Tube-Mac® TFM-01 Flaring Machine Instruction Manual

TUBE–MAC PIPING TECHNOLOGIES LTD., has prepared this manual to demonstrate our ability to consistently provide Safe Instructional Information for our Special Purpose Tools and Equipment that meets our customer requirements as agreed when an order to purchase or rent our equipment is accepted. The purpose of this manual is to guide users on the proper use of our equipment to produce a 37° flared pipe end in either cold drawn carbon steel or stainless steel pipe. The TFM-01 flaring machine will produce a quality surface finish which meets the Tube-Mac® 37° Flare Flange Technology.

This manual has been reviewed and approved by:

_____	_____
Senior Manager	**Date**
_____	_____
Engineering Manager	**Date**

This manual may only be reproduced with written permission from an authorized Tube-Mac representative.

IMPORTANT SAFETY WARNINGS !

For safety reasons, to eliminate injury and to prevent damage of the flaring machine the flaring machine must be turned off when unattended.

The flaring machine must only be operated by a fully trained personnel who possess a Certified Training Card issued by Tube-Mac.

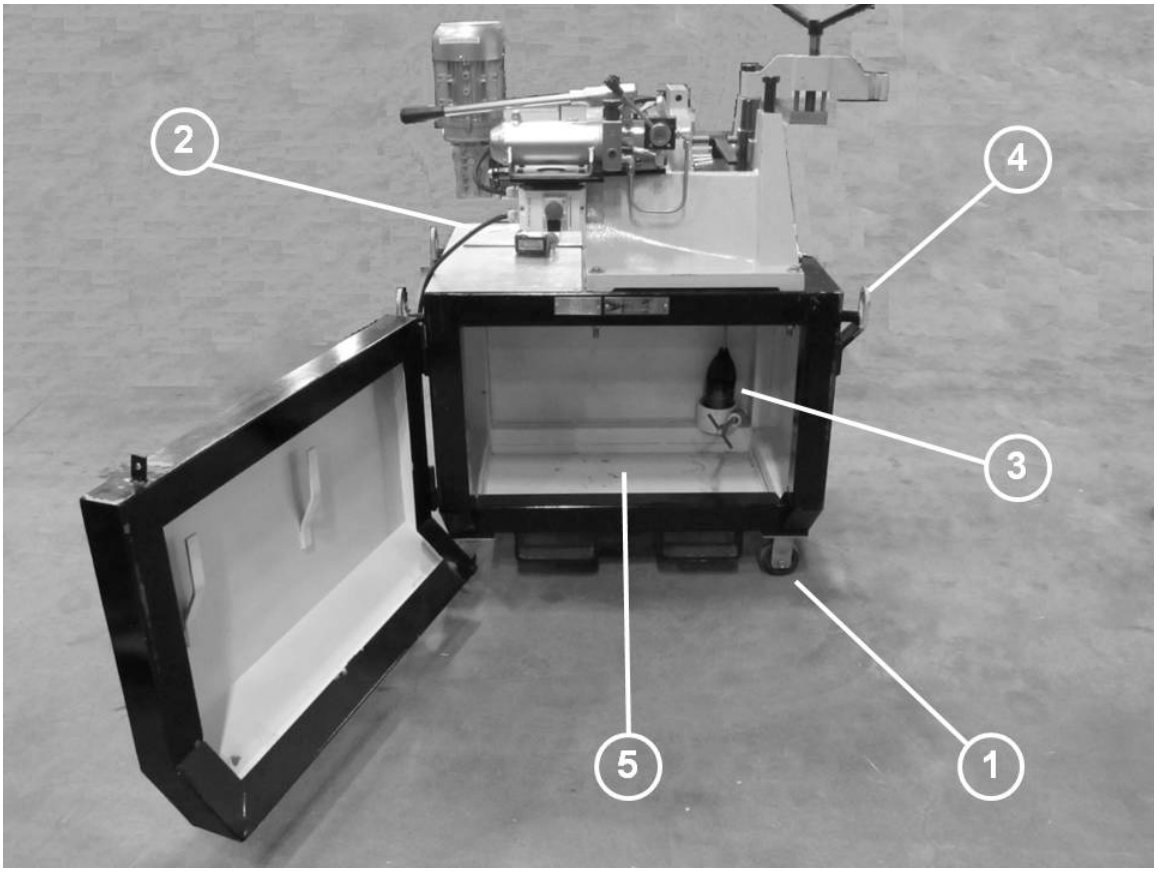
Disconnect the main power supply prior to performing any repair or service. If defective the flaring machine must be tagged and locked out. Do not operate the flaring machine until the repair is complete and lock-out removed.

DO NOT REACH INTO THE WORK AREA OF THE FLARING MACHINE

PRODUCT INFORMATION

Product	Tube-Mac Flaring Machine
Model No.	TFM-01
Purpose	Tube-Mac Piping Technologies has developed several flaring machines for cold flaring seamless tubes and pipes to produce a 37° flared pipe end. The flare is produced by a rolling action of a flaring pin that is mechanically driven towards the end of the pipe until the pipe is rolled against the 37° surface of the flaring dies. This action produces a quality surface which meets the Tube-Mac design standards. All series of flaring machines are suitable for flaring a wide range of materials including carbon steel St52.4 or St37.4, stainless steel, duplex and super duplex. The TFM-01 flaring machines are capable of flaring pipe sizes from ½" to 4" NPS, ½" to 2" OD tube and 12mm to 100mm metric tubes.
Conformity	CE
Power	**TFM-01:** 120V / 1 Phase / 60Hz. **TFM-01-220:** 220V / 1 Phase / 50Hz.
Weight	920 lbs (417 kgs) with base
Hydraulic Oil	Dexron III
Environment	Operating Temperature 14°F to 140°F (-10°C to +60°C)

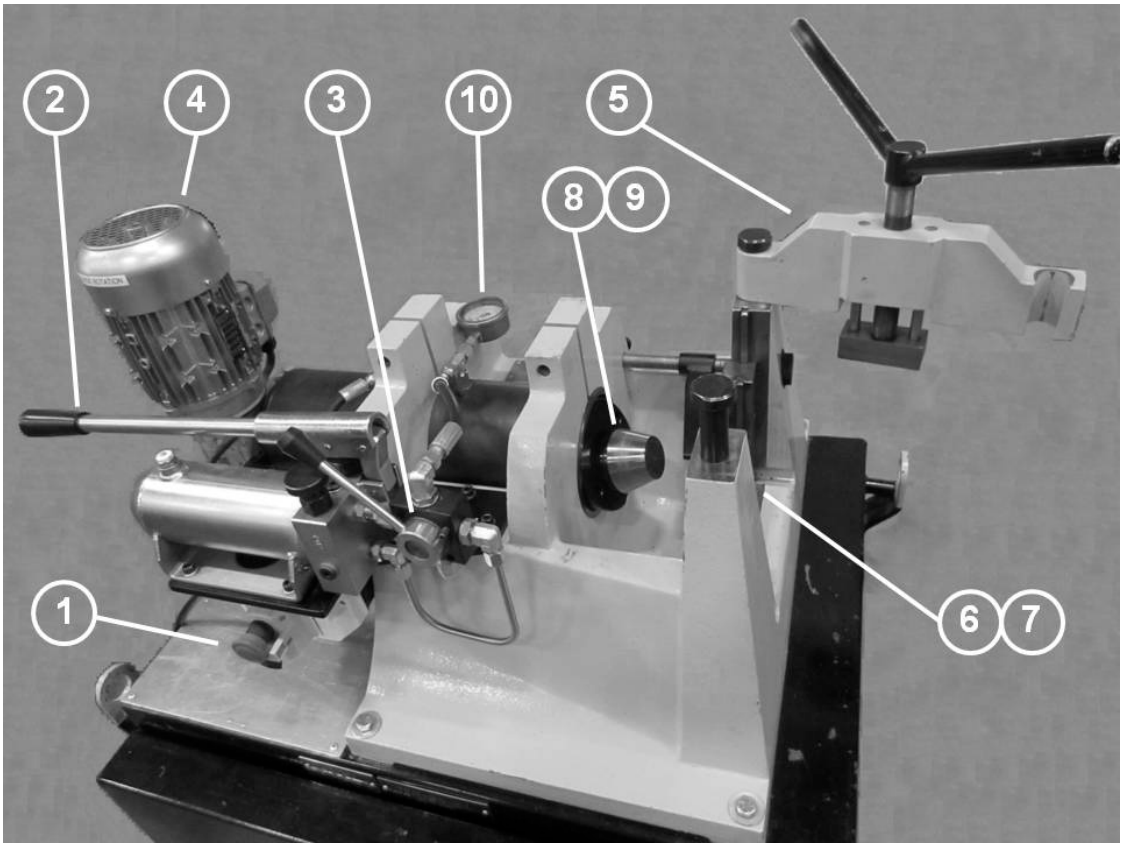
TFM-01 Flaring Machine



Basic Construction (See photo above):

1. Castors located at each bottom corner and a maximum width of 30” (760mm) allow for easy maneuvering of unit anywhere in a facility.
2. A 5ft (1.5m) power cord will reach any electrical outlet or generator.
3. Oil drain below flaring pin allows for oil to drain away from flaring area to a collection bottle located underneath in the storage area of the machine.
4. Four (4) bright yellow lifting eyelets at each corner of the unit allow for easy lifting with a crane to any destination such as on board a ship or above/below ground working areas.
5. Bottom of unit allows for storage of material or tooling that can be kept clean and safe behind the locked front door.
6. Rigid framework makes for a durable and long lasting machine designed for a large range of flaring tube/pipe sizes.

TFM-01 Flaring Machine



Basic Operating Components (See photo above):

1. Start/Stop Button (rotate flaring pin)
2. Manual pump with operating handle (cylinder moves flaring head - linear motion)
3. Manual Directional control valve (forward and backward)
4. Electric motor and Gearbox
5. Die Clamp
6. U-adapter (required for small pipe flaring dies)
7. Pipe Flare Dies
8. Flaring Pin
9. Flaring Head
10. Pressure Gauge

Operating Instruction

The proper use of the TFM-01 flaring machine is simple and easy when trained by qualified Tube-Mac personnel. The operators are fully trained on proper operating procedures and maintenance of the flaring machine.

The operator must always be positioned behind and to side of the flaring machine where the manual pump and directional control valve are located. This allows the operator easy access to the operating components of the flaring machine and also provides a clear view of the flaring process and of the pressure gauge.

Pipe Preparation

(Refer to the photographs on page 8)

1. Cut the pipe to length with a band saw, or abrasive saw. Check the cut is square.
2. Remove all sharp edges on the “outside” of the pipe with a file.
3. Remove all sharp edges on the “inside” of the pipe with an internal deburring tool.
4. File the end of the pipe smooth, removing saw marks.
5. Clean the pipe, removing any cuttings/filings.
6. Pull a clean lint free rag through the pipe to remove any dust or dirt.

37° Flaring Procedure

(Refer to the photographs on page 8)

1. Select the flaring pin[1] for the pipe size, ensure it is clean, and then insert the flaring pin into the flaring head. Wipe the cone surface and apply a few drops of oil.
   [1]See “Consumable Parts List” on page 10 for proper flare pin selection.

IMPORTANT SAFETY WARNING !

Always make sure the flaring pin is pressed firmly into the flaring head prior to starting the flaring machine.

2. Select the die set for the size of pipe to be flared. Install one die half into the die holder. Slide the flange onto the pipe, and place the pipe end into the lower die half. Support the other end of the pipe on a pipe stand. Place the other die half into the die holder and rest it on top of the pipe. Hold the straight edge across the die surface and slide the pipe until the pipe end is flush with the straight edge. Now tighten the die clamp firmly and lock the pipe in place.

3. Press the “start” button to energize the electric motor. The flaring head will begin to rotate.
4. Lubricate the flaring pin with 90 weight gear oil.
5. With the directional control valve in the forward position use the manual pump to advance the flaring head until the flaring pin comes into contact with the pipe. (Fig. 1)
6. Continue to advance the flaring pin with short strokes of the manual pump until the desired flaring pressure is reached. Reference the Pressure and Duration chart on page 9. Maintain the pressure with short strokes of the manual pump as the pipe is flared and there is no further pressure decay. The back of the flare should be contacting the die, and the flare is now complete. (Fig. 2)

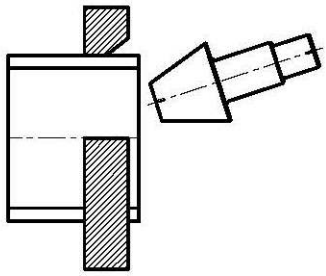


Fig. 1

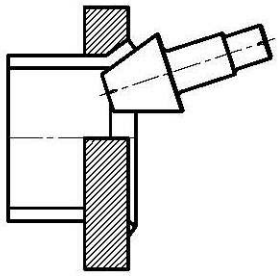


Fig. 2

WARNING !

Continuing to iron the flare too long will cause a ridge to form in the bore of the pipe.

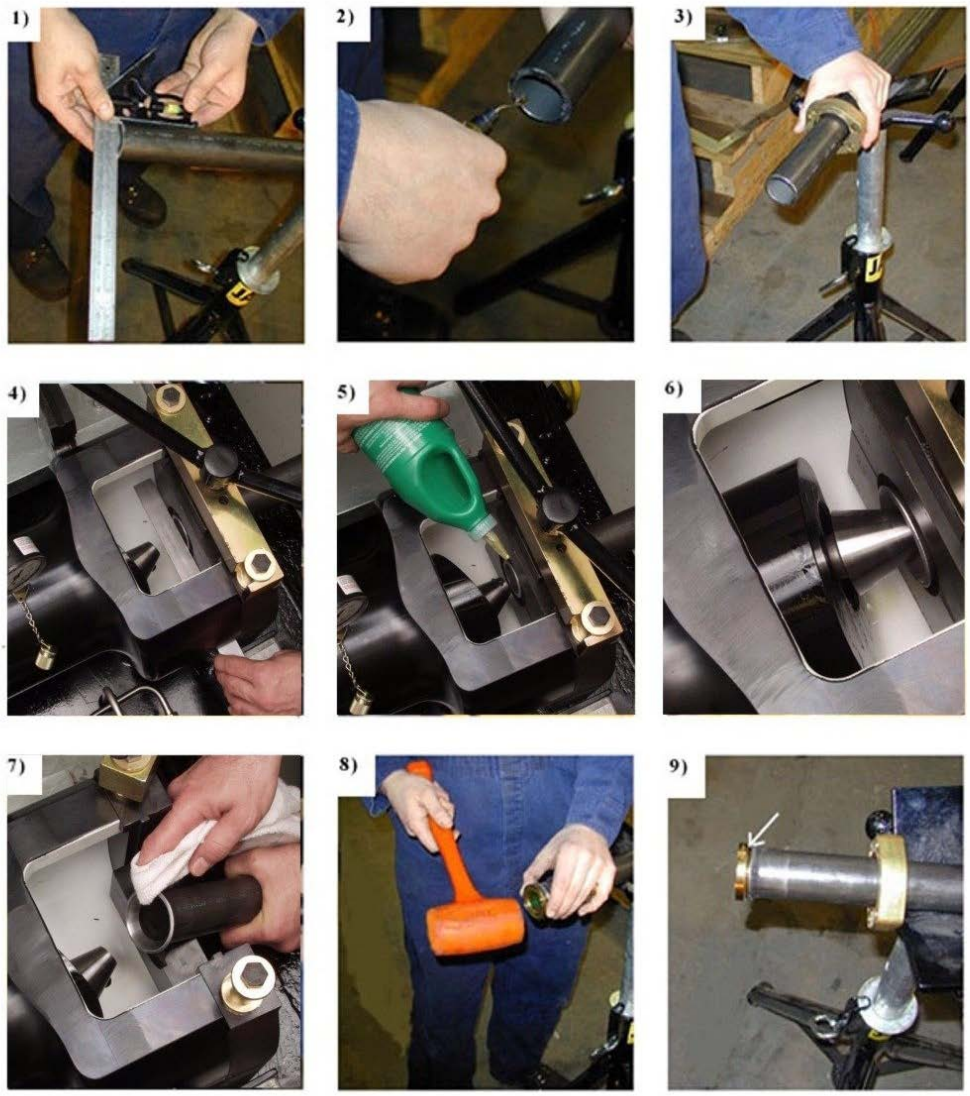
7. Shift the manual directional control valve to release pressure from the flaring head.
8. Stroke the manual pump to retract the flaring head as much as necessary to remove the finished pipe.
9. Loosen the die clamp and remove the pipe from the dies.

CAUTION

Always press the “stop” button to shut off the electric motor prior to removing the pipe.

10. Clean the flared surface and inspect. The flared surface should be smooth, polished, and free of cracks.
11. Place the cone insert into the flared end of the pipe with a soft face rubber hammer. There should be a gap of 1/16” – 1/8” (1-3mm) between the end of the flare and the shoulder of the cone.
12. Slide the flare flange towards the flared end of the pipe. The flare flange should slide freely over the flare.

Step-by step flaring procedures



FLARING PRESSURE and DURATION				
PIPE SIZE		Pressure**		Duration**
NPS	Metric	PSI	BAR	Time
-	12 mm	435 - 725	30 - 50	3 - 6 seconds
-	16 mm	435 - 725	30 - 50	3 - 6 seconds
1/2”	20mm	435 - 725	30 - 50	3 - 6 seconds
3/4”	25mm	580 - 725	40 - 50	5 -10 seconds
1”	30mm	580 - 870	40 - 60	5 -10 seconds
1-1/4”	38mm	725 - 1015	50 - 70	5 -10 seconds
1-1/2”	50mm	870 - 1160	60 - 80	7 -20 seconds
2”	60mm	1015 - 1160	70 - 80	8 -20 seconds
2-1/2”	75mm	1015 - 1450	70 - 100	15 - 60 seconds
3”	90mm	1160 - 1595	80 - 110	30 - 120 seconds*
3-1/2”	100mm	1160 - 1595	80 - 110	30 - 120 seconds*
4”	115mm	1160 - 1595	80 - 110	30 - 120 seconds*

****Pressures and durations will vary with wall thickness and material strength**

Flaring Pins

Part Number	Sizes
TL-0011A	• 1/2” to 1”NPS Pipe • 1/2” to 1-1/4” OD Tube • 12mm to 30mm Metric
TL-0012A	• 1-1/4” and 1-1/2” NPS Pipe • 1-1/2” to 2” OD Tube • 38mm to 50mm Metric
TL-0013A	• 2” and 2-1/2” NPS Pipe • 60mm and 75mm Metric
TL-0014A	• 3” NPS Pipe • 90mm Metric
TL-0017A	• 3-1/2”NPS Pipe • 100mm Metric
TL-0018A	• 4” NPS Pipe • 115mm Metric

NPS Pipe Dies

Part Number	Description
PFD-050	1/2” pipe die
PFD-075	3/4” pipe die
PFD-100	1” pipe die
PFD-125	1-1/4” pipe die
PFD-150	1-1/2” pipe die
PFD-200	2” pipe die
PFD-250	2-1/2” pipe die
PFD-300	3” pipe die
PFD-350	3-1/2” pipe die
PFD-400	4” pipe die

OD Tube Dies

Part Number	Description
TFD-050	1/2” tube die
TFD-075	3/4” tube die
TFD-100	1” tube die
TFD-125	1-1/4” tube die
TFD-150	1-1/2” tube die
TFD-200	2” tube die

Metric Pipe Dies

Part Number	Description
PFD-M12	12mm pipe die
PFD-M16	16mm pipe die
PFD-M20	20mm pipe die
PFD-M25	25mm pipe die
PFD-M30	30mm pipe die
PFD-M38	38mm pipe die
PFD-M42	42mm pipe die
PFD-M50	50mm pipe die
PFD-M60	60mm pipe die
PFD-M75	75mm pipe die
PFD-M90	90mm pipe die
PFD-M100	100mm pipe die
PFD-M115	115mm pipe die

Spare Shaft Supports and Seals

Part Number	Description
32304	Inner Bearing
NJ2305E.TVP2	Outer Bearing
TFM01-SK	Spare Seal Kit

Flaring Die Adapters

Part Number	Description
TFMU-01	U-Adapter

For all other inquires for spare parts please consult factory or local representative

Maintenance:

The TFM-01 flaring machine needs very little maintenance, as long as the machine is kept dry and clean and operated in accordance to this manual. All bearings are of a standard type and pre-greased.

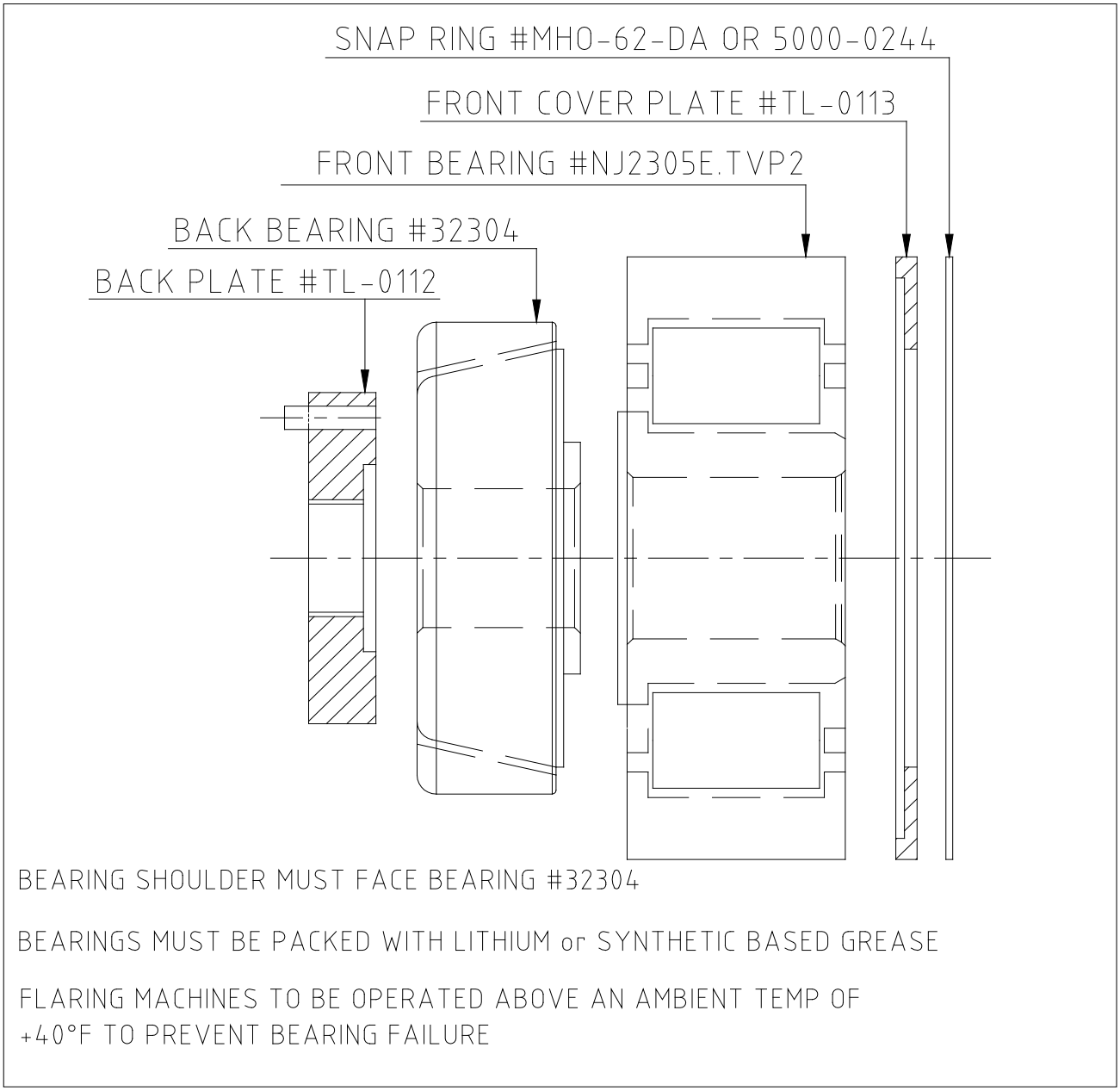
The fluid in the cylinder barrel is Dexron III hydraulic fluid. The fluid must be checked occasionally and topped up as required.

It is advised the flaring head be kept in the forward position when the machine is not in use, with the front end of piston flush with the front of cylinder. This is to protect the hydraulic cylinder against rust and dust.

When replacing the flaring pin bearings they can be removed easily with the 8mm threaded “back plate” (Part# M8) which is behind the flaring pin bearings, using slide hammer. When replacing the bearings it is imperative to always replace both bearings and pack each with high pressure grease. Using the provided diagram, position the bearings and back plate in the proper arrangement in the shaft support area. See Figure “A” for bearing alignment and configuration when changing out damaged shaft support bearings.

Figure "A"

Configuration for Bearing Change



←Back of Machine (Cylinder End) **(See Fig.1)** **Front of Machine (Flaring End) →**