

REDUCTION DRIVE

The Falk Type M Unit is a single reduction marine propulsion drive which can be used with a reversing engine or a controllable pitch propeller. The standard unit has one pinion for single engine connection. Special units are available for multiple engines connected to multiple pinions driving a single gear.

Engine connection is made through a suitable coupling to the Falk Airflex Clutch mounted on the pinion shaft. The clutch is normally designed for inflation at engine idle speed and the maximum and minimum inflation rates will depend on the ability of the engine to break-away and accelerate the propeller shaft system from idle speed and the clutches' ability to dissipate the heat prior to clutch lockup.

The proper inflation rate for a given installation will be dictated by that systems' characteristics.

LUBRICATION

The gear case must be filled to the proper level with the type lubricant specified on the nameplate. The correct level is indicated on the bayonet type oil gauge rod (dipstick). For approximate amount of lubricant, see nameplate.

The oil level must be checked before the unit is put into operation. Oil flowing in or out of the oil pan will affect dipstick level so recheck oil level if the quantity has been changed or if the unit was recently operated to be sure that a stable reading is obtained. Add or drain oil as necessary.

Oil levels are Factory established with the unit sitting level. The slope of the propeller shaft varies depending on the vessel design, so the operating oil level can only be determined after the unit is installed; at which time the oil gauge rod can be marked so that the oil level can be checked while under way.

DO NOT mix different brands of lubricants. If the brand of lubricant in the unit is not available, drain and flush the unit before using the available brand. See Page 2 for a listing of typical lubricants.

ROTARY AIR SEAL

Falk utilizes two types of rotary air seals; one with an oil cup and one without an oil cup. If the rotary air seal is equipped with an oil cup, add a few drops of light machine oil every four (4) to six (6) months. Rotary air seals without oil cups require no further lubrication.

CLUTCH PILOT BEARING

Some M Models require a grease lubricated pilot bearing mounted in the clutch spacer. A standard grease fitting mounted in the bearing cage is accessible through the clutch spacer. At approximately six month intervals, pump grease through the fitting until grease comes through the labyrinth seal, see Figure 1. Wipe off excess grease before operating clutch. Use NLGI Grade 3 lithium base grease. For emergency use only, Grade 2 NLGI may be used but must be replaced with Grade 3 as soon as possible.

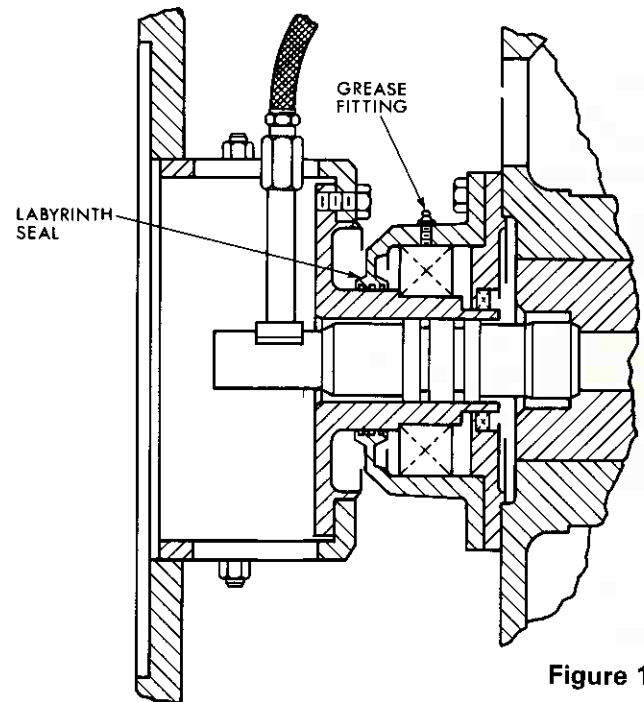


Figure 1

STANDARD OPERATING CONDITIONS

Clutch Air Supply

140 ± 5 psig or as specified. It is recommended that pressure of the supply air to the clutches be monitored with an alarm system set for 125 psig falling pressure.

Falk recommends that the clutch air supply system include a pressure tank with at least 2.5 cubic foot capacity for each clutch assembly plus a pressure regulator, filter, safety valve and check valve up stream of the air tank and a valve downstream from the air tank. The filter and air tank should be suitably valved for draining.

The air tank provides emergency inflation of the clutch upon loss of ships supply air and the valving provides for limited service during operation without declutching (blow down of tank for example). A positive means to prevent accidental closing of a hand operated valve should be provided. All connections should be made on top of the tank except the drain line, see Figure 2.

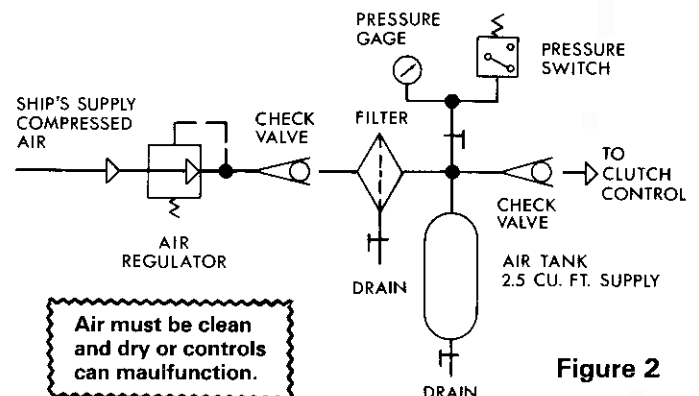


Figure 2

CAUTION

Use of air from the clutch supply system for other components such as horns, may cause pressure drops which could result in clutch failure, especially if the recommended air tank is not supplied.

Lubricating Oil – Lubrication systems for Type M units are generally designed to suit the order and therefore specific instructions cannot be included here but will be provided with the drive.

EMERGENCY OPERATION ON LOSS OF AIR PRESSURE

Provision is made for manual air supply to the clutch. There is a plug in the outer flange of the clutch spacer as shown in Figure 3. With the engine(s) shut down and the shaft locked to prevent rotation (windmilling from current, etc.), remove the 3/4" pipe plug, Part Number 914017, and insert a 1/2" pipe plug, Part Number 914016, to block off air from the normal air supply hose. Put the 3/4" pipe plug securely back in place and inflate the clutch through the Schrader valve (similar to an automobile tire valve) with a suitable air pump. Each clutch must be inflated separately.

Whenever using emergency inflation, pressure must be maintained since there is no supply reservoir. If the clutch should start to slip (smoke) shut down immediately and restore air pressure. If rated pressure cannot be supplied, reduce speed and power to a level where the clutch will not slip during operation.

CAUTION

Clutch must be manually exhausted through the Schrader valve when emergency inflated. It will not exhaust on command from the control station.

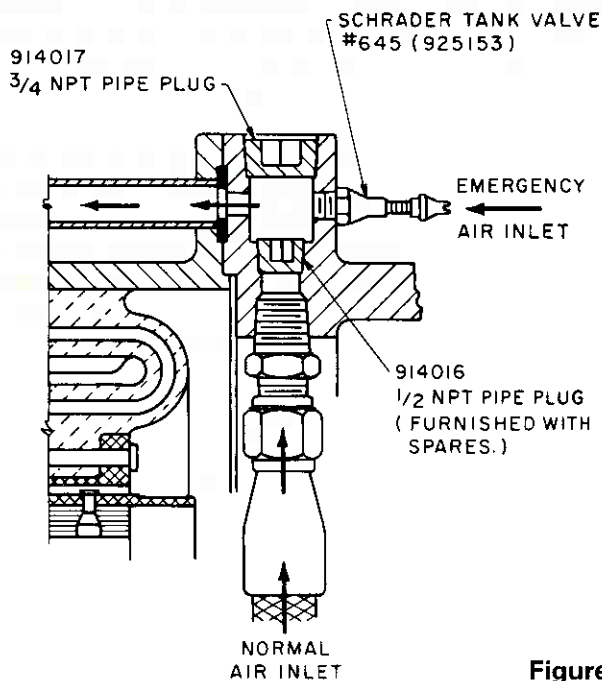


Figure 3

PRECAUTIONS

- Do not open inspection covers while unit is in operation.
- Do not allow any foreign matter to enter the unit through the inspection openings.
- Loose objects should be kept away when inspection covers are open so they cannot be accidentally knocked or dropped into the drive.
- Do not mix different brands of lubricants.
- Do not inflate clutch without drum in it.
- Do not allow equipment or materials (frayed electric wires, torches, etc.), which could cause ignition of the oil or oil vapor near the gear box openings.
- Whenever clutch is overheated, inspect clutch drum for cracks.

Typical Lubricants for Gear Case – (See nameplate for type selection) Falk prefers that a mineral oil with rust and oxidation inhibitors (R & O) be used. The preferred viscosity range is 1335-1632 SSU at 100°F (38°C). Alternately a sulfur phosphorus type of EP compound of equivalent viscosity rating may be used.

The following table of typical lubricants is not intended to exclude lubricants not listed.

Lubricant Type	R & O Gear Oils	EP Oils
AGMA Viscosity Grade	6	6
ASTM Viscosity Grade	S1500/C320	S1500/C320
ISO Viscosity Grade	ISO-VG320	ISO-VG320
SAE Viscosity Grade Approx.	50 or 90	50 or 90
Viscosity at 104°F (40°C)	SSU	1335-1632
	cSt	288-352
Manufacturer	Lubricant	Lubricant
Amoco Oil Co.	Ind Oil #320	Permagear EP 110
Ashland Oil Inc.	ETC (R&O) #150
Atlantic Richfield Co.	Duro 320	Pennant NL 320
Chevron U.S.A. Inc.	AW Machine Oil 320	NL Gear Compound 320
Cities Service Co.	Citgo Pacemaker 320	Citgo EP Compound 320
Conoco Inc.	Decol R&O Oil 320	Gear Oil 320
Exxon Company, U.S.A.	Teresstic 320	Spartan EP 320
Gulf Oil Corp.	Harmony 320	EP Lubricant HD 320
Gulf Canada Limited	Harmony 111	SP Lubricant 100
E.F. Houghton & Co.	MP Gear Oil 120
Imperial Oil Ltd.	Teresso 320	Spartan EP 320
Keystone Div. Pennwalt Corp.	WG-1
Mobil Oil Corp.	DTE Oil AA	Mobilgear 632
Phillips Petroleum Co.	Magnus Oil 320
Shell Oil Co.	Turbo Oil 320	Omala Oil 320
Shell Canada Limited	Covil Oil 320	Omala Oil 320
Standard Oil Co. (Ohio)	Gearep 125
Sun Oil Co.	Sun R&O 1500	Sunep 1090
Texaco Inc.	Regal Oil R&O 320	Meropa 320
Texaco Canada Inc.	Regal R&O 320	Meropa 320
Union Oil Co. of Calif.	Unax AW 320	Extra Duty N6 Gear Lube 6EP