

P.N. 97350



# **TUBE EXPANDERS OPERATORS MANUAL**



**Model 1690**



**Model 1691**

[www.huthbenders.com](http://www.huthbenders.com)

800-558-7808

# To The Owner

Please take a few minutes to carefully read this Operator's Manual. It has been designed to help you in realizing the many benefits you anticipated when you purchased your Huth Tube Expander. Every Huth Tube Expander is constructed from the finest materials by highly trained, experienced craftsmen. They have a profound interest in your expander's successful performance and have prepared this manual to give you the benefit of their experience, gained through years of building top-quality expanders and related products.

The manner in which you operate, and the care you provide this expander, will have a direct bearing on its continued successful performance. Read this entire manual; keep it handy for future reference.

It has always been Huth's policy to improve its products whenever possible and practical to do so. We reserve the right to make changes and/or improvements without incurring any obligation to do so on previously sold products.

Model Number \_\_\_\_\_

Serial Number \_\_\_\_\_

Date Delivered \_\_\_\_\_

**HUTH-BEN PEARSON INTERNATIONAL**

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# Safety Precautions

## Warning!

### General Operation

- All warning statements must be carefully observed to prevent personal injury.
- Wear eye protection at all times.

### Stand to the side of the unit when operating.

- Before operating the pump, all hose connections must be tightened with the proper tools. Do not overtighten. Connections should only be tightened securely and leak-free. Overtightening can cause result in thread failure or cause high pressure fittings to split at pressures lower than their rated capacities.
- Should a hydraulic hose ever rupture, burst, or need to be disconnected, immediately shut off the pump and shift the control valve twice to release all pressure. Never attempt to grasp a leaking pressurized hose with your hands. The force of escaping hydraulic fluid could cause serious injury.
- Hose material must be compatible with the hydraulic fluid used. Hoses also must not come in contact with corrosive materials such as creosote-impregnated objects and some paints. Consult the manufacturer before painting a hose. Hose deterioration due to corrosive materials can result in personal injury.

### Pump

- Do not exceed the hydraulic pressure rating noted on the pump nameplate or tamper with the internal high pressure relief valve. Creating pressure beyond rated capacities can result in personal injury.
- Before replenishing the oil level, retract the system to prevent overfilling the pump reservoir. An overfill can cause personal injury due to excess reservoir pressure created when cylinders are retracted.

### Cylinder

- Do not exceed the rated capacities of the cylinders. Excess pressure can result in personal injury.
- Do not set poorly balanced or off-center loads on a cylinder. The load can tip and cause personal injury.

## Upon Delivery

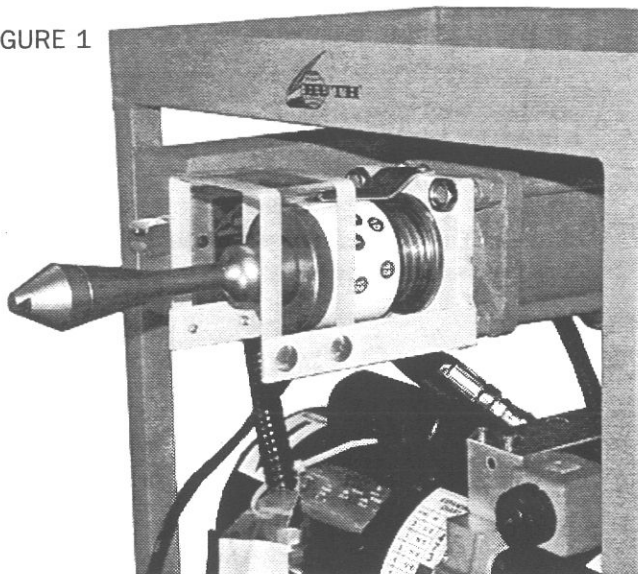
1. Inspect for shipping damage and shortages.
2. Altering any components will **VOID WARRANTY**.
3. Install provided receptacle in an outlet box. Based off your order, this unit is either a 120-volt AC and requires a 30 Amp Industrial Service, or a 240-volt AC and requires a 20 Amp Industrial Service.
4. Replace tank plug with breather cap.
5. Plug the expander into the receptacle.
6. Using the toggle switch, turn the unit on.
7. Depress the foot pedal to the right to extend the cylinder shaft. Then depress the foot pedal to the left to retract the cylinder shaft. When the cylinder is bottomed out, the PSI will build to 3200 lbs. **WARNING DO NOT EXCEED 3200 PSI.** The expander will properly operate with the pressure set between 3000 and 3200 psi.
8. Turn expander off.
9. Your expander is now tested.

## Setting Up Your Expander

### Expander Operation

The Huth Benchtop Expander comes equipped with the Accu-Sizer Expanding Kit. The Accu-Sizer needs to be installed into position on the expanding cylinder. To install the Accu-Sizer on your expander, proceed as follows: (See Figure 1).

FIGURE 1



1. Install the arbor on to the cylinder shaft. Be sure that it is all the way onto the shaft. The arbor tip must also be screwed all of the way into the arbor. A wrench may be used to secure the arbor and tip. **Do Not over tighten.**

## Warning!

### Loose Parts May Cause Damage

2. Slip the Adjustable Collar Guard Assembly over the arbor and cylinder tie rods.
3. Secure the assembly to the cylinder using the two 1/2" - 13 jam nuts provided. Locate these in opposite corners.
4. Lightly grease the arbor and face of the adjustable collar.  
(The adjustable collar has been calibrated at the factory. Once it has been installed you are ready to expand.)

The Expander has a Sizing Chart (See Figure 2) located on the side of the machine. To achieve the desired I.D. expansion, the chart should be read across. For example:

For a 2" I.D. expansion - set the Adjustable Collar so the 5 appears in the sight. Place the #474 Red Segment on the Arbor with the #499 large tip.

FIGURE 2

EXPANDING CHART			
SETTING	SIZE	SEGMENT	TIP
2	1 1/2" ID	4	4
1	1 5/8" ID	7	9
3	1 3/4" ID	3	8
4	1 7/8" ID	4	4
5	2" ID		
8	2" OD		
9	2 1/8" OD	7	9
10	2 1/8" ID	4	9
11	2 1/4" OD	4	9
6	2 1/4" ID		
7	2 1/2" ID		
12	2 3/2" ID	4	7
13	3" ID	6	6

5. Select the desired expanding segment set according to the color coded expanding chart.

### Note:

The most commonly used sizes are identified on the expanding chart. If a dimension is desired that is not noted, always begin with the adjustable collar inward and gradually move it outward to make the expansion.

X

This unit may also be a 240  
V AC unit which would require  
minimum 20 Amp Industrial  
Service.

6. Be sure to select the correct arbor tip according to the chart. The small tip is used only with the yellow segment set for 1-1/2" to 1-3/4" expansions. The large tip is used for the remaining segment sets.

## Caution:

**Always use the correct segment with the correct arbor and arbor tip. Failure to do so will result in tool breakage.**

7. Install the segment set on the arbor by pressing the center opening of the segment over the tip and arbor.
8. Select the desired expanding size by rotating the adjustable collar and aligning the proper color coded number in the indicator hole.
9. Place the material to be expanded over the segment set until it reaches the segment base.
10. Depress the foot pedal to the left to retract the arbor and begin expanding. Continue to expand until the cylinder bottoms out.
11. Depress the foot pedal to the right to release the segment set from the material.
12. Slightly rotate the material and repeat operations 9-11. This will give you a round expansion.

## Warning!

**When performing an expansion other than a calibrated one, always begin with the adjustable collar located inward and advance it to make the desired expansion.**

**If the collar is left fully extended, prolonged use may distort the end threads and lock up the collar.**

## General Repair

### Calibration Decal Replacement

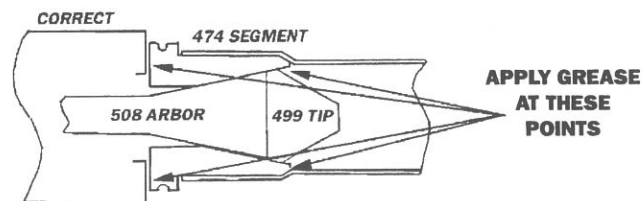
Should the Calibration Decal of the Accu-Sizer need to be replaced, proceed as follows:

1. Remove the old decal and clean the area.
2. Be sure the #508 Arbor and #499 Arbor tip are securely tightened to the cylinder shaft.
3. Place the #474 Red Segment on the arbor.
4. Expand a piece of 2" tubing just large enough to insert another piece of 2" tubing into it. (2.015" I.D.)
5. Locate #5 of the Calibration Decal in the hole of the gun sight.
6. Secure the decal to the adjustable collar.

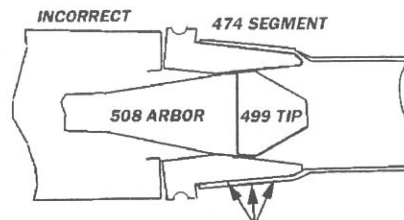
### Note:

**Arbor and face of adjustable collar should always be well lubricated with grease.**

FIGURE 3



**INCORRECT USAGE OF ARBOR AND SEGMENT COMBINATIONS WILL RESULT IN PREMATURE WEAR AND BREAKAGE OF SEGMENT SETS.**



**SEGMENT WILL CRACK (NO SUPPORT HERE). THIS IS CAUSED BY IMPROPER ADJUSTMENT OF ADJUSTABLE COLLAR.**

### Note:

**Always be sure the Arbor and Tips are securely screwed in place before expanding begins.**

## Caution:

**Always use the correct segment with the correct arbor and arbor tip. Failure to do so will result in tool breakage.**

### Note:

**The #498 Small Tip is only used for 1-1/2" - 1-3/4" expansion with the #473 Yellow Segment. All other expansion greater than 1-3/4" will use the #499 Arbor Tip.**

Your Expander comes standard with an assortment of five straight expansion segment sets, which range from 1-1/2" to 3-1/2".

The Expander has the capability of a larger range and style of expansions with the addition of other tooling. Refer to the chart below and the following examples of tooling use for fulfilling your requirement. For further information, please call Huth.

## Huth Expanding Tool Chart

A Ready Reference For What Tools Are Used With What Arbors

### For The Accu-Sizer™

Size	Arbor	Tip	Seg. Set	Collar
1-1/2" - 1-3/4"	508	498	473	41047
1-3/4" - 2-1/8"	508	499	474	41047
2-1/8" - 2-1/2"	508	499	475	41047
2-1/2" - 3"	508	499	476	41047
3" - 3-1/2"	508	499	477	41047

### For 45° Flaring Work

Size	Arbor	Tip	Seg. Set	Collar
1-1/2" - 2-1/2"	508	499	440	41047
1" - 1-1/2"	575*		405	41047

\*Requires 570 Spacer

### For Making Ball Joints

Size	Arbor	Tip	Ball Joint Tool	Collar
1-3/4"	508	499	410	41047
2"	508	499	419	41047
2-1/4"	508	499	420	41047
2-1/2"	508	499	421	41047
3"	508	499	452	41047

### For Expansion Work

Size	Arbor	Seg. Set	Collar
1"	575**	470	41047
1-1/8"	575**	404	41047
1-1/4" - 1-1/2"	500	400	41047
1-1/2" - 1-3/4"	501	422	41047
1-3/4" - 2-1/8"	502	423	41047
2-1/8" - 2-1/2"	502	424	41047
2-1/2" - 2-3/4"	502	425	41047
2-3/4" - 3-1/8"	503	403	523
3-1/8" - 3-1/2"	503	406	523
3-1/2" - 4"	503	408	523
4" - 4-7/8"	503	450	523
4-7/8" - 5-1/2"	503	451	523

\*\*Requires a 570 Spacer

### For Flanges

Size	Arbor	Tip	Seg. Set Flange	Collar
2"	508	499	411 w/413 Flange Ring	41047
2-1/4"	508	499	411 w/414 Flange Ring	41047
2-1/2"	508	499	412 w/418 Flange Ring	41047

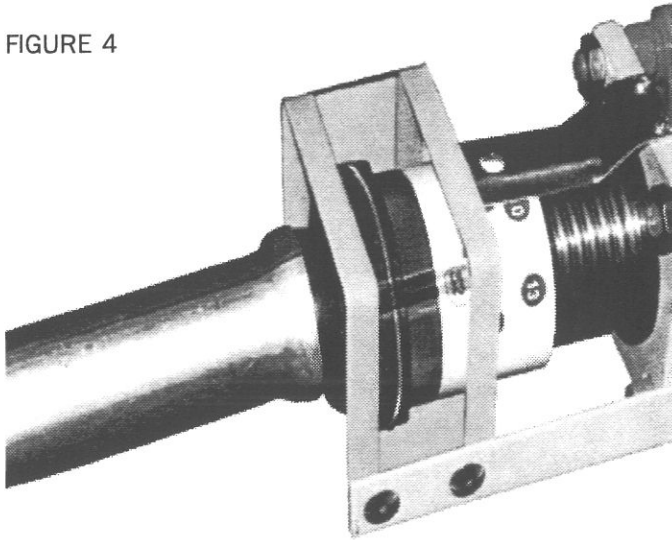


### #440 FLARING SEGMENT SET

With a #440 Flaring Segment Set, flares from 1-1/2" to and including 2-1/2" can be completed quickly using the expander. To produce a flare, proceed as follows:

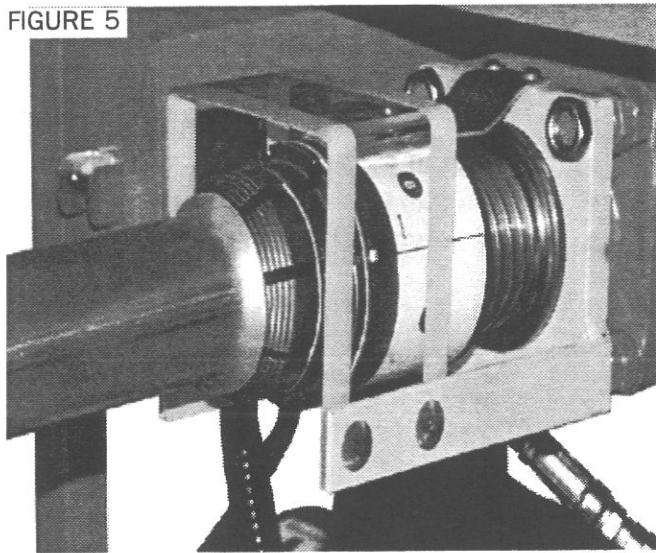
1. Install the arbor and Tip #499, being sure they are securely tightened onto the cylinder shaft.

FIGURE 4



2. Slide the Flaring Segment Set over the Arbor. (See Figure 4.)

FIGURE 5



3. Place the tubing over the Arbor and Segment Set, but **DO NOT** place the end of the tubing past the last step (tooth) on the segment. (See Figure 5.)
4. Depress the foot pedal and rotate the tubing to produce the desired flare.

#### **Note:**

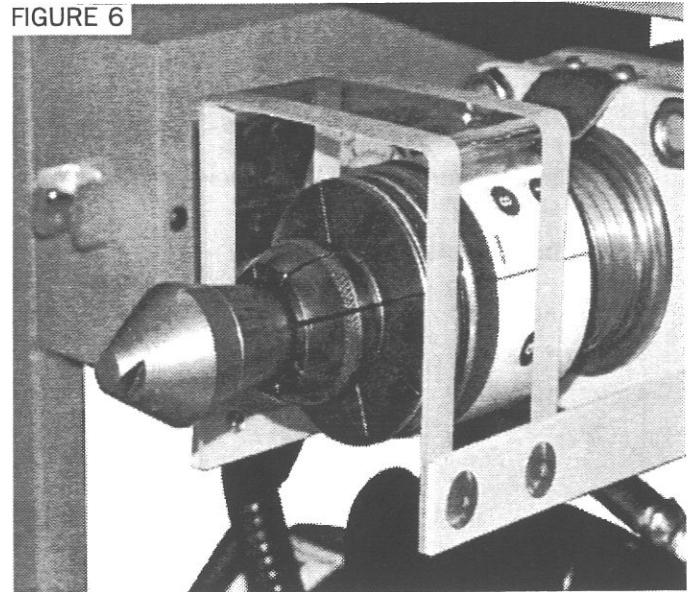
**Smaller diameter should be gradually worked up onto the Segment Set.**

### BALL JOINT SEGMENT SETS

Ball Joint Segment Sets are used to produce male and female joints on tubing from 1-3/4" to and including 3".

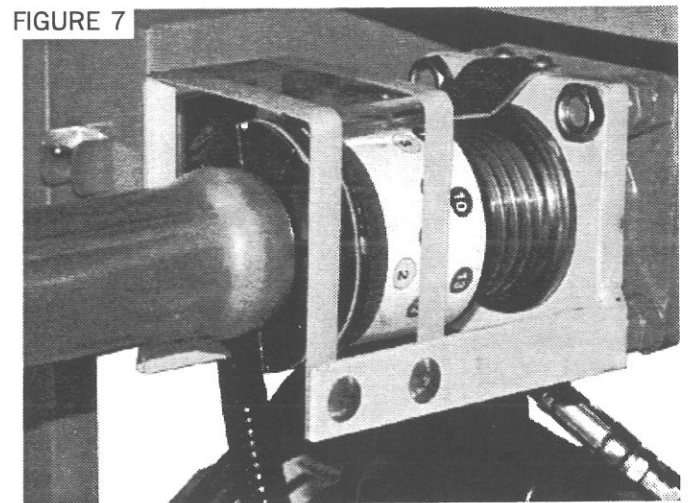
The joints can be made quickly using the expander. To produce a ball joint, proceed as follows:

FIGURE 6



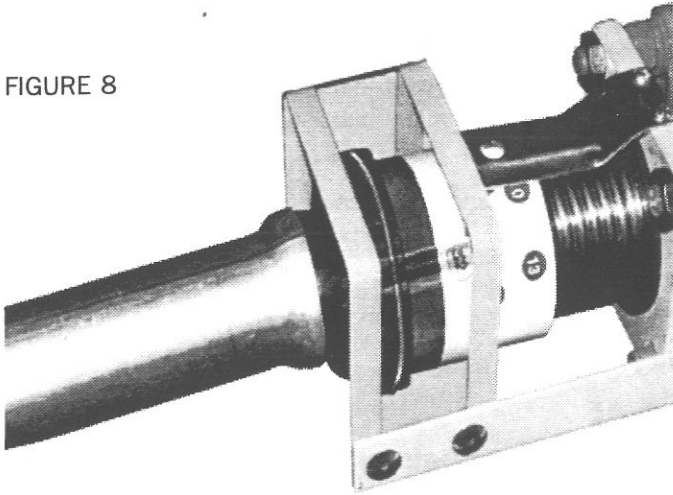
1. Install the Arbor and tip #499. Be sure they are secured tightly to the cylinder shaft.
2. Slide the Ball Joint Segment over the Arbor. (See Figure 6.)
3. Place the tubing over the Arbor and the Segments Set until the end of the tubing touches the base of the segment set.

FIGURE 7



4. Depress the foot pedal to form the ball, being careful not to distort the open end of the tubing. (See Figure 7.)
5. To make the female, place the tubing over the Arbor and Segment Set until the end of the tubing is at the groove on the ball.

FIGURE 8



6. Depress the foot pedal and flare the end of the tubing to fit the mating ball joint. (See figure 8.)

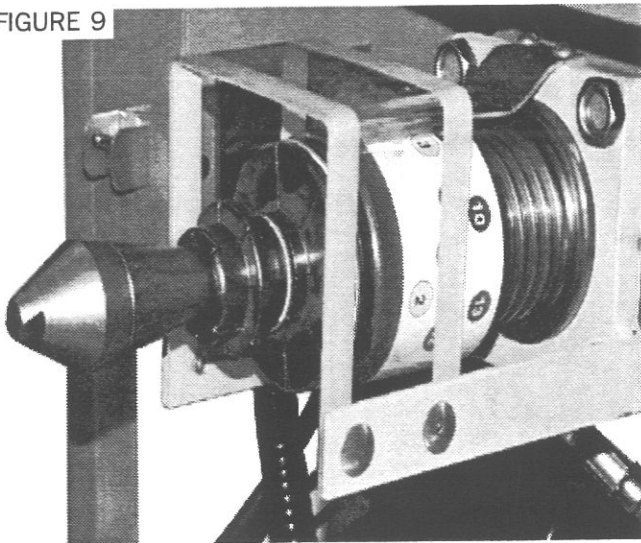
### FLANGE SEGMENT SETS

Expanding Flange Segment sets come in sizes 2" - 2-1/2" tubing with sizing rings for 2", 2-1/4" and 2-1/2"

To Produce a flange, select the correct segment set, flange ring and proceed as follows:

1. Place the segment set over the arbor. Secure into position.
2. Place the flange ring over the end of the tubing.
3. Place the tubing over the arbor and segment set until it meets the base of the segment set.
4. Push the sizing ring forward until it also touches the base of the segment set

FIGURE 9



5. Press the foot pedal to form the flange. The flange will be formed when the tubing meets the inside of the flange ring. (See figure 9.)

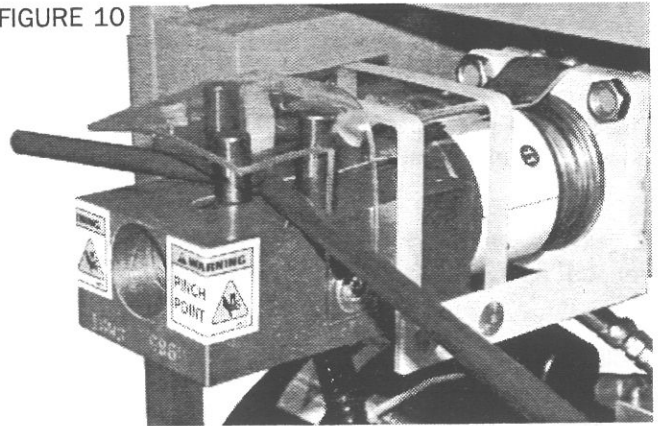
### ROD BRACKET BENDER

Rod bracket bender can form up to 1/2" round or 1/4" x 1" flat low carbon mild steel.

To Produce a bend, install the rod bracket bender and proceed as follows:

1. Turn adjustable collar all the way in.
2. Extend cylinder fully.
3. Slide bending block on arbor until arbor pin bottoms out in block slot.
4. Screw adjustment collar out to meet block. This will allow for the maximum bend angle.
5. Place material to be bent between arbor pin and block pins.

FIGURE 10



6. Depress the foot pedal until the material is bent to the desired angle. (See figure 10.)
7. Release Cylinder. If more bends of the same angle are to be produced, set the adjustment collar to limit the travel of the arbor and the depth of the bend.



## Maintenance

The Benchtop Expander is designed for trouble free operation with minimum maintenance. If you observe common sense and the hints given you, you will greatly extend you expander's life without trouble and costly repairs.

General: Grit, grease and dirt should not be allowed to accumulate on the expander; this cause wear on moving parts and reduces the effectiveness of the expander.

At least on a weekly basis, remove dirt buildup from the expander with a dry rag or an air hose.

### Caution:

**Do Not use strong solvents to clean dirt build up from your expander. Solvents may damage some components.**

Check for leakage.

### Caution:

**Hose fittings are made of soft metal. Over tightening may damage fittings and cause leaks.**

Inspect high pressure hoses and electrical plug and cord for any damage. (Never unplug the expander power unit by yanking the electrical cord.)

Check oil level every 60 days. Remove oil reservoir cap (27). Oil level should be  $\frac{1}{2}$ " from the top of the fill hole. If needed, add Shell Tallus 32 or equivalent.

Tooling: It is absolutely necessary to keep the arbor and expanding segment assembly clean and lubricated at all times. For best results use grease or a lubricating spray. If expanding tools stick in pipe, tap pipe slightly until the tool is released. (This can be avoided by properly cleaning and lubricating the arbor and expanding segment assembly.)

**NEVER TRY TO FORCE STUCK TOOLING BY HAMMERING ON THE UNIT.**

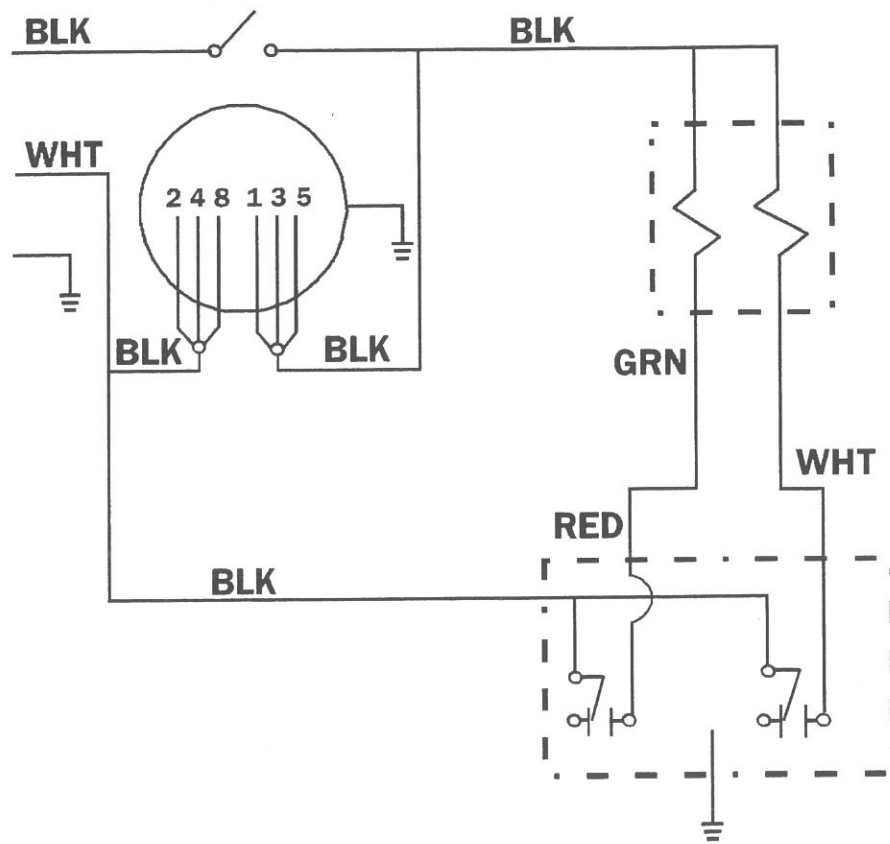
Tools should be stored carefully; cleaned and lubricated in the place provided for them. Mishandling or abusing tooling can result in breakage or damage and void the warranty.

### Warning!

**Lockout, tagout unit before attempting service.**

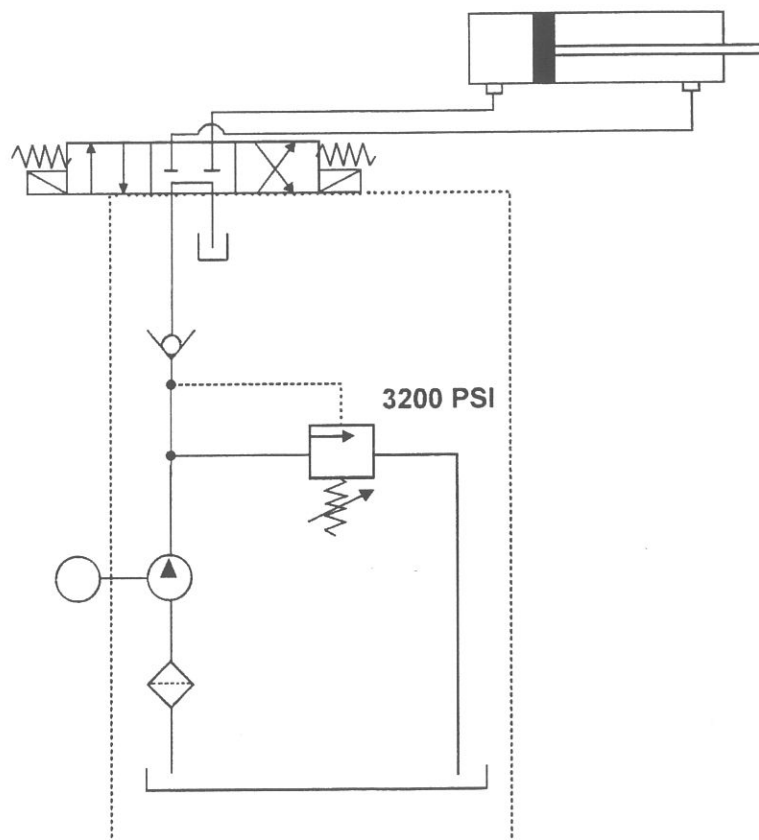
## ELECTRICAL FLOW

Figure 11

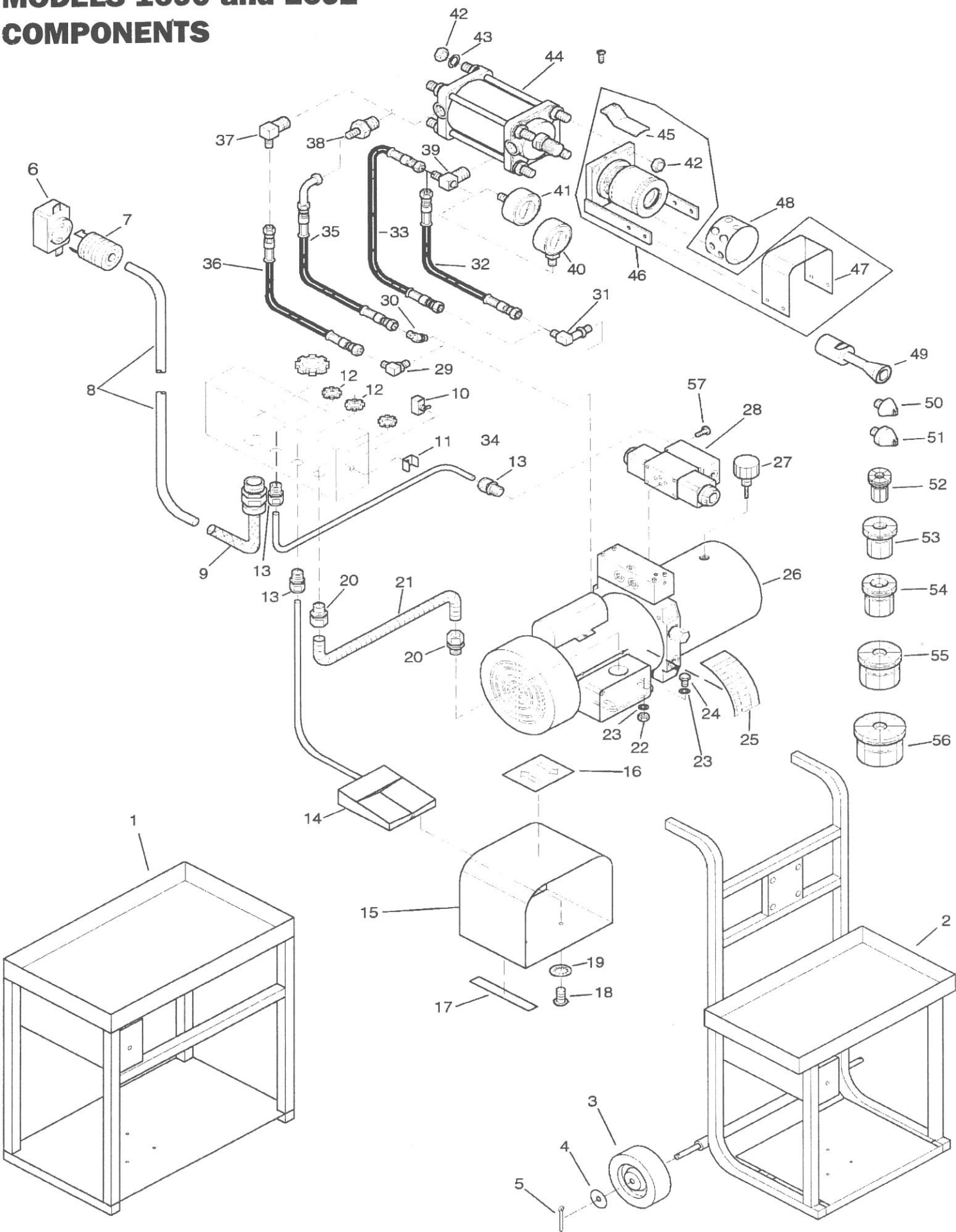


## HYDRAULIC FLOW

Figure 12



**MODELS 1690 and 1691**  
**COMPONENTS**



# MODELS 1690 and 1691 COMPONENTS

KEY	PART NUMBER	DESCRIPTION
1	97010	Benchtop Frame <b>Model 1690</b>
2	97011	Cart Frame <b>Model 1691</b>
3	97059	Wheel
4	97333	1/2" Flat Washer
5	97334	1/2" x 2" Cotter Pin
**	6	95190 Receptacle - 110V, 30A ** 6) 95187 Receptacle - 220V, 20A
***	7	95189 Plug - 110V, 30A *** 7) 95188 Plug - 220V, 20A
8	95370	10-3 Cord - 10'
9	95172	Kellum
10	95087	Toggle Switch
11	95091	Toggle Switch Cover
12	95429	Lock Nut
13	95449	Cord Grip
14	95419	Foot Pedal
15	95102	Foot Pedal Guard
16	98036	Direction Label
17	50058	Rubber Foot
18	97283	6 - 32 x 1/2" Screw
19	97285	6 - 32 Star Washer
20	95229	1/2" Straight Conduit Connector
21	95230	1/2" x 8" Conduit
22	97210	1/4" - 20 Locknut
23	97395	1/4" Flat Washer
24	97260	1/4" - 20 x 3/4" Hex Bolt * 28) 92171 Directional Valve 110V
25	98042	Sizing Chart
26	1617	Power Unit 92164 Directional Valve 220V
27	838	Breather Cap
* 28	92171	Directional Valve
29	92071	90° O-Ring Fitting, 3/8" St. Thread x 3/8" JIC <b>Model 1691</b>
30	92066	45° O-Ring Fitting, 3/8" St. Thread x 3/8" JIC <b>Model 1690</b>
31	92065	90° O-Ring Fitting, 3/8" St. Thread x 3/8" JIC Extra Long
32	92265	1/4" 2-Wire, 5,000 PSI 3/8" Female Swivel Hose 16" <b>Model 1690</b>
33	92271	1/4" 2-Wire, 5,000 PSI 3/8" Female Swivel Hose 30" <b>Model 1691</b>
34	95508	16-3 Cord, 30"
35	92298	1/4" 2-Wire, 5,000 PSI 3/8" Female Swivel- 3/8" Female 90° Swivel Hose, 13", <b>Model 1690</b>
36	92270	1/4" 2-Wire, 5,000 PSI 3/8" Female Swivel Hose 24" <b>Model 1691</b>
37	92009	90° Fitting, 1/2" Male NPT - 3/8" Male JIC <b>Model 1691</b>
38	92002	St. Fitting, 1/2" Male NPT x 3/8" Male JIC <b>Model 1690</b>
39	92009DT	90° Fitting, 1/2" Male NPT x 3/8" Male JIC, Tapped 1/4" NPT
40	92100	Pressure Gauge, <b>Model 1691</b>
41	92099	Pressure Gauge, <b>Model 1690</b>
42	97208	1/2" - 13 Jam Nut
43	97383	1/2" Lock Washer
44	92375	3-1/2" x 3" Expanding Cylinder
45	595	Sight
46	41047	Adjustable Collar (Includes sight and guard, but not decal)
47	41010	Guard Material
48	98043	Calibration Decal
49	508	Arbor
50	498	Small Arbor Tip, 1-1/2" - 1-3/4"
51	499	Large Arbor Tip, 1-3/4" - 3-1/2"
52	473	Segment Set, 1-1/2" - 1-3/4"
53	474	Segment Set, 1-3/4" - 2-1/8"
54	475	Segment Set, 2-1/8" - 2-1/2"
55	476	Segment Set, 2-1/2" - 3"
56	477	Segment Set, 3" - 3-1/2"
57	97268	10 - 24 x 1 1/4" Allen Head Cap Screw

## **Service**

Service will be provided through Huth-Ben Pearson Customer Service.

For repair authorization or parts please call:

**Huth-Ben Pearson International LLC**  
**Customer Service**  
**800-558-7808**

For your convenience we are providing an assembly part selection from which you can order if you attempt to make repairs. However, for professional quality repair we recommend our Factory Service Department.

Damages made by unauthorized repair will void warranty.

## **Warranty**

This warranty is made for the exclusive benefit of the original owner and is not transferable. There is no other warranty applicable to Huth-Ben Pearson Products, and no representative has any authority to make any representation, promise or agreement except as stated in the warranty.

## **One Year Warranty\***

For one year from date of original invoice the SELLER will repair the expander if found to be defective in material and workmanship without cost to the Purchaser. Following the first 90 days from the date of original invoice, Replacement Parts are shipped from the SELLER to the Purchaser freight collect. Returns of defective parts are shipped prepaid to the SELLER.

In effecting such repairs, the SELLER may at its election, repair or replace any part which it finds to be defective.

\*DURING FIRST 90 DAYS FROM DATE OF ORIGINAL INVOICE, THE SELLER WILL PAY FREIGHT CHARGES FOR REPLACEMENT OF DEFECTIVE PARTS.

**The SELLER of this merchandise is**  
**Huth-Ben Pearson International LLC.**