ENGINEERING
TOMORROW

Operator's Manual

# Aeroquip® by Danfoss FT1360
## Crimp Machine

# Warning

Aeroquip fitting tolerances are engineered to match Aeroquip hose tolerances. The use of Aeroquip fittings on hose supplied by other manufacturers and/or the use of Aeroquip hose with fittings supplied by other manufacturers may result in the production of unreliable and unsafe hose assemblies and is neither recommended nor authorized by Aeroquip.

Failure to follow Aeroquip process and product instructions and limitations could lead to premature hose assembly failures resulting in property damage, serious injury or death.

The user must exercise extreme care when operating any Aeroquip assembly equipment with powered moving components. Safety glasses must be worn at all times when using any Aeroquip assembly equipment.

Read and understand the owners and operators manual before attempting to operate any equipment.

*Danfoss hereby disclaims any obligation or liability (including incidental and consequential damages) arising from breach of contract, warranty, or tort (under negligence or strict liability theories) should Aeroquip hose, fittings or assembly equipment be used with the hose, fittings or assembly equipment supplied by another manufacturer or in the event that product instructions for each specified hose assembly are not followed.*

# FT1360

## CAPABILITIES

- ALL SIZES THRU -32 INCLUDING INTERNAL SKIVE

## DIE SIZE

- FT1307 CAGE STYLE DIES ARE 1.100" WIDE AND 2.000" LONG
- FT1209 CAGE STYLE DIES ARE 1.237" WIDE AND 3.250" LONG

## POWER UNIT

- 10 H.P./ 3 PHASE/18 GPM WITH SLOW DOWN CIRCUITRY

## CYLINDER SIZE

- 8" BORE/ 5 3/4" STROKE/ 4" ROD

## MAJOR USE

- PRODUCTION CRIMP MACHINE (LARGE DISTRIBUTORS, OEM'S)
- FTI209 REPLACEMENT

## COMMENTS

- BACKSTOP LOCATOR SYSTEM STANDARD
- WORK-LAMP STANDARD
- STATIONARY CAGE (CRIMP RING MOVES ONTO DIES FOR CRIMP OPERATION)
- DIGITAL ENCODER/TRANSDUCER POSITION SYSTEM
- 2:1 CALIBRATION RATIO, SAME AS FT1330 AND FT1340

# Table of Contents

# Introduction

The Aeroquip FT1360 crimp machine has been designed to provide production style crimping capability for all Aeroquip distributors as well as original equipment manufacturers. The user can crimp -2 through -40 size Aeroquip fittings onto all Aeroquip hose styles including four and six wire spiral hoses requiring internal skive crimp style fittings.

Each set of eight crimp dies is contained in a die cage which slides in and out of the machine as one package, thus eliminating time consuming and messy die insertion and removal.

A compact hydraulic power unit supplies pressure to a cylinder which provides the required crimping force through the mechanical advantage of a crimp ring and crimp die cage.

The crimp die cage is fixed, and the crimp ring moves over the cage to ease in crimping without the fitting moving.

# Limited Safety Instructions

1. **KEEP WORK AREA CLEAN.** Cluttered areas and benches invite accidents.

2. **AVOID DANGEROUS ENVIRONMENT.** Keep the work area well lit. Do not operate equipment when floors are slippery. Always ensure you have sound footing with both feet on the floor. Do not operate controls if hands or controls are wet.

3. **PREVENT UNAUTHORIZED OPERATION.** Do not permit anyone to operate this machine unless they have read and thoroughly understand this manual. Unplug the machine when not in use.

4. **USE THE RIGHT DIE CAGE.** Do not force the dies to do a job they were not designed for. Never mix dies of different sets. Dies are assembled in a cage.

5. **WEAR PROPER APPAREL** Do not wear loose clothing or jewelry that could get caught in moving parts. Rubber-soled footwear is recommend for best footing.

6. **DO NOT OVERREACH.** Keep proper footing and balance at all times.

7. **MAINTAIN DIES WITH CARE.** Most dies used on the FT1360 crimp machine are hardened tool steel affording the best combination of strength and wear resistance for long life. Hardened dies are generally brittle and care should be taken to avoid any sharp impact. Never strike a die with a hardened instrument.

8. **INSERT CRIMP DIE CAGE. CAUTION: MAKE SURE DIES ARE COMPLETELY IN PLACE, FLAT AGAINST PRESSURE PLATE OR DAMAGE TO THE DIES OR MACHINE MAY RESULT.**

9. **CHECK PARTS.** Check for alignment of all moving parts, broken parts, and any other conditions that may affect the machine's operations.

10. **STORE DIES PROPERLY.** Never place die cages, tools, fittings, or any other material on the machine where it may interfere or fall into the crimping operation.

11. **DO NOT OVER PRESSURE.** Do not exceed 3.100 psi hydraulic pressure supplied to machine. This setting is preset at the factory and should not require adjustment.

12. **DIE CAGE TOOLING CHANGE.** Do not insert or remove die cage while power unit is turned on.

13. **AVOID PINCH POINT.** Do not rest hand on crimp ring. Keep hands well away from all moving parts. Do not operate with any personnel close to moving parts.

14. **USE PROPER PROCEDURES.** Never rush a hose assembly. Always take the time required to ensure all specified procedures are followed.

# Specifications

| | |
|---|---|
| **Dimensions** | 32" wide, 42" deep, 50" high |
| **Weight** | 2,000 lbs. |
| **Motor** | 10 HP |
| **Electrical Requirements** | 230/460 volts, 60 Hz, 3 phase |
| **Pump** | 15 gpm to preset limit, 2 gpm to 3,000 psi |
| **Reservoir** | 10 gallon, SAE 10W hydraulic oil |
| **Hose** | -4 through -40 textile and wire reinforced, through -32 six wire spiral |

# Installation

The FT1360 crimp machine is delivered completely plumbed and wired. The reservoir has been filled with 10 weight hydraulic oil.

1. Uncrate the machine and position it in its work location on a floor capable of supporting a machine weighing 2000 pounds.
2. Position the disconnect switch to the "OFF" position.
3. The transformer in electrical box is wired for 460 volts.
4. The machine comes wired for 460 volts. Thermal overloads and fuses are provided for conversion to 230 volts. Consult Danfoss with any questions regarding assistance with conversion procedures.

*5. Install 460 volt power into the disconnect.

* If the FT1360 crimp machine fails to operate properly, 2 of the incoming disconnect 3Ø lines must be switched.

# Tooling

**Crimp Die Cages:** Crimp dies for the FT1360 crimp machine are contained in a die cage which can be inserted as a package into the machine, thus eliminating time consuming and inaccurate insertion of individual dies. Each set of eight crimp dies is contained in a separate die cage, thus eliminating concern from inter-mixing dies of different sets.

Crimp die cage part numbers are similar to crimp die part numbers. In either case the die suffix number is the same. Use the PowerSource Crimp Spec tool to determine the tooling that should be used. The FT1209 crimp dies are longer than the FT1307 dies. They will accommodate the longer sockets required with these assemblies.

# Basic Machine Operation

With the machine installed as outlined in this manual and with the disconnect switch turned on. push the start button. The pump will start running.

The crimp ring is pulled over the crimp cage by a hydraulic cylinder. Depressing the footswitch will move the crimp ring forward extending the cylinder. Pressing the jog reverse button will move the crimp ring back to its retracted position..

You will find that being able to jog the crimp ring in either direction will be very helpful when positioning the fitting within the crimp dies during the crimping cycle or when setting up the fitting locator.

# Maintenance

1. Sliding surfaces must be kept free of dirt and other abrasive materials.

2. Surfaces of crimp dies and the crimp ring where metal to metal contact is made should be lubricated with high efficiency PTFE grease (Danfoss part number FF91455) at the beginning of each production run or as required during production (minimum of once per 25 crimps, and more often with larger hose).

3. All exposed black metal surfaces should be coated occasionally with a light film of oil to prevent corrosion.

4. The oil level in the fluid reservoir of the hydraulic power unit should be checked periodically and maintained at a level one inch below the top of .the reservoir. Note: The crimp die cage should be retracted fully when the oil level is checked. Add SAE 10 weight hydraulic oil as necessary.

# Using the PowerSource Crimp Spec Tool

Visit the PowerSource Crimp Spec tool at danfoss.com/crimp for tooling and Crimp Spec details.

# Operating Instructions

## Hose Preparation

### 1. Hose Preparation and Pre-Assembly

Select the proper hose, nipple and socket combination. Cut the hose to length, assemble and crimp. Skiving is required for flat factory crimp.

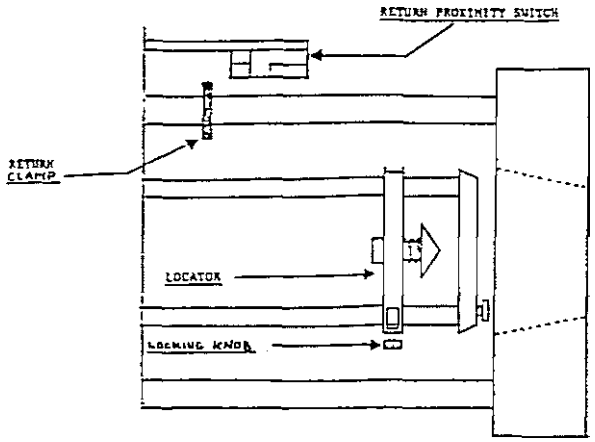
### 2. Crimp Machine Setup

Determine the correct crimp die cage to be used to crimp the assembly you have selected. With the cylinder retracted fully, install the crimp die cage by sliding it downward against the pressure plate until the shoulder bolts on the pressure plate are seated in the slots on the back of the crimp die cage and the bolt on the back of the crimp die cage is seated in the slot at the top of the pressure plate.

### 3. Positioning The Fitting Locator

### Straight Fittings

If only one hose assembly is being crimped on this setup, you will probably choose to locate the fittings visually rather than set the locator. Whether the fitting is positioned within the dies visually or with the aid of the locator, the proper position will be the same. The scribe line at the skirt end of the socket must be lined up with the face of the jaw inset. The locator, can be moved forward by loosening the locking knob. When the locator touches the end of the fitting tighten the knob. The locator is spring loaded to accommodate for hose growth during crimping operation.



## Setting the digital encoder

The forward travel of the crimp cylinder is limited or controlled by the linear Transducer position system. By setting the encoder to a number between 000 and 999 you can control the last 2 inches of cylinder travel. The larger the encoder number the further the cylinder travels before it stops, therefore the crimp diameter gets smaller as the encoder number increases.

**Example:**

You want to crimp FC195-16 hose with a 1401 -16 socket. Find that the crimp diameter to is 1.529 - 1.539. The goal is to hit the average diameter which is 1.534. Crimp an assembly with the encoder at 000. If you do not make an impression on the socket, increase the setting by 100 and crimp again. Continue this process until you can measure an impression. Let's say for example that at 300 you've made an impression in the socket and measure one of the flats to be 1.793. Because the ratio of the encoder to cylinder is approximately 2 to 1, the new encoder setting will be (1.793 -1.534) x 2 added to 300. The new setting should be approximately 818. Readjust if necessary, and once you have an established setting, record it in the "Micro Setting" column within your crimp specification bulletin. Remember, always check your first assembly for proper crimp diameter.

## Shortening the return stroke

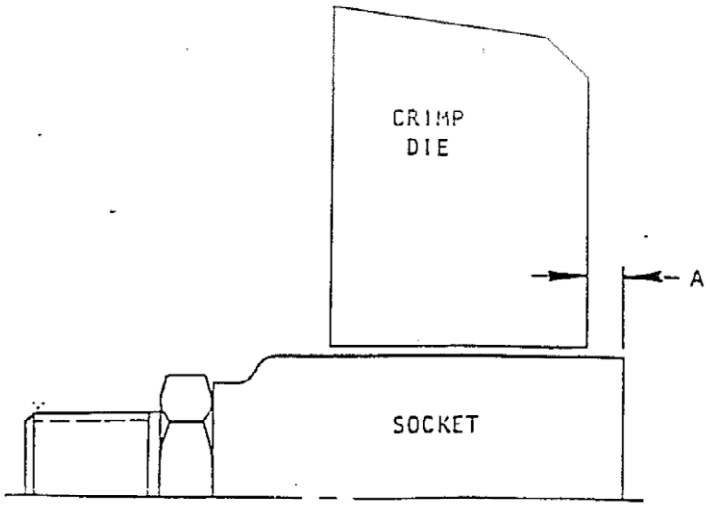
When crimping several identical assemblies, it may be desirable to shorten the machine cycle time by shortening the return stroke of the cylinder. This can be done by jogging the crimp ring forward until just enough clearance remains to insert the uncrimped fitting into position. Now slide the split clamp nearest the proximity switch directly under the front of the cylinder back to check the return stroke. It is infinitely adjustable by sliding the split collar.

# Crimping precrimped -32 assemblies

The crimp dies in the FT1307-200-23 crimp die cage are shorter than the required length of crimp for -32 size Danfoss fittings. In order to crimp a -32 size fitting with these dies, it is necessary to use a special fitting onto which the socket has been pre-crimped at the factory. The chart below shows the proper position for loading -32 pre-crimped fittings within the FT1307-200-23 crimp die cage.

Two piece -32 fittings (separate nipple and socket) can be crimped with the FT1360 crimp machine using the FT1209-200-17 crimp die cage. Proper location in this case will be the same as described in the section "Position the Fitting Locator".

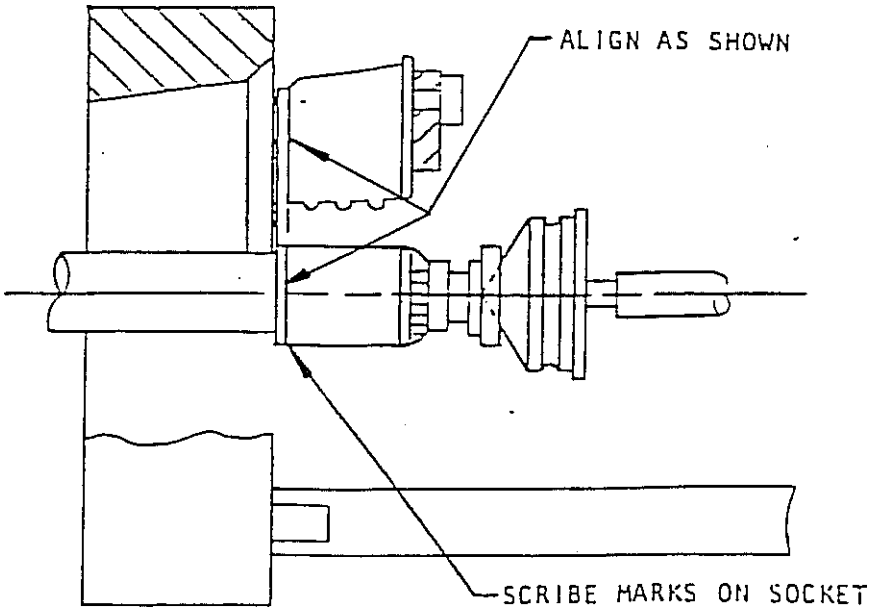
| HOSE | A |
|---|---|
| 1509-32 | .41 |
| 1529-32 | .41 |
| 2661-32 | .40 |
| 2665-32 | .41 |
| 2681-32 | .41 |
| 2766-32 | .41 |
| 2781-32 | .41 |
| 2791-32 | .35 |
| FC194-32 | .41 |



# Crimping field crimp style assemblies

Field crimp (barrel crimp) style hose assemblies were designed for "on location" repairs with a minimum of equipment. Skiving is not required with field crimp fittings. The socket is pre-crimped to the nipple so the fitting can simply be pushed onto the hose and crimped.

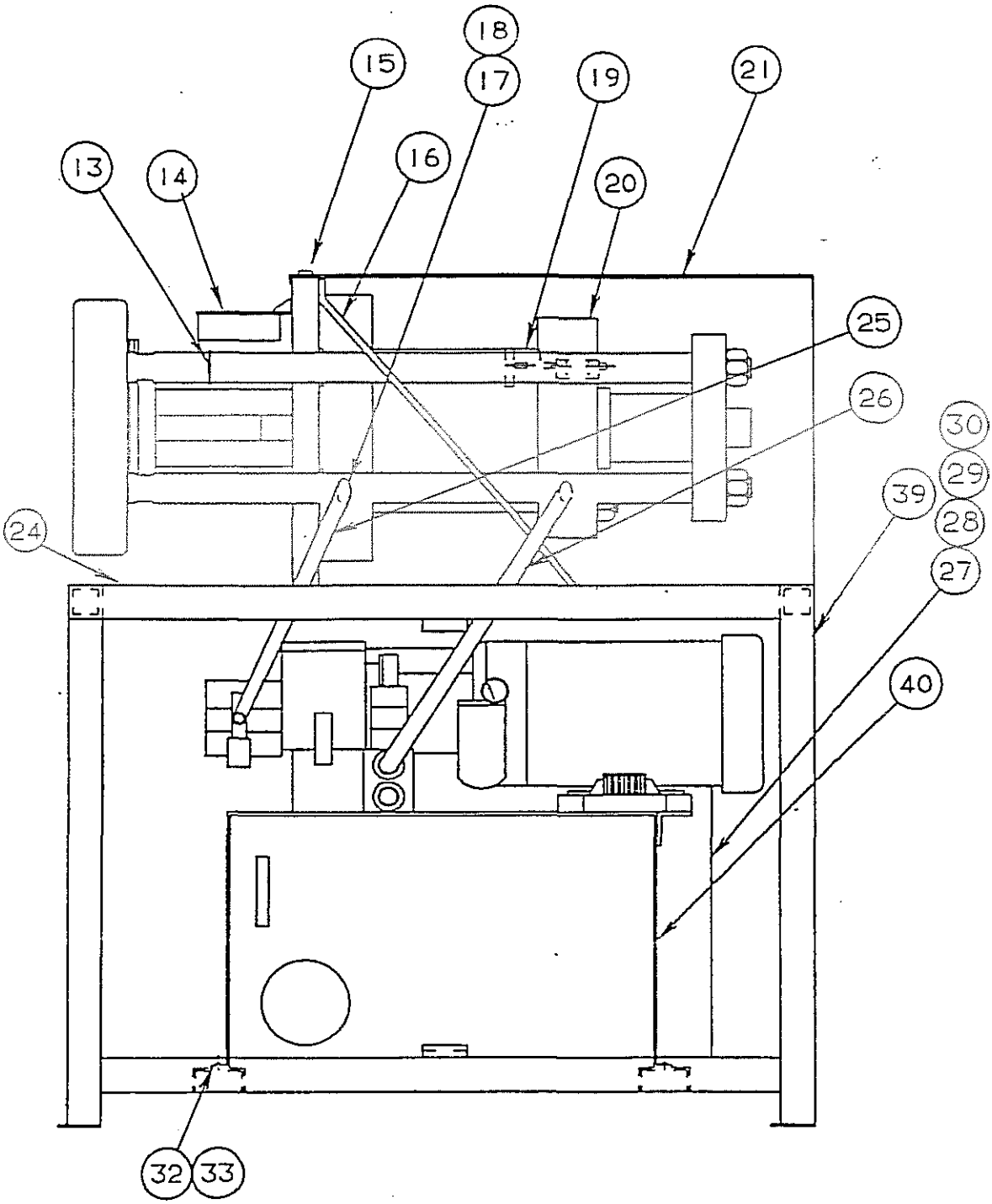
When crimping field crimp style hose assemblies, special procedures must be followed when locating these assemblies in the crimp die cage. The crimp socket has a line scribed near each end. The distance between the scribe lines is equal to the length of the crimp dies. When crimped, the dies must be centered between the scribe lines. This can be done by aligning the face of either end of the crimp die with the scribe line on that end of the socket (See Illustration).



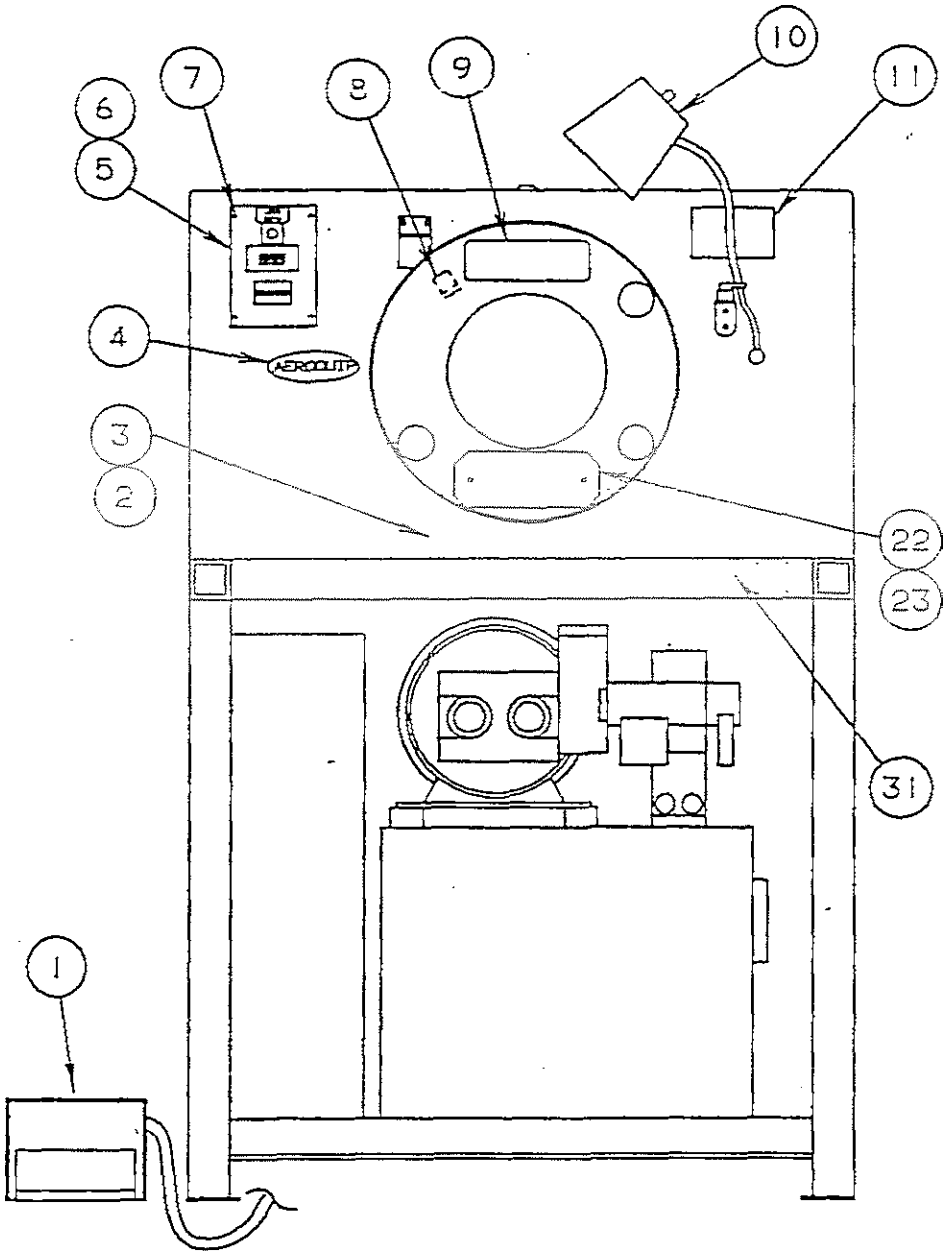

# Recalibration procedure

1. Insert an FT1307-200-8 crimp cage into the crimper and then crimp a 1401-16 socket using a setting of 920 on the digital encoder.
2. If a diameter of 1.483 + .003 is obtained, no further adjustments are necessary.
3. If a diameter of less than 1.483 is obtained, the transducer backstop must be moved toward the transducer. Consequently, if the diameter is more than 1.483 the backstop must be moved away from the transducer.
4. The transducer backstop is located at the top left side of the crimper as shown on page 13, detail 19.

# FT1360 Crimp Machine



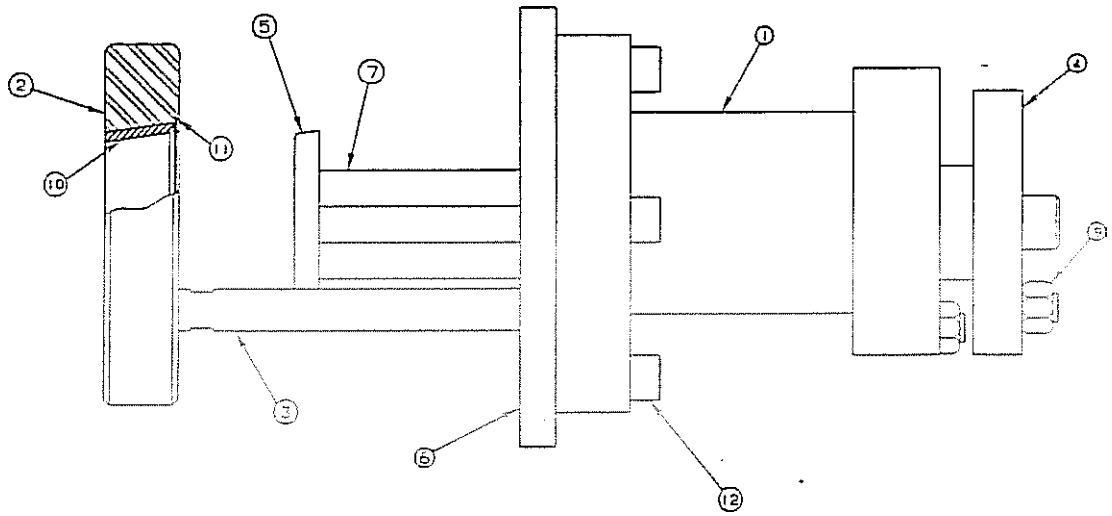
# FT1360 Crimp Machine

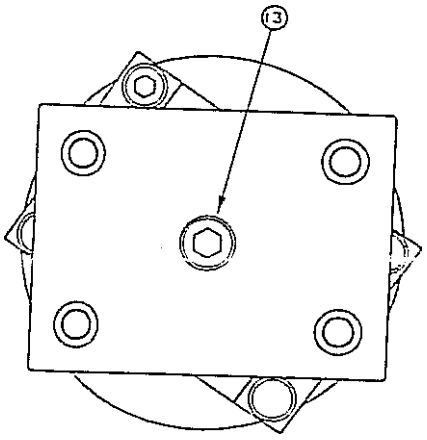


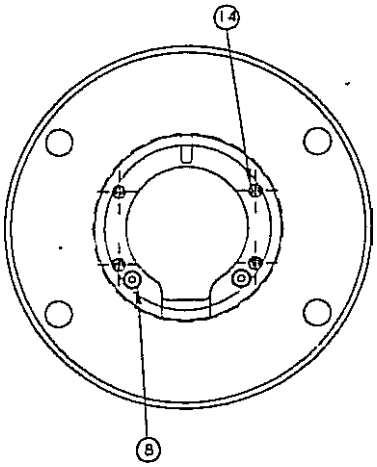
# FT1360 Crimp Machine parts list

| DETAIL NUMBER | PART NUMBER | DESCRIPTION | NUMBER REQUIRED |
|---|---|---|---|
| 1 | FT1330-2-5-4 | Foot Switch | 1 |
| 2 | FT1360-3-20 | Cylinder Support | 1 |
| 3 | FT1360-3-19 | 1/4-20 x .62 Soc Hd Cap Screw | 2 |
| 4 | FT1244-3-62 | Decal, Aeroquip | 1 |
| 5 | FT1350-3-1 | Control Box Panel | 1 |
| 6 | FT1350-3-29 | Enclosure Box Panel, Back | 1 |
| 7 | FT1360-3-26 | #10-24 x .50 Button Hd Cap Screw | 8 |
| 8 | FT1350-2-5-20 | Transducer | 1 |
| 9 | FT1289-3-60 | Decal, Caution | 1 |
| 10 | FT1330-3-68 | Light | 1 |
| 11 | SC2307 | ID Tag | 1 |
| 13 | FT1350-3-31 | Locator Collar, McMaster #6436K25 | 1 |
| 14 | FT1350-3-24 | Proximity Switch Holder | 1 |
| 15 | FT1360-3-27 | 5/16-18 x .75 Button Hd Cap Screw | 1 |
| 16 | FT1350-3-30 | Brace | 1 |
| 17 | FT1360-3-14 | Aeroquip Adapter To Suit At Assembly | |
| 18 | FT1360-3-33 | Aeroquip Adapter To Suit At Assembly | |
| 19 | FT1350-3-23 | Backstop, Transducer | 1 |
| 20 | FT1360-2-2 | Cylinder Subassembly | 1 |
| 21 | FT1360-3-17 | Cabinet Cover | 1 |
| 22 | FT1360-3-2 | Plate | 1 |
| 23 | FT1360-3-3 | #10-24 x 1.00 Soc Countersunk Screw | 2 |
| 24 | FT1360-3-32 | Rubber Pad, 32" x 13" | 1 |
| 25 | FT1360-3-25 | Aeroquip Hose Assembly To Suit | 1 |
| 26 | FT1360-3-22 | Aeroquip Hose Assembly To Suit | 1 |
| 27 | FT1360-3-6 | Enclosure, Hoffman #A-242408FMLP | 1 |
| 28 | FT1360-3-7 | Panel, Hoffman #A-24P24 | -1 |
| 29 | FT1360-3-8 | 1/4-20 x .38 Button Hd Cap Screw | 4 |
| 30 | FT1360-3-8 | 1/4-20 Hex Nut | 4 |
| 31 | FT1360-3-18 | 1/2-20 x .75 Soc Hd Cap Screw | 4 |
| 32 | FT1360-3-4 | #8-32 x .5 Soc Hd Cap Screw | 4 |
| 33 | FT1360-3-28 | Rubber Grommet To Suit At Assembly | 4 |
| 35 | FT1289-3-62 | Guard | 1 |
| 36 | FT1360-2-20 | Crate | 1 |
| 37 | FF91455 | High efficiency PTFE grease | 1 |
| 38 | FT1340-3-4 | Locator Assembly | 1 |
| 39 | FT1360-2-4 | Cabinet Assembly | 1 |
| 40 | FT1360-2-12 | Power Unit | 1 |

# Cylinder subassembly



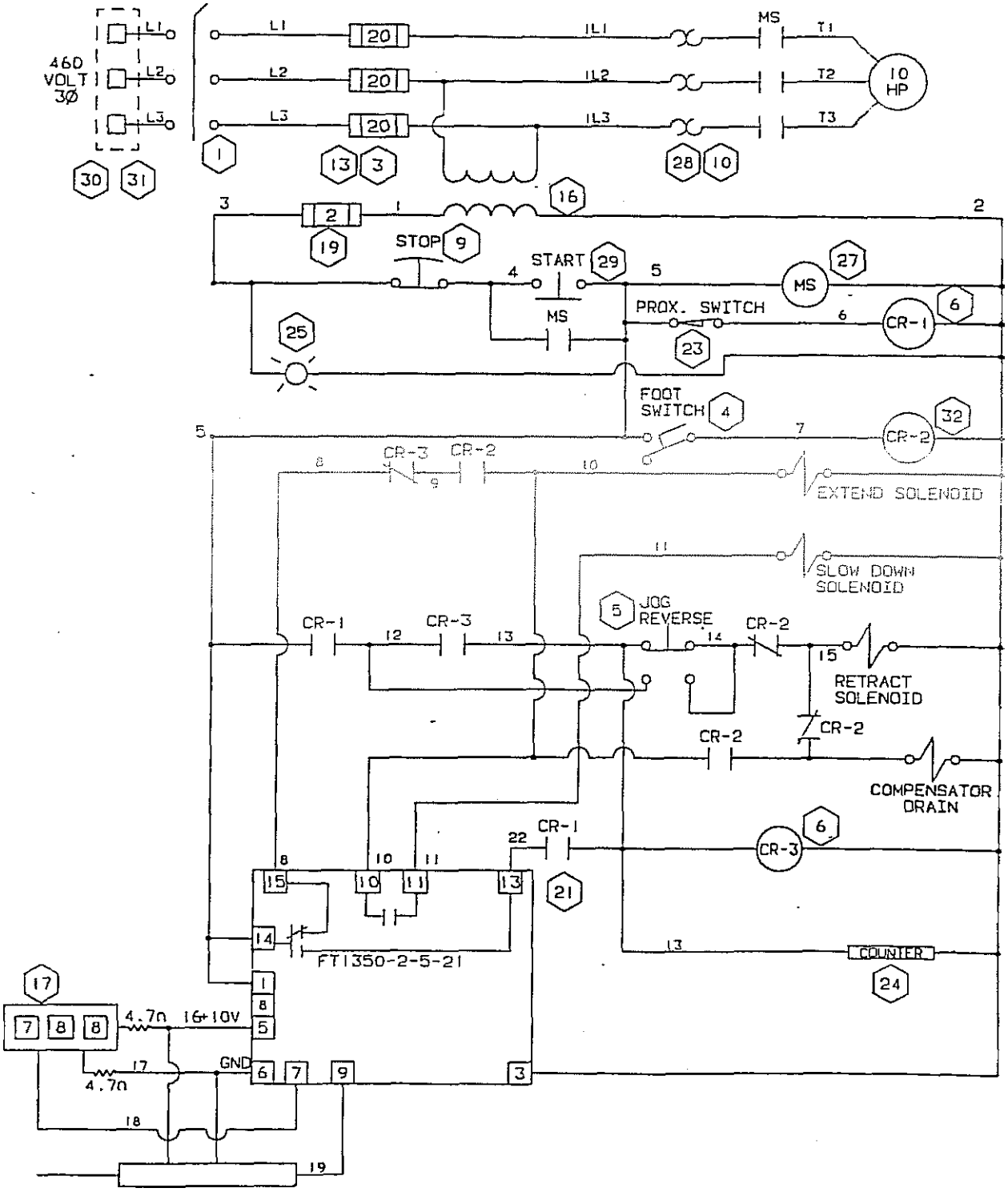



# Cylinder subassembly

| DETAIL NUMBER | PART NUMBER | DESCRIPTION | NUMBER REQUIRED |
|---|---|---|---|
| 1 | FT1360-2-2-1 | Cylinder, T-J #TG14NAXCXAAAA333 | 1 |
| 2 | FT1350-2-2-2 | Crimp Ring | 1 |
| 3 | FT1360-2-2-3 | Tie Rod | 4 |
| 4 | FT1350-2-2-4 | Push Plate | 1 |
| 5 | FT1350-2-2-5 | Pressure Plate | 1 |
| 6 | FT1360-2-2-6 | Front Plate | 1 |
| 7 | FT1360-2-2-7 | Push Rod | 4 |
| 8 | FT1303-3-76 | 3/8-16 x .50 Soc Hd Shoulder Screw | 2 |
| 9 | FT1360-2-2-9 | 1 1/8-12 Hex Nut | 4 |
| 10 | FT1289-2-2-15 | Crimp Insert | 1 |
| 11 | FT1289-2-2-14 | Ring, Danfoss T-J #6471 | 1 |
| 12 | FT1360-2-2-10 | 1 1/8-12 x 4.75 Soc Hd Cap Screw | 4 |
| 13 | FT1360-2-2-11 | 1 1/2-12 x 3.00 Soc Hd Cap Screw | 1 |
| 14 | FT1360-2-2-12 | 1/2-20 x 1.38 Soc Hd Cap Screw | 4 |

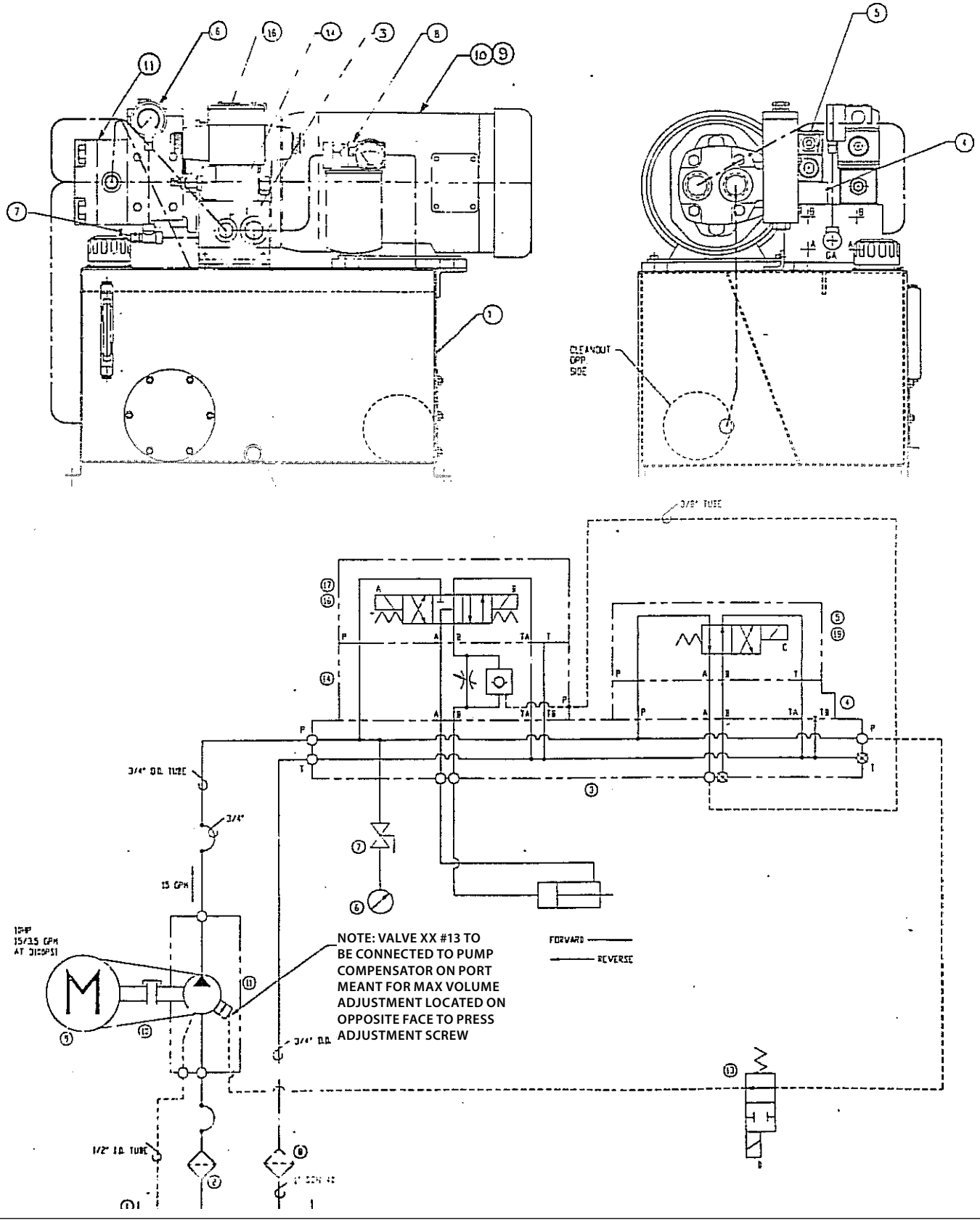
# Electrical schematic



# Electrical schematic parts list

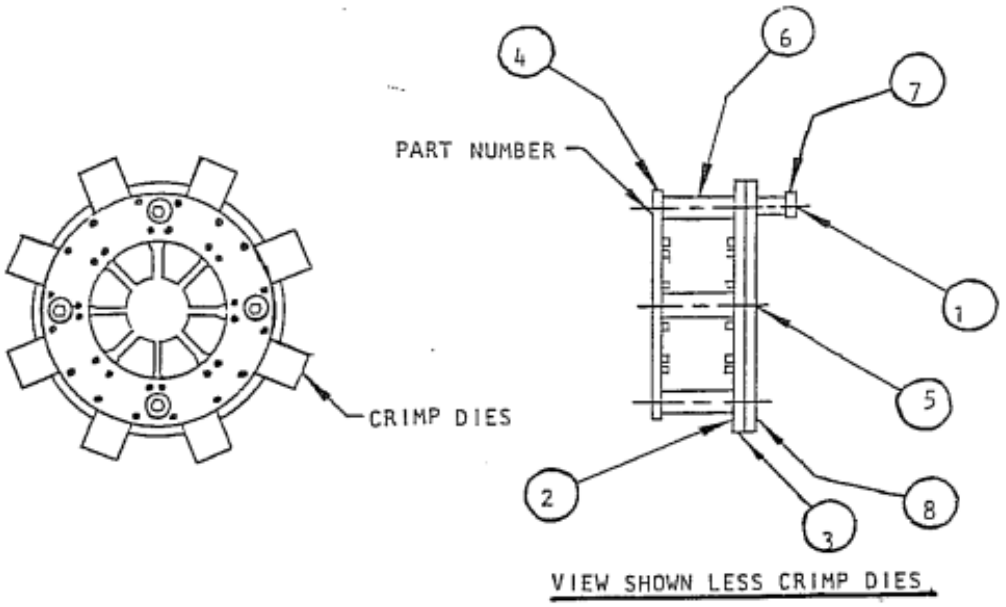
| DETAIL NUMBER | PART NUMBER | DESCRIPTION | NUMBER REQUIRED |
|---|---|---|---|
| 1 | FT1360-2-8-1 | Disconnect | 1 |
| 2 | FT1340-2-5-2 | Fuse Holder | 1 |
| 3 | FT1360-2-8-3 | Fuse | 3 |
| 4 | FT1330-2-5-4 | Foot Switch | 1 |
| 5 | FT1244-2-5-5 | Push Bution/Contact Block | 1 |
| 6 | FT1244-2-5-6 | Relay | 3 |
| 7 | FT1340-2-5-10 | 300V Terminal | 11 |
| 8 | FT1340-2-5-9 | 600V Terminal | 1 |
| 9 | FT1350-2-8-9 | Stop Switch | 1 |
| 10 | FT1360-2-8-10 | Overload Relay | 1 |
| 11 | FT1289-2-5-11 | Foot Switch Cord | 1 |
| 12 | FT1244-2-5-12 | Solenoid Cord | 3 |
| 13 | FT1360-2-8-13 | Fuse Block | 1 |
| 14 | FT1360-2-8-14 | Motor Cord | 1 |
| 15 | FT1244-2-5-15 | Proximity Switch Cord | "I |
| 16 | FT1360-2-8-16 | Control Transformer | 1 |
| 17 | FT1350-2-5-17 | Digital Knobpot | 1 |
| 18 | FT1244-2-5-18 | Cord Connectors | 5 |
| 19 | FT1340-2-5-3 | 2 Amp Fuse | 1 |
| 20 | FT1350-2-5-20 | Linear Transducer | 1 |
| 21 | FT1350-2-5-21 | Aeroquip Dual Limit Control Board | 1 |
| 22 | FT1350-2-5-22 | Card Connector | 1 |
| 23 | FT1350-2-5-23 | Proximity Switch | 1 |
| 24 | FT1350-2-5-24 | Counter | 1 |
| 25 | FTI330-3-68 | Light | 1 |
| 26 | FT1350-2-5-26 | Transducer Connector | 1 |
| 27 | FT1360-2-8-27 | Motor Contactor | 1 |
| 28 | FT1360-2-8-28 | Heater Element | 3 |
| 29 | FT1350-2-8-29 | Start Switch | 1 |
| 30 | FT1360-2-8-30 | Conn. Terminal | 1 |
| 31 | FT1360-2-8-21 | Conn. Enclosure | 1 |
| 32 | FT1360-2-8-32 | Relay | 1 |

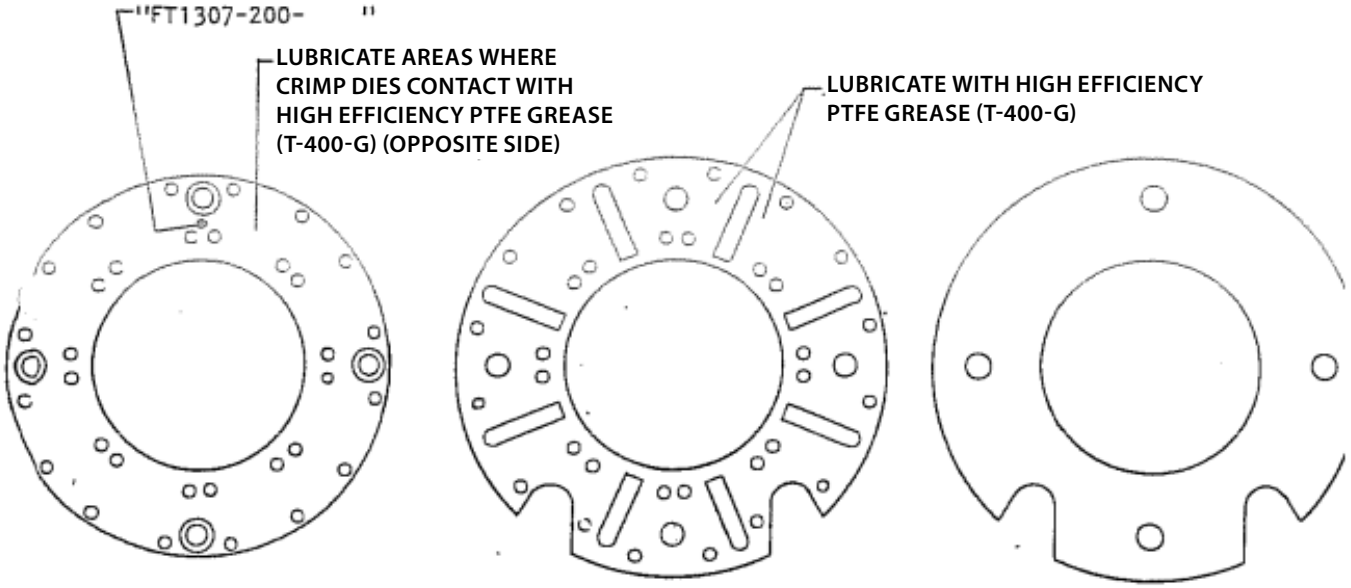
# Hydraulic diagram



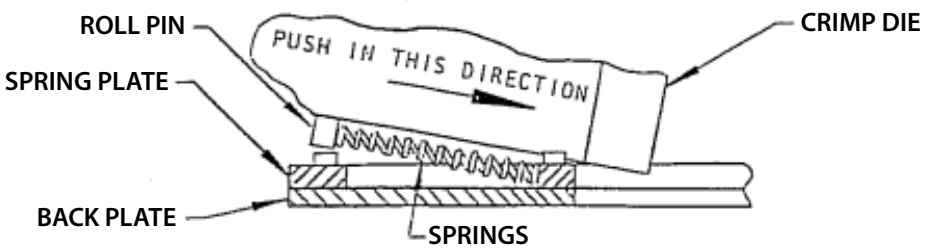
# Hydraulic diagram parts list

| DETAIL NUMBER | PART NUMBER | DESCRIPTION | NUMBER REQUIRED |
|---|---|---|---|
| 1 | FT1360-2-12-1 | Reservoir With Stand Accessories | 1 |
| 2 | FT1360-2-12-2 | Inlet Strainer | 1 |
| 3 | FT1360-2-12-3 | 2 Station Manifold | 1 |
| 4 | FT1360-2-12-4 | Valve Adapter | 1 |
| 5 | FT1360-2-12-5 | Directional Valve | 1 |
| 6 | FT1360-2-12-6 | 0 - 5,000 psi Gauge | 1 |
| 7 | FT1360-2-12-7 | Needle Valve Gauge Shut Off | 1 |
| 8 | FT1360-2-12-8 | Return Line Filter | 1 |
| 9 | FT1360-2-12-9 | 10 HP 30 Motor | 1 |
| 10 | FT1360-2-12-10 | Pump/Motor Mount Kit | 1 |
| 11 | FT1360-2-12-11 | Pump, Hydura | 1 |
| 12 | FT1360-2-12-12 | Bolt Kit | 1 |
| 13 | FT1360-2-12-13 | Solenoid Valve | 1 |
| 14 | FT1360-2-12-14 | Flow Regulator Module | 1 |
| 15 | FT1360-2-12-15 | Bolt Kn | 1 |
| 16 | FT1360-2-12-16 | Directional Valve | 1 |




## INSTALLING THE CRIMP DIE



# Crimp Die Cage

| PART NUMBER | DESCRIPTION | NUMBER REQUIRED |
|---|---|---|
| FT1307-2-9-10 | 5/16-18 x 3.00 BUGS | 1 |
| FT1209-2-9-7 | Spring | 8 |
| FT1307-2-9-3 | Spring Plate | 1 |
| FT1307-2-9-4 | Front Plate | 1 |
| FT1307-2-9-5 | Screw | .3 |
| FT1307-2-9-6 | Spacer | 4 |
| FT1307-2-9-7 | Nut | 1 |
| FT1307-2-9-8 | Back Plate | 1 |

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# About Danfoss Power Solutions FC

Danfoss hoses, fittings, and tooling provide the ultimate fluid conveyance solutions for a variety of equipment and applications around the world. We proudly engineer to support a sustainable future for tomorrow.

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**Danfoss Power Solutions**
14615 Lone Oak Road
Eden Prairie, MN 55344, USA
Phone: 952-937-9800

**Danfoss Power Solutions (US) Company**
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515-239-6000

**Danfoss Power Solutions GmbH & Co.OHG**
Krokamp 35
D-2439 Neumünster, Germany
Phone: +49 4321 871 0

**Danfoss Power Solutions ApS**
Nordborgveg 81
DK-6430 Nordborg, Denmark
Phone: +45 7488 2222

**Danfoss Power Solutions Trade (Shanghai) Co. Ltd.**
Building #22, No 1000 Jin Hai Rd
Jin Qiao, Pudong New District
Shanghai, China 201206
Phone: +86 21 3418 5200w