



REPAIR PARTS CATALOG FOR SUNNEN® SV3 VERTICAL HONING MACHINES

MODEL:

SV3 Series

THIS CATALOG COVERS THE ABOVE MODEL WITH SERIAL NUMBERS:
SV3-1297209, SV3-0100242, SV3-1299247, SV3-0302281, SV3-0400256,
SV3-0700266, SV3-0801273, & SV3-1201278.



SUNNEN, THE SUNNEN LOGO, GENERAL HONE AND THE GENERAL HONE LOGO ARE REGISTERED TRADEMARKS OF SUNNEN PRODUCTS COMPANY.



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

X-SV-3001D

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

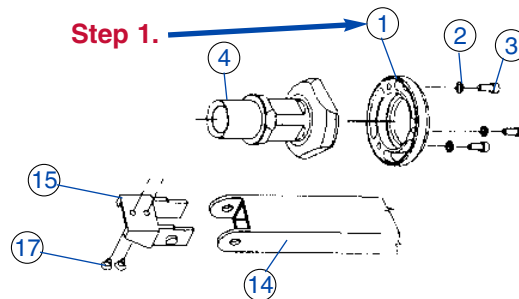
Step 1. – Locate desired part on illustration. Note item number.

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.

SUNNEN® SOFTWARE LICENSE AGREEMENT

This document is a Legal Agreement between you, as user and licensee (Licensee), and Sunnen® Products Company (SPC) with respect to preprogrammed software (Software) provided by SPC for use on SPC Equipment. By using the Software, you, as Licensee, agree to become bound by the terms of this Agreement.

In consideration of payment of the license fee (License Fee) which is part of the price evidenced by your receipt (Receipt), SPC grants to you as Licensee a non-exclusive right, without right to sub-license, to use the particular copy of the SPC Software licensed hereunder only on the particular equipment sold with the Software. SPC reserves all rights including rights not otherwise expressly granted, and retain title and ownership to the Software including all subsequent copies or updates in any media. The Software and all accompanying written materials are covered by copyrights owned by SPC. If supplied on removable media (floppy disk), you, as Licensee, may copy the Software only for back up purposes; or you may request that SPC copy the Software for you for the same purposes. All other copying of the Software or of the accompanying written materials is expressly forbidden and is in violation of the Agreement.

The Software and accompanying written materials (including the user's manual, if any) are provided in an "as is" condition without warranty of any kind including the implied warranties of merchantability and fitness for a particular purpose, even if SPC has been advised of this purpose. SPC specifically does not warrant that it will be liable as a result of the operation of the Software for any direct, indirect, consequential or accidental damages arising out of the use of or inability to use such product even if SPC has been advised of the possibility of such use. It is recognized that some states do not allow the exclusion or limitation of liability for consequential or accidental damages and to the extent this is true, the above limitations may not apply.

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.

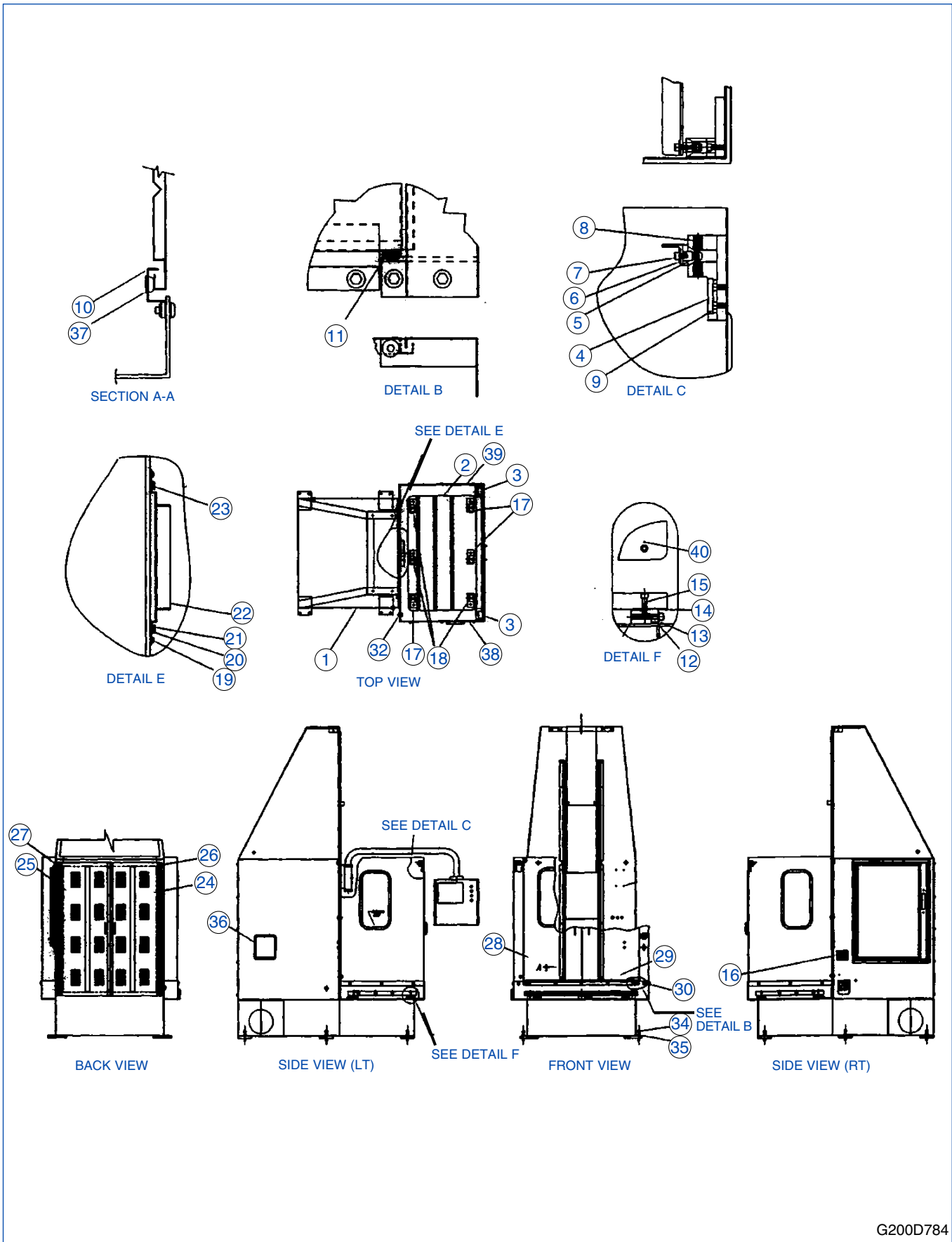
CONTENTS

	PAGE
Introduction	iii
How To Order	iii
How To Use This Parts List	iii
General Information	iv
ESD Prevention Review	iv
Limited Product Warranty	v
Sunnen Software License Agreement.....	v
General Safety Instructions	vi
Contents	1
 SECTION I- MACHINE BASE ASSEMBLY	
1-A Machine Base Assembly (Non-CE).....	2
1-B Machine Base Assembly (CE).....	5
1-C Spindle Carriage Assembly	8
1-D Spindle Carriage Assembly (Heavy Duty)	10
1-E Rotary Feed System Assembly	12
1-F Push Feed System Assembly	13
1-G Push Feed System Assembly	14
1-H Rotary Feed Drive Adapter Assembly	16
1-I Push Feed Drive Adapter Assembly	17
1-J Way Bar Assembly	18
1-K Control Console Assembly	19
1-L Encoder Assembly	20
 SECTION II- HYDRAULIC SYSTEM	
2-A Hydraulic Schematic - Push & Rotary Feed System	22
2-B Hydraulic Piping Schematic - Push & Rotary Feed System	24
 SECTION III- LUBRICATION SCHEMATICS	
3-A Lubrication Schematic	28
3-B Lubrication Schematic (Heavy Duty)	29
3-C Coolant Piping Schematic (Std).....	30
3-D Coolant Piping Schematic (Paper Bed Filter).....	32
3-E Coolant Piping Schematic (Paper Bed Filter w/Mag. Separator)	34
 SECTION IV- ELECTRICAL	
4-A Electrical Schematic	36
 SECTION V- OPTIONAL EQUIPMENT	
5-A Rotary Feed Driveshaft Assembly	42
5-B Hone Body Assembly (3.5")	43
5-C End Clamping Fixture	44

"SUNNEN, THE SUNNEN LOGO, GENERAL HONE AND THE GENERAL HONE LOGO ARE REGISTERED TRADEMARKS OF SUNNEN PRODUCTS COMPANY."

©Copyright 2008 by Sunnen® Products Company•Printed in U.S.A.

SECTION I - MACHINE BASE ASSEMBLY



G200D784

FIGURE 1-A – MACHINE BASE ASSEMBLY (NON-CE)

PARTS LIST COVERING FIGURE "1-A"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G200D784		....Machine Base Assembly (GV3)
-	G200D784PG2		....Machine Base Assembly (GV3)
1	G200D987	1	.....Machine Base Fabrication
2	G200C519	1	.....Table
3	G200C533	2	.....Limit Switch & Pilot Mount
4	G200C527-1	2	.....Engagement Bracket
5	G200C527-2	2	.....Pilot Pin
6	F1244	2	.....Std. Flat Washer (1/4")
7	F1260	2	.....Screw (1/4-20 x 1" SHCS)
8	F441-21	4	.....Ball Plunger
9	F1683	4	.....Screw (1/4-20 x 3/8" SHCS)
10	G200D771	1	.....Drip Channel
11	F457-15	2	.....Bushing
12	F1226GH1	6	.....Screw (1/2-13 x 1 1/2" Lg SHCS)
13	F105-13	6	.....Flat Washer
14	G200C514	6	.....Way Bar Adjusting Wedge
15	F1237	6	.....Screw (1/2-13 x 2" Lg SHCS)
16	F494-8	1	.....Machine Data Plate
17	C200C518	3	.....Right Table Adjustment Pad
18	G200C517	3	.....Left Table Adjustment Pad
19	F1261	10	.....Screw (1/4-20 x 1/2" BHCS) (To Mount Slide Channels)
N/S	PDL-143		.....Decal Kit
20	F457-16	8'	.....Wear Strip
21	G200D770-2	1	.....Left Slide Channel
N/S	F1272	2	.....Screws (1/4-20 x 3/8" BHCS)(Mounts Sldg Guard To Spindle)
22	G200D770-3	1	.....Sliding Guard
23	G200D770-1	1	.....Right Slide Channel
24	G200D783-1	1	.....Right Door-Louvered
25	G200D783-2	1	.....Left Door-Louvered
26	F1626GH1	15	.....Screws (1/4-20 x 3/4" BHCS)(To Mount Rear Door Panels)
27	F1261	12	.....Screws (1/4-20 x 1/2" BHCS)(To Mount Electrical Cabinet)
28	G200D772-1	1	.....Guard Door (Lt)
29	G200D772-2	1	.....Guard Door (Rt)
30	F1685	23	.....Screws (3/8-16 x 3/4" BHCS)(To Mount Guard/Door Assy)
31	F1823	--	.....Full Pipe Coupling (1/4")(Ref. Part Of Mach. Base)
32	F1865	--	.....Full Pipe Coupling (1/2" NPT)(Ref. Part Of Mach. Base)
33	F1652	--	.....Full Pipe Coupling (1" NPT)(Ref. Part Of Mach Base)
34	F465-1	6	.....Leveling Screw
35	F1686	6	.....Hex Nuts (3/4-10)
36	F457-17	58"	.....Grommet Stripping (For Heat Exchanger)
37	F520-1	2	.....Door Stops
38	G200D772-3	1	.....Left Guard Panel
39	G200D772-4	1	.....Right Guard Panel
40	F1687	6	.....Roll Pin (1/4" Dia x 2 1/2" Lg)(To Locate Table)
N/S	F1319	4	.....Screw (3/8-16 x 1" HHCS)(To Mount Heat Exchanger)
N/S	F1301	8	.....Flat Washer (3/8" Std.)
N/S	F1309	4	.....Hex Nuts (3/8" Std.)
N/S	F1324	14	.....Screw (3/8-16 x 1/2" HHCS)(To Mount Hydraulic Unit)
N/S	F1274	2	.....Screw (1/4-20 x 3/8" HHCS)(To Mount Solenoid Box)
N/S	F1244	2	.....Flat Washer (1/4" Std)

N/S indicates Not Shown

(Parts continued on next page)

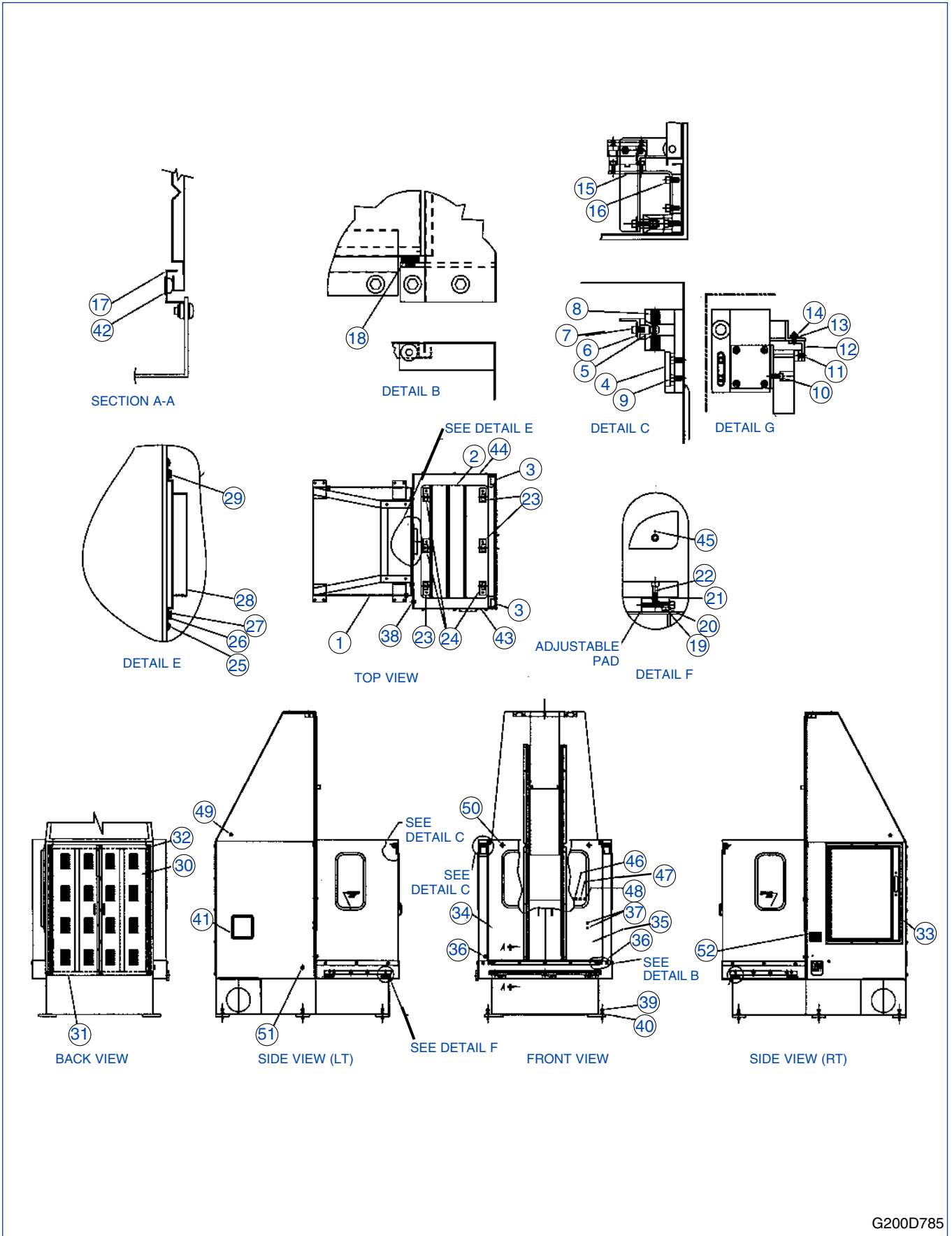
SECTION I

MACHINE BASE ASSEMBLY

PARTS LIST COVERING FIGURE "1-A" (Cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
N/S	F434-40	4	.....Clamping Unit (HC-16-5)
N/S	F434-9	20	.....Stacking Unit (N-16)
N/S	F434-38	12	.....Split Bushing ($\frac{3}{8}$ " Hyd Tube) (G-16-6)
N/S	F434-20	8	.....Split Bushing ($\frac{3}{4}$ " Rigid Conduit) (G-16-12-P)
N/S	F5589	20	.....Screw ($\frac{5}{16}$ -18 x $\frac{3}{4}$ " Lg HHCS)(For Clamping Unit)
N/S	F1918	4	.....Setscrews ($\frac{5}{16}$ -18 x 1")(For Clamping Unit)
N/S	F434-19	8	.....Split Bushing ($\frac{1}{2}$ " Liquid tight) (G-16-16)
N/S	F434-52	2	.....Clamping Unit (HC-16-4)
N/S	G200D773	1	.....Shipping Bracket
41	F1632	1	.....Full Pipe Coupling ($\frac{3}{4}$ " NPT)(Ref. Part Of Mach Base)
42	F1865	1	.....Full Pipe Coupling ($\frac{1}{2}$ " NPT)(Ref. Part Of Mach Base)
43	F1865	1	.....Full Pipe Coupling ($\frac{1}{2}$ " NPT)(Ref. Part Of Mach Base)
44	F1632	1	.....Full Pipe Coupling ($\frac{3}{4}$ " NPT)(Ref. Part Of Mach Base)
45	F1632	1	.....Full Pipe Coupling ($\frac{3}{4}$ " NPT)(Ref. Part Of Guard)
N/S	G200C550	1	.....Hose Retaining Channel
N/S	F1270	4	.....Screw ($\frac{1}{4}$ -20 x $\frac{3}{4}$ " SHCS)(Mounts Relief Valve)
N/S	F1190	2	.....Screw (10-32 x $\frac{1}{2}$ " BHCS)(Mounts Hose Channel)
N/S	F3631	3	.....Screw (6-32 x $\frac{1}{4}$ " BHCS)(Mounts Tool Feed Press Gage)
N/S	G200C560	1	.....Shipping Bracket

N/S indicates Not Shown



G200D785

FIGURE 1-B – MACHINE BASE ASSEMBLY (CE)

SECTION I

MACHINE BASE ASSEMBLY

PARTS LIST COVERING FIGURE "1-B"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G200D785		....Machine Base Assembly (GV3 CE)
1	G200D987	1	.....Machine Base Fabrication
2	G200C519	1	.....Table
3	G200C533	2	.....Limit Switch & Pilot Mount
4	G200C527-1	2	.....Engagement Bracket
5	G200C527-2	2	.....Pilot Pin
6	F1244	2	.....Std. Flat Washer (1/4")
7	F1260	2	.....Screw (1/4-20 x 1" SHCS)
8	F441-21	4	.....Ball Plunger
9	F1683	4	.....Screw (1/4-20 x 3/8" SHCS)
10	F1677	4	.....Screw (10-32 x 1/2" Lg SHCS)(To Mount Switch)
11	F1191	4	.....Screw (10-32 x 1/2" Lg FHCS)(To Mount Key)
12	G200B742	1	.....Actuator Key Mount Bracket (Lt)
13	F1191	4	.....Screw (10-32 x 1/2" Lg FHCS)(To Mount Actuator Key Brkt)
14	F1917	4	.....Hex Nut (10-32)(To Mount Actuator Key Brkt)
15	G200B746	2	.....Actuator Mount Bracket
-	G200B738	1	.....Actuator Key Mount Bracket (Rt)
16	F1264	8	.....Screw (1/4-20 x 1/2" SHCS)(To Mount Actuator Mount Brkt)
17	G200D771	1	.....Drip Channel
18	F457-15	2	.....Bushing
19	F1226	6	.....Screw (1/2-13 x 1 1/2" Lg SHCS)
20	F105-13	6	.....Flat Washer
21	G200C514	6	.....Way Bar Adjusting Wedge
22	F1684	6	.....Screw (1/2-13 x 2" Lg SHCS)
23	C200C518	3	.....Right Table Adjustment Pad
24	G200C517	3	.....Left Table Adjustment Pad
25	F1261	10	.....Screw (1/4-20 x 1/2" BHCS) (To Mount Slide Channels)
N/S	PDL-143	1	.....Decal Kit
26	F457-16	8'	.....Wear Strip
27	G200D770-2	1	.....Left Slide Channel
N/S	F2814	2	.....Screws (1/4-20 x 3/8" BHCS)(Mounts Sldg Guard To Spindle)
28	G200D770-3	1	.....Sliding Guard
29	G200D770-1	1	.....Right Slide Channel
30	G200D783-1	1	.....Right Door-Louvered
31	G200D783-2	1	.....Left Door-Louvered
32	F1626	15	.....Screws (1/4-20 x 3/4" BHCS)(To Mount Rear Door Panels)
33	F1261	12	.....Screws (1/4-20 x 1/2" BHCS)(To Mount Electrical Cabinet)
34	G200D772-1	1	.....Guard Door (Lt)
35	G200D772-2	1	.....Guard Door (Rt)
36	F1685	23	.....Screws (3/8-16 x 3/4" BHCS)(To Mount Guard/Door Assy)
37	F1823	--	.....Full Pipe Coupling (1/4")(Ref. Part Of Mach Base)
38	F1632	--	.....Full Pipe Coupling (3/4" NPT)(Ref. Part Of Guard)
39	F465-1	6	.....Leveling Screw
40	F1686	6	.....Hex Nuts (3/4-10)
41	F457-17	58"	.....Grommet Stripping (For Heat Exchanger)
42	F520-1	2	.....Door Stops
43	G200D772-3	1	.....Guard Panel (Lt)
44	G200D772-4	1	.....Guard Panel (Rt)
45	F1687	6	.....Roll Pin (1/4" Dia x 2 1/2" Lg)(To Locate Table)
46	F1632	--	.....Full Pipe Coupling (3/4" NPT)(Ref. Part Of Mach Base)

N/S indicates Not Shown

(Parts continued on next page)

PARTS LIST COVERING FIGURE "1-B" (Cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
47	F1865	--	.....Full Pipe Coupling (1/2" NPT)(Ref. Part Of Mach Base)
48	F1865	--	.....Full Pipe Coupling (1/2" NPT)(Ref. Part Of Mach Base)
49	F1652	--	.....Full Pipe Coupling (1" NPT)(Ref. Part Of Mach Base)
50	F1865	--	.....Full Pipe Coupling (1/2" NPT)(Ref. Part Of Mach. Base)
51	F1632	--	.....Full Pipe Coupling (3/4" NPT)(Ref. Part Of Mach Base)
52	F494-8	1	.....Machine Data Plate
N/S	F1319	4	.....Screw (3/8-16 x 1" HHCS)(To Mount Heat Exchanger)
N/S	F1301	8	.....Flat Washer (3/8" Std)(To Mount Heat Exchanger)
N/S	F1309	4	.....Hex Nuts (3/8" Std)(To Mount Heat Exchanger)
N/S	F1324	14	.....Screw (3/8-16 x 1/2" HHCS)(To Mount Hydraulic Unit)
N/S	F1274	2	.....Screw (1/4-20 x 3/8" HHCS)(To Mount Solenoid Box)
N/S	F1244	2	.....Flat Washer (1/4" Std)(To Mount Solenoid Box)
N/S	F434-40	4	.....Clamping Unit (HC-16-5)
N/S	F434-9	20	.....Stacking Unit (N-16)
N/S	F434-38	12	.....Split Bushing (3/8" Hyd Tube) (G-16-6)
N/S	F434-18	8	.....Split Bushing (3/4" Rigid Conduit) (G-16-12-P)
N/S	F5589	20	.....Screw (5/16-18 x 3/4" Lg HHCS)(For Clamping Unit)
N/S	F1918	4	.....Setscrews (5/16-18 x 1")(For Clamping Unit)
N/S	F434-19	8	.....Split Bushing (1/2" Liquid tight) (G-16-16)
N/S	F434-5	2	.....Clamping Unit (HC-16-4)
N/S	G200D773	1	.....Shipping Bracket
N/S	G200C550	1	.....Hose Retaining Channel
N/S	F1737	1	.....Drive Screw (1/8")(Mounts Data Plate)
N/S	F1270	4	.....Screw (1/4-20 x 3/4" SHCS) (Mounts Relief Valve)
N/S	F1190	2	.....Screw (10-32 x 1/2" BHCS) (Mounts Hose Channel)
N/S	F3631	3	.....Screw (6-32 x 3/4" BHCS) (Mounts Tool Feed Press Gage)
N/S	G200C560	1	.....Shipping Bracket

N/S indicates Not Shown

SECTION I
MACHINE BASE ASSEMBLY

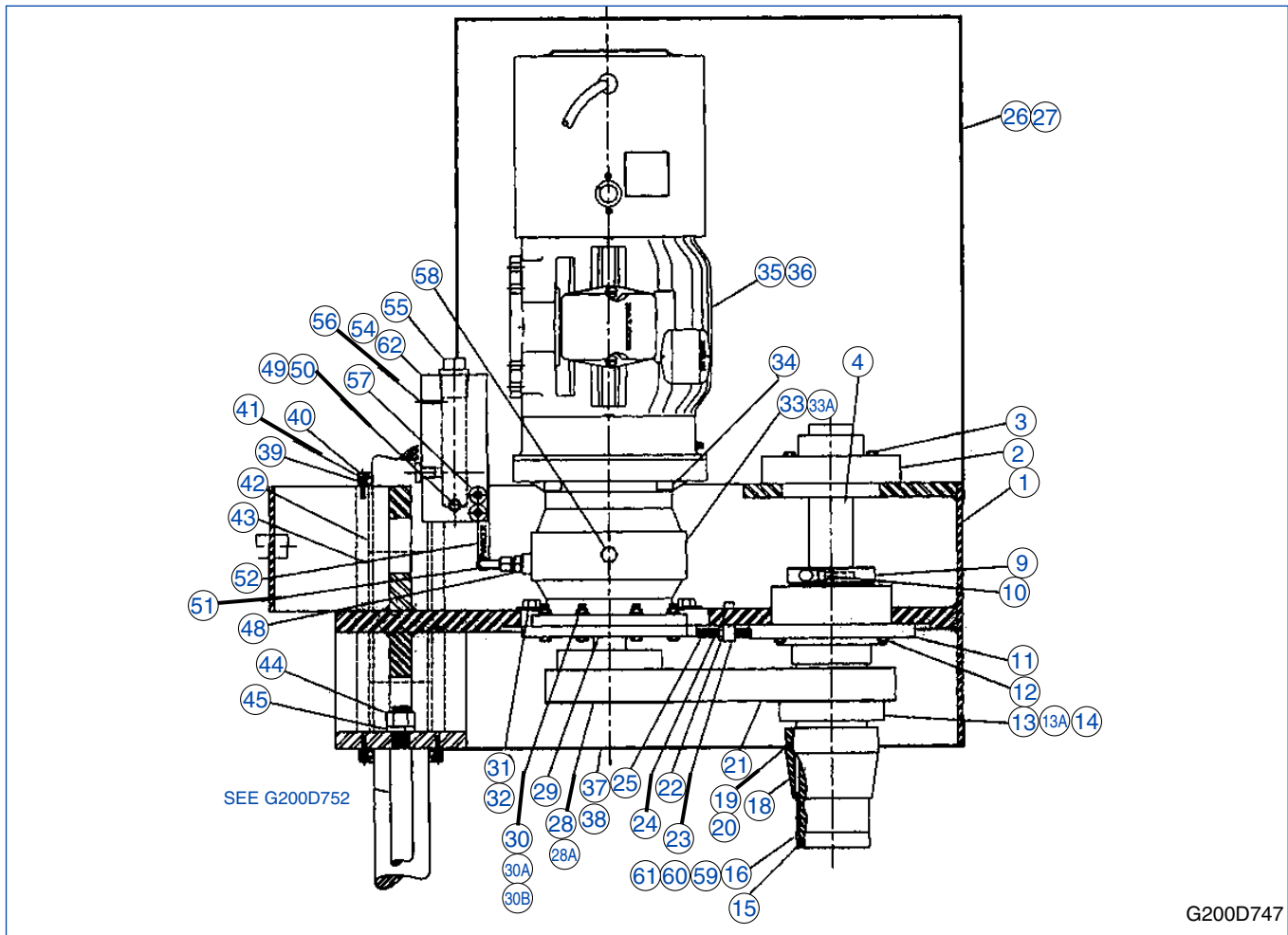


FIGURE 1-C – SPINDLE CARRIAGE ASSEMBLY

PARTS LIST COVERING FIGURE “1-C”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G200D747		....Spindle Carriage Assembly
1	G200D741	1	.....Spindle Carriage (Machining)
-	G200D738	1	.....Spindle Carriage (Fabrication)
2	F489-5	1	.....Bearing
3	F1781	4	.....Bolt ($\frac{7}{16}$ -14 x $1\frac{3}{4}$ " Lg Hex Hd)
4	G200D694	1	.....Spindle Shaft
5	---	--	.....NOT USED
6	---	--	.....NOT USED
7	---	--	.....NOT USED
8	---	--	.....NOT USED
9	G200B679	1	.....Spindle Nut
10	F1782	1	.....Screw ($\frac{5}{16}$ -24 x $1\frac{1}{4}$ " Lg Nyloc SHCS)
11	F489-1	1	.....Bearing
12	F1225	4	.....Screws ($\frac{1}{2}$ -13 x $1\frac{1}{2}$ " Lg Hex Hd)
13	F372-72	1	.....Sprocket (5/10 Hp, 300 RPM Carriage)
13	F372-77	1	.....Sprocket (5/10 Hp, 500 RPM Carriage)
13A	F372-75	1	.....Bushing, Taper Lock (5/10 Hp, 300 RPM Carriage)
13A	---	--	.....NOT USED (5/10 Hp, 500 RPM Carriage)
14	F1783	1	.....Key ($\frac{1}{2}$ " X $\frac{3}{4}$ " X $2\frac{3}{4}$ " Lg)(Goes With Item # 13)
15	F1784	1	.....Roll Pin ($\frac{1}{8}$ " Dia X $\frac{9}{16}$ " Lg)

N/S indicates Not Shown

(Parts continued on next page)

PARTS LIST COVERING FIGURE "1-C"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
16	G35B106-1	1	.....Lock Sleeve (Used W/Rev. Keys)
17	---	--	.....NOT USED
18	G35B112	1	.....Lock Collar
19	F1785	3	.....Setscrew (¼-20 x ¼" Lg Cup Pt)
20	F1265	3	.....Setscrew (¼-20 x ¼" Lg)
21	F372-74	1	.....Belt (5/10 Hp, 300 RPM Carriage)
21	F372-38	1	.....Belt (5 Hp, 500 RPM Carriage)
21	F372-30	1	.....Belt (10 Hp, 500 RPM Carriage)
22	F1310	2	.....Hex Jam Nut (¾-16 UNC)
23	G200A412	2	.....Adjustment Block
24	F1353	4	.....Screw (5/16-18 x 1½" Lg SHCS)
25	F1786	2	.....Setscrew (¾-16 x 2½" Lg)
26	G200D760-1	1	.....Top Motor Cover (5 Hp)
26	G200D801	1	.....Top Motor Cover (10 Hp)
27	F1272	6	.....Screw (¼-20 x ¾" Lg BHCS)
28	F372-73	1	.....Sprocket (¾" x ¾" x 3" Lg Key)
28A	F372-76	1	.....Bushing
29	G200B724	1	.....Gearbox Mounting Plate
30	F1787	8	.....Screw (5/16-18 x 1¾" Lg HHCS)
30A	F1735	8	.....Hex Nut (5/16-18 UNC)
30B	F1736	8	.....Std. Lock Washer (5/16" Dia)
31	F1225	4	.....Screw (½-13 x 1½" Lg Hex Hd.)
32	F1347	4	.....Flat Washer (½" Dia)
33	F112B-13	1	.....Gearbox
33A	F112B-10	1	.....Coupling (5 Hp Motor)
33A	F112B-11	1	.....Coupling (10 Hp Motor)
34	F1226	4	.....Screw (½-13 x 1½" Lg SHCS)
35	F169-9	1	.....Motor (5 Hp)
35	F169-11	1	.....Motor (10 Hp)
36	F1788	1	.....Key (¼" Sq. x 1¾" Lg)
37	G200D760-2	1	.....Bottom Sprocket Cover
38	F1272	6	.....Screw (¼-20 x ¾" Lg BHCS)
39	F430-9	4	.....Rod Wiper
40	F1196	16	.....Screw (10-32 x ¾" Lg SHCS)
41	G200C513	4	.....Way Bar Seal Cap
42	G200A528-1	4	.....Oilite Bearing
43	G200B728	2	.....Spacer
44	F1789	1	.....Hex Nut (¾-16 UNC)Grade 5)
45	F1292	1	.....Lockwasher (¾" Dia)
46	---	--	.....NOT USED
47	---	--	.....NOT USED
48	F469-82	1	.....Gear Box Breather Fitting (9002-0604)(¾" JIC X Male BSP)
49	F469-83	1	.....Male Connector (¾" JIC x ¼" NPT)(2402-06-04)
50	F1424	1	.....Straight Hose Fitting, ¾" JIC (BW Rogers 10643-6-6)
51	F471-44	1	.....90 Deg Hose Fitting, ¾" JIC (BW Rogers 13943-6-6)
52	F650	1	.....Hose 12" Lg (BW Rogers A 451TC-6)
53	---	--	.....NOT USED
54	G200C580	1	.....Riser Mount
55	F1790	1	.....Pipe Plug, Amer. Std. Sq. Head (1" NPT)
56	F1791	1	.....Setscrew (8-32 x ¼" Lg)
57	F1317	2	.....Screw (¾-16 x 1" Lg SFHCS)
58	F469-87	1	.....Sealed Plug (9028-04)
59	G16A143	1	.....Rev. Key (W/Radius Corner)
60	G16A143-1	1	.....Rev. Key
61	F2814	2	.....Screw (¼-20 x ¾" Lg BHCS)(Used W/Rev. Keys)
62	F471-105	1	.....Sight Glass

N/S indicates Not Shown

SECTION I
MACHINE BASE ASSEMBLY

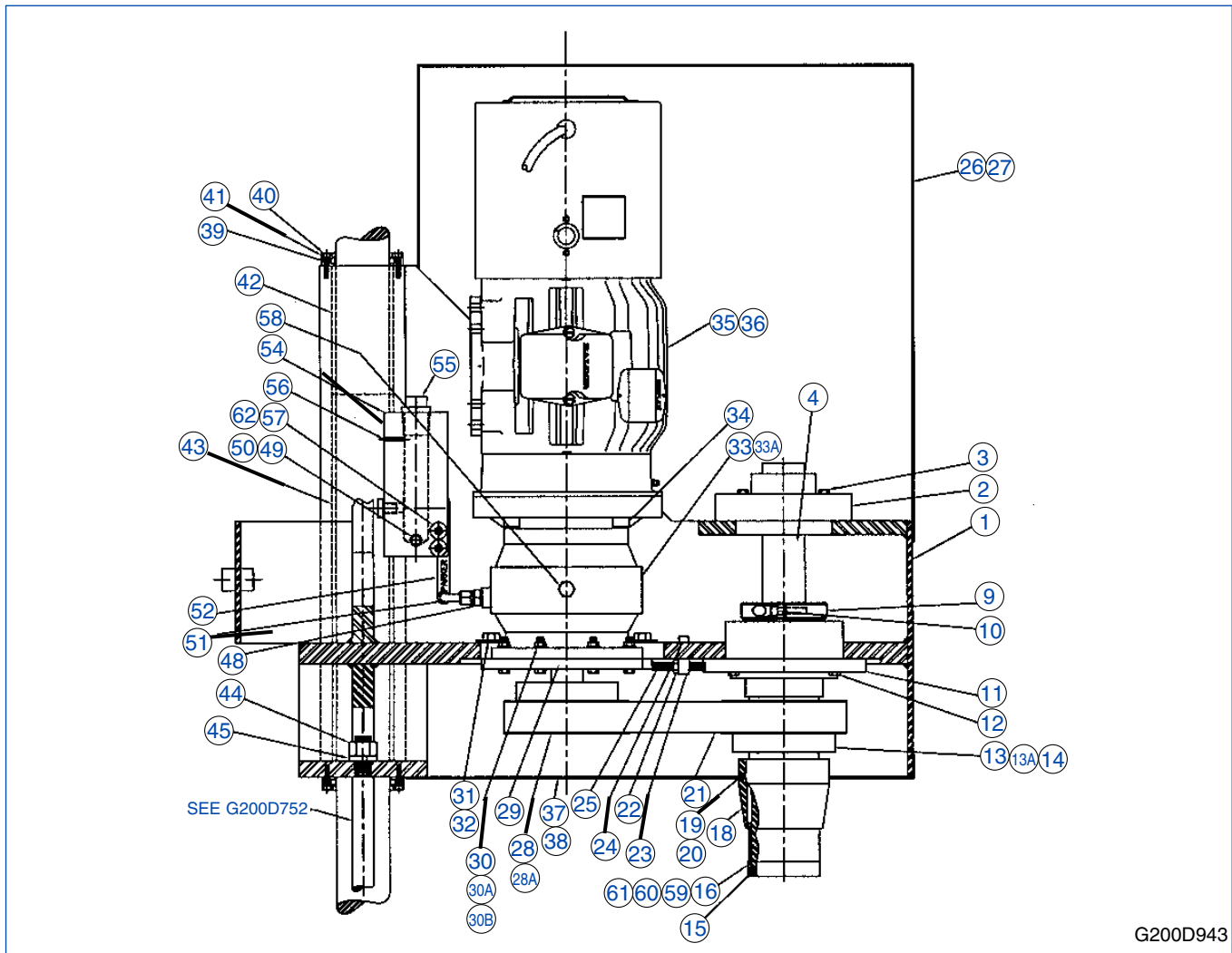


FIGURE 1-D – SPINDLE CARRIAGE ASSEMBLY (HEAVY DUTY)

PARTS LIST COVERING FIGURE “1-D”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G200D943		....Heavy Duty Spindle Carriage Assembly (10 Hp, 300 RPM Carriage)
1	G200D905	1	.....Spindle Carriage (Machining)
-	G200D904	1	.....Spindle Carriage (Fabrication)
2	F489-5	1	.....Bearing
3	F1781	4	.....Bolt ($7/16$ -14 x 1 $3/4$ " Lg Hex Hd)
4	G200D694	1	.....Spindle Shaft
5	---	--	.....NOT USED
6	---	--	.....NOT USED
7	---	--	.....NOT USED
8	---	--	.....NOT USED
9	G200B679	1	.....Spindle Nut
10	F1782	1	.....Screw ($5/16$ -24 x 1 $1/4$ " Lg Nyloc SHCS)
11	F489-1	1	.....Bearing
12	F1225	4	.....Screws ($1/2$ -13 x 1 $1/2$ " Lg Hex Hd)
13	F372-72	1	.....Sprocket
13A	F372-75	1	.....Bushing, Taper Lock
14	F1783	1	.....Key ($1/2$ " x $3/4$ " x 2 $3/4$ " Lg)(Goes With Item # 13)

N/S indicates Not Shown

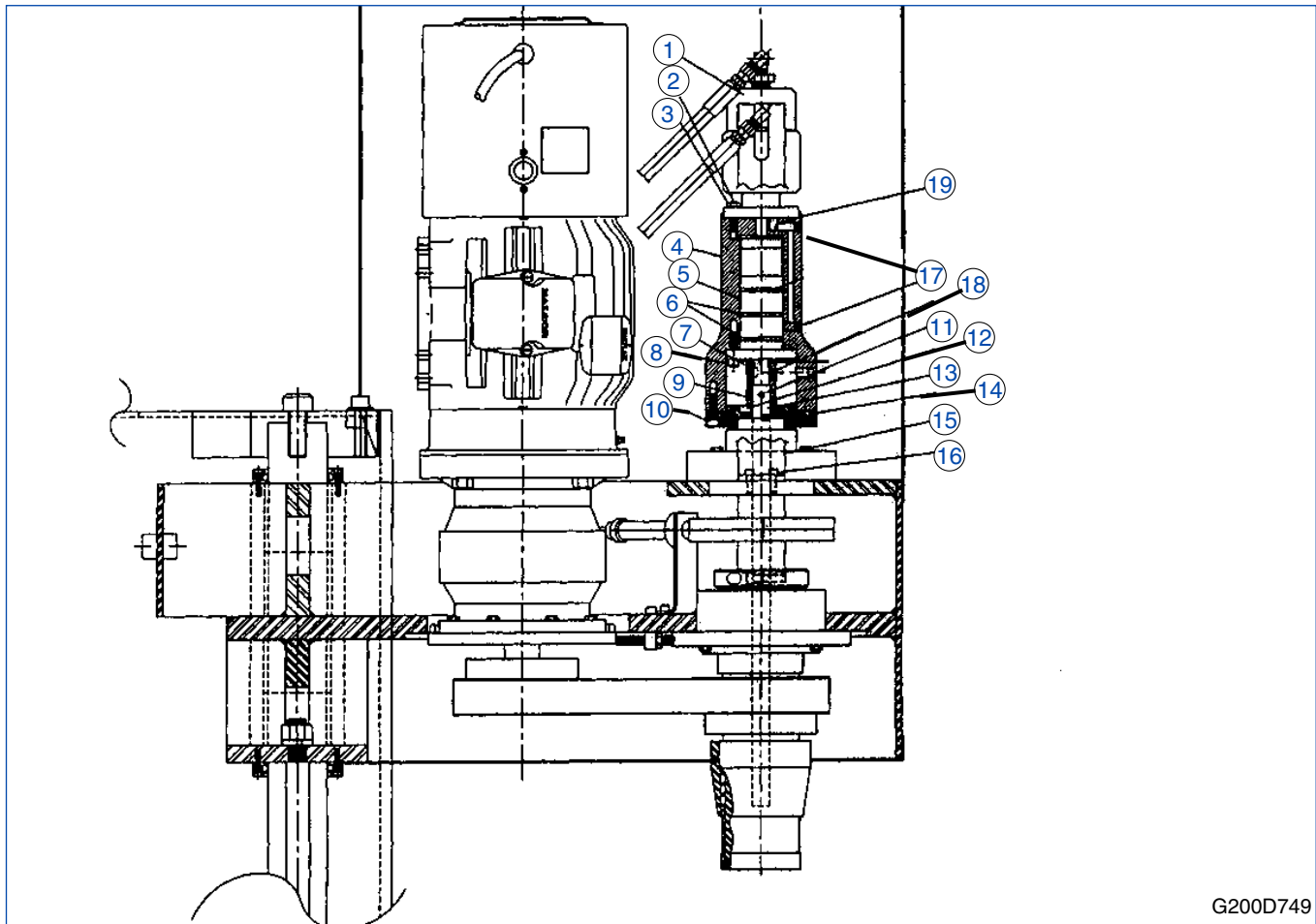
(Parts continued on next page)

PARTS LIST COVERING FIGURE "1-D"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
15	F1784	1	.....Roll Pin (1/8" Dia X 9/16" Lg)
16	G35B106-1	1	.....Lock Sleeve (Used With Item # 60)
17	---	--	.....NOT USED
18	G35B112	1	.....Lock Collar
19	F1785	3	.....Setscrew (1/4-20 x 1/4" Lg Cup Pt)
20	F1265	3	.....Setscrew (1/4-20 x 1/4" Lg)
21	F372-74	1	.....Belt
22	F1310	2	.....Hex Jam Nut (3/8-16 UNC)
23	G200A412	2	.....Adjustment Block
24	F1353	4	.....Screw (5/16-18 x 1 1/2" Lg SHCS)
25	F1786	2	.....Setscrew (3/8-16 x 2 1/2" Lg)
26	G200D801	1	.....Top Motor Cover
27	F1272	6	.....Screw (1/4-20 x 3/8" Lg BHCS)
28	F372-73	1	.....Sprocket (3/8" x 3/8" x 3" Lg Key)
28A	F372-76	1	.....Bushing
29	G200B724	1	.....Gearbox Mounting Plate
30	F1787	8	.....Screw (5/16-18 x 1 3/4" Lg HHCS)
30A	F1735	8	.....Hex Nut (5/16-18 UNC)
30B	F1736	8	.....Std. Lock Washer (5/16" Dia)
31	F1225	4	.....Hex Head Screw (1/2-13 x 1 1/2" Lg)
32	F1347	4	.....Flat Washer (1/2" Dia)
33	F112B-13	1	.....Gearbox
33A	F112B-11	1	.....Coupling (10 Hp Motor)
34	F1226	4	.....Screw (1/2-13 x 1 1/2" Lg SHCS)
35	F169-11	1	.....Motor (10 Hp)
36	F1788	1	.....Key (1/4" Sq. x 1 3/4" Lg)
37	G200D760-2	1	.....Bottom Sprocket Cover
38	F1272	6	.....Screw (1/4-20 x 3/8" Lg BHCS)
39	F430-9	4	.....Rod Wiper
40	F1196	16	.....Screw (10-32 x 3/4" Lg SHCS)
41	G200C513	4	.....Way Bar Seal Cap
42	G200A528-2	4	.....Oilite Bearing
43	G200B728	4	.....Spacer
44	F1789	1	.....Hex Nut (3/4-16 UNC)Grade 5)
45	F1292	1	.....Lockwasher (3/4" Dia)
46	---	--	.....NOT USED
47	---	--	.....NOT USED
48	F469-82	1	.....Gear Box Breather Fitting (9002-0604)(3/8" JIC x Male BSP)
49	F469-83	1	.....Male Connector (3/8" JIC x 1/4" NPT0(2404-06-04)
50	F1424	1	.....Straight Hose Fitting, 3/8" JIC (BW Rogers 10643-6-6)
51	F471-44	1	.....90 Deg Hose Fitting, 3/8" JIC (BW Rogers 13943-6-6)
52	F650	1	.....Hose 12" Lg (BW Rogers A 451TC-6)
53	---	--	.....NOT USED
54	G200C580	1	.....Riser Mount
55	F1790	1	.....Pipe Plug, Amer. Std Sq Hd (1" NPT)
56	F1791	1	.....Setscrew (8-32 x 1/4" Lg)
57	F1317	2	.....Screw (3/8-16 x 1 1/4" Lg Ft. SHCS)
58	F469-87	1	.....Sealed Plug (9028-04)
59	G16A143	1	.....Rev. Key (W / Radius Corner)
60	G16A143-1	1	.....Rev. Key
61	F2814	2	.....Screw (1/4-20 x 3/8" Lg BHCS)(Used With Item # 60)
62	F471-105	1	.....Sight Glass

N/S indicates Not Shown

SECTION I
MACHINE BASE ASSEMBLY



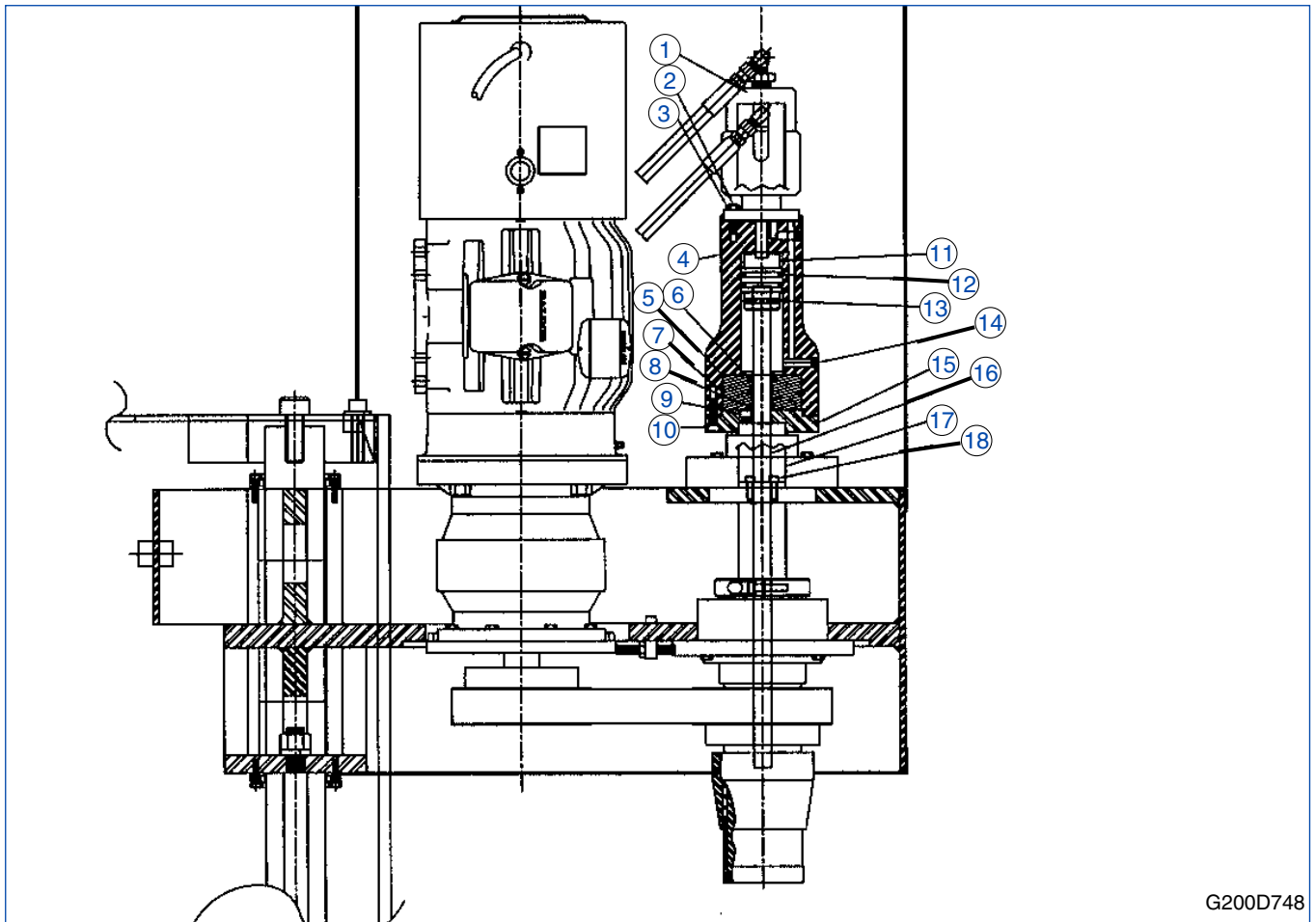
G200D749

FIGURE 1-E – ROTARY FEED SYSTEM ASSEMBLY

PARTS LIST COVERING FIGURE “1-E”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G200D749		....Rotary Feed System Assembly
1	F381-3	1	.....Rotating Union
2	---	6	.....Setscrew ($\frac{5}{16}$ -18 x 1 $\frac{1}{2}$ " Lg)
3	F1670	6	.....Hex Jam Nut ($\frac{5}{16}$ -18 UNC)
4	G200C486	1	.....Feed Motor Housing
5	F356-5	1	.....Feed Motor
6	F409-6	2	.....O-Ring (01-130)
7	#404	1	.....Woodruff Key ($\frac{1}{8}$ " x $\frac{1}{2}$ ")
8	F1357	4	.....Screw ($\frac{5}{16}$ -18 x 1" Lg SHCS)
9	G200B680	1	.....Coupling
10	F1357	5	.....Screw ($\frac{5}{16}$ -18 x 1" Lg SHCS)
11	F1248	1	.....Roll Pin ($\frac{1}{4}$ " Dia x 1 $\frac{1}{4}$ " Lg)
12	F1357	4	.....Screw ($\frac{5}{16}$ -18 x 1" Lg SHCS)
13	G200C488	1	.....Feed Rod
14	G200C487	1	.....Feed Motor Housing Cap
15	G200B729	1	.....Torque Stop
16	F1270	2	.....Screw ($\frac{1}{4}$ -20 x $\frac{3}{4}$ " Lg SHCS)
17	F5099	2	.....Recessed Pipe Plug ($\frac{1}{8}$ " NPT)
18	F1266	1	.....Screw ($\frac{1}{4}$ -20 x $\frac{1}{4}$ " Lg SHCS)
19	F1915	1	.....Recessed Pipe Plug ($\frac{1}{16}$ " NPT x $\frac{5}{16}$ " Lg)

N/S indicates Not Shown



G200D748

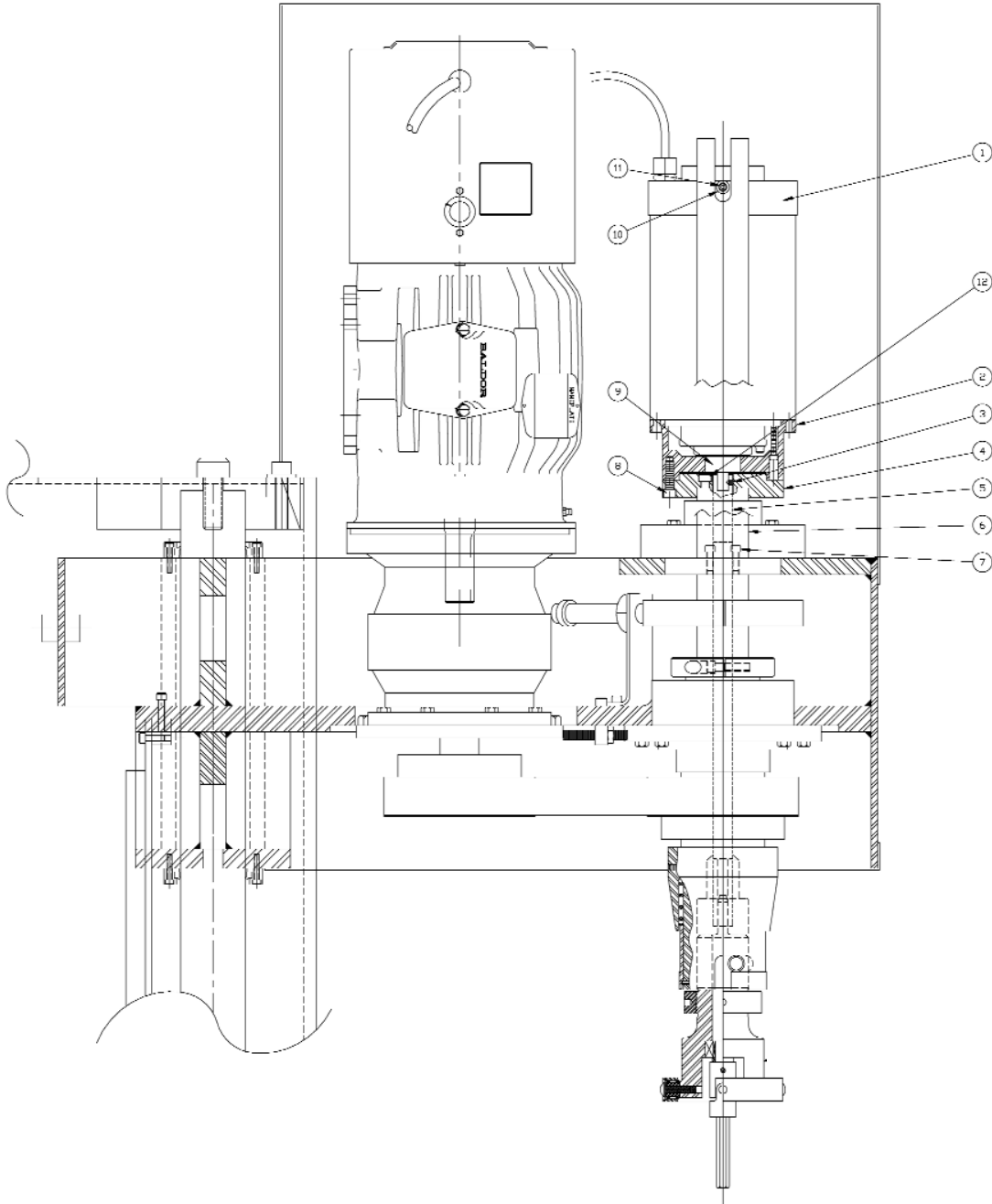
FIGURE 1-F – HYDRAULIC PUSH FEED SYSTEM ASSEMBLY

PARTS LIST COVERING FIGURE “1-F”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G200D748		....Hydraulic Push Feed System Assembly
1	F381-3	1	.....Rotating Union
2	---	5	.....Studs ($\frac{5}{16}$ -18 x $1\frac{3}{4}$ " Lg)
3	F1670	5	.....Hex Jam Nut ($\frac{5}{16}$ -18 UNC)
4	G200D808	1	.....Housing
5	F430-24	1	.....Seal
6	G200B685	1	.....Rod Gland
6A	G200B685-1	1	.....Rod Gland Spacer
7	F475-14	1	.....O-Ring
8	F430-23	1	.....Seal
9	F1365	4	.....Screw ($\frac{5}{16}$ -18 x $\frac{3}{4}$ " Lg SHCS)
10	F1357	5	.....Screw ($\frac{5}{16}$ -18 x 1" Lg SHCS)
11	G200B764	1	.....Piston
12	F430-16	2	.....Seal
13	F1284	1	.....Roll Pin ($\frac{1}{4}$ " Dia x $1\frac{15}{32}$ " Lg)
14	F5099	1	.....Pipe Plug ($\frac{1}{8}$ " NPT)
15	G200C490	1	.....Housing Cap
16	G200B686	1	.....Feed Rod
17	G200B729	1	.....Torque Stop
18	F1270	2	.....Screw ($\frac{1}{4}$ -20 x $\frac{3}{4}$ " Lg SHCS)

N/S indicates Not Shown

SECTION I
MACHINE BASE ASSEMBLY



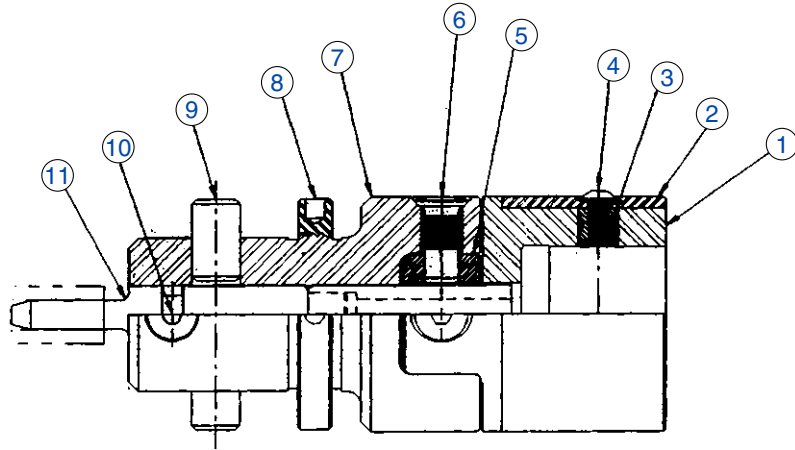
G200D750

FIGURE 1-G – MPS FEED SYSTEM ASSEMBLY

PARTS LIST COVERING FIGURE "1-G"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G200D750		....MPS Feed System Assembly
1	MPS-100	1	.....Remote Feed
2	G200C520	1	.....Adapter, MPS Feed
3	F3629	1	.....Setscrew (#10-32 x 3/16)
4	G200C521	1	.....Flange, MPS Mounting
5	G200C522	1	.....Rod, Feed
6	G200B729	1	.....Stop, Torque
7	F1270	2	.....Screw (1/4-20 x 3/4 SHCS)
8	F1357	9	.....Screw (5/16-18 x 1 SHCS)
9	F475-39	1	.....Bearing
10	G200A501	1	.....Tube, Torque Stop
11	F2702	1	.....Screw (#10-32 x 1 1/4 SHCS)
12	F1365	4	.....Screw (5/16-18 x 3/4 SHCS)

SECTION I
MACHINE BASE ASSEMBLY

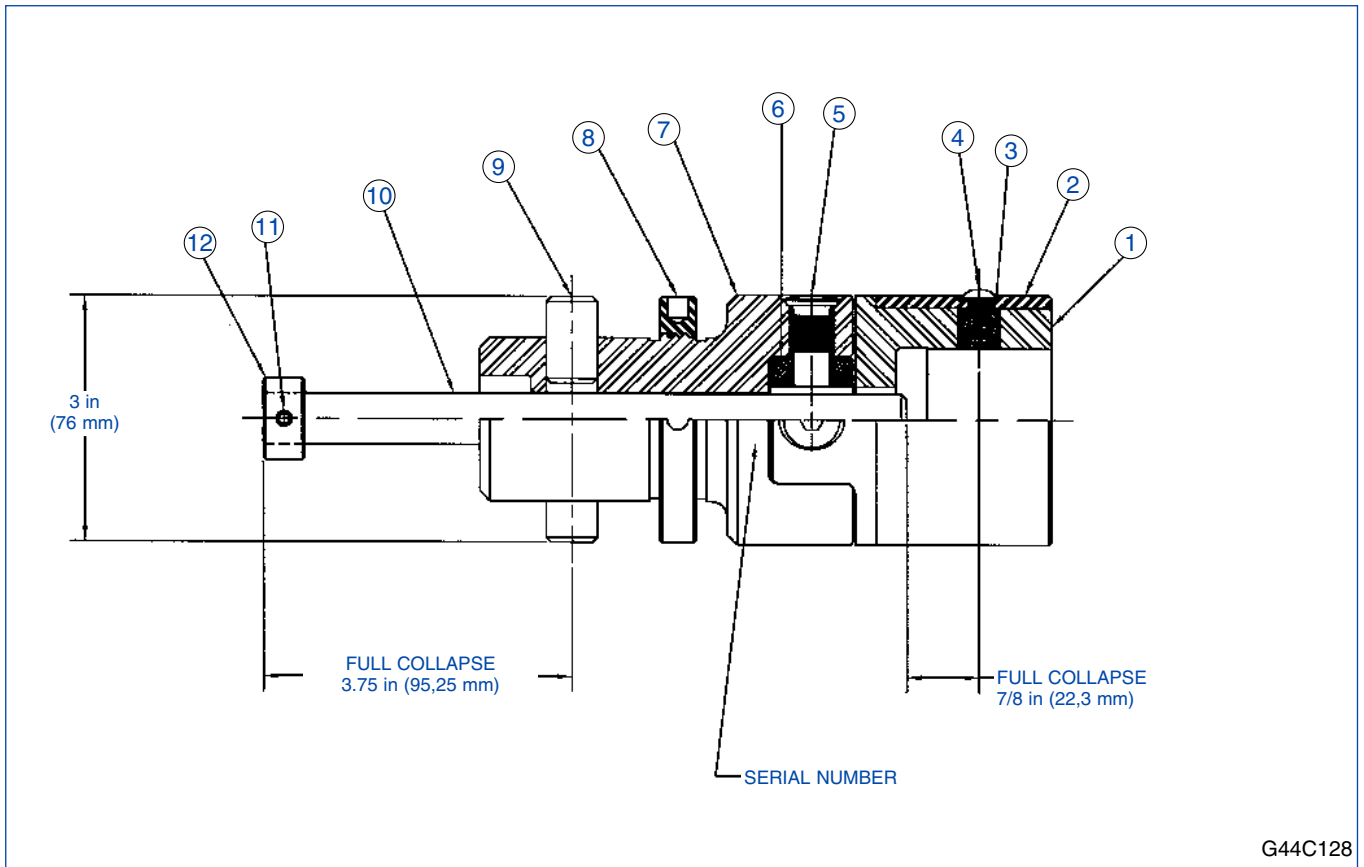


G44C129

FIGURE 1-H – ROTARY FEED DRIVE ADAPTER ASSEMBLY
PARTS LIST COVERING FIGURE “1-H”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G44C129		....Rotary Feed Drive Adapter Assembly
1	G31C147	1	.....Body
2	G35A230	1	.....Lock Sleeve
3	G16A207	2	.....Drive Pin Stop
4	F1261	1	.....Screw (¼-20 x ½" Lg BHCS)
5	G15B103	1	.....Universal Block
6	G16A116-1	4	.....Drive Screw
7	G18C239	1	.....Driveshank
8	G19A110	1	.....Ring Nut
9	G16A104	2	.....Drive Pin
10	G20A169-20	1	.....Screw (Dog Pt. BHCS)
11	G17B389	1	.....Feed Rod

N/S indicates Not Shown



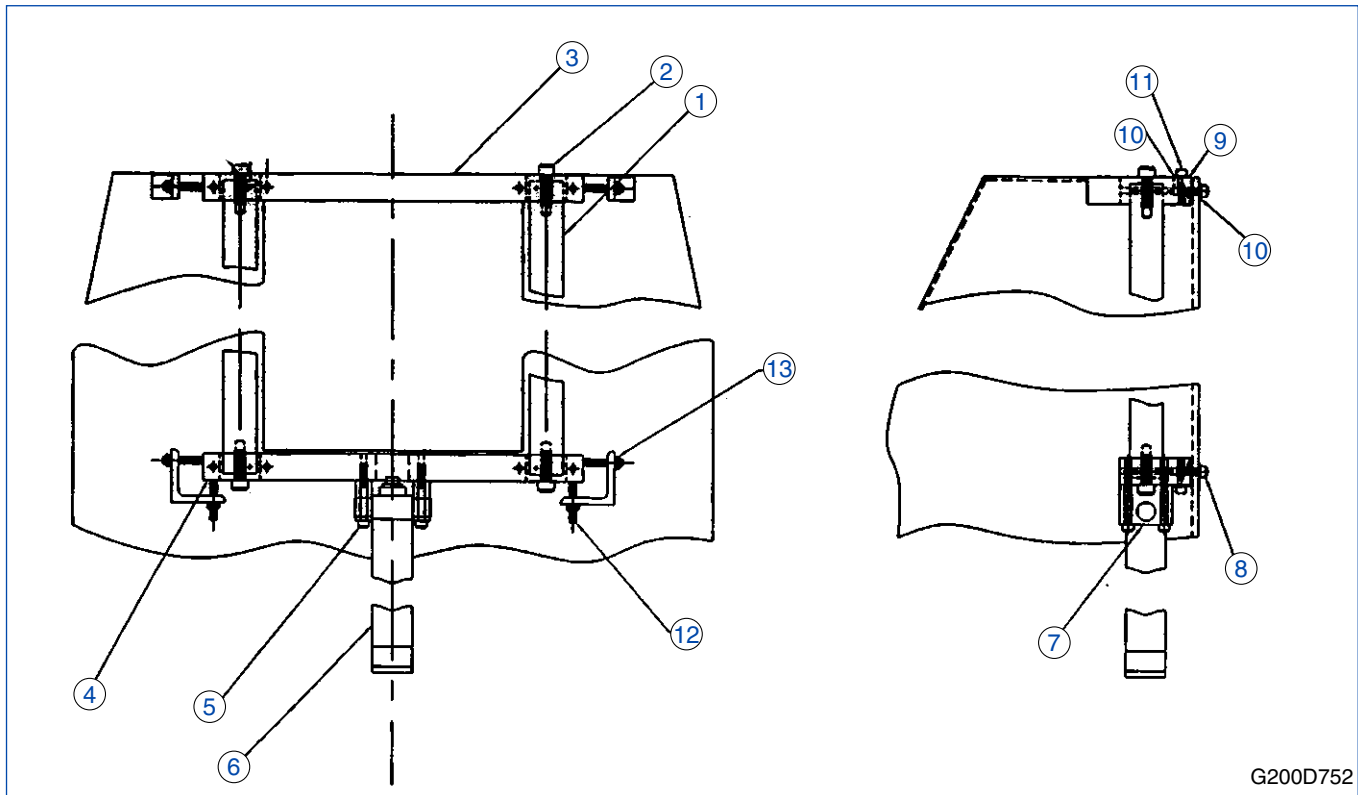
G44C128

FIGURE 1-1 – PUSH FEED DRIVE ADAPTER ASSEMBLY
PARTS LIST COVERING FIGURE “1-1”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G44C128		....Push Feed Drive Adapter Assembly
1	G31C146	1	.....Body
2	G35A230	1	.....Lock Sleeve
3	G16A207	2	.....Drive Pin Stop
4	F1261	1	.....Screw (1/4-20 x 1/2" Lg BHCS)
5	G16A116	4	.....Drive Screw
6	G15B103	1	.....Universal Block
7	G18C235	1	.....Driveshank
8	G19A110	1	.....Ring Nut
9	G16A104	2	.....Drive Pin
10	G17B385	1	.....Feed Rod
11	F1932	1	.....Roll Pin (3/16" Dia x 23/32" Lg)
12	G17A395	1	.....Feed Rod Collar

N/S indicates Not Shown

SECTION I
MACHINE BASE ASSEMBLY



G200D752

FIGURE 1-J – WAY BAR ASSEMBLY
PARTS LIST COVERING FIGURE “1-J”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G200D752		....Waybar Assembly
1	G200D949	2	.....Waybar
2	F1297	4	.....Screw (¾-10 x 2" SHCS)
3	G200D736	1	.....Waybar Top Plate
4	G200D739	1	.....Waybar Lower Plate
5	F1681	4	.....Screw (½-13 x 4" SHCS)
6	F5162GH2	1	.....Hydraulic Cylinder (<i>See Section II, Hydraulic System</i>)
7	G200C515	2	.....Cylinder Mounts
8	F1226GH1	8	.....Screw (½-13 x 1½" SHCS)
9	G200C514	4	.....Adjusting Wedge
10	F105-13	12	.....Flat Washer (Hardened)
11	F1226GH1	4	.....Screw (½-13 x 1½" SHCS)
12	F1682	6	.....Screw (½-13 x 3" Lg SHCS)
13	F1222	6	.....Hex Nuts (½-13)
N/S	F1247	4	.....Roll Pins (¼ Dia X 1½" Lg) (To Locate Upper & Lower Plates)
N/S	F461-6	2	.....Split Shaft Collar (For Shipping Only)

N/S indicates Not Shown

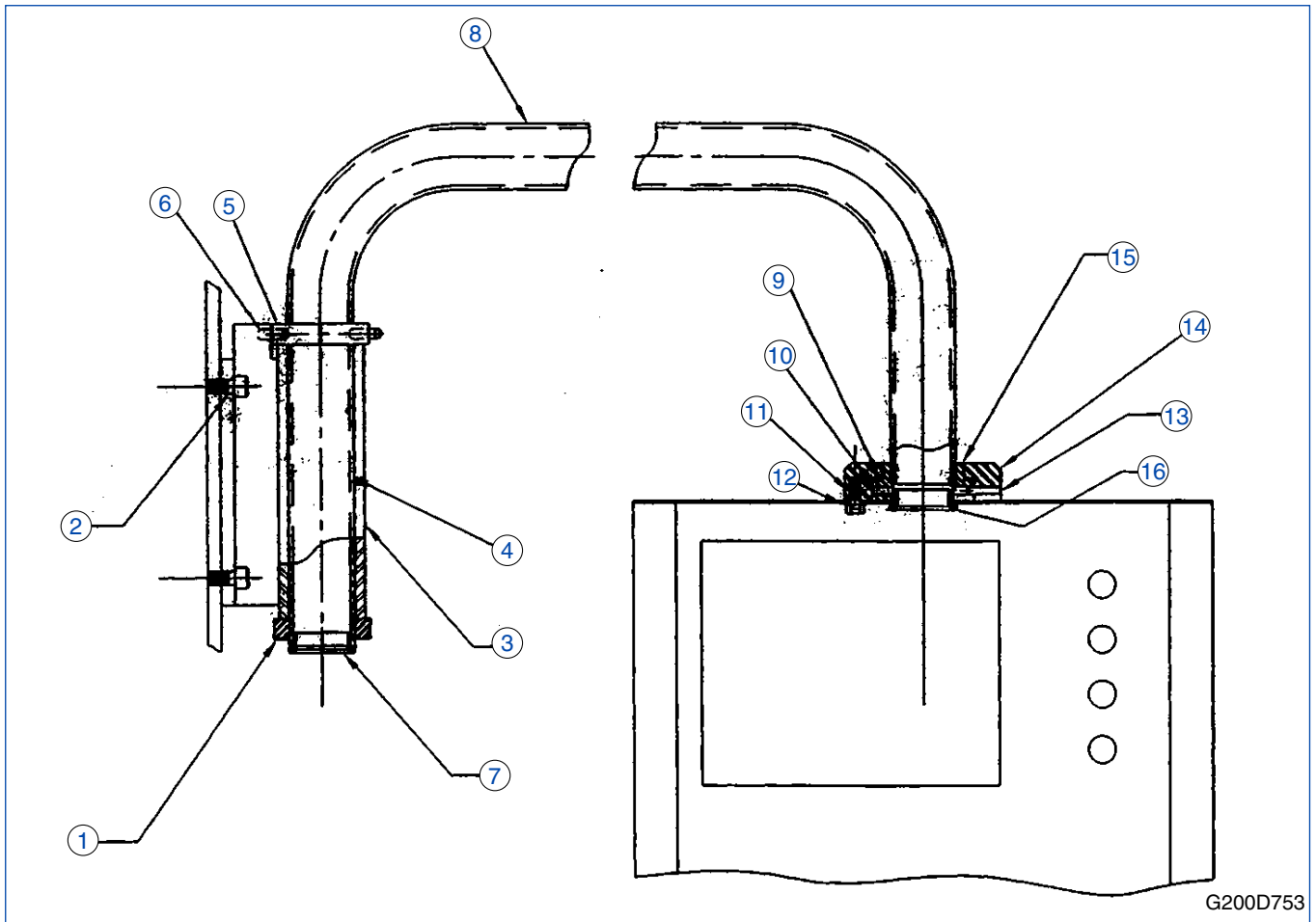
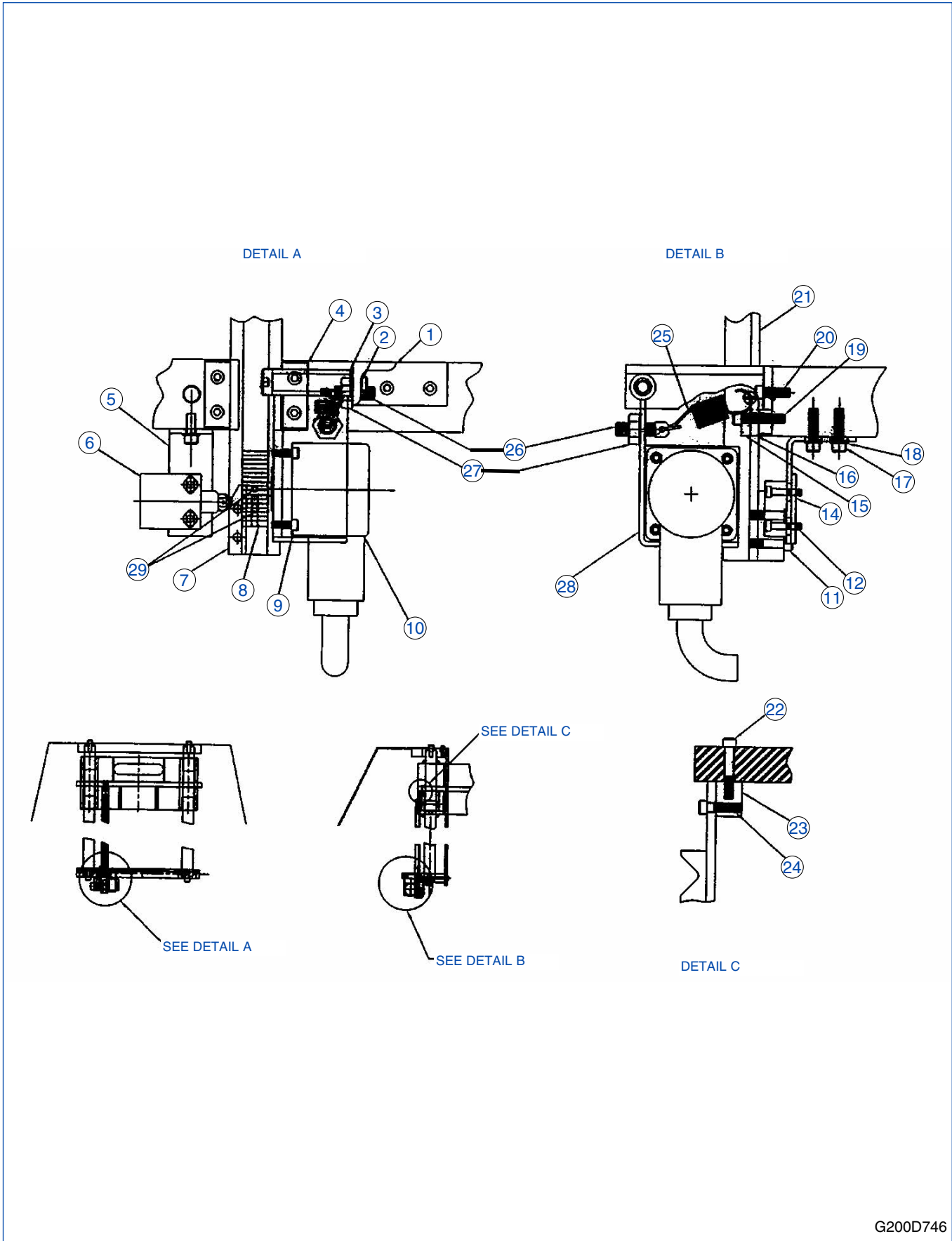


FIGURE 1-K – CONTROL CONSOLE ASSEMBLY
PARTS LIST COVERING FIGURE “1-K”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G200D753		....Control Console Assembly
1	F461-1	1	.....Stop Collar
2	F1228	4	.....Screw (1/2-13 x 1" Lg SHCS)
3	G200C525	1	.....Swing Arm Mount
4	F3125	1	.....Setscrew (1/4-28 x 1/4" Lg Brass Tipped)(10338)
5	G200B733	1	.....Stop Collar With Holes (Ref: F461-1)
6	F1673	2	.....Roll Pin (3/8" Dia x 3/4" Lg)
7	G200A503	1	.....Console Arm Bushing
8	G200D751	1	.....Console Swing Arm
9	G200B731	1	.....Swivel Washer
10	F1674	1	.....Roll Pin (1/4" Dia x 3/4" Lg)
11	F1675	4	.....Screw (3/8-16 x 7/8" Lg HHCS)
12	F1301	4	.....Standard Flat Washer (3/8" Dia)
13	F1248	1	.....Roll Pin (1/4" Dia x 1 1/4" Lg)
14	G200C523	1	.....Retainer Bushing
15	G200C524	1	.....Swivel Bushing
16	G200A504	1	.....Console Bushing

N/S indicates Not Shown

SECTION I
MACHINE BASE ASSEMBLY



G200D746

FIGURE 1-L – ENCODER ASSEMBLY

PARTS LIST COVERING FIGURE "1-L"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G200D746		....Encoder Assembly
1	G200C516	1	.....Mounting Bracket
2	F1676	1	.....Screw (1/2 x 2 1/4" SHSS)
3	F105-52	1	.....Hardened 3/8" Flat Washer
4	G200A496	1	.....Backing Bar
5	G200A499	1	.....Limit Switch Bracket
6	F1165	1	.....Limit Switch <i>(See Section IV, Electrical)</i>
7	G200A500	1	.....Limit Switch Dog
8	G200A383	1	.....Encoder Gear
9	F1205	4	.....Screw (8-32 x 1/2" Lg SHCS)
N/S	F1203	4	.....Flat Washer (#8)
10	F1709	1	.....Encoder <i>(See Section IV, Electrical)</i>
11	F1260	2	.....Screw (1/4-20 x 1" SHCS)
12	F1678	2	.....Screw (#10-32 x 7/8" SHCS)
13	---	--	.....NOT USED
14	G200A555	1	.....Tapping Plate
15	G200A495	2	.....Retainer Bar
16	G200A497	2	.....Spacer Bars
17	F1270	2	.....Screw (1/4-20 x 3/4" SHCS)
18	F1244	2	.....Standard Flat Washer (1/4")
19	F2920	4	.....Screw(1/4-20 x 1 1/4" SHCS)
20	F1270	2	.....Screw (1/4-20 x 3/4" SHCS)
21	G200D742	1	.....Encoder Gear Rack Assembly
22	F1257	2	.....Screw (1/4-20 x 1 1/2" SHCS)
23	G200A498	1	.....Encoder Rack Mount
24	F1270	2	.....Screw (1/4-20 x 3/4" SHCS)
25	G21A177	1	.....Encoder Spring (F423-1)
26	F417-2	2	.....Spring Anchor
27	F1310	2	.....Jam Nut (3/8-16)
28	G200B703	1	.....Encoder Mount
29	F1193	4	.....Setscrew (#10-32 UNF x 1/4" Lg Soc Hd)

N/S indicates Not Shown

SECTION II - HYDRAULIC SYSTEM

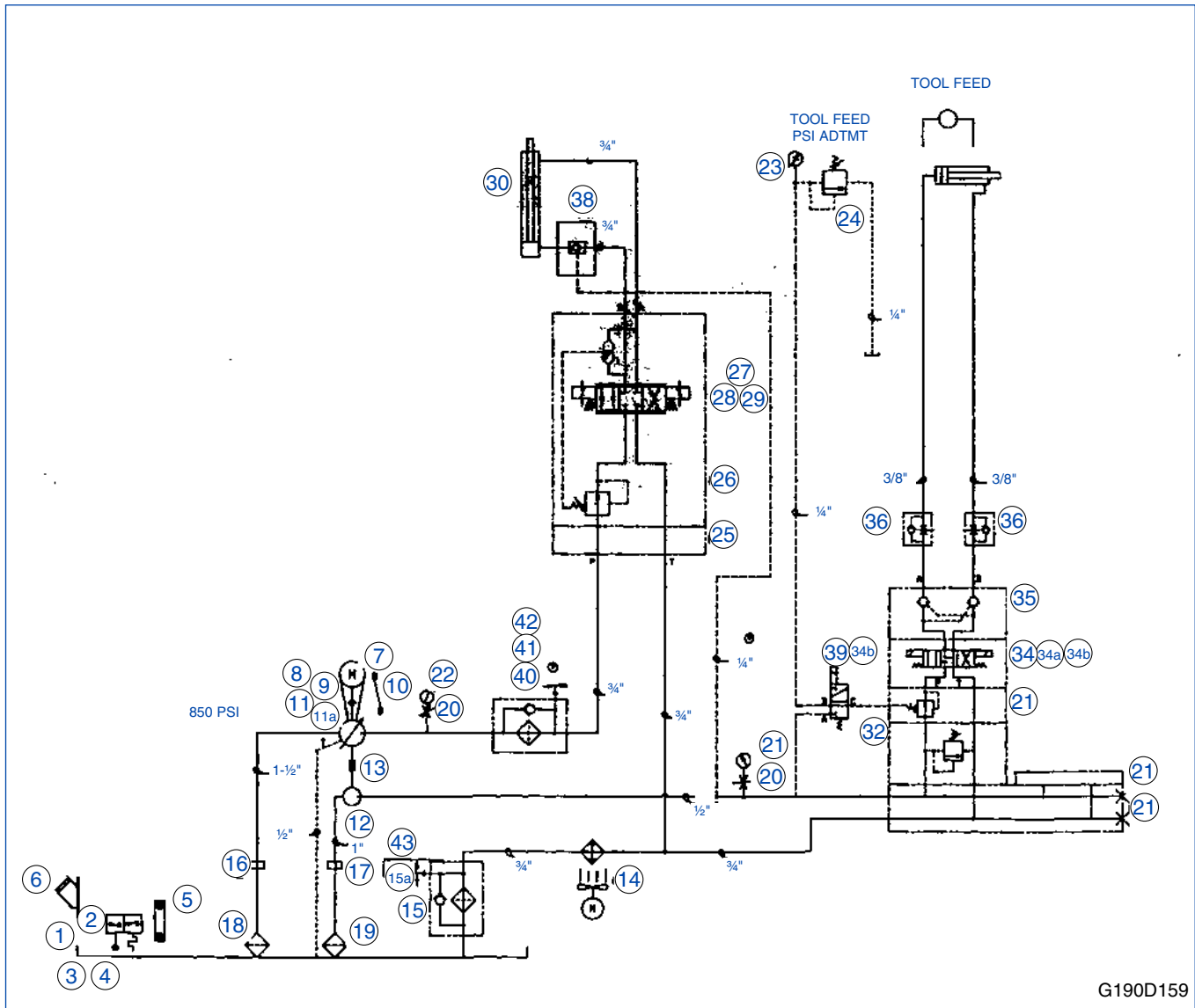


FIGURE 2-A – HYDRAULIC SCHEMATIC (PUSH & ROTARY FEED SYSTEM)
PARTS LIST COVERING FIGURE “2-A”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G190D159		....Hydraulic Schematic (Push & Rotary Feed System)
1	G200D744	1	.....Tank Top
2	F525-1	1	.....Temp/Level Switch (TL-008-170)
3	F522-15	1	.....End Cover (5080)
4	F522-16	1	.....Clean Out End Cover (5080d)
5	F528-2	1	.....Sight Gauge (HSG-55)
6	F528-1	1	.....Side Mount Filler/Breather (HCS-M-120)
7	F169-8	1	.....Baldor Electric Motor (10 Hp/1800/230/460/3/50/60) (TEFC 215TC)(Catalog Number CM3774T)
-	---		
8	F522-11	1	.....Pump Motor Adapter (1952)
9	F522-40	1	.....Coupling (RC4-1375-312)
9	F522-41	1	.....Coupling (RC4-1316-A-C)

N/S indicates Not Shown

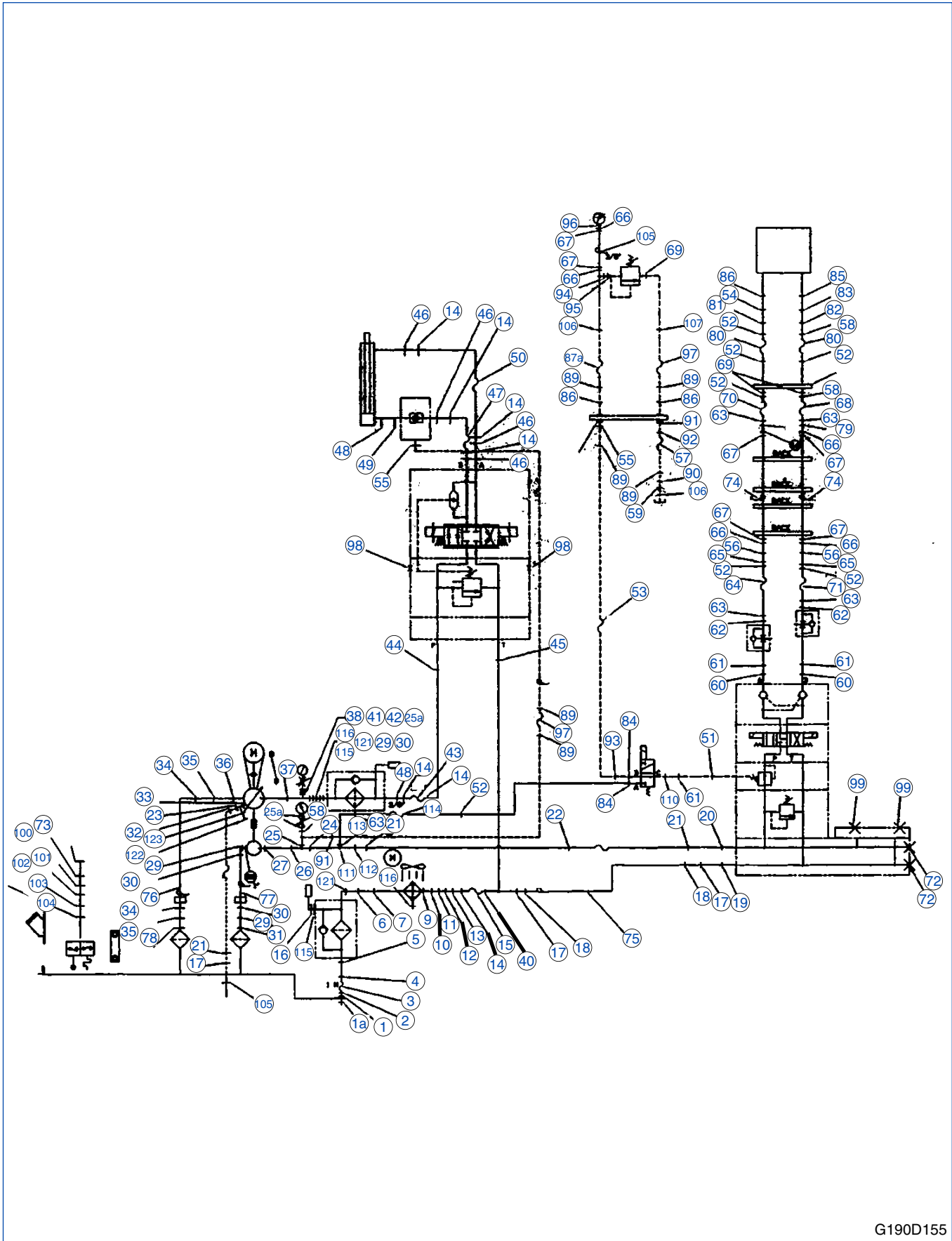
(Parts continued on next page)

PARTS LIST COVERING FIGURE "2-A" (Cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
9	F522-42	1	.....Hytrell Coupling Insert (RG 4H5)
10	F522-12	2	.....Vescor Motor Dampening Rods (VSM-215-W)
11	F435-42	1	.....Vickers Piston Pump (PVQ 40-B2R-A9SS3S-10-C21-10)
12	F435-44	1	.....Vickers Vane Pump (O-Ring: V10-1S2S-11C20 W/01-042)
13	F435-45	1	.....Vickers Coupling Kit (864224)
14	F525-3	1	.....Oil Cooler (American Industrial)(AOCH-10-3)
14	F525-3	1	.....Oil Cooler (Thermal Transfer)(AOVH-10-3)
15	F471-100	1	.....Return Filter (Parker)(5OAT10BN2500LI)
15A	F471-104	1	.....Pressure Switch (Nason)(SM-2A-20R/HR)
16	F522-5	1	.....Tube Suction Flange (1½")(5885)
17	F522-4	1	.....Tube Suction Flange (1")(5883)
18	F522-13	1	.....1½" Suction Strainer (SS-30-RV3)
19	F522-14	1	.....1" Suction Strainer (SS-10-RV3)
20	F522-18	2	.....Needle Valve (NVG250B)
21	F416-15	1	.....1000 Psi Gauge (BAC-1M-25)
22	F416-16	1	.....2000 Psi Gauge (BAC-2M-25)
23	F416-8	1	.....Tool Feed Gauge, Rotary Feed (BAC-600-25-RC-FFC)
23	F416-14	1	.....Tool Feed Gauge, Push Feed (BAC-300-25-RC-FFC)
24	F112-15	1	.....Rexroth Relief Valve, Push (DBDH6G1X/25/12)
24	F112-16	1	.....Rexroth Relief Valve, Rotary (DBDH6G1X/50/12)
25	F467-35	1	.....Daman Subplate (A-DO5H-SP-S-12S)
26	F525-18	1	.....Bosch Compensator (0-811-401-223)
27	F525-5	1	.....Bosch Proportional Valve (0-811-404-001)
28	F525-6	1	.....Bosch Amplifier Card (0-811-405-120)
29	F525-7	1	.....Bosch Card Holder (1834486001)
30	F516-2	1	.....Parker Recip. Hydraulic Cylinder (2 x 48)
33	F525-14	1	.....Daman 2 Station Manifold (A-D03-P02-2S)
32	F498-38	1	.....Sun Relief (RPEC-LDN-FBP)
33	F498-39	1	.....Sun Reducing Valve (PBDB-LDN-EBQ)
34	F525-9	1	.....Bosch 4-Way Valve (9-810-231-006)
34A	F525-10	1	.....Din Connector (Black)(1-834-484-057)
34B	F525-11	2	.....Din Connector (Grey)(1-834-484-058)
35	F525-12	1	.....Bosch Check Valve (9-810-161-171)
36	F471-56	2	.....Flow Control Valve (PCCM4005)
37	F525-15	1	.....Daman Cover Plate (AD03CPP)
38	F542-1	1	.....Pilot Check Valve (Kepner - 2712T12)
39	F525-19	1	.....3-Way Valve (12C31S-F115-T4)
40	F471-70	1	.....Filter Housing (316968M 15P2)
41	F471-71	1	.....Parker Hirsch Indicator (929599 15/30P)
42	F471-72	1	.....Parker Filter Element (10 Micron Absolute)(932618Q)
43	G190B198	1	.....Guard For Return Filter Switch

N/S indicates Not Shown

SECTION II
HYDRAULIC SYSTEM



G190D155

FIGURE 2-B – HYDRAULIC PIPING SCHEMATIC (PUSH & ROTARY FEED SYSTEM)

PARTS LIST COVERING FIGURE "2-B"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G190D155		....Hydraulic Piping Schematic (Push & Rotary Feed System)
1	---	1	.....Male Connector (Mid-State 2404-16-16)
1A	---	1	.....Blk Pipe (1" x 13½" Lg Thread One End)(Rex Pipe)
2	F715	1	.....Hose End (BW Rogers 13743-16-16)
3	F643	1	.....Parker Hose (1" x 25⅝" Lg) (BW Rogers 451TC-16)
4	F644	1	.....Hose End (BW Rogers 13943-16-16)
5	---	1	.....Male O-Ring Connector (Mid-State 6400-16-20)
6	---	1	.....Nipple (1¼" X 6" NPT)(Rex Pipe)
7	F1740	1	.....Reducer Coupling (1½" x 1¼" NPT)(Rex Pipe)
8	---		.....NOT USED
9	---	1	.....Reducing Coupling (1½" x 1")(Rex Pipe)
10	---	1	.....Reducing Bushing (1" x ¾")(Rex Pipe)
11	---	1	.....Nipple (¾" x 2" NPT)(Rex Pipe)
12	F1516	1	.....Elbow (¾" x 90° NPT)(Rex Pipe)
13	---		.....NOT USED
14	F647	7	.....Hose End (BW Rogers 10643-12-12)
15	F646	1	.....Parker Hose (¾" x 26½" Lg)(BW Rogers 451TC-12)
16	---	1	.....Female Elbow (Mid-State 5504-2-2)
17	---	2	.....Tube Nut (¾")(Mid-State 318-12)
18	---	2	.....Tube Sleeve (¾")(Mid-State 319-12)
19	---	1	.....Male O-Ring Connector (Mid-State 6400-12-10)
20	---	1	.....Male Elbow (Mid-State 6801-8-10)
21	F651	3	.....Hose End (BW Rogers 10643-8-8)
22	F648	1	.....Parker Hose (½" x 16½" Lg)(BW Rogers 451TC-8)
23	F660	1	.....Hose End (BW Rogers 13943-8-8)
24	---	1	.....Male Connector (Mid-State 2404-8-8)
25	---	1	.....Hex Nipple (Mid-State 5404-8-4)
25A	---	3	.....Street Elbow (Mid-State 5502-4-4)
26	---	1	.....Tee (Mid-State 5605-8-8-8)
27	---	1	.....Adapter (Mid-State 6401-8-8)
28	---	1	.....O-Ring 90° Elbow (Mid-State 6801-16-16)
29	---	4	.....Tube Nut (1")(Mid-State 318-16)
30	---	4	.....Tube Sleeve (1")(Mid-State 319-16)
31	---	1	.....Male Elbow (Mid-State 2501-16-16)
32	F646	1	.....Parker Hose(½" x 19" Lg)(BW Rogers 451TC-8)
33	---	1	.....Male O-Ring Connector (Mid-State 6400-8-10)
34	---	2	.....Tube Sleeve (1½")(Mid-State 319-24)
35	---	2	.....Tube Nut (1½")(Mid-State 318-24)
36	---	1	.....O-Ring 90° Elbow (Mid-State 6801-24-24)
37	---	1	.....O-Ring Adapter (Mid-State 6405-16-12)
38	---	1	.....Tee (Mid-State 5604-12-12-12)
39	---	1	.....Male Connector (Mid-State 2400-12-12)
40	F704	2	.....Hose End (BW Rogers 13943-12-12)
41	---	1	.....Hex Nipple (Mid-State 5404-4-4)
42	---	1	.....Bushing (Mid-State 5406-12-4)
43	F646	1	.....Parker Hose(¾" x 18½" Lg)(BW Rogers 451TC-12)
44	---	1	.....Male O-Ring Connector (Mid-State 6400-12-12)
45	---	1	.....O-Ring Tee (Mid-State 6804-12-12-12)
46	---	3	.....Male O-Ring Connector (Mid-State 6400-12-12)
47	F646	1	.....Parker Hose (¾" x 30" Lg)(BW Rogers 451TC-12)

N/S indicates Not Shown

(Parts continued on next page)

SECTION II
HYDRAULIC SYSTEM

PARTS LIST COVERING FIGURE "2-B" (Cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
48	---	3	.....O-Ring 90° Elbow (Mid-State 6801-12-12)
49	F4065	1	.....Swivel Adapter (BW Rogers 12F650X-S)
50	F646	1	.....Parker Hose (3/4" x 58" Lg)(BW Rogers 451TC-12)
51	---	1	.....Male O-Ring Connector (Mid-State 6400-6-6)
52	F1424	9	.....Hose End (BW Rogers 10643-6-6)
53	F649	1	.....Parker Hose (1/4" x 35 1/4" Lg)(BW Rogers 451TC-4)
54	---	1	.....Male Elbow (Mid-State 2501-6-6)
55	---	2	.....Male Elbow (Mid-State 2501-4-4)
56	---	2	.....Swivel 45° Elbow (Mid-State 6502-6-6)
57	F649	1	.....Parker Hose (1/4" x 56" Lg)(BW Rogers 451TC-4)
58	---	1	.....Service Tee (1/4")(Mid-State 5602-4)
59	---	1	.....NPT Reducer Bushing (3/4" x 1/2")(Rex Pipe)
60	---	2	.....O-Ring Adapter (Mid-State 6400-6-8)
61	F641	3	.....Swivel Connector (BW Rogers 6F6X)
62	---	2	.....Male Connector (Mid-State 2404-6-4)
63	F471-44	5	.....Hose End (BW Rogers 13943-6-6)
64	F650	1	.....Parker Hose (3/8" x 45" Lg)(BW Rogers 451TC-6)
65	---	2	.....Union (Mid-State 2403-6-6)
66	---	6	.....Tube Nut (3/8")(Mid-State 318-6)
67	---	6	.....Tube Sleeve (3/8")(Mid-State 319-6)
68	F650	1	.....Parker Hose (3/8" x 51 3/4" Lg)(BW Rogers 451TC-6)
69	---	2	.....Bulkhead Elbow (Mid-State 2701-6LN)
70	F650	1	.....Parker Hose (3/8" x 50" Lg)(BW Rogers 451TC-6)
71	F650	1	.....Parker Hose (3/8" x 49" Lg)(BW Rogers 451TC-6)
72	---	2	.....O-Ring Plug (Mid-State 6408H-10)
73	F1757	1	.....Aluminum Threaded Conduit Tee (1/2")(Wolfe Bros NERTC50)
73A	F3587	1	.....Aluminum Cover (1/2")(Wolfe Bros NERCC50)
73B	F1759	1	.....Fiber Gasket (1/2")(Wolfe Bros NERFG50)
74	---	2	.....Steel Tubing, Welded/Drawn (3/8" x .035" Wall x 82" Lg)(Jorgensen)
75	---	1	.....Steel Tubing, W/D (3/4" x .083" Wall x 22 3/8" Lg)(Jorgensen)
76	---	1	.....Steel Tubing, W/D (1 1/2" x .120" x 15 1/4" Lg)(Jorgensen)
77	---	1	.....Steel Tubing (1" x .095" Wall x 25" Lg)(Jorgensen)
78	---	1	.....Male Elbow (Mid-State 2501-24-24)
79	---	2	.....Union Elbow (Mid-State 2500-6-6)
80	F650	2	.....Parker Hose (3/8" x 35" Lg)(BW Rogers 451TC-6)
81	---	1	.....Swivel 45° Elbow (Mid-State 6502-6-6)
82	---	1	.....Swivel 90° Elbow (Mid-State 6500-6-6)
83	F1762	11	.....Jaeroquip Adapter (Telco 202114-4-6S)
84	---	2	.....O-Ring 90° Elbow (Mid-State 66801-6-4)
85	---	1	.....Reducing Bushing (1/2" x 1/4" NPT)(Rex Pipe)
86	---	1	.....Reducing Bushing (1/2" x 3/8" NPT)(Rex Pipe)
87	F649	1	.....Parker Hose (1/4" x 38 1/2" Lg)(BW Rogers 451TC-4)
87A	F649	1	.....Parker Hose (1/4" x 37 1/2" Lg)(BW Rogers 451TC-4)
88	---	3	.....Male Elbow (Mid-State 2501-4-4)
89	F1475	6	.....Hose End (BW Rogers 10643-4-4)
90	---	1	.....Male Elbow (Mid-State 2501-4-8)
91	---	2	.....Male Connector (Mid-State 2404-4-4)
92	F653	1	.....Hose End (BW Rogers 13943-4-4)
93	F654	1	.....Hose End (BW Rogers 10643-6-4)

N/S indicates Not Shown

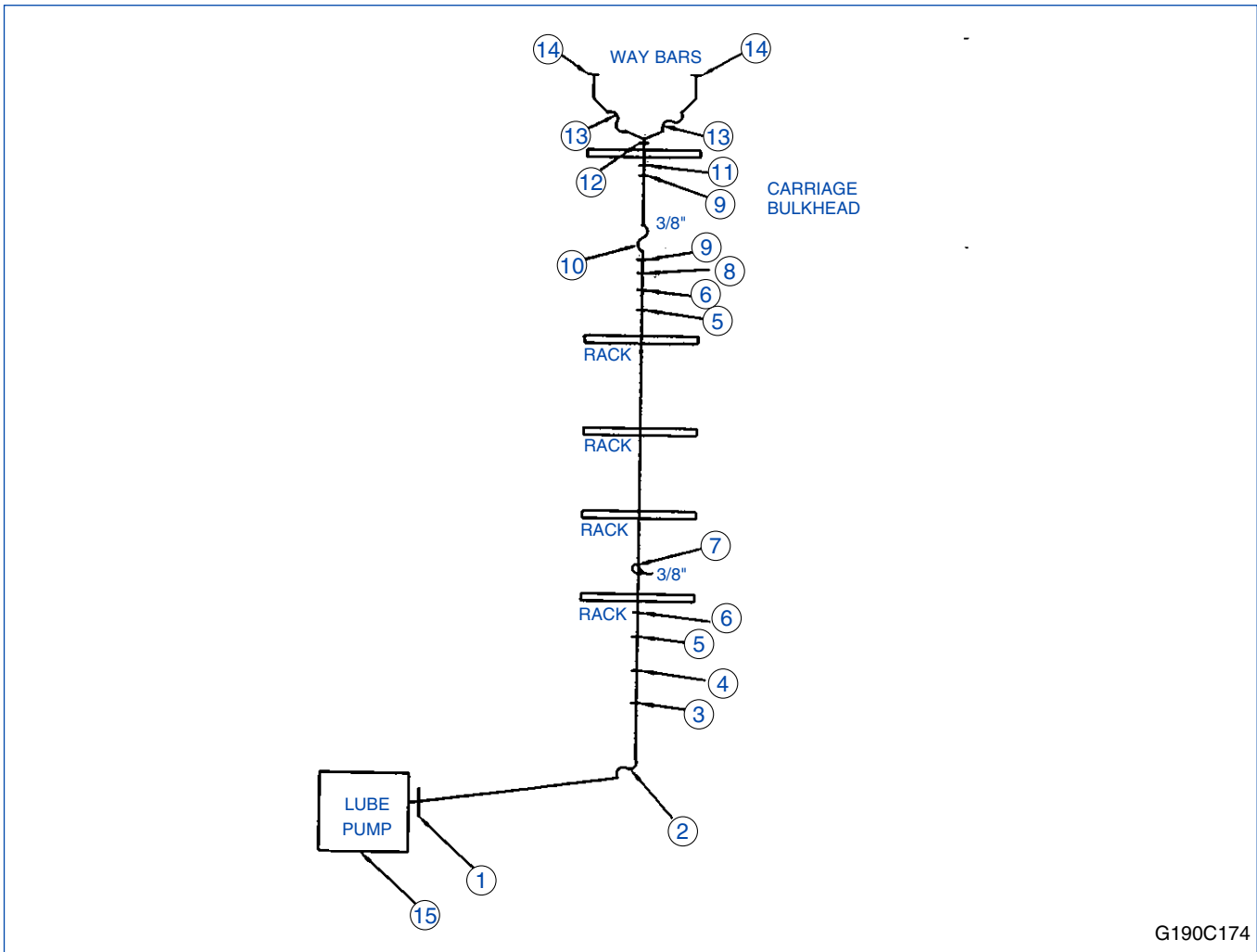
(Parts continued on next page)

PARTS LIST COVERING FIGURE "2-B" (Cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
94	---	1	.....Male Run Tee (Mid-State 2605-6-4-6)
95	---	1	.....Swivel 90° Elbow (Mid-State 6500-6-6)
96	---	1	.....Female Connector (Mid-State 2405-6-4)
97	F649	1	.....Parker Hose (1/4" x 43" Lg)(BW Rogers 451TC-4)
98	---	2	.....O-Ring Plug (Mid-State 6408H-6)
99	---	2	.....Pring Plug (Mid-State 6408H-8)
100	---	1	.....Close Nipple (1/2" NPT)(Rex Pipe)
101	---	1	.....Reducing Bushing (1 1/4" x 1/2" NPT)(Rex Pipe)
102	---	1	.....Nipple (1/2" NPT x 4")(Rex Pipe)
103	---	1	.....Coupling (1/2" NPT)(Rex Pipe)
104	---	1	.....Reducing Bushing (1/2" x 1/4" NPT)(Rex Pipe)
105	---	1	.....Blk Pipe, Thread One End (1/2" x 13 1/2" Lg)(Rex Pipe)
106	---	1	.....Blk Pipe, Thread One End (3/4" x 13 1/2" Lg)(Rex Pipe)
107	F656	1	.....45° Hose End (BW Rogers 13743-4-4)
108	F1771	1	.....45° Hose End (BW Rogers 13743-6-4)
109	G190B188	1	.....Valve To Gauge Tube (GHC)
110	---	1	.....O-Ring Adapter (Mid-State 6405-4-4)
111	---	1	.....Swivel Tee (Mid-State 6600-8-8-8)
112	---	1	.....Swivel 90° Elbow (Mid-State 6500-8-8)
113	---	1	.....Reducer (Mid-State 2406-8-6)
114	F650	1	.....Parker Hose (3/8" x 18" Lg)(BW Rogers 451TC-6)
115	---	1	.....Hex Nipple (1")(Mid-State 5404-2-2)
116	---	1	.....Blk Cap (1 1/2" NPT)(Rex Pipe)
117	---	1	.....Male Elbow (Mid-State 2501-8-8)
118	---	1	.....Male 90, Welded / Drawn (1")(Mid-State 2501-16-12)
119	---	1	.....Steel Tubing (1" x .095" Wall x 6 1/2" Lg)(Jorgensen)
120	---	1	.....O-Ring 90° Elbow (Mid-State 6801-16-12)
121	---	1	.....O-Ring Adapter (Mid-State 6405-20-20)
122	---	1	.....Swivel Run Tee (Mid-State 6602-8-8-8)
123	---	1	.....Cap (Mid-State 304-C-8)

N/S indicates Not Shown

SECTION III - LUBRICATION SYSTEM

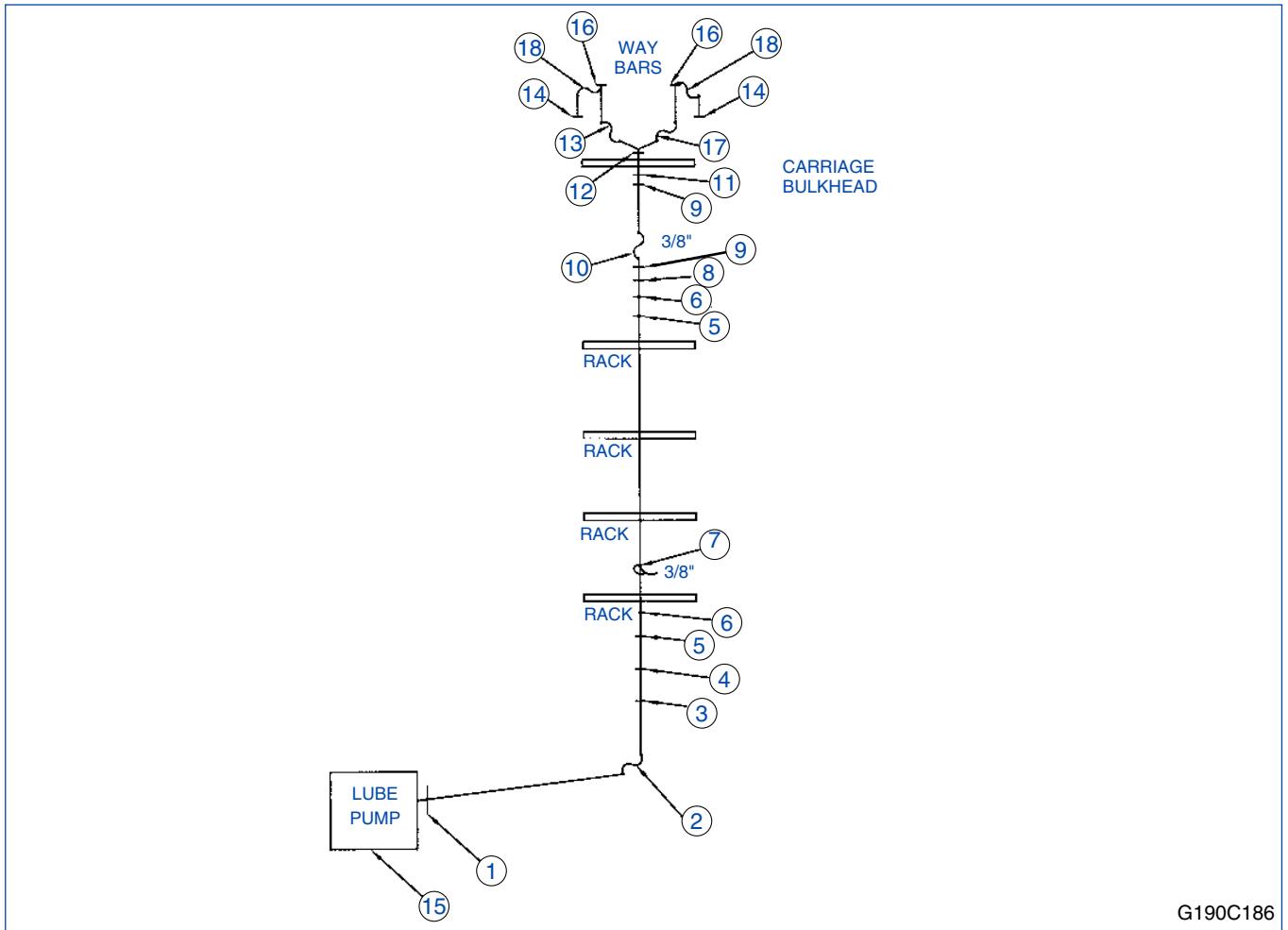


G190C174

FIGURE 3-A – LUBRICATION SCHEMATIC
PARTS LIST COVERING FIGURE “3-A”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G190C174		....Lubrication Schematic
1	F475-40	1	.....AQ68P-4x2-1/4"Tx1/8" NPT
2	F469-60	1	.....NT10004-BK 1/4" Polyline 6 Ft (Mid-State)
3	F475-44	1	.....AQ69P-4x4-1/4"Tx1/4" NPT 90° Elbow
4	F469-11	1	.....2405-6 Female Connector, (Mid-State)
5	F469-68	2	.....318-6 Tube Nut
6	F469-69	2	.....Tube Sleeve (Mid-State)(319-6)
7	F5504GH1	1	.....3/8" OD x .035" Wall x 81" Lg (Jorgensen)
8	F469-70	6	.....Union Elbow (Mid-State)(2500-6)
9	F471-44	2	.....90° Hose End (BW Rogers)(13943-6-6)
10	F650	1	.....Parker Hose 48" (BW Rogers)(F451TC-6)
11	F469-71	1	.....Locknut (Mid-State)(C5275-6 W/#306)
12	F475-47	1	.....AQ88P-4x4-1/4"Tx1/4"Tx1/4" NPT Branch Tee
13	F469-60	2	.....NT10004-BK 1/4" Polyline 16" Lg (Mid-State)
14	F475-43	2	.....AQ69P-4x2-1/4"Tx1/8" NPT 90° Elbow
15	F521-1	1	.....Lube Pump (ACS.)(162807)

N/S indicates Not Shown



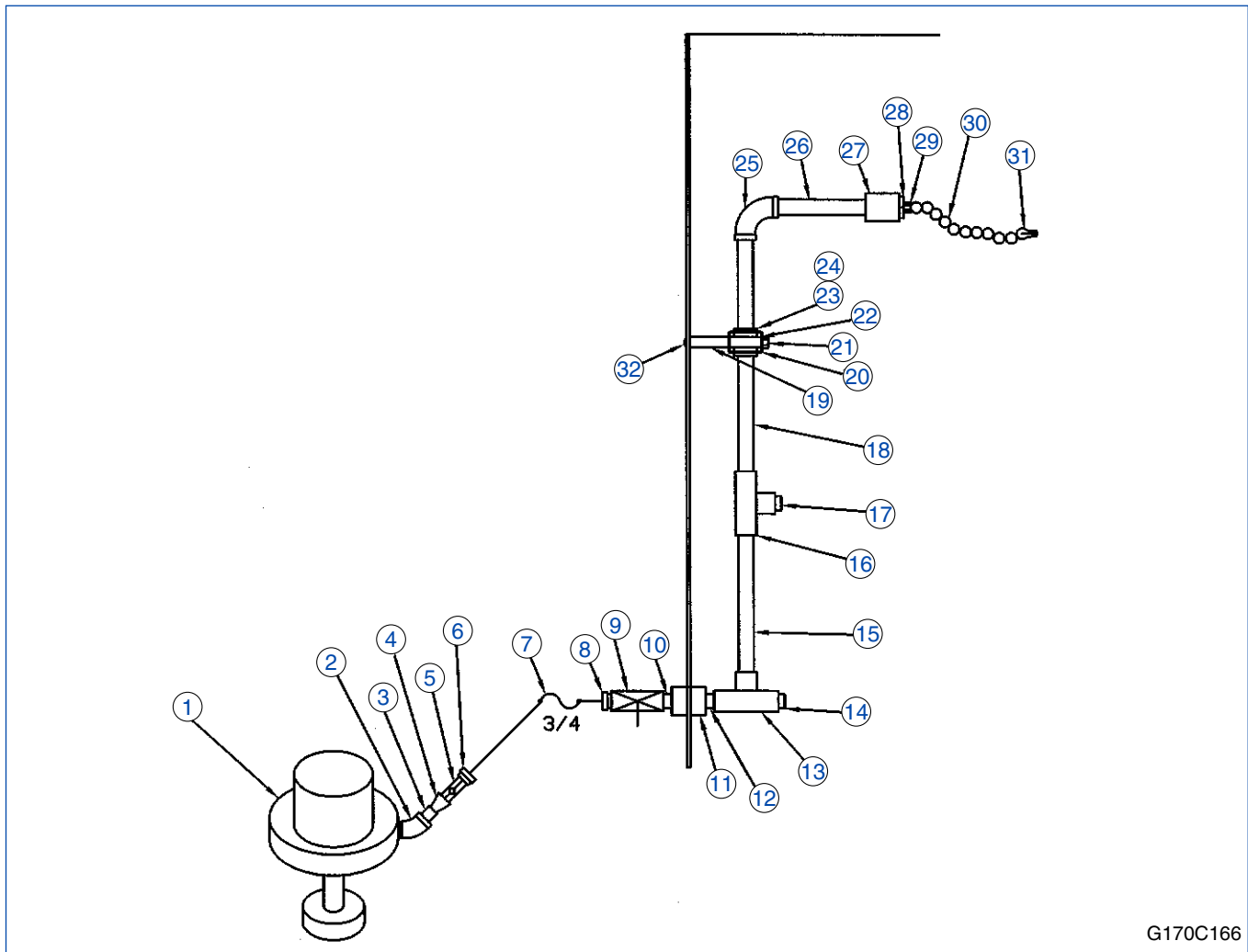
G190C186

FIGURE 3-B – LUBRICATION SCHEMATIC (HEAVY DUTY)
PARTS LIST COVERING FIGURE “3-B”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G190C186		....Lubrication Schematic
1	F475-40	1	.....AQ68P-4x2-1/4"Tx1/8" NPT
2	F469-60	1	.....NT10004-BK 1/4" Polyline 6 Ft (Mid-State)
3	F475-44	1	.....AQ69P-4x4-1/4"Tx1/4" NPT 90° Elbow
4	F469-11	1	.....2405-6 Female Connector, (Mid-State)
5	F469-68	2	.....318-6 Tube Nut
6	F469-69	2	.....Tube Sleeve (Mid-State)(319-6)
7	F5504GH1	1	.....3/8" OD x .035" Wall x 81" Lg (Jorgensen)
8	F469-70	6	.....Union Elbow (Mid-State)(2500-6)
9	F471-44	2	.....90° Hose End (BW Rogers)(13943-6-6)
10	F650	1	.....Parker Hose 48" (BW Rogers)(F451TC-6)
11	F469-71	1	.....Locknut (Mid-State)(C5275-6 W/#306)
12	F475-47	1	.....AQ88P-4x4-1/4"Tx1/4"Tx1/4" NPT Branch Tee
13	F469-60	1	.....NT10004-BK 1/4" Polyline 16" Lg (Mid-State)
14	F475-43	2	.....AQ69P-4x2-1/4"Tx1/8" NPT 90° Elbow
15	F521-1	1	.....Lube Pump (ACS)(162807)
16	F475-48	2	.....AQ72PS-4x2-1/4"Tx1/8" NPT Branch Tee
17	F469-60	1	.....NT10004-BK 1/4" Polyline 19 3/4" Lg
18	F469-60	2	.....NT10004-BK 1/4" Polyline 36 3/4" Lg

N/S indicates Not Shown

SECTION III
LUBRICATION SYSTEM



G170C166

FIGURE 3-C – COOLANT PIPING SCHEMATIC (STD)
PARTS LIST COVERING FIGURE “3-C”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G170C166		....Coolant Piping Schematic (Std)
1	F412-2	1	.....Coolant Pump (6-P3 Lg)
2	---	1	.....45 Deg Street Elbow (1/2" NPT)
3	---	1	.....Close Nipple (1/2" NPT)
4	---	1	.....Reducer Bushing (3/4" x 1/2" NPT)
5	F457-3	1	.....Check Valve (3/4" NPT)
6	F469-59	1	.....Hose Barb (3/4")
7	F513-5	1	.....Hose (3/4" x 30" Lg)
8	F469-59	1	.....Hose Barb (3/4")
9	F527-2	1	.....Ball Valve (3/4")
10	PPP394	1	.....Close Nipple (3/4" NPT)
11	---	1	.....Full Pipe Coupling (Ref. Part Of Guard)(3/4" NPT)
12	---	1	.....Close Nipple (3/4" NPT)
13	F5091	1	.....Female Pipe Tee (3/4" NPT)
14	F694	1	.....Socket Head Pipe Plug (3/4" NPT)
15	F1645	1	.....Black Pipe (Thread Both Ends)(3/4" x 16" Lg)

N/S indicates Not Shown

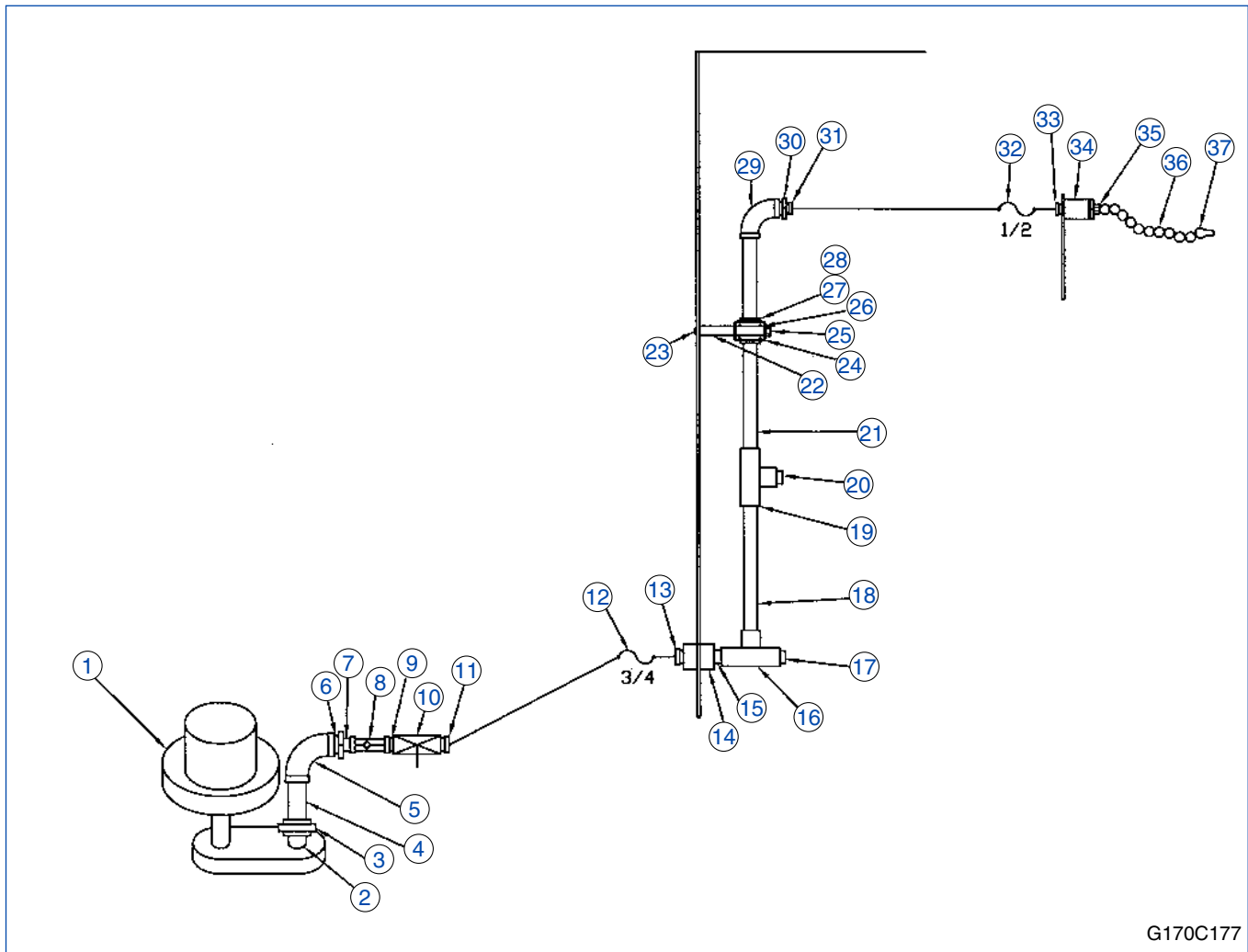
(Parts continued on next page)

PARTS LIST COVERING FIGURE "3-C" (Cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
16	---	1	.....Female Pipe Tee (3/4" NPT)
17	---	1	.....Socket Head Pipe Plug (3/4" NPT)
18	---	1	.....Black Pipe (Thread Both Ends)(3/4" x 17" Lg)
19	F434-8	2	.....Stacking Nut
20	F434-25	1	.....Clamping Unit
21	---	2	.....Hex Head Cap Screw (5/16-18 x 3/4")
22	F434-9	2	.....Stacking Nuts
23	F434-20	1	.....Split Bushing
24	F1936	2	.....Setscrews (5/16-18 x 3/4" SHSS)
25	F1733	1	.....Female Pipe Elbow (3/4" NPT)
26	---	1	.....Black Pipe (Thread Both Ends)(3/4" x 13")
27	---	1	.....Full Pipe Coupling (3/4" NPT)
28	---	1	.....Reducer Bushing (3/4" x 1/2" NPT)
29	F441-14	1	.....Connector (1/2")
30	F441-12	--	.....Snap Lock Segments (As Req'd)
31	F441-13	1	.....Nozzle (1/2")
32	F1646	2	.....Screws (5/16-18 x 1/2" BHCS)
N/S	G170D195	1	.....50 Gallon Coolant Tank
N/S	G170C153	1	.....Tank Cover
N/S	G170C153-1	1	.....Tank Cover
N/S	G170C152	1	.....Pump Mount Baseplate
N/S	F1272	19	.....Screws (1/4-20 x 3/8" BHCS)(To Mount Covers)
N/S	F1269	4	.....Screws (1/4-20 x 3/4" HHCS)(To Mount Pump)
N/S	F1261	2	.....Screws (1/4-20 x 1/2" BHCS)(To Mount Sw. Chute)
N/S	F469-61	2	.....Hose Clamps (5/8 To 1 1/2")
N/S	F1232	4	.....Screws (1/2-13 x 1" Lg SHCS)
N/S	G170B180	1	.....Flanged Coolant Chute
N/S	G170B181-1	1	.....Coolant Chute Extension
N/S	F362-14	1	.....HPS-10 Magnetic Indexing Filter (60 Cycle)(Mag Separator Only)
N/S	F362-13	1	.....HPS-10 Magnetic Indexing Filter (50 Cycle)(Mag Separator Only)
N/S	F1336	4	.....Screws (3/8-16 x 3/4" SHCS)(To Mount Filter)(Mag Separator Only)
N/S	F1301	4	.....Flatwasher, Std. (3/8")(Mag Separator Only)
N/S	G170C157	1	.....Swarf Bucket (Mag Separator Only)

N/S indicates Not Shown

SECTION III
LUBRICATION SYSTEM



G170C177

FIGURE 3-D – COOLANT PIPING SCHEMATIC (PAPER BED FILTER)
PARTS LIST COVERING FIGURE “3-D”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G170C177		....Coolant Piping Schematic (Paper Bed Filter)
1	F362-21	1	.....Coolant Pump
2	---	1	.....Close Nipple (1" NPT)
3	---	1	.....Union (1" NPT)
4	---	1	.....Nipple (1" NPT x 4" Lg)
5	---	1	.....90° Elbow (1" NPT)
6	---	1	.....Reducer Bushing (1"-3/4" NPT)
7	PPP-394	1	.....Close Nipple (3/4" NPT)
8	F457-3	1	.....Check Valve (3/4" NPT)
9	PPP-394	1	.....Close Nipple (3/4" NPT)
10	F527-2	1	.....Ball Valve (3/4")
11	F469-59	1	.....Hose Barb (3/4")
12	F513-5	1	.....Hose (3/4" x 72" Lg)
13	F469-59	1	.....Hose Barb (3/4")
14	---	1	.....Full Pipe Coupling (3/4" NPT)
15	PPP-394	1	.....Close Nipple (3/4" NPT)

N/S indicates Not Shown

(Parts continued on next page)

PARTS LIST COVERING FIGURE "3-D" (Cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
16	F1521	1	.....Pipe Tee (¾" NPT)
17	---	1	.....Socket Head Pipe Plug (¾" NPT)
18	---	1	.....Black Pipe (¾" x 16" Lg)
19	F1521	1	.....Pipe Tee (¾" NPT)
20	F1644	1	.....Socket Head Pipe Plug (¾" NPT)
21	---	1	.....Black Pipe (¾" x 17" Lg)
22	F434-8	2	.....Stacking Nut
23	F1646	2	.....Screws (5/16-18 x ½" BHCS)
24	F434-25	1	.....Clamping Unit
25	F5589	2	.....Screw (5/16-18 x ¾" HHCS)
26	F434-9	2	.....Stacking Nuts
27	F434-20	1	.....Split Bushing
28	F1365	2	.....Screws (5/16-18 x ¾" SHCS)
29	F1516	1	.....90° Elbow (¾" NPT)
30	---	1	.....Reducer Bushing (¾" x ½" NPT)
31	F469-72	1	.....Hose Barb (½")
32	F513-8	1	.....Hose (½" x 52" Lg)
33	F469-72	1	.....Hose Barb (½")
34	G170B173	1	.....Nozzle Mounting Bracket
35	F441-14	1	.....Connector (½")
36	F441-12	--	.....Snap Lock Segments (As Req.)
37	F441-13	1	.....Nozzle (½")
N/S	F362-21	1	.....Paper Bed Coolant System
N/S	G170D215	1	.....Coolant Discharge Chute
N/S	G170C175	1	.....Pump Mounting Flange

N/S indicates Not Shown

SECTION III
LUBRICATION SYSTEM

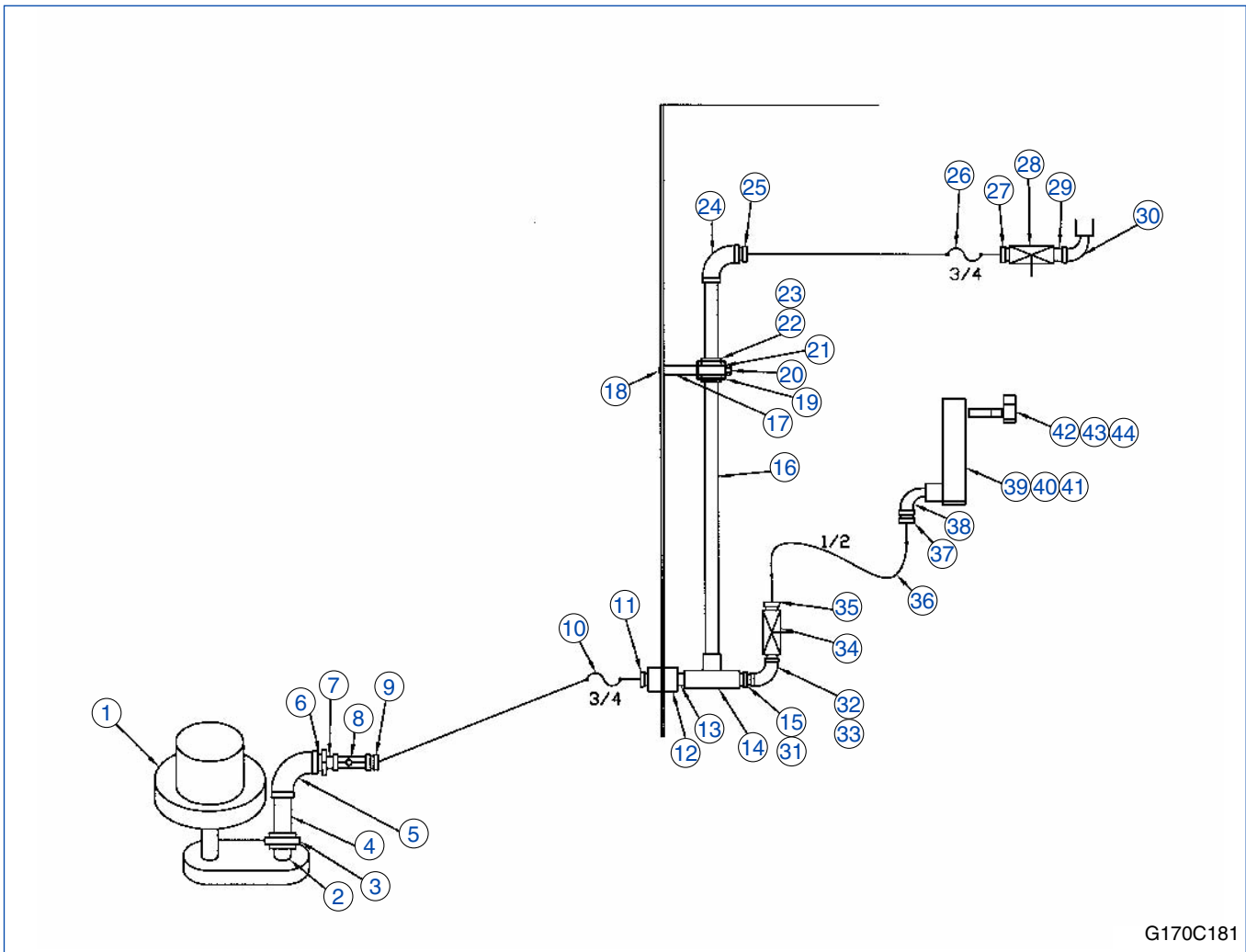


FIGURE 3-E – COOLANT PIPING SCHEMATIC (PAPER BED FILTER W/MAGNETIC SEPARATOR)
PARTS LIST COVERING FIGURE “3-E”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G170C181		....Coolant Piping Schematic (Paper Bed Filter <i>with</i> Magnetic Separator)
1	F362-24	1	.....Coolant Pump
2	---	1	.....Close Nipple (1" NPT)
3	---	1	.....Union (1" NPT)
4	---	1	.....Nipple (1" NPT x 4" Lg)
5	---	1	.....90 Deg Elbow (1" NPT)
6	---	1	.....Reducer Bushing (1" x 3/4" NPT)
7	---	1	.....Close Nipple (3/4" NPT)
8	F457-3	1	.....Check Valve (3/4" NPT)
9	F469-59	1	.....Hose Barb (3/4")
10	F513-5	1	.....Hose (3/4" x 72" Lg)
11	F469-59	1	.....Hose Barb (3/4")
12	---	1	.....Full Pipe Coupling (3/4" NPT)
13	PPP-394	1	.....Close Nipple (3/4" NPT)
14	F1521	1	.....Pipe Tee (3/4" NPT)
15	---	1	.....Reducer Bushing (3/4" x 1/2" NPT)

N/S indicates Not Shown

(Parts continued on next page)

PARTS LIST COVERING FIGURE "3-E" (Cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
16	---	1	.....Black Pipe (3/4" x 20 3/4" Lg)
17	F434-8	2	.....Stacking Nut
18	F1646	2	.....Screws (5/16-18 x 1/2" BHCS)
19	F434-25	1	.....Clamping Unit
20	F5589	2	.....Screw (5/16-18 x 3/4" HHCS)
21	F434-9	2	.....Stacking Nuts
22	F434-20	1	.....Split Bushing
23	F1365	2	.....Screws (5/16-18 x 3/4" SHCS)
24	F1516	1	.....90° Elbow (3/4" NPT)
25	F469-59	1	.....Hose Barb (3/4")
26	F513-5	1	.....Hose (3/4" x 36" Lg)
N/S	F469-86	2	.....Hose Clamp
27	F469-59	1	.....Hose Barb (3/4")
28	F527-2	1	.....Ball Valve (3/4")
29	PPP-394	1	.....Close Nipple (3/4" NPT)
30	---	1	.....90° Reducing Street Elbow (3/4" x 1/2" NPT)
31	F441-13	1	.....Close Nipple (1/2" NPT)
32	F1458	1	.....90° Elbow (1/2" NPT)
33	F441-13	1	.....Close Nipple (1/2" NPT)
34	F527-6	1	.....Ball Valve (1/2")
35	F469-72	1	.....Hose Barb (1/2")
36	F513-8	1	.....Hose (1/2" x 52" Lg)
N/S	F469-81	2	.....Hose Clamp
37	F469-72	1	.....Hose Barb (1/2")
38	F1458	1	.....90° Street Elbow (1/2" NPT)
39	G170B186	1	.....Coolant Supply Manifold
40	F1264	2	.....Screws (1/4-20 UNC x 1/2" SHCS)
41	F1244	2	.....Flat Washer (1/4" Std)
42	G170B187	2	.....Coolant Nozzle
43	F1264	4	.....Screws (1/4-20 UNC x 1/2" SHCS)
44	F1244	4	.....Flat Washer (1/4" Std)
N/S	F362-24	1	.....Magnetic / Paper Bed Coolant System
N/S	F205-7A	1	.....Dirty Coolant Pump
N/S	G170B180	1	.....Pump Drop Flange
N/S	F1226	8	.....Screws (1/2-13 x 1 1/2" SHCS)
N/S	---	1	.....Reducer Bushing (1 1/4" x 1" NPT)
N/S	F469-84	2	.....Hose Barb (1")
N/S	F513-6	1	.....Hose (1" x ____ Lg)
N/S	F1438	1	.....Street Elbow (1" NPT)

N/S indicates Not Shown

SECTION IV - ELECTRICAL

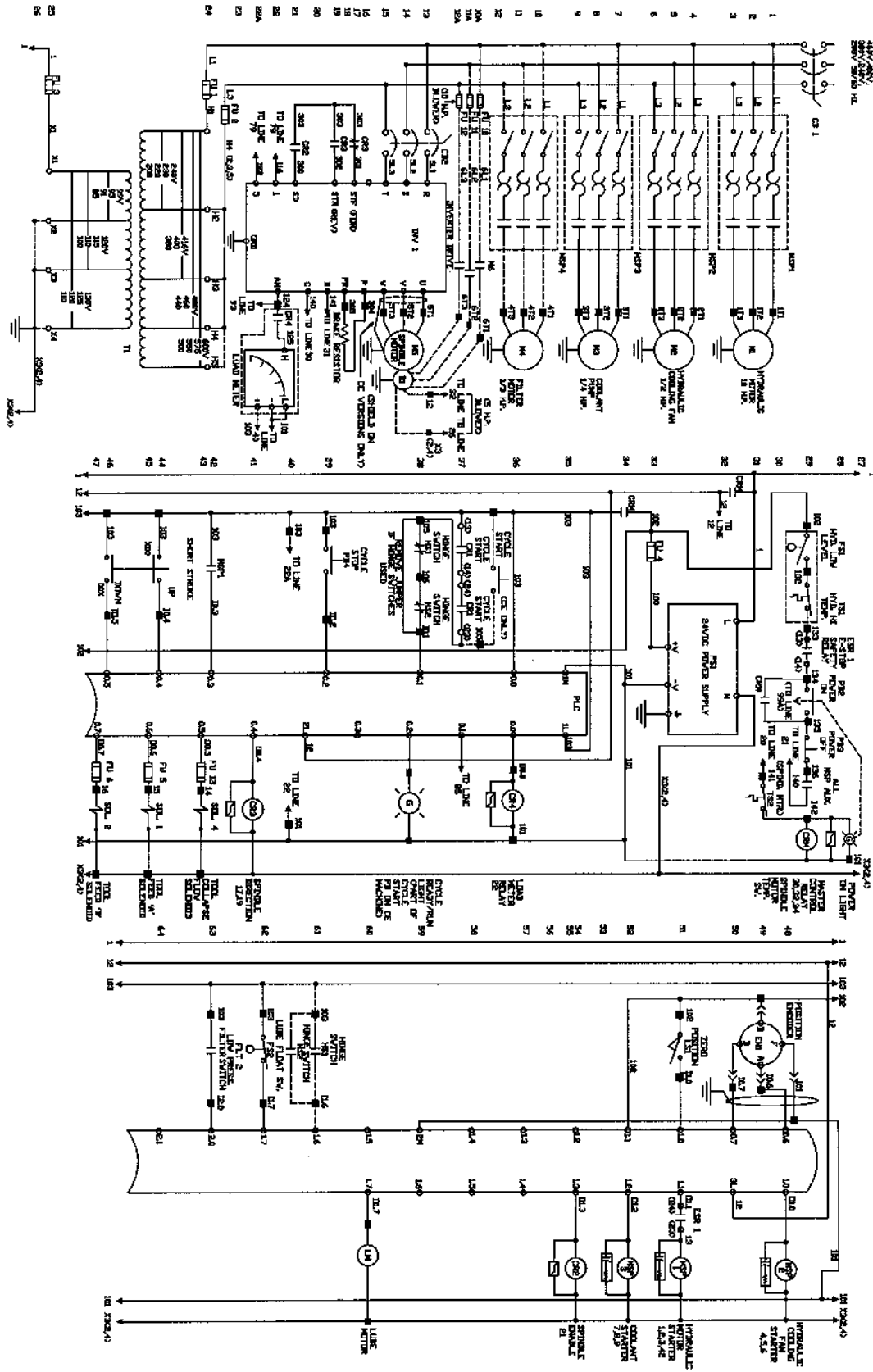


FIGURE 4-A – ELECTRICAL SCHEMATIC (1 of 2)

G180D442-1

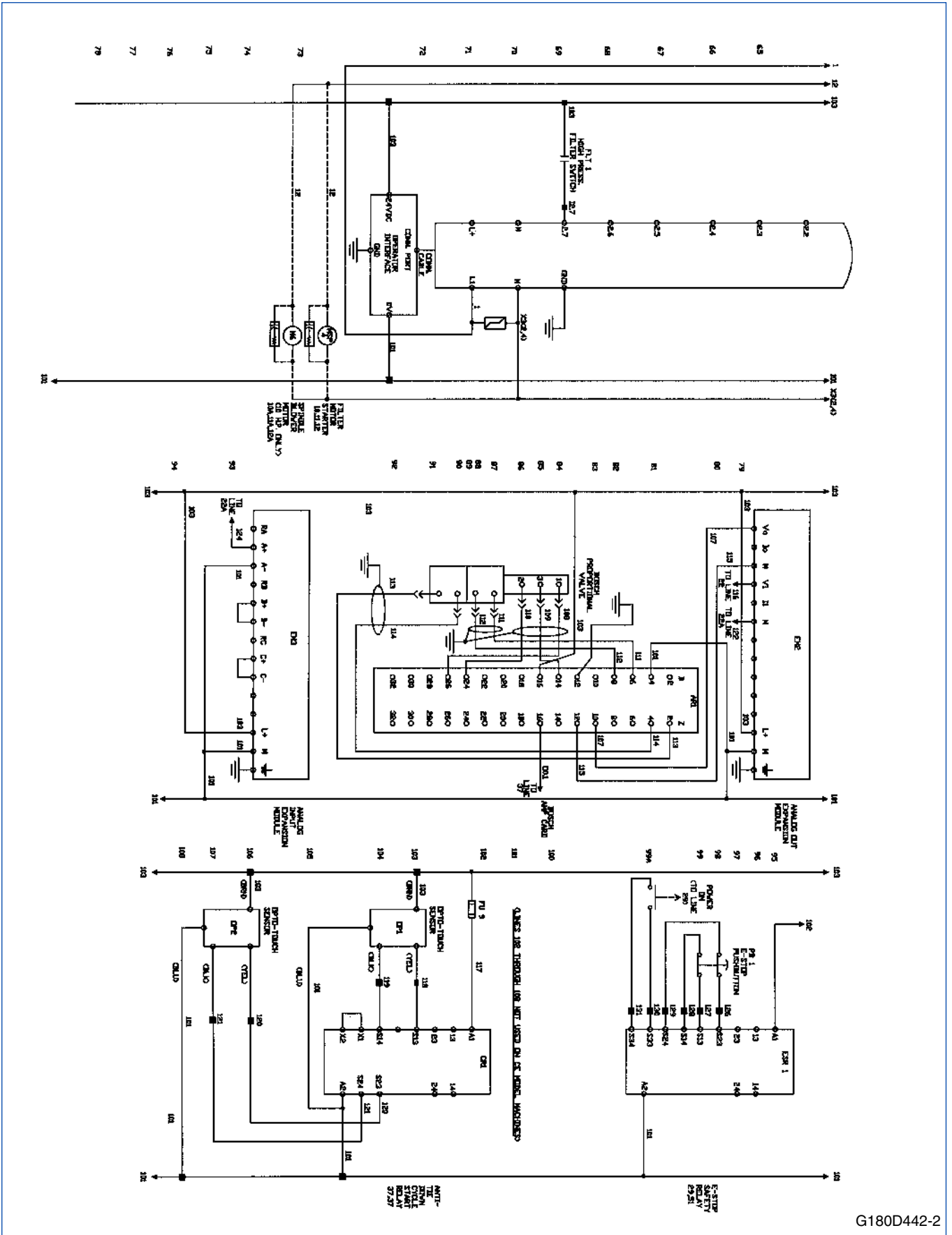


FIGURE 4-A – ELECTRICAL SCHEMATIC (2 of 2)

G180D442-2

SECTION IV
ELECTRICAL

PARTS LIST COVERING FIGURE "4-A"

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
1	G180D442-1&2	Ref.	....Electrical Schematic
2	F1048	1	....Main Electrical Enclosure (Pepco)(Hoffman A-42SA3212LPPL-524MJ)
3	F1047	1	....Backpanel (Hoffman A-42P30)
4	F1051	1	....Junction Box (Coolant Pump)(Hoffman A-6044SC)
5	F1068	1	....Safety Door Latch Mechanism (Cutler-Hammer C361KJ4)
6	F1069	1	....Roller Kit (Cutler-Hammer C361KR)
7	F1086	1	....Main Circuit Breaker (Spindle)(Cutler-Hammer FDB3045L)(5Hp 460V)
7	F1097	1	....Main Circuit Breaker (Spindle)(Cutter-Hammer GWF3063)(5Hp 380V CE)
7	F1087	1	....Main Crct Brkr (Spindle)Cutter-Hammer FDB3060L)(5Hp 380V Non-CE)
7	F1088	1	....Main Circuit Breaker (Spindle)(Cutter-Hammer FDB3090L)(5Hp 230V)
7	F1087	1	....Main Circuit Breaker (Spindle)(Cutler-Hammer FDB3060L)(10Hp 460V)
7	F1986	1	....Main Crct Breaker (Spindle)(Cutter-Hammer GWF3080)(10Hp 380V CE)
7	F5120	1	....Main Crct Brkr (Spindle)(Cutter-Hammer FDB3080L)(10Hp 380V Non-CE)
7	F1090	1	....Main Circuit Breaker (Spindle)(Cutter-Hammer FDR3110L)(10Hp 230V)
8	F1107	1	....Circuit Breaker (Spindle)(Cutler-Hammer SPCL3C20)(5Hp 460V)
8	F1913	1	....Crct Brkr (Spindle)(Cutter-Hammer SPCL3C25)(5Hp 380V CE/Non-CE)
8	F1106	1	....Circuit Breaker (Spindle Drive)(Cutter-Hammer SPCL3C32)(5Hp 230V)
8	F1106	1	....Circuit Breaker (Spindle) (Cutler-Hammer SPCL3C32)(10Hp 460V)
8	F1693	1	....Crct Brkr (Spindle)(Cutter-Hammer SPCL3C40)(10Hp 380V CE/Non-CE)
8	F1801	1	....Circuit Breaker (Spindle Drive)(Cutter-Hammer SPCL3C63)(10Hp 230V)
9	F1070	1	....Oper. Handle Mech. w/4 Handle (Cutler-Hammer C371E1)(Non-CE)
9	F1099	1	....Disconnect Mech. w/LEC Handle (Cutter-Hammer HRGCV34L)(380V CE)
10	F1094	1	....Control Transformer (Amce FS-3-750)
11	F1100	1	....Fuse Kit (Amce PL-79906)
12	F995	1	....Line Side Feeder Lug (Siemens 3RV1915-5A)
13	F994	1	....Line Side Feeder (Siemens 3RV1915-1C)(460/380V CE/Non-CE)
13	F993	1	....Line Side Feeder (Siemens 3RV1915-1B)(230V Only)
14	F1827	1	....Motor Protector (Hyd Motor)(Siemens 3RV1021-4AA10)(460V)
14	F984	1	....Motor Protector (Hy Motor)(Siemens 3RV1021-4BA10)(380V CE/Non-CE)
14	F990	1	....Motor Protector (Hy Motor)(Siemens 3RV1031-4EA10)(230V)
15	F988	1	....Motor Protector (Fan)(Siemens 3RV1021-0KA10)(460/380V CE/Non-CE)
15	F980	1	....Motor Protector (Fan)(Siemens 3RV1021-1CA10)(230V Only)
16	F986	1	....Motor Prot. (Coolant)(Siemens 3RV1021-0GA10)(460/380V CE/Non-CE)
16	F988	1	....Motor Protector (Coolant)(Siemens 3RV1021-0KA10)(230V Only)
17	F987	1	....Motor Protector (Filter)(Siemens 3RV1021-0JA10)(460/380V CE/Non-CE)
17	F980	1	....Motor Protector (Filter)(Siemens 3RV1021-1CA10)(230V Only)
18	F1695	1	....Motor Cont. (Hyd Motor)(Siemens 3RT1026-1AK60)(460/380V CE/Non-CE)
18	F977	1	....Motor Contactor (Hyd Motor)(Siemens 3RT1035-1AK60)(230V)
19	F974	3	....Motor Contactor (Cooling Fan/Pump/Filter)(Siemens 3RT1024-1AK60)
20	F965	4	....Wiring Module (Siemens 3RA1921-1A)(460V; 380V CE/Non-CE)
20	F965	3	....Wiring Module (Siemens 3RA1921-1A)(230V)
21	F991	4	....Motor Protector Auxiliary (Siemens 3RV1901-1D)
22	F970	1	....Auxiliary Contact (Hyd Contactor)(Siemens 3RH1921-1CA10)
23	F967	4	....Adapter Plate (Siemens 3RA1922-1A)(460V; 380V CE/Non-CE)
23	F967	3	....Adapter Plate (Siemens 3RA1922-1A)(230V Only)
24	F1696	1	....24VDC Power Supply (Idec PS5R-E24/100W)
25	---	--	....NOT USED
26	---	--	....NOT USED
27	---	--	....NOT USED
28	F1697	1	....Insulated Terminal Strip (Farnell 151-028)

N/S indicates Not Shown

(Parts continued on next page)

PARTS LIST COVERING FIGURE "4-A" (Cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
29	F941	3	....Insulated Terminal Strip (Farvell 149-850)
30	---	2	....Control Relay (Siemens 3TH2022-0AK6)
31	F1008	1	....Control Relay (Master Control)(Siemens 3TH4040-0BB4)
32	F1021	1	....PLC (Siemens 6ES7 216-2BD21-0XB0)
33	---	1	....Analog Output Module (Siemens 6ES7 232-0HB20-0XA0)
34	---	1	....Analog Input Module(Siemens 6ES7 231-0HC20-0XA0)
35	F1012	1	....Operator Interface (Siemens 6AV3-617-1JC20-0AX1)
36	F1113	1	....Battery (Op17)(Siemens W79084E1001B2)
37	F1017	1	....Battery (PLC)(Siemens 6ES7291-8BA20-0XA0)
38	F1005	1	....Spindle Blower Mtr Contactor (Siemens 3TF2010-0AK6)(10Hp Spindle Only)
39	---	--	....NOT USED
40	F759	67	....Blue Terminal Blocks (Beyond Components)(Enterlec 199 053-20)
41	F760	12	....Green/Yellow Terminal Block (Beyond Comp)(Enterlec 199 054-21)
42	F758	20	....Gray Terminal Blocks (Enterlec 199 051-26)
43	F757	1	....Manual Insertion Wiring Tool (Enterlec 179 466-06)
44	F762	4	....End Bracket (Enterlec 199 408-02)
45	F747	18	....Large Terminal Blocks (Enterlec 115 118-11)
46	F754	2	....Green/Yellow Terminal Blocks (Enterlec 165 113-16)
47	F761	4	....Terminal Fuse Block (Enterlec 199 095-13)
48	F755	4	....Jumper Bars (Enterlec 168 973-07)
49	F745	1	....24VDC Relay (Load Meter)(Enterlec 007 002.21)
50	F765	5	....Terminal Block Label Card (6mm)(Enterlec 233 000-01)
51	F766	1	....Terminal Block Label Card (8mm)(Enterlec 234 000-02)
52	F764	1	....Terminal Block Label Card (5mm)(Enterlec 231 000-07)
53	F1169	1	....Din Rail (Enterlec 101 598-26)
54	F763	1	....End Section (Enterlec 199 635-24)
55	F753	4	....Blue Screw Terminal Blocks (Enterlec 125 486-05)
56	---	--	....NOT USED
57	---	--	....NOT USED
58	---	1	....Anti-Tie Down Cycle Start Kit (Non-CE Mach Only)(Banner AT-FM-K81)
59	F1129	1	....E-Stop Safety Relay (Banner ES-FL-2A)
60	---	1	....Plug (Allied Electronics)(Amphenol MS3108A-18-1S)
61	F731	1	....Cable Clamp Ass. (Allied Electronics 714-2563)
62	F1700	1	....Rubber Boot (Allied Electronics 714-2581)
63	F732	3	....Rubber Boot (Allied Electronics 714-2580)
64	F3612	1	....Fuse Fu 4 (AGC 5)
65	---	1	....Fuse Fu 9 (AGC 2)
66	F1703	2	....Fuse Holders (Allied Electronics 740-5268)
67	---	1	....Drive (5Hp Spd)(Cons'd Cont.)(Mits FR-A740-3.7K-NA)(460/380V CE/Non-CE)
67	F773	1	....Drive (5Hp Spindle)(Cons'd Cont)(Mitsubishi FR-A520-3.7K-NA)(230V Only)
67	---	1	....Drive (10Hp Spd)(Cons'd Cont.)(Mits FR-A740-7.5K-NA)(460/380V CE/Non-CE)
67	F1878	1	....Drive (10Hp Spindle)(Cons'd Cont)(Mitsubishi FR-A520-7.5K-NA)(230V Only)
68	F778	1	....Braking Rstr (5Hp Spdl)(Mitsubishi FR-ABR-H3.7K)(460/380V CE/Non-CE)
68	F3119	1	....Braking Rstr (5Hp Spindle)(Mitsubishi FR-ABR-3.7K)(230V Only)
68	F779	1	....Braking Rstr (10Hp Spdl)(Mitsubishi FR-ABR-H7.5K)(460/380V CE/Non-CE)
68	F1806	1	....Braking Rstr (10Hp Spindle)(Mitsubishi FR-ABR-7.5K)(230V Only)
69	---	--	....NOT USED
70	F951	2	....9 Pin Connector (Newark Electronics 87N484)
71	F943	2	....Backshell (Newark Electronics 44N8887)
72	F2652	2	....Emi Shield Beads (5Hp, Spindle Only)(Newark Electronics 91F6486)
72	F1706	2	....Emi Shield Beads (10Hp Spindle Only)(Newark Electronics 91F6487)

N/S indicates Not Shown

(Parts continued on next page)

SECTION IV
ELECTRICAL

PARTS LIST COVERING FIGURE "4-A" (Cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
73	F5314	1	....Green Illuminated Pushbutton (Power On)(Idec HW1L-MF2F20Q-G24)
74	F801	2	....Red Extended Head Pushbutton (Power Off, Cy Stop)(Idec HW1B-M2F11-R)
75	F802	1	....Red Mushroom Head Pushbutton (E-Stop)(Idec HW1B-V3FO2-R)
76	F805	1	....Joystick (Idec HW1M-2020-20)
77	F5315	1	....Green Pilot Light (Cy Ready)(Idec HW1P-2FQ-G-24)(230/460V; 380V Non-CE)
77	F5314	1	....Green Illum'd Pushbttn (Cycle Ready/Start)(Idec HW1L-MF2F20Q-G24)(380V CE)
78	---	--	....NOT USED
79	F1707	1	....Operator Enclosure (Northwest Controls)(Rittal CP6552)
80	F1708	1	....Handle (Rittal CP6195)
81	G180D384	1	....Operator Console Modification Drawing (GHC)
82	G180B150	1	....Fuse Mounting Bracket (Harris Mach.)(GHC)
83	G180C204	1	....Operator Console Sealtite Mounting Bracket (GHC)
84	G180A135	2	....Operator Console Terminal Block Mounting Bracket (GHC)
85	---	--	....NOT USED
86	G180D370	1	....Legend Plate (Nelson Eng Graphics)(GHC)(230/460V; 380V Non-CE)
86	G180D390	1	....Legend Plate (Nelson Eng Graphics)(GHC)(380V CE)
87	G180D372	1	....Machining Drawing (GHC)
88	PED-1035A	1	....Load Meter
89	F6609	1	....Encoder (Bei Encoder 7272-Led-Sm18)(H25D-SS-300-ABZC)
90	F4344	46'	....Liquitite Flex Conduit (3/8")(Wolff Bros.)
91	F1599	20'	....Liquitite Flex Conduit (3/4")(Wolff Bros.)
92	F1582	41'	....Liquitite Flex Conduit (1/2")(Wolff Bros.)
93	---	9	....90° Sealtite Connector (3/8")(Steel City)(Wolff Bros.)
94	---	5	....90° Sealtite Connector (3/4")(Steel City)(Wolff Bros.)
95	---	8	....90° Sealtite Connector (1/2")(Steel City)(Wolff Bros.)
96	---	1	....45° Sealtite Connector (3/8")(Wolff Bros.)
97	---	1	....45° Sealtite Connector (1/2")(Wolff Bros.)
98	F2470	5	....Straight Sealtite Connector (3/8")(Wolff Bros.)
99	F1642	3	....Straight Sealtite Connector (3/4")(Wolff Bros.)
100	F2469	11	....Straight Sealtite Connector (1/2")(Wolff Bros.)
101	F5122	1	....Rigid Tee (3/4")(5 Hp Spindle Only)(Rex Pipe)
102	F5123	1	....Rigid Tee (1")(10 Hp Spindle Only)(Rex Pipe)
103	F1704	1	....Cord Grip (.187")(Wolff Bros.)(Appelton CG-1850)
104	F1151	6	....Cord Grip (.312")(Wolff Bros.)(Appelton CG-3150)
105	F1150	4	....Cord Grip (.125")(Wolff Bros.)(Appelton CG-1250)
105	F1152	1	....Cord Grip (.250")(Wolff Bros.)(Appelton CG90-2550)
106	---	1	....Fuse Block (Gould US3CCI)(10 Hp Spindle Only)
107	F1147	3	....Fuses (Gould ATDR 8/10)(10 Hp Spindle Only)
108	F1148	2	....Primary Fuses (Gould ATQR4)(460V)
108	F1064	2	....Primary Fuses (Wolff Bros ATQR7)(Gould)(230V)
108	F1149	2	....Primary Fuses (Wolff Bros ATQR6)(Gould)(380V)
109	F1159	1	....Secondary Fuse (Gould TRM8)
110	F1153	4	....Fuses (Solenoids)(Gould GDL-1)
111	F1165	1	....Limit Switch (914CE2-9K)
112	F1156	1	....Ground Bar (Ilsco NB-350-12)
113	F849	2	....Receptacle,Base (Coolant)(Mcnaughton-Mckay)(Harting 09 33 010 2716)
113	F829	2	....Plug Filter Receptacle(Harting 09 30 010 0302)
114A	F848	1	....Plug (Coolant Plug)(Harting 09 33 010 2616)
114B	F832	1	....Hood (Coolant Plug)(Harting 09 30 010 1431)
114C	F2534	1	....Adapter (Coolant Plug)(Harting 73 00 000 5312)

N/S indicates Not Shown

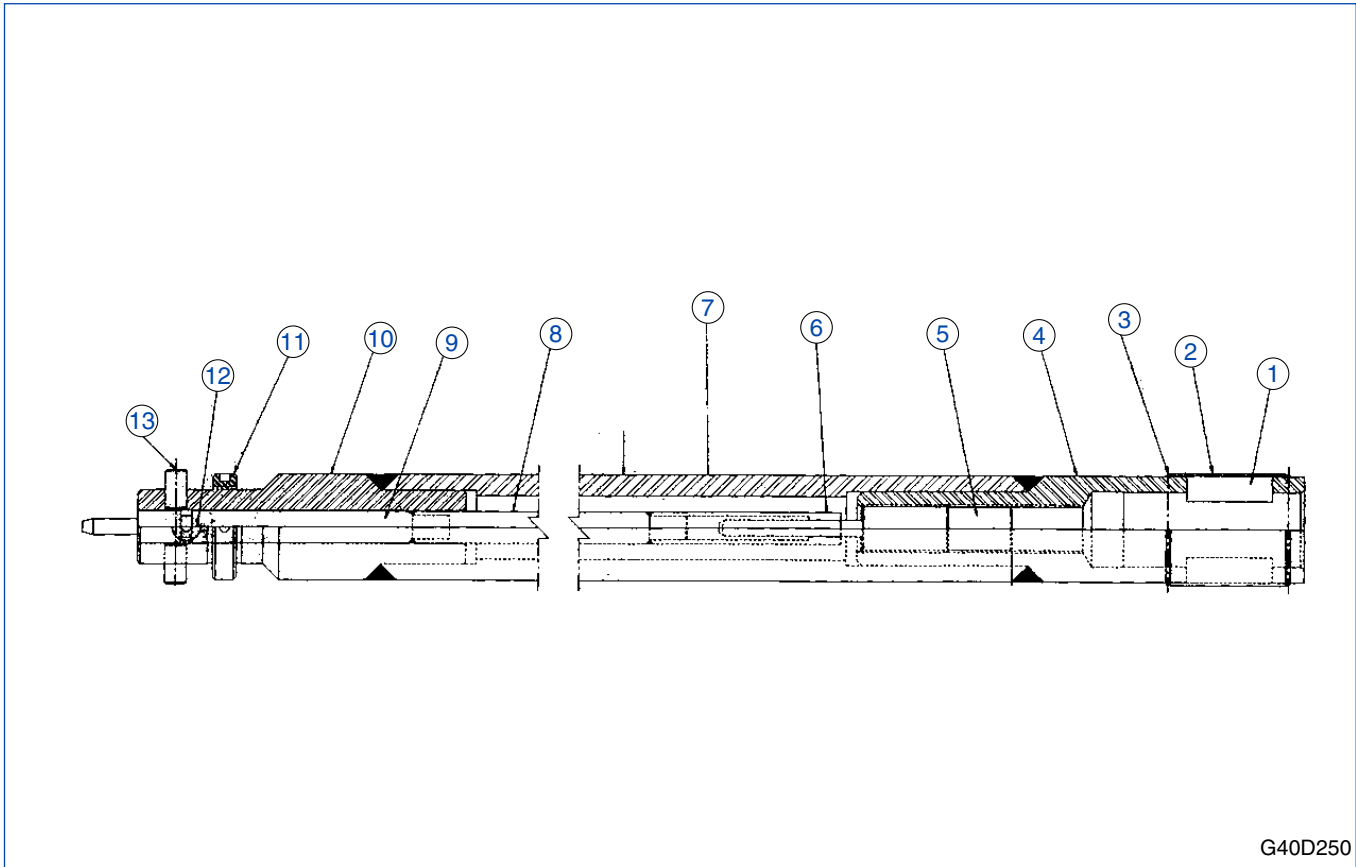
(Parts continued on next page)

PARTS LIST COVERING FIGURE "4-A" (Cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
115	F908	12	....Wireway (Panduit G1X2LG6)
116	F909	6'	....Wireway (2")(Panduit G2X2LG6)
117	F903	12'	....Wireway Cover (1")(Panduit C1LG6)
118	F904	6'	....Wireway Cover (2")(Panduit C2LG6)
119	---	14	....Wireway Bracket (1")(Panduit SNS1F-C)
120	F1711	6	....Wireway Bracket (2")(Panduit SNS2F-C)
121A	F848	1	....Plug (Mcnaughton-Mckay)(Harting 09 33 010 2616)(Mag Separator Only)
121B	F832	1	....Hood (Mcnaughton-Mckay)(Harting 09 30 010 1431)(Mag Separator Only)
121C	F2534	1	....Adapter (Mcnaughton-Mckay)(Harting 73 00 000 5312)(Mag Separator Only)
122	F968	1	....Wiring Module (Hydraulic Msp)(Siemens 3RA1931-1A)(230V Only)
123	F969	1	....Adapter Plate (Hydraulic Msp)(Siemens 3RA1932-1A)(230V Only)
124	F3000	1	....Blank Disconnect Cover Plate (Hoffman A-3456BAP)(380V CE Only)
125	F783	1	....Line Filter (5Hp Spindle Drive)(Cons'd Cont.)(Mit SF1197)(380V CE Only)
125	F1989	1	....Line Filter (10Hp Spindle Dr)(Cons'd Cont.)(Mit SF1174B)(380V CE Only)
126	F777	1	....Adapter Kit (5Hp Spindle Dr)(Cons'd Cont.)(Mit FR-A5AT02)(380V CE Only)
126	F3106	1	....Adapter Kit (10Hp Spindle Dr)(Cons'd Cont.)(Mit FR-A5AT03)(380V CE Only)
127	F1123	2	....Interlock Key (Tri-Power Mpt)(Schmersal AZ15/16 B2)(380V CE Only)
128	F1126	2	....Door Interlock Switch (Schmersal AZ16ZVK)(380V CE Only)
129	G200B746	1	....Left Door Sw Actuator Bracket (Harris Mach.)(380V CE Only)
130	G200B745	1	....Right Door Sw Actuator Bracket(380V CE Only)
131	G200B738	1	....Left Door Sw Key Mount(380V CE Only)
132	G200B742	1	....Right Door Sw Key Mount(380V CE Only)

N/S indicates Not Shown

SECTION V - ACCESSORIES & OPTIONAL EQUIPMENT



G40D250

FIGURE 5-A – ROTARY FEED DRIVESHAFT ASSEMBLY
PARTS LIST COVERING FIGURE “5-A”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G40D250		....Rotary Feed Driveshaft Assembly (2 ½" Dia)
1	G22A106	2	.....Key
2	G35A101	1	.....Key Sleeve
3	- - -	2	.....Retaining Spring (3/32" Dia X 6" Lg).
4	G43B165	1	.....Socket
5	G17A275	1	.....Feed Screw
6	G17C148-3	1	.....Female Square Drive
7	G41B213	1	.....Driveshaft Tube x ____ Long (Driveshaft Length Minus 11.31")
8	G17C171-2	1	.....Feed Rod Extension
9	G17C171-1	1	.....Feed Rod
10	G42C161	1	.....Driveshaft Shank End
11	G19A106	1	.....Ring Nut
12	G20A169-19	1	.....Screw (Dog Pt BHCS)
13	G16A205	2	.....Drive Pin

N/S indicates Not Shown

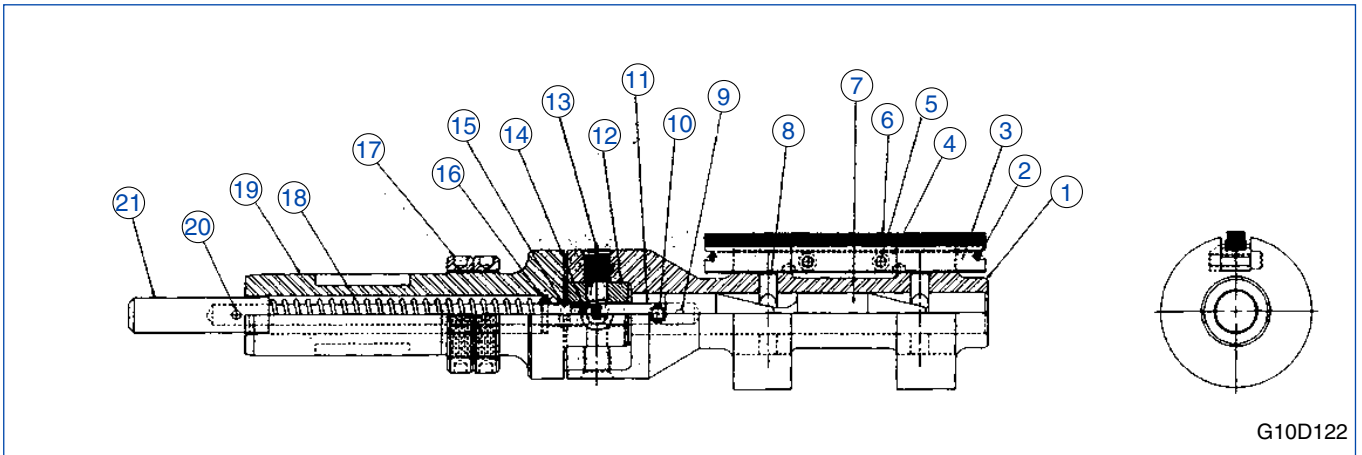


FIGURE 5-B – HONE BODY ASSEMBLY
PARTS LIST COVERING FIGURE “5-B”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G10D122		....Hone Body Assembly (3.5" Dia Std. Flange Type Honing Tool)
1	G11D173-1	1	.....Body, 3.250" Across Flanges, 1.750" Across Slots
2	---	2	.....Stoneholder Retaining Spring (1/8" Dia X 6" Lg)
3	G14C178-3	5	.....Stoneholder, (.437" High)(3.43 - 3.55")
3	G14C178-4	5	.....Stoneholder (.500" High)(3.55 - 3.68")
3	G14C178-5	5	.....Stoneholder (.562" High)(3.68 - 3.80")
3	G14C178-6	5	.....Stoneholder (.625" High)(3.80 - 3.93")
3	G14C178-7	5	.....Stoneholder (.687" High)(3.93 - 4.05")
3	G14C178-8	5	.....Stoneholder (.750" High)(4.05 - 4.18")
3	G14C178-9	5	.....Stoneholder (.812" High)(4.18 - 4.30")
4	---	1/SH	.....Stoneholder Clamp Plate (Refer To Stoneholder)
5	---	2/SH	.....Stoneholder Clamp Plate Screw (Refer To Stoneholder)
6	---	5	.....Abrasive (3/8" x 3/8" x 6" Lg)
7	G12B176	1	.....Cone, 14°
8	G13A139	10	.....Expander Pin
9	---	1	.....Cone Pin (Roll Pin)(3/16" Dia x .875" Lg)
10	---	1	.....Cone Stop Pin (Dowel Pin)(1/4" Dia x 7/8" Lg)
11	G17B113-5	1	.....Cone Rod Link
12	G15A111	1	.....Universal Block
13	G16A116	4	.....Screw Type Drive Pin
14	G17B113-4	1	.....Cone Rod Link Pin
15	G17B401-1	1	.....Cone Rod (1 1/8" Driveshank)
15	G17B113-3	1	.....Cone Rod (1 1/2" & 1 3/4" Driveshank)
16	G20A112	1	.....Cone Rod Washer (1 1/8" Driveshank)
16	G20A109	1	.....Cone Rod Washer (1 1/2" & 1 3/4" Driveshank)
17	G19A111	2	.....Ring Nut (1 1/8" Driveshank)
17	G19A109	2	.....Ring Nut (1 1/2" Driveshank)
17	G19A106	2	.....Ring Nut (1 3/4" Driveshank)
18	G21A105	1	.....Cone Rod Spring (1 1/8" Driveshank)
18	G21A101	1	.....Cone Rod Spring (1 1/2" & 1 3/4" Driveshank)
19	G18C123	1	.....Driveshank (1 1/8")
19	G18B111	1	.....Driveshank (1 1/2")
19	G18C121	1	.....Driveshank (1 3/4")
20	G17B112-2	1	.....Cone Rod Cap Pin (1 1/8" Driveshank)
20	G17B113-2	1	.....Cone Rod Cap Pin (1 1/2" & 1 3/4" Driveshank)
21	G17B112-1	1	.....Cone Rod Cap (1 1/8" Driveshank)
21	G17B113-1	1	.....Cone Rod Cap (1 1/2" & 1 3/4" Driveshank)

N/S indicates Not Shown

SECTION V

ACCESSORIES & OPTIONAL EQUIPMENT

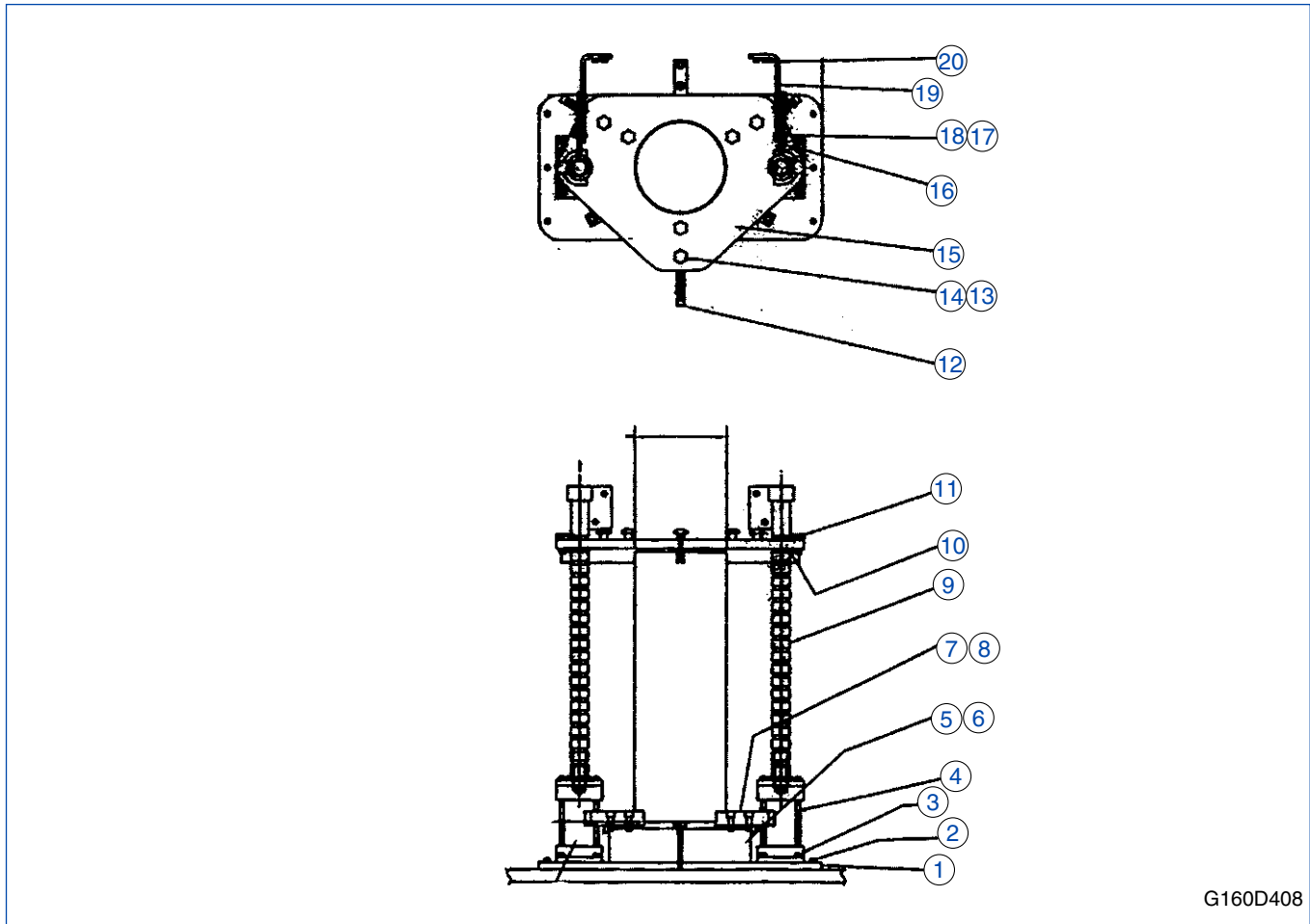


FIGURE 5-C – END CLAMPING FIXTURE ASSEMBLY
PARTS LIST COVERING FIGURE “5-C”

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
-	G160D408		....End Clamping Fixture Assembly
1	G160D409	1	.....Base Plate
2	F1229	6	.....Screw (½-13 UNC x 1¾" Lg SHCS)
3	F1228	8	.....Screw (½-13 UNC x 1¼" Lg SHCS)
4	F471-47	2	.....Pneumatic Cylinder
5	F1822	3	.....Screw (½-13 UNC x 5" Lg SHCS)
6	G160D411	1	.....Chuck (Ref: F523-3)
7	F1297	6	.....Screw (¾-10 UNC x 2" Lg SHCS)
8	G160D410	3	.....Bottom Clamping Arm
9A	G160D412	2	.....Adjustment Rod (For 38" Max Length Part)(Opt)
9B	G160D413	2	.....Adjustment Rod (For 40" Max Length Part)(Opt)
10	G160C323	4	.....Clamping Yoke
11	G160A227	2	.....Safety Pin
12	G160C313	3	.....Top Clamping Arm
13	F105-61	6	.....T-Bolt
14	F105-62	6	.....Palmgrip Handle
15	G160D414	1	.....Clamping Top Plate
16	G160D415-3	2	.....Steady Arm

N/S indicates Not Shown

(Parts continued on next page)

PARTS LIST COVERING FIGURE "5-C" (Cont'd)

ITEM NO.	ORDER BY PART NUMBER	QTY.	DESCRIPTION
17	F1214	4	.....Flatwasher (1/2" Std.)
18	F1228	4	.....Screw (1/2-13 UNC x 1 1/4" Lg SHCS)
19A	G160D415-1	1	.....Steady Arm Mount (Right Hand)
19B	G160D415-2	1	.....Steady Arm Mount (Left Hand)
20	F1232	4	.....Screw (1/2-13 UNC x 1" Lg SHCS)
N/S	F365-10	1	.....Air Valve
N/S	F339-4	1	.....Firl Unit With Mounting Bracket
N/S	F471-46	2	.....Speed Regulator
N/S	F457-6	1	.....Muffler/Filter
N/S	F469-60	20'	.....Polyflow Airline (1/4")
N/S	F105-57	6	.....T-Slot Nut
N/S	F475-46	2	.....Male Branch Swivel Tee (Valve Side)
N/S	F475-44	3	.....Polyflow Fitting (1/4" x 1/4" 90°)(Opp. Valve Side & At Guard OS Con.)
N/S	F475-41	5	.....Straight Polyflow Fitting (1/4" x 1/4")(Into Air Valve & Out of Fnt Unit)
N/S	F1764	2	.....Reducing Bushing (1/2" x 3/8" NPT)(Valve Side)
N/S	F1763	2	.....Reducing Bushing (1/2" x 1/4" NPT)(Opposite Side)
N/S	---	2	.....Close Nipple (3/8" NPT)(Opposite Valve Side)
N/S	F2732	7	.....Reducing Bushing (3/8" x 1/4" NPT)(Out Of Speed Reg & Into Air Valve)
N/S	---	1	.....Pipe Coupling (1/4" NPT)(At Guard)
N/S	F1214	1	.....Flatwasher (1/2")(At Guard)
N/S	#5502-04-04	1	.....Street Elbow (1/4" Steel)(Connects Air At Fnt)
N/S	F1825	1	.....Male Quick Coupler (1/4")(MPA 2)
N/S	G160A237	1	.....Chuck Wrench (F513-10)
N/S	F513-11	1	.....Drive Ratchet (1/2")
N/S	G160B303	1	.....Cylinder Supply Line Bulkhead
N/S	F1264	2	.....Screw (1/4-20 x 1/2" Lg SHCS)(To Mount Bulkhead)
N/S	G160D444-1	1	.....Lower Locating Riser
N/S	G160D444-2	1	.....Upper Adapter Ring

N/S indicates Not Shown

**MANUFACTURED UNDER ONE OR MORE OF THE FOLLOWING
UNITED STATES PATENTS**

4,428,160	5,022,196	5,234,295	5,443,417	6,780,084
4,796,363	5,178,643	5,243,792	5,663,886	7,371,149
4,809,440	5,185,969	5,255,476	5,707,278	7,575,502
4,866,855	5,209,615	5,390,448	6,074,282	7,727,051
4,993,189	5,222,625	5,433,656	6,527,620	

OTHER U.S. AND FOREIGN PATENTS PENDING



SUNNEN PRODUCTS COMPANY, ST. LOUIS, MO U.S.A.

LTA1015T / IL0437T

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:

<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">MULTIPLY</td> <td style="text-align: center;">BY</td> <td style="text-align: center;">TO GET</td> </tr> <tr> <td style="text-align: center;">INCHES (in)</td> <td style="text-align: center;">x 25.4</td> <td style="text-align: center;">= MILLIMETERS (mm)</td> </tr> <tr> <td style="text-align: center;">FEET (ft)</td> <td style="text-align: center;">x 0.3048</td> <td style="text-align: center;">= METERS (m)</td> </tr> </table>	MULTIPLY	BY	TO GET	INCHES (in)	x 25.4	= MILLIMETERS (mm)	FEET (ft)	x 0.3048	= METERS (m)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">MULTIPLY</td> <td style="text-align: center;">BY</td> <td style="text-align: center;">TO GET</td> </tr> <tr> <td style="text-align: center;">MILLIMETERS (mm)</td> <td style="text-align: center;">x 0.03937</td> <td style="text-align: center;">= INCHES (in)</td> </tr> <tr> <td style="text-align: center;">METERS (m)</td> <td style="text-align: center;">x 3.281</td> <td style="text-align: center;">= FEET (ft)</td> </tr> </table>	MULTIPLY	BY	TO GET	MILLIMETERS (mm)	x 0.03937	= INCHES (in)	METERS (m)	x 3.281	= FEET (ft)
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)																	

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

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 discrepancy with Sunnen before proceeding.



SUNNEN PRODUCTS COMPANY
 7910 Manchester Road, St. Louis, MO 63143 U.S.A.
 Phone: 314-781-2100 Fax: 314-781-2268
 U.S.A. Toll-Free Sales and Service: 1-800-325-3670
 International Division Fax: 314-781-6128

<http://www.sunnen.com>
 e-mail: sunnen@sunnen.com

SWITZERLAND – SUNNEN AG
 Phone: ++ 41 71 649 33 33 Fax: ++ 41 71 649 34 34
www.sunnen.ch e-mail: info@sunnen.ch

ITALY – SUNNEN ITALIA S.R.L.
 Phone: 39 02 383 417 1 Fax: 39 02 383 417 50
www.sunnenitalia.com e-mail: sunnen@sunnenitalia.com

FRANCE – SUNNEN SAS
 Phone: +33 01 69 30 0000 Fax: +33 01 69 30 1111
www.sunnen.fr e-mail: info@sunnen.fr

BELGIUM – SUNNEN BENELUX BVBA
 Phone: +32 38 80 28 00 Fax: +32 38 44 39 01
www.sunnen.be e-mail: info@sunnen.be

UK – SUNNEN PRODUCTS LTD.
 Phone: ++ 44 1442 39 39 39 Fax: ++ 44 1442 39 12 12
www.sunnen.co.uk e-mail: hemel@sunnen.co.uk

POLAND – SUNNEN POLSKA SP. Z O.O.
 Phone: +48 22 814 34 29 Fax: +48 22 814 34 28
www.sunnen.pl e-mail: sunnen@sunnen.pl

RUSSIA – SUNNEN RUS
 Phone: +7 495 258 43 43 Fax: +7 495 258 91 75
www.sunnen.ru e-mail: sunnen@sunnen-russia.ru

CZECH REPUBLIC – SUNNEN S.R.O.
 Phone: +420 383 376 317 Fax: +420 383 376 316
www.sunnen.cz e-mail: sunnen@sunnen.cz

CHINA – SHANGHAI SUNNEN MECHANICAL CO., LTD.
 Phone: 86 21 5813 3322 Fax: 86 21 5813 2299
www.sunnensh.com e-mail: shsunnen@sunnensh.com