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SPARTAN®

SERIES PA13/2

Horizontal Band Saw

- Safety
- Installation
- Operation
- Maintenance
- Exploded Assemblies

Part No. PL/OMPA13/2, Fourth Edition, 2/00D

Replaces 4/99C, 9/96B, 11/95A

Record your machine's serial number here:

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An Important Message...

While Armstrong-Blum machinery and equipment is engineered for safety and efficiency, a high degree of responsibility must be placed upon the machine operator to follow safe practices, based primarily on common sense, upon which true safety depends. **Any machine with a potential safety hazard must be operated according to the instructions in the instruction manual, within the equipment's capacity, and in a careful and deliberate manner.** All guards must be in place, and safety glasses and other applicable safety clothing must always be used. The machine must be inspected and maintained regularly. Any questions regarding the safety, condition, or operation of this equipment must be immediately referred to supervisory or engineering personnel.

The warning sign reproduced below is attached to the machine in plain view of the operator to constantly remind the operator that only s/he can make this machine safe by following safe operating procedures. This sign must not be removed or disfigured. The sign must be replaced if it becomes unreadable. Replacement signs can be obtained from Armstrong-Blum Mfg. Co. by requesting part number 10-NP35 for the Marvel V10A2 Vertical Metal Cutting Band Saw, and part number 81-NP50 for all other machines sold by Armstrong-Blum Mfg. Co.

WARNING

READ THIS SIGN BEFORE OPERATING THIS MACHINE.

MISUSE OF THIS MACHINE MAY RESULT IN SERIOUS BODILY INJURY. YOU MUST THEREFORE FOLLOW THESE SAFE OPERATING PROCEDURES.

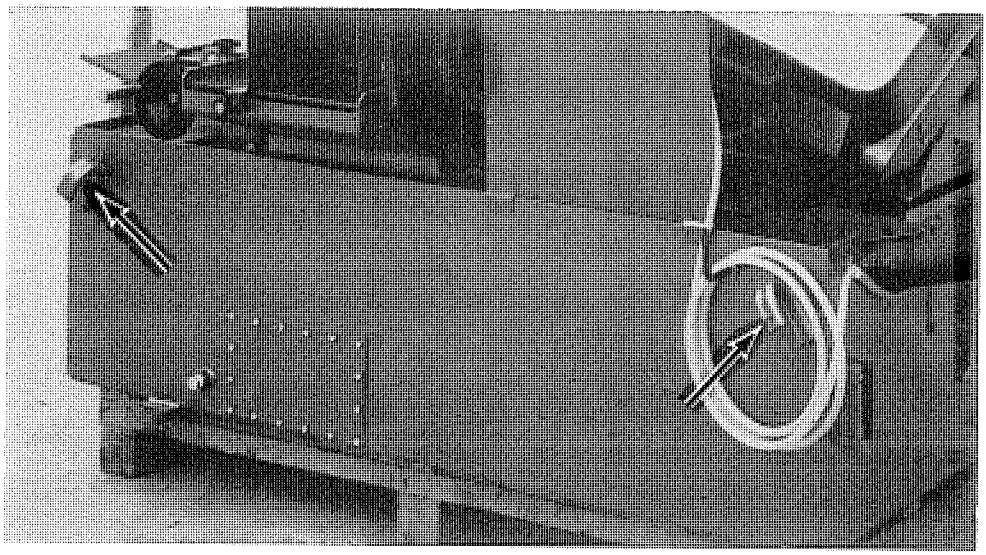
- THIS MACHINE IS CONSTRUCTED FOR METAL SAWING ONLY. DO NOT USE THIS MACHINE TO SAW OTHER MATERIAL.
- ALWAYS USE SAFETY GUARDS, ENCLOSURES, DEVICES OR TOOLING PROVIDED FOR SAFE OPERATION OF THIS MACHINE. DO NOT REMOVE THESE MECHANISMS FROM THIS MACHINE.
- ALWAYS USE YOUR EMPLOYER PROVIDED PERSONAL SAFETY EQUIPMENT.
- NEVER WEAR GLOVES WHILE OPERATING THIS SAW. WEAR GLOVES ONLY WHEN HANDLING BLADE DURING BLADE SET-UP.
- ALWAYS REMOVE RINGS, WATCHES, BRACELETS OR THE LIKE BEFORE OPERATING SAW.
- ALWAYS POSITION SAW GUIDE AND/OR POINT-OF-OPERATION GUARD AS CLOSE TO WORKPIECE AS POSSIBLE.
- ALWAYS CLAMP WORKPIECE SECURELY.
- ALWAYS STOP MACHINE AND WAIT FOR BLADE TO STOP MOVING BEFORE REACHING INTO POINT-OF-OPERATION OR VISE AREA.
- ALWAYS REFER TO DATA CHARTS OR OPERATOR'S MANUAL FOR PROPER SELECTION OF BLADE, SPEED, FEED, AND COOLANT FOR THE SIZE AND TYPE OF MATERIAL YOU ARE CUTTING.
- REPORT ANY UNSAFE CONDITIONS TO YOUR EMPLOYER.

DO NOT REMOVE THIS SIGN FROM THIS MACHINE.

Spartan bandsaws are fully tested prior to leaving the factory and are easily installed. Anyone with a basic knowledge of this equipment can have the machine ready for production in a minimum amount of time.

HANDLING

The saw is skidded and crated for shipment. For ease of handling, the saw should remain on the skid until positioned for installation. To ease handling, four lifting points are permanently attached to the saw for use with an overhead hoist.



Two of the permanent lifting points are identified in this photo.

Note: The machine is shipped with a shipping brace to secure the saw frame to the saw base. Do not remove this brace until the machine is properly positioned. See photo on page A-3.

IMPORTANT: Equipment capable of safely handling the weight of the machine is required. When crated, each saw weighs approximately:
Model PA10 - 2750 lbs. (1250 kg)
Model PA13 and PA13/2 - 3630 lbs. (1650 kg)
Model PA18 - 5300 lbs. (2409 kg)

CAUTION

When moving the machine with a forklift, be sure the load is safely balanced or personal injury or damage to the machine may occur.

PLACEMENT

The following items should be considered when positioning the saw:

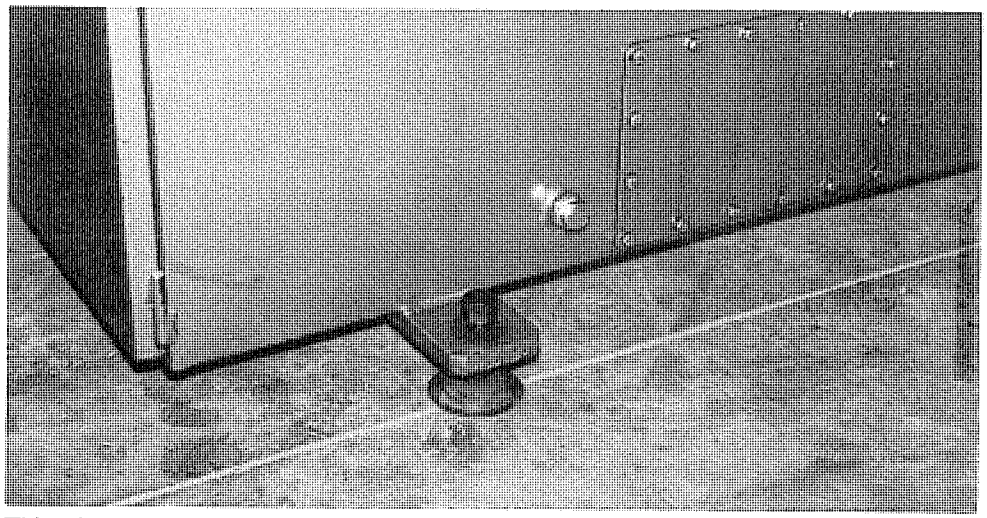
Foundation - The foundation should be a dry, level concrete floor in good condition. No special machine foundation is required.

Lighting - The entire machine should be well lighted, both for operator safety and convenience, and for machine maintenance.

Stock Movement - Allow sufficient space around the machine for loading and unloading work stock.

Maintenance - The saw should be placed to allow easy access to all areas for maintenance and repairs. Ensure that all doors and access panels can be opened without interference.

After a suitable location has been found, the machine can be removed from the skid and placed in position. Before lowering the saw to the floor, install the leveling screws supplied with the saw (shipped in the red toolbox) into the machine base. Place the floor washers (also shipped in the red toolbox) under each of the leveling screws.



This photo shows a floor washer and leveling screw.

CLEANING

All machined surfaces were coated with a rust inhibitor prior to shipment and need to be thoroughly cleaned. Remove the rust inhibitor with an appropriate solvent.

Note: Unfinished machined surfaces are susceptible to rust. Give all unfinished surfaces a light coat of machine oil.

LEVELING

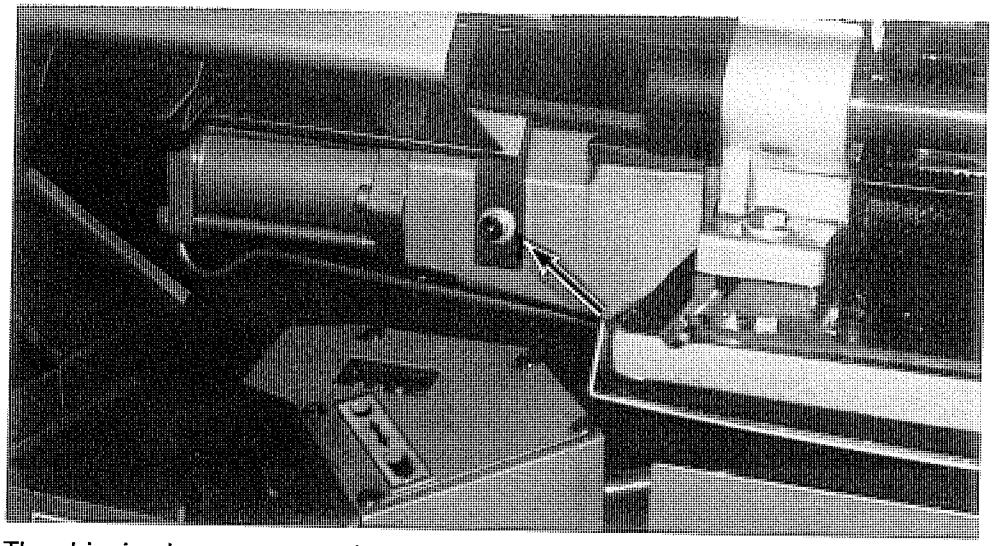
After the machine has been placed in a suitable location, it must be leveled.

IMPORTANT: Leveling is extremely important for consistent, accurate cuts.

Place a machinist's level at right angles on the saw table and vise slide plates and adjust the leveling screws until the machine is level both side to side and front to back. Make sure all of the leveling screws are supporting the machine.

SHIPPING BRACE

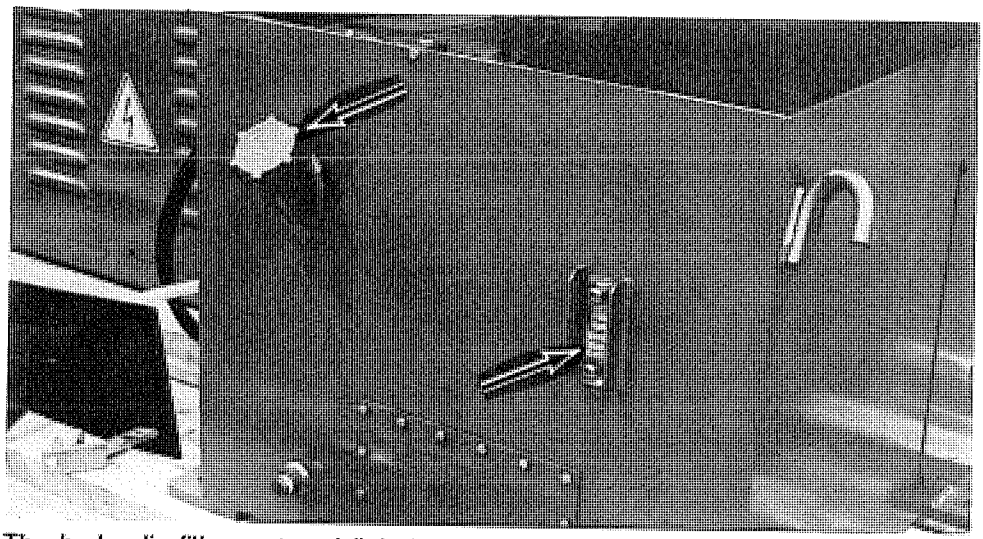
After the machine is positioned and leveled, the shipping brace which secures the saw frame to the saw base may be removed. This is located on the back of the idler bandwheel end of the saw frame. Retain the shipping brace for future use.



The shipping brace secures the saw frame during shipment and movement of the machine. The brace is mounted between the machine base and the idler bandwheel.

HYDRAULIC SYSTEM

The hydraulic system is shipped complete with hydraulic fluid. The level of the hydraulic fluid should be checked before use. A sight gauge is mounted on the back (PA10) or left end (PA13, PA13/2, and PA18) of the machine base to visually inspect the oil level. If the oil level is low, add Mobil DTE 24 or equivalent until the oil level in the sight gauge indicates full.



The hydraulic filler port and fluid level sight gauge are shown in this photo. The location of these items depends on the particular model of saw. Refer to the text.

COOLANT SYSTEM

The coolant system requires the addition of coolant (cutting fluid), mixed according to the coolant manufacturer's directions, poured directly into the coolant tank. The model PA10 has a coolant capacity

of 15 gallons (57 liters), and the Spartan models PA13, PA13/2, and PA18 have a capacity of 21 gallons (80 liters). A sight gauge is mounted on the right side (PA10) or front (PA13, PA13/2, and PA18) of the saw base for visual inspection of the coolant level.

CAUTION

The coolant pump should never be run without coolant in the reservoir. Damage to the coolant pump will occur.

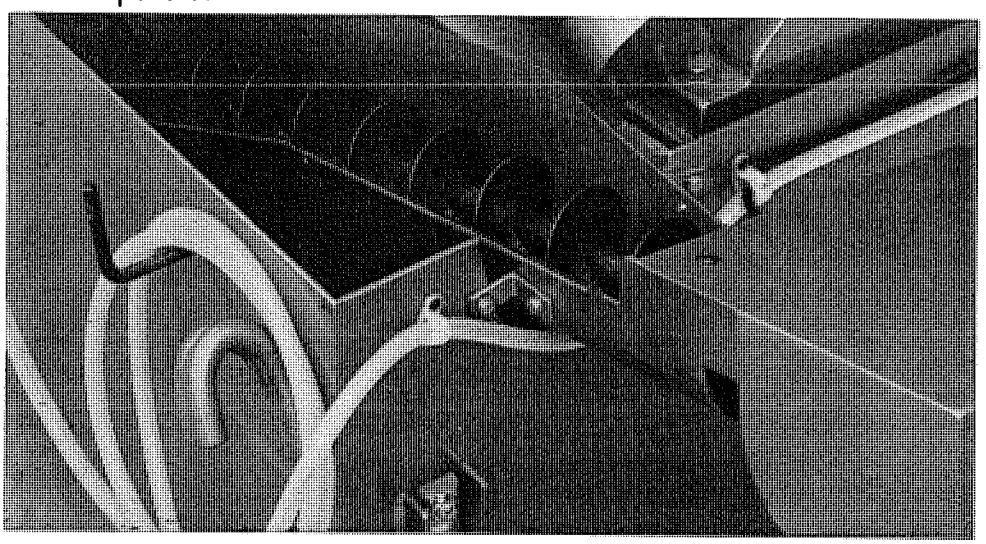
Flushing Hoses. The Model PA10's flushing hose is slip-fit into the tube on the chip brush housing. The Model PA13, PA13/2, and PA18 each have a separate flushing hose in addition to the hose which flushes the chip brush.

OPTIONAL EQUIPMENT

The Spartan line of bandsaws can be equipped with a number of optional features. These are described below.

Chip Conveyor. All Spartan saws can be fitted with an optional powered chip conveyor.

1. Slide the chip conveyor into the coolant return, position the angle brackets against the conveyor and the machine base, and mark the position of the holes.
2. Drill and tap on the marks for 1/4-20 threads. Mount the chip conveyor to the machine with the angled brackets.
3. Plug the conveyor's motor cord into an appropriate 115 volt receptacle.



This photo shows how the optional chip conveyor is mounted to the saw base.

Roller Tables. Roller tables are available in 5' sections to aid in material handling. These tables may be used on either the infeed or outfeed side of the machine. These tables are self standing units with no permanent attachment to the saw.

ELECTRICAL WIRING

Note: All electrical wiring must be done by a qualified electrician in conformance with the prevailing electrical standards of your area.

DANGER

Hazardous voltage. Will cause serious injury or death. Turn off the appropriate building circuit breaker prior to performing these steps.

1. Turn off the appropriate building circuit breaker to isolate electrical circuit to which the machine will be connected.

CAUTION

Be sure the supply voltage and phase matches the voltage the machine has been wired for. The machine's power cord is tagged with a red tag noting the proper voltage.

2. Connect the machine's power cord to an appropriate power source. Make sure the voltage of the power supply matches that for which the machine was wired.
3. After the machine's power cord has been connected, turn on the building's circuit breaker.

After the machine has been connected to a suitable power supply, a check must be made to insure the main power leads have been properly connected. To do this:

4. Turn on the machine's main electrical disconnect switch. The white "Power On" light should illuminate.

Note: The All Stop pushbutton must be released for the saw to run. Turn this mushroom shaped pushbutton clockwise to release.

5. Press the "Hydraulic On" button on the operator's panel.

IMPORTANT: Before performing the next step, make sure the shipping brace has been removed from the saw. See "Shipping Brace" on page A-3.

6. Press the "Frame Up" pushbutton. The saw frame should rise. If the saw frame does not rise, the main power lead connections need to be changed as described in steps 7 through 10.

DANGER

Hazardous voltage. Will cause serious injury or death. Turn off supply electricity at the circuit breaker before making connections to the saw.

7. Turn off the main electrical disconnect switch.
8. Turn off the saw's supply electricity at the circuit breaker.
9. Reverse any *two* of the power leads on the power cord.
10. Repeat steps 3 through 6 of this procedure.

FINAL INSPECTION

After the saw has been installed, a final, thorough inspection should be performed. The following checklist will locate any items that may need further attention.

INSPECT FOR:

- ☐ Loose components, guards or panels
- ☐ Loose fasteners and fittings
- ☐ Loose hoses and conduit
- ☐ Missing or damaged items
- ☐ Coolant, oil, or hydraulic leaks
- ☐ Tools and other materials left on saw
- ☐ Overall condition and readiness for use

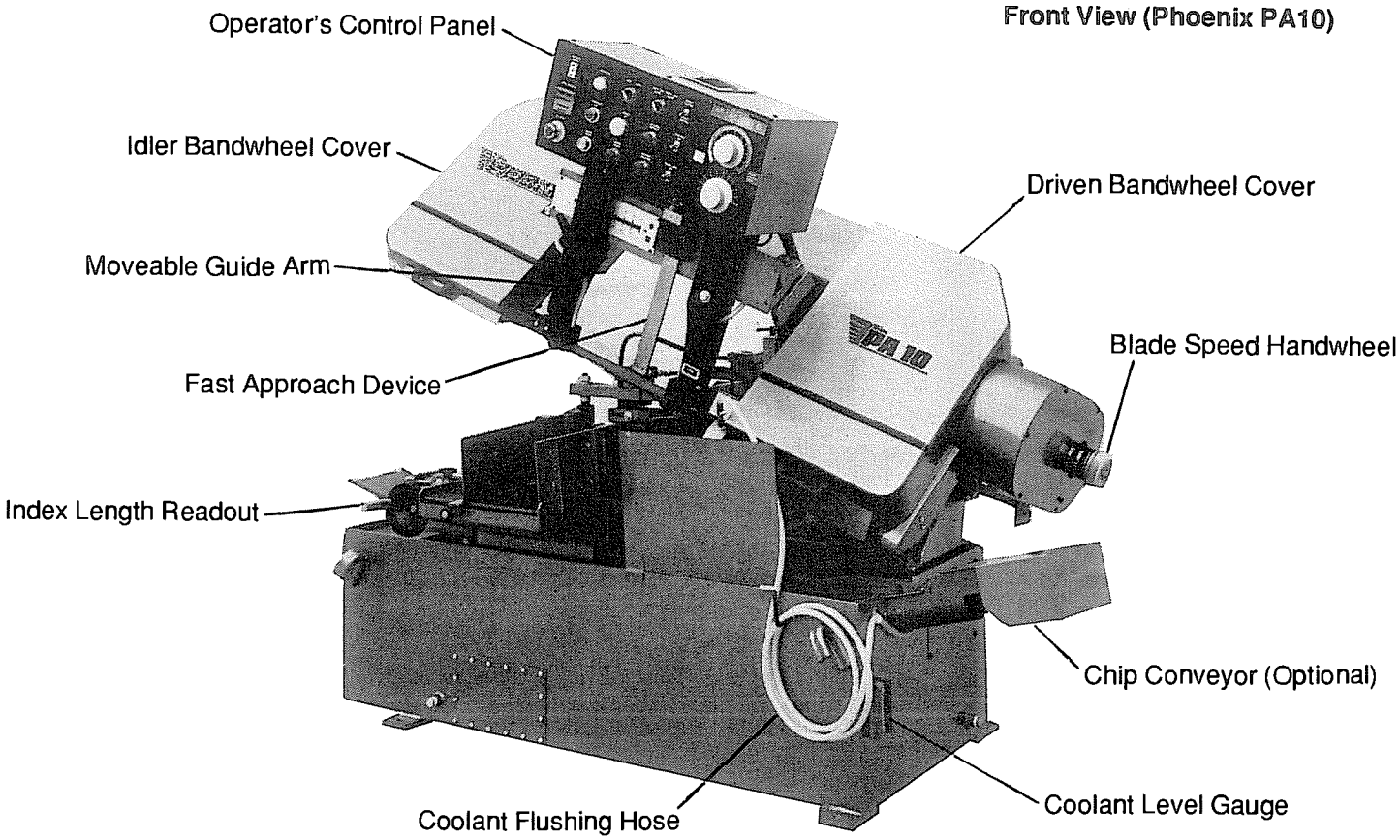
Note: Metric specifications represent nearest SI Unit converted from the basic U.S. Customary Unit.

Note: Specifications given are for standard machines. Available options may alter these specifications.

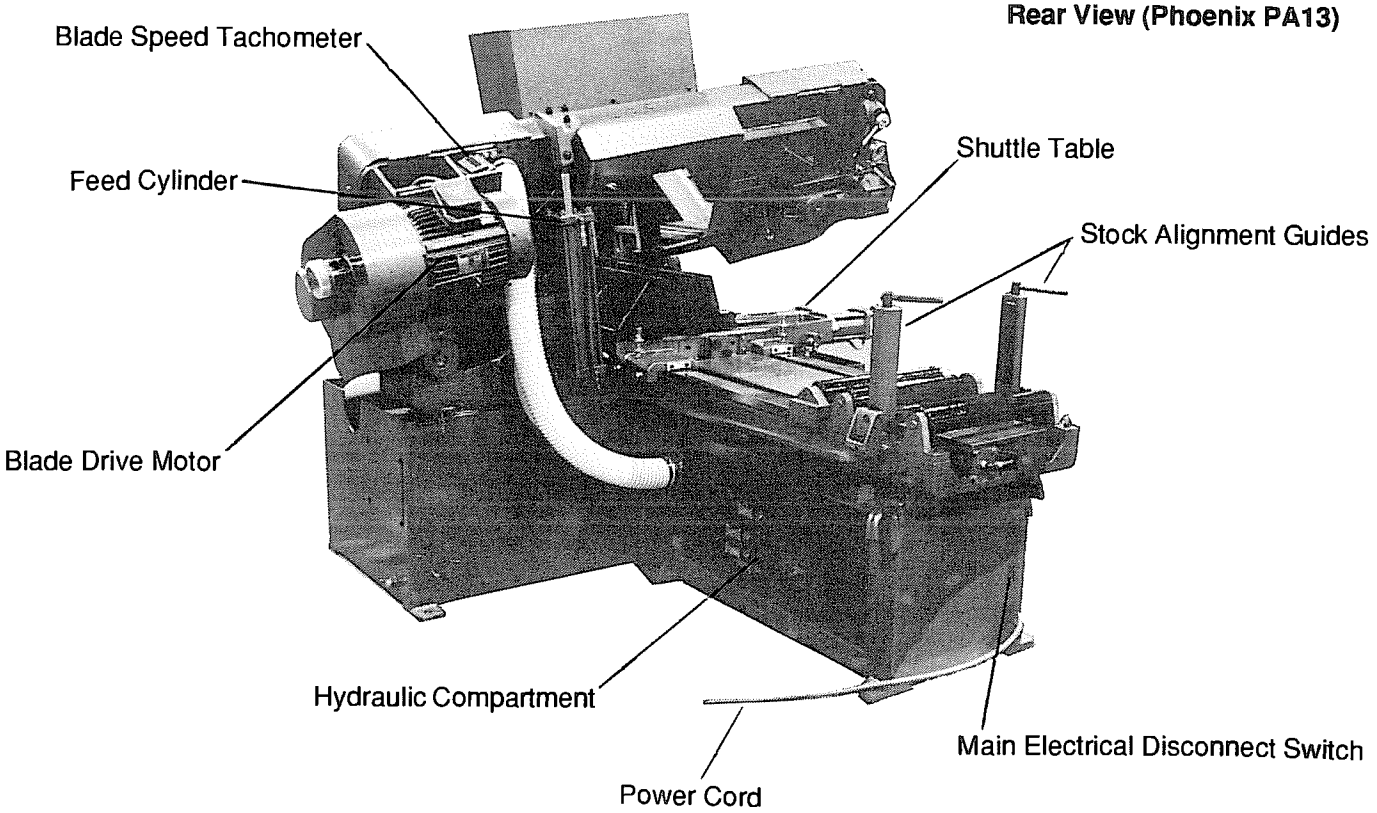
All specifications are subject to change without notice.

	PA10	PA13	PA13/2	PA18
Capacity				
Rectangle	8" x 12" (200 x 300mm)	10 x 14" (250 x 350mm)	13 x 14.1" (330 x 360mm)	14" x 18" (350 x 460mmm)
Round	10" dia. (250mm)	13" dia. (330mm)	13" dia. (330mm)	18" dia. (460mm)
Maximum Vise Opening	12" (300mm)	14.5" (360mm)	14.5" (360mm)	18.5" (470mm)
Blade/Blade Drive				
Blade Size (L x W x T)	11'-6" x 1" x .035"	12'-6" x 1.25" x .042"	13'-6" x 1.25" x .042"	15'-4" x 1.5" x .050"
	3505 x 25 x .9mm	3810 x 32 x 1.07mm	4115 x 32 x 1.07mm	4670 x 38 x 1.3mm
Blade Speed	70-278 sfpm	80-400 sfpm	80-400 sfpm	80-400 sfpm
	21-85m/min.	24-123m/min.	24-123m/min.	24-123m/min.
Feed Force	0-300 lbs. (0-1334N)	0-300 lbs. (0-1334N)	0-300 lbs. (0-1334N)	0-300 lbs. (0-1334N)
Motor	3 hp (2.2kW)	5hp (3.75 kW)	5hp (3.75 kW)	7.5hp (5.6kW)
Coolant System				
Capacity	15 gal. (57 liters)	21 gal. (80 liters)	21 gal. (80 liters)	21 gal. (80 liters)
Motor	0.125 hp (.09kW)	.125 hp (.09kW)	.125 hp (.09kW)	.25 (.19kW)
Hydraulic System				
Capacity	13 gal. (49 Liters)	16 gal. (61 Liters)	17 gal. (65 Liters)	21 gal. (80 Liters)
Hydraulic Pump	1hp (.75kW)	1 hp (.75kW)	1 hp (.75kW)	2 hp (1.5kW)
Automatic Feed Table				
Overall Length	43" (1092mm)	47" (1194mm)	47" (1194mm)	46" (1168mm)1
Maximum Load Capacity	5600 lbs. (2445kg)	6250 lbs. (2840kg)	6250 lbs. (2840kg)	7250 lbs. (3295kg)
Maximum Shuttle Travel:				
Single Cycle	16" (406mm)	24" (610mm)	19.6" (500mm)	20" (508mm)
Multi-cycle	144" (3654mm)	216" (5490mm)	177.1" (4500mm)	180" (4572mm)
Weight				
Shipping Weight	2750 lbs. (1250 kg)	3630 lbs. (1650 kg)	3630 lbs. (1650 kg)	5300 lbs. (2409 kg)

Front View (Phoenix PA10)



Rear View (Phoenix PA13)

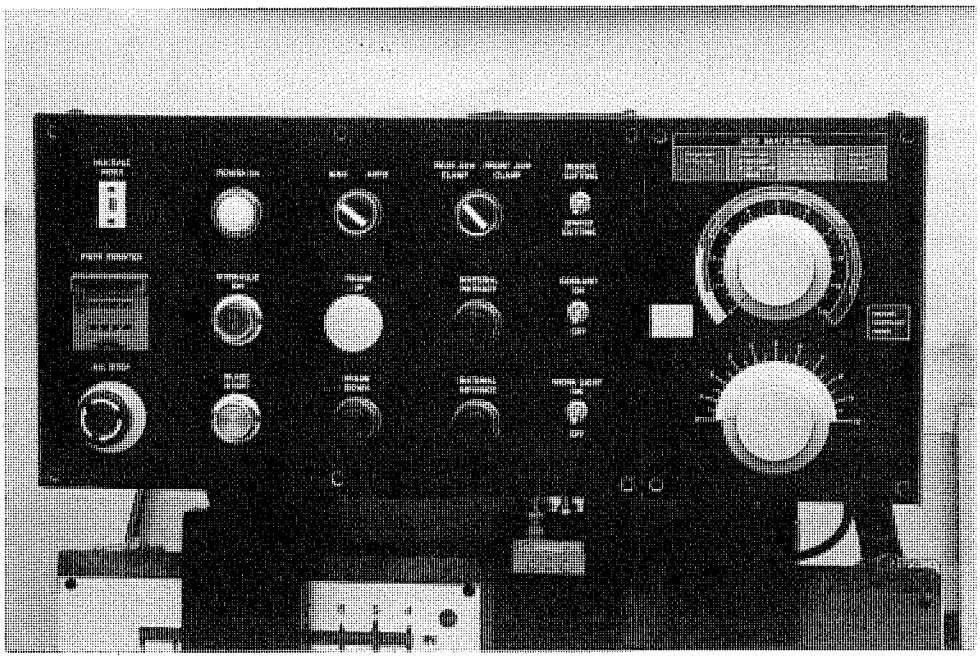


This section will help the operator become familiar with the machine and its components.

IMPORTANT: This section is not intended to describe the operation of the saw, but rather the function and operation of the individual components.

OPERATOR'S CONTROL PANEL

The following controls are located on the operator's control panel.



MULTIPLE INDEX SWITCH. This switch is used to set the number of times (0-9) the shuttle feeds stock forward before the saw makes a cut. This feature allows the saw to cut off material at lengths greater than the maximum shuttle movement. Both "0" and "1" will cause a single shuttle feed prior to the cut.

Example: For a nominal 30" cut-off length, the shuttle index length would be set for 15" (nominal) and the Multiple Index Switch would be set on "2". This provides two 15" stock shuttles prior to material cut-off.

POWER ON LIGHT. This white light illuminates when the main electrical disconnect is turned on.

MANUAL/AUTO SWITCH. This is a two position switch which controls the mode of operation of the saw.

Auto. In this position the machine will cycle and cut automatically.

Man. In this position each function or movement of the saw must be manually actuated.

VISE CONTROL SWITCH. This two position switch manually controls the clamping of the vises.

Rear Jaw Clamp. In this position the rear, or feed table vise jaws are clamped and the front jaws are unclamped.

Front Jaw Clamp. In this position the front, or machine vise jaws are clamped and the rear jaws are unclamped.

Note: To start a cutting cycle the vise control switch must be set on the "Front Jaw Clamp" position.

BUNDLE/SINGLE CUTTING SWITCH. This is a two position toggle switch which effects the behavior of the feed table vise and shuttle.

Single Cutting. In this position the feed table vise will feed the material forward, unclamp after the machine vise has clamped, retract and then reclamp the stock to wait for the next material feed cycle. This setting reduces the time between cuts and should be used when cutting individual pieces of stock.

Bundle Cutting. In this position the feed table vise will feed the material forward and stay clamped on the material while the cut is made. This provides greater support for the stock when cutting bundles of material.

COOLANT SWITCH. The coolant switch is a two position toggle switch which controls the flow of coolant to the cutting area.

CAUTION

Never operate the coolant pump without coolant in the reservoir. Damage to the coolant pump will result. If a liquid coolant is not used, the coolant motor should be disconnected by a qualified electrician.

Coolant On. In this position the coolant pump will operate and coolant will flow to the cutting area and chip brush (if the coolant valves are opened. See page D-5).

Coolant Off. In this position the coolant pump will not operate and no coolant will flow unless a cutting cycle is started.

Note: Regardless of the position of the coolant switch, when a cutting cycle is started the coolant pump will operate and coolant will flow.

Note: Coolant will not flow to the cutting area unless the manually adjusted coolant valves are adjusted open. See page D-5.

MATERIAL ADVANCE. This pushbutton is used to manually advance the feed table vise shuttle. This switch is functional only when the "Manual/Auto" switch is set on "MAN".

MATERIAL RETRACT. This pushbutton is used to manually retract the feed table vise shuttle. This switch is functional only when the "Manual/Auto" switch is set on "MAN".

FRAME UP. This yellow mushroom pushbutton is used to raise the saw frame. As long as the button is pressed, the saw frame will rise. This control is functional in both the manual and automatic mode. Pressing this button while operating in the automatic mode will terminate the cycle.

FRAME DOWN. This pushbutton is used to manually lower the saw frame. As long as the button is pressed, the saw frame will descend.

Note: This control is functional only when the machine is in the manual mode of operation.

BLADE START. This pushbutton is used to start the saw blade and begin a cutting cycle.

Note: The blade will not run, and a cutting cycle will not begin, unless the front vise jaws are clamped.

Note: As soon as the blade is started the saw fame will begin to descend rapidly until the fast approach device contacts the work. To run the blade without the saw frame feeding into the work, set the feed rate on "0".

HYDRAULIC ON. This pushbutton turns on the electric pump drive motor.

PIECE COUNTER. The piece counter is used to set the number of pieces, or cuts, desired when operating the saw in the automatic mode. To set the piece counter:

a. Press the individual black buttons at the top of the piece counter until the required number of pieces to be cut is displayed in the upper number field of the piece counter.

b. Press the single black button at the bottom of the piece counter to reset the lower number field to zero. This field shows how many pieces in a particular operation have already been cut.

The piece counter will count down as the saw completes each cut. When the piece counter reaches zero, the machine will shut off.

WORK LIGHT SWITCH. This switch turns the work light on and off.

FEED FORCE VALVE. The feed force valve adjusts the force with which the saw frame descends when cutting stock. The feed force is quickly adjusted via a color coded feed force selector.

ALL STOP. The red "All Stop" push button stops the hydraulic pump and the coolant pump, causing all saw functions to stop. To reset the "all stop" button, turn it clockwise.

WARNING

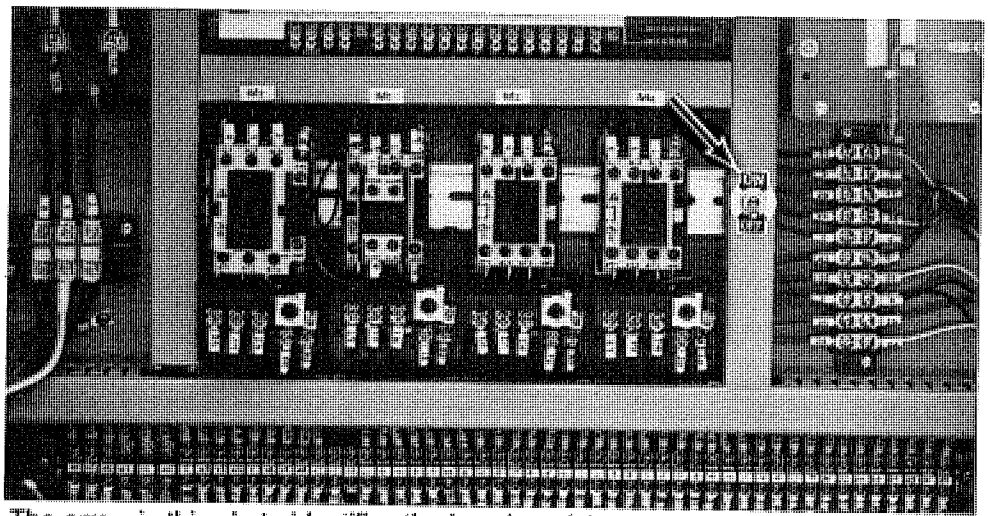
Hazardous voltage. The "All Stop" push button does not disconnect any components from the main power supply. Avoid serious injury or death by turning the machine's power off with the main electrical disconnect switch on the electrical enclosure and locking it in the "Off" position before servicing the machine.

FEED RATE VALVE. The feed rate valve, located just below the feed force valve, adjusts the speed at which the blade descends when cutting. The higher the number (0-10), the greater the feed rate.

OPERATOR'S MACHINE CONTROLS

The following controls are located in different areas of the saw. The descriptions will help you locate these controls and understand their function.

VISE DELAY SWITCH. Located inside the electrical enclosure is a "On/Off" toggle switch which effects the way the front and rear vise jaws clamp. Under normal cutting conditions (with this toggle switch in the "Off" position) the front vise jaws will clamp onto the work material and then the rear vise jaws will unclamp. However, under some conditions such as bundle cutting, the work material may have a tendency to be pushed up in the vises. To prevent this a delay in the clamping sequence of the vises can be activated by positioning the toggle switch in the "On" position. This delay allows the rear jaws to unclamp and the stock to settle in the vises before the front vises clamp.



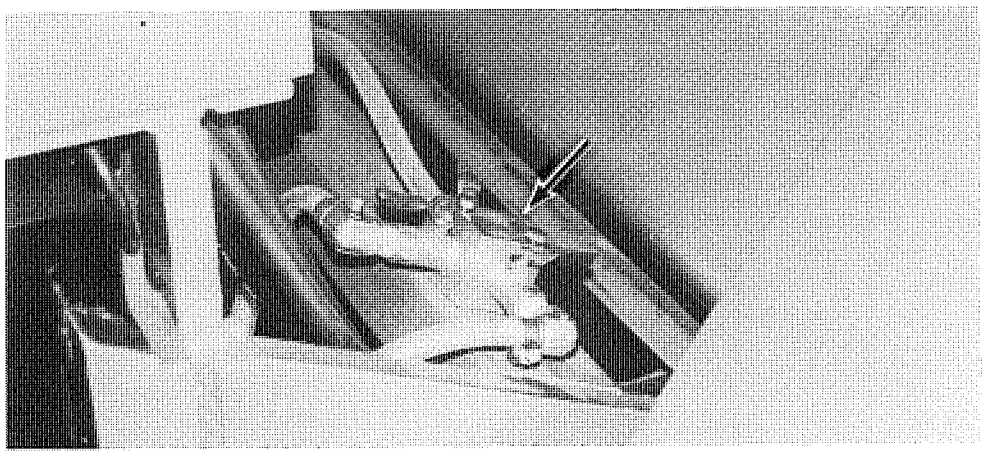
The arrow in this photo identifies the location of the vise delay toggle switch.

FRONT and REAR VISE JAWS. The moveable front and rear vise jaws are manually positioned against the work piece and hydraulically clamped with the vise switch on the operator's panel.

CAUTION

Avoid serious injury. Never place any part of your body between the vise jaws, or vise jaws and material to be clamped.

COOLANT VALVES. The flow of coolant to the chip brush and cutting area is controlled by separate valves. The valves can be adjusted as needed to achieve the desired coolant flow to the chip brush and cutting area.



The coolant valve configuration for each Spartan band saw is different, however their functions are the same.

FLUSHING HOSE. The Model PA10's coolant hose, which supplies coolant to the chip brush, can also be used for cleaning saw chips off the vise slide plates and other surfaces. Simply slip the hose out of the fitting on the chip brush housing.

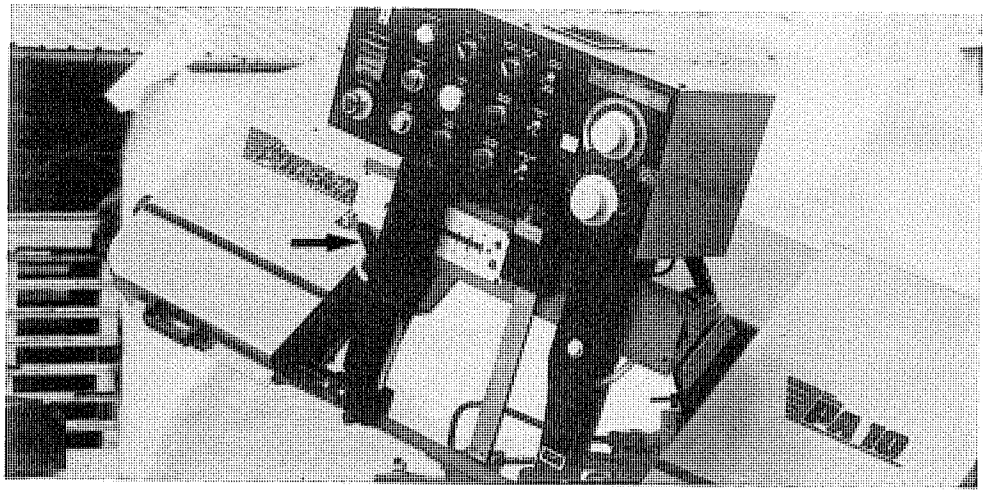
The PA13, PA13/2, and PA18 are supplied with a separate flushing hose with a spray nozzle on the end.

MOVEABLE GUIDE ARM. The moveable guide arm should always be positioned as close to the work piece as possible to provide maximum support for the blade. A scale mounted below the operator's control panel aids in adjusting the guide arm.

CAUTION

Avoid damaging the saw. Use care to prevent the moveable guide arm from striking the work stock or forward vise jaws.

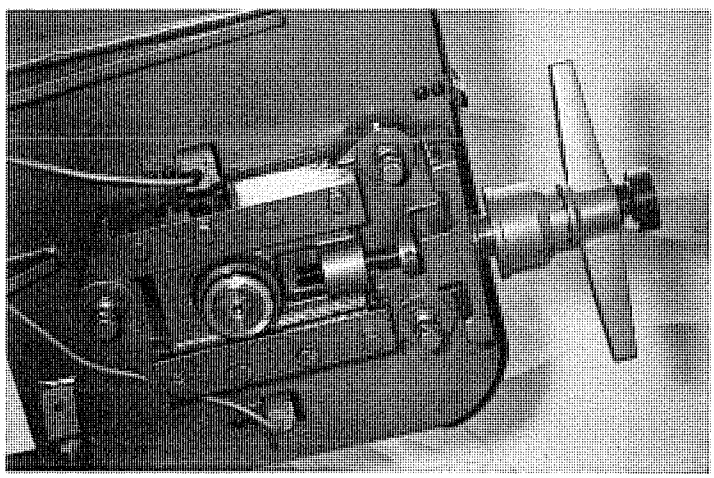
To adjust the guide arm, loosen the lock handle on the guide arm, loosen the small knurled knob on the lower part of the guide arm which loosens the carbide blade guides, position the guide arm as required, tighten the lock handle, and tighten the carbide blade guide knob.



The moveable guide arm is locked in place by a lock handle. The scale below the operator's control panel aids in adjusting the guide arm.

BLADE TENSIONING UNIT. There are two types of blade tensioning units used on the Spartan band saws; manual and hydraulic. Both types provide a precise blade tension of 30,000 psi.

Spartan PA10. The PA10 is equipped with a manual blade tensioning system. The blade is tensioned by turning the tensioning handle clockwise until the handle "breaks free". At that point the blade has been properly tensioned.

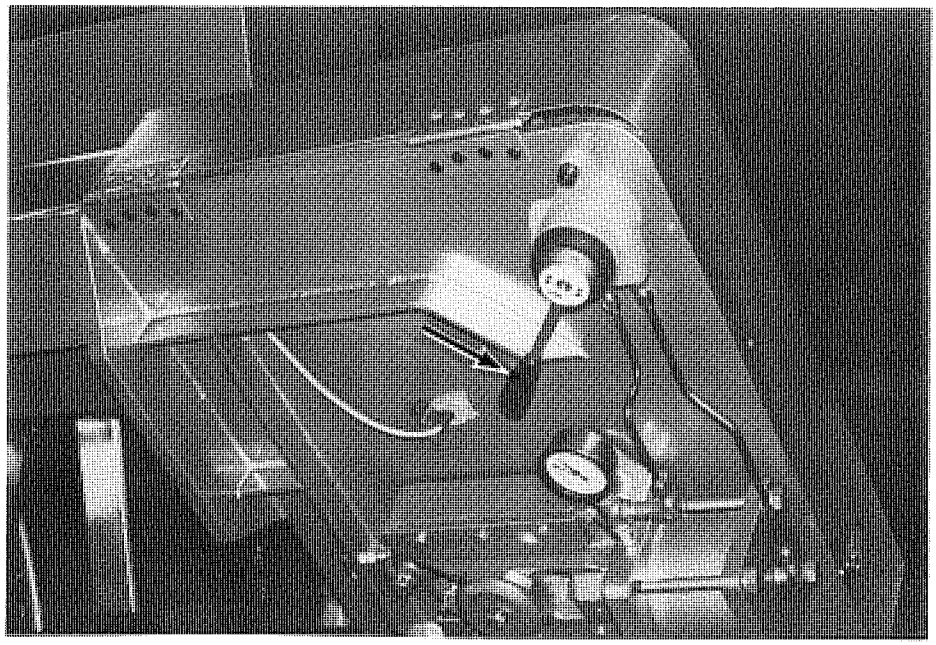


The PA10 is supplied with a manual blade tensioning unit. The handle is designed to "break free" when the proper blade tension has been applied. For accurate blade tension, however, it is important to heed the "Important" messages below.

IMPORTANT: When manually tensioning the blade do not lean in on the blade tension handle as this will cause the blade to be over-tensioned.

IMPORTANT: Keep the contact surfaces of the blade tension handle and mating collar well greased. Failure to do this will result in erratic cuts and shortened blade life.

Spartan PA13, PA13/2, and PA18. The PA13, PA13/2, and PA18 have hydraulic blade tensioning. Proper blade tension is automatically applied when the lever operated valve actuates the tension cylinder.



This lever controls a hydraulic cylinder which controls the blade tension. The lever should never be operated when the blade is running.

MAIN ELECTRICAL DISCONNECT SWITCH. The main electrical disconnect switch is located on the panel at the rear of the feed table. The switch disconnects the saw's electrical circuits from the main power supply when turned to its "Off" position.

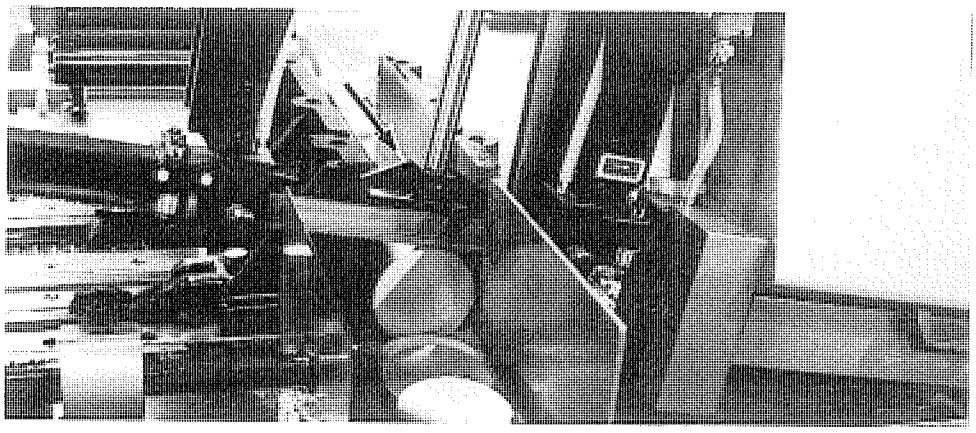
DANGER

Hazardous voltage. Full line voltage is still present on the input side of the machine's main electrical disconnect switch after the disconnect switch is turned to the "Off" position.

DANGER

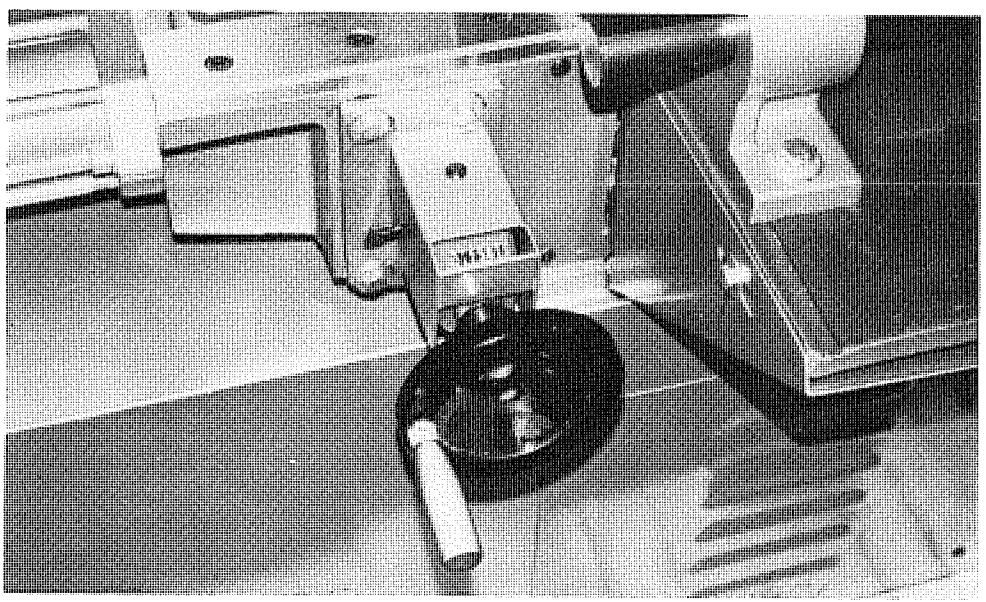
Hazardous voltage. The main electrical disconnect switch must always be turned to the "off" position and locked before adjusting, servicing, or cleaning the saw. Failure to do so may result in serious injury or death.

FAST APPROACH DEVICE. Located between the blade guide arms, the fast approach device is a time saving feature that controls the rate of descent of the saw frame. The frame will descend at a rapid rate until the fast approach devise comes into contact with the work stock. At that point the saw frame slows to the feed rate set for the material that is being cut.



This photo shows the fast approach device.

INDEX LENGTH READOUT. The index length readout is used in conjunction with the multiple index switch to set the cut-off length for the work piece (see "Automatic Operation" in the Operation section). The distance the feed shuttle travels on each shuttle cycle is determined by the setting on the index length readout. The index length readout displays the index length setting in inches and hundredths of an inch.



The index length readout of the Spartan PA13/2 is shown here.

Note: An example of how the index length readout and all its components function together is given after the component descriptions.

The index length readout incorporates the following features:

Index Handwheel: The index handwheel is used to set the distance the shuttle will travel on each shuttle cycle. The distance is shown on the index length display.

Note: Adjustments to the index length cannot be made unless the shuttle carriage is in the extreme forward position.

Index Handwheel Lock: This knob locks the handwheel in place preventing the shuttle length setting from being disturbed.

Index Length Display: The index length display displays the distance, in inches, that the shuttle is set to travel on each shuttle cycle. The display is visually divided by whole inches and tenths and hundredths of an inch.

IMPORTANT: A kerf allowance is built in to the index length display to allow for the set of the blade. This allowance is approximately .06" (1.6mm). When making multiple index cuts, however, you must make additional allowances for the kerf of the blade. This process is described in the following example, and a formula is provided to help you determine the proper length setting for any cut-off length.

Using the Index Length Readout: The example on the following pages describes how to set the index length readout for a typical cut.

Note: This is only an example and is not intended as machine operating instructions. For step by step operating instructions, refer to "Automatic Operation" in the Operation section.

In this example we will assume a part measuring 45.00" is required.

Determine how many shuttle cycles are needed to achieve the desired cut-off length. Assuming our maximum available shuttle length is 15.7" (maximum available shuttle length of the model PA10), we must divide 45.00" (the required cut-off length) by the maximum shuttle length available (15.7") and round the answer up to the nearest whole number. In this example 45.00 divided by 15.7 yeilds an answer of 2.86 which is rounded up to 3. This answer becomes the setting on the multi-index switch.

45.00" shuttle length divided by 3 shuttle cycles equals 15.00" shuttle length setting. Always use the smallest number of shuttle cycles possible to maximize production.

continued on next page

Anytime the feed shuttle makes more than one cycle before the stock is cut, an allowance must be made in the shuttle length's setting to accomodate for the blade's kerf. This is done by using the following formula:

$$D = \frac{L - k\,(N - 1)}{N}$$

Where:
D = length set on Index Length Display
L = required cut-off length of stock
k = the blades kerf, or set width
N = the number of shuttle indexes prior to the cut

Applying this formula to our required cut-off length of 45.00", we get:

$$D = \frac{45.00 - .06 \times (3 - 1)}{3} = 14.96"$$

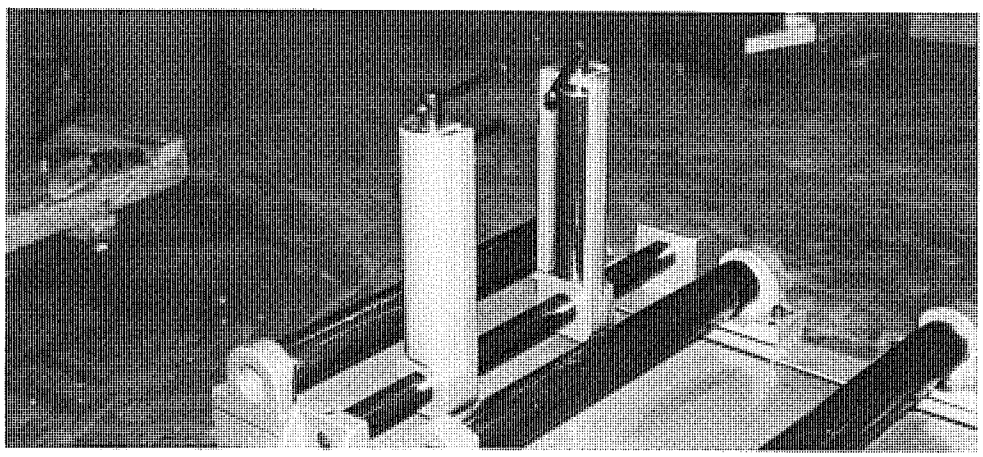
D = 14.96"

Therefore, to cut a piece of stock 45.00" on the Spartan PA10, we must set the Multi-index switch on "3", and the Index Length Readout on 14.96".

Note: We have used an example blade kerf of .06". For the most accurate cuts, measure the actual kerf of the blade you are using.

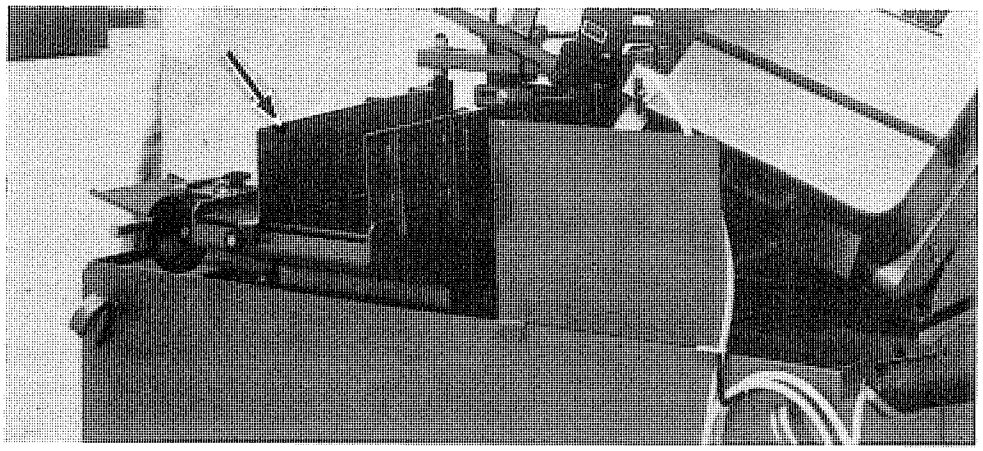
IMPORTANT: Always measure the first piece of stock cut to insure the accuracy of the shuttle length setting.

STOCK ALIGNMENT GUIDES. The feed table is provided with two fully adjustable stock alignment guides. These guides help position the stock for accurate feeding to the front vise.



This photo shows the two fully adjustable stock alignment guides fitted to the feed table.

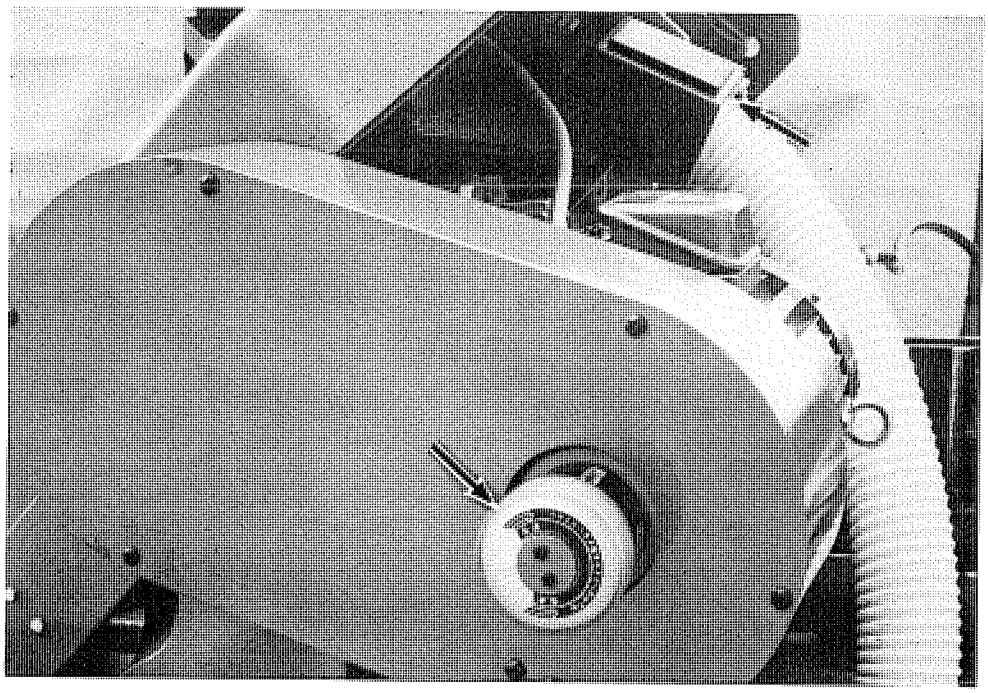
OUTFEED GUIDES. These guides on the outfeed side of the front vise jaws help manage the stock after it has been cut. These are especially useful when bundle cutting round material.



The left guide can be positioned as required to control the stock after it has been cut.

BLADE SPEED HANDWHEEL and TACHOMETER. The blade speed handwheel controls the speed of the blade. The blade speed is infinitely adjustable from 70 to 278 SFPM (21 to 85m/min) on the Spartan PA10, and 80 to 400 SFPM (24-123m/min) on the Spartan models PA13, PA13/2, and PA18. The blade speed setting is indicated by the digital blade speed readout mounted above the handwheel.

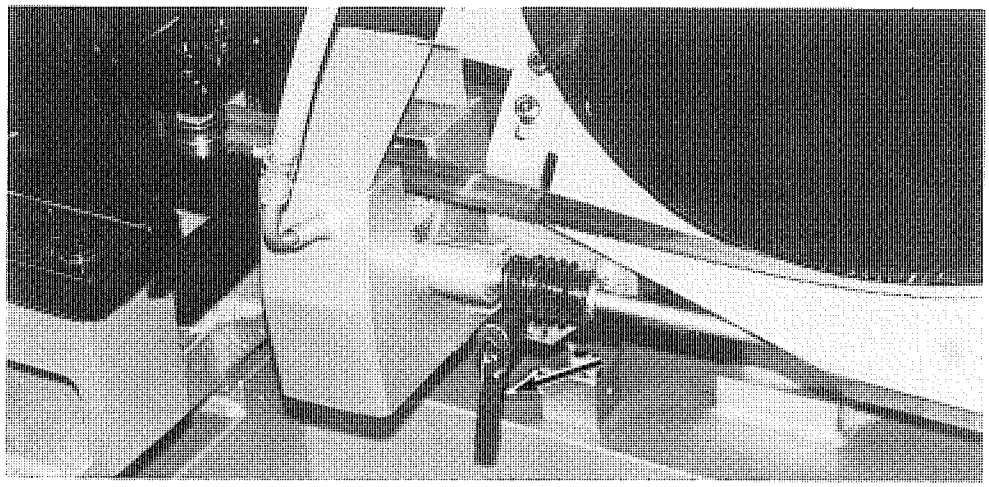
IMPORTANT: Adjust the blade speed only when the blade is running.



This photo shows the blade speed handwheel. The blade speed tachometer is positioned just above the blade speed handwheel.

CHIP BRUSH. The chip brush is located in an adjustable housing where the blade enters the driven bandwheel housing. A lever (PA10 and PA13/2) or a knurled knob (PA13 & PA18) below the chip brush locks the brush in place. After loosening, the chip brush assembly can be lowered to ease chip brush replacement and blade changing.

IMPORTANT. The chip brush is properly positioned for cutting when the edge of the chip brush reaches fully into the blades gullet without extending beyond.



The PA13/2's chip brush and locking lever are illustrated by this photo.

TRANSMISSION OIL LEVEL GAUGE. To prevent damage to the transmission, the saw operator should be aware of its oil level. A sight glass is provided on the transmission so the oil level can be checked easily. The oil level should be 3/4 full in the sight glass when the saw frame is in the down position. If the transmission requires the addition of fluid, Mobilube C140 or equivalent should be used. Refer to the "Maintenance" section.

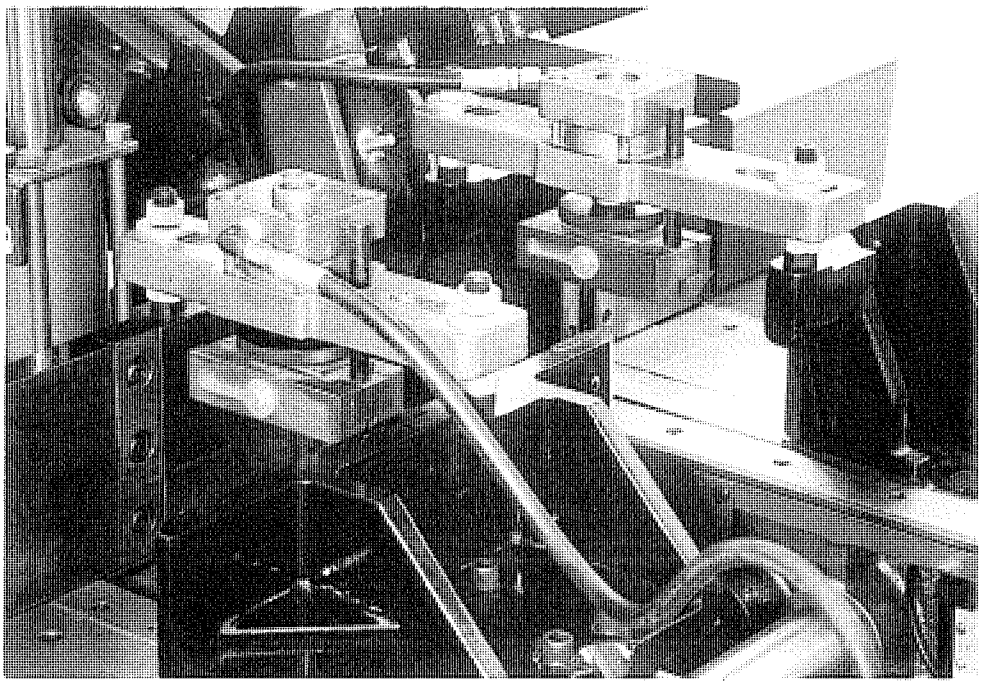
OPTIONAL EQUIPMENT

CHIP CONVEYOR (optional). An optional chip conveyor inserted in the coolant return reservoir collects saw chips and automatically removes them from the saw. Installation of the chip conveyor is described in the installation section of this manual.

NESTING CLAMPS (optional). Optional nesting clamps are available for bundle cutting. To install the nesting clamps:

1. Remove the allen head plug on the machine base just in front of the vise base near the trunnion (saw frame pivot point) and install the quick disconnect fitting to the long nipple.
2. Remove the allen head plug from the top of the small block near the shuttle vise cylinder and install the quick disconnect fitting to the small nipple.

3. Remove the hex nuts from the bottom of the hold down posts and thread the posts into the holes in the vises. The holddowns are marked for front and rear vises.
4. Finally, attach the hydraulic hoses to the appropriate fittings.



This photo shows the optional nesting clamps installed on the vises.

Metal sawing is influenced by several elements or combinations of elements which are always present during the cutting cycle. Some of those elements are:

a. Machinability of material

b. Condition of material (surface condition and hardness)

c. Size and shape of material (cross section)

d. Blade condition

e. Blade type

f. Blade speed and feed rate

g. Type and condition of coolant

Because so many factors effect the performance of a cut, the information given in cutting charts and guides should be used as a starting point when setting cutting rates, pressures, and blade speeds. A good guide is the "Marvel Blade Selection Guide" which was included with your saw, and is available free upon request from Armstrong-Blum Mfg. Co.

"MARVEL BLADE SELECTION GUIDE"

The *"Marvel Blade Selection Guide"* contains the information needed to select the proper blade for the material to be cut, as well as information for setting the blade speed, cutting rate, and feed pressure of the saw. Additionally, the guide has an extensive band saw trouble shooting chart. The guide is updated frequently and is available free by contacting Armstrong-Blum Mfg. Co.

FEED PRESSURE

The correct feed pressure can be obtained by turning the saw's feed pressure knob until it is pointing within the color band for the material being cut. Generally, the feed pressure increases as the material size or cross section increases.

CUTTING RATE

The *"Marvel Blade Selection Guide"* provides an acceptable range of cutting rates, given in square inches of material per minute, for a wide variety of materials. The actual cutting rate achieved depends on the feed pressure, blade speed, blade type and condition, etc.

If the cutting rate is too low, the saw chips will have a powdery appearance. If the cutting rate is too high, the chips will be thick and cause blade tooth strippage. The proper cutting rate will produce a clean, curled chip.

BLADE SPEED

The blade speed should be obtained from the *"Marvel Blade Selection Guide"*. If your particular saw is not listed in the guide, use a column with a similar blade size (e.g 1", $1\frac{1}{4}$", and $1\frac{1}{2}$").

Note: The following page may be used to record your most commonly cut materials and their appropriate feed pressure and blade speeds.

USER RECORD

MATERIAL		BLADE		SETTINGS		
TYPE	SIZE	TYPE	TEETH	BLADE SPEED	FEED PRESSURE	CUTTING RATE

This section describes normal operation of the Spartan band saws, step by step, from the pre-operation checklist to the final shut-down. This section assumes that the operator is already familiar with the function and location of the components described in the Machine Description section.

WARNING

Avoid personal injury or damage to the saw. Do not operate this saw until you are thoroughly familiar with the function and location of each operator control, and the safety warnings and cautions associated with the operation of this saw.

PRE-OPERATION CHECKLIST

This checklist should be performed at the beginning of each shift and by each new operator. Completing this checklist will help maintain peak saw performance, increase blade life, reduce down-time, and provide a safe machine for the operator.

PRE-OPERATION CHECKLIST

- ☐ Remember: Safety first! Obey all warnings and cautions.
- ☐ Review and comply with all of the safety messages and warnings in this manual, and those posted on the machine.
- ☐ Turn the machine's power off with the main electrical disconnect switch and lock the switch in the "Off" position.
- ☐ Check that all covers and guards are in place and secure.
- ☐ Remove unnecessary tools and equipment from the saw and surrounding area.
- ☐ Inspect for damage and leaks. Repair before operating.
- ☐ Check the level of the hydraulic fluid. Fill if necessary. See page G-2.
- ☐ Inspect the band wheels and blade guides - remove chips.
- ☐ Inspect the chip brush. Replace if worn. See page G-9.
- ☐ Check the coolant level and condition. Add coolant if necessary, change the coolant if contaminated or excessively dirty. See page G-2.
- ☐ Check the level of the transmission fluid and add fluid if necessary. See page G-2.

IMPORTANT

WARNING

Never operate a defective or broken saw, a saw with missing parts, or a saw that has been altered in any way. Serious injury may result.

WARNING

Never operate the saw with guards or covers removed. Serious injury may result.

WARNING

Avoid Serious injury by turning the machine's power off with the main electrical disconnect switch and locking it in the "Off" position before adjusting, servicing, or cleaning the saw.

CAUTION

Never operate the saw without hydraulic fluid or coolant. Damage to the saw will occur.

MACHINE SET-UP and TRIM CUT

Performing the following steps will prepare the saw for either manual or automatic operation. These steps should be performed for every new cutting operation.

1. Perform the pre-operation checklist on page F-1.
2. *For single cutting:*
   a. Set the Single/Bundle Cutting switch to "Single".
   b. Remove the nesting clamps.

2a. *For bundle cutting:*
   a. Set the Single/Bundle Cutting switch to "Bundle".
   b. Install the nesting clamps (see the "Machine Description" section).

3. Install the proper blade for the material to be cut.
4. Turn the main electrical disconnect switch on.
5. Turn on the work light.

6. Press the hydraulic push button once to start the hydraulic motor.

Note: If the hydraulic fluid is cold, a warm-up time of 5 to 10 minutes may be necessary for best saw performance.

7. Press the frame up button to raise the saw frame to its uppermost position.
8. Adjust the feed pressure for the material to be cut.
9. Adjust the feed rate to "0" (zero).
10. Load the work stock into the shuttle and machine vises and adjust the vises.
11. Position the rear stock guides as needed.
12. Position the outfeed guides as needed.
13. Position the moveable guide arm as close to the stock as possible. Use the built in scale as a guide.
14. Turn the Manual/Automatic switch to "Man".
15. Press the Frame Down button to manually lower the saw frame until the fast approach device is approximately 1/4" above the work stock.
16. Manually operate the vise jaws and vise shuttle to position the material for a trim cut.
17. Press the blade button to start the blade and initiate the manual cutting cycle.
18. Adjust the blade speed.
19. Adjust the feed rate for the material that is being cut.

Note: Once the feed rate is adjusted off of "0" (zero), the saw frame will begin to feed.

At the completion of the trim cut the saw blade will stop and the saw frame will stay in the down position.

With the machine set-up and the trim cut complete, the saw is ready for production cutting in either the manual or the automatic mode. Refer to "Manual Operation" or "Automatic Operation".

MANUAL OPERATION

These instructions describe manual operation of the Spartan band saws. Manual operation is beneficial when few parts are needed or when parts of varying sizes are needed.

1. Perform steps 1 through 19 of "Machine Set-up and Trim Cut", page F-2.
2. Raise the saw frame.
3. Manually operate the vise jaws and vise shuttle to position the stock for the next cut.

IMPORTANT: If the shuttle has limited rearward travel it may be necessary to move the shuttle fully forward so the index length readout can be adjusted to provide greater shuttle travel.

4. Turn the vise switch to the "Front Jaw Closed" position to clamp the work stock in the vise.
5. Press the "Blade" button to start another cutting cycle.

IMPORTANT: Always check the accuracy of the first cut before performing more. Make any adjustments that may be necessary.

At the completion of the cut the blade will stop and the saw frame will stay in the down position. If no more cuts are to be made, go to step 6. To continue cutting, repeat steps 2 through 6 until all cuts have been completed.

6. When all the cuts have been completed:
   a. Turn the coolant switch off
   b. Turn the worklight off
   c. Turn the main electrical disconnect switch to "Off".

AUTOMATIC OPERATION

Automatic operation of the Spartan band saw is recommended when many identical parts need to be produced. By setting the piece counter and the index length readout, the saw can be set to produce many parts with very little attention from the saw operator.

1. Perform steps 1 through 19 of "Machine Set-up and Trim Cut" on page F-2.
2. Using the Frame Up pushbutton, raise the saw frame until the fast approach device is approximately 1/4" above the work stock.
3. Make sure the rear vise jaws are unclamped and manually operate the vise shuttle until it is in the full advance position.
4. Determine the appropriate number of shuttle indexes needed to achieve the desired material cut-off length. Set this on the multi-index counter. See page D-10.
5. Determine the correct setting for the multiple index readout and dial in that setting. An example and formula for calculating the

proper setting for a desired cut-off length is given beginning on page D-10.

6. Set the number of pieces to be cut on the piece counter.
7. **Clear the piece counter with the black reset button.**
8. Set the vise switch to "Front Jaw Clamp".

Note: A cutting cycle will not begin unless the front vise jaws are clamped.

9. Turn the Manual/Automatic switch to the "Auto" position.
10. Press the Blade Start button to begin automatic operation.
11. The saw will continue to cut automatically until:
    a. All the pieces have been cut and the machine shuts itself off.
    b. An out-of-stock condition is detected by the saw.
    c. The All Stop or Frame Up pushbutton is pressed.
12. When the job is completed the saw frame will stop in the fully down position and the blade and hydraulic motors will shut off. If all cutting is completed:
    a. Turn off the work light.
    b. Turn off the main electrical disconnect switch.

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Regular maintenance of your Spartan band saw will help it deliver consistently accurate performance and reduce down time. This section begins with a suggested maintenance schedule and is followed by instructions for all common maintenance procedures. Read through an entire procedure before performing any maintenance. Extensive repairs should be performed by a qualified technician.

IMPORTANT: Before performing maintenance on this machine, become familiar with the function and location of the components described in the Machine Description section.

SERVICE TECHNICIANS

Should you require the help of a service technician, contact your Spartan distributor or call Armstrong-Blum Mfg. Co., Mt. Prospect, Illinois, 1-847-803-4000 or 1-800-472-9464 (1-800-462-7835 in Illinois).

MAINTENANCE SCHEDULE

MAINTENANCE SCHEDULE

Daily

- ☐ Clean chips from the machined surfaces, vise slide ways, shuttle table slide ways, vise jaws, band wheels, blade guides, and chip brush.
- ☐ Inspect the blade, blade guides, and chip brush for wear. Replace worn parts.
- ☐ Check all fluid and lubricant levels.

Monthly

- ☐ Grease the transmission.

Quarterly

- ☐ Clean the coolant reservoir.
- ☐ Grease the idler band wheel slides, chip brush drive, and blade tensioning unit.

Semi-annually

- ☐ Change the hydraulic fluid.
- ☐ Change transmission oil.

DAILY CLEANING

Regular cleaning of the saw is an essential part of maintenance. Failure to clean the saw will result in inaccurate cuts, worn parts, and costly repairs.

WARNING

Avoid serious injury by turning the machine's power off at the main electrical disconnect switch and locking it in the "Off" position before adjusting, servicing, or cleaning the saw.

The machined surfaces of the saw should be thoroughly flushed with the coolant flushing hose. Make sure that the vise jaw faces, vise slide ways, vise ratchets, and shuttle table slide-ways are free of saw chips.

WARNING

Do not use compressed air to clean the machine. Flying debris may cause serious injury.

The band wheels, blade guides and chip brush should be kept as free of chips as possible. Chips that accumulate on these parts will cause wear and reduce the quality and accuracy of the cut.

Operator's Panel. The operator's panel should be cleaned with ammonia free liquid household cleaners only. Do not use benzene, toluene, ketone, or esters.

DAILY LUBRICATION

Regular and proper lubrication is essential for accurate cuts and long saw life. The areas that require daily attention are listed below.

WARNING

Avoid serious injury by turning the machine's power off at the main electrical disconnect switch and locking it in the "Off" position before adjusting, servicing, or cleaning the saw.

Coolant Level. The coolant level should be maintained at least 3/4 full according to the sight gauge on the machine's base. Mix the coolant according to the coolant manufacturer's directions and pour it directly into the coolant reservoir.

Hydraulic Fluid. The hydraulic fluid level and condition should be checked daily. The tank should be kept full with Mobil DTE 24 hydraulic oil or equivalent.

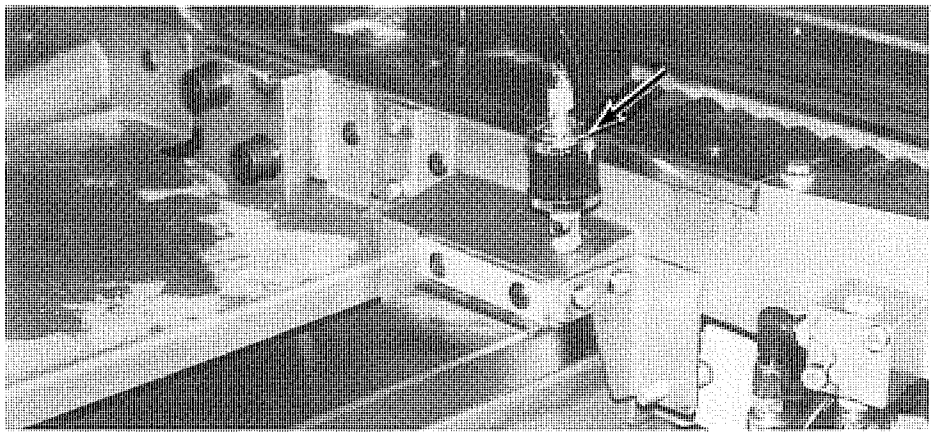
Transmission. The transmission fluid level should be checked daily and the level of the fluid maintained with Mobil SHC634 or equivalent. The level of the fluid should be at least 3/4 full on the transmission mounted sight gauge when the saw frame is in the down position.

Vise Slide Plates. The vise slide plates (the machined surfaces on which the vises slide) should be wiped with a clean rag and lightly oiled with a light weight machine oil once each day - more often with heavy usage.

Shuttle Slide Ways:

PA10, PA13/2, and PA18. The shuttle slide ways (the cylinders on which the shuttle table travels) should be wiped with a clean rag and lightly oiled with a light weight machine oil once each day - more often with heavy usage.

PA13. The PA13 is equipped with two shuttle lubricators. These should be filled with Mobil Vactra Oil No. 2 or equivalent at all times to prevent scoring of the slide ways.

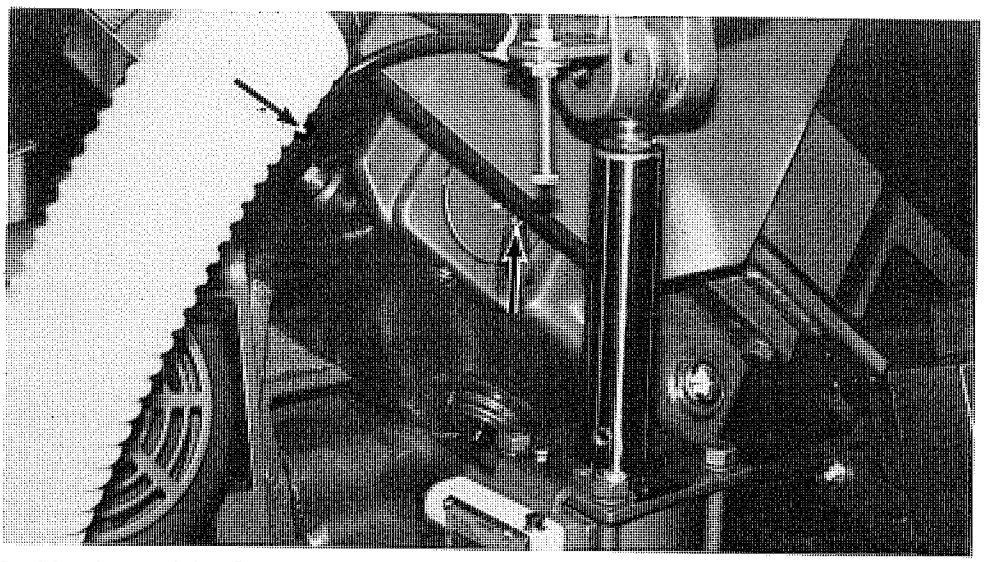


The two shuttle lubricators on the Spartan PA13 must be filled with oil at all times or the shuttle slide ways will be damaged.

PERIODIC LUBRICATION

The following points on the machine need to be lubricated at the intervals given for each area.

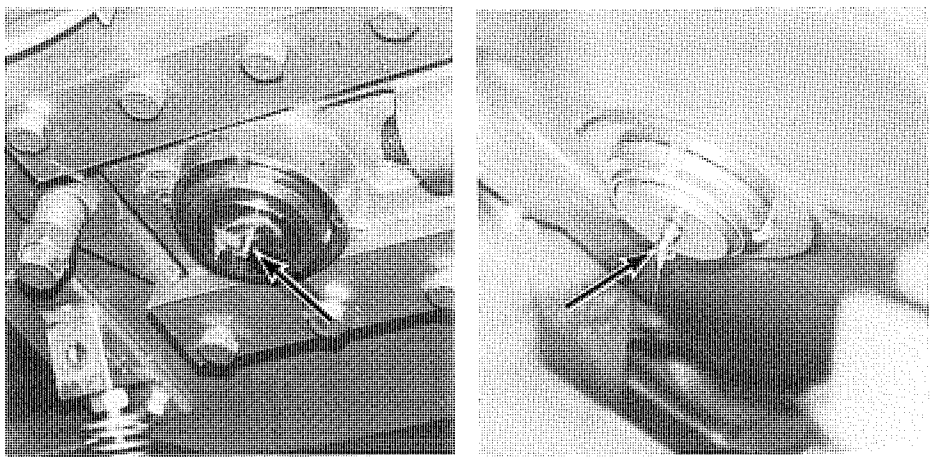
Transmission. The transmission is fitted with grease fittings (two each on the Model PA13, PA13/2, and PA18, three on the Model PA10) to keep the unit's bearings greased. These should be greased monthly with Mobilith SHC 460 or equivalent lithium based grease with EP additives.



In this photo of the Spartan PA10's transmission two of its three grease fittings are identified. The third is located on the underside of the transmission housing.

Bandwheel Bearings. The bandwheel bearings should be greased quarterly with Mobilith SHC 460 or equivalent lithium based grease with EP additives.

PA10. The Spartan PA10 has a grease fitting for each bandwheel bearing. The idler bandwheel is lubricated via a grease fitting on the blade tensioning unit. The drive bandwheel's bearing is lubricated via a grease fitting on the transmission.

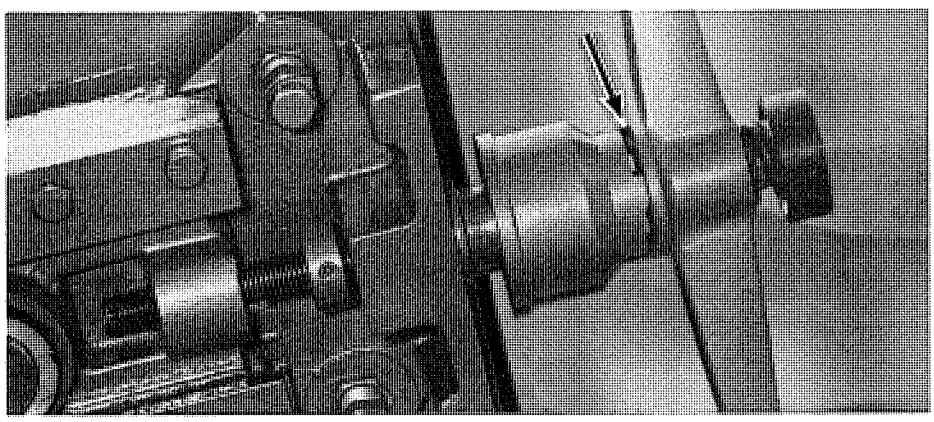


The PA10's bandwheel bearings are lubricated with the grease fittings shown in these photos. The left photo shows the location of the idler band wheel grease fitting, the right photo shows the drive bandwheel's grease fitting.

PA13, PA13/2, and PA18. The Spartan Models PA13, PA13/2, and PA18 each have a grease fitting in the center of each bandwheel hub. These are accessed by opening the bandwheel doors.

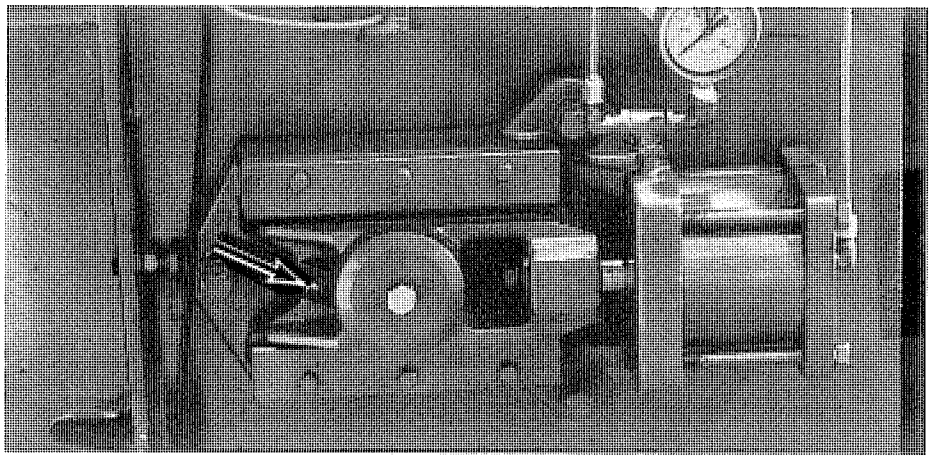
Blade Tensioning Units. The blade tensioning units should be greased quarterly with Mobilith SHC 460 or equivalent lithium based grease with EP additives.

PA10. The contact surfaces between the blade tensioning handle and mating collar should be cleaned and well greased as needed to prevent over-tensioning the blade. In addition, a grease fitting is provided on the idler bandwheel slide.



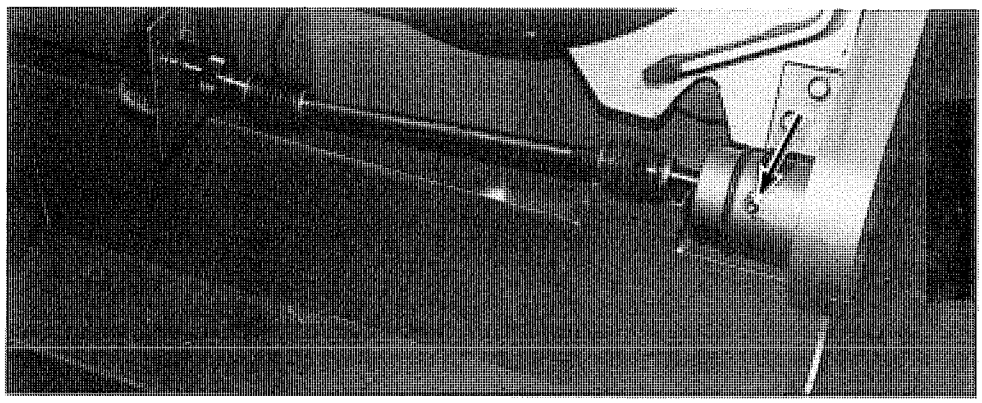
For proper operation and blade tension, the PA10's blade tensioning handle should be kept clean and greased where it contacts the mating collar.

PA13, PA13/2, and PA18. The idler bandwheel slide of each of these models is provided with a grease fitting to keep the blade tensioning unit lubricated and sliding freely.



The arrow indicates the grease fitting supplied on both the PA13, PA13/2, and PA18 to lubricate the blade tension unit's slide ways.

Chip Brush Drive. A grease fitting is provided on the chip brush drive of the Spartan Models PA13 and PA18. This should be greased quarterly with Mobilith SHC 460 or equivalent lithium based grease with EP additives.



The arrow indicates the grease fitting supplied on both the PA13 and PA18 to lubricate the chip brush drive unit.

BLADE CHANGING PROCEDURE

For accurate cuts it is important to always use the correct blade for the material that is being cut. It is also important to always use a sharp blade.

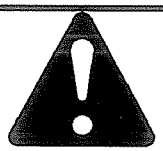
1. Raise the saw frame to its highest position.
2. **Models PA13, PA13/2, and PA18 only.** Position the blade tension lever to release the blade tension.

3. Press the Stop button and disconnect the saw from the main power supply.

WARNING

Avoid serious injury by turning the machine's power off at the main electrical disconnect switch and locking it in the "Off" position before adjusting, servicing, or cleaning the saw.

4. (PA10 only) Turn the blade tension hand wheel counter-clockwise to release the tension on the blade.
5. Open the bandwheel doors.
6. Move the adjustable guide arm as close to the fixed guide arm as possible. This makes it easier to remove and install the blades.
7. Turn the knurled knobs on the guide arms counter-clockwise to loosen the carbide blade guides.



CAUTION

Avoid injury. Wear heavy protective work gloves and safety glasses when handling blades.

8. Loosen the chip brush locking device and lower the chip brush away from the blade.

WARNING

Coiled blades are under tension and can spring open. To prevent injury, use extreme caution when uncoiling a blade.

9. Carefully remove the blade from the saw.
10. Uncoil a new blade and install it in the blade guides so the teeth point in the direction indicated by the arrow decal on the guide arm.
11. Wrap the blade around the bandwheels and press the **back edge** of the blade firmly against the flange of each bandwheel.
12. **Model PA10 only.** Make certain the blade is against the flange of each bandwheel and is inserted fully into the blade guides and turn the blade tension handle until the handle "breaks free" indicating proper tension has been applied.

13. **Models PA13, PA13/2, and PA18:**
    a. Turn on the machine's power at the main electrical disconnect switch.
    b. Twist the Stop button to release and press the Hydraulic On pushbutton to start the hydraulic pump motor.
    c. Make certain the blade is against the flange of each bandwheel and is inserted fully into the blade guides and then position the blade tension lever to actuate the blade tension cylinder. The cylinder will automatically apply proper blade tension.
    d. Press the All Stop button.
    e. Turn off the machine's power at the main electrical disconnect switch and lock it in the off position.

WARNING

Avoid serious injury by turning the machine's power off at the main electrical disconnect switch and locking it in the "Off" position before adjusting, servicing, or cleaning the saw.

14. Turn the knurled knobs on the blade guide arms clockwise to tighten the carbide blade guides against the blade. **Tighten the carbide guides by hand only - do not use tools as this will over-tighten the carbide guides.**
15. Position the chip brush so the tips of the bristles reach fully into the gullet of the blade but do not extend beyond and lock it in place.

IMPORTANT: Improper positioning of the chip brush will cause excessive blade or chip brush wear which will result in erratic cuts.

16. Close and secure the bandwheel doors.

Note: For longer blade life, reduce the feed pressure of the blade approximately 50 percent for the first 50 square inches of material cut.

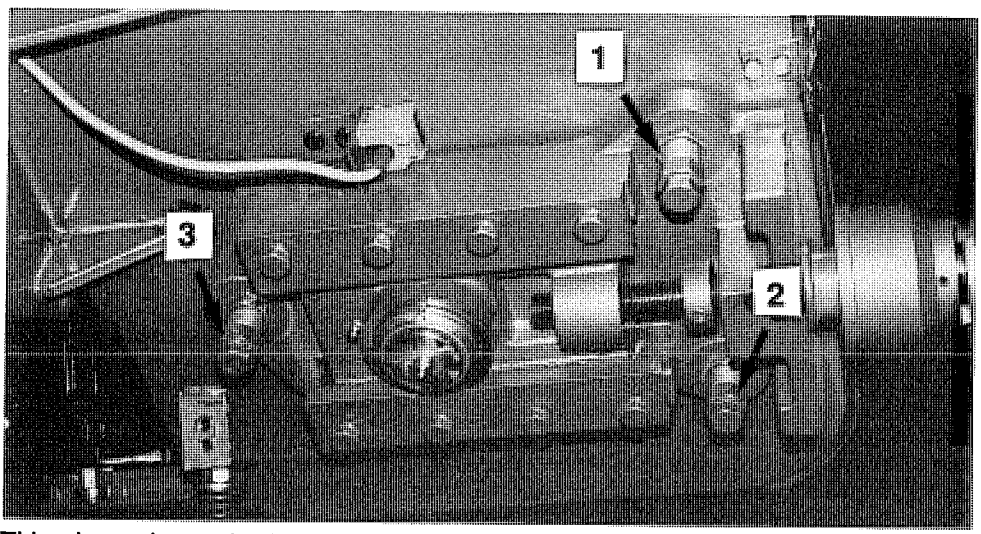
BLADE TRACKING ADJUSTMENT

The idler bandwheel assembly is equipped with three jack screws used to adjust the tracking of the blade around the bandwheels. A properly aligned idler bandwheel allows the blade to track evenly on the bandwheels, preventing uneven blade tension which causes blades to crack and break. The idler bandwheel should be periodically checked and adjusted so the blade tracks no more than 1/32" from the flanges of the bandwheels. To adjust the blade tracking:

DANGER

The bandwheel doors must be open while the blade is running to permit visual inspection of the blade's tracking. Avoid serious injury or death by staying clear of all moving parts, especially the blade.

1. Open the bandwheel doors.
2. Ensure the blade is properly tensioned.
3. Run the blade at the slowest possible speed.
4. Loosen the small hex head screws which lock the jack screws in place.



This photo shows the jack screws and locking screws which are part of the idler bandwheel assembly and are used to adjust the tracking of the blade. The numbers are referenced in the text.

5. Adjust the blade tracking by adjusting the jack screws according to the following guidelines:

Note: Adjusting the blade tracking is a matter of trial-and-error. All adjustments are interrelated and may need to be performed several times before the blade tracks properly (1/32" from the flange of the bandwheels).

To move the blade towards the flange of the idler bandwheel, turn jack screws "1" and "2" clockwise.

To move the blade away from the flange of the idler bandwheel, turn jack screw "1" counterclockwise, and jack screw "2" clockwise.

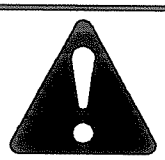
6. When the blade is tracking properly, turn off the machine and tighten the small hex head cap screws to lock the jack screws in place.
7. Close the bandwheel doors.

CHIP BRUSH REPLACEMENT

The chip brush removes saw chips from the blade to prevent them from being carried into the band wheels and eventually into the blade guides where they cause significant wear. It is very important to always have a functioning chip brush on the machine.

To replace a worn chip brush:

1. Turn off the saw's main electrical disconnect switch.



WARNING

Avoid serious injury by turning the machine's power off at the main electrical disconnect switch and locking it in the "Off" position before adjusting, servicing, or cleaning the saw.

2. Loosen the locking lever (PA10 and PA13/2) or knurled knob (PA13 and 18) and lower the chip brush assembly.
3. Remove the nut that holds the chip brush on the drive shaft and remove the chip brush.
4. Install a new chip brush and secure it with the nut.
5. Position the chip brush so the tips of the bristles reach fully into the gullet of the blade but do not extend beyond and lock it in place.

IMPORTANT: Improper positioning of the chip brush will cause excessive blade or chip brush wear which will, in turn, result in erratic cuts.

COOLANT CHANGING PROCEDURE

Under normal use the coolant should be changed - and the saw chips should be cleaned from the coolant reservoir - every three months.

1. Turn off the saw's main electrical disconnect switch.

CAUTION

Avoid serious injury by turning the machine's power off at the main electrical disconnect switch and locking it in the "Off" position before adjusting, servicing, or cleaning the saw.

2. Remove the coolant reservoir drain plug from the side of the saw's base and drain the coolant (approx. 15 gallons [57 liters] for the PA10 and 21 gallons [80 liters] for the PA13, PA13/2, and PA18) into an appropriate container. Replace the drain plug.
3. If equipped, remove the optional chip conveyor.
4. Remove the expanded metal screens from the bottom of the coolant reservoir.
5. Remove saw chips from the reservoir and wipe the reservoir with a lint free cloth.
6. After mixing new coolant to the coolant manufacturer's directions, add the coolant to the coolant reservoir. Capacities for each model are listed in step 2.
7. Replace the optional chip conveyor if necessary.

HYDRAULIC FLUID CHANGING PROCEDURE

The hydraulic fluid should be drained every 6 months and replaced with new fluid.

1. Turn off the saw's main electrical disconnect switch.

CAUTION

Avoid serious injury by turning the machine's power off at the main electrical disconnect switch and locking it in the "Off" position before adjusting, servicing, or cleaning the saw.

2. Remove the hydraulic fluid drain plug from the side of the machine's base and drain the hydraulic fluid into a suitable container.

Note: The hydraulic fluid may also be pumped out of the tank through the filler port with an external pump.

3. When the hydraulic reservoir is empty, replace the drain plug.

4. Refill the hydraulic reservoir with Mobil DTE 24 hydraulic oil or equivalent until the sight gauge indicates the reservoir is full. The reservoir of the PA10 hold approximately 13 gallons (49 liters), the PA13 and PA13/2 hold approximately 16 gallons (61 liters), and the PA18 holds approximately 21 gallons (80 liters).
5. Wipe up any hydraulic fluid that has spilled.

CHANGING THE TRANSMISSION OIL

The transmission oil should be changed every 6 months or 1200 hours of use.

1. Place the saw frame in the horizontal position.

CAUTION

Avoid serious injury by turning the machine's power off at the main electrical disconnect switch and locking it in the "Off" position before adjusting, servicing, or cleaning the saw.

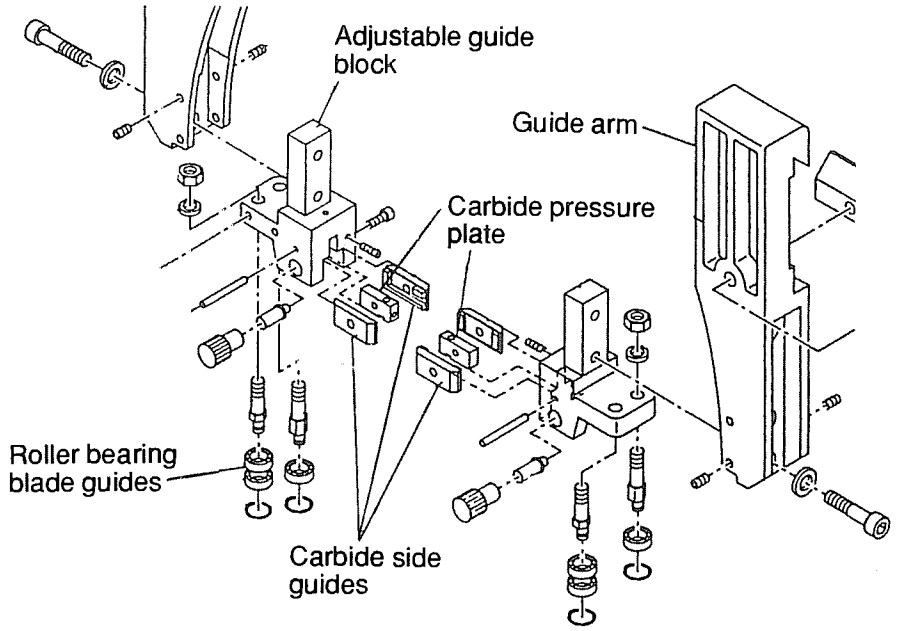
2. Turn off the saw's power at the main electrical disconnect switch and lock it in the "Off" position.
3. Remove the drain plug from the transmission and drain the fluid from the transmission into an appropriate container.
4. Reinstall the drain plug.
5. Remove the oil fill plug from the transmission. Add Mobil SHC634 oil or its equivalent until the transmission mounted sight gauge indicates the transmission is 3/4 full. The transmission has a capacity of approximately 1/2 gallon (2 liters).
6. Reinstall the oil fill plug and wipe up any oil that may have spilled.

BLADE GUIDE SYSTEM

The blade guide system consists primarily of two guide arms, each fitted with an adjustable guide block. Each adjustable guide block is equipped with roller bearing blade guides, fixed carbide (side) guides, and a carbide pressure plate. When properly adjusted, this system of guiding the blade results in a cutting accuracy of +/-.002" per inch of material being cut. Though this system rarely requires attention, it may be necessary to make adjustments or replace worn guides from time to time.

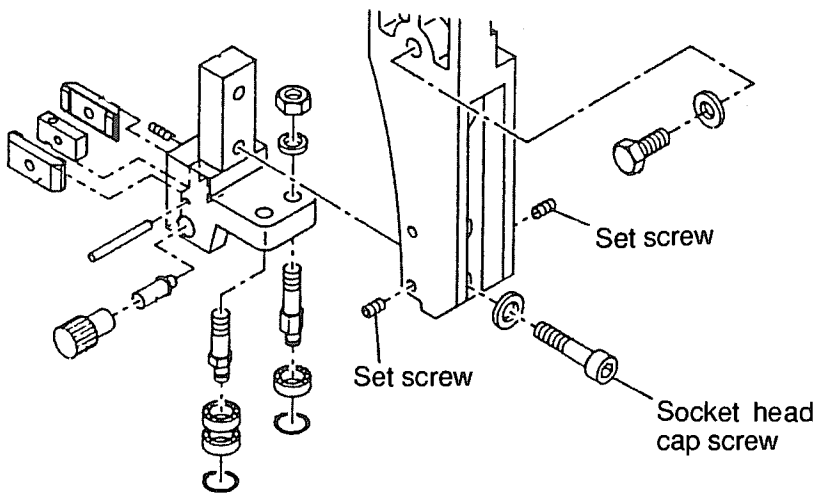
IMPORTANT: Inaccurate cuts are rarely caused by the blade guide system. If you experience inaccurate cuts, before making any adjustments to the blade guides always make sure a new blade of the correct type is installed and properly tensioned, the feed rate, feed pressure, and blade speed are set correctly for

the material being cut, and the coolant is clean and serviceable. These items are most often the cause of inaccurate cuts.



This illustration identifies the parts of the blade guide system. Refer to this illustration when working on the blade guide system.

Adjustable Guide Blocks. The guide blocks can be adjusted both up and down and forward and backward. Up and down adjustments, accomplished by loosening the socket head cap screw shown in the illustration below, would normally be made to compensate for wear of the blade pressure plates that support the back edge of the blade. The guide blocks should be adjusted so the blade pressure plates are in contact with the blade during a cut, but do not exert any unnecessary downward force on the blade.



This illustration identifies the adjusting hardware of the guide blocks.

Forward and backward adjustments, accomplished by adjusting the socket set screws on the front and back of each guide arm (see illustration on previous page), would normally be required when the blade is not square (90°) with the vises. The guide blocks should be adjusted forward and backward until the blade between the two guide blocks is square (90°) with the machined face of the fixed front vise jaw.

Roller Bearing Blade Guides. The roller bearing blade guides are mounted on eccentric shafts which are locked in position with hex nuts. These are factory set and should not require adjustment. Should the roller bearings ever wear out, they can be replaced by removing the snap rings which hold them in place, installing new bearings, and replacing the snap rings.

CAUTION

Avoid serious injury by turning the machine's power off at the main electrical disconnect switch and locking it in the "Off" position before adjusting, servicing, or cleaning the saw.

Fixed Carbide (Side) Guides. When blades begin to appear scored, or when cuts become consistently uneven, it may indicate that the carbide (side) guides need to be replaced.

1. Turn off the saw's main electrical disconnect switch.
2. Remove the front carbide blade guides from the guide arms by removing the knurled knobs that hold the adjustable carbide guides in place.
3. Remove the socket head cap screws that hold the rear carbide guides in place.
4. Install new carbide guides. The guides are self adjusting and should require nothing more than being screwed in place.

IMPORTANT: Tighten the adjustable carbide guides hand tight only. Do not use a wrench.

IMPORTANT: Make sure the adjustable carbide guides are tightened against the blade before operating the saw.

Blade Pressure Plates. Each blade guide block contains a blade pressure plate which supports the back of the blade during a cut. Each pressure plate is held in the guide block by a pin. Refer to the illustration on page G-12.

Note: It is beyond the scope of this trouble-shooting guide to cover every possible problem or cause of a problem. The best trouble shooting guides are a thorough knowledge of the machine's systems and the technical drawings supplied with the machine.

Note: For blade related problems refer to the "Marvel Blade Selection Guide" supplied with the machine.

Hydraulic motor will not start

- ✔ Power is off
- ✔ Main electrical disconnect switch is off
- ✔ Main fuses are open
- ✔ Control circuit fuses are open
- ✔ Overload relay open

Blade and cycle will not start

- ✔ Front vise selector switch not on
- ✔ Front vise must have material to clamp or the out of stock switch (2LS) will prevent the blade and cycle from starting
- ✔ The bandwheel proximity switch (PRS) is not pulsing when the bandwheel is rotating

Manual cycle common problems

- ✔ Frame down will not work if (4LS) is not being tripped by the height bar
- ✔ The feed rate and feed pressure valves have to be greater than "0" for the feed to work

Auto cycle common problems

- ✔ Material has to be clamped in the front vise before the cycle will start
- ✔ The piece counter must be reset with the orange button
- ✔ Cycle switch is in the "manual" position
- ✔ Shuttle does not complete the cycle. Check both the rear (5LS) and the front (6LS) shuttle limit switches and ensure there is stock for the shuttle vise to clamp so that the out of stock limit switch (1LS) is not tripped

No coolant flow	✔ Coolant switch is off ✔ Low coolant level ✔ Coolant intake screen is plugged ✔ Coolant valves are closed ✔ Coolant impeller is worn
Blade breakage	✔ Excessive feed pressure ✔ Excessive feed rate ✔ Improper blade tension ✔ Bandwheels not properly aligned ✔ Refer to the "Marvel Blade Selection Guide"

Every effort has been made to provide a complete and accurate parts catalog. However, recent product improvements and special options or components that may be included on your particular saw may not appear in this catalog. Our service department will gladly help you with any problems this may cause.

PARTS ORDERING

When ordering parts, always provide the following information:

- ☐ Machine model and serial number
- ☐ Machine voltage
- ☐ Part number (not key number)
- ☐ Part description
- ☐ Quantity required

This information is important to speed the processing of your order and to avoid the cost and inconvenience of shipping the wrong part.

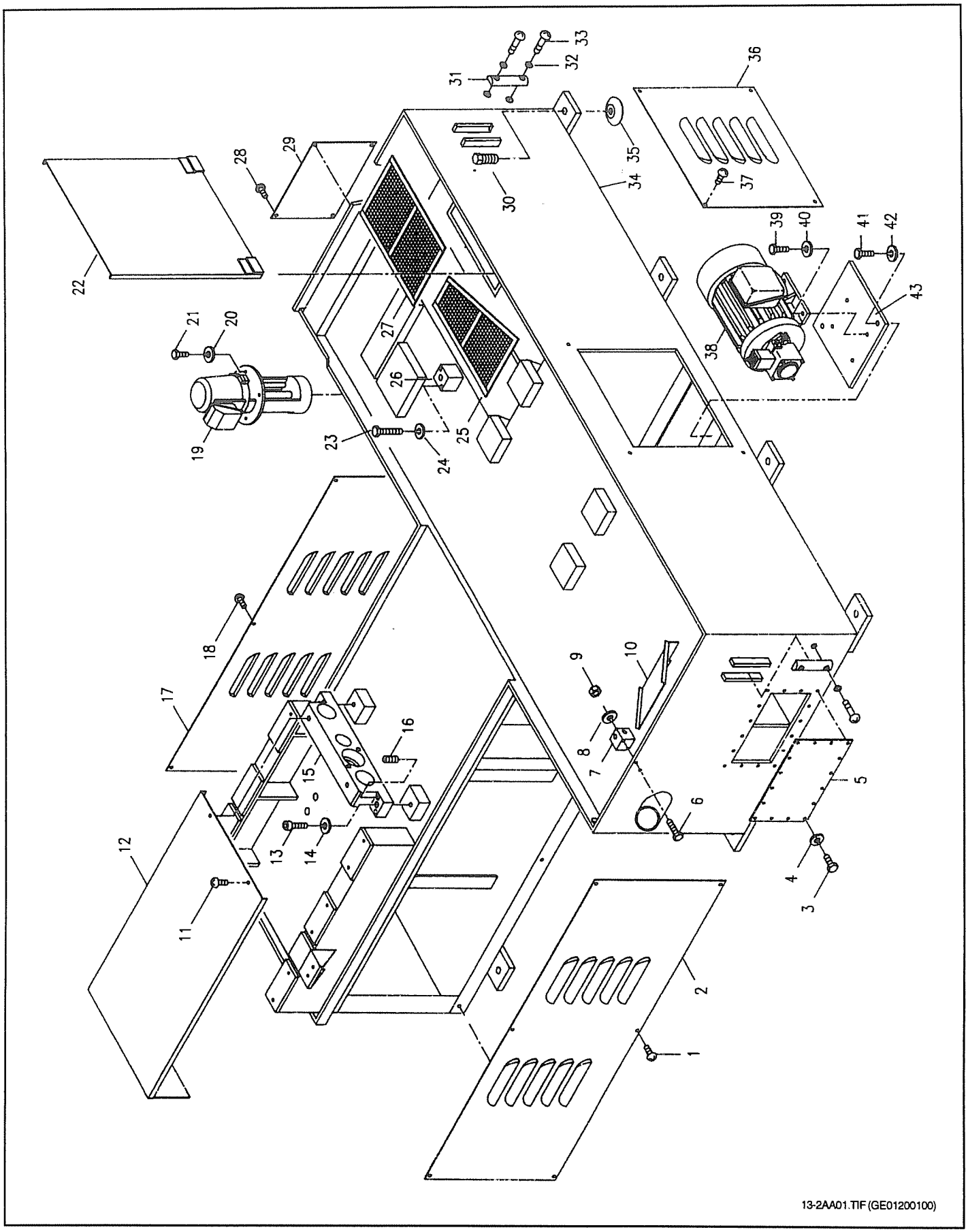
To order parts or request service, contact:

Armstrong-Blum Mfg. Co.
1441 Business Center Drive
Mount Prospect, Illinois 60056
Phone (847) 803-4000
Fax (847) 803-4019

Customer:

There have been a couple additions/ changes since the printing of this owners manual.

Page	Key #	New Part #	Description
Page I-7	Not Shown	P132BA0318	Enclosure
Page I-25	46	P10-FD1403	Counter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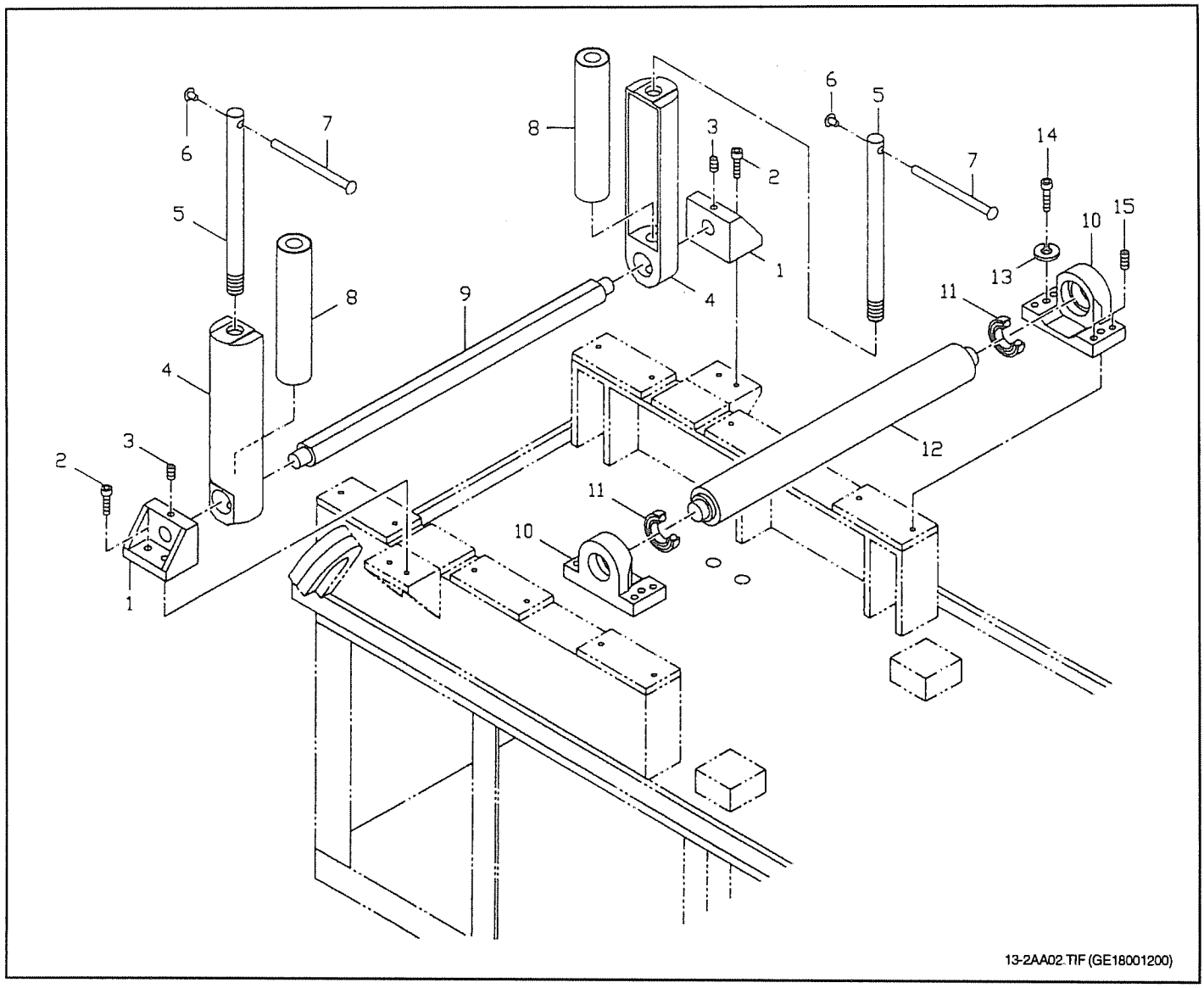
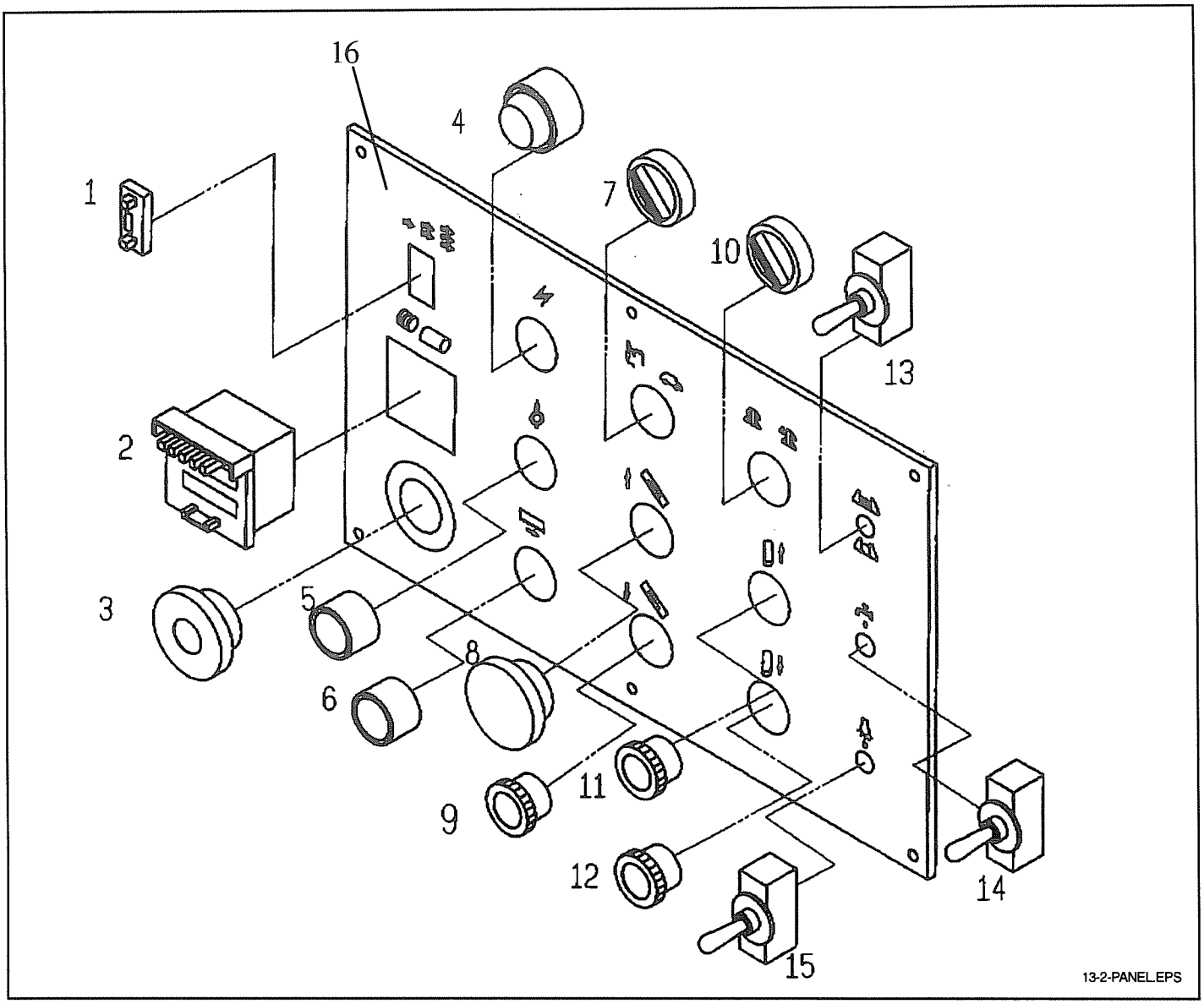
13-2AA01.TIF (GE01200100)

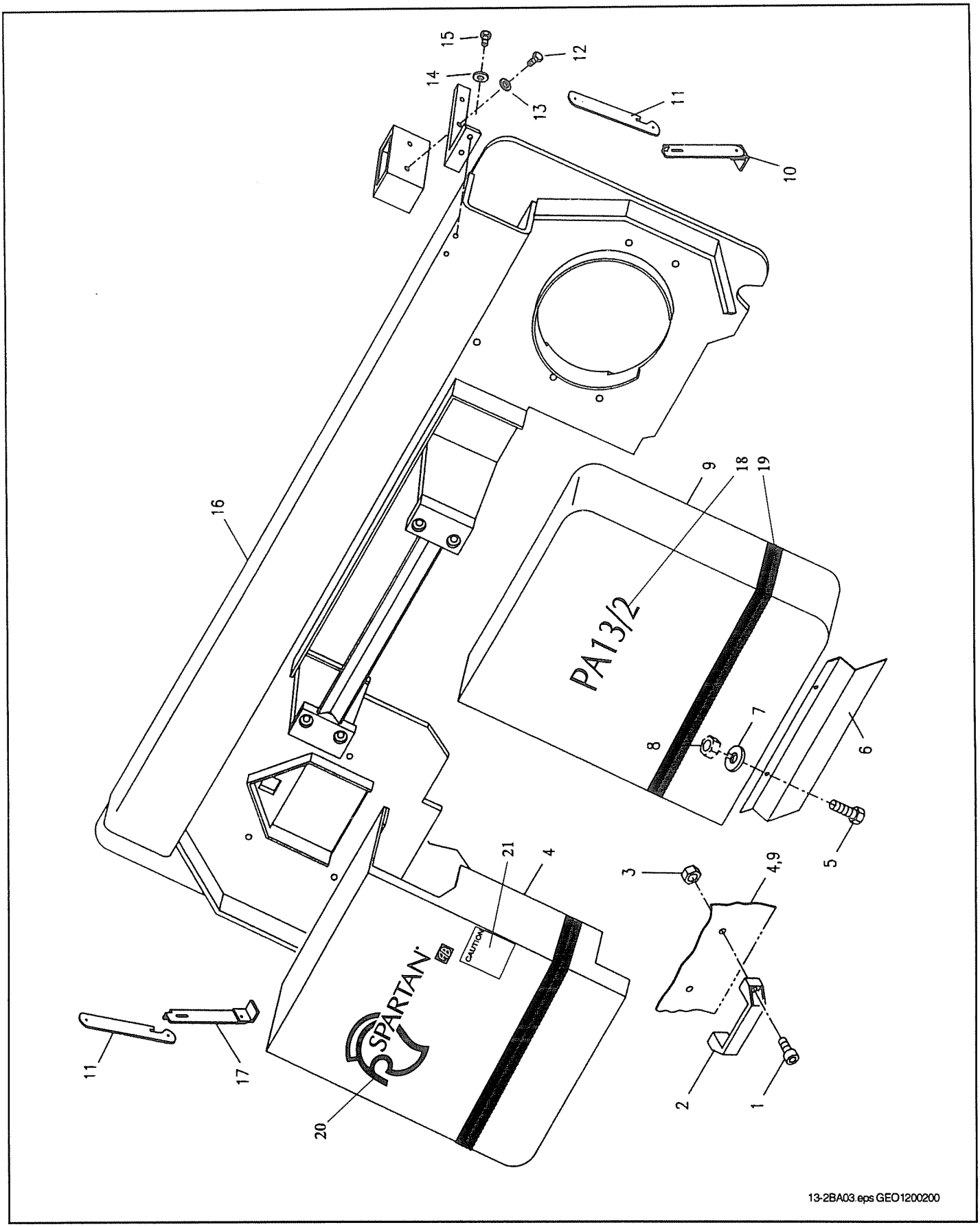
KEY	PART NO.	QTY	DESCRIPTION
1		6	M6x10L DOME HD. SCREW
2	P132AA0102	1	COVER
3		16	M6 SPRING WASHER
4		16	M6x15L HEX. HD. SCREW
5	P132AA0105	1	COVER
6		1	M6x50L HEX. HD. SCREW
7	P132AA0107	1	CONNECTOR
8		1	M6 SPRING WASHER
9		1	M6 NUT
10	P132AA0110	1	SPLASH SHIELD
11		2	M6x10L DOME. HD. SCREW
12	P132AA0112	1	COVER
13		2	M12x50L SOC. HD. SCREW
14		2	M12 SPRING WASHER
15	P132AA0115	1	BRACKET
16		4	M12x30L SET SCREW
17	P132AA0117	1	COVER
18		6	M6x10L DOME HD. SCREW
19	P10-DB1	1	COOLANT PUMP
20		4	M8 SPRING WASHER
21		4	M8x20L HEX. HD. SCREW
22	P132AA0122	1	SPLASH SHIELD
23		2	M6x50L HEX. HD. SCREW
24		2	M6 SPRING WASHER
25	P132AA0125	1	SCREEN
26	P132AA0126	1	CONNECTOR
27	P132AA0127	1	SCREEN
28		4	M6x10L DOME. HD. SCREW
29	P132AA0129	1	COVER
30	P132AA0130	9	ADJUSTING SCREW
31	P132AA0131	2	OIL GAUGE
32	P132AA0132	8	O-RING
33		4	M10x35L SCREW
34	P132AA0134	1	BASE
35	P132AA0135	9	PAD
36	P132AA0136	1	COVER
37		4	M6x10L DOME HD. SCREW
38	PHP25	1	OIL PUMP
39		4	M8x25L HEX. HD. SCREW
40		4	M8 SPRING WASHER
41		2	M8x25L HEX. HD. SCREW
42		4	M8 SPRING WASHER
43	P132AA0143	1	PLATE



KEY	PART NO.	QTY	DESCRIPTION
1	P132AA0201	2	BRACKET
2		4	M8x25L SOC. HD. SCREW
3		2	M10x16L SET SCREW
4	P132AA0204	2	VERTICAL ROLLER BRACKET
5	P132AA0205	2	ROD
6	P132AA0206	2	RIVET
7	P132AA0207	2	HANDLE
8	P132AA0208	2	VERTICAL ROLLER
9	P132AA0209	1	BAR
10	P132AA0210	6	BRACKET
11	P132AA0211	6	BEARING
12	P132AA0212	3	ROLLER
13		12	M8 SPRING WASHER
14		12	M8x30L SOC. HD. SCREW
15		24	M10x18L SET SCREW

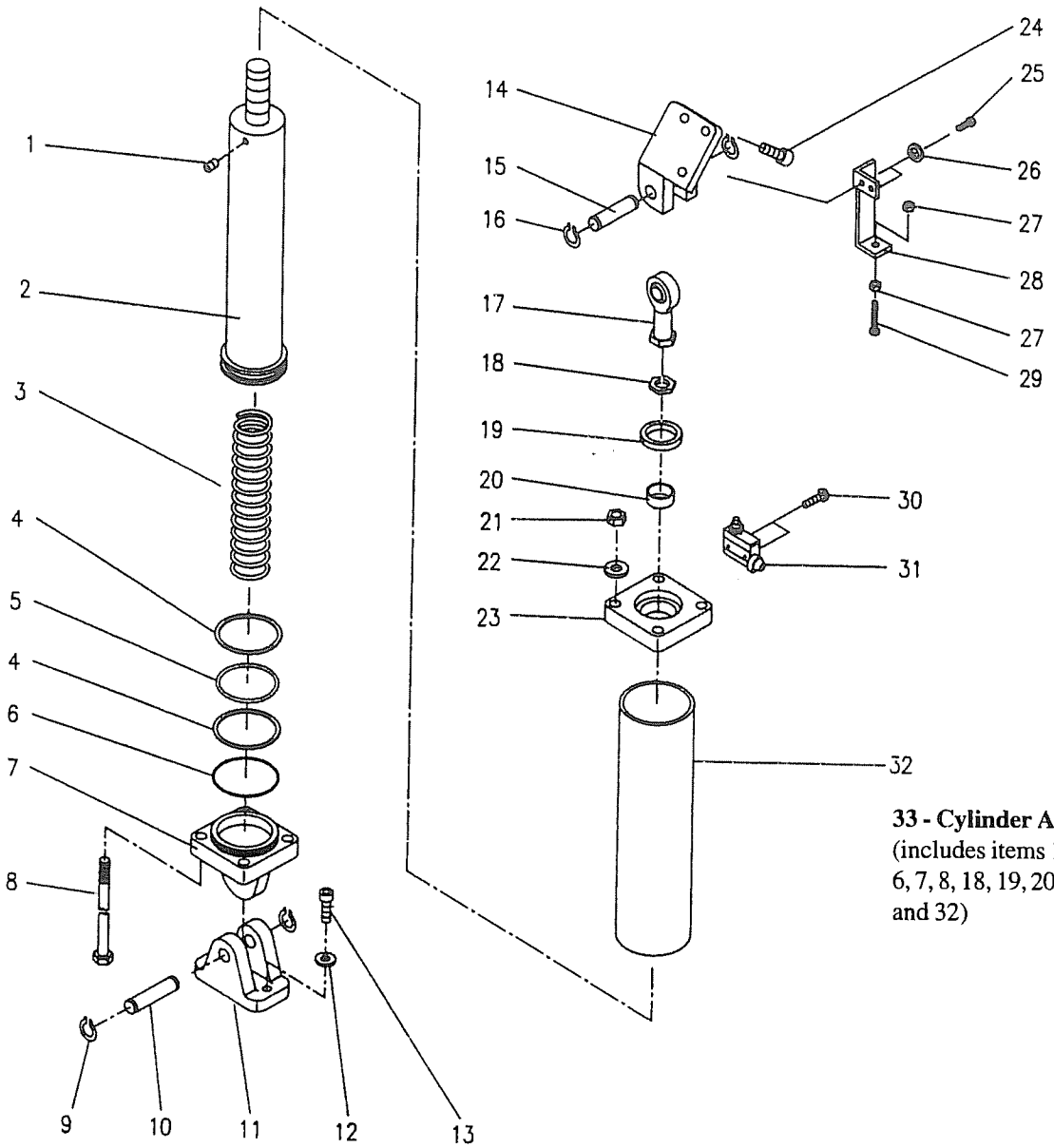


KEY	PART NO.	QTY	DESCRIPTION
1	P10-PEB-6	1	Multiple Index Switch
2	P10-PEP-8	1	Piece Counter
3	P10-PEB-7	1	All Stop Pushbutton (Red)
4	P10-PEB-8	1	"Power On" Light
5	P10-PEB-9	1	Start Hydraulic Pushbutton
6	P10-PEB-10	1	Blade Run Pushbutton
7	P10-PEB-11	1	Auto / Manual Switch
8	P10-PEB-12	1	Frame Up Pushbutton
9	P10-PEB-13	1	Frame Down Pushbutton
10	P10-PEB-11	1	Vise Clamp / Unclamp Switch
11	P10-PEB-12	1	Shuttle Retract Pushbutton
12	P10-PEB-12	1	Shuttle Forward Pushbutton
13	P10-PEB-14	1	Auto Unclamp Toggle Switch
14	P10-PEB-14	1	Coolant Toggle Switch
15	P10-PEB-14	1	Work Light Toggle Switch
16	PA-EC1	1	Operator's Panel (does not include switches)



13-2BA03.eps GEO1200200

KEY	PART NO.	QTY	DESCRIPTION
1		4	M8x25L SOC. HD. SCREW
2	P132BA0302	2	HANDLE (5HD-01)
3		4	M8 NUT
4	P132BA0304	1	COVER
5		2	M6X10L HEX. HD. SCREW
6	P132BA0306	2	COVER
7		2	M6 SPRING WASHER
8		2	M6 NUT
9	P132BA0309	1	COVER
10	P132BA0310	1	STAY
11	P132BA0311	2	STAY
12		2	M6x10L HEX. HD. SCREW
13		2	M6 SPRING WASHER
14		2	M6 SPRING WASHER
15		2	M6x15L HEX. HD. SCREW
16	P132BA0316	1	SAW FRAME
17	P132BA0317	1	STAY
18	P13-NP4	1	"PA13/2" Decal (includes item 20)
19	P10-NP2	A/R	Stripe
20	P13-NP4	1	"Spartan" decal (includes item 18)
21	81-NP50	1	Safety decal



33 - Cylinder Assembly
(includes items 1, 2, 3, 4, 5, 6, 7, 8, 18, 19, 20, 21, 22, 23, and 32)

13-2FH04.TIF (GE01200300)

KEY	PART NO.	QTY	DESCRIPTION
1		1	PLUG (1/8 PT)
2	P132FH0402	1	PISTON
3	P132FH0403	1	SPRING
4	P132FH0404	2	BACKING RING
5	P132FH0405	1	O-RING
6	P132FH0406	1	O-RING
7	P132FH0407	1	CYLINDER CAP
8	P132FH0408	4	HEX. HD. SCREW
9	P132FH0409	2	RETAINING RING
10	P132FH0410	1	PIN
11	P132FH0411	1	BRACKET
12		2	M10 SPRING WASHER
13		2	M10x30L SOC. HD. SCREW
14	P132FH0414	1	SUPPORT
15	P132FH0415	1	PIN
16	P132FH0416	2	RETAINING RING
17	P132FH0417	1	BEARING
18	P132FH0418	1	NUT
19	P132FH0419	1	OIL SEAL
20	P132FH0420	1	BUSH
21	P132FH0421	4	NUT
22	P132FH0422	4	SPRING WASHER
23	P132FH0423	1	CYLINDER CAP
24		3	M12x35L SOC. HD. SCREW
25		2	M6x15L HEX. HD. SCREW
26		2	M6 SPRING WASHER
27		2	M8 NUT
28	P132FH0428	1	ANGLE PLATE
29		1	M8x30L HEX. HD. SCREW
30		1	M4x 30L DOME HD. SCREW
31	P132FH0431	1	LIMIT SWITCH
32	P132FH0432	1	CYLINDER TUBE
33	P132-FH0400A	1	Cylinder Assembly

IMPORTANT

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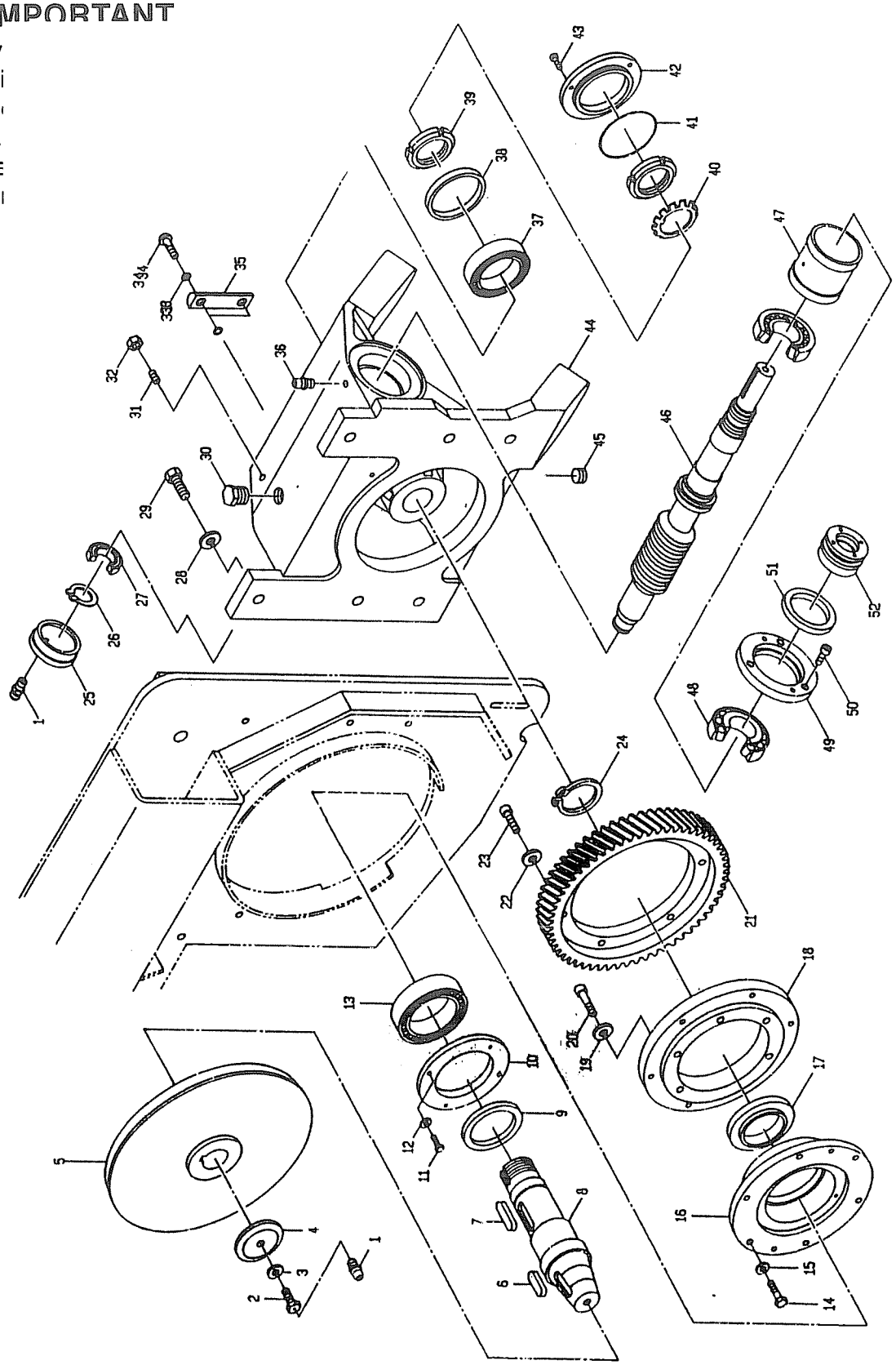


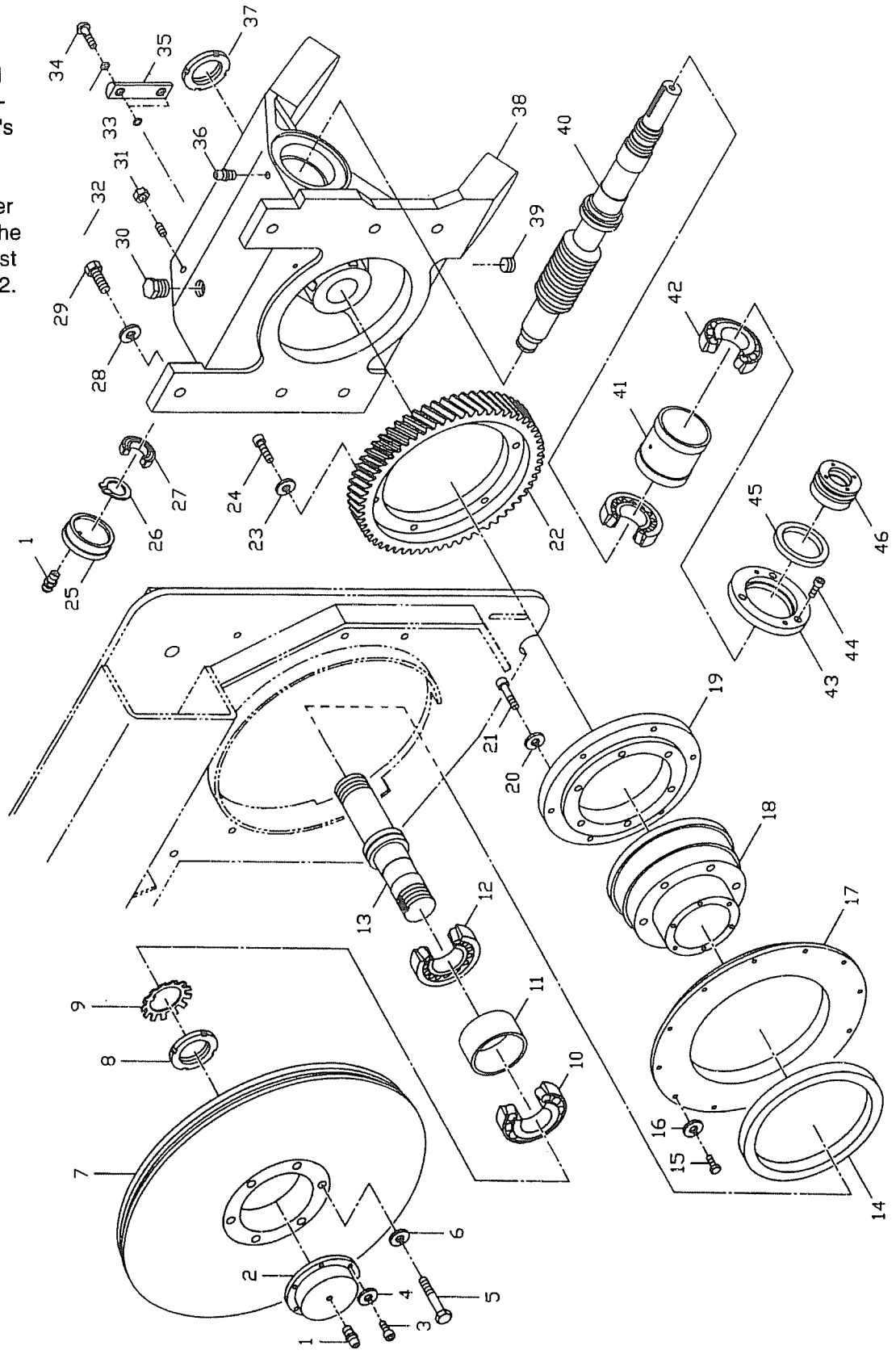
13-2BB05-NEW.EPS (GE01200400)

SPARTAN PA13/2 GEAR BOX & DRIVE WHEEL - New Style

KEY	PART NO.	QTY	DESCRIPTION
1	P132BB0501	2	Nipple
2		1	Hex Head Cap Screw - M12 x 25L
3		1	Spring Washer - M12
4	P132BB1004	1	Washer
5	P13201220500	1	Wheel
6	P13216X10X50L	1	Key
7	P132BB1007	1	Key
8	P132BB1008	1	Shaft
9	P13-BB0705	1	Oil Seal
10	P132BB1010	1	Oil Seal Cover
11		2	Hex Head Cap Screw (M6 x 16L
12		2	Spring Washer (m6)
13	P13-BB0713	1	Bearing
14		6	Hex Head Cap Screw (M10 x 35L
15		6	Spring Washer (M10)
16	P132BB1016	1	Cover
17	P132BB1017	1	Collar
18	P132BB1018	1	Flange
19		6	Spring Washer (M10)
20		6	Socket Head Cap Screw (M10 x 50L)
21	P132BB1021	1	Worm Wheel
22		6	Spring Washer (M10)
23		6	Socket Head Screw (M10 x 40L)
24	P132BB1024	1	Retaining Ring
25	P132BB1025	1	Cover
26	P132BB1026	1	Retaining Ring
27	P132BB0527	1	Bearing
28		6	Spring Washer
29		6	Hex Head Cap Screw (M14 x 40L)
30	P132BB0530	1	Plug
31		1	Set Screw (M8 x 35L)
32		1	Nut (M8)
33	P132BB1033	4	O-Ring
34		2	Screw (M10 x 35L)
35	P132BB0535	1	Oil Gauge
36	P132BB0536	1	Nipple
37	P18-BB0719	1	Bearing
38	P132BB1038	1	Collar
39	P13-BB0720	2	Locking Nut
40	P13-BB0721	1	Locking Washer
41	P13-BB0722	1	O-Ring
42	P132-BB1042	1	Cover
43		3	Hex Head Cap Screw (M6 x 20L)
44	P132BB1044	1	Gear Box
45	P132BB0539	1	Plug
46	P132BB1046	1	Worm
47	P132BB1047	1	Collar
48	P132BB0542	2	Bearing
49	P132BB1049	1	Cover
50		3	Socket Head Screw (M6 x 20L)
51	P13-BB0736	1	Oil Seal
52	P132BB0546	1	Nut

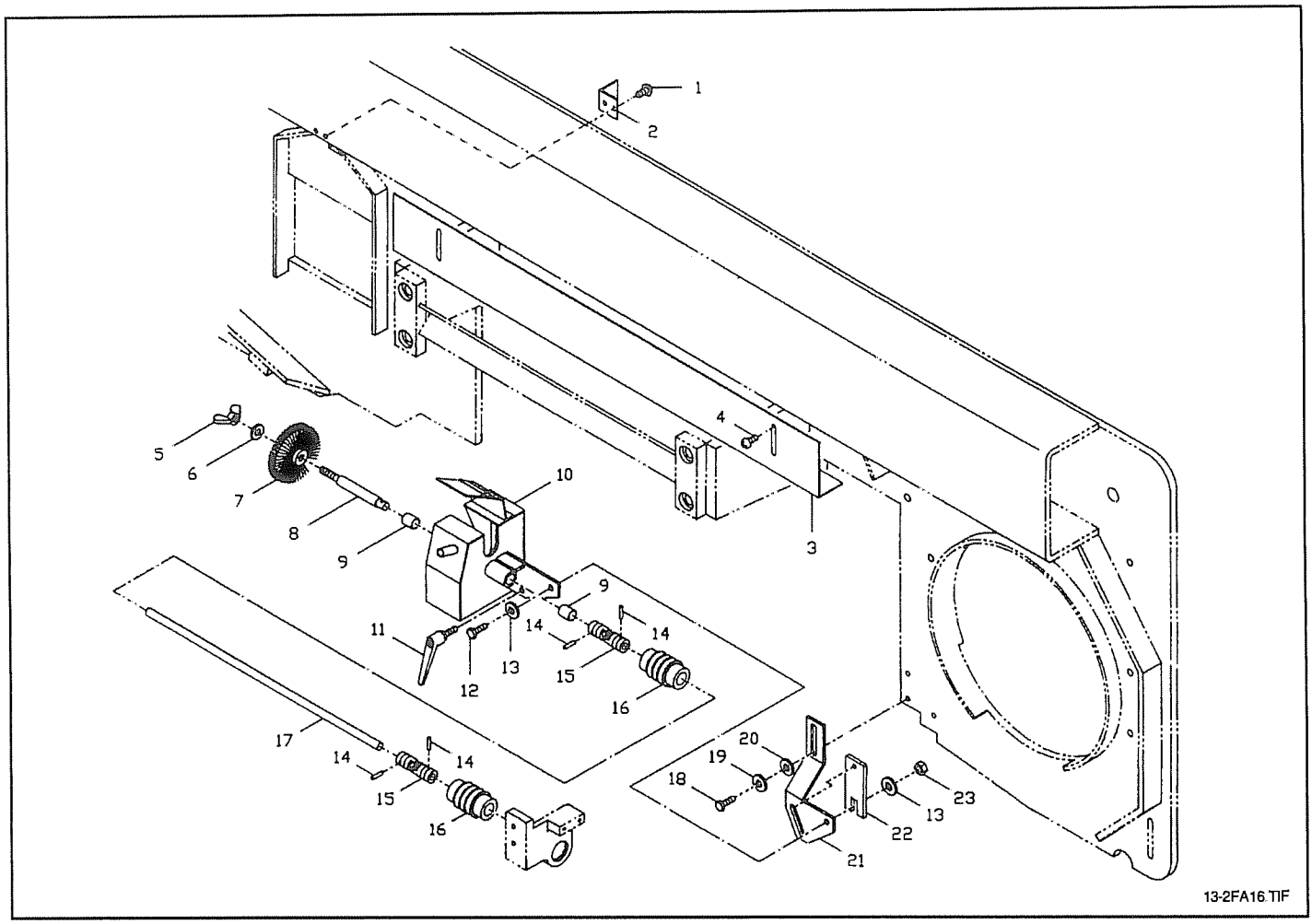
IMPORTANT

Look closely at your machine's bandwheel (item 7 in this illustration). If your machine's bandwheel **does not** have 6 bolt holes surrounding the center bore, you must use the part illustration and list on pages I-11 and I-12.

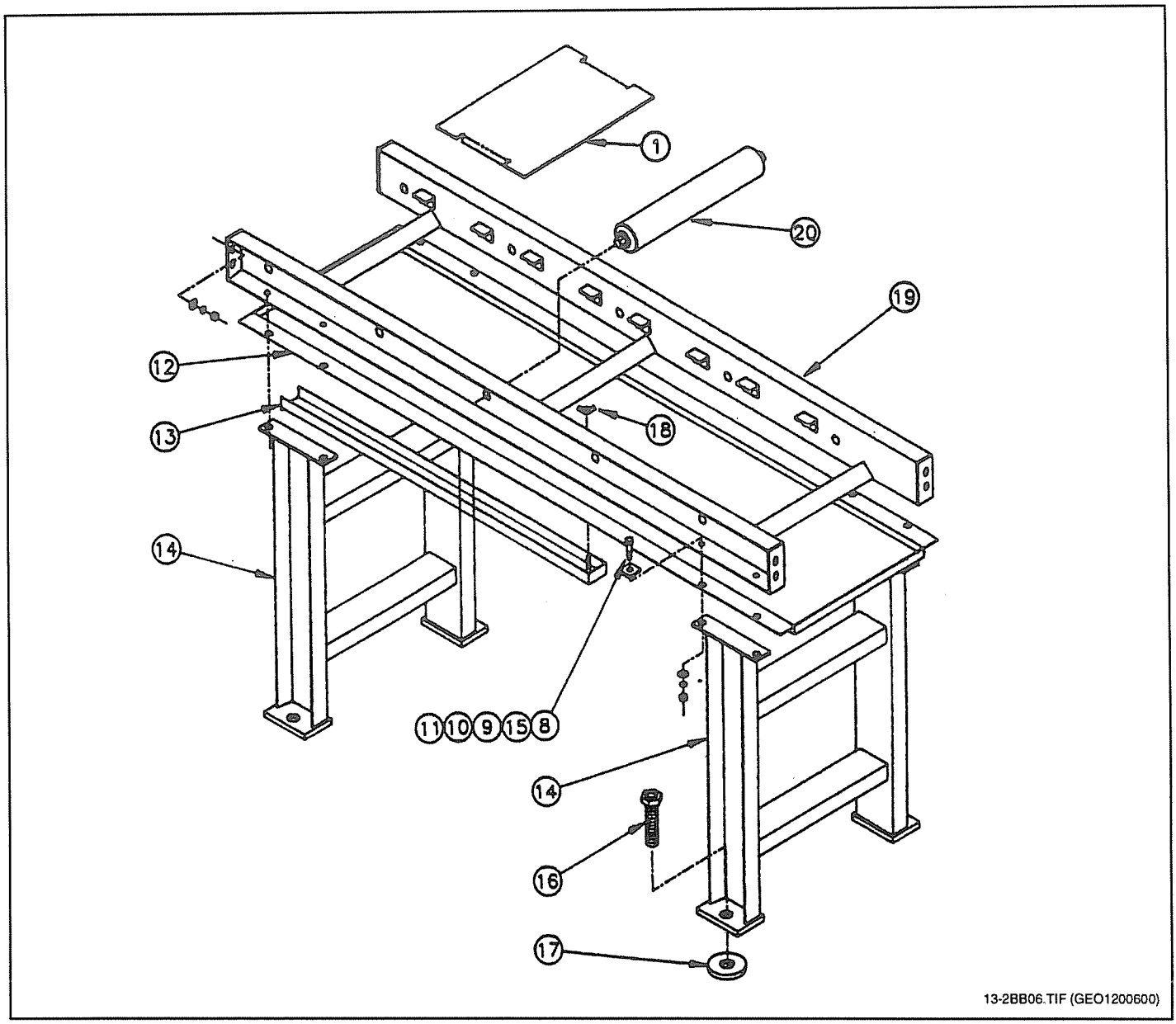


13-2BB05.TIF (GE01200400)

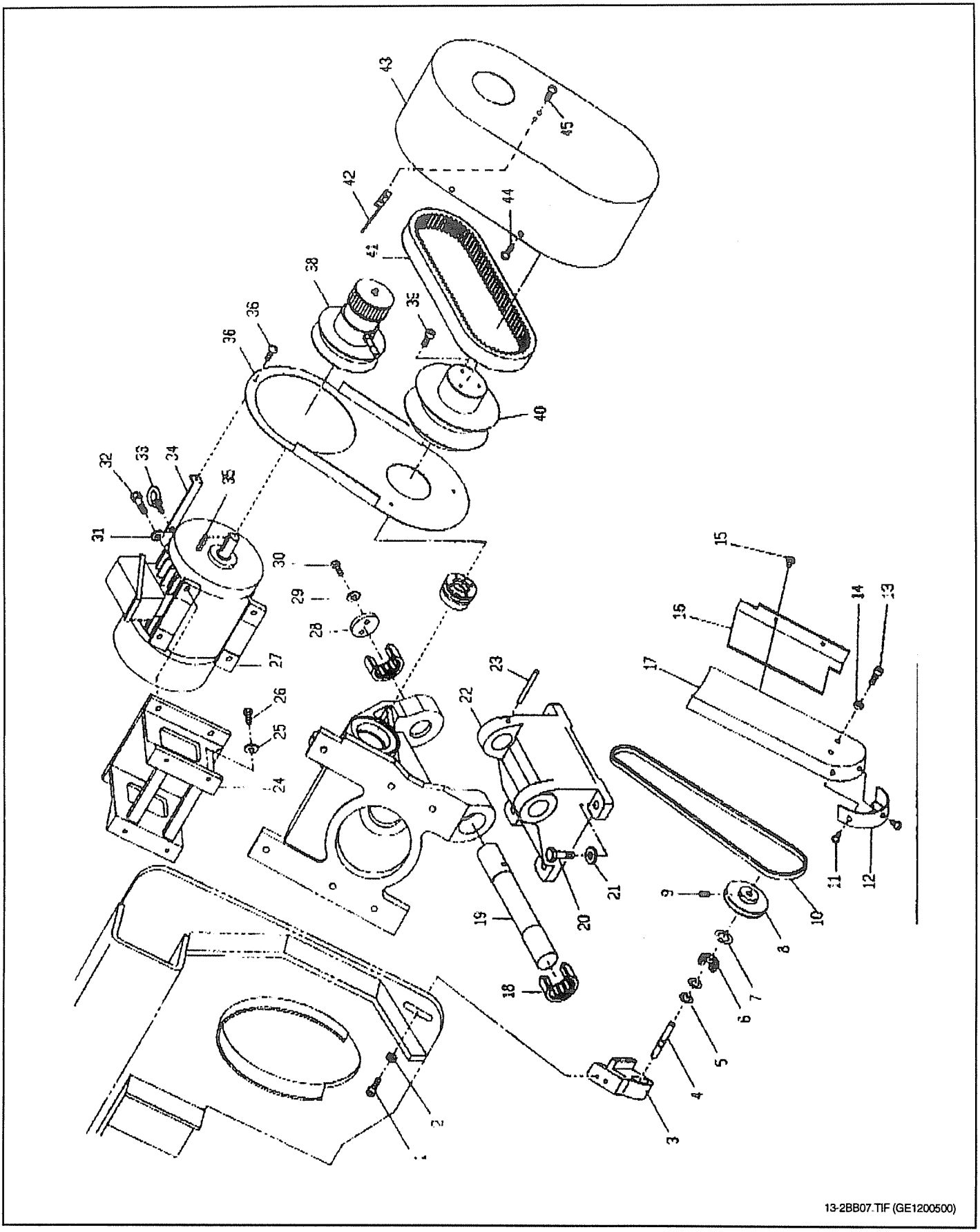
KEY	PART NO.	QTY	DESCRIPTION
1	P132BB0501	2	NIPPLE
2	P132BB0502	1	COVER
3		6	M6x20L SOC. HD. SCREW
4		6	M6 SPRING WASHER
5		6	M12x65L HEX. HD. SCREW
6		6	M12 SPRING WASHER
7	P132BB0507	1	WHEEL
8	P132BB0508	1	LOCKING NUT
9	P132BB0509	1	LOCKING WASHER
10	P132BB0510	1	BEARING
11	P132BB0511	1	COLLAR
12	P132BB0512	2	BEARING
13	P132BB0513	1	SHAFT
14	P132BB0514	1	OIL SEAL
15		12	M6x20L HEX. HD. SCREW
16		12	M6 SPRING WASHER
17	P132BB0517	1	COVER
18	P132BB0518	1	BEARING SLEEVE
19	P132BB0519	1	FLANGE
20		6	M10 SPRING WASHER
21		6	M10x50L SOC. HD. SCREW
22	P132BB0522	1	WORM WHEEL
23		6	M10 SPRING WASHER
24		6	M10x40L SOC. HD. SCREW
25	P132BB0525	1	COVER
26	P132BB0526	1	RETAINING RING
27	P132BB0527	1	BEARING
28		6	M14 SPRING WASHER
29		6	M14x40L HEX. HD. SCREW
30	P132BB0530	1	PLUG
31		1	M8 NUT
32		1	M8x35L SET SCREW
33	P132BB0533	4	O RING
34		2	M10x35L SCREW
35	P132BB0535	1	OIL GAGE
36	P132BB0536	1	NIPPLE
37	P132BB0537	1	LOCKING NUT
38	P132BB0538	1	GEAR BOX
39	P132BB0539	1	PLUG
40	P132BB0540	1	WORM
41	P132BB0541	1	COLLAR
42	P132BB0542	2	BEARING
43	P132BB0543	1	COVER
44		3	M6x20L SOC. HD. SCREW
45	P132BB0545	1	OIL SEAL
46	P132BB0546	1	NUT



KEY	PART NO.	QTY	DESCRIPTION
1		2	M6x10L DOME HD. SCREW
2	P132BB0702	1	ANGLE PLATE
3	P132BB0703	1	BLADE COVER
4		2	M6x10L DOME HD. SCREW
5		1	M10 WING SCREW
6		1	M10 WASHER
7	P10-BB3	1	BRUSH
8	P132BB0708	1	SHAFT
9	P132BB0709	2	BUSH
10	P132BB0710	1	COVER
11	P132BB0711	1	HANDLE
12		1	M10x30L HEX. HD. SCREW
13		2	M10 WASHER
14	P132BB0714	4	PIN
15	P10-BB4	2	UNIVERSAL JOINT
16	P10-BB5	2	ENVELOPE
17	P132BB0717	1	SHAFT
18		2	M10x20L HEX. HD. SCREW
19		2	M10 SPRING WASHER
20		2	M10 WASHER
21	P132BB0721	1	BRACKET
22	P132BB0722	1	PLATE
23		1	M10 NUT

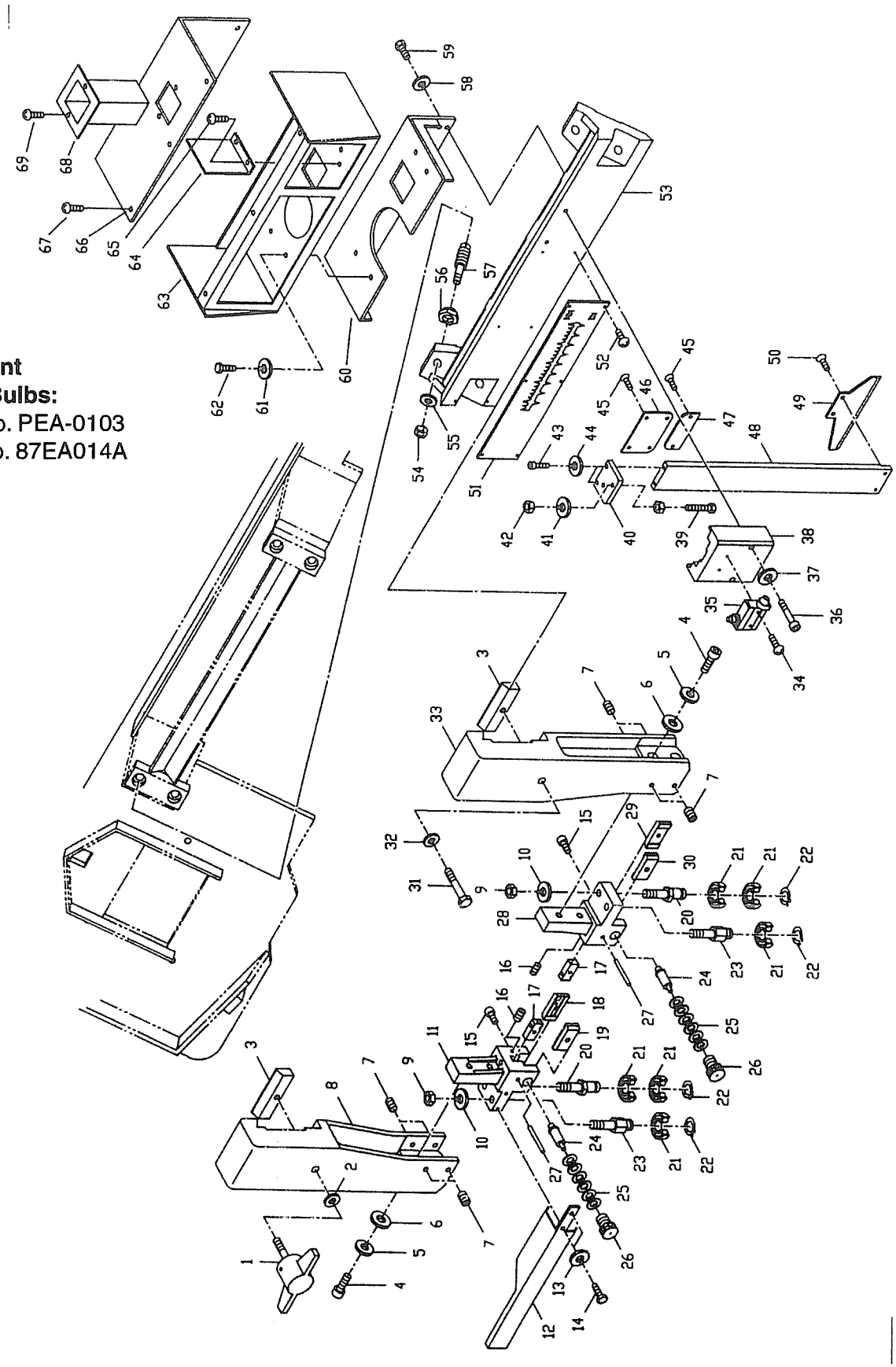


KEY	PART NO.	QTY	DESCRIPTION
1	13-FA33	1	FLUSH PLATE (IF ORDERED)
8		8	3/8-16 x 1-1/2 HEX HEAD SCREW
9		8	3/8 FLAT WASHER
10		8	3/8 LOCKWASHER
11		8	3/8-16 LOCKWASHER
12	13-FA31	1	COOLANT PAN (IF ORDERED)
13	13-FA32	1	COOLANT TROUGH (IF ORDERED)
14	P13-FA1	2	TRACK STAND
15	81-FK222	12	3/8 BEVEL WASHER
16	6/9-835	4	LEVELING SCREW
17	6/9-725	4	FLOOR WASHER
18		1	5/16-18 WINGNUT
19	13-FA34	1	FIRST SECTION ROLLER TABLE FRAME
20	13-FA24	5	ROLLER, 2.5 DIA. x 15 B.F.


13-2BB07.TIF (GE1200500)

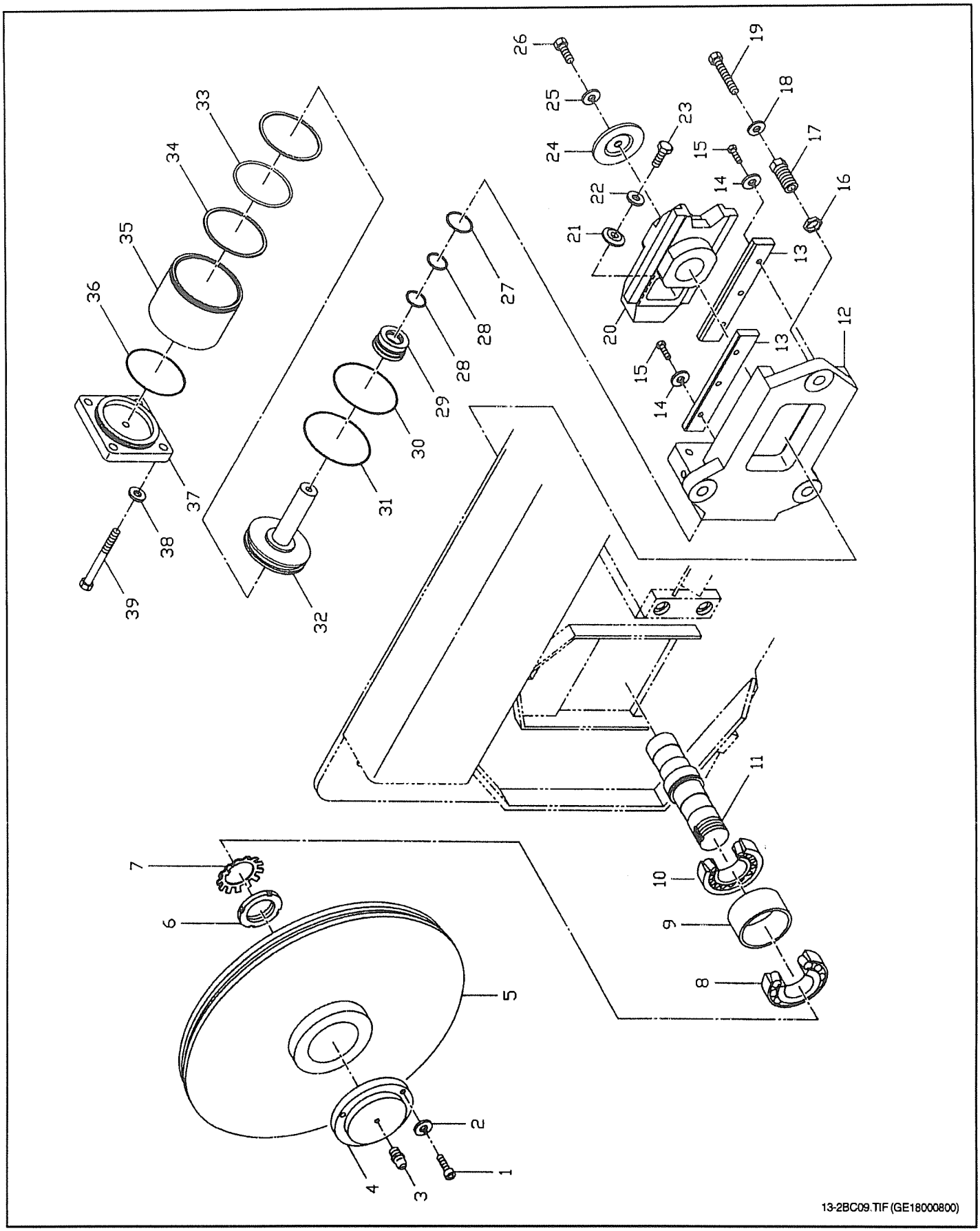
KEY	PART NO.	QTY	DESCRIPTION
1		2	M8x250L SOC. HD. SCREW
2		2	M8 WASHER
3	P132BB0603	1	BRACKET
4	P132BB0604	1	SHAFT
5	P132BB0605	2	RETAINING RING
6	P132BB0606	2	BEARING
7	P132BB0607	1	RETAINING RING
8	P132BB0608	1	PULLEY
9		1	SET SCREW M8x10L
10	P132BB0615	1	V-BELT
11		2	DOME HEAD SCREW M6x10L
12	P132BB0612	1	COVER
13		2	SOCKET HEAD SCREW M6x30L
14		2	M6 WASHER
15		2	M6x10L DOME HEAD SCREW
16	P132BB0616	1	COVER
17	P132BB0617	1	COVER
18	P132BB0618	2	BEARING
19	P132BB0619	1	SHAFT
20		4	M16x45L HEAX HD. SCREW
21		4	M16 SPRING WASHER
22	P132BB0622	1	BRACKET
23	P132BB0623	1	PIN
24	P132BB0624	1	MOTOR BASE
25		4	M10 SPRING WASHER
26		4	M10x30L HEX HD. SCREW
27	P132BB0627	1	MOTOR
28	P132BB0628	1	COVER
29		2	M8 SPRING WASHER
30		2	M8x25L HEX HD. SCREW
31		4	M10 SPRING WASHER
32		4	M10x30L HEX HD. SCREW
33		1	M10 EYE SCREW
34	P132BB0634	1	COVER SUPPORT
35		1	8x8x50L KEY
36	P132BB0636	1	COVER
37		3	M6x10L DOME HD. SCREW
38	P132BB0638	1	PULLEY
39		1	M10x35L SOCKET HD. SCREW
40	P132BB0640	1	PULLEY
41	P13-BB1	1	BELT
42	P132BB0642	1	FIX PLATE
43	P132BB0643	1	COVER
44		4	M6x10L DOME HD. SCREW
45		2	M6x10L DOME HD. SCREW

Replacement Worklight Bulbs:
12V - part no. PEA-0103
24V - part no. 87EA014A



13-2BD008 (GEO1200700)

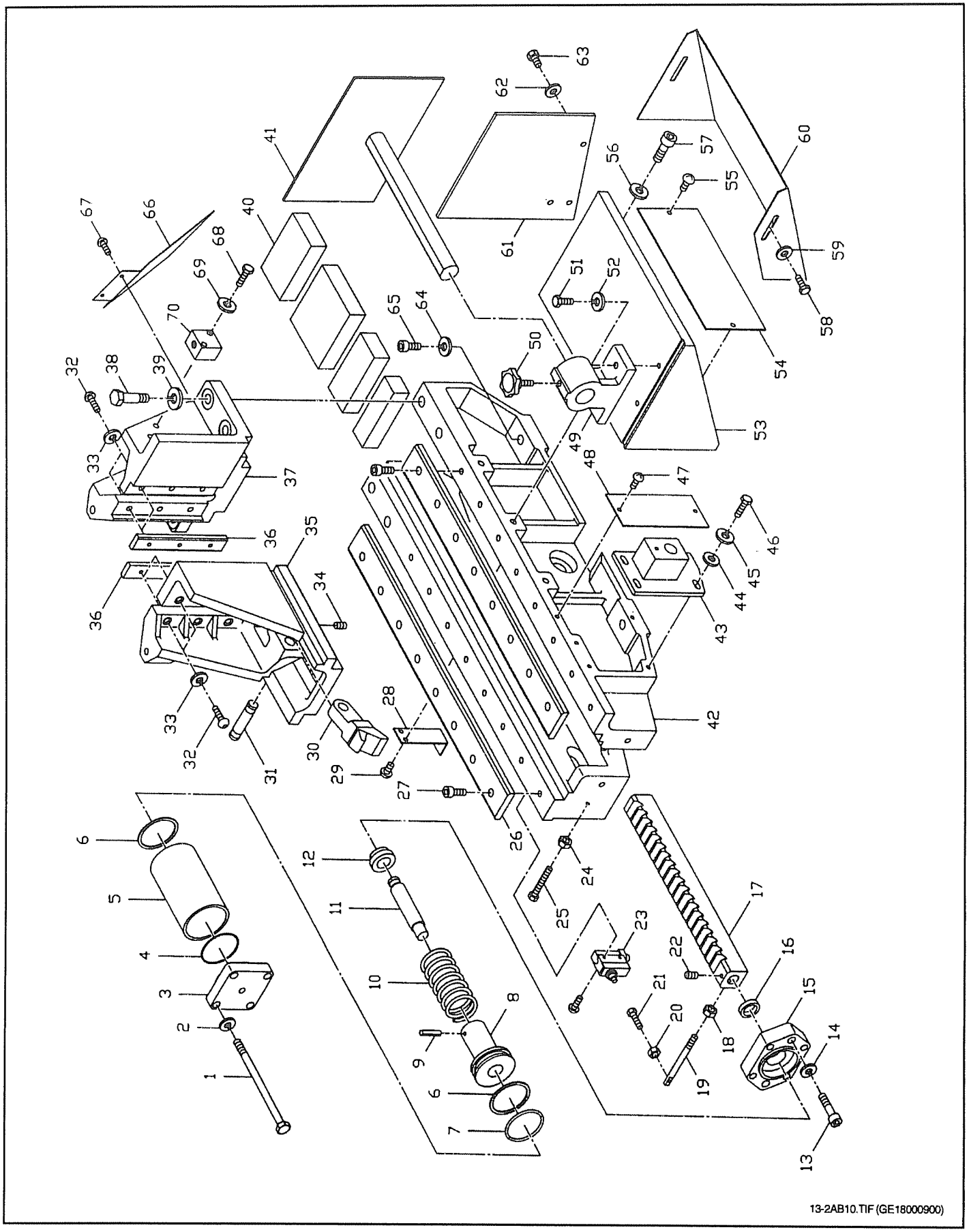
KEY	PART NO.	QTY	DESCRIPTION
1	P132BD0801	1	LOCK HANDLE
2		1	M12 WASHER
3	P132BD0803	1	SLIDE BLOCK
4		4	M12x50L SOC. HD. SCREW
5		4	M12 SPRING WASHER
6	P132BD0806	4	WASHER
7		8	M10x14L SET SCREW
8	P132BD0808	1	L. H. GUIDE ARM
9		4	M12 NUT
10		4	M12 SPRING WASHER
11	P132BD0811	1	L.H. GUIDE HOLDER
12	P132BD0812	1	BLADE COVER
13		2	M6 SPRING WASHER
14		2	M6x15L HEX. HD. SCREW
15		2	M8x18L SOC. HD. SCREW
16		2	M6x10L SET SCREW
17	P13-BD5	2	UPPER INSERT
18	P13-BD2	1	L. H. REAR INSERT
19	P13-BD1	1	L. H. FRONT INSERT
20	P132BD0820	2	SHORT ECCENTRIC SHAFT
21	P13-PB1	6	BEARING
22	P132BD0822	4	RETAINING RING
23	P132BD0823	2	LONG ECCENTRIC SHAFT
24	P132BD0824	2	PIN
25	P132BD0825	12	DISC SPRING
26	P132BD0826	2	SCREW
27	P132BD0827	2	PIN
28	P132BD0828	1	R. H. GUIDE HOLDER
29	P13-BD4	1	R. H. REAR INSERT
30	P13-BD3	1	R. H. FRONT INSERT
31		1	M12x65L HEX. HD. SCREW
32		1	M12 WASHER
33	P132BD0833	1	R. H. GUIDE ARM
34		2	M4x30L DOME HD. SCREW
35	P132BD0835	1	LIMIT SWITCH
36		2	M8x55L SOC. HD. SCREW
37		2	M8 SPRING WASHER
38	P132BD0838	1	SLIDE BLOCK
39		1	M8x50L HEX. HD. SCREW
40	P132BD0840	1	PLATE
41		1	M8 SPRING WASHER
42		2	M8 NUT
43		2	M6x20L SOC. HD. SCREW
44		2	M6 SPRING WASHER
45		6	M5x10L FLAT HD. SCREW
46	P132BD0846	1	PLATE
47	P132BD0847	1	PLATE
48	P132BD0848	1	GUIDE
49	P132BD0849	1	PLATE
50		2	M6x10L FLAT HD. SCREW
51	P132BD0851	1	SCALE
52		6	M4x6L DOME HD. SCREW
53	P132BD0853	1	SLIDE SCREW
54		4	M12 NUT
55		4	M12 WASHER
56	P132BD0856	4	NUT
57	P132BD0857	4	SCREW
58		4	M8 SPRING WASHER
59		4	M8x15L HEX. HD. SCREW
60	P132BD0860	1	SUPPORT
61		4	M6 SPRING WASHER
62		4	M6x10L HEX. HD. SCREW
63	P132BD0863	1	PANEL BOX
64	P132BD0864	1	PLATE
65		2	M6x10L DOME HD. SCREW
66	P132BD0866	1	COVER
67		6	M6x10L DOME HD. SCREW
68	P132BD0868	1	COVER
69		2	M6x10L DOME HD. SCREW



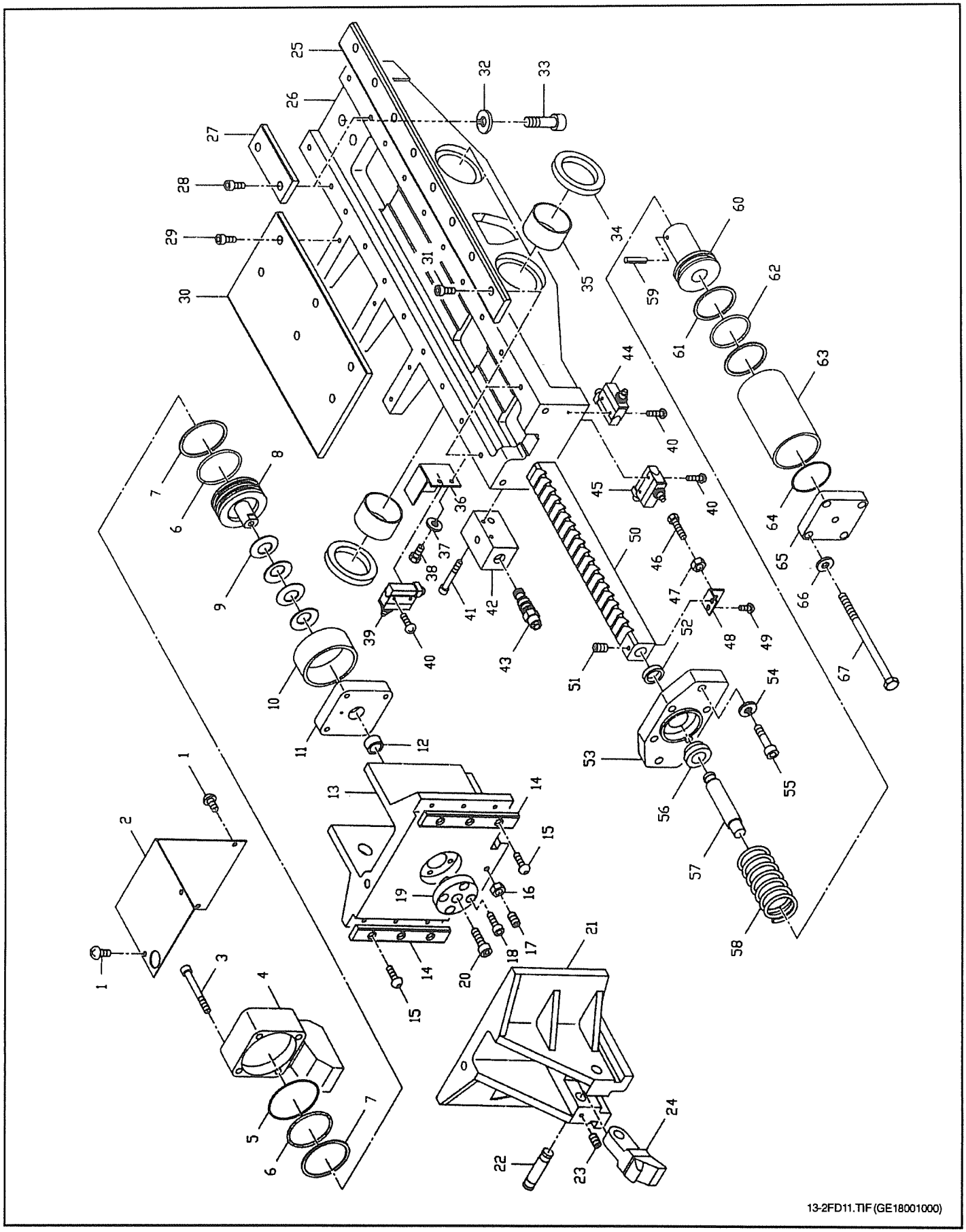
13-2BC09.TIF (GE18000800)

KEY	PART NO.	QTY	DESCRIPTION
1		3	M8x30L SOC. HD. SCREW
2		3	M8 SPRING WASHER
3	P132BC0903	1	NIPPLE
4	P132BC0904	1	COVER
5	P132BC0905	1	IDLE WHEEL
6	P132BC0906	1	LOCKING NUT
7	P132BC0907	1	LOCKING WASHER
8	P132BC0908	2	BEARING
9	P132BC0909	1	COLLAR
1	P132BC0910	1	BEARING
11	P132BC0911	1	SHAFT
12	P132BC0912	1	TENSION FRAME
13	P132BC0913	2	PLATE
14		6	M8 SPRING WASHER
15		6	M8x30L HEX. HD. SCREW
16	P132BC0916	3	NUT
17	P132BC0917	3	ADJUSTING SCREW
18		3	M12 WASHER
19		3	M12x75L HEX. HD. SCREW
20	P132BC0920	1	SLIDE
21	P132BC0921	1	WASHER
22		1	M12 WASHER
23		1	M12x25L HEX. HD. SCREW
24	P132BC0924	1	WASHER
25		1	M12 SPRING WASHER
26		1	M12x30L HEX. HD. SCREW
27	P132BC0927	1	O-RING
28	P132BC0928	1	O-RING
29	P132BC0929	1	COLLAR
30	P132BC0930	1	O-RING
31	P132BC0931	1	O-RING
32	P132BC0932	1	PISTON
33	P132BC0933	1	O-RING
34	P132BC0934	2	BACKING RING
35	P132BC0935	1	CYLINDER
36	P132BC0936	1	O-RING
37	P132BC0937	1	CYLINDER CAP
38	P132BC0938	4	WASHER
39	P132BC0939	4	HEX. HD. SCREW
NS*	P10-PHV-29	1	MANUAL HYDRAULIC VALVE
NS*	P13-BC0935	1	HANDLE ONLY, FOR ABOVE VALVE

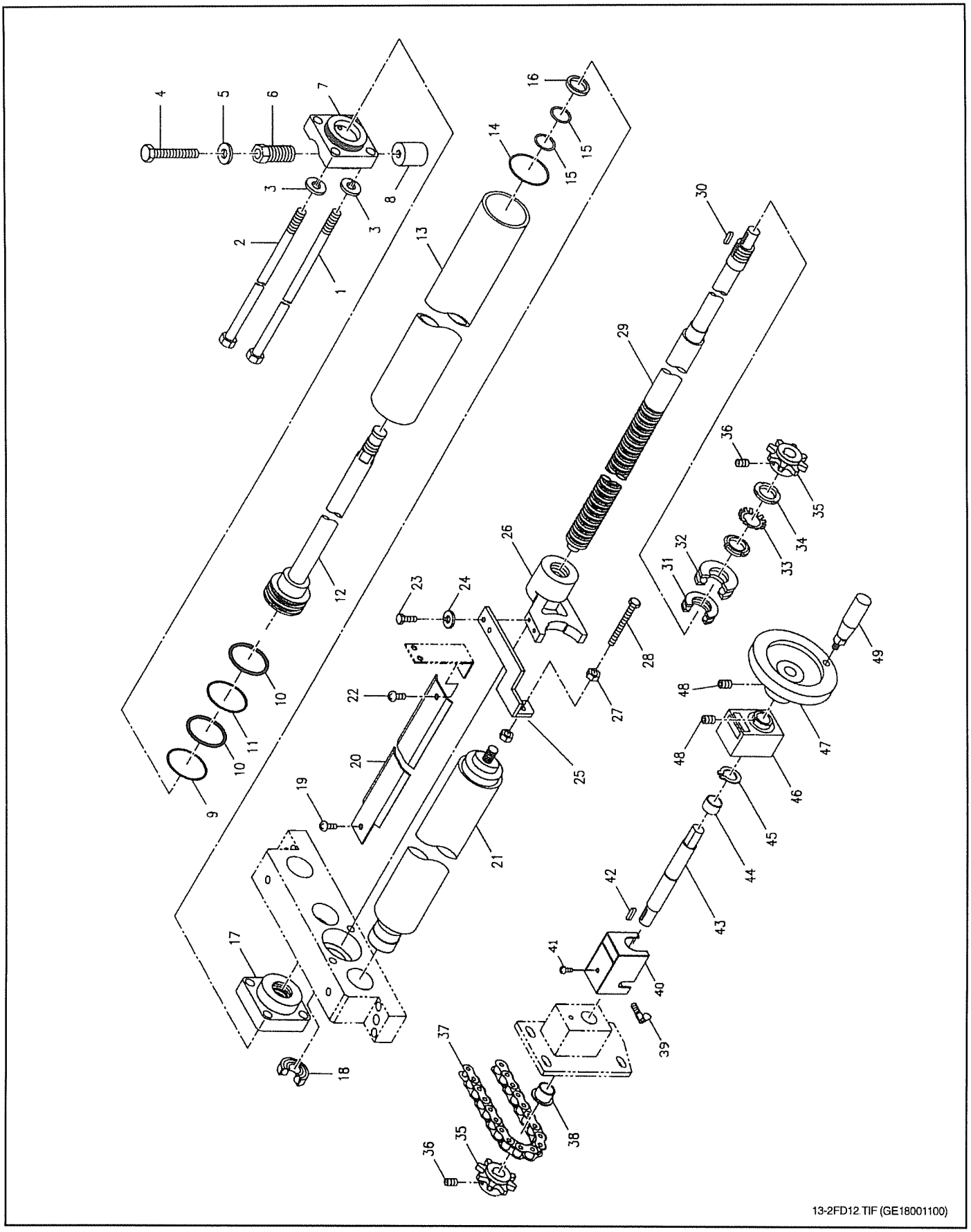
*NS = NOT SHOWN


13-2AB10.TIF (GE18000900)

KEY	PART NO.	QTY	DESCRIPTION
1	P132AB1001	4	HEX. HD. SCREW
2	P132AB1002	4	SPRING WASHER
3	P132AB1003	1	CYLINDER CAP
4	P132AB1004	1	O RING
5	P132AB1005	1	CYLINDER
6	P132AB1006	2	BACKING RING
7	P132AB1007	1	O RING
8	P132AB1008	1	PISTON
9	P132AB1009	1	SPRING PIN
10	P132AB1010	1	SPRING
11	P132AB1011	1	PISTON ROD
12	P132AB1012	1	BUSH
13		2	M12x50L SOC. HD. SCREW
14		2	M12 SPRING WASHER
15	P132AB1015	1	CYLINDER CAP
16	P132AB1016	1	OIL SEAL
17	P132AB1017	1	RACK
18		1	M10 NUT
19	P132AB1019	1	SCREW
20		1	M6 NUT
21		1	M6x25L HEX. HD. SCREW
22		1	M8x10L SET SCREW
23	P132AB1023	1	LIMIT SWITCH
24		1	M10 NUT
25		1	M10x40L HEX. HD. SCREW
26	P132AB1026	2	ANTI-FRICTION PLATE
27		16	M8x20L SOC. HD. SCREW
28	P132AB1028	1	BRACKET
29		2	M6x10L DOME HD. SCREW
30	P132AB1030	1	PAWL
31	P132AB1031	1	PIN
32		12	M8x30L DOME HD. SCREW
33		12	M8 SPRING WASHER
34		1	M6x10L SET SCREW
35	P132AB1035	1	VISE JAW
36	P132AB1036	4	PLATE
37	P132AB1037	1	VISE JAW
38	P132AB1038	4	SET SCREW
39		4	M16 SPRING WASHER
40	P132AB1040	1	SUPPORT PLATE SET
41	P132AB1041	1	VISE
42	P132AB1042	1	BED
43	P132AB1043	1	GAUGE SET
44		3	M8 WASHER
45		3	M8 SPRING WASHER
46		3	M8x25L HEX. HD. SCREW
47		2	M6x10L DOME HD. SCREW
48	P132AB1048	1	COVER
49	P132AB1049	1	BRACKET
50		1	M10 SCREW
51		2	M10x35L HEX. HD. SCREW
52		2	M10 SPRING WASHER
53	P132AB1053	1	SUPPORT
54	P132AB1054	1	COVER
55		2	M6x10L DOME HD. SCREW
56		3	M14 SPRING WASHER
57		3	M14x40L SOC. HD. SCREW
58		1	M8x20L HEX. HD. SCREW
59		1	M8 WASHER
60	P132AB1060	1	WATER SHIELD
61	P132AB1061	1	PLATE
62		3	M8 WASHER
63		3	M8x20L HEX. HD. SCREW
64		4	M14 SPRING WASHER
65		4	M14x50L SOC. HD. SCREW
66	P132AB1066	1	CHIP GUIDE PLATE
67		2	M6x10L DOME. HD. SCREW
68		2	M6x35L HEX. HD. SCREW
69		2	M6 SPRING WASHER
70	P132AB1070	1	CONNECTOR


13-2FD11.TIF (GE18001000)

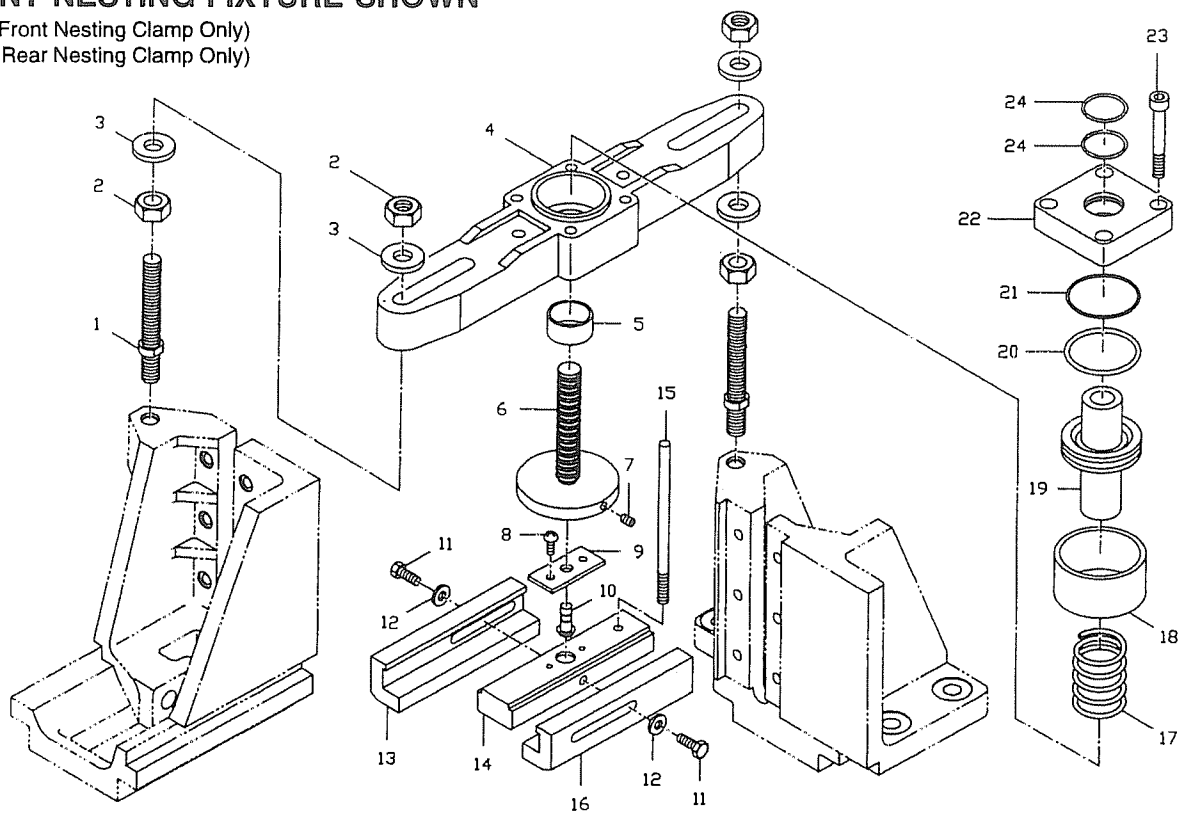
KEY	PART NO.	QTY	DESCRIPTION
1		4	M6x12L DOME HD. SCREW
2	P132FD1102	1	COVER
3		4	M10x85L SOC. HD. SCREW
4	P132FD1104	1	CYLINDER CAP
5	P132FD1105	1	O-RING
6	P132FD1106	2	O-RING
7	P132FD1107	2	BACKING RING
8	P132FD1108	1	PISTON
9	P132FD1109	4	DISC SPRING
10	P132FD1110	1	CYLINDER
11	P132FD1111	1	CYLINDER CAP
12	P132FD1112	1	BUSH
13	P132FD1113	1	VISE
14	P132FD1114	1	PLATE
15		6	M8x20L DOME HD. SCREW
16		1	M10 NUT
17		1	M10x30L SET SCREW
18		4	M10x20L SOC. HD. SCREW
19	P132FD1119	1	COVER
20		1	M12x30L SOC. HD. SCREW
21	P132FD1121	1	LIVE VISE
22	P132FD1122	1	PIN
23		1	M8x14L SET SCREW
24	P132FD1124	1	PAWL
25	P132FD1125	2	ANTI-FRICTION PLATE
26	P132FD1126	1	BED
27	P132FD1127	2	PLATE
28		4	M8x20L SOC. HD. SCREW
29		6	M8x20L SOC. HD. SCREW
30	P132FD1130	1	SUPPORT PLATE
31		16	M8x20L SOC. HD. SCREW
32		2	M16 SPRING WASHER
33		2	M16x60L SOC. HD. SCREW
34	P132FD1134	4	OIL SEAL
35	P132FD1135	4	BUSH
36	P132FD1136	1	COVER
37		2	M6 SPRING WASHER
38		2	M6x10L HEX. HD. SCREW
39	P132FD1139	1	LIMIT SWITCH
40		6	M4x30L DOME HD. SCREW
41		2	M5x45L SOC. HD. SCREW
42	P132FD1142	1	CONNECTOR SEAT
43	P132FD1143	1	CONNECTOR
44	P132FD1144	1	LIMIT SWITCH
45	P132FD1145	1	LIMIT SWITCH
46		2	M8x40L HEX. HD. SCREW
47		2	M8 NUT
49		2	M6x10L DOME HD. SCREW
50	P132FD1150	1	RACK
51		1	M8x10L SET SCREW
52	P132FD1152	1	OIL SEAL
53	P132FD1153	1	CYLINDER CAP
54		2	M12 SPRING WASHER
55		2	M12x50L SOC. HD. SCREW
56	P132FD1156	1	BUSH
57	P132FD1157	1	PISTON ROD
58	P132FD1158	1	SPRING
59	P132FD1159	1	SPRING PIN
60	P132FD1160	1	PISTON
61	P132FD1161	2	BACKING RING
62	P132FD1162	1	O-RING
63	P132FD1163	1	CYLINDER
64	P132FD1164	1	O-RING
65	P132FD1165	1	CYLINDER CAP
66	P132FD1166	4	WASHER
67	P132FD1167	4	HEX. HD. SCREW


13-2FD12.TIF (GE18001100)

KEY	PART NO.	QTY	DESCRIPTION
1	P132FD1201	2	TIE SCREW
2	P132FD1202	2	TIE SCREW
3	P132FD1203	4	SPRING WASHER
4		1	M12x75L HEX. HD. SCREW
5		1	M12 WASHER
6	P132FD1206	1	ADJUSTING SCREW
7	P132FD1207	1	CYLINDER CAP
8	P132FD1208	1	ADJUSTER SEAT
9	P132FD1209	1	O RING
10	P132FD1210	2	BACKING RING
11	P132FD1211	2	O RING
12	P132FD1212	1	PISTON
13	P132FD1213	1	CYLINDER
14	P132FD1214	1	O RING
15	P132FD1215	2	O RING
16	P132FD1216	1	OIL SEAL
17	P132FD1217	1	CYLINDER CAP
18	P132FD1218	1	BEARING
19		2	M6x10L DOME HD. SCREW
20	P132FD1220	1	COVER
21	P132FD1221	2	RAIL
22		1	M6x10L DOME HD. SCREW
23		2	M6x15L HEX. HD. SCREW
24		2	M6 SPRING WASHER
25	P132FD1225	1	PLATE
26	P132FD1226	1	NUT
27		2	M8 NUT
28		1	M8x30L HEX. HD. SCREW
29	P132FD1229	1	GAUGE SCREW
30	P132FD1230	1	KEY
31	P132FD1231	1	THRUST BEARING
32	P132FD1232	1	THRUST BEARING
33	P132FD1233	1	LOCKING WASHER
34	P132FD1234	2	LOCKING NUT
35	P132FD1235	2	SPROCKET
36		3	M6x10L SET SCREW
37	P132FD1237	1	ROLLER CHAIN
38	P132FD1238	1	BUSH
39		1	M8xP1.25 SCREW
40	P132FD1240	1	COVER
41		1	M6x10L DOME HD. SCREW
42	P132FD1242	1	KEY
43	P132FD1243	1	SHAFT
44	P132FD1244	1	BUSH
45	P132FD1245	1	RETAINING RING
46	P10-FD1403	1	COUNTER - Orange Housing
	P13-BD6	1	COUNTER - Black Housing
47	P132FD1247	1	HANDWHEEL
48		2	M6x10L SCREW
49	P132FD1249	1	LEVER

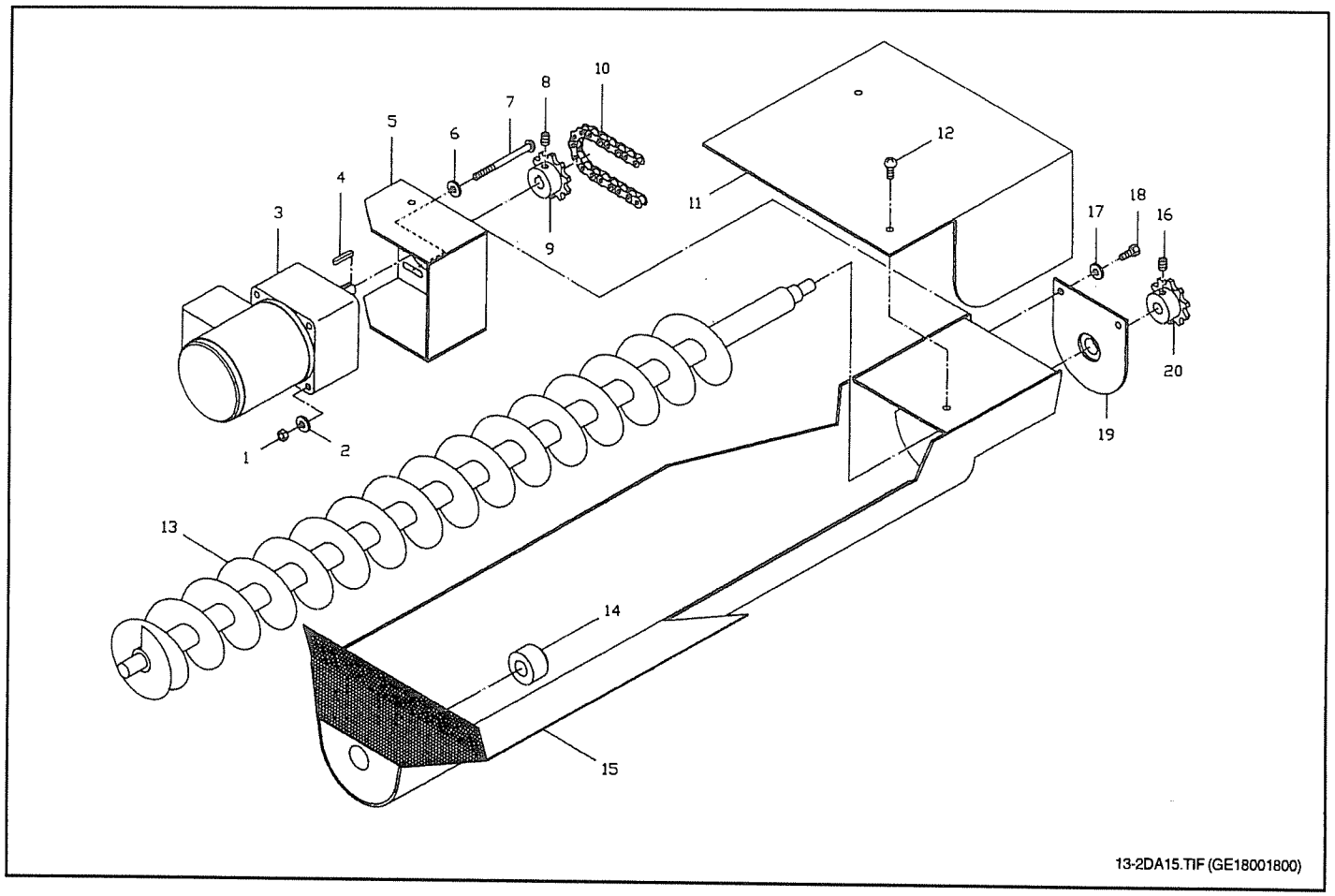
FRONT NESTING FIXTURE SHOWN

4 (Front Nesting Clamp Only)
25 (Rear Nesting Clamp Only)



KEY	PART NO.	QTY	DESCRIPTION
1	P132GA1301	2	ADJUSTING SCREW
2		4	M16 NUT
3		4	M16 WASHER
4	P132GA1304	1	CYLINDER CAP, FRONT NESTING CLAMP
5	P132GA1305	1	BUSH
6	P132GA1306	1	SCREW
7		1	M6x10L SET SCREW
8		2	M6x10L DOME HD. SCREW
9	P132GA1309	1	PLATE
10	P132GA1310	1	CONNECTOR
11		2	M8x20L HEX. HD. SCREW
12		2	M8 WASHER
13	P132GA1313	1	ADJUSTING CLAMPER
14	P132GA1314	1	CLAMPER
15	P132GA1315	1	BAR
16	P132GA1316	1	ADJUSTING CLAMPER
17	P132GA1317	1	SPRING
18	P132GA1318	1	CYLINDER
19	P132GA1319	1	PISTON
20	P132GA1320	1	O-RING
21	P132GA1321	1	O-RING
22	P132GA1322	1	CYLINDER CAP
23		4	3/8" x 3" L SOC. HD. SCREW
24	P132GA1324	2	O-RING
25	P132GA1325	1	CYLINDER CAP, REAR NESTING CLAMP
NS*	P10-GA1525	1	QUICK DISCONNECT - PLUG END
NS*	P10-GA1524	1	QUICK DISCONNECT - SOCKET END

*NS - Not Shown



13-2DA15.TIF (GE18001800)

KEY	PART NO.	QTY	DESCRIPTION
1		4	M6 NUT
2		4	M6 SPRING WASHER
3	P132DA1503	1	MOTOR
4	P132DA1504	1	KEY
5	P132DA1505	1	MOTOR BASE
6		4	M6 SPRING WASHER
7		4	M6x75L DOME HD. SCREW
8		1	M8x10L SET SCREW
9	P132DA1509	1	SPROCKET GEAR
10	P132DA1510	1	ROLLER CHAIN
11	P132DA1511	1	MOTOR COVER
12		2	M6x10L DOME HD. SCREW
13	P132DA1513	1	SPIRAL CONVEYOR
14	P132DA1514	1	BUSH
15	P132DA1515	1	CONVEYOR BODY
16		2	M6 SPRING WASHER
17		2	M6x10L HEX. HD. SCREW
18	P132DA1518	1	SUPPORT
19	P132DA1519	1	SPROCKET