

# Predator Series Grinder

P650PRO and P650E



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**ORIGINAL LANGUAGE OPERATING MANUAL FOR  
BARTELL GRINDERS**

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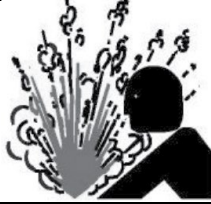
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A	1/5/2023	Initial Release	JHL

## SAFETY PRECAUTIONS



### **DANGER** **EXPLOSION HAZARD**

Never operate the machine in an explosive atmosphere, near combustible materials, or where ventilation does not clear exhaust fumes.



### **WARNING** **BURN HAZARD**

Never come into contact with the engine or muffler when engine is operating or shortly after it is turned off. Serious burns may occur.



### **WARNING** **ROTATING HAZARD**

Never place hands or feet inside safety guard rings. Serious injury will result from contact with rotating blades.



### **CAUTION** **MOVING PARTS**

Before starting the machine, ensure that all guards and safety devices are in place and functioning properly.



### **ATTENTION** **READ OWNER'S MANUAL**

Read and understand owner's manual before using this machine. Failure to follow operating instructions could result in serious injury or death.

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## **INTRODUCTION**

The Predator Series Planetary Diamond Grinders are designed for wet and dry grinding of Concrete, marble, terrazzo, and granite. Their applications range from rough grinding and coating removal through a polished finish.

This Manual contains the information and procedures to assist you to operate and maintain the P650E, P650PRO, P800E, and P800PRO floor grinder safely and correctly.

- P650E – 650mm Wide, Electrically Powered Planetary Grinder
- P650PRO – 650mm Wide, Propane Powered Planetary Grinder
- P800E – 800mm Wide, Electrically Powered Planetary Grinder
- P800PRO – 800mm Wide, Propane Powered Planetary Grinder

It is extremely important for all users to be familiar with the contents of the manual before commencing operation of either machine. Failure to do so may result in damage to the machine or expose the operator to unnecessary dangers that may cause injury/death.

Only staff that has received the necessary training, both practically and theoretically concerning their usage should operate the machines

## **WARRANTY INFORMATION**

All grinders sold by Bartell Morrison Inc. are warranted against defects in materials and/or workmanship; excluding normal wear on wearing components and components covered by a separate original manufacturer's warranty, for a period of 12 months from the date of sale to the original end user purchaser provided that certain conditions have been met.

### **Conditions:**

1. The equipment serial number has been registered with Bartell Morrison Inc. or its approved dealers, distributors, representatives, or agents.
2. The equipment has been operated in an appropriate manner by qualified individuals.
3. The equipment has been properly maintained as per the instructions included in the Owner's Manual.
4. All claims for warranty must be filed on proper forms and include the serial number of the equipment along with proof of purchase.

Any evidence of failure to meet these conditions may result in a denial of the warranty claim. Consideration of warranty claims will be at the sole discretion of Bartell Morrison Inc., or its authorized dealers, distributors, representatives, or agents. Bartell Morrison Inc. may, at its discretion, request that the equipment to be considered for warranty be returned at the owner's expense to an authorized repair facility for inspection. Under this warranty we may, at our discretion, repair or replace a part or the whole of the defective component or equipment. Our Warranty coverage is limited to the cost to repair or replace the defective portion of the equipment and a reasonable (as determined by Bartell Morrison Inc.) amount of labor to conduct the repair or replacement. Under no circumstances shall Bartell Morrison Inc. be liable for any additional or exceptional costs beyond the cost to repair or replace the defective portion of the equipment. Bartell Morrison Inc. shall not be held accountable for; costs associated with travel to inspect or repair defective equipment, costs for transporting defective equipment to or from an authorized repair facility, costs incurred to repair or replace the defective equipment at any facility other than one authorized by Bartell Morrison Inc., or ancillary damage caused by or because of the defective equipment. Under no circumstances shall equipment be returned to Bartell Morrison Inc. or its authorized dealers, distributors, representatives, or agents without the approval of Bartell Morrison Inc. as evidenced by a Returned Goods Number. To obtain a Returned Goods Number contact the factory or your authorized dealer, distributor, representative or agent. This warranty is for the sole benefit of the original end user purchaser and is not transferable to any other company or person.



## SPECIFICATIONS

	<b>P650E</b>	<b>P650Pro</b>	<b>P800E</b>	<b>P800Pro</b>
<b>Source</b>	Electric	Propane	Electric	Propane
<b>Power</b>	230V, 60 Hz, 1 Phase 230V, 60 Hz, 3 Phase 460V, 60 Hz, 3 Phase	LX700 - 708cc OYNX	230V, 60 Hz, 3 Phase 460V, 60 Hz, 3 Phase	993 cc Briggs and Stratton Vanguard
<b>Output - HP (kW)</b>	10 HP (7.5 kW) – 460V 7.5 HP (5.6 kW) – 230V	19 HP (14.1 kW)	20 HP (15 kW)	35 HP (26 kW)
<b>Variable Head Speed - RPM</b>	1012	1012	890	890
<b>Grinding Heads</b>	3	3	3	3
<b>Head Diameter</b>	9" (228.6mm)	9" (228.6mm)	11" (279.4 mm)	11" (279.4 mm)
<b>Grinding Width</b>	25" (625mm)	25" (625mm)	30" (762 mm)	30" (762 mm)
<b>Water Tank Capacity</b>	7.5 gal (28 L)	7.5 gal (28 L)	12.5 gal (47 L)	12.5 gal (47 L)
<b>Vacuum Port</b>	3" (75.6mm)	3" (75.6mm)	3" (75.6mm)	3" (75.6mm)
<b>Machine Weight (lbs)</b>	873 lbs (395 kg)	775 lbs (351 kg)	1254 lbs (568 kg)	1309 lbs (593 kg)
<b>Grinding Force (lbs)</b>	639 lbs (289 kg)	565 lbs (256 kg)	877 lbs (397 kg)	916 lbs (415 kg)
<b>Max Height</b>	76" (1930 mm)	76" (1930 mm)	82.3" (2092 mm)	82.3" (2092 mm)
(Handle Up)				
<b>Min Height</b>	44" (1118 mm)	44" (1118 mm)	51.5" (1310 mm)	51.5" (1310 mm)
(Handle Down)				
<b>Min Length - in (mm)</b>	52" (1321 mm)	52" (1321 mm)	68.5" (1740 mm)	68.5" (1740 mm)
(Handle and Weights forward)				
<b>Max Length - in (mm)</b>	83" (2108 mm)	83" (2108 mm)	92.3" (2345 mm)	92.3" (2345 mm)
(Handle and weights Back)				
<b>Width - in (mm)</b>	26" (660 mm)	26" (660 mm)	31.6" (800 mm)	31.6" (800 mm)

## **SAFETY PRECAUTIONS**

It is important that the following be read carefully in order that the operational performance of the Bartell Grinder be fully understood. Proper maintenance procedures will ensure long life and top performance of the unit.

### **SAFETY PRECAUTIONS**

- Always keep unauthorized, inexperienced, untrained people away from this machine.
- Rotating and moving parts will cause injury if contacted. Make sure guards are in place. Keep hands and feet away from moving parts.
- Fuel the machine only when the engine is stopped, using all necessary safety precautions.
- The engine must always be stopped (Propane models) or electrically disconnected from the source (electric models) before attempting any repair or adjustments. Ignition key should be off.

**Danger: Never operate the machine in an explosive atmosphere, near combustible materials or where ventilation does not clear exhaust fumes. Repair fuel leaks immediately. Refer to your engine owner's manual for more safety instructions.**

- Be careful not to come in contact with the muffler when the engine is hot, serious burns may result!
- Always maintain control of the machine while it is in operation. Never let go of the machine while drum is rotating.
- When starting the grinder, maintain throttle in closed position as recommended.
- Be sure that the RPM's do not exceed 2000 when starting and stopping the drum rotation.
- Be careful with the grinder around stub pipes or other obstructions on the floor. Should the machine catch, or hit such an obstruction, serious damage may result to the machine, or operator to be injured.
- At no time should lifting of machinery be attempted without mechanical means such as a hoist or a forklift.
- When lifting the grinder, only use specified connection points.
- When securing the grinder for transport, only use specified connection points.
- Disconnect battery before attempting any electrical maintenance.
- The machine should not be started without the rubber dust skirt attached. It is essential a good seal between floor and machine be established for safety, especially when operating in dry grinding applications.

- Extreme caution must be used when moving machinery by hand on an inclined plane. Even the slightest slope can cause forces/ momentum making the machinery impossible to brake manually.
- Never use the machine if you are tired, if you have consumed any alcohol, or if you are taking medication that could affect your vision, your judgment or your coordination.
- Never use a machine that has been modified in any way from its original specification.

## Propane Tank Safety

Using propane tanks to power grinders can be an efficient and reliable energy source. However, it is crucial to follow certain safety guidelines to ensure the proper handling and usage of propane tanks. This operation manual provides essential instructions to promote safe practices when using propane tanks to power grinders.

### 1. Storage:

- a. Select an appropriate storage area: Choose a well-ventilated, dry, and secure location for storing propane tanks. The storage area should be away from ignition sources, such as open flames, electrical equipment, or direct sunlight.
- b. Position the tanks upright: Always keep the propane tanks in an upright position to prevent any leaks or damage to the valves.
- c. Store tanks at a safe distance: Maintain a minimum of 10 feet distance between propane tanks and any flammable materials or combustible substances.
- d. Secure tanks properly: Ensure propane tanks are properly secured in an upright position, either by using a tank stand, rack, or restraining straps designed for this purpose.
- e. Ensure compliance with local, state, and federal regulations.

### 2. Tank Handling:

- a. Inspect tanks regularly: Before using a propane tank, conduct visual inspections for signs of damage, such as dents, rust, or oil residue. If any damage is observed, do not use the tank, and arrange for professional inspection or replacement.
- b. Avoid dropping or mishandling tanks: Propane tanks may rupture or leak when dropped or mishandled. Always handle them with care, avoid dropping or banging them against hard surfaces.
- c. Do not overfill tanks: It is vital to fill the propane tanks only up to their designated fill line. Overfilling tanks can lead to gas leakage or even a rupture.
- d. Use protective gloves and goggles: When handling propane tanks, wear protective gloves and safety goggles to protect yourself from any potential leaks or hazards.

### 3. Connecting and Disconnecting:

- a. Check for leaks: Before connecting a propane tank to a grinder, perform a leak check using a solution of soapy water. Apply the solution to all connections and observe for bubbles that indicate a leak. If a leak is detected, refrain from using the tank and tighten the connections or seek professional assistance.
- b. Follow proper connection procedures: When connecting the propane tank to the grinder, ensure that the hose and fittings are compatible with the tank and grinder. Follow the manufacturer's instructions for proper connection and secure all fittings tightly.
- c. Turn off the grinder and disconnect: Before disconnecting the propane tank from the grinder, turn off the grinder and close the valve on the tank. Allow any residual gas pressure to dissipate before disconnecting the hose.

#### 4. Operating Precautions:

- a. Use grinders in well-ventilated areas: When operating grinders powered by propane tanks, ensure that the area is adequately ventilated to prevent the accumulation of propane gas. Carbon monoxide detectors should also be installed in enclosed spaces to monitor gas levels.
- b. Keep tanks away from heat sources: Avoid exposing propane tanks to excessive heat or direct sources of flame, as this can cause the tank to overheat or potentially explode.
- c. Store and transport tanks upright: Always store and transport propane tanks in an upright position, either secured in a vehicle or using appropriate storage measures.
- d. Never tamper with valves: Do not attempt to repair or modify any components of the propane tank or its valves. Only trained professionals should handle repairs or maintenance.

#### 5. Additional Notes:

- a. The cylinder used is classified as a DOT 4E240 cylinder. The service pressure the cylinder is designed for is at 20 PSI. The cylinder has a pressure relief if it reaches an excess of 300 PSI. If the tank is overfilled, this pressure relief will become active once the tank comes up to room temperature.
  - i. Pressure relief is highly flammable!
  - ii. Never store the propane tank on the grinder.
  - iii. Follow local and national regulation when using, storing and filling propane.
- b. In the case of pressure relief catching fire, it is necessary to cool the cylinder. Use non-flammable cooling liquid, or a fire extinguisher, to lower the temperature of the cylinder. The flow of gas should stop, when the cylinder is cooled. Shutting off

the flow of gas should extinguish the fire the gas was fueling. Propane cylinders are above the capacity for storage in a place frequented by the public. So, storage on site at a grocery store would be against national fire safety code. NFPA 58 chapters 5 and 8

- c. All propane grinders include a sensor to test the air around the machine to limit exposure to toxic levels of emissions. Without proper ventilation, this sensor will shut down the machine after 30 seconds of use.

**Conclusion:**

Following these safety guidelines will help maintain a secure working environment when using propane tanks to power machines. Remember, safety should always be a top priority. If you have any questions or concerns, consult the manufacturer's guidelines or seek professional assistance.

## Transportation

The Predator Series Grinders are equipped with 3<sup>rd</sup> Transport wheel.

To use 3<sup>rd</sup> Transport Wheel.

1. Rotate swing weights to rear position by pulling ball handle to release pin.



2. Rotate handle in most vertical position.
3. Place one foot on swing weight and pull machine back until 3<sup>rd</sup> wheel is contacting ground.



4. Rotate handle to new vertical position



5. Pull swing weights up to the first locking position.



6. Grinder is now ready to roll.



Note: If greater ground clearance is required, (Example: A ramp) remove propane tank before tilting machine back.

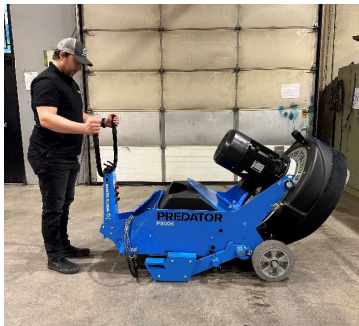


To return the grinder back to grinding position.

1. Release swing weights to the ground.

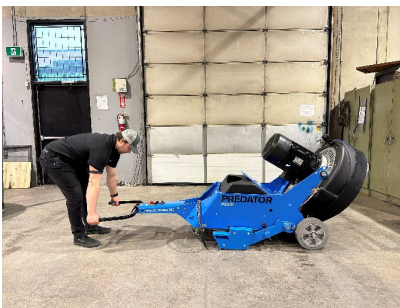


2. Rotate Handle to horizontal position.



3. Confirm no people or objects are under the grinder.

4. Pick up handle while placing one foot on the swing weights at the grinder rotates up.



5. Rotate Handle to comfortable operating position.



6. Rotate swing weights to desired grinding position.



To lift grinder with a hoist.

1. Grinder should be in grinding position.
2. Swing weights should be rotated down nearest to the drum.
3. Rotate Handle in horizontal position.



4. Locate marked single Lifting point behind motor/engine.
  - a. Do not use any other points of lifting.



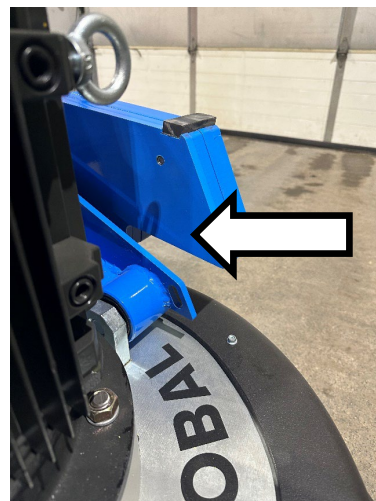
5. Only use OSHA/non-damaged certified lifting equipment

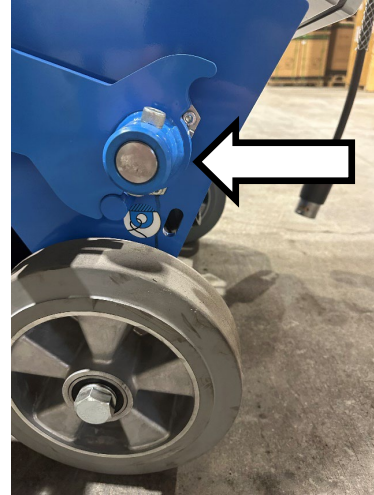
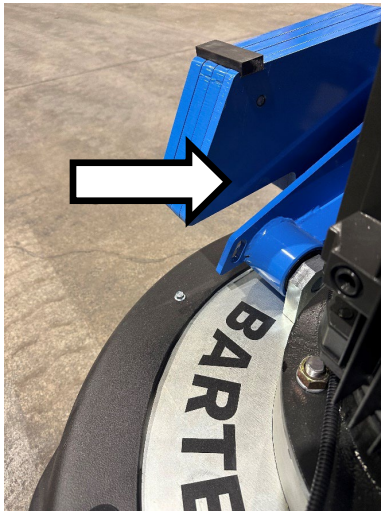
To secure machine for transport

1. Grinder should be in grinding position.
2. Swing weights should be rotated down nearest to the drum.
3. Rotate Handle in a horizontal position.

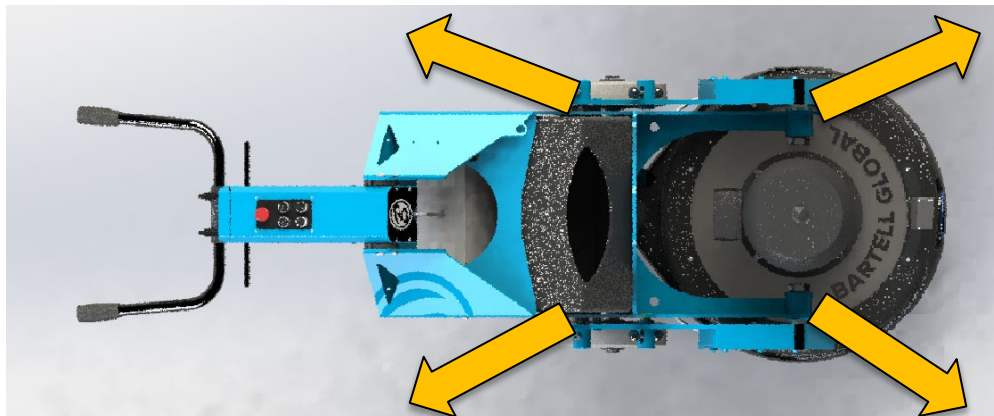


4. Locate 4 marked tie down points
  - a. Do not use any other tie down points.





- 5. Only use DOT certified ratcheting straps based on the weight of the grinder.
  - a. Do not use chains for securing machine



## Tooling Installation

The Predator Series Grinders come equipped with quick change tooling system. This allows operators to quickly change grits or types of diamond tooling.

To install/change tooling plates on machine.

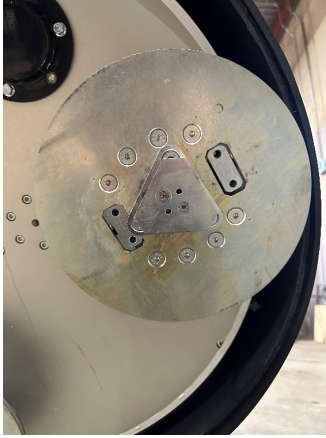
1. Rotate swing weights to rear position by pulling ball handle to release pin.



2. Rotate handle in most vertical position.
3. Place one foot on swing weight and pull machine back until 3<sup>rd</sup> wheel is contacting ground.



1. Install/change tooling plates by rotating the triangle in the center of each head.
  - a. 3 optional screws can be used to fix the tooling plates to the grinder.
  - b. Caution Tooling and tooling plates can be hot. Always use correct PPE.



a. Same method for metal or resin plates



- b. 3 optional screws can be used to fix the tooling plates to the grinder.
- c. Caution Tooling and tooling plates can be hot. Always use correct PPE.
- d. Resin Tooling is in

2. Install/slide Mag by sliding tooling into grooves.
  - a. Use rubber mallet to tap tooling in and out of place.



Note: It is recommended not to transport machines with tooling plates installed, unless using optional transport screws.

3. Install resin tooling by attaching with Velcro





## **Propane Tank Use**

The Predator Series Propane grinders come equipped with a quick-change propane tank system to get you running quicker.

Before operating a propane grinder, read and understand the propane safety check list in this manual.

The predator series propane grinders only run on vapor style tanks. Attempt to run a liquid style tank will result in damage to the regulator and engine.

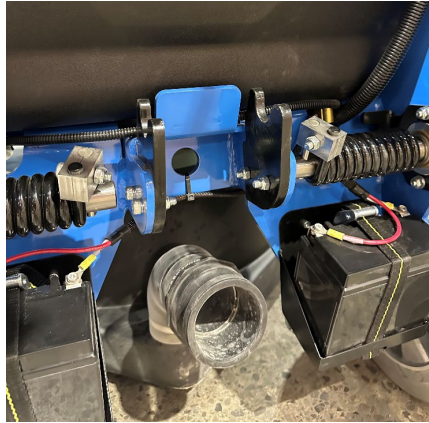
Always confirm the propane tank is not overfilled before bringing it inside a building or installing to the grinder.

To Install a Propane Tank

1. Confirm Grinder is in grinding position with handle raised to vertical position.



2. Place lower portion of propane tank onto brackets



3. Rotate the top of propane tank toward machine until quick release handle catches top of propane tank.



4. Install optional safety strap behind propane tank.
  - a. This strap can also be used if the tank is not of standard size.



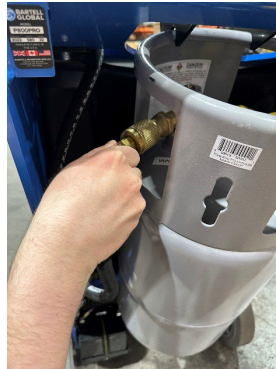
5. Connect propane hose to propane tank and confirm a tight connection.



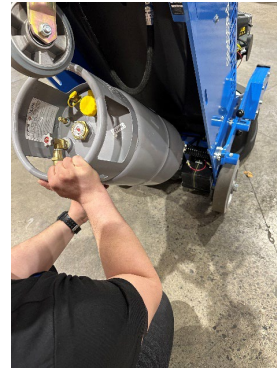
6. Fully Open valve on propane tank.

## To Remove Propane Tank

1. Confirm Grinder is in grinding position with handle raised to vertical position.
2. Fully Close valve on propane tank
3. Disconnect propane hose from propane tank.



4. While supporting the propane tank with one hand. Use the other hand to pull up on the latch holding the propane tank in place.



5. Rotate the tank down clear of the latch.

6. Release the propane latch with one hand and use two hands to lift and remove the propane tank from the grinder.



**\*\* Follow all Propane handling safety guidelines.\*\***

## **OPERATING INSTRUCTIONS**

### **STARTING PROCEDURES - WARM TEMPERATURES**

- a) Prior to starting the grinder, check the engine oil levels. (Propane only) Be sure the fuel tank is full. Fuel is not shipped with the unit. **WARRANTY IS VOID IF RUN WITHOUT OIL.**

**\*\*Fill tank with safety approved fuel containers. DO NOT MIX OIL WITH FUEL.\*\***

- b) Confirm PTO switch is in off position.
- c) Confirm throttle is in closed position.
- d) Maintain contact with the safety switch. Engine will disengage and stop if safety switch is released. Do not tape, tie-down, or otherwise attempt to bypass safety device.
- e) Turn ignition key all the way. Allow engine to warm up before proceeding to full speed operation.
- f) Engage PTO below 2000rpms.

### **STARTING PROCEDURES - COLD TEMPERATURES**

Follow same procedure as above but allow for a longer warm up period of 3-5 min. (In cold weather, oil is much heavier to move. Extra time is required to heat the oil.)

### **STOPPING PROCEDURE**

- a) Bring throttle to low idle (below 2000 RPM) and wait a few seconds.
- b) Disengage PTO
- c) Turn off ignition key.

## **PREVENTATIVE MAINTENANCE AND ROUTINE SERVICE PLAN**

This Bartell Predator Grinder has been assembled with care and will provide years of service. Preventative maintenance and routine service are essential to the long life of your Bartell Grinder. Your dealer is interested in your new Grinder and has the desire to help you get the most value from it. After reading through this manual thoroughly you will find that you can do some of the regular maintenance yourself. However, when in need of parts or major service, be sure to see your Bartell dealer. For your convenience we have provided this space to record relevant data about your Grinder. When in need of parts or service be prepared to provide your Grinder serial number. Locate the serial number now and record in the space below.

Date Purchased:		Type of Machine:	
Dealer Name:		Model:	
Dealer Phone:		Serial Number:	

Replacement Parts Used				Maintenance Log:	
Part No.	Quantity	Cost	Date	Date	Operation

### **ROUTINE SERVICE SCHEDULE**

Routine Service Intervals		Each Use	After 1.5 months or 50 hrs	Each 3 months or 100 hrs	Each 6 months or 200 hrs	Each 9 months or 300 hrs	Each 12 months or 400 hrs
<b>General Inspection</b>							
Operation of lights	Check		○	○	○	○	○
Battery	Check and clean			○	○	○	○
	Recharge			○	○	○	○
	Replace						2 yrs
Guards	Check	○	○	○	○	○	○
Warning Stickers	Check		○	○	○	○	○
Test Run	Check Operation		○	○	○	○	○
<b>Controls</b>							
Safety switch operation	Check	○	○	○	○	○	○
Throttle (Propane Only)	Check	○	○	○	○	○	○
<b>Engine (Propane Models Only)</b>							
Fuel Lines & Clamps	Check		○	○	○	○	○
	Replace						2 yrs
Engine oil	Check level	○	○	○	○	○	○
	Change		○		○		○
Engine oil filter	Replace				○		○
Oil Cooler	Clean			○	○	○	○
Cooling fins	Clean		○	○	○	○	○
Air Cleaner	Check-clean	○	○	○	○	○	○
	Replace						○
Air Intake Line	Check				○		
	Replace						2 yrs
Valve Clearance	Check-adjust				○		○
Fuel Filter	Check and clean			○	○	○	○
	Replace				○		
Fuel Tank	Clean						500 hrs
Fuel Injection Nozzles	Check pressure						500 hrs
Fuel Injection Timer	Check						500 hrs
Injection Pump	Check						500 hrs
Engine Wiring	Check						○
Coolant	Check	○					
	Change						○

Routine Service Intervals		Each Use	After 1.5 months or 50 hrs	Each 3 months or 100 hrs	Each 6 months or 200 hrs	Each 9 months or 300 hrs	Each 12 months or 400 hrs
<b>Drive Train:</b>							
Bearings	Lubricate		○	○	○	○	○
Universal Couplings	Lubricate			○	○	○	○
Belt Tension/Condition	Check	○	○	○	○	○	○
Clutch/ Pulley Operation	Check	○	○	○	○	○	○



## ROUTINE SERVICE INTERVALS

Due to the nature and environment of use, grinders are exposed to severe operating conditions.

Some general maintenance guidelines will extend the useful life of your grinder:

- The initial service for your grinder should be performed after 50 hours of use, at which time your mechanic (or authorized repair shop) should complete all of the recommended checks in the schedule above. The previous chart is handy for keeping a record of the maintenance performed and the parts used for servicing your grinder.
- Regular service according to the schedule above will prolong the life of the grinder and prevent expensive repairs.
- After each use, your grinder should be cleaned to remove any concrete residue from the drum, flex heads and surrounding components. Use of a power washer will make clean up quick and easy, especially if a release agent was applied prior to use. Use caution to not wet any electrical components. Refer to engine supplier manual on pressure washing guidelines.
- In the Service Schedule above, items that should be checked, replaced or adjusted are indicated by “o” in the appropriate column. Not all grinder models include the same features and options and as such not all service operations may have to be performed. For ease of recording, place a checkmark (✓) through the “o” when the item is complete. If an item is not required or not completed place an “x” through the “o” in the box.
- Failure to have your grinder regularly serviced and properly maintained in accordance with the manufacturer’s instructions will lead to premature failure and void the warranty.

## **MAINTENANCE INSTRUCTIONS**

### **GENERAL MAINTENANCE**

Remember, safety is paramount when performing routine maintenance checks. Always disconnect the grinder from the power source before conducting any inspections or maintenance tasks.

- **Visual Inspection:** Regularly examine the grinder for any signs of damage, loose parts, or frayed wires. Ensure that all components are in good condition and properly connected.
- **Power Cord:** Check the power cord for any cuts or exposed wires. If any damage is found, replace the cord immediately to prevent electrical hazards.
  - **NOTE:** After the first 8 hours of run time, check electrical connections for tightness. Connectors may come loose due to vibration.
- **Fasteners:** Check all screws, nuts, and bolts on the grinder for proper tightness. If any are loose, tighten them securely to prevent accidents during operation.
- **Safety Mechanisms:** Test the grinder's safety mechanisms, such as the E-Stop, to ensure they are functioning effectively. These mechanisms are designed to protect the user from potential accidents or injuries.
- **Electrical Connections:** Inspect the grinder's electrical connections, such as switches and plugs, for any signs of damage or loose connections. Ensure that all connections are secure and properly insulated.
- **Cleanliness:** Regularly clean the grinder's external surfaces and remove any debris or residue from the grinding area. This prevents build-up that can affect the grinder's performance and poses a safety hazard. Hard concrete is very difficult to remove, greatly increases weight, and reduces efficient subsequent operation of unit.

### **MAINTENANCE FOR PROPANE POWERED GRINDERS**

- **Check the propane tank:** Ensure that the propane tank is securely fastened and in good condition. Check for any leaks or damage to the tank.
- **Inspect fuel lines and connections:** Inspect the fuel lines and connections for any signs of wear, cracks, or leaks. Tighten any loose connections and replace any damaged fuel lines.
- **Clean the air filter:** Regularly clean or replace the air filter to prevent dirt and debris from clogging the engine. A clogged air filter can lead to decreased engine performance.

- **Check the spark plug:** Inspect the spark plug for any buildup or damage. Clean or replace the spark plug as needed. A clean spark plug ensures proper ignition and efficient combustion.
- **Change the engine oil:** Regularly change the engine oil to maintain optimal engine performance. Follow the manufacturer's recommendations for the correct oil type and interval for oil changes.
- **Check and adjust the throttle and idle speed:** Inspect the throttle and idle speed settings and adjust them according to the manufacturer's recommendations. Proper throttle and idle settings help maintain efficient and smooth engine performance.
- **Inspect the exhaust system:** Check the exhaust system for any leaks, damage, or clogs. A properly functioning exhaust system is essential for safe operation and optimal engine performance.
- **Clean the engine exterior:** Regularly clean the exterior of the engine to remove dirt, debris, and any flammable materials. A clean engine is less likely to overheat and will last longer.
- **Lubricate Swing Weight Locking Pin:** It is recommended to spray the swing weight locking pin with a graphite based lubricate to allow pin to move freely. The spring inside the swing weight should engage the holes automatically.

## **TROUBLESHOOTING**

### **800PRO and 650PRO**

#### **WON'T START**

- Throttle fully open
- Hand lever wire broken
- Propane Tank overfilled
- Propane Tank Empty
- Propane Tank is not Vapor Style
- Propane Tank valve turned off
- Electrical Source is not working
- Gas filter plugged
- Gas line plugged
- Hole in gas line
- Safety Switch is engaged
- Safety switch wire or connectors not making good contact

#### **STARTS BUT NO HIGH SPEED**

- Engine problems
- Throttle cable broken or seized
- Throttle lever and connectors loose or out of adjustment
- Other engine problems (Refer to engine manual)

#### **BELT WEARING RAPIDLY**

- Belt adjusted improperly
- Pulley out of alignment
- Wrong belt/defective belt
- Clutch sticking
- Belt rubbing

#### **DRIVE SHAFT WILL NOT TURN**

- Universal joint(s) seized
- Spline stripped
- Key(s) sheared

### 800E and 650E

Operation Panel Indication		Name	Refer to Page	
Error message	E---	E--	Faults history	229
	HOLD	HOLD	Operation panel lock	234
	LOCD	LOCD	Password locked	234
	Er1 Er2 Er4	Er1 Er2 Er4	Parameter write error	234
	Err.	Err.	Inverter reset	234
	Warning	OL	OL	Stall prevention (overcurrent)
oL		oL	Stall prevention (overvoltage)	235
rb		RB	Regenerative brake prealarm	236
TH		TH	Electronic thermal relay function prealarm	236
PS		PS	PU stop	235
MT		MT	Maintenance signal output	236
UV		UV	Undervoltage	236
SA		SA	Safety stop	236
EV		EV	24V external power supply operation	237
Alarm		Fn	FN	Fan alarm
Fault	E.OC1	E.OC1	Overcurrent trip during acceleration	237
	E.OC2	E.OC2	Overcurrent trip during constant speed	237
	E.OC3	E.OC3	Overcurrent trip during deceleration or stop	238
	E.OV1	E.OV1	Regenerative overvoltage trip during acceleration	238
	E.OV2	E.OV2	Regenerative overvoltage trip during constant speed	238
	E.OV3	E.OV3	Regenerative overvoltage trip during deceleration or stop	238
	E.THT	E.THT	Inverter overload trip (electronic thermal relay function)	239
	E.THM	E.THM	Motor overload trip (electronic thermal relay function)	239
	E.FIN	E.FIN	Heatsink overheat	239

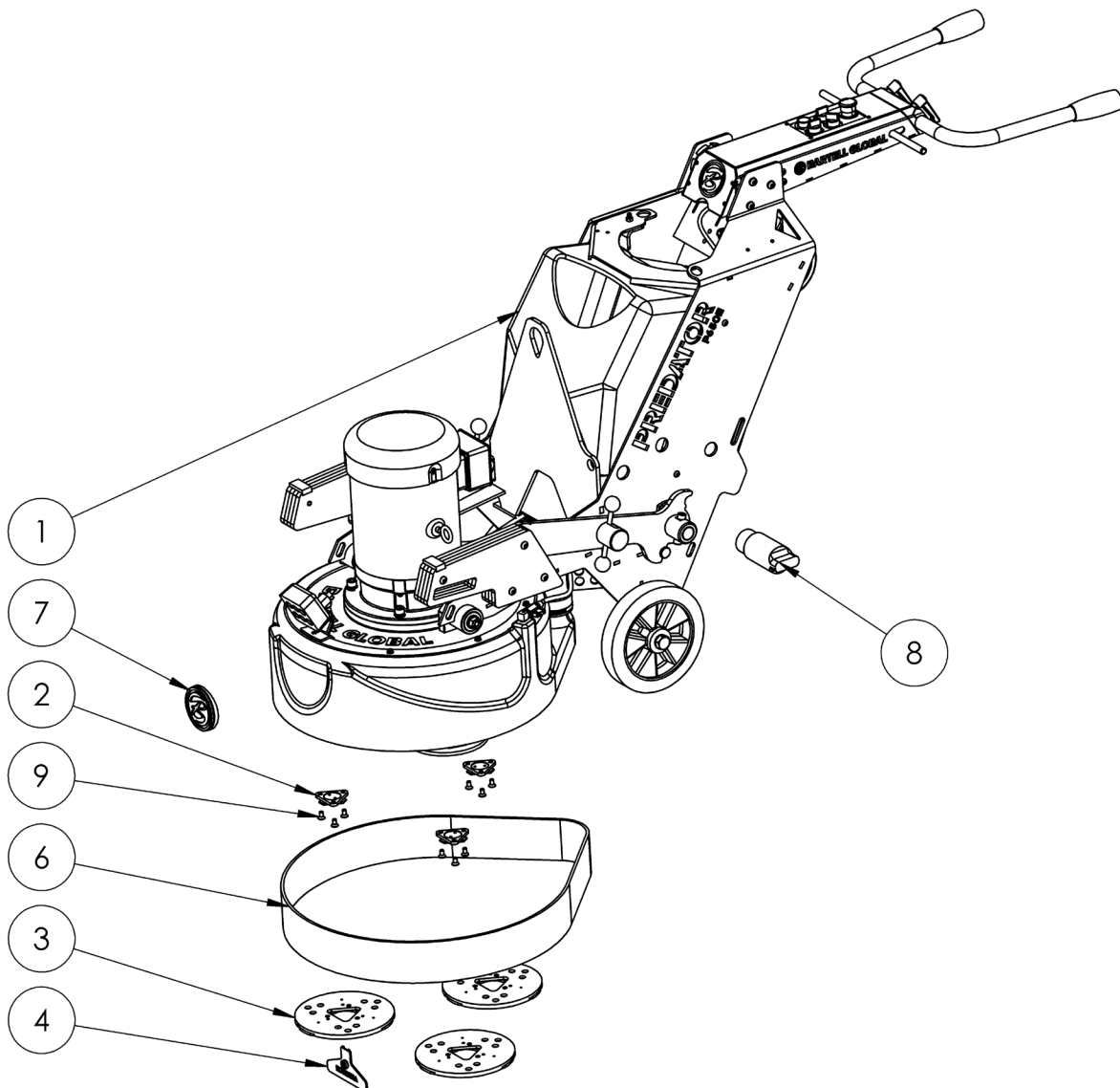
Operation Panel Indication		Name	Refer to Page
E.ILF	E.ILF	Input phase loss	239
E.OLT	E.OLT	Stall prevention stop	240
E. bE	E. BE	Brake transistor alarm detection	240
E. GF	E.GF	Output side earth (ground) fault overcurrent at start	240
E. LF	E.LF	Output phase loss	240
E.OP1	E.OP1	Communication option fault	240
E.OPT	E.OPT	Option fault	241
E. 1	E. 1	Option fault	241
E. PE	E.PE	Parameter storage device fault	241
E.PE2	E.PE2	Internal board fault	241
E. rE	E.RET	Retry count excess	241
E. 5 E. 6 E. 7 E.CPU	E. 5 E. 6 E. 7 E.CPU	CPU fault	241
E.IOH	E.IOH	Inrush current limit circuit fault	242
E.USB	E.USB	USB communication fault	242
E.MB4 to E.MB7	E.MB4 to E.MB7	Brake sequence fault	242
E.SAF	E.SAF	Safety circuit fault	242
E. 13	E.13	Internal circuit fault	242

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## PARTS

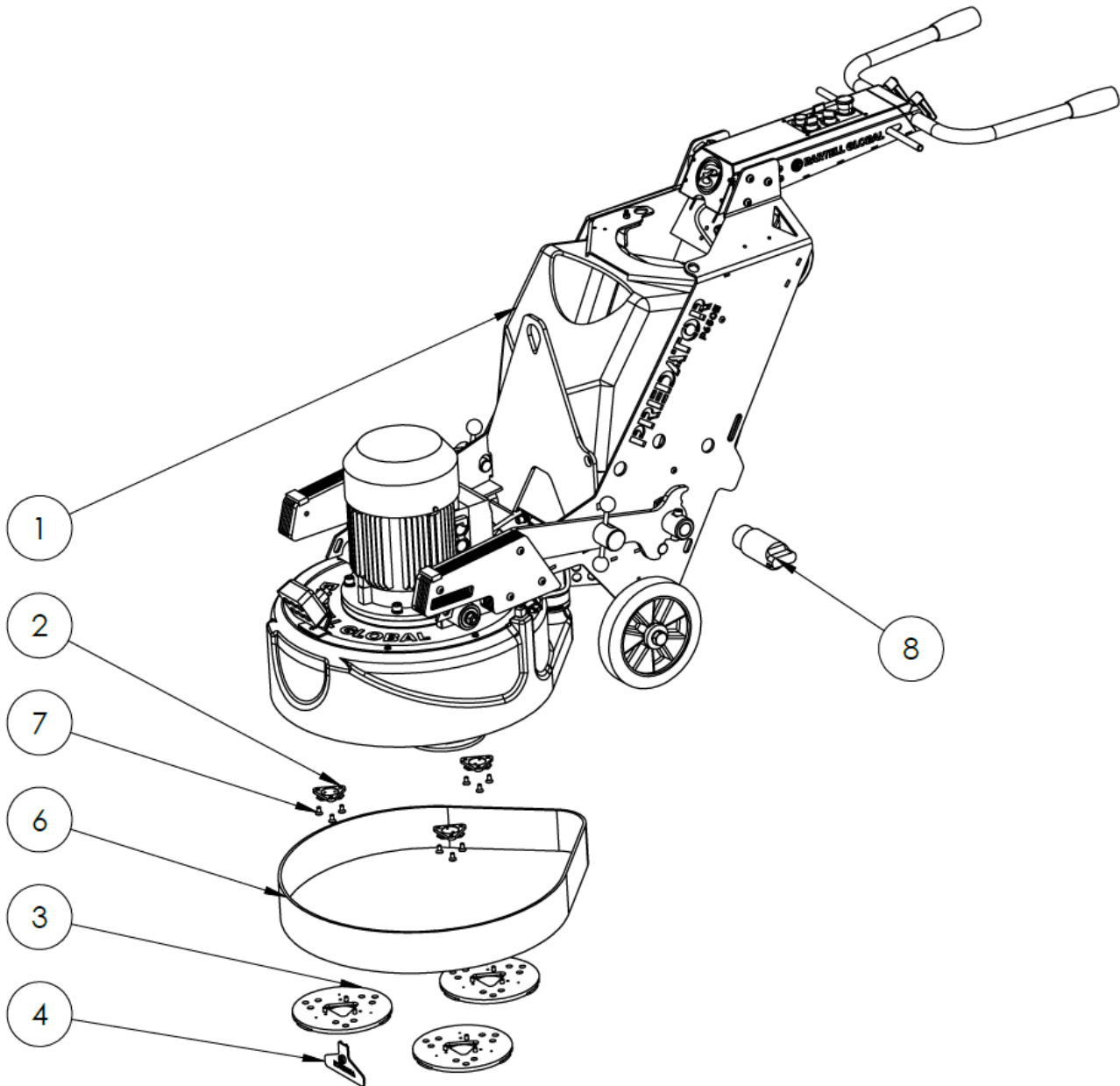
### 98-0056 - PREDATOR P650E GRINDER - C

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	96-0757	PREDATOR P650E GRINDER ASSEMBLY	1
2	96-0785	TOOLING TRIANGLE ASSEMBLY 650	3
3	96-0786	METAL TOOLING KIT 650	3
4	96-0456	TOOLING WRENCH	1
5	61-0078	PREDATOR 650E DECAL KIT	1
6	13-0673	DUST COVER - 650	1
7	51-3376	PREDATOR EMBLEM 650	1
8	24-0102	TWISTLOCK 50A 250V 2 POLE 3 WIRE MALE	1
9	12-0880-16	FLAT HEAD SOCKET SCREW - M8X16 - ZINC	9



**98-0057 - PREDATOR P650E GRINDER 480V 3PH - A**

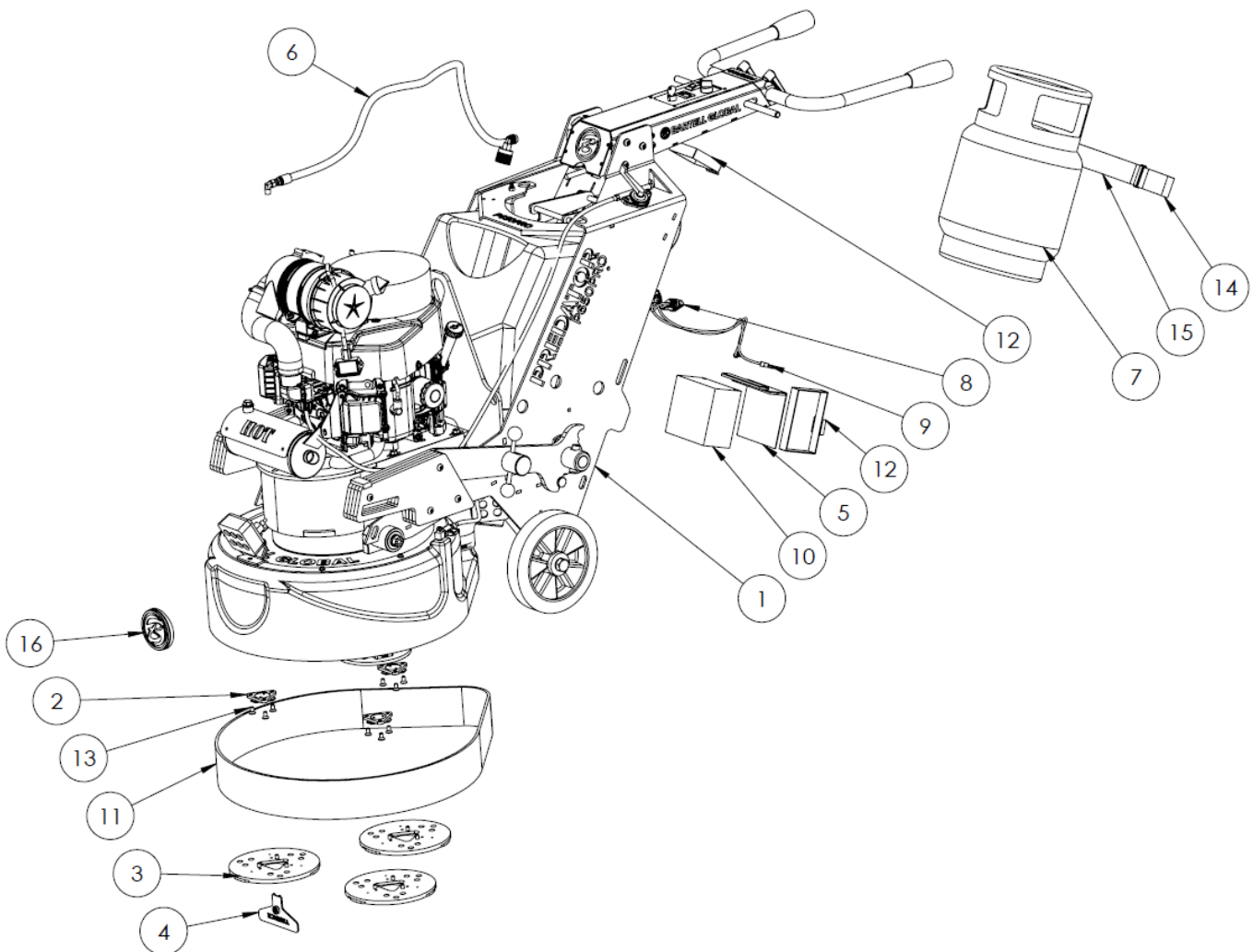
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	96-0605	PREDATOR P650E GRINDER ASSEMBLY 480V 3 Phase	1
2	96-0785	TOOLING TRIANGLE ASSEMBLY 650	3
3	96-0786	METAL TOOLING KIT 650	3
4	96-0456	TOOLING WRENCH	1
5	61-0078	PREDATOR 650E DECAL KIT	1
6	13-0673	DUST COVER - 650	1
7	12-0880-16	FLAT HEAD SOCKET SCREW - M8X16 - ZINC	9
8	24-0102	TWISTLOCK .50A 250V 2 POLE 3 WIRE MALE	1





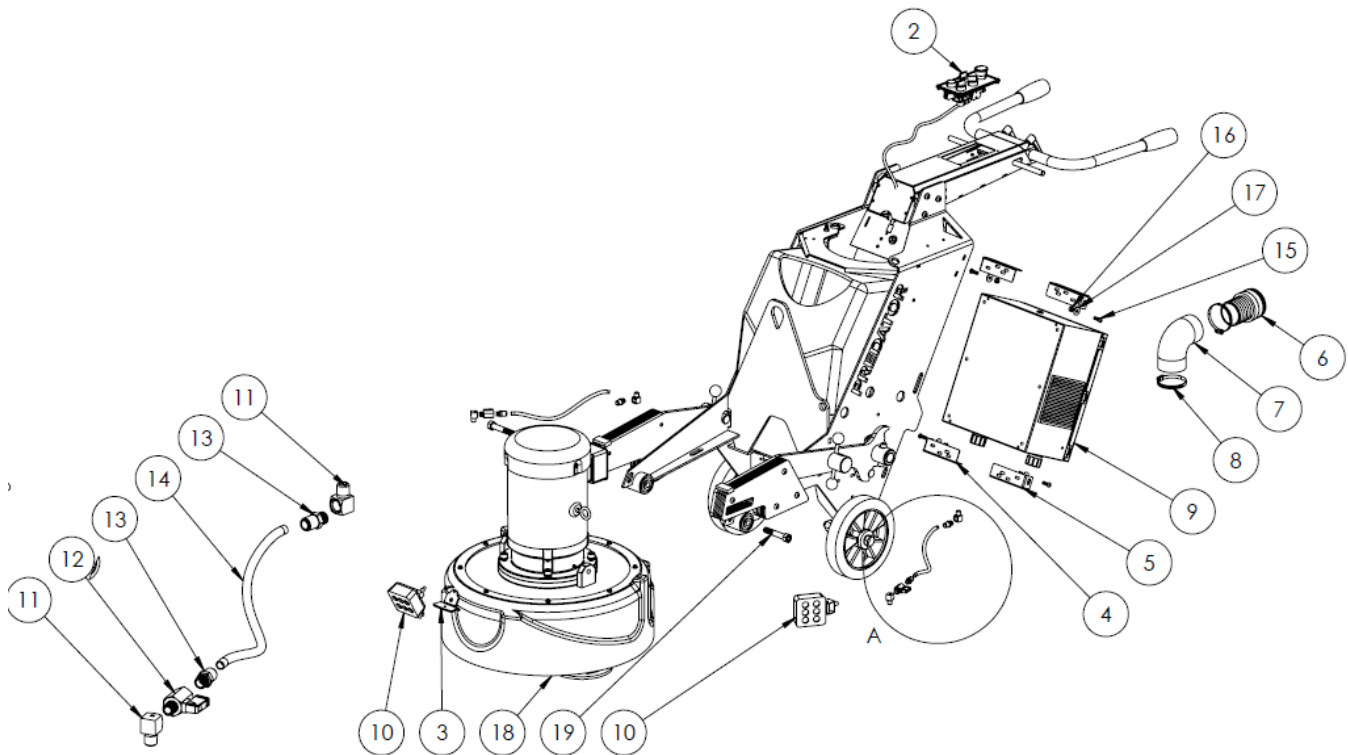
**98-0055 - PREDATOR P650PRO GRINDER - F**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	96-0601	PREDATOR P650PRO GRINDER ASSEMBLY	1
2	96-0785	TOOLING TRIANGLE ASSEMBLY 650	3
3	96-0786	METAL TOOLING KIT 650	3
4	96-0456	TOOLING WRENCH	1
5	96-0807	BATTERY BOX COVER ASSEMBLY	2
6	41-0055	PROPANE HOSE ASSEMBLY 650PRO	1
7	44-0060	PROPANE TANK VAPOR - 650	1
8	24-0309	BATTERY CABLE ENGINE SIDE 650PRO AND 800PRO	1
9	24-0307	BATTERY CABLE 1X BATTERY 650PRO	1
10	23-0235	BATTERY, 12V	1
11	13-0673	DUST COVER - 650	1
12	13-0618	BATTERY STRAP 1"X24"	2
13	12-0880-16	FLAT HEAD SOCKET SCREW - M8X16 - ZINC	9
14	13-3326	PROPANE TANK STRAP 2X VELCRO	1
15	13-3327	PROPANE TANK STRAP RING+VELCRO	1
16	51-3376	PREDATOR EMBLEM 650	1
17	61-0077	PREDATOR 650PRO DECAL KIT	1



**96-0757 - PREDATOR P650E GRINDER ASSEMBLY - F**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	96-0603	FRAME ASSEMBLY - 650	1
2	96-0788	SWITCH PANEL - 800E	1
3	52-0620	FRONT LIGHT BRACKET - 650	1
4	52-0609	ELECTRICAL PANEL BRACKET LEFT 800E AND 600E	2
5	52-0608	ELECTRICAL PANEL BRACKET RIGHT 800E AND 600E	2
6	13-0613	MALE 3IN CAMLOCK BARBED	1
7	13-0616	SHROUD TO VAC ELBOW 3IN	1
8	13-0672	HOSE CLAMP 3IN SMOOTH	2
9	22-0108	ELECTRICAL CONTROL ASSEMBLY - 650E 230V	1
10	23-0240	LIGHT 12V FLOOD	2
11	41-0032	FITTING 0.25 NPT MALE TO 0.25 NPT FEMALE 90 DEG BRASS	4
12	41-0051	BALL VALVE MALE 0.25 NPT FEMALE 0.25 NPT	2
13	41-0052	PUSH-TO-CONNECT 0.25 NPT 0.38 TUBE	4
14	41-0053	WATER TUBE CLEAR 0.38 OD	2
15	12-0810-25	BUTTON HEAD CAP SCREW - M8X25 - ZINC	4
16	12-0021-08	LOCKNUT - M8 - ZINC	4
17	12-0850	WASHER - M8 - ZINC	4
18	96-0615	DRUM MOTOR SUB ASSEM 650E 1PH	1
19	11-0376	HEX HEAD SCREW 40671 X 3.5" ZINC	2

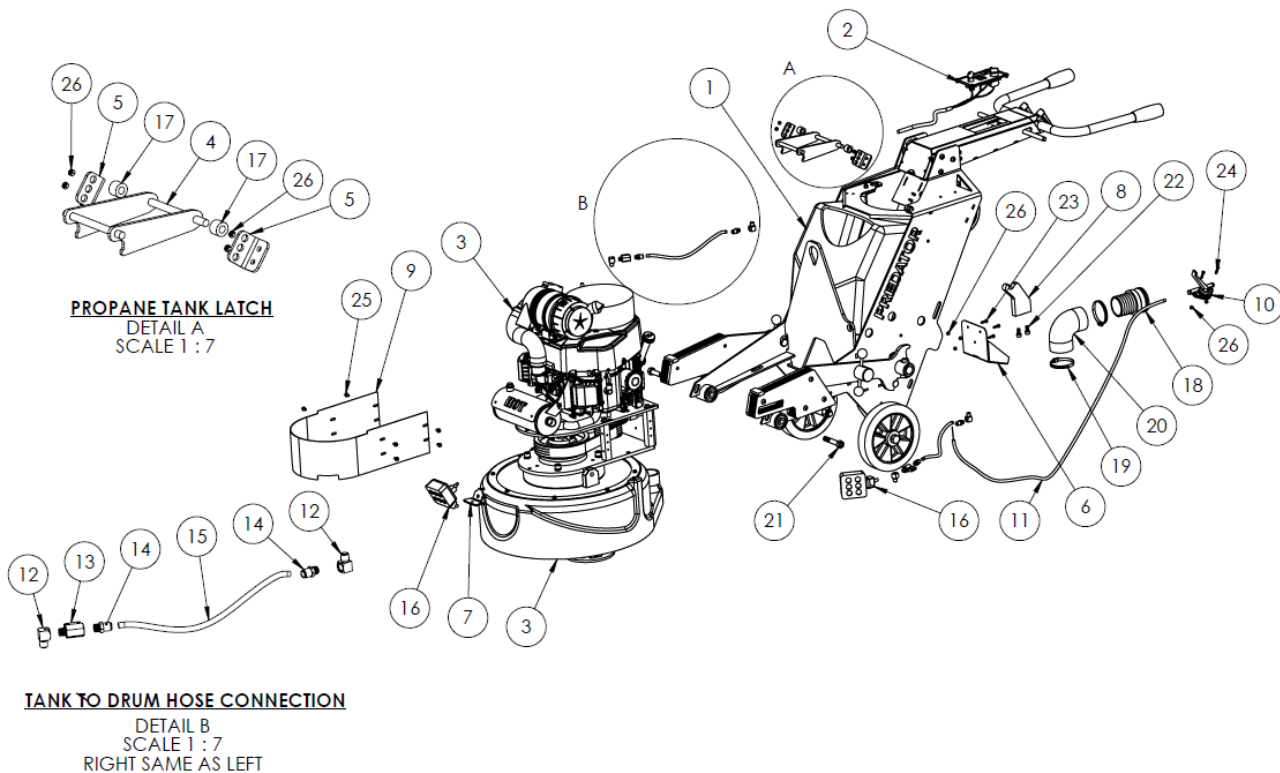


**TANK TO DRUM CONNECTION**

DETAIL A  
SCALE 1 : 5

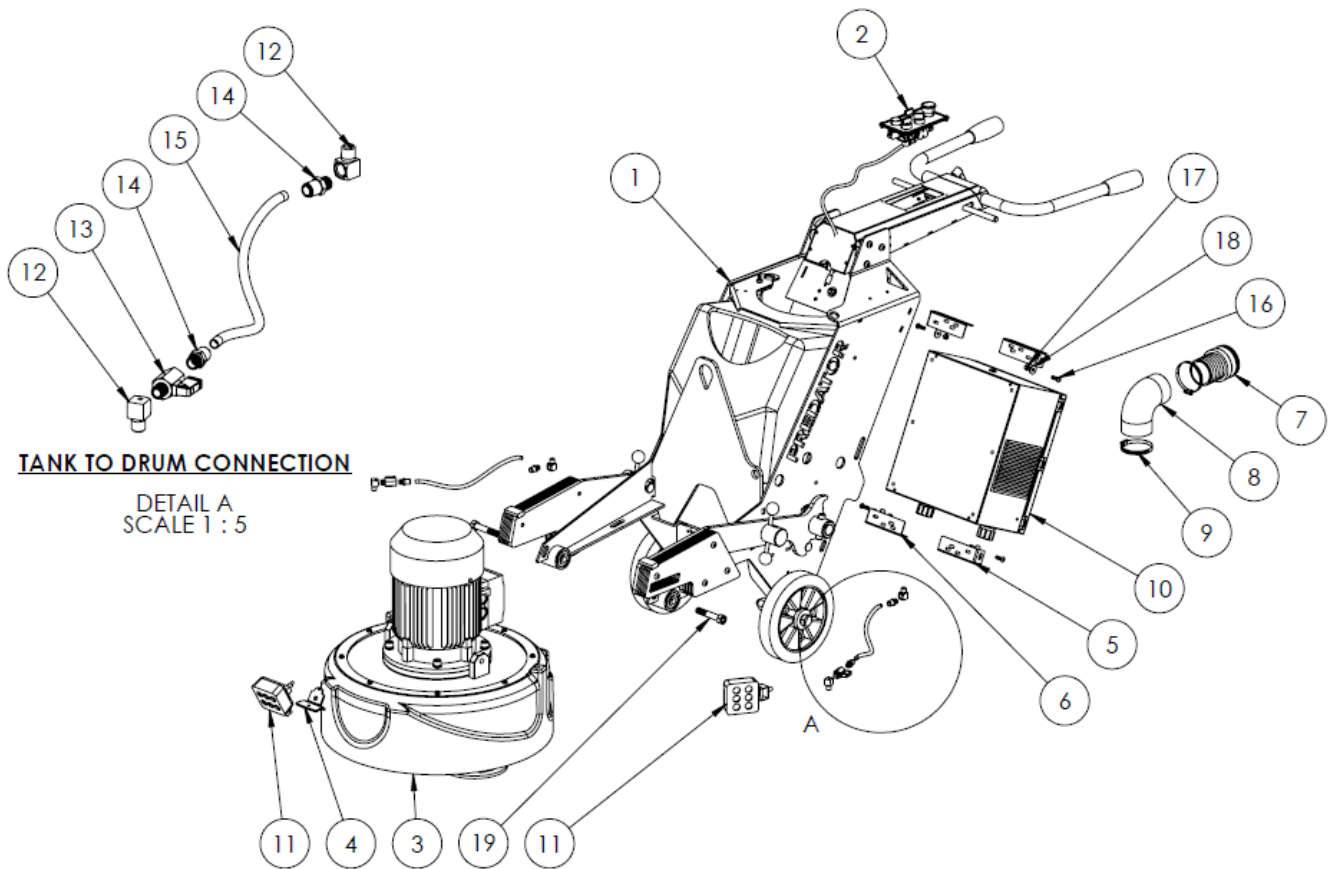
**96-0601 - PREDATOR P650PRO GRINDER ASSEMBLY - F**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	96-0603	FRAME ASSEMBLY - 650	1
2	96-0789	SWITCH PANEL - 650PRO	1
3	96-0813	ENGINE CLUTCH BOX DRUM ASSEMBLY 650PRO	1
4	53-0795	PROPANE TANK LATCH - 650	1
5	52-0360	PROPANE TANK LATCH MOUNT - 650	2
6	52-0605	BATTERY BOX	1
7	52-0620	FRONT LIGHT BRACKET - 650	1
8	51-3375	PROPANE SUPPORT PLATE - 650PRO	1
9	51-3395	CLUTCH BOX COVER 650PRO	1
10	43-0405	THROTTLE HANDLE 650 AND 800PRO	1
11	43-0406	THROTTLE CABLE 650 AND 800PRO	1
12	41-0032	FITTING 0.25 NPT MALE TO 0.25 NPT FEMALE 90 DEG BRASS	4
13	41-0051	BALL VALVE MALE 0.25 NPT FEMALE 0.25 NPT	2
14	41-0052	PUSH-TO-CONNECT 0.25 NPT 0.38 TUBE	4
15	41-0053	WATER TUBE CLEAR 0.38 OD	2
16	23-0240	LIGHT 12V FLOOD	2
17	13-0671	PROPANE TANK LATCH SPACER - 650	2
18	13-0613	MALE 3IN CAMLOCK BARBED	1
19	13-0672	HOSE CLAMP 3IN SMOOTH	2
20	13-0616	SHROUD TO VAC ELBOW 3IN	1
21	11-0376	HEX HEAD SCREW 40671 X 3.5" ZINC	2
22	12-1000-20	SOCKET HEAD CAP SCREW - M10X20 - ZINC	2
23	12-0600-20	SOCKET HEAD CAP SCREW - M6X20 - ZINC	7
24	12-0610-30	BUTTON HEAD CAP SCREW - M6X30 - ZINC	2
25	12-0660-12	SERRATED - M6X12 - ZINC	8
26	12-0640	NYLOC NUT - M6 - ZINC	9



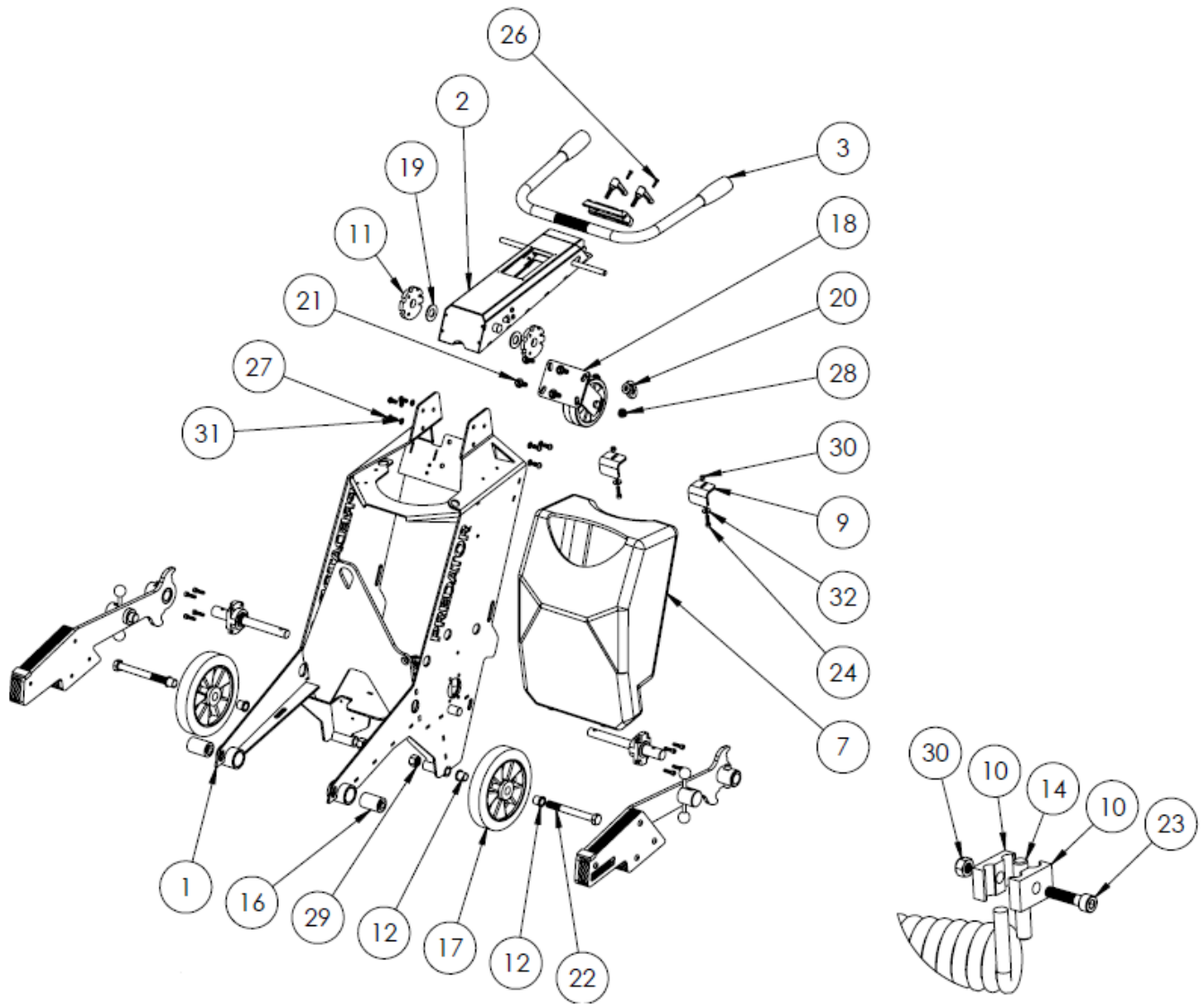
**96-0605 - PREDATOR P650E GRINDER ASSEMBLY 480V 3PH - A**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	96-0603	FRAME ASSEMBLY - 650	1
2	96-0788	SWITCH PANEL - 800E	1
3	96-0607	DRUM MOTOR SUB ASSEM 650E 3PH	1
4	52-0620	FRONT LIGHT BRACKET - 650	1
5	52-0608	ELECTRICAL PANEL BRACKET RIGHT 800E AND 600E	2
6	52-0609	ELECTRICAL PANEL BRACKET LEFT 800E AND 600E	2
7	13-0613	MALE 3IN CAMLOCK BARBED	1
8	13-0616	SHROUD TO VAC ELBOW 3IN	1
9	13-0672	HOSE CLAMP 3IN SMOOTH	2
10	22-0111	ELECTRICAL CONTROL ASSEMBLY - 650E 480V	1
11	23-0240	LIGHT 12V FLOOD	2
12	41-0032	FITTING 0.25 NPT MALE TO 0.25 NPT FEMALE 90 DEG BRASS	4
13	41-0051	BALL VALVE MALE 0.25 NPT FEMALE 0.25 NPT	2
14	41-0052	PUSH-TO-CONNECT 0.25 NPT 0.38 TUBE	4
15	41-0053	WATER TUBE CLEAR 0.38 OD	2
16	12-0810-25	BUTTON HEAD CAP SCREW - M8X25 - ZINC	4
17	12-0021-08	LOCKNUT - M8 - ZINC	4
18	12-0850	WASHER - M8 - ZINC	4
19	11-0376	HEX HEAD SCREW 40671 X 3.5" ZINC	2

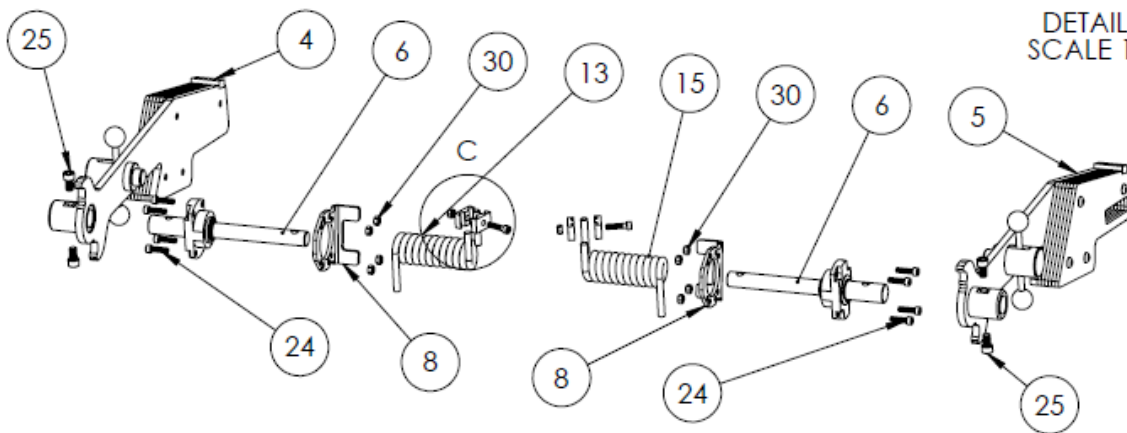


**96-0603 - FRAME ASSEMBLY – 650 - B**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	53-0792	FRAME WELDMENT - 650	1
2	96-0725	HANDLE ASSEMBLY	1
3	96-0720	BG HANDLE	1
4	96-0475	SWING WEIGHT ASSEMBLY LEFT - 650	1
5	96-0470	SWING WEIGHT ASSEMBLY RIGHT - 650	1
6	96-0469	SWING WEIGHT BUSHING ASSEM	2
7	54-0050	WATER TANK - 650	1
8	52-0614	INNER SPRING FLANGE - 650	2
9	52-0600	TANK MOUNTING BRACKET	2
10	51-3309	CLAMP	4
11	51-3372	HANDLE CLOCK - 650	2
12	51-3378	AXLE BUSHING - 650	4
13	13-0602	TORSION SPRING LEFT	1
14	13-0609	TORSION SPRING PIN	2
15	13-0608	TORSION SPRING RIGHT	1
16	13-0669	DRUM BUSHING ASSEM - 650	2
17	13-0670	WHEEL 10IN - 650	2
18	13-0611	CASTER WHEEL	1
19	13-0556	THRUST BEARING 1"	2
20	13-3329	EYE NUT - M12 - GALV	1
21	12-1260-35	HEX HEAD SERRATED - M12X35 - ZINC	4
22	12-2020-160	HEX HEAD SCREW - M20X180 - ZINC	2
23	12-0800-35	SOCKET HEAD CAP SCREW - M8X35 - ZINC	2
24	12-0800-30	SOCKET HEAD CAP SCREW - M8X30 - ZINC	10
25	12-1200-20	SOCKET HEAD CAP SCREW - M12X20 - ZINC	4
26	12-0600-20	SOCKET HEAD CAP SCREW - M6X20 - ZINC	2
27	12-1010-22	BUTTON HEAD CAP SCREW - M10X22 - ZINC	6
28	12-1260	HEX NUT SRRATED - M12 - ZINC	3
29	12-2040	LOCKNUT - M20 - ZINC	2
30	12-0840	LOCKNUT - M8 - ZINC	12
31	12-1070	LOCK WASHER - M10 - ZINC	6
32	12-0850	WASHER - M8 - ZINC	2



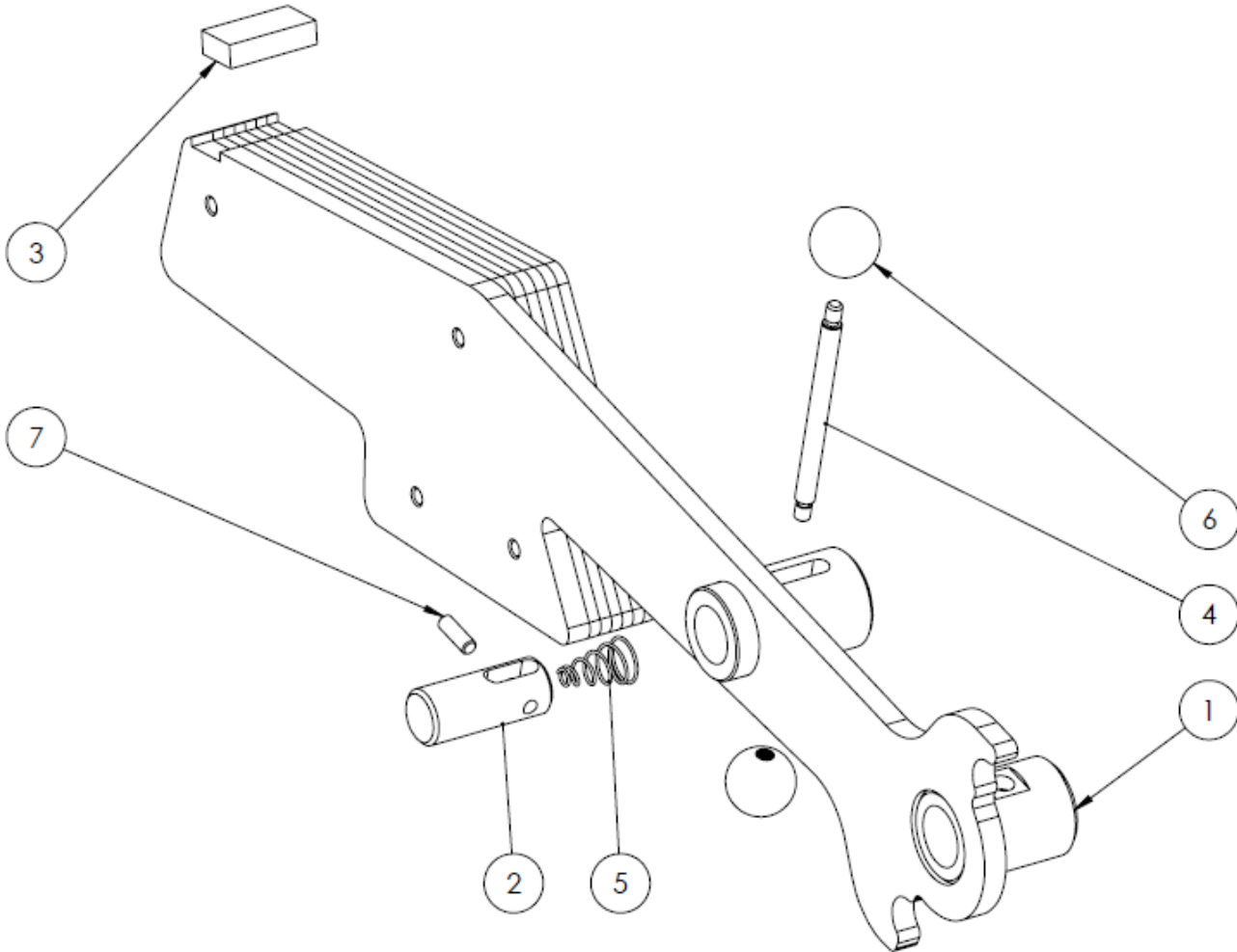
DETAIL C  
SCALE 1 : 4



**SWING WEIGHTS FROM REAR OF MACHINE**

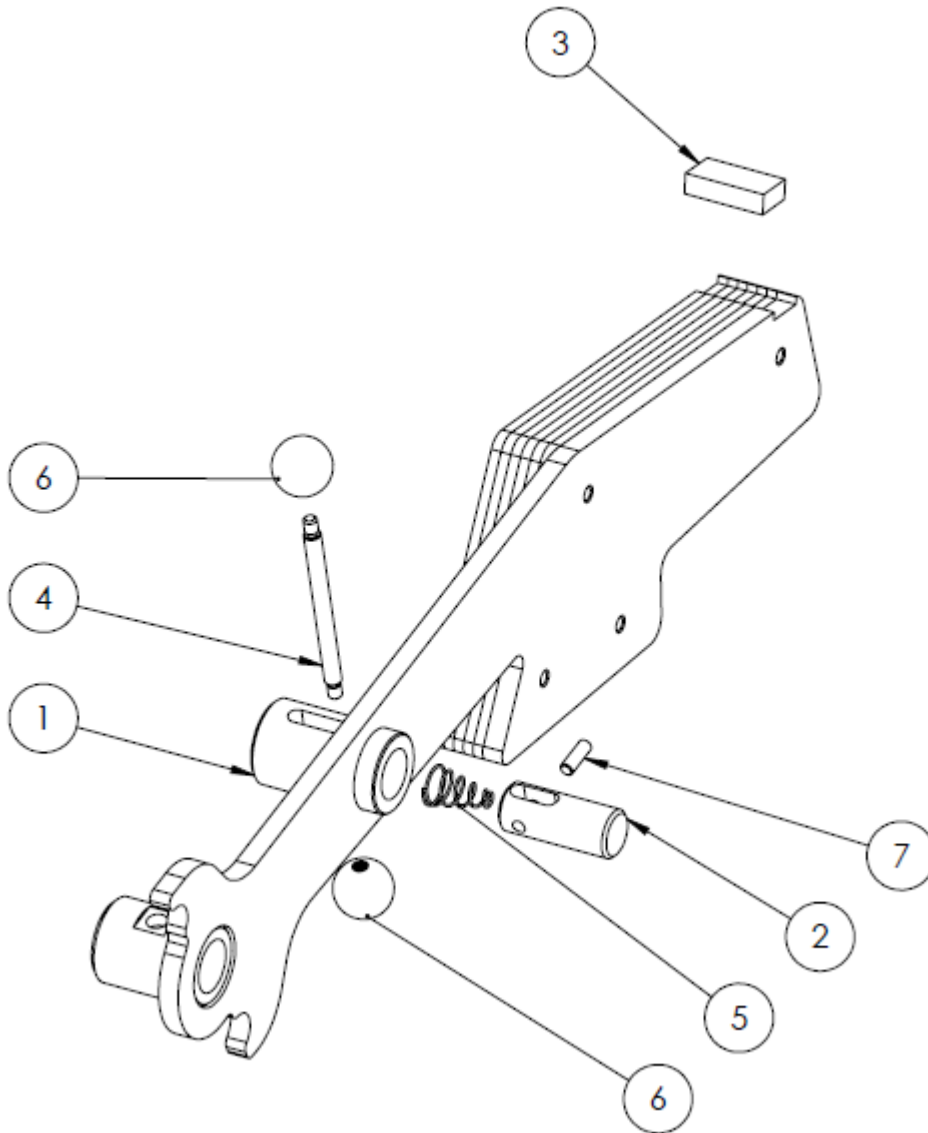
**96-0470 - SWING WEIGHT ASSEMBLY RIGHT – 650 - D**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	53-0793	WEIGHT ARM WELDMENT RIGHT - 650	1
2	51-3310	WEIGHT PIN	1
3	51-3370	SWING WEIGHT PAD - 650	1
4	13-0600	LEVERAGE PIN	1
5	13-0603	PIN LOCK SPRING	1
6	13-0604	KNOB	2
7	13-0605	SPRING PIN	1



**96-0475 - SWING WEIGHT ASSEMBLY LEFT – 650 - D**

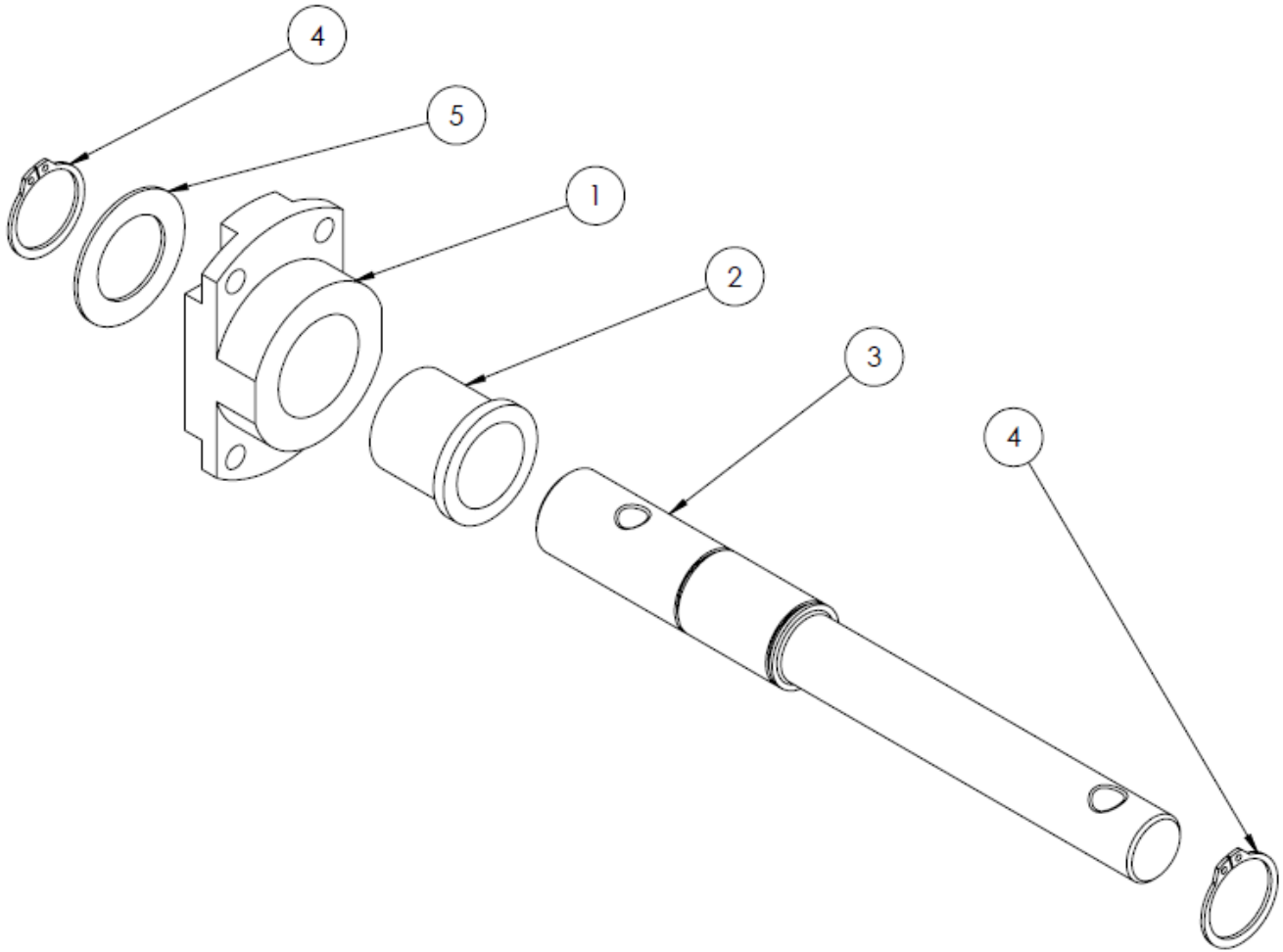
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	53-0794	WEIGHT ARM WELD LEFT - 650	1
2	51-3310	WEIGHT PIN	1
3	51-3370	SWING WEIGHT PAD - 650	1
4	13-0600	LEVERAGE PIN	1
5	13-0603	PIN LOCK SPRING	1
6	13-0604	KNOB	2
7	13-0605	SPRING PIN	1





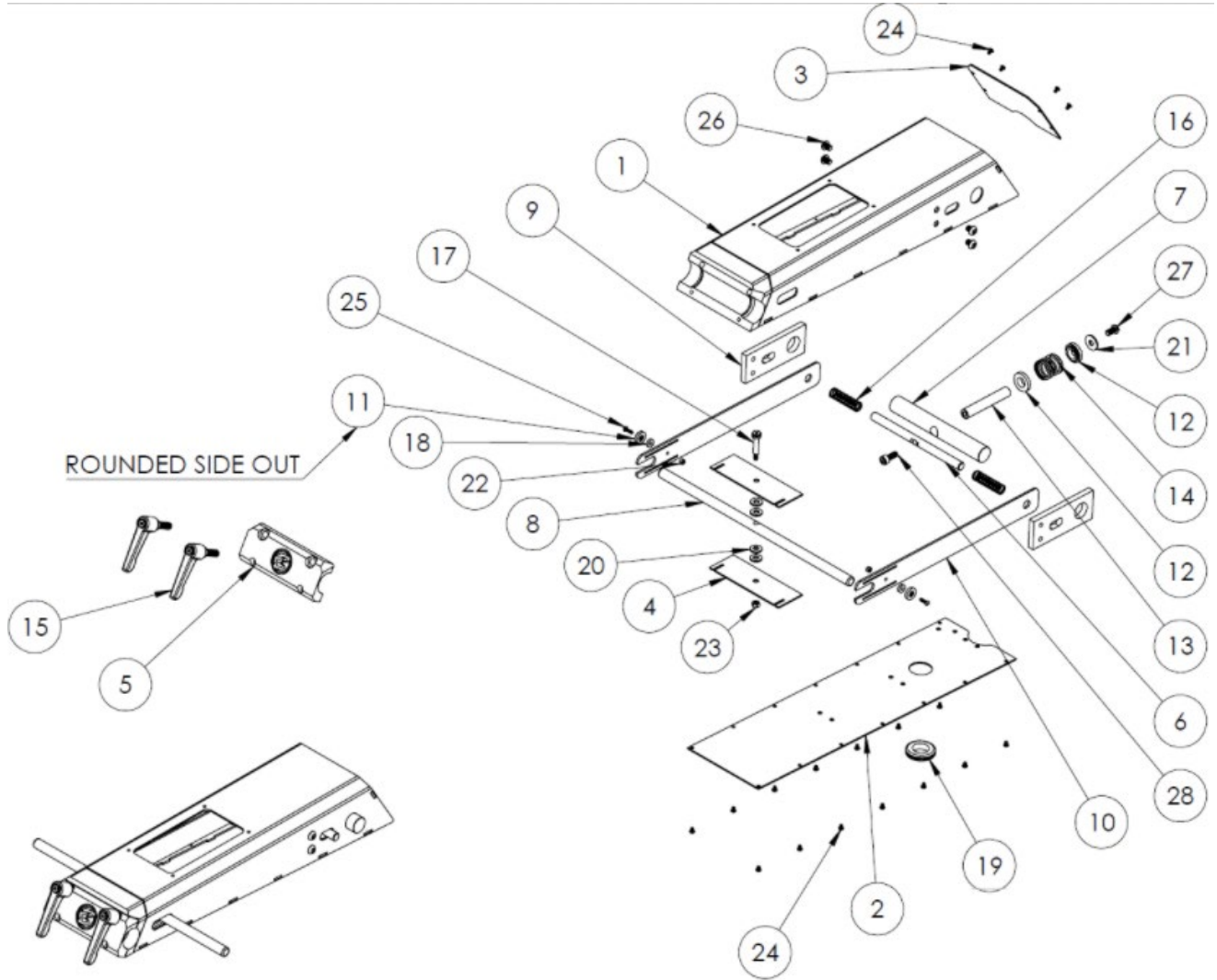
**96-0469 - SWING WEIGHT BUSHING ASSEMBLY - B**

ITEM NO.	Part Number	DESCRIPTION	QTY.
1	51-3306	BUSHING HOUSING	1
2	13-0601	WEIGHT BUSHING	1
3	51-3308	SPINDLE	1
4	13-0606	RETAINING RING 30MM	2
5	13-0607	THRUST WASHER 30MM	1



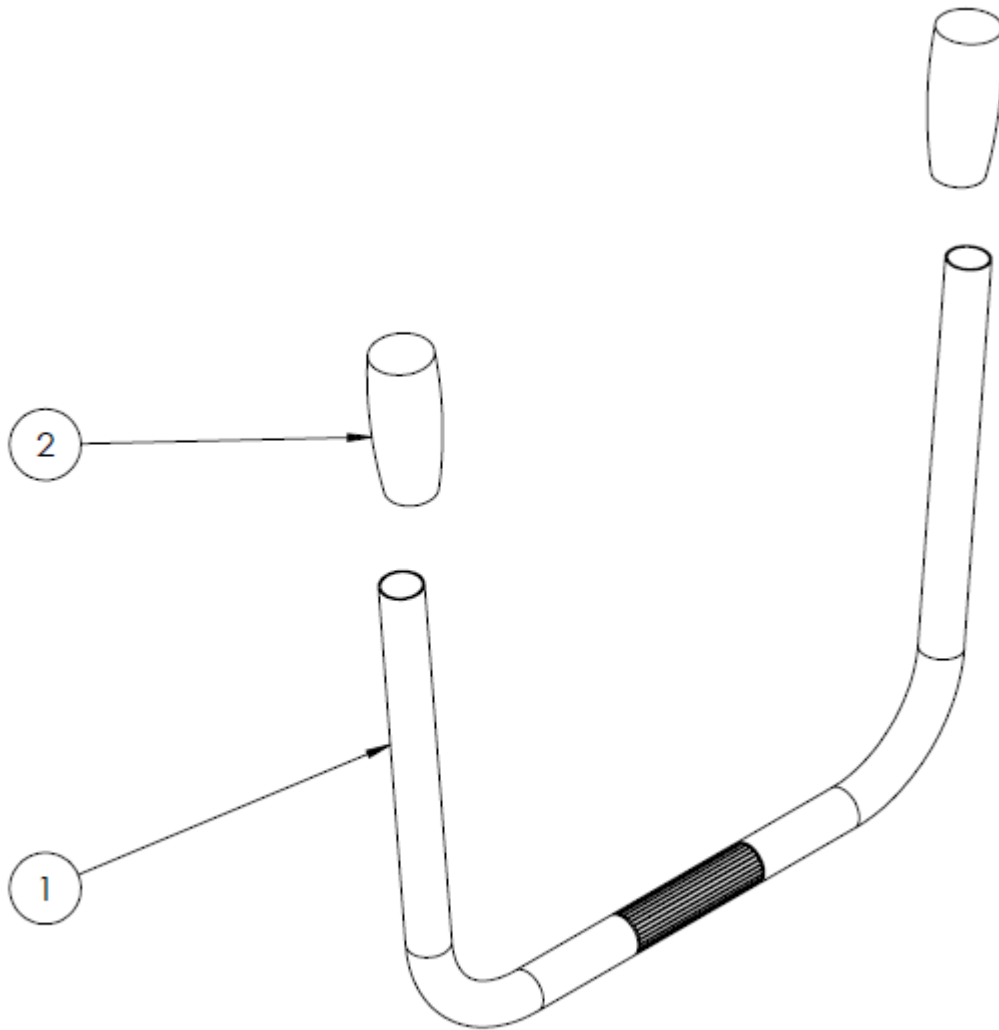
**96-0725 - HANDLE ASSEMBLY – 650 AND 800 - E**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	53-0750	HANDLE STEM WELDMENT	1
2	52-0350	BOTTOM COVER PANEL	1
3	52-0351	FRONT COVER PANEL	1
4	52-0354	PREP PLATES	2
5	51-3200	HANDLE CAP PLATE	1
6	51-3201	LATCH PIN	1
7	51-3203	PIVOT PIN	1
8	51-3303	PULL HANDLE	1
9	51-3304	REINFORCEMENT PLATE	2
10	51-3305	PULL PLATE	2
11	13-0551	TEFLON SLIDER 3/4"	2
12	13-0552	SPRING LOCATOR	2
13	13-0553	TAPPED SHAFT M8	1
14	13-0575	COMPRESSION SPRING	1
15	13-0554	LOW-PROFILE ADJUSTABLE HANDLE	2
16	13-0555	COMPRESSION SPRING	2
17	13-0557	SHOULDER BOLT 8X30 M6	1
18	13-0558	SPACER 1/2" X 1/8"	2
19	25-0182	GROMET 1IN	1
20	12-0852	WASHER - M8 - PTFE	4
21	12-0850	WASHER - M8 - ZINC	1
22	12-0440	NYLOC NUT - M4 - ZINC	2
23	12-0640	NYLOC NUT - M6 - ZINC	1
24	12-0410-06	BUTTON HEAD CAP SCREW - M4X6 - ZINC	18
25	12-0410-16	BUTTON HEAD CAP SCREW - M4X16 - ZINC	2
26	12-0810-10	BUTTON HEAD CAP SCREW - M8X10 - ZINC	4
27	12-0810-16	BUTTON HEAD CAP SCREW - M8X16 - ZINC	1
28	12-0800-20	SOCKET HEAD CAP SCREW - M8X20 - ZINC	1



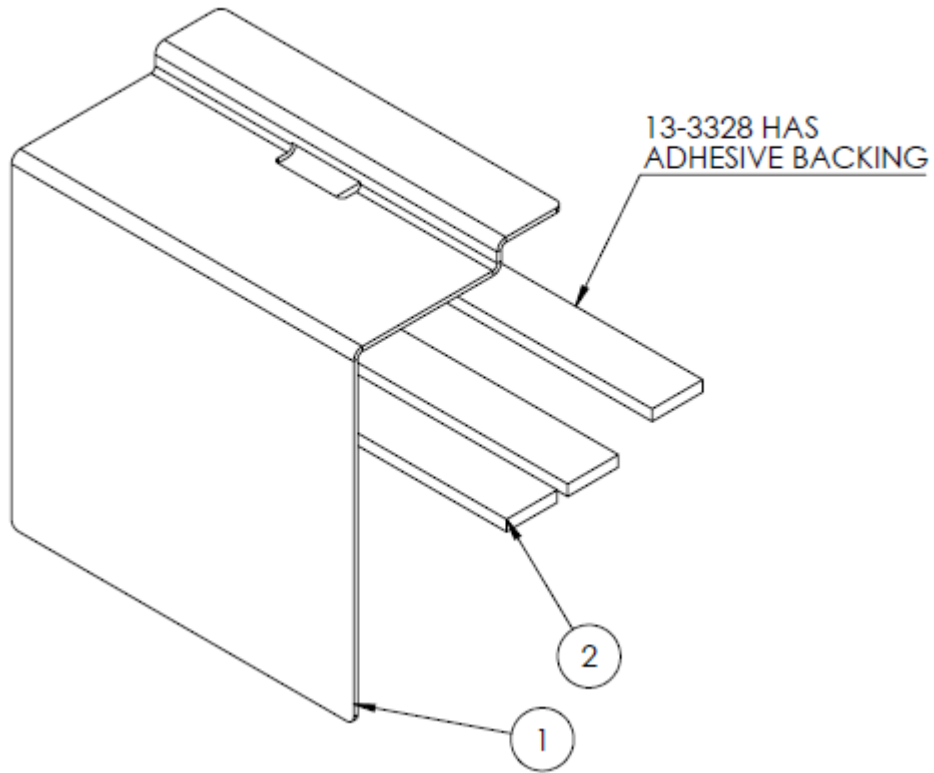
**96-0720 - BG HANDLE – 650 AND 800 - C**

ITEM NO.	Part Number	DESCRIPTION	QTY.
1	53-0797	BG HANDLEBAR WELDMENT	1
2	13-0560	BG HANDLE END GRIP	2



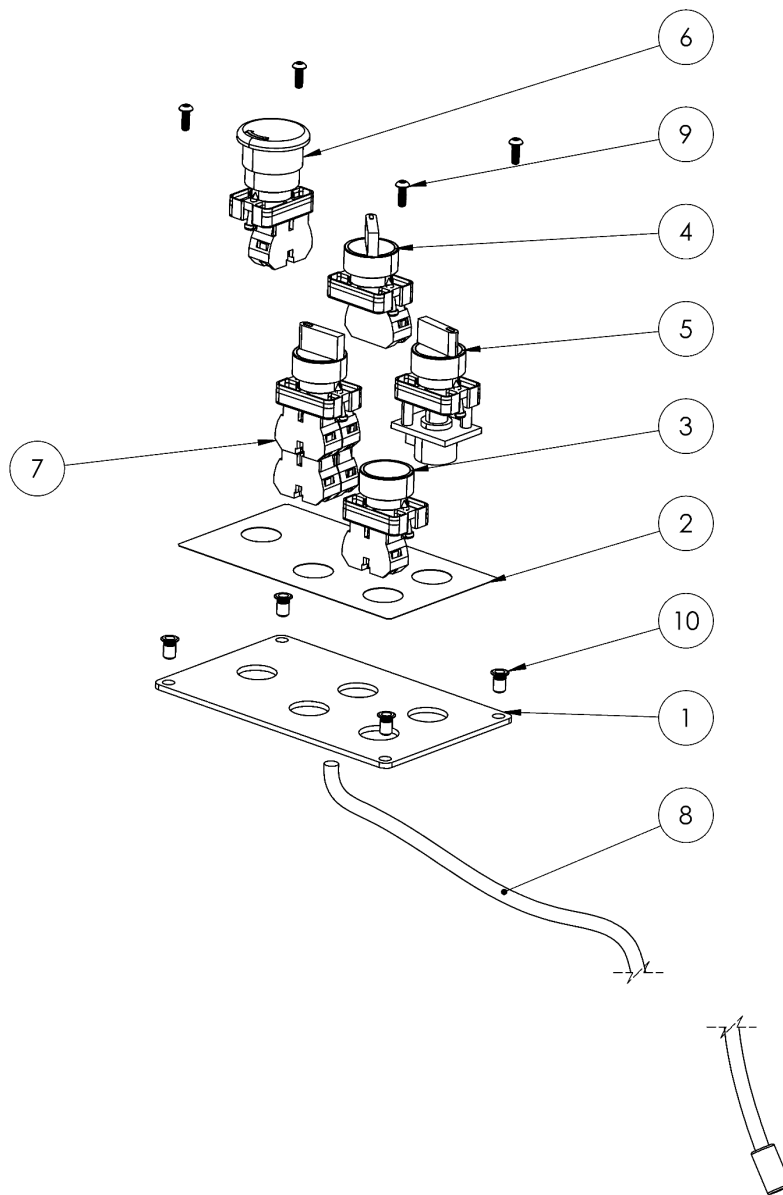
**96-0807 - BATTERY BOX COVER ASSEMBLY - A**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	52-0630	BATTERY BOX COVER	1
2	13-3328	BATTERY COVER FOAM	3



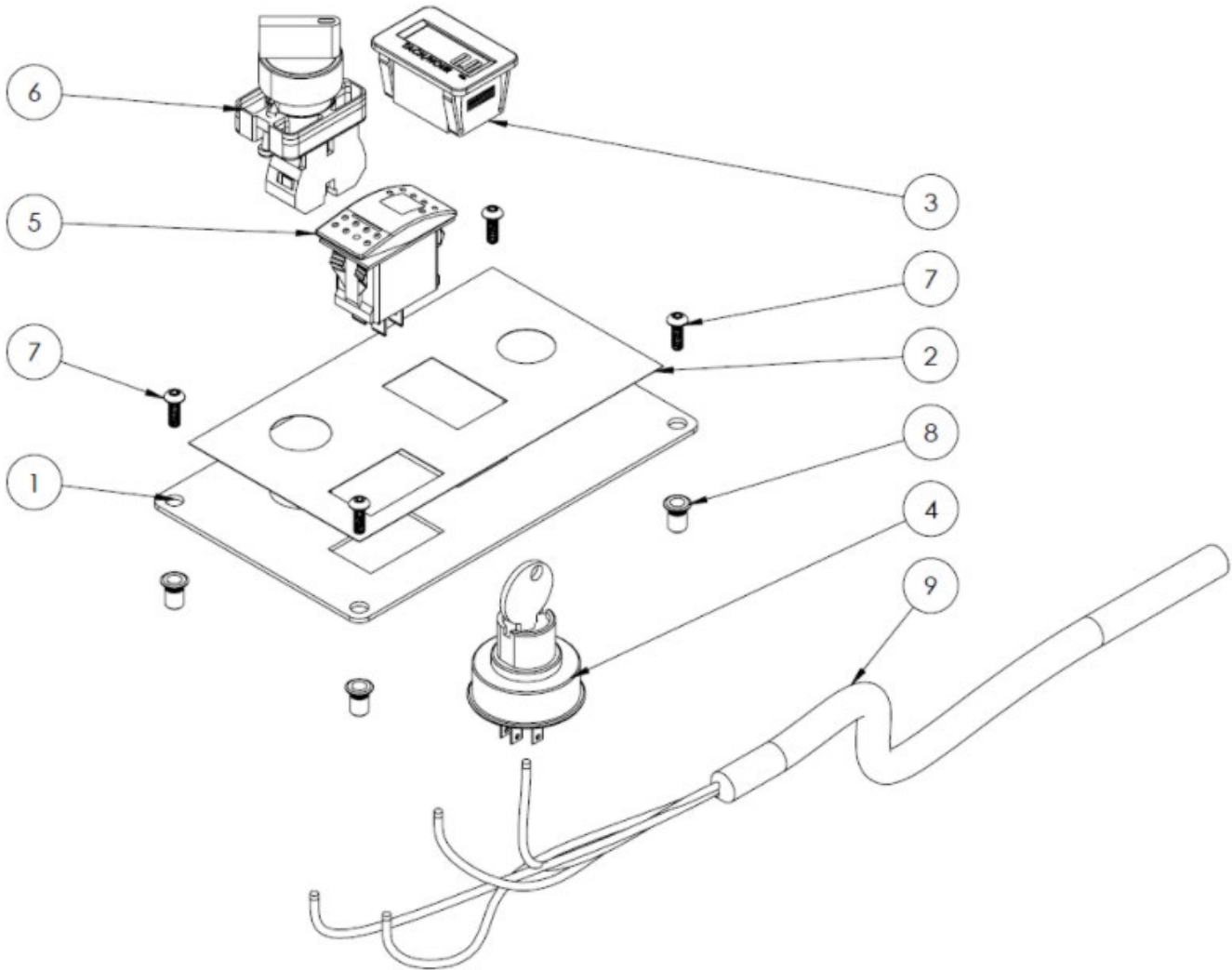
**96-0788 - SWITCH PANEL – 650E AND 800E - E**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	52-0613	SWITCH PLATE - 800E	1
2	61-0080	SWITCH PLATE DECAL 650 AND 800E	1
3	22-0100	PUSH BUTTON	1
4	22-0104	SWITCH TWO POSITION	1
5	22-0105	SWITCH POTENTIOMETER	1
6	22-0106	ESTOP SWITCH	1
7	22-0109	SWITCH 3 POSITION	1
8	24-0290co	SWITCH PANEL CABLE 650E AND 800E	1
9	12-0410-12	BUTTON HEAD CAP SCREW - M4X12 - ZINC	1
10	13-0700	REVNUT - M4 - ZINC	1



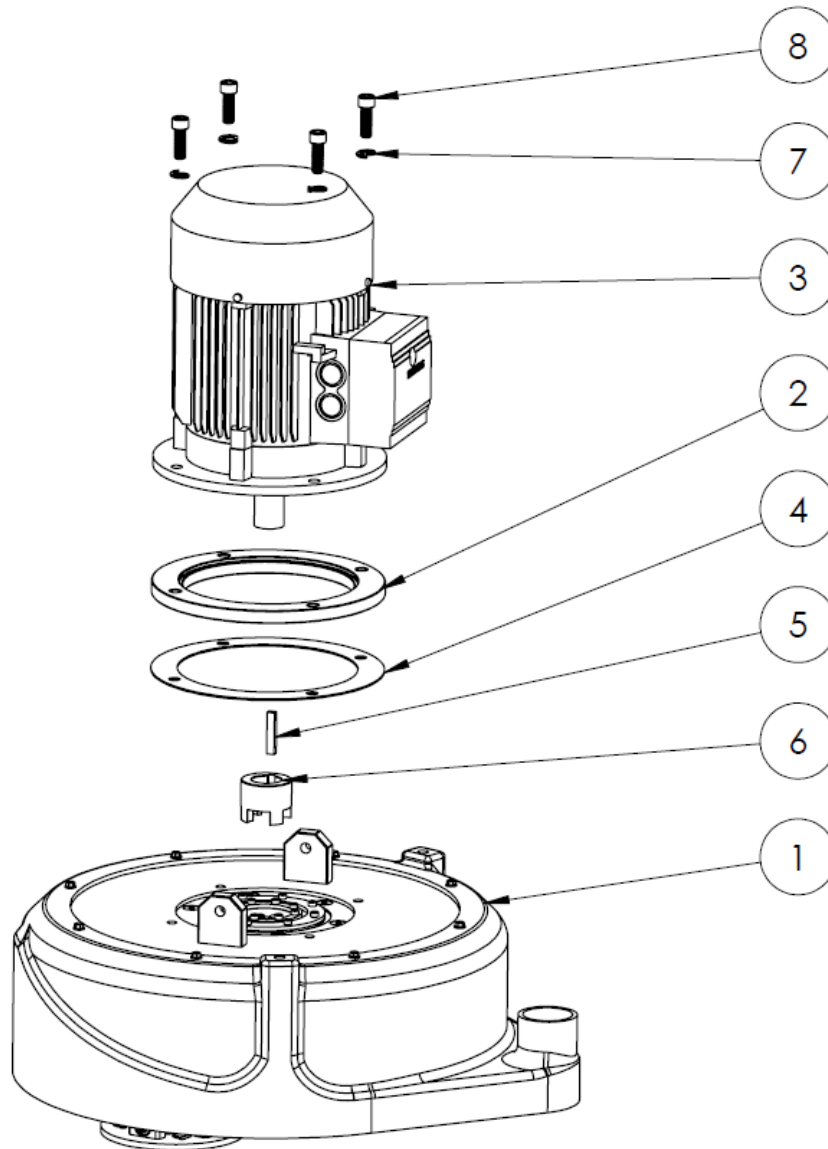
**96-0789 - SWITCH PANEL – 650PRO - B**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	52-0607	SWITCH PLATE DECAL	1
2	61-0079	SWITCH PLATE DECAL	1
3	22-0101	HOUR/TACH DIGITAL METER	1
4	22-0110	IGNITION SWITCH 650PRO	1
5	22-0103	SWITCH LIGHTED 4 PIN	1
6	22-0104	SWITCH TWO POSITION	1
7	12-0410-12	BUTTON HEAD CAP SCREW - M4X12 - ZINC	4
8	13-0700	REVNUT - M4 - ZINC	4
9	24-0305	WIRING HARNESS 650PRO	1



**96-0607 DRUM MOTOR SUB ASSEM 650 3PH - A**

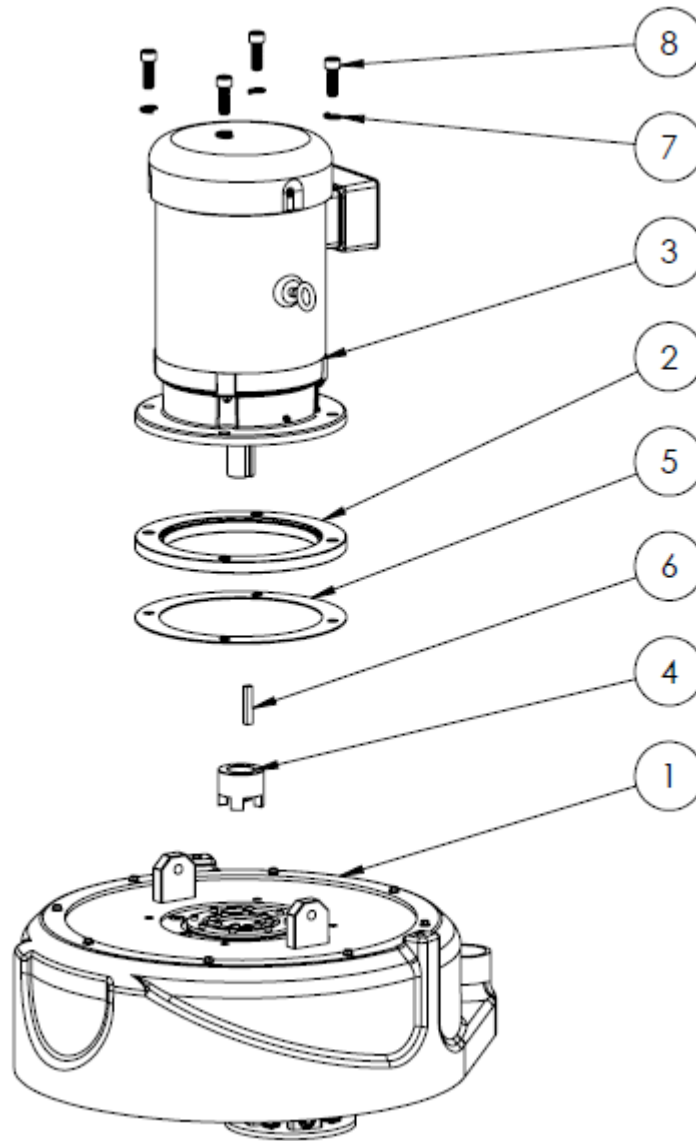
ITEM NO.	Part Number	DESCRIPTION	QTY.
1	96-0460	DRUM ASSEMBLY - 650	1
2	51-3377	DRUM TO DRIVE SPACER - 650E	1
3	23-0253	3PHASE 10KW MOTOR 650E	1
4	13-0675	DRUM TO DRIVE GASKET - 650	1
5	13-0719	KEY M10X8X55 SQUARE 650E	1
6	13-0706	COUPLER, CJ28/38 LOVEJOY 650PRO	1
7	12-1470	LOCK WASHER - M14 - ZINC	4
8	12-1400-40	SOCKET HEAD CAP SCREW - M14X40 - ZINC	4





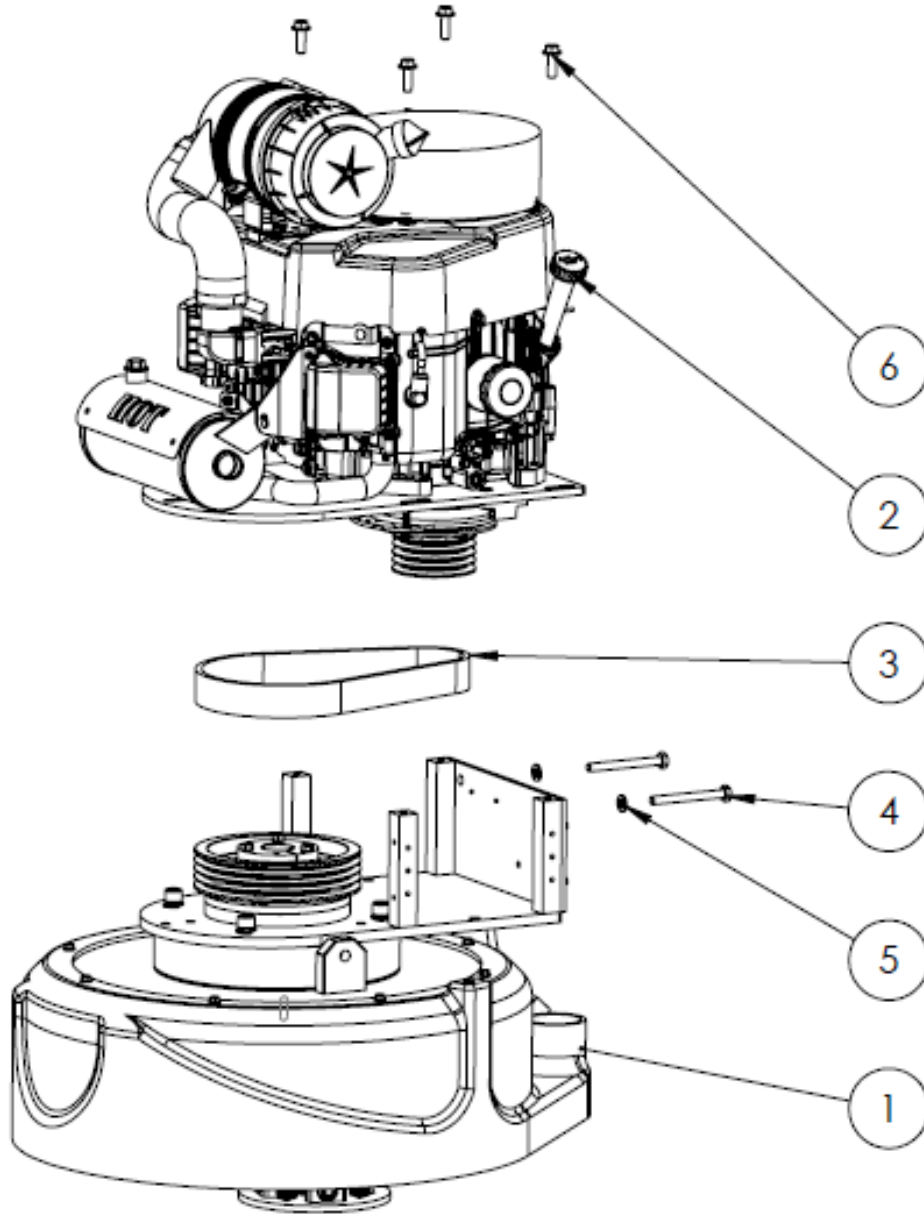
**96-0615 DRUM MOTOR SUB ASSEM 650E PH1 - A**

ITEM NO.	Part Number	DESCRIPTION	QTY.
1	96-0460	DRUM ASSEMBLY - 650	1
2	51-3377	DRUM TO DRIVE SPACER - 650E	1
3	23-0246	SINGLE PHASE MOTOR - 650E	1
4	13-0706	COUPLER, CJ28/38 LOVEJOY 650PRO	1
5	13-0675	DRUM TO DRIVE GASKET - 650	1
6	13-0719	KEY M10X8X55 SQUARE 650E	1
7	12-1470	LOCK WASHER - M14 - ZINC	4
8	12-1400-40	SOCKET HEAD CAP SCREW - M14X40 - ZINC	4



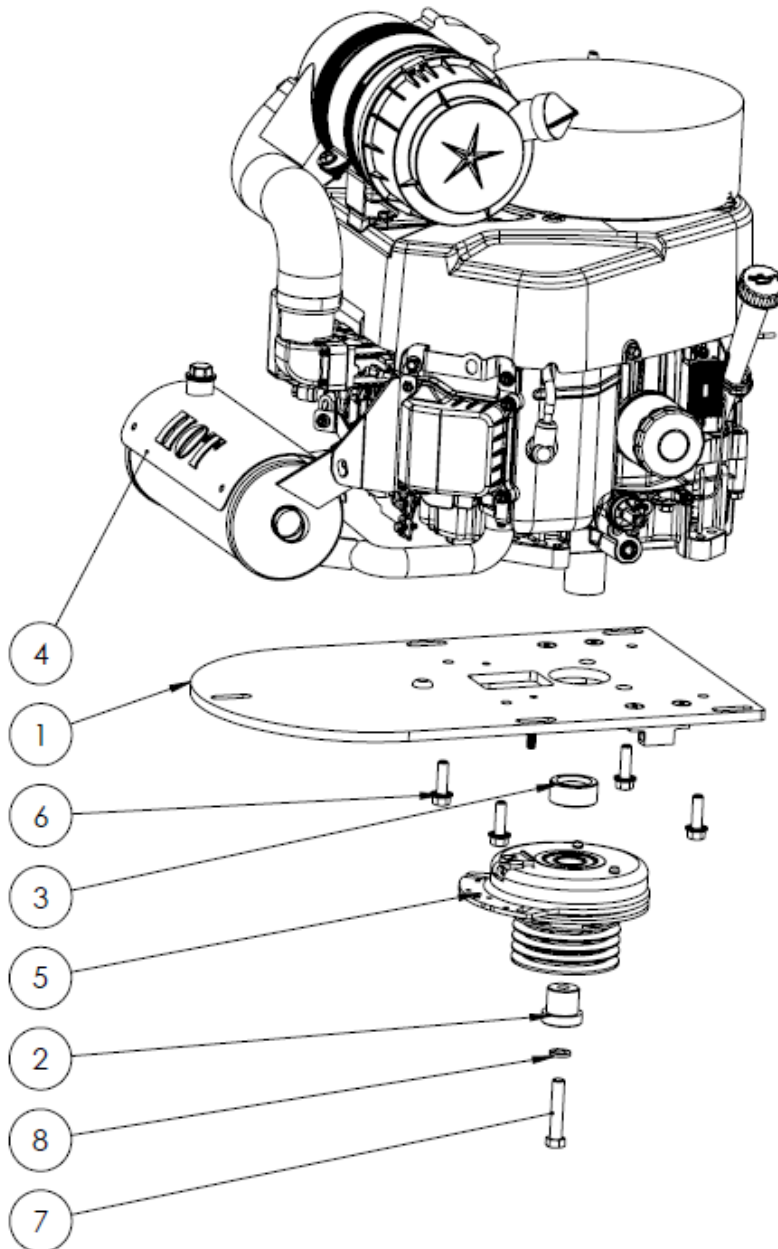
**96-0813 ENGINE CLUTCH BOX DRUM ASSEMBLY 650PRO - A**

ITEM NO.	Part Number	DESCRIPTION	QTY.
1	96-0812	DRUM CLUTCH BOX SUB ASSEMBLY 650PRO	1
2	96-0760	DRIVE ASSEMBLY 650PRO	1
3	13-0708	BELT, 4-3VX 355 GATES 650PRO	1
4	12-1020-100	HEX HEAD CAP SCREW M10-1.5 X 100 - ZINC	2
5	12-1050	WASHER, FLAT M10 ZINC	2
6	12-1060-30	SCREW, FLANGED HEX HEAD CAP SERRATED M10-1.5 X 30 ZINC	4



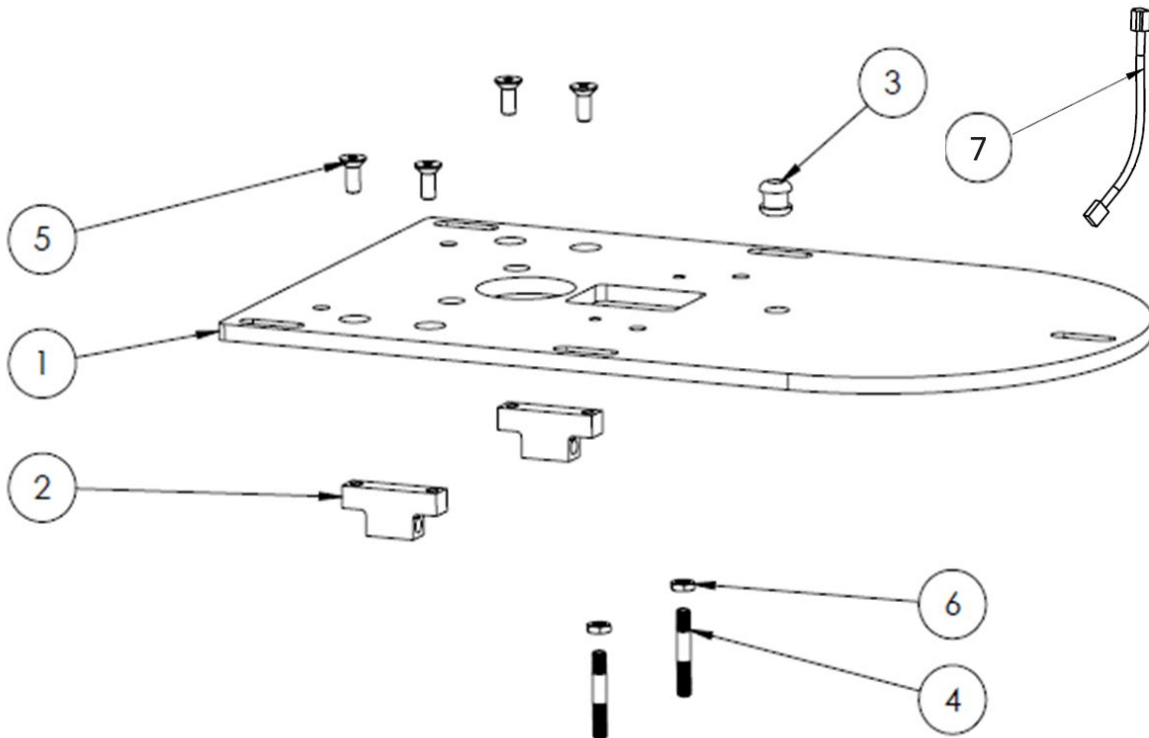
**96-0760 - DRIVE ASSEMBLY - 650PRO - A**

ITEM NO.	Part Number	DESCRIPTION	QTY.
1	96-0764	ENGINE MOUNT PLATE SUB ASSEM - 650PRO	1
2	51-3398	CLUTCH CAP 650PRO	1
3	51-3397	CLUTCH SPACER 650PRO	1
4	43-0415	LX700 ENGINE - 650PRO	1
5	13-3320	CLUTCH MS WARNER ELECTRIC 650PRO	1
6	11-0377	HHCS SERRATED 3/8X16 X1.5IN Zinc	4
7	11-0388	SCREW, HEX 7/16-20 X 2-1/4 GRADE 8	1
8	11-0378	LOCK WASHER – 7/16" – ZINC	1



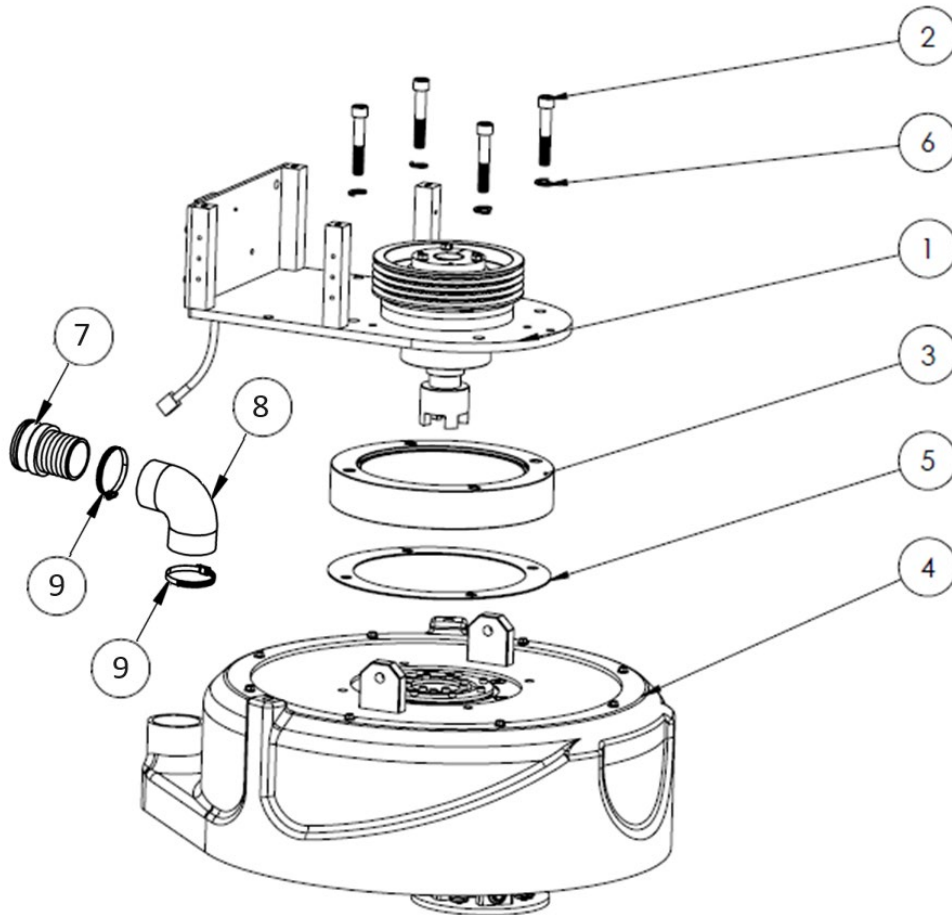
**96-0764 - ENGINE MOUNT PLATE SUB ASSEM - 650PRO - B**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	51-3396	MOTOR PLATE 650PRO	1
2	51-3399	BLOCK TENSIONER 650PRO	2
3	13-0716	GROMMET, HIGH-TEMP 9/16"-3/8"-3/8"	1
4	13-0715	STUD DOUBLE END M8X50	2
5	12-0880-20	SCREW, FLAT HEAD SOCKET CAP M8-1.25 X 20	4
6	12-0830-JAM	NUT - M8XJAM - ZINC	2
7	CLUTCH CABLE	COMES W/ CLUTCH	1



**96-0812 DRUM CLUTCH BOX SUB ASSEMBLY 650PRO - A**

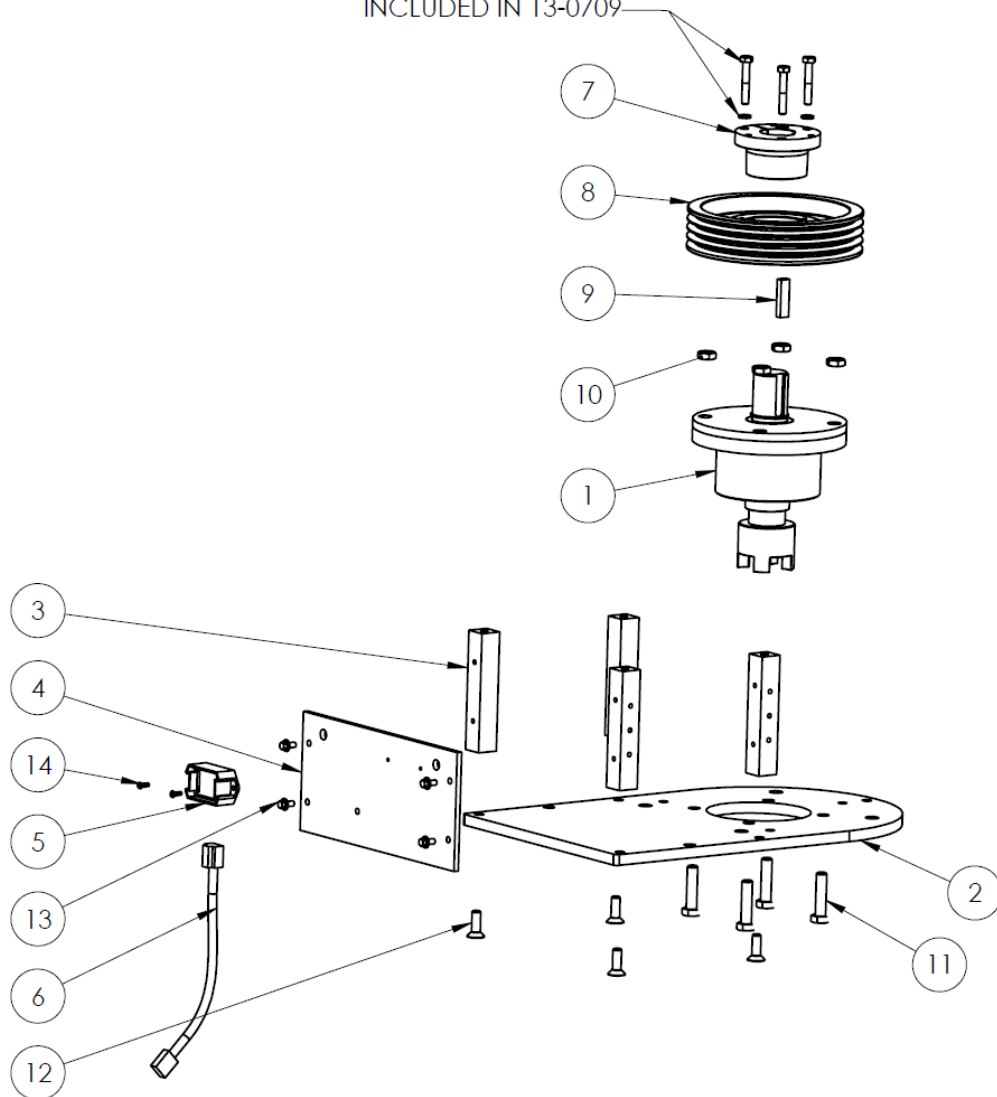
ITEM NO.	Part Number	DESCRIPTION	QTY.
1	96-0762	DRUM MOUNT PLATE SUB ASSEM - 650PRO	1
2	12-1400-80	SOCKET HEAD CAP SCREW M14-2.0 X 80	4
3	51-3381	DRUM TO DRIVE SPACER - 650PRO	1
4	96-0460	DRUM ASSEMBLY - 650	1
5	13-0675	DRUM TO DRIVE GASKET - 650	1
6	12-1470	LOCK WASHER - M14 - ZINC	4
7	13-0616	3" CAM LOC BARBED	1
8	13-0613	3" ELBO RUBBER	1
9	13-0672	3" HOSE CLAMP SMOOTH	2



**96-0762 - DRUM MOUNT PLATE SUB ASSEM - 650PRO - B**

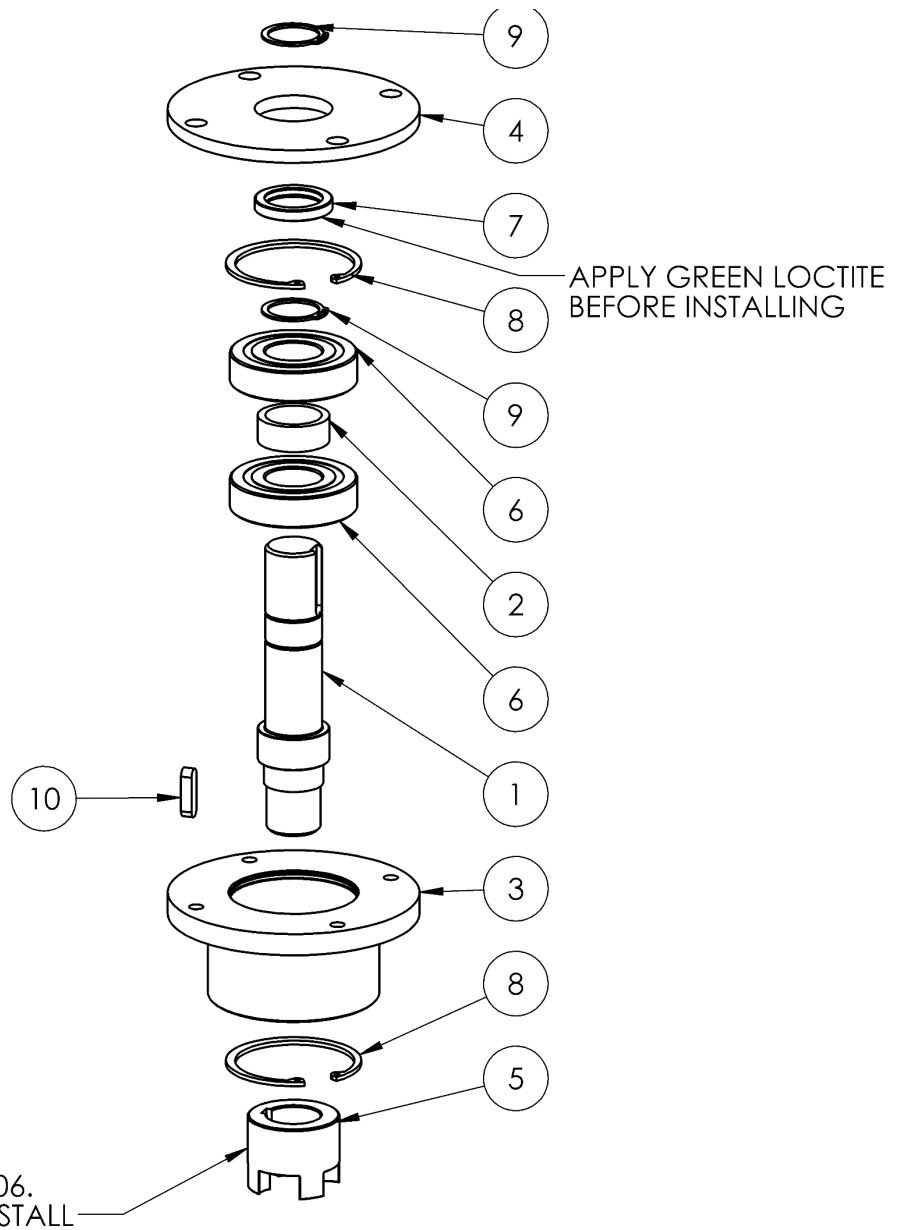
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	96-0766	TRANSFER SHAFT SUB ASSEM - 650PRO	1
2	51-3391	BASE PLATE ELECTRIC CLUTCH BOX 650PRO	1
3	51-3393	STANCHION CLUTCH BOX 650PRO	4
4	51-3394	CLUTCH BOX REAR COVER 650PRO	1
5	23-0250	SOFT START, CLUTCH	1
6	23-0251	SOFT START CABLE - 650PRO	1
7	13-0709	BUSHING 40MM - SK 650PRO AND 800PRO	1
8	13-0710	SHEAVE, 4/3V OD8"	1
9	13-0719	KEY M12-8X40 PARALLEL 650PRO	1
10	12-1230-JAM	NUT, JAM M12-1.75	4
11	12-1220-50	HEX HEAD CAP SCREW - M12X50 - ZINC	4
12	12-1080-30	FLAT HEAD - M10X30 - ZINC	4
13	12-0660-12	SERRATED - M6X12 - ZINC	4
14	12-0410-12	SERRATED - M4X12 - ZINC	2

INCLUDED IN 13-0709



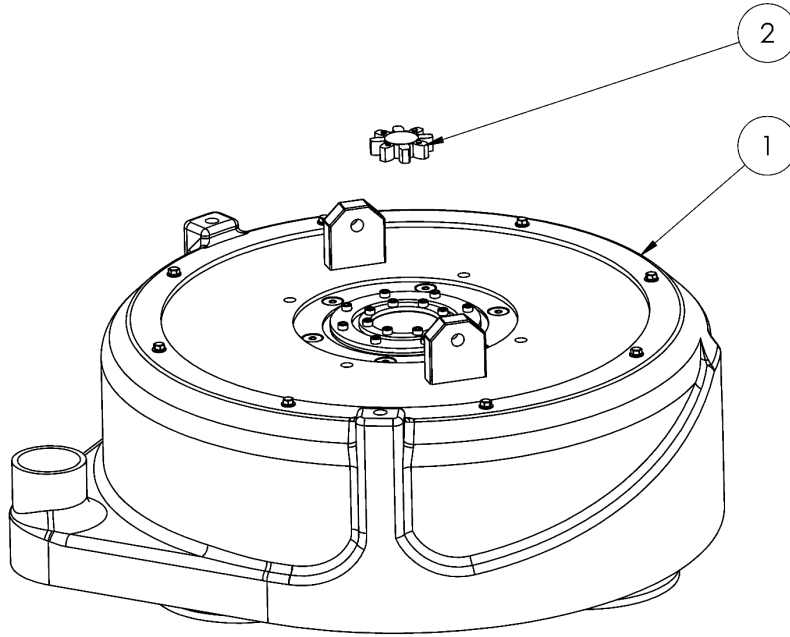
**96-0766 - TRANSFER SHAFT SUB ASSEM - 650PRO - A**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	51-3400	TRANSFER SHAFT 650PRO	1
2	51-3401	ID SPACER 650PRO 850PRO	1
3	51-3402	BEARING HOUSING, PRIMARY 650PRO 850PRO	1
4	51-3403	SEAL PLATE 650PRO 850PRO	1
5	13-0706	COUPLER, CJ28/38 LOVEJOY 650PRO	1
6	13-3321	BEARING, BALL, 6308-2RS 650PRO 850PRO	2
7	13-3322	SEAL, ROTARY SHAFT M40 X M55 650PRO 850PRO	1
8	13-3323	RING, INTERNAL M90 650PRO 850PRO	2
9	13-3324	RING, EXTERNAL M40 650PRO 850PRO	2
10	13-0705	KEY M10X8X36 PARALLEL	1



**96-0460 - DRUM ASSEMBLY – 650**

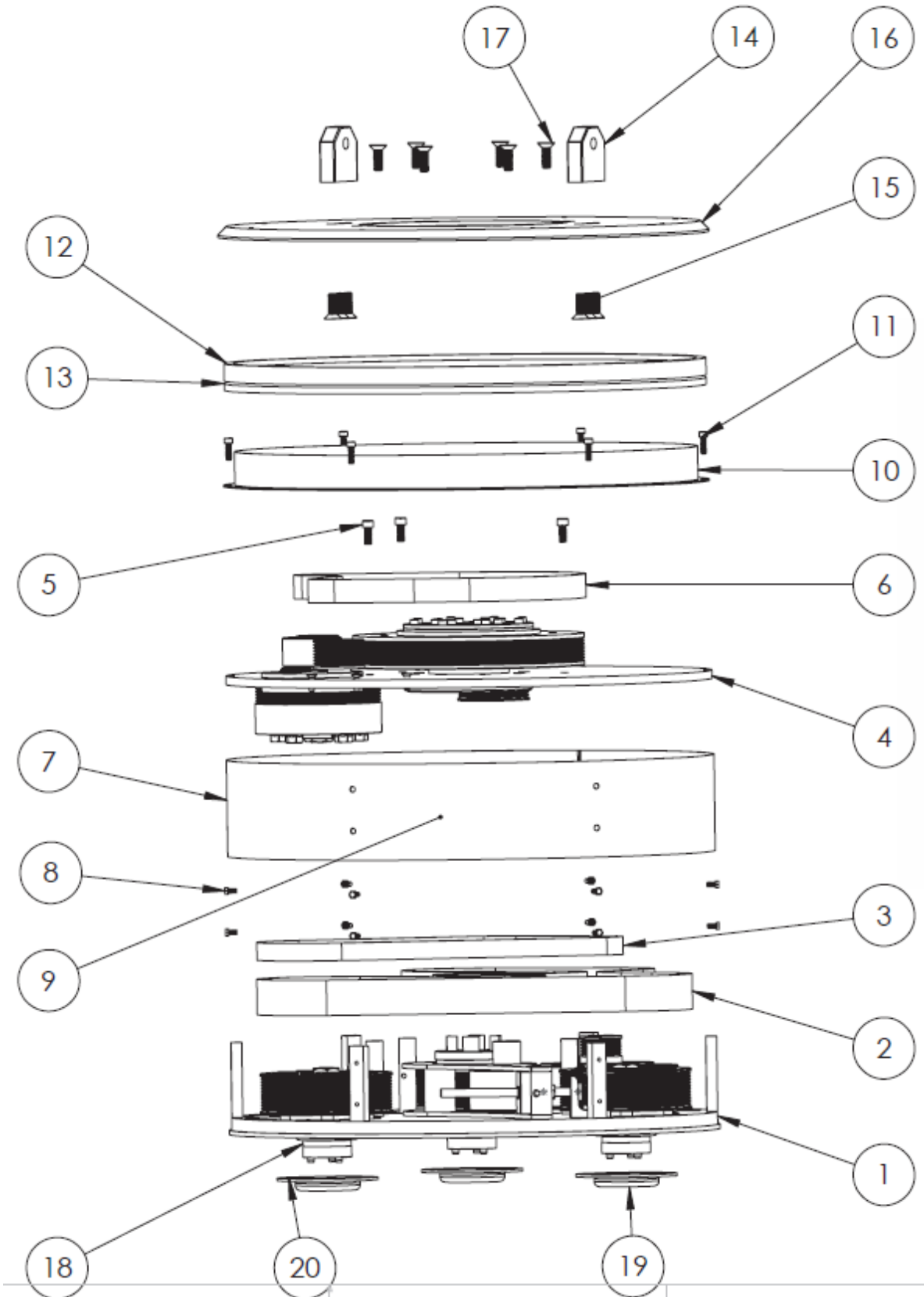
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	96-0460 - DRUM	DRUM ASSEMBLY - 650	1
2	13-0707	BUSHING, SPIDER, CJ 28/38 RED /PDG6K	1





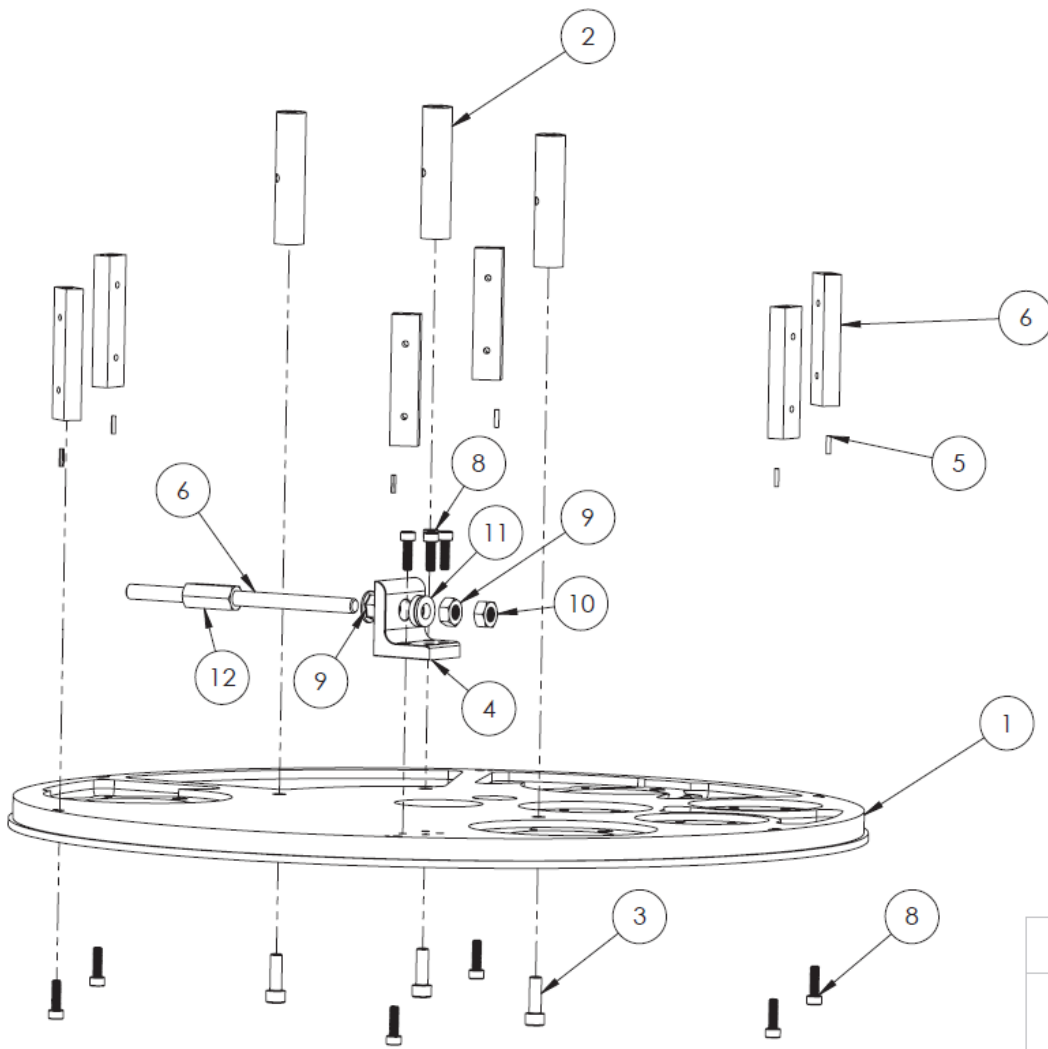
## COMPLETE DRUM – 650

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1		<b>PLATE, BOTTOM DRUM</b>	<b>1</b>
2	BG.60056.00	BELT, MAIN PK12 M42 X 2381.4 OC BOTTOM	1
3	BG.60057.00	BELT, PTO PK6 M20 X 1043 OC MIDDLE	1
4		<b>PLATE, TOP DRUM</b>	<b>1</b>
5	NB.10.219	SCREW, SOCKET LOW HEAD CAP M8-1.25 X 20 ZINC	3
6	BG.60058.00	BELT, TOP PK8 M28 X 1122.4 OC	1
7	BG.60036.00	SHROUD, BOTTOM BELT DUST	1
8	12-0520-10	SCREW, HEX HEAD CAP M5-0.8 X 10 ZINC 8.8	12
9	BG.20287.00	TAPE, PRESERVATION HEAT SHRINK 3" WHITE(3-3 2/3 revolutions)	40 ft
10	BG.60037.00	SHROUD, TOP BELT DUST	1
11	12-0600-20	SCREW, SOCKET HEAD CAP M6-1.0 X 20 12.9 ZINC	6
11b	NB.30.215	WASHER, M6 INTERNAL LOCK ZINC	6
12	BG.60047.00	SEAL, FOAM/FELT	1
13	BG.20269.00	ZIP TIE, 48"	2
14	BG.60046.00	EARS, DRUM MOUNTING	2
15	12-1080-30	SCREW, SOCKET FLAT HEAD CAP M10-1.5 X 30	6
16	BG.60034.00	PLATE, STATIONARY	1
17	12-1080-30	SCREW, SOCKET FLAT HEAD CAP M10-1.5 X 30	6
18	BG.20286.2	SEAL, AXLE NITRILE AL. SLURRY COVERS	3
19	BG.20285.2	COVER, PLANETARY SLURRY ALUMINUM	3
20	12-0600-25	SCREW, SOCKET HEAD CAP M6-1.0 X 25 12.9 ZINC	9
<b>NOT PICTURED</b>			
2	N/A	Tension across longest span 96-100 Hz	1
3	N/A	Tighten #5 before tensioning. Tension across longest span 101-106 Hz	1
5	N/A	<b>Red</b> LocTite 263	3
6	N/A	Tighten #5 before tensioning. Tension across longest span 196-212 Hz	1
7	N/A	Butyl Flex along top and bottom lip after belts are tight, and everything is set.	1
8	N/A	<b>Red</b> LocTite 263	12
11	N/A	<b>Red</b> LocTite 263	6
12	N/A	Grease on inside edge of felt. Chemrex on top edge of foam.	1
15	N/A	<b>Red</b> LocTite 263, Torque 40 ft-lbf	6
17	N/A	<b>Red</b> LocTite 263, Anti-Seize added to countersink	6
19	N/A	Silicone added to sealing edge.	3
20	N/A	<b>Red</b> LocTite 263	9



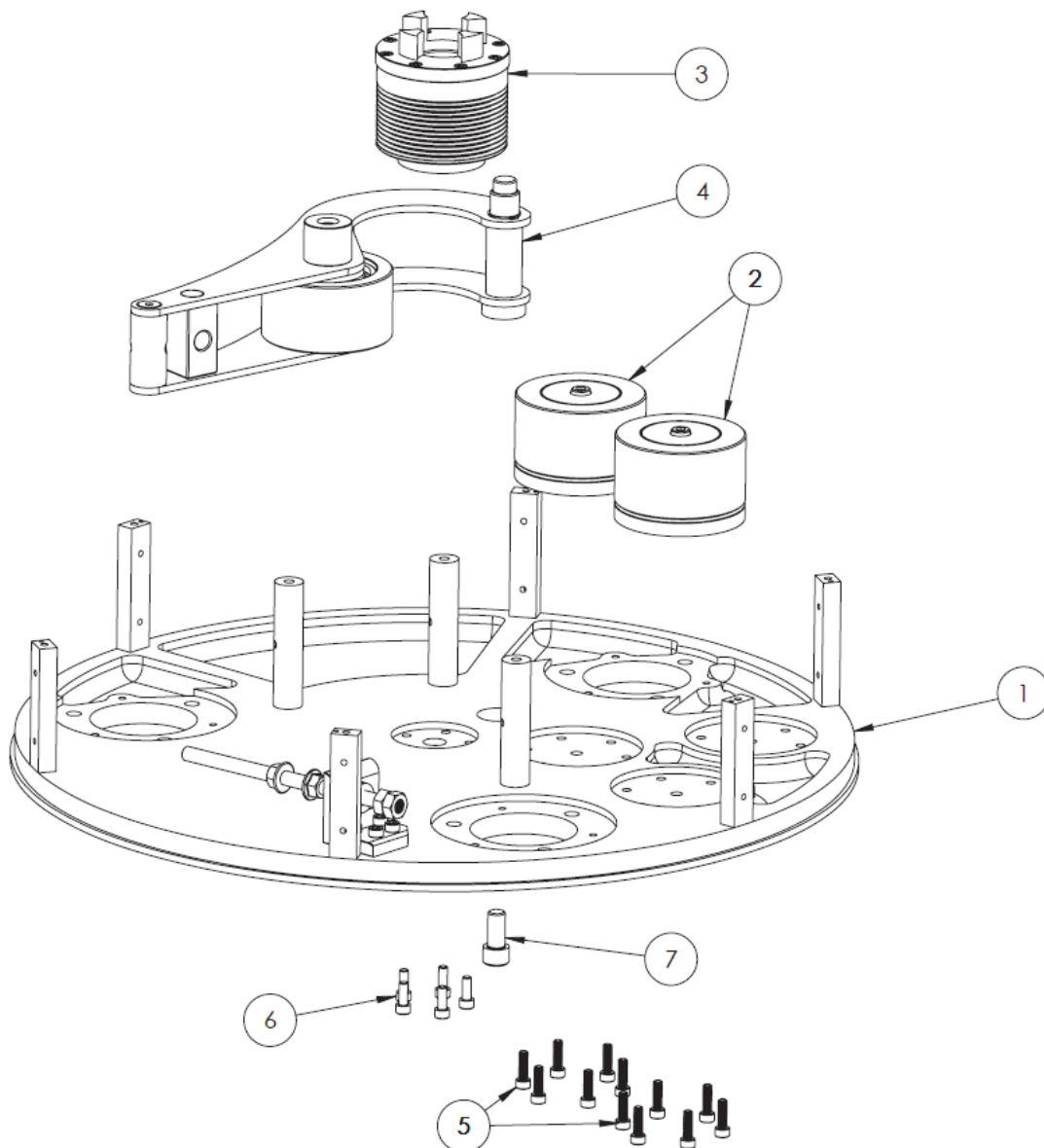
## BOTTOM DRUM I ASSEMBLY – 650

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	BG.60023.00	PLATE, BOTTOM	1
2	BG.60011.00	STANCION, INNER	3
3	12-0800-25	SCREW, SOCKET HEAD M8-1.25 X 25	3
4	BG.45017.25	POST, REACTION	1
5	NB.50.147	PIN, SPIRAL M3x16	6
6	BG.60079.00	ROD, TIGHTENER	1
7	BG.60010.00	STANCION, PERIMETER	6
8	12-0600-25	SCREW, SOCKET HEAD M6-1.0x25	10
9	NB.20.137	NUT, JAM M10	2
10	NB.20.131	NUT, NYLOC M10	1
11	NB.32.101	WASHER, SPHERICAL M10	1
12	NB.20.119	NUT, TENSIONER M10	1
<b>NOT PICTURED</b>			
3	N/A	Red LocTite 262	3
8	N/A	Red LocTite 262	10
9	N/A	Red LocTite 262. Use LocTite after belt is added, not at this step.	1
12	N/A	Red LocTite 262. Use LocTite after belt is added, not at this step.	1



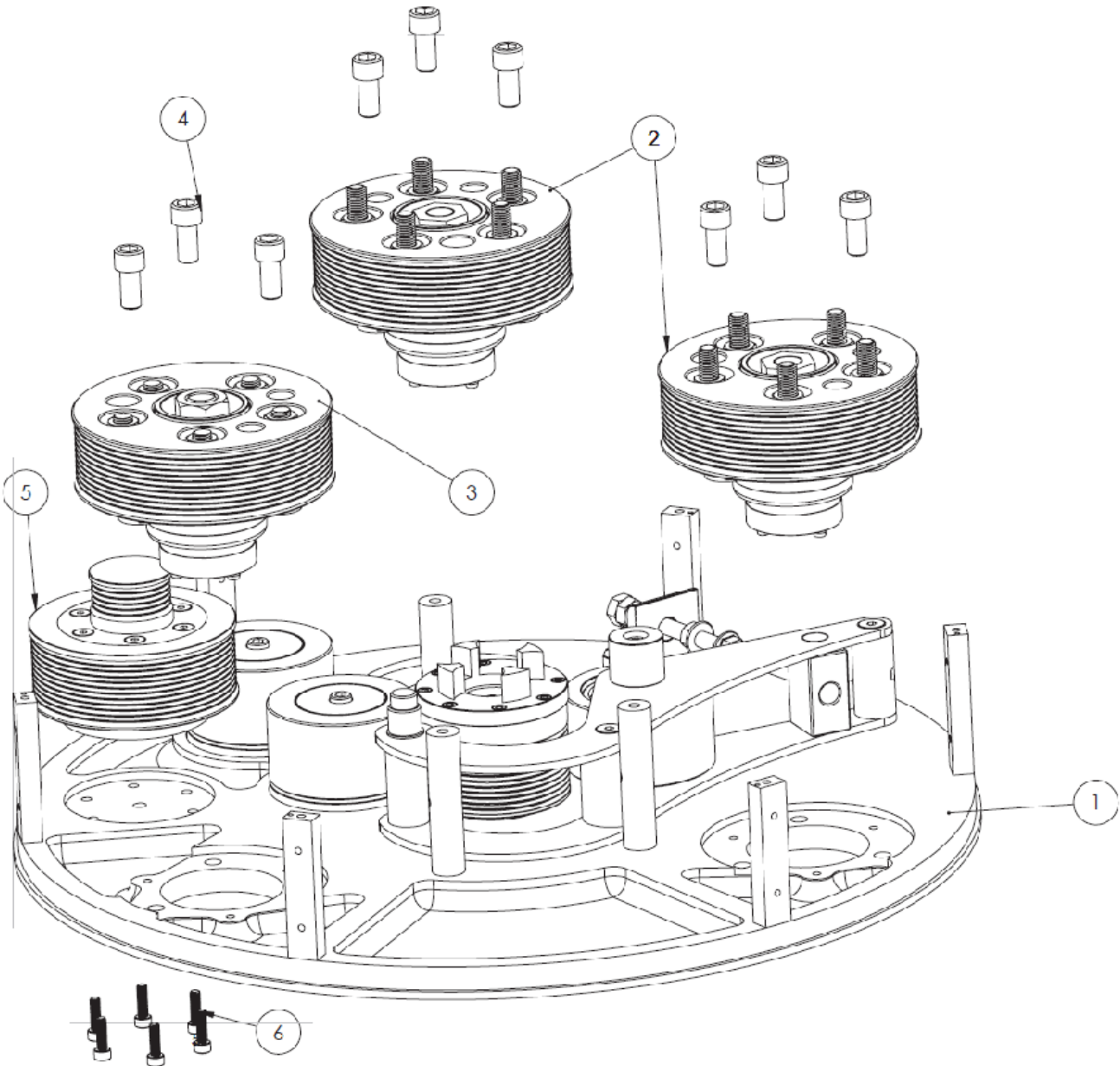
## BOTTOM DRUM II ASSEMBLY – 650

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1		BOTTOM DRUM I	1
2	BG.6A006.10	SUBASSEM, MAIN BELT IDLER	2
3	BG.6A007.00	SUBASSEM, MAIN BELT SPINDLE	1
4	BG.6A005.10	SUBASSEM, BELT TIGHTENER	1
5	12-0600-20	SCREW, SOCKET HEAD CAP M6-1.0 X 16	12
6	12-0600-20	SCREW, SOCKET HEAD CAP M6-1.0 X 16	6
7	NB.12.232	SCREW, SOCKET HEAD M12-1.75 X 20 LOW HEAD	1
<b>NOT PICTURED</b>			
5	12-0600-20	Red LocTite 262	12
6	12-0600-20	Red LocTite 262	6
7	NB.12.232	Red LocTite 262	1



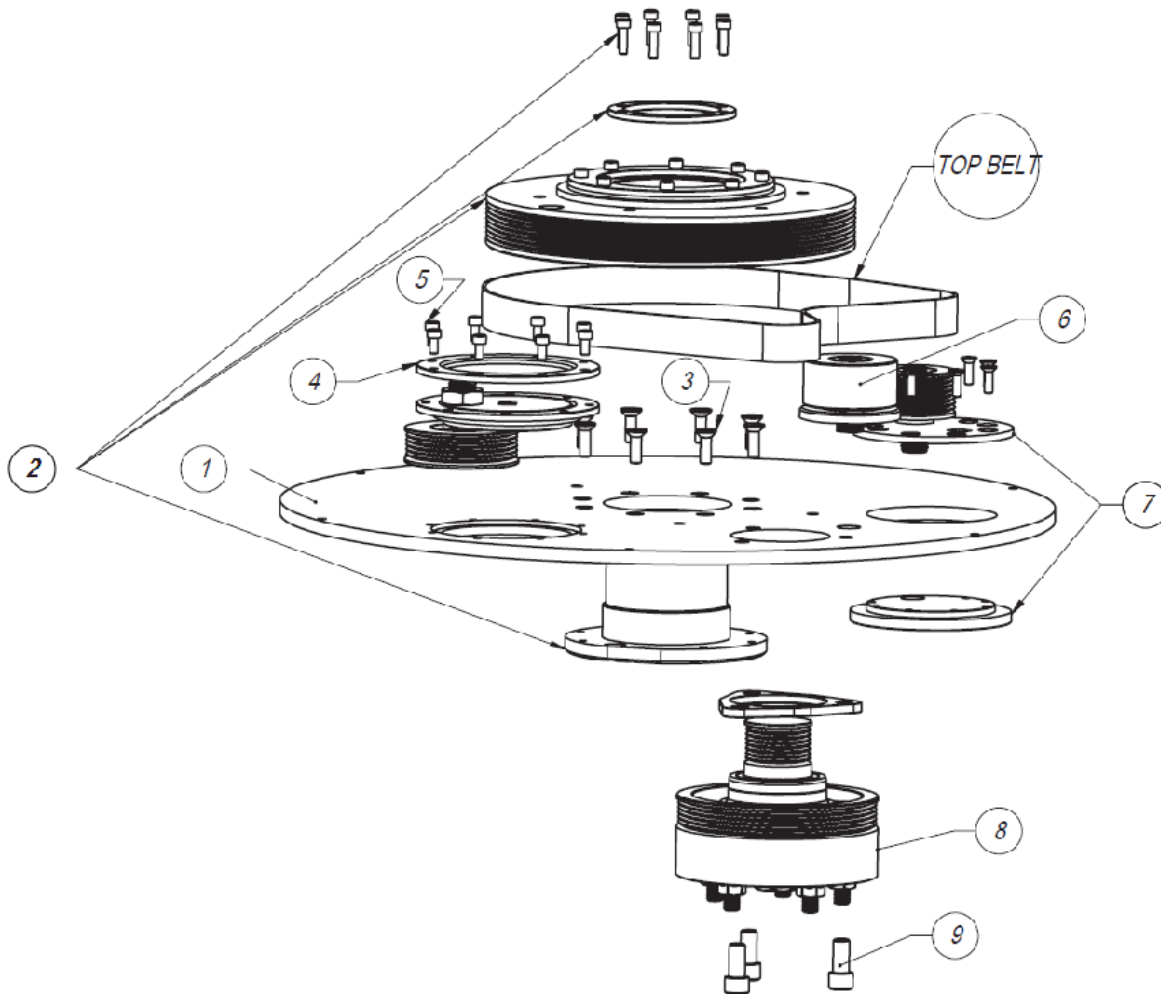
**BOTTOM DRUM III ASSEMBLY – 650**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1		BOTTOM DRUM II	1
2	BG.6A008.00	SUBASSEM, PLANETARY	2
3	BG.6A008.10	SUBASSEM, PLANETARY, SHORTENED	1
4	12-1200-30	SCREW, SOCKET HEAD CAP M12-1.75 X 30 12.9 ZINC	9
5	BG.6A009.00	SUBASSEM, PTO	1
6	12-0600-20	SCREW, SOCKET HEAD CAP M6-1.0 X 16 12.9 ZINC	6
<b>NOT PICTURED</b>			
4	N/A	Red Loctite 262, Torque 80 ft-lbf	9
6	N/A	Red Loctite 262	6



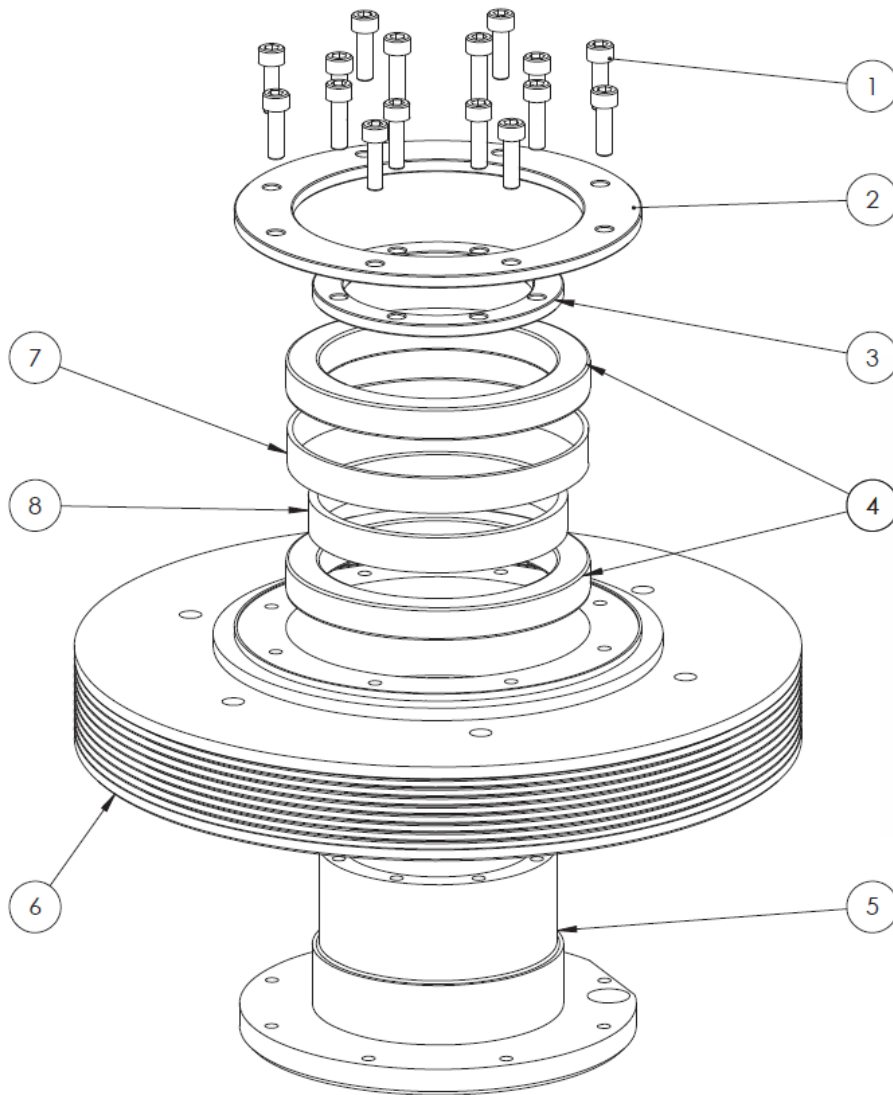
## TOP PLATE ASSEMBLY – 650

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	BG.60024.00	PLATE, TOP DRUM	1
2	BG.6A001.00	SUBASSEM, DRUM SHEAVE	1
3	12-0680-20	SCREW, FLAT HEAD SOCKET CAP M6 -1.0 X 20	8
4	BG.2A001.00	SUBASSEM, PTO TENSIONER	1
5	12-0600-12	SCREW, SOCKET HEAD CAP M6 -1.0 X 12 ZINC	8
6	BG.6A003.00	SUBASSEM, TOP BELT IDLER	1
7	BG.6A004.00	SUBASSEM, TOP BELT TENSIONER	1
8	BG.6A002.00	SUBASSEM, INTERMEDIATE SHEAVE	1
9	12-1200-25	SCREW, SOCKET HEAD CAP M12-1.75 X 25 12.9	3
<b>NOT PICTURED</b>			
2	N/A	Rotate spindle so it lines up as in the picture. Fasten #2 with #3 first, then assemble	1
3	N/A	Red LocTite 263, Torque to 35 ft/lb sq	8
5	N/A	AFTER PTO BELT IS TENSIONED PROPERLY, Blue LocTite 243	8
7	N/A	Large(M20) Bolt: Red LocTite 263, Torque 80 ft-lbf Small bolts: leave loose, until Top belt is tensioned, then use Blue LocTite 242	
8	N/A	Install with spacer in the correct position.	1
9	N/A	Red LocTite 263, Torque to 80 ft/lb sq	3



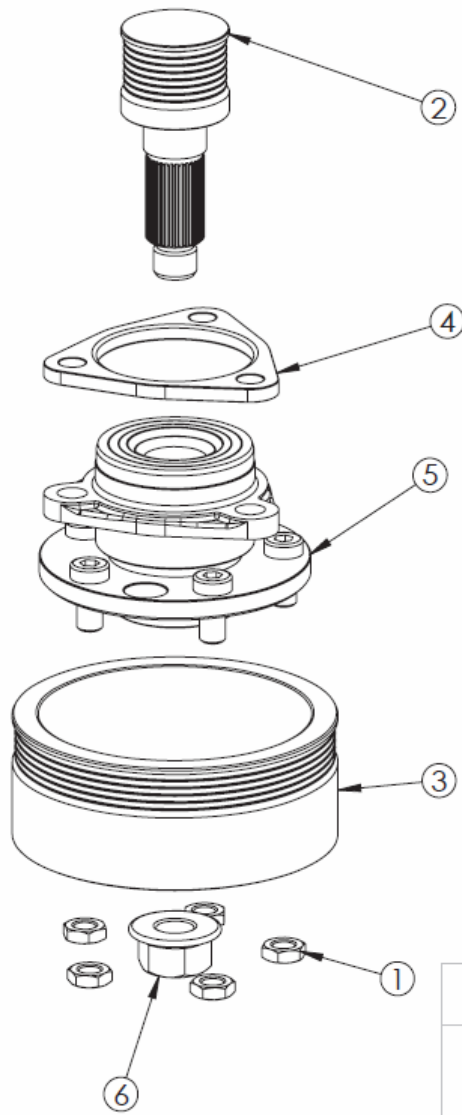
### DRUM SHEAVE ASSEMBLY – 650

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	12-0600-20	SCREW, SOCKET HEAD CAP M6-1.0 X 20 12.9 ZINC	16
2	BG.60032.50	RETAINER, OUTER SUSPENSION DUAL BEARING	1
3	BG.60033.50	RETAINER, INNER SUSPENSION BEARING DUAL	1
4	BG.20224.00	BEARING, 61818-2RS	2
5	BG.60030.00	SPINDLE, STATIONARY DRUM	1
6	BG.60035.00	SHEAVE, STATIONARY DRUM	1
7	BG.60060.00	SPACER, INNER SUSPENSION BEARING	1
8	BG.60059.00	SPACER, INNER DRUM SPINDLE BEARING	1
	BG.6A001.00	<b>SUBASSEM, DRUM SHEAVE</b>	<b>1</b>
<b>NOT PICTURED</b>			
1	12-0600-20	Red LocTite 263	8
1	12-0600-20	These parts are installed at the top plate 'upper level'. Shown here for proper stack-up	8
3	BG.60033.50		1
5	BG.60030.00		1



**INTERMEDIATE ASSEMBLY – 650**

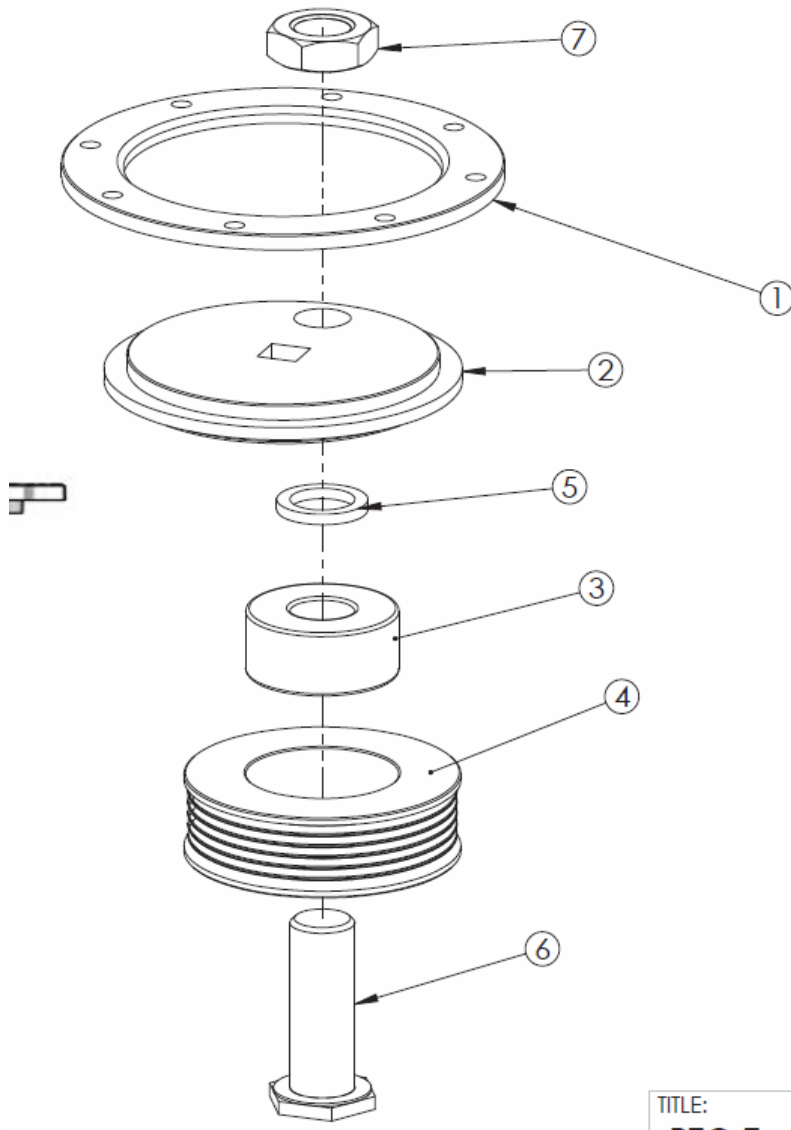
ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	NB.20.107	LUGNUT, M12-1.5	5
2	BG.60026.00	AXLE, INTERMEDIATE	1
3	BG.60025.00	SHEAVE, INTERMEDIATE	1
4	BG.20209.00	SPACER, PTO HUB	1
5	BG.20201.00	HUB	1
6	12-2060	NUT, HEX FLANGE M20-2.5	1
	BG.6A002.00	<b>SUBASSEM, INTERMEDIATE SHEAVE</b>	<b>1</b>
<b>NOT PICTURED</b>			
1	N/A	<b>Red</b> LocTite 263, Torque 60 ft-lbf	5
6	N/A	<b>Red</b> LocTite 263, Torque 150 ft-lbf	1





**PTO TENSIONER ASSEMBLY – 650**

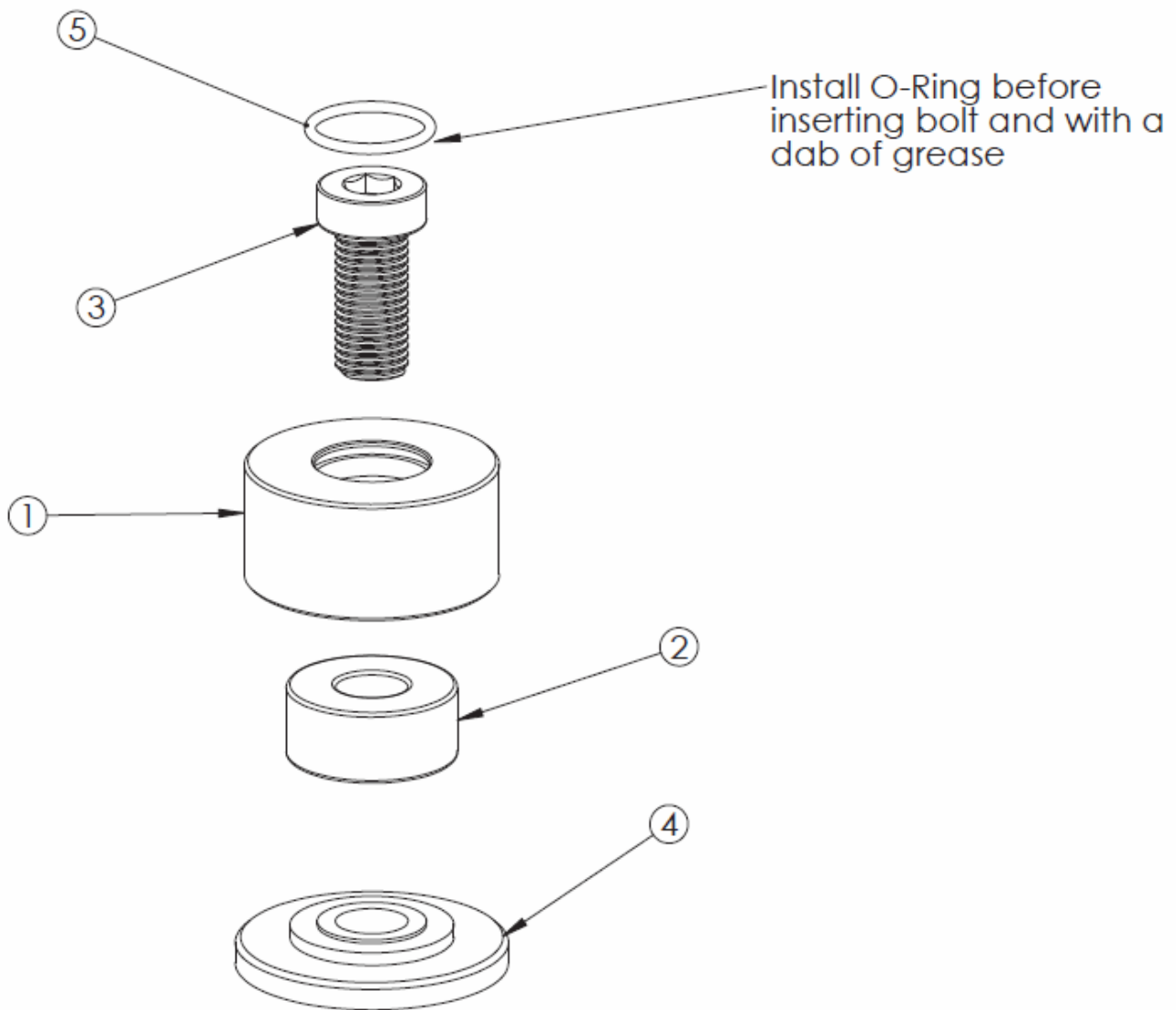
ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	BG.20203.00	CLAMP, PTO TENSIONER	1
2	BG.20204.00	PLATE, PTO TENSIONER	1
3	BG.20220.00	BEARING, 3204-2RS	1
4	BG.20212.00	IDLER, PTO TENSIONER	1
5	BG.20211.00	SPACER, PTO TENSIONER IDLER	1
6	BG.20214.00	SCREW, HEX HEAD MODIFIED M20-2.5 X 55	1
7	12-2040	NUT, JAM M20 - 2.5	1
	BG.2A001.00	<b>SUBASSEM, PTO TENSIONER</b>	<b>1</b>
<b>NOT PICTURED</b>			
6	N/A	Red LocTite 263 for contact with #2, Torque 80 ft-lbf.	1
7	N/A	Then, Red LocTite 263 on #6 for #7. Capture #6; Torque #7 to 80 ft-lbf.	1



TITLE:  
**PTO Ten:**

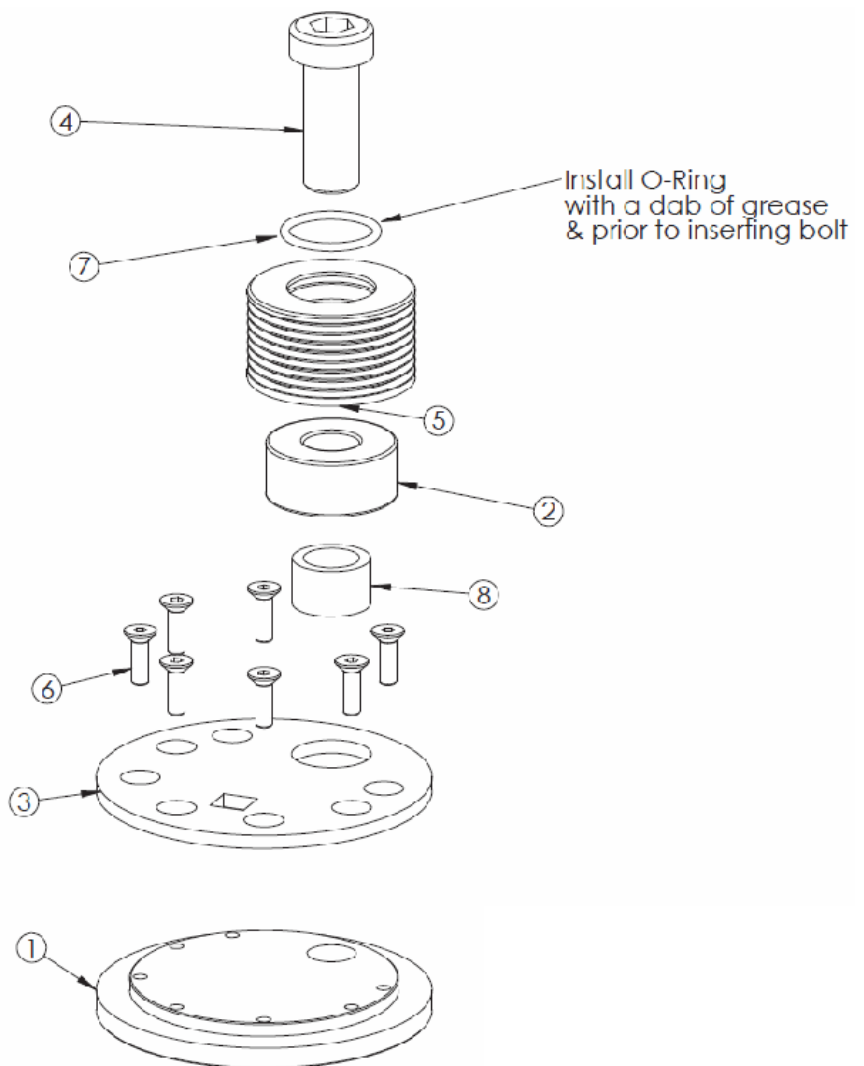
### TOP IDLER ASSEMBLY – 650

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	BG.60028.00	IDLER, TOP BELT	1
2	BG.20220.00	BEARING, 3204-2RS	1
3	BG.60073.00	SCREW, MODIFIED SOCKET HEAD M20-2.5	1
4	BG.60027.00	BASE, TOP BELT IDLER	1
5	BG.20215.00	O-RING, M30	1
	BG.6A003.00	SUBASSEM, TOP BELT IDLER	1
<b>NOT PICTURED</b>			
3	N/A	Red LocTite 263, Torque 80 ft-lbf into the top plate.	1



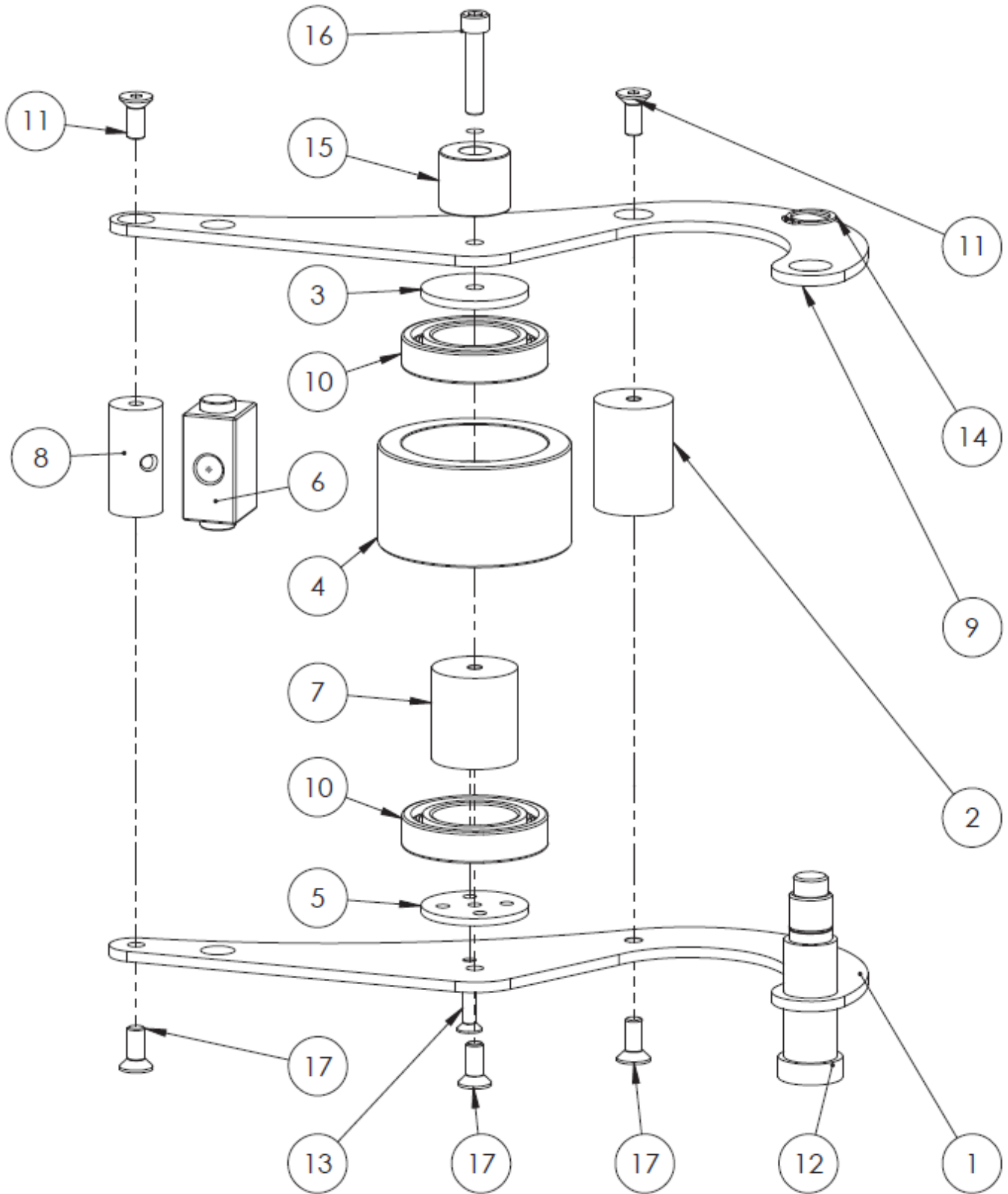
## TOP TENSIONER ASSEMBLY – 650

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	BG.20205.50	PLATE, BELT TENSIONER	1
2	BG.20220.00	BEARING 3204-2RS	1
3	BG.20206.50	CLAMP, TOP BELT TENSIONER	1
4	NB.12.263	SCREW, LOW SOCKET HEAD CAP M20-2.5	1
5	BG.60031.00	IDLER, TOP BELT TENSIONER	1
6	12-0680-20	SCREW, FLAT HEAD SOCKET CAP M6 - 1.0	7
7	BG.20215.00	O-RING, M30	1
8	BG.20210.00	SPACER, TOP BELT TENSIONER IDLER	1
	BG.6A004.00	<b>SUBASSEM, TOP BELT TENSIONER</b>	<b>1</b>
<b>NOT PICTURED</b>			
4	N/A	Red LocTite 263, Torque 80 ft-lbf after installed on top plate.	1
6	N/A	Blue LocTite 243, After belts are tensioned.	7



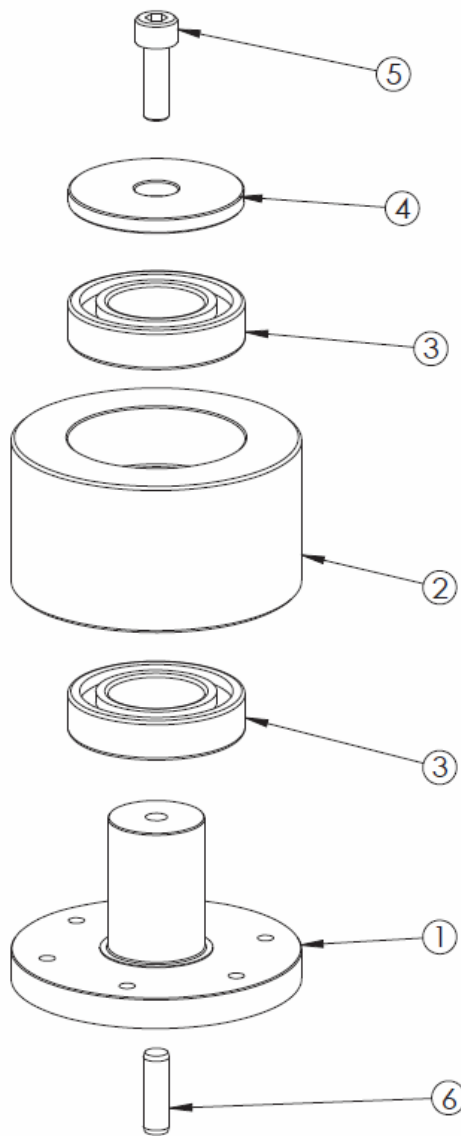
## MAIN BELT TIGHTENER ASSEMBLY – 650

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	BG.60013.10	ARM, LOWER TENSION	1
2	BG.60015.10	STANCION, HEAVY MAIN TENSIONER	1
3	BG.60016.00	SPACER, UPPER TENSIONER SPINDLE	1
4	BG.60017.00	IDLER, MAIN TENSIONER	1
5	BG.60020.00	SPACER, LOWER TENSIONER SPINDLE	1
6	BG.60022.00	GRUDGEON, MAIN TENSIONER	1
7	BG.60018.10	SPINDLE, MAIN TENSIONER IDLER	1
8	BG.60019.00	STANCION, MAIN TENSIONER LIGHT	1
9	BG.60014.10	ARM, UPPER TENSION	1
10	BG.20217.00	Bearing 6008-2RS	2
11	12-0800-20	SCREW, SOCKET HEAD CAP M8 -1.25 X 20	5
12	BG.60012.10	SPINDLE, MAIN TENSIONER	1
13	12-0680-20	SCREW, FLAT HEAD SOCKET CAP M6 -1.0 X 20	1
14	NB.40.104	M20 RETAINER	1
15	BG.60016.01	Upper Tensioner Upper Spacer	1
16	12-0800-35	SCREW, SOCKET HEAD CAP M8x1.25x35	1
17	12-0880-20	SCREW, FLAT HEAD SOCKET CAP M8x1.25x20	1
	BG.6A005.00	<b>SUBASSEM, BELT TIGHTENER</b>	<b>1</b>
<b>NOT PICTURED</b>			
11	N/A	Red LocTite 262, Do not LocTite the top bolts, until bottom belt is installed	5
13	N/A	Red LocTite 262	1
16	N/A	Red LocTite 262, Do not LocTite the top bolts, until bottom belt is installed	1
17	N/A	Red LocTite 262, Do not LocTite the top bolts, until bottom belt is installed	1



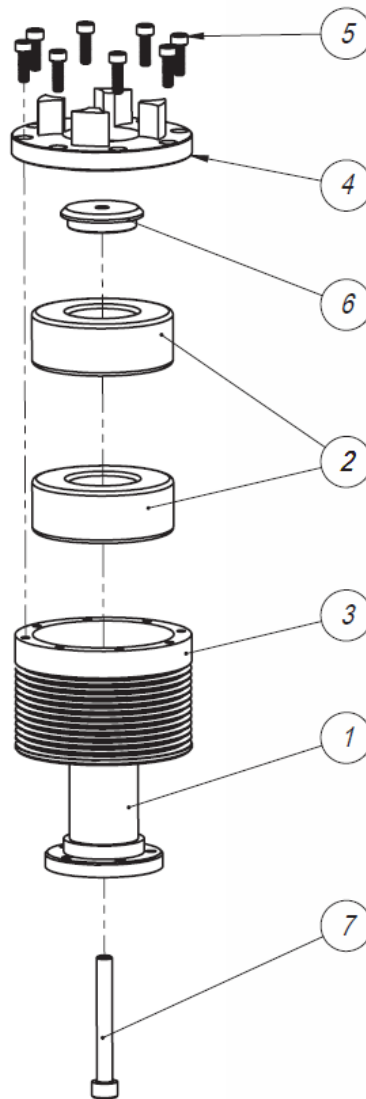
**MAIN IDLER ASSEMBLY – 650**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	BG.60008.00	SPINDLE, MAIN BELT IDLER	1
2	BG.60007.00	IDLER, MAIN BELT	1
3	BG.20221.00	BEARING 6006-2RS	2
4	BG.60009.00	RETAINER, IDLER BEARING <span style="float: right;">Be Careful this does not rub one side.</span>	1
5	12-0800-20	SCREW, SOCKET HEAD CAP M8-1.25X20	1
6	NB.50.143	PIN, HARDENED M8 X 26	1
	BG.6A006.00	<b>SUBASSEM, MAIN BELT IDLER</b>	<b>2</b>
<b>NOT PICTURED</b>			
5	N/A	Red Loctite 263	1



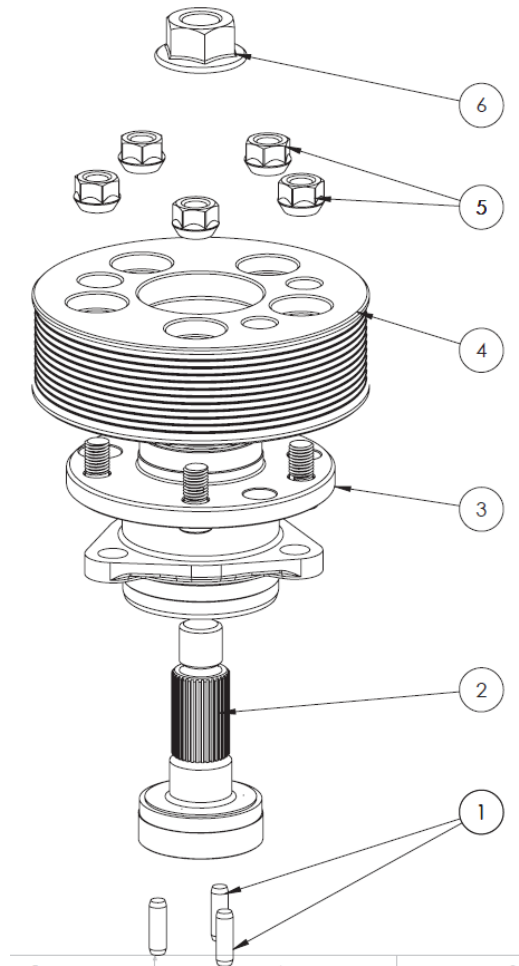
### MAIN SPINDLE ASSEMBLY – 650

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	BG.60005.10	SPINDLE, MAIN DRIVE SHEAVE	1
2	BG.20216.00	BEARING, 5207-2RS	2
3	BG.60004.60	SHEAVE, MAIN DRIVE	1
4	BG.60039.60	CAP, MAIN SHEAVE	1
5	12-0500-16	SCREW, SOCKET HEAD CAP M5 -0.8 X 16	8
6	BG.60005.11	Retainer, Bearing	1
7	NB.12.222	M8x1.25x65 SHCS	1
	BG.6A007.00	<b>Main Spindle</b>	<b>1</b>
<b>NOT PICTURED</b>			
5	N/A	Red LocTite 263	8
7	N/A	Red LocTite 263	1
<b>NOT PICTURED</b>			
X	DG.1499	WRENCH, SPINDLE EDGER	0



**PLANATARY ASSEMBLY – 650**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	NB.50.143	PIN, HARDENED M8 X 26	3
2	BG.60080.00	AXLE, PLANETARY 40MM (MODIFIED)	1
3	BG.20201.00	HUB	1
3	NB.82.200	SHORTENED STUD	5
4	BG.60001.00	SHEAVE, PLANETARY	1
5	NB.20.109	NUT, JAM M12-1.5 (Lugnuts displayed are for a 'future' revision)	5
6	12-2060	NUT, HEX FLANGE M20-2.5 (MODIFIED)	1
	BG.6A008.10	<b>Planetary Assembled Short</b>	<b>1</b>
1	NB.50.143	PIN, HARDENED M8 X 26	3
2	BG.20200.00	AXLE, PLANETARY 40MM	1
3	BG.20201.00	HUB	1
4	BG.60001.00	SHEAVE, PLANETARY	1
5	NB.20.109	NUT, JAM M12-1.5 (Lugnuts displayed are for a 'future' revision)	5
6	12-2060	NUT, HEX FLANGE M20-2.5	1
	BG.6A008.00	<b>Planetary Assembled</b>	<b>2</b>
<b>NOT PICTURED</b>			
3	N/A	Studs removed from hub, shortened, reinserted.	5
5	N/A	Red LocTite 263, Torque 60 ft-lbf	5
6	N/A	Red LocTite 263, Torque 150 ft-lbf	1



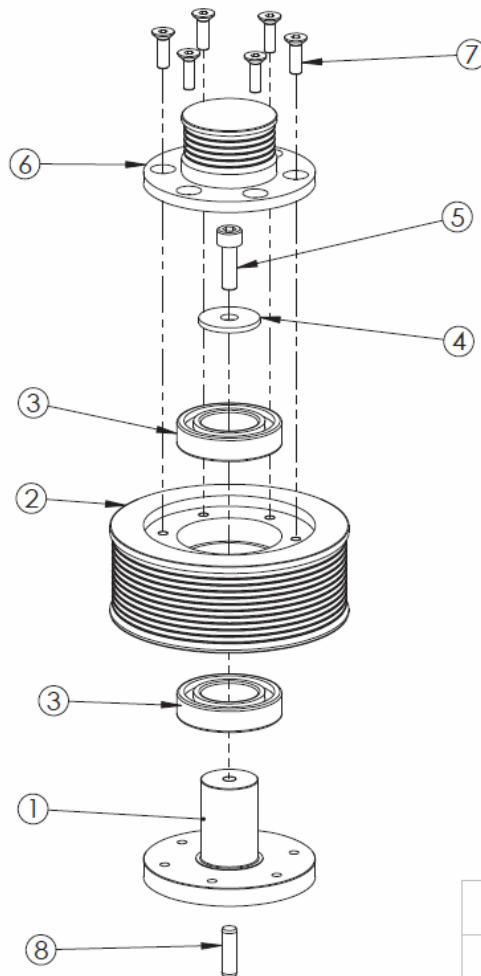


## POWER TAKE OFF (PTO) – 650

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	BG.60006.00	PTO Sheave Spindle	1
2	BG.60002.00	PTO Hub Sheave	1
3	BG.20221.00	Bearing 6006-2RS	2
4	NB.30.112	M8X35X2.5 Fender Washer	1
5	12-0800-25	M8-1.25x25 Socket Head Cap Screw	1
6	BG.60003.00	PTO Drive Sheave	1
7	12-0680-20	M6-1.0x20 Socket Flat Head Cap Screw	6
8	NB.50.143	Hardened Pin M8x26	1
	BG.6A009.00	<b>PTO Assembled</b>	<b>1</b>

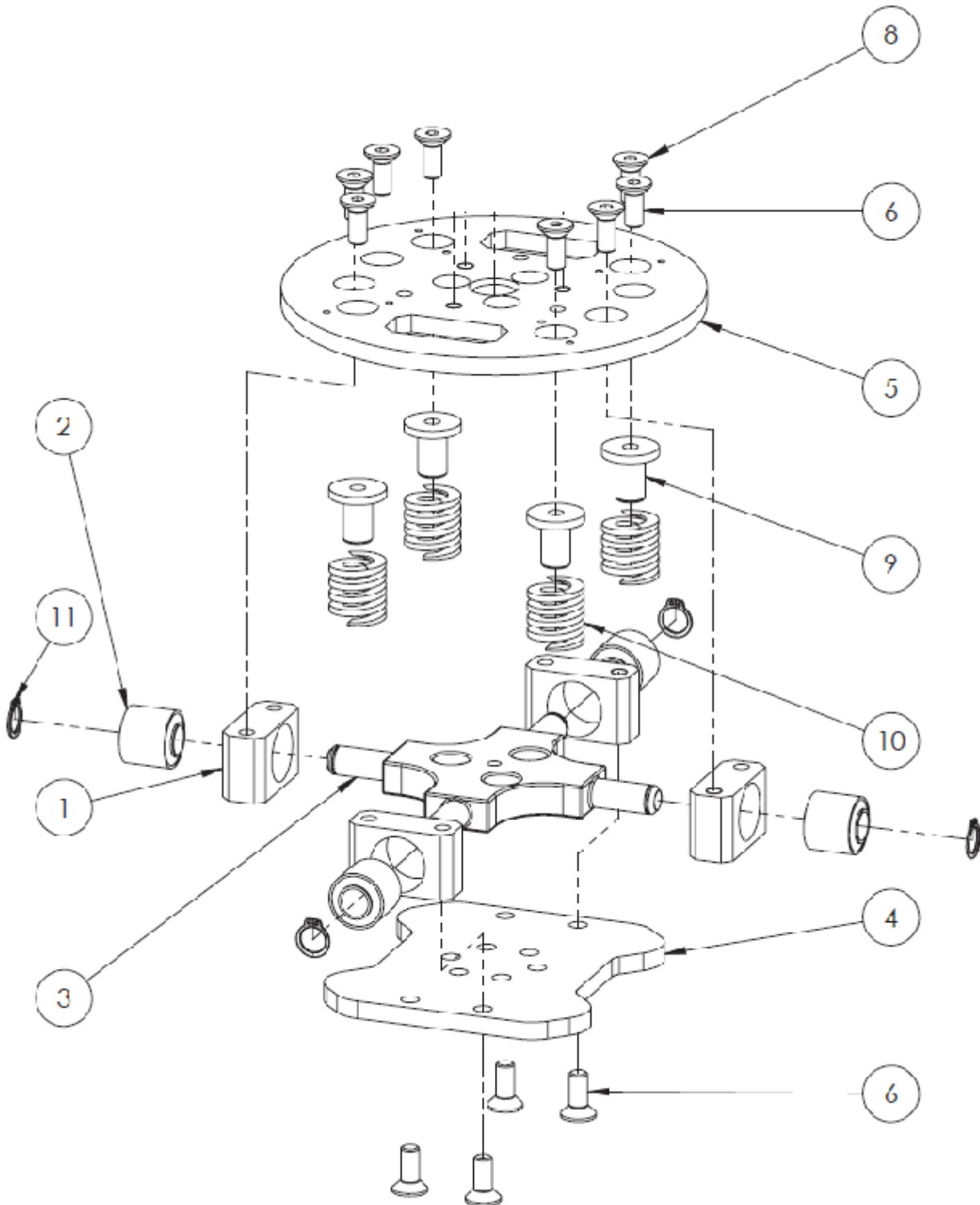
**NOT PICTURED**

5	N/A	Red LocTite 263	1
7	N/A	Red LocTite 263	6



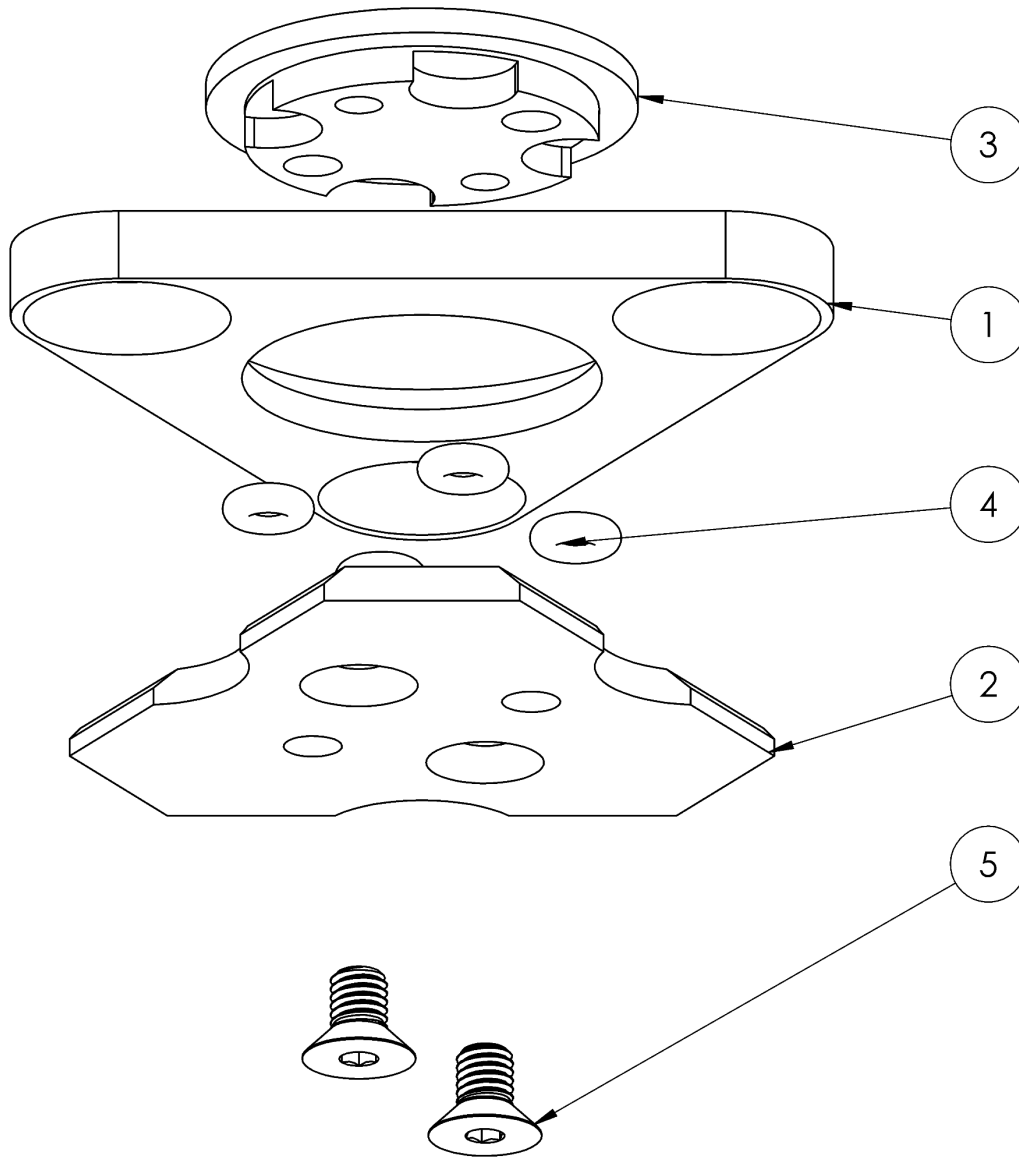
## FLEX HEAD – 650

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	BG.20103.00	YOKE, SUSPENSION	4
2	BG.20109.00	BUSHING, YOKE	4
3	BG.20102.01	ELEMENT, CENTER STUDED	1
4	BG.20100.50	PLATE, DRIVING	1
5	BG.20101.01	PLATE, DRIVEN	1
6	12-0880-20	SCREW, FLAT HEAD SOCKET CAP M8 -1.25 X 20	8
7	BG.20104.25	LOCK, SHAMROCK PLATE ASSEM	1
8	12-0880-16	SCREW, FLAT HEAD SOCKET CAP M8-1.25 X 16	7
9	BG.20106.25	POST, SPRING	4
10	BG.20106.52	SPRING, DIE BLUE MEDIUM	4
11	NB.40.113	RING, EXTERNAL 1/2"	4
	BG.6A010.00	<b>FLEX HEAD, WITH BLUE SPRING</b>	<b>3</b>
<b>NOT PICTURED</b>			
1	N/A	Insert bushing first. One side will be flush on the outer edge of metal sheath, one side will protrude out on the outer edge of metal. The flush side faces the inward in the assembly.	4
6	N/A	Red LocTite 263	8
8	N/A	Red LocTite 263	7



**96-0785 - TOOLING TRIANGLE ASSEMBLY – 650 - B**

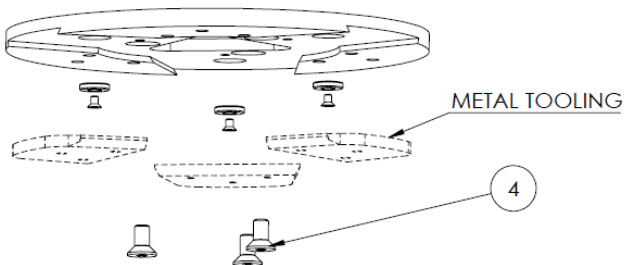
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	51-3340	TOOLING TRIANGLE BASE 650	1
2	51-3341	TRIANGLE HOLDER 650	1
3	51-0110	TRIANGLE HOLDER CENTER ROTATOR	1
4	13-0142	O-RING (.125 ID X .313 OD X 0.94 W)	4
5	12-0581-10	FLAT HEAD - M5X10 -SS	2



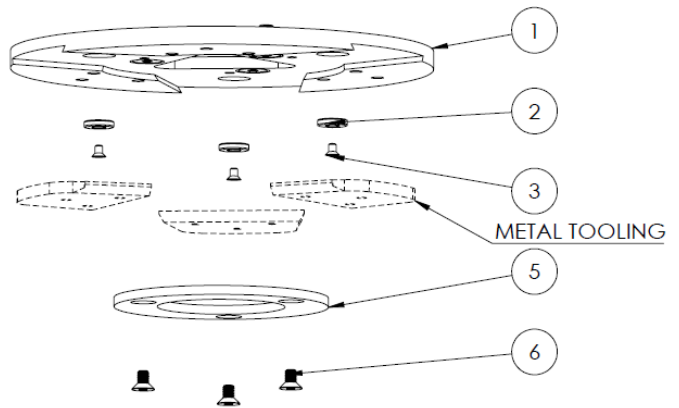
**96-0786 - METAL TOOLING KIT – 650 – C**

ITEM NO.	PART NUMBER	DESCRIPTION	SLIDE IN QTY.	SLIDE IN WITH RING QTY.	BOLT ON QTY.
1	51-3342	TOOLING PLATE 650	1	1	1
2	13-0650	METAL TOOLING MAGNET	3	3	3
3	12-0481-06	FLAT HEAD PHILLIPS SCREW – M4X6 - SS	3	3	3
4	12-0880-16	FLAT HEAD SOCKET SCREW – M8X16 - ZINC	3	3	3
5	51-3343	METAL TOOLING RING 650		1	
6	12-0680-10	FLAT HEAD SOCKET SCREW – M6X10 - ZINC		3	
7	12-0680-16	FLAT HEAD SOCKET SCREW – M6X16 - ZINC			9

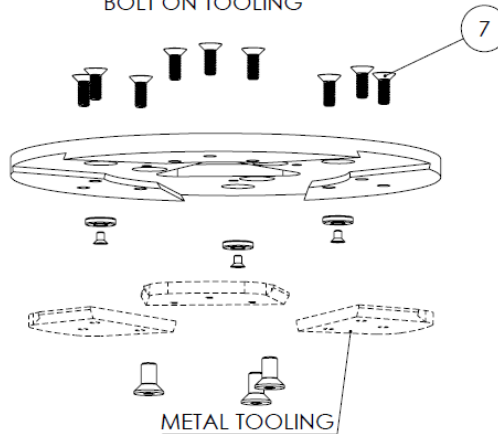
SLIDE IN TOOLING  
(WITH LOCKING TRANSPORT SCREWS)



SLIDE IN TOOLING  
(WITH LOCKING RING AND TRANSPORT SCREWS)

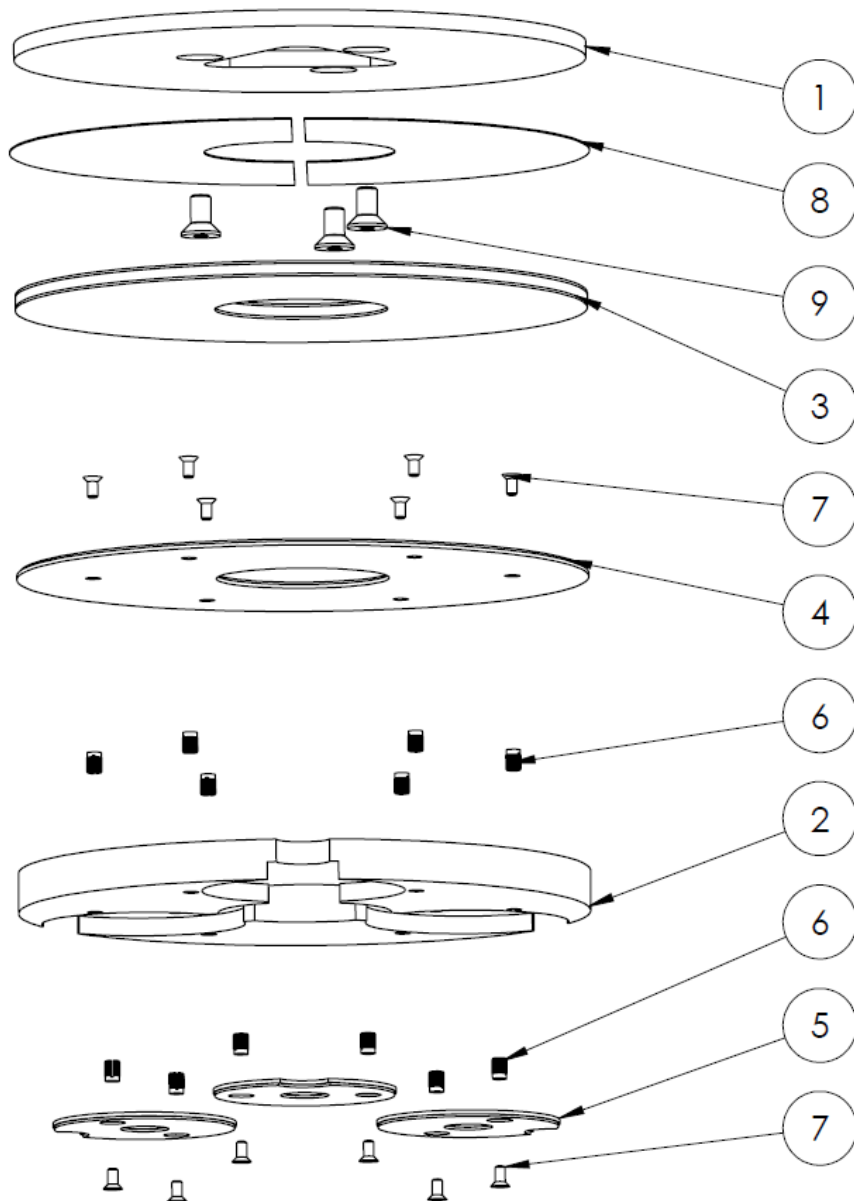


BOLT ON TOOLING



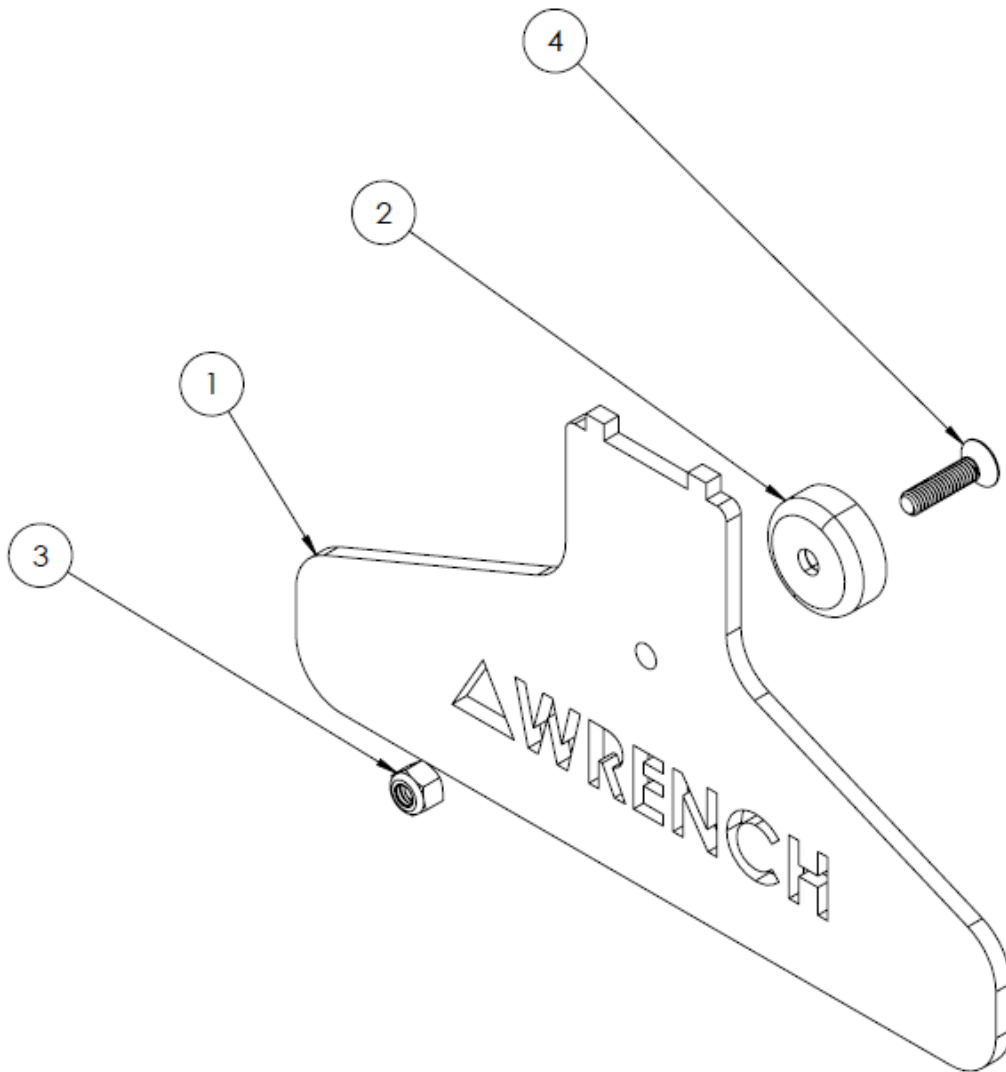
**96-0787 RESIN TOOLING PLATE ASSEMBLY 3IN 650 – A**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	51-3344	RESIN TOOLING PLATE 650	1
2	51-3345	RESIN TOOLING HOLDER 650	1
3	13-0651	FOAM RISER ASSEMBLY 650	1
4	13-0652	RESIN TOOLING VELCRO PLATE 650	1
5	13-0653	RESIN TOOLING PLATE VELCRO 3IN	3
6	13-0654	PRESS-IN INSERT - M4 - BRASS	12
7	12-0480-08	FLAT HEAD PHILLIPS SCREW - M4X8 - ZINC	12
8	51-0665	ADHESIVE/VELCRO LOOP HALF 650	2
9	12-0880-16	FLAT HEAD SOCKET SCREW - M8X16 - ZINC	3



### 96-0456 – TOOLING WRENCH

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	52-0628	TOOLING WRENCH FLAT	1
2	13-0115	WRENCH MAGNET	1
3	12-0440	NYLOC NUT – M4 - ZINC	1
4	12-0480-16	FLAT HEAD – M4X16 - ZINC	1



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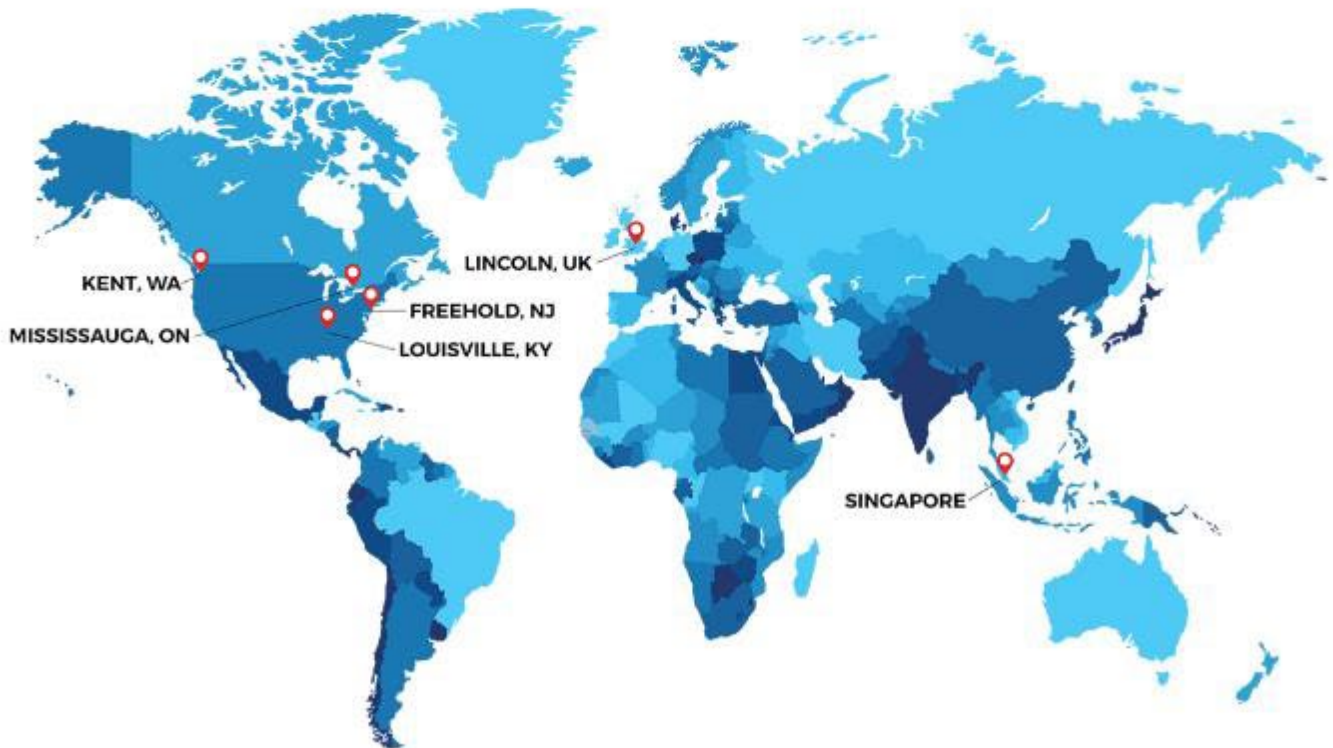


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