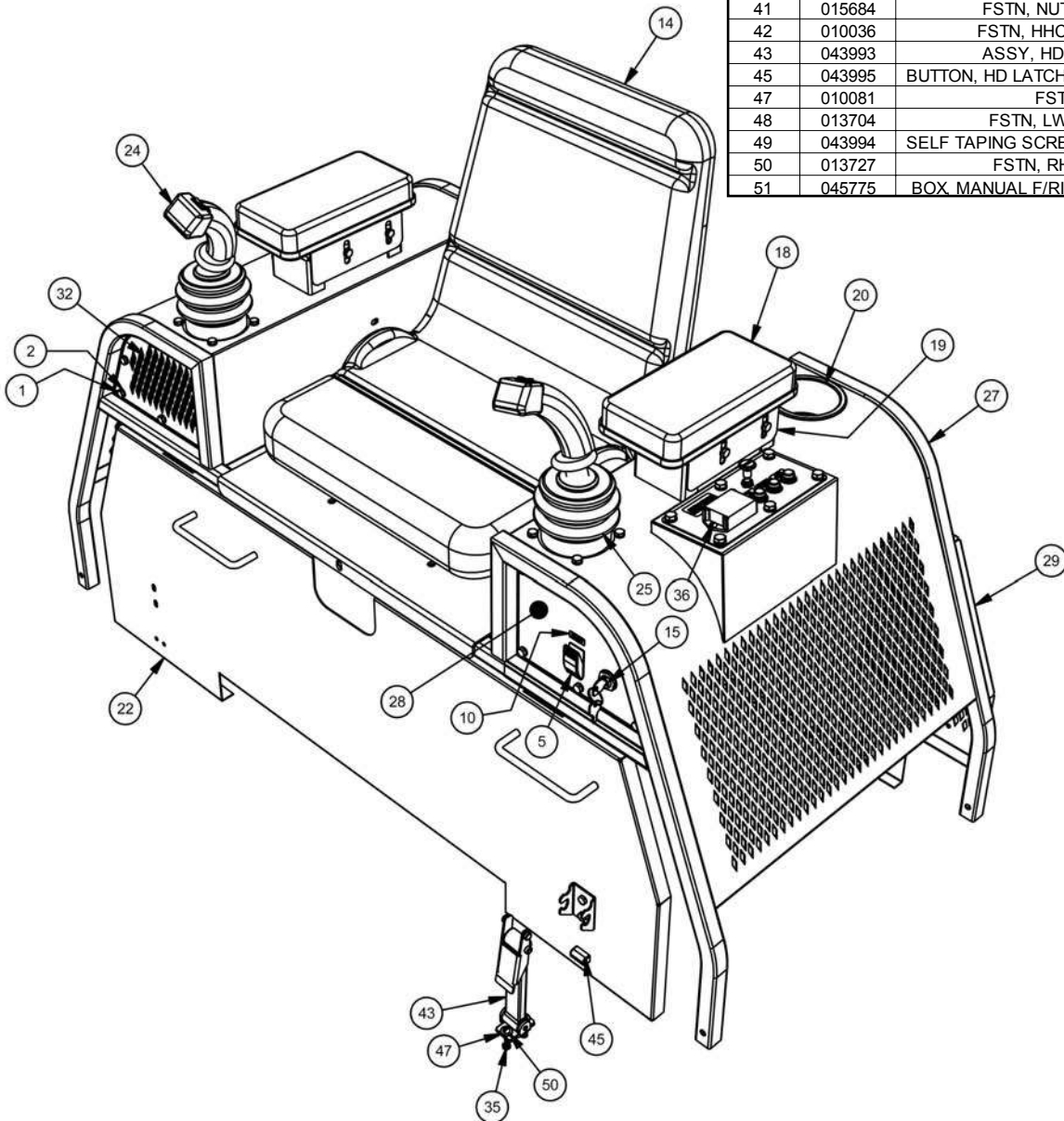
UPPER UNIT ASSEMBLY

NOTE: All set screws used on PRO 1200C RIDERS 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 PRO 1200C RIDERS are capped with CAP PLUG GC-5 part number #015692 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 coupling, 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.

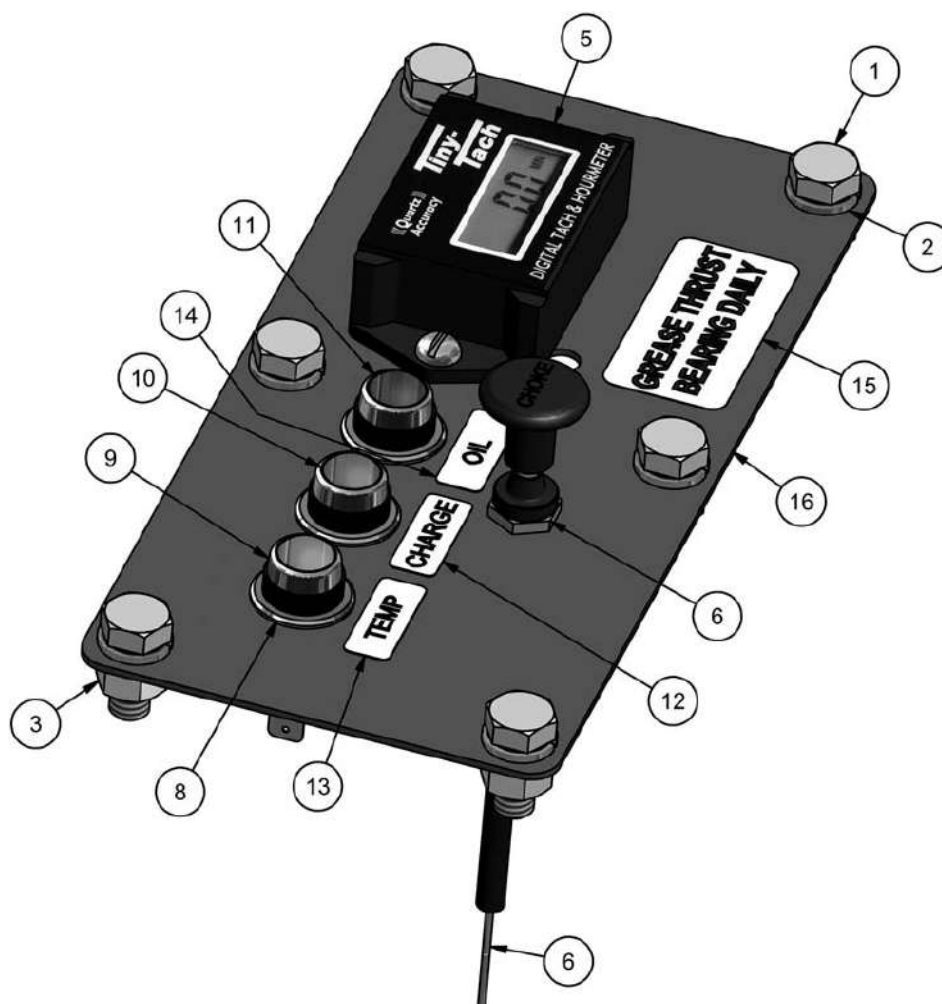
ITEM	PART #	DESCRIPTION	QTY
1	010001	FSTN, HHCS 1/4-20 X 1/2 GR 5	44
2	010089	FSTN, LW 1/4	44
5	032125	LIGHT SWITCH	1
10	034876	DECAL, LIGHTS	1
14	037769	SEAT, F/ RIDER	1
15	038727	SWITCH, VANGUARD KEY	1
18	039991	ARM REST, RIDING TROWEL	2
19	040254S	BRACKET, ARM REST SHORT	2
20	041537	HOLDER, CUP FOR RIDERS	1
22	046651	FRONT SCREEN F/ 1200C 34VG DIESEL	1
22	046847	FRONT SCREEN F/ 1200C 3LC GAS	1
24	046736	CONTROL VALVE, RH DUAL AXIS	1
25	046737	CONTROL VALVE, LH SINGLE AXIS	1
27	046820	SEAT FRAME, 1200C 3LC GAS	1
27	046664	SEAT FRAME 1200C 34VG DIESEL	1
28	046825	PANEL, KEYSWITCH F/ 1200C	1
29	046832	REAR SCREEN 1200C 3LC GAS	1
29	046640	SCREEN, REAR F/ 1200C 34VG DIESEL	1
32	046930	COVER, ACCESS PANEL F/ SEAT FRAME	3
38	010019	FSTN, HHCS 5/16-18 X 3/4 GR 5	6
39	010003	FSTN, HHCS 1/4-20 X 1	8
40	010098	FSTN, NUT HEX 1/4-20	10
41	015684	FSTN, NUT HEX JAM 3/8-16	1
42	010036	FSTN, HHCS 3/8-16 x 1 GR 5	4
43	043993	ASSY, HD SCREEN LATCH	1
45	043995	BUTTON, HD LATCH ASSY PRESSURE POINT	1
47	010081	FSTN, FW 1/4	2
48	013704	FSTN, LW EXT STAR 8-32	2
49	043994	SELF TAPING SCREW #8 X 1/2 (NOT SHOWN)	2
50	013727	FSTN, RHMS 10-32 X 3/4	2
51	045775	BOX, MANUAL F/RIDER SEAT (NOT SHOWN)	1



CONTROL PANEL ASSEMBLY

2A PARTS

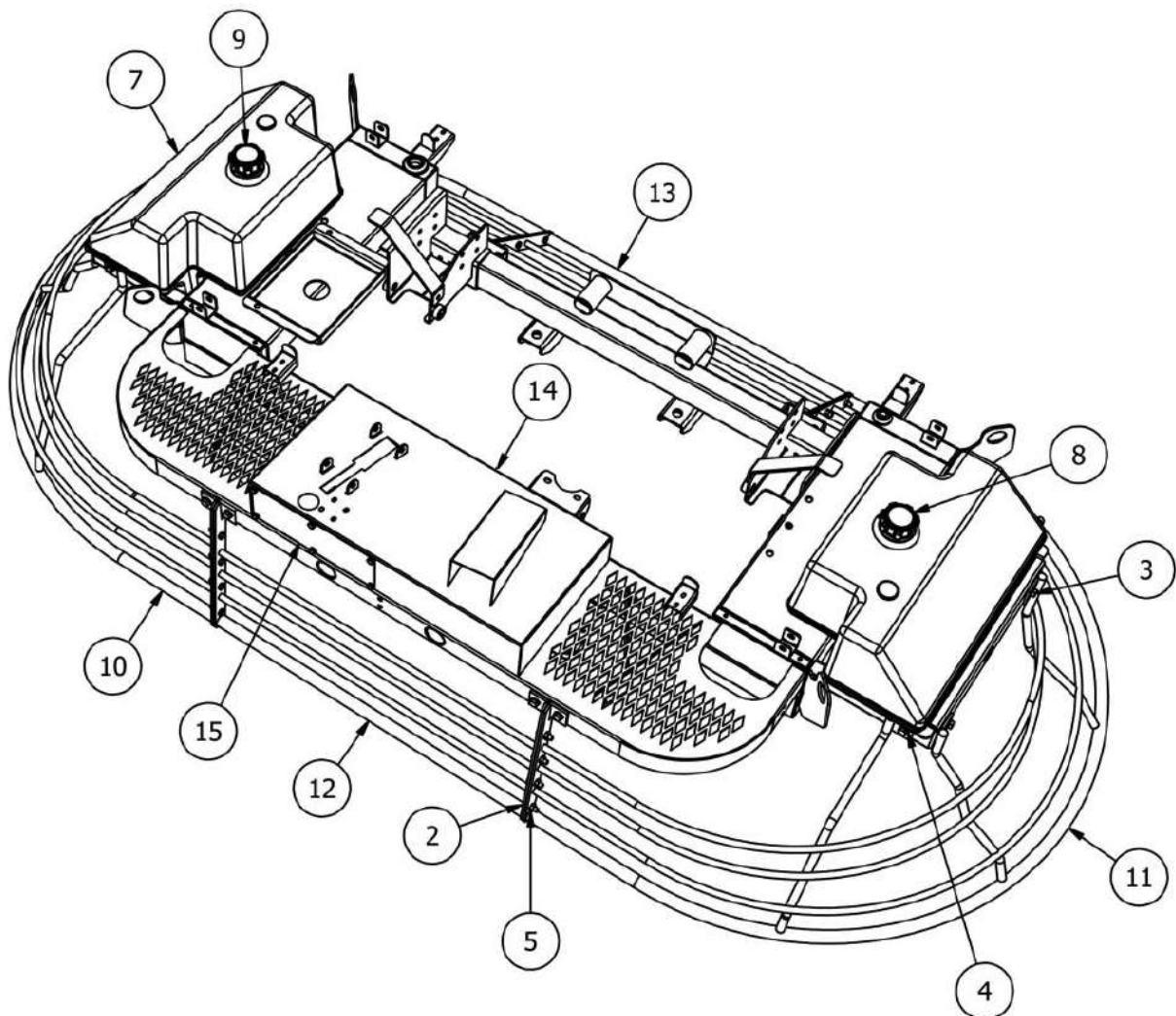
ITEM	PART #	DESCRIPTION	QTY
1	010002	FSTN, HHCS 1/4-20 X 3/4	6
2	010089	FSTN, LW 1/4	6
3	010098	FSTN, NUT HEX 1/4-20	6
4	010570	FSTN, NUT HEX 10-32 (NOT SHOWN)	2
5	029473	HOURLMETER, TINY TACH (GAS)	1
5	046819	HOURLMETER, TINY TACH (DIESEL)	1
6	029928	CHOKE CABLE (GAS ONLY)	1
7	032979	FSTN, RHMS 10-32 x 3/4 (TINY TACH)	2
8	034610	LAMP SOCKET	3
9	034612	LENS, LAMP-AMBER	1
10	034613	LENS, LAMP-GREEN	1
11	034614	LENS, LAMP-RED	1
12	036770	DECAL, "CHARGE"	1
13	036771	DECAL, "TEMP"	1
14	036772	DECAL, "OIL"	1
15	039778	DECAL, GREASE THRUST BEARING DAILY	1
16	046773	PLATE, CONTROL PANEL 1200C	1



2A PARTS

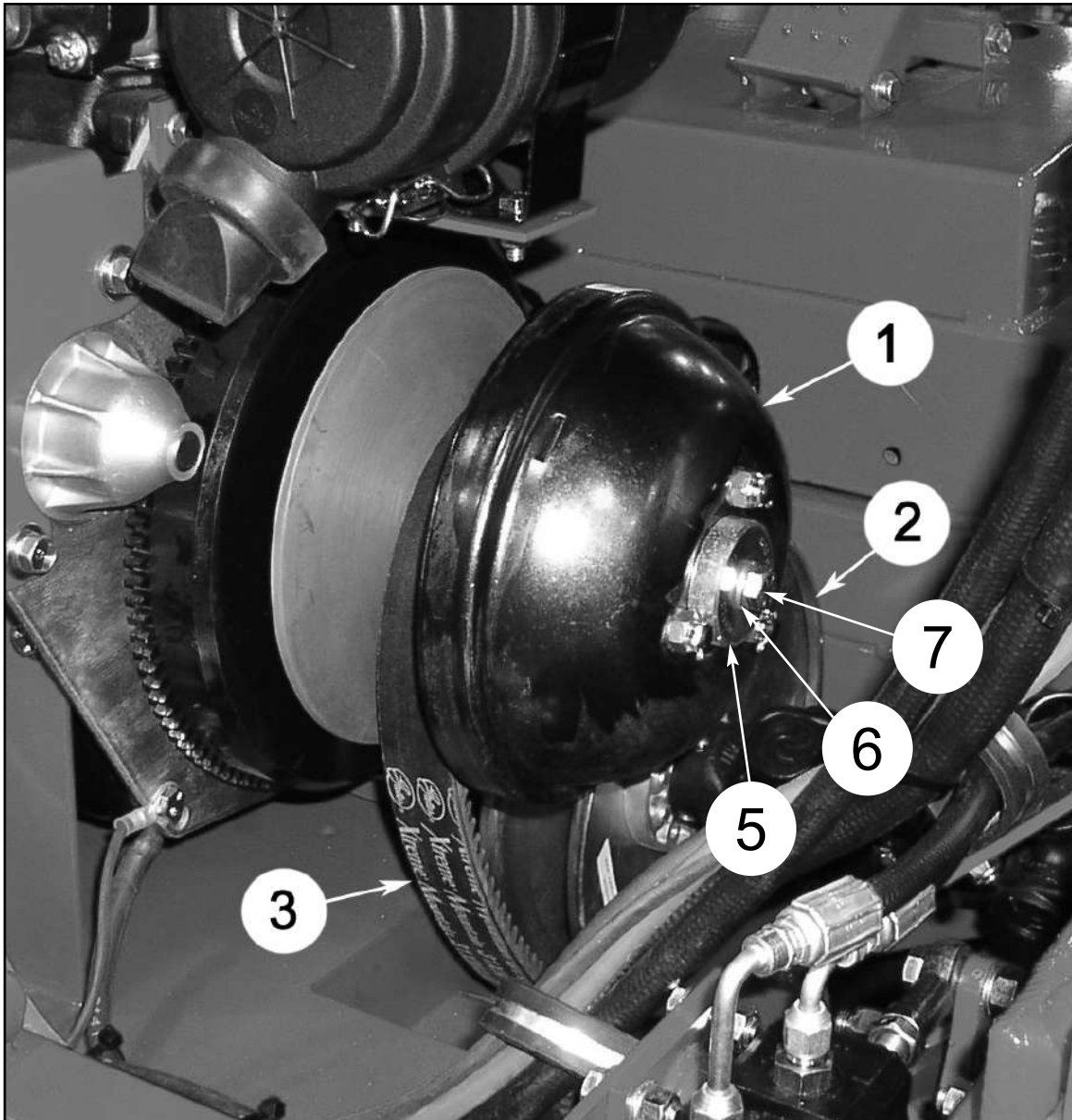
FRAME ASSEMBLY

ITEM	PART #	DESCRIPTION	QTY
2	010020	FSTN, HHCS 5/16-18 X 1	14
3	010036	FSTN, HHCS 3/8-16 X 1	16
4	010082	FSTN, FW 5/16	22
5	010100	FSTN, NUT HEX 5/16-18	14
6	010102	FSTN, NUT HEX 3/8-16	16
7	045957	TANK, BLACK PLASTIC 6 GAL.	2
8	045965	CAP, RED PLASTIC FOR 6-GAL TANK	1
9	045967	CAP, BLUE PLASTIC FOR 6-GAL TANK	1
10	046577	END RING, RIGHT F/ 1200C RIDER	1
11	046576	END RING, LEFT F/ 1200C RIDER	1
12	046578	RING, FRONT F/ 1200C RIDER	1
13	046579	RING, REAR F/ 1200C RIDER	1
14	046580	MAIN FRAME, 1200C 34VG	1
15	046630	COVER, FRONT DECK ACCESS	1
16	036881	LIGHT, PREP (NOT SHOWN)	4



TORQUE CONVERTER ASSEMBLY

2A PARTS

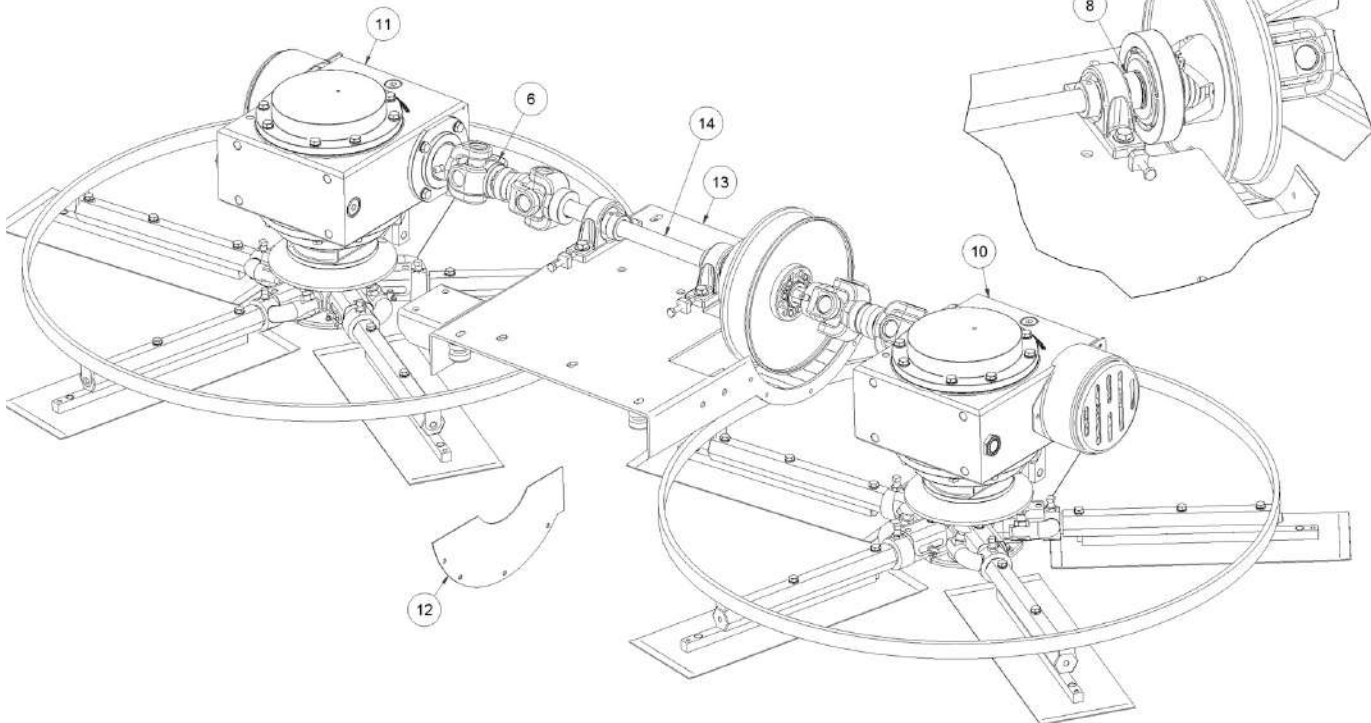
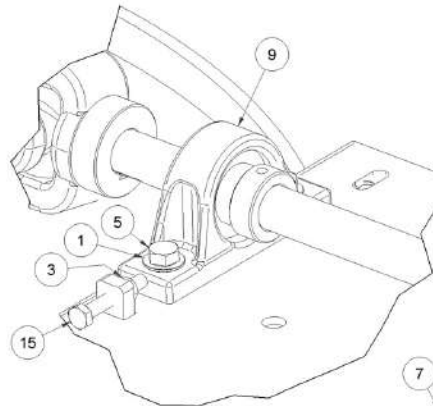


ILL.	PART #	DESCRIPTION	QTY.
1.....	042281	CLUTCH DRIVER, TORQUE CONV (RT)	1
2.....	042282	PULLEY, DRIVEN TORQUE CONV (RT)	1
3.....	046300	BELT, 31XM4300 SPECIAL CVT KEVLAR	1
4.....	038726	SHAFT, VANGUARD STUB 1-1/8" (NOT SHOWN)	1
5.....	000000	WASHER, RETAINING (INCLUDED WITH CLUTCH)	1
6.....	010092	FSTN, LW 7/16	1
7.....	042280	FSTN, HHCS 7/16-20 x 4-1/2	1

2A PARTS

DRIVELINE ASSEMBLY

Parts List			
ITEM	PART #	DESCRIPTION	QTY
1	010084	FSTN, FW 7/16	4
2	010092	FSTN, LW 7/16	4
3	010100	FSTN, NUT HEX 5/16-18	2
4	010104	FSTN, NUT HEX 7/16-14	4
5	017898	FSTN, HHCS 7/16-20 X 1-1/2 GR8	4
6	028622	U-JOINT ASSY, 446-2-FD/NOL-24H	2
7	042282	PULLEY, DRIVEN TORQUE CONV	1
8	046493	SET COLLAR, DR SHAFT	1
9	046741	BEARING, PILLOW BLOCK 1" CAM LOCK	2
10	046794	GEARBOX, LH (SOM) 1200C	1
11	046795	GEARBOX, RH (SOM) 1200C	1
12	046803	COVER, ENGINE MOUNT PLATE 1200C	1
13	046805	MOUNT, ENGINE	1
14	046836	SHAFT, LOCK BEARING 19 1/2 DRIVE	1
15	047188	FSTN, BOLT TAP 5/16-18 x 2	2

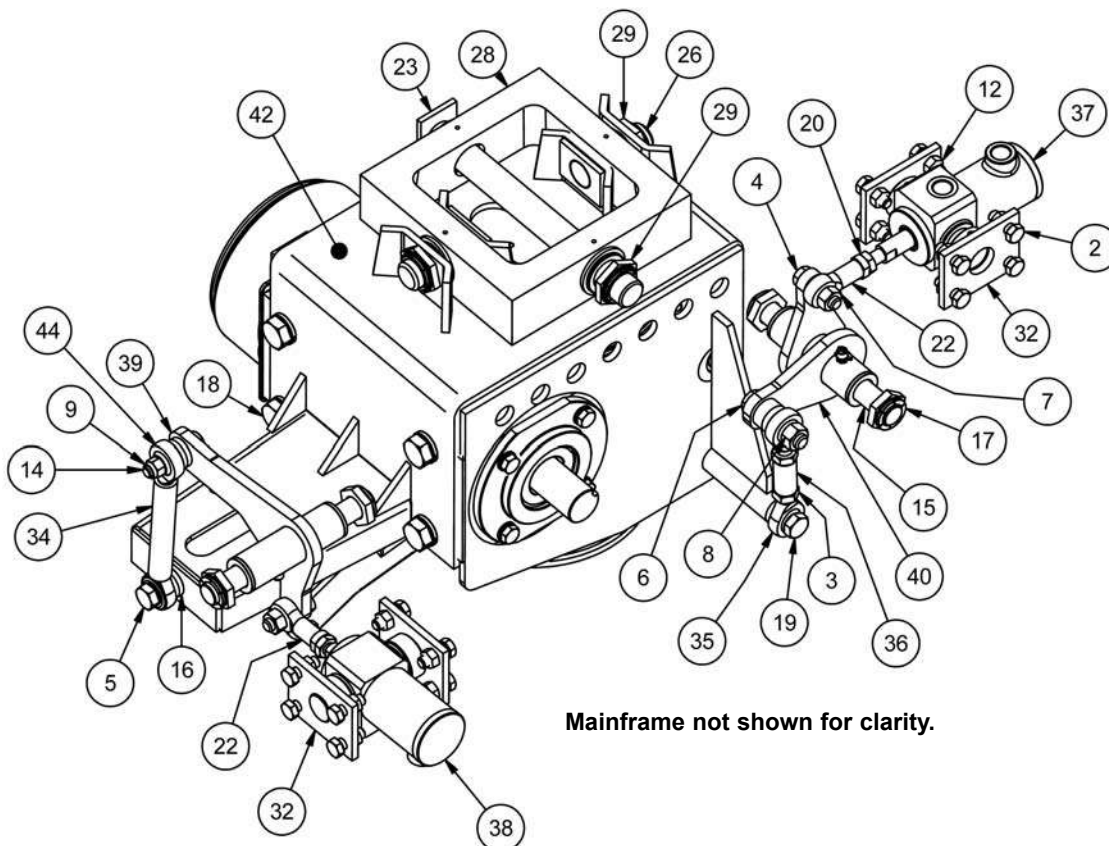


STEERING ASSEMBLY

2A PARTS

ITEM	PART #	DESCRIPTION	QTY
2	010036	FSTN, HHCS 3/8-16 X 1 GR 5	16
3	010051	FSTN, NUT HEX JAM 1/2-20 FINE	2
4	010054	FSTN, HHCS 7/16-14 X 1-1/2	2
5	010070	FSTN, HHCS 1/2-13 X 1-3/4 GR 5	1
6	010072	FSTN, HHCS 1/2-13 X 2-1/4 GR 5	1
7	010104	FSTN, NUT HEX 7/16-14	2
8	010106	FSTN, NUT HEX 1/2-13	2
9	010464	FSTN, NUT NYLOK 3/8-16	2
12	020514	FSTN, NUT STOVER LOCK 3/8-16	16
14	026268	FSTN, SHLD BLT 1/2 X 1-1/4	1
15	026272	SHAFT, FULCRUM ARM MTG FF RT	2
16	026412	SPACER 5/16"THICK X 1"ROUND RT	2
17	026447	FSTN, NUT SELFLOCK THIN 3/4-10	4
18	036787	FSTN, HHCS 5/8-11 X 1 1/4	8
19	037140	FSTN, HHCS 1/2-20 X 1 1/2 GR 5	1
20	038180	FSTN, NUT 7/16-20 HEX JAM	2
22	038184	ALINABALL, 7/16 FEMALE RODEND	2
23	039358	PIN, FRAME CROSSHEAD	1
26	039832	BOLT, WELD" T CROSSHEAD (SMALL)	2
28	039841L	CROSSHEAD BOX ASSEMBLY (LH) SP	1
28	039841R	CROSSHEAD BOX ASSEMBLY (RH) SP	1
29	040034	FSTN, NUT FLEX LOCK 1"-8	3
32	042949	PLATE CYLINDER MOUNT	4
34	046701	CONTROL ARM, 1200C	1
35	046721	ROD END, MALE MODIFIED 1/2" 1200C	2
36	046722	COUPLER, HEIM JOINT 1200C	1
37	046739	CYLINDER, HYD FWD & REV 1200C	1
38	046740	CYLINDER, HYD LEFT TO RIGHT 1200C	1
39	046753	FULCRUM ASS"Y, LEFT/RIGHT 1200C	1
40	046761	ASSEMBLY, FULCRUM RH FWD/REV 1200C	1
42	046765	RH CROSSHEAD	1
42	046764	LH CROSSHEAD	1
44	221408	ROD, END MALE 1/2"	2

NOTE: This is the right hand view of the steering assembly. All the parts for the forward/reverse mechanism are identical on the left side with the exception of item #40 which will be 046762. There is no left to right mechanism on the left side of the machine.



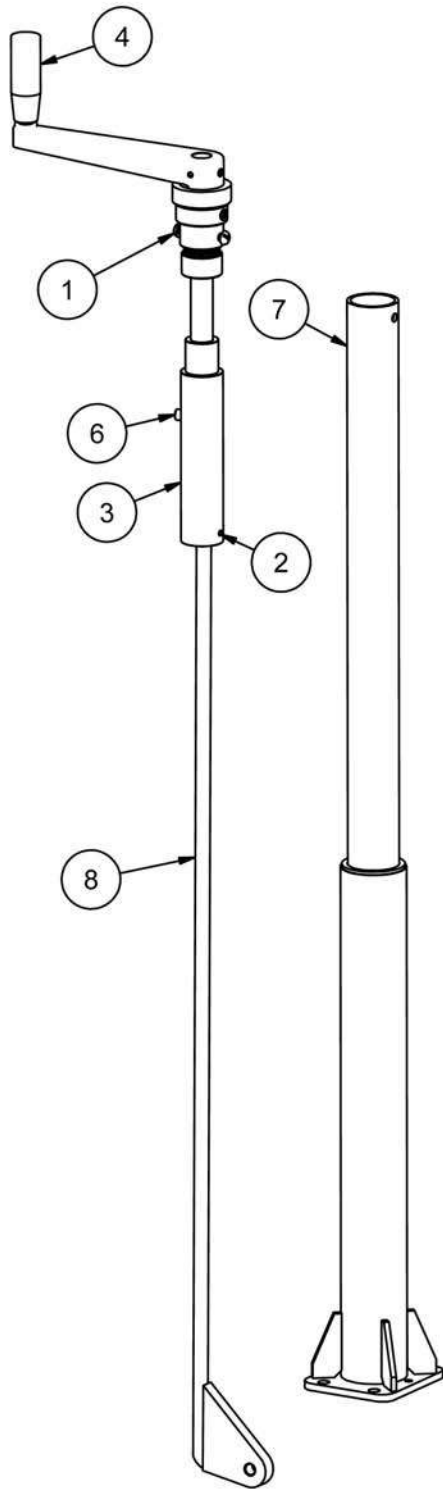
Mainframe not shown for clarity.

2A PARTS

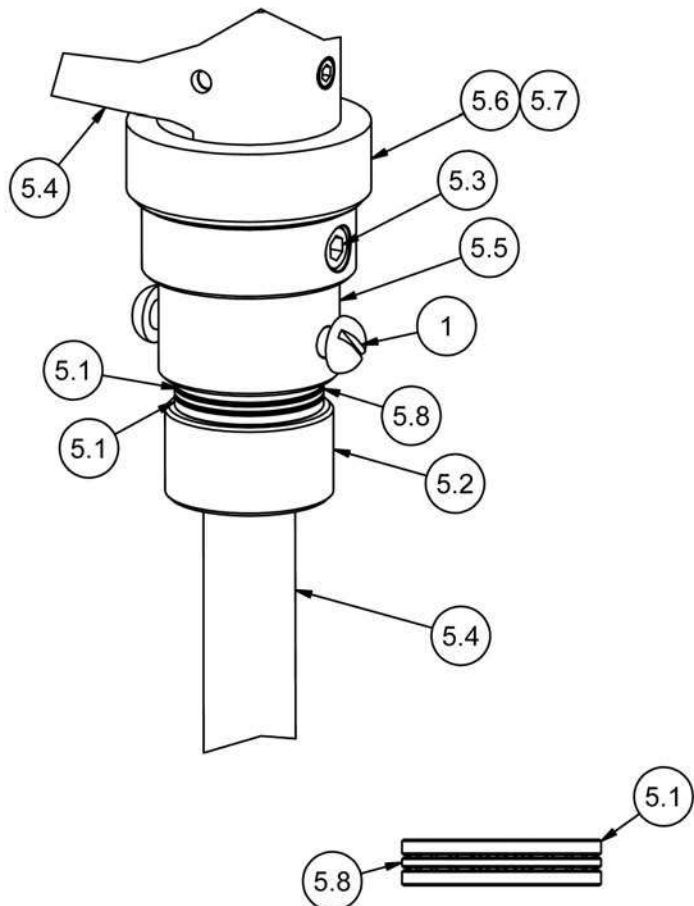
PITCH CONTROL ASSEMBLY

Pitch Control Assembly

Part #: 046827

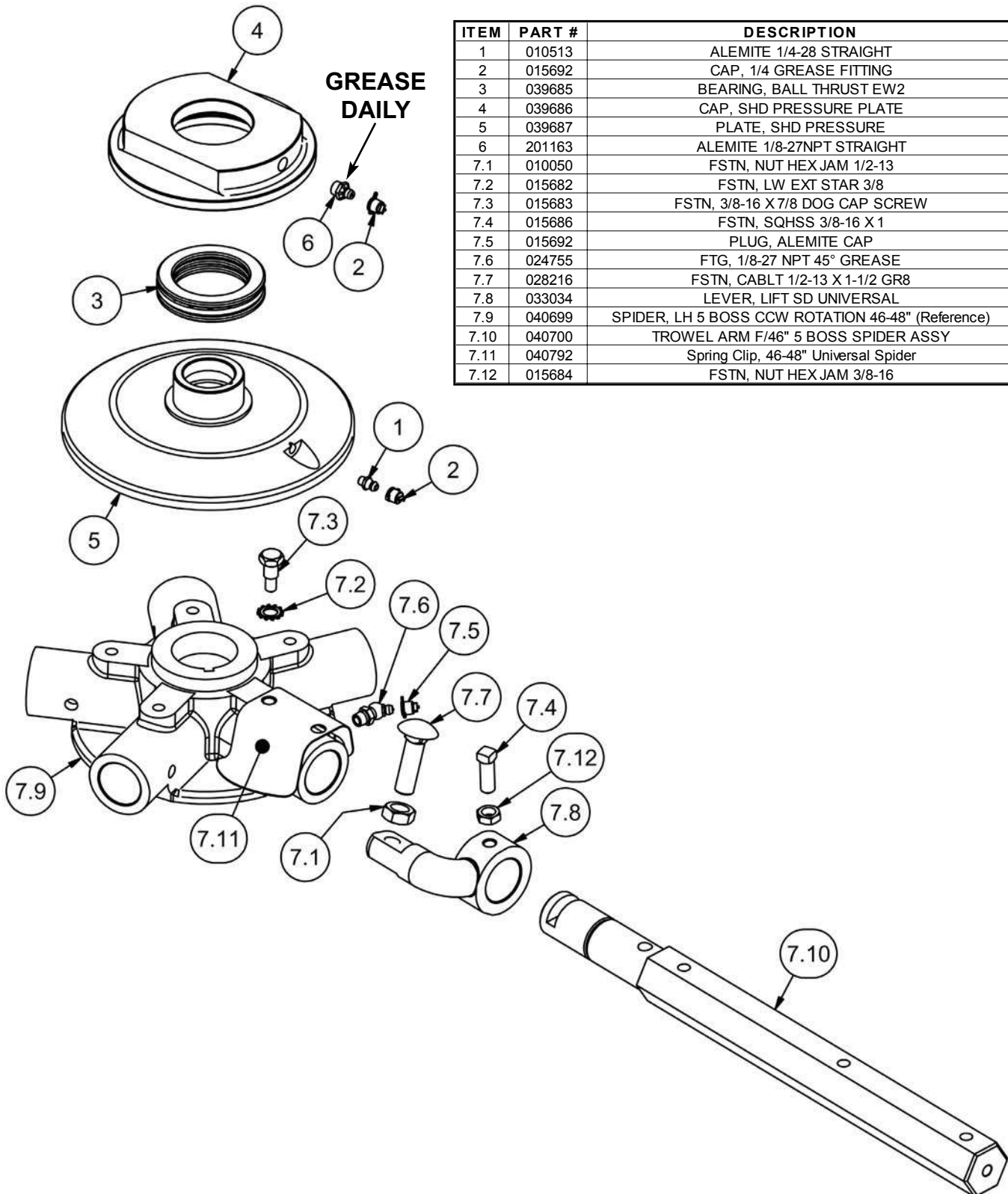


ITEM	PART #	DESCRIPTION	QTY
1	015410	FSTN, RHMS 1/4-20 X 3/8	2
2	015747	PIN, ROLL 3/16 X 1-3/8	1
3	029812	BUSHING, SLIDE PITCH CONTROL	1
4	032115	KNOB, PITCH CONTROL HANDLE	1
5	040147	ASSY, CRANK HANDLE	1
5.1	012710	BEARING THRUST RACE	2
5.2	032191	STOP F/ PITCH CONTROL HANDLE	1
5.3	040143	BALL PLUNGER	2
5.4	040144	HANDLE CRANK	1
5.5	040146	BUSHING	1
5.6	040280	BEARING, THRUST	1
5.7	040281	SPACER, 1" OD, 5/8 LG, 11 GA WALL	1
5.8	100340	BEARING NTA-1220 THRUST	1
6	044036	FSTN, SHCS 1/4-20 X 3/8	1
7	046716	TUBE, PITCH CONTROL	1
8	046719	PITCH CONTROL ROD	1



TROWEL ARM ASSEMBLY

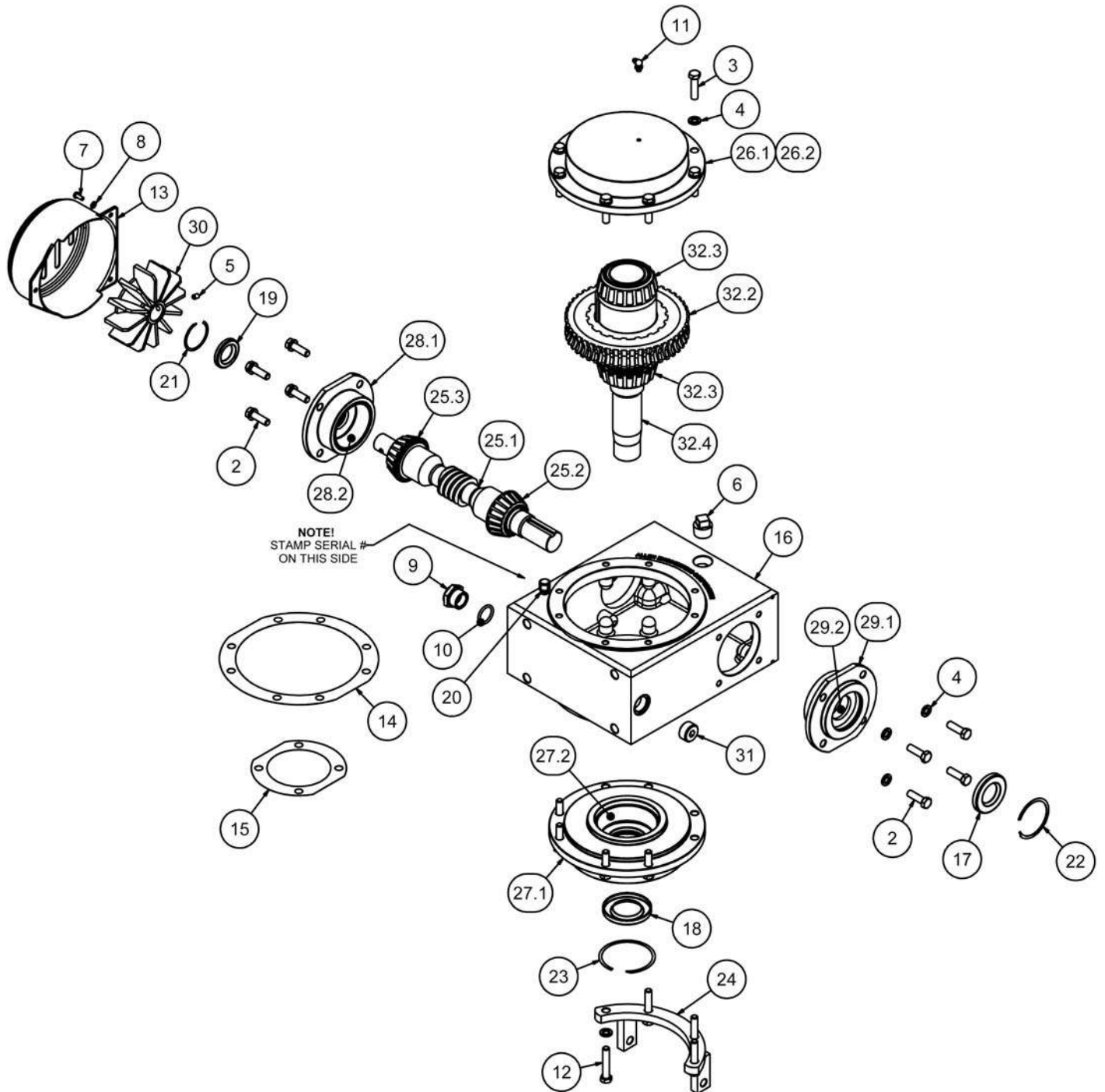
2A PARTS



ITEM	PART #	DESCRIPTION	QTY
1	010513	ALEMITE 1/4-28 STRAIGHT	1
2	015692	CAP, 1/4 GREASE FITTING	2
3	039685	BEARING, BALL THRUST EW2	1
4	039686	CAP, SHD PRESSURE PLATE	1
5	039687	PLATE, SHD PRESSURE	1
6	201163	ALEMITE 1/8-27NPT STRAIGHT	1
7.1	010050	FSTN, NUT HEX JAM 1/2-13	5
7.2	015682	FSTN, LW EXT STAR 3/8	5
7.3	015683	FSTN, 3/8-16 X 7/8 DOG CAP SCREW	5
7.4	015686	FSTN, SQHSS 3/8-16 X 1	5
7.5	015692	PLUG, ALEMITE CAP	5
7.6	024755	FTG, 1/8-27 NPT 45° GREASE	5
7.7	028216	FSTN, CABLT 1/2-13 X 1-1/2 GR8	5
7.8	033034	LEVER, LIFT SD UNIVERSAL	5
7.9	040699	SPIDER, LH 5 BOSS CCW ROTATION 46-48" (Reference)	1
7.10	040700	TROWEL ARM F/46" 5 BOSS SPIDER ASSY	5
7.11	040792	Spring Clip, 46-48" Universal Spider	5
7.12	015684	FSTN, NUT HEX JAM 3/8-16	5

2A PARTS

SUPER HEAVY DUTY (SHD) GEARBOX LEFT HAND SITTING ON MACHINE(SOM) PART#: 046794



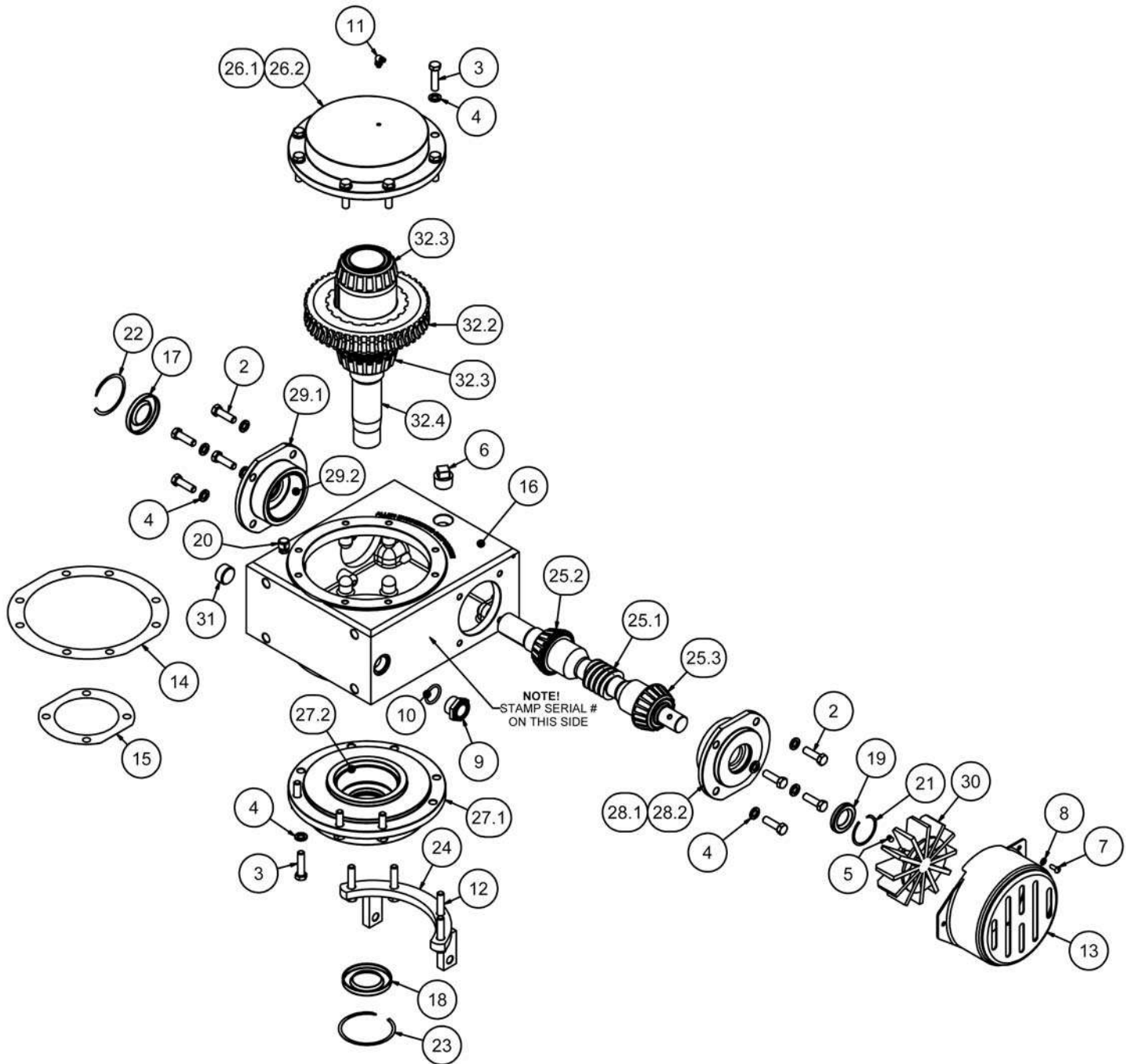
(SHD) GEARBOX LEFT HAND (SOM)
PART#: 046794 (cont'd)

2A
PARTS

ITEM	PART #	DESCRIPTION	QTY
1	001004	OIL, MOBIL SHC 634	.75
2	010037	FSTN, HHCS 3/8-16 X 1-1/4 GR 5	8
3	010038	FSTN, HHCS 3/8-16 X 1-1/2 GR 5	12
4	010091	FSTN, LW 3/8	24
5	012869	FSTN, SHSS 1/4-20 X 3/8	1
6	012953	PLUG 3/4 NPT BI SQ HEAD PIPE	2
7	013484	FSTN, SCREW RHPMS 10-24 X 1/2	3
8	013740	FSTN, LW STAR #10	3
9	015672	SIGHTGLASS 3/4-14 NPT	1
10	015673	O-RING	1
11	018511	ALEMITE, 1/4-28 X 90 DEG.	1
12	026775	FSTN, HHCS 3/8-16NC X 2 GR 8	4
13	028703	SHROUD, FAN GEAR BOX SHD	1
14	028914	SHIM, LARGE	REQ
15	028915	SHIM, SMALL	REQ
16	029143	CASE, GEAR BOX SHD	1
17	029179	SEAL, COUNTER SHAFT SHD	1
18	029180	SEAL, SHAFT OUTPUT SHD	1
19	029181	SEAL, COUNTER SHAFT FAN END SHD	1
20	029529	VALVE,RELIEF 1/8-27NPT (AIR V)	1
21	032713	RING, RETAINING	1
22	032714	RING, RETAINING	1
23	032715	RING, RETAINING	1
24	032716	BRACKET, GEARBOX SD	1
25	034295	COUNTERSHAFT, ASSY RH SD G-BOX	1
25.1	029145	SHAFT, COUNTER RH SHD	1
25.2	029178	BEARING, COUNTER SHAFT SHD	1
25.3	029182	BEARING, C-SHAFT FAN END SHD	1
26	034298	COVER, TOP ASSY F/ SD GEARBOX	1
26.1	029150	PLATE, TOP GEAR BOX SHD	1
26.2	029184	BEARING, CUP OP-SHAFT SHD	1
27	034299	COVER, BOTTOM ASSY F/ SD G-BOX	1
27.1	029155	PLATE, BOTTOM GEAR BOX SHD	1
27.2	029184	BEARING, CUP OP-SHAFT SHD	1
28	034300	CAP, FLANGE ASSY F/ SD GEARBOX	1
28.1	029147	FLANGE, GEAR BOX SHD	1
28.2	029272	RACE, GEAR BOX SHD	1
29	034301	CAP, END ASSY F/ SD GEARBOX	1
29.1	029154	CAP, END GEAR BOX SHD	1
29.2	029272	RACE, GEAR BOX SHD	1
30	034541	FAN, SHD GEARBOX	1
31	035327	PLUG ALLEN HEAD	1
32	046797	MAINSHAFT ASS"Y, LH F/ 1200C	1
32.1	029146	KEY, GEAR BOX SD 1/2 X 2 1/2 (NOT SHOWN)	1
32.2	029148	GEAR,BRONZE/IRON SHD LH	1
32.3	029183	BEARING, CONE OP-SHAFT SHD	2
32.4	037650	SHAFT, MAIN RH F/ SHD GEARBOX	1

2A PARTS

SUPER HEAVY DUTY (SHD) GEARBOX RIGHT HAND SITTING ON MACHINE(SOM) PART#: 046795



SHD GEARBOX RIGHT HAND SOM
PART#: 046795 (cont'd)

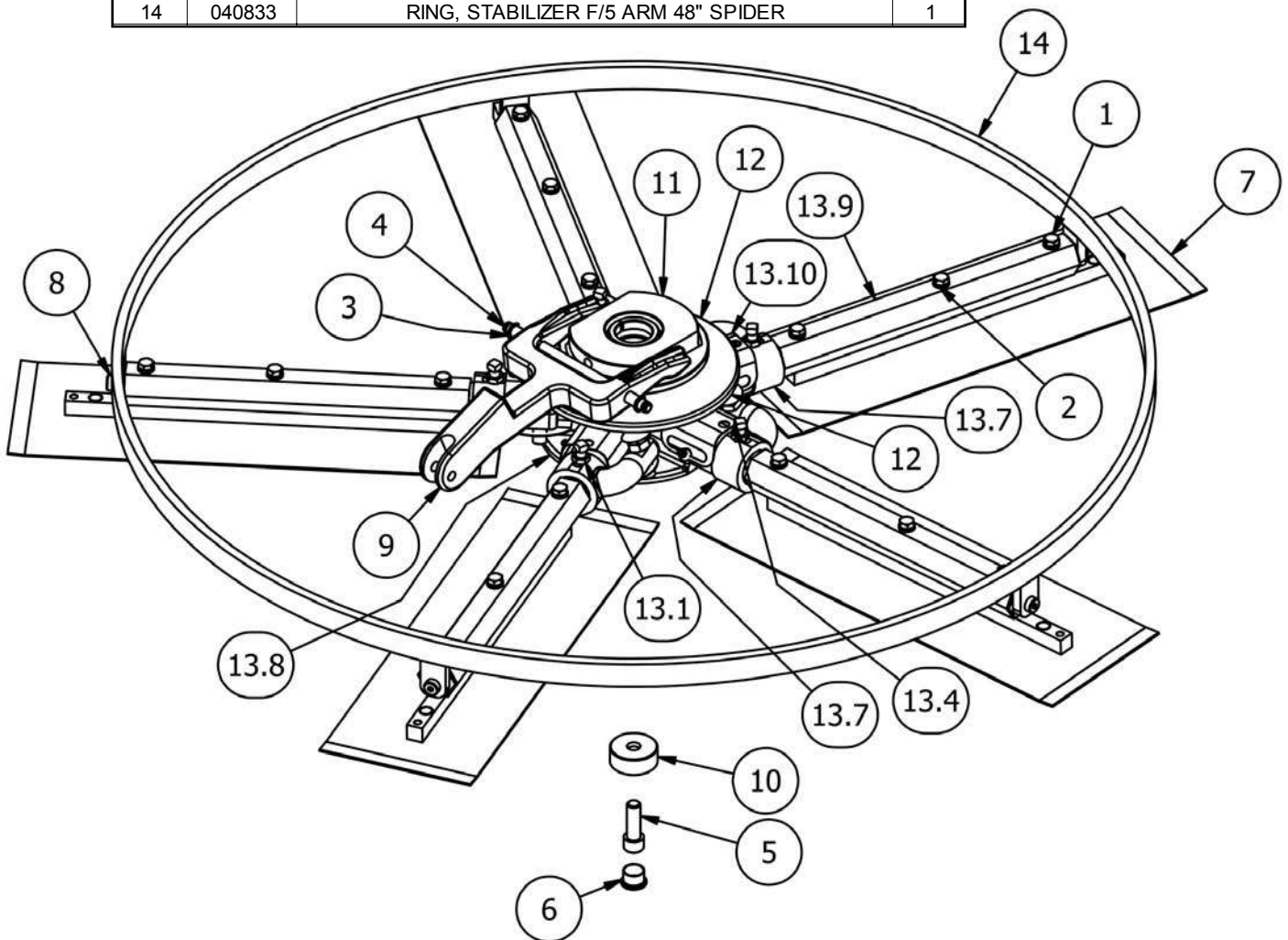
2A
PARTS

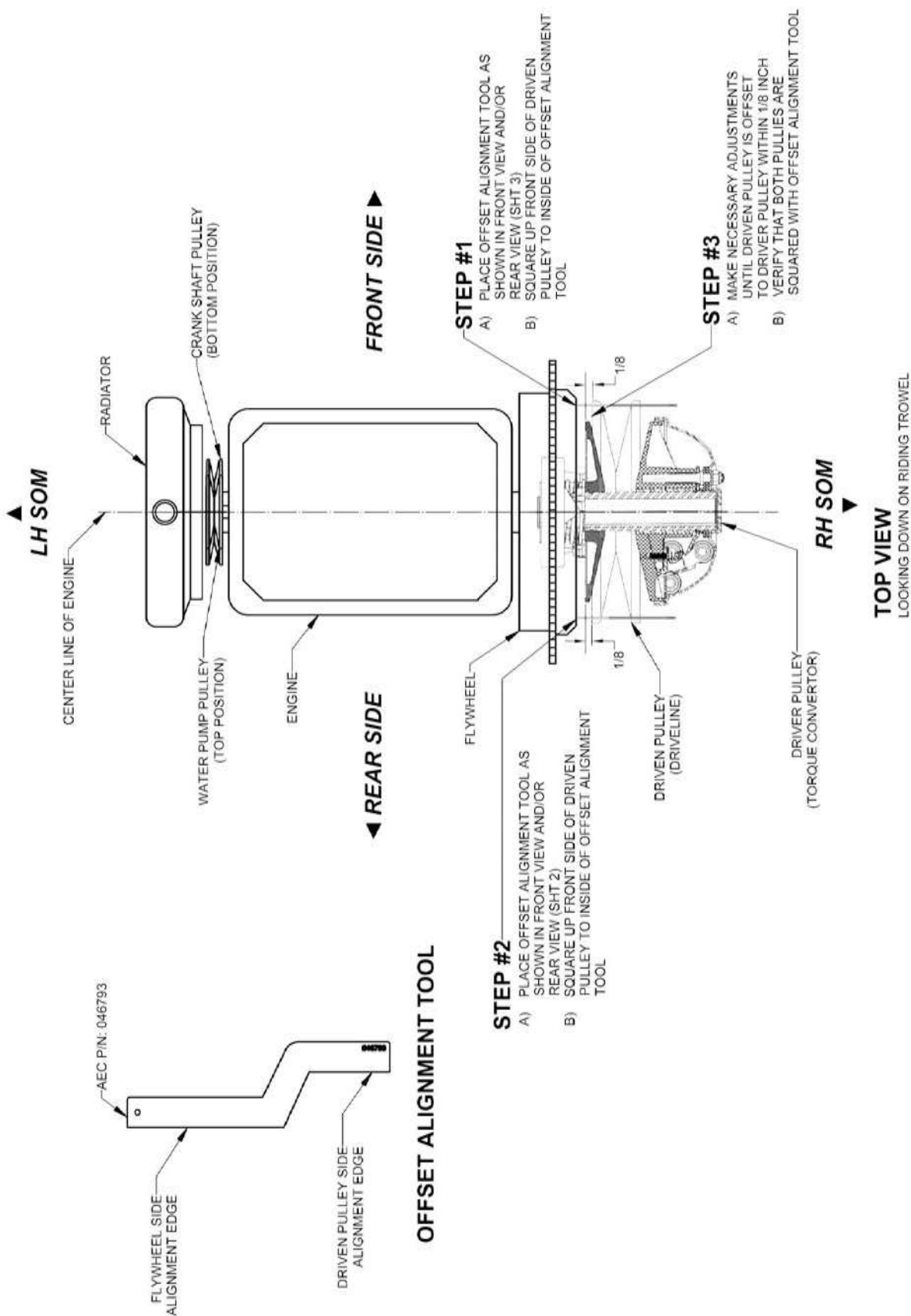
ITEM	PART #	DESCRIPTION	QTY
1	001004	OIL, MOBIL SHC 634	.75
2	010037	FSTN, HHCS 3/8-16 X 1-1/4 GR 5	8
3	010038	FSTN, HHCS 3/8-16 X 1-1/2 GR 5	12
4	010091	FSTN, LW 3/8	24
5	012869	FSTN, SHSS 1/4-20 X 3/8	1
6	012953	PLUG 3/4 NPT BI SQ HD PIPE	2
7	013484	FSTN, SCREW RHPMS 10-24 X 1/2	3
8	013740	FSTN, LW STAR #10	3
9	015672	SIGHTGLASS 3/4-14 NPT	1
10	015673	O-RING	1
11	018511	ALEMITE, 1/4-28 X 90 DEG.	1
12	026775	FSTN, HHCS 3/8-16NC X 2 GR 8	4
13	028703	SHROUD, FAN GEAR BOX SHD	1
14	028914	SHIM, LARGE	REQ
15	028915	SHIM, SMALL	REQ
16	029143	CASE, GEAR BOX SHD	1
17	029179	SEAL, COUNTER SHAFT SHD	1
18	029180	SEAL, SHAFT OUTPUT SHD	1
19	029181	SEAL, COUNTER SHAFT FAN END SHD	1
20	029529	VALVE,RELIEF 1/8-27NPT (AIR V)	1
21	032713	RING, RETAINING	1
22	032714	RING, RETAINING	1
23	032715	RING, RETAINING	1
24	032716	BRACKET, GEARBOX SD	1
25	034297	COUNTERSHAFT, ASSY LH SD G-BOX	1
25.1	029144	SHAFT, COUNTER LH SHD	1
25.2	029178	BEARING, COUNTER SHAFT SHD	1
25.3	029182	BEARING, C-SHAFT FAN END SHD	1
26	034298	COVER, TOP ASSY F/ SD GEARBOX	1
26.1	029150	PLATE, TOP GEAR BOX SHD	1
26.2	029184	BEARING, CUP OP-SHAFT SHD	1
27	034299	COVER, BOTTOM ASSY F/ SD G-BOX	1
27.1	029155	PLATE, BOTTOM GEAR BOX SHD	1
27.2	029184	BEARING, CUP OP-SHAFT SHD	1
28	034300	CAP, FLANGE ASSY F/ SD GEARBOX	1
28.1	029147	FLANGE, GEAR BOX SHD	1
28.2	029272	RACE, GEAR BOX SHD	1
29	034301	CAP, END ASSY F/ SD GEARBOX	1
29.1	029154	CAP, END GEAR BOX SHD	1
29.2	029272	RACE, GEAR BOX SHD	1
30	034541	FAN, SHD GEARBOX	1
31	035327	PLUG, ALLEN HEAD	1
32	046796	MAINSHAFT ASS"Y, RH F/ 1200C	1
32.1	029146	KEY, GEAR BOX SD 1/2 X 2 1/2	1
32.2	029149	GEAR, BRONZE/IRON SHD RH	1
32.3	029183	BEARING, CONE OP-SHAFT SHD	2
32.4	037651	SHAFT, MAIN LH F/ SHD GEARBOX	1

LEFT HAND SPIDER ASSEMBLY (SOM)

**2A
PARTS**

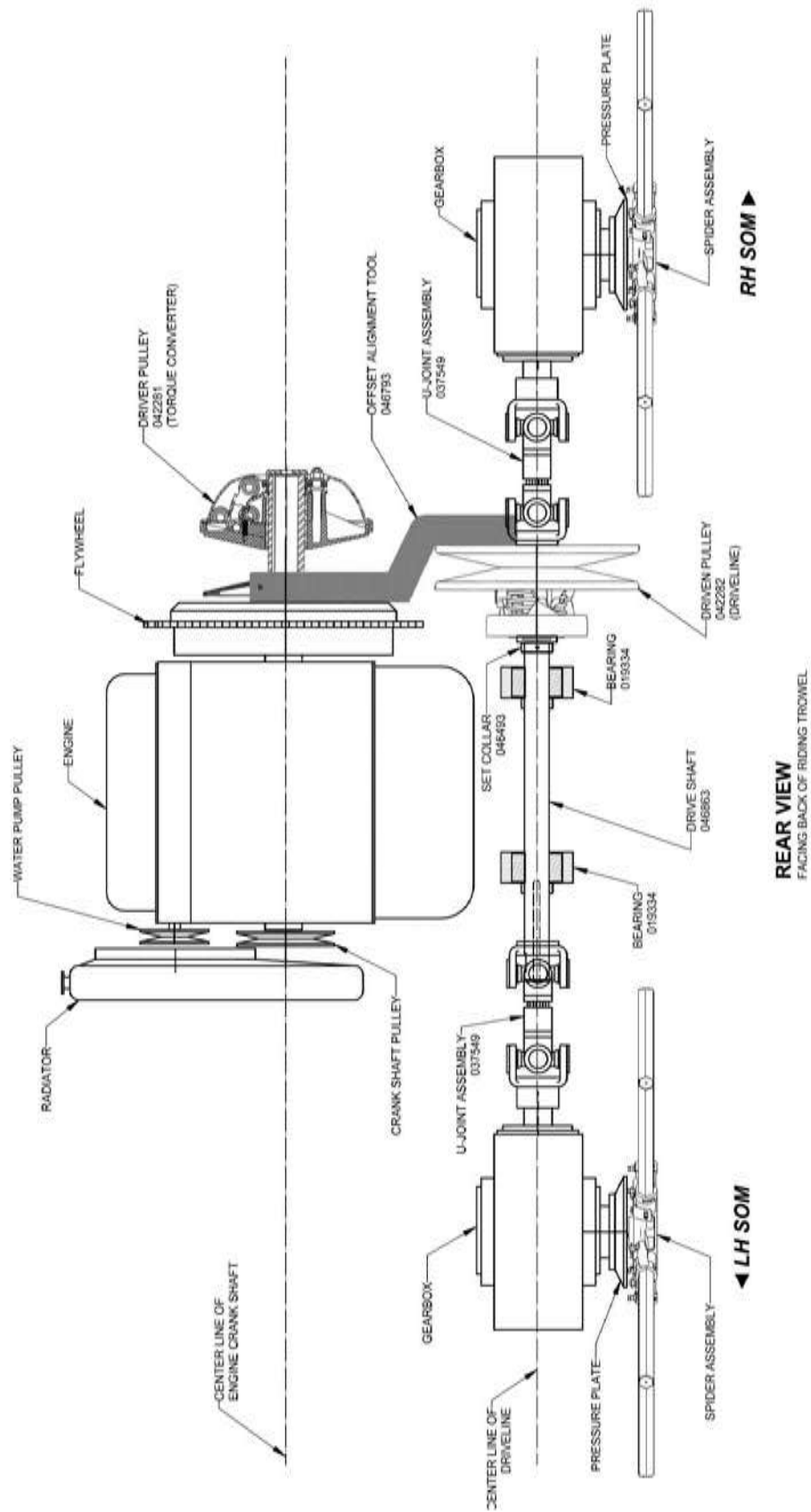
ITEM	PART #	DESCRIPTION	QTY
1	010024	FSTN, HHCS 5/16-18 X 2 GR 5	15
2	010090	FSTN, LW 5/16	15
3	015677	FSTN, RING RETAINING (E-CLIP)	2
4	015678	FSTN, PIN YOKE ARM 7-3/8 X 7/16	1
5	015691	FSTN, SHCS 1/2-13 X 1-1/2 RH	1
6	015693	PLUG, PLASTIC CAP EC12	1
7	015695	TROWEL BLADE, FINISH 6 X 18 (BLUE BLADE .074)	5
8	025091	FSTN, SHLD BLT 3/8 X 3/8 HOLO	5
9	026215	YOKE, ARM	1
10	037652	WASHER, RETAINING HD	1
11	039686	CAP, SHD PRESSURE PLATE	1
12	039687	PLATE, SHD PRESSURE	1
13	040794	SPIDER ASSY, 1200SHD 5-ARM LH-SOM	1
13.1	010050	FSTN, NUT HEX JAM 1/2-13	5
13.2	015682	FSTN, LW EXT STAR 3/8	5
13.3	015683	BOLT, 3/8-16 X 7/8 DOG PT HEX HD CAP	5
13.4	015686	SCR, SQ HD SET	5
13.5	024755	FTG, 1/8-27 NPT 45° GREASE	5
13.6	028216	FSTN, CABLT 1/2-13 X 1-1/2 GR8	5
13.7	033034	LEVER, LIFT SD UNIVERSAL	5
13.8	040698	SPIDER RH 5 BOSS CW ROTATION 46-48"	1
13.9	040700	TROWEL ARM F/46" 5 BOSS SPIDER ASSY	5
13.10	040792	Spring Clip, 46-48" Universal Spider	5
14	040833	RING, STABILIZER F/5 ARM 48" SPIDER	1

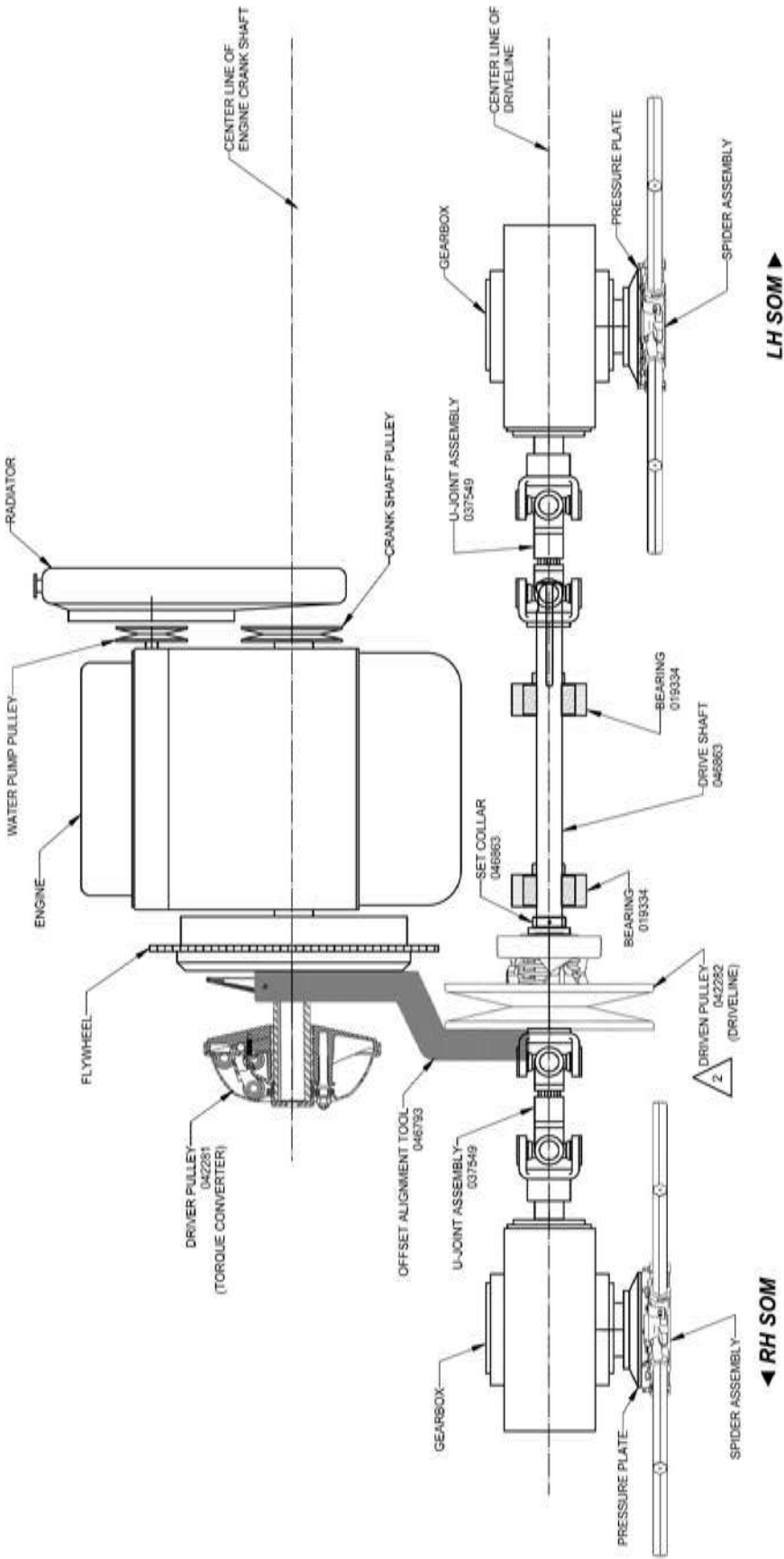




2A PARTS

OFFSET ALIGNMENT TUTORIAL (2 of 3)

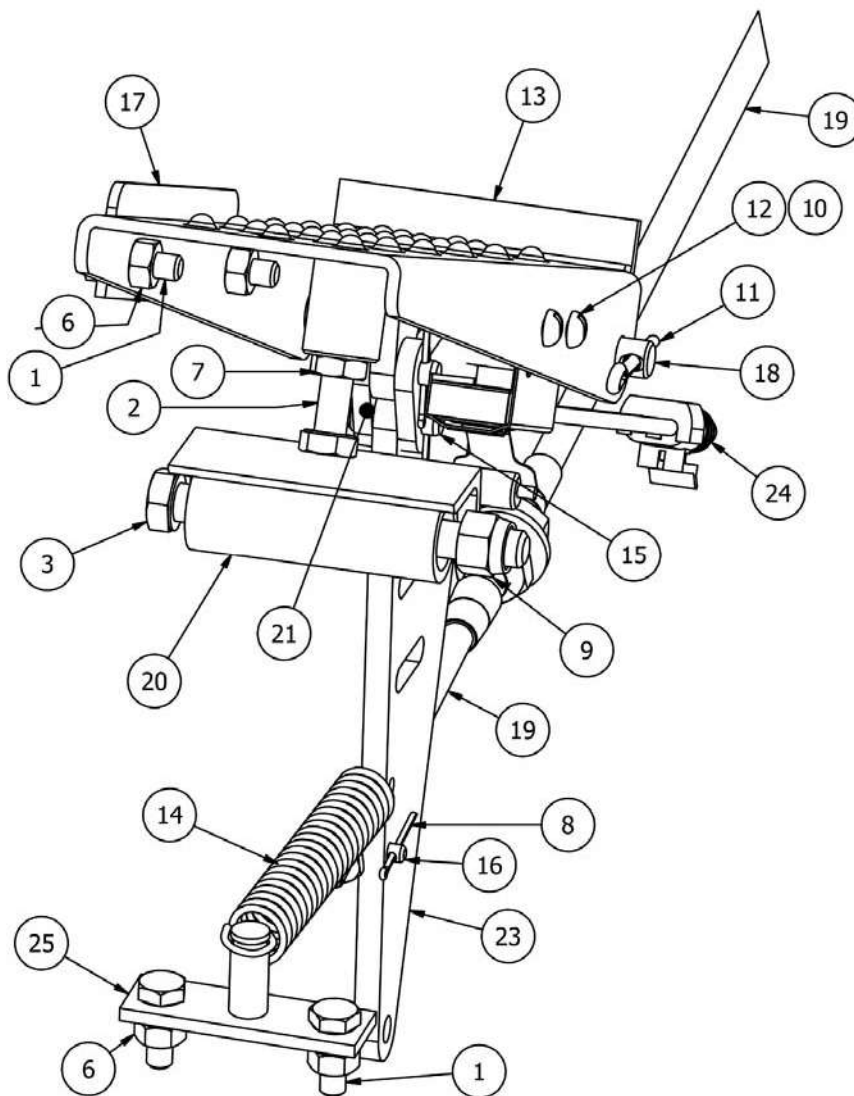




2A PARTS

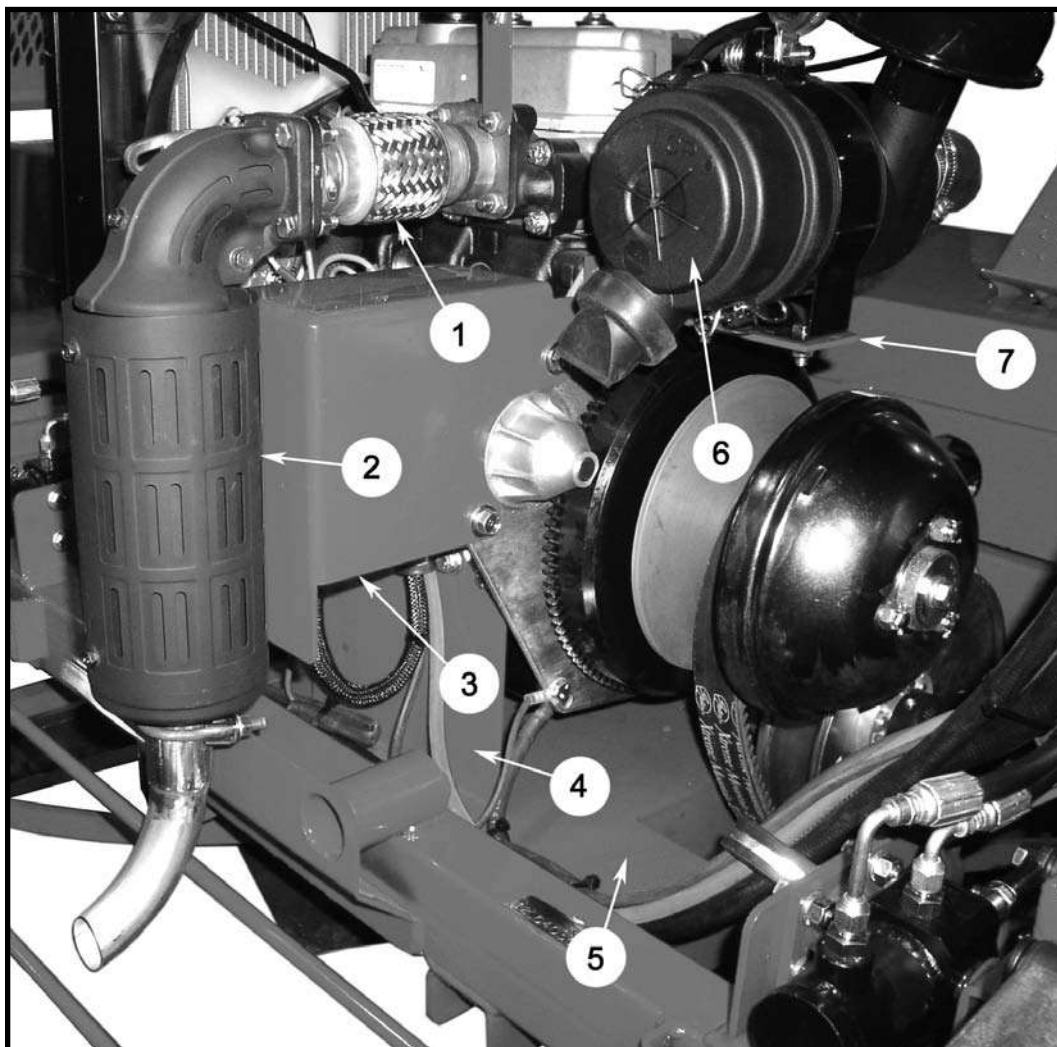
FOOT SPEED ASSEMBLY

ITEM	PART #	DESCRIPTION	QTY
1	010002	FSTN, HHCS 1/4-20 X 3/4	4
2	010021	FSTN, HHCS 5/16-18 X 1-1/4 GR5	1
3	010046	FSTN, HHCS 3/8-16 X 3-1/2	1
6	010098	FSTN, NUT HEX 1/4-20	4
7	010100	FSTN, NUT HEX 5/16-18	1
8	010131	FSTN, PIN COTTER 1/16 X 1	3
9	010464	FSTN, NUT NYLOK 3/8-16	1
10	010570	FSTN, NUT HEX 10-32	2
11	012361	FSTN, PIN COTTER 1/8 X 1	1
12	013370	FSTN, RHMS 10-32 X 3/8	2
13	024839	PEDAL, FOOT SPEED	1
14	024981	SPRING, FOOT SPEED CONTROL	1
15	024982	FSTN, PIN CLEVIS 1/4 X 51/64	2
16	024984	PIVOT, FOOT SPEED CONTROL	1
17	024985	PLATE, STOP FOOT SPEED R.TW	1
18	028895	FSTN, PIN CLEVIS 3/8 X 3 3/4	1
19	037796	CABLE, THROTTLE 36"	1
20	038987	VANGUARD THROTTLE STOP	1
21	040246	SHACKLE 1-1/4" FOOT SPEED SHORT	2
23	046700	FULCRUM, FOOT SPEED 1200C	1
24	046742	SWITCH, KILL E1161-B9112-6C	1
25	046899	SPRING CATCH PLATE 1200C	1



ENGINE MOUNT ASSEMBLY (GAS)

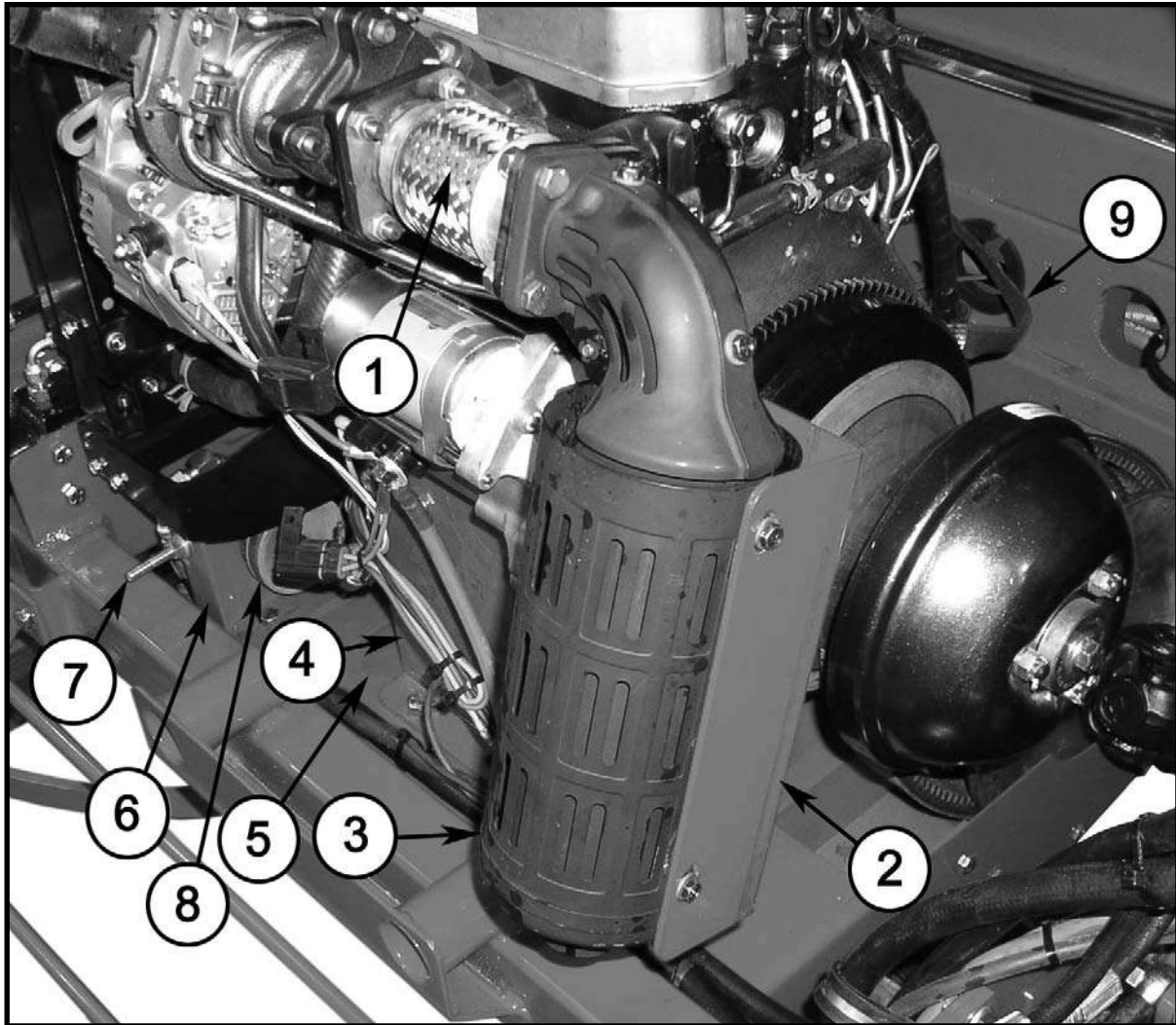
2A PARTS



ITEM	PART #	DESCRIPTION	QTY
1	046710	MUFFLER EXTENSION	1
2	038728	MUFFLER	1
3	047078	MUFFLER MOUNT BRACKET	1
4	046812	REAR MOTOR MOUNT PLATE	1
5	046805	MOTOR PLATE	1
6		BREATHER	1
7	039002	BREATHER MOUNT PLATE	1
8	046811	FRONT MOTOR MOUNT PLATE (NOT SHOWN)	1

2A PARTS

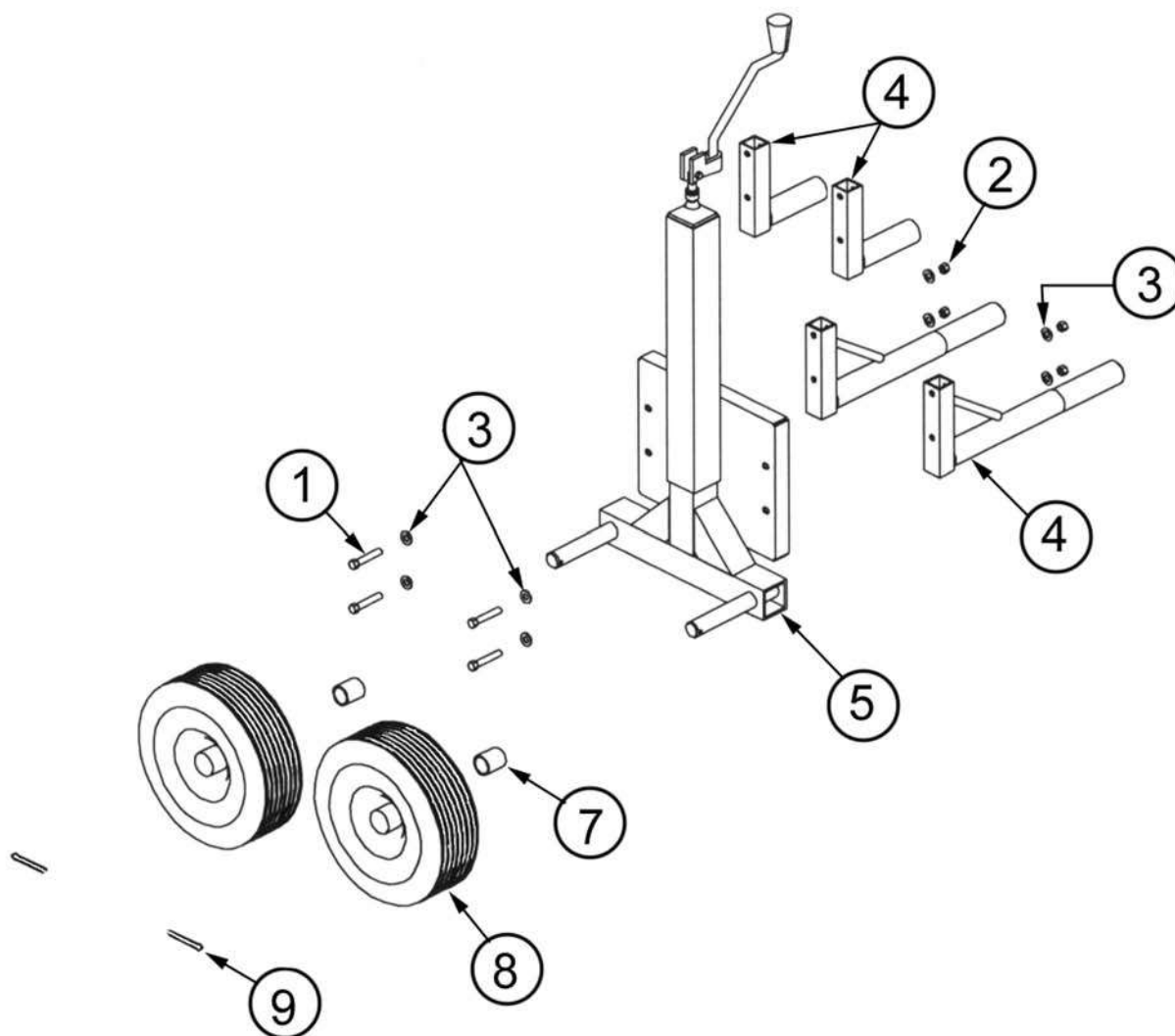
ENGINE MOUNT ASSEMBLY (DIESEL)



ITEM	PART #	DESCRIPTION	QTY
1	047075	MUFFLER EXTENSION	1
2	046705	MUFFLER MOUNT BRACKET	1
3	038728	MUFFLER	1
4	046812	REAR MOTOR MOUNT PLATE	1
5	046805	MOTOR PLATE	1
6	046804	PUMP MOUNTING PLATE	1
7	046808	PUMP ADJUSTMENT ROD	1
8	046550	PULLEY, AK30 X 1/2 BORE	1
9	038070	GROUND STRAP	1
10	046811	FRONT MOTOR MOUNT PLATE (NOT SHOWN)	1

ACCESSORIES
SUPER PRO SERIES DOLLY JACK SYSTEM -- SET PART # 039090

2A
PARTS

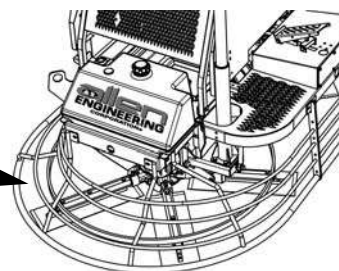


ILL.	PART#	DESCRIPTION	QTY.
1.	.040637	FSTN, HHCS 3/8-16 x 2 1/4 GRADE 8	8
2.	.010464	NUT, NYLON LOCK 3/8-16	8
3.	.017751	FLAT WASHER 3/8	16
4.	.026729	DOLLY JACK MOUNTING TUBES (FRONT)	2
	.039581	DOLLY JACK MOUNTING TUBES (REAR)	2
5.	.039091	DOLLY JACK	2
7.	.039094	WHEEL SPACER	4
8.	.039095	TIRES	4
9.	.010133	FSTN, PIN COTTER 3/16 X 2	4

2A PARTS

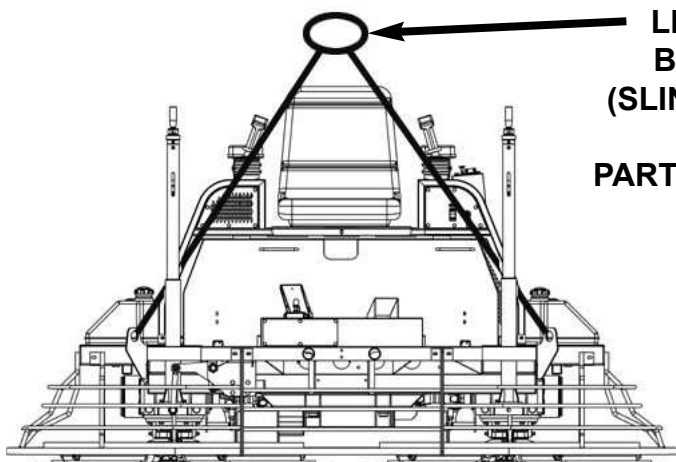
**1200-5 SERIES
FLOATING
DISCS (PANS)**

PART #: 040904-2



**PRO SERIES
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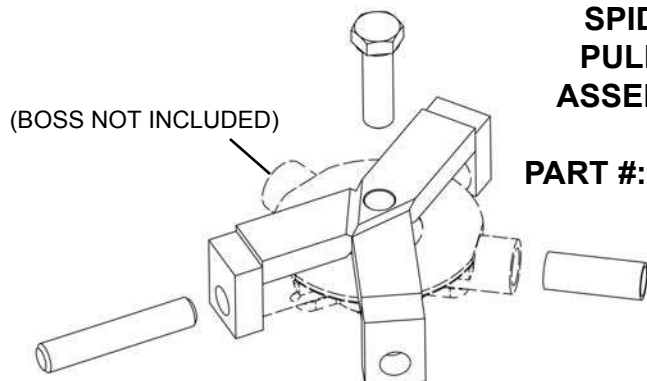
PART #: 045901



Patent Pending

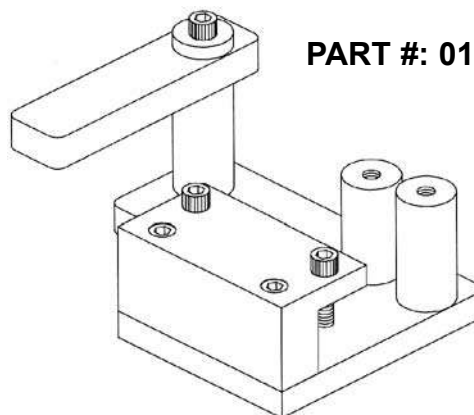
**SPIDER
PULLER
ASSEMBLY**

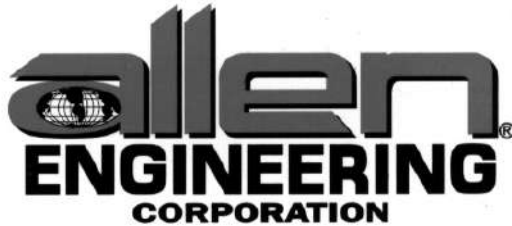
PART #: 045399



**TROWEL ARM
ALIGNMENT JIG**

PART #: 016863





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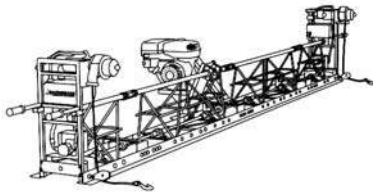
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ROLLER SCREEDS

FLOOR FLATNESS HAND TOOLS

MATERIAL SPREADERS

FLOATING DISKS

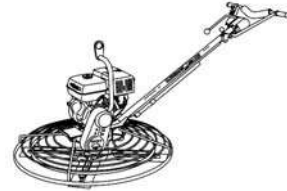
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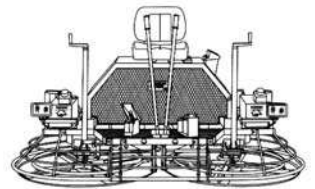
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