

KR - 20
SERIES 2000
ROOF PANEL
MACHINE

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MODEL KR-20 SPECIFICATIONS

PORTABLE ROOF PANEL FORMER

Specifications

WEIGHT	(With trailer)	6980 lbs.
LENGTH		19 feet (including trailer)
WIDTH		88 inches
HEIGHT		54 inches
DRIVE		Chain & Gear
POWER		Gasoline Engine/Hydraulic
ROLLER STATIONS		Ten
SPEED		Approx. 70 feet per minute at 24 gauge
CUTTER		Hydraulic Shear

Standard Equipment

Base Machine
Pencil Ribbs
Expandable Uncoiler
Lifting Eyes
Trailer
Digital Controller, sealant applicator

Material

18'' - 28'' Wide
Steel 26-22 gauge (.036 finished)
Aluminum - Copper - Terne - Steel

IMPORTANT WARRANTY INFORMATION

Twenty-four Month Warranty

We warrant to the original purchaser, that all KNUDSON MANUFACTURED PARTS are free from defects in material and workmanship under normal use. (Parts list enclosed.) For a period of twenty-four months from the date of shipment to the original purchaser, WE WILL REPAIR OR REPLACE with new or rebuilt, at our option, all KNUDSON MANUFACTURED parts proven to be defective in material or workmanship. Parts not manufactured by Knudson are covered under the original manufacturer's warranty.

Defective Knudson manufactured parts must be returned to the factory for warranty service, freight prepaid. Replacement parts will be shipped to the purchaser freight collect. Our warranty is limited to repair or replacement of defective parts received (freight prepaid) at the factory and does not extend to providing field service, machine adjustments, field repair, freight, air fare, or direct or consequential costs or expenses resulting from or associated with machine failure.

This warranty is VOID if the machinery is altered, abused, misused, or neglected, or if required maintenance is not timely performed. This warranty is also VOID unless the warranty registration card has been properly completed and returned to Knudson within thirty (30) days from the date of shipment.

There are no express or implied warranties, including any warranty of fitness for a particular purpose, which extend beyond the face hereof.

ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARE EXCLUDED.

This warranty will be void unless the Warranty Registration Card has been properly filled out and returned to the factory within 30 days.

KR-20 SAFETY PRECAUTIONS

Before attempting to operate this machine, read all manuals completely.

The KR-20 machine has many moving parts which can cause serious injury. Observe all safety precautions constantly.

Keep control box locked and key removed when machine is not in use.

Never operate machine with covers or guards removed.

Do not attempt to make repairs, adjustments, or perform maintenance while machine is running. Use care that no one starts machine while it is being worked on.

When forming panels at eave height of building, always use a safe and secured platform on roof to operate controls from. Never attempt to climb on suspended machine.

Use only qualified operators and properly rated equipment when lifting machine or coil stock. Be sure to comply with all local and national safety codes applying to any lifting devices or equipment.

When forming panels, an operator must stay at controls. An assistant operator should guide free end of panel to prevent collision with stationary objects. Never attempt to form panels in high winds.

The edges of panels can be sharp. Use caution and wear gloves when handling panels.

Do not wear loose clothing or jewelry. Contain long hair under a hat or hair net. Wear safety glasses and dust mask when appropriate. All personnel must wear safety shoes with non-conducting, non-slip soles and other appropriate clothing. Wear hard hats when overhead work is being done.

Never fill fuel tank while engine is running or hot. Always refuel slowly to avoid spillage. Do not operate in a closed-in area unless exhaust is piped outside.

Keep children clear of all equipment. Be sure all jobsite visitors are accompanied and supervised.

MACHINE MAINTENANCE

Always transport machine with material between rollers.

Keep chains and gears well-lubricated at all times. A dry lubricant should be used on gears and chains. Other lubricants will attract dirt and dust, causing accelerated wear.

Keep blade greased or oiled at all times. This will keep the quality of cut good and greatly increase the life of blade and dies.

Machine bearings are factory-sealed and require no maintenance.

Inspect panel sections between rollers after storage or transportation and remove all dirt or debris before operating.

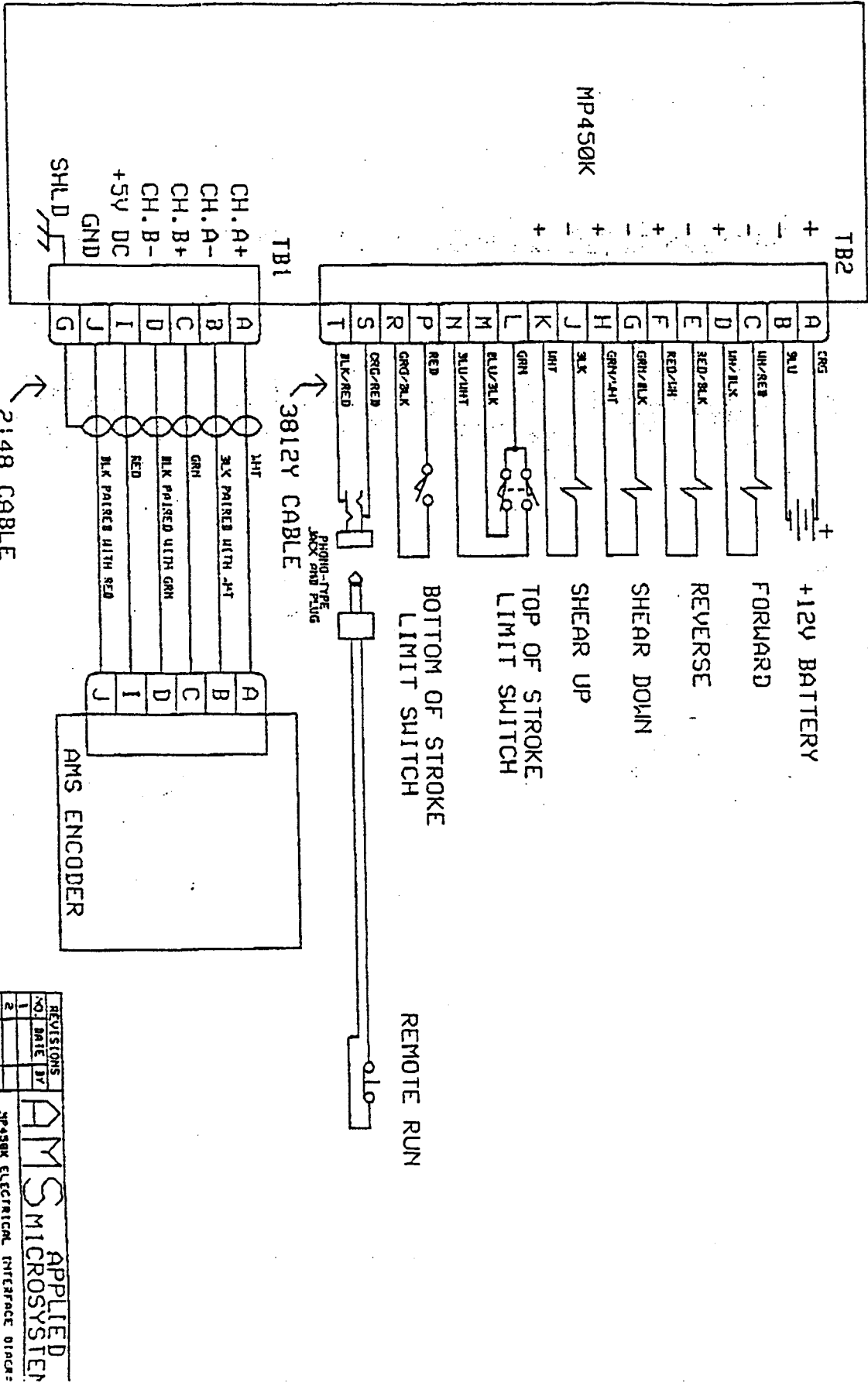
Regular cleaning of rollers and a light application of auto wax will increase life of rollers and quality of the end product.

For long periods of storage, coat all rollers with auto wax and provide good ventilation to prevent condensation and rust. Inspect frequently.

Galvanized or aluminized material can build up on roller surfaces. If build-up occurs, use "Galv-Off" or similar product to remove. Be sure to follow manufacturer's directions.

Perform engine maintenance as instructed by the manufacturer's owners manual.

Keeping your machine clean will increase the longevity, keep the quality of the product high and prevent breakdowns.



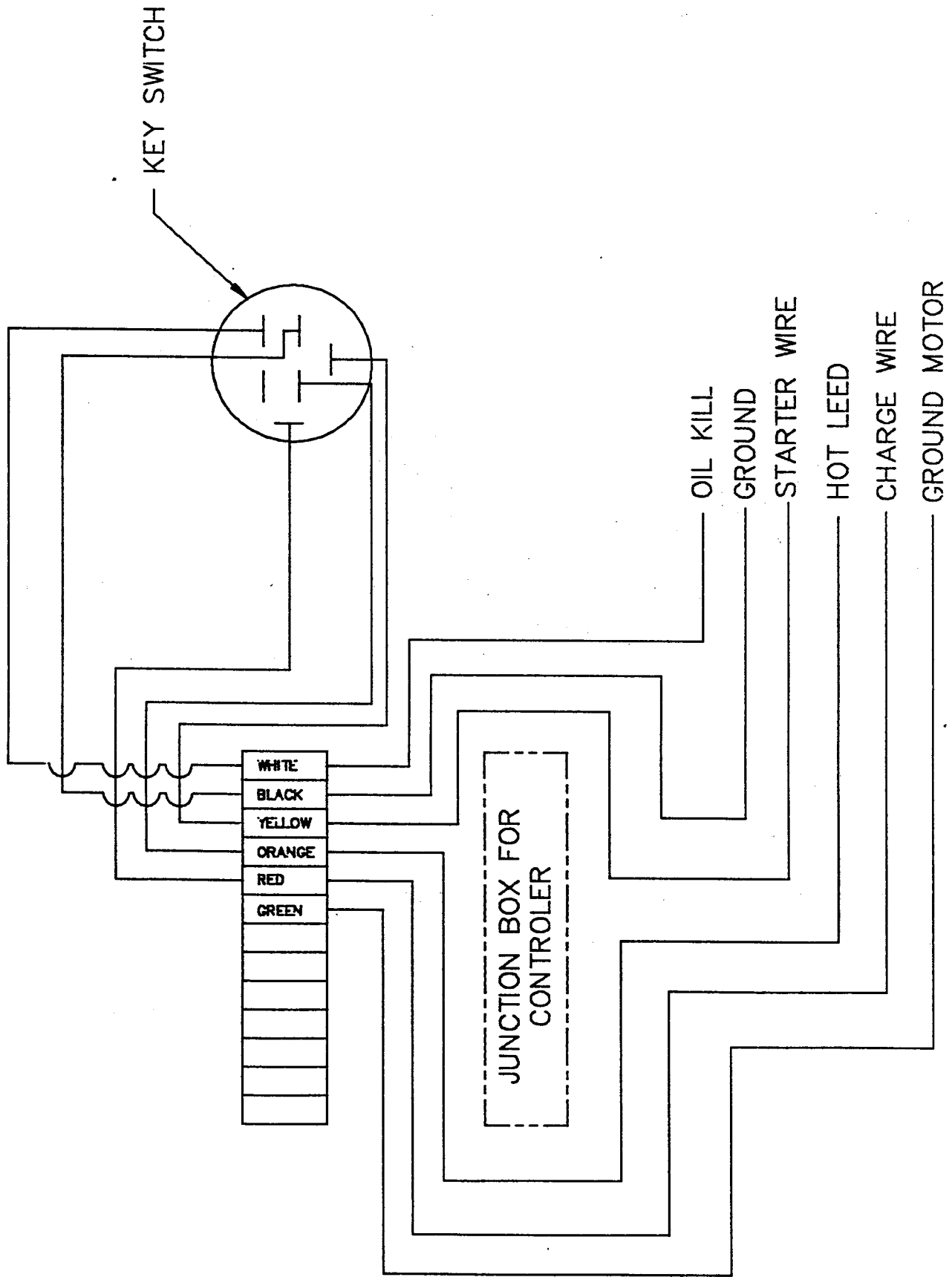
REV	NO.	DATE	BY
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MP450K ELECTRICAL INTERFACE DIAG
 DRAWN BY DATE SCALE DRAUGHTING
 JJB 11-1-69 4111

APPLIED
AMS
MICROSYSTEM

BRIGGS & STRATTON ENGINE DIAGRAM



HYDRAULIC SYSTEM OPERATION

Hydraulic power is supplied by the engine/hydraulic pump unit. The engine rpm controls gallons per minute flow of hydraulic fluid, therefore controlling the speed of the panel machine. Maximum flow is approximately 13 gpm at 3600 rpm.

With the engine running, move the control switch toward the forward position to make the machine run forward. Reverse should be used for adjustment purposes only. The machine will continue to run until the switch is released or until the remote limit switch is actuated. After the desired panel length is achieved, push the shear button to cycle the shear through one cut.

To run the machine in fully automatic mode, refer to A M S Control Operation pages. (12-15).

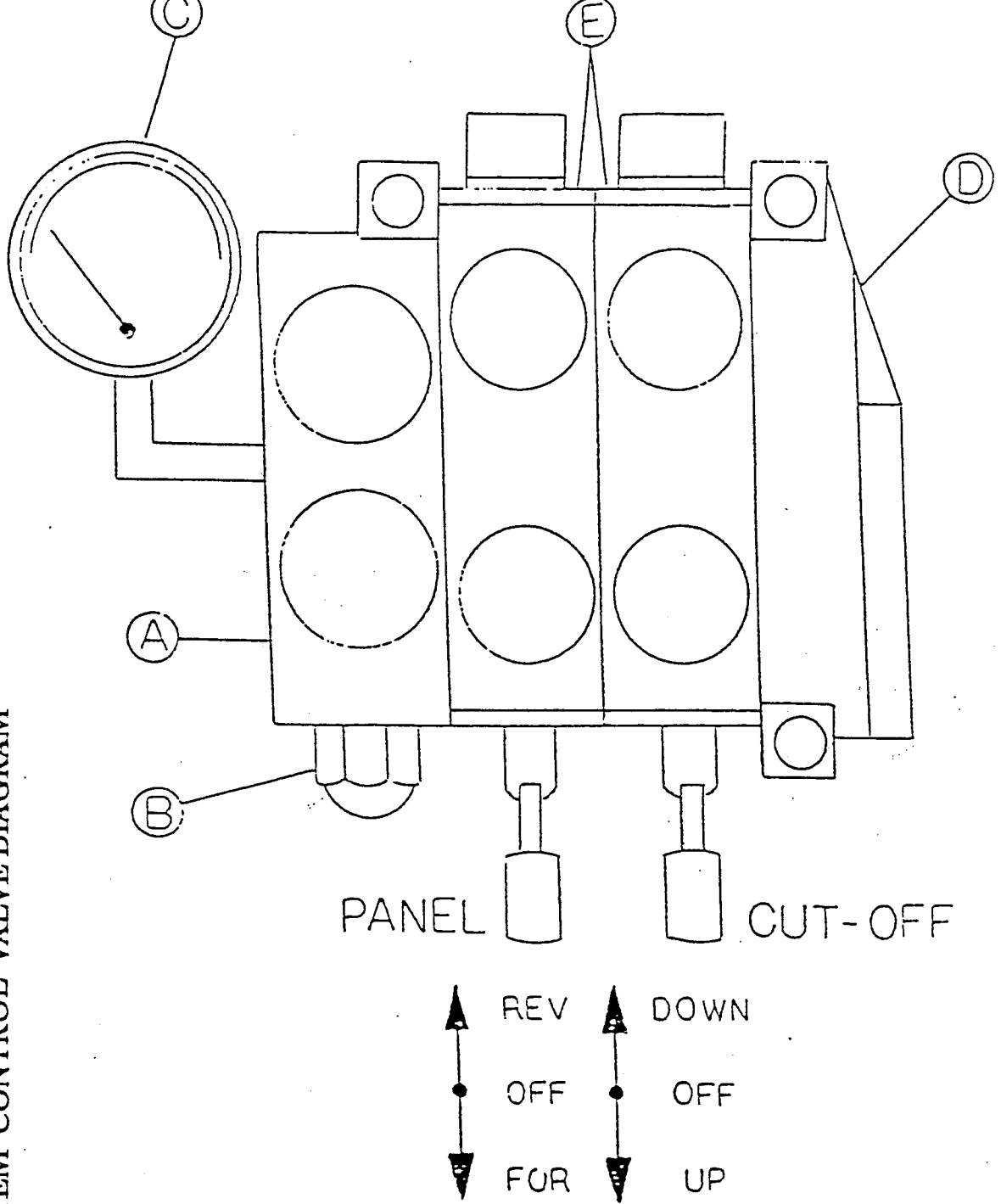
The hydraulic solenoid valve must have fluid pass through it in order to drive the hydraulic motor. The hydraulic solenoid valve requires 12 volts and can only be energized when the cut-off home limit switch is closed, and the dummy plug or the remote limit switch is in place. Any interruption in the circuit removes 12 volts from the solenoid and hydraulic fluid is prevented from circulating through the hydraulic motor.

MANUAL CONTROLS ONLY

To cut off panel, push the cut-off valve handle away from the operator. The cut-off valve is a three position spring return to off position and must be manually held in place for operation. When the cut-off blade has reached the bottom of its stroke, pull the cut-off valve handle back toward the operator and hold until the cut-off blade reaches the top of its stroke. Release handle and it will return to off position. The panel valve must be in the off position in order for the cut-off to operate properly. If the cut-off blade is not at the top of its stroke and the cut-off home limit switch is not tripped, the panel machine drive motor will not operate.

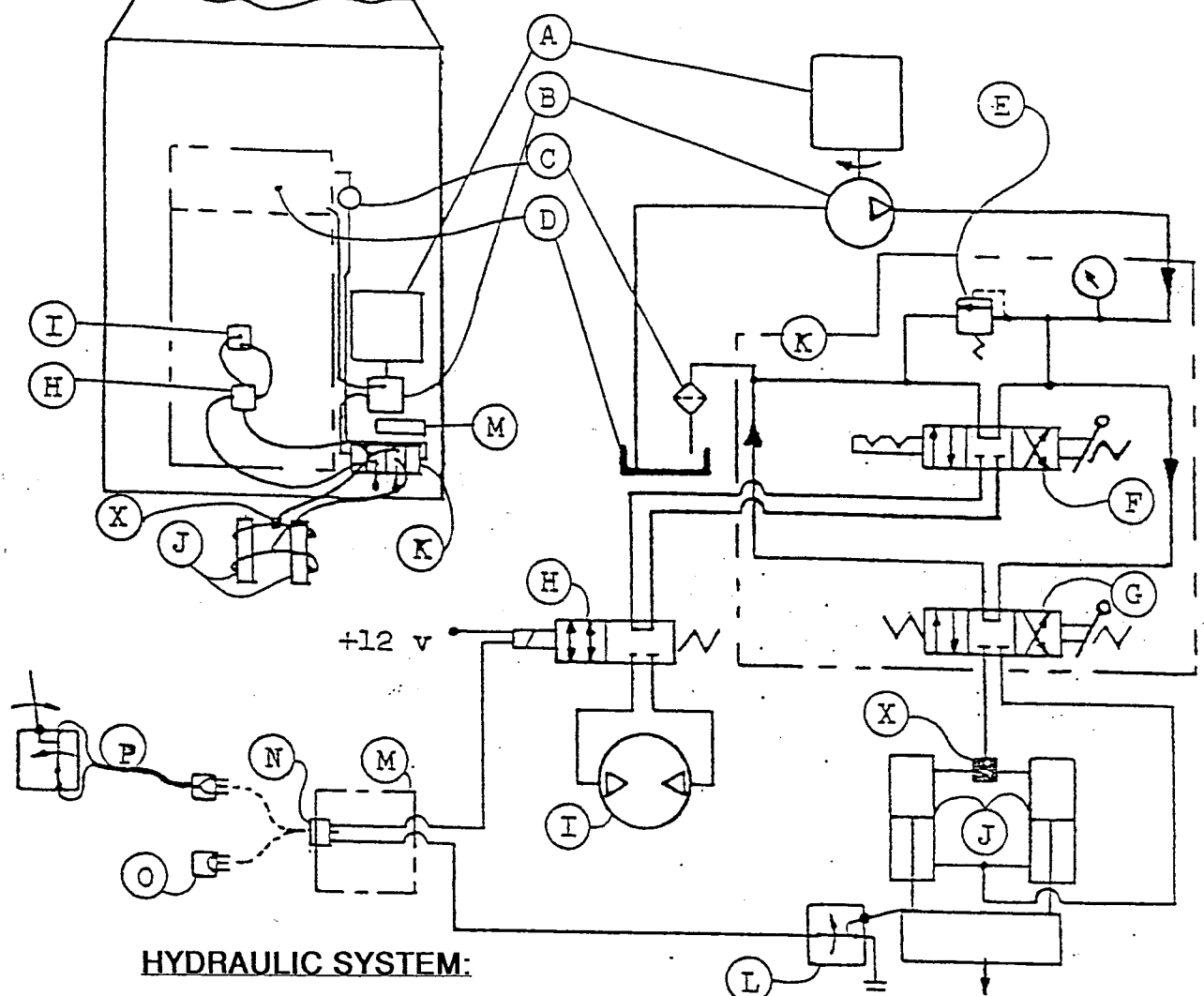
SEE DIAGRAM NEXT PAGE

HYDRAULIC SYSTEM CONTROL VALVE DIAGRAM



- A INLET SECTION
- B PRESSURE RELIEF (BY-PASS) PRE SET AT APPROXIMATELY 1500 P.S.I.
- C PRESSURE GAGE
- D OUTLET COVER
- E WORK SECTION

HYDRAULIC SYSTEM/MANUAL CONTROL DIAGRAM



HYDRAULIC SYSTEM:

- | | |
|--|--|
| <ul style="list-style-type: none"> A. Engine B. Pump C. Filter (Return line) D. Fluid Tank E. Bypass, Approx. 1500 psi. F. Panel Valve, Double detente | <ul style="list-style-type: none"> G. Cut-Off Valve, Double Spring Return... H. Solenoid I. Drive Motor J. Cut-Off CylindersMotor K. Control Valve Assembly X. Synchronizing Valve |
|--|--|

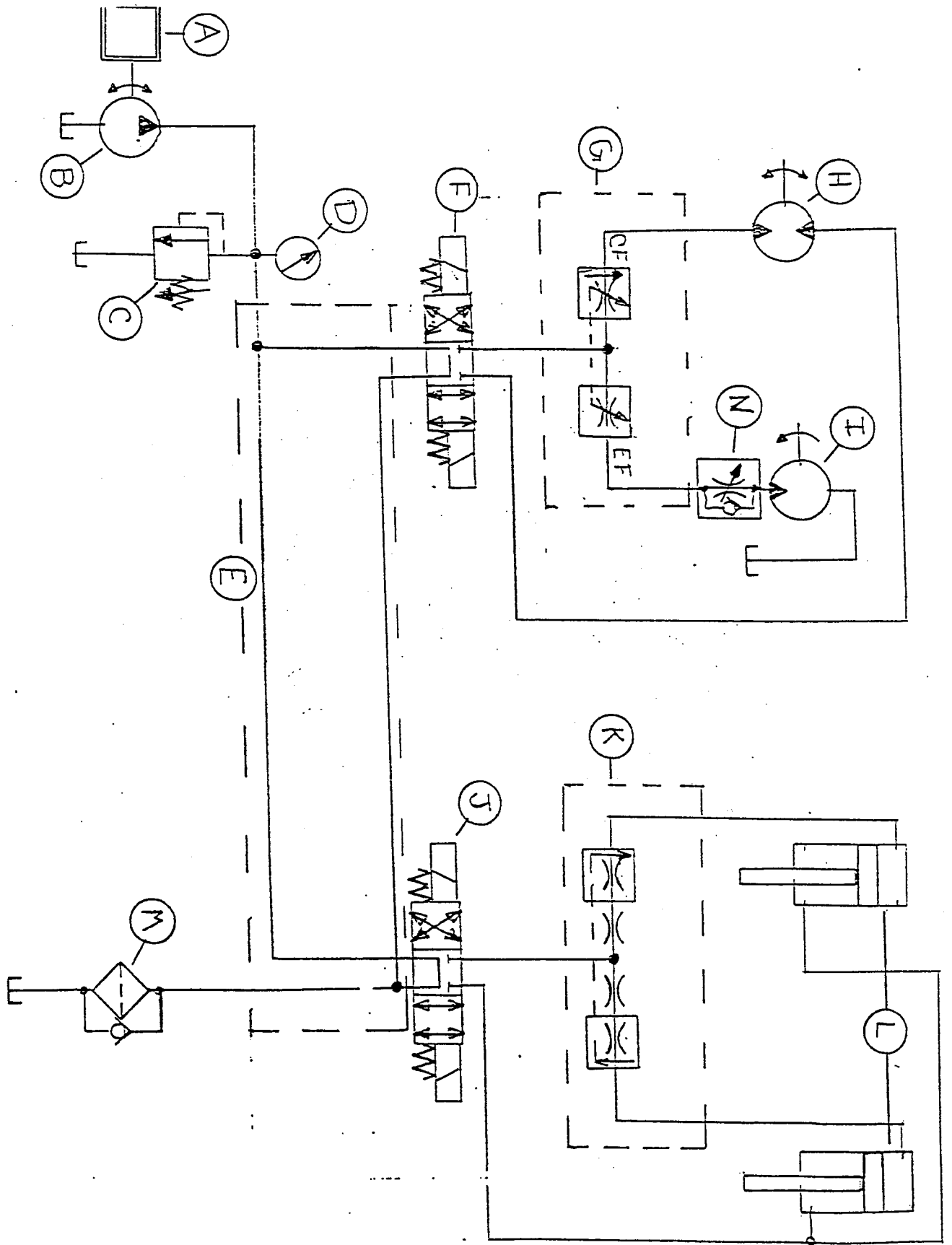
SOLENOID ELECTRICAL CIRCUIT:

- L. Cut-Off upper limit switch
- M. Engine remote control box
- N. Control box electrical receptacle
- O. Dummy Plug
- P. Automatic-measure limit switch assembly.

HYDRAULIC SYSTEM/AUTO CONTROLS

- A. Gasoline Engine
- B. Hydraulic Pump
- C. Pressure Relief
- D. Pressure Gauge
- E. Double Manifold
- F. Motor Directional Control Valve Combiner(Spring Center)
- G. Pressure Compensated Adjustable
- H. Panel Machine Hydraulic Motor
- I. Graco Sealant Pump Motor
- J. Cut Off Directional Control Valve (Spring Center)
- K. Pressure Compensated Proportional Divider/Combiner
- L. Cut Off Cylinders
- M. Oil Filter with Bypass Check
- N. Adjustable Flow Control

SEE DIAGRAM NEXT PAGE.



MODEL MP450K
OPERATING INSTRUCTIONS

AMS APPLIED
MICROSYSTEMS, INC.

9410 Aero Space Drive ■ St. Louis, Missouri 63134 ■ (314) 429-4009 FAX (314) 429-4355

Model MP450K Length Control System

Front Panel Controls

Pushbutton and Selector Switches

SHEAR - Press the **SHEAR** pushbutton to manually activate the shear. The MP450K will only allow this switch to operate when the machine is stopped.

HAND/AUTO - Select the **HAND** position to load a coil and to stop the machine. Select the **AUTO** position to start the machine after a job has been programmed.

JOG-FWD/REF - When the **HAND/AUTO** switch is in the **HAND** position, turn and hold the selector switch in the **FWD** position to jog material forward and turn and hold the switch in the **REV** position to jog material in reverse. This switch is inactive when the **HAND/AUTO** switch is in the **AUTO** position.

Keypad

CAL - Press the **CAL** key to calibrate the MP450K to your machine. The calibration procedure will ensure accurate length parts. Also press the **CAL** key to display the footage totalizer. To reset the totalizer to zero, press the **CE** key when the footage is displayed, and then enter 1984 in response to the prompt "**ENTER CODE TO CLEAR TOTAL.**"

* - Press the asterisk key when you have completed programming the desired quantities and lengths and want to exit the program mode.

PRG - Press the **PRG** key to program jobs in response to flashing prompts for the Job Number, Quantity, and Length.

ENT - Press the **ENT** key to store the values programmed for the Job Number, Quantity, and Length.

Toggle Switch

A toggle switch on the bottom of the MP450K allows the pushbutton and selector switches on the front panel to operate without the MP450K P.C. board. Normally this switch should be positioned toward the operator. If the P.C. board must be removed for repair, the machine can still be operated manually by positioning this switch away from the operator.

Model MP450K Length Control System

Version 1.01 Operating Instructions

How to Calibrate the MP450K

The MP450K should be calibrated using the following procedure to ensure accurate length parts.

1. Press the **CAL** key. Enter a part length (the longer the better) in response to the prompt “**ENTER LENGTH FOR CAL:**”.
2. After a calibration length has been entered, the MP450K will display “**LOAD COIL, PRESS SHEAR BUTTON.**” With the **HAND/AUTO** switch in the **HAND** position, load a coil using the **JOG** switch and with material slightly past the shear, press the **SHEAR** button.
3. The MP450K will display “**SWITCH TO AUTO; LINE WILL START.**” Turn the **HAND/AUTO** switch to **AUTO**. The machine will start, produce one part to the calibration length, and stop automatically.
4. Carefully measure the part produced and enter the measured part length in response to the prompt “**ACTUAL MEASURED LENGTH:**”. The MP450K is now calibrated. Calibration should typically be required only once at the beginning of the day.

How to Load a Coil

After the MP450K has been calibrated, additional coils can be loaded using the following procedure.

1. Turn the **HAND/AUTO** switch to the **HAND** position.
2. Use the **JOG** switch to load the coil into the machine and slightly past the cutoff.
3. Push the **SHEAR** button to trim cut the leading edge of the coil and set the MP450K length counter to zero. The machine is now ready to produce parts.

How to Program a Job

Up to 50 different quantities and lengths can be programmed into the MP450K using the following procedure.

1. Press the **PRG** key. The MP450K will display flashing prompts for “**#**” (Job Number), “**QTY**” (Quantity), and “**LENGTH**” (Length).

2. Enter a Job Number from 1 through 50.
3. Enter a Quantity up to 999.
4. Enter a Length up to 999' 11.999".
5. The MP450K will then flash the message "**PAUSE AFTER JOB #XX**" (where XX is the job number just programmed) followed by **YES** or **NO**. Pressing any numbered key will change the response between **YES** and **NO**. Enter **NO** if you want the machine to change lengths on-the-fly and run the following job without stopping. Enter **YES** if you want the machine to halt automatically after this job. To restart the machine after an automatic halt, turn the **HAND/AUTO** switch to the **HAND** position and then back to the **AUTO** position.

Note: To increase productivity, additional jobs can be programmed on-the-fly while the machine is running previously programmed jobs.

How to Start the Machine

To start the machine after a job has been programmed, turn the **HAND/AUTO** switch to the **AUTO** position. The machine can be halted at any time by turning the **HAND/AUTO** switch to the **HAND** position. The machine will halt automatically when all programmed jobs are completed.

HYDRAULIC FLUID

The factory-installed fluid is Mobil DTE-15 with an operating temperature range of -10 to +165 degrees Fahrenheit. Any equivalent grade is acceptable to add to the hydraulic tank.

Always use only the highest quality hydraulic fluid available from sealed containers to assure cleanliness and grade. Be aware that the majority of hydraulic system failures or problems are directly related to fluid.

Check the fluid level frequently and note any change in color or condition. Fluid should be clear and have a bright amber color.

White or milky color indicates water contamination. If water is left in the system during storage, it may settle into puddles, cause corrosion and damage components. Small amounts of water will usually evaporate during sustained operation.

Fluid that is foamy or filled with air bubbles will cause a noisy pump and slow or erratic operation of the motor or cylinders. This is normally caused by low fluid level, loose pump intake line or a worn or damaged pump.

Dirty or discolored fluid is usually caused by adding contaminated fluid. Dark fluid indicates a dirty filter.

Continued operation of the hydraulic system with any of the previous mentioned symptoms may cause hydraulic system failure and void warranty.

If the machine is being operated in extreme cold, operate engine on low speed for approximately five minutes or until the pump operates quietly. A high-pitched whine indicates pump cavitation, caused by insufficient fluid availability, air in the system or fluid too thick or thin. Avoid machinery operation at very cold temperatures if possible.

If machine is operated in extreme heat, shade from direct sun rays and allow as much ventilation as possible.

Machines manufactured by Knudson have operated in the field for over ten years without requiring a fluid change. If a fluid change becomes necessary, most hoses must be removed and front of trailer must be raised to effect good drainage. Do not operate engine to aid drainage or pump damage will result. Protect all removed hoses and fittings from dirt and sand. Mark all fittings prior to hose removal to insure proper replacement. Tighten adequately to prevent air or fluid leaks. System holds approximately 38 US gallons. Choose any high grade fluid suitable for your area.

MOBIL OIL GRADES:

DTE-13 - 25 + 150 degrees Fahrenheit

DTE-15 -10 + 165 (Installed at factory)

DTE-26 -20 + 180 degrees Fahrenheit

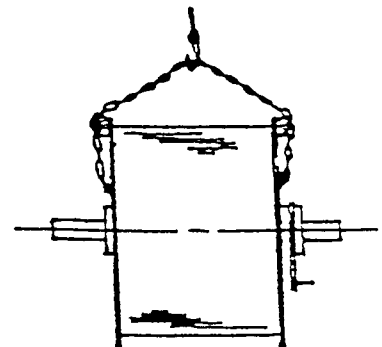
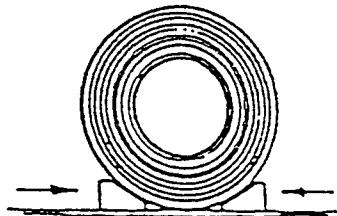
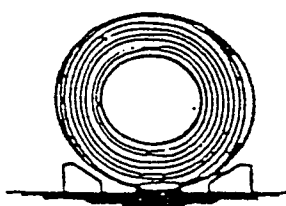
LIFTING COILS

- 1) Coil may be lifted with a lift truck using a chain or strap.
- 2) Several commercial coil-lifting devices are available. Carefully check the load rating for the weight you are lifting.
- 3) Use only 3/8" high test chain, grab hooks, 48" over-all length.
DO NOT LIFT COILS WITH DAMAGED CHAIN!

Use extreme care when lifting coils. Only experienced operators should control the equipment you utilize. Keep all spectators completely clear of lifting operations. Carefully check all equipment and devices for weight capacities.

LOADING COILS ONTO MACHINE

- 1) Remove hold-down clamps.
- 2) Lift coil & shaft from cradle.
- 3) Loosen expander nut and collapse spool arms.
- 4) Lay coil horizontally on clean surface and block it to prevent rolling. If coil tends to flatten, raise it and move blocks toward each other so center hole will remain round.
- 5) Insert arbor.
- 6) Tighten expander nut until spool arms are snug on I.D. of coil. (Do not over-tighten or damage to coil may result).
- 7) Carefully lift coil into place.
- 8) Replace hold-down clamps and tighten until snug. (Tighten or loosen to adjust coil tension).



EXPANDABLE ARBOR OPERATION

The expandable arbor is used to allow use of coils of different inside diameters. By turning the hand wheel on the arbor the operator can shrink or expand the arbor to hold the coil tightly on the inside. Tighten the lock knob located on the hand wheel, to secure the wheel into place.

- 1.) Load a coil onto arbor remove the 2 bolts on each end of the arbor stand (See FIGURE 1).
- 2.) Loosen the lock knob (See FIGURE 2) and turn the hand wheel counter clockwise to make the arbor smaller.
- 3.) Slide the arbor into the center of the coil against the end stops and tighten the hand wheel expanding the arbor tightly against the coil. Tighten the lock knob on the hand wheel.
- 4.) Lift the coil back onto the coil stand.
- 5.) Tighten slightly, the 4 bolts holding the coil into the stand. These bolts adjust the tension on the arbor shaft braking the coil. **ADJUST THE BRAKING OF THE COIL AFTER THE MATERIAL IS FED INTO THE MACHINE.DO NOT TIGHTEN TOO TIGHT JUST ENOUGH TO KEEP SLACK FROM THE COIL WHILE THE MACHINE IS RUNNING.**

When changing the arbor size from a 20" (508 mm) inside diameter coil to a 16" (406 mm) inside diameter coil follow these steps:

- 1.) Remove the 3 locating bolts holding the arbor on the fixed side.(See FIGURE 3 and 4). Slide the collar on the shaft until the next (See FIGURE 5) hole in the shaft and the holes in the collar align together. Insert the locating bolts and tighten firmly. Now the arbor is ready to adjust to a smaller or larger inside diameter.

To change the arbor back to a 20" (508mm) diameter repeat the above procedure sliding the collar toward the hand wheel to align with the next hole.

EXPANDABLE ARBOR OPERATION cont.

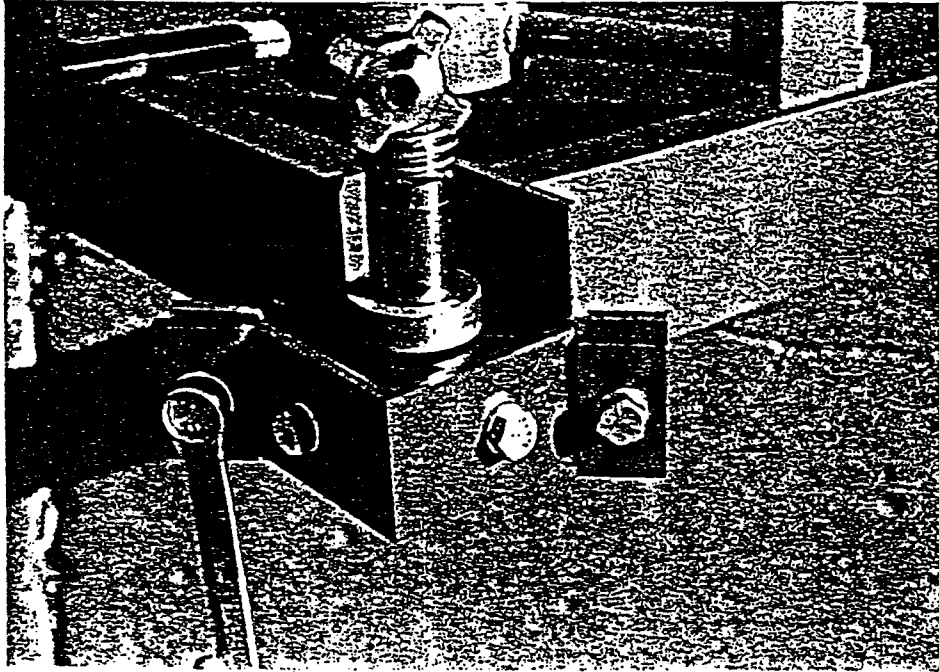


FIGURE 1

Remove the 2 bolts on each end of the arbor. Adjust the tension of the coil with these bolts.

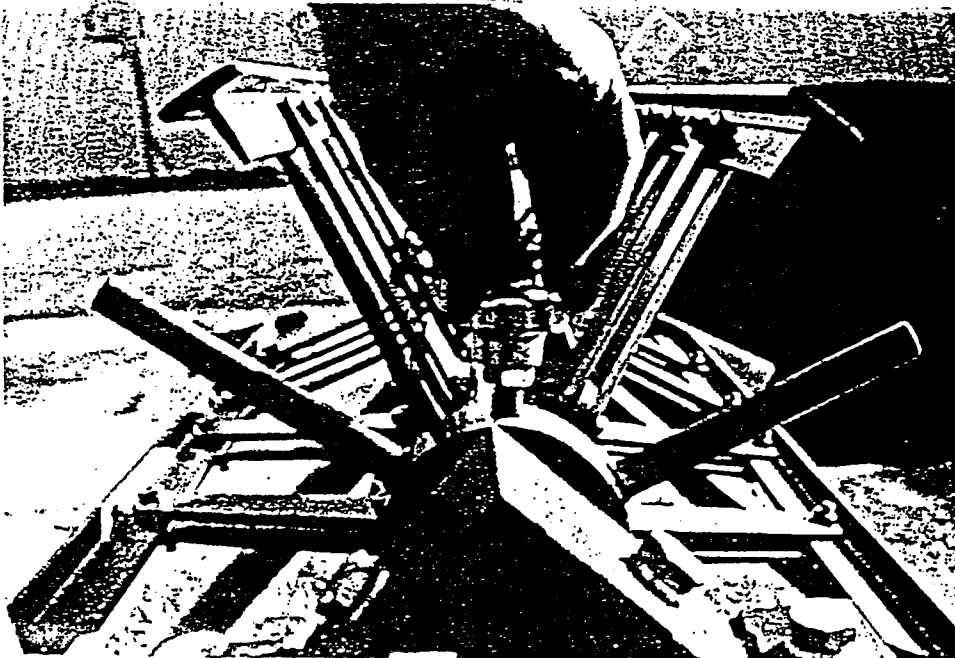


FIGURE 2

Loosen the lock knob and turn the hand wheel.

EXPANDABLE ARBOR OPERATION cont.

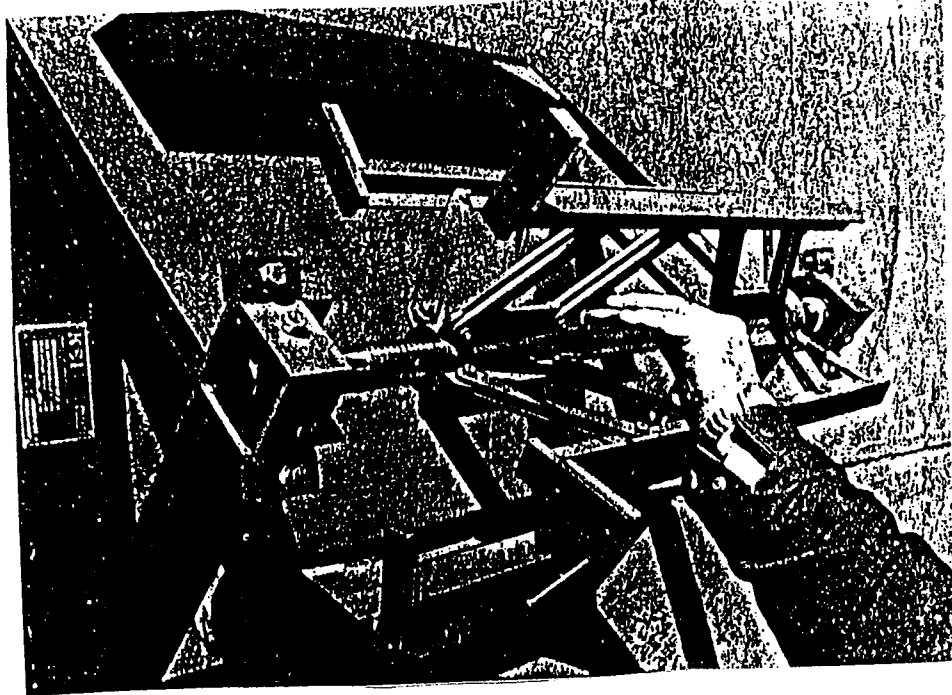


FIGURE 3

Remove the 3 locating bolts when changing arbor sizes from 20" inside to 16" inside.

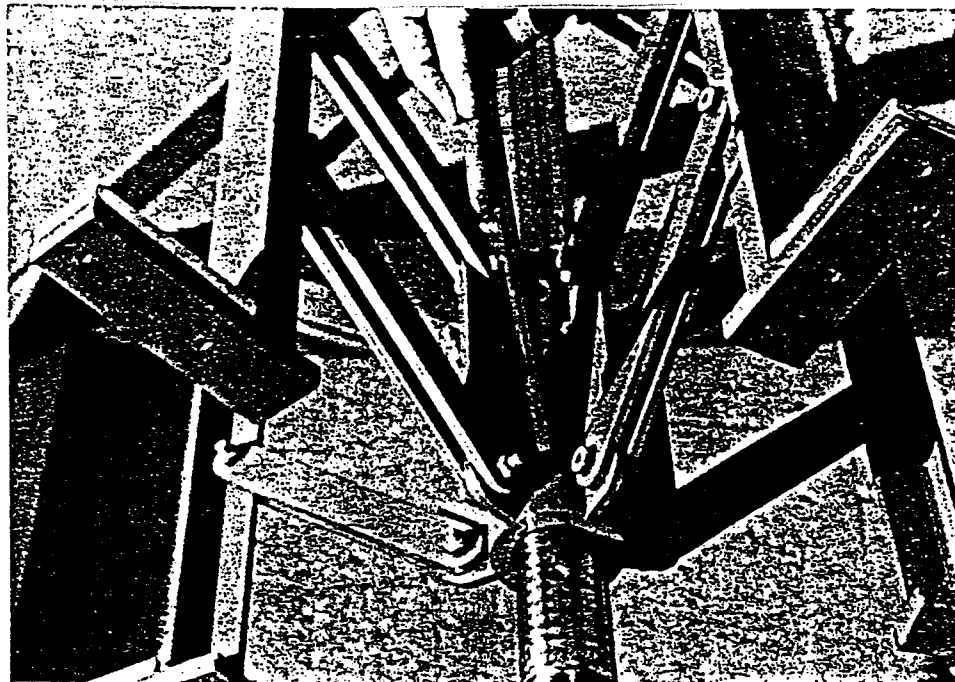


FIGURE 4

Remove the bolts in the collar and slide the collar on the shaft.

EXPANDABLE ARBOR OPERATIONS cont.

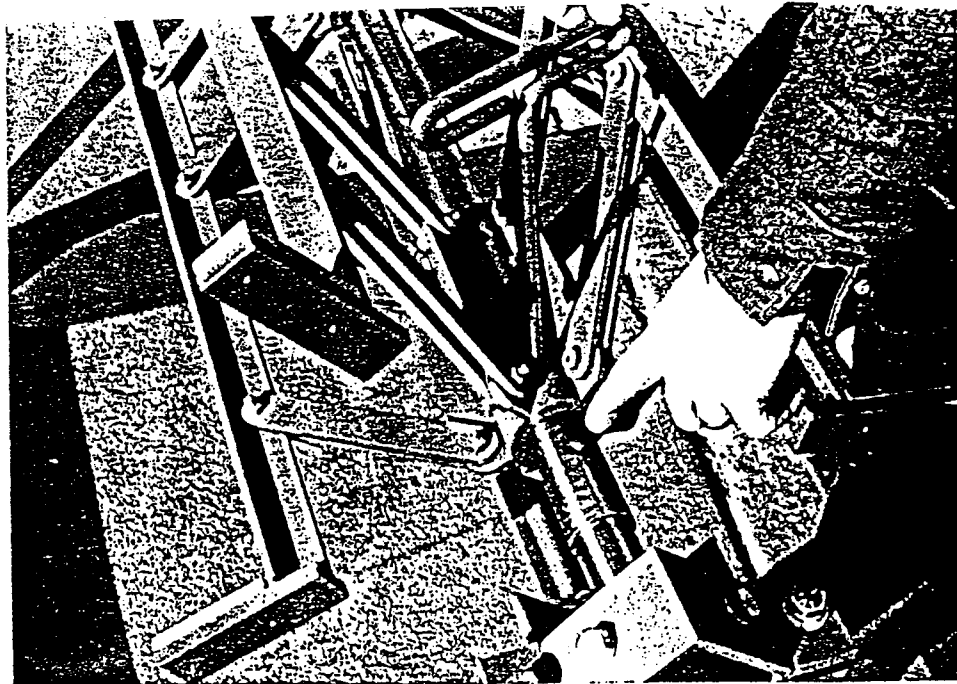


FIGURE 5

Slide the collar to the next locating position.

TRAILER SPECIFICATIONS & TOWING **INSTRUCTIONS**

Approximate trailer specifications with machinery mounted:

Length	19''
Width	7'4''
Height	5' without reel stand & reel
Weight	4,600#
Tongue Weight	725#

Tires: 760 - 16LT
Load range D
Inflate to 65 p.s.i., cold

Lug bolt torque, 90 - 95 foot pounds.

Check frequently (left side lug bolts are left-hand thread)

Lubrication, pack wheel bearings every 20,000 miles with Sunoco #802 or equivalent.

Before moving trailer, check the following:

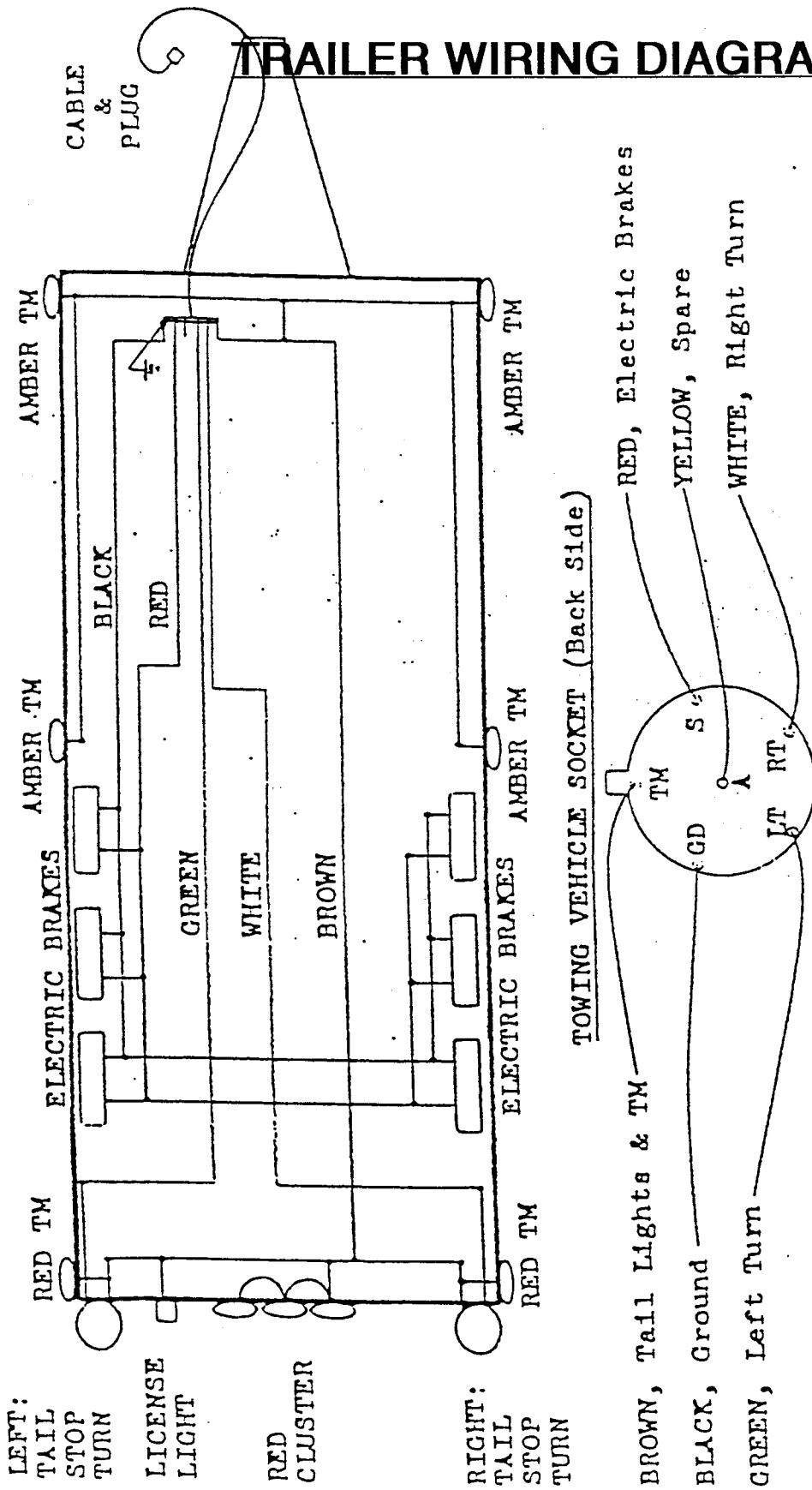
1. Hitch and safety chains properly secured
2. Brakes, lights and signals functioning properly
3. Tongue jacks fully raised
4. Lug bolts tight and tires fully inflated
5. Stands, covers and safety shields secured
6. Metal between rollers
7. Reel stand centered over axles or trailer damage may result (see warning)
- 8.. Driver must be properly licensed for your locality

WARNING

Never attempt to tow trailer with coil stock Exceeding 3,000 lbs. in reel stand. Always tow trailer with reel stand centered over Axles.

- ➔ Damage to trailer frame will result.
- ➔ Towing characteristics of trailer will be adversely affected.
- ➔ Rated weight capacities of trailer hitch and axle assemblies may be exceeded.

TRAILER WIRING DIAGRAM

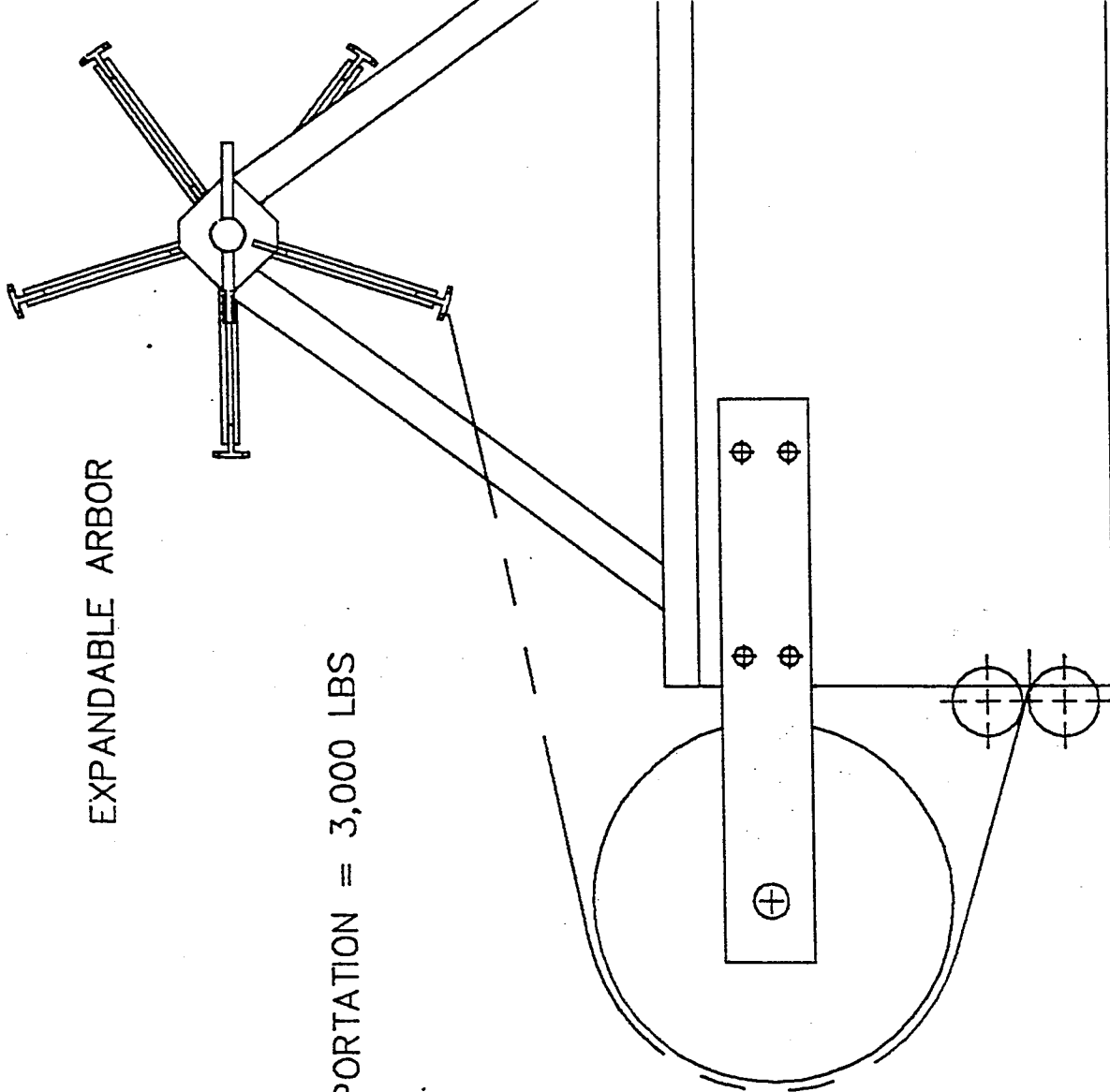


NOTES:

- 1) Socket wiring colors refer to trailer wiring. Towing vehicle wire colors will vary according to manufacturer.
- 2) Spare wire provided to circuit board for European manufactured vehicles that require separate stop lights. (Lights not provided with trailer.)
- 3) Electric brake controller must be mounted and properly connected in towing vehicle for safe towing. Control provided for hydraulic brakes, "T" connection must be obtained for specific truck types. Air brake controller available upon request at additional cost.

REEL STAND/ENTRY GUIDE DIAGRAM

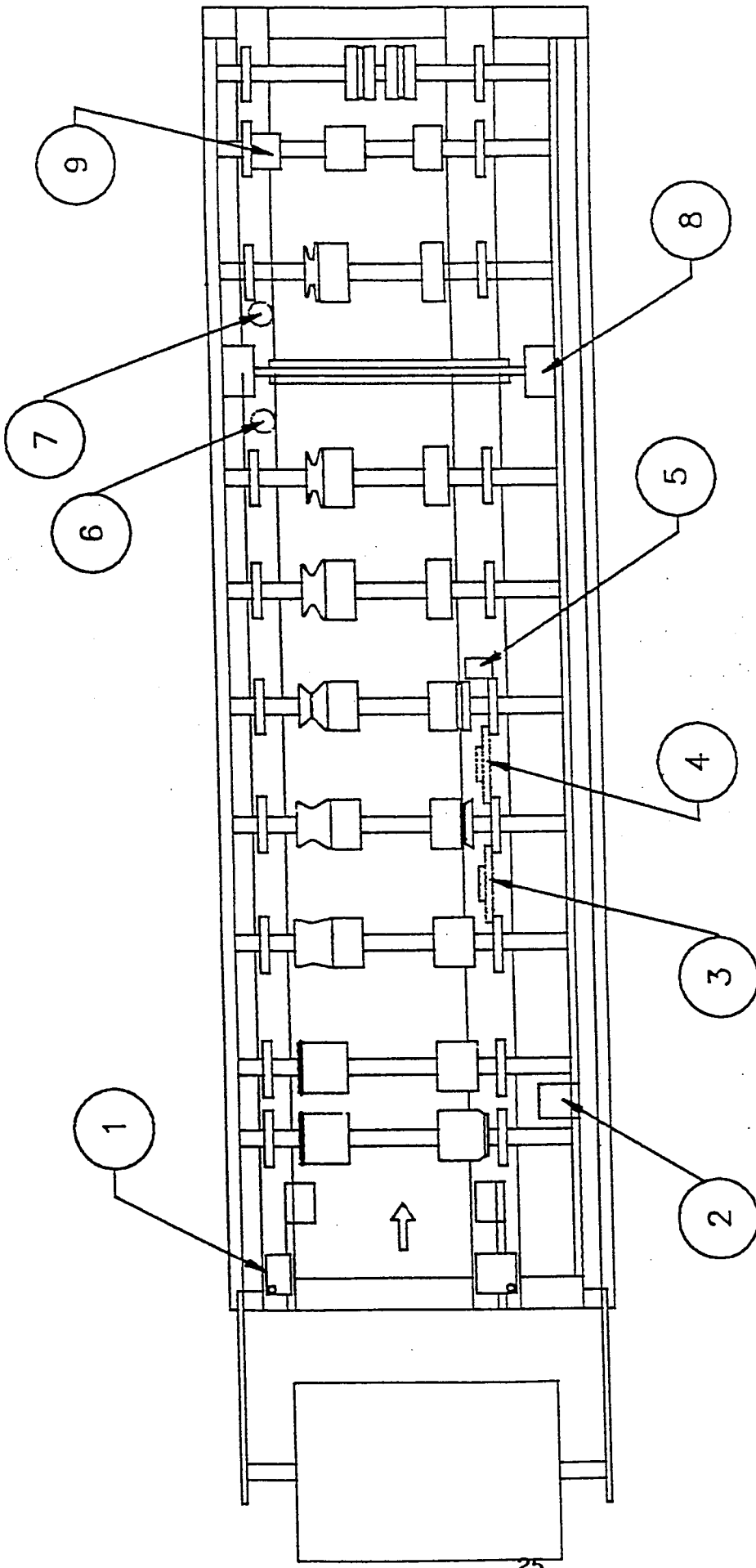
EXPANDABLE ARBOR



WARNING !
MAXIMUM COIL WEIGHT DURING TRANSPORTATION = 3,000 LBS
(REFER TO TRAILER SPECIFICATIONS)

MAXIMUM COIL WEIGHT = 3,500 LBS
COIL WIDTH = 16" : 30"
COIL I.D. = 16" : 20"

KR-20 ASSEMBLY DIAGRAM



6. AUXILLARY #7-#8 LEFT

7. AUXILLARY #8 LEFT

8. SHEAR ASSEMBLY

9. AUXILLARY #9 LEFT

1. ENTRY GUIDE ASSEMBLY

2. PANEL WIDTH ADJUSTMENT

3. AUXILLARY #3-#4 RIGHT

4. AUXILLARY #4-#5 RIGHT

5. AUXILLARY #5-#6 RIGHT

ENTRY GUIDE SETTING DIAGRAM

SET DIMENSION (A) AT

MATERIAL WIDTH PLUS 1/32".

TRIM CORNERS AS SHOWN.

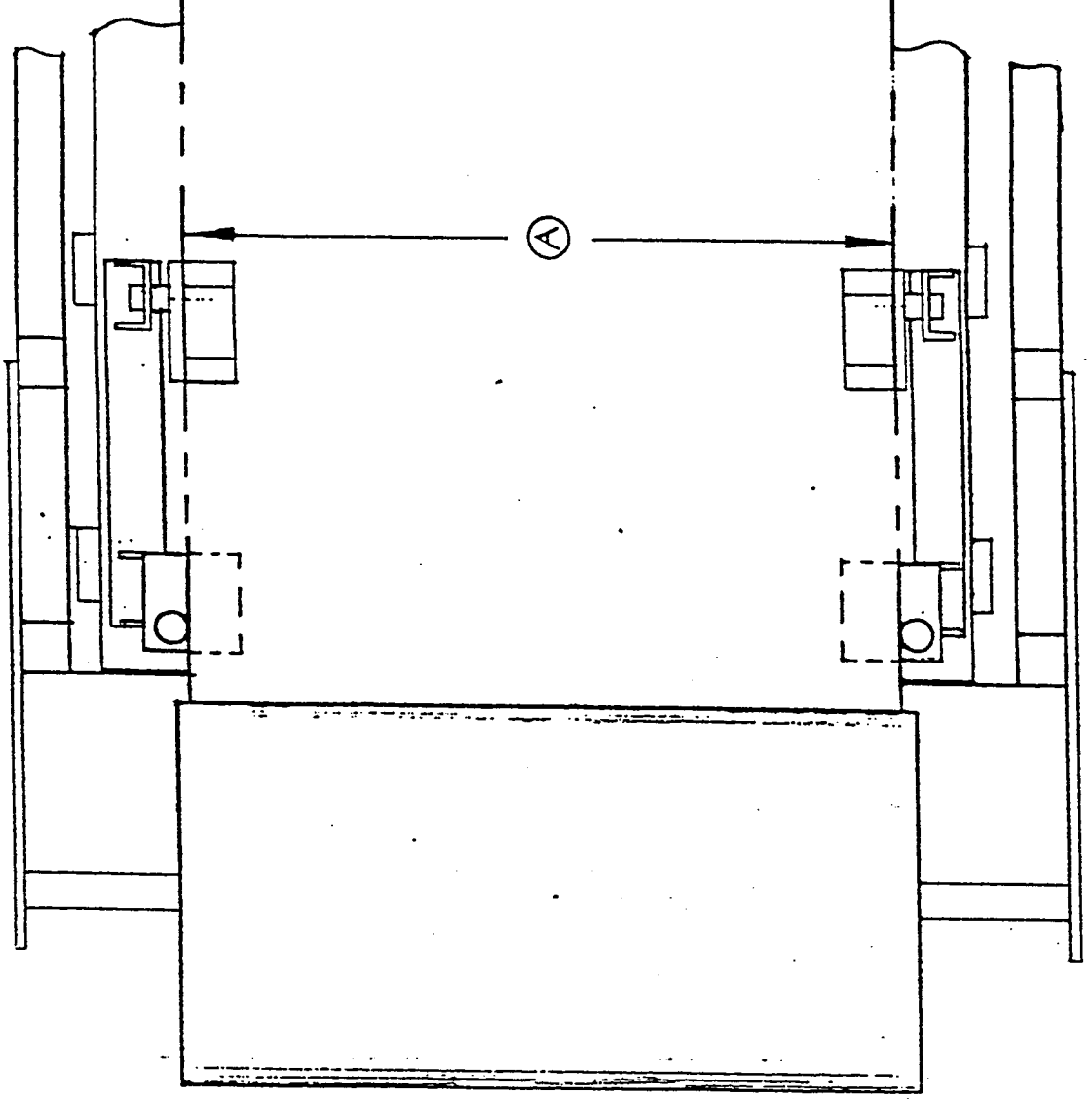
26

MATERIAL
FLOW



45°
TYP

6"
TYP



PANEL MACHINE ADJUSTMENTS

Roller Clearance

Steel - .005 less than material thickness

Aluminum - .003 less than material thickness

Copper - .002 less than material thickness

To set roller clearance, use a feeler gauge and adjust both points B evenly using nut A . Feeler gauge should fit snugly with nuts tight. Check points B for all main roller stations to be sure they are all exactly equal **(See Diagram Page 28)** Set bead rollers at approximately 2 times metal thickness.

If slippage occurs after threading coil stock through the machine, tighten roller (Sta. #1 - Sta. #7) one flat of nut A . If original thickness adjustment was performed properly, there is no need to check with the feeler gauge. If pressure ripples occur in panel, locate the station causing the ripple and loosen nut A until ripples are eliminated. All auxiliary roller sets are factory set for metal clearance and should not require adjustment.

Panel Width Adjustment

Rotate crank on right side of machine to adjust roller carriage to desired width of panel. Use the measuring device located on the shear to find desired panel width. **DO NOT ADJUST ROLLER CARRIAGE WITH MATERIAL IN THE MACHINE!!**

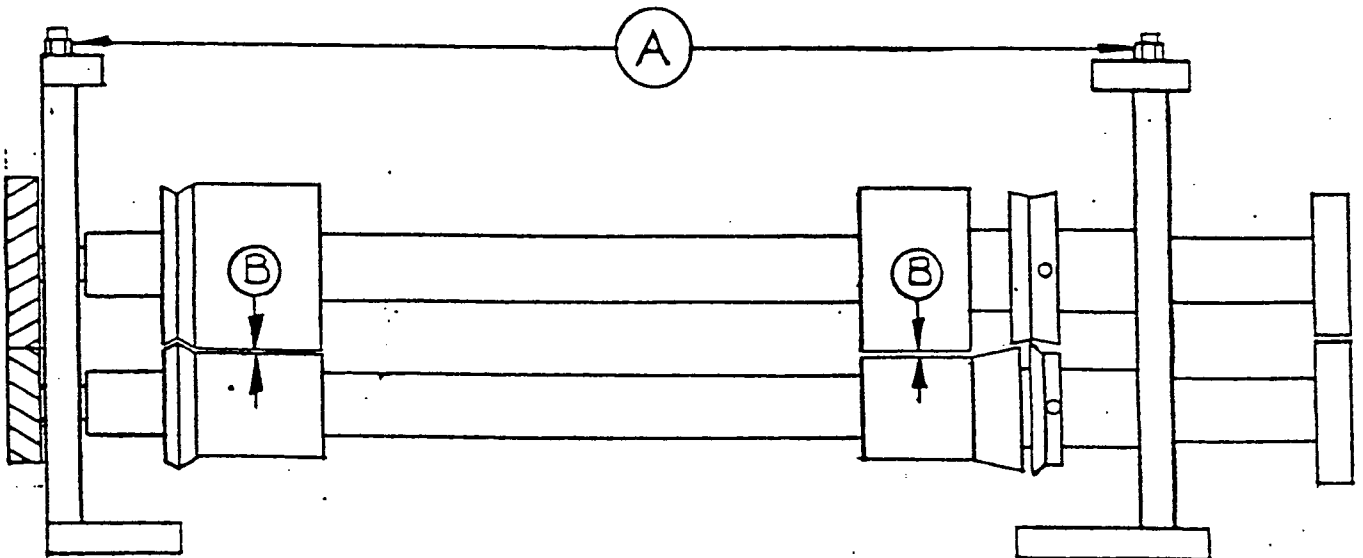
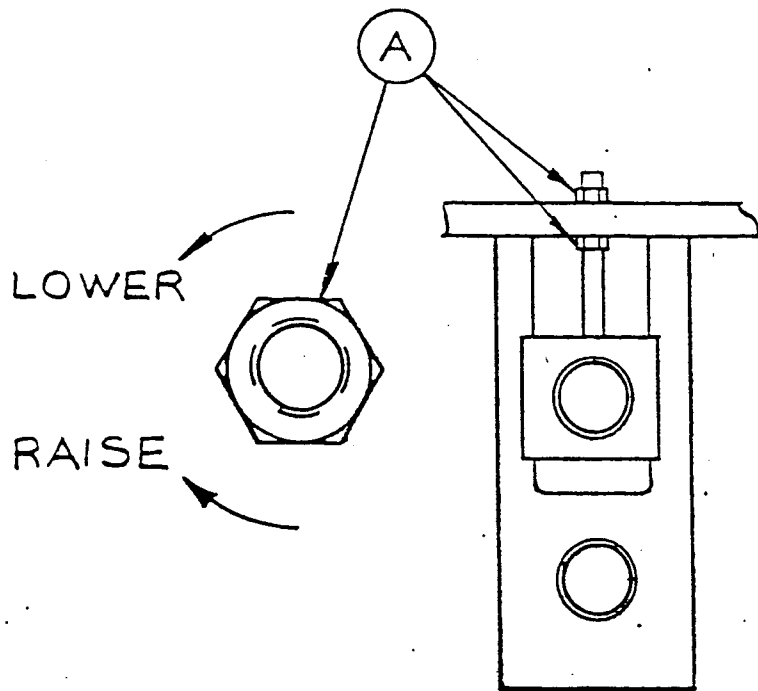
24" Wide Coil = Panel x 18" Wide

UPHILL OR DOWNHILL ON MALE OR FEMALE PANEL LEG

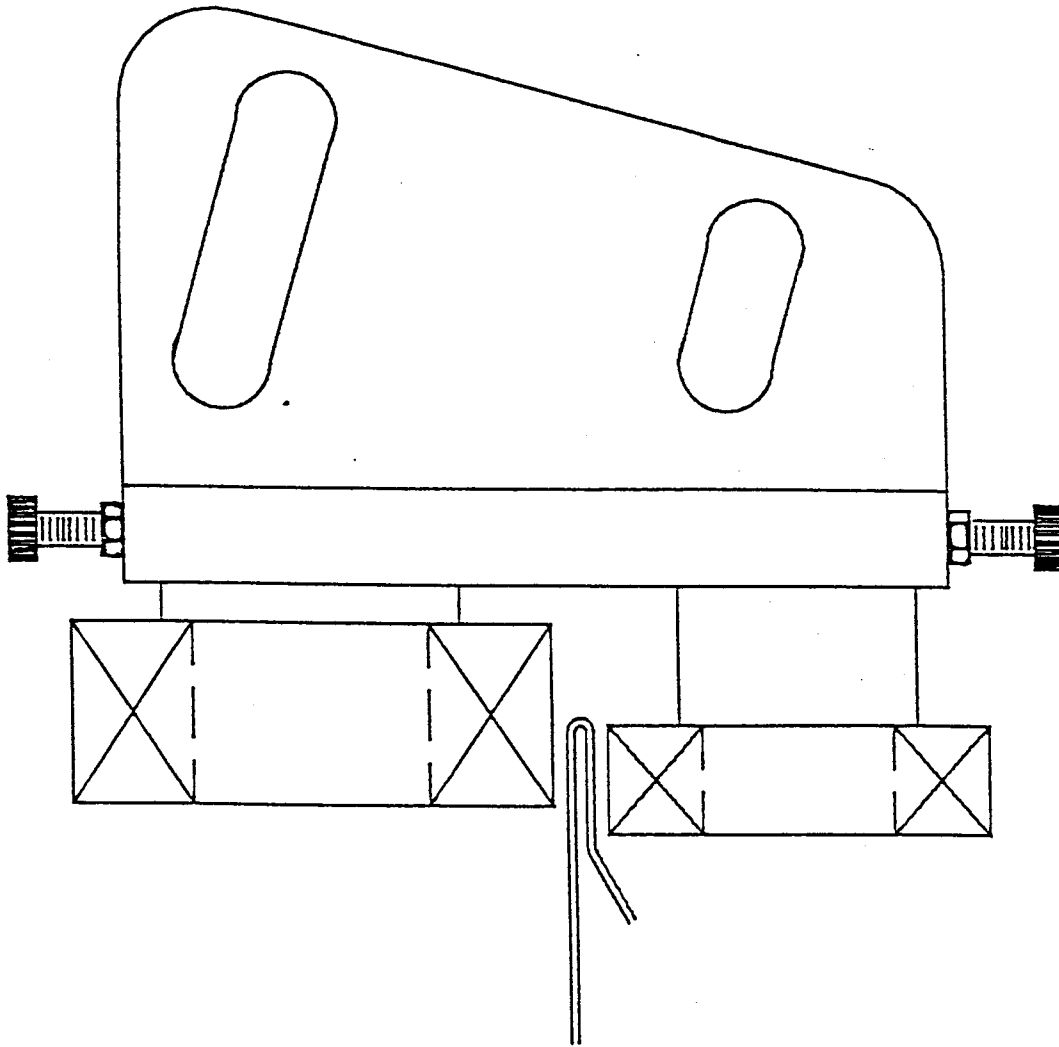
Auxiliary Station #9 (Left Side) and Auxiliary Station #5 (Right Side) (Refer to diagrams on pages 29 and 30)

To adjust the angle of the panel leg, (Male Side) tighten angle roller at Station #9 Right Side. To adjust female panel leg, adjust rollers on Auxiliary Station #9, Left Side.

PANEL MACHINE ADJUSTMENTS DIAGRAM



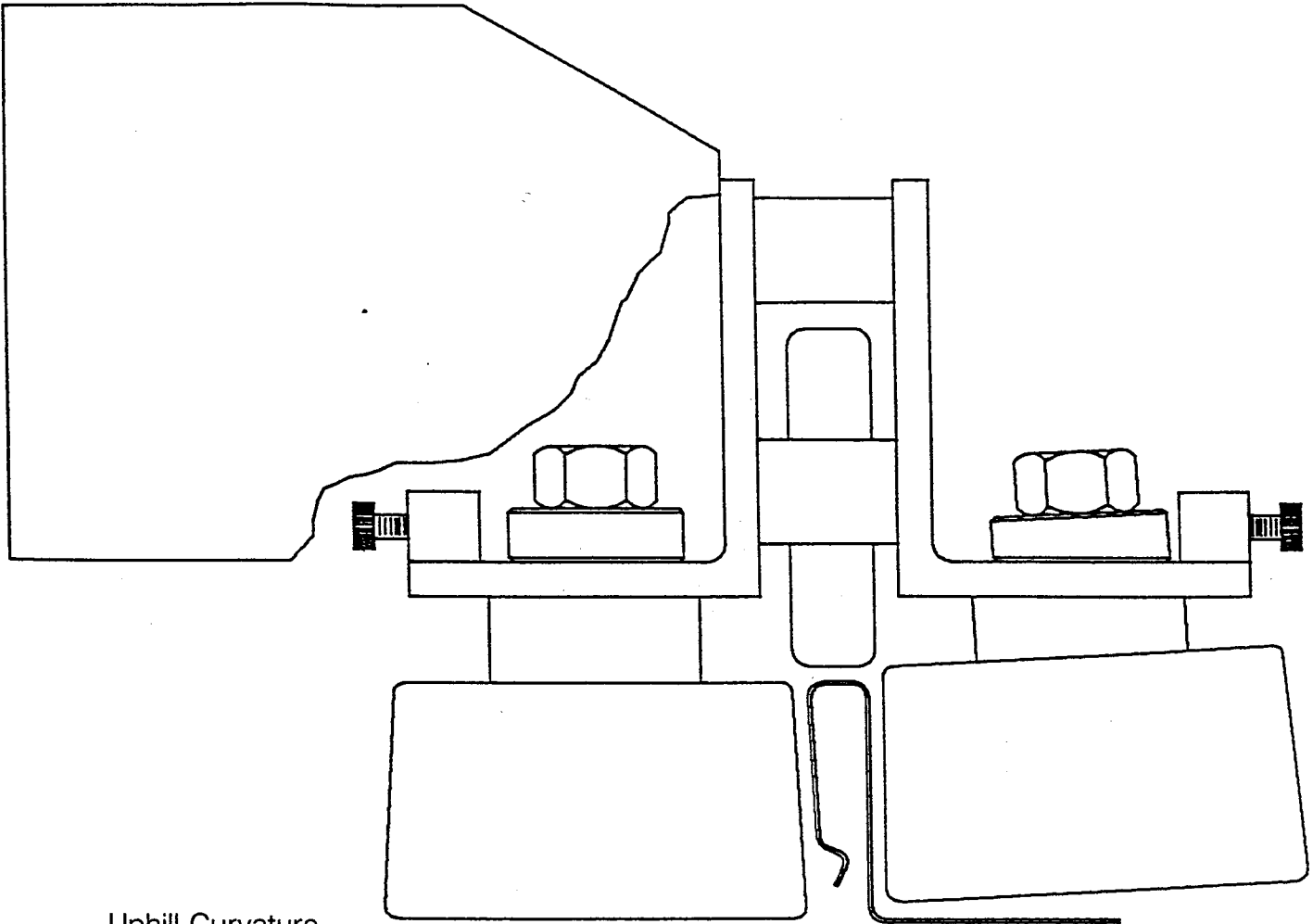
AUXILIARY 5 - 6 RIGHT



Male Panel Leg Adjustments

1. Align Auxiliary #5 right so that bottom roller is parallel with bottom of panel.
2. Adjust top roller so that male leg fits into the opening on your panel template (approximately 1/8"). If the top roller is overtightened, male leg will have a tendency to go uphill.
3. To adjust the angle of the male leg, tighten or loosen angle roller located on Station #9 right. If angle roller is over-tightened, male leg will overbend and have a tendency to go uphill.

AUXILIARY STATION #9 LEFT



Uphill Curvature

If uphill curvature occurs in female panel leg, raise exit end of Auxiliary Station #9. If Auxiliary is raised too high, top of female leg will not be square.

Panel Opening

Check the panel opening with your panel template. If opening is too wide, tighten outside (left side) roller. If too narrow, loosen outside roller. Opening should measure approximately 1/8" for proper interlock.

Angle of Panel Leg

To adjust the angle of the female leg, move both inside and outside rollers the same direction. Move rollers to left, panel will have less angle; to right, more angle. When moving right hand roller, make sure roller is angled as illustrated in the diagram above.

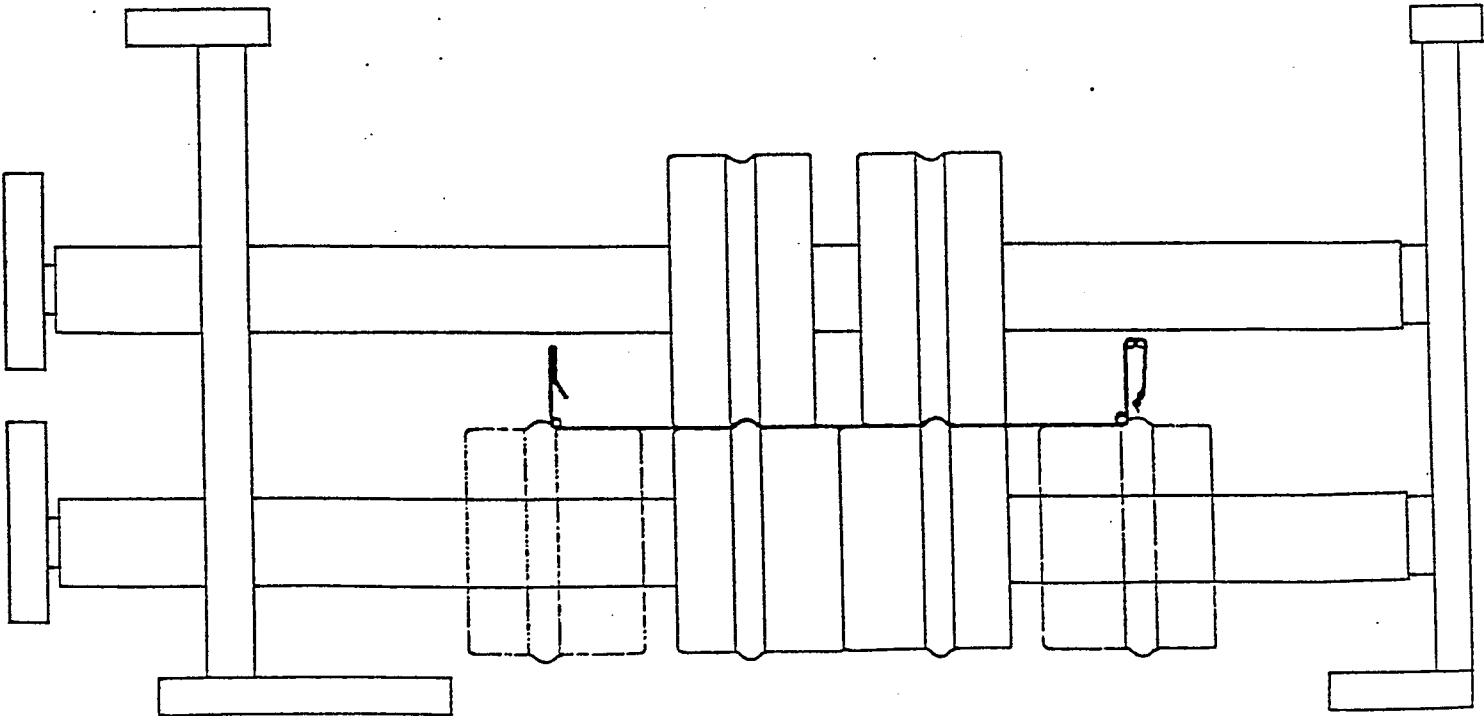
STIFFENING BEADS

Metal Clearance

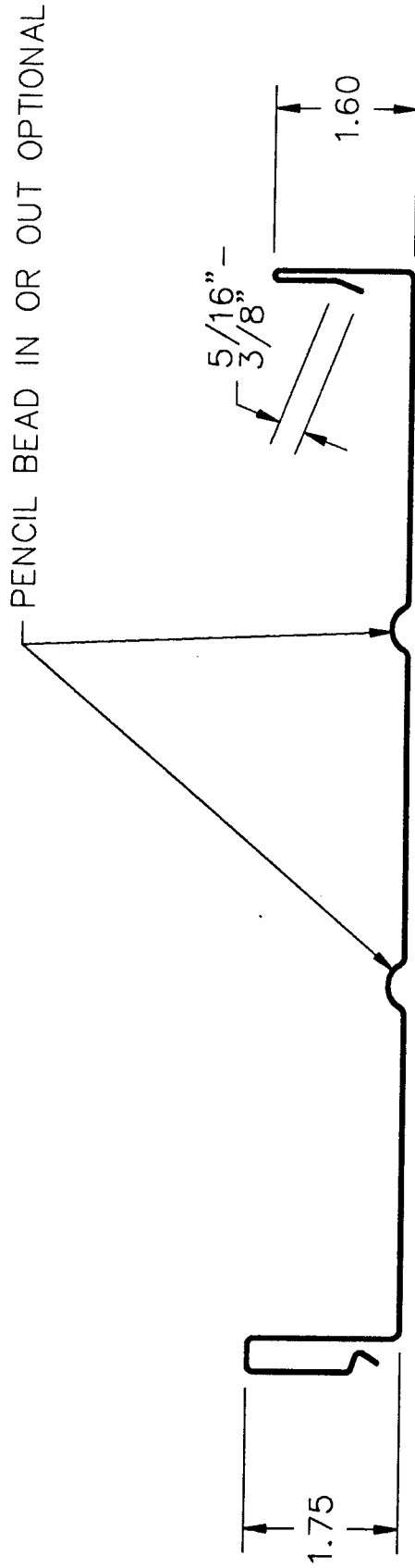
Set the clearance between pencil rib rollers at two times the metal thickness you are using. Set clearance between flat rib rollers at a one metal clearance.

Removing Stiffening Beads

To remove stiffening beads, raise top rollers approximately 1/4". Loosen the locating screws in bottom rollers and reposition into holes on opposite side of bottom roller shaft. Bottom beads should just clear edges of panel. Loosen top roller locating screws and reposition rollers so that the flat portion of the roller is over the flat portion of the bottom rollers. Reclearance rollers at one metal thickness.

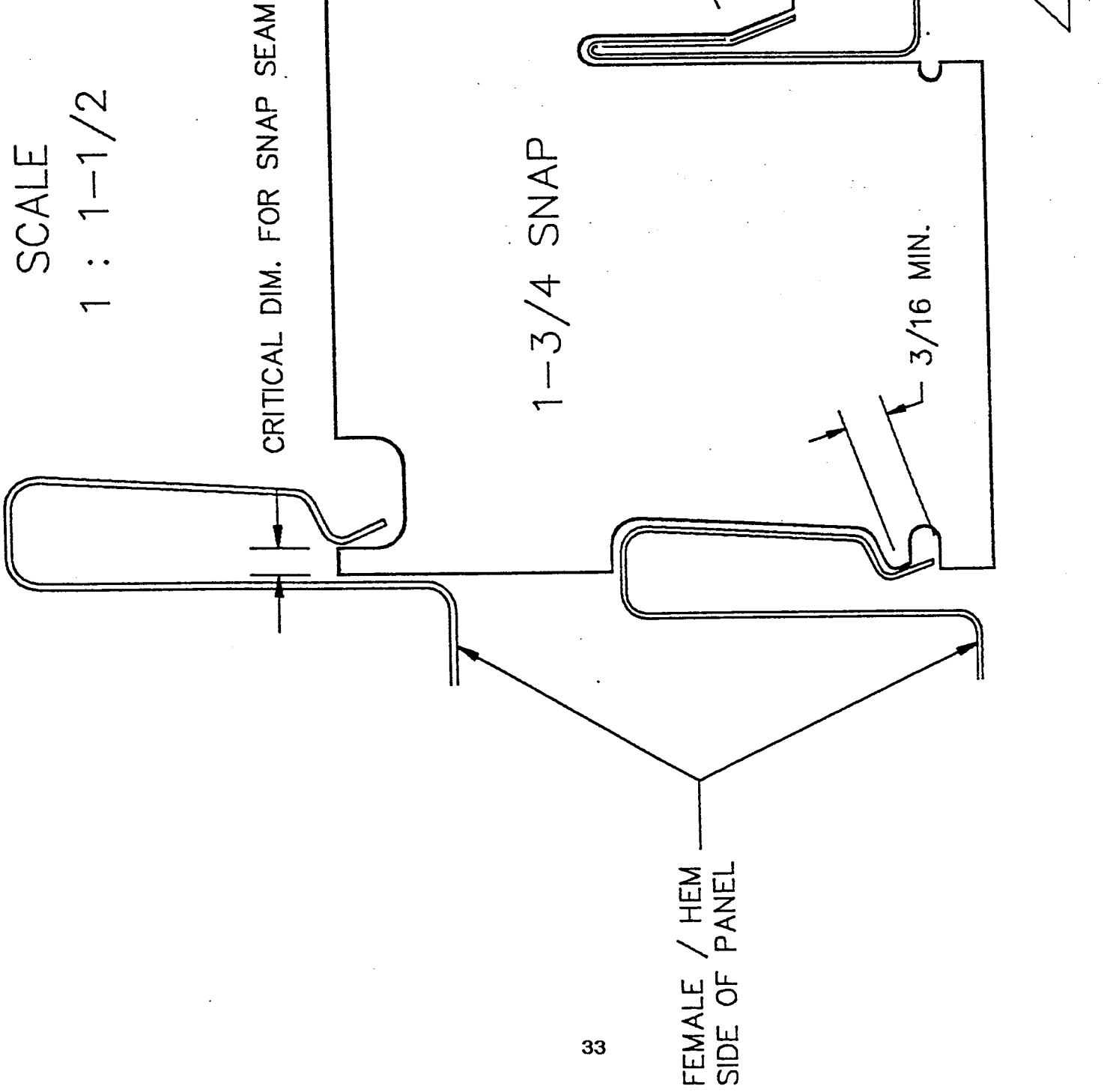


KNUDSON MFG., INC.
KR-20 SNAP-ON PANEL
SCALE 1:2



SCALE

1 : 1-1/2



Illustrated Parts List

Model Series

Vanguard

303400 to 303499

TYPE NUMBERS
0021 through 0037
0040 through 0064
0070
0075 through 0079
0084, 0085, 0092
0093
0100 through 0104
0120 through 0145

TYPE NUMBERS
0326 through 0358
0362, 0364, 0365
0369 through 0379
0385, 0392, 0393
0397 through 0401
0410 through 0424
0438, 0439

**TO FIND
THE CORRECT NUMBER OF THE PART YOU NEED:
FOLLOW THE INSTRUCTIONS BELOW**

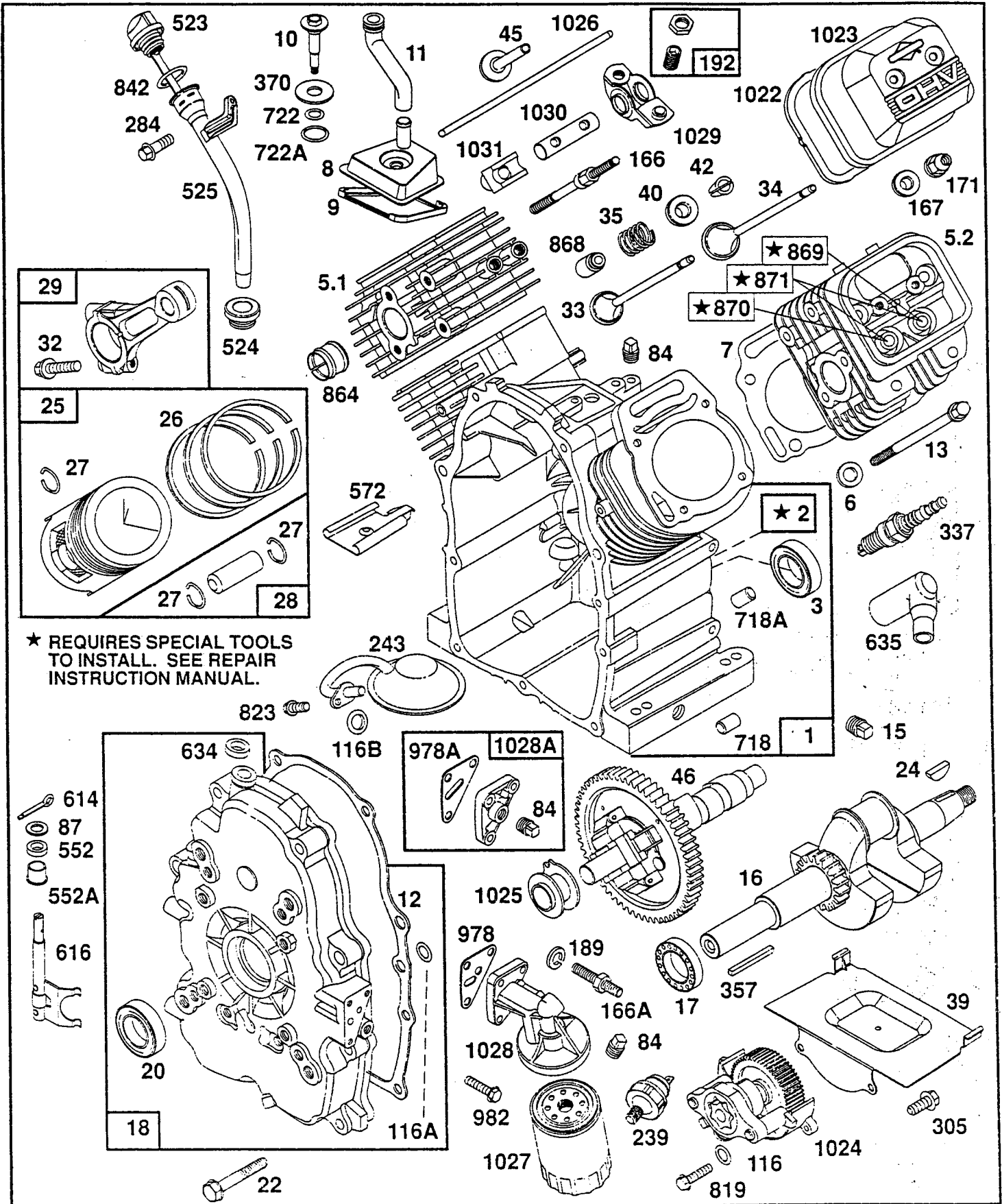
- A. Refer to Engine Model, Type and Code Number that is stamped on the blower housing of engine. Engine type numbers such as 012301 are listed herein only as 0123 in most instances. The two digits (01 or 02, etc.) to the right of the space may be needed for more accurate parts identification. Then use the Illustrated Parts List covering the Model Series.
- B. Refer to Illustrated Parts section and compare the old part with illustration. The number on the illustration is the Reference Number. Assemblies include all parts shown in frames. All parts shown in assembly frames on which individual reference numbers are given can be purchased separately.
- C. After the Reference Number has been identified, refer to the Numerical Parts List, where Reference and Master Part Number are listed. **THE MASTER PART IS USED ON ALL TYPE NUMBERS EXCEPT THOSE TYPE NUMBERS UNDER "NOTE."**
- D. If a "Note" appears below the Master Part Number, this means that this part differs from the Master Part for certain types. If the Type number is listed under "Note," order the part referred to.
- E. If the Engine Type Number does not appear after any part number listed under "Note," use the Master Part Number.
- F. For Type Numbers higher than those covered by this book, please refer to the factory if you are unable to identify the part by comparison.

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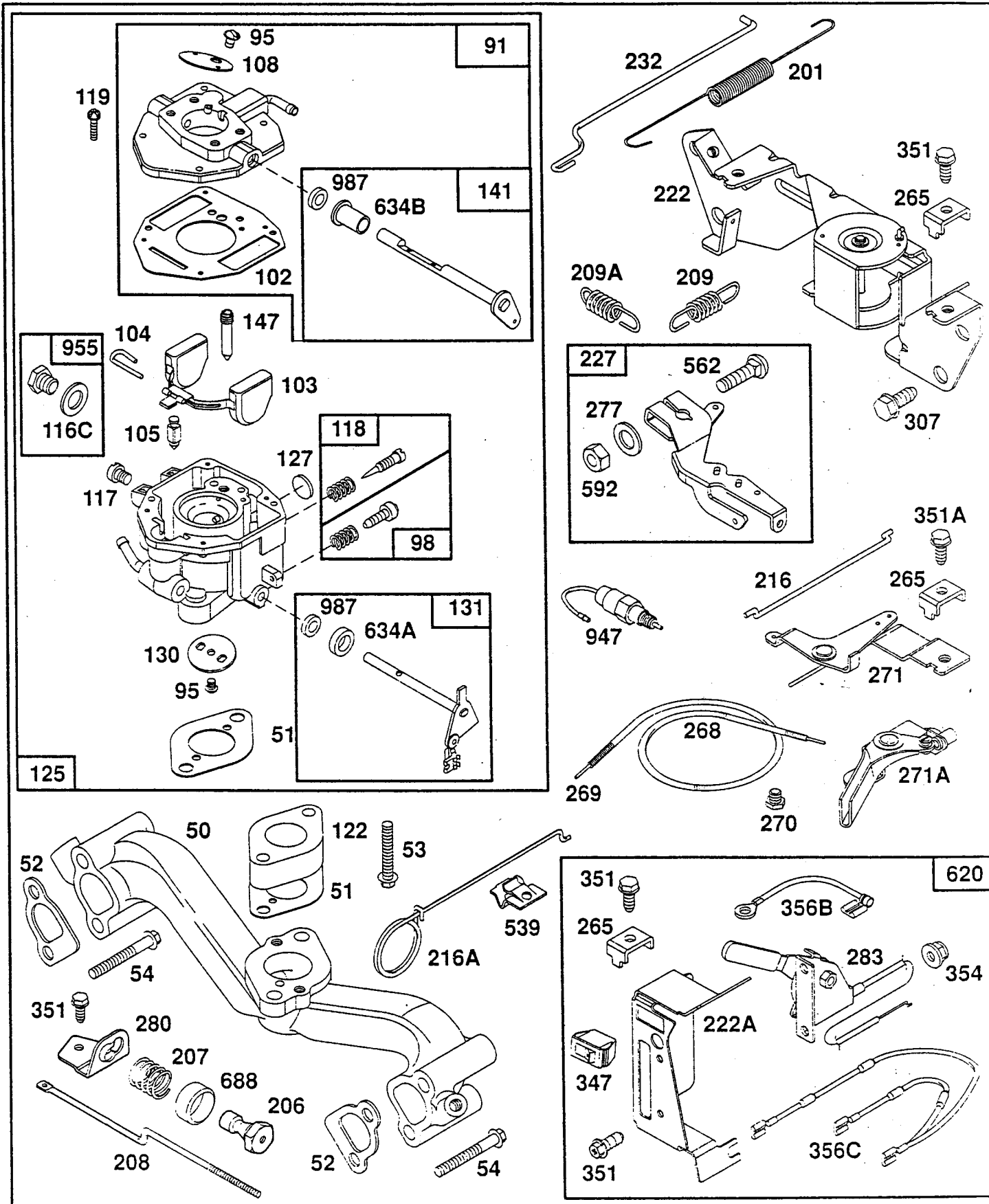
BRIGGS & STRATTON

303400 to 303499



9691-2

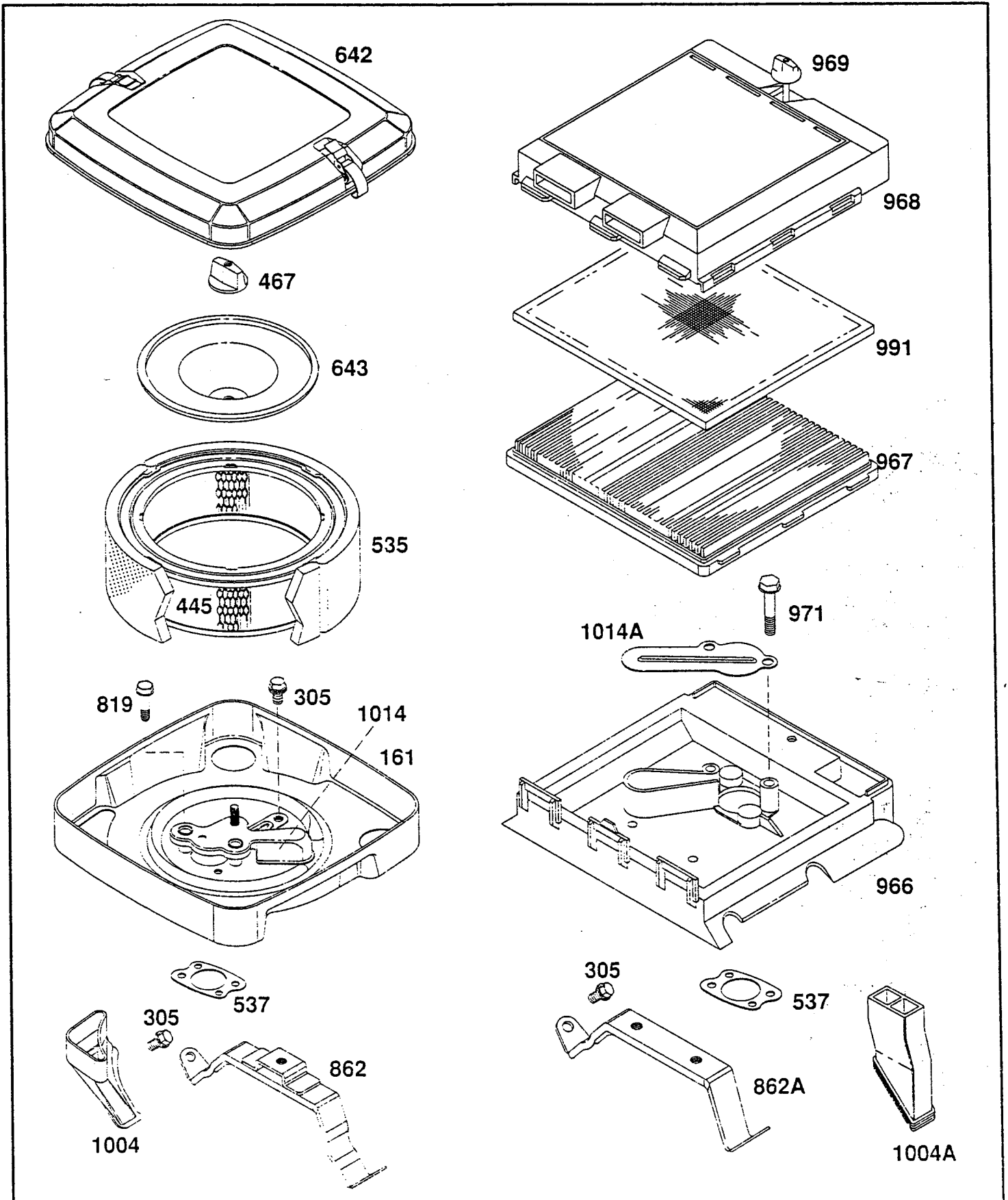
Assemblies include all parts shown in frames.



9691-3

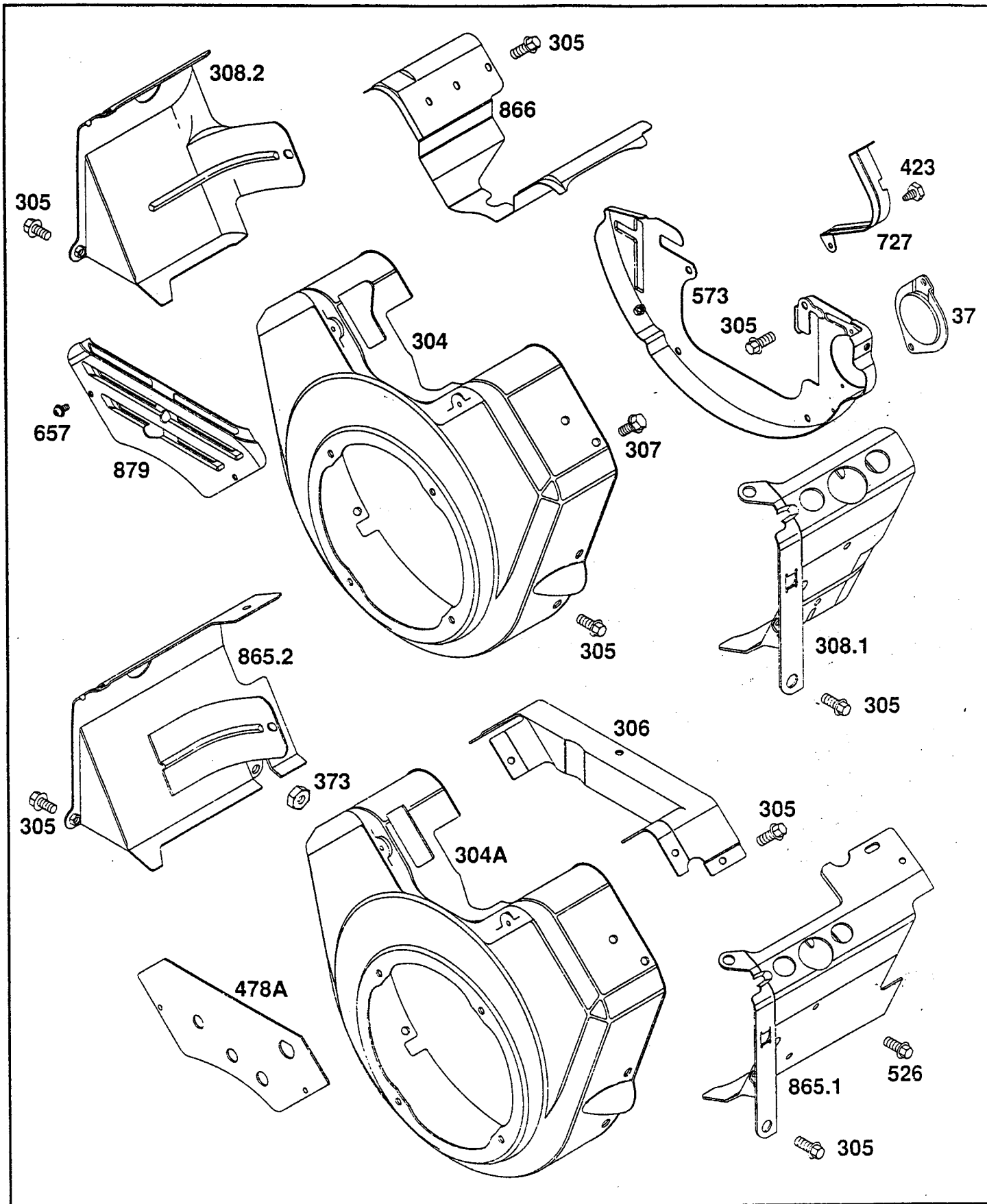
Assemblies include all parts shown in frames.

303400 to 303499



9691-4

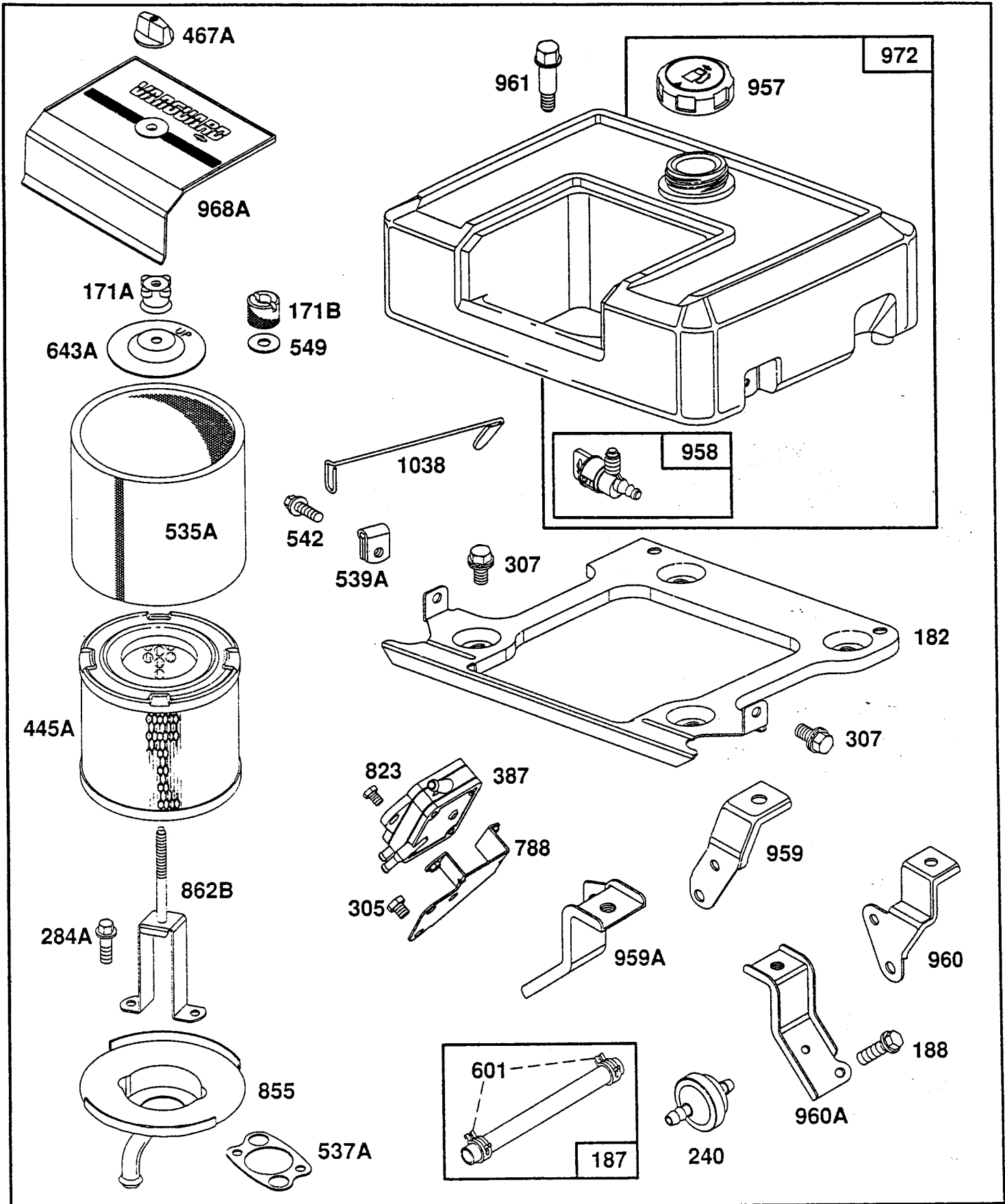
Assemblies include all parts shown in frames.



9691-5

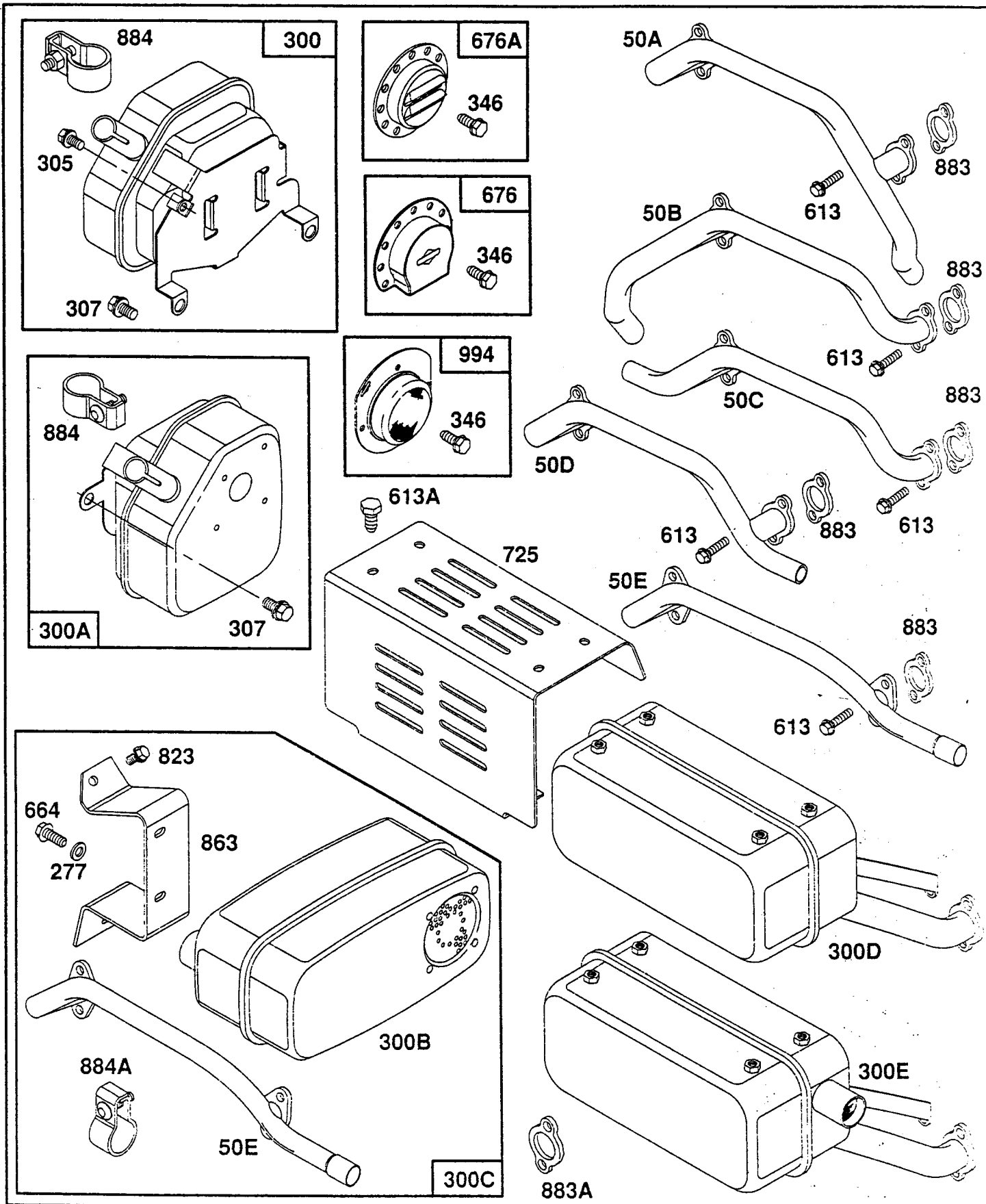
Assemblies include all parts shown in frames.

303400 to 303499



9691-6

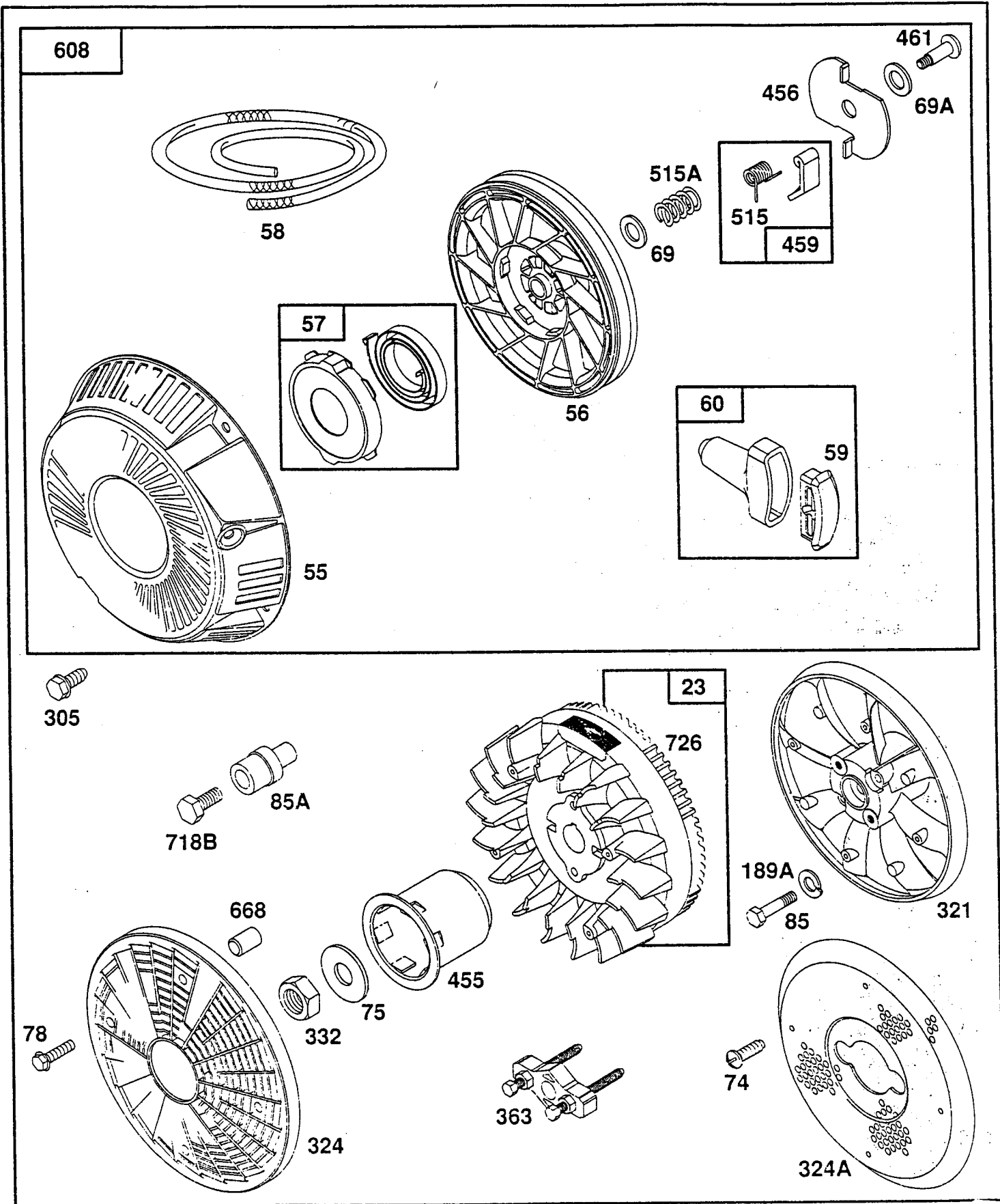
Assemblies include all parts shown in frames.



9691-7

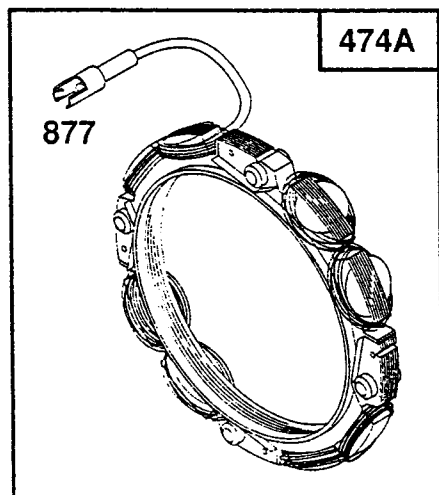
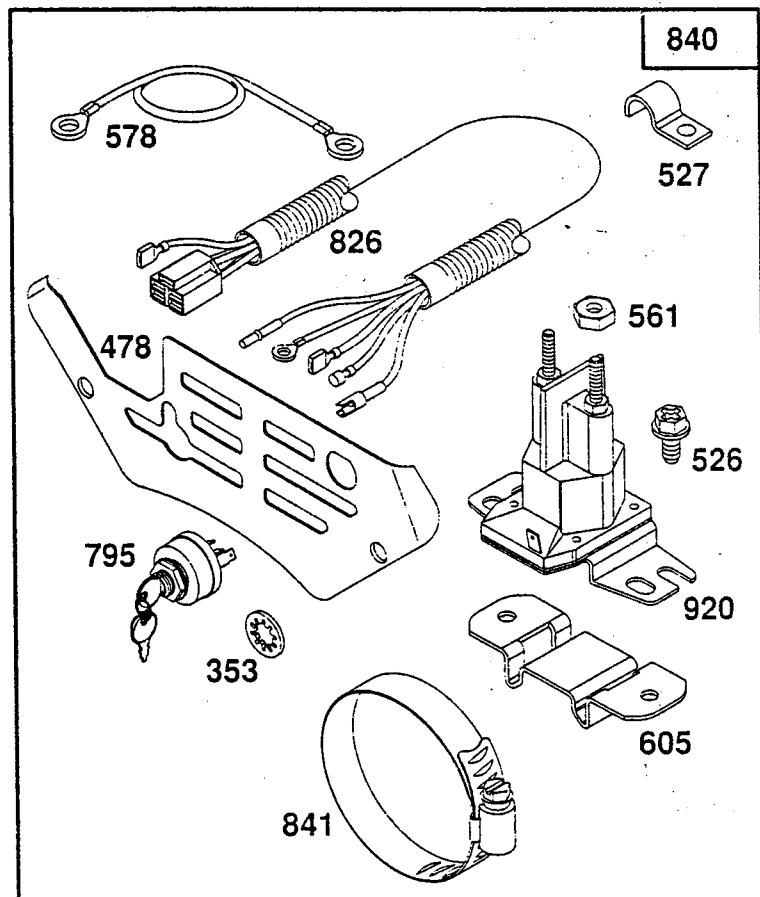
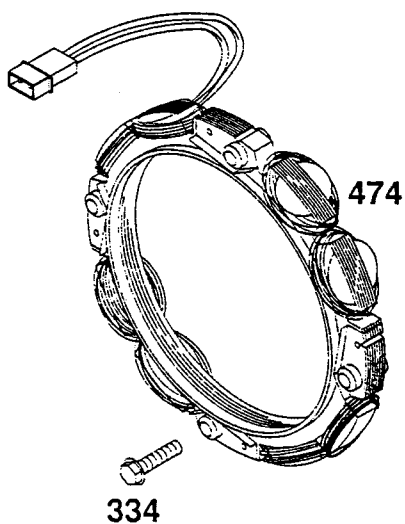
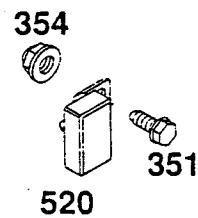
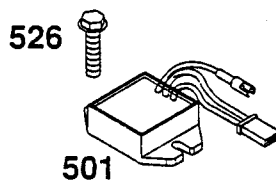
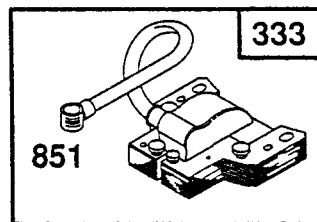
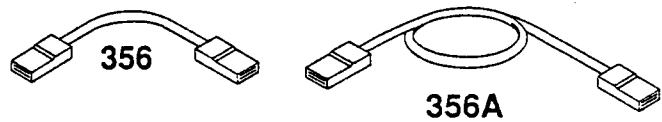
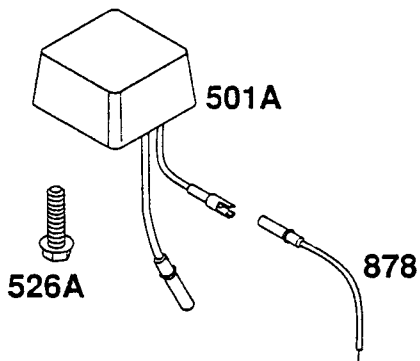
Assemblies include all parts shown in frames.

303400 to 303499



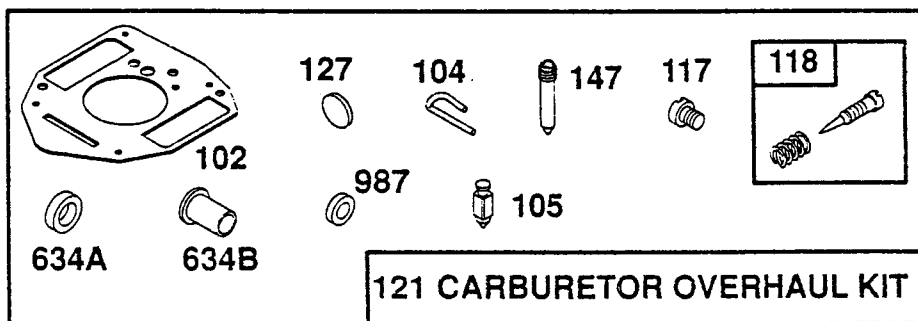
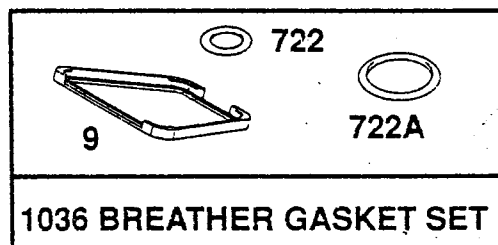
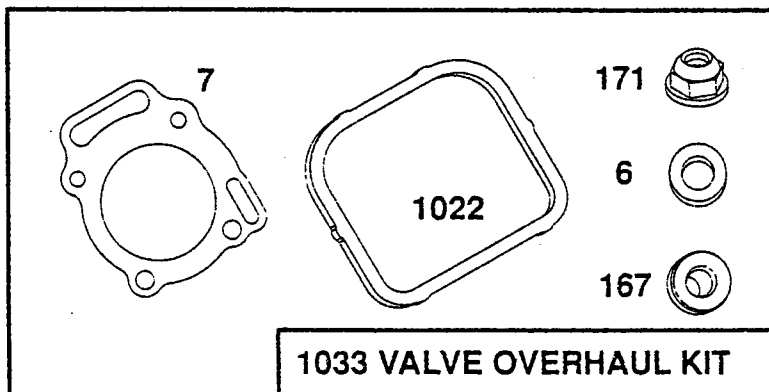
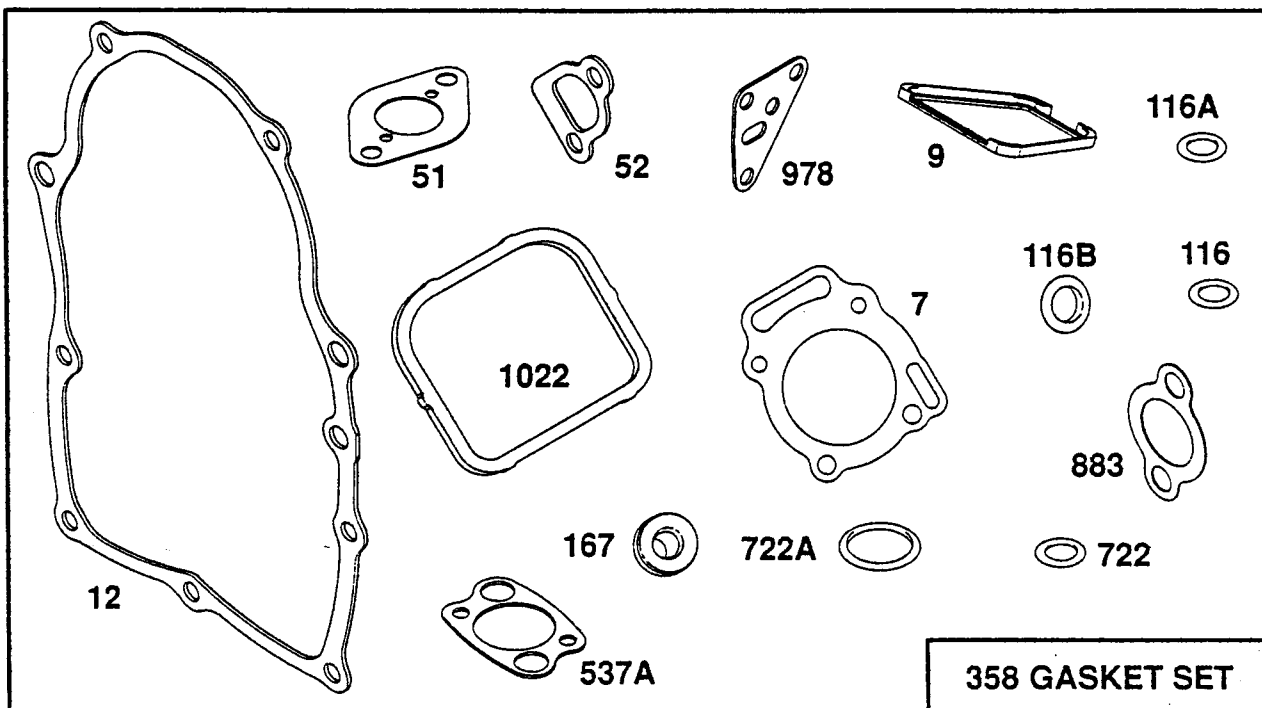
9691-8

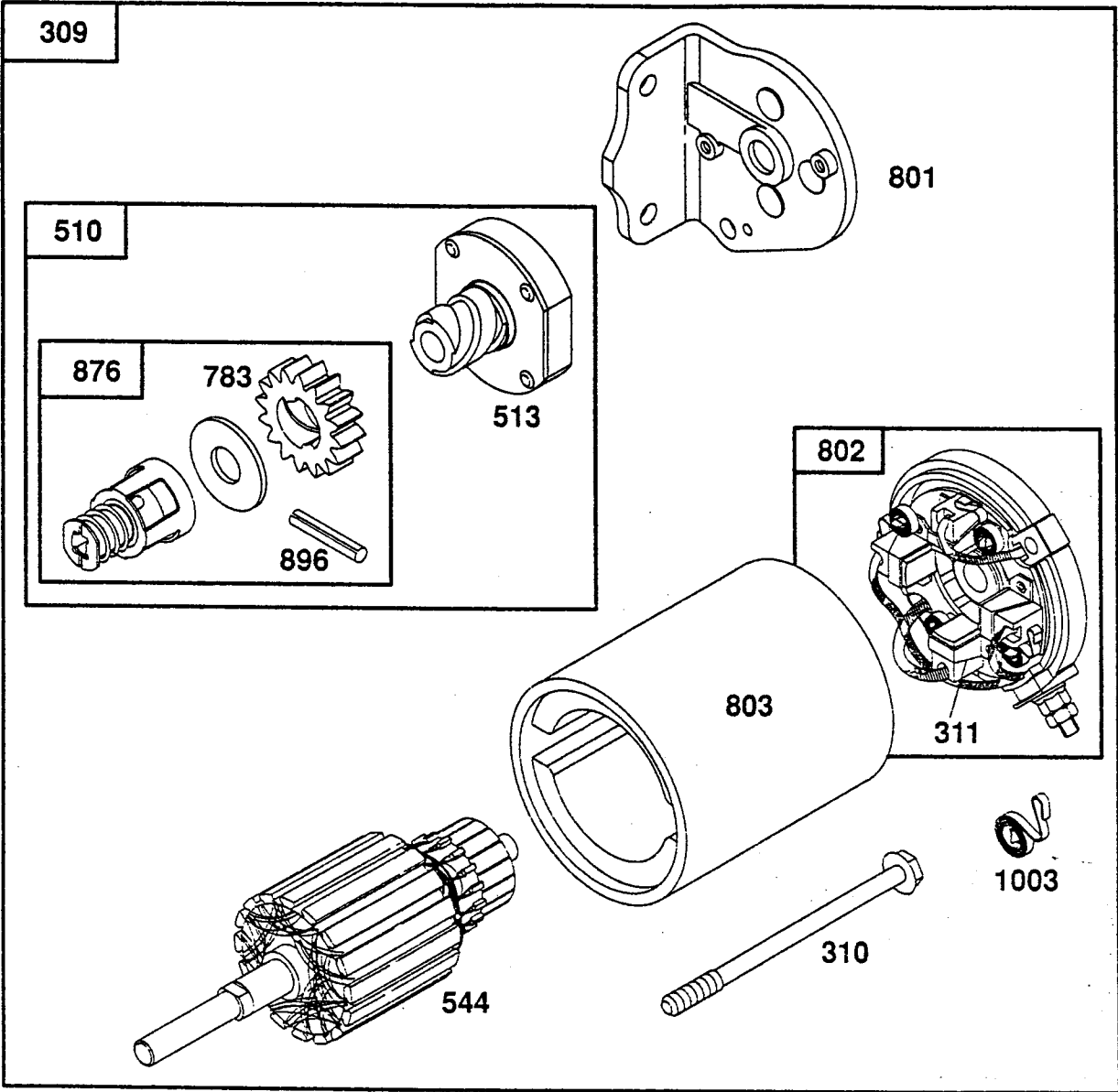
Assemblies include all parts shown in frames.



9691-9

Assemblies include all parts shown in frames.





303400 to 303499

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
1	807521	Cylinder Assembly			0362, 0365, 0373,	37	805185	Cover-Starter (Black)
2	805107	Bearing-Cylinder			0374, 0378, 0385,			Note: 805504 Cover-Starter (Red)
3	805101	Seal-Oil			0392, 0397, 0399,	39	805300	Plate-Windage
5.1	807508	Head-Cylinder (Cyl. #1)			0415, 0416, 0417, 0419, 0420.	40	805092	Retainer-Valve Spring
5.2	807510	Head-Cylinder (Cyl. #2)			807849 Crankshaft	42	805161	Retainer-Valve
6	▲805193	Washer-Cylinder Head			Used on Type No. 0133, 0412.	45	805354	Tappet-Valve
7	★805111	Gasket-Cylinder Head			807851 Crankshaft	46	807542	Gear-Cam
8	807795	Breather Assembly (Used After Code Date 90111400).			Used on Type Nos. 0138, 0139, 0438, 0439.	50	805409	Manifold-Intake
		Note: 807553 Breather Assy. (Used Before Code Date 90111500).	17	805213	Bearing-Ball			Note: 807802 Manifold Assembly-Intake (Used on Type Nos. 0031, 0032, 0033, 0034, 0035, 0040, 0047, 0048, 0049, 0055, 0058, 0076, 0157, 0124, 0126, 0128, 0133, 0137, 0140, 0141, 0142.
9	★805379	Gasket-Breather			Note: 807884 Cover	50A	805142	Manifold-Exhaust (Used with Muffler Part No. 807742)
10	805751	Screw (Used After Code Date 90111400).			Assembly-Crankcase (Used on Type Nos. 0133, 0412.	50B	805378	Manifold-Exhaust (Used with Muffler Part No. 807741)
		Note: 805194 Screw (Used Before Code Date 90111500).	20	805049	Seal-Oil	50C	805404	Manifold-Exhaust (Used with Muffler Supplied by Customer)
11	805362	Tube-Breather	22	805017	Screw-Crankcase Cover	50D	805403	Manifold-Exhaust (Used with Muffler Supplied by Customer)
12	★805112	Gasket-Crankcase Cover	23	807531	Flywheel-Magneto	50E	805609	Manifold-Exhaust (Used with Muffler Part No. 392101)
13	805097	Screw-Cylinder Head	24	805016	Key-Flywheel			Note: Order Part No. 807752 For Exhaust Kit.
15	805048	Plug-Oil Drain	25	807619	Piston Assembly (Standard)	51	★805264	Gasket-Carb. Mtg.
16	807589	Crankshaft			807807 Piston Assembly .010" O.S.	52	★805023	Gasket-Intake Manifold
		Note: 807625 Washers-Thrust			807809 Piston Assembly .020" O.S.	53	805466	Screw-Sem
		807590 Crankshaft (Used on Type Nos. 0021, 0033, 0041, 0044, 0049, 0051, 0077, 0377.			807811 Piston Assembly .030" O.S.	54	805006	Screw-Sem
		807745 Crankshaft (Used After Code Date 89051700).	PISTON RING SETS:			55	492193	Housing-Starter
		807588 Crankshaft (Used Before Code Date 89051800). Used on Type Nos. 0022, 0027, 0028, 0034, 0035, 0036, 0037, 0042, 0044, 0052, 0054, 0060, 0061, 0078, 0084, 0085, 0092, 0123, 0124, 0129, 0130, 0136, 0327, 0342, 0350, 0352, 0354.	26	807620	Ring Set-Piston (Standard)	56	280918	Pulley-Rewind Starter
					807808 Ring Set-Piston .010" O.S.	57	492194	Spring-Rewind Starter
					807810 Ring Set-Piston .020" O.S.	58	66894	Rope-Starter (Cut To 69 1/2")
					807812 Ring Set-Piston .030" O.S.	59	490653	Insert-Starter Handle
			27	805099	Lock-Piston Pin	60	490652	Handle-Rewind Starter
			28	807621	Pin Assy.-Piston (Standard)	65	805026	Screw-Sem
			29	807622	Rod Assy.-Connecting	69	94464	Washer-Pulley
			32	805395	Screw-Connecting Rod	69A	94462	Washer-Retainer
			33	805089	Valve-Exhaust	74	93808	Screw-Sem
			34	805090	Valve-Intake			
			35	805078	Spring-Valve			

◆ Included in Gasket Set-Part No. 807640.

● Included in Carburetor Overhaul Kit-Part No. 807726.

▲ Included in Valve Overhaul Kit-Part No. 807668.

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
75	805007	Washer-Spring	119	805540	Screw-Upper Body Mounting	187	393815	Hose-Fuel (Cut to Suit)
78	805447	Screw-Sem	121	807726	Carburetor Overhaul Kit	188	805247	Screw-Hex. Head
84	805059	Plug-Pipe	122	805328	Spacer-Carburetor	189	805449	Lockwasher
85	94385	Screw-Hex. Head	125	807918	Carburetor Assembly (Pump Feed) (Used After Code Date 90113000).	189A	90366	Lockwasher
85A	94493	Screw-Hex. Head			807624 Carb. Assy. (Pump Feed) (Used Before Code Date 90120100).	192	807623	Screw-Valve Adjustment (Includes: Jam Nut)
87	805054	Seal-Governor Shaft			Note: 807943 Carb. Assy. (Gravity Feed) (Used After Code Date 90113000).	201	805480	Link-Governor
91	807919	Body-Upper Carburetor (Used After Date Code 90113000).			807801 Carb. Assy. (Gravity Feed) (Used Before Code Date 90120100).	206	805470	Nut-Speed Control
		Note: 807721 Body-Upper Carburetor (Used Before Date Code 90120100).			Note: 807943 Carb. Assy. (Gravity Feed) (Used After Code Date 90113000).	207	805473	Spring
95	805538	Screw-Valve Mtg.			807801 Carb. Assy. (Gravity Feed) (Used Before Code Date 90120100).	208	805471	Rod-Speed Control
98	807718	Screw-Throttle Adj.			Used on Type Nos. 0031, 0032, 0033, 0034, 0035, 0036, 0037, 0040, 0047, 0048, 0049, 0054, 0055, 0057, 0058, 0070, 0076, 0085, 0124, 0126, 0128, 0129, 0130, 0133, 0137, 0138, 0139, 0140, 0141, 0142, 0340, 0348, 0350, 0354, 0357, 0358, 0362, 0370, 0373, 0376, 0385, 0397, 0401, 0412, 0423, 0424, 0438, 0439.	209	805460	Spring-Governor
102	•805541	Gasket-Intake Elbow			Used on Type Nos. 0031, 0032, 0033, 0034, 0035, 0036, 0037, 0040, 0047, 0048, 0049, 0054, 0055, 0057, 0058, 0070, 0076, 0085, 0124, 0126, 0128, 0129, 0130, 0133, 0137, 0138, 0139, 0140, 0141, 0142, 0340, 0348, 0350, 0354, 0357, 0358, 0362, 0370, 0373, 0376, 0385, 0397, 0401, 0412, 0423, 0424, 0438, 0439.			Note: 805455 Spring-Gov. Used on Type Nos. 0022, 0028, 0037, 0042, 0044, 0052, 0078, 0129, 0130, 0342, 0352, 0378, 0415.
103	805546	Float Assembly			Used on Type Nos. 0031, 0032, 0033, 0034, 0035, 0036, 0037, 0040, 0047, 0048, 0049, 0054, 0055, 0057, 0058, 0070, 0076, 0085, 0124, 0126, 0128, 0129, 0130, 0133, 0137, 0138, 0139, 0140, 0141, 0142, 0340, 0348, 0350, 0354, 0357, 0358, 0362, 0370, 0373, 0376, 0385, 0397, 0401, 0412, 0423, 0424, 0438, 0439.			805456 Spring-Gov. Used on Type Nos. 0027, 0034, 0035, 0036, 0054, 0060, 0061, 0084, 0085, 0092, 0123, 0124, 0133, 0136, 0327, 0350, 0354, 0362, 0365, 0373, 0374, 0385, 0392, 0397, 0399, 0412, 0416, 0417, 0419, 0420.
104	•805545	Pin-Float Hinge			Used on Type Nos. 0031, 0032, 0033, 0034, 0035, 0036, 0037, 0040, 0047, 0048, 0049, 0054, 0055, 0057, 0058, 0070, 0076, 0085, 0124, 0126, 0128, 0129, 0130, 0133, 0137, 0138, 0139, 0140, 0141, 0142, 0340, 0348, 0350, 0354, 0357, 0358, 0362, 0370, 0373, 0376, 0385, 0397, 0401, 0412, 0423, 0424, 0438, 0439.			805462 Spring-Gov. Used on Type Nos. 0064, 0093, 0132, 0364, 0393.
105	•805547	Valve-Fuel Inlet			Used on Type Nos. 0031, 0032, 0033, 0034, 0035, 0036, 0037, 0040, 0047, 0048, 0049, 0054, 0055, 0057, 0058, 0070, 0076, 0085, 0124, 0126, 0128, 0129, 0130, 0133, 0137, 0138, 0139, 0140, 0141, 0142, 0340, 0348, 0350, 0354, 0357, 0358, 0362, 0370, 0373, 0376, 0385, 0397, 0401, 0412, 0423, 0424, 0438, 0439.			805463 Spring-Gov. Used on Type Nos. 0045, 0423.
		Note: 805620 Valve-Fuel Inlet Used on Type Nos. 0031, 0032, 0033, 0034, 0035, 0036, 0037, 0040, 0047, 0048, 0049, 0054, 0055, 0057, 0058, 0070, 0076, 0085, 0124, 0126, 0128, 0129, 0130, 0133, 0137, 0138, 0139, 0140, 0141, 0142, 0340, 0348, 0350, 0354, 0357, 0358, 0362, 0370, 0373, 0376, 0385, 0397, 0401, 0412, 0423, 0424, 0438, 0439.			Used on Type Nos. 0031, 0032, 0033, 0034, 0035, 0036, 0037, 0040, 0047, 0048, 0049, 0054, 0055, 0057, 0058, 0070, 0076, 0085, 0124, 0126, 0128, 0129, 0130, 0133, 0137, 0138, 0139, 0140, 0141, 0142, 0340, 0348, 0350, 0354, 0357, 0358, 0362, 0370, 0373, 0376, 0385, 0397, 0401, 0412, 0423, 0424, 0438, 0439.			805630 Spring-Gov. Used on Type Nos. 0129, 0130, 0138, 0139, 0438, 0439.
108	805539	Valve-Choke	127	•805559	Plug-Welch	209A	805453	Spring-Governed Idle
116	805058	O-Ring (Oil Pump)	130	805554	Valve-Throttle			Note: 805450 Spring-Governed Idle Used on Type Nos. 0022, 0028, 0037, 0042, 0044, 0129, 0130, 0342, 0352, 0378, 0415.
116A	805198	O-Ring (Crankcase Cover)	131	807720	Shaft-Throttle			
116B	805316	O-Ring (Pick-Up Tube)	141	807722	Shaft-Choke			
116C	•805549	Gasket-Main Jet	147	•805553	Jet-Slow Speed			
117	•805548	Jet-Main	161	807857	Base Assy.-Air Cleaner			
		Note: 805537 Jet-Main (High Altitude)	166	805343	Stud-Rocker Arm			
118	•807719	Valve-Idle Adjusting Needle	166A	805073	Stud-Oil Filter Adapter			
			167	▲805420	Washer-Valve Cover			
			171	▲805019	Nut-Nylock			
			171A	281051	Nut-Air Cleaner			
			171B	231532	Nut-Air Cleaner			
			182	492317	Bracket-Fuel Tank			

* Included in Gasket Set-Part No. 807640.

• Included in Carburetor Overhaul Kit-Part No. 807726.

▲ Included in Valve Overhaul Kit-Part No. 807668.

303400 to 303499

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
		0378, 0411, 0415, 0438, 0439. 805451 Spring—Governed Idle Used on Type Nos. 0027, 0034, 0035, 0036, 0054, 0084, 0085, 0092, 0123, 0124, 0327, 0350, 0354, 0362, 0365, 0373, 0374, 0385, 0392, 0397, 0399, 0412, 0416, 0417, 0419, 0420.	269	26633	Wire—Control Note: If Longer Wire is Required, Specify Length in Inches; If Shorter Wire is Needed, Order Part No. 26633 and Cut to Required Length.	307	805025	Screw—Sem Note: 805247 Screw—Hex. Head Used To Mount Blower Housing on Engines with Fuel Tanks.
216	805439	Link—Choke	270	63426	Locknut—Control Wire Casing	308.1	807656	Cover—Air Guide (Cyl. #1, Black) Note: 807648 Cover—Air Guide (Cyl. #1, Red)
216A	805509	Rod—Manual Choke	271	807609	Bracket—Choke Control	308.2	807657	Cover—Air Guide (Cyl. #2, Black) Note: 807649 Cover—Air Guide (Cyl. #2, Red)
222	807610	Bracket—Gov. Control	271A	290568	Lever Assy.—Control			
222A	805627	Panel—Control	277	805018	Washer			
227	807528	Lever Assy.—Governor	280	805472	Bracket—Speed Control			
232	805465	Spring—Governor Link	283	807763	Lever Assy.—Control			
239	491657	Switch—Oil Pressure	284	805177	Screw—Sem			
240	394358	Filter—Fuel Note: 298090 Filter—Fuel Used on Type Nos. 0031, 0032, 0033, 0034, 0035, 0040, 0047, 0048, 0049, 0054, 0055, 0057, 0058, 0070, 0076, 0085, 0122, 0124, 0126, 0128, 0129, 0130, 0133, 0137, 0138, 0139, 0140, 0141, 0142, 0340, 0348, 0350, 0354, 0357, 0358, 0362, 0370, 0373, 0376, 0385, 0397, 0401, 0412, 0423, 0424, 0438, 0439.	284A	810037	Screw—Hex. Head	309	399169	Motor—Starting
			300	807741	Muffler—Exhaust (Used with Manifold Part No. 805378).	310	94169	Bolt
			300A	807742	Muffler—Exhaust (Used with Manifold Part No. 805142).	311	490311	Brush Assembly
			300B	392101	Muffler—Exhaust (Used with Manifold Part No. 805609).	321	213472	Fan—Booster
			300C	807752	Exhaust Kit	324	280829	Screen—Rotating
			300D	807799	Muffler—Exhaust (Cyl. #1 Side Outlet)	324A	805633	Screen—Rotating
			300E	807831	Muffler—Exhaust (Cyl. #2 Side Outlet)	332	805021	Nut—Hex.
			304	807898	Housing—Blower (Black) Used on Type Nos. Above 0300. Note: 807899 Housing—Blower (Red) Used on Type Nos. Above 0300.	333	490586	Armature—Magneto
			304A	807662	Housing—Blower (Black) Used on Type Nos. Below 0300. Note: 807654 Housing—Blower (Red) Used on Type Nos. Below 0300.	334	805407	Screw—Mounting
243	807598	Screen—Oil Pump Pick-Up	305	805406	Screw—Sem	337	491055	Plug—Spark
265	805170	Clamp—Casing	306	807661	Cover—Valley Extension (Black) Note: 807653 Cover—Valley Extension (Red)	346	93705	Screw—Hex. Head Sem
268	65616	Casing—Control Wire (72" Long) Note: If Longer Casing is Required, Specify Length; If Shorter Casing is Needed, Order No. 65616 and Cut to Required Length.				347	493521	Switch—Stop
						351	805169	Screw—Hex. Head
						351A	805762	Screw—Hex. Hd. Sem
						353	92791	Washer—Lock (Internal Tooth)
						354	805496	Nut—Nylock
						356	807594	Wire—Ground (Cyl. #1)
						356A	807593	Wire—Ground (Cyl. #2)
						356B	493863	Wire—Ground
						356C	493864	Wire—Ground
						357	91540	Key—Pulley
						358	807640	Gasket Set
						363	19203	Puller—Flywheel
						370	805484	Washer—Screw (Used Before Code Date 90111500).
						373	805383	Nut—Hex.
						383	19374	Wrench—Spark Plug
						387	491922	Pump—Fuel
						423	805260	Screw—Sem
						445	394018	Cartridge—Air Cleaner
						445A	393957	Cartridge—Air Cleaner
						455	805153	Hub—Starter
						456	224228	Retainer

* Included in Gasket Set—Part No. 807640.

• Included in Carburetor Overhaul Kit—Part No. 807726.

▲ Included in Valve Overhaul Kit—Part No. 807668.

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
459	492431	Dog-Starter	592	805383	Nut-Hex.	851	221798	Terminal-Ignition Cable
461	94463	Screw-Retainer	601	93053	Clamp-Hose	855	492134	Adapter-Air Cleaner
467	491875	Knob-Air Cleaner	605	222934	Bracket-Solenoid Mtg.	862	807796	Bracket-Air Cleaner
467A	212706	Knob-Air Cleaner	608	491017	Starter Assy.-Rewind	862A	807563	Bracket-Air Cleaner
474	393295	Stator-Alternator (Dual Circuit)	613	805158	Screw-Sem	862B	492133	Strap-Air Cleaner
474A	392595	Stator Alternator (Tri-Circuit)	613A	805704	Screw-Hex. Head	863	805610	Bracket-Muffler Mtg.
478	805636	Panel-Keyswitch	614	805417	Pin-Cotter	864	805083	Liner-Exhaust Port
478A	805626	Panel-Switch (Used on Type Nos. Below 0300 With Keyswitch).	616	807596	Fork-Governor	865.1	807658	Cover-Air Guide (Cyl. #1, Black)
501	394890	Regulator-Alternator	620	494052	Control-Governor			Note: 807650 Cover-Air Guide (Cyl. #1, Red)
501A	491546	Regulator	634	805416	Washer-Gov. Shaft	865.2	807659	Cover-Air Guide (Cyl. #2, Black)
510	490421	Drive Assembly	634A	•805557	Collar-Throttle			Note: 807651 Cover-Air Guide (Cyl. #2, Red)
513	398003	Clutch Assembly	634B	•805543	Collar-Choke			
515	262565	Spring-Dog	635	805529	Elbow-Spark Plug			
515A	262564	Spring-Torsion	642	807862	Cover Assy.- Air Cleaner			
520	807527	Terminal-Ground	643	805631	Plate-Air Cleaner			
523	807585	Dipstick	643A	224198	Cup-Air Cleaner			
524	805259	Seal-Filler Tube	657	805009	Screw-Sem	866	807660	Valley Cover-Air Guide (Black)
525	807584	Tube-Oil Filler	664	93872	Screw-Bracket Mtg.			Note: 807652 Valley Cover-Air Guide (Red)
526	805448	Screw-Mtg.	668	805402	Spacer			
526A	805535	Screw-Hex. Head (Used After Code Date 90021100).	676	393761	Deflector-Exhaust	868	805094	Seal-Valve Guide
	Note: 810084	Screw-Hex. Head (Used Before Code Dste 90021200).	676A	397630	Deflector-Exhaust	869	805085	Seat-Intake Valve
527	223167	Clamp-Wire	688	805485	Cap-Spring	870	805086	Seat-Exhaust Valve
535	271271	Element-Foam	718	805103	Dowel-Crankcase	871	805084	Guide-Valve
535A	271794	Element-Foam	718A	805102	Dowel-Cylinder Head	876	490467	Gear Kit
537	805655	Gasket-Air Cleaner	718B	805613	Pin-Pilot	877	393537	Connector Assembly
537A	•805003	Gasket-Air Cleaner	722	805482	Seal-Breather Screw (Used Before Code Date 90111500).	878	393422	Alternator Harness Assemlly
539	221372	Clip-Control Rod	722A	805483	Seal-Breather Screw	879	805369	Cover-Carburetor Used on Type Nos. Below 0300 Without Keyswitch.
539A	94484	Clamp-Rod	725	805702	Shield-Heat			
542	94504	Screw-Hex. Head	726	807805	Gear-Flywheel Ring			
544	490309	Armature Assembly	727	805505	Shield-Starter (Black)			
549	94249	Washer-Air Cleaner		Note: 805503	Shield-Starter (Red)	883	•805024	Gasket-Exhaust Manifold
552	805412	Bushing-Gov. Shaft	783	280104	Gear	883A	805502	Flange-Exhaust Manifold
552A	805413	Bushing-Gov. Shaft	788	807685	Bracket-Fuel Pump			
561	92278	Nut-Hex.	795	493625	Switch Assy.-Key Includes: 392832 Key Set	884	807595	Clamp-Muffler
562	805381	Bolt	801	394856	Cap Assembly- Drive End	884A	392649	Clamp-Muffler Pipe
572	805197	Baffle-Breather	802	490310	Cap Assembly- Commutator End	896	94288	Roll Pin
573	807663	Back Plate Assembly (Black)	803	399172	Housing Assembly	920	807829	Solenoid Assembly
	Note: 807655	Back Plate Assembly (Red)	819	805057	Screw-Sem	947	807664	Solenoid
578	493623	Wire Assembly	823	805317	Screw-Mounting	955	807723	Plug-Jet
			826	493624	Harness Assy.-Wire	957	491367	Cap-Fuel Tank
			840	807817	Panel-Ignition	958	399517	Valve-Fuel Shut-Off
			841	393514	Clamp-Reg.	959	492319	Bracket-Fuel Tank
			842	805386	O-Ring	959A	492320	Bracket-Fuel Tank
						960	492318	Bracket-Fuel Tank
						960A	492321	Bracket-Fuel Tank
						961	94536	Screw-Shoulder
						966	807564	Base-Air Cleaner

* Included in Gasket Set-
Part No. 807640.

• Included in Carburetor Overhaul Kit-
Part No. 807726.

▲ Included in Valve Overhaul Kit-
Part No. 807668.

303400 to 303499

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
967	805113	Filter—Air Cleaner	1004A	805363	Tube—Air Inlet Used on Type Nos. Below 0300.	1027	491056	Filter—Oil
968	805359	Cover—Air Cleaner						Note: 492932 Filter—Oil Used on Type No. 0142.
968A	280903	Cover—Air Cleaner	1014	807797	Shield Assy.—Carb. Inlet	1028	805292	Adapter—Oil Filter
969	807565	Screw—Air Cleaner Mtg.	1014A	805370	Deflector—Breather (A.C.)			Note: 807755 Adapter— Oil Filter (For Horizontal Mounted Oil Filter)
971	805405	Screw—Air Cleaner Base	1022	★805028	Gasket—Valve Cover	1028A	807689	Cover—Oil Filter Bypass
972	492369	Tank Assy.—Fuel	1023	805100	Cover—Valve Note: 807665 Cover—Valve Used on Cyl. #1 Fuel Pump Applications.	1029	807557	Arm—Rocker
978	★805250	Gasket—Oil Filter Adapter	1024	807644	Oil Pump Assembly	1030	805342	Shaft—Rocker Arm
978A	805229	Gasket—Bypass Cover	1025	805313	Slider—Governor	1031	805341	Support—Rocker Arm
982	805030	Screw—Sem	1026	805352	Rod—Push Note: 805617 Rod—Push Used on Exhaust Side Only.	1033	807668	Overhaul Kit—Valve
987	●805544	Seal—Shaft				1036	807688	Gasket Set—Breather
991	805267	Pre—Filter				1038	492374	Rod—Fuel Shut-Off
994	392390	Arrester—Spark						
1003	490316	Brush Spring Set						
1004	805632	Tube—Air Inlet Used on Type Nos. Above 0300.						

★ Included in Gasket Set—
Part No. 807640.

● Included in Carburetor Overhaul Kit—
Part No. 807726.

▲ Included in Valve Overhaul Kit—
Part No. 807668.

HYDRAULIC COMPONENT LIST

<u>Description</u>	<u>Part #</u>	<u>Page #</u>
Prince Filter	FA-10.....	73
Pump	SP-20A14.....	74
Motor	MG-201813	76
Rex Roth Solenoid	4W-E10-G5X/AG12NDAV	78
Shear Flow Divider	RD-400.....	90
Adjustable Flow Control	RD-100.....	91
Shear Cylinder	LH-2 1/2 CO2-4.....	92
Pressure Relief	RD-1875S	94



FA SERIES LINE TYPE HYDRAULIC OIL FILTER

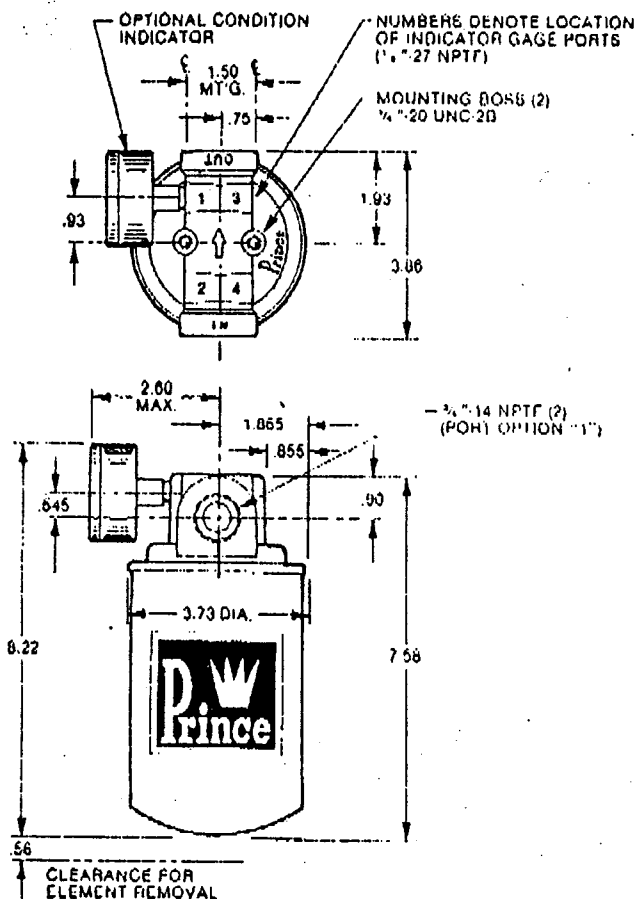
SPECIFICATIONS

Max. Working Pressure 150 PSI
 Flow Up to 20 GPM
 Operating Temperature -65°F to 250°F
 Filter Head Material Cast Aluminum
 Gasket Material Buna N
 Shipping Wt. 2 Lbs.

FEATURES

- Spin-on type filter element interchangeable with Cross and Gresen. See reverse side for additional interchange information
- Standard elements available with 10 or 25 Micron Phenol Coated Paper. 100 mesh suction strainer elements also available
- Filter condition indicator available
- Compatible with all petroleum base fluids
- The Prince FA Series Line Type Hydraulic Filter is a high quality, low cost filtration device for use on systems with flows up to 20 GPM. A built in bypass valve is incorporated in the rugged aluminum housing
- For return line applications, a 15 PSI bypass spring is standard, with a 5 PSI spring available for suction line applications

DIMENSIONAL INFORMATION



DIMENSIONS ARE IN INCHES, REFERENCE ONLY

PRINCE MANUFACTURING CORPORATION

SIoux CITY, IOWA 51102

PH. 712-277-4061 FAX 712-277-8538

FOR YOUR CLOSEST STOCKING DISTRIBUTOR, CONTACT:

PRINCE DISTRIBUTOR SERVICES, INC.

P. O. BOX 814

SOUTH SIOUX CITY, NE 68776

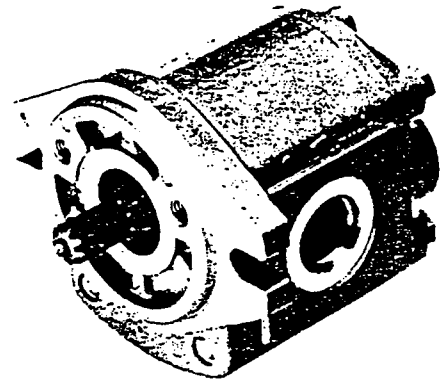
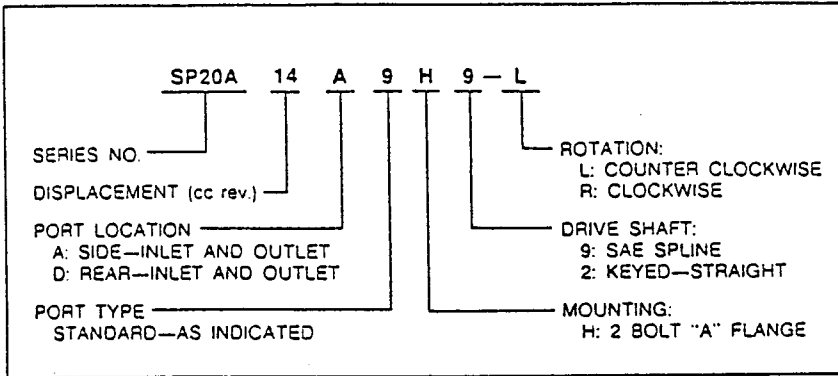
PH. 402-494-6165 FAX 402-494-6941

SERVICE COMPONENTS

PART NUMBER	DESCRIPTION
FA10	10 MICRON ELEMENT
FA25	25 MICRON ELEMENT
FA150	150 MICRON ELEMENT
270018001	NO BYPASS KIT
270018002	5 PSI BYPASS KIT
270018003	15 PSI BYPASS KIT
270018004	25 PSI BYPASS KIT
180900669	0-200 PSI RETURN LINE GAGE
180900778	0-30" VACUUM GAGE

SP-20A SERIES

MODEL NO. CODING



SPECIFICATIONS

MODEL NUMBER	DISPL. IN ³ /REV.	RATED PRESSURE	MAX RPM	A	B	INLET PORT			OUTLET PORT			WT.											
						SIZE		FULL THREAD DEPTH	SIZE		FULL THREAD DEPTH												
						SIDE	REAR		SIDE	REAR													
SP20A8	.499	3000	4000	1.834	4.301	1 1/16-12	UN-2B	3/4"	7/8-14	UN-2B	5/8"	5.1											
SP20A9	.589	3000	4000	1.873	4.380	UN-2B			1 5/16-12			UN-2B	UN-2B	5/8"	5.3								
SP20A11	.677	3000	4000	1.913	4.458	UN-2B									UN-2B	UN-2B	UN-2B	5/8"	5.5				
SP20A14	.860	3000	4000	1.992	4.616	UN-2B													UN-2B	UN-2B	UN-2B	5/8"	5.7
SP20A16	.976	3000	4000	2.041	4.714	UN-2B																	UN-2B
SP20A20	1.220	3000	3500	2.149	4.931	1 5/16-12	UN-2B	UN-2B		UN-2B	5/8"												
SP20A23	1.403	2500	3500	2.228	5.088	UN-2B			UN-2B			UN-2B	UN-2B	5/8"									
SP20A27	1.654	2500	3500	2.336	5.305	UN-2B									UN-2B	UN-2B	UN-2B	5/8"					

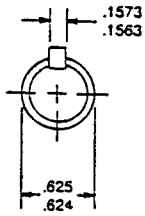
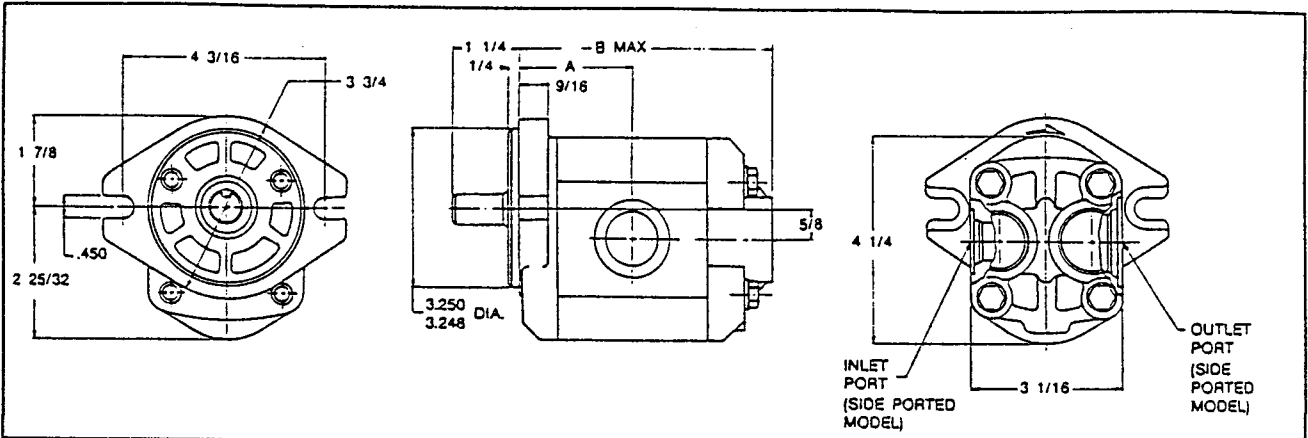
DOUBLE PUMPS (L or R Rotation)

MODEL	DESCRIPTION
SPD2020	SP20 FRONT PUMP SP20 REAR PUMP
SPD2525	SP25 FRONT PUMP SP25 REAR PUMP
SPD2520	SP25 FRONT PUMP SP20 REAR PUMP

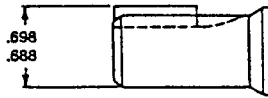
Available in all combinations of standard displacements, keyed or splined drive shaft.

(Consult Factor For Pump Configurations Not Listed).

DIMENSIONS-SP-20A SERIES



KEYED SHAFT



SPLINE SHAFT

9T
16/32 DP
30° PA
FLAT ROOT SIDE FIT

TYPICAL PERFORMANCE DATA

MODEL		RPM								PRESSURE (PSI)
		500	1000	1500	2000	2500	3000	3500	4000	
SP20A8	FLOW (GPM)	.88	1.91	2.97	4.04	5.10	6.16	7.27	8.33	3000
	INPUT HORSE POWER	2.23	4.38	6.53	8.83	11.13	13.57	16.17	18.69	
SP20A9	FLOW (GPM)	1.03	2.30	3.52	4.75	5.97	7.19	8.46	9.74	
	INPUT HORSE POWER	2.61	5.03	7.54	10.14	12.84	15.54	18.43	21.31	
SP20A11	FLOW (GPM)	1.27	2.74	4.16	5.63	7.05	8.51	9.98	11.40	
	INPUT HORSE POWER	2.98	5.77	8.75	11.63	14.80	17.87	21.12	24.38	
SP20A14	FLOW (GPM)	1.61	3.36	5.19	7.01	8.91	10.74	12.56	14.39	
	INPUT HORSE POWER	3.68	7.09	10.51	14.19	18.00	21.68	25.49	29.43	
SP20A16	FLOW (GPM)	1.80	3.82	5.87	7.93	9.98	12.11	14.24	16.22	
	INPUT HORSE POWER	4.01	7.86	11.87	15.87	20.17	24.33	28.78	34.12	
SP20A20	FLOW (GPM)	2.35	4.92	7.49	10.05	12.70	15.26	17.76		
	INPUT HORSE POWER	5.21	9.98	14.89	20.10	25.16	30.52	35.73		
SP20A23	FLOW (GPM)	2.80	5.72	8.73	11.60	14.68	17.61	20.55		2500
	INPUT HORSE POWER	5.06	9.68	14.44	19.21	24.27	29.48	34.54		
SP20A27	FLOW (GPM)	3.30	6.90	10.47	13.90	17.52	20.94	24.46		
	INPUT HORSE POWER	5.98	11.59	17.20	23.00	28.98	34.78	41.13		

Typical Performance Data Based on 140 SUS
Oil at 120° F.

MAG Service Parts List Chart

CHART USE EXAMPLE: MAG06001 TOROMOTOR™ INCLUDES PART NUMBERS LISTED TO THE RIGHT OF MAG, 06- AND -001 SHOWN IN LEFT HAND COLUMN OF CHART.

NOTE: REFER TO INDIVIDUAL SERVICE PARTS LIST FOR TOROMOTORS NOT COVERED IN THIS CHART.

EXPLODED VIEW ITEM #	2	3	4	6 & 7
DESCRIPTION	End Cover Assy.	Washer	Seal Ring (2)	Commutator Set
MAG- SERVICE PART /	402364-A1	028395	032582	MAG014000A2
EXPLODED VIEW ITEM #	8	10	14	15
DESCRIPTION	Manifold	Wearplate	Thrust Bearing	Thrust Washer
MAG- SERVICE PART /	MAC015000	477255	066980	400108
EXPLODED VIEW ITEM #	16	17	19* **	20* **
DESCRIPTION	Seal	Spacer	Retaining Ring	Needle Bearing
MAG- SERVICE PART /	032377	028414	401369	065067
EXPLODED VIEW ITEM #	1	5	9	11
DESCRIPTION	Special Bolts (7)	Sleeve	Rotor Set	Drive Link
04- SERVICE PART /	021311	099094	MAC047000	MAC043000A1
06- SERVICE PART /	021311	099061	MAC067000	MAC063000A1
08- SERVICE PART /	021306	099060	MAC087001	MAC083000A1
14- SERVICE PART /	021307	099093	MAC147000	MAC143000A1
16- SERVICE PART /	021307	099059	MAC167001	MAC163000A1
20- SERVICE PART /	021358	099099	MAC207001	MAG203000A1
24- SERVICE PART /	021308	099058	MAC247001	MAC243000A1
32- SERVICE PART /	021310	099057	MAC327000	MAC323000A1
EXPLODED VIEW ITEM #	12	13	18* **	18.1**
DESCRIPTION	Coupling Shaft	Woodruff Key	Housing Assy.	O-Ring (2)
-001 SERVICE PART /	091417	G124553	MAG012003A1	
-002 SERVICE PART /	091417	G124553	MAG012001A1	
-003 SERVICE PART /	091417	G124553	MAG012005X1	032200-10
-004 SERVICE PART /	091417	G124553	MAG012004X1	032200-10
-005 SERVICE PART /	091417	G124553	MAG012002A1	
-006 SERVICE PART /	091417	G124553	MAG012000A1	
-007 SERVICE PART /	091436		MAG012003A1	
-008 SERVICE PART /	091436		MAG012002A1	
-009 SERVICE PART /	091436		MAG012005X1	032200-10
-010 SERVICE PART /	091436		MAG012004X1	032200-10
-011 SERVICE PART /	091436		MAG012001A1	
-012 SERVICE PART /	091436		MAG012000A1	
-013 SERVICE PART /	091430		MAG012003A1	

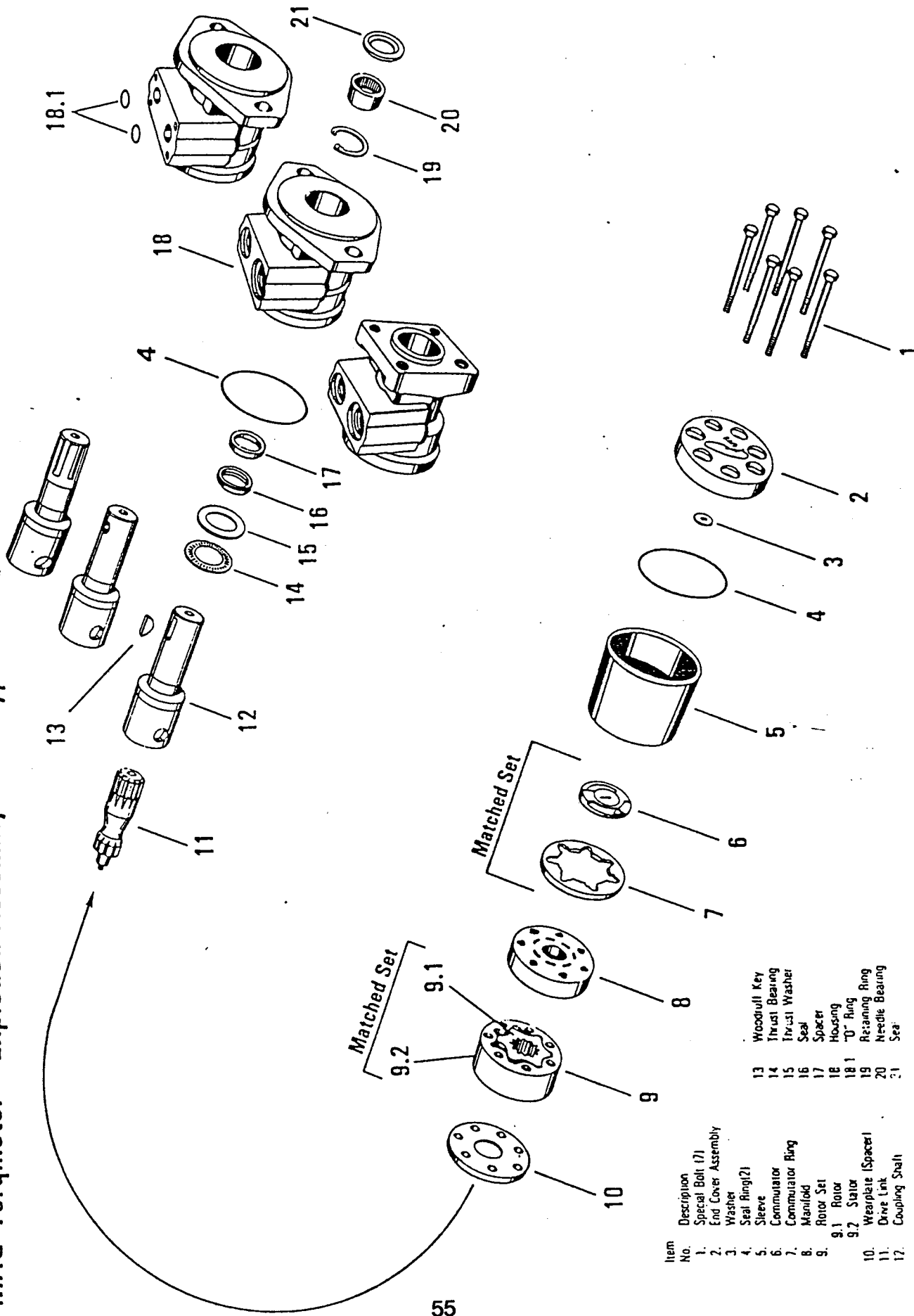
EXPLODED VIEW ITEM #	12	13	18* **	18.1**
DESCRIPTION	Coupling Shaft	Woodruff Key	Housing Assy.	O-Ring (2)
-014 SERVICE PART /	091430		MAG012002A1	
-015 SERVICE PART /	091430		MAG012005X1	032200-10
-016 SERVICE PART /	091430		MAG012004X1	032200-10
-017 SERVICE PART /	091430		MAG012001A1	
-018 SERVICE PART /	091430		MAG012000A1	
-022 SERVICE PART /	091446		MAG012003A1	
-024 SERVICE PART /	091446		MAG012005X1	032200-10
-025 SERVICE PART /	091446		MAG012000A1	
-026 SERVICE PART /	091440	G124553	MAG012003A1	
-027 SERVICE PART /	091440	G124553	MAG012001A1	
-028 SERVICE PART /	091440	G124553	MAG012005X1	032200-10
-029 SERVICE PART /	091440	G124553	MAG012000A1	
-031 SERVICE PART /	091446		MAG012001A1	
-035 SERVICE PART /	091454		MAG012000A1	
-036 SERVICE PART /	091446		MAG012002A1	
-043 SERVICE PART /	091454		MAG012005X1	032200-10
-044 SERVICE PART /	091454		MAG012003A1	
-045 SERVICE PART /	091454		MAG012002A1	

NOTES: Seal Kit MAC500001 includes items #16, #17, #21, and two of item #4.

*Service Housing Assy. item #18, with part number suffix A1 also includes items #19, #20.

**Service Housing Assy. item #18 with part number suffix X1 also includes item #19, #20, and two of item #18.1.

MAG Torqmotor™ Exploded Assembly View-Typical



Item No.	Description
1	Special Bolt (7)
2	End Cover Assembly
3	Washer
4	Seal Ring(2)
5	Sleeve
6	Commutator
7	Commutator Ring
8	Manifold
9	Rotor Set
9.1	Rotor
9.2	Stator
10	Wearplate (Spacer)
11	Drive Link
12	Coupling Shaft
13	Woodruff Key
14	Thrust Bearing
15	Thrust Washer
16	Seal
17	Spacer
18	Housing
18.1	"U" Ring
19	Retaining Ring
20	Needle Bearing
21	Seal

**MANNESMANN
REXROTH**

4/3-, 4/2- und 3/2-Wegeventile,
mit in Öl schaltenden Gleich- oder Wechselspannungs-
magneten, Typ WE 6, NG 6, Serie 5X
4/3-, 4/2- and 3/2-way Directional Valves, with Oil Immersed
AC or DC Solenoids, Type WE 6, Size 6, Series 5X

RDE
23 177-E/04.89
Ersetzt/Replaces:
RD 23 177-E/09.82

2 3 4 6 7 9 10 11 12 15 16 18 19 22 23

	WE	6		5X	/							/				*
--	----	---	--	----	---	--	--	--	--	--	--	---	--	--	--	---

3 Nutzan­schlüsse = 3
4 Nutzan­schlüsse = 4

Schaltzeichen z.B. C, E, EA, EB usw.
mögliche Ausführungen siehe Seite 11

Serie 50 bis 59 = 5X
(50 bis 59 = unveränderte Einbau- und Anschlußmaße)

Federrückstellung = ohne Bez.
ohne Federrückstellung = O
ohne Federrückstellung mit Raste = OF
(nicht möglich bei Standardmagnet "A" mit Wechselspannung)

Standardmagnet (in Öl schaltend) = A
Hochleistungsmagnet (in Öl schaltend) = B

Gleichspannung 24V = G24
Gleichspannungsmagnet mit eingebautem Gleichrichter
für Wechselspannung 220V frequenzunabhängig = W 220 R
(nur für Spannungen $\geq 110V$ und mit Stecker Z5)

Wechselspannung 220V - 50Hz = W 220 - 50
(Standardmagnete "A")
Wechselspannung 220V = W 220
(Hochleistungsmagnete "B")

ohne Notbetätigung = ohne Bez.
mit Notbetätigung = N
mit verdeckter Notbetätigung = N9

elektr. Anschlußarten nach Katalogblatt RD 08 000

Einzelanschluß		Zentralanschluß	
Würfelstecker DIN 43 650 = Z4		Klemmkasten mit Kabelverschraubung Pg 16 = D	
großer Würfelstecker = Z5		Klemmkasten mit Kabelverschraubung Pg 16 und Lampe(n) = DL	
großer Würfelstecker mit Lampe = Z5L		Klemmkasten mit Winkelstecker = DZ	
		Klemmkasten mit Winkelstecker und Lampe(n) = DZL	

Zusatz­aus­rüs­tung - induktiver Ends­chal­ter nach Katalogblatt RD 24 830
(nur möglich bei Ventilen mit 1 Magnet)

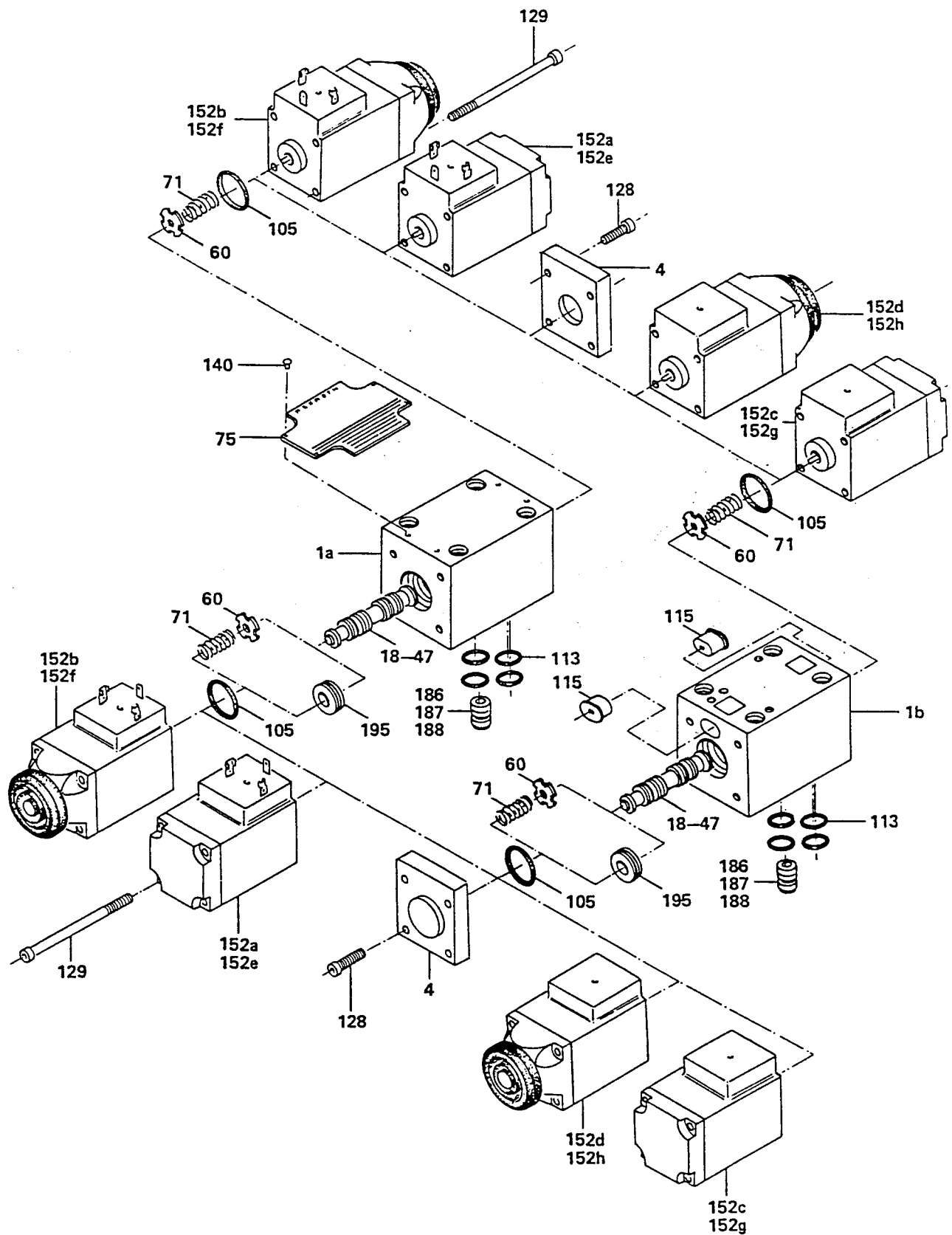
Schalt­sch­tel­lung "a" über­wacht = QAG24 Schalt­sch­tel­lung "O" über­wacht = QOG24
Schalt­sch­tel­lung "b" über­wacht = QBG24 ohne Ends­chal­ter = ohne Bez.

ohne Schaltzeitverzögerung = ohne Bez.
Schaltzeitverzögerung (nur für Gleichspannungsmagnete und Elektroanschluß Z4, Z5 möglich) = C

ohne Einsteck-Drossel = ohne Bez. Drossel- \emptyset 1,0mm = B10 Einsatz bei Durchflußmengen > Leistungs-
Drossel- \emptyset 0,8mm = B08 Drossel- \emptyset 1,2mm = B12 grenze des Ventils, wirksam im P-Kanal

NBR-Dichtungen, geeignet für Mineralöl (HL, HLP) gemäß DIN 51 524 = ohne Bez.
FPM (Viton)-Dichtungen, geeignet für Phosphorsäure-Ester (HFD-R) = V

weitere Angaben im Klartext

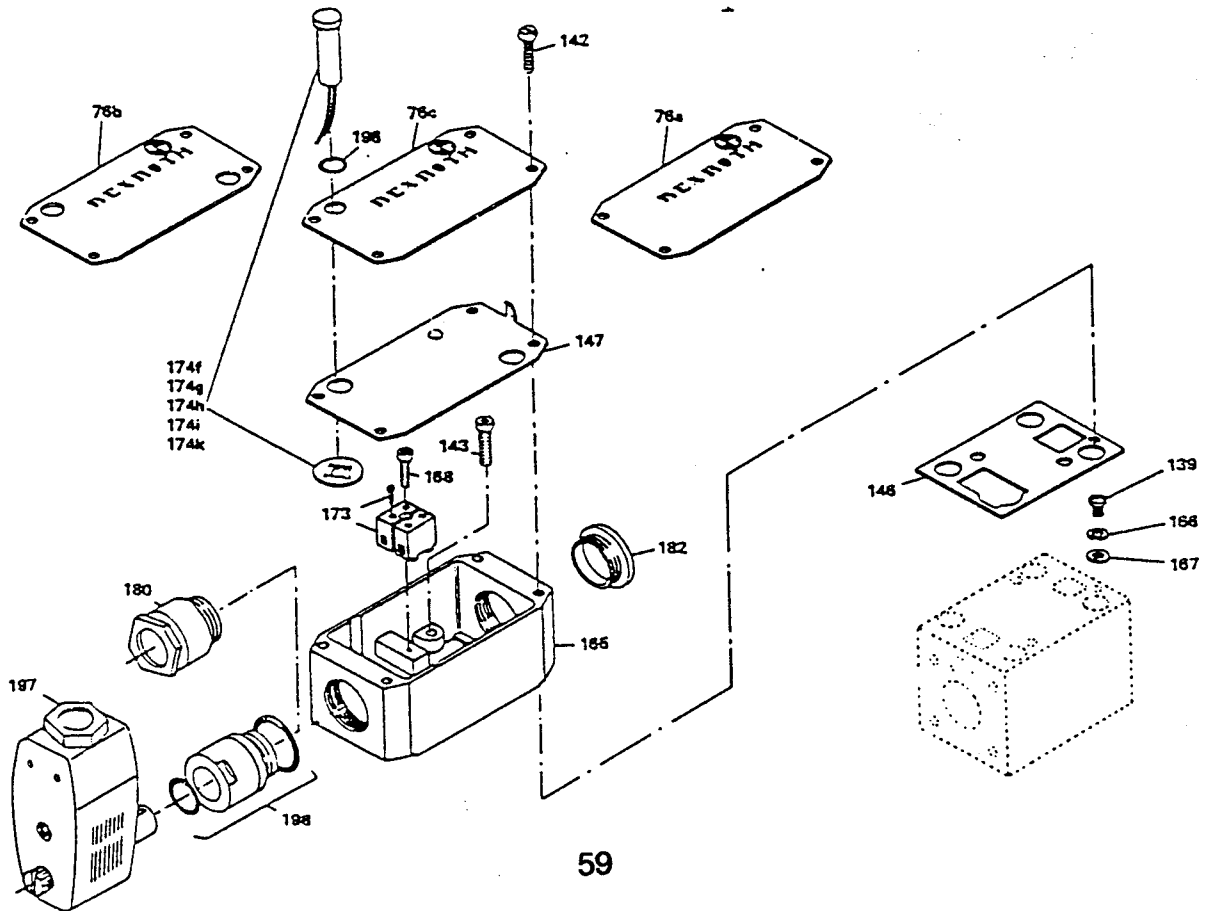


SERIE 51

Nr. Item	Benennung Description		Bestellnummer Part-No.	DIN DIN	Abmessungen Dimensions	WE6 51/...Z4	WE6 51/...Z5	WE6 51/...D	WE6 51/W., RZ5	WE6 51/...Z5L	WE6 51/...DL	WE6 51/...DZ	WE6 51/...DZL
76a	Typenschild	Identification plate	001448		RN177.63-1			1					
76b	Typenschild	Identification plate	001449		RN177.70-1						1	1	1
76c	Typenschild	Identification plate	001573		RN177.79-1						1	1	1
139	Flachkopfschraube	Low head screw	005514	85	M4 x 6		1					1	1
142	Flachkopfschraube	Low head screw	007090	85- 4.8	M4 x 16 x 6			4			4	4	4
143	Zylinderschraube	S.H.C.S.	001649	912- 8.8	M4 x 15			2			2	2	2
146	Dichtung	Seal	149807				1				1	1	1
147	Dichtung mit Band	Seal with string	307619				1				1	1	1
153	Gleichrichter	Rectifier	008885					2					
165	Deckel	Cover	152070						2				
166	Sicherungsscheibe	Retaining washer	004191		4,0			1			1	1	1
167	Scheibe	Washer	003834	433	4,3			1			1	1	1
168	Zylinderschraube	Cylindrical tap	006767	7513	M3 x 16			2			2	2	2
169	Würfelstecker (a)	Plug - in connector (a)	008908				1						
170	Würfelstecker (b)	Plug - in connector (b)	008909				1						
171	Gr. Würfelstecker (a)	Large plug - in connector (a)	008616				1			1			
172	Gr. Würfelstecker (b)	Large plug - in connector (b)	009129				1			1			
173	Klemmstein	Terminal clip	006764					2			2	2	2
174a	Lampe	Lamp	008618		130-110V								
174b	Lampe	Lamp	008619		180-240V								
174c	Lampe	Lamp	008617		24V								
174d	Lampe	Lamp	009601		42-60V								
174e	Lampe	Lamp	009600		12V								
174f	Lampe m. Haltering	Lamp w. retaining ring	001582		180-240V						2	2	2
174g	Lampe m. Haltering	Lamp w. retaining ring	001581		130-110V						2	2	2
174h	Lampe m. Haltering	Lamp w. retaining ring	001580		42-60V						2	2	2
174i	Lampe m. Haltering	Lamp w. retaining ring	001579		24V						2	2	2
174k	Lampe m. Haltering	Lamp w. retaining ring	001578		12V						2	2	2
180	Kabelverschraubung	Screw type conduit fitting	005547					1					
182	Verschlußstopfen	Blanking plug	005545					1			1	1	1
197	Kuppelungsstecker	Coupling plug	005538								1	1	1
198	Einbaudose	Socket	005537								1	1	1
Dichtungssätze, Elemente nicht einzeln lieferbar			Seal kits, elements not available separately										
			NBR	Viton									
Dichtungssatz bestehend aus**			314087	314088									
196	O - Ring	O - ring	001042		8 x 1							2	2

* 1 Stück bei 2 Pos. Ventilen (1 Magnet)
 ** weitere Elemente siehe Seite 2

* 1 piece for 2 pos. valves (1 solenoid)
 ** for further elements see page 2

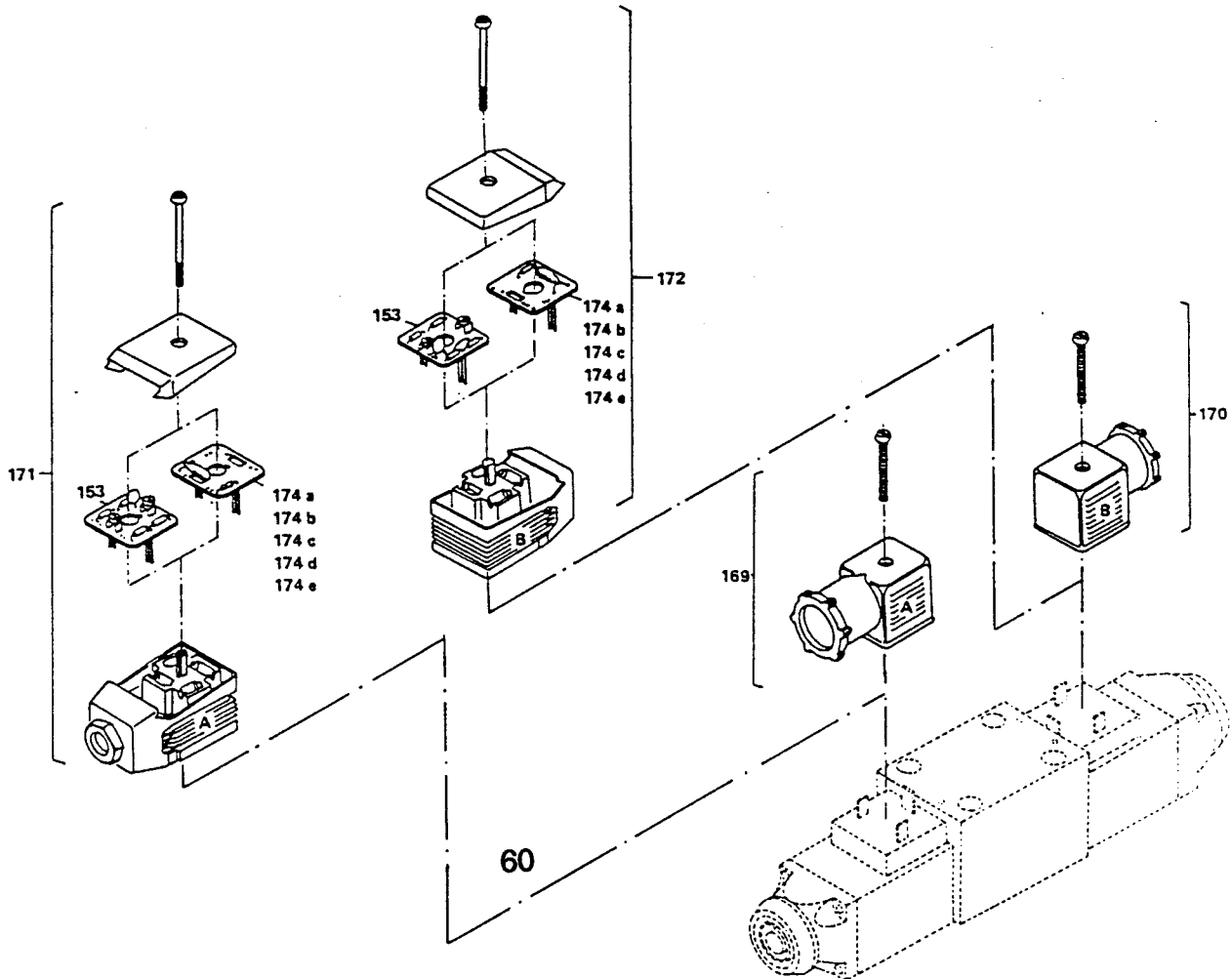


SERIE 51

Nr.	Benennung	Bestellnummer	DIN	Abmessungen	WE6 51/...Z4	WE6 51/...Z5	WE6 51/...D	WE6 51/W..RZ5	WE6 51/...Z5L	WE6 51/...DL	WE6 51/...DZ	WE6 51/...DZL
Item	Description	Part-No.	DIN	Dimensions								
76a	Typenschild	Identification plate	001448									
76b	Typenschild	Identification plate	001449									
76c	Typenschild	Identification plate	001573									
139	Flachkopfschraube	Low head screw	005514	85								
142	Flachkopfschraube	Low head screw	007090	85-4.8								
143	Zylinderschraube	S.H.C.S.	001649	912-8.8								
146	Dichtung	Seal	149807									
147	Dichtung mit Band	Seal with string	307619									
153	Gleichrichter	Rectifier	008885									
165	Deckel	Cover	152070									
166	Sicherungsscheibe	Retaining washer	004191									
167	Scheibe	Washer	003834	433								
168	Zylinderschraube	Cylindrical tap	006767	7513	4.0							
169	Würfelstecker (a)	Plug - in connector (a)	008908									
170	Würfelstecker (b)	Plug - in connector (b)	008909									
171	Gr. Würfelstecker (a)	Large plug - in connector (a)	008616									
172	Gr. Würfelstecker (b)	Large plug - in connector (b)	009129									
173	Klemmstein	Terminal clip	006764									
174a	Lampe	Lamp	008618		130-110V							
174b	Lampe	Lamp	008619		180-240V							
174c	Lampe	Lamp	008617		24V							
174d	Lampe	Lamp	009601		42-60V							
174e	Lampe	Lamp	009600		12V							
174f	Lampe m. Haltering	Lamp w. retaining ring	001582		180-240V							
174g	Lampe m. Haltering	Lamp w. retaining ring	001581		130-110V							
174h	Lampe m. Haltering	Lamp w. retaining ring	001580		42-60V							
174i	Lampe m. Haltering	Lamp w. retaining ring	001579		24V							
174k	Lampe m. Haltering	Lamp w. retaining ring	001578		12V							
180	Kabelverschraubung	Screw type conduit fitting	005547									
182	Verschußstopfen	Blanking plug	005545									
197	Kupplungsstecker	Coupling plug	005538									
198	Einbaudose	Socket	005537									
Dichtungssätze, Elemente nicht einzeln lieferbar		Seal kits, elements not available separately										
		NBR	Viton									
Dichtungssatz bestehend aus**		314087	314088									
196	O - Ring	001042		8 x 1								

* 1 Stück bei 2 Pos. Ventilen (1 Magnet)
 ** weitere Elemente siehe Seite 2

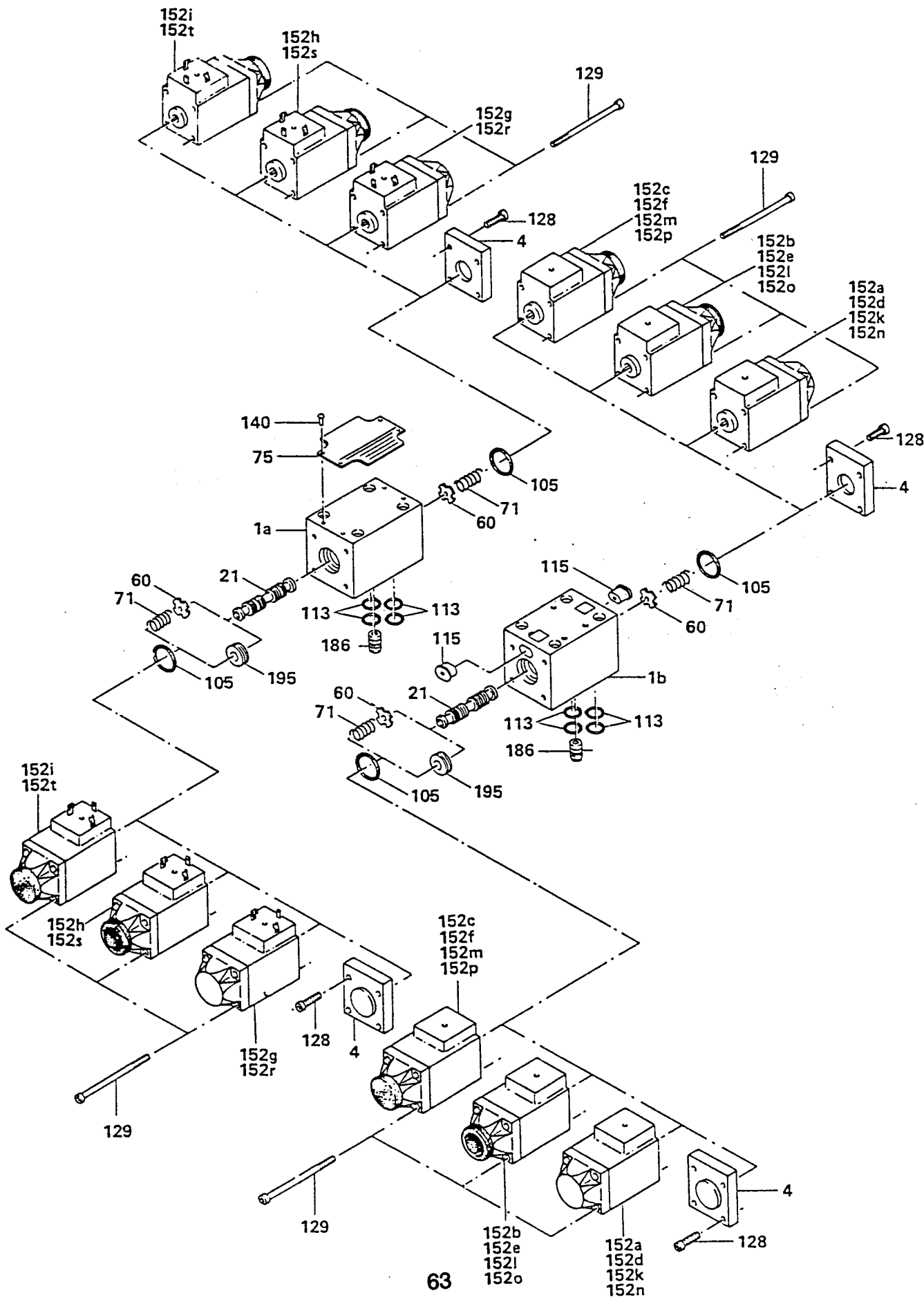
* 1 piece for 2 pos. valves (1 solenoid)
 ** for further elements see page 2



SERIE 52
SERIES 52

Nr. Item	Benennung Description	Bestellnummer Part-No.	Bestellnummer/USA Part-No./USA	DIN DIN
1 a	Gehäuse "Z"	Housing "Z"	153194	
1 b	Gehäuse "D"	Housing "D"	624760	
4	Deckel	Cover	152060	
21	Kolben	Piston	149813	
	Kolben	Piston	317499	
	Kolben	Piston	317456	
	Kolben	Piston	149815	
	Kolben	Piston	149814	
	Kolben	Piston	149818	
	Kolben	Piston	151137	
	Kolben	Piston	149819	
	Kolben	Piston	317585	
	Kolben	Piston	317493	
	Kolben	Piston	150266	
	Kolben	Piston	149823	
	Kolben	Piston	152073	
	Kolben	Piston	149816	
	Kolben	Piston	150263	
	Kolben	Piston	149811	
	Kolben	Piston	152069	
	Kolben	Piston	150264	
	Kolben	Piston	149824	
	Kolben	Piston	149822	
	Kolben	Piston	149821	
	Kolben	Piston	149820	
60	Scheibe	Washer	149806	
71	Druckfeder	Compression spring	011180	
	Druckfeder	Compression spring	001486	
	Druckfeder	Compression spring	001488	
	Druckfeder	Compression spring	001487	
75	Typenschild "Z"	Identification plate "Z"	008745	
	Typenschild "Z . 5"	Identification plate "Z . 5"		009279
115	Stopfen	Plug	149809	
128	Zylinderschraube	S.H.C.S.	001649	912-8.8
129	Zylinderschraube	S.H.C.S.	008132	912-8.8
140	Karbnagel	Grooved pin	005106	1476-4.6
152 a	Magnet	Solenoid	010262	
152 b	Magnet mit Nothand	Solenoid with emergency switch	010263	
152 c	Magnet mit verdeckter Nothand	Solenoid with concealed emergency switch	010517	
152 d	Magnet	Solenoid		
152 e	Magnet mit Nothand	Solenoid with emergency switch	010538	
152 f	Magnet mit verdeckter Nothand	Solenoid with concealed emergency switch		
152 g	Magnet	Solenoid	010274	
152 h	Magnet mit Nothand	Solenoid with emergency switch	010275	
152 i	Magnet mit verdeckter Nothand	Solenoid with concealed emergency switch	010953	
152 k	Magnet	Solenoid		
152 l	Magnet mit Nothand	Solenoid with emergency switch	010593	
152 m	Magnet mit verdeckter Nothand	Solenoid with concealed emergency switch		
152 n	Magnet	Solenoid		
152 o	Magnet mit Nothand	Solenoid with emergency switch		
152 p	Magnet mit verdeckter Nothand	Solenoid with concealed emergency switch		
152 r	Magnet	Solenoid		
152 s	Magnet mit Nothand	Solenoid with emergency switch		
152 t	Magnet mit verdeckter Nothand	Solenoid with concealed emergency switch		
186	Blende	Orifice	152065	
	Blende	Orifice	152066	
	Blende	Orifice	152067	
195	Raste	Detent	318001	
Dichtungssätze, Elemente nicht einzeln lieferbar			Seal kits, elements not available separately	
	Dichtungssatz bestehend aus:	Seal kit consisting of:	NBR 314087	FPM 314088
105	O-Ring	O-ring	009193	009193
113	O-Ring	O-ring	007111	009097

15,6 x 1,73
9,25 x 1,78

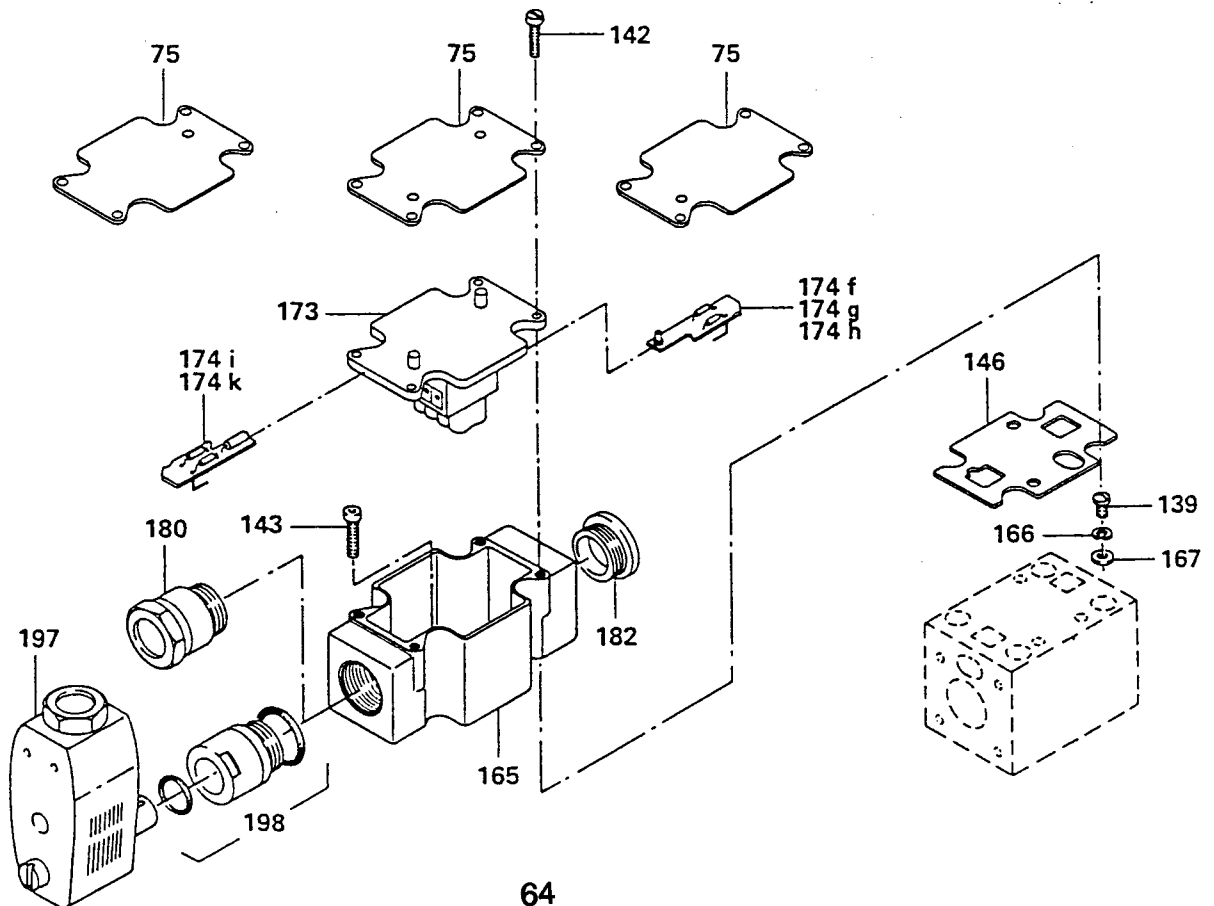


SERIE 52
SERIES 52

Nr. Item	Benennung Description	Bestellnummer Part-No.	Bestellnr./USA Part-No./USA	DIN DIN	Abmessungen Dimensions	. WE 6 . 5X/ D WE 6 . 5X/ DL WE 6 . 5X/ DZ WE 6 . 5X/ DZL	Teileänderung bei USA-Ausführung parts alteration for US - model
75	Typenschild „D“ Typenschild „DA“ Typenschild „DL“ Typenschild „DAL“	005708	01 7290			1	1			1
	Identification plate „D“ Identification plate „DA“ Identification plate „DL“ Identification plate „DAL“	005709	01 7289			1	1			1
139	Flachkopfschraube	005514		85	M4 x 6	1	1	1	1	
142	Flachkopfschraube	01 7259		85- 4.8	BM3 x 12 x 4	4	4	4	4	
143	Zylinderschraube	001649		912- 8.8	M4 x 15	2	2	2	2	
146	Dichtung	696024				1	1	1	1	
165	Rahmen	697088	697087			1	1	1	1	1
166	Sicherungsscheibe	004191			4,0	1	1	1	1	
167	Scheibe	003834		4333	4,3	1	1	1	1	
173	Trägerplatte	01 7252				1				
	Trägerplatte	01 7253				1				
174 f	Lampe	01 7254			GSL 16, 6-12V		2		2	
174 g	Lampe	01 7255			GSL 42, 24-36V		2		2	
174 h	Lampe	01 7256			GSL 75, 42-60V		2		2	
174 i	Lampe	01 7257			WSL 110, 80-110V		2		2	
174 k	Lampe	01 7258			WSL 220, 150-230V		2		2	
180	Kabelverschraubung	005547				1	1			
182	Verschlussstopfen	005545	002437			1	1			1
197	Stecker	005538						1	1	
198	Einbaudose	005537						1	1	

* 1 Stück bei 2 Pos. Ventilen (1 Magnet)

*1 piece for 2 pos. valves (1 solenoid)

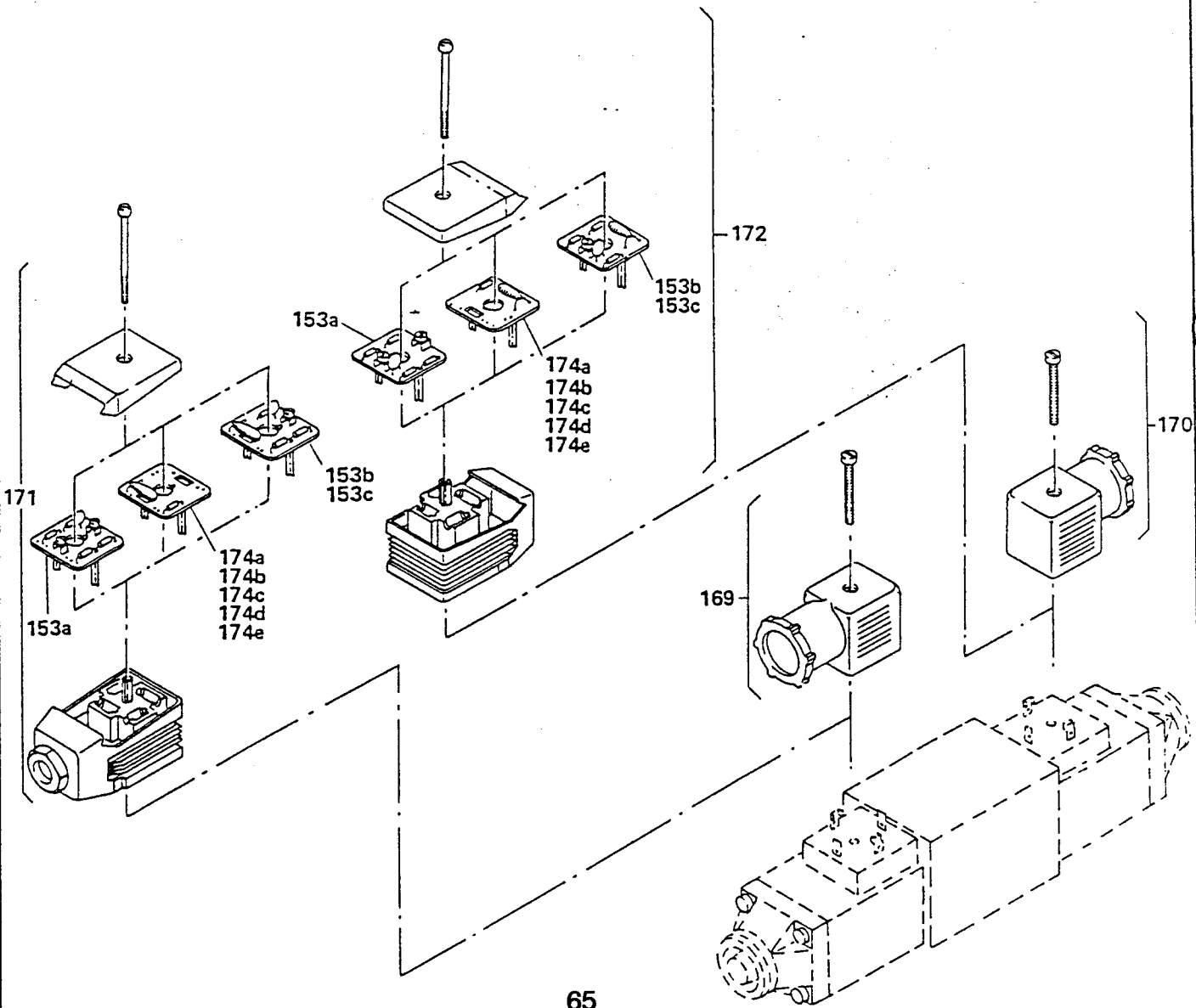


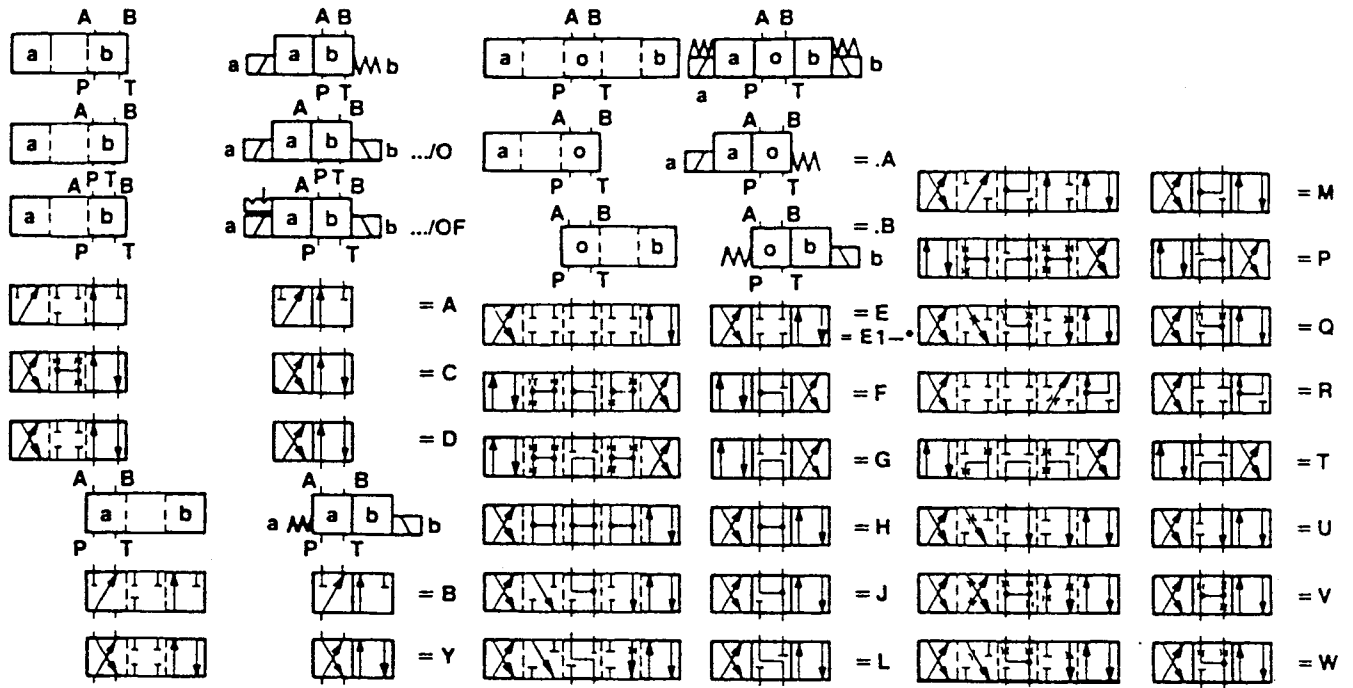
SERIE 52
SERIES 52

Nr.	Benennung		Bestellnummer	Bestellnr./USA	DIN	Abmessungen					
Item	Description		Part-No.	Part-No./USA	DIN	Dimensions					
153 a	Gleichrichter	Rectifier	008885								. 74
153 b	Gleichrichter	Rectifier	003660			GDME-GB1 Lg 110					. 75
153 c	Gleichrichter	Rectifier	003661			GDME-GB1 Lg 220		2			. WE 6 . 5X/ . . . W220 R . Z5L
169	Stecker Z4 (a)	Plug Z4 (a)	008908	004823				1			. WE 6 . 5X/
170	Stecker Z4 (b)	Plug Z4 (b)	008909	011039				1			. WE 6 . 5X/ . . . W220 R . Z5
171	Stecker Z5 (a)	Plug Z5 (a)	008616	004824				1	1	1	. WE 6 . 5X/ . . . W220 R . Z5L
172	Stecker Z5 (b)	Plug Z5 (b)	009129	012651				1	1	1	Teiländerung bei USA-Ausführung parts alteration for US - model
174 a	Lampe	Lamp	008618			130—110V					. WE 6 . 5X/
174 b	Lampe	Lamp	008619			180—240V					. WE 6 . 5X/
174 c	Lampe	Lamp	008617			24V					. WE 6 . 5X/
174 d	Lampe	Lamp	009601			42—60V					. WE 6 . 5X/
174 e	Lampe	Lamp	009600			12V					. WE 6 . 5X/

* 1 Stück bei 2 Pos. Ventilen (1 Magnet)

*1 piece for 2 pos. valves (1 solenoid)





* Schaltzeichen E1- = P → A/B Voröffnung
 Hinweis: Vorsicht wegen Druckübersetzung bei Differentialzylindern

* Spool type E1- = P → A/B opening first
 Note: With single rod cylinders, care must be taken because of possible intensification

2	3	4	6	7	9	10	11	12	15	16	18	19	22	23
	WE	6		5X							/			*

3 Service Ports = 3
 4 Service Ports = 4

Spool symbol e.g. C, E, EA, EB, etc.
 See page 11 for models available

Series 50 to 59 = 5X
 (50 to 59 = externally interchangeable)

Spring returned = no code
 Without springs = O
 Without springs, with detents = OF
 (not possible with standard solenoid type "A" with AC operation)

Standard solenoid (wet pin) = A
 High power solenoid (wet pin) = B

DC, 24 V = G24
 DC Solenoid with built in rectifier
 for 220V AC independent of frequency = W 220 R
 (only for voltages ≥ 110V and with Z5 plug)
 220V AC - 50 Hz = W 220 - 50
 (Standard solenoids "A")
 220V AC = W 220
 (High power solenoids "B")

Without emergency hand operation = no code
 With emergency hand operation = N
 With concealed emergency operator = N9

Electrical connections to RE 08 000

Individual connections

Angled plug to DIN 43 650 = Z4
 Large angled plug = Z5
 Large plug with lamp = Z5L

Central connection

Terminal box with cable gland Pg16 = D
 Terminal box with cable gland Pg16
 and lamp(s) = DL
 Terminal box with angled plug = DZ
 Terminal box with angled plug and lamp(s) = DZL

Auxiliary equipment - inductive limit switch to catalogue sheet RE 24 830
 (only possible for valves with 1 solenoid)

to monitor position "a" = QAG24 to monitor position "O" = QOG24
 to monitor position "b" = QBG24 without limit switch = no code

Without pilot choke adjustment = no code
 With pilot choke adjustment (only possible with DC solenoids and Z4, Z5 plugs) = C

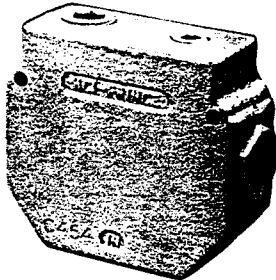
Without throttle insert = no code Throttle dia 1.0mm = B10 For use when flow is greater than
 Throttle dia 0.8mm = B08 Throttle dia 1.2mm = B12 valve capacity, fitted in P line

NBR seals, suitable for mineral oils (HL, HLP) to DIN 51 524 = no code
 FPM (Viton) seals, suitable for phosphate ester (HFD-R) = V

Further details in clear text

CONSTANT VOLUME PRIORITY DIVIDERS

MODEL RD-400 FIXED FLOW PRIORITY DIVIDER



The PRINCE model RD-400 is a constant volume priority divider. It can be used in applications where two circuits are to be supplied by a single pump such as power steering systems. In operation the flow of oil supplied to the inlet is divided into two flows, the priority flow and the excess flow. The priority flow will remain nearly constant with variations in pressure on either the priority or excess flow port and will also remain nearly constant with variations in the inlet flow.

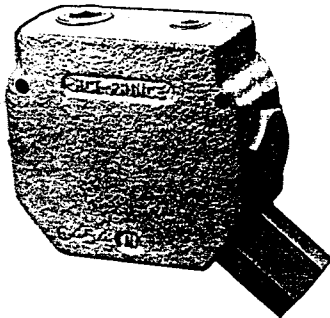
The priority flow GPM is determined by a fixed orifice inside the main spool. The desired priority GPM must be specified with model number, see below. The PRINCE model RD-400R provides the same function as described above with the addition of a built in pressure relief for the priority port only. This relief is internally adjustable and requires a separate line to tank. The relief is factory set at 1500 PSI.

VALVE SPECIFICATIONS:

Capacity: 30 gpm max inlet flow
Pressure: 3000 psi max

Weight: RD-400 7 lbs.
RD-400-R 7.5 lbs.

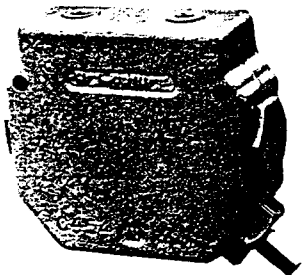
MODEL RD-400R FIXED FLOW PRIORITY DIVIDER WITH PRIORITY PRESSURE RELIEF



STANDARD MODELS AVAILABLE				PRIORITY GPM
VALVE MODEL NUMBER		PORT SIZE		
		INLET AND EXCESS PORT	PRIORITY PORT	
RD-400-___	RD-400R-__	3/4 NPTF	3/8 NPTF	1.5
RD-405-___	RD-405R-__	3/4 NPTF	1/2 NPTF	2
RD-412-___	RD-412R-__	#12 SAE	#8 SAE	3
RD-450-___	RD-450R-__	1/2 NPTF	3/8 NPTF	4
RD-455-___	RD-455R-__	1/2 NPTF	1/2 NPTF	5
RD-477-___	RD-477R-__	3/4 NPTF	3/4 NPTF	6
				7
				8
				9
				10
				12
				14

To complete the model number fill in the blank with the desired priority GPM from the list at right.
EX: RD-400-3 for 3 GPM priority flow; RD-405R-6 for 6 GPM priority flow.

MODEL RD-500 ADJUSTABLE FLOW PRIORITY DIVIDER



The PRINCE model RD-500 is an adjustable constant volume priority divider. This valve provides the same function as the PRINCE model RD-400 except the priority flow is adjustable from 2 GPM to 14 GPM. The priority flow is set using the adjusting screw and is then locked in place to maintain setting. This allows setting to be fine tuned in the field to the exact flow needed.

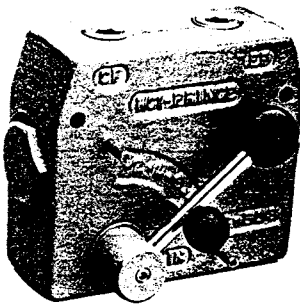
VALVE SPECIFICATIONS:

Capacity: 30 gpm max inlet flow
Pressure: 3000 psi max
Weight: 7 lbs.

STANDARD MODELS AVAILABLE	
VALVE MODEL NUMBER	PORT SIZE
RD-537	3/8 NPTF
RD-550	1/2 NPTF
RD-575	3/4 NPTF

PRESSURE COMPENSATED ADJUSTABLE FLOW CONTROL VALVES

MODEL RD-100 TOP PORT FLOW CONTROL

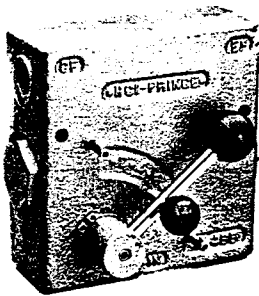


The PRINCE valve models RD-100 and RD-1900 are pressure compensated adjustable flow control valves. By rotating the handle the flow out the "CF" or controlled flow port can be varied within the range given in the chart below. Any remaining flow is bypassed to the "EF" or excess flow port. This flow can be used to power another circuit or can be returned to tank. Once the controlled flow is set it will remain nearly constant with variations in pressure on either the controlled or excess flow ports. Please note, if during operation the controlled flow port is blocked the valve will compensate in such a way as to shut off flow to the excess port.

These valves can also be used as a restrictive flow control by plugging the excess flow port.

The PRINCE valve models RDRS-100 and RDRS-1900 have a built in adjustable pressure relief. For these models the excess flow port **must** be connected to tank.

MODEL RD-1900 SIDE PORT FLOW CONTROL



It should be noted that whenever these or any valve is used to bypass or restrict flow heat will be generated. Steps maybe required to keep oil temperature from becoming to high.

VALVE SPECIFICATIONS:

Capacity: 30 gpm max inlet flow
 Pressure: 3000 psi max
 Weight: RD-100 8 lbs.
 RD-1900 9 lbs.

STANDARD MODELS AVAILABLE

MODEL NUMBER		PORT SIZES	CONTROLLED FLOW RANGE
RD-137-8	RD-1937-8	3/8 NPTF	0-8 GPM
RD-150-8	RD-1950-8	1/2 NPTF	0-8 GPM
RD-150-16	RD-1950-16	1/2 NPTF	0-16 GPM
RD-175-16	RD-1975-16	3/4 NPTF	0-16 GPM
RD-175-30	RD-1975-30	3/4 NPTF	0-30 GPM
RD-108-8	RD-1908-8	#8 SAE	0-8 GPM
RD-112-30	RD-1912-30	#12 SAE	0-30 GPM
RDRS-150-16	RDRS-1950-16	1/2 NPTF	0-16 GPM
RDRS-175-30	RDRS-1975-30	3/4 NPTF	0-30 GPM

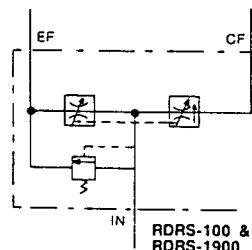
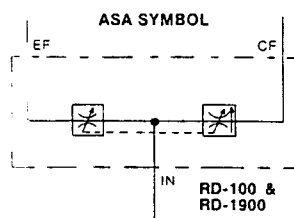
FIELD REPAIR KITS:

Handle hardware kit 660301002
 Seal Kit 660501001

These models have built in relief set at 1500 psi @ 10 GPM.

Special combinations of port size and controlled flow range are available in OEM quantities. Please consult your sales representative.

SYMBOL



REPAIR PARTS SHEET

BASIC PARTS LIST

ITEM NO.	PART NAME	QTY. PER UNIT
1	ROD WIPER	1
2	ROD BEARING	1
3	ROD PACKING	3
4	SUPPORT RING	4
5	BALL	2
6	SPRING	2
7	PIPE PLUG	2
8A	GASKET SERIES "A" ONLY	2
8LH	HEAD TO SHELL "O" RING "LH" ONLY	2
9	PISTON ROD	1
10	CUSHION BUSHING	1
11	PISTON PACKING	2
12	PISTON "O" RING	1
13	PISTON	1
14	PISTON NUT	1
15	SET SCREW	1
16	SHELL	1
17	ADJ. SCREW "O" RING	2
18	CUSHION ADJ. SCREW	2
19	ADJ. SCREW NUT	2

SERIES "A" SQUARE TYPE AIR CYLINDERS
SERIES "LH" LOW PRESSURE HYDRAULIC CYLS.

Models A, B, C, D, E, F, G, J, K, L

When ordering repair parts for LYNAIR SQUARE AIR CYLINDERS, furnish the following information:

- SERIAL NUMBER
- MODEL NUMBER
- PISTON ROD DIAMETER
- BORE
- STROKE

Also specify the parts you need by the item number and FULL part name.

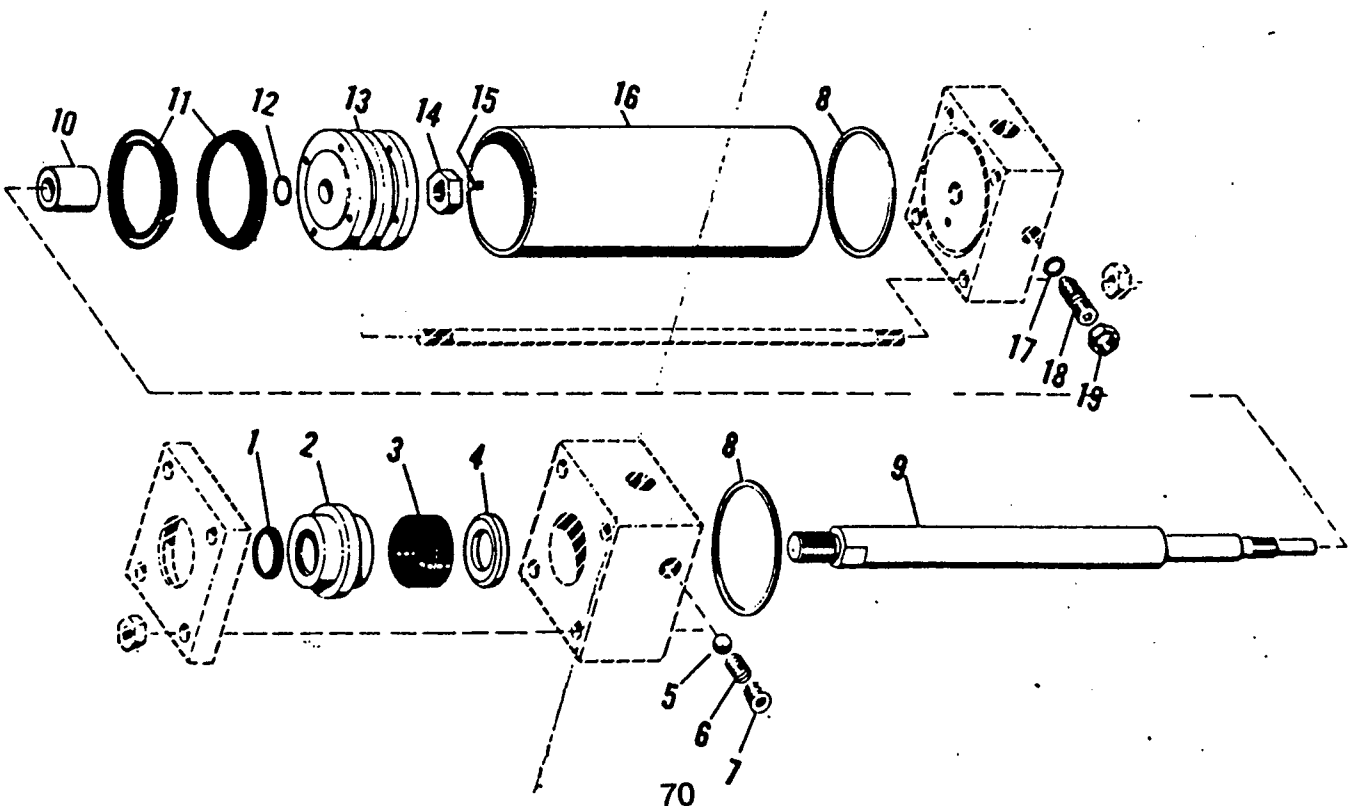
Basic cylinder repair parts are shown in the large illustration. Repair parts suitable only to specific models are shown in the smaller illustrations. Order by letter and FULL part name.

SPECIFIC MODEL PARTS LIST

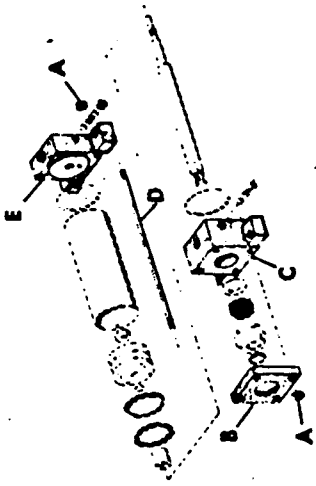
ITEM NO.	PART NAME
A	TIE ROD NUT
B	CAP
C	FOOT MOUNT ROD END HEAD
D	TIE ROD
E	FOOT MOUNT BLIND END HEAD
F	STANDARD ROD END HEAD
G	PIVOT MOUNT BLIND END HEAD
H	FRONT FLANGE MOUNTING PLATE
J	STANDARD BLIND END HEAD
K	REAR FLANGE MOUNTING PLATE
L	FRONT TRUNNION MOUNT ROD END HEAD
M	REAR TRUNNION MOUNT BLIND END HEAD
N	END LUG MOUNT NUT
P	CENTERLINE MOUNT ROD END HEAD
R	CENTERLINE MOUNT BLIND END HEAD

LYNAIR, INC.

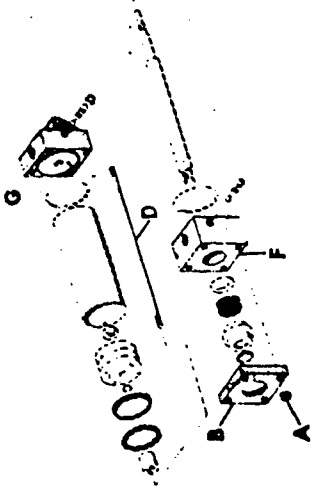
3515 SCHEELE DRIVE JACKSON, MICHIGAN



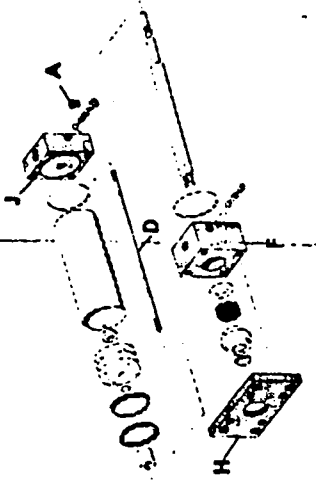
MODEL A
FOOT MOUNT



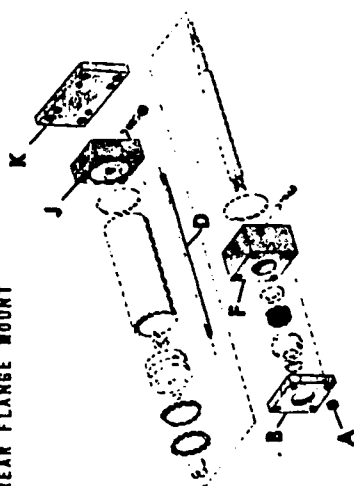
MODEL B
PIVOT MOUNT



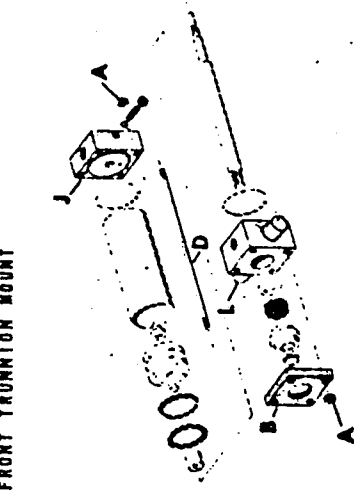
MODEL C
FRONT FLANGE MOUNT



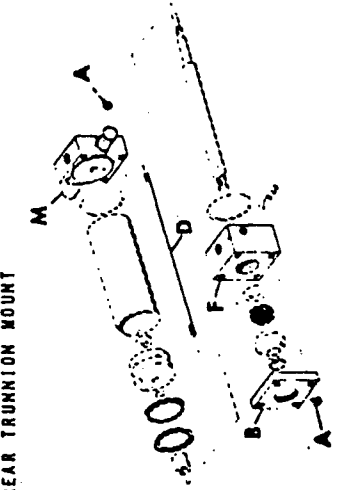
MODEL D
REAR FLANGE MOUNT



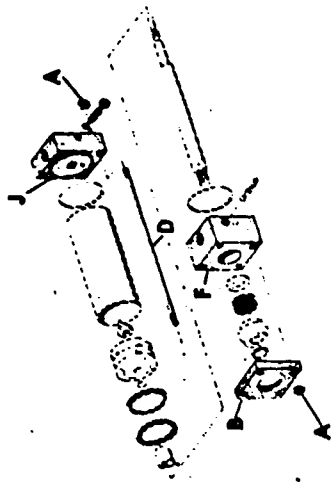
MODEL E
FRONT TRUNNION MOUNT



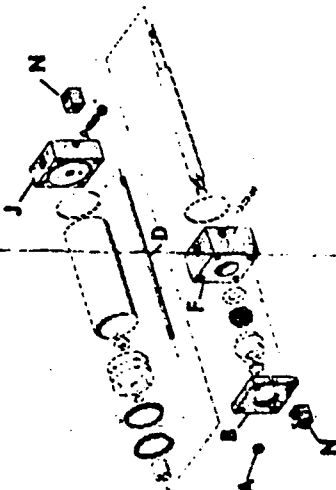
MODEL F
REAR TRUNNION MOUNT



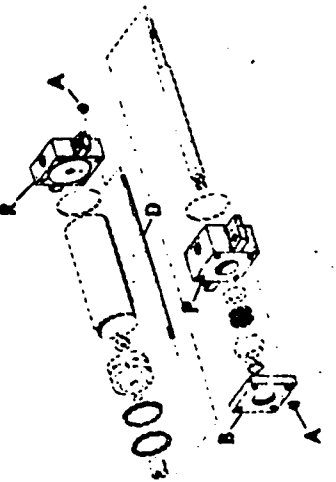
MODEL G
SIDE MOUNT



MODEL J
END LUG MOUNT

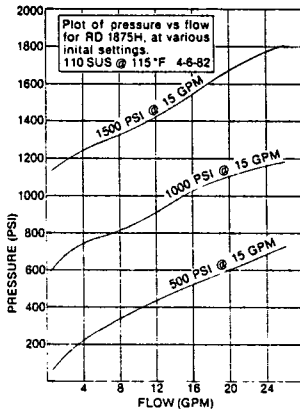
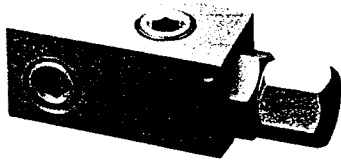


MODEL K
CENTERLINE MOUNT



MODEL RD-1800 PRESSURE RELIEF MODEL RD-900 SELECTOR VALVE

MODEL RD-1800 BALL/SPRING TYPE DIRECT ACTING RELIEF



Performance data is typical. Actual data may vary slightly from unit to unit in production.

The PRINCE valve model RD-1800 is a direct acting ball/spring type pressure relief. The valve is compact and simple in design. This type relief is fast opening and is well suited for pressure spike protection. The performance curves below indicate the low cracking pressure typical to ball/spring reliefs. Please refer to the model RV relief for a system pressure relief. The valve is available with a standard steel seat, model RD-1800S, or with a hardened seat, model RD-1800H. Both models are externally adjustable.

VALVE SPECIFICATIONS:

Capacity: 20 gpm max inlet flow
Pressure: 2500 psi max
Weight: 2 lb.

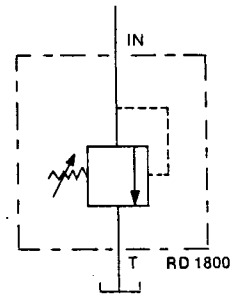
STANDARD MODELS AVAILABLE

MODEL #	PORT SIZES	MAX FLOW
RD-1837S	3/8 NPTF	8 GPM
RD-1850H	1/2 NPTF	16 GPM
RD-1850S	1/2 NPTF	16 GPM
RD-1875S	3/4 NPTF	20 GPM

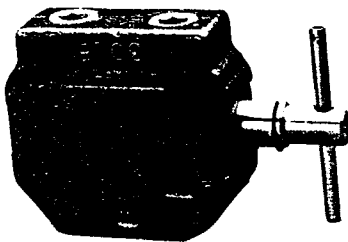
NOTE: Relief settings are 1500 PSI @ 12 GPM
For non-standard relief settings specify PSI in hundreds and GPM after model number
EX: RD-1850S-12-10 for 1200 PSI @ 10 GPM.

See page 44 for mounting dimensions

SYMBOL



MODEL RD-900 SELECTOR VALVE

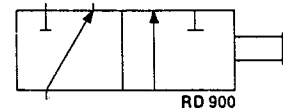


The PRINCE valve model RD-900 is a manual 3 way 2 position selector valve. This valve will allow one pump source to supply two separate circuits. Pushing the handle in diverts oil flow to port away from handle. Pulling the handle out diverts oil flow to port nearest handle.

VALVE SPECIFICATIONS:

Capacity: 30 gpm max inlet flow
Pressure: 3000 psi max
Weight: 7 lbs.

SYMBOL



STANDARD MODELS

MODEL #	PORT SIZES
RD-950	1/2 NPTF
RD-975	3/4 NPTF

See page 44 for mounting dimensions