

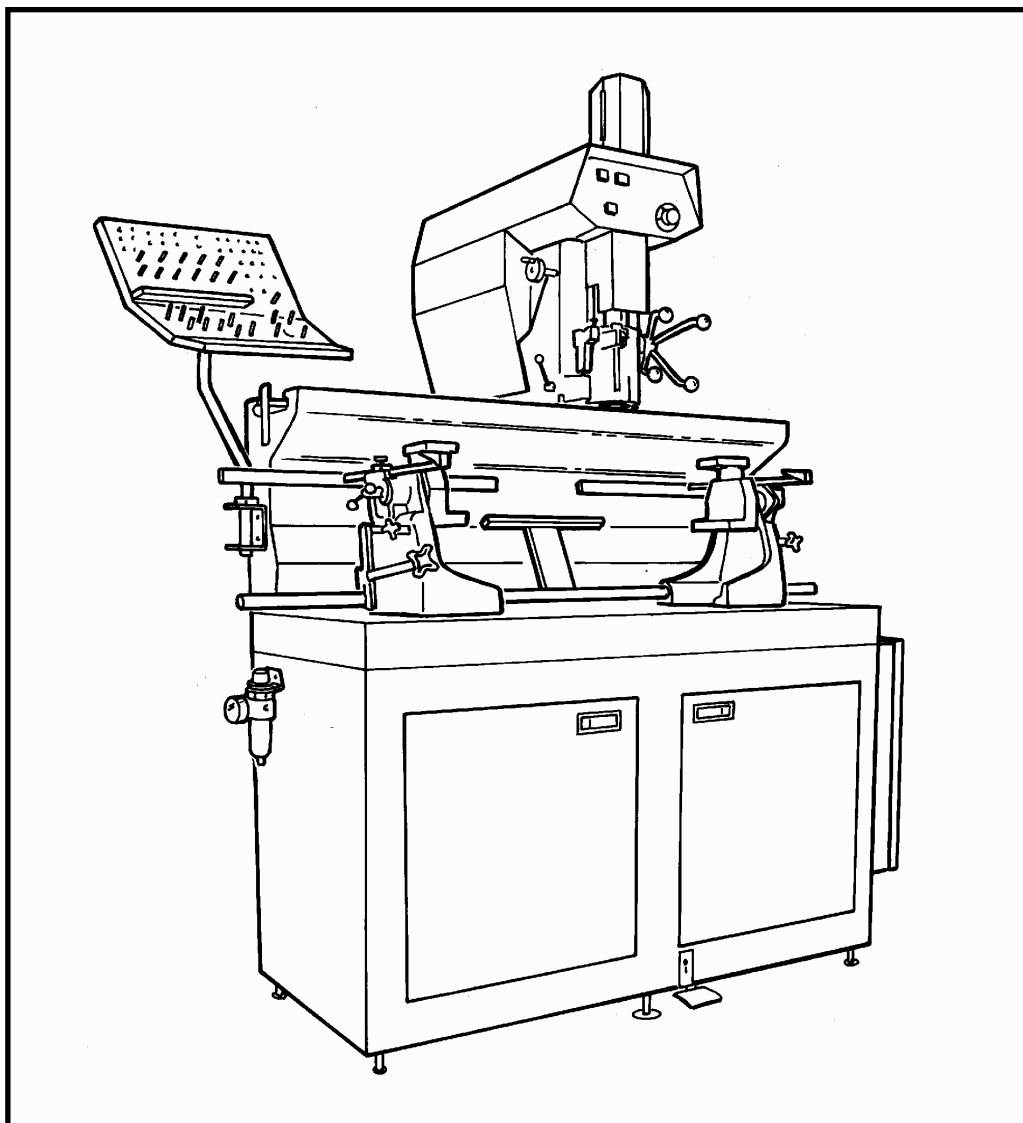


REPAIR PARTS CATALOG FOR SUNNEN® VALVE GUIDE & SEAT MACHINE

MODEL:

VGS-20

THIS CATALOG COVERS THE
ABOVE MODEL BETWEEN
SERIAL NO. 2163 & 2889.



SUNNEN AND THE SUNNEN LOGO ARE REGISTERED TRADEMARKS OF SUNNEN® PRODUCTS COMPANY.



SUNNEN® PRODUCTS COMPANY
7910 MANCHESTER AVENUE • ST. LOUIS, MO 63143, U.S.A. • PHONE: 314-781-2100

X-VGS-2009E

Like any machinery, this equipment may be dangerous if used improperly. Be sure to read and follow instructions for operation of equipment.

INTRODUCTION

Illustrations show all major components in exploded detail. Item numbers on each illustration are keyed to the corresponding parts list, providing a descriptive identification of each part.

The parts lists include assemblies as well as detail parts. An item listed without a part number can be obtained as a component of the complete assembly of which it is a part.

Standard hardware items are listed with complete descriptions, such as Item 29 below. **These may be purchased at your local hardware store**, but it is important to replace an item with one having the same dimensions as the original. In some places brand names and part numbers are shown. These may change depending upon availability.

Sunnen Products Company reserves the right to make changes, without notice, to materials, specifications, colors, designs and accessories included with units.

HOW TO ORDER

When ordering replacement parts be sure to include the following information to ensure prompt shipment of correct parts:

1. The part number and description of each part desired, obtained from this parts catalog.
2. The quantity of each part desired.
3. The voltage, frequency and phase, when ordering electrical parts.
4. The model and serial number of the machine, obtained from the name plate, where there is any question concerning a part.

HOW TO USE THIS PARTS LIST

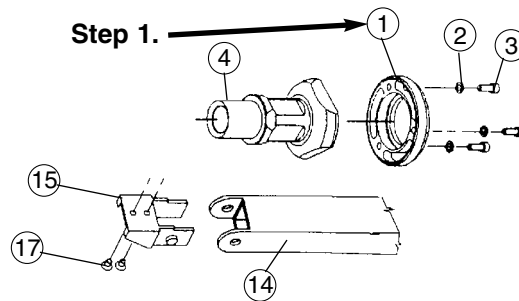
Step 1. – Locate desired part on illustration. Note item number.

Step 2. – Locate item number in the parts list.

Step 3. – If the item has a part number listed, order by part number and the description. A part number in light face type indicates that it is a component of the last preceding part number in bold face type.

Step 4. – If no number is listed, order the part number of the unit of which the desired part is a component. **ORDER ONLY BY PART NUMBER AND DESCRIPTION – NOT by item number.**

NOTE: In this manual, parts may be followed by “(For CE Machines)” or “(For Non-CE Machines)” to denote domestic machines from exported machines. The CE version is constructed to meet the requirements of the European market, and is available to any customer.



	ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
Step 2. →	1	MVH-4499A	1	....Spindle Cap <i>includes</i>
	2	PHSM-405	3	.....Screw (M6 x 1 x 16 SHCS)
Step 3. →	3	PHW-354	3	.....Washer (M6)
	4	MVH-4422	1	....Inner Spindle Nose
	14	PEM-870A	1	....Cable Carrier <i>includes</i>
	15	PEM-871	1	.....Cable Carrier Bracket
Step 4. →	16	PEM-872	1	.....Cable Carrier Bracket
	17	PHSM-600	1	....Screw (M3 x 0,5 x 5mm FHCS)

GENERAL INFORMATION

The Sunnen® equipment has been designed and engineered for a wide variety of parts within the capacity and limitation of the equipment. With proper care and maintenance this equipment will give years of service.

READ THE FOLLOWING INSTRUCTIONS CAREFULLY AND THOROUGHLY BEFORE UNPACKING, INSPECTING, OR INSTALLING THIS EQUIPMENT.

IMPORTANT: Read any supplemental instructions BEFORE installing this equipment. These supplemental instructions give you important information to assist you with the planning and installation of your Sunnen equipment.

Sunnen Technical Service Department is available to provide telephone assistance for installation, programming, & troubleshooting of your Sunnen equipment. All support is available during normal business hours, 8:00 AM to 4:30 PM Central Time. Emergency breakdown support is available on a 24 hour / 7 day basis.

Review all literature provided with your Sunnen equipment. This literature provides valuable information for proper installation, operation, and maintenance of your equipment. Troubleshooting information can also be found within the Instructions. If you cannot find what you need, call for technical support.

Where applicable, programming information for your Sunnen equipment is also included. Most answers can be found in the literature packaged with your equipment.

Help us help you. When ordering parts, requesting information, or technical assistance about your equipment, please have the following information available:

- Have ALL MANUALS on hand. The Customer Services Representative or Technician will refer to it.
- Have Model Number and Serial Number printed on your equipment Specification Nameplate.
- Where Applicable: Have Drive model and all nameplate data. Motor type, brand, and all nameplate data.

For Troubleshooting, additional information may be required:

- Power distribution information (type - delta, wye, power factor correction; other major switching devices used, voltage fluctuations)
- Installation Wiring (separation of power & control wire; wire type/class used, distance between drive and motor, grounding).
- Use of any optional devices/equipment between the Drive & motor (output chokes, etc.).

For fast service on your orders call:

Sunnen Automotive Customer Service toll free at: 1-800-772-2878

Sunnen Industrial Customer Service toll free at: 1-800-325-3670

Customers outside the USA, contact your local authorized Sunnen Distributor.

Additional information available at: <http://www.sunnen.com> or e-mail: sunnen@sunnen.com

NOTE: Sunnen reserves the right to change or revise specifications and product design in connection with any feature of our products contained herein. Such changes do not entitle the buyer to corresponding changes, improvements, additions, or replacements for equipment, supplies or accessories previously sold. Information contained herein is considered to be accurate based on available information at the time of printing. Should any discrepancy of information arise, Sunnen recommends that user verify the discrepancy with Sunnen before proceeding.

ESD PREVENTION REVIEW

Let's review the basics of a sound static control system and its effective implementation. First, in the three step plan:

1. Always ground yourself when handling sensitive components or assemblies.
2. Always use a conductive or shielded container during storage or transportation. These materials create a Faraday cage which will isolate the contents from static charges.
3. Open ESD safe containers only at a static safe work station.

At the static safe work station, follow these procedures before beginning any work:

- A. Put on your wrist strap or foot grounding devices.
- B. Check all grounding cords to make sure they are properly connected to ground, ensuring the effective dissipation of static charges.
- C. Make sure that your work surface is clean and clear of unnecessary materials, particularly common plastics.
- D. Anti-static bubble wrap has been included for use at the machine when an ESD safe workstation is not available.

You are now properly grounded and ready to begin work. Following these few simple rules and using a little common sense will go a long way toward helping you and your company in the battle against the hazards of static electricity. When you are working with ESD sensitive devices, make sure you:

**GROUND
ISOLATE
NEUTRALIZE**

SUNNEN® LIMITED PRODUCT WARRANTY

Sunnen® Products Company and its subsidiaries (SPC) warrant that all new SPC honing machines, gaging equipment, tooling, and related equipment will be free of defects in material and/or workmanship for a period of one year from the date of original shipment from SPC.

Upon prompt notification of a defect during the one-year period, SPC will repair, replace, or refund the purchase price, with respect to parts that prove to be defective (as defined above). Any equipment or tooling which is found to be defective from improper use will be returned at the customer's cost or repaired (if possible) at customer's request. Customer shall be charged current rates for all such repair.

Prior to returning any SPC product, an authorization (RMA#) and shipping instructions must be obtained from the Customer Service Department or items sent to SPC will be returned to the customer.

Warranty Limitations and Exclusions This Warranty does not apply to the following:

- Normal maintenance items subject to wear and tear: (belts, fuses, filters, etc).
- Damages resulting from but not limited to:
 - › Shipment to the customer (for items delivered to customer or customer's agent F.O.B., Shipping Point)
 - › Incorrect installation including improper lifting, dropping and/or placement
 - › Incorrect electric power (beyond +/- 10% of rated voltage) including intermittent or random voltage spikes or drops
 - › Incorrect air supply volume and/or pressure and/or contaminated air supply
 - › Electromagnetic or radio frequency interference from surrounding equipment (EMI, RFI)
 - › Storm, lightning, flood or fire damage
 - › Failure to perform regular maintenance as outlined in SPC manuals
 - › Improper machine setup or operation causing a crash to occur
 - › Misapplication of the equipment
 - › Use of non-SPC machines, tooling, abrasive, fixturing, coolant, repair parts, or filtration
 - › Incorrect software installation and/or misuse
 - › Non-authorized customer installed electronics and/or software
 - › Customer modifications to SPC software

THE LIMITED WARRANTY DESCRIBED HEREIN IS EXPRESSLY IN LIEU OF ALL ANY OTHER WARRANTIES. SPC MAKES NO REPRESENTATION OR WARRANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, WHETHER AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER MATTER. SPC IS NOT RESPONSIBLE FOR THE IMPROPER USE OF ANY OF ITS PRODUCTS. SPC SHALL NOT BE LIABLE FOR DIRECT, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES INCLUDING BUT NOT LIMITED TO: LOSS OF USE, REVENUE, OR PROFIT. SPC ASSUMES NO LIABILITY FOR PURCHASED ITEMS PRODUCED BY OTHER MANUFACTURERS WHO EXTEND SEPARATE WARRANTIES. REGARDLESS OF ANY RIGHTS AFFORDED BY LAW TO BUYER, SPC'S LIABILITY, IF ANY, FOR ANY AND ALL CLAIMS FOR LOSS OR DAMAGES WITH RESPECT TO THE PRODUCTS, AND BUYER'S SOLE AND EXCLUSIVE REMEDY THEREFORE, SHALL IN ALL EVENTS BE LIMITED IN AMOUNT TO THE PURCHASE PRICE OF THAT PORTION OF THE PRODUCTS WITH RESPECT TO WHICH A VALID CLAIM IS MADE.

Shipping Damages

Except in the case of F.O.B., Buyer's destination shipments, SPC will not be liable for any settlement claims for obvious and/or concealed shipping damages. The customer bears the responsibility to unpack all shipments immediately and inspect for damage. When obvious and/or concealed damage is found, the customer must immediately notify the carrier's agent to make an inspection and file a claim. The customer should retain the shipping container and packing material.

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Any alteration or reverse engineering of the software is expressly forbidden and is in violation of this agreement.

SPC reserves the right to update the software covered by this agreement at any time without prior notice and any such updates are covered by this agreement.

SAFETY INSTRUCTIONS

READ FIRST

This machine, like any equipment, may be dangerous if used improperly. Please read all warnings and instructions before attempting to use this machine.

Always disconnect power at main enclosure before servicing machine.¹

Always wear eye protection when operating this machine.

NEVER open or remove any machine cover or protective guard with power "ON."
Always disconnect power at main enclosure before servicing this equipment.¹

DO NOT attempt any repair or maintenance procedure beyond those described in this book. Contact your Sunnen® Field Service Engineer or Technical Services Representative for repairs not covered in these instructions.

Due to the wide variety of machine configurations, all possibilities cannot be described in these instructions. Instructions for safe use and maintenance of optional equipment ordered through Sunnen, will be provided through separate documentation and/or training provided by your Sunnen Field Service Engineer or Technical Services Representative.

DO NOT attempt to defeat any safety device on this machine or on any of the optional equipment.

If specially built automation components are added to this system, be sure that safety is not compromised. If necessary, obtain special enlarged work area safety system from Sunnen Products Co.

 Indicates CE version ONLY.

¹ DO NOT touch electrical components until main input power has been turned off and *CHARGE* lamps are extinguished. WARNING: The capacitors are still charged and can be quite dangerous.

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SECTION I - BASIC MACHINE

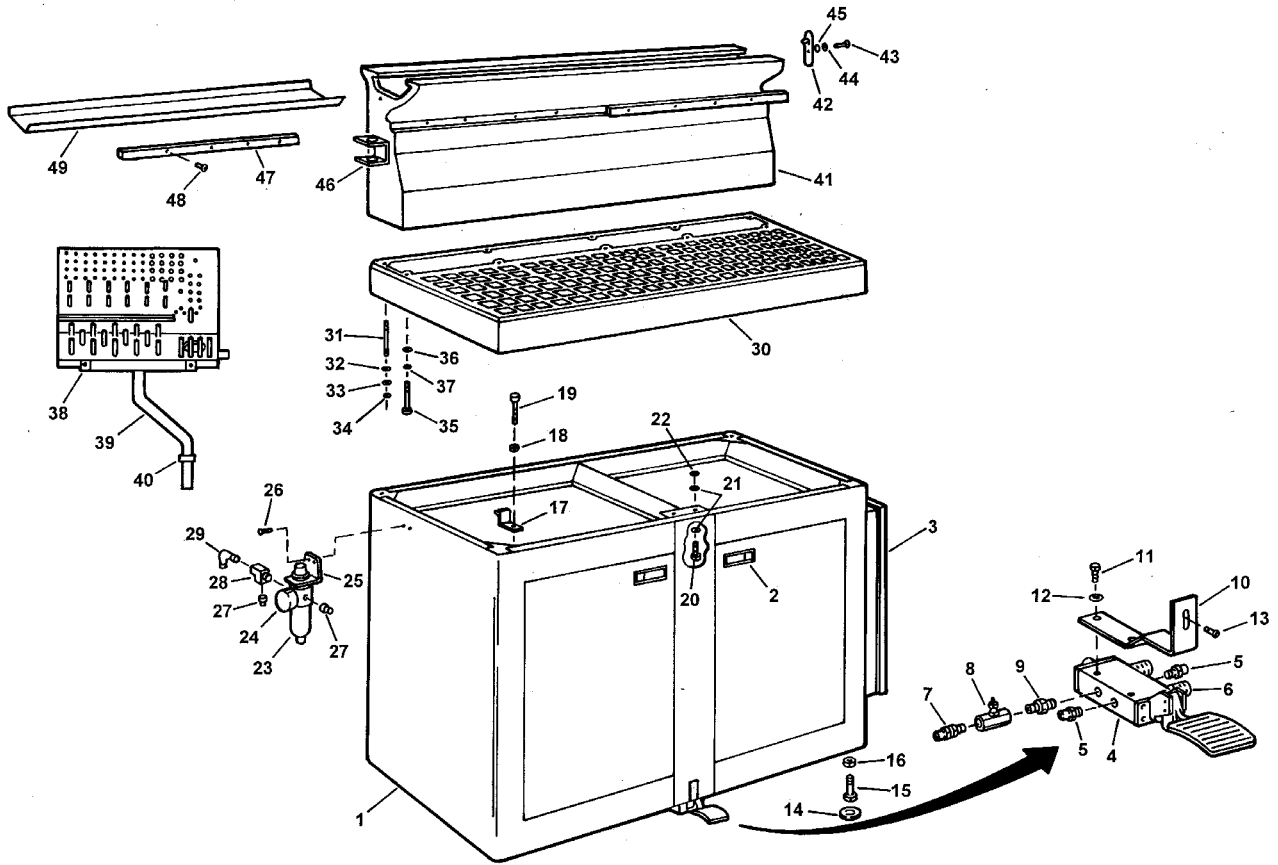


FIGURE A - BASE ASSEMBLY

PARTS LIST COVERING FIGURE "A"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
1	VGS-2007	1	....Cabinet Assembly
2	PHM-371A	2	....Trigger Latch (Pkg. of 1)
3	- - -	1	....Control Enclosure (See Fig. I)
- -	VGS-2480A	1	....Float and Lock Valve Assembly includes
4	VGS-1337A	1	.....Foot Pedal Valve
N/S	VGS-1337-1A	1	.....Spool
5	PPP-191A	2	.....Fitting (1/4 Tube x 1/4 Pipe)
6	PPP-40A	2	.....Exhaust Silencer (Pkg. of 1)
7	PPP-238A	1	.....Connector (1/4 Tube x 1/4 Pipe)
8	VGS-2484A	1	.....Flow Control Valve
9	PPP-250A	1	.....Nipple Reducer (1/4 x 1/8)

N/S indicates Not Shown

(Parts list continued on next page.)

PARTS LIST COVERING FIGURE "A" (cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
10	VGS-2482A	1	.....Foot Valve Bracket <i>with</i>
11	PHS-801	2	.....Screw (5/1624 x 1/2 HHCS)
12	PHW-308	2	.....Lockwasher (5/16 Internal Tooth)
13	PHS-506	1	.....Screw (10-32 x 3/8 PHCS)
N/S	LBN-451	1	....Lockwasher (#10 External Tooth)
N/S	VGS-2494A	1	....Tube (To Filter)
N/S	VGS-2492A	2	....Tube (To Head) (Pkg. of 1)
14	VGS-1492A	5	....Leveling Plate (Pkg. of 1)
15	VGS-1011A	5	....Leveling Screw (Pkg. of 1) <i>with</i>
16	PHN-103	1	.....Nut (1/2-20 Hex Jam)
17	VGS-2015A	2	....Corner Support (Pkg. of 1) <i>with</i>
18	KN-172	1	.....Nut (5/16-18 Hex)
19	PHS-559	1	.....Screw (5/16-18 x 1-3/4 SHCS)
20	PHS-1019	1	....Screw (3/8-16 x 1-1/2" HHCS)
21	PHW-302	2	....Washer (.390 ID x 1" OD x .092)
22	PHW-390	1	....Washer (.406 ID x 1" OD x .156)
N/S	MAN-1223	1	....Lockwasher
23	MBC-531A	1	....Filter Regulator
24	MBC-531-1A	1	....Guage
25	MBC-531-2A	1	....Bracket
26	PHS-652	2	....Screw (1/4-20 x 1/2 BHCS)
N/S	PHW-118	2	....Lockwasher
N/S	LBN-431	2	....Nut (10-32)
27	PPP-167A	2	....Plug (Pkg. of 1)
28	PPP-215A	1	....Street Tee (1/4 NPT Brass)
29	PPP-189A	1	....Elbow (1/4 Tube x 1/4 Pipe)
30	VGS-2008	1	....Table
31	VGS-2028A	2	....Stud (Pkg. of 1)
32	PHW-390	2	....Washer (.406 ID x 1" OD x .156)
33	PHW-302	4	....Washer (.390 ID x 1" OD x .092)
34	MAN-1223	2	....Lockwasher
N/S	PHN-218	2	....Nut (3/8-16 Hex)
35	PHS-893	8	....Screw (3/8-16 x 4 SHCS)
36	PHW-390	8	....Washer (.460 ID x 1" OD x .156)
37	MAN-1223	8	....Lockwasher
38	VGS-1520A	1	....Tool Rack Tray
39	VGS-1414A	1	....Tool Rack Post
40	VGS-1413A	2	....Stop Collar (Pkg. of 1) <i>with</i>
N/S	KN-456	1	.....Setscrew (1/4-20 CPSS)
41	VGS-2026	1	....Riser
42	VGS-2030A	2	....Stop and Clamp Assembly (Pkg. of 1) <i>with</i>
43	MSA-219	2	.....Screw (1/4-20 x 1/2 HHCS)
44	PHW-118	2	.....Lockwasher
45	LBN-401	2	.....Washer (17/64 ID x 5/8 OD x .065)
46	VGS-1412A	1	....Support Bracket <i>with</i>
N/S	PHS-652	4	.....Screw (1/4-20 x 1/2 BHCS)
N/S	PHW-118	4	.....Lockwasher
47	VGS-2046A	2	....Clamp Bar (Pkg. of 1) <i>with</i>
48	PHS-851	4	.....Screw (1/4-20 x 1/2 SHCS)
49	VGS-2042A	1	....Cover Pan

N/S indicates Not Shown

SECTION I
BASIC MACHINE

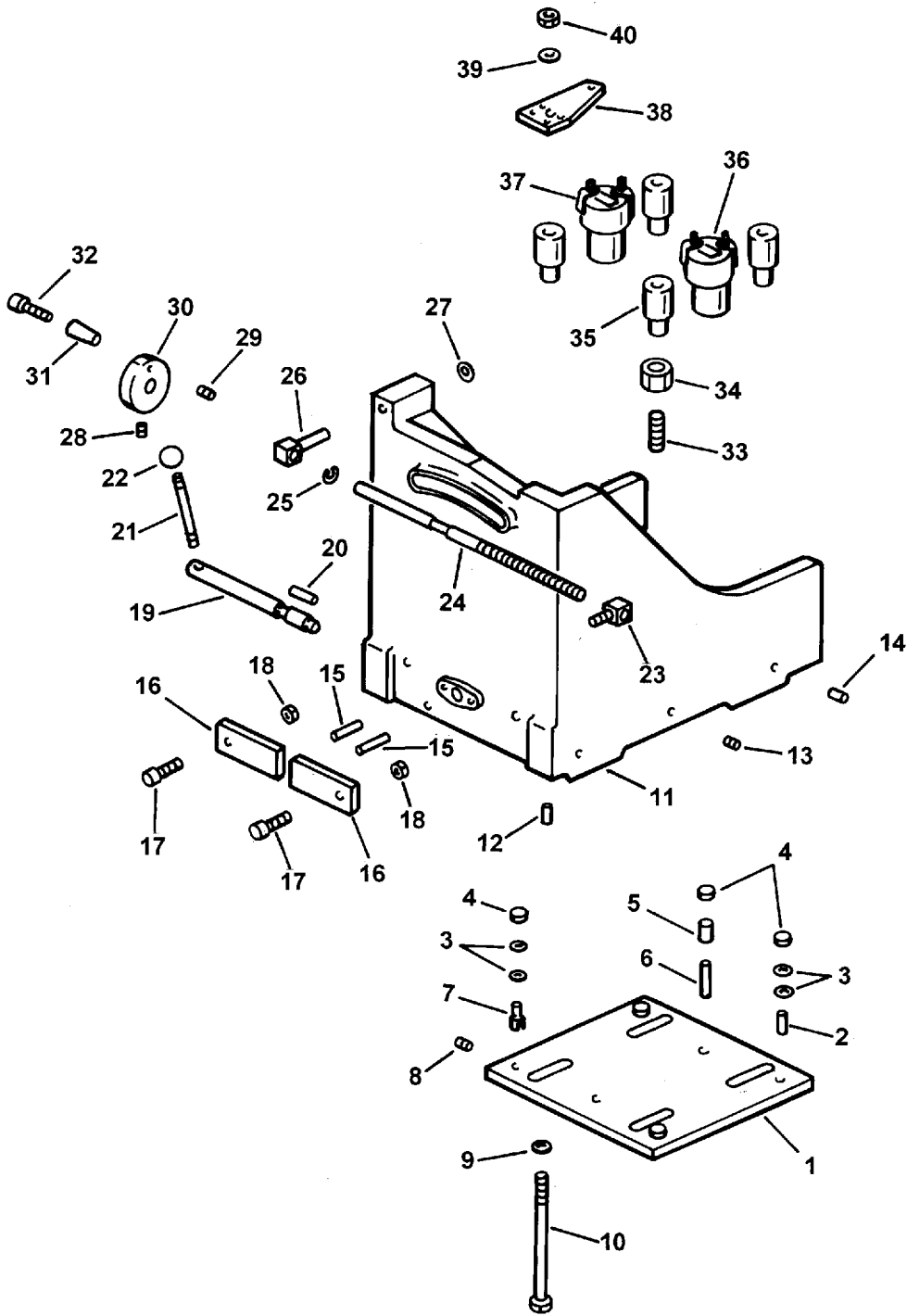


FIGURE B - AIR FLOAT ASSEMBLY

PARTS LIST COVERING FIGURE "B"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-2440A	1	....Plate Assembly includes
1	VGS-2442	1	.....Plate
2	PHP-507	2	.....Pin (3/16 x 5/8 Dowel)
3	PHW-307	8	.....Washer #8 Flat)
4	PBR-98A	6	.....Bearing (Pkg. of 1)
5	VGS-2448	2	.....Spacer
6	PHP-597	2	.....Pin (3/16 x 1-1/4 Dowel)
7	VGS-2446A	2	.....Eccentric Pin (Pkg. of 1)
8	PHS-191	2	.....Setscrew (10-32 x 1/4 Brass)
9	PHW-306	4	....Washer (25/64 ID x 7/8 OD x 1/8)
10	PHS-806	4	....Screw (3/8-24 x 3-3/4 HHCS)
11	VGS-2312	1	....Base Assembly with
12	VGS-2314	16	.....Plug
13	PHS-178	2	....Setscrew (10-32 x 3/8 FPSS)
14	PPP-243A	5	....Plug (1/16-27 Tapered) (Pkg. of 1)
15	VGS-1026A	2	....Face Clamp Pin (Pkg. of 1)
16	VGS-1027A	2	....Face Clamp Bar (Pkg. of 1) with
17	VGS-1028	2	.....Pivot Screw
18	PHN-106	2	.....Nut (1/4-28 Hex Jam)
19	VGS-1022A	1	....Eccentric
20	PHP-416	2	....Pin (1/8 x 1" Spring)
21	VGS-1023A	1	....Lever
22	PHM-318A	1	....Ball Knob
23	VGS-1043A	1	....Adjusting Screw Nut
24	VGS-1032A	1	....Adjusting Screw with
25	PHR-337	2	.....Retaining Ring
26	VGS-1031A	1	....Adjusting Collar with
27	PHR-347	1	.....Retaining Ring
--	VGS-1040A	1	....Knob and Handle Assembly includes
28	PHS-178	1	.....Setscrew (10-32 x 3/8 FPSS)
29	PG-967	1	.....Setscrew (10-32 x 3/16 FPSS)
30	VGS-1041A	1	.....Adjusting Knob
31	VGS-1042A	1	.....Handle
32	PHS-579	1	.....Screw (10-32 x 1-1/4 SHCS)
33	VGS-2322	1	....Stud (See Fig. E)
34	VGS-2324	1	....Nest (See Fig. E)
35	VGS-2328A	4	....Bushing (Pkg. of 1)
36	VGS-2340A	1	....Right Cylinder and Piston Assembly
37	VGS-2400A	1	....Left Cylinder and Piston Assembly
38	VGS-2460A	4	....Lever Assembly (Pkg. of 1)
39	PHW-306	4	....Washer (25/64 ID x 7/8 OD x 1/8)
40	PHN-163	4	....Nut (3/8-24 Flexloc)
N/S	VGS-2326A	1	....Tube (Approx. 6" Long)
N/S	VGS-2422A	1	....Tube (Approx. 8-1/2" Long)

N/S indicates Not Shown

NOTE: For complete Air Float Assembly order VGS-2305A. This does not include items 23 thru 33.

SECTION I
BASIC MACHINE

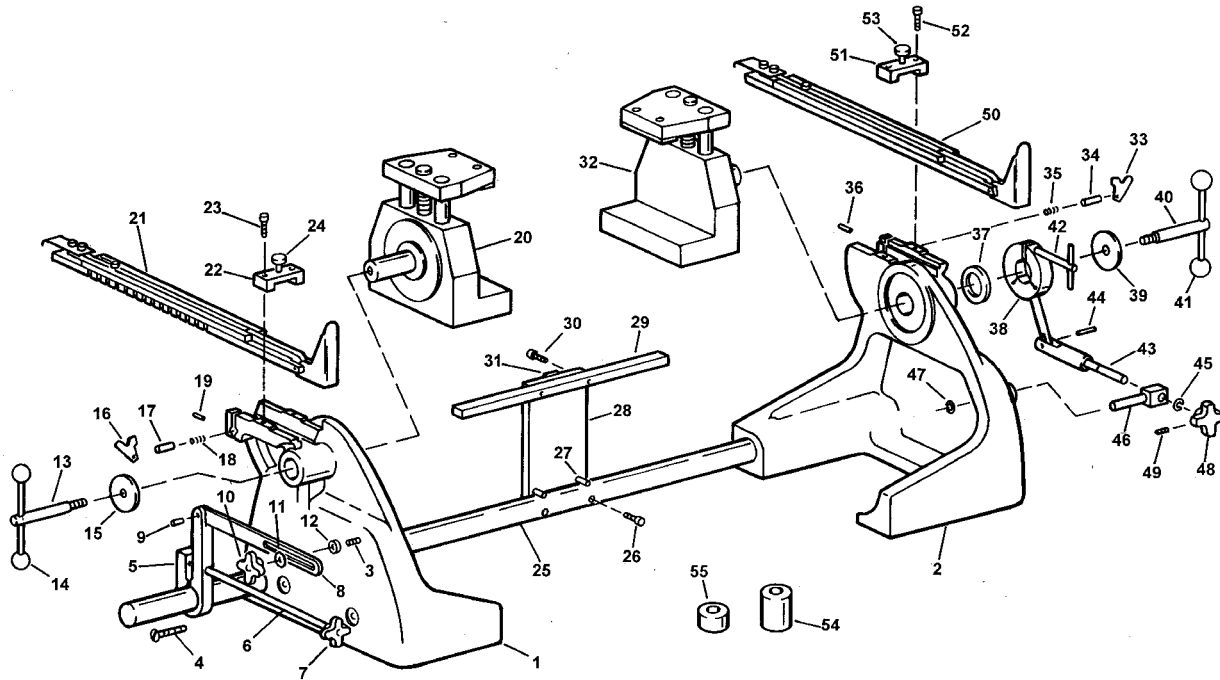


FIGURE C - HEAD SUPPORT FIXTURE

PARTS LIST COVERING FIGURE "C"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
	VGS-2062D	1	....Head Support Kit includes
1	VGS-2551	1	.....Left Head Support
2	VGS-2561	1	.....Right Head Support
3	VGS-2092	1	.....Stud
4	PHS-805	1	.....Screw (1/4-20 x 7/8 Truss Hd.)
--	VGS-2150A	1	....Bar Clamp and Adjustment Assembly includes
5	VGS-2152A	1	.....Clamp
6	VGS-2154A	1	.....Arm
7	PHM-326A	1	.....Knob
8	VGS-2153A	1	.....Bar
9	PHP-425	1	.....Pin (1/4 x 5/8 Spring)
N/S	PF-258	1	.....Washer (Special)
10	PHM-327A	1	....Knob with
11	CK-1828	1	.....Washer (Special)
12	VGS-2162	1	.....Spacer
13	VGS-1370A	1	....Angle Lock Screw Assembly with
14	PHM-325A	2	.....Ball Knob (Pkg. of 1)
15	VGS-1394A	1	....Outer Washer
16	VGS-2087A	1	....Stabilizer Latch with
17	VGS-2086	1	.....Plunger
18	PSP-521	1	.....Spring

N/S indicates Not Shown

(Parts list continued on next

PARTS LIST COVERING FIGURE "C" (cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
19	PHP-423	1	.....Pin (3/32 x 5/8 Spring)
20	VGS-2555A	1	....Left Swivel Clamp Assembly
21	VGS-2100A	1	....Left Head Stabilizer Assembly
22	VGS-2128A	1	....Head Stabilizer Bridge with
23	PHS-520	2	.....Screw (8-32 x 5/8 SHCS)
24	VGS-2140	1	.....Vertical Slide Lock Screw
25	VGS-2262A	1	....Guide Rod with
26	MBB-971	2	.....Screw (5/16-18 x 1" SHCS)
- -	VGS-2280A	1	....Alignment Plate and Bar Assembly includes
27	PHP-424	2	.....Pin (1/4 x 1-1/4 Spring)
28	VGS-2284	1	.....Alignment Plate
29	VGS-2282	1	.....Alignment Bar
30	PHS-582	2	.....Screw (1/4-20 x 3/4 SHCS)
31	PHM-756	1	.....Bumper
32	VGS-2565A	1	....Right Swivel Clamp Assembly
33	VGS-2087A	1	....Stabilizer Latch with
34	VGS-2086	1	.....Plunger
35	PSP-521	1	.....Spring
36	PHP-423	1	.....Pin (3/32 x 5/8 Spring)
37	VGS-1377A	1	....Inner Washer
38	VGS-2215A	1	....Collar and Arm Assembly
39	VGS-1394A	1	....Outer Washer
40	VGS-1370A	1	....Angle Lock Screw Assembly with
41	PHM-325A	2	.....Ball Knob (Pkg. of 1)
42	VGS-1390A	1	....Lock Collar Screw Assembly
43	VGS-1395A	1	....Stud and Nut Assembly with
44	VGS-1398	1	.....Pin
45	PHR-337	2	.....Retaining Ring
46	VGS-1366A	1	....Pivot Block with
47	PHR-347	1	.....Retaining Ring
48	PHM-329A	1	....Knob with
49	KN-180	1	.....Setscrew (10-32 x 1/4 FPSS)
50	VGS-2240A	1	....Right Head Stabilizer Assembly
51	VGS-2128A	1	....Head Stabilizer Bridge with
52	PHS-520	2	.....Screw (8-32 x 5/8 SHCS)
53	VGS-2140	1	.....Vertical Slide Lock Screw
54	VGS-1487A	4	....Head Clamp Spacer, Long (Pkg. of 1)
55	VGS-1488A	4	....Head Clamp Spacer, Short (Pkg. of 1)

N/S indicates Not Shown

NOTE: For complete Head Support & Stabilizer Assembly order VGS-2540A.

SECTION I
BASIC MACHINE

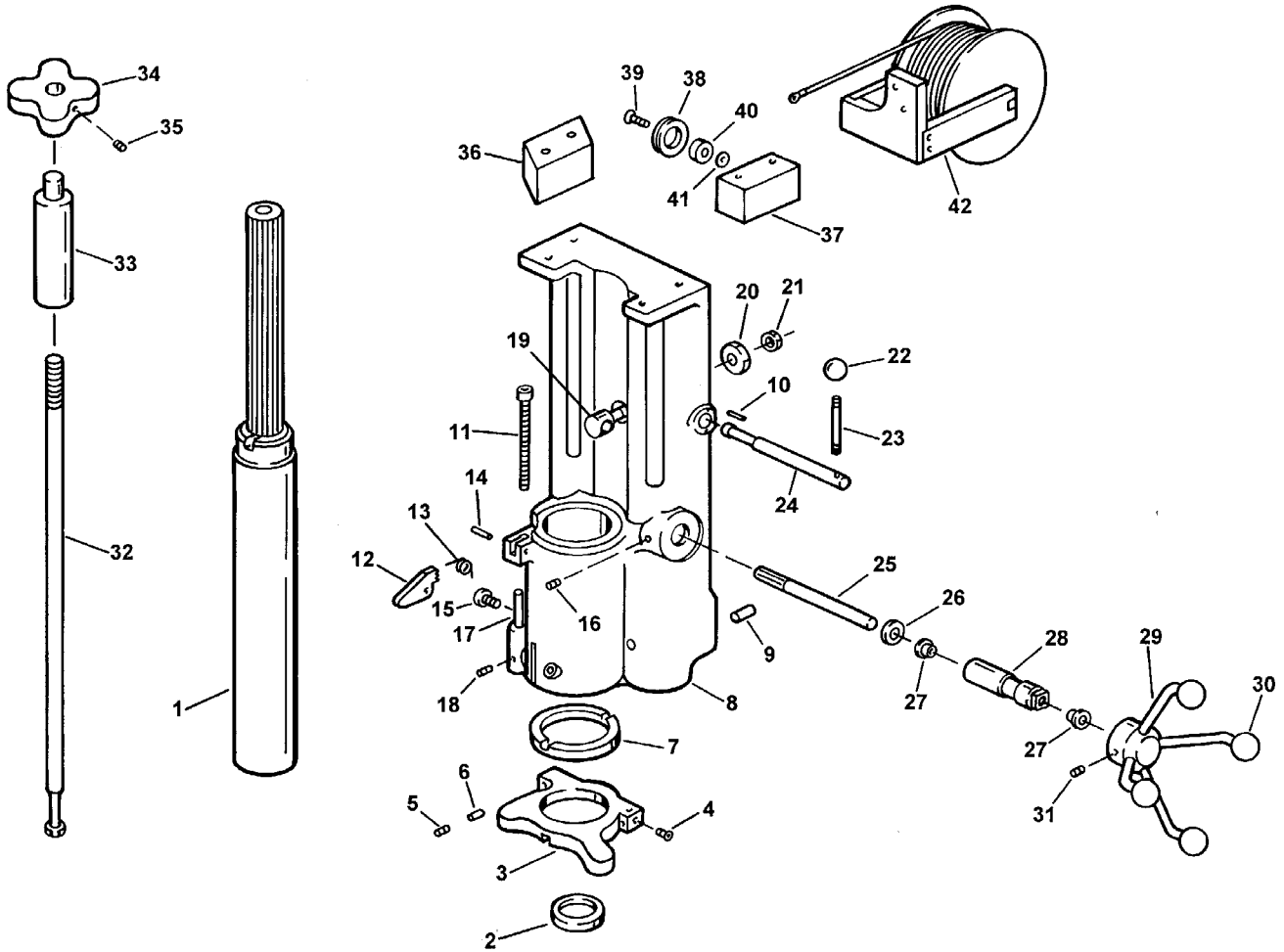


FIGURE D - SPINDLE HOUSING

PARTS LIST COVERING FIGURE "D"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
1	VGS-1250A	1	....Spindle includes
2	VGS-1259A	1	.....Stop Collar
--	VGS-1265A	1	....Lift Cable Plate Assembly includes
3	VGS-1266A	1	.....Plate
4	PHS-547	1	.....Screw (#2 x 1/4 RHMS)
5	PG-2372	2	.....Setscrew (10-32 x 1/4 CPSS with Nylok)
6	VGS-1267	2	.....Pad
7	VGS-1269A	1	....Stop Plate Lock Nut
--	VGS-1050A	1	....Spindle Housing Assembly includes
8	VGS-1051	1	.....Spindle Housing
9	PHP-596	1	.....Pin (1/2 x 1-1/4 Dowel)
10	PHP-416	2	.....Pin (1/8 x 1" Spring)
11	VGS-1060A	1	.....Control Stop Assembly
12	VGS-1056A	1	.....Control Stop Latch with
13	PSP-520A	1	.....Spring
14	VGS-1057A	1	.....Pin
15	VGS-1065A	1	.....Lock Plate Screw Assembly
16	PHS-178	1	.....Setscrew (10-32 x 3/8 FPSS)
17	VGS-1071A	1	.....Leveling Pin with
18	AN-320	4	.....Setscrew (10-32 x 1/4 CPSS)
19	VGS-1083A	1	....Eccentric Stud
20	VGS-1084A	1	....Eccentric Nut
21	LBA-150	1	....Nut (3/8-24 Hex)
22	PHM-318A	1	....Knob (1" Dia. with 1/4-20 Thread)
23	VGS-1023A	1	....Valve Operating Lever
24	VGS-1082A	1	....Eccentric Clamp
--	VGS-1275A	1	....Handle and Pinion Feed Assembly includes
25	VGS-1276A	1	.....Pinion
26	VGS-1277A	1	.....Thrust Washer
27	CK-242A	2	.....Flange Bushing (Pkg. of 2)
28	VGS-1278A	1	.....Eccentric Bushing
29	VGS-1280A	1	.....Feed Handle Assembly includes
30	PHM-323A	4	.....Knob (1-1/4 Dia. with 3/8-24 Thread) (Pkg. of 1)
31	LBN-309	2	.....Setscrew (1/4-20 x 1/2 CPSS)
32	VGS-1431A	1	....Spindle Tool Adapter
--	VGS-1435A	1	....Drawbar Knob and Nut Assembly includes
33	VGS-1436A	1	.....Drawbar Nut
34	VGS-1437A	1	.....Knob
35	LBN-369	1	.....Setscrew (1/4-20 x 1/4 CPSS)
36	VGS-1052A	1	....Left Extension Block
37	VGS-1058A	1	....Right Extension Block
38	VGS-1093A	1	....Counterweight Pulley with
39	PHS-506	1	.....Screw (10-32 x 3/8 BHCS)
40	PBR-98A	1	.....Ball Bearing
41	CRG-868	3	.....Washer
42	VGS-1285D	1	....Spindle Counterbalance

N/S indicates Not Shown

SECTION I
BASIC MACHINE

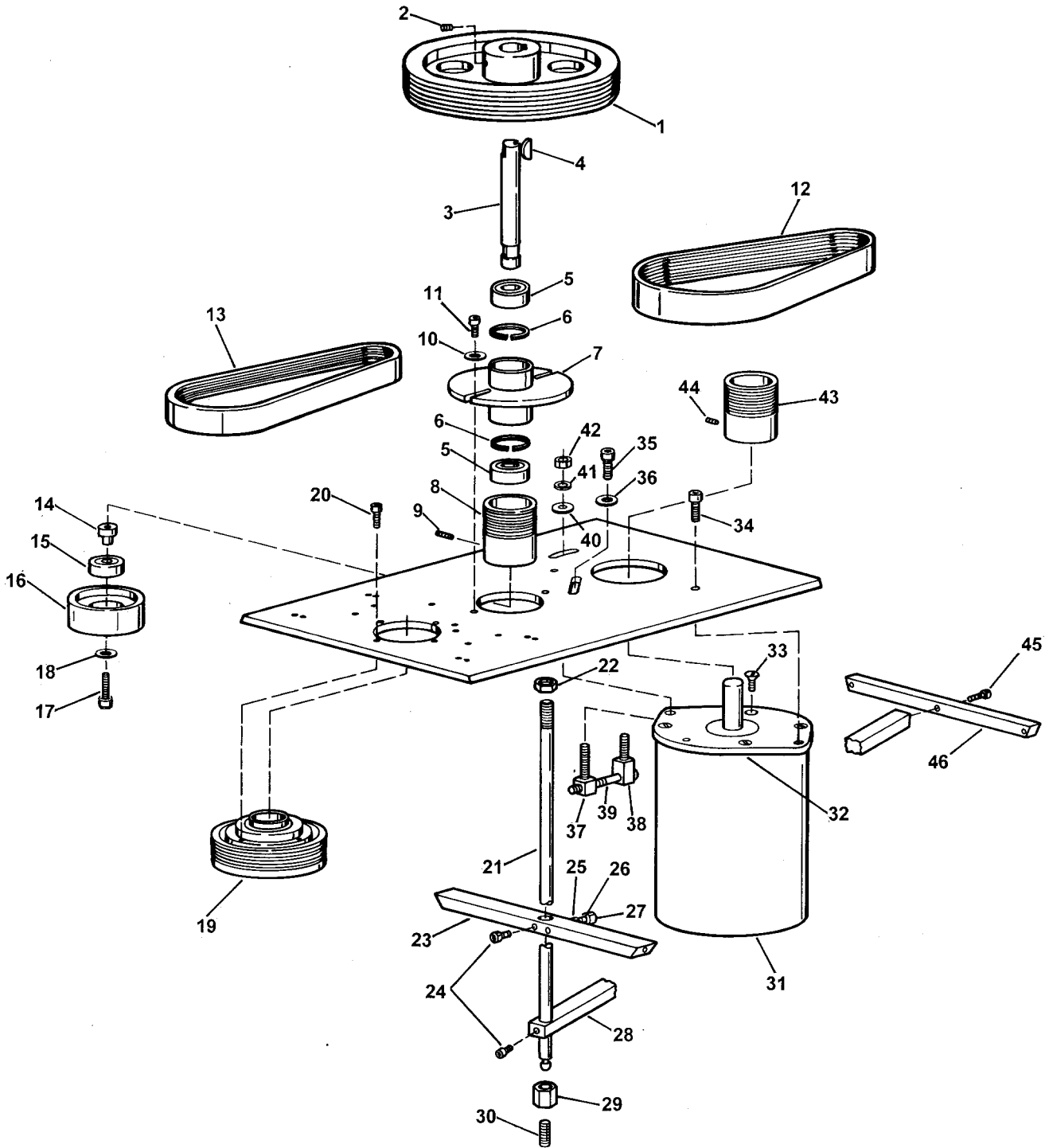


FIGURE E - MOTOR, PULLEYS & BELTS

PARTS LIST COVERING FIGURE "E"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-1130A	1	....Countershaft Assembly includes
1	VGS-1133A	1	.....Pulley
2	---	1	.....Setscrew (1/4-20 x 3/4 Knurled Cup Point)
3	VGS-1131A	1	.....Shaft Assembly includes
4	CK-719	2	.....Key (3/16 x 3/4 Woodruff)
5	PBR-89A	2	.....Bearing (Pkg. of 1)
6	PHR-113	2	.....Retaining Ring (Truarc #N5000-137)
N/S	PHR-301	2	.....Retaining Ring (Roto Clip #SH-62ST-PA)
7	VGS-1132	1	.....Flange
8	VGS-1136A	1	.....Pulley with
9	LBN-309	2	.....Setscrew (1/4-20 x 1/2 CPSS)
N/S	LBN-369	2	.....Setscrew (1/4-20 x 1/4 CPSS)
10	PHW-299	2	....Washer (Special)
11	PHS-585	2	....Screw (1/4-28 x 3/4 SHCS)
12	PDB-310A	1	....Drive Belt
13	PDB-309A	1	....Countershaft Belt
--	VGS-1120A	1	....Idler Pulley Assembly includes
14	VGS-1122A	1	.....Idler Hub
15	PBR-91A	1	.....Bearing
16	VGS-1121A	1	.....Idler Pulley
17	PHS-717A	1	.....Screw (1/4-28 x 1-1/2 SHCS)
18	LBN-401A	1	.....Washer (1/4 IDX x 5/8)
19	VGS-1105A	1	....Drive Pulley Assembly
20	AG-178	4	....Screw (10-32 x 3/8 SHCS)
21	VGS-1076A	1	....Motor Control Support with
22	PHN-103	1	.....Nut (1/2-20 Hex Jam)
23	VGS-1077A	1	....Shroud Support Bracket
24	PHS-851	2	....Screw (1/4-20 x 1/2 SHCS)
25	LBN-431	1	....Nut (1/4-20 Hex)
26	DL-66	1	....Screw (1/4-20 x 7/8 HHCS)
27	MBB-856A	1	....Bumper
28	VGS-1147A	1	....Support Bracket Arm
29	VGS-2324A	1	....Nest
30	VGS-2322A	1	....Stud
31	PMO-416A	1	....Motor (230/460 Volt, 60 Hz. 3 Ph.)
32	VGS-1141A	1	....Motor Mounting Plate with
33	PHS-811	4	.....Screw (3/8-16 x 3/4 SFH.)
34	PHS-640	1	....Screw (1/4-28 x 5/8 SHCS)
35	AN-24U	1	....Screw (1/4-28 x 3/4 SHCS)
36	PHW-299	1	....Washer (1/4 Special)
37	VGS-1048A	1	....Adjusting Screw Nut
38	VGS-1049A	1	....Adjusting Screw Nut
39	AG-259A	1	....Screw
40	CK-542	2	....Washer (Special)
41	PHW-119	2	....Washer (5/16 Lock)
42	PHN-101	2	....Nut (5/16-24 Hex)
43	VGS-1138A	1	....Pulley with
44	LBN-309	2	.....SetScrew (1/4-20 x 1/2 CPSS)
45	AG-128	1	....Screw (10-32 x 3/4 SHCS)
46	VGS-1078A	1	....Control Support Bracket

N/S indicates Not Shown

SECTION I
BASIC MACHINE

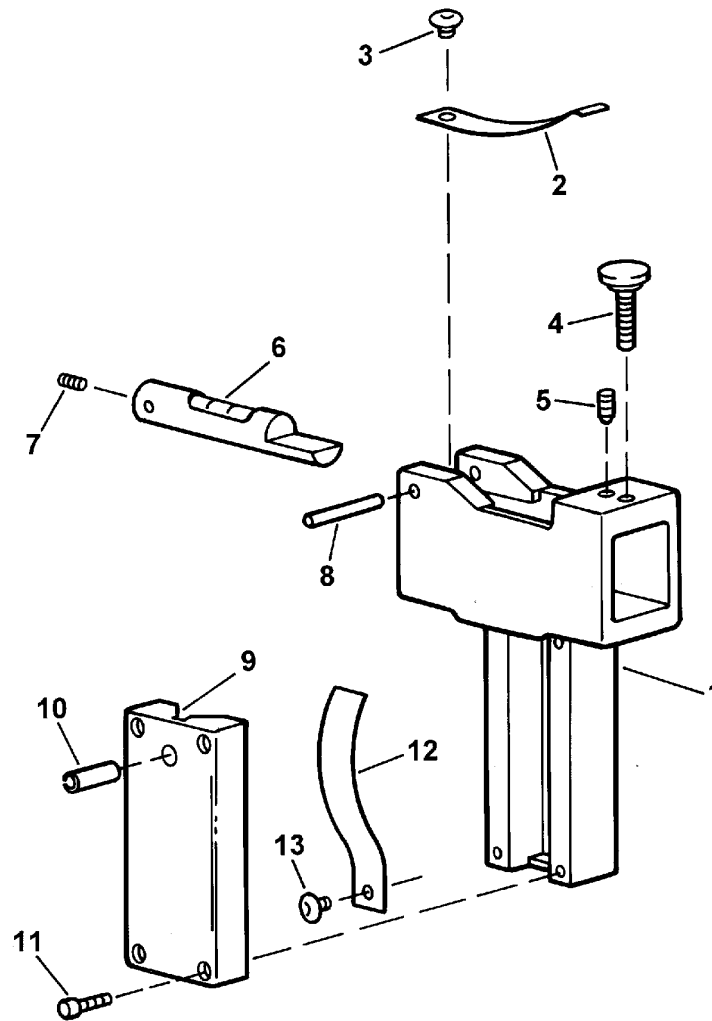


FIGURE F - ADJUSTABLE LEVEL

PARTS LIST COVERING FIGURE "F"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-1450A	1	....Adjustable Lever Assembly includes
1	VGS-1451A	1	.....Adjustable Level Head
2	PSP-518A	1	.....Level Adjusting Spring
3	PHS-802	2	.....Screw (8-32 x 1/8 Binding Hd.)
4	VGS-1460A	1	.....Level Screw Assembly
5	PHS-188	1	.....Setscrew (8-32 x 3/8 FPSS with Nylok)
6	VGS-1455A	1	.....Vial and Sleeve Assembly with
7	PHS-187	1	.....Setscrew (4-40 x 1/8 CPSS)
8	PHP-595	1	.....Pin (1/8 x 7/8 Dowel)
9	VGS-1452A	1	....."V" Plate with
10	PHP-422	1	.....Pin (3/16 x 1/2 Spring)
11	AG-536	4	.....Screw (4-40 x 1/2 SHCS)
12	PSP-519A	1	.....Pressure Spring with
13	PHS-802	1	.....Screw (8-32 x 1/8 Binding Hd.)

N/S indicates Not Shown

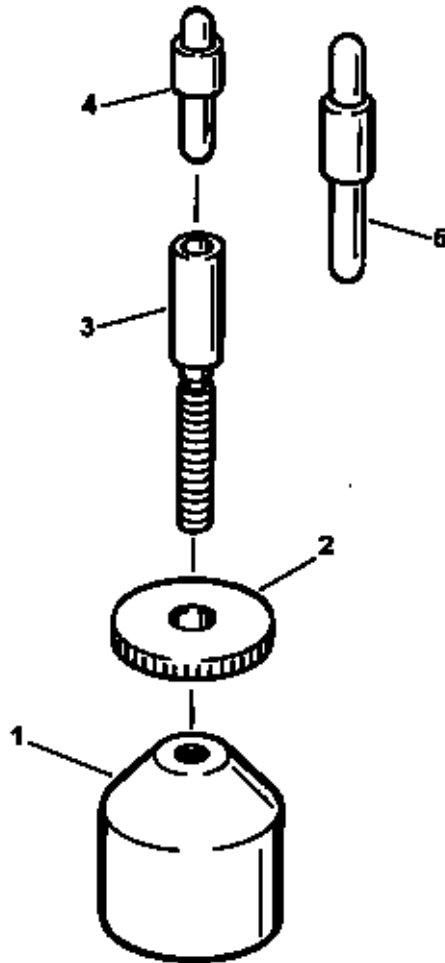


FIGURE G - JACK STAND ASSEMBLY

PARTS LIST COVERING FIGURE "G"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-1510A	1	....Jack Assembly includes
1	VGS-1511A	1	.....Jack Base
--	VGS-1515A	1	.....Knob & Screw Set includes
2	VGS-1516A	1	.....Knob
3	VGS-1517A	1	.....Screw
4	VGS-1519A	1	.....Short Support Plug
5	VGS-1518A	1	.....Long Support Plug

N/S indicates Not Shown

SECTION I
BASIC MACHINE

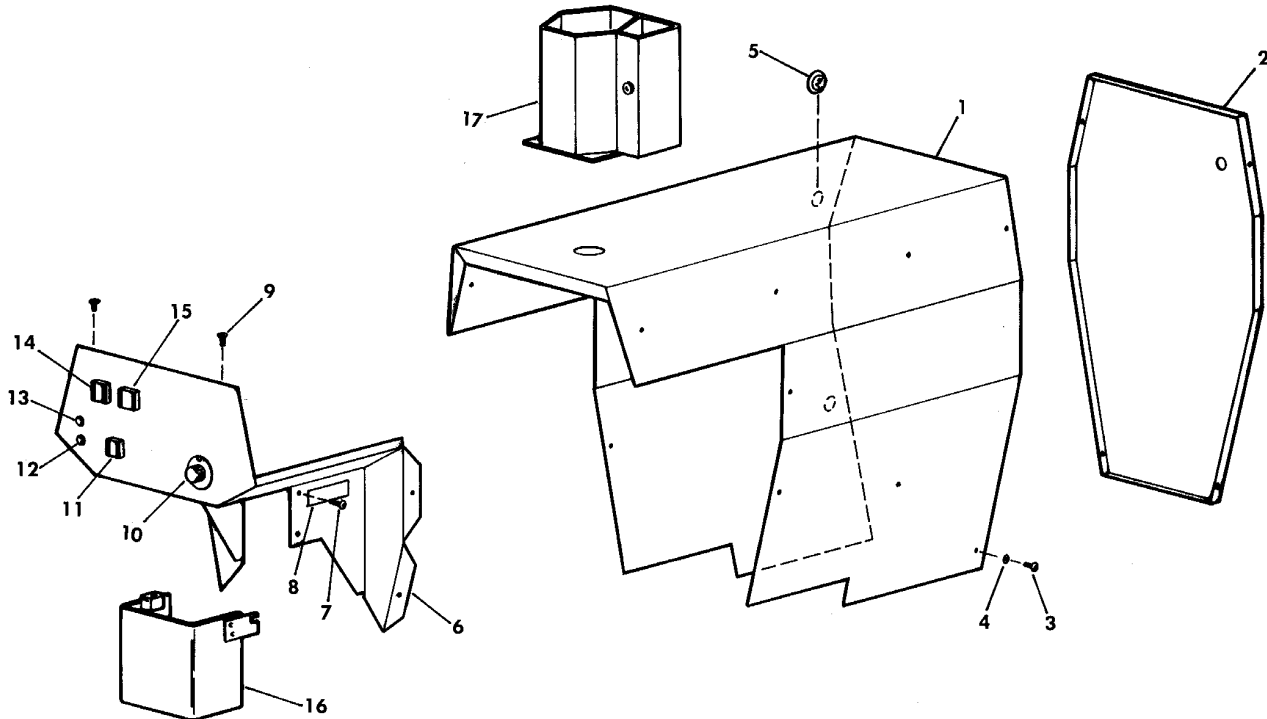


FIGURE H - SHROUD & SWITCHES

PARTS LIST COVERING FIGURE "H"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
1	VGS-1294A	1	....Shroud Body with
2	VGS-1295A	1	.....Back Cover
3	PHS-506	16	.....Screw (10-32 x 3/8 Button Hd. Cap)
4	LBA-451	16	.....Washer (#10 Shakeproof)
5	PHM-758	2	.....Plug (3/8)
6	VGS-1293A	1	....Shroud with
7	PHS-506	3	.....Screw (10-32 x 3/8 RHCS)
N/S	LBA-451	3	.....Washer (#10 Shakeproof)
8	L-TA-1017	1	.....Caution Label
9	PHS-506	2	.....Screw (10-32 x 3/8 RHCS)
N/S	LBA-451	2	.....Washer (#10 Shakeproof)
10	PHM-328A	1	....Potentiometer Knob
N/S	VGS-1720C	1	....Potentiometer
11	VGS-1715A	1	....Reverse Switch Assembly
12	VGS-1695C	1	....Overload LED Switch Assembly
13	VGS-1700C	1	....Power On LED Switch Assembly
14	VGS-1705A	1	....Start Switch Assembly
15	VGS-1710A	1	....Stop Switch Assembly
--	VGS-770	1	....Guard Set (CE Machines Only) includes
16	VGS-775A	1	.....Front Guard (CE Machines Only)
17	VGS-780A	1	.....Top Guard (CE Machines Only)

N/S indicates Not Shown

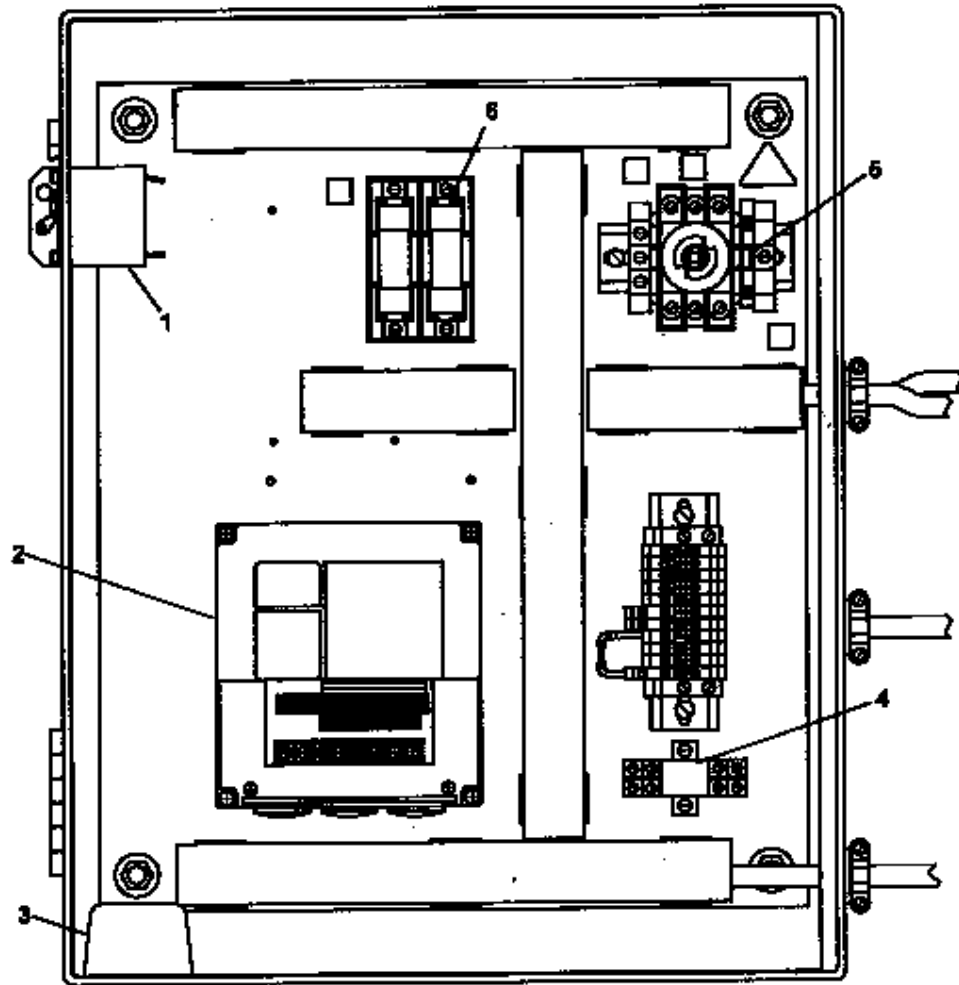


FIGURE I - ELECTRICAL ENCLOSURE

PARTS LIST COVERING FIGURE "I"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-1540/L	1	....Control Enclosure includes
1	PES-296A	1	.....Circuit Breaker
2	VGS-1572A	1	.....Inverter Drive
3	VGS-1540-1A	1	.....Power Supply
4	PES-295A	1	.....Relay
5	PEF-170A	1	.....Fuse (.1 Amp.)
6	PEF-161A	2	.....Fuse (15 Amp.)(208 Volt, 60 Hz. Machine Only)
N/S	PED-2061A	1	.....Power Line Filter ("CE" Machine Only)

N/S indicates Not Shown

SECTION II - ACCESSORIES

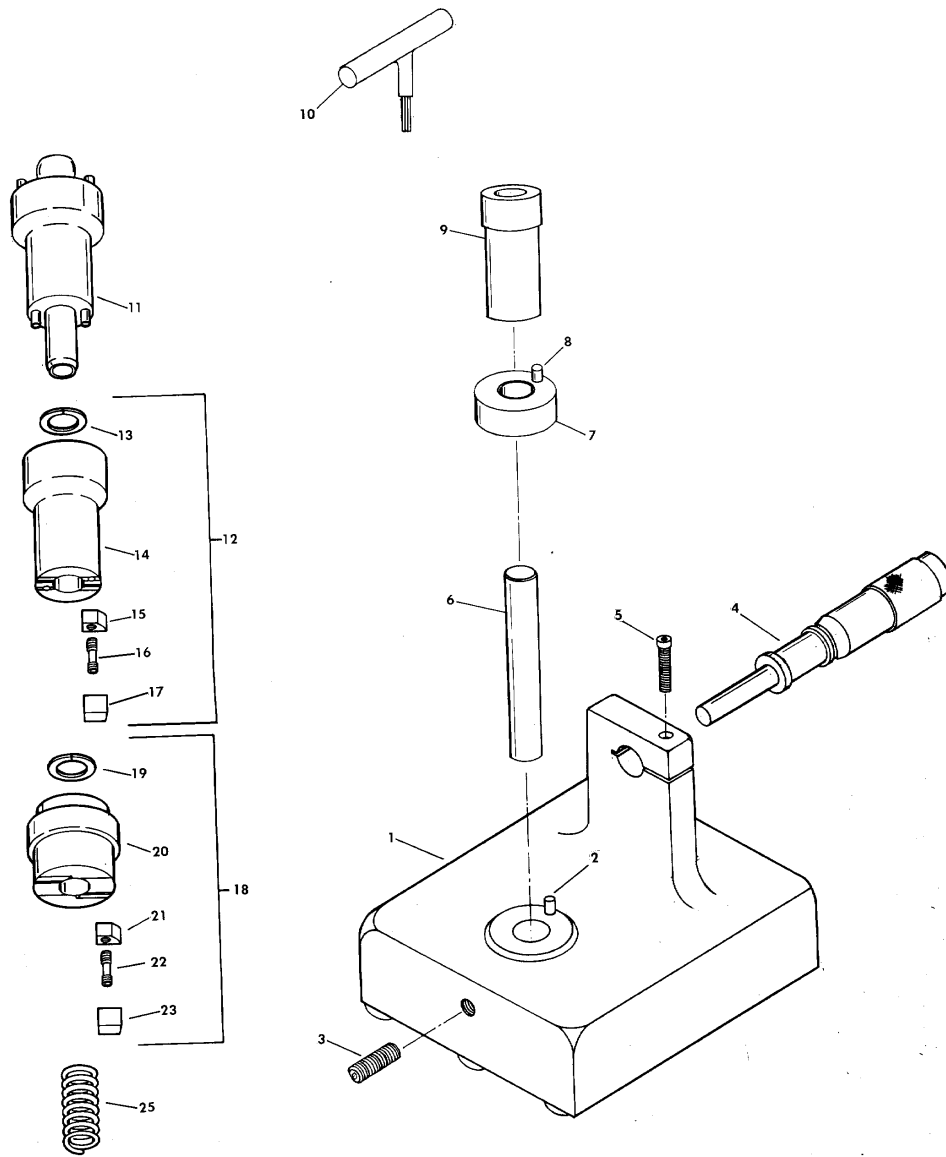


FIGURE J - VALVE SEAT CUTTER KIT

PARTS LIST COVERING FIGURE "J"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-410A	1	....Setting Fixture, English <i>includes</i>
1	VGS-411A	1	.....Base <i>with</i>
2	AG-9	1	.....Pin
3	F-406	1	.....Setscrew (1/4-20 x 3/4 FPSS)
4	CB-1932A	1	.....Micrometer
5	AG-128	1	.....Screw (10-32 x 3/4 SHCS)
6	VGS-412A	1	.....Locating Pin
7	VGS-413A	1	.....Spacer Ring <i>with</i>
8	AG-9	1	.....Pin
9	VGS-414A	1	.....Setting Plug

N/S indicates Not Shown

PARTS LIST COVERING FIGURE "J" (cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-410MA	1	....Setting Fixture, Metric <i>includes</i>
1	VGS-411A	1	.....Base <i>with</i>
2	AG-9	1	.....Pin
3	F-406	1	.....Setscrew (1/4-20 x 3/4 FPSS)
4	CB-1932MA	1	.....Micrometer
5	AG-128	1	.....Screw (10-32 x 3/4 SHCS)
6	VGS-412A	1	.....Locating Pin
7	VGS-413A	1	.....Spacer Ring <i>with</i>
8	AG-9	1	.....Pin
9	VGS-414MA	1	.....Setting Plug
10	PWM-5A	1	....Hex "T" Wrench (3/32)
11	VGS-325	1	....Driver (.389 Arbor)
11	VGS-325S	1	....Driver (.385 Arbor)
11	VGS-325T	1	....Driver (.390 Arbor)
12	ASPC-937A	1	....Cutting Head (Range: .937 - 1.031) <i>includes</i> items 13 thru 17
12	ASPC-1031	1	....Cutting Head (Range: 1.031 - 1.125) <i>includes</i> Items 13 thru 17
12	ASPC-1125	1	....Cutting Head (Range: 1.125 - 1.218) <i>includes</i> Items 13 thru 17
12	ASPC-1218	1	....Cutting Head (Range: 1.218 - 1.312) <i>includes</i> Items 13 thru 17
13	ASPC-939A	1	.....Retention Spring
14	---	1	.....Body
15	ASPC-944A	2	.....Wedge Insert (Pkg. of 2)
16	ASPC-949A	2	.....Insert Wedge Screw (Pkg. of 2)
17	ASPC-942A	2	.....Carbide Insert (Pkg. of 5)
18	ASPC-1312	1	....Cutting Head (Range: 1.312 - 1.500) <i>includes</i> 19 thru 23
18	ASPC-1500	1	....Cutting Head (Range: 1.500 - 1.687) <i>includes</i> 19 thru 23
18	ASPC-1687	1	....Cutting Head (Range: 1.687 - 1.875) <i>includes</i> 19 thru 23
18	ASPC-1875	1	....Cutting Head (Range: 1.875 - 2.062) <i>includes</i> 19 thru 23
18	ASPC-2062	1	....Cutting Head (Range: 2.062 - 2.250) <i>includes</i> 19 thru 23
18	ASPC-2250	1	....Cutting Head (Range: 2.250 - 2.437) <i>includes</i> 19 thru 23
18	ASPC-2437	1	....Cutting Head (Range: 2.437 - 2.625) <i>includes</i> 19 thru 23
18	ASPC-2625	1	....Cutting Head (Range: 2.625 - 2.812) <i>includes</i> 19 thru 23
18	ASPC-2812	1	....Cutting Head (Range: 2.812 - 3.000) <i>includes</i> 19 thru 23
19	ASPC-939A	1	.....Retention Spring
20	---	1	.....Body
21	ASPC-943A	2	.....Wedge Insert (Pkg. of 1)
22	ASPC-947A	2	.....Insert Wedge Screw (Pkg. of 2)
23	ASPC-941A	2	.....Carbide Insert (Pkg. of 5)
24	PSP-215A	1	....Spring (2" Long)
24	PSP-216A	1	....Spring (3" Long)
25	VSC-509A	4	....Spring Bushing (Pkg. of 2)

N/S indicates Not Shown

NOTE: Item 7, VGS-413A, is used with Cutting Heads ASPC-1312 and up.
Item 9, VGS-414A, is used to set Micrometer. item 4.

NOTE: ASPC-1500, -1687, -1875, and -2062 are included with kit. All others must be ordered separately.

SECTION II
ACCESSORIES

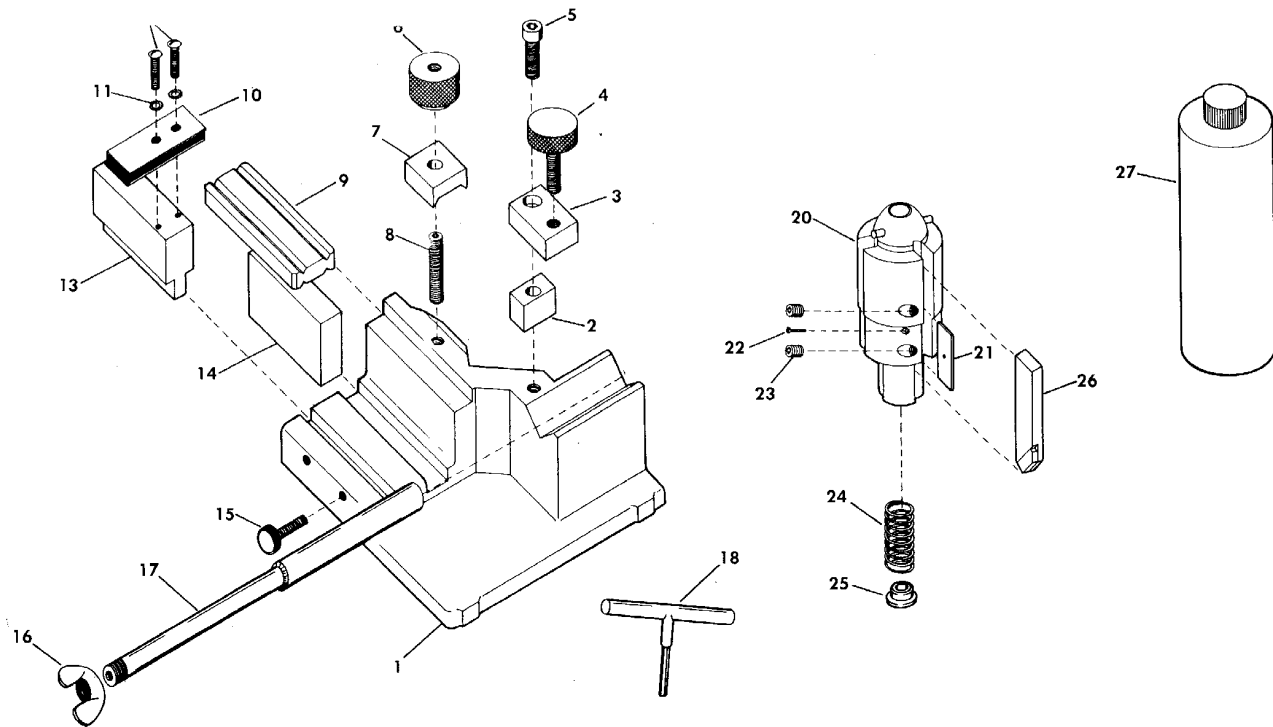


FIGURE K - SEAT ANGLE CUTTER KIT (VGS-500)

PARTS LIST COVERING FIGURE "K"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-600A	1	....Setting Fixture (.389 / .390 Arbor) includes
1	VGS-601	1	.....Base
2	VGS-602A	1	.....Pilot Spacer
3	VGS-603A	1	.....Pilot Clamp Bracket
4	VGS-620A	1	.....Pilot Clamp Knob
5	PHS-585	1	.....Screw (1/4-28 x 1" SHCS)
6	VGS-611A	1	.....Setting Plate Knob
7	VGS-609A	1	.....Clamp Block
8	PHS-126	1	.....Setscrew (1/4-28 x 1-1/4 CPSS)
9	VGS-608A	1	.....Setting Plate
--	VGS-625A	1	.....Magnetic Locator Assembly <i>includes</i>
10	VGS-627A	1	.....Magnet with Plates
11	PHW-181	2	.....Lockasher (#6 External Tooth)
12	PHS-824	2	.....Screw (6-32 x 1/2 Brass RHMS)
13	VGS-626	1	.....Sliding Block

N/S indicates Not Shown

(Parts list continued on next

PARTS LIST COVERING FIGURE "K" (cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
14	VGS-607	1	.....Stop Block
15	VGS-635A	1	.....Locator Knob
16	PHN-168	1	.....Wing Nut (3/8-16)
17	VGS-616	1	.....Arbor
--	VGS-600SA	1	....Setting Fixture (.385 Arbor) includes Items 1 thru 16 with
17	VGS-616S	1	.....Arbor
18	PWM-83A	1	....Hex Wrench (1/8)
--	VGS-510	1	....Boring Head (For .389 Arbor) includes
20	---	1	.....Cutter Body
21	VGS-512A	3	.....Plate (Pkg. of 1)
22	PHS-823	3	.....Screw (2-56 x 3/8 Fil Hd. IMS)
23	PHS-225	6	.....Setscrew (1/4-28 x 1/4 FPSS)
--	VGS-510S	1	....Boring Head (For .385 Arbor) includes Items 20 thru 23
--	VGS-510T	1	....Boring Head (For .390 Arbor) includes Items 20 thru 23
--	VGS-515	1	....Boring Head (For .389 Arbor) includes Items 20 thru 23
--	VGS-515S	1	....Boring Head (For .385 Arbor) includes Items 20 thru 23
--	VGS-515T	1	....Boring Head (For .390 Arbor) includes Items 20 thru 23
24	PSP-215A	1	....Spring (2" Long)
24	PSP-216A	1	....Spring (3" Long)
25	VSC-509A	5	....Spring Bushing (Pkg. of 1)
26	VGS-250-00	1	....Seat Angle Cutter (1/4 x 0 Degree) Order Separately
26	VGS-250-15	1	....Seat Angle Cutter (1/4 x 15 Degree) Order Separately
26	VGS-250-30	1	....Seat Angle Cutter (1/4 x 30 Degree) Order Separately
26	VGS-250-45	1	....Seat Angle Cutter (1/4 x 45 Degree) Order Separately
26	VGS-250-60	1	....Seat Angle Cutter (1/4 x 60 Degree) Order Separately
26	VGS-312-00	1	....Seat Angle Cutter (5/16 x 0 Degree) Order Separately
26	VGS-312-15	1	....Seat Angle Cutter (5/16 x 15 Degree) Order Separately
26	VGS-312-30	1	....Seat Angle Cutter (5/16 x 30 Degree) Order Separately
26	VGS-312-45	1	....Seat Angle Cutter (5/16 x 45 Degree) Order Separately
26	VGS-312-60	1	....Seat Angle Cutter (5/16 x 60 Degree) Order Separately
26	VGS-375-00	1	....Seat Angle Cutter (3/8 x 0 Degree) Order Separately
26	VGS-375-15	1	....Seat Angle Cutter (3/8 x 15 Degree) Supplied With Kit
26	VGS-375-30	1	....Seat Angle Cutter (3/8 x 30 Degree) Supplied With Kit
26	VGS-375-45	1	....Seat Angle Cutter (3.8 x 45 Degree) Supplied With Kit
26	VGS-375-60	1	....Seat Angle Cutter (3/8 x 60 Degree) Supplied With Kit
26	VGS-500-00	1	....Seat Angle Cutter (1/2 x 0 Degree) Order Separately
26	VGS-500-15	1	....Seat Angle Cutter (1/2 x 15 Degree) Supplied With Kit
26	VGS-500-30	1	....Seat Angle Cutter (1/2 x 30 Degree) Supplied With Kit
26	VGS-500-45	1	....Seat Angle Cutter (1/2 x 45 Degree) Supplied With Kit
26	VGS-500-60	1	....Seat Angle Cutter (1/2 x 60 Degree) Supplied With Kit
26	VGS-625-00	1	....Seat Angle Cutter (5/8 x 0 Degree) Order Separately
26	VGS-625-15	1	....Seat Angle Cutter (5/8 x 15 Degree) Order Separately
26	VGS-625-30	1	....Seat Angle Cutter (5/8 x 30 Degree) Order Separately
26	VGS-625-45	1	....Seat Angle Cutter (5/8 x 45 Degree) Order Separately
26	VGS-625-60	1	....Seat Angle Cutter (5/8 x 60 Degree) Order Separately
27	VGS-20657	--	....Cutting Oil (Quart)

N/S indicates Not Shown

SECTION II
ACCESSORIES

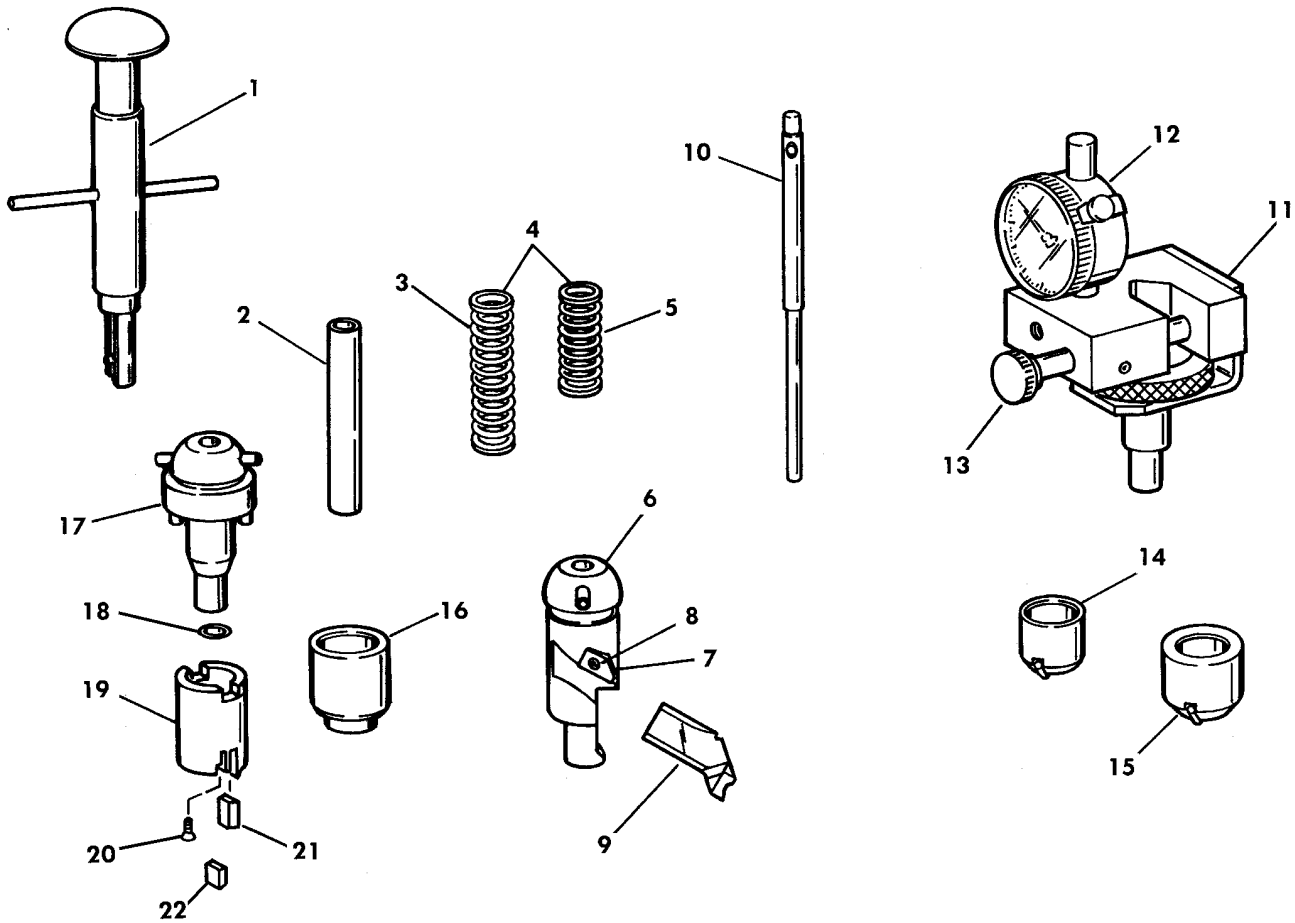


FIGURE L - SEAT ANGLE CUTTER KIT

PARTS LIST COVERING FIGURE "L"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
1	---	1	....Pilot Tool
--	VSC-700	1	....Seat Angle Cutter Kit (17 - 25 mm / .669 - 1.0 in.) includes
2	VSC-780A	1	.....Level Bushing
3	PSP-213A	1	.....Spring (Long) <i>with</i>
4	VSC-709A	2	.....Bushing (Pkg. of 2)
5	PSP-212A	1	.....Spring (Short) <i>with</i>
4	VSC-709A	2	.....Bushing (Pkg. of 2)
6	VSC-710A	1	.....Cutter Body Assembly <i>includes</i>
7	VSC-202A	1	.....Wedge
8	ASPC-947A	1	.....Screw (Special)
9	VSC-717	1	.....Cutter (1,3 mm / .051 in. Seat Width)
9	VSC-718	1	.....Cutter (1,0 mm / .040 in. Seat Width)
10	---	1	....Pilot
--	VSC-750	1	....Runout Gage Kit <i>includes</i>
11	VSC-760	1	.....Runout Gage Assembly <i>includes</i>
12	VSC-752A	1	.....Dial Indicator
13	PHM-330A	1	.....Knob
14	VS-87544	1	.....Indicator Wheel (.625 - .875)
15	VS-100044	1	.....Indicator Wheel (.625 - 1.00)
--	VSC-750M	1	....Metric Runout Gage Kit <i>includes</i>
11	VSC-760M	1	.....Runout Gage Assembly <i>includes</i>
12	VSC-752MA	1	.....Metric Dial Indicator
13	PHM-330A	1	.....Knob
14	VS-87544	1	.....Indicator Wheel (.625 - .875 in.)
15	VS-100044	1	.....Indicator Wheel (.625 - 1.00 in.)
16	VSC-770A	1	....Seat Driver Ring (11/16 Dia.)
17	VSC-725A	1	....Driver Assembly
--	ASPC-937A	1	....Cutting Head Assembly (.937 - 1.031 in.) <i>includes</i>
18	ASPC-939A	1	.....Retention Spring
19	ASPC-938	1	.....Cutting Head
20	ASPC-949A	2	.....Insert Wedge Screw (Pkg. of 2)
21	ASPC-944A	2	.....Wedge Insert (Pkg. of 2)
22	ASPC-942A	2	.....Carbide Insert (Pkg. of 2)

N/S indicates Not Shown

SECTION II
ACCESSORIES

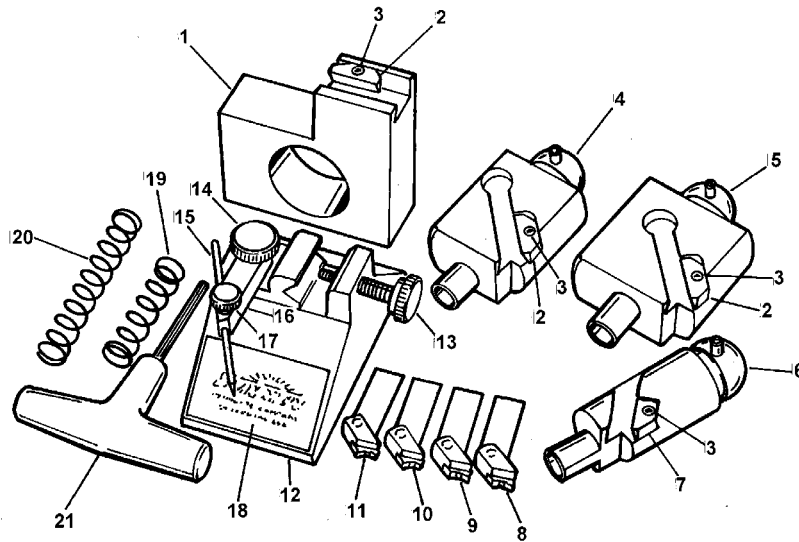


FIGURE M - SEAT ANGLE CUTTER KIT (VSC-500)

PARTS LIST COVERING FIGURE "M"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VSC-500	1	....Seat Angle Cutter Kit includes
1	VSC-50	1	.....Tool Sharpening Fixture with
2	VSC-302A	1	.....Wedge
3	ASPC-947A	1	.....Screw (Special)
4	VSC-305	1	.....Cutter Body (38 - 52 mm / 1.5 - 20 in.) with
2	VSC-302A	1	.....Wedge
3	ASPC-947A	1	.....Screw (Special)
5	VSC-350	1	.....Cutter Body (47 - 64 mm / 1.9 - 2.5 in.) with
2	VSC-302A	1	.....Wedge
3	ASPC-947A	1	.....Screw (Special)
6	VSC-205	1	.....Cutter Body (25 - 41 mm / 1.0 - 1.6 in.) with
7	VSC-202A	1	.....Wedge
3	ASPC-947A	1	.....Screw (Special)
8	VSC-08030	1	.....Cutter (15, 30, 60)
9	VSC-06030	1	.....Cutter (15, 30, 60)
10	VSC-08045	1	.....Cutter (30, 45, 60)
11	VSC-06045	1	.....Cutter (30, 45, 60)
--	VSC-400	1	.....Setting Fixture Assembly includes
12	VSC-403	1	.....Base
13	VSC-420A	1	.....Ball Plunger Assembly
14	VSC-435A	1	.....Pointer Adjustment Knob
15	VSC-437A	1	.....Pointer Needle
16	VSC-438A	1	.....Pointer
17	VSC-430A	1	.....Pointer Knob
N/S	PHW-383	1	.....Spring Washer
18	VSC-426A	2	.....Decal (Pkg. of 2)
19	PSP-215A	1	.....Spring (2" Long)
20	PSP-216A	1	.....Spring (3" Long)
21	PWM-5	1	.....Hex "T" Wrench (3/32)
N/S	VSC-509A	4	.....Spring Bushing (Pkg. of 1)
N/S	VGS-20657	1	.....Cutting Oil (Quart)

N/S indicates Not Shown

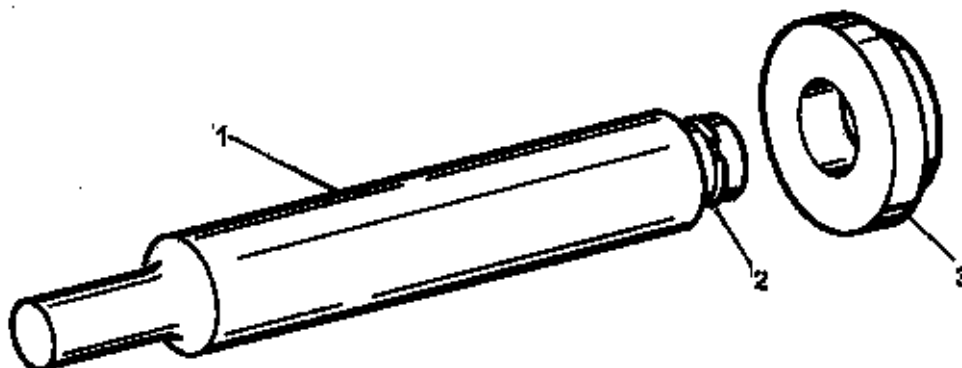


FIGURE N - VALVE SEAT DRIVER KIT

PARTS LIST COVERING FIGURE "N"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-440A	1	....Driver Assembly includes
1	VGS-441	1	.....Driver
2	PHR-107A	1	.....Retaining Ring
3	VGS-451A	1	....Seat Driver Ring (15/16)
3	VGS-452A	1	....Seat Driver Ring (1-1/4)
3	VGS-453A	1	....Seat Driver Ring (1-1/2)
3	VGS-454A	1	....Seat Driver Ring (1-3/4)
3	VGS-455A	1	....Seat Driver Ring (2)
3	VGS-456A	1	....Seat Driver Ring (2-1/4)

N/S indicates Not Shown

SECTION II
ACCESSORIES

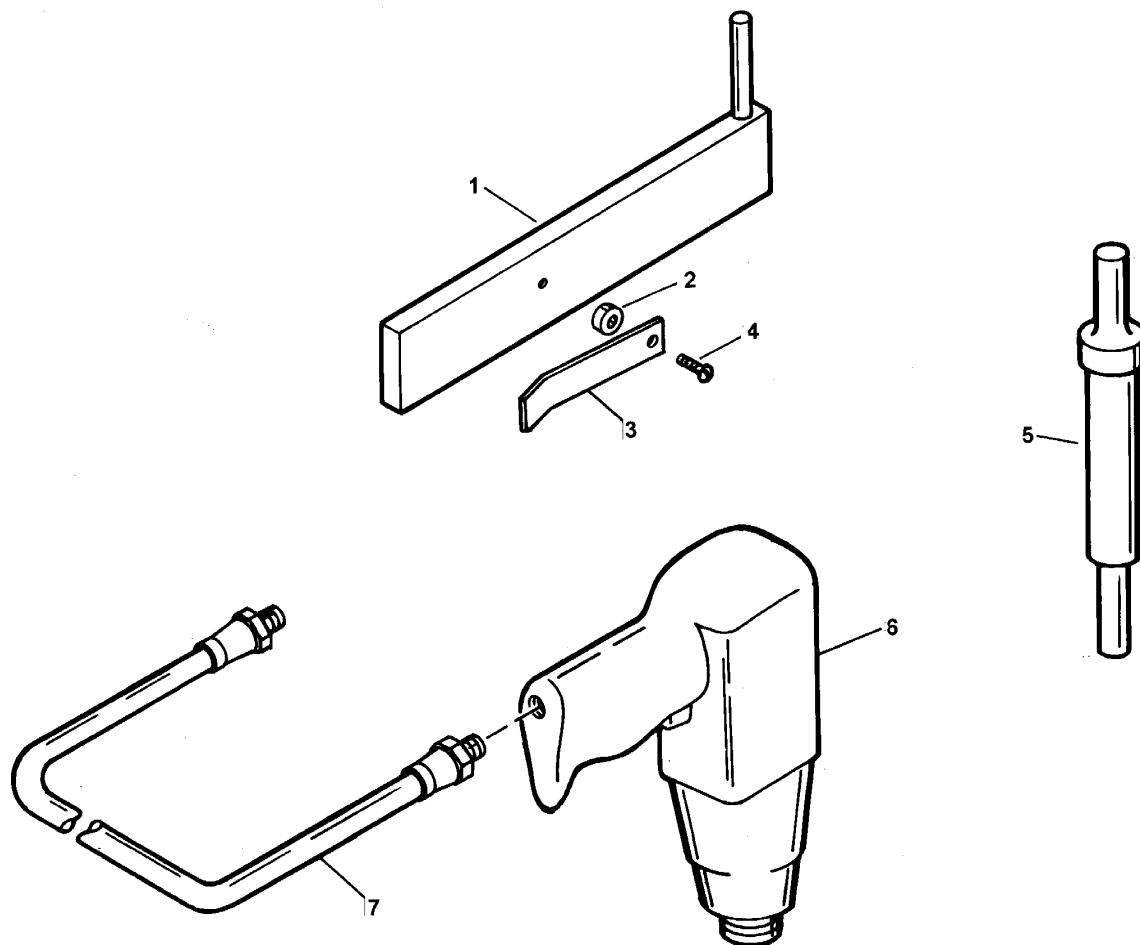


FIGURE O - VALVE GUIDE INSTALLATION KIT

PARTS LIST COVERING FIGURE "O"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-180A	1	....Canted Guide Alignment Bar includes
1	VGS-181A	1	.....Guide Alignment Bar <i>with Pin</i>
2	VGS-183A	1	.....Spacer
3	VGS-184A	1	.....Leaf Spring
4	PHS-603	1	.....Screw (10-32 x 3/4 RHMS)
5	VGS-191A	1	....Guide Driver (5/16)
5	VGS-192A	1	....Guide Driver (11/32)
5	VGS-193A	1	....Guide Driver (3/8)
5	VGS-194A	1	....Guide Driver (7/16)
6	VGS-216A	1	....Air Hammer
7	VGS-217A	1	....Air Hammer Hose
N/S	B-200	1	....Lubricant (Pkg. of 6)

N/S indicates Not Shown

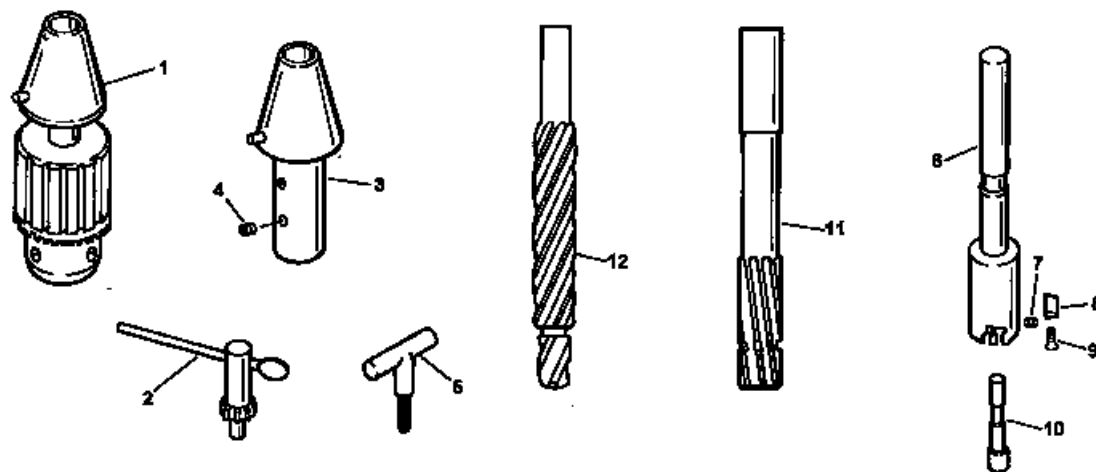


FIGURE P - REAMER, SPOTFACER KIT, & VALVE GUIDE KIT

PARTS LIST COVERING FIGURE "P"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
1	VGS-130A	1	....Adapter and Drill Chuck includes
2	VGS-132	1	.....Key (Jacobs K3)
3	VGS-140A	3	....Adapter (Pkg. of 1) with
4	PHS-198	2	.....Setscrew (3/8-24 x 1/4 CPSS)
5	PWM-12A	1	....Hex "T" Wrench (3/16)
--	VGS-145A	1	....Spotfacer Assembly (3/4) includes
6	VGS-146A	1	.....Spotfacer
7	AN-320	1	.....Setscrew (10-32 x 1/4 CPSS)
8	ASPC-942A	2	.....Carbide Insert (Pkg. of 5)
9	ASPC-948A	2	.....Taper Head Wedge Screw (Pkg. of 2)
N/S	VGS-245A	1	....Spotfacer Assembly (1-1/8) includes
--	VGS-246A	1	.....Spotfacer
7	AN-320	1	.....Setscrew (10-32 x 1/4 CPSS)
8a	ASPC-952A	2	.....Carbide Insert (Pkg. of 5)
9	ASPC-948A	4	.....Taper Head Wedge Screw (Pkg. of 2)
10	VGS-171A	1	....Pilot (5/16)
10	VGS-172A	1	....Pilot (11/32)
10	VGS-173A	1	....Pilot (3/8)
10	VGS-174A	1	....Pilot (7/16)
11	VGS-161A	1	....Reamer (7/16)
11	VGS-162A	1	....Reamer (1/2)
11	VGS-163A	1	....Reamer (5/8)
11	VGS-244A	1	....Reamer (9/16 x .549 Pilot) Component of VGS-20518
12	VGS-151A	1	....Drill (.427 x .341 Pilot)
12	VGS-152A	1	....Drill (.490 x .343 Pilot)
12	VGS-153A	1	....Drill (.490 x .371 Pilot)
12	VGS-154A	1	....Drill (.610 x .435 Pilot)
12	VGS-243A	1	....Drill (.550 x .341 Pilot) Component of VGS-20518

N/S indicates Not Shown

SECTION II
ACCESSORIES

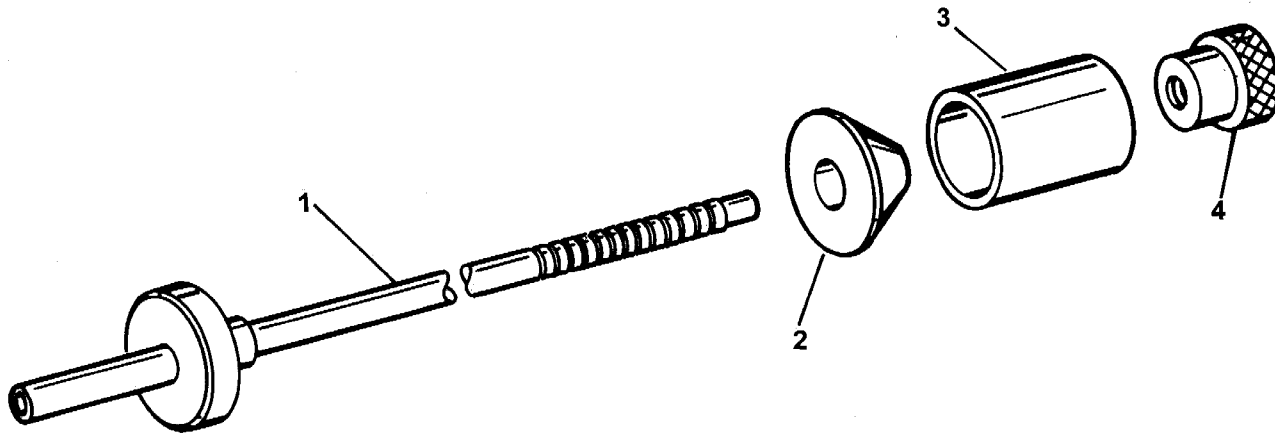


FIGURE Q - WORN GUIDE ALIGNMENT FIXTURE KIT

PARTS LIST COVERING FIGURE "Q"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-20524A	1	....Worn Guide Alignment Fixture includes
1	VGS-100A	1	.....Guide Locator Pilot
2	VGS-107A	1	.....Alignment Bushing
2	VGS-108A	1	.....Alignment Bushing
2	VGS-109A	1	.....Alignment Bushing
3	VGS-112A	1	.....Alignment Sleeve
4	VGS-106A	1	.....Nut

N/S indicates Not Shown

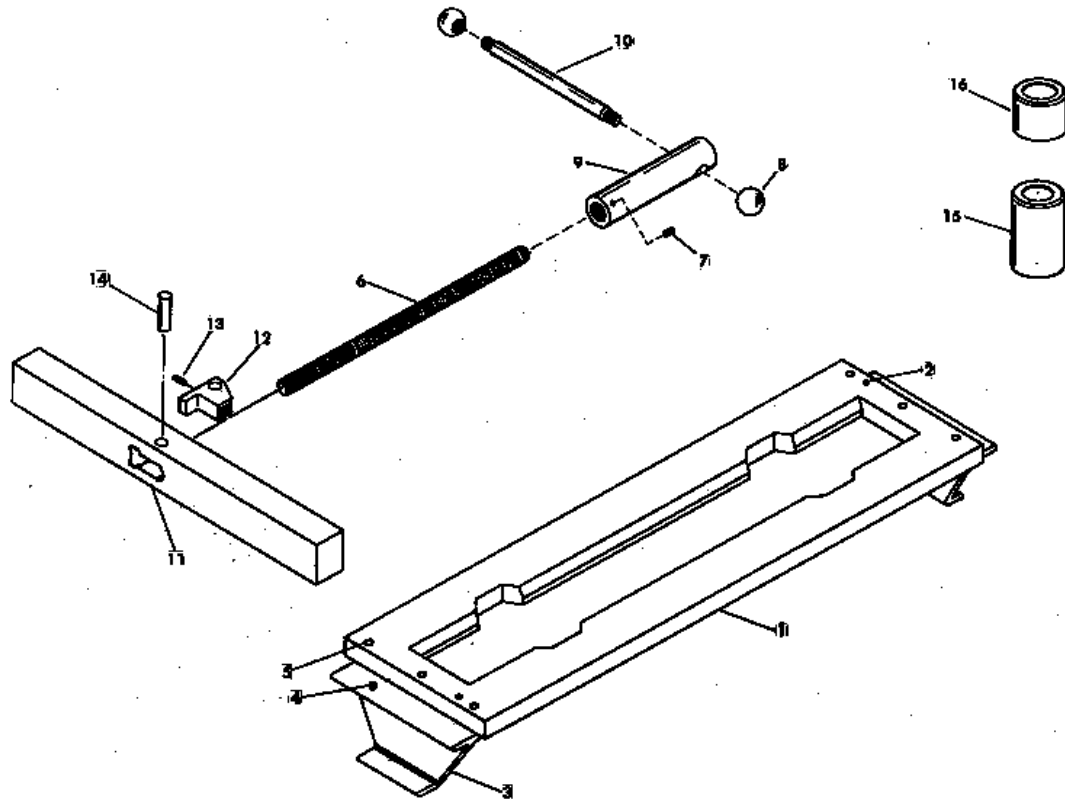


FIGURE R - HEAD HOLDER FRAME KIT

PARTS LIST COVERING FIGURE "R"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-120A	1	....Frame Assembly includes
1	VGS-1399	1	.....Plate with
2	PHP-599	2	.....Pin (5/16 x 1/2 Dowel)
3	VGS-121	2	.....Spacer <i>with</i>
4	PHP-598	2	.....Pin (3/8 x 1/2 Dowel)
5	PHS-605	6	.....Screw (3/8-16 x 1" SHCS)
--	VGS-1470A	2	....Clamp Stud Assembly (Pkg. of 1) includes
6	VGS-1472	1	.....Stud
7	KN-180	1	.....Setscrew (10-32 x 1/4 FPSS)
8	PHM-318A	2	.....Knob (Pkg. of 1)
9	VGS-1471	1	.....Clamp Stud Nut
10	VGS-1473	1	.....Handle
--	VGS-1480A	2	....Clamp Bar Assembly (Pkg. of 1) includes
11	VGS-1481	1	.....Clamp Bar
12	VGS-1482	1	.....Clamp Bar Latch
13	PSP-161A	1	.....Spring
14	PHP-704	1	.....Drive Pin (1/4 x 1")
15	VGS-1487A	4	....Long Head Clamp Spacer (Pkg. of 1)
16	VGS-1488A	4	....Short Head Clamp Spacer (Pkg. of 1)

N/S indicates Not Shown

SECTION II
ACCESSORIES

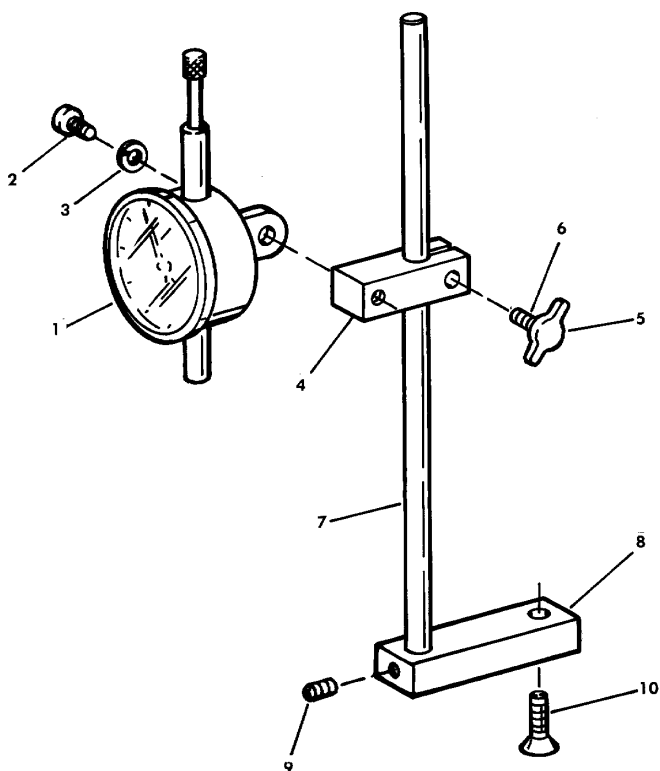


FIGURE S - SEAT DEPTH INDICATOR KIT

PARTS LIST COVERING FIGURE "S"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
--	VGS-1750	1	....Seat Depth Indicator, English includes
1	VGS-1756A	1	.....Dial Indicator
2	PHS-653	1	.....Screw (1/4-20 x 3/4 BHCS)
3	PHW-118	1	.....Washer (1/4 Lock)
4	VGS-1757	1	.....Indicator Clamp
5	PHM-348A	1	.....Tee Knob
6	P-144	1	.....Screw (10-32 x 1/2 SHCS)
7	VGS-1759A	1	.....Post
8	VGS-1758	1	.....Post Support
9	AN-320	1	.....Setscrew (10-32 x 1/4 CPSS)
10	LN-1676	1	.....Screw (1/4-20 x 7/8 Flat Hd.)
--	VGS-1750M	1	....Seat Depth Indicator, Metric includes
1	VGS-1756MA	1	.....Metric Dial Indicator
2	PHS-653	1	.....Screw (1/4-20 x 3/4 BHCS)
3	PHW-118	1	.....Washer (1/4 Lock)
4	VGS-1757	1	.....Indicator Clamp
5	PHM-348A	1	.....Tee Knob
6	P-144	1	.....Screw (10-32 x 1/2 SHCS)
7	VGS-1759A	1	.....Post
8	VGS-1758	1	.....Post Support
9	AN-320	1	.....Setscrew (10-32 x 1/4 CPSS)
10	LN-1676	1	.....Screw (1/4-20 x 7/8 Flat Hd.)

N/S indicates Not Shown

Like any machinery, this equipment may be dangerous if used improperly. Be sure to read and follow the instructions for the operation of the equipment.

FRACTION / DECIMAL / MILLIMETER EQUIVALENTS CHART

INCH			INCH			INCH		
FRACTION	DECIMAL	MILLIMETER	FRACTION	DECIMAL	MILLIMETER	FRACTION	DECIMAL	MILLIMETER
....	.003937	0,1000	9/32	.281250	7,1438	21/32	.656250	16,6688
....	.007874	0,2000	19/64	.296875	7,5406	....	.669291	17,0000
....	.011811	0,3000	5/16	.312500	7,9375	43/64	.671875	17,0656
1/64	.015625	0,3969	....	.314961	8,0000	11/16	.687500	17,4625
....	.015748	0,4000	21/64	.328125	8,3344	45/64	.703125	17,8594
....	.019685	0,5000	11/32	.343750	8,7313	....	.708661	18,0000
....	.023622	0,6000	....	.354331	9,0000	23/32	.718750	18,2563
....	.027559	0,7000	23/64	.359375	9,1281	47/64	.734375	18,6531
1/32	.031250	0,7938	3/8	.375000	9,5250	....	.748031	19,0000
....	.031496	0,8000	25/64	.390625	9,9219	3/4	.750000	19,0500
....	.035433	0,9000	....	.393701	10,0000	49/64	.765625	19,4469
....	.039370	1,0000	13/32	.406250	10,3188	25/32	.781250	19,8438
3/64	.046875	1,1906	27/64	.421875	10,7156	....	.787402	20,0000
1/16	.062500	1,5875	....	.433071	11,0000	51/64	.796875	20,2406
5/64	.078125	1,9844	7/16	.437500	11,1125	13/16	.812500	20,6375
....	.078740	2,0000	29/64	.453125	11,5094	....	.826772	21,0000
3/32	.093750	2,3813	15/32	.468750	11,9063	53/64	.828125	21,0344
7/64	.109375	2,7781	....	.472441	12,0000	27/32	.843750	21,4313
....	.118110	3,0000	31/64	.484375	12,3031	55/64	.859375	21,8281
1/8	.125000	3,1750	1/2	.500000	12,7000	....	.866142	22,0000
9/64	.140625	3,5719	....	.511811	13,0000	7/8	.875000	22,2250
5/32	.156250	3,9688	33/64	.515625	13,0969	57/64	.890625	22,6219
....	.157480	4,0000	17/32	.531250	13,4938	....	.905512	23,0000
11/64	.171875	4,3656	35/64	.546875	13,8906	29/32	.906250	23,0188
3/16	.187500	4,7625	....	.551181	14,0000	59/64	.921875	23,4156
....	.196850	5,0000	9/16	.562500	14,2875	15/16	.937500	23,8125
13/64	.203125	5,1594	37/64	.578125	14,6844	....	.944882	24,0000
7/32	.218750	5,5563	....	.590551	15,0000	61/64	.953125	24,2094
15/64	.234375	5,9531	19/32	.593750	15,0813	31/32	.968750	24,6063
....	.236220	6,0000	39/64	.609375	15,4781	....	.984252	25,0000
1/4	.250000	6,3500	5/8	.625000	15,8750	63/64	.984375	25,0031
17/64	.265625	6,7469	....	.629921	16,0000	1	1.000000	25,4000
....	.275591	7,0000	41/64	.640625	16,2719	1-1/16	1.062500	26,9880

FORMULAS:

MULTIPLY		BY		TO GET
INCHES (in)	x	25.4	=	MILLIMETERS (mm)
FEET (ft)	x	0.3048	=	METERS (m)

MULTIPLY		BY		TO GET
MILLIMETERS (mm)	x	0.03937	=	INCHES (in)
METERS (m)	x	3.281	=	FEET (ft)

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