

**TWIN DISC
INCORPORATED**



Operator's Manual

Pump Drive

**Model:
AM080**

Document Number: 1033752

NOTICE

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**WARRANTY, LIMITATION OF REMEDIES LIMITATION
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All sales made subject to the LIMITED TWIN DISC GENERAL WARRANTY, LIMITATIONS OF REMEDIES AND LIMITATION OF ANY OTHER WARRANTIES, including any applicable product-specific warranties and warranty policies shown on our website at <http://www.twindisc.com/company/warranty/>

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Safety

These messages convey important information about **SAFETY**. The safety alert symbol and signal words described below are followed by safety messages and appear throughout this manual.

All personnel must read, understand and follow all safety message instructions prior to operation, maintenance or repair of this unit.

Safety Alert Symbol



This is the safety alert symbol. It is used throughout this manual to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Signal Words

Signal words are used with the safety alert symbol to designate a level of hazard seriousness. The signal words used are **DANGER**, **WARNING**, **CAUTION** and **NOTICE**.



DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTICE is used to address practices not related to physical injury.

Introduction

General Information

This publication provides the information necessary for the operation and routine maintenance of the Twin Disc, Incorporated equipment specified on the cover of this manual. Specific engineering details and performance characteristics can be obtained from the Product Service Department of Twin Disc, Incorporated, Racine, Wisconsin, USA.

Operating personnel responsible for this equipment should have this manual at their disposal and be familiar with its contents. Applying the information in the manual will result in consistent performance from the unit and help reduce downtime.

Replacement Parts

Parts Lists

See the engineering assembly drawings in Engineering Drawings section of the Service Manual to facilitate ordering spare or replacement parts.

Ordering Parts

All replacement parts or products (including hoses and fittings) must be of Twin Disc origin or equal, and otherwise identical with components of the original equipment. Use of any other parts or products will void the warranty and may result in malfunction or accident, causing injury to personnel and /or serious damage to the equipment.

Renewal parts and service parts kits may be obtained from any authorized Twin Disc distributor or service dealer.

NOTICE

Do not order parts from the part numbers on the engineering drawings. These numbers may be referenced for part identification; however, they should be verified on the bill of material (BOM) before an order is placed. BOM numbers are stamped on the unit nameplate.

Parts Shipment

Furnish the complete shipping information and postal address. All parts shipments made from the factory will be FOB factory location, USA. State specifically whether the parts are to be shipped by freight, express, etc. If shipping instructions are not specified, the equipment will be shipped the best way, considering time and expense. Twin Disc, Incorporated will not be responsible for any charges incurred by this procedure.

Twin Disc, Incorporated, having stipulated the bill of material number on the unit's nameplate, absolves itself of any responsibility resulting from any external, internal or installation changes made in the field without the express written approval of Twin Disc. All returned parts, new or old, emanating from any of the above-stated changes will not be accepted for credit. Furthermore, any equipment which has been subjected to such changes will not be covered by a Twin Disc warranty.

Safety

Safe practices must be employed by all personnel operating and servicing this unit. Twin Disc, Incorporated will not be responsible for personal injury resulting from careless use of hand tools, lifting equipment, power tools, or unaccepted maintenance/operating practices.

Important Safety Notice

Because of the possible danger to person(s) or property from accidents which may result from the use of manufactured products, it is important that correct procedures be followed. Products must be used in accordance with the engineering information specified. Proper installation, maintenance, and operation procedures must be observed. Inspection should be made as necessary to assure safe operations under prevailing conditions. Proper guards and other suitable safety codes should be provided. These devices are neither provided by Twin Disc, Incorporated nor are they the responsibility of Twin Disc, Incorporated.

WARNING

To prevent accidental starting of the engine when performing routine maintenance, disconnect the battery cables from the battery and remove ignition key from the switch.

Sources of Service Information

Each series of manuals issued by Twin Disc, Incorporated is current at the time of printing. When required, changes are made to reflect advancing technology and improvements in state-of-the-art.

Individual product service bulletins are issued to provide the field with immediate notice of new service information.

For the latest service information on Twin Disc products, contact any Twin Disc distributor or service dealer. This can be done on the Twin Disc corporate web site found at <http://www.twindisc.com>. Provide your model number, serial number and bill of material number to obtain information on your unit. If necessary, contact the Product Service Department of Twin Disc, International S.A., Nivelles, Belgium, or Twin Disc, Incorporated, Racine, Wisconsin, 53405-3698, USA by e-mail at service@twindisc.com.

Warranty

Equipment for which this manual was written has a limited warranty. For details of the warranty, refer to the warranty statement at the front of this manual.

NOTES

Operation

Overview

Twin Disc pump drives provide for simultaneous running of two or more hydraulic pumps from a single prime mover. All models can be prepared for various applications.

Auxiliary Power Take-off

The input gear drives, through an idler gear, two output gears, each capable of driving two auxiliary devices. These output gears rotate in the same direction of the prime mover at a given ratio, and each is fitted with two mounting plates with two or four mounting holes for auxiliary devices. Below is showing different tower positions:

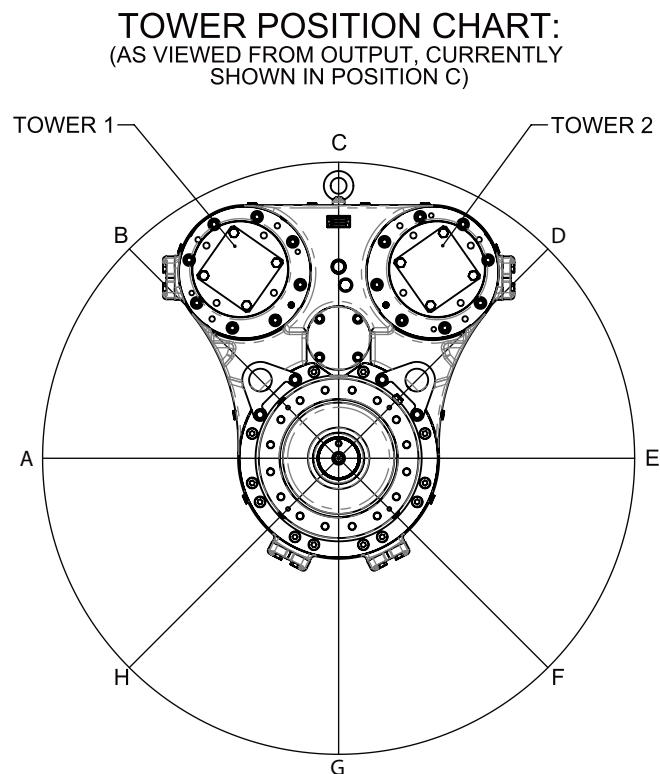


Figure 1. Tower Positions

TOWER POSITION CHART:
(AS VIEWED FROM OUTPUT, CURRENTLY
SHOWN IN POSITION C)

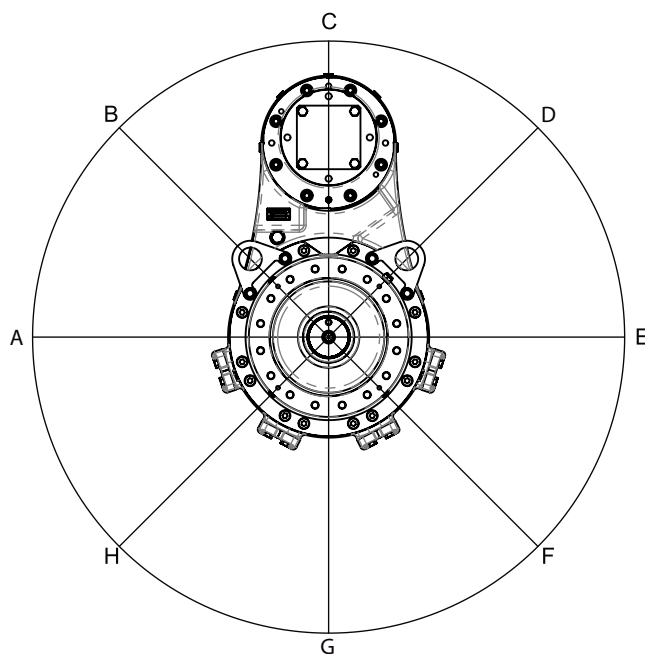


Figure 2. Tower Positions

Coupling

The Pump Drive is coupled to the prime mover either directly to the fly-wheel, or remotely through a drive shaft. The prime mover turns the pump drive input gear and clutch drive ring.

Oil Plug And Breather Diagrams

Table 1. Oil Capacities Based On Tower Position

TOWER POSITION	OIL FILL QUARTS (L)	
	DUAL TOWER	SINGLE TOWER
A	2.5 (2.4)	2.5 (2.4)
B	2.5 (2.4)	2.5 (2.4)
C	2.5 (2.4)	2.5 (2.4)
D	2.5 (2.4)	2.5 (2.4)
E	2.5 (2.4)	2.5 (2.4)
F	2.5 (2.4)	2.5 (2.4)
G	2.5 (2.4)	1.5 (1.4)
H	2.5 (2.4)	2.5 (2.4)

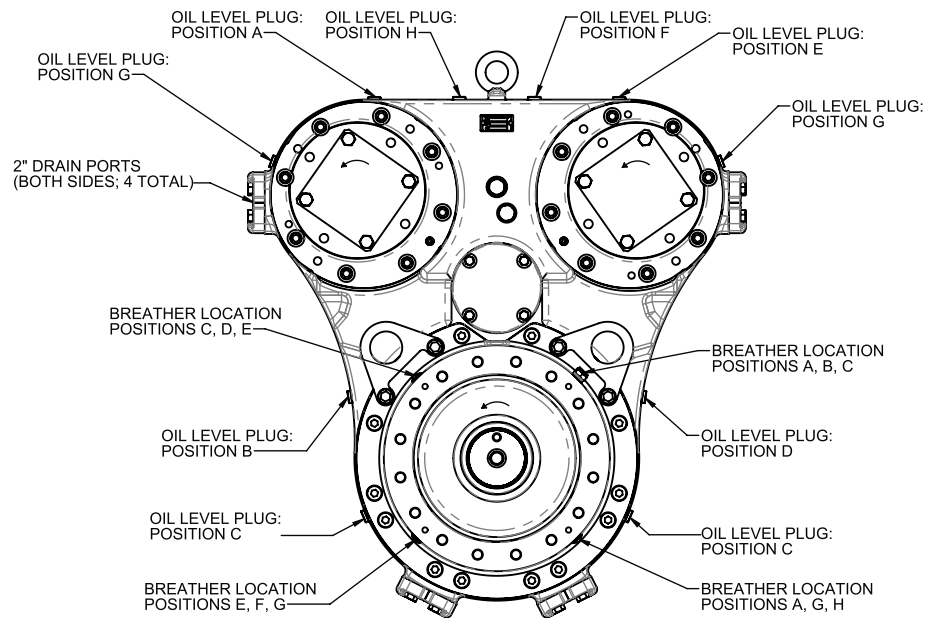


Figure 3. Oil Plug And Breather Diagram 1

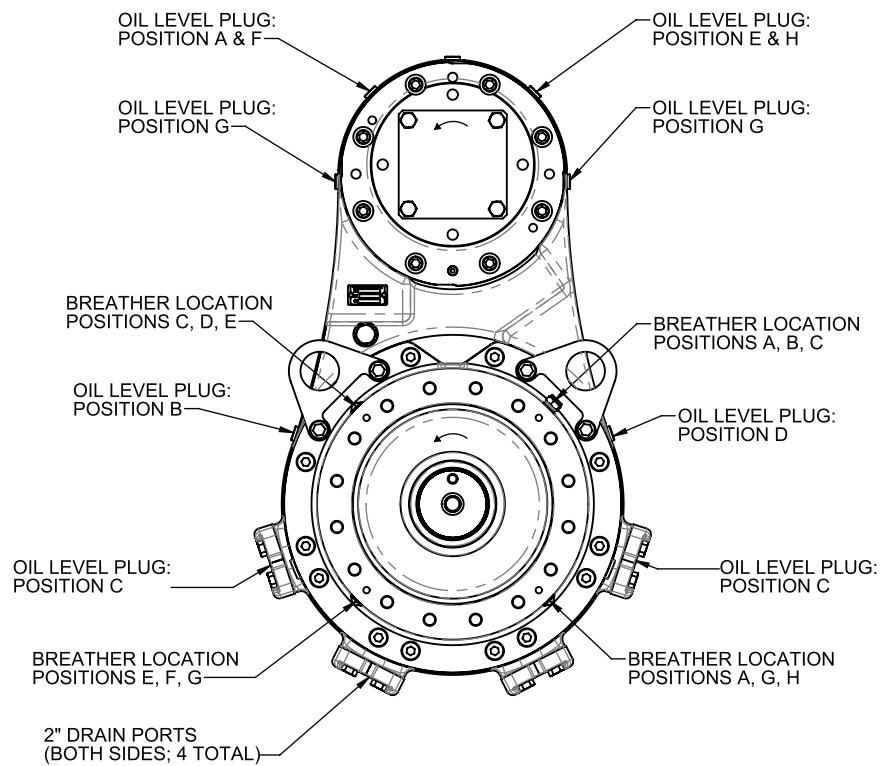


Figure 4. Oil Plug And Breather Diagram 2

Table 2. Tower Ports

DESCRIPTION	PORT/ STANDARD	TYPE
OIL LEVEL PLUG	M14 X 1.5	FLAT FACE PORT
2" DRAIN/ FILL PORT	SIZE 51/ ISO 6162 (CODE 61) M12 X 1.75	FLANGE PORT
BREATHER PORT	3/8"-18 NPT	NPT

Maintenance

Lubrication

Gears and bearings are splash lubricated.

Oil Specifications

The pump drive is supplied without oil. Before start up fill pump drive to level indicated by oil level plug.

Use oil for gears with EP additives, minimum viscosity index 95. Oil type can be chosen depending on the ambient temperature, on Table 2.

Ensure that the oil temperature, when working, is not higher than 105 °C (221 °F) with synthetic oil and 80 °C (176 °F) with mineral oil.

Oil Type and Viscosity

Table 1. Oil Type And Viscosity

Ambient Temperature		-15/+25 °C +5/+77 °F	-5/+35 °C +23/+95 °F	-15/+80 °C -13/+176 °F
Viscosity	ISO 3448	VG 100	VG 150	VG 150 - 220
	IV min	95	95	165
AGIP		BLASIA 100	BLASIA 150	BLASIA SX 220
BP MACH		GR XP 100	GR XP 150	ENERSYN HTX 220
CASTROL		ALPHA SP 100	ALPHA SP 150	ALPHA SN 220
ELF		REDUCTELF SP 100	REDUCTELF SP 150	ORITIS 125 MS
ESSO		SPARTAN EP 100	SPARTAN EP 150	SPARTAN SYNT. EP 220
I.P.		MELLANA 100	MELLANA 150	TELESIA OIL 150
SHELL		OMALA OIL 100	OMALA OIL 150	OMALA OIL HD 200
TOTAL		CARTER EP 100N	CARTER EP 150	CARTER SH 220

NOTICE

Multi-viscosity oils (i.e. 10W-30, etc.) can be used under certain conditions, but require TWIN DISC approval.

Oil Cooling Requirements (see Engineering Drawings for additional specs.)

Table 2. Oil Cooling Requirements

Customer supplied air to oil cooling is typical	
Minimum oil temperature at start-up	-40°C (-40° F)
Oil temperature at steady operating conditions	66°C to -85°C (150°F to -185°F)
Maximum oil sump temperature	93°C (200°F)

Oil System

Oil Level

The customer supplied sump oil level should be checked daily or every ten hours.

Oil and Filter Change Interval

With a new unit, change the oil and filter element within the first 50 hours of operation. Change oil and filter element after each 1000 hours thereafter or more often if conditions warrant. The oil and filter should be changed every six months if less than 1000 hours has accumulated since the last oil change.

For a repaired unit, check the filter element after eight hours of operation. If the filter is clean, install a new filter element and then change the oil and filter element after 1000 hours of service. If the filter is dirty, change the element and operate for another eight hours. Check the filter again. Continue this cycle until the filter is clean and then change the oil and filter after 1000 hours of service or more often if conditions warrant.

Torsional Coupling

1. Do not obstruct the flywheel housing vents preventing the free flow of air for cooling the coupling. The ambient temperature of the air around the coupling should be between -60°C. (22°F.) and 80°C. (176°F.). Assure baffles are installed properly so hot air is ported out of the housing.
2. Visually inspect the element after the first 100 hours of operation and every 2000 hours thereafter, or every six months, whichever comes first. Torsional vibration, misalignment, degradation by contaminants (oil), heat, ultraviolet radiation, and excessive system torque can cause cracks or other signs of distress to appear on the surface of the rubber. The above described items affect the life of the coupling element.

When inspecting the flexible coupling, look for evidence or conditions identified in the following steps:

- A. Cracks in the surface of the rubber. May be caused by torsional vibrations, excessive misalignment or exposure to contaminants (heat, petroleum products, chemicals, ozone, ultraviolet radiation, etc.), excessive system torques.
 - B. Deterioration of the rubber element, as evidenced by sponginess or by black carbon-like dust on rubber surface. May be caused by contaminants or excessive heat, either external or internal to the coupling.
 - C. Cracked, bent or otherwise damaged flex plate or coupling plate.
 - D. Bolt holes in flex plate or coupling plate are elongated oval shaped, not round. This could be caused by improperly assembled parts, loose parts, vibration or improperly torqued parts.
 - E. Bolts/nuts -- bent, worn or stripped threads.
- 3. Inspect the hub, looking for the following:
 - A. Damaged or worn splines.
 - B. Cracked parts.
 - 4. Replace any defective parts including defective fasteners.

Overhaul Interval

A complete overhaul of the unit should be made at the same time that the engine is overhauled.

Periodic Visual Inspection

1. Check the mountings for tightness or damage such as cracks. Tighten loose mountings and replace damaged parts.
2. Check pressure and temperature gauge where applicable.
3. Inspect the oil lines and heat exchanger for leaky connections, cracks, or other damage. Replace damaged lines.
4. Periodically, inspect the drive line and the input and output shaft oil seals for leakage. Replace parts as required.

NOTICE

The lifting force established in steps 1 - 3 only needs to be done for the first machine of the design type. Any significant changes to the weight of the accessories added to the Pump Drive would require that the lifting force be re-established.

Alignment - U-Joint-Type Installation

Alignment of In-line Drive “U” Joint Type

To realize maximum bearing life, the best possible alignment must be maintained between the center line of the PTO shaft and the center line of the pump drive. This may be accomplished as follows:

1. First, and very important, the forks (items 1 and 2, Figure 1) of the drive shaft between the PTO and the gearbox must lie in the same plane. This will prevent severe vibrations from occurring in the drive shaft.
2. Second, the center lines of the PTO shaft and gearbox input shaft must be offset within the limits recommended by the universal joint manufacturer to prolong the life of the universal joint needle bearings.
3. Third, and very important, the center lines of the PTO shaft and gearbox input shaft must be parallel. This will further prevent vibrations which cause premature bearing failure.
4. Proper lubrication of the gearbox clutch is very important for satisfactory performance. The clutch bearings are lubricated with lithium -based grease, NLGI-2 grease. The grease selected should be recommended for anti-friction bearings and have a minimum melting point of 149° C (300° F). A list of approved lubricants is available upon request.

Alignment Measurement Procedure

The centerlines of the PTO shaft and input shaft of the pump drive must be parallel. One method of accomplishing this is shown in Figure 1. To align engine and pump drive by this method, two accurate straight edges that are at least 36 inches (860 mm) long, and a tape measure are required.

1. Place the straight edges horizontally along the face of the PTO and pump drive hubs.
2. Measure distances A and B. A and B should be equal within 3 mm (0.125 inch) measured 430 mm (18.0 inches) out from the centerlines of the shaft. If a difference in A and B of more than 3 mm (0.125 inch) is found, the engine should be moved to bring these distances within 3 mm (0.125 inch).
3. After A and B have been set the straight edges should be rotated to the vertical position as shown by the dotted lines in the sketch. Distance C should be equal to distance D within 3 mm (0.125 inch) measured 430 mm (18.0 inches) out from the center of the shaft. If C and D vary more than 3 mm (0.125 inch) measured 430 mm (18.0 inches) from the shaft center the engine should be moved until the difference is brought within 3 mm (0.125 inch).
4. After setting C and D, A and B should be rechecked and reset if required. Repeat this procedure until distances A and B, and C and D are equal to each other within 3 mm (0.125 inch) measured 18 inches (430 mm) from shaft centers.
5. After setting as described above, the engine should be securely anchored. The PTO shaft centerline and gear head input shaft centerline will now be within 1 degree of parallel

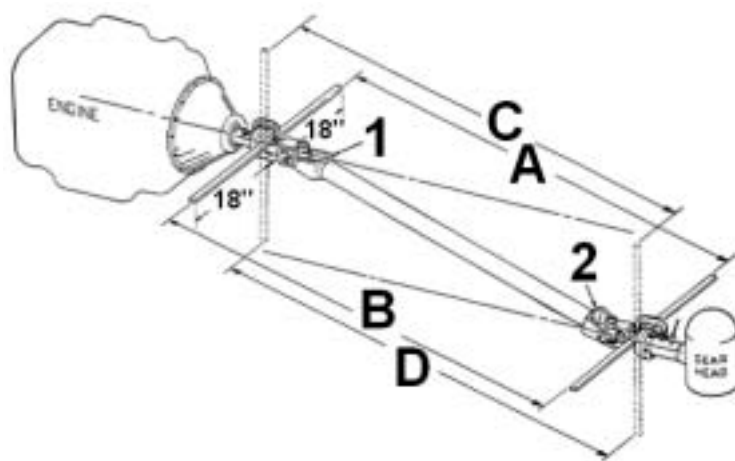


Figure 1. Alignment Of Pump Drive

Note: All threads and bearing face to be lubricated with light oil film prior to assembly.

Troubleshooting

Table 2. Troubleshooting Chart

Table 2					
Symptom		Cause		Remedy	
1.	High temperature	1-1	Improper oil level.	1-1	Check and fill (or drain) with proper oil to the correct level.
		1-2	Faulty heat exchanger.	1-2	Inspect, repair or replace heat exchanger.
		1-3	Bearing failure.	1-3	Overhaul Pump Drive.
		1-4	Air leak on suction side of pump.	1-4	Inspect and correct cause of suction leak.
2.	Excessive noise	2-1	Bearing failure.	2-1	Overhaul Pump Drive.
		2-2	Worn or damaged input coupling.	2-2	Remove Pump Drive. Replace worn or damaged coupling.
		2-3	Excessive torsional vibration.	2-3	Select proper torsional coupling.
		2-4	Worn or damaged gears.	2-4	Remove Pump Drive. Overhaul.
		2-5	Improper alignment.	2-5	Check alignment of engine and remove Pump Drive flange to drive shaft. Correct as necessary.
		2-6	Damaged driveline.	2-6	Repair driveline.
		2-7	Misfiring engine.	2-7	Repair engine.

