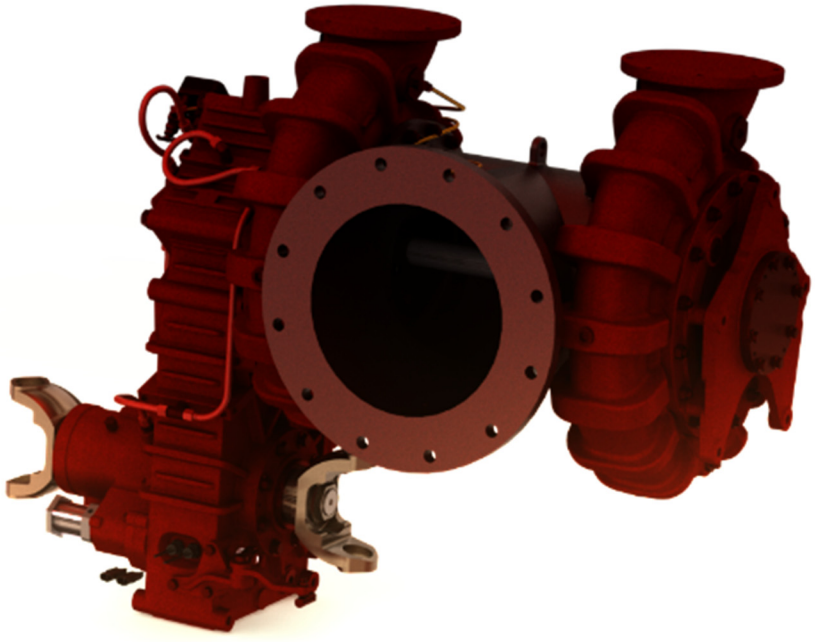
Tuesday, August 08, 2017

Operation, Installation, and Repair Manual

Midship Driven 2ZS Pump



Prepared By: KMD
Approved By:
Revised By:

Rev. 0
Rev Date:
Document: 1200679

W.S. Darley & Company
1051 Palmer Street
Chippewa Falls, WI 54729

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Type 2ZS Midship Fire Pump

Note:
All Documents are found in this manual in the order they are listed (Left to Right and Top to Bottom)

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Introduction

This manual provides information for the correct safety, installation, mounting, plumbing, operation, maintenance, repair, and troubleshooting of the Darley 2ZSM pump system. Thoroughly read and follow these instructions before putting the system in service. Doing so will ensure optimal performance and long life of your equipped apparatus.

The manual is divided into 5 sections plus an appendix. Each section details the operation, installation, mounting, plumbing, safety, use, and maintenance of the 2ZSM pump system. The appendix includes supplementary information.

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Section 1

Definitions of Symbols and Immediate Safety Information

IMPORTANT

Throughout this manual will find Caution, Warning and Danger symbols. Please pay close attention to these symbols as they are for your safety.

DANGER Signifies an imminently hazardous situation that could result in death or serious injury.

WARNING OR  **WARNING**

Signifies a potentially hazardous situation that could result in death or serious injury.

CAUTION Signifies a potentially hazardous situation that might result in minor or moderate injury.

CAUTION Signifies a potentially hazardous situation that might result in property damage.

Ignoring any of these identified hazards is not recommended. W.S. Darley does not advise such actions or take responsibility for the actions of any operator of this unit.

SAFETY

Always read safety instructions indicated by any of the above symbols.

1) Open and close valves slowly.
2) Be prepared for high nozzle reactions – open nozzle slowly.

1) Do not exceed system rated pressure of 250 PSI, capacity of 6000 GPM or impeller speed of 3500 RPM. If assistance is needed in determining engine speed to impeller speed correlation, contact W.S. Darley Customer Service.
2) Observe local regulations on the use of hearing protection.
3) Use only hoses with pressure rating higher than their intended use.
4) Remove all pressure from hoses before disconnecting.
5) Shutdown and depressurize completely before attempting maintenance.
6) Use of wheel chocks or blocks is required.

Relay pumping is acceptable as long as system rated pressures are not exceeded. Receiving pump should be equipped with sufficient safety relief type devices, such as Suction Relief Valves and/or Discharge Relief Valves. Failure to follow this recommendation could result in phenomena such as water hammer and system pressure spikes. Such occurrences can cause severe personnel injury and severe equipment damage.

Great care must be taken in the layout of pump systems drivelines. Interference and driveline vibration must be considered. A sufficiently experienced installer with knowledge of driveline considerations, proper layout and recommended guidelines should be utilized as well as a proper CAD system for technically precise layouts. Installation of said drivelines should not occur until a proper analysis is performed by either said drafter or W.S. Darley. Darley utilizes and can distribute the Allison Driveline Analysis program which they use for said analysis, along with an instruction for use.

Failure to do said layout and analysis could result in severe injury and damage to equipment, including items not furnished by Darley, including but not limited to: drive tubes, hanger bearings, u-joint crosses, gears, rear differentials, and main truck transmissions.

⚠WARNING

Exposed rotating drive-shafts should be guarded.

Use safety rings around drive tubes especially near connecting u-joint crosses. Such safety rings would be sufficiently attached to the chassis frame and sufficiently strong enough to prevent a broken u-joint assembly from allowing a driveline to slide out from underneath the truck at high speeds while still rotating, causing severe personnel injury. Said safety rings would be larger than the drive tube OD and provide enough clearance for dynamic non-rotational movement of the drivelines through loaded and unloaded conditions, driving operations and where chassis flex may occur.

Pump Division
1051 Palmer St.
Chippewa Falls, WI 54729
715-726-2650

Technical Bulletin on Midship Mounted Fire Pump Drivelines

1202519

FEB, 25 2016

The driveline torque rating is 19,230 lb-ft (26,072 Nm) – exceeding this torque rating can result in a driveline failure.

Great care must be taken in the layout of pump drivelines. Interference and driveline vibration must be considered. An experienced installer with knowledge of driveline considerations, proper layout and recommended guidelines should be utilized as well as proper CAD systems for driveline layouts. Installation of the driveline should not occur until a proper analysis is performed by either a qualified driveline specialist or W.S. Darley. W.S. Darley utilizes, can distribute and can train qualified individuals to use the Allison Multiple Joint Driveline Analysis program.

W.S. Darley requires that midship driven pumps have at most 500 radians per second^2 torsional vibration, at most 1000 radians per second^2 inertial drive torsional vibration and at most 1000 radians per second^2 inertial coast torsional vibration, as calculated by the Allison Multiple Joint Driveline Analysis program, for a completed driveline installation. A completed driveline installation includes the entire multi-driveshaft assembly from the power source on apparatus transmission output flange to the input flange of the rear axle.

Failure to design and analyze a proper driveline layout could result in severe injury and damage to equipment, including but not limited to: the water pump, the water pump transmission, drive tubes, hanger bearings, u-joint crosses, gears, the rear differential, and the main truck transmission.

Questions can also be directed to our Customer Service Department at 800-634-7812 or 715-726-2650.

Section 2

General Information and Operation

Transmission Lubrication and Service

Prepared by: KMD
Approved by: WAH
Revised By:

Rev. 0
Date: 7/11/17
Rev. Date:
1200678

Recommended Lubricant Type:

80W/90 Gear Oil

Service Interval:

Replace oil every 6 months or 50 hours of operation, whichever occurs first. In applications requiring continuous pump operation (six hours or more), the oil should be replaced after completion of pumping.

Oil Level Inspection:

Over the course of a regular service interval, oil level shall be monitored to ensure adequate lubricant remains in the gearcase. If the oil level is found to be lower than the recommended level, within a standard service interval, additional 80W/90 gear oil shall be added.

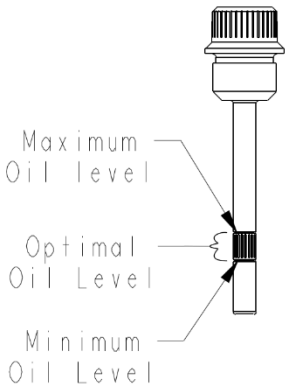
> **Note:** *Ensure the apparatus, pump, or trailer is on a level surface prior to checking the oil level.*

Draining Oil:

1. Place a receptacle under the oil drain port
2. Remove the oil fill plug, cap, or breather
3. Remove the (magnetic) transmission drain plug
4. Inspect plug for debris (small granular debris indicates normal wear, Flake like debris should be investigated)
5. Allow oil to completely drain from transmission
6. Re-Fasten the (magnetic) transmission oil drain plug

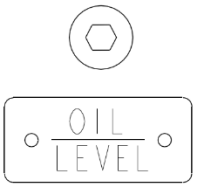
Oil Fill Procedure- Transmissions with an Oil Level Dipstick:

1. Ensure pump, apparatus, or trailer is on a level surface
2. Remove oil level dipstick and wipe clean, removing all oil
   Note: *For pumps equipped with an oil level plug, refer to: Oil Fill Procedure– Transmissions with an Oil Level Hole*
3. Pour 80W/90 gear oil into dipstick opening
4. Allow oil to settle for approximately one minute after pouring
5. Re-fasten dipstick
6. Remove dipstick to verify oil level
7. Continue to add oil until oil covers the knurled portion of the dipstick
   Note: *Do not fill oil beyond knurled portion of the dipstick*
8. Repeat steps 5 thru 7 until optimal oil level is achieved
9. Re-fasten dipstick
10. You have now completed your oil fill



Oil Fill Procedure- Transmissions with an Oil Level Hole:

1. Ensure pump, apparatus, or trailer is on a level surface
2. Remove oil fill plug, cap, or breather
3. Remove oil level plug
   Note: *For pumps equipped with an oil level dipstick, refer to: Oil Fill Procedure – Transmissions with an Oil Level Dipstick*
4. Pour 80W/90 gear oil into oil fill port
5. Continue to add oil until oil weeps from oil level fill hole
6. Allow oil to settle for approximately one minute after pouring
7. Re-fasten oil level fill plug to transmission gearcase
8. Re-fasten oil fill plug, cap, or breather
9. You have now completed your oil fill



NOTE: OIL LEVEL HOLE WILL BE INDICATED BY OIL LEVEL TAG AS SHOWN ABOVE

Pump Shifting Procedure

SUMMARY OF THINGS TO REMEMBER

1. Always shift pump clutches with engine clutch disengaged.
2. Do not clash clutch gears when shifting.
3. Close booster valves, drain valves, cooling line and third stage discharge valve before attempting to prime the pump.
4. Always keep primer shut-off valve closed, except while priming.
5. Re-open and close primer valve to re-prime or eliminate trapped air from suction line.
6. Always drive a midship mounted split-shaft pump with truck transmission in the gear recommended by the chassis manufacturer.
7. Never run the pump without water in it except momentarily while priming.
8. Accelerate and retard speed of engine gradually.
9. Watch the engine temperature, and start the cooling water at the first signs of overheating.
10. Keep good gaskets in suction hoses, and handle carefully to avoid damage to coupling threads.
11. Air leakage into suction lines is the most frequent source of trouble when pumping from a suction lift (draft).
12. Always use a suction strainer when pumping from draft, and a hydrant strainer when pumping from a hydrant.
13. Foreign matter in impellers is a result of failure to use adequate strainers and is a common source of trouble.
14. Drain pump immediately after each run. This is especially critical in freezing conditions.
15. Do not run the pump long with discharge completely shut off.
16. Do not close a “Shutoff” nozzle when pumping with motor throttle wide open, unless relief valve or pressure regulator is set for the correct pressure.
17. Keep the pump gear case filled with oil to the level of the oil level plug/dipstick.
18. Check oil level in the pump transmission after every 25 hours of operation or 3 months, and changed it after every 50 hours of operation or 6 months.
19. In such equipped transmissions, once the oil is drained, remove the strainer screen oil sump fitting and thoroughly cleanse in a parts washer or with isopropyl alcohol, ensuring any debris is washed away.
20. If pump is equipped with a Darley plastallic (injection) packing shaft seal, check the drip rate frequently, and adjust according to the packing adjustment instruction, as required. The drip rate may vary between 5 and 60 drops per minute.
21. Work all suction and discharge valves often to ensure free and easy operation.

OPERATION OF PUMP SHIFT WITH AUTOMATIC TRANSMISSION

The pump gear shift consists of a sliding clutch gear splined to the transmission shaft which can be moved forward to engage the pump clutch gear, or to the rear to engage the rear drive shaft connected to the truck drive axle.

The sliding clutch gear is moved either by direct mechanical linkage from a notched quadrant shift lever, or by an air power cylinder controlled by a selector valve. The shift lever or selector valve must be moved all the way and locked for either ROAD position to drive truck or PUMP position to pump.

MANUAL PUMP GEAR SHIFT PROCEDURE

With trucking parking brake set, the truck transmission shift selector must be in neutral position to stop rotation of truck transmission output shaft before shifting into either ROAD or PUMP gear to prevent clashing and damage to gear teeth. With a manual pump gear shift control, a butt tooth position of gears may be encountered preventing engagement and "Pump Engaged" light from coming on. If this occurs, move transmission shift selector momentarily into any forward gear position with engine idling, then return to neutral. Wait approximately 5 seconds until shaft stops turning. Moving the pump shift lever to PUMP position again should complete the pump shift and turn on the "Pump Engaged" light. Repeat this procedure if a butt tooth condition is again encountered. Pump priming should be completed before shift to PUMP position.

AIR POWER PUMP GEAR SHIFT PROCEDURE

With the air power pump gear shift control a butt tooth condition may also occur preventing engagement and "Pump Engaged" light from coming on. This can be easily overcome by momentarily placing truck transmission in any forward gear position with engine idling after the pump shift valve is placed in the PUMP position. Shaft rotation will complete the shift and turn on green "Pump Engaged" light. Transmission shift should be returned to neutral position after "Pump Engaged" light comes on for the pump priming period.

The above procedure insures that the pump shift is completed and the "Pump Engaged" light comes on. An alternate procedure in case of a butt tooth condition is simply to wait until the transmission is placed into pump drive gear position, when shaft rotation will immediately permit pump gears to mesh into full engagement.

The pump is usually operated with truck transmission in direct (high) gear such as D or 2-5. Overdrive may be required with very low speed engines.

When the truck is equipped with an automatic transmission, a danger exists that should the operator forget to move the pump shift valve to PUMP position, and at the same time place transmission selector in high gear before leaving cab, the engine will continue to run due to converter slip. If the operator advances the vernier throttle at the pump operators panel, the engine could overcome the parking brake and cause the truck to move. To prevent this possibility, the following shifting procedure should be followed for PUMP position:

1. Read and fully understand pump Operators Manual before proceeding.

2. Set parking brake and idle engine.

3. Place automatic transmission shift selector in neutral.

4. Move pump shift lever or valve to PUMP position. "Pump Engaged" green light in cab should now come on. If not, momentarily place truck transmission shift selector in a forward gear to complete pump shift, then return to neutral position. Green light will now be on.

5. Prime pump.

6. Move automatic transmission shift selector to direct drive position. “OK to Pump” green light in cab should now be on.

7. Lock automatic transmission shift selector in direct drive.

8. Listen for sound of pump gears turning. Speedometer will show MPH unless connected to the wheel.

9. At pump operators position, observe the green indicator warning light near vernier throttle control. WARNING: DO NOT OPEN THROTTLE UNLESS LIGHT IS ON.

10. Advance throttle to provide a minimum of 900 rpm idle speed. Observe discharge pressure gage on panel while advancing vernier throttle to make sure it is indicating pressure. If pump is not engaged or the pump is not primed, no pressure will show.

The vernier throttle has a quick release emergency red center button. Push it all the way in to return the engine to idle if necessary in an emergency situation

To return to ROAD operation:

1. Throttle engine back to idle.

2. Place the truck transmission selector lever in neutral position. Wait approximately 5 seconds until drive shaft stops rotating.

3. Move pump shift lever or valve from PUMP to ROAD position. “Pump Engaged” green indicator light should be off. A butt tooth condition may require momentary engagement of transmission to complete the shift.

OPERATION OF PUMP SHIFT WITH MANUAL TRANSMISSION

The pump gear shift consists of a sliding clutch gear, splined to the transmission shaft which can be moved forward to engage the pump clutch gear, or to the rear to engage the rear drive shaft connected to the truck drive axle. A neutral position is half way between.

The sliding clutch gear is moved either by direct mechanical linkage from a notched quadrant shift lever, or by a vacuum or air power cylinder controlled by a selector switch. The shift lever must be moved all the way and locked for either ROAD position to drive truck or PUMP position to power pump.

The truck clutch must always be disengaged to stop rotation of truck transmission output shaft before shifting into either ROAD or PUMP gear to prevent clashing and damage to gear teeth. With the manual shift lever, a butt tooth position of gears may be encountered occasionally preventing engagement. If this occurs, move pump shift lever to neutral (half way) position, engage truck clutch momentarily, then disengage truck clutch and try pump shift again.

The pump is always operated with truck transmission in direct (high) gear, such as 4th on a 4 speed or 5th on 5 speed transmission.

The following shifting procedure should be followed for PUMP operation:

1. Set parking brake.
2. Disengage truck clutch.
3. Move pump shift lever (valve) to PUMP position. "PUMP ENGAGED" green light in cab should now come on.
4. Move truck transmission shift lever to neutral position.
5. Engage truck clutch.
6. Prime pump (See Priming Instructions).
7. Disengage truck clutch.
8. Move truck transmission shift lever to direct drive position and lock in place with safety latch provided.
9. Slowly engage truck clutch to begin pumping.

TO RETURN TO ROAD OPERATION

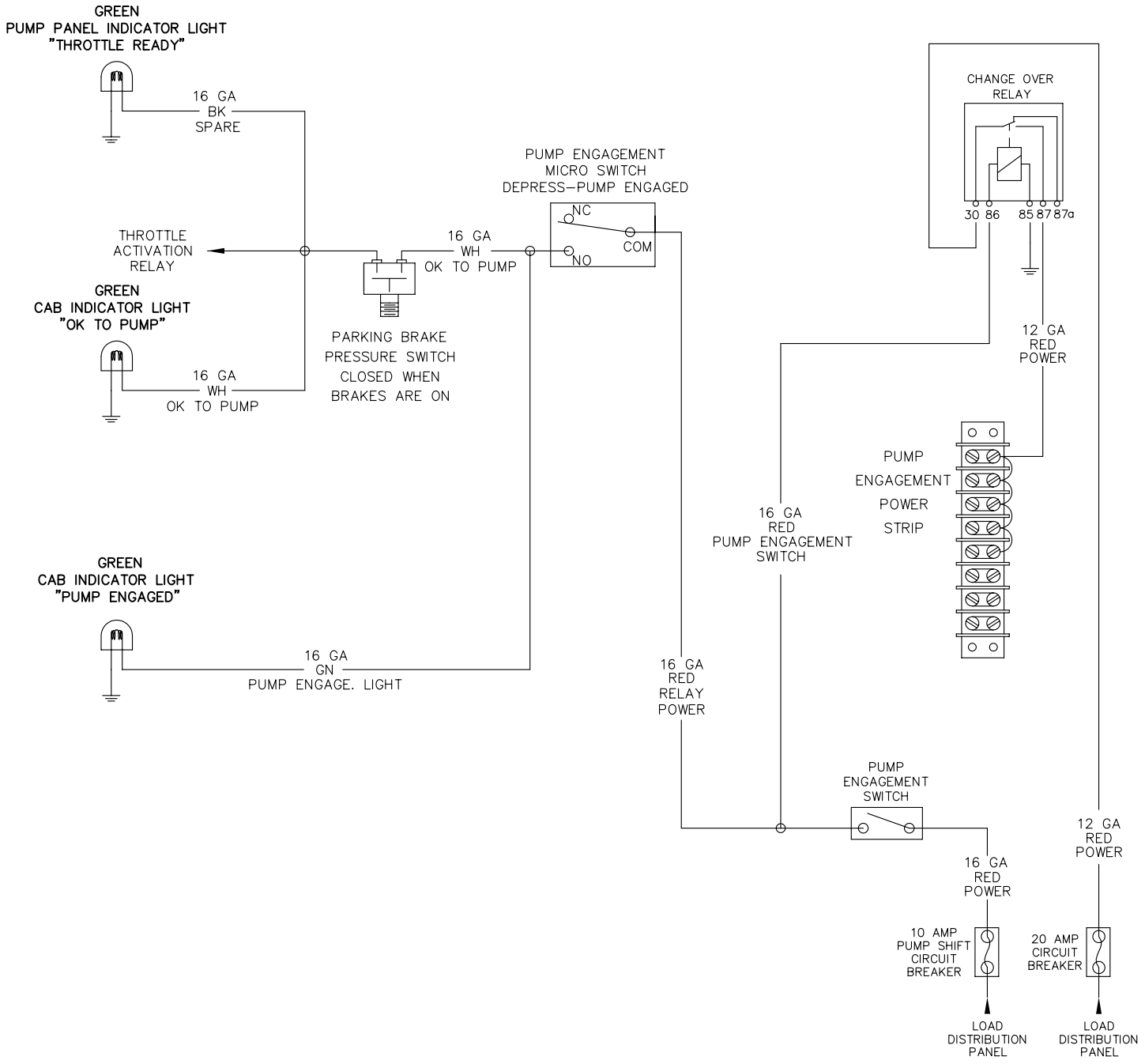
1. Disengage truck clutch to stop shaft rotation. Allow 10 seconds for shaft to stop rotating.
2. Move truck transmission shift lever to neutral position.
3. Move pump shift lever (valve) to ROAD position.

CAUTION

Follow the procedures step by step as indicated.

IF FURTHER INFORMATION IS NEEDED, CALL W.S. DARLEY & CO. AT CHIPPEWA FALLS, WI. AT 800-634-7812 or 715-726-2650

REVISIONS			
SYM.	DATE	BY	REVISION



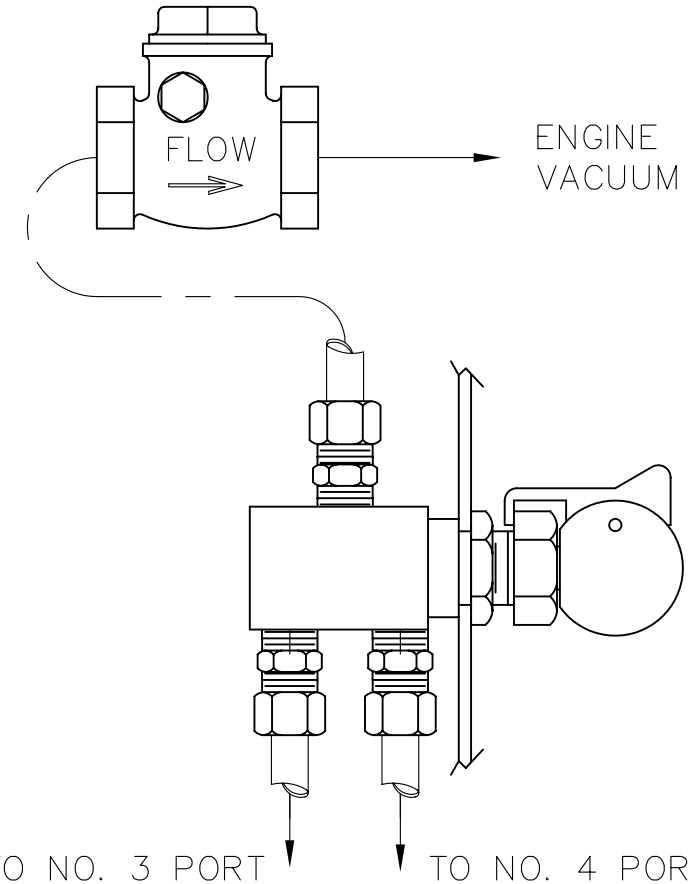
ELECTRICAL SCHEMATIC
MANUAL TRANSMISSION
PUMP ENGAGEMENT

W.S. Darley & Co.
APPARATUS DIVISION
920 KURTH ROAD
CHIPPEWA FALLS, WISCONSIN 54729
1-715-726-2645

DWG BY JSS	SCALE NONE	REV
DATE 7-23-02	JOB NO.	DWG. NO. DGS1202

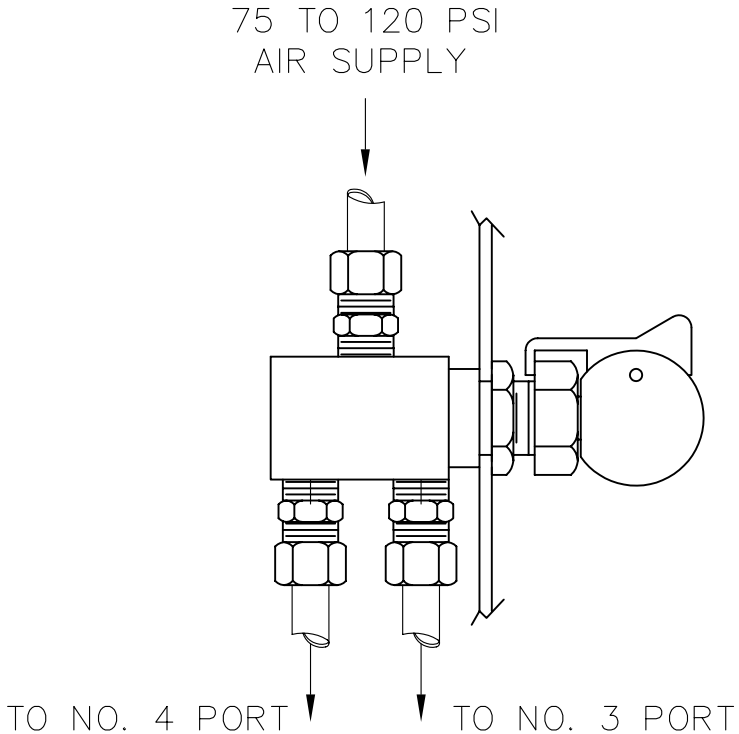
REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

CHECK VALVE



VACUUM SHIFT
PIPING DIAGRAM
3" DIA. CYLINDER

NOTE: CONNECT TO AIR SOURCE
THAT HAS AN 80 PSI PRESSURE
PROTECTION VALVE



AIR PRESSURE SHIFT
PIPING DIAGRAM
1-1/8 DIA. CYLINDER

INCH
[MILLIMETER]

THIRD ANGLE PROJECTION

ALL DIMENSIONS IN
INCHES UNLESS NOTED

DO NOT SCALE PRINT

W.S. DARLEY & CO.
MELROSE PARK, IL – CHIPPEWA FALLS, WI

DWG – POWER SHIFT VALVE
–

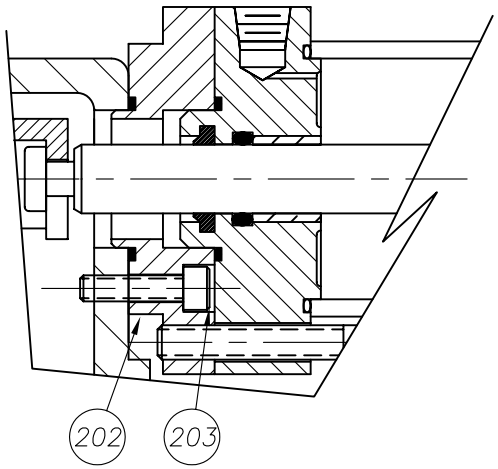
DR'N TED
CHKD
TRCD

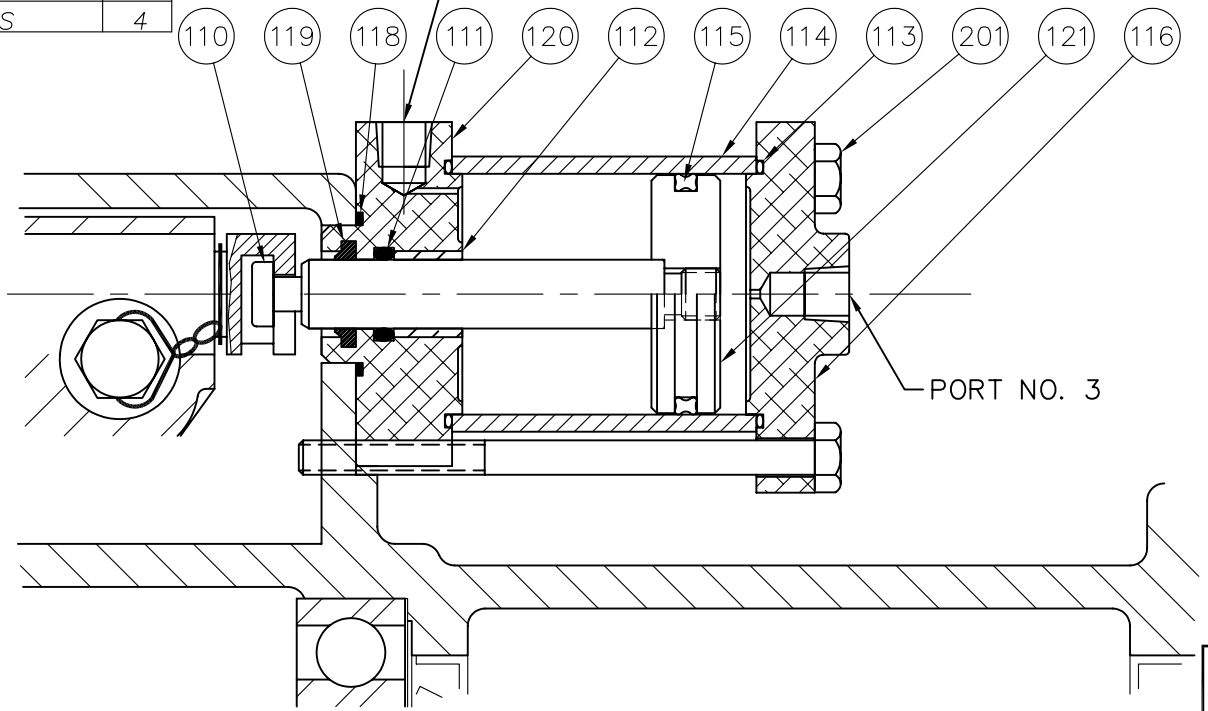
DATE MAR10,97
SCALE NTS

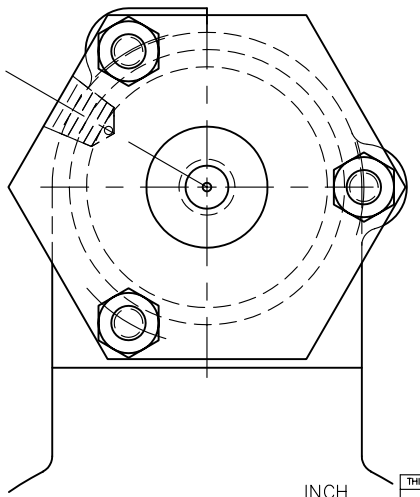
DGS0500

PARTS LIST		
REP. NO.	DESCRIPTION	QTY.
110	PISTON ROD	1
111	ORING – ROD	1
112	OILITE SLEEVE BEARING	1
113	O'RING	2
114	CYLINDER	1
115	QUAD RING SEAL	1
116	CYLINDER END	1
118	O'RING	1
119	WIPER RING	1
120	CYLINDER HEAD	1
121	PISTON	1
201	CYLINDER SCREWS	3
202	*ADAPTER*	*1*
203	*ADAPTER SCREWS*	*4*

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D







REFERENCE SPEC AY00201 (G427A1)
& AY00202 (G427A2)

OLD PART NO.
G2514

INCH
[MILLIMETER]

THIRD ANGLE PROJECTION

W.S. DARLEY & Co.
MELROSE PARK, IL – CHIPPEWA FALLS, WI

DWG – 1.75" AIR CYLINDER

DR'N DWS
CHKD
TRCD

DATE JUN02,93
SCALE 1/1

DGC0701

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT

Definitions, Operating Characteristics of Pumps, and Conversion Factors

DEFINITIONS

HEAD OF WATER -- vertical depth of water measured in feet or in pressure per unit or area. In hydraulics, head always represents pressure and it is expressed interchangeably in feet of water or pounds per square inch and sometimes in inches of depth of mercury.

STATIC HEAD -- the pressure that is exerted by a stationary column of water of a given height or depth.

TOTAL HEAD OR TOTAL DYNAMIC HEAD -- the maximum height above the source of supply to which the pump would elevate the water plus all the resistance to flow in the pipe or hose line.

DISCHARGE HEAD -- the pressure measured at the discharge outlet of a pump.

SUCTION HEAD -- the positive pressure measured at the suction entrance of a pump (when pumping from an elevated tank or hydrant).

VELOCITY HEAD -- the equivalent pressure represented by fluid in motion as measured by means of a Pitot Gage.

STATIC LIFT -- the vertical height of the center of the pump above the source of supply (when pump from draft).

TOTAL SUCTION LIFT -- the static lift plus the friction in suction line plus entrance losses.

NET PUMP PRESSURE -- the total dynamic head of the pump.

EFFECTIVE NOZZLE PRESSURE -- the pump discharge pressure minus hose friction plus or minus the difference in elevation above or below pump.

WATER HORSEPOWER - the theoretical power required to deliver a given quantity of water per minute against a given head.

BRAKE HORSEPOWER -- Actual power as delivered by a motor or engine to a driven machine.

PUMP EFFICIENCY -- The quotient of the water horsepower divided by brake horsepower required to produce it.

WATER HAMMER -- a series of shock waves produced in a pipeline or pump by a sudden change in water velocity. A sudden change in flow velocity can result from rapid closure of valves. A pressure wave is set up which travels back and forth in the water column at extremely high speed producing rapid vibrations that may be violent and destructive if the water column is long.

THE MAXIMUM THEORETICAL LIFT of a pump is 34 feet, which is the pressure of the atmosphere at sea level. The maximum practical total lift at sea level is 20 to 25 feet (depending on the type and condition of the pump) and this decreases with drops in barometric pressure.

OPERATING CHARACTERISTICS OF PUMPS

CENTRIFUGAL PUMPS: A centrifugal pump develops pressure by centrifugal force of the liquid rotating in the impeller wheel. The pressure developed depends upon the peripheral speed of the impeller (increasing as the square of the speed) and it remains fairly constant over a wide range of capacities up to the maximum output of the pump, if speed remains constant.

If the discharge outlet of a centrifugal pump is entirely shut off, with speed kept constant, there is a small rise in pressure, the water churns in the pump casing and the power drops to a low value. If the discharge is opened wide, with little resistance to flow the pressure drops while the capacity and power both increase to their maximum.

A centrifugal pump is an extremely simple mechanism mechanically, but rather complex hydraulically; in that many factors enter into the design of the impeller and water ways which will affect the pump's efficiency.

DISPLACEMENT PUMPS: Rotary and piston pumps are termed "Positive Displacement" pumps because each revolution displaces or discharge (theoretically) an exact amount of liquid, regardless of the resistance. The capacity is, therefore, proportional to the number of revolutions of the pump per minute and independent of the discharge pressure except as it is reduced by "slip" (leakage past the pistons or rotors). For a given speed the power is directly proportional to the head. If the discharge is completely shut off, the pressure, power, and torque climb indefinitely until the drive power is stalled or breakage occurs.

Slip is the greatest factor affecting efficiency of a displacement pump, and this factor is greatly influenced by the condition of and wears on the working parts.

IF FURTHER INFORMATION IS NEEDED, CALL W.S. DARLEY & CO. AT CHIPPEWA FALLS, WI. AT 800-634-7812 or 715-726-2650

CONVERSION FACTORS

One pound per square inch	=	2.31 feet of water
	=	2.04 inches of mercury
	=	27.7 inches of water
One foot of water	=	0.43 pounds per square inch
One inch of mercury	=	1.13 feet of water
	=	0.49 pounds per square inch
One cubic foot of water	=	62.4 pounds
	=	7.5 gallons
One gallon of water	=	231 cubic inches
	=	0.13 cubic feet
	=	8.34 pounds
	=	3.8 liters
One Imperial Gallon	=	1.2 U.S. gallons
Atmospheric Pressure (Sea Level)	=	14.8 pounds per square inch
	=	29.9 inches of mercury
	=	34 feet of water

NFPA 1901 Test Tables

TABLE NO. 1
NFPA 1901 TEST

Class A							
TEST No.	GPM	Recom-mended Nozzles	Min. Nozzle Press. PSI	Min. Disch. Press. PSI	Min. Net Pump Press. PSI	Disch. Lines	Suction Hose
250 GPM Fire Pump							
1	250	(1), 1”	72	143	150	(1), 50'	20’ of 3”
2	175	(1), 7/8”	62	194	200		
3	125	(1), 3/4”	56	244	250		
4	250	(1), 1”	72	158	165		
350 GPM Fire Pump							
1	350	(1), 1-1/4”	58	144	150	(1), 50'	20’ of 4”
2	245	(1), 1”	69	195	200		
3	175	(1), 7/8”	62	245	250		
4	350	(1), 1-1/4”	58	159	165		
500 GPM Fire Pump							
1	500	(1), 1-1/2"	57	143	150	(1), 50'	20' of 4"
2	350	(1), 1-1/4"	58	194	200		
3	250	(1), 1"	72	245	250		
4	500	(1), 1-1/2"	57	158	165		
750 GPM Fire Pump							
1	750	(1), 1-3/4" or (2), 1-1/4"	68 66	142	150	(2), 50' or (2), 100' Siamesed	20' of 4-1/2"
2	525	(1), 1-1/2"	62	193	200		
3	375	(1), 1-1/4"	66	244	250		
4	750	(1), 1-3/4" or (2), 1-1/4"	68 66	157	165		
1000 GPM Fire Pump							
1	1000	(1), 2" or (2), 1-1/2"	71 57	142	150	(2), 50' or (3), 100' Siamesed	20' of 5"
2	700	(1), 1-3/4" or (2), 1-1/4"	60 58	193	200		
3	500	(1), 1-1/2"	57	244	250		
4	1000	(1), 2" or (2), 1-1/2"	71 57	157	165		

Min. discharge pressures listed above are for pumps operating with full 10’ static suction lift. These pressures must be increased by 1 PSI for each 2.3 ft. less than 10’ of lift.

TABLE NO. 1
NFPA 1901 TEST

Class A							
TEST No.	GPM	Recom-mended Nozzles	Min. Nozzle Press. PSI	Min. Disch. Press. PSI	Min. Net Pump Press. PSI	Disch. Lines	Suction Hose
1250 GPM Fire Pump							
1	1250	(1), 2-1/4" or (2), 1-1/2"	69 88	143	150	(3), 50'	20' of 6"
2	875	(1), 2" or (2), 1-3/8"	55 61	194	200	or	
3	625	(1), 1-1/2"	88	245	250	(3), 100'	
4	1250	2-1/4" or (2), 1-1/2"	69 88	158	165	and (1), 50' Siamesed	
1500 GPM Fire Pump							
1	1500	(2), 1-3/4" or (3), 1-1/2"	68 57	142	150	(3), 50'	20' of
2	1050	(1), 2" or (2), 1-1/2"	78 62	194	200	or	6" Min
3	750	(1), 1-3/4" or (2), 1-1/4"	68 66	245	250	(3), 100' and (1), 50'	or (2) 20' of
4	1500	(2), 1-3/4" or (3), 1-1/2"	68 57	157	165	Siamesed	6" Max

Min. discharge pressures listed above are for pumps operating with full 10' static suction lift. These pressures must be increased by 1 PSI for each 2.3 ft. less than 10' of lift.

TABLE NO. 1
NFPA 1901 TEST

Class A							
TEST No.	GPM	Recom-mended Nozzles	Min. Nozzle Press. PSI	Min. Disch. Press. PSI	Min. Net Pump Press. PSI	Disch. Lines	Suction Hose
1750 GPM Fire Pump							
1	1750	(2), 2” or (3), 1-1/2”	55 76	143	150	(4), 50’	(2) 20’ of 6”
2	1225	(2), 1-5/8” or (2), 1-1/2” or (3), 1-1/4”	61 84 79	194	200	or	
3	875	(1), 2” or (2), 1-3/8”	55 61	245	250	(4), 100’	
4	1750	(2), 2” or (3), 1-1/2”	55 76	158	165		
2000 GPM Fire Pump							
1	2000	(2), 2” or (4), 1-1/2”	71 57	147	150	(4), 50’	(2) 20’ of 6”
2	1400	(2), 1-3/4” or (3), 1-1/2”	60 49	199	200	or	
3	1000	(1), 2” or (2), 1-1/2”	71 57	249	250	(4), 100’	
4	2000	(2), 2” or (4), 1-1/2”	71 57	163	165		
2250 GPM Fire Pump							
1	2250	(2), 2-1/4”	56	144	150	(2 Groups) (3), 100’ Siamesed	20’ of 8”
2	1575	(2), 1-3/4”	76	196	200		
3	1125	(2), 1-1/2”	72	246	250		
4	2250	(2), 2-1/4”	56	153	165		

Min. discharge pressures listed above are for pumps operating with full 10’ static suction lift. These pressures must be increased by 1 PSI for each 2.3 ft. less than 10’ of lift.

TABLE NO. 1
NFPA 1901 TEST

Class A							
TEST No.	GPM	Recom-mended Nozzles	Min. Nozzle Press. PSI	Min. Disch. Press. PSI	Min. Net Pump Press. PSI	Disch. Lines	Suction Hose
2500 GPM Fire Pump							
1	2500	(2), 2-1/4"	69	144	150	(2 Groups) (3), 100' Siamesed	20' of 8"
2	1750	(2), 2"	55	195	200		
3	1250	(2), 1-1/2"	88	246	250		
4	2500	(2), 2-1/4"	69	159	165		
3000 GPM Fire Pump							
1	3000	(2), 2-1/2"	65	146	150	(2 Groups) (3), 100' Siamesed	(2) 20' of 8"
2	2100	(2), 2"	78	196	200		
3	1500	(2), 1-3/4"	68	247	250		
4	3000	(2), 2-1/2"	65	161	165		
3000 GPM Industrial Fire Pump							
1	3000	(2), 2-1/2"	65	96	100	(2 Groups) (3), 100' Siamesed	(2) 20' of 8"
2	2100	(2), 2"	78	146	150		
3	1500	(2), 1-3/4"	68	197	200		
3500 GPM Industrial Fire Pump							
1	3500	(2), 2-1/2" and (1), 2-1/4"	45 44	95	100	(2 Groups) (3), 100' Siamesed & (2)-50' Siamesed	(2) 20' of 8"
2	2450	(2), 2-1/4"	67	146	150		
3	1750	(2), 2"	55	197	200		

Min. discharge pressures listed above are for pumps operating with full 10' static suction lift. These pressures must be increased by 1 PSI for each 2.3 ft. less than 10' of lift.

IF FURTHER INFORMATION IS NEEDED, CALL W.S. DARLEY & CO. AT CHIPPEWA FALLS, WI. AT 800-634-7812 or 715-726-2650

TABLE NO. 5
REACH OF FIRE STREAMS

Size of Nozzle	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1-1/4"	1-1/2"
NOZZLE PRESSURE	**EFFECTIVE VERTICAL REACH - Feet**								
40	30	35	40	50	59	62	64	65	69
60	35	40	45	60	74	77	79	84	87
80	38	42	48	65	81	85	89	94	96
100	40	44	50	68	84	89	94	100	102
NOZZLE PRESSURE	**MAXIMUM VERTICAL REACH - Feet**								
40	60	65	70	75	78	79	80	80	80
60	70	75	85	95	105	106	108	110	110
80	78	83	95	105	117	125	132	140	140
100	80	88	100	110	122	135	145	155	155
NOZZLE PRESSURE	**EFFECTIVE HORIZONTAL REACH - Feet**								
40	20	25	30	40	44	50	55	62	66
60	25	32	37	50	54	61	67	75	80
80	28	35	40	57	62	70	76	84	88
100	30	37	42	60	66	76	84	93	95
NOZZLE PRESSURE	**MAXIMUM HORIZONTAL REACH - Feet**								
40	65	80	90	100	108	120	125	138	140
60	80	95	95	120	127	142	156	176	183
80	90	105	105	135	143	160	175	201	210
100	95	110	110	140	153	180	205	215	223

TABLE NO. 6
Friction Loss in Fire Hose
Loss in PSI per 100 Feet of Hose

SIZE HOSE	LINEN HOSE			BEST RUBER LINED HOSE							
G.P.M.	1 1/2	2	2 1/2	3/4	1	1 1/2	2	2 1/2	3	3 1/2	(2)-2 1/2
10	1.0			13.5	3.5	0.5	.1				
15	2.2			29.0	7.2	1.0	0.3				
20	3.6			50.0	12.3	1.7	0.4				
25	5.5			75.0	18.5	2.6	0.6				
30	8.0	1.9		105.0	26.0	3.6	0.9				
40	13.0	3.2		180.0	44.0	6.1	1.5				
50	20.0	4.9	1.6		67.0	9.3	2.3				
60	28.0	7.0	2.2		96.0	13.5	3.3				
70	37.0	9.0	3.1		131.0	17.0	4..3				
80	47.0	11.5	3.8		171.0	23.0	5.6				
90	59.0	14.5	5.0		217.0	29.0	7.0				
100	72.0	17.5	5.9		268.0	33.0	8.4				
120		25.0	8.3		386.0	47.0	11.7				
140		34.0	11.0			62.0	16.0	5.2	2.0	0.9	1.4
160		43.0	14.0			78.0	20.0	6.6	2.6	1.2	1.9
180		53.0	17.7			97.0	25.0	8.3	3.2	1.5	2.3
200		63.0	21.5			121.0	30.6	10.1	3.9	1.8	2.8
220						146.0		12.0	4.6	2.1	3.3
240						173.0		14.1	5.4	2.5	3.9
260						204.0		16.4	6.3	2.9	4.5
280						237.0		18.7	7.2	3.3	5.2
300						272.0		21.2	8.2	3.7	5.9
320								23.8	9.3	4.2	6.6
340								26.9	10.5	4.7	7.4
360								30.0	11.5	5.2	8.3
380								33.0	12.8	5.8	9.2
400								36.2	14.1	6.3	10.1
425								40.8	15..7	7.0	11.3
450								45.2	17.5	7.9	12.5
475								50.0	19.3	8.7	13.8
500								55.0	21.2	9.5	15.2
525									23.2	10.5	16.6
550									25.2	11.4	18.1
575									27.5	12.4	19.6
600									29.9	13.4	21.2
650									34.5	15.5	24.8
700									39.5	17.7	28.3
750									45.0	20.1	32.2
800									50.5	22.7	36.2
850									56.5	25.4	40.7
900									63.0	28.2	45.2
1000									76.5	34.3	55.0

Losses in rough walled, rubber hose may be 50% higher than values given above.

TABLE NO. 7
Friction Loss in 15-year-old Steel Pipe
Loss in PSI per 100 Feet of Pipe

PIPE SIZE / G.P.M.	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8
1	52.0	12.0	2.8	0.9										
2		45.0	10.0	3.2	4.0									
5			55.0	18.0	4.5	1.4	0.4							
10				64.0	16.0	5.0	1.3	0.6						
15				135.0	34.0	11.0	2.7	1.3	0.5					
20					59.0	18.0	4.7	2.2	0.8					
25					89.0	27.0	7.1	3.4	1.2					
30					125.0	39.0	10.0	4.7	1.7	0.6				
35						51.0	13.0	6.3	2.2	0.7				
40						66.0	17.0	8.0	2.9	0.9				
45						82.0	21.0	10.0	3.6	1.2				
50						99.0	26.0	12.0	4.3	1.4	0.6			
60						140.0	38.0	17.0	6.1	2.0	0.8			
70							49.0	23.0	8.0	2.7	1.1			
80							63.0	29.0	10.0	3.4	1.5			
90							78.0	36.0	13.0	4.3	1.8			
100							96.0	44.0	15.0	5.1	2.2	0.5		
125							144.0	66.0	24.0	7.8	3.3	0.8		
150								93.0	33.0	11.0	4.6	1.1		
175								125.0	44.0	15.0	6.1	1.5		
200									56.0	19.0	7.8	1.9		
250									84.0	28.0	12.0	2.9		
300									114.0	40.0	16.0	4.0	0.6	
350										53.0	22.0	5.4	0.8	
400										68.0	28.0	6.9	1.0	
450										84.0	35.0	8.6	1.2	
500										102.0	42.0	10.0	1.4	0.4
600											60.0	15.0	2.1	0.6
800												25.0	3.5	1
1000												37.0	5.2	1.3
1500													11.0	2.7
2000													19.0	4.7
2500													29.0	7.1
3000														10

TABLE NO. 8
Resistance of Fittings
Equivalent Lengths of Straight Pipe - Feet

PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8
Gate Valve	0.4	0.6	0.8	1.1	1.4	1.8	2.2	2.8	4.1	5.3	6.7	9.4
Global Valve	3.0	4.5	6.0	8.5	10.5	14.0	17.0	22.0	32.0	42.0	53.0	75.0
Angle Valve	1.4	2.0	2.7	3.8	4.8	6.3	7.9	10.5	14.5	18.5	23.0	33.0
Std. Elbow	1.1	1.5	2.0	2.8	3.5	4.7	5.8	7.5	11.0	14.0	18.0	24.0
45 Elbow	0.6	0.8	1.0	1.4	1.6	2.1	2.5	3.1	4.2	5.2	6.3	8.5
Long Sweep EI Str Run Tee	0.5	0.8	1.0	1.4	1.7	2.3	2.8	3.7	5.3	7.0	9.0	12.5
Std. Tee Thru Side Outlet	2.1	2.9	3.9	5.5	6.9	9.1	11.6	14.8	21.0	27.0	34.0	49.0
SuddenEnlarg or contraction	1.8	2.5	3.2	4.2	5.0	6.5	7.5	9.5	13.0	16.0	19.0	25.0
Entrance to Pipe	1.0	1.3	1.6	2.2	2.6	3.3	3.9	4.9	6.5	8.2	10.0	13.0

TABLE NO. 9
To Convert Pounds per Square Inch to
Feet Elevation of Water

2.308ft head = 1.0 psi
1ft head = .433psi

Feet	5	10	15	20	25	30	35	40	45	50	60	70	80	90
Pounds	2.2	4.3	6.5	8.7	11	13	15	17	20	22	26	30	35	39
Feet	**100**	**120**	**130**	**140**	**150**	**160**	**170**	**180**	**190**	**200**	**220**	**240**	**260**	**280**
Pounds	**43**	**52**	**56**	**61**	**65**	**69**	**74**	**78**	**82**	**87**	**95**	**104**	**113**	**121**
Feet	300	320	340	360	380	400	425	450	475	500	525	550	600	700
Pounds	130	139	147	156	165	173	184	195	206	217	227	238	260	303

Table NO. 10
American National Fire Hose Connection Screw Thread - NH

Size of Hose	4-Mar	1	1 1/2	2 1/2	3	3 1/2	4	4 1/2	5	6	8
Thr'ds per inch	8	8	9	7.5	6	6	4	4	4	4	4
Thread Designation	0.75-8 NH	1-8 NH	1.5-9 NH	2.5-7.5 NH	3-6 NH	3.5-6 NH	4-4 NH	4.5-4 NH	5-4 NH	6-4 NH	8-4 NH
Max. O.D. Male	1.375	1.375	1.99	3.0686	3.6239	4.2439	5.0109	5.7609	6.26	7.025	9.05

Ref. NFPA 1963

Underwriters Nozzle Tip Thread: 2.1875 O.D. - 12 threads per inch.

IF FURTHER INFORMATION IS NEEDED, CALL W.S. DARLEY & CO. AT CHIPPEWA FALLS, WI. AT 800-634-7812 or 715-726-2650

TABLE NO. 2
DISCHARGE FROM SMOOTH BORE NOZZLE
Pressures measured by Pitot gage.

Nozzle Pressure PSI	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	2	2 1/4	2 1/2
	GALLONS PER MINUTE DELIVERED															
5	4	9	16	26	37	50	66	84	103	125	149	175	203	266	337	415
6	4	10	18	28	41	55	72	92	113	137	163	192	223	292	369	455
7	4	11	19	30	44	59	78	99	122	148	176	207	241	315	399	491
8	5	11	21	32	47	64	84	106	131	158	188	222	257	336	427	525
9	5	12	22	34	50	67	89	112	139	168	200	235	273	357	452	557
10	6	13	23	36	53	71	93	118	146	177	211	248	288	376	477	587
12	6	15	25	40	58	78	102	130	160	194	231	271	315	412	522	643
14	7	15	27	43	63	84	110	140	173	210	249	293	340	445	564	695
16	7	16	29	46	67	90	118	150	185	224	267	313	364	475	603	743
18	7	17	31	49	71	95	125	159	196	237	283	332	386	504	640	788
20	8	18	33	51	75	101	132	167	206	250	298	350	407	532	674	830
22	8	19	34	54	79	105	139	175	216	263	313	367	427	557	707	871
24	8	20	36	56	82	110	145	183	226	275	327	384	446	582	739	909
26	9	21	37	59	85	115	151	191	235	286	340	400	464	606	769	947
28	9	21	39	61	89	119	157	198	244	297	353	415	481	629	799	982
30	10	22	40	63	92	123	162	205	253	307	365	429	498	651	826	1017
32	10	23	41	65	95	127	167	212	261	317	377	443	514	673	854	1050
34	11	23	43	67	98	131	172	218	269	327	389	457	530	693	880	1082
36	11	24	44	69	100	135	177	224	277	336	400	470	546	713	905	1114
38	11	25	45	71	103	138	182	231	285	345	411	483	561	733	930	1144
40	11	26	46	73	106	142	187	237	292	354	422	496	575	752	954	1174
42	11	26	47	74	109	146	192	243	299	363	432	508	589	770	978	1203
44	12	27	49	76	111	149	196	248	306	372	442	520	603	788	1000	1231
46	12	28	50	78	114	152	200	254	313	380	452	531	617	806	1021	1259
48	12	28	51	80	116	156	205	259	320	388	462	543	630	824	1043	1286
50	13	29	52	81	118	159	209	265	326	396	472	554	643	841	1065	1313
52	13	29	53	83	121	162	213	270	333	404	481	565	656	857	1087	1339
54	13	30	54	84	123	165	217	275	339	412	490	576	668	873	1108	1364
56	13	30	56	86	125	168	221	280	345	419	499	586	680	889	1129	1389
58	13	31	56	87	128	171	225	285	351	426	508	596	692	905	1149	1414
60	14	31	57	89	130	174	229	290	357	434	517	607	704	920	1168	1437
62	14	32	58	90	132	177	233	295	363	441	525	617	716	936	1187	1462
64	14	32	59	92	134	180	237	299	369	448	533	627	727	951	1206	1485
66	14	33	60	93	136	182	240	304	375	455	542	636	738	965	1224	1508
68	14	33	60	95	138	185	244	308	381	462	550	646	750	980	1242	1531
70	15	34	61	96	140	188	247	313	386	469	558	655	761	994	1260	1553
72	15	34	62	97	142	191	251	318	391	475	566	665	771	1008	1278	1575
74	15	35	63	99	144	193	254	322	397	482	574	674	782	1023	1296	1597
76	15	35	64	100	146	196	258	326	402	488	582	683	792	1036	1313	1618
78	15	36	65	101	148	198	261	330	407	494	589	692	803	1050	1330	1639

TABLE NO. 2
DISCHARGE FROM SMOOTH BORE NOZZLE
Pressures measured by Pitot gage.

Nozzle Pressure PSI	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	2	2 1/4	2 1/2
	GALLONS PER MINUTE DELIVERED															
80	16	36	66	103	150	201	264	335	413	500	596	700	813	1063	1347	1660
82	16	37	66	104	152	204	268	339	418	507	604	709	823	1076	1364	1681
84	16	37	67	105	154	206	271	343	423	513	611	718	833	1089	1380	1701
86	16	37	68	107	155	208	274	347	428	519	618	726	843	1102	1396	1721
88	16	38	69	108	157	211	277	351	433	525	626	735	853	1115	1412	1741
90	17	39	70	109	159	213	280	355	438	531	633	743	862	1128	1429	1761
92	17	39	70	110	161	215	283	359	443	537	640	751	872	1140	1445	1780
94	17	39	71	111	162	218	286	363	447	543	647	759	881	1152	1460	1800
96	17	40	72	113	164	220	289	367	452	549	654	767	890	1164	1476	1819
98	17	40	73	114	166	223	292	370	456	554	660	775	900	1176	1491	1838
100	18	41	73	115	168	225	295	374	461	560	667	783	909	1189	1506	1856
105	18	42	75	118	172	230	303	383	473	574	683	803	932	1218	1542	1902
110	19	43	77	121	176	236	310	392	484	588	699	822	954	1247	1579	1947
115	19	43	79	123	180	241	317	401	495	600	715	840	975	1275	1615	1991
120	19	44	80	126	183	246	324	410	505	613	730	858	996	1303	1649	2033
125	20	45	82	129	187	251	331	418	516	626	745	876	1016	1329	1683	2075
130	20	46	84	131	191	256	337	427	526	638	760	893	1036	1356	1717	2116
135	21	47	85	134	195	262	343	435	536	650	775	910	1056	1382	1750	2157
140	21	48	87	136	198	266	350	443	546	662	789	927	1076	1407	1780	2196
145	21	49	88	139	202	271	356	450	556	674	803	944	1095	1432	1812	2235
150	22	50	90	141	205	275	362	458	565	686	817	960	1114	1456	1843	2273

TABLE NO. 3
Approximate Discharge Flow From Different Nozzles
At the end of Fifty Feet of Average, 2 1/2"
Rubber Lined Fire Hose, for Various
Pump Pressures with Discharge
Valve Wide Open

PUMP	SIZE	OF	NOZZLE	&	GALLONS	PER	MINUTE
PRESSURE LBS	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
30	90	119	153	187	217	250	282
40	103	137	177	216	253	290	327
50	115	153	198	242	284	325	367
60	126	168	216	265	311	357	402
70	136	182	234	287	337	385	435
80	145	194	250	308	361	414	465
90	154	206	265	325	383	437	492
100	162	217	280	343	405	462	520
110	171	228	295	360	425	485	549
120	179	239	307	377	444	510	572
130	186	249	318	392	462	530	596
140	193	258	330	407	480	549	618
150	200	267	341	421	497	567	
175	215	288	374	455	538		
200	230	309	395	486			
225	243	328	420				
250	257	345					

This table is offered as an aide in testing pump performance where facilities for accurate measurement of capacity are not available. The capacities given above are conservative, and will not vary more than 5% from actual capacities with any of the standard hose that might be used.

TABLE NO. 4

Pump or Hydrant Pressure required to give Effective Nozzle Pressure through various Lengths of Rubber Lined Hose.

Size of Hose		1	1 1/2			2		2 1/2					3	
Size of Nozzle		1/4	3/8	1/2	5/8	5/8	3/4	3/4	7/8	1	1 1/4	1 1/2	1 1/4	1 1/2
Nozzle Press PSI	Length of Hose Feet	PUMP OR HYDRANT PRESSURE - PSI												
40	100	45	43	48	60	42	50	44	46	51	64	88	51	62
	200	49	46	56	79	43	60	47	52	60	86	130	59	78
	400	58	51	73	118	46	79	53	62	79	129	212	75	110
	600	67	57	89	158	50	99	59	74	97	172		92	143
	800	76	62	106	196	53	119	65	85	116	215		108	176
	1000	85	68	122	235	56	138	72	96	134	258		124	208
	1500	108	72	142		64	187	87	118	181			165	
	2000	130	96	204		72	226	103	151	227			205	
60	100	67	64	72	89	63	73	65	69	75	95	132	76	92
	200	74	68	84	117	65	86	70	78	89	126	196	88	115
	400	87	76	107	173	69	112	79	94	116	188		111	161
	600	101	85	131	231	74	138	88	111	143	250		135	208
	800	114	93	153		79	164	98	127	170			158	
	1000	127	101	178		83	190	107	143	197			182	
	1500	161	122	237		95	155	130	184	264				
	2000	195	142			106		153	225					
80	100	88	85	96	117	83	99	87	92	99	126	175	101	103
	200	97	91	112	154	86	117	93	103	115	167		116	154
	400	115	102	143	228	92	154	105	125	148	249		147	
	600	132	112	174		98	191	117	147	181			178	
	800	150	123	206		104	228	129	167	214			209	
	1000	167	134	238		110		141	191	247				
	1500	211	161			125		171	245					
	2000	254	188			140		201						
100	100	111	107	120	146	104	123	108	115	125	157		126	152
	200	122	113	139	192	108	145	116	128	150	209		146	190
	400	143	127	177	284	115	190	130	154	200			184	
	600	165	140	217		123	235	145	180	250			223	
	800	186	154	256		131		159	206					
	1000	208	167			138		174	232					
	1500	262	200			157		211						
	2000		234			175		253						

Section 3

Installation

Important

⚠WARNING

Rotating shafts can be dangerous. Clothes, skin, hair, hands, etc. can become snagged or tangled, causing serious injury or death. DO NOT work on a drive shaft or pump when the engine is running and without the wheels chocked.

⚠WARNING

Great care must be taken in the layout of pump systems drivelines. Interference and driveline vibration must be considered. A sufficiently experienced installer with knowledge of driveline considerations, proper layout and recommended guidelines should be utilized as well as a proper CAD system for technically precise layouts. Installation of said drivelines should not occur until a proper analysis is performed by either said drafter or W.S. Darley. Darley utilizes and can distribute the Allison Driveline Analysis program which they use for said analysis, along with an instruction for use.

Failure to do said layout and analysis could result in severe injury and damage to equipment, including items not furnished by Darley, including but not limited to: drive tubes, hanger bearings, u-joint crosses, gears, rear differentials, and main truck transmissions.

⚠WARNING 

Exposed rotating drive-shafts should be guarded.

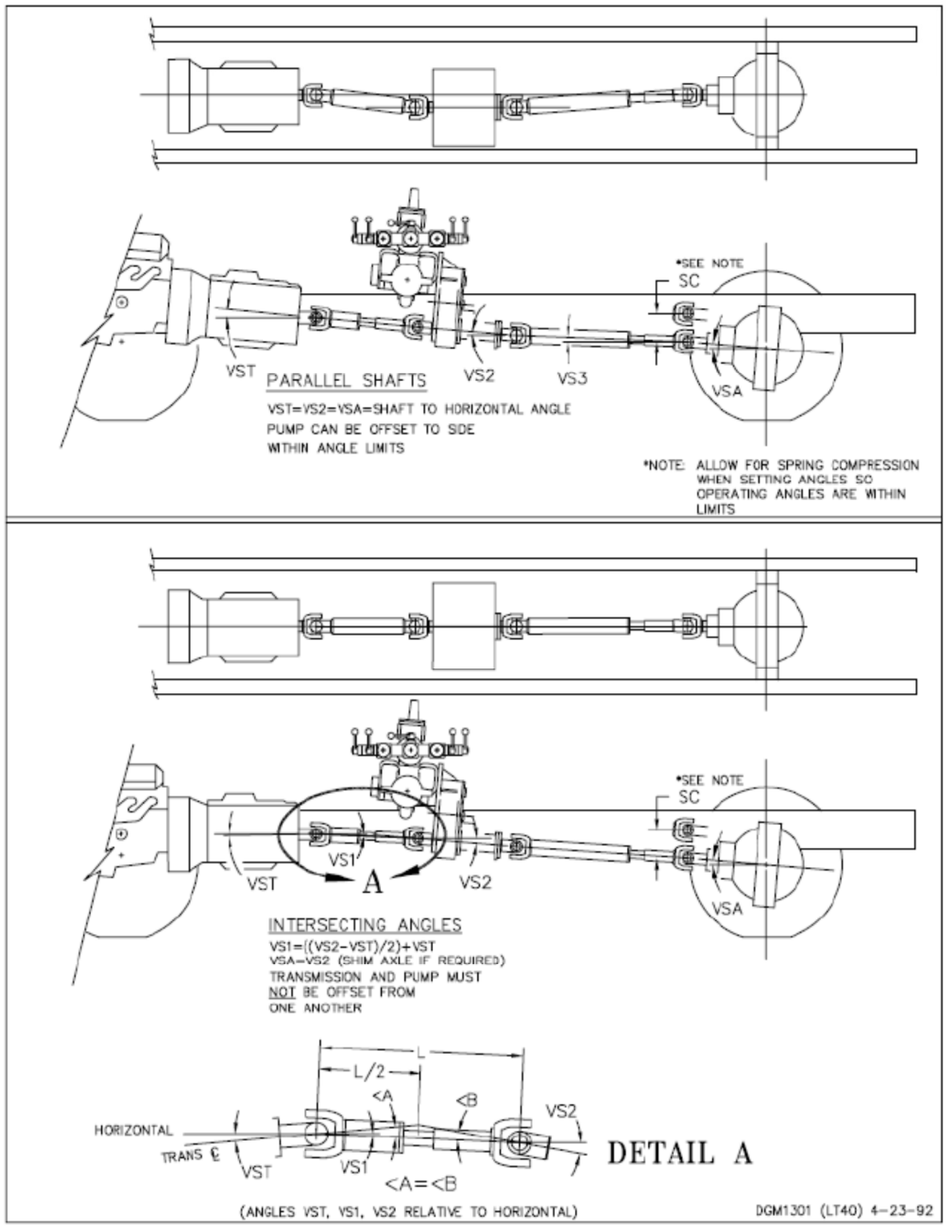
Use safety rings around drive tubes. Especially near connecting u-joint crosses. Such safety rings would be sufficiently attached to the chassis frame and sufficiently strong enough to prevent a broken u-joint assembly from allowing a driveline to slide out from underneath the truck at high speeds while still rotating, causing severe personnel injury. Said safety rings would be larger than the drive tube OD and provide enough clearance for dynamic non-rotational movement of the drivelines through loaded and unloaded conditions, driving operations and where chassis flex may occur.

U-Joints:

- Universal joints must always be installed in pairs to transmit uniform rotary motion.
- The operating angles of each universal joint in the pair should be as close to equal as possible.
- The input and output shafts of each universal joint pair may be either parallel, or so located that the centerline of each shaft intersects the midpoint of the shaft connecting each universal joint (intersecting angles).
    - This arrangement may be required if the coupling shaft between pump and chassis transmission is relatively short, or the engine is mounted with its driveshaft

horizontal. Refer to attached drawing DGM1301 for examples of parallel shaft and intersecting angle installations.

See the appendix of this portion of the manual for the Spicer Driveline Installation Guide (J3311-1-DSSP)



Driveline and Mounting:

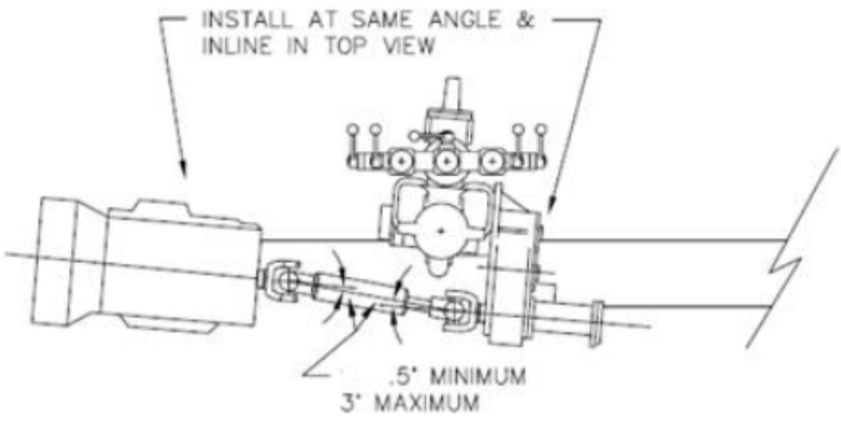
Determine the best location for the pump in your chassis. Allow adequate room for pump maintenance and repair.

Place the pump/cross-member assembly on the chassis frame at the desired location. Be sure to set the suction manifold and transmission support brackets at a position allowing the best possible operating angle and driveline performance. This can be done by drilling frame rail mounting holes in a manner to rotate the entire pump/transmission assembly at an angle; up and down positioning is important.

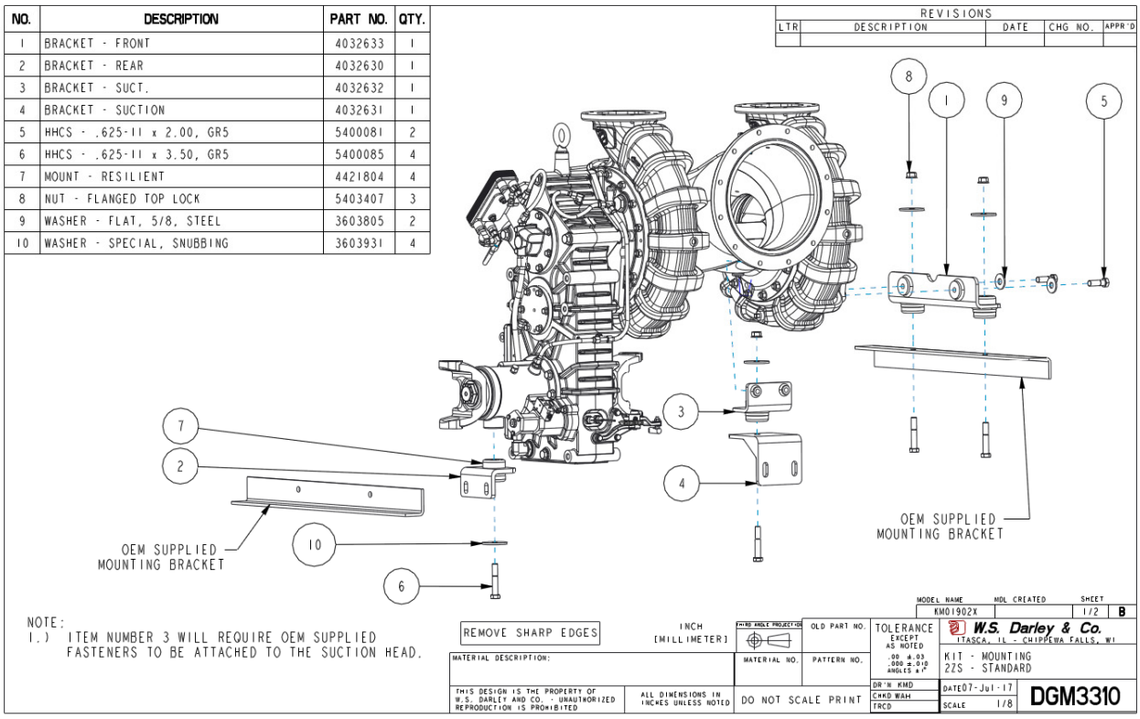
Measure the vertical angle between the truck transmission shaft centerline and chassis frame (often 4°).

Suspend the pump so that the pump driveshaft centerline is as close as possible to being inline and parallel to the truck transmission tail shaft centerline. Example: If the truck transmission is at 4° with horizontal, the pump driveshaft should also be set at 4° with horizontal. This will insure that even if the transmission and pump are offset from each other, the universal joint operating angles will be equal.

Check to confirm that the pump shaft is parallel to the transmission tail shaft and be sure to match rear differential operating angle according to attached Spicer driveline installation manual.

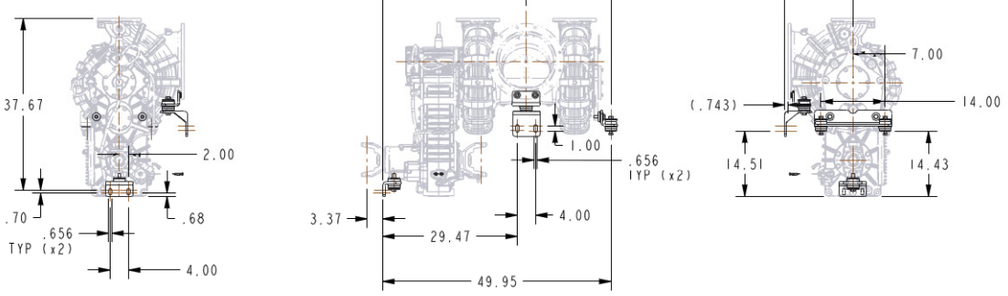


Reference drawing DGM3310, DZD0105, 4032630, 4032631, 4032632, 4032633 and DGM1301 for transmission mounting assembly utilizing rubber isolation mounts to adapt to customer supplied cross member. Additionally, mount bracket number four (shown in DGM3310) securely to the frame rail directly, or by using an OEM supplied support bracket. DGM3310 details the optional rubber isolation mounting system to further reduce pump and transmission related vibration resulting in stress to the frame rail and driveline.



NO.	DESCRIPTION	PART NO.	QTY.
1	BRACKET - FRONT	4032633	1
2	BRACKET - REAR	4032630	1
3	BRACKET - SUCT.	4032632	1
4	BRACKET - SUCTION	4032631	1
5	HHCS - .625-11 x 2.00, GR5	5400081	2
6	HHCS - .625-11 x 3.50, GR5	5400085	4
7	MOUNT - RESILIENT	4421804	4
8	NUT - FLANGED TOP LOCK	5403407	3
9	WASHER - FLAT, 5/8, STEEL	3603805	2
10	WASHER - SPECIAL, SNUBBING	3603931	4

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D



MODEL NAME	MDL CREATED	SHEET		
KM01902X		2/2	B	

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.	TOLERANCE EXCEPT AS NOTED	W.S. Darley & Co. ITASCA, IL - CHIPPEWA FALLS, WI
PATTERN NO.	.00 ±.03 .000 ±.010 ANGLES ±1°	KIT - MOUNTING 2ZS - STANDARD
MATERIAL NO.	DR'N KMD	DATE 07-Jul-17
	CHKD WAH	SCALE 1/16
	TRCD	DGM3310

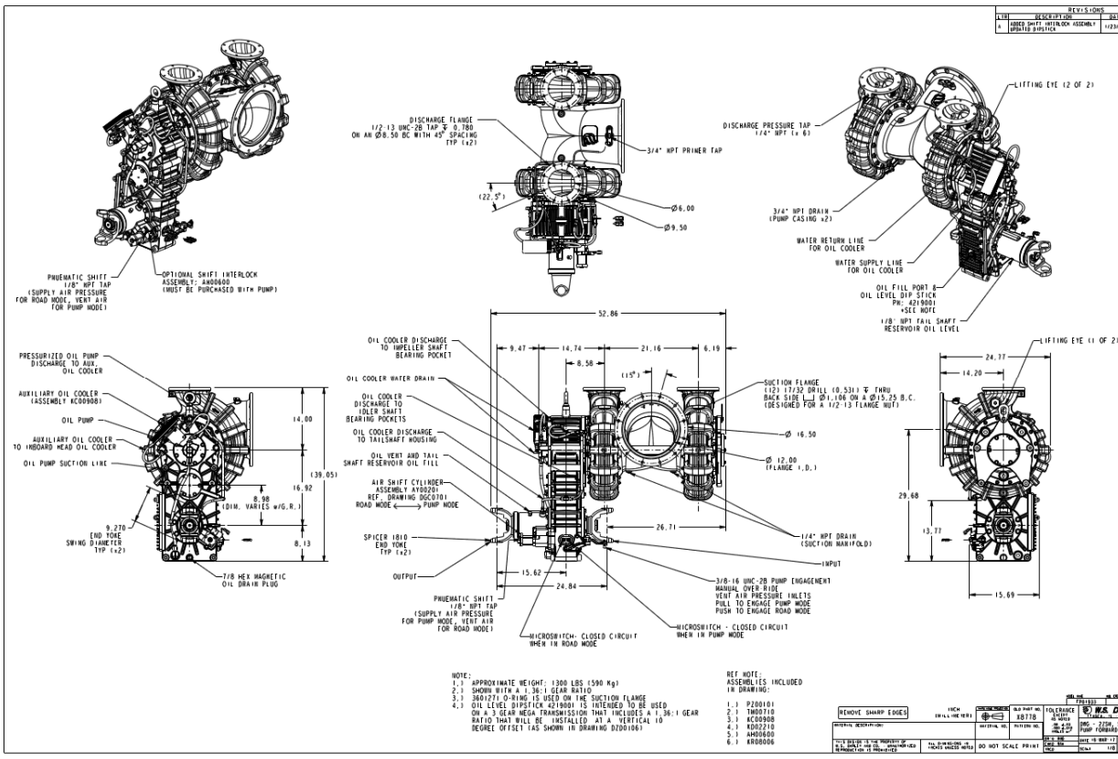
MATERIAL DESCRIPTION:

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D
A	ADDED SHIFT INTERLOCK ASSEMBLY UPDATED DIMETRICS	11/23/17	11580	KMD



NOTE:
1.) APPROXIMATE WEIGHT: 1300 LBS (590 Kg)
2.) SHOWN WITH A 1.36:1 GEAR RATIO
3.) 360127) O-RING IS USED ON THE SUCTION FLANGE
4.) OIL LEVEL DIPSTICK 4219001 IS INTENDED TO BE USED ON A 3 GEAR MEGA TRANSMISSION THAT INCLUDES A 1.36:1 GEAR RATIO THAT WILL BE INSTALLED AT A VERTICAL 10 DEGREE OFFSET (AS SHOWN IN DRAWING DZD0106)

REF NOTE:
ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00101
2.) TM00710
3.) KC00900
4.) KD02210
5.) AH00600
6.) KR00606

MODEL NAME	MDL CREATED	SHEET		
KM01902X		1/1	B	

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.	TOLERANCE EXCEPT AS NOTED	W.S. Darley & Co. ITASCA, IL - CHIPPEWA FALLS, WI
88778	.00 ±.03 .000 ±.010 ANGLES ±1°	DRG - 2ZSH, STANDARD CONF. PUMP FORWARD
PATTERN NO.	DR'N KMD	DATE 10-Oct-17
MATERIAL NO.	CHKD WAH	SCALE 1/8
	TRCD	DZD0105

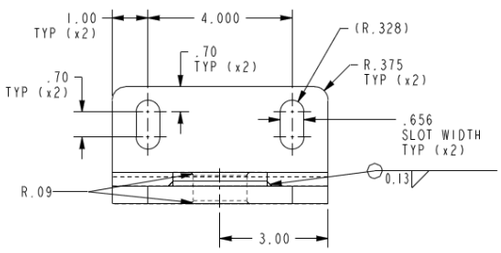
MATERIAL DESCRIPTION:

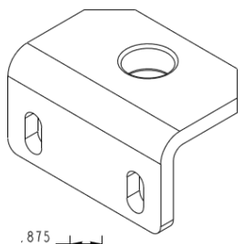
THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED

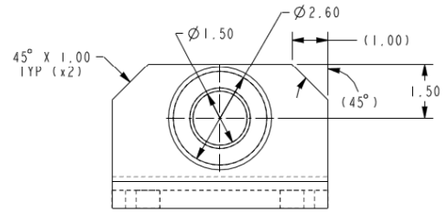
ALL DIMENSIONS IN INCHES UNLESS NOTED

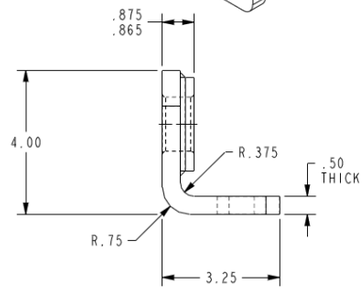
DO NOT SCALE PRINT

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D







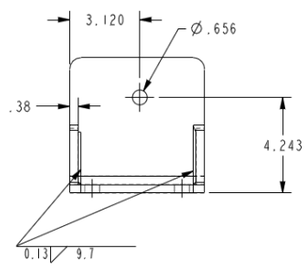


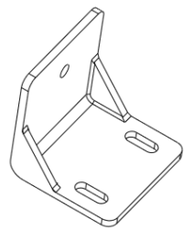
NOTE:
1.) REMOVE ALL SLAG AFTER WELDING
2.) POWDER COAT BLACK

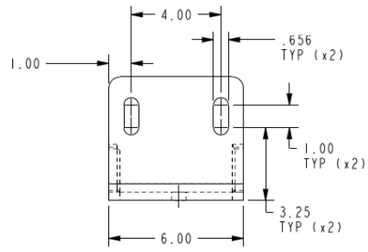
MODEL	MDL CREATED	SHEET	
4032630		1/1	B

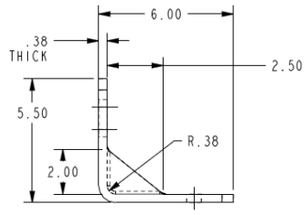
REMOVE SHARP EDGES	INCH [MILLIMETER]	THIRD ANGLE PROJECTION	OLD PART NO. X8665	TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°	W.S. Darley & Co. ITASCA, IL - CHIPPEWA FALLS, WI
MATERIAL DESCRIPTION: FMS		MATERIAL NO.	PATTERN NO.		BRACKET - REAR MOUNTING - 2ZS
THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED	ALL DIMENSIONS IN INCHES UNLESS NOTED	DO NOT SCALE PRINT	DR'N KMD CHK'D TED TRC'D	DATE 20-Jan-16 SCALE 1/2	4032630

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D







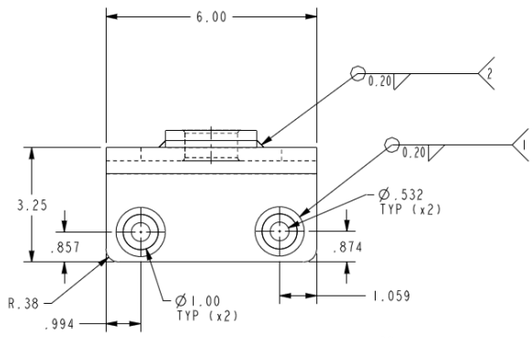


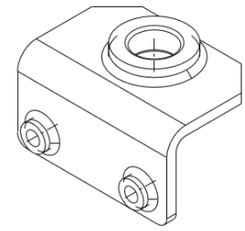
NOTE:
1.) REMOVE ALL SLAG FROM WELDS
2.) BREAK SHARP EDGES
3.) POWERDER COAT BLACK

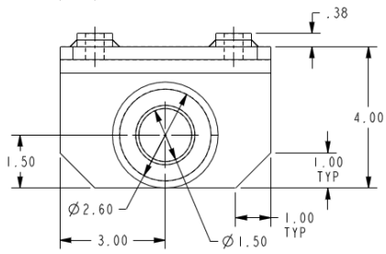
MODEL	MDL CREATED	SHEET	
4032631	1/13/17	1/1	B

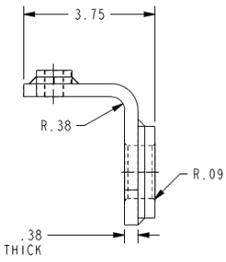
REMOVE SHARP EDGES	INCH [MILLIMETER]	THIRD ANGLE PROJECTION	OLD PART NO. X8794	TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°	W.S. Darley & Co. ITASCA, IL - CHIPPEWA FALLS, WI
MATERIAL DESCRIPTION: FMS		MATERIAL NO. -	PATTERN NO.		BRACKET - SUCTION MOUNTING - 2ZS (2 OF 2)
THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED	ALL DIMENSIONS IN INCHES UNLESS NOTED	DO NOT SCALE PRINT	DR'N KMD CHK'D TED TRC'D	DATE 13-Jan-17 SCALE 5/16	4032631

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D





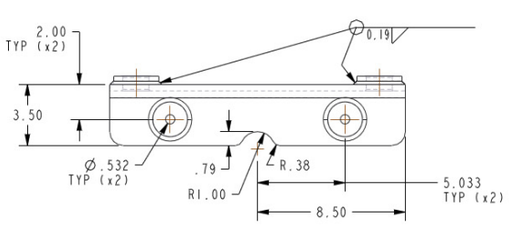


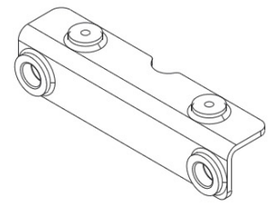


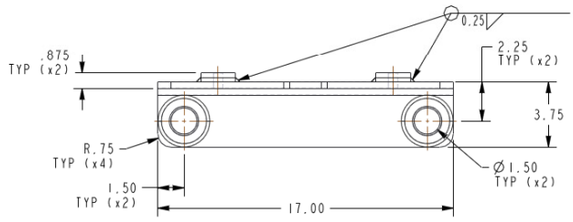
NOTE:
1.) REMOVE ALL SLAG FROM WELDS
2.) POWDER COAT BLACK
3.) BREAK SHARP EDGES

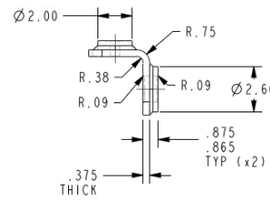
REMOVE SHARP EDGES	INCH [MILLIMETER]	3RD ANGLE PROJECTION	OLD PART NO. X8792	TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°	MODEL 4032632	MDL CREATED	SHEET 1/1 B
MATERIAL DESCRIPTION: FMS		MATERIAL NO.	PATTERN NO.		W.S. Darley & Co. ITASCA, IL · CHIPPEWA FALLS, WI		
THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. · UNAUTHORIZED REPRODUCTION IS PROHIBITED	ALL DIMENSIONS IN INCHES UNLESS NOTED	DO NOT SCALE PRINT		DR'N KMD CHKD WAH TRCD	BRACKET · SUCT. MOUNTING · 2ZS		
					DATE 13-Jan-17 SCALE 1/2		4032632

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D



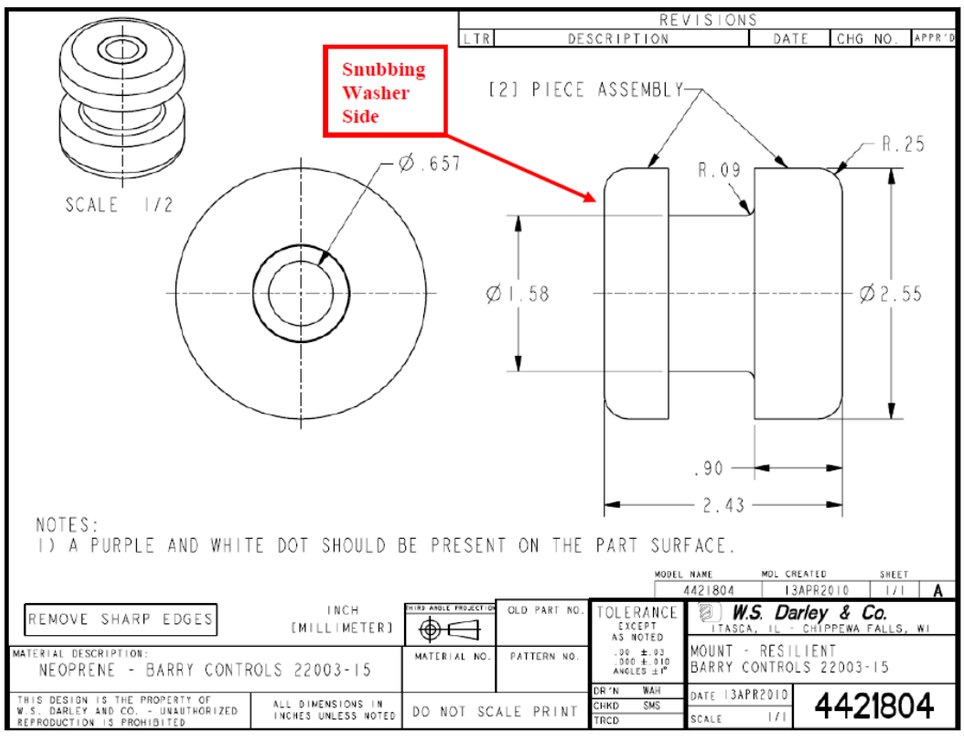




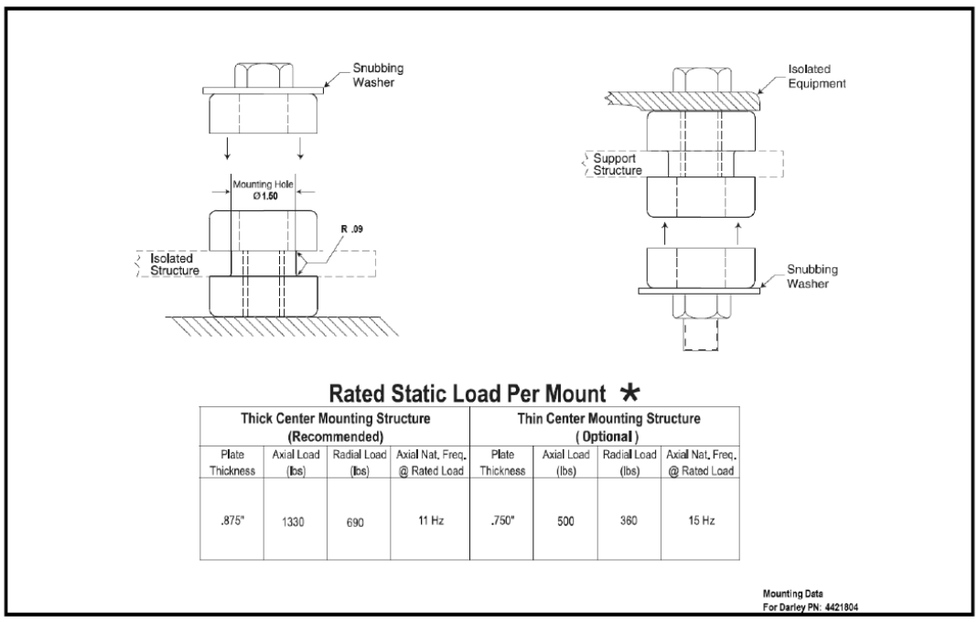


NOTE:
1.) REMOVE ALL SLAG FROM WELDS
2.) POWDER COAT BLACK

REMOVE SHARP EDGES	INCH [MILLIMETER]	3RD ANGLE PROJECTION	OLD PART NO. X8669	TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°	MODEL 4032633	MDL CREATED	SHEET 1/1 B
MATERIAL DESCRIPTION: FMS		MATERIAL NO.	PATTERN NO.		W.S. Darley & Co. ITASCA, IL · CHIPPEWA FALLS, WI		
THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. · UNAUTHORIZED REPRODUCTION IS PROHIBITED	ALL DIMENSIONS IN INCHES UNLESS NOTED	DO NOT SCALE PRINT		DR'N KMD CHKD WAH TRCD	BRACKET · FRONT MOUNTING · 2ZS		
					DATE 21-Jan-16 SCALE 1/4		4032633



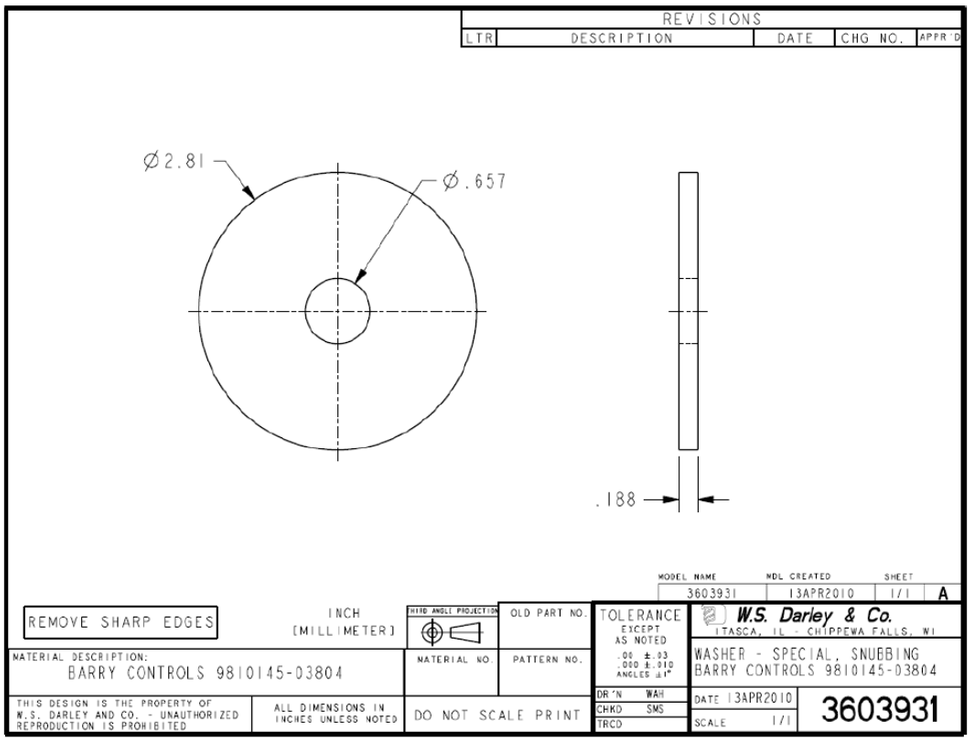
IMPORTANT: These rubber isolators are a two piece design. The loading on these isolation mounts is cantilevered in this application (i.e. the center of gravity of the transmission and pump assembly is not directly above the centerline of the rubber isolators, it is offset), therefore the snubbing washer (see 3603931 on the next page) should be on the core/bushing side of the rubber isolator (see below images). Therefore the snubbing washer should be on top of the smaller rubber section of the isolator, not the ring portion. So, for this application the stack-up from top to bottom should be as follows: bolt head, snubbing washer, core/bushing side of isolator, transmission mount bracket, ring portion of isolator, customer supplied cross member, nut or lock nut. Torsional loading should never be placed on the ring portion of the isolator.



Rated Static Load Per Mount *

Thick Center Mounting Structure (Recommended)				Thin Center Mounting Structure (Optional)			
Plate Thickness	Axial Load (lbs)	Radial Load (lbs)	Axial Nat. Freq. @ Rated Load	Plate Thickness	Axial Load (lbs)	Radial Load (lbs)	Axial Nat. Freq. @ Rated Load
.875"	1330	690	11 Hz	.750"	500	360	15 Hz

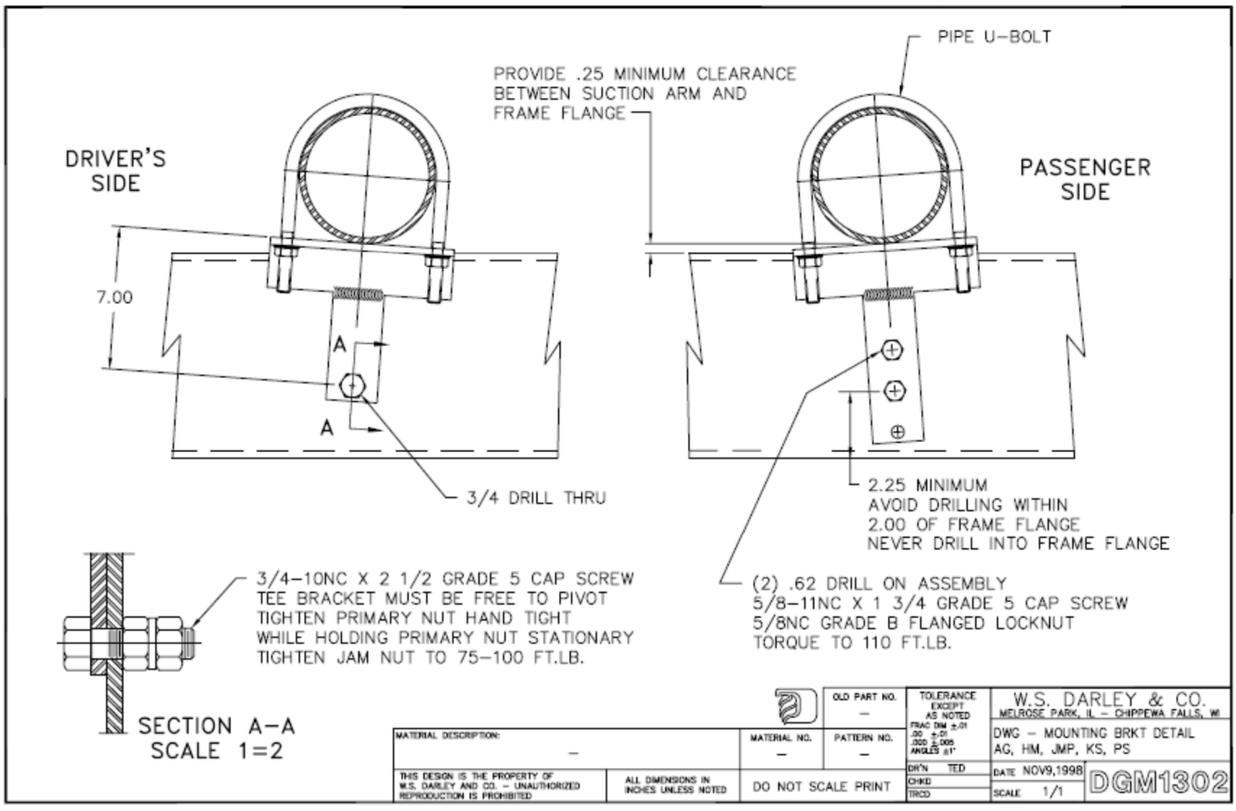
Mounting Data
For Darley PN: 4421804



Adequate discharge and suction plumbing supports shall be provided by the installer. Note: When mounting plumbing that spans width the frame rail, supports shall be constructed and mounted to include a pivot point on one side or the other. Refer to drawing DGM1302 to view an illustration of a pivoting support structure.

Keep the following points in mind when positioning the pump and constructing the driveline.

1. Do not exceed recommended universal joint operating angles. Complementary shaft angles should be equal and as low as possible.
2. Do not exceed universal joint torque limitations.
3. Do not exceed driveshaft speed/length limitations.
4. Yokes on each end of the drive shaft must usually be in phase. When in phase the yoke lugs (ears) at each end are in line.
5. Use balanced driveline components to help prevent vibration and to extend the life of drive yokes and other components related to the drive line.



MATERIAL DESCRIPTION: –	MATERIAL NO. –	PATTERN NO. –	OLD PART NO. –	TOLERANCE EXCEPT AS NOTED FRAC DIM ±.01 .00 ±.01 .000 ±.005 ANGLES ±1°
THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. – UNAUTHORIZED REPRODUCTION IS PROHIBITED	ALL DIMENSIONS IN INCHES UNLESS NOTED	DO NOT SCALE PRINT	DR'N TED CHKD TRCD	W.S. DARLEY & CO. MELROSE PARK, IL – CHIPPEWA FALLS, WI DWG – MOUNTING BRKT DETAIL AG, HM, JMP, KS, PS DATE NOV9,1998 SCALE 1/1 DGM1302

Torque the universal joint bearing cap retaining bolts to the following Dana Spicer Recommendations:

U-BOLT	
SERIES	*RECOMMENDED NUT TORQUE*
1280	14-17 LB. FT
1310	14-17 LB. FT
1330	14-17 LB. FT
1350	20-24 LB. FT
1410	20-24 LB. FT
1480	32-37 LB. FT
1550	32-37 LB. FT

BEARING STRAP	
SERIES	*RECOMMENDED BOLT TORQUE*
SPL90	45-60 LB. FT
1210	13-18 LB. FT
1280	13-18 LB. FT
1310	13-18 LB. FT
1330	13-18 LB. FT
1350	30-35 LB. FT
1410	30-35 LB. FT
1480	55-60 LB.FT
1550	55-60 LB.FT
1610	55-60 LB.FT
1710	130-135 LB. FT
1760	130-135 LB. FT
1810	130-135 LB. FT

CAP & BOLT	
SERIES	*RECOMMENDED BOLT TORQUE*
1650	77-103 LB. FT
1850	110-147 LB. FT
1850	110-147 LB. FT
1910	110-147 LB. FT
1950	271-362 LB. FT
2010	102-118 LB. FT
2050	744- 844 LB. FT
2110	171-197 LB. FT
2150	744- 844 LB. FT
2210	260- 298 LB. FT

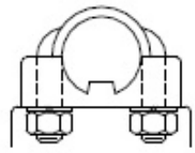
BEARING PLATE	
SERIES	*RECOMMENDED BOLT TORQUE*
1610	26-35 LB. FT
1710	38-48 LB. FT
1760	38-48 LB. FT
1810	38-48 LB. FT
1880	60-70 LB.FT

New part kits with lockstraps available from Spicer after Spring 1994

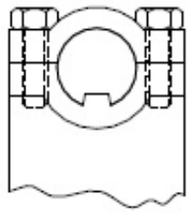
SERIES	*RECOMMEND BOLT TORQUE*
1610	17-24 LB. FT
1710	32-42 LB. FT
1760	32-42 LB. FT
1810	32-42 LB. FT
1880	50-66 LB. FT

WARNING: Bearing strap retaining bolts must **NOT** be reused!
WARNING: Self-locking bolts must **NOT** be reused!

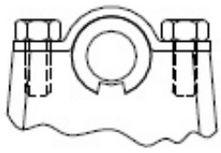
Note: The Dana Spicer fastener torque recommendations are per Dana Spicer's literature # 3119-5 DSD 4/94.



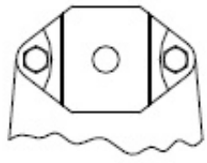
U–BOLT



CAP &
BOLT



BEARING
STRAP



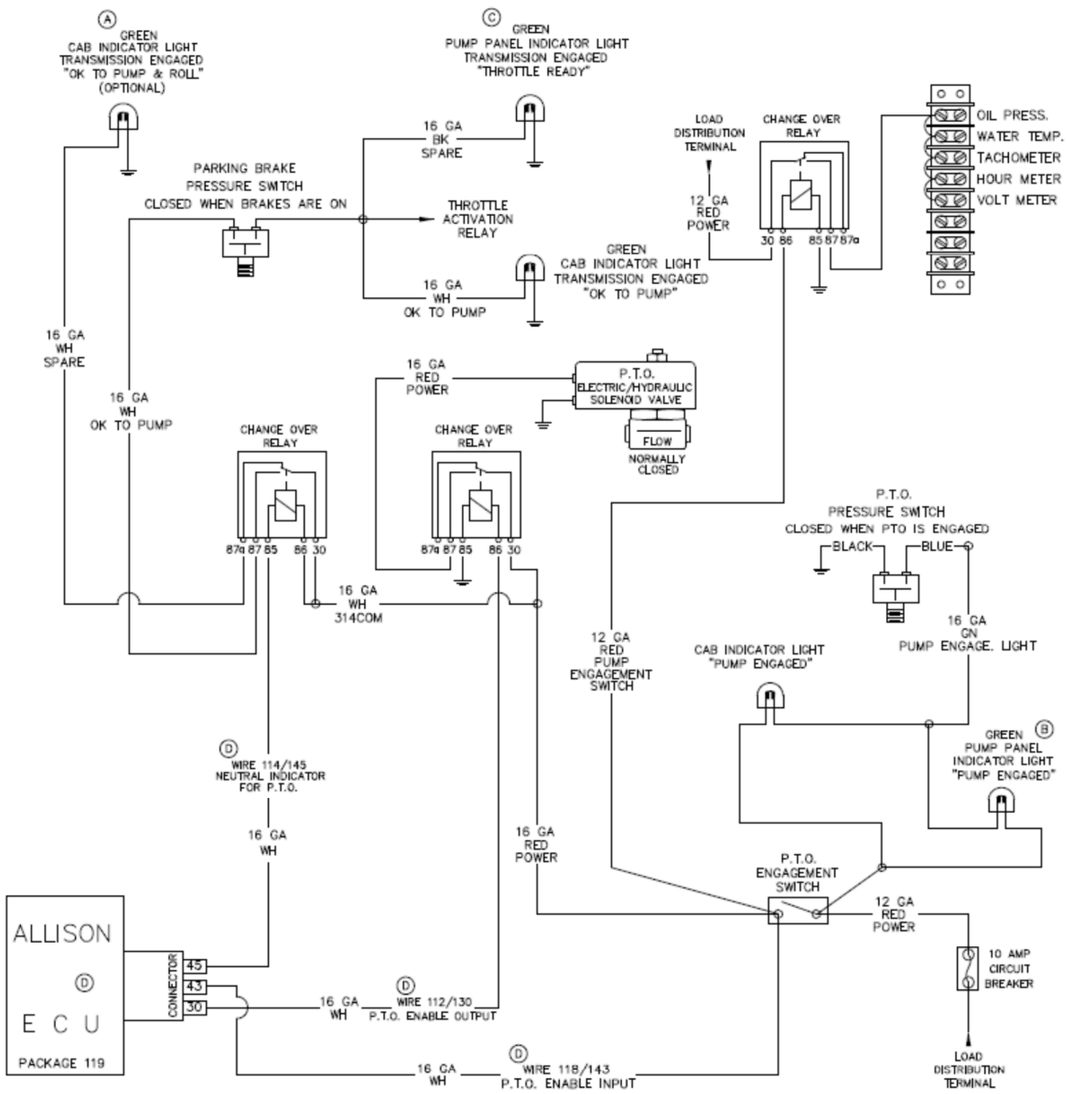
BEARING
PLATE

Lubricate universal joint cross using a good quality E.P. (extreme pressure) grease meeting N.L.G.I. E.P. Grade 2 specifications. (Consult your local lubricant source for greases that meet this specification.

ENGINE COOLING/PUMP HEATER: Two tapped openings in the pump suction head are provided for circulating engine coolant through the heater jacket/heat exchanger to prevent pump freezing in cold weather and to aid in engine cooling in warm weather. Use no smaller than a 1/2" heater hose for this connection. See drawing DGS0400.

PUMP SHIFT INSTALLATION: For power shift installation, refer to DGS1100 for automatic transmission wiring details.

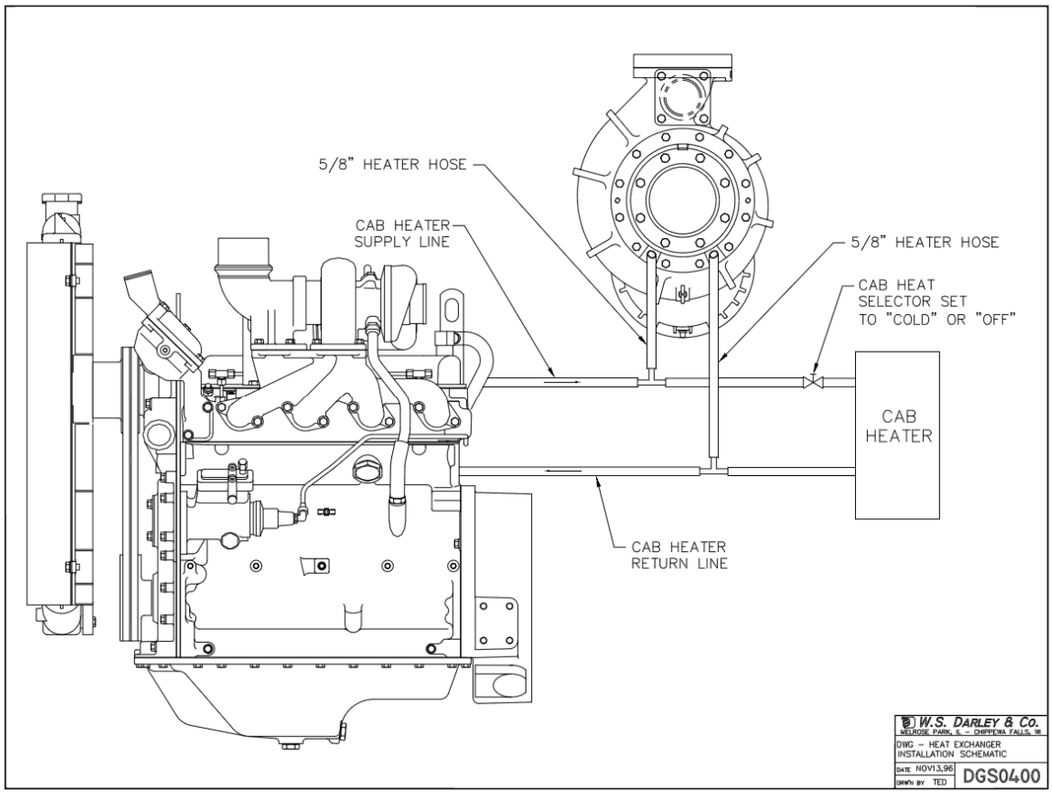
REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D
A	WAS: RED, PUMP PANEL "DANGER DO NOT OPEN THROTTLE"	20JAN00	00–11	DLW
B	ADDED LIGHT	20JAN00	00–11	DLW
C	WAS: GREEN, "WARNING: DO NOT OPEN THROTTLE UNLESS LIGHT IS ON"	20JAN00	00–11	DLW
D	ADDED NEWEST WIRE DESIGNATION #'s: 145, 143, 130; ADDED ALLISON E C U CONNECTOR #'s: 45, 43, 30;	6/23/08	2008–166	RJG

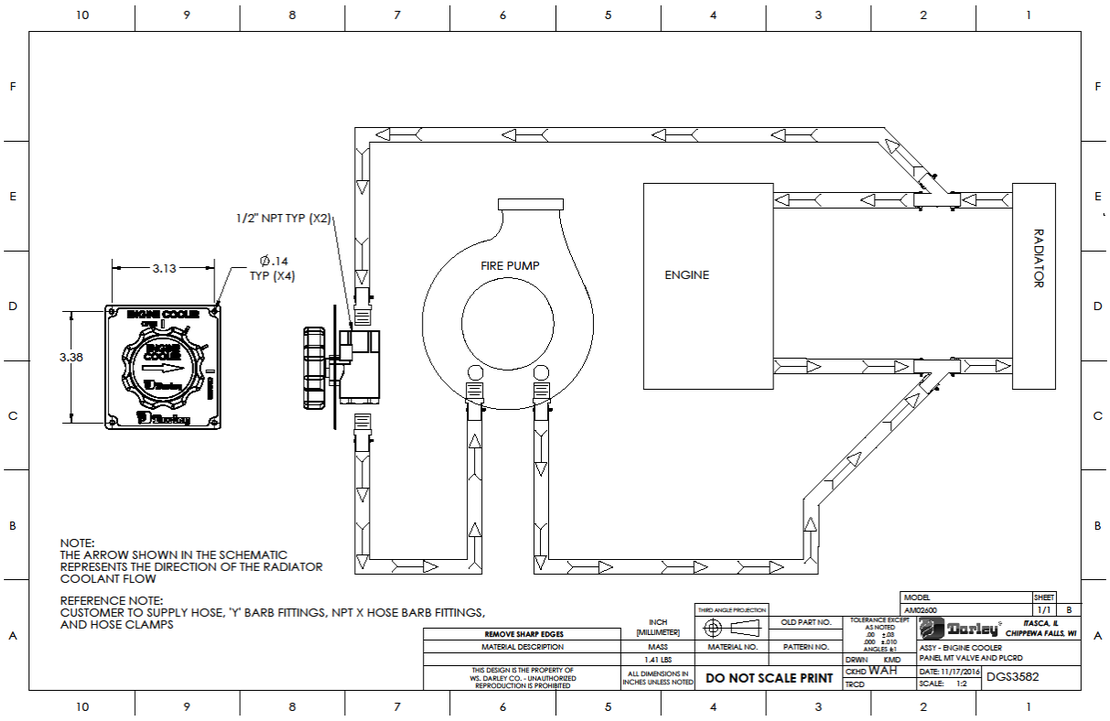


ELECTRICAL SCHEMATIC
ALLISON WORLD TRANS.
PTO/PUMP ENGAGEMENT

W.S. Darley & Co.
APPARATUS DIVISION
920 KURTH ROAD
CHIPPEWA FALLS, WISCONSIN 54729
1-715-726-2645

DWG BY SCHULTZ	SCALE SIZE A, 1:2	REV D
DATE 8–29–96	JOB NO.	DWG. NO. DGS1100


5/8" HEATER HOSE
CAB HEATER
SUPPLY LINE
5/8" HEATER HOSE
CAB HEAT
SELECTOR SET
TO "COLD" OR "OFF"
CAB
HEATER
CAB HEATER
RETURN LINE
W.S. DARLEY & Co.
MELROSE PARK, IL - CHIPPEWA FALLS, WI
DWG - HEAT EXCHANGER
INSTALLATION SCHEMATIC
DATE NOV13,96
DRWN BY TED
DGS0400


1/2" NPT TYP (X2)
3.13
Ø.14
TYP (X4)
3.38
ENGINE COOLER
FIRE PUMP
ENGINE
RADIATOR
NOTE:
THE ARROW SHOWN IN THE SCHEMATIC
REPRESENTS THE DIRECTION OF THE RADIATOR
COOLANT FLOW
REFERENCE NOTE:
CUSTOMER TO SUPPLY HOSE, 'Y' BARB FITTINGS, NPT X HOSE BARB FITTINGS,
AND HOSE CLAMPS
REMOVE SHARP EDGES
MATERIAL DESCRIPTION
MASS
1.41 LBS
THIS DESIGN IS THE PROPERTY OF
WS. DARLEY CO. - UNAUTHORIZED
REPRODUCTION IS PROHIBITED
INCH
[MILLIMETER]
ALL DIMENSIONS IN
INCHES UNLESS NOTED
THIRD ANGLE PROJECTION
OLD PART NO.
MATERIAL NO.
PATTERN NO.
DO NOT SCALE PRINT
TOLERANCE EXCEPT
AS NOTED
.00 ±.03
.000 ±.010
ANGLES ±1
DRWN EMD
CKD WAH
TRCD
MODEL
AM02600
SHEET
1/1
B
Darley
IRASCA, IL
CHIPPEWA FALLS, WI
ASSY - ENGINE COOLER
PANEL MT VALVE AND PLCRD
DATE: 11/17/2016
SCALE: 1:2
DGS3582

Appendix

(Dana Spicer Driveline Installation Guide Document 1201026)

SPICER®
DRIVETRAIN COMPONENTS
DANA

DRIVELINE INSTALLATION

J3311-1-DSSP
AUGUST 2008

Supersedes
J3311-1-HVTSS, Dated
February 2005

DANA
SPICER®
Drivetrain Products

General Safety Information

To prevent injury to yourself and /or damage to the equipment:

- Read carefully all owners manuals, service manuals, and/or other instructions.
- Always follow proper procedures and use proper tools and safety equipment.
- Be sure to receive proper training.
- Never work alone while under a vehicle or while repairing or maintaining equipment.
- Always use proper components in applications for which they are approved.
- Be sure to assemble components properly.
- Never use worn-out or damaged components.
- Always block any raised or moving device that may injure a person working on or under a vehicle.
- Never operate the controls of the power take-off or other driven equipment from any position that could result in getting caught in the moving machinery.

WARNING: ROTATING DRIVESHAFTS

- Rotating auxiliary driveshafts are dangerous. You can snag clothes, skin, hair, hands, etc. This can cause serious injury or death.
- Do not go under the vehicle when the engine is running.
- Do not work on or near an exposed shaft when engine is running.
- Shut off engine before working on power take-off or driven equipment.
- Exposed rotating driveshafts must be guarded.

WARNING: GUARDING AUXILIARY DRIVESHAFTS

We strongly recommend that a power take-off and a directly mounted pump be used to eliminate the auxiliary driveshaft whenever possible. If an auxiliary driveshaft is used and remains exposed after installation, it is the responsibility of the vehicle designer and PTO installer to install a guard.

WARNING: USING SET SCREWS

Auxiliary driveshafts may be installed with either recessed or protruding set screws. If you choose a square head set screw, you should be aware that it will protrude above the hub of the yoke and may be a point where clothes, skin, hair, hands, etc. could be snagged. A socket head set screw, which may not protrude above the hub of the yoke, does not permit the same amount of torquing as does a square head set screw. Also a square head set screw, if used with a lock wire, will prevent loosening of the screw caused by vibration. Regardless of the choice made with respect to a set screw, an exposed rotating auxiliary driveshaft must be guarded.

WARNING: THIS SYMBOL WARNS OF POSSIBLE PERSONAL INJURY.

Table of Contents

Introduction

This brochure is intended for:

- Installers who install Spicer driveshafts into an application where the transmission and axle are not in direct line with each other, causing the driveshaft universal joints to operate at an angle.
- Anyone experiencing vibration problems with their application or their vehicle that driveshaft assembly balancing will not correct.
- Truck Equipment Distributors who:
    - Re-work a chassis to change the wheel base.
    - Install a midship mounted power take-off or fire pump.
    - Mount any other PTO-driven device such as a blower, hydraulic pump, or hydraulic motor.

Universal joint failures, as a rule, are of a progressive nature, which, when they occur, generally accelerate rapidly resulting in a mass of melted trunnions and bearings.

Some recognizable signs of universal joint deterioration are:

1. Vibrations - Driver should report to maintenance.
2. Universal joint looseness - End play across bearings.
3. Universal joint discoloration due to excessive heat build-up.
4. Inability to purge all four trunnion seals when re-lubing universal joint.

Items 2) thru 4) should be checked at re-lube cycle and, if detected, reported to the maintenance supervisor for investigation.

Experience with universal joint failures has shown that a significant majority are related to lubricating film breakdown. This may be caused by a lack of lubricant, inadequate lube quality for the application, inadequate initial lubrication, or failure to lubricate properly and often enough.

Failures which are not the result of lubrication film breakdown are associated with the installation, angles and speeds, and manufacturing discrepancies.

Driveshaft failures through torque, fatigue, and bending are associated with overload, excessively high universal joint angles, and drive shaft lengths excessive for operating speeds.

Driveshaft Torque

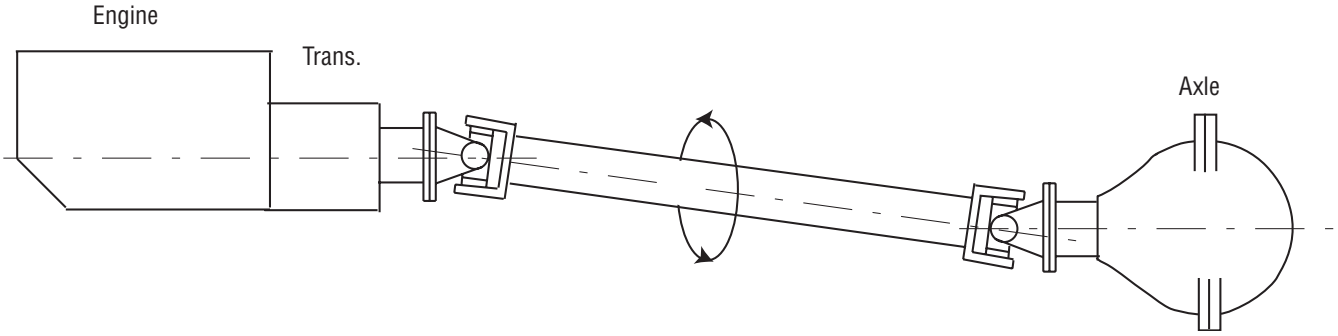
The following problems are usually a result of torque overloads:

Twisted driveshaft tube

Broken yoke shaft, slip yoke, tube yoke, flange yoke, end yoke

Broken journal cross

How much torque can be generated in your application?



How to Calculate Torque:

LGT = T x TLGR x TE x SR x TCR x C

LGT = Maximum Driveshaft Low Gear Torque

T = Net Engine Torque or 95% of the Gross Engine Torque

TLGR = Transmission Low Gear Ratio (forward)*

TE = Transmission Efficiency (automatic = 0.8; manual = 0.85)

SR = Torque Converter Stall Ratio (if applicable)

TCR = Transfer Case Ratio (if applicable)

C = Transfer Case Efficiency (if applicable, 0.95)

How to Calculate Wheel Slip:

WST = (.71 x W x RR) / (11.4 x AR)

WST = Wheel Slip Torque Applied to the Driveshaft

W = Axle Capacity (lbs)

RR = Tire Rolling Radius (in)

AR = Axle Ratio

For On Road Applications

Relate the lesser of above to Spicer universal joint ratings. If your torque exceeds the Spicer rating for the universal joint used in your application, switch to a size with a rating compatible to your calculation. However, the series selected cannot be more than one series below the series called for by the LGT calculation.

For Off Road or On-Off Road Applications

Use Low Gear Torque value only to verify or switch to a size with a rating compatible to your calculation.

Common Causes of Vibrations

The three most common causes of driveshaft vibration are: Driveshaft Imbalance, Critical Speed, and Universal Joint Operating Angles.

Driveshaft Imbalance

Eliminate the potential for balance problems before you undertake any other measures.

A driveshaft on a vehicle usually rotates at a higher rate of speed than the tire. For that reason, like tires, driveshafts should be balanced.

Any time you build or rework a driveshaft, make sure it is dynamically balanced at, 3000 RPM for Light Duty or 2500 RPM for Heavy Duty, to the following specifications:

Series	Specification
1310, 1330	.375 oz-in total at each end of shaft *
1350, 1410	.500 oz-in total at each end of shaft *
1480 - 1880	1.00 oz-in for each ten pounds of driveshaft weight divided proportionally at each end of shaft
* Passenger Car, Light Truck, Van, and SUV only. Industrial, Mobile Off-Highway, PTO, etc. same as 1480 - 1880.	

Critical Speed

Every driveshaft has a critical speed. Critical speed is the point at which a rotating driveshaft begins to bow off its normal rotating centerline.

Driveshafts begin to vibrate as they approach critical speed. If they are operated at near critical speed for an extended period, they often fail. This can damage the vehicle and possibly injure persons nearby.

As a driveshaft fabricator or installer, you are responsible for checking the safe operating speed of any driveshaft you fabricate or specify into an application. Make sure it will not operate at a speed higher than Spicer's recommended safe operating speed. Use Spicer Calculator (P/N J 3253) to determine safe operating speed.

Checking for a Possible Critical Speed Problem

Here is what you must do to make sure you won't have a critical speed problem:

- Determine the safe operating speed of the driveshaft you want to use in your application. Insert the tube diameter and center-to-center installed length of the shaft you want to use into a Spicer Safe Operating Speed Calculator (P/N. J3253). The calculator will tell you the safe operating speed of the shaft you have chosen.
- Determine the NORMAL and MAXIMUM POSSIBLE operating speed of the driveshaft.
  REMEMBER:
  - On vehicles with a standard transmission that have a 1:1 direct drive high gear and no overdrive, MAXIMUM POSSIBLE driveshaft RPM is the same as the maximum possible ENGINE RPM.
  - On vehicles that have an overdrive transmission, MAXIMUM POSSIBLE driveshaft RPM is higher than maximum possible ENGINE RPM.

Maximum Possible Driveshaft RPM

To calculate the maximum possible driveshaft RPM in vehicles having an overdrive transmission, divide the maximum possible engine RPM by the overdrive ratio. (See examples below.)

Example 1:
Max. engine RPM: 2100
Overdrive ratio: .79
2100/.79 = 2658 maximum possible driveshaft RPM

Example 2:
Max. engine RPM 6000
Overdrive ratio: .66
6000/.66 - 9091 maximum possible driveshaft RPM

Compare the maximum possible driveshaft RPM with the safe operating speed determined from the Safe Operating Speed Calculator. If the maximum possible driveshaft RPM meets or exceeds the safe operating speed determined from the calculator, you must do whatever is required to raise the critical speed of the driveshaft you have chosen for the application.

Sample Specification:

To specify a driveshaft for the application described in Example 1 above, compare the safe operating speed for the driveshaft selected with the maximum possible driveshaft RPM calculated (2658 RPM). Make sure the safe operating speed of the driveshaft is greater than 2658 RPM.

Changing the Safe Operating Speed of a Driveshaft

A driveshaft's safe operating speed can be raised by increasing its tube diameter or by shortening the installed center-to-center length of the driveshaft. Changing the installed length of a driveshaft will require the use of multiple driveshafts with center bearings.

Important: The critical speed of an assembly can be affected by driveshaft imbalance, improper universal joint operating angles, or improperly phased driveshafts. (A properly phased driveshaft has the in-board yokes of the shaft in line with each other.) Each of the above items will tend to lower the true critical speed from the values shown on the calculator.

Since critical speed can ultimately cause driveshaft failure, it is extremely important to be very precise in all applications.

Universal Joint Operating Angles

Every Universal Joint that Operates at an Angle Creates a Vibration

Universal joint operating angles are probably the most common causes of driveline vibration in vehicles that have been reworked, or in vehicles that have had auxiliary equipment installed.

Universal joint operating angles are a primary source of problems contributing to:

- Vibrations
- Reduced universal joint life
- Problems with other drivetrain components that may include:
  - Transmission gear failures
  - Synchronizer failures
  - Differential problems
  - Premature seal failures in axles, transmissions, pumps, or blowers
  - Premature failure of gears, seals, and shafts in Power Take-Offs

When you rework a chassis or install a new driveshaft in a vehicle, make sure that you follow the basic rules that apply to universal joint operating angles:

RULE 1: UNIVERSAL JOINT OPERATING ANGLES AT EACH END OF A DRIVESHAFT SHOULD ALWAYS BE AT LEAST 1 DEGREE.

RULE 2: UNIVERSAL JOINT OPERATING ANGLES ON EACH END OF A DRIVESHAFT SHOULD ALWAYS BE EQUAL WITHIN 1 DEGREE OF EACH OTHER (ONE HALF DEGREE FOR MOTOR HOMES AND SHAFTS IN FRONT OF TRANSFER CASE OR AUXILIARY DEVICE).

RULE 3: FOR VIRTUAL VIBRATION FREE PERFORMANCE, UNIVERSAL JOINT OPERATING ANGLES SHOULD NOT BE LARGER THAN 3 DEGREES. IF THEY ARE, MAKE SURE THEY DO NOT EXCEED THE MAXIMUM RECOMMENDED ANGLES.

A universal joint operating angle is the angle that occurs at each end of a driveshaft when the output shaft of the transmission and driveshaft and the input shaft of the axle and driveshaft are not in line. (See Fig 1)

The connecting driveshaft operates with an angle at each universal joint. It is that angle that creates a vibration.

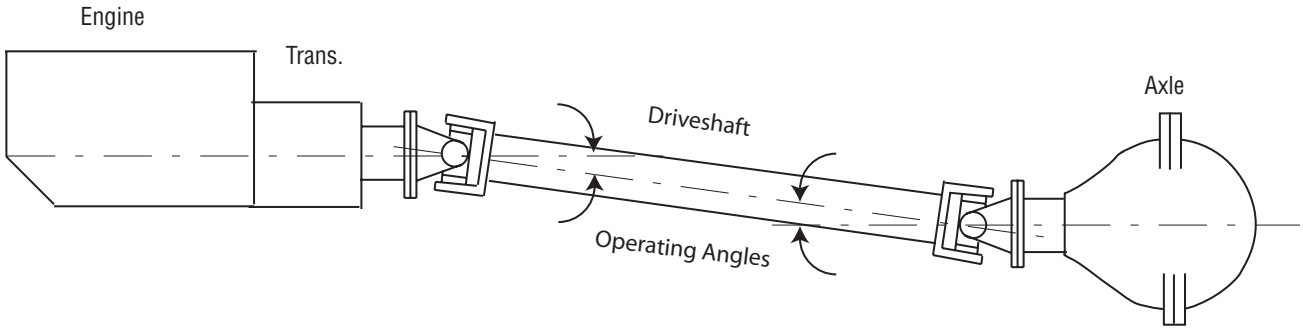


Figure 1

Reducing and Canceling Vibration

A key point to remember about universal joint operating angles: To reduce the amount of vibration, the angles on each end of a driveshaft should always be SMALL.

To cancel an angle vibration, the universal joint operating angles need to be EQUAL within 1 degree at each end of a driveshaft. On motor home applications and auxiliary transmission installations, the tolerance is 1/2 degree. (See Fig 2)

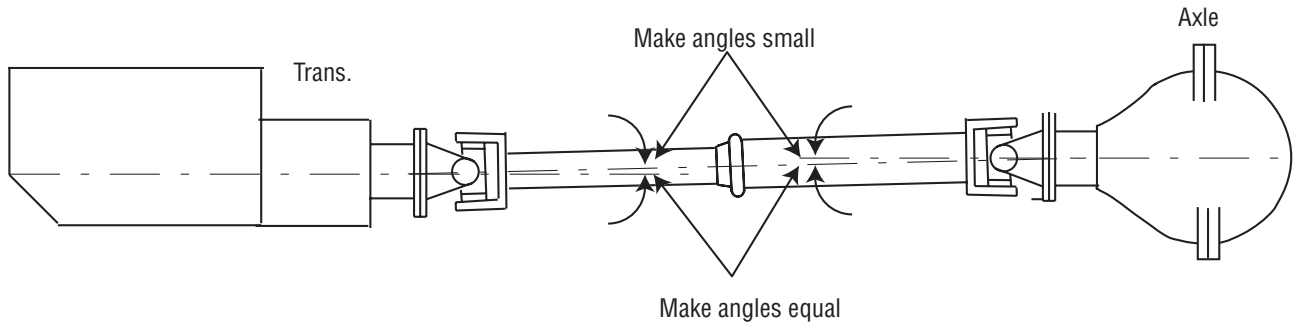


Figure 2

Single Plane and Compound Universal Joint Operating Angles

There are two types of universal joint operating angles: Single Plane and Compound.

Single Plane

Single Plane angles occur when the transmission and axle components are in line when viewed from either the top or side, but not both.

Determining the universal joint operating angle in an application where the components are in line when viewed from the top, but not in line when viewed from the side, is as simple as measuring the slope of the components in the side view, and adding or subtracting those slopes to determine the angle. (See Fig. 3)

These angles should be **small** and **equal** within 1 degree.

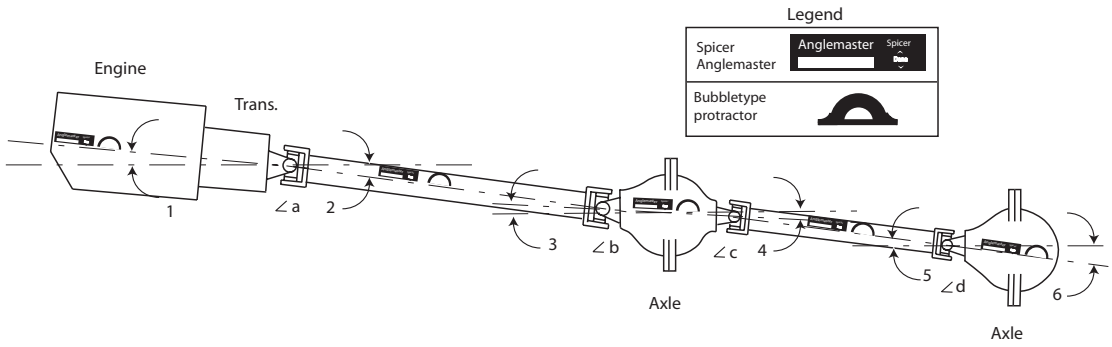


Figure 3

The most convenient way to determine universal joint angles in the side view is through the use of a Spicer Anglemaster™ or a bubble type protractor.

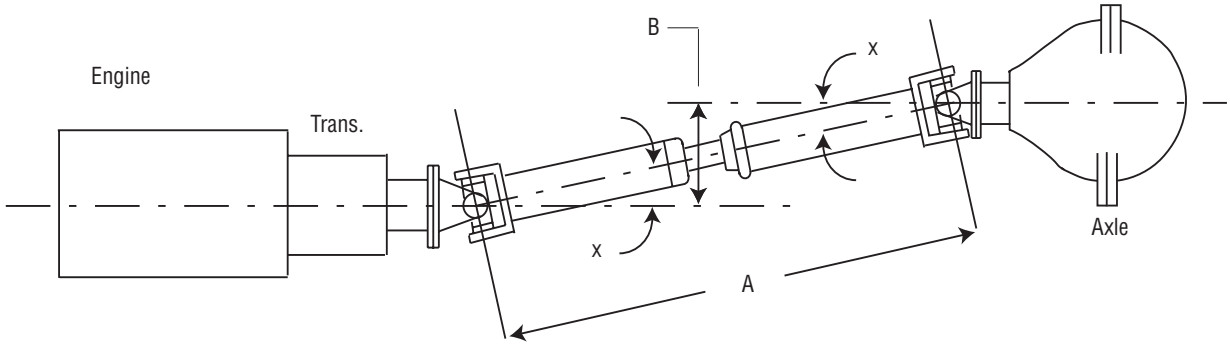
Using an Anglemaster or a bubble protractor, record inclination angles of drivetrain components. Set Anglemaster or protractor on machined surfaces of engine, transmission, axle, or on machined lugs of transmission and axle yoke(s).

Note: Universal joint angles can change significantly in a loaded situation. Therefore, check vehicle loaded and unloaded to achieve the accepted angle cancellation.

Example:

Engine-Transmission Output	4°30’ Down (1)
Main Driveshaft	7°00’ Down (2)
Input 1st Rear Axle	4°00’ Up (Input Shaft Nose Up) (3)
Output 1st Rear Axle	4°00’ Down (4)
Inter-axle Shaft	7°00’ Down (5)
Input 2nd Rear Axle	4°15’ Up (Pinion Shaft Nose Up) (6)
Note: If inclination of driveshaft is opposite connecting component, add angles to obtain the universal joint operating angle.	
Angle a = (2) - (1) = 7°00’ - 4°30’ = 2°30’ (2.50°)	
Angle b = (2) - (3) = 7°00’ - 4°00’ = 3°00’ (3.00°)	
Angle c = (5) - (4) = 7°00’ - 4°00’ = 3°00’ (3.00°)	
Angle d = (5) - (6) = 7°00’ - 4°15’ = 2°45’ (2.75°)	

Determining the universal joint operating angles on a driveshaft that is straight when viewed from the side and offset when viewed from the top requires the use of a special chart (See Angle Chart). In this type of application, the centerlines of the connected components **must be parallel** when viewed from the top as shown. These angles also should be **small** and **equal** within 1 degree. (See Fig. 4)



Angles in Top View

Figure 4

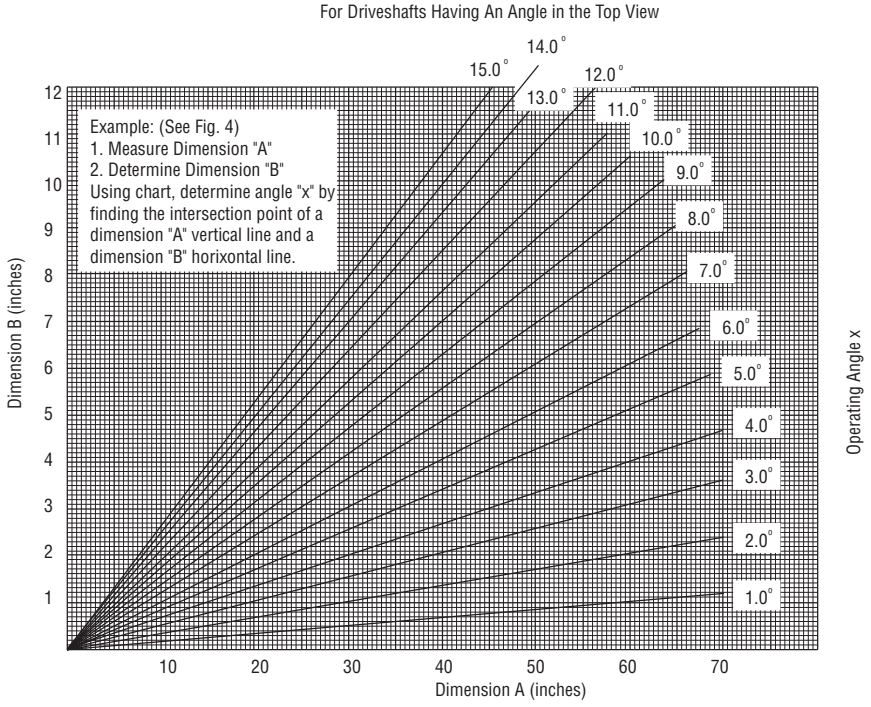
Measure dimensions "A" and "B" shown in figure 4. Use the instructions in the angle chart below to determine the size of the angle.

Look at the Angle Chart and note that the smaller the offset, the smaller the resultant angle.

To reduce the possibility of vibration, keep any offset between connected points to a minimum.

There are two things you can do to always make sure Single Plane angles are SMALL and EQUAL: Make sure the transmission and axle are mounted so their centerlines are parallel when viewed from both the side and the top. Make sure the offset between them is small in both views.

ANGLE CHART



Compound Angles

Compound universal joint operating angles occur when the transmission and axle are not in line when viewed from BOTH the top and side. Their centerlines, however, are parallel in both views. (See Fig. 5)

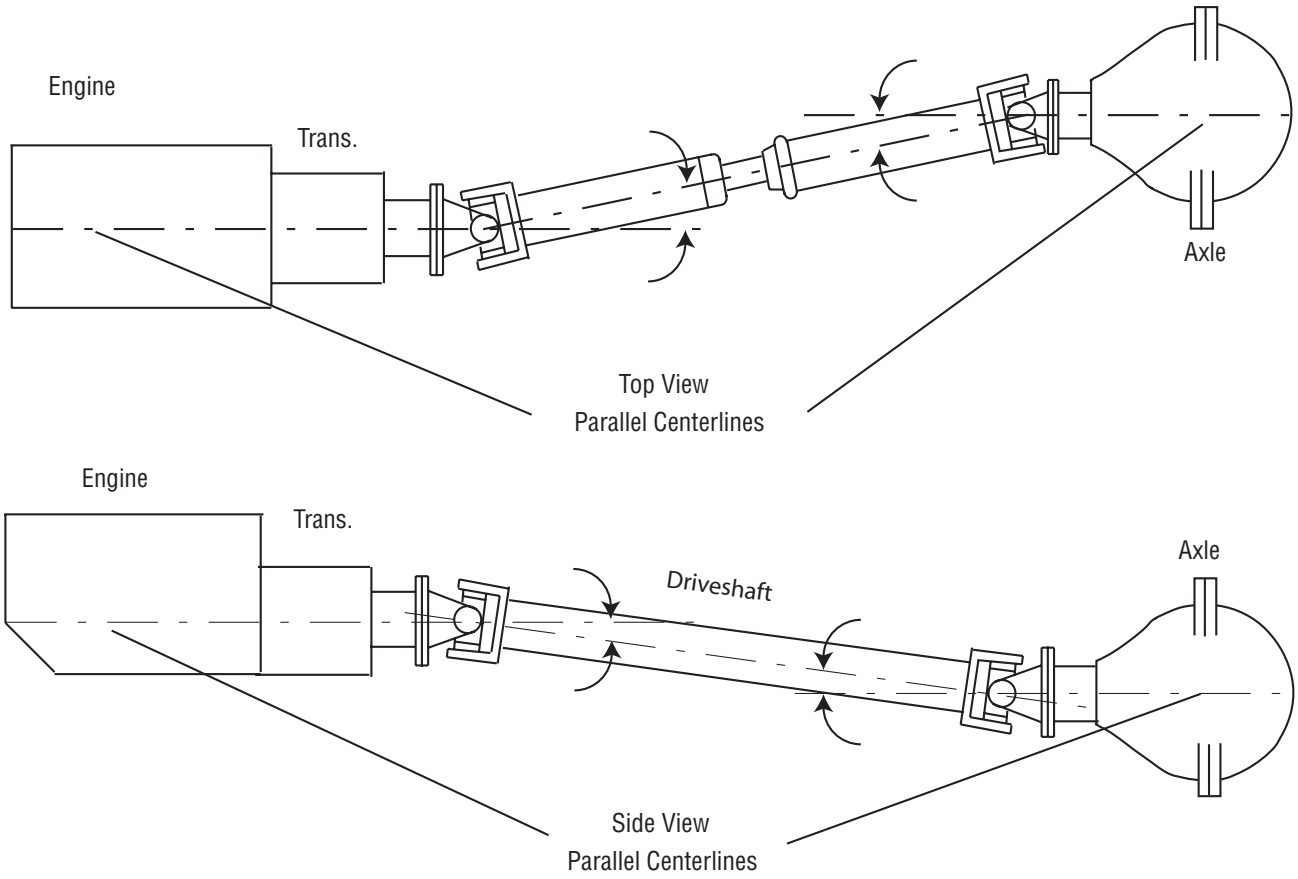


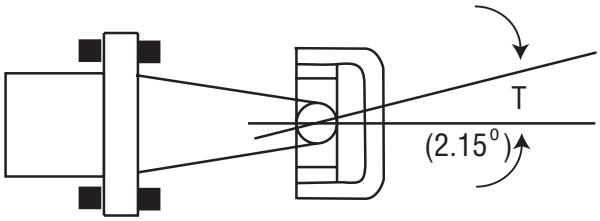
Figure 5

When you have a compound angle, you have to calculate the "True Universal Joint Operating Angle" of each universal joint. It is the True Universal Joint Operating Angle that must meet the three rules shown on page 5.

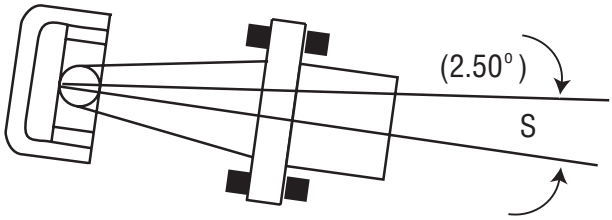
True Universal Joint Operating Angle

The True Universal Joint Operating Angle, which must be calculated for each end of the shaft with compound angles, is a combination of the universal joint operating angle in the top view, as determined from the chart, and the measured universal joint operating angle in the side view.

To determine the true universal joint operating angle for one end of a shaft, (compound angle C° in the formula shown in Fig. 6) insert the universal joint operating angle measurement obtained in the side view and the universal joint operating angle obtained from the chart into the formula.



Angle in Top View (from Chart)



SideView

$$\text{Compound Angle } (C^{\circ}) = \sqrt{T^2 + S^2}$$

$T = 2.15^{\circ}$ (A calculated angle)

$S = 2.5^{\circ}$ (The measured angle)

$$C = \sqrt{2.15^2 + 2.5^2}$$

$$C = \sqrt{10.873}$$

$C = 3.3^{\circ}$ (True operating angle)

Figure 6

Do the same for the other end of the shaft. Compare the resultant calculated universal joint operating angle for each end. They should be EQUAL within 1 degree. If they're not, the driveshaft will vibrate.

Eliminating Compound Angle Induced Vibrations

Compound universal joint operating angles are one of the most common causes of driveline vibration. To avoid theses problems, remember these important points:

- When setting up an application that requires compound universal joint operating angles, always keep the centerlines of the transmission and axle parallel in both views.
- Always keep the offset between their horizontal and vertical centerlines small.

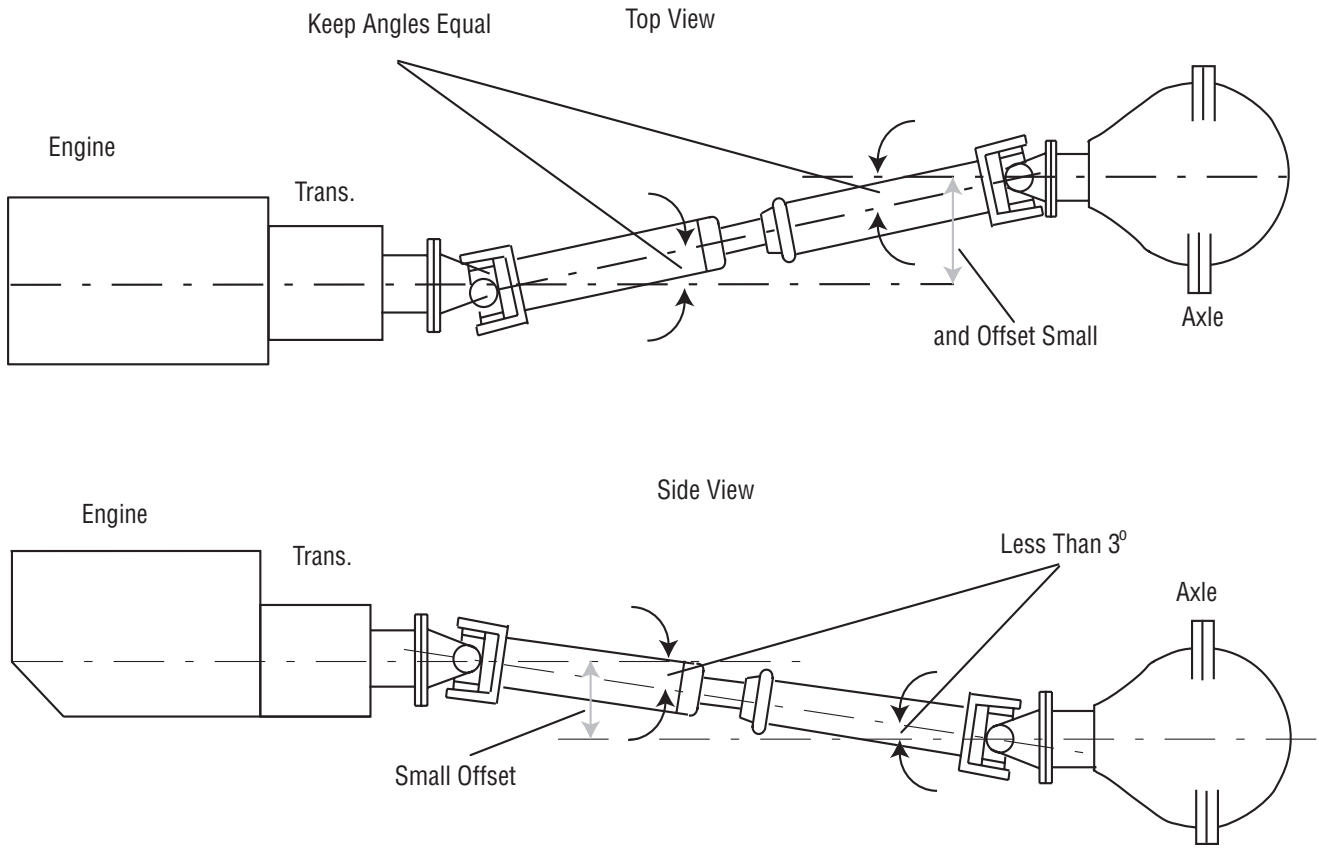


Figure 7

Note: Centerlines of transmission and axle must be parallel in both top and side views to use this method of determining true universal joint operating angle. Please contact Spicer Driveshaft Engineering if you have an application where the components cannot be installed with their centerlines parallel.

If adjustments must be made to the system:

- Install shims between the axle housing and springs to rotate the axle input yoke to change operating angles.
- Change operating angle on torque arm type suspensions by lengthening or shortening torque arms.
- Raise, lower, or shift side-to-side a pump, blower, or other piece of auxiliary equipment to change operating angles.

Note: It is important to remember to keep the centerlines of two components that are connected by a driveshaft parallel in both the top and side views, so the operating angles will ALWAYS be equal.

Angle Size

The magnitude of a vibration created by a universal joint operating angle is proportional to the size of the universal joint operating angle. Spicer Engineers recommend true universal joint operating angles of 3 degrees or less.

Obtain the true universal joint operating angle, as explained above, and if it is greater than 3 degrees, compare it to this chart.

Driveshaft RPM	Maximum Operating Angle	Interaxle	
		Parallel	Intersecting
5000	3.2°	-	-
4500	3.7°	-	-
4000	4.2°	3.8°	3.8°
3500	5.0°	4.4°	4.4°
3000	5.8°	5.1°	4.8°
2500	7.0°	6.0°	4.8°
2000	8.7°	6.0°	4.8°
1500	11.5°	6.0°	4.8°

The angles shown on this chart are the maximum universal joint operating angles recommended by Spicer Engineers and are directly related to the speed of the driveshaft. Any universal joint operating angle greater than 3 degrees will lower universal joint life and may cause a vibration. Remember to check maximum safe driveshaft RPM by using the Spicer Safe Operating Speed Calculator.

Multiple Shaft Installations

Multiple Shaft Set Up Recommendations

In general, multiple shaft installations follow the same guidelines, except there are different recommendations for setting up the driveline:

- For a 2-shaft application, set up the first coupling shaft (sometimes called a jackshaft) so that the universal joint operating angle that occurs at the transmission end is 1 to 1-1/2 degrees. (See Fig. 8)

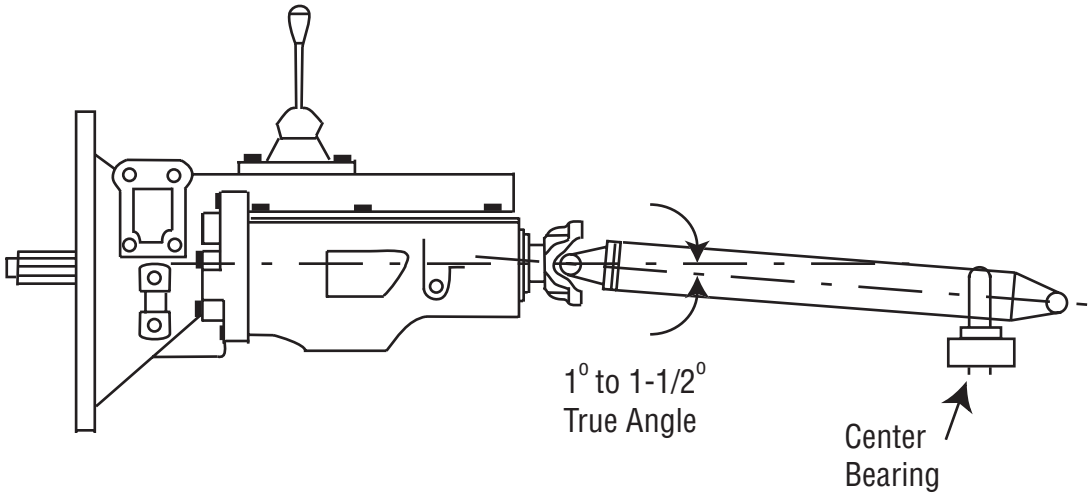


Figure 8

- Try to avoid building a compound universal joint operating angle into the first coupling shaft by installing it in line with the transmission.
- If it ends up being compound, make sure the true universal joint operating angle, determined by using the information mentioned earlier, is 1 to 1-1/2 degrees.

Install or tilt the axle so it is mounted on the same angle as the first coupling shaft (the centerlines of the axle and the first coupling shaft will be parallel).

Note: BY FOLLOWING THIS PROCEDURE, THE UNIVERSAL JOINT OPERATING ANGLE AT EACH END OF THE LAST SHAFT WILL AUTOMATICALLY BE EQUAL. (See Fig. 9)

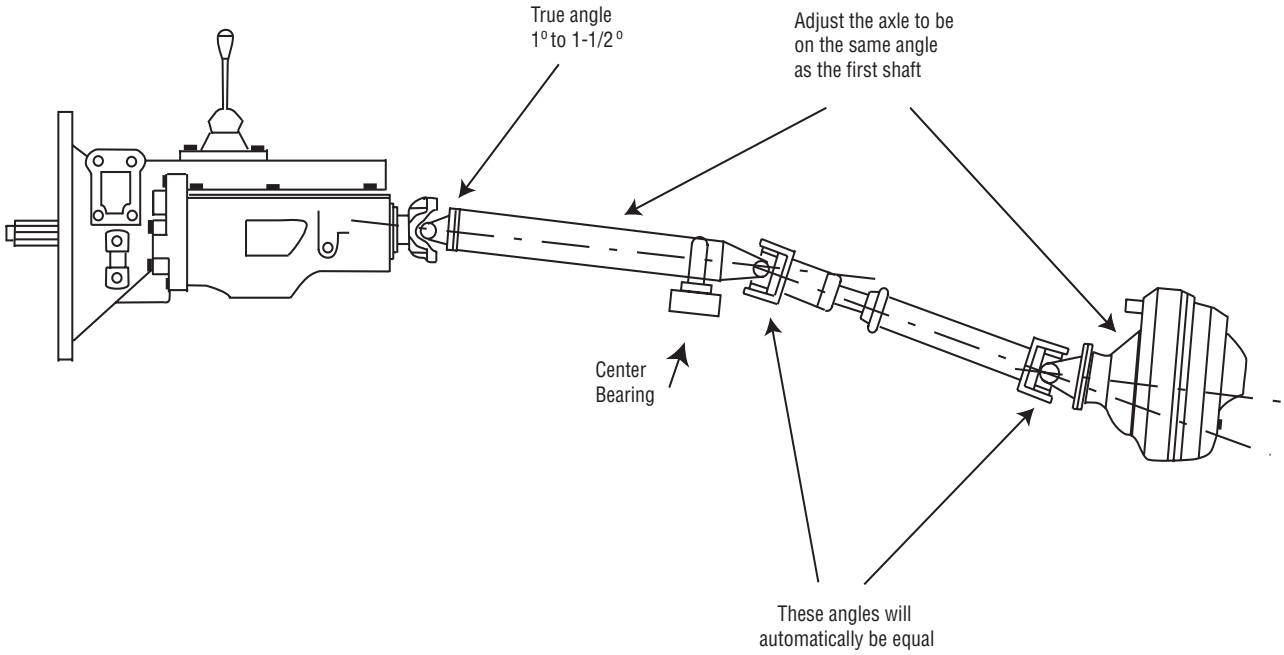


Figure 9

If there is an offset in the installation of the axle, make sure it does not create too large of a compound universal joint operating angle. Whenever possible, mount the axle directly in line with the first coupling shaft (when viewed from the top).

Check the actual universal joint operating angle at the rear of the first coupling shaft. If it is less than 1° and the transmission universal joint operating angle is greater than 1.5°, rotate the end yoke at the center bearing position so that the ears of the yoke are 90° to the ears of the tube yoke on the transmission end of the coupling shaft. (See Fig. 10) As an alternative, rotate the slip yoke on the driveshaft 90° if the slip spline has 16 teeth.

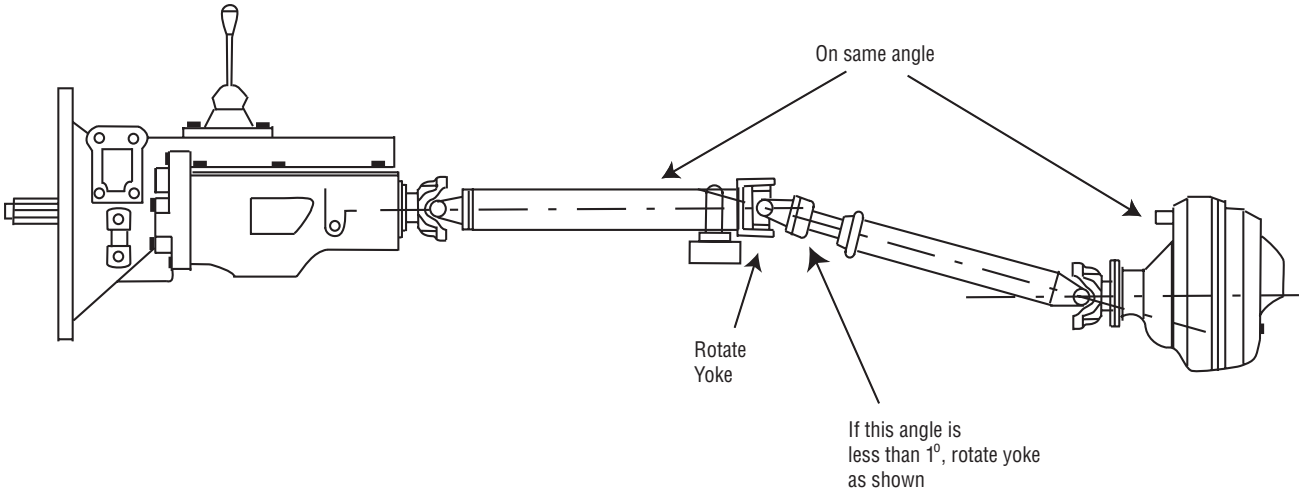


Figure 10

On applications having more than two shafts, mount the first coupling shaft as outlined in the preceding example, and each additional coupling shaft at a 1 to 1-1/2 degree universal joint operating angle to the previous coupling shaft.

Install or tilt the axle to the same angle as the last fixed coupling shaft so the centerline of the axle and the last fixed coupling shaft are parallel.

Note: THIS ASSURES THE UNIVERSAL JOINT OPEARTING ANGLE AT EACH END OF THE LAST SHAFT WILL AUTOMATICALLY BE EQUAL (See Fig. 11).

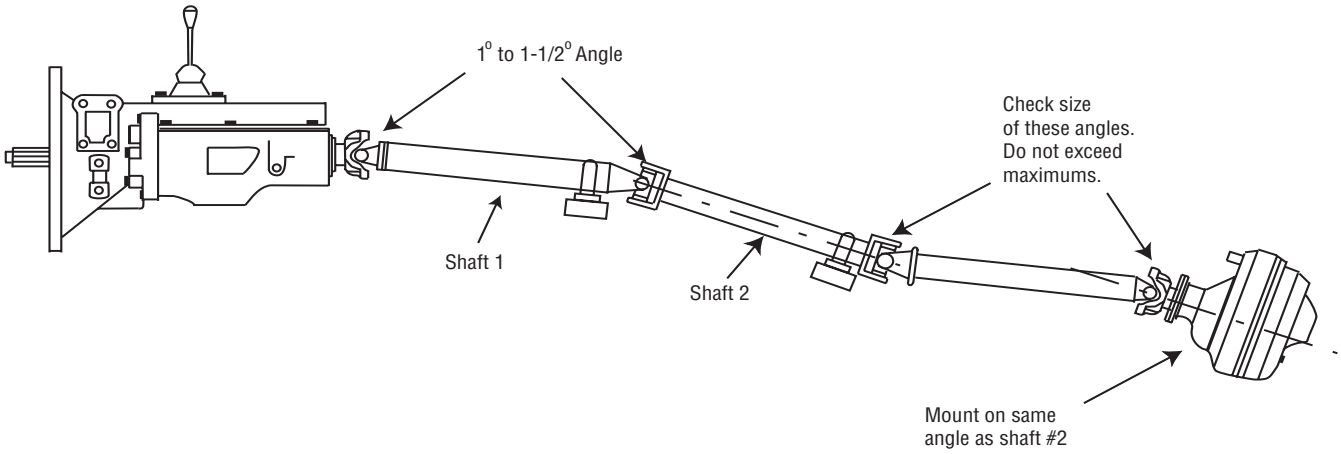


Figure 11

Mounting a Midship-Mounted PTO, Pump, or Auxiliary Transmission

When installing a midship-mounted PTO, auxiliary transmission, or midship-mounted pump into the main driveline of a vehicle, install it at the same angle as the transmission. Keep the offset to a minimum to reduce universal joint operating angles.

Note: Do not make the universal joint operating angle less than 1/2 degree.

Before bolting the device in place, check the universal joint operating angles that occur at each end of the driveshaft. They must be 1 to 1-1/2 degrees and they must be equal to within 1/2 degree for this type of application.

If the device ends up being installed in direct line with the transmission, with little or no universal joint operating angle on the joints, raise or lower it so there is enough offset to create the required 1 to 1-1/2 degree universal joint operating angle on each end of the driveshaft. (See Fig. 12)

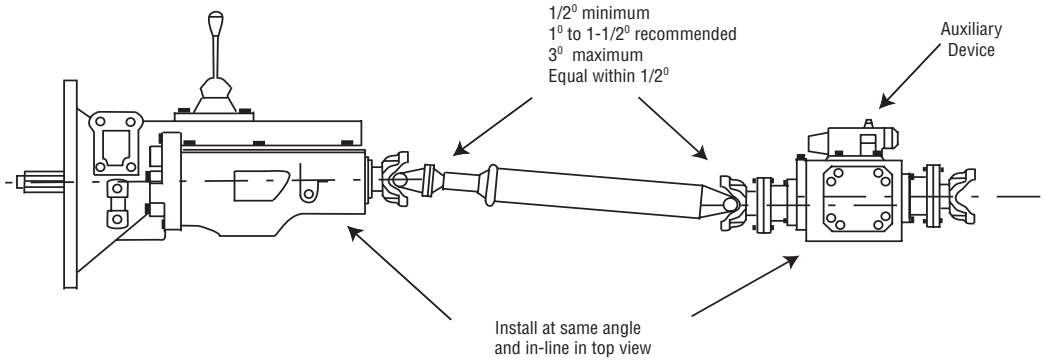


Figure 12

If there is only one driveshaft between the device and the rear axle, rotate the rear axle (using shims in the appropriate place) so it is the same angle as the device. This makes the universal joint operating angle at each end of the driveshaft equal (See Fig. 13). Check the size of the universal joint operating angles to determine if they meet recommendations.

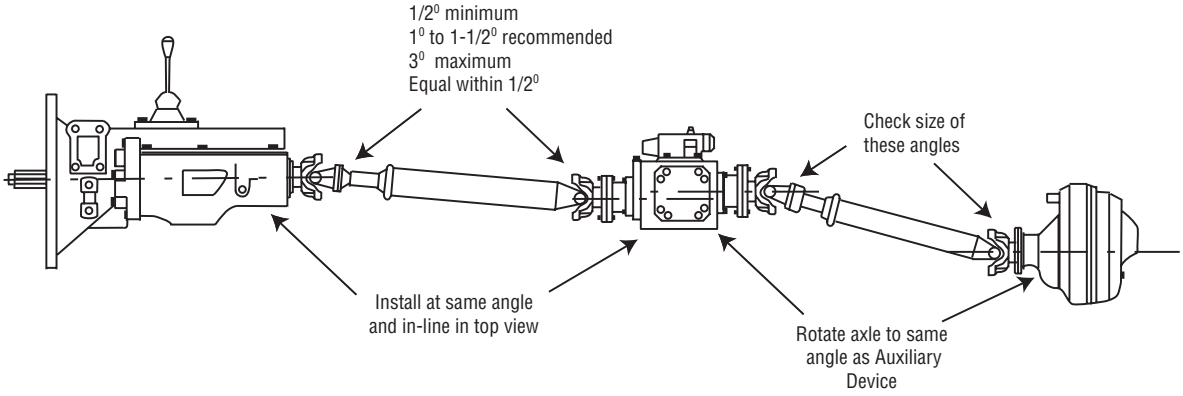


Figure 13

If there is more than one driveshaft between the device and the rear axle, install the driveshaft as outlined earlier with a 1 to 1-1/2 degree universal joint operating angle on the input end of each shaft. Then rotate the axle so it is on the same angle as the last fixed shaft. The universal joint operating angle on each end of the last shaft will automatically be equal. (See Fig. 14)

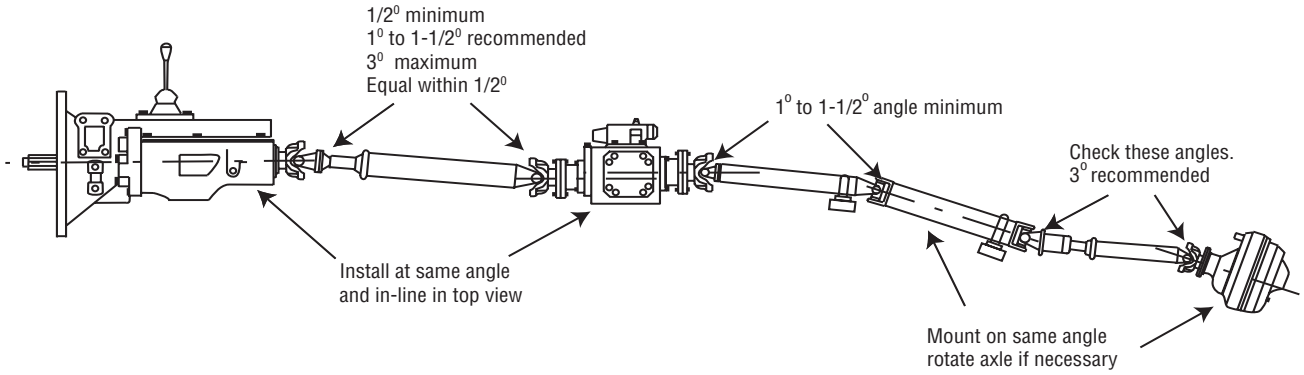


Figure 14

Mounting a Remote-Driven Pump, Blower, or Similar Device

Remote mounted-pumps, blowers, or similar devices are usually driven by a side, top, or bottom-mounted PTO and use an auxiliary driveshaft.

Many times these devices are mounted to the vehicle frame or cross member. The usual method of mounting, where the driven device is mounted parallel with the ground without regard to the mounted angle of the PTO, will produce a vibration that may cause failure of the PTO, pump, blower, or other driven device.

Any remote driven device must be mounted parallel and in line, if possible, with the PTO.

To select the appropriate auxiliary driveshaft for these types of applications, you should consider proper torque, safe operating speed (which is different than the critical speed for tubular driveshafts), and angularity. (See Maximum Safe Operating Speed Chart on page 18).

An auxiliary driveshaft must be capable of transmitting the maximum torque and RPM required by the driven equipment. For most low-torque applications operating at less than 1200 RPM, solid bar-stock constructed driveshafts are adequate. For applications requiring additional torque or RPMs, tubular shafts should be fabricated.

Maximum Safe Operating Speed

MAXIMUM OPERATING SPEED* BY TUBE SIZE, SOLID SHAFT SIZE, AND LENGTH *(For speeds over 6000 RPM, contact Spicer Universal Joint Division Engineering)											
TUBING	MAXIMUM INSTALLED LENGTH (IN INCHES) FOR GIVEN RPM										
Diameter & Wall Thickness	Centerline to Centerline of Joints for a Two Joint Assembly or Centerline of Joint to Centerline of Center Bearing for a Joint and Shaft										
W - Welded	RPM - Revolutions Per Minute										
S - Seamless	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000
1.750" x .065" W	82"	67"	58"	52"	-	-	-	-	-	-	-
1.250" x .095" S	64"	52"	45"	40"	37"	34"	32"	-	-	-	-
2.500" x .083" W	87"	70"	62"	55"	50"	45"	43"	41"	39"	37"	35"
3.000" x .083" W	-	-	85"	76"	70"	64"	60"	57"	54"	51"	49"
SOLID SHAFT DIAMETER											
.750"	42"	35"	30"	27"	25"	-	-	-	-	-	-
.812"	44"	36"	31"	28"	26"	-	-	-	-	-	-
.875"	46"	37"	32"	29"	27"	-	-	-	-	-	-
1.000"	49"	40"	35"	31"	28"	-	-	-	-	-	-
1.250"	55"	45"	39"	35"	32"	-	-	-	-	-	-

To prevent premature wear, auxiliary driveshaft breakage, and possible injury to people or equipment, be aware of the critical speed of these types of driveshafts. Critical speed, explained earlier in this guide, is different for these solid shaft and small tube driveshafts.

Refer to the chart above for maximum safe operating speed information on these types of shafts.

If the chart indicates that the critical speed may be a problem, use multiple shafts. Be sure to use support bearings where necessary and set up the true universal joint operating angles as indicated earlier in this guide.

As with all driveshafts, auxiliary driveshafts should be:

- Carefully installed to minimize vibrations caused by incorrect universal joint operating angles
- Capable of absorbing shock loads
- Capable of changing length as needed
- Guarded so as to prevent inadvertent entanglement

Special Notes Regarding Auxiliary Driveshafts

WARNING: Working on or near an auxiliary driveshaft when the engine is running is extremely dangerous and should be avoided. You can snag clothes, skin, hair, hands, etc. This can cause serious injury or death.

- Shut off engine before working on power take-off or driven equipment.
- Do not go under the vehicle when the engine is running.
- Do not engage or disengage driven equipment by hand from under the vehicle when the engine is running.
- Fasteners should be properly selected and torqued to the manufacturer's specifications.
- If a setscrew protrudes above the hub of an end yoke, you may want to replace it with a recessed (Allen-type) setscrew.
- If you decide that a recessed setscrew does not have enough holding power for your application and you must use a protruding setscrew, be sure no one can come in contact with the rotating driveshaft or the protruding setscrew.
- **Exposed rotating driveshafts must be guarded!**
- Lubricate auxiliary driveshafts according to manufacturer's specifications.

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Section 4

Pump and Transmission Detail

Description of Pump Type

The Type 2ZSM pump is a high speed, high volume, single stage, dual impeller, centrifugal Fire Fighting Pump.

Inherent characteristics of the 2ZSM pump are high volume, high efficiency, and compactness.

The 2ZSM pump is a midship pump and is powered via the main truck driveline.

OPERATION AND MAINTENANCE OF TYPE ZSM FIRE PUMP

Operation of Pump

Right, left, front and rear locations are referred to relative to a position facing the pump suction inlet.

This pump is driven from a standard trucks main driveline. The midship pump features a split-shaft gearbox design. Shifting of the split-shaft from road (driving) mode to pump mode is shifted from the driver's seat. The truck clutch should be disengaged to stop the rotation of the truck transmission main drive gear while shifting the split-shaft.

To Engage the Pump --- Stationary Operation

1. Shift Transmission into Neutral (N)
Before engaging a split-shaft driven pump for operation, shift the transmission into NEUTRAL (N).

2. Pull Parking Brake to Apply
If you fail to apply the parking brake, safety interlocks installed by the builder are required to prevent operation of throttle or pressure governor.

NOTE: If the parking brake is released during pump operation, the throttle or pressure governor is disconnected AND the engine speed falls to IDLE. Water pressure to the hose will drop. The pump speed will then be controlled only by the driver's pedal. That is the manual override.

3. Chock the Wheels
Block both front and rear of tire using wheel chocks.

CAUTION

- **Engage the pump only at engine idle speed.**
- **Begin pumping water immediately after engaging the pump and prime is reached.**
- **Do not operate the engine at speeds higher than 1000 RPM during the priming cycle.**
- **If prime is not attained in 90 seconds, check your system and fittings to be air tight, resolve the matter, and reattempt prime.**
- **Running the pump dry for more than a few minutes will cause damage.**
- **Circulate water if hoses are not ready to keep water cool.**

4. Engage the Pump
Confirm engine is at idle RPM. Activate the Pump Shift control located on the driver's panel in the cab.

5. Prime the Pump
Engage the "Pull-to-Prime" actuation handle and hold. Engine speed should not exceed 1000 RPM and no more than 90 seconds should elapse before prime.

- If 90 seconds is exceeded without achieving prime.

- Disengage the pump.
- Check your system and fittings to be air tight, resolve the matter, and reattempt prim after re-engaging the pump.

6. Observe Pump Engaged and OK to Pump indicator lamps

The PUMP ENGAGED and OK TO PUMP indicator lights turn ON when:
- Pump is engaged
- Pump is spinning
- Safety Interlocks are engaged

Operation of Primer

To prime the pump a certain amount of dry running of the pump along with a recommended engine speed are given. Significant testing has proven these figures at W.S. Darley and should never be exceeded without W.S Darley Customer Service approval.

Priming time should not exceed 90 seconds. If pump fails to prime within 90 seconds, shut down and thoroughly inspect the pump system for air leaks and resolve the issue before attempting to re-prime.

Engine speed during priming should NOT exceed 1000 RPM regardless of the pump ratio in relation to engine speed.

To Prime: Activate the “Pull-to-Prime” momentary switch and hold. Prime should occur within 90 seconds. Indication of prime should be noticed when water discharges from the primer pump exhaust port. Releasing the pull to prime activation handle will disengage the primer motor and close the primer ¼ turn ball valve automatically. Prime should now be attained and the master intake gauge should show a vacuum reading.

As soon as prime is reached, the pump will develop pressure.

When pumping from hydrants, the primer is not needed and should remain disengaged.

It may be necessary to use the primer momentarily when pumping from a booster tank when the suction head is insufficient to force all the air out of the pump.

CAUTION

Dry running of the pump, especially the mechanical seal and seal rings of the pump, can be detrimental to seal life. The figures given here are within a certain safety factor to prevent premature failure of the seal as well as the primer assembly. Exceeding these figures will cause premature wear, blistering and failure of seal faces as well as premature failure and wear of the primer assembly including but not limited to: overheating of the body, seizure of the rotor, and cracking of primer vanes.

CAUTION

Do not use this pump for hose testing.

CAUTION

FOR ALL PRIMING SCENARIOS:
If water does not discharge from the primer exhaust within 90 seconds, stop the primer pump, check for air leaks and resolve the issue before attempting to re-prime. MAX PRIMER OPERATION TIME = 90 seconds. DO NOT EXCEED 90 SECONDS OF PRIMER OPERATION. Repeated operation should be avoided.

CAUTION

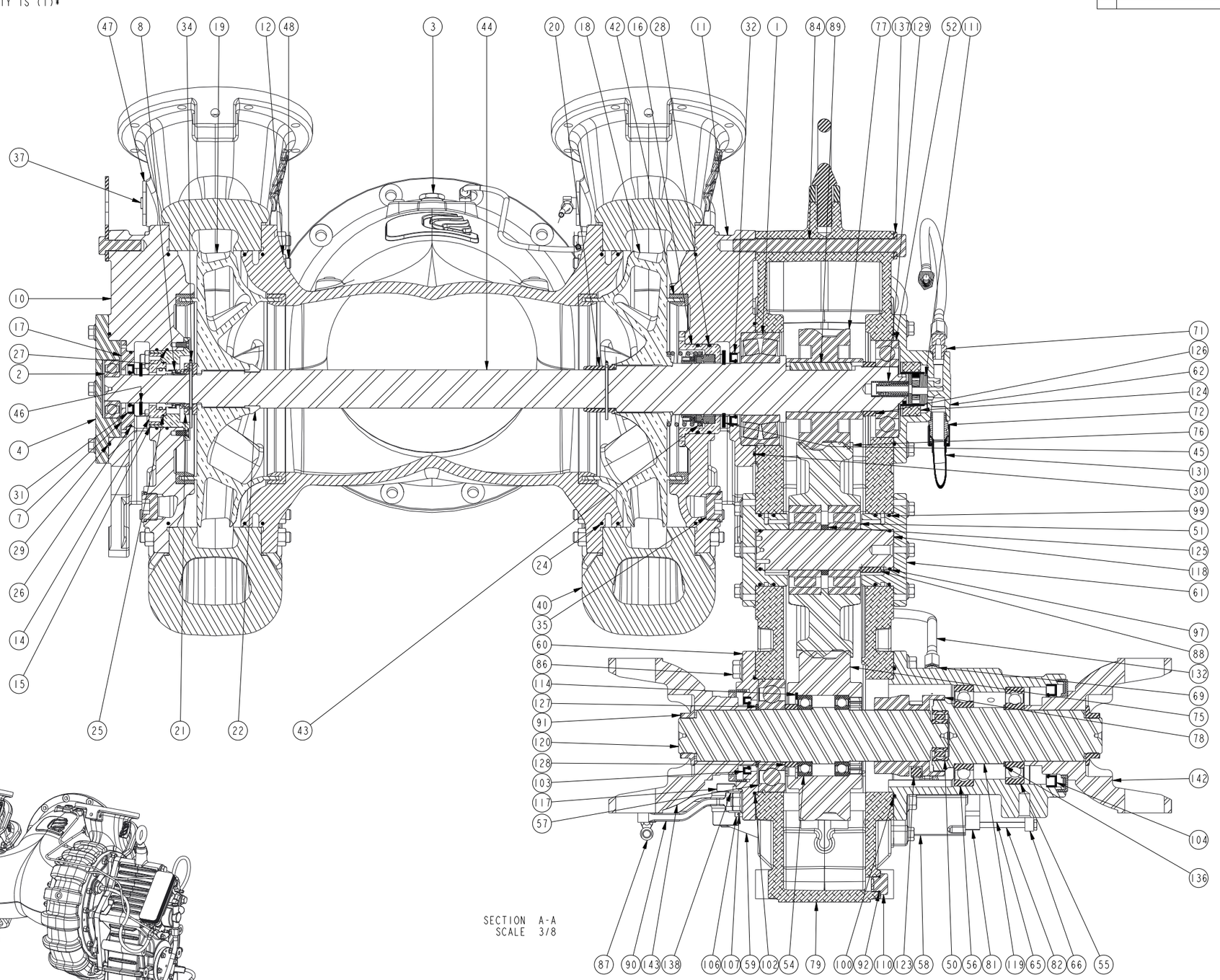
The primer pump generates heat as soon as operation begins. Extended run times (up to 80 seconds) and repeating priming cycles consecutively or within short time periods may lead to accelerated wear or premature failure of the primer pump assembly. If an attempt to prime should fail, thoroughly inspect the pump system for air leaks and resolve the issue before attempting re-prime.

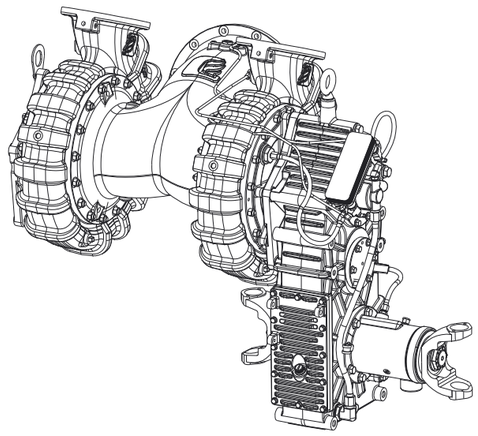
Pump Drawings

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	*2*
2	BEARING-BALL, 306SFF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814001	1
6	FHMS - #10-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRNG	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, ZS	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - ZS, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC. IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	2
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601203	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501575	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SQ HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - ZS	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - ZS	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	*2*
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22206E C3	1723600	1
51	BEARING - 22310E C3	1726700	2
52	BEARING - BALL, 6311 C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 113KSFF	1723400	2
55	BEARING-BALL, 213SF	1721401	1
56	BEARING-BALL, 6214 ZR C0	1725400	1
57	BEARING-BALL, 6313 ZR C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, ZS	2313300	1
63	CLAMP - CUSH, 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.75ID x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THR'D, NO DIPSTICK	4219005	1
68	FILTER - LUBE PUMP, 100 MESH	1724501	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	4
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 461.6DP,LH HELIX	2716914	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 32 T	2720407	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.44, 6DP	1804921	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1227D940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	2
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250_FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269_FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, ZS	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - ZS	1184500	1
123	SHIFT YOKE - ZS	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, ZSM	4432130	1
132	TUBE - LUBE, ZS	4434100_FRM3	1
133	TUBE - LUBRICATION, ZS	4434100_FRM4	1
134	TUBE - LUBRICATION, ZS	4434103_FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK-ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS (1)

5023900 ACTUAL QUANTITY IS (1)





SECTION A-A
SCALE 3/8

NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0100 ARE INCLUDED IN ASSEMBLY FP01934
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0100

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08001 (1.44:1 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

DR'N KMD
CHKD WAH
TRC'D

MODEL NAME FP01934 | MDL CREATED | SHEET 1/3 | D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

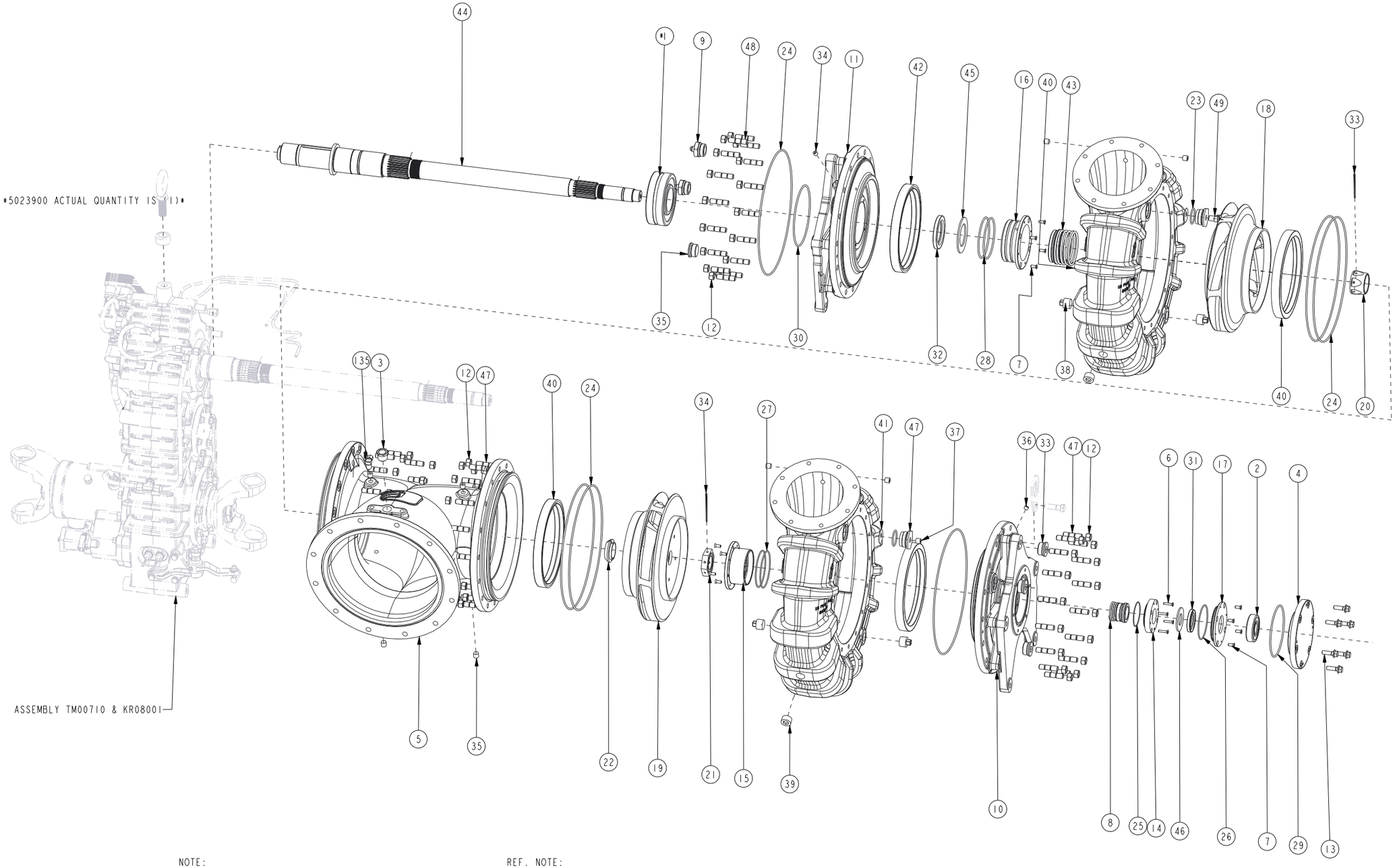
DATE 2-FEB-17
SCALE 3/8

DZC0100

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	* 2 *
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814001	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - 250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601203	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501575	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	* 2 *
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22208E C3	1723600	1
51	BEARING - 2231DE C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1138SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THR'D, NO DIPSTICK	4219005	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 461.6DP.LH HELIX	2716914	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 32 T	2720407	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.44, 6DP	1804921	1
80	GREASE ZERK - 25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 6.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1227D940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.150 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT FORK - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS 1

5023900 ACTUAL QUANTITY IS 1



REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0100 ARE INCLUDED IN ASSEMBLY FP01934
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0100

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

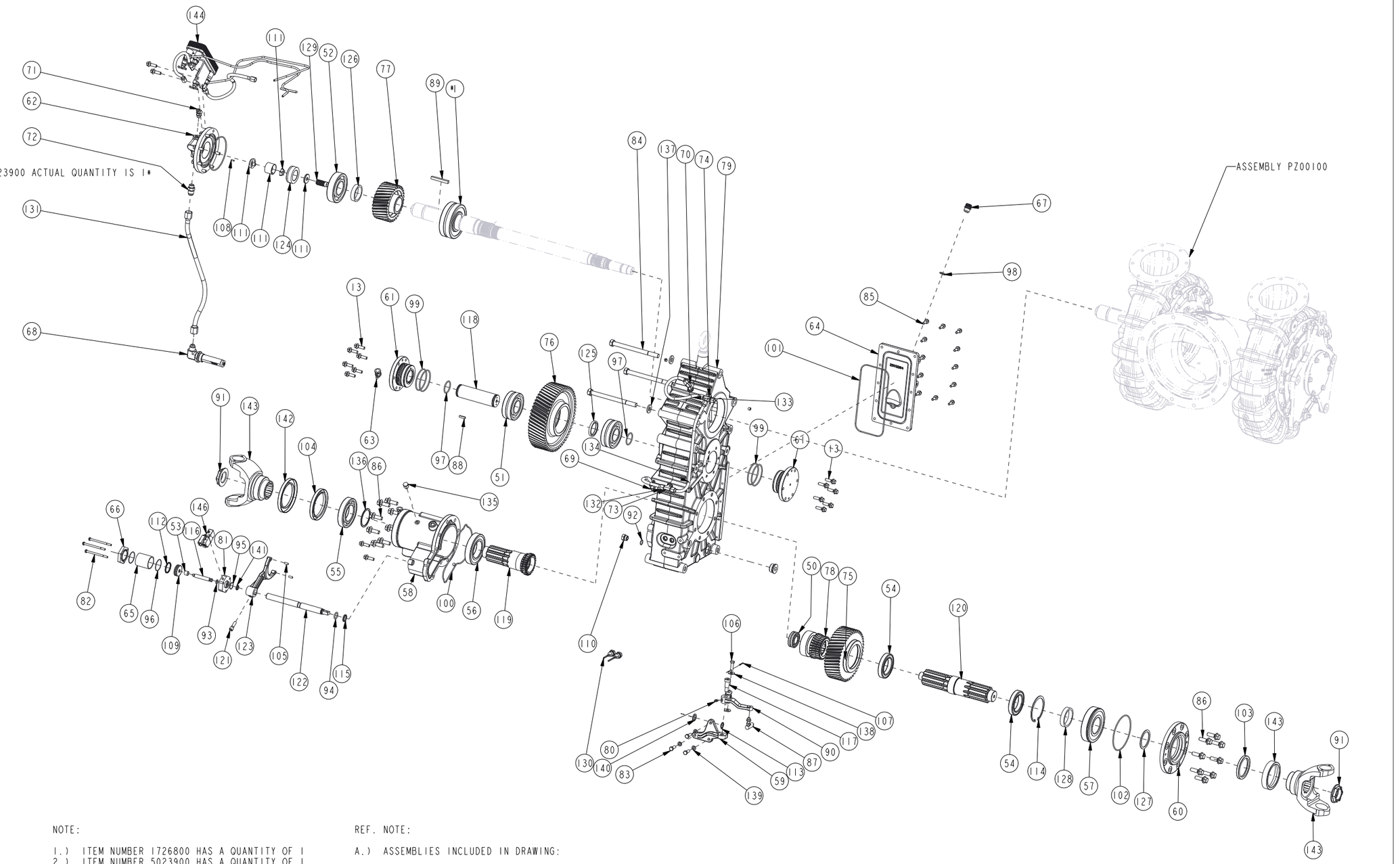
1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08001 (1.44:1 GR)

REMOVE SHARP EDGES	INCH [MILLIMETER]	THIRD ANGLE PROJECTION	OLD PART NO.	TOLERANCE EXCEPT AS NOTED	MODEL NAME FP01934	NOL CREATED	SHEET 2/3 D
MATERIAL DESCRIPTION: REF. TABLE		MATERIAL NO.	PATTERN NO.	.00 ±.03 .000 ±.010 ANGLES ±1°	W.S. Darley & Co. ITASCA, IL - CHIPPEWA FALLS, WI		
THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED	ALL DIMENSIONS IN INCHES UNLESS NOTED	DO NOT SCALE PRINT		DR'N KMD CHKD WAH TRCD	DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED		
					DATE 2-FEB-17	SCALE 1/4	DZC0100

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	* 2 *
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814001	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC. IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 x 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601253	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501515	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	* 2 *
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22206E C3	1723600	1
51	BEARING - 2316K C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1136SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.15 TD	2502200	1
67	DIPSTICK - M22 THR'D, NO DIPSTICK	4219005	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501619	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 461.6DP,LH HELIX	2716914	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 37 T	2720407	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 11.44, 6DP	1804921	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1ZZD940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 2.5MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250 FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269 FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, S160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SW	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS 1

5023900 ACTUAL QUANTITY IS 1



NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0100 ARE INCLUDED IN ASSEMBLY FP01934
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0100

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08001 (1.44:1 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

MODEL NAME	MDL CREATED		SHEET	
FP01934			3/3	D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

TOLERANCE EXCEPT AS NOTED .00 ±.03, .000 ±.010, ANGLES ±1°

W.S. Darley & Co. ITASCA, IL - CHIPPEWA FALLS, WI

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

DR'N KMD | DATE 2-FEB-17

CHKD WAH | SCALE 1/8

TRCD

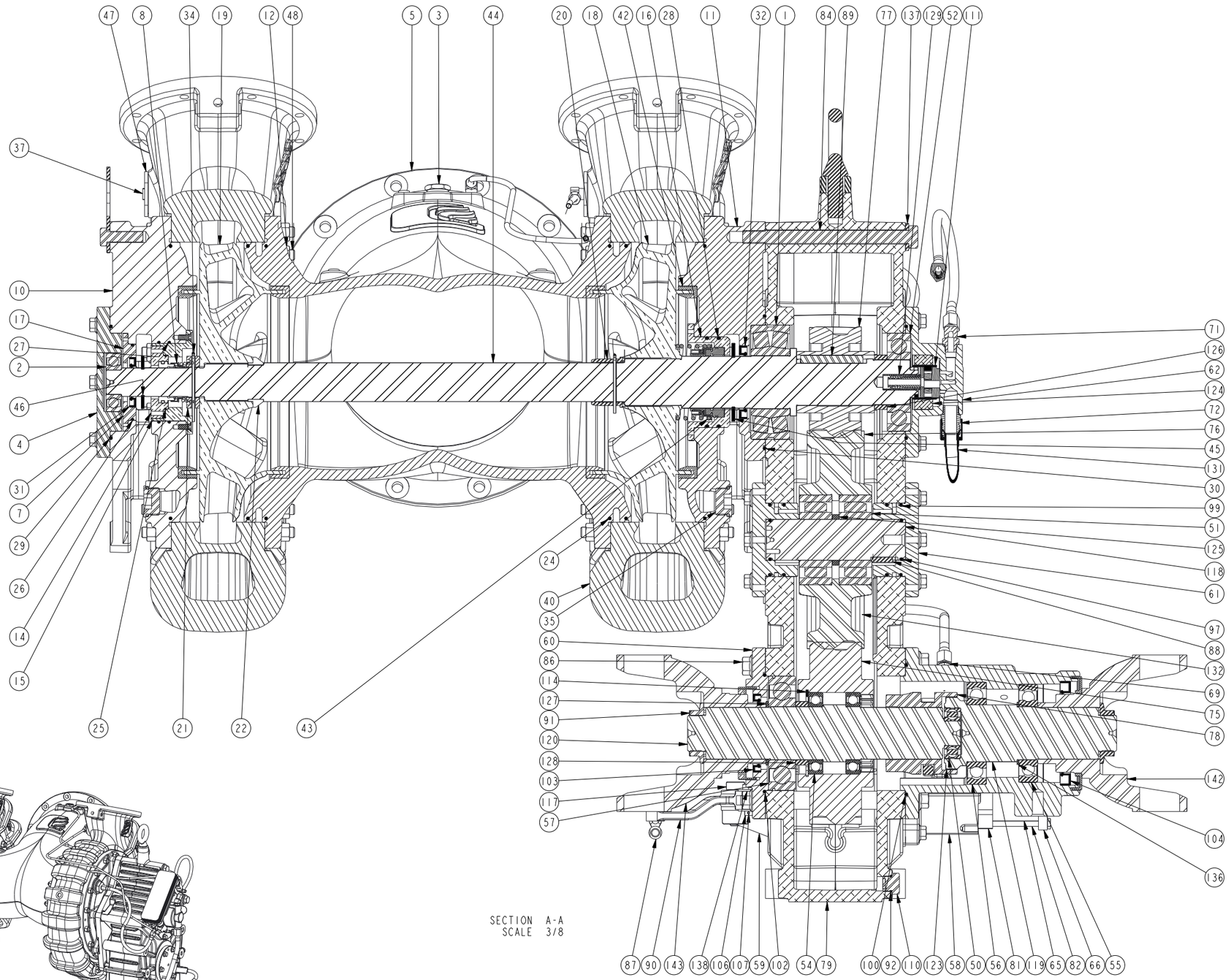
DZC0100

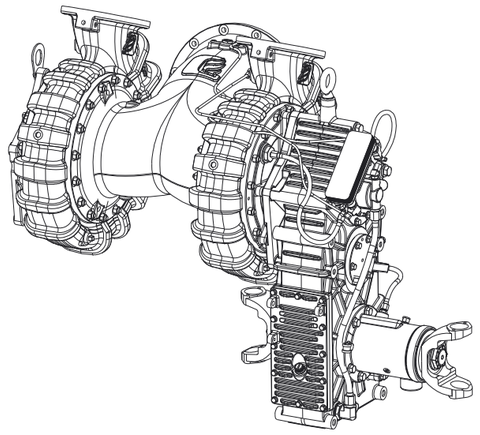
ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	#2#
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814001	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601253	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501515	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	#2#
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22208E C3	1723600	1
51	BEARING - 2316E C3	1726700	1
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - QILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1136SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 TD	2502200	1
67	DIPSTICK - M22 THR'D, 1.24 LO MARK	4219023	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 49T, 6DP, LH HELIX	2716906	1
76	GEAR - IDLER, 6DP, 9H, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 29 T	2720410	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.69, 6DP	1804920	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1220940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .614	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4437130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS (1)

5023900 ACTUAL QUANTITY IS (1)





SECTION A-A
SCALE 3/8

NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0101 ARE INCLUDED IN ASSEMBLY FP01935
5.) FOR DIMENSIONAL INFORMATION, PLEASE REFER TO DRAWING DZD0101

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08002 (1.69 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED .00 ±.03, .000 ±.010, ANGLES ±1°

DR'N KMD
CHKD WAH
TRCD

MODEL NAME	MDL CREATED	SHEET
FP01935		1/3 D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

DATE 2-FEB-17
SCALE 3/8

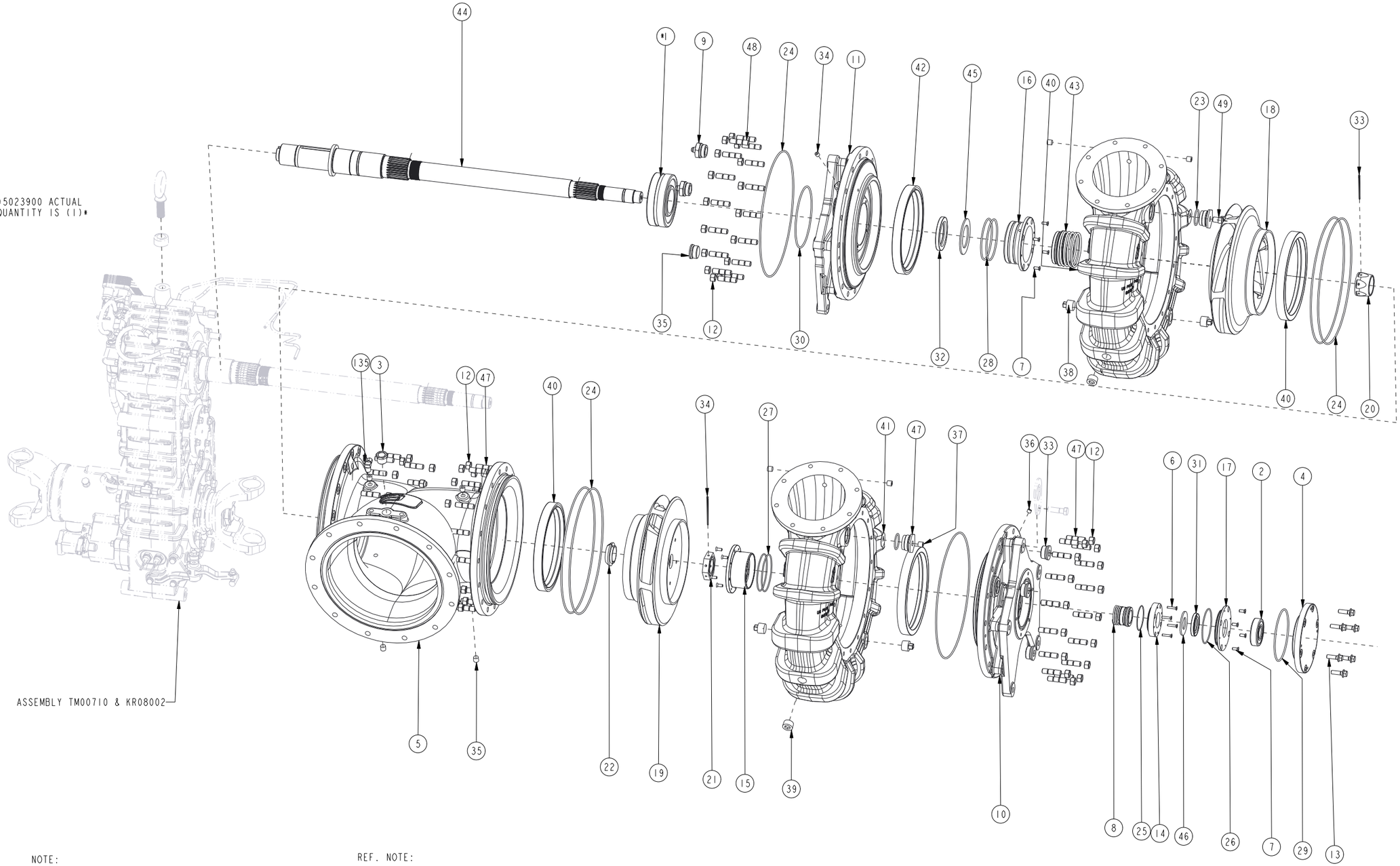
DZC0101

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	#2 #
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814001	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - 250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601203	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501575	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT- IMPELLER 2ZS	5023900	#2 #
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22208E.C3	1723600	1
51	BEARING - 2231QC.C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - QILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1138SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 TD	2502200	1
67	DIPSTICK - M22 THR'D, 1.24 LO MARK	4219023	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 49T, 6DP, LH HELIX	2716906	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 29 T	2720410	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.69, 6DP	1804920	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 6.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1227D940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.150 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

1726800 ACTUAL QUANTITY IS (1)

5023900 ACTUAL QUANTITY IS (1)



NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0101 ARE INCLUDED IN ASSEMBLY FP01935
5.) FOR DIMENSIONAL INFORMATION, PLEASE REFER TO DRAWING DZD0101

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08002 (1.69 GR)

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

DR'N KMD | CHK'D WAH | TRC'D

MODEL NAME FP01935 | NO. CREATED | SHEET 2/3 | D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

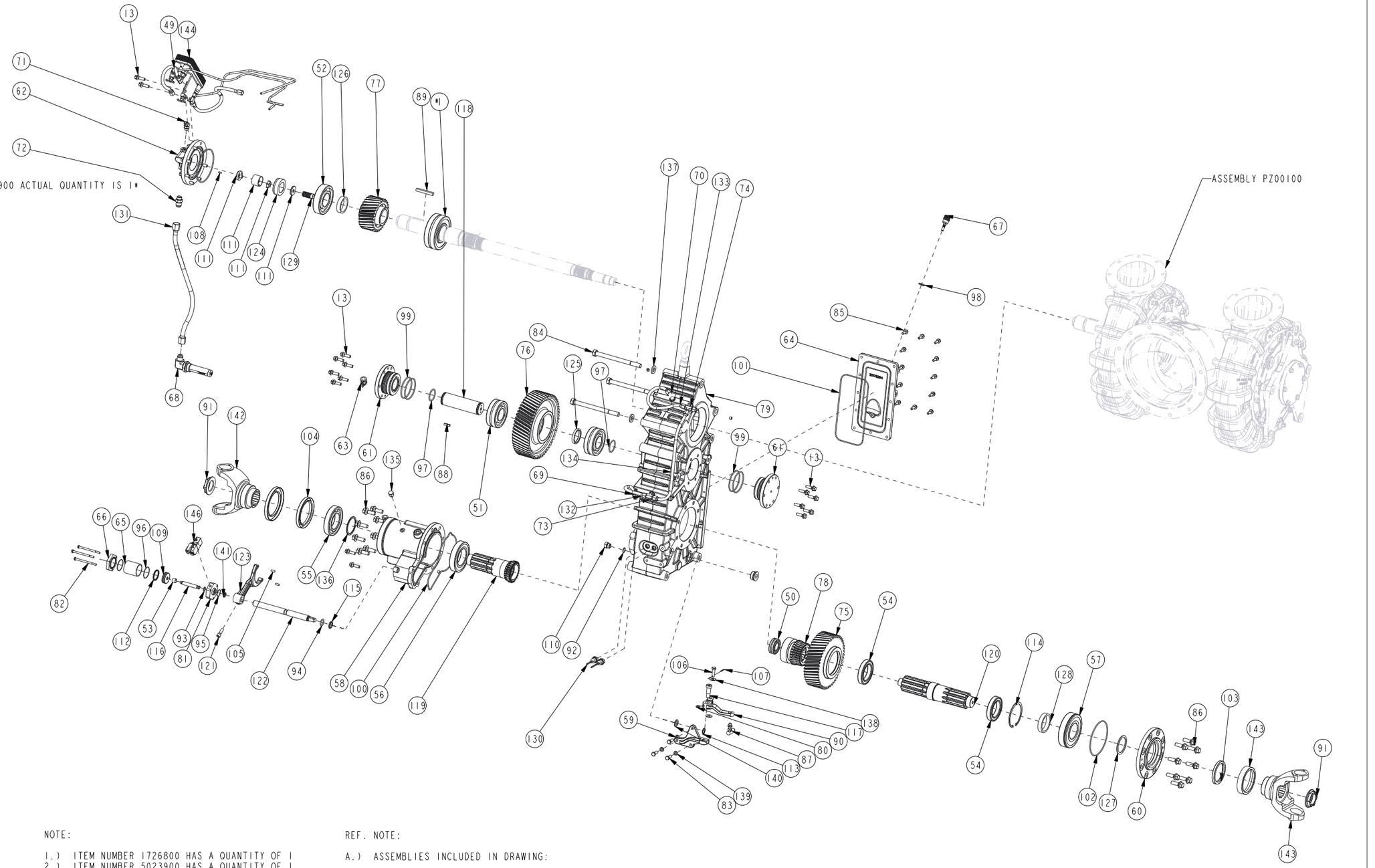
DATE 2-FEB-17 | SCALE 1/4

DZC0101

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	* 2 *
2	BEARING-BALL, 306SFF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814001	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC. IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 x 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601253	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501515	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	* 2 *
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22206E C3	1723600	1
51	BEARING - 22310E C2	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1.13KSFF	1723400	2
55	BEARING-BALL, 213SF	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 TD	2502700	1
67	DIPSTICK - M22 THR'D, 1.24 LO MARK	4219023	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 49T, 6DP, LH HELIX	2716906	1
76	GEAR - IDLER, 6DP, RH, 59 T	2722300	1
77	GEAR - PINION, 6 DP, LH, 29 T	2720410	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 11.69, 6DP	1804920	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1.227D940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 2.5MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.903 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SW	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS 1

5023900 ACTUAL QUANTITY IS 1



NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0101 ARE INCLUDED IN ASSEMBLY FP01935
5.) FOR DIMENSIONAL INFORMATION, PLEASE REFER TO DRAWING DZD0101

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08002 (1.69 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED .00 ±.03, .000 ±.010, ANGLES ±1°

DR'N KMD | CHKD WAH | TRCD

MODEL NAME: FP01935 | MDL CREATED | SHEET: 3/3 | D

W.S. Darley & Co. ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

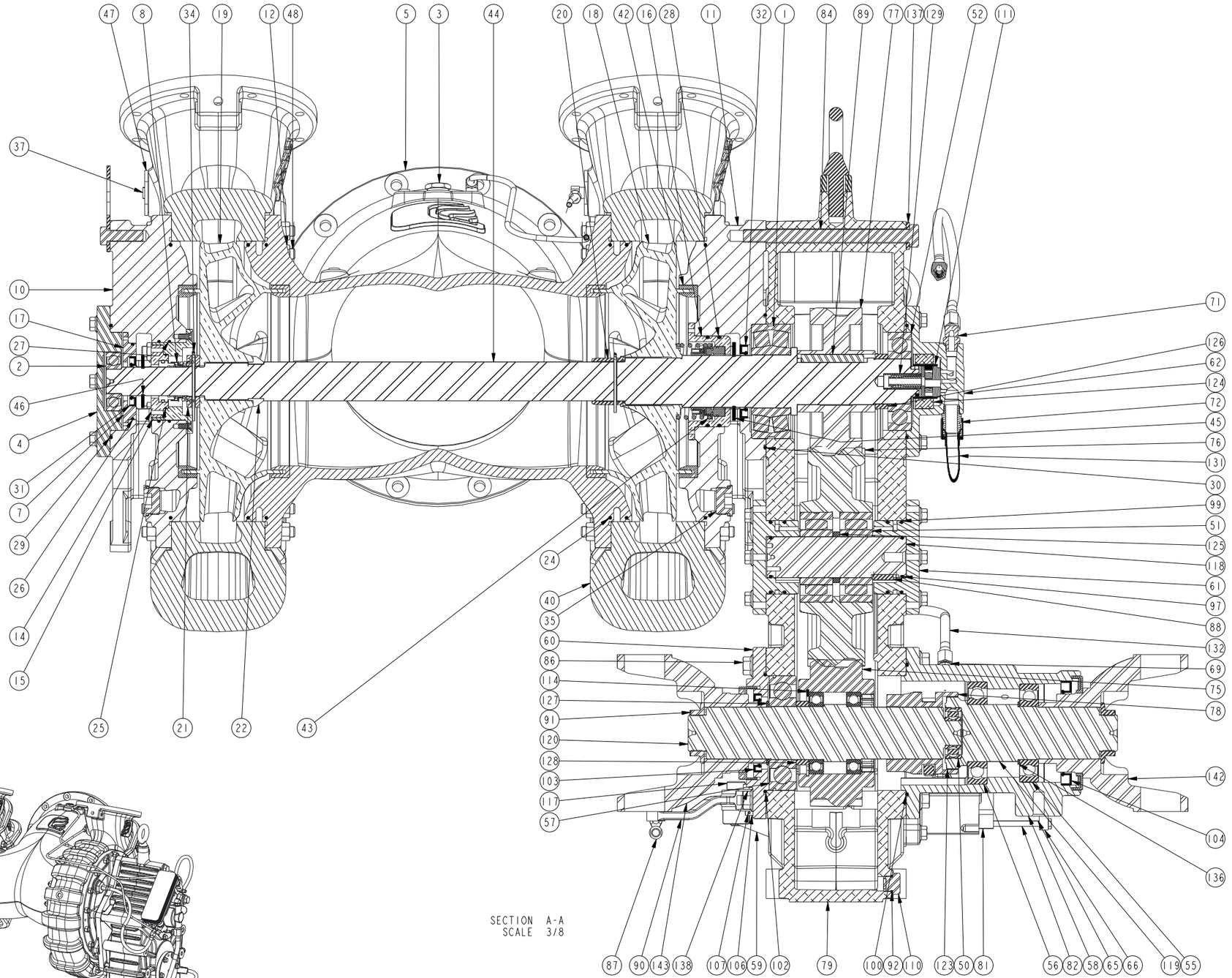
DATE 2-FEB-17 | SCALE 1/8

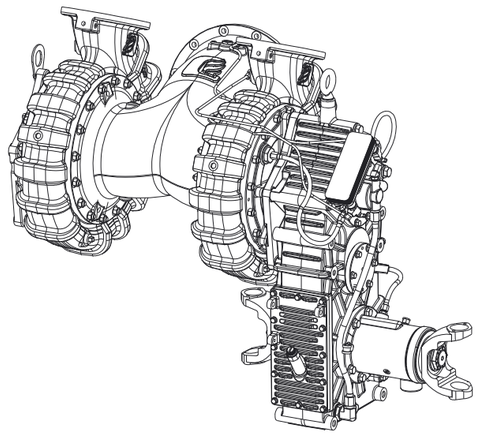
DZC0101

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	#2#
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814001	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403574	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601253	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501515	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	#2#
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22208E C3	1723600	1
51	BEARING - 2316E C3	1726700	1
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - QILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1136SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THR'D, 3.03 LO MARK	4218909	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 39T, 6DP, LH HELIX	2716901	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 39 T	2720400	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.00, 6DP	1804922	1
80	GREASE JERK - 25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 12270940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	2
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, S160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603022	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	ASST - SHIFT INTERLOCK, 12VDC	AH06600	1
145	KIT - COOLER	KC00908	1
146	KIT - LIFTING RINGS	KD02210	1
147	EXTENSION, DIPSTICK	4436620	1

1726800 ACTUAL QUANTITY IS (1)

5023900 ACTUAL QUANTITY IS (1)





SECTION A-A
SCALE 3/8

NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0102 ARE INCLUDED IN ASSEMBLY FP01930
5.) FOR DIMENSIONAL INFORMATION, PLEASE REFER TO DRAWING DZD0102

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08000 (1:1 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.

MATERIAL DESCRIPTION: REF. TABLE

MATERIAL NO.

PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED
.00 ±.03
.000 ±.010
ANGLES ±1°

DR'N KMD
CHKD WAH
TRCD

MODEL NAME	MDL CREATED	SHEET
FP01930		1/3 D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

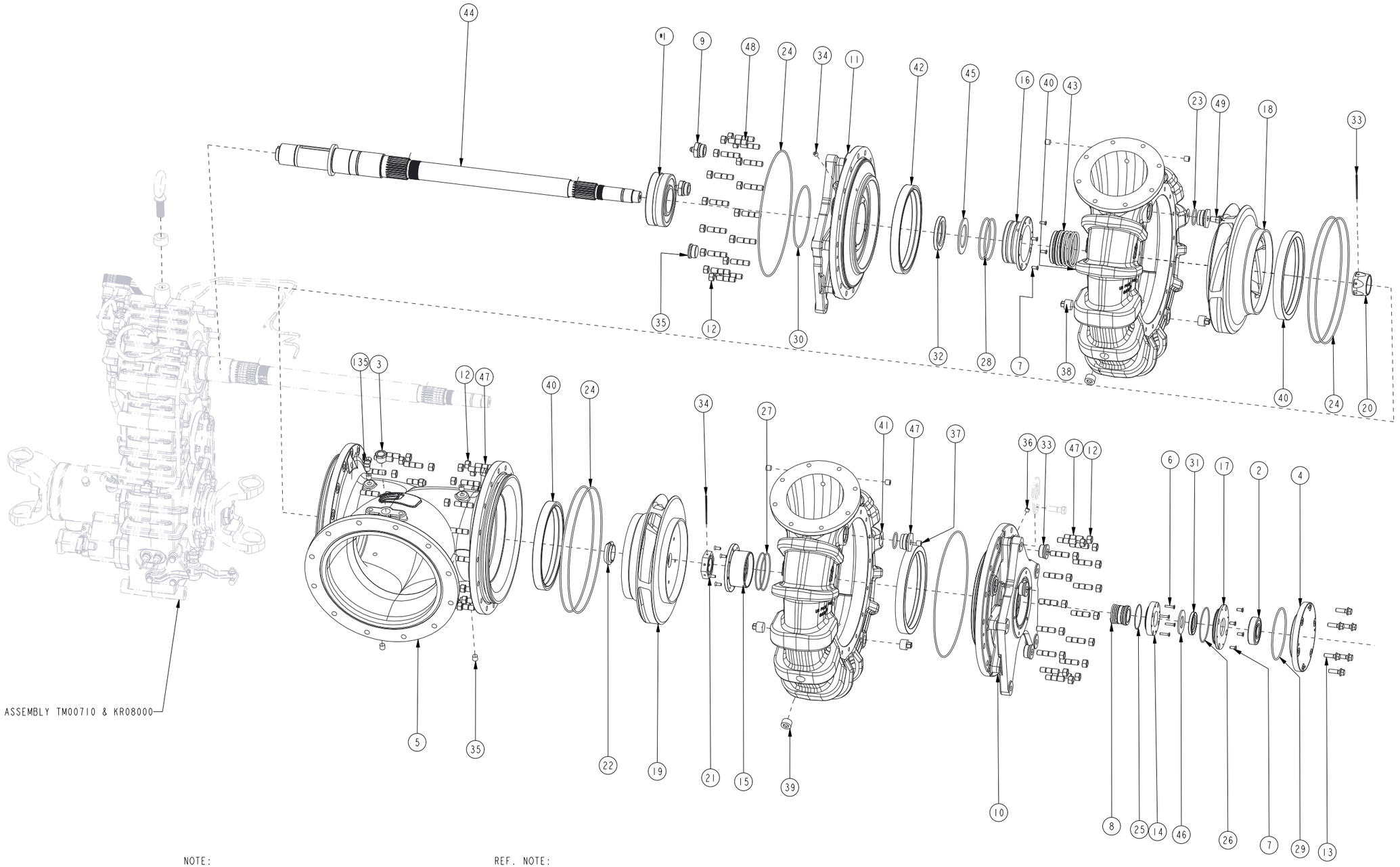
DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

DATE 2-FEB-17

SCALE 3/8

DZC0102

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	2
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814001	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - 250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601203	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501575	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT- IMPELLER 2ZS	5023900	2
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3604402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22206E C3	1723600	1
51	BEARING - 2231QC C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - QILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1134SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.35 TD	2502200	1
67	DIPSTICK - M22 THR'D, 3.03 LO MARK	4219009	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 39T, 6DP, LH HELIX	2716901	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 39 T	2720400	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.00, 6DP	1804922	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 6.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1227D940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	2
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.150 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1
147	EXTENSION, DIPSTICK	4436620	1



REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0102 ARE INCLUDED IN ASSEMBLY FP01930
5.) FOR DIMENSIONAL INFORMATION, PLEASE REFER TO DRAWING DZD0102

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

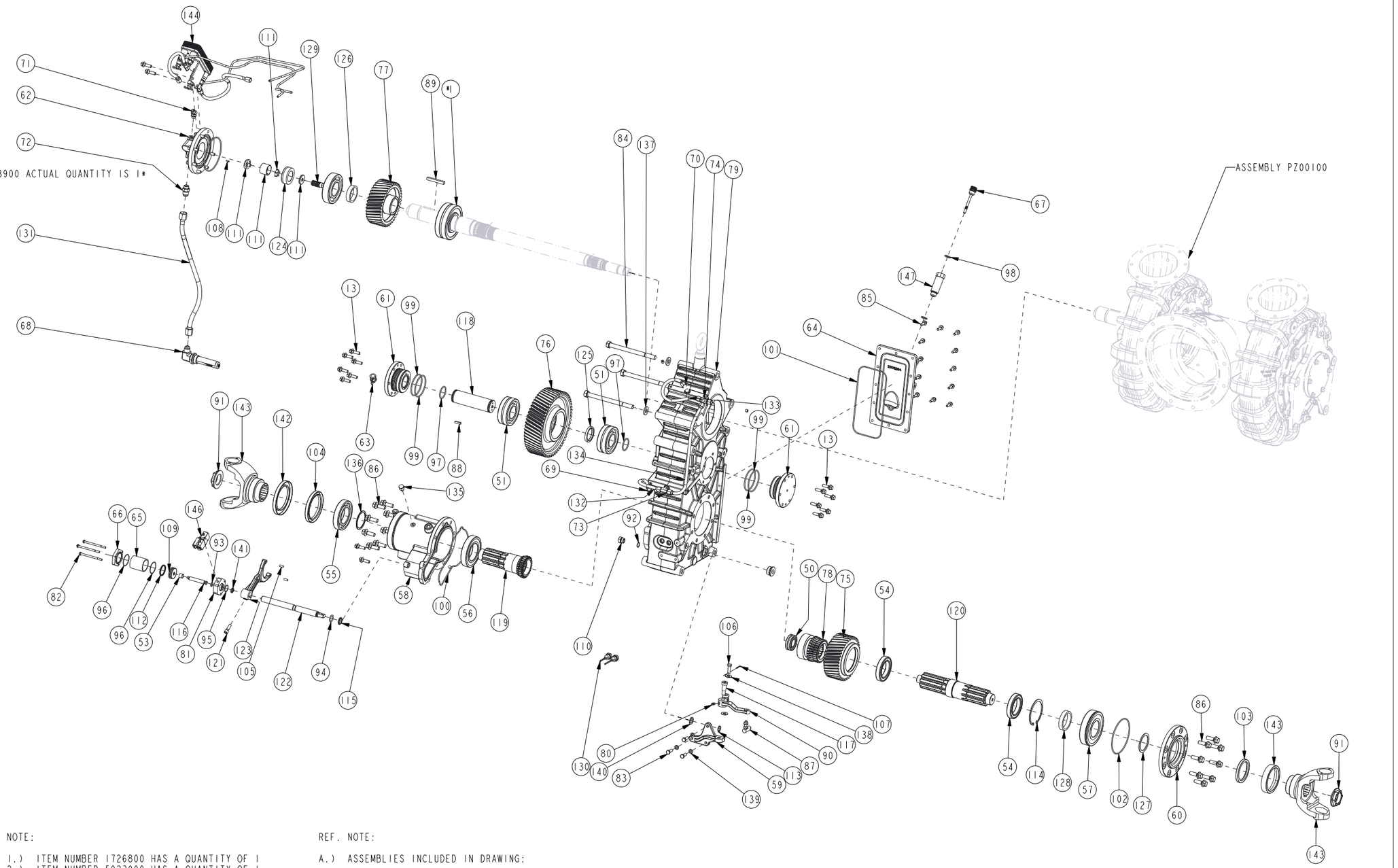
1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08000 (1:1 GR)

REMOVE SHARP EDGES	INCH [MILLIMETER]	THIRD ANGLE PROJECTION	OLD PART NO.	TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°	MODEL NAME FP01930	NOL CREATED	SHEET 2/3	D
MATERIAL DESCRIPTION: REF. TABLE			MATERIAL NO. / PATTERN NO.		W.S. Darley & Co. ITASCA, IL - CHIPPEWA FALLS, WI			
THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED	ALL DIMENSIONS IN INCHES UNLESS NOTED	DO NOT SCALE PRINT		DR'N KMD / CHKD WAH / TRCD	DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED			
					DATE 2-FEB-17	SCALE 1/4	DZC0102	

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	* 2 *
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814001	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 x 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601253	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501515	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2054400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	* 2 *
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22206E C3	1723600	1
51	BEARING - 2316E C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1136SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THR'D, 3.03 LO MARK	4218009	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 39T, 6DP, LH HELIX	2716901	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 39 T	2720400	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.00, 6DP	1804922	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1220940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 2.5MM x 2.5MM	3601702	2
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.11 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SW	4437130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1
147	EXTENSION, DIPSTICK	4436620	1

1726800 ACTUAL QUANTITY IS 1

5023900 ACTUAL QUANTITY IS 1



NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0102 ARE INCLUDED IN ASSEMBLY FP01930
5.) FOR DIMENSIONAL INFORMATION, PLEASE REFER TO DRAWING DZD0102

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08000 (1:1 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

DR'N KMD | CHKD WAH | TRCD

DATE 2-FEB-17 | SCALE 1/8

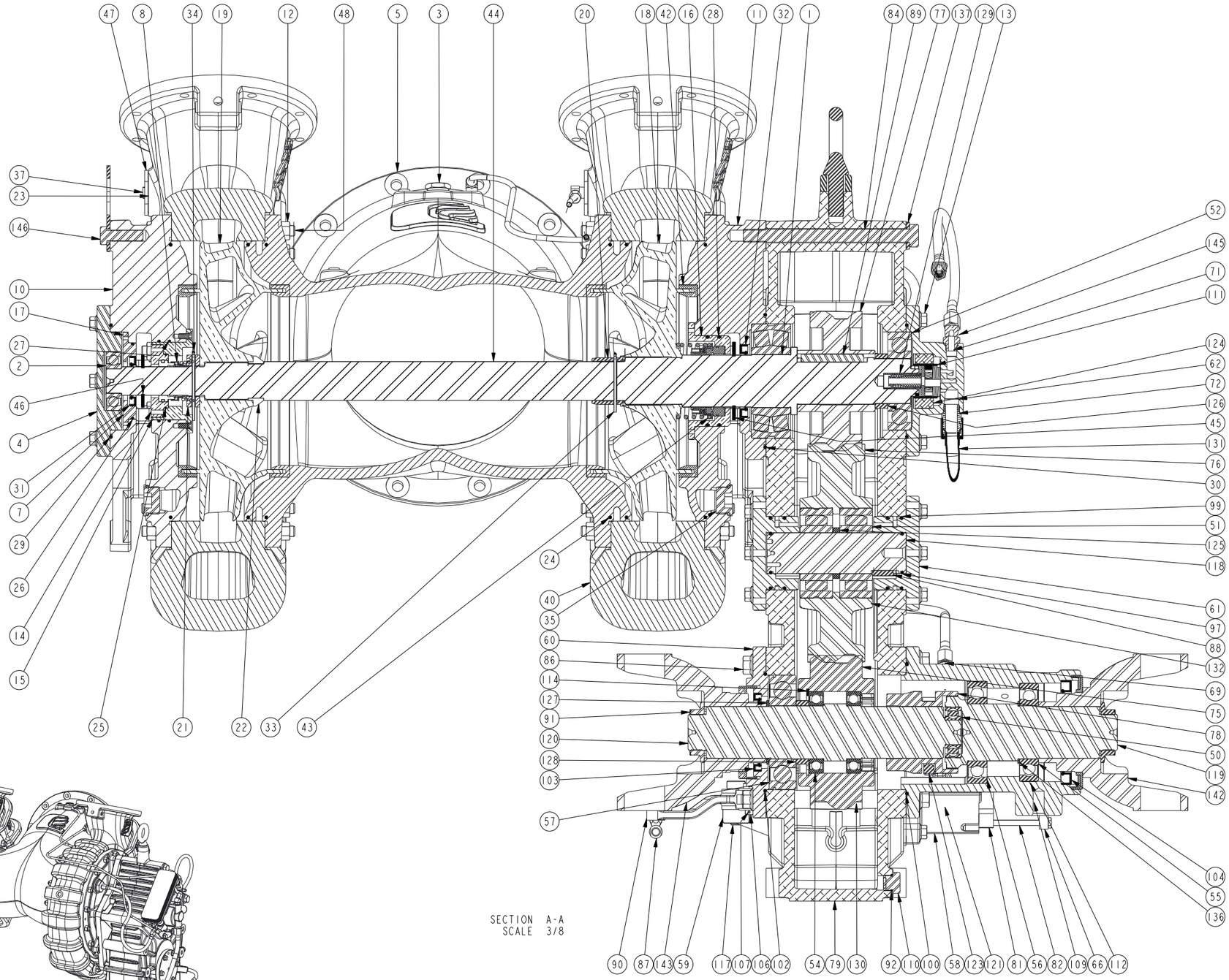
MODEL NAME	MDL CREATED	SHEET
FP01930		3/3 D

DZC0102

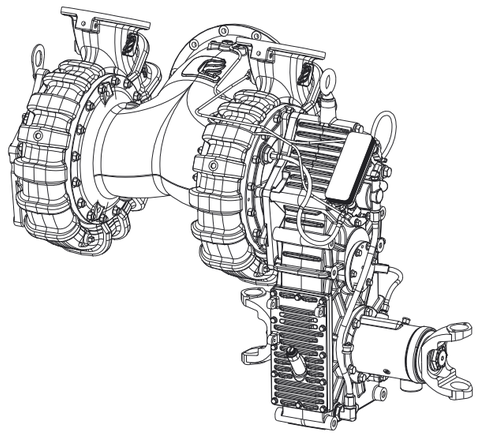
NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	#2#
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814001	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 x 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 8.25 x 8.50 x 0.12	3601203	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501515	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2054400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	#2#
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22208E C3	1723600	1
51	BEARING - 2316E C3	1726700	1
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1136SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THR'D, 3.03 LO MARK	4218009	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 4IT, 6DP, LH HELIX	2716902	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 37 T	2720402	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, D.11, 6DP	1804923	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 12270940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	2
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, S160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SN	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603922	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK ON, 1810	4813610	1
144	ASST - SHIFT INTERLOCK, 12VDC	AH06600	1
145	KIT - COOLER	KC00908	1
146	KIT - LIFTING RINGS	KD02210	1
147	EXTENSION, DIPSTICK	4436620	1

1726800 ACTUAL QUANTITY IS (1)

5023900 ACTUAL QUANTITY IS (1)



SECTION A-A
SCALE 3/8



NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0103 ARE INCLUDED IN ASSEMBLY FP01931
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0103

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08003 (1.11:1 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

DR'N KMD
CHK'D WAH
TRC'D

MODEL NAME	MDL CREATED	SHEET
FP01931		1/3 D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

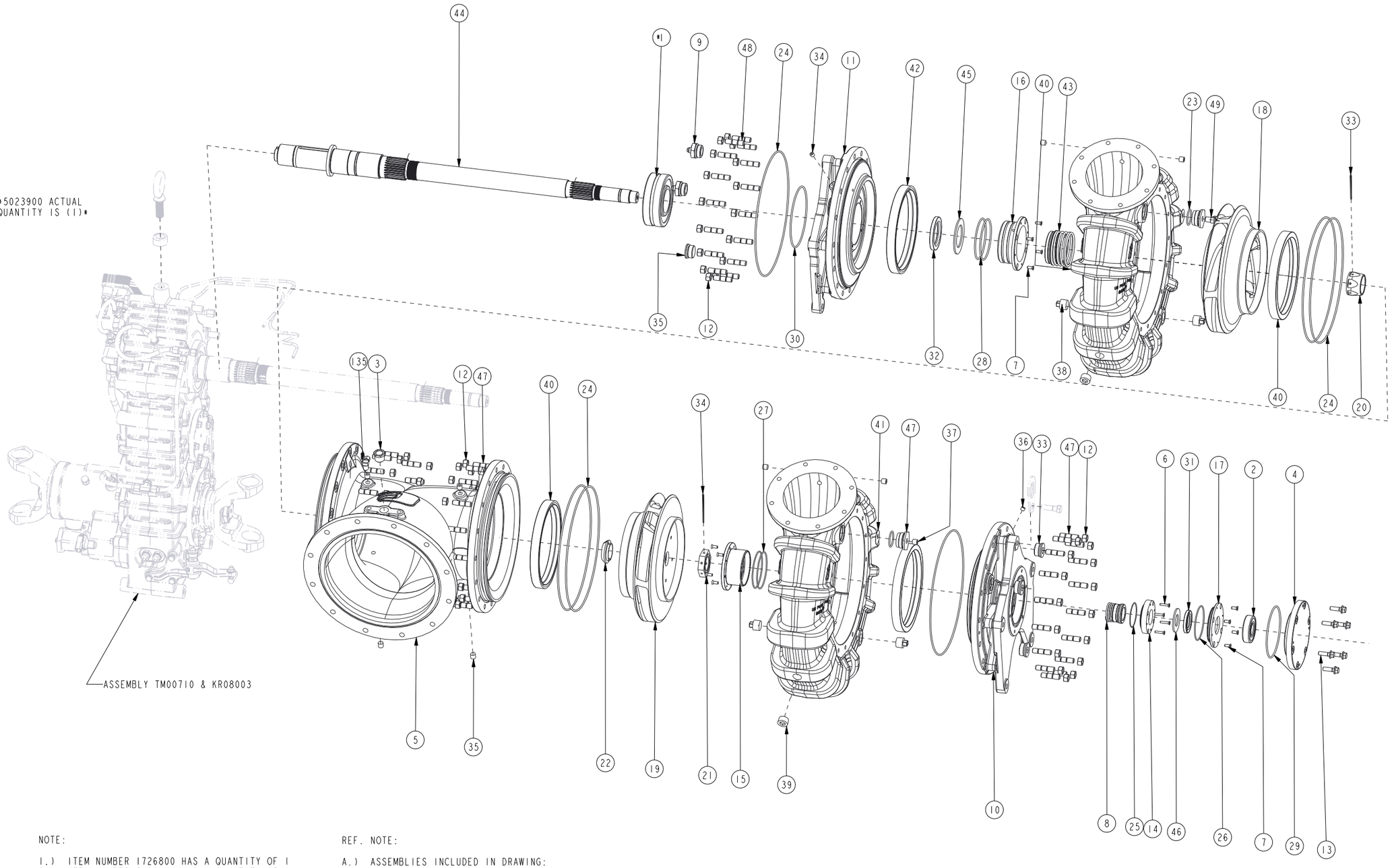
DATE 2-FEB-17
SCALE 3/8

DZC0103

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	#2 #
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814001	1
6	FHMS - #10-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601253	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501575	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2054400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	#2 #
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22206E C3	1723600	1
51	BEARING - 2231EC C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1138SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 TD	2502200	1
67	DIPSTICK - M22 THR'D, 3.03 LO MARK	4219009	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 41T, 6DP, LH HELIX	2716902	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 37 T	2720402	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.11, 6DP	1804923	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 6.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1227D940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	2
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605401	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, R5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1
145	KIT - COOLER	KC00908	1
146	KIT - LIFTING RINGS	KD02210	1
147	EXTENSION, DIPSTICK	4436620	1

1726800 ACTUAL QUANTITY IS (1)

5023900 ACTUAL QUANTITY IS (1)



NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0103 ARE INCLUDED IN ASSEMBLY FP01931
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0103

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08003 (1,11:1 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED .00 ±.03, .000 ±.010, ANGLES ±1°

DR'N KMD | CHK'D WAH | TRC'D

MODEL NAME: FP01931 | MOL CREATED | SHEET: 2/3 | D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

DATE 2-FEB-17 | SCALE 1/4

DZC0103

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	# 2 #
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814001	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - 250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403574	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601293	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501515	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	# 2 #
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22206E C3	1723600	1
51	BEARING - 2313SE C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1.13KSFF	1723400	2
55	BEARING-BALL, 2.13SF	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503329	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THR'D, 3.03 LO MARK	4219009	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 4IT, 6DP, LH HELIX	2716902	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 37 T	2720402	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 11, 6DP	1804923	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1220940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 2.5MM x 2.5MM	3601702	2
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.903 X 2.44 X .320	3309800	1
126	SPACER - 2.11 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SW	4437130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1
145	KIT - COOLER	KC00908	1
146	KIT - LIFTING RINGS	KD02210	1
147	EXTENSION, DIPSTICK	4436620	1

1726800 ACTUAL QUANTITY IS (1)

5023900 ACTUAL QUANTITY IS (1)

ASSEMBLY PZ00101

NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0103 ARE INCLUDED IN ASSEMBLY FP01931
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0103

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08003 (1.11:1 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

TOLERANCE EXCEPT AS NOTED .00 ±.03, .000 ±.010, ANGLES ±1°

ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

DR'N KMD | CHKD WAH | TRCD

MODEL NAME	MDL CREATED	SHEET
FP01931		3/3 D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

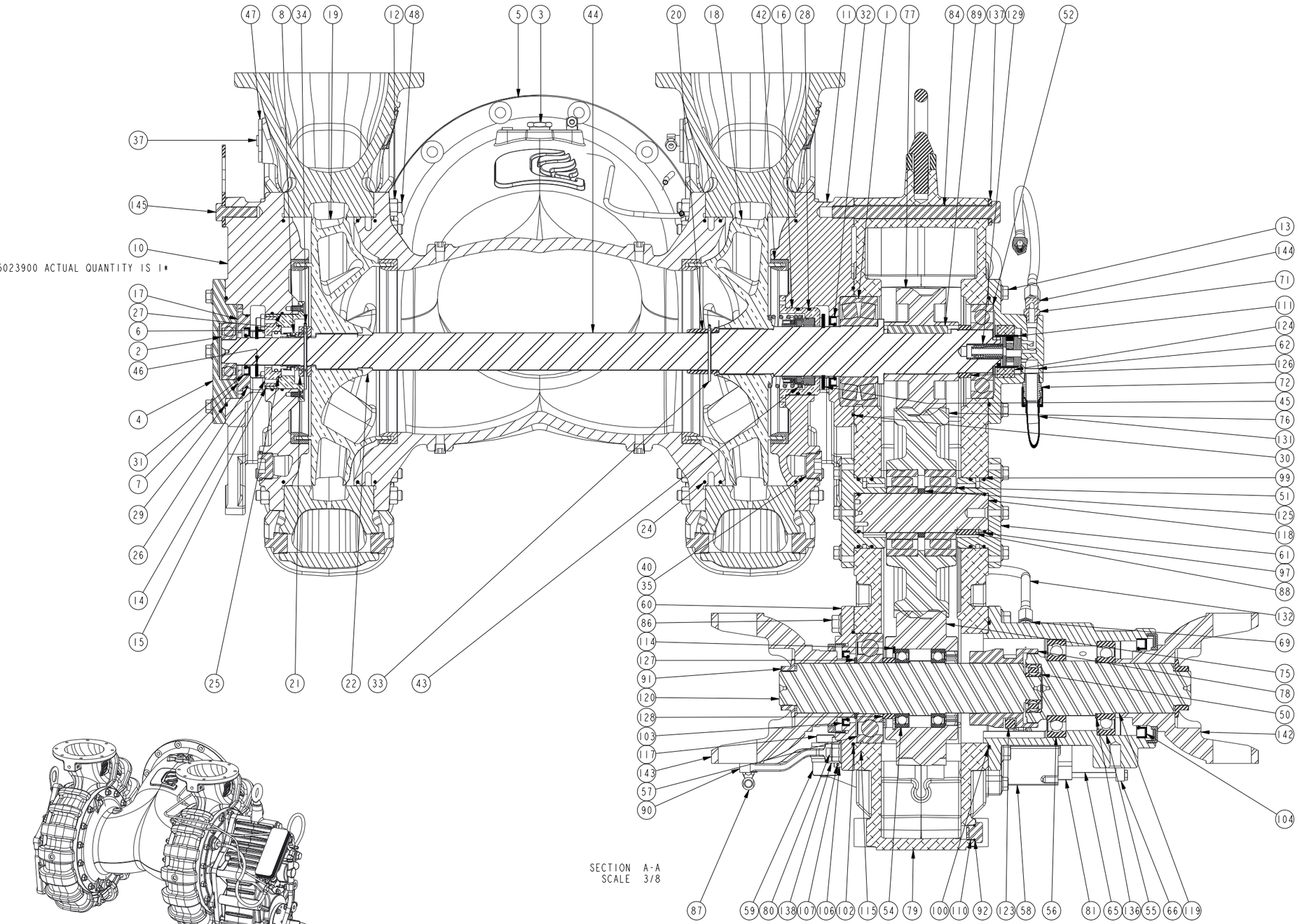
DATE 2-FEB-17 | SCALE 1/8

DZC0103

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	* 2 *
2	BEARING-BALL, 306SFF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814000	1
6	FHMS - #10-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRNG	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 3S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601203	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501575	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	* 2 *
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22206E C3	1723600	1
51	BEARING - 22310E C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 113KSFF	1723400	2
55	BEARING-BALL, 213SF	1721401	1
56	BEARING-BALL, 6214 ZR C0	1725400	1
57	BEARING-BALL, 6313 ZR C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH, 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.2I LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THR'D, 2.00 LO MARK	4219002	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 43T, 6DP, LH HELIX	2716903	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 35 T	2720404	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.23, 6DP	1804924	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ, 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ, 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 12270940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, S160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 x 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 3S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS 1

5023900 ACTUAL QUANTITY IS 1



SECTION A-A
SCALE 3/8

NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0104 ARE INCLUDED IN ASSEMBLY FP01932
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0104

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00101
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08005 (1.23 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED .00 ±.03, .000 ±.010, ANGLES ±1°

DR'N KMD
CHKD WAH
TRCD

MODEL NAME	MDL CREATED	SHEET
FP01932		1/3 D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

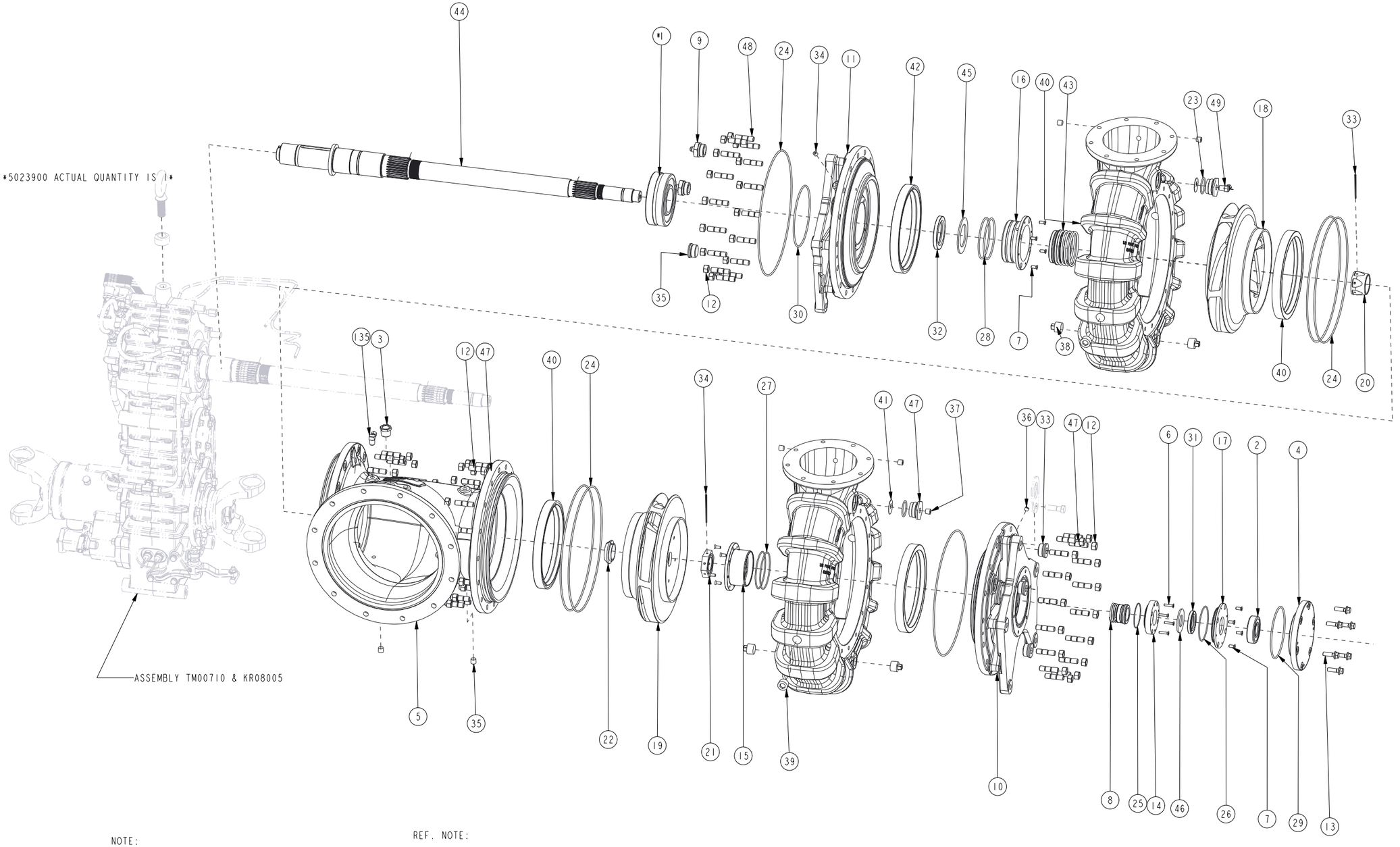
DATE 2-FEB-17
SCALE 3/8

DZC0104

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	* 2 *
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814000	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601203	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501575	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	* 2 *
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3604402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22208E C3	1723600	1
51	BEARING - 22310C C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1138SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THR'D, 2.00 LO MARK	4219002	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 43T, 6DP, LH HELIX	2716903	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 35 T	2720404	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.23, 6DP	1804924	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 6.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1227D940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.150 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT TOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS 1

5023900 ACTUAL QUANTITY IS 1



NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0104 ARE INCLUDED IN ASSEMBLY FP01932
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0104

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00101
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08005 (1.23 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

MATERIAL DESCRIPTION: REF. TABLE

MATERIAL NO.

PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT

DR'N KMD
CHK'D WAH
TRC'D

MODEL NAME: FP01932
NO. CREATED:
SHEET: 2/3
D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

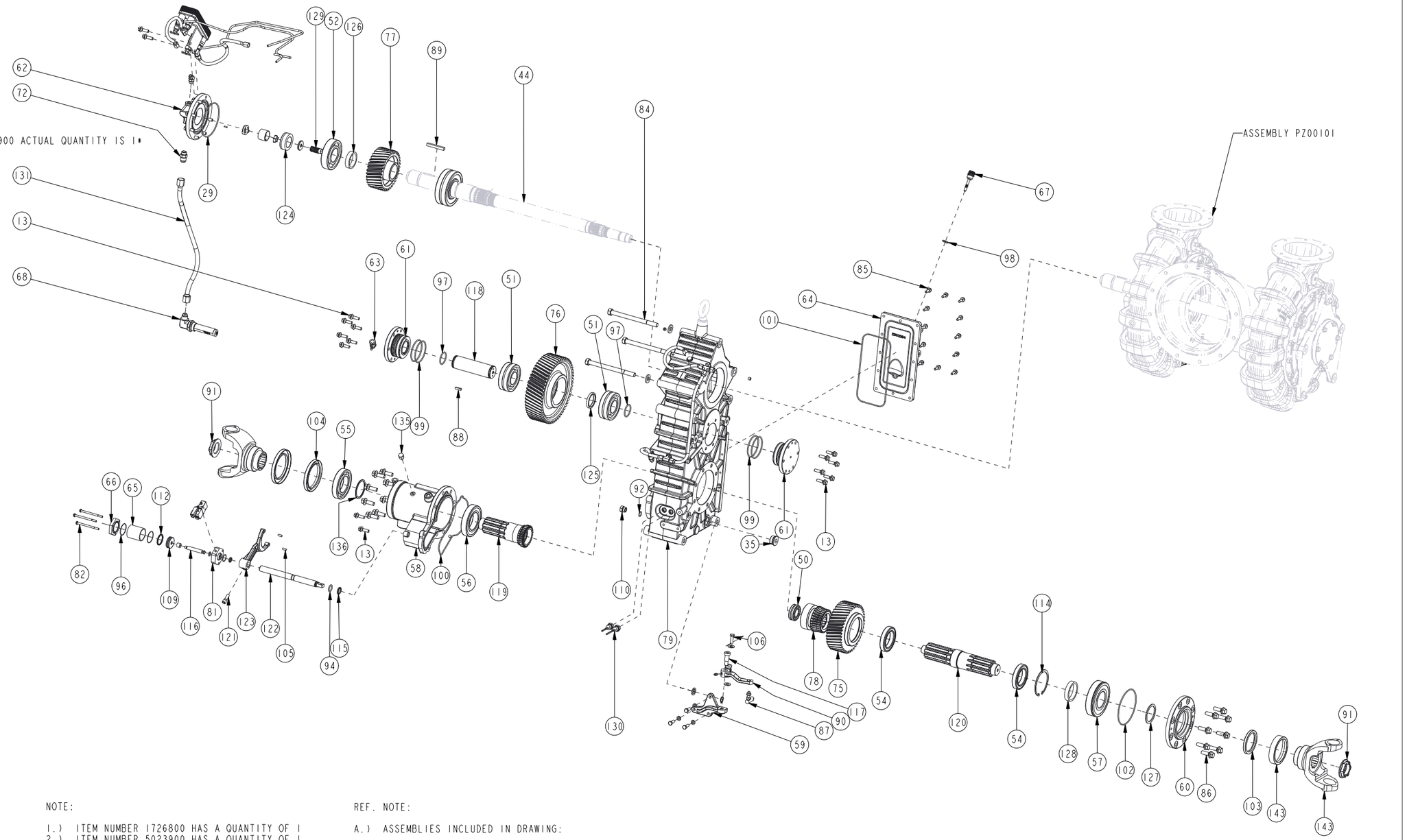
DATE 2-FEB-17
SCALE 1/4

DZC0104

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	* 2 *
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814000	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC. IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 x 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601293	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501515	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	* 2 *
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22208E C3	1723600	1
51	BEARING - 2316K C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1136SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THR'D, 2.00 LO MARK	4219002	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501619	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 43T, 6DP, LH HELIX	2716903	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 35 T	2720404	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, P.23, 6DP	1804924	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1227D940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 2.5MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.11 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS 1

5023900 ACTUAL QUANTITY IS 1



NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0104 ARE INCLUDED IN ASSEMBLY FP01932
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0104

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00101
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08005 (1.23 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

TOLERANCE EXCEPT AS NOTED .00 ±.03, 000 ±.010, ANGLES ±1°

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

DR'N KMD
CHKD WAH
TRCD

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

DATE 2-FEB-17
SCALE 1/8

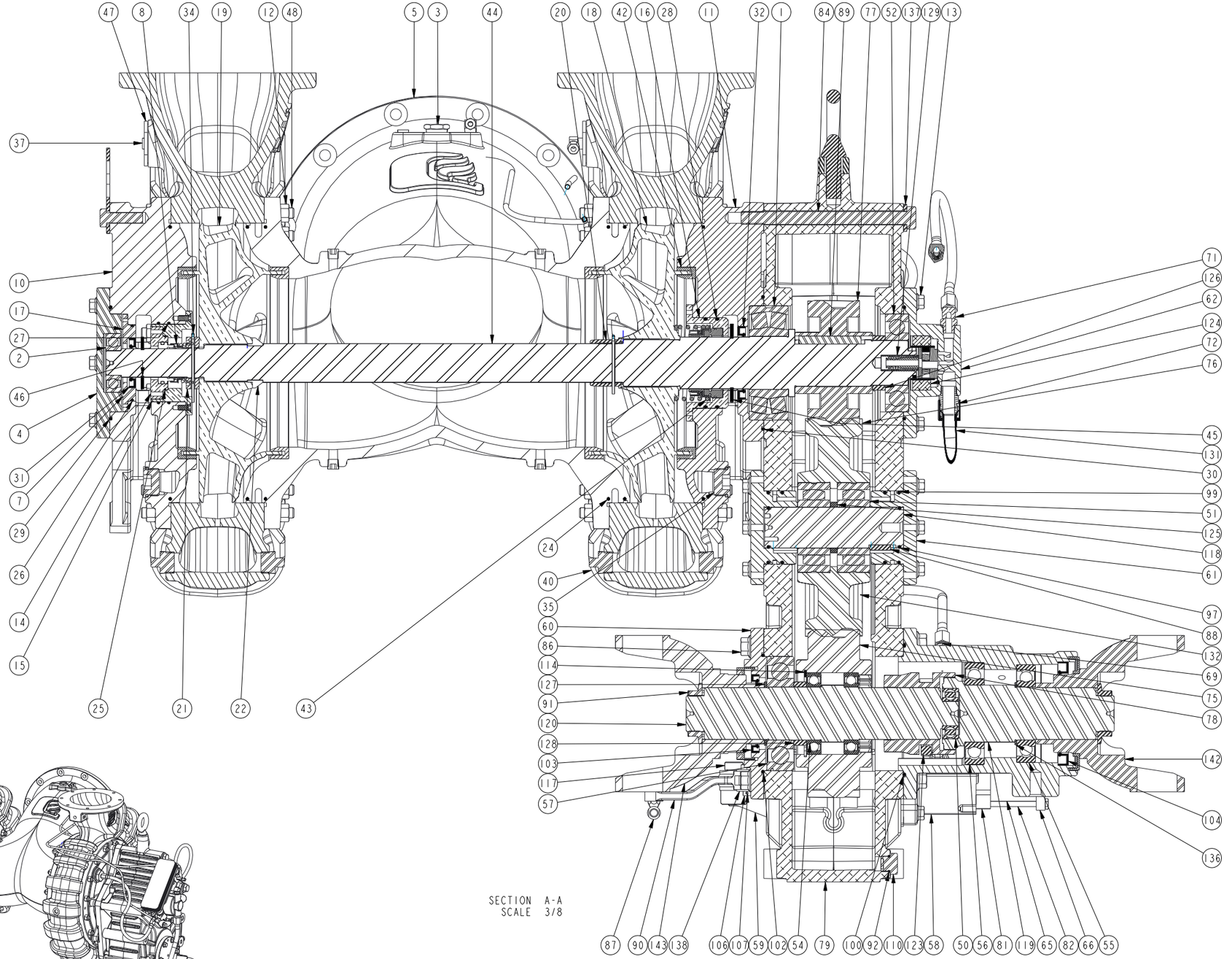
DZC0104

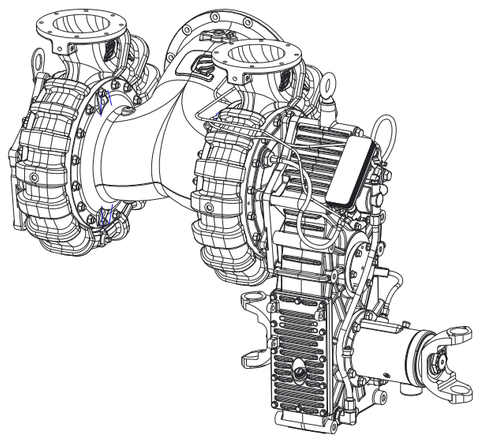
MODEL NAME	MDL CREATED	SHEET	
FP01932		3/3	D

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	#2#
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814000	1
6	FHMS - #10-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRNG	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 3S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 01.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601303	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501575	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT- IMPELLER 2ZS	5023900	2
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	#2#
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22206E C3	1723600	1
51	BEARING - 22310E C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1.13KSFF	1723400	2
55	BEARING-BALL, 213SF	1721401	1
56	BEARING-BALL, 6214 ZR C0	1725400	1
57	BEARING-BALL, 6313 ZR C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH, 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THRD, W/GROOVE	4219001	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 45T, 6DP, LH HELIX	2716904	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 33 T	2720406	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.36, 6DP	1804925	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ, 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ, 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 12270940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 x 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 3S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS (1)

5023900 ACTUAL QUANTITY IS (1)





SECTION A-A
SCALE 3/8

NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0105 ARE INCLUDED IN ASSEMBLY FP01933
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0105

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00101
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08006 (1.36 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

DR'N KMD
CHKD WAH
TRCD

MODEL NAME FP01933 | WDL CREATED | SHEET 1/3 | D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

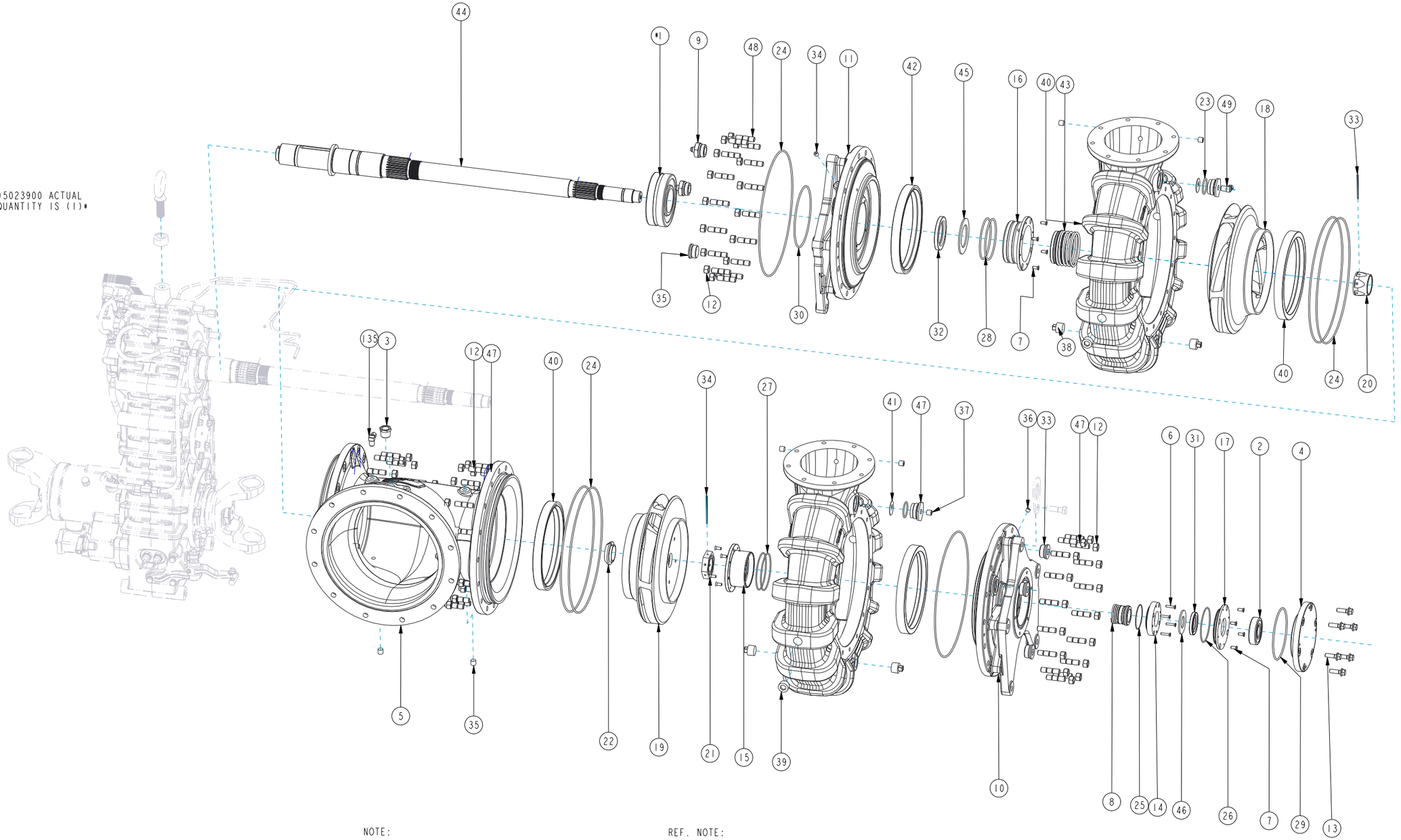
DATE 2-FEB-17
SCALE 3/8

DZC0105

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	#2#
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814000	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601203	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501575	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	2
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	#2#
48	STUD - 0.500-13 X 2.000, GR5	3604402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22208E C3	1723600	1
51	BEARING - 22310E C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - QILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1134SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THRD, W/GROOVE	4219001	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 4ST, 6DP, LH HELIX	2716904	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 33 T	2720406	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.36, 6DP	1804925	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 6.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1227D940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.150 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS (1)

5023900 ACTUAL QUANTITY IS (1)



REVISIONS

LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0105 ARE INCLUDED IN ASSEMBLY FP01933
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0105

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00101
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08006 (1.36 GR)

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

TOLERANCE EXCEPT AS NOTED .00 ±.03, .000 ±.010, ANGLES ±1°

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

DR'N KMD | CHK'D WAH | TRC'D

MODEL NAME: FP01933 | NOL CREATED | SHEET: 2/3 | D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

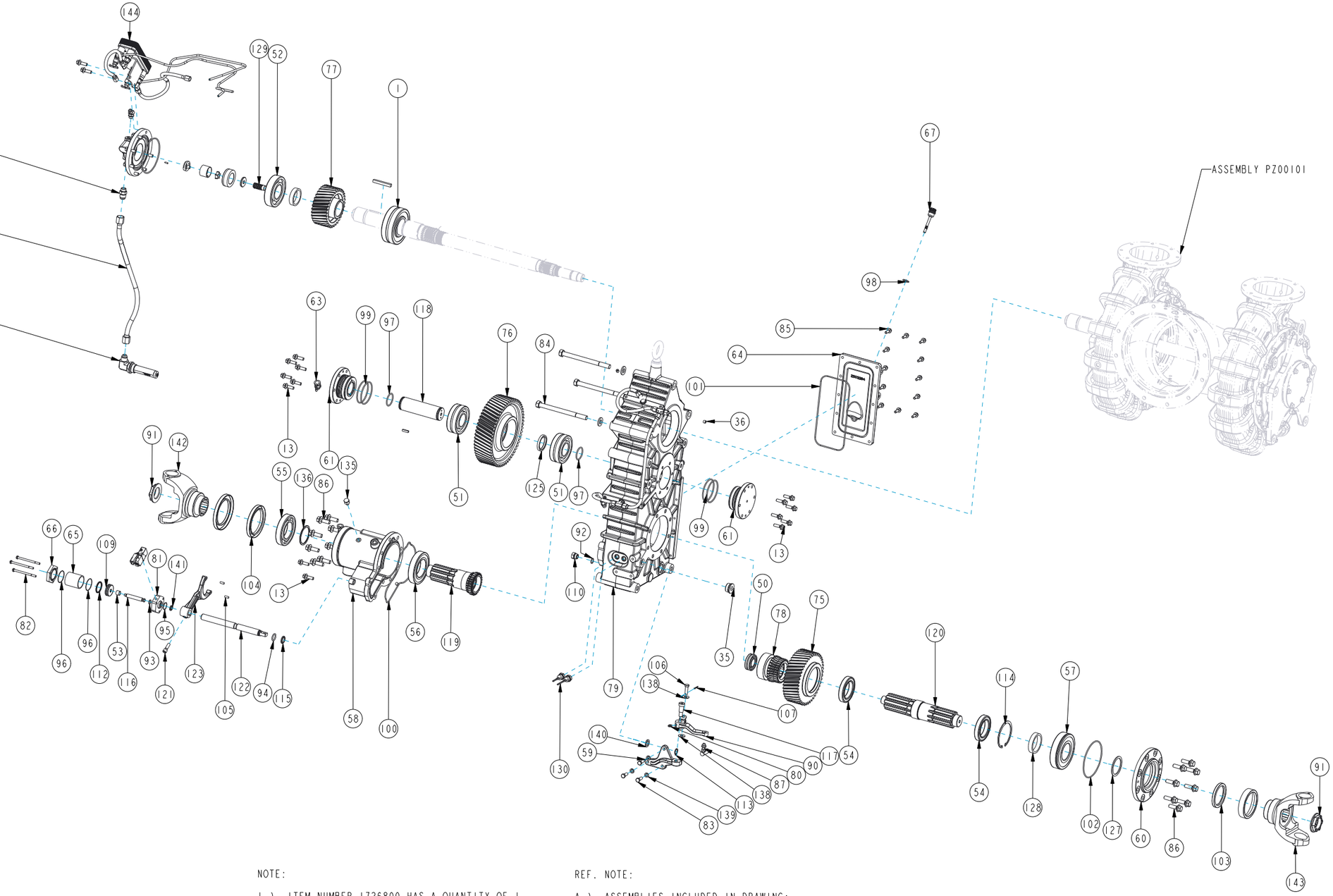
DATE 2-FEB-17 | SCALE 1/4

DZC0105

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	#2#
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814000	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - 250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC. IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 x 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601293	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501575	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2054400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	2
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	#2#
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22206E C3	1723600	1
51	BEARING - 2231QC C2	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - QILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1136SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THRD, W/GROOVE	4219001	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 4ST, 6DP, LH HELIX	2716904	1
76	GEAR - IDLER, 6DP, RH, .59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 33 T	2720406	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 11.36, 6DP	1804925	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1227D940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.903 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4437130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS (1)

5023900 ACTUAL QUANTITY IS (1)



NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0105 ARE INCLUDED IN ASSEMBLY FP01933
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0105

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00101
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08006 (1.36 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED .00 ±.03, .000 ±.010, ANGLES ±1°

DR'N KMD | CHK'D WAH | TRC'D

MODEL NAME: FP01933 | MDL CREATED | SHEET: 3/3 | D

W.S. Darley & Co. ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

DATE 2-FEB-17 | SCALE 1/8

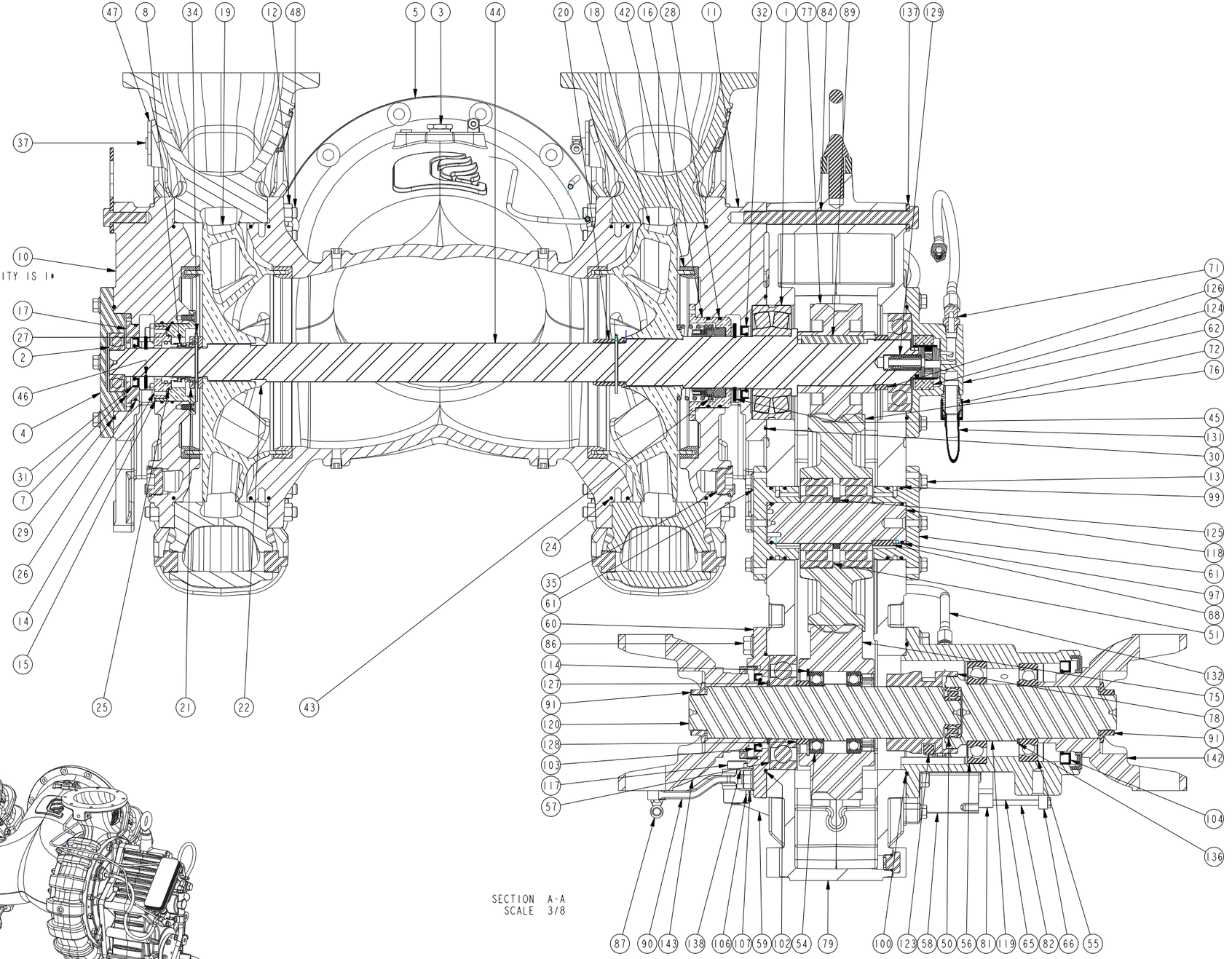
DZC0105

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	* 2 *
2	BEARING-BALL, 306SFF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814000	1
6	FHMS - #10-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRNG	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 01.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601303	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501575	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT- IMPELLER 2ZS	5023900	* 2 *
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22206E C3	1723600	1
51	BEARING - 22310E C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 113KSFF	1723400	2
55	BEARING-BALL, 213SF	1721401	1
56	BEARING-BALL, 6214 ZR C0	1725400	1
57	BEARING-BALL, 6313 ZR C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH, 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THRD, W/GROOVE	4219001	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 47T, 6DP, LH HELIX	2716905	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 31 T	2720408	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.5Z, 6DP	1804926	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ, 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ, 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 122T0940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 x 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1
150	DWG - 2SM, 3 GEAR, PUMP FORWARD	TM00710.152GR	1

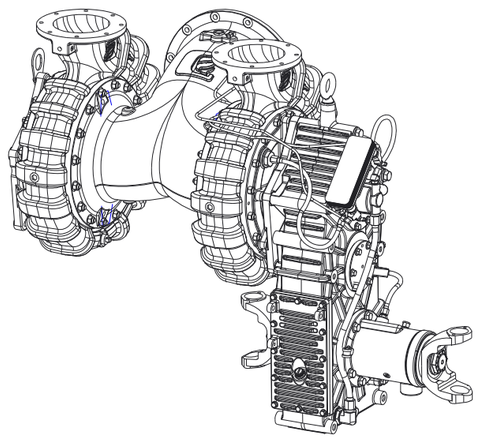
REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

1726800 ACTUAL QUANTITY IS 1

5023900 ACTUAL QUANTITY IS 1



SECTION A-A
SCALE 3/8



NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0106 ARE INCLUDED IN ASSEMBLY FP01936
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0106

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00101
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08004 (1.52 GR)

MODEL NAME	MDL CREATED	SHEET
FP01936		1/3 D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

DR'N KMD
CHKD WAH
TRCD

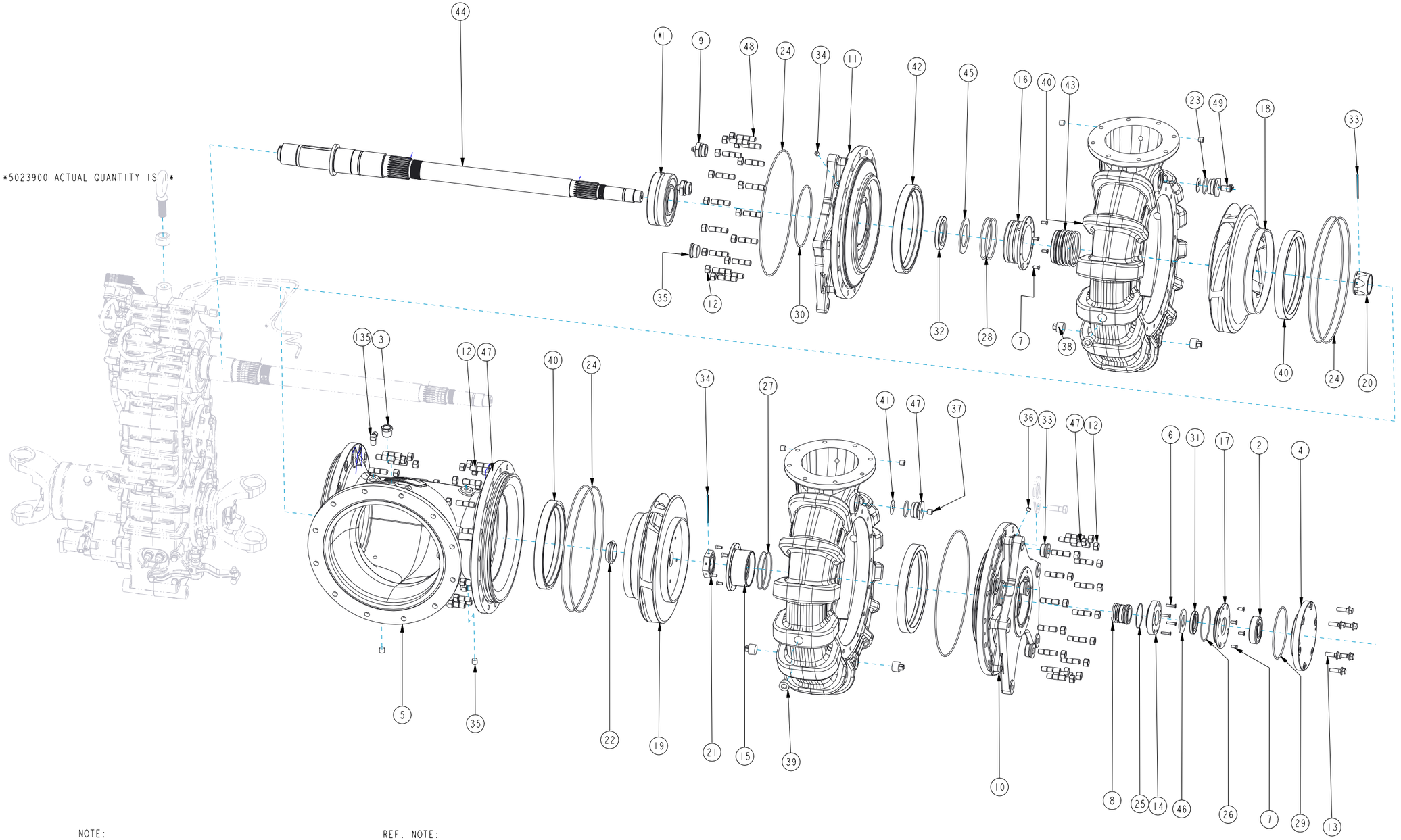
DATE 2-FEB-17
SCALE 3/8

DZC0106

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	* 2 *
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814000	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC, IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 X 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601203	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501575	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2056400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT- IMPELLER 2ZS	5023900	* 2 *
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3604402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22208E C3	1723600	1
51	BEARING - 2231QC C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - QILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1134SFF	1723400	2
55	BEARING-BALL, 2135F	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THRD, W/GROOVE	4219001	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 47T, 6DP, LH HELIX	2716905	1
76	GEAR - IDLER, 6DP, RH, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 31 T	2720408	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 1.52, 6DP	1804926	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 6.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1227D940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 25MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250.FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269.FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.150 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT TOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4432130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS 1

5023900 ACTUAL QUANTITY IS 1



NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0106 ARE INCLUDED IN ASSEMBLY FP01936
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0106

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00101
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08004 (1.52 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

MATERIAL DESCRIPTION: REF. TABLE

MATERIAL NO.

PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT

DR'N KMD
CHK'D WAH
TRC'D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

MODEL NAME	NOL CREATED	SHEET	
FP01936		2/3	D

DATE 2-FEB-17

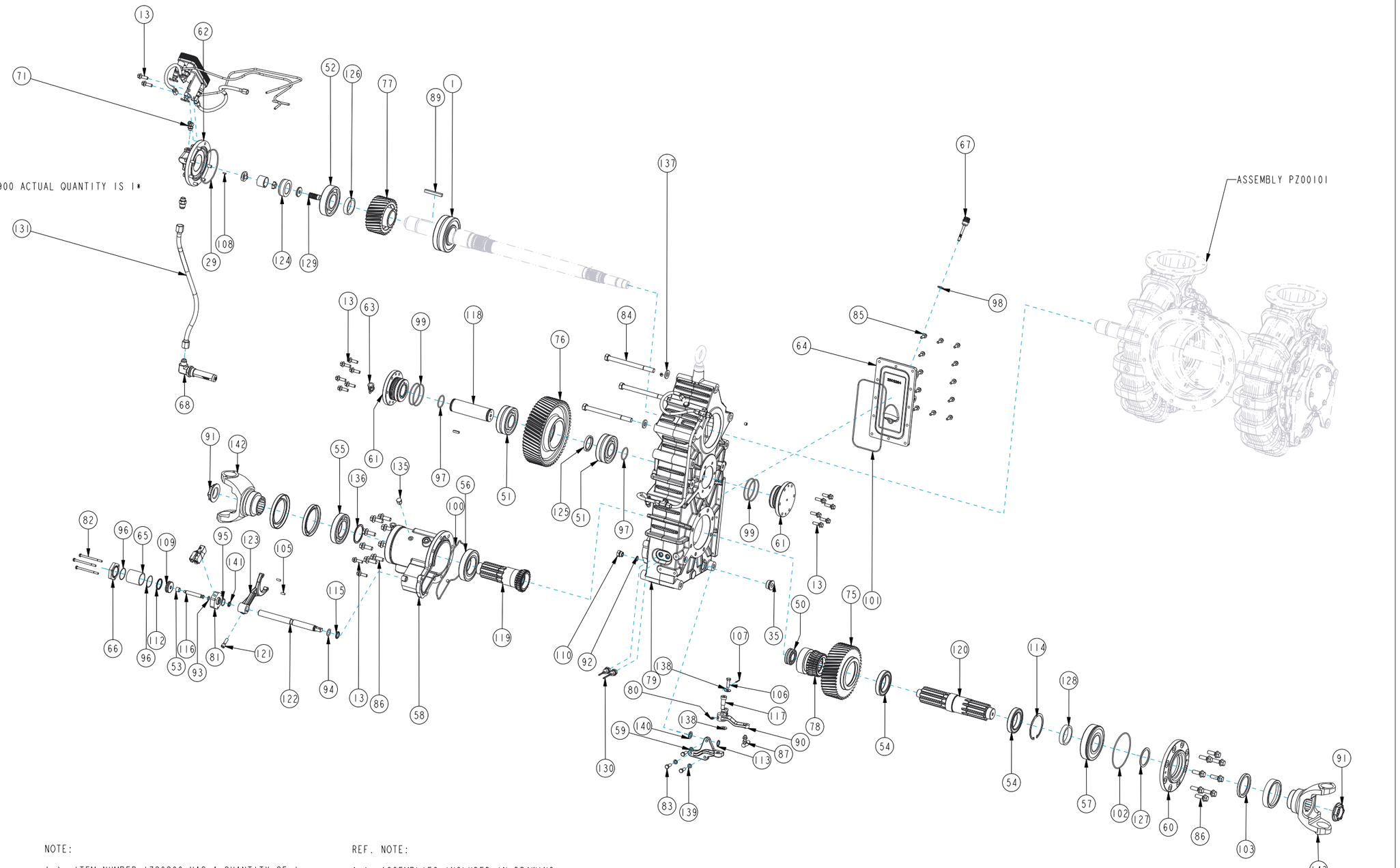
SCALE 1/4

DZC0106

NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - SPHERICAL ROLLER	1726800	* 2 *
2	BEARING-BALL, 3065FF	1721802	1
3	BUSHING - PIPE, .75 x 0.50 BR	1080653	1
4	CAP, BEARING	2316600	1
5	DUAL SUCTION HEAD - 2ZS	2814000	1
6	FHMS - 810-24 x 1.00"	5402416	4
7	FHMS - .250-20 x 0.63, SS	5402402	12
8	FLOWSERVE - 1.375" WELD SPRING	1841403	1
9	FTG - 1.00 ORB MALE X -06 JIC MALE	3501574	2
10	HEAD - INBOARD, 2ZS	2812610	1
11	HEAD - INBOARD, 2S	2812620	1
12	HEX NUT - .500-13, GR 2	5403005	64
13	HHCS - FLANGED, .375-16 X 1.25	5402856	28
14	HOUSING, MECH SEAL	2316800	1
15	HOUSING, MECHANICAL SEAL	2316700	1
16	HOUSING, MECHANICAL SEAL	2316900	1
17	HOUSING, OIL SEAL	2316500	1
18	IMPELLER - 2ZS, TRANS SIDE	2908710	1
19	IMPELLER - 2S, R.H.	2908720	1
20	LOCKNUT - IMPELLER	5403524	1
21	MECH SEAL PILOT, 2ZS	5403523	1
22	MISC. IMPELLER SHOULDER	4436700	2
23	O-RING - 1.47 x 1.71 x 0.09	3601401	2
24	O-RING - 13.00 x 12.75 x 0.12	3601272	6
25	O-RING - 2.50 x 2.62 x 0.06	3601010	1
26	O-RING - 3.50 x 3.69 x 0.09	3601101	1
27	O-RING - 3.75 x 3.94 x 0.09	3601133	2
28	O-RING - 4.12 x 4.38 x 0.12	3601217	2
29	O-RING - 5.25 x 5.50 x 0.12	3601232	2
30	O-RING - 6.25 x 6.50 x 0.12	3601293	1
31	OIL SEAL - 1.375 ID X 2.378 OD	3600550	1
32	OIL SEAL - 2.500 ID X 3.505 OD	3600513	1
33	PIN - COTTER 2.5" x .125"	3605214	1
34	PIN - COTTER 3.00" x .125"	3605215	1
35	PLUG - 1 5/16-12 SAE ORB, HEX SOC	3501515	5
36	PLUG - PIPE, 0.125, SST SOC HD	1080533	9
37	PLUG - PIPE, 0.250, SST SOC HD	1080535	10
38	PLUG - PIPE, 0.750 SST SO HD	1080543	4
39	PLUG - PIPE, 0.750, SST SOC HD	1080551	4
40	PUMP CASING - 2S	2054400	2
41	SCREEN STRAINER	1122400	2
42	SEAL RING - 2S	3407500	4
43	SEAL, MECHANICAL	1846800	1
44	SHAFT - IMPELLER 2ZS	5023900	* 2 *
45	SLINGER - WATER	3206901	1
46	SLINGER - WATER	3206900	1
47	STRAINER - FITTING	1122300	2
48	STUD - 0.500-13 X 2.000, GR5	3606402	64
49	TUBE FITTING - EL, .25 x .25	3500509	2
50	BEARING - 22208E C3	1723600	1
51	BEARING - 2Z310E C3	1726700	2
52	BEARING - BALL, 6311.C3	1725900	1
53	BEARING - OILITE, 0.500 ID	1760021	1
54	BEARING-BALL, 1.13KSFF	1723400	2
55	BEARING-BALL, 2.13SF	1721401	1
56	BEARING-BALL, 6214.ZR.C0	1725400	1
57	BEARING-BALL, 6313.ZR.C0	1725200	1
58	BRACKET - BEARING, REAR, SHORT	2311300	1
59	BRACKET - LEVER, SHIFT ASSIST	4032800	1
60	CAP - BEARING, FRONT	2311400	1
61	CAP - BEARING, IDLER	2316000	2
62	CAP - BEARING, IMPELLER, 2S	2313300	1
63	CLAMP - CUSH., 0.62 ID x .75 W	4403347	2
64	COVER - GEARCASE, CAST	2503320	1
65	CYLINDER - 1.751D x 2.21 LG	1020700	1
66	CYLINDER END - 1.75 ID	2502200	1
67	DIPSTICK - M22 THRD, W/GROOVE	4219001	1
68	FILTER - LUBE PUMP, 100 MESH	1124301	1
69	FTG - .38 JICM X 9/16-18, SAE ORB	3501566	1
70	FTG - .38 JICM X 9/16-18, SAE ORB	3501567	1
71	FTG - .38 JICM X 9/16-18, SAE ORB	3501576	1
72	FTG - .62 JICM X 3/4-16 SAE ORB	3501569	1
73	FTG - BRANCH TEE ADJUSTABLE, .38	3501609	1
74	FTG - SWIVEL TEE-RUN, -06, .38	3501610	1
75	GEAR - DRIVE, 47T, 6DP, LH HELIX	2716905	1
76	GEAR - IDLER, 6DP, 9H, 59 T	2720300	1
77	GEAR - PINION, 6 DP, LH, 31 T	2720408	1
78	GEAR - SLIDING CLUTCH, N	2410800	1
79	GEARCASE - MIDSHIP, 11.52, 6DP	1804926	1
80	GREASE ZERK - .25-28	4403200	1
81	HEAD - CYLINDER, 1.75 ID	2802700	1
82	HHCS - .250-20 x 3.75, 18-8	5400651	3
83	HHCS - .375-16 x 1.00, GR5	5400036	3
84	HHCS - .625-11 x 8.00, GR5	5400108	3
85	HHCS - FLANGED, .313-18 X 1.00	5402843	12
86	HHCS - FLANGED, .500-13 X 1.50	5402855	16
87	JOINT - BALL, 0.38"	4403100	1
88	KEY - SQ., 0.25 x 1.00, GR2	3602432	1
89	KEY - SQ., 0.38 X 3.00	3602407	1
90	LEVER - MANUAL SHIFT ASSIST	3012200	1
91	NUT - 1227D940	4814600	2
92	O-RING - .644 x .818 x 0.087	3601900	1
93	O-RING - 0.50 x 0.69 x 0.09	3601118	3
94	O-RING - 0.88 x 1.12 x 0.12	3601212	1
95	O-RING - 1.00 x 1.12 x 0.06	3601016	1
96	O-RING - 1.75 x 1.88 x 0.06	3601015	2
97	O-RING - 1.75 x 2.00 x 0.12	3601205	2
98	O-RING - 20MM x 2.5MM x 2.5MM	3601702	1
99	O-RING - 3.25 x 3.50 x 0.12	3601246	4
100	O-RING - 3601250, 2311300 FORM	3601250 FRM2	1
101	O-RING - 3601269, 2503320 FORM	3601269 FRM1	1
102	O-RING - 5.50 x 5.75 x 0.12	3601270	1
103	OIL SEAL - 2.938 ID X 3.756 OD	3600543	1
104	OIL SEAL - 3.750 ID X 5.000 OD	3600570	1
105	PELLET - OIL WICK	4400901	2
106	PIN - CLEVIS, CYLINDER END	1160300	1
107	PIN - COTTER, .094 x .750, SST	3605201	1
108	PIN - DOWEL, 0.156 x 0.50, GR8	3605407	1
109	PISTON - CYLINDER, 1.75 ID	4421200	1
110	PLUG - MAGNETIC, 3/4-16UNF	1080545	1
111	PUMP - HYD, INTERNAL GEAR, LUBE	4821020	1
112	QUAD RING - 1.50 x 1.75 x 0.12	3601602	1
113	RING - RETAINER, 5160-75	3600415	1
114	RING - RETAINER, N5000-393	3600438	1
115	RING - WIPER, .875 ID	1841001	1
116	ROD - PISTON	4416100	1
117	SCREW - SHOULDER, .625 DIA X 1.00	5402854	1
118	SHAFT - IDLER GEAR, 2S	5023500	1
119	SHAFT - TAILSHAFT	5020800	1
120	SHAFT - TRANSMISSION	5020900	1
121	SHCS - .375-16 x 1.25, GR8	5401024	1
122	SHIFT BAR - 2S	1184500	1
123	SHIFT YOKE - 2S	1184600	1
124	SLEEVE - MEGATRANS, OIL PUMP	1887400	1
125	SPACER - 1.983 X 2.44 X .320	3309800	1
126	SPACER - 2.17 x 2.63 x .611	3305202	1
127	SPACER - 2.51 x 3.06 x .125	3304711	1
128	SPACER - 2.56 x 3.06 x .616	3304706	1
129	SPRING CARTRIDGE - OIL PUMP	4821100	1
130	SWITCH - POSITION, BALL DETENT	2600153	2
131	TUBE - LUBE PUMP SUCTION, 2SM	4437130	1
132	TUBE - LUBE, 2S	4434100.FRM3	1
133	TUBE - LUBRICATION, 2S	4434100.FRM4	1
134	TUBE - LUBRICATION, 2S	4434103.FRM1	1
135	VENT - GEARCASE, 1/8 NPT MALE	4401801	1
136	WASHER - 2.56 x 3.00 x .09 STL	3603023	1
137	WASHER - FLAT, .641 X 1.303 X .160	3603825	3
138	WASHER - FLAT, 3/8, STEEL	3603803	2
139	WASHER - LOCK, 0.375 ID	3603503	3
140	WASHER - SHIFT BAR STOP	3603923	1
141	WIPER RING	1841000	1
142	YOKE - PUMP, LOCK ON, 1810	4813620	1
143	YOKE - PUMP, LOCK-ON, 1810	4813610	1
144	KIT - COOLER	KC00908	1
145	KIT - LIFTING RINGS	KD02210	1
146	ASSY - SHIFT INTERLOCK, 12VDC	AH00600	1

1726800 ACTUAL QUANTITY IS 1

5023900 ACTUAL QUANTITY IS 1



NOTE:

1.) ITEM NUMBER 1726800 HAS A QUANTITY OF 1
2.) ITEM NUMBER 5023900 HAS A QUANTITY OF 1
3.) APPROXIMATE WEIGHT 1300 LBS (590 Kg)
4.) COMPONENETS AND ASSEMBLIES DEPICTED IN DRAWING DZC0106 ARE INCLUDED IN ASSEMBLY FP01936
5.) FOR DIMENSIONAL INFORMATION, REFER TO DRAWING DZD0106

REF. NOTE:

A.) ASSEMBLIES INCLUDED IN DRAWING:

1.) PZ00101
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08004 (1.52 GR)

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

TOLERANCE EXCEPT AS NOTED .00 ±.03, 000 ±.010, ANGLES ±1°

MATERIAL DESCRIPTION: REF. TABLE | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, 3GEAR, PUMP FORWARD CROSS SECTION / EXPLODED

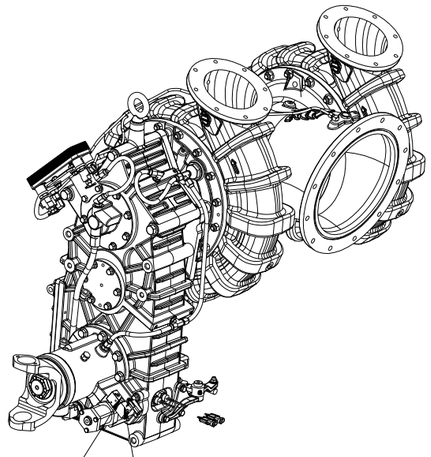
DR'N KMD | CHKD WAH | TRCD

DATE 2-FEB-17 | SCALE 1/8

MODEL NAME	MDL CREATED	SHEET	
FP01936		3/3	D

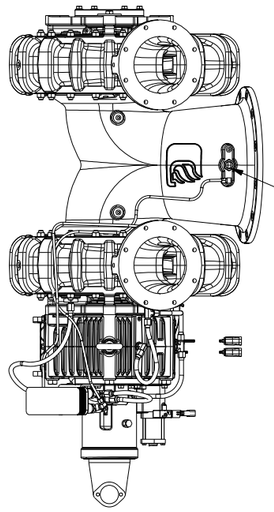
DZC0106

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D
A	ADDED SHIFT INTERLOCK ASSEMBLY UPDATED DIPSTICK	1/23/17	11580	KMD

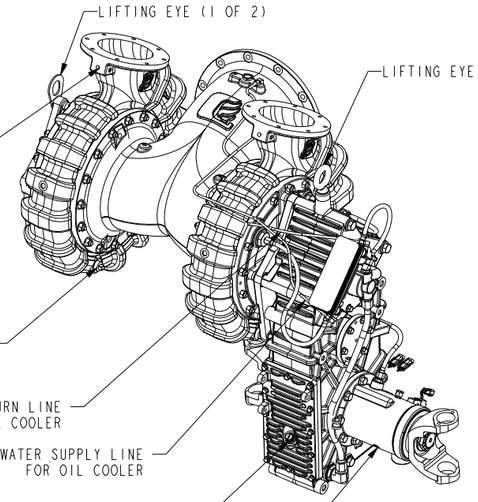


PNUEMATIC SHIFT
1/8" NPT TAP
(SUPPLY AIR PRESSURE
FOR ROAD MODE, VENT AIR
FOR PUMP MODE)

OPTIONAL SHIFT INTERLOCK
ASSEMBLY: AH00600
(MUST BE PURCHASED WITH PUMP)



3/4" NPT PRIMER TAP



LIFTING EYE (1 OF 2)

LIFTING EYE (2 OF 2)

DISCHARGE PRESSURE TAP
1/4" NPT (x 6)

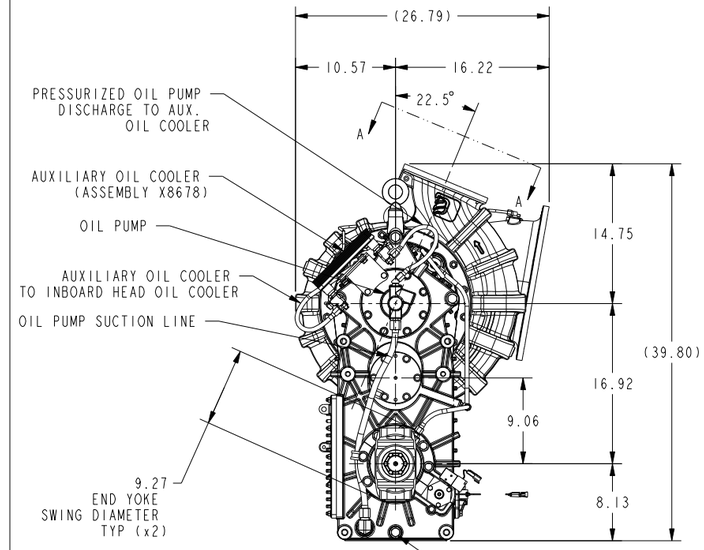
3/4" NPT DRAIN
(PUMP CASING x2)

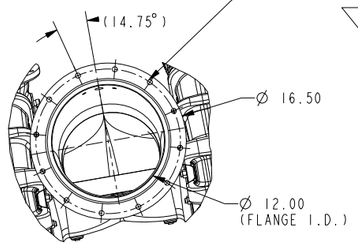
WATER RETURN LINE
FOR OIL COOLER

WATER SUPPLY LINE
FOR OIL COOLER

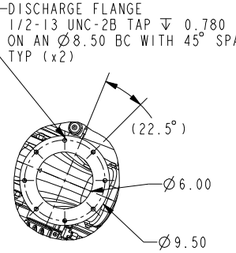
OIL LEVEL DIP STICK
PN: 4219005
*SEE NOTE

1/8" NPT TAIL SHAFT
RESERVOIR OIL LEVEL

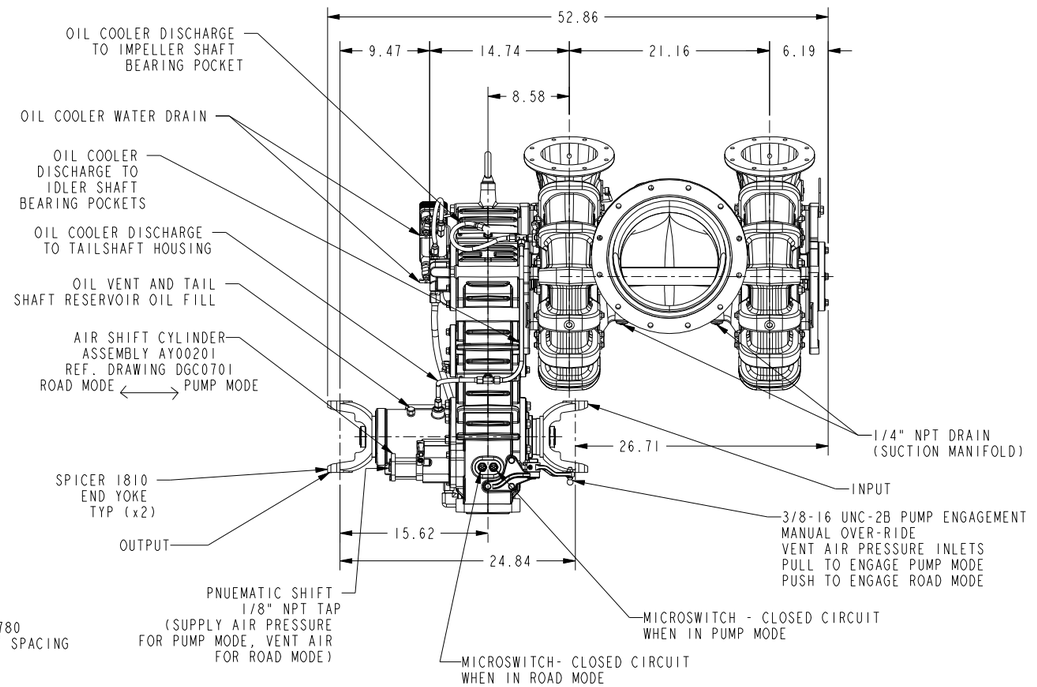


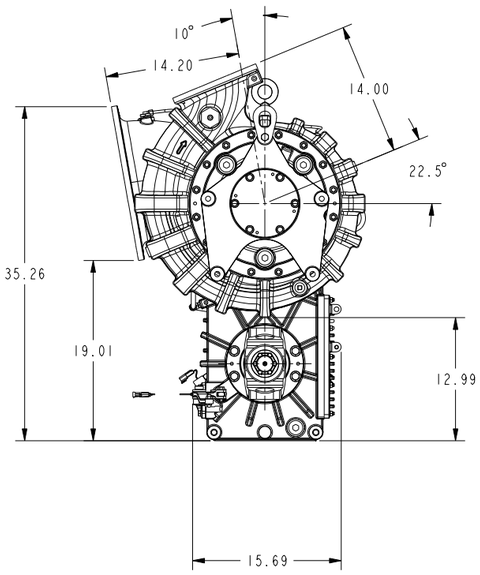


AUXILIARY VIEW B-B



AUXILIARY VIEW A-A





NOTE:
1.) APPROXIMATE WEIGHT: 1300 LBS (590 Kg)
2.) SHOWN WITH A 1.44:1 GEAR RATIO
3.) 3601271 O-RING IS USED ON THE SUCTION FLANGE
4.) OIL LEVEL DIPSTICK 4219005 IS INTENDED TO BE USED ON A 3 GEAR MEGA TRANSMISSION THAT INCLUDES A 1.44:1 GEAR RATIO THAT WILL BE INSTALLED AT A VERTICAL 10 DEGREE OFFSET (AS SHOWN IN DRAWING DZD0100)

REF NOTE:
ASSEMBLIES INCLUDED
IN DRAWING :

1.) PZ00100
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR00801

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO. X8778 | TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

MATERIAL DESCRIPTION: | MATERIAL NO. | PATTERN NO.

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MODEL NAME FP01934 | MDL CREATED 1/1 | SHEET D

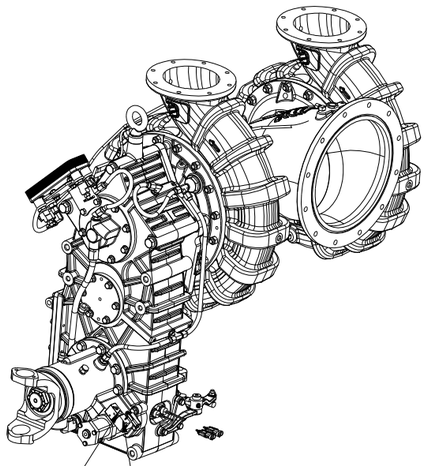
W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM
PUMP FORWARD

DR'N KMD | CHKD WAH | TRCD | DATE 16-MAR-17 | SCALE 1/8

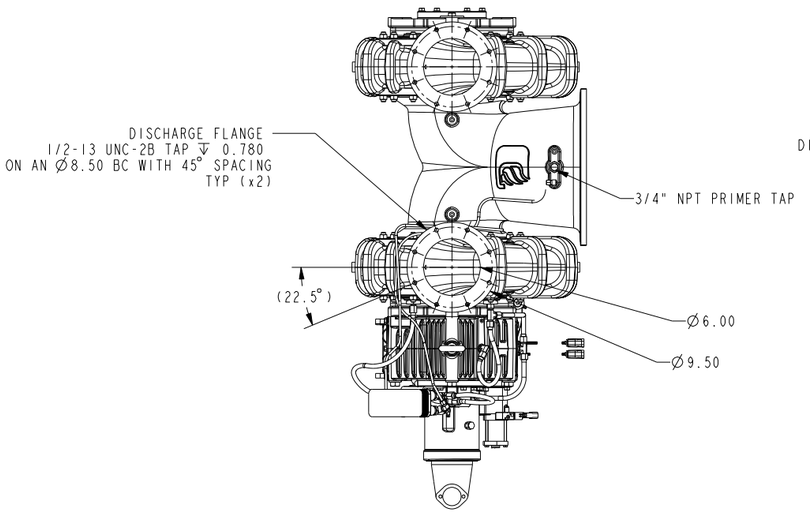
DZD0100

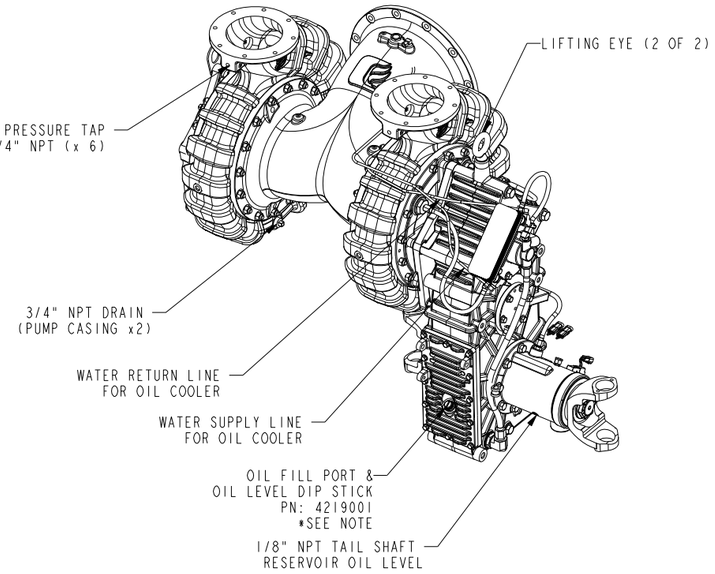
REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D
A	ADDED SHIFT INTERLOCK ASSEMBLY UPDATED DIPSTICK	1/23/17	11580	KMD

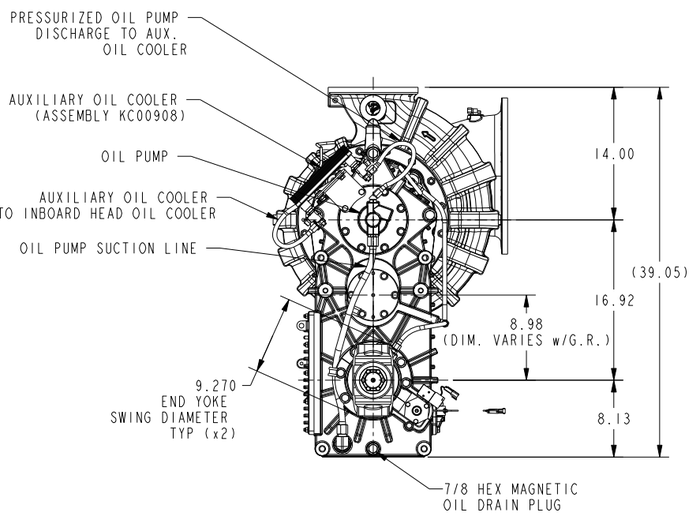


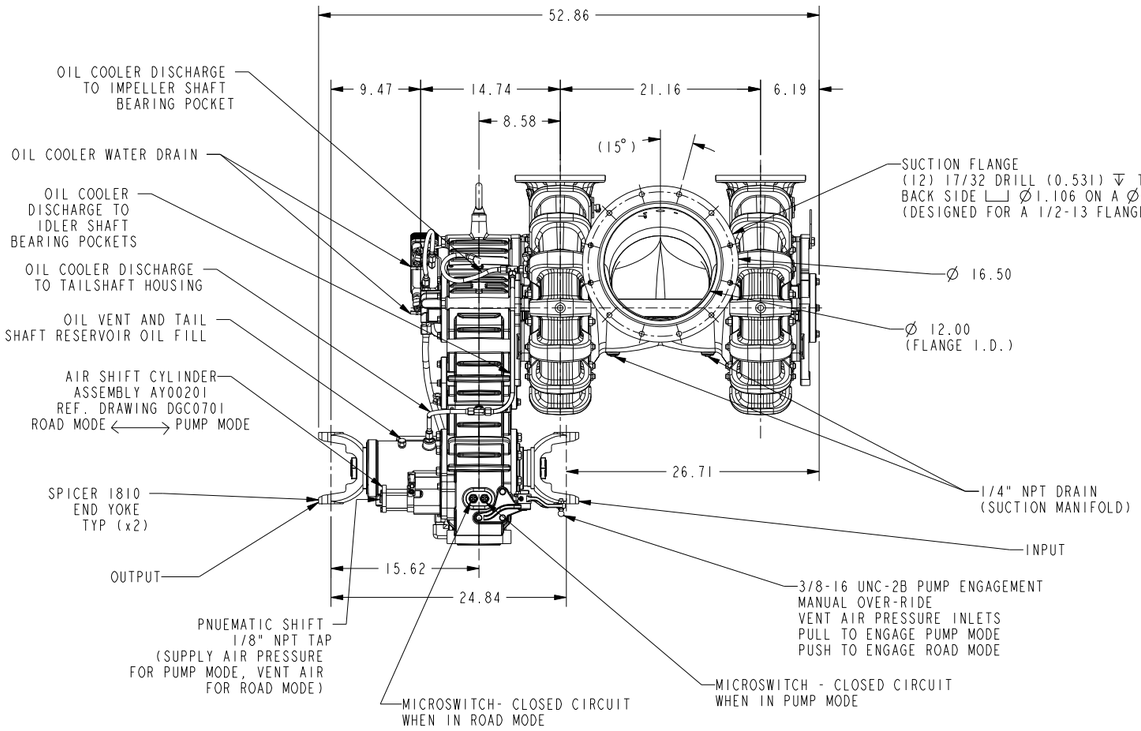
PNUEMATIC SHIFT
1/8" NPT TAP
(SUPPLY AIR PRESSURE
FOR ROAD MODE, VENT AIR
FOR PUMP MODE)

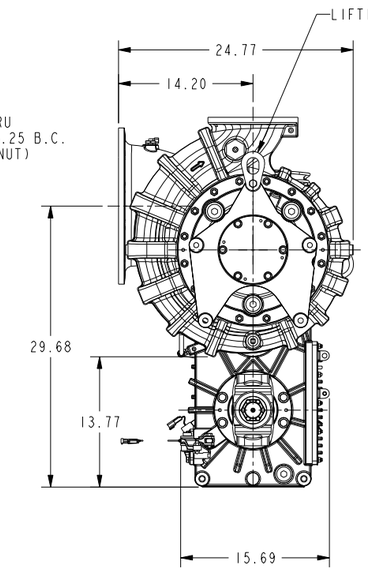
OPTIONAL SHIFT INTERLOCK
ASSEMBLY: AH00600
(MUST BE PURCHASED WITH PUMP)











NOTE:
1.) APPROXIMATE WEIGHT: 1300 LBS (590 Kg)
2.) SHOWN WITH A 1.36:1 GEAR RATIO
3.) 3601271 O-RING IS USED ON THE SUCTION FLANGE
4.) OIL LEVEL DIPSTICK 4219001 IS INTENDED TO BE USED ON A 3 GEAR MEGA TRANSMISSION THAT INCLUDES A 1.36:1 GEAR RATIO THAT WILL BE INSTALLED AT A VERTICAL 10 DEGREE OFFSET (AS SHOWN IN DRAWING DZD0106)

REF NOTE:
ASSEMBLIES INCLUDED
IN DRAWING:

1.) PZ00101
2.) TM00710
3.) KC00908
4.) KD02210
5.) AH00600
6.) KR08006

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO. X8778 | TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

MATERIAL DESCRIPTION: | MATERIAL NO. | PATTERN NO.

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DR'N KMD | CHKD WAH | TRCD

MODEL NAME FP01933 | MDL CREATED | SHEET 1/1 | D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - 2ZSM, STANDARD CONF. PUMP FORWARD

DATE 16-MAR-17 | SCALE 1/8

DZD0105

Mechanical Seal

Mechanical Shaft Seal

This pump assembly incorporates high quality mechanical shaft seal(s) separating the pump housing components from atmosphere. Depending on the pump design, there may be one or two seals on each impeller shaft.

The seal size, design type, component materials, and housing configuration have been specifically designed for this pump application and rated operating parameters.

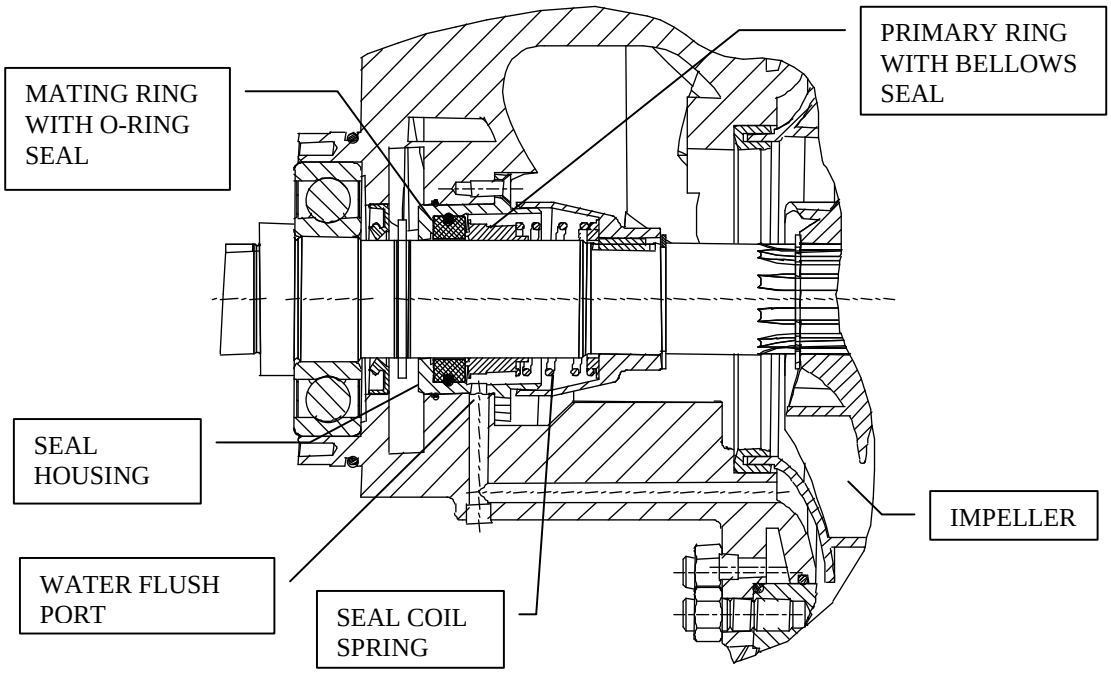
Mechanical Seal Basics

A mechanical seal is a device that houses two highly polished components (known as faces). One face rotates, the other is stationary. A secondary elastomer bellows seals the primary ring to the shaft. An o-ring or cup seal seals the mating ring in the housing. The polished seal faces of the primary and mating rings are pressed together by a spring mechanism to provide adequate force to affect a seal. The force acting between the seal faces increases in direct proportion to product pressure.

The elastomer bellows seal utilized in this pump has the following design features:

- Mechanical drive of the primary seal ring. The drive band's notch design eliminates overstressing the elastomer sealing bellows.
- Bellows design provides automatic compensation for shaft endplay, run out, and primary ring wear.
- Seal face contact pressure is controlled by a single, non-clogging coil spring. This coil spring has been custom welded per Darley specifications to eliminate high-speed spring distortion.

The seal housing is designed and ported to provide optimal water flow and pressure assuring proper cooling and flushing of the seal components.



Operation and Maintenance

When operated within rated operating conditions of this pump, these seals will provide trouble free service for extended periods.

Properly selected and applied mechanical shaft seals are leak free and require no adjustment. Should the seal area develop a leak, investigate the cause as soon as possible. Seal failure, leakage, may be the result of; worn seal faces, leaking bellows, or damaged o-rings. These failures may be attributed to bearing failure, impeller blockage, impeller imbalance, seal housing contamination, operating beyond pump design rating, or dry running,

Mechanical shaft seal design relies on the sealed media, in this case, water, to cool and lubricate the sealing surfaces. Therefore, extended dry operation may cause overheating and scoring or damage to the sealing surfaces, resulting in excessive leakage or a much shortened seal life.

To maximize seal life, minimize operation at pump pressures higher than pump rating. While operating at pressures beyond rating will not immediately damage the seal, it will increase sealing surface wear rate.

CAUTION: **DO NOT RUN THE PUMP DRY EXCEPT MOMENTARILY AND AT LOW SPEEDS**

CAUTION: **DO NOT USE THIS PUMP FOR HOSE TESTING**

CAUTION: **THE MECHANICAL SEAL SHOULD NOT BE RUN DRY, WHILE THE PUMP IS NOT ENTRAINED WITH WATER, FOR A PERIOD LONGER THAN 2 MINUTES. FAILURE TO FOLLOW THIS RECOMMENDATION WILL LEAD TO PREMATURE WEAR AND FAILURE OF YOUR MECHANICAL SHAFT SEAL.**

DARLEY

INSTALLATION OF MECHANICAL FACE SEAL WITH O'RING

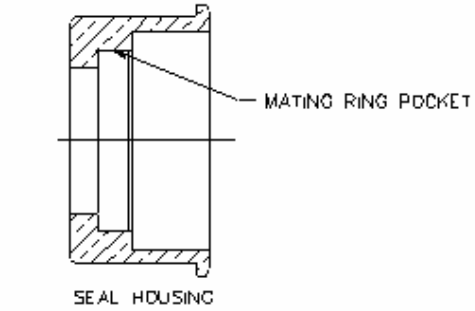
SPECIAL HANDLING

Study the engineering layout before installing the seal. This shaft seal is a precision product and should be handled and treated with care. Take special care to prevent scratches on the lapped faces of the primary and mating ring. Provide a very clean work area where the assembly will take place. Clean hands prior to assembly.

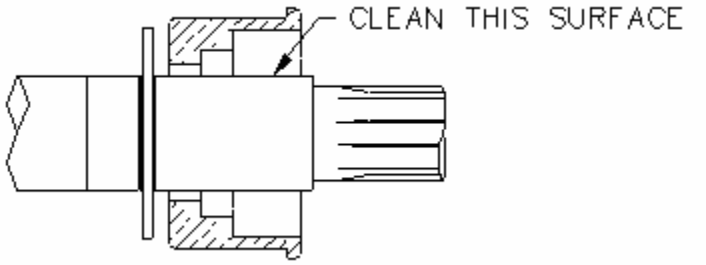
INSTRUCTION STEPS:

Instructions for Installing a Mechanical Shaft Seal

1. Inspect mating ring pocket in seal housing ensuring it is clean, free of chips, and nick free, to provide a proper sealing surface. Isopropyl alcohol may be used to clean the surfaces if required.

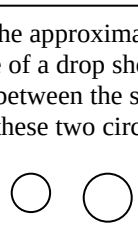


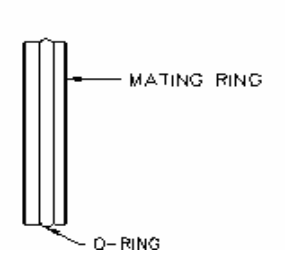
2. Inspect the pump shaft surface under the bellows, ensuring it is clean and nick free to provide a proper sealing surface. Isopropyl alcohol may be used to clean surface if required.

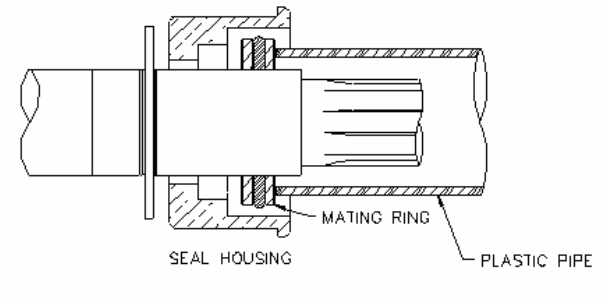


3. Lightly lubricate the o-ring on the mating ring with a single drop of P-80 water soluble rubber lubricant (do not over lubricate) and push it into the cavity using the recommended installation tool or other suitable plastic tube free of contaminants, firmly seating the mating ring square.
   Note: The polished face of the mating ring must face out – away from the pump's gear case. Try to not touch the polished sealing face with your fingers; the oils from your fingerprint can cause the seal to leak. Remove any P-80 from the sealing face after installation.

The approximate size of a drop should be between the sizes of these two circles.





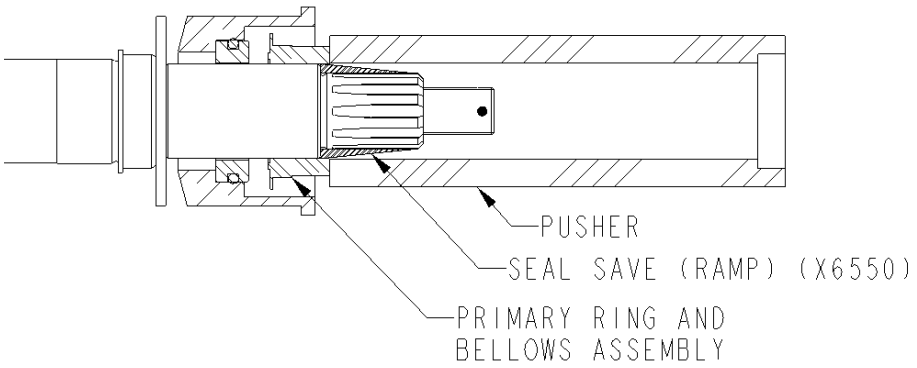


4. Clean the mating ring surface with isopropyl alcohol to remove any fingerprints and any other contaminants left on mating ring.

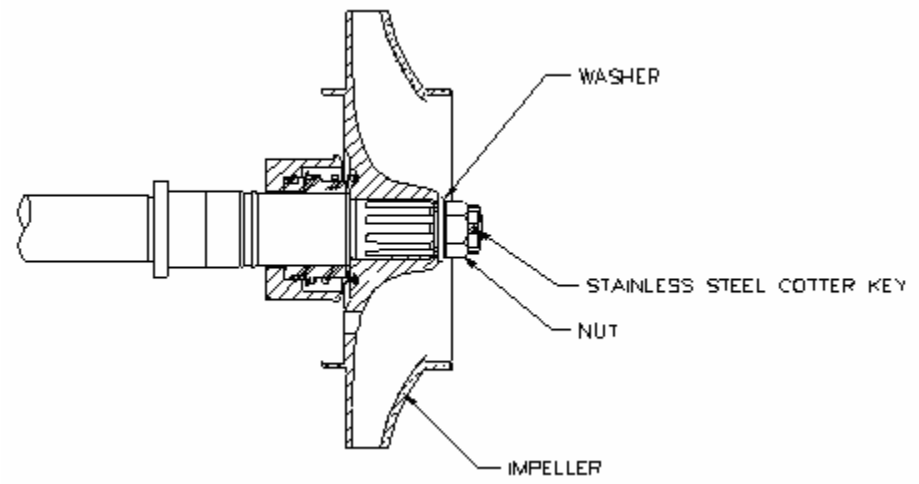
Note: Steps 5 – 9 need to all be completed with in 15 minutes or less.

5. Apply a small drop of P-80 rubber lubricant or water-soluble lubricant (not soapy water) to the inside diameter of the bellows assembly allowing it to be pushed easily into position.
6. Clean the polished sealing face of the primary ring with a clean lint free rag with isopropyl alcohol to remove all fingerprints and other contaminants.
7. Slide a seal save, similar to X6550, over the shaft splines to ensure that the seal is not damaged during installation. Place the primary ring and lubricated bellows assembly (without the spring) on the shaft, using a proper pusher - push the assembly into position so that the seal surfaces are in contact. Remove the seal save from the shaft.

The approximate size of a drop should be between the sizes of these two circles.



8. Put the spring in place, seated tight against the spring retainer on the primary ring.
   Note: Some springs may be slightly tapered, so one end fits the seal better than the other. The end of the spring that best fits the seal should go towards the seal to ensure even spring pressure all the way around.
9. Slide impeller onto impeller shaft, engage the spring into the groove of the impeller hub and install impeller washer, impeller nut, and stainless steel cotter key.



*** Reference pump configuration for individual mechanical seal instructions.*
*** Reference pump assembly drawings and pump assembly tips for further assembly.*

Note: If the seal leaks slightly after assembly, it may be necessary to run the pump for approximately 30 minutes at 50-60 psi to rinse out excess lubricant and other contaminants.

Once a mechanical seal has been installed, it is recommended that it not be reused.

If further information is needed, call **DARLEY** in
Chippewa Falls, WI. at 800-634-7812 or 715-726-2650

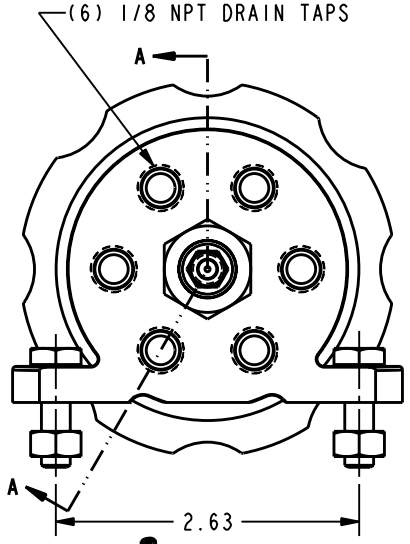
Section 5

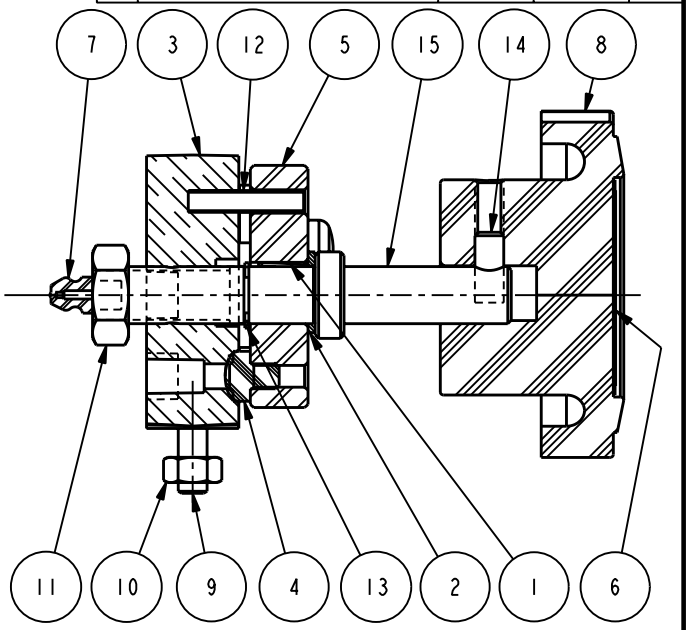
Optional Equipment

Multi-Drain Valve

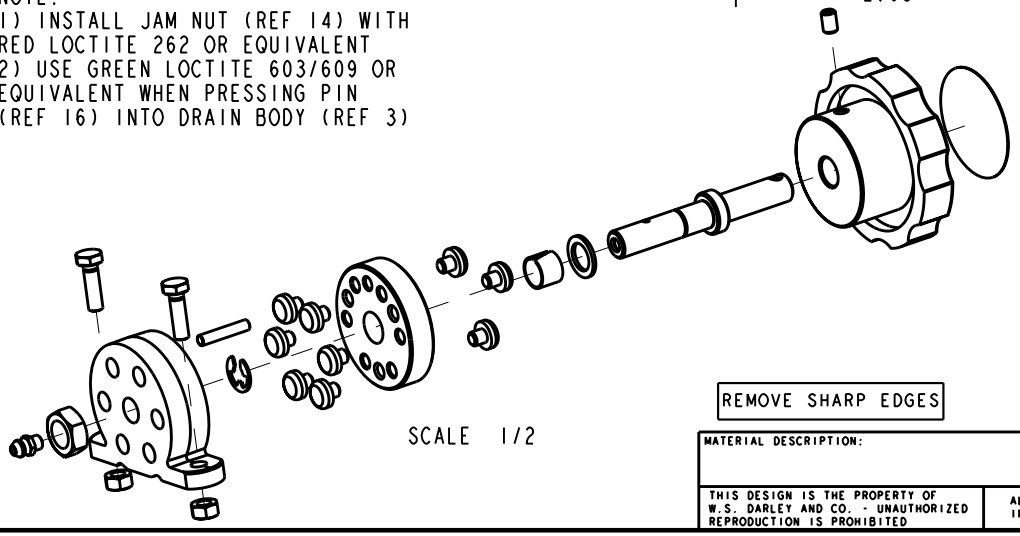
NO.	DESCRIPTION	PART NO.	QTY.
1	BEARING - NYLINER, 0.50 ID	1760102	1
2	BEARING - OILITE, 0.500 ID	1760024	1
3	BODY - MULTIPLE DRAIN VALVE	5320602	1
4	BUMPER - DRAIN VALVE	4401727	9
5	CAP - MULTIPLE DRAIN VALVE	5323803	1
6	DECAL - DRAIN VALVE	1963200	1
7	GREASE ZERK - .25-28	4403200	1
8	HANDWHEEL	3001800	1
9	HHCS - .250-20 x 0.88, 18-8	5400658	2
10	NUT - HEX, .250-20, 18-8 SST	5403027	2
11	NUT - JAM, .500-20, 18-8 SST	5403219	1
12	PIN - SPRING, 0.19 X 1.00, SST	3605029	1
13	RING - RETAINER, 68011	3600435	1
14	SSS - 1/4-20 x 0.38, SST	5402603	1
15	STEM - MULTIPLE DRAIN VALVE	5241303	1

NOTE:
1) INSTALL JAM NUT (REF 14) WITH RED LOCTITE 262 OR EQUIVALENT
2) USE GREEN LOCTITE 603/609 OR EQUIVALENT WHEN PRESSING PIN (REF 16) INTO DRAIN BODY (REF 3)

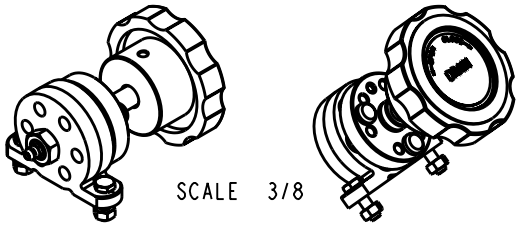




SECTION A-A



SCALE 1/2



SCALE 3/8

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

MODEL NAME	MDL CREATED	SHEET	
VD00600	12JUN2009	1/1	B

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.

MATERIAL DESCRIPTION:

MATERIAL NO.

PATTERN NO.

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - MULTIPLE DRAIN VALVE BUMPER

DR'N SMS

CHKD MCR

TRCD

DATE 16-Jul-09

SCALE 1/1

DGC0904

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ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT

NAME:SMS OBJECT:DGC0904 DATE:13-May-10 13:22:00

Ball Valve

BALL VALVE QUARTER TURN - SELF LOCKING

The Darley Ball Valve is a quarter turn, all bronze valve designed for the fire service.

The ball is cast bronze, precision machined *stainless steel ball* for long trouble free service. It is easily serviced in the field.

The lever is self locking and easily adjusted, even under extreme high pressure.

TO DISASSEMBLE AND REPAIR THE BALL VALVE
ILLUSTRATION DGC0100

TOOLS REQUIRED:

- 3/16" Allen Wrench
- 1-1/8" Wrench
- 3/4" & 1" Wrench
- Vise Grips or Pliers

1. Remove cap nut (20) and adjusting nut (16).

2. Lever Assembly (11) pulls straight up. Watch for 2 cam balls (12).

3. Unbolt and remove clutch ring (9), clutch sleeve (8), valve stem (7), spring (14), and valve stem washer (15). Check clutch ring (9) and sleeve (8) for scoring or excessive wear. Check o-ring (26). Replace if necessary.

4. Remove nipple (2). Check Quad Ring (25). Replace if necessary.

5. Unscrew ball guide screw (6). Check o-ring (23). Replace if necessary.

6. Remove valve ball (3). Check for scratches, corrosion, and wear. Replace if necessary.

7. Remove seat assembly (4). Check condition of rubber seat. Replace seat assembly if necessary.

REASSEMBLY OF BALL VALVE
ILLUSTRATION DGC0100

1. Position ball (3) in body so ball guide screw (6) engages bottom of ball as it is screwed into position.

2. Put valve stem (7) into position. Make certain stem engages slot on top of ball.

3. Slip washer (15), spring (14), and clutch sleeve (8) over the stem. Place clutch ring (9) over the sleeve and secure with the four (4) 1/4″ NC x 5/8″ socket head cap screws.

4. Set the two cam balls (12) into the V grooves in the clutch sleeve (8) and drop lever assembly over them. Tighten the adjusting nut (16) so that approximately 1/8″ play is left at the end of a 6″ lever. Over tightening this nut will make the clutch lock inoperative. Lock adjusting nut (16) with cap nut (20). Recheck this adjustment after valve is placed in service.

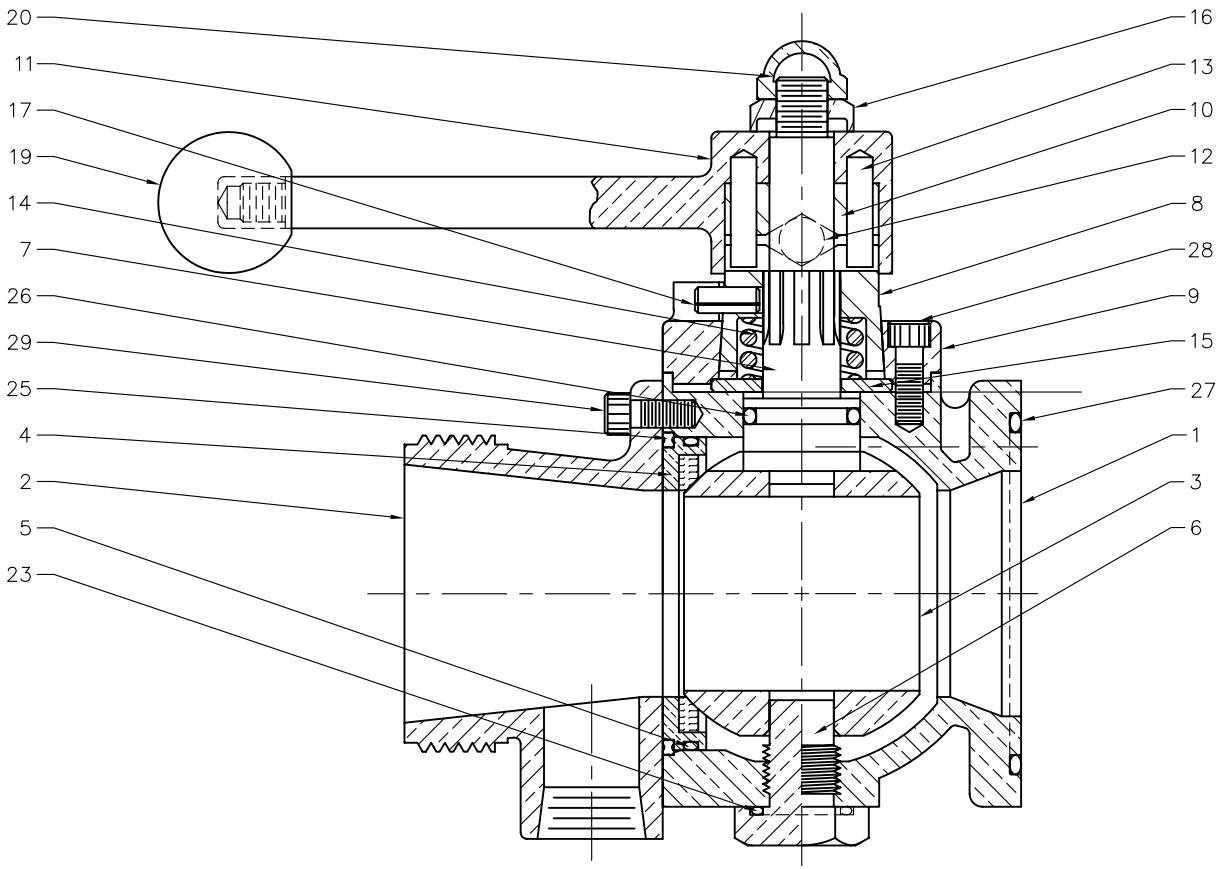
5. Place seat assembly (4), seat o-ring (5), and quad ring (25) into position.

6. Secure nipple (2) to valve body with eight (8) 1/4″ NC x 5/8″ socket head cap screws.

If more information is needed, call W.S. DARLEY & CO. at Chippewa Falls, WI at 800-634-7812 or 715-726-2650

LETTER	CHANGE NO.	DATE
(A)	96–53	5/15/96

REP NO.	NAME OF PART	QTY.
1	DISCHARGE VALVE BODY	1
2	VALVE NIPPLE	1
3	VALVE BALL	1
4	VALVE SEAT	1
5	O'RING	1
6	BALL GUIDE SCREW	1
7	VALVE STEM	1
8	CLUTCH SLEEVE	1
9	CLUTCH RING	1
10	LEVER CAM	1
11	FRONT MOUNT LEVER	1
12	CAM BALL	2
13	VALVE PIN	2
14	VALVE SPRING	1
15	VALVE STEM WASHER	1
16	ADJUSTING NUT	1
17	SPRING PIN–STL (A)	1
19	CONTROL LEVER BALL	1
20	CAP NUT	1
23	O'RING	1
25	QUAD RING	1
26	O'RING	1
27	O'RING	1
28	SOCKET HEAD CAP SCREW	4
29	SOCKET HEAD CAP SCREW	8



INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO. G1200

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

W.S. DARLEY & Co.
MELROSE PARK, IL – CHIPPEWA FALLS, WI

DWG – BALL VALVE ASSEMBLY CROSS SECTION

DR'N JCM
CHKD
TRCDLMH 5/96

DATE NOV12,65
SCALE 1/1

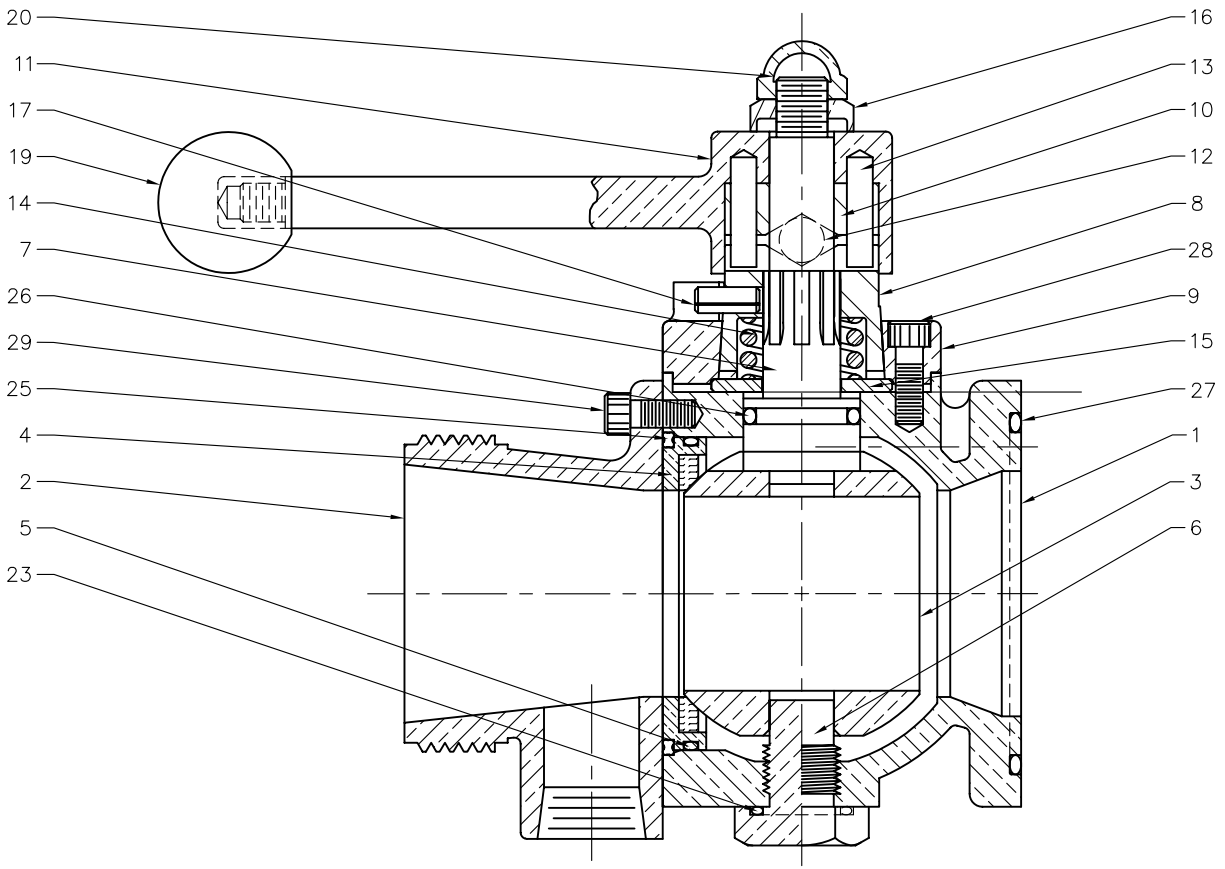
DGC0100

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT

LETTER	CHANGE NO.	DATE
(A)	96–53	5/15/96

REP NO.	NAME OF PART	QTY.
1	DISCHARGE VALVE BODY	1
2	VALVE NIPPLE	1
3	VALVE BALL	1
4	VALVE SEAT	1
5	O'RING	1
6	BALL GUIDE SCREW	1
7	VALVE STEM	1
8	CLUTCH SLEEVE	1
9	CLUTCH RING	1
10	LEVER CAM	1
11	FRONT MOUNT LEVER	1
12	CAM BALL	2
13	VALVE PIN	2
14	VALVE SPRING	1
15	VALVE STEM WASHER	1
16	ADJUSTING NUT	1
17	SPRING PIN–STL (A)	1
19	CONTROL LEVER BALL	1
20	CAP NUT	1
23	O'RING	1
25	QUAD RING	1
26	O'RING	1
27	O'RING	1
28	SOCKET HEAD CAP SCREW	4
29	SOCKET HEAD CAP SCREW	8



INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO. G1200

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

W.S. DARLEY & Co.
MELROSE PARK, IL – CHIPPEWA FALLS, WI

DWG – BALL VALVE ASSEMBLY CROSS SECTION

DR'N JCM
CHKD
TRCDLMH 5/96

DATE NOV12,65
SCALE 1/1

DGC0100

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT

Pressure Relief Valve

W.S. DARLEY & CO.

REMOTE CONTROL PRESSURE RELIEF VALVE WITH MECHANICAL SHUTOFF

Refer to Drawing DGC0141

The relief valve bypasses water from the pump discharge manifold to the suction chamber at a set pump pressure, preventing excessive rise of discharge pressure when hose lines are shut off.

Turning pressure setting hand wheel (14) clockwise raises the relief pressure, and counter clockwise lowers it.

The self-cleaning fine mesh strainer will prevent the entry of solids that could cause the relief valve to malfunction. Open the strainer flush valve to remove small accumulations. This is accomplished by turning the strainer flush valve knob (6) counter clockwise 2 to 3 full turns. Strainer trapped debris will be flushed to the ground. Pump supply pressure should be 50-100 PSI when performing this procedure.

TO SET RELIEF VALVE

1. Turn four-way valve OFF.

2. Open at least one discharge valve and increase engine throttle setting until pressure gage indicates the pressure at which relief valve is to open.

3. Turn four-way valve ON.

4. If gage reading drops below pressure set in step 2, turn hand wheel (14) clockwise until pressure returns to set point.

5. If gage reading does not drop, turn hand wheel (14) counter clockwise until pressure drops 5 to 10 PSI below set point. Then slowly turn hand wheel clockwise until pressure returns to pressure set in step 2.

The relief valve will now prevent the discharge pressure from rising above that for which it is set, and requires no further attention.

Should a higher or lower relief pressure be desired, repeat above procedure.

CAUTION

With all discharge valves closed, water in the auxiliary pump casing will heat up rapidly. To avoid possible damage, allow a very small stream of water to discharge when the pump is running.

REMOTE CONTROL PRESSURE RELIEF VALVE WITH MECHANICAL SHUTOFF

MAINTENANCE
DRAWING DGC0141

Open the relief valve strainer flush valve (6) during every operation at 50-100 PSI supply pressure to insure foreign material is not blocking the screen.

The 3/32" diameter metering orifice and diaphragm chamber at (21) may be back-flushed if necessary while the pump is delivering water by opening the pilot head drain and placing valve handle (9) midway between ON and OFF position.

The relief valve, pilot unit, and strainer assemblies should be taken apart for inspection and cleaning at least annually, or as often as found necessary to insure trouble free performance.

To disassemble pilot head, first turn hand wheel (14) counter clockwise to remove spring compression. Remove the four 1/4" screws holding regulator spring housing (18). Lift out diaphragm (23) and pilot valve (51) assembly. Clean and make certain 3/32" diameter orifice hole is free of obstruction.

When reassembling pilot head, turn hand wheel (14) a few times clockwise to compress spring before tightening four screws holding spring housing. This will properly center valve seat and diaphragm.

The valve piston (40) and spring (44) chamber should be inspected and cleaned.

Replace diaphragm and o-rings if damaged or deteriorated.

Apply a thin coating of waterproof grease lubricant: to spring housing counterbore that guides the pilot valve (51) and ball (52), to end of tension screw (17), and between piston (40) and center post.

Self-cleaning strainer (63) can be removed for inspection or replacement by alternately turning valve knob (6) and stop nut (7) counter clockwise until stem is free for removal. To avoid discharging water through opening created by stem (62) removal, pump should be completely shut down before stem (62) is removed. Inspect and clean screen (63) if required. Check quad ring (64) for damage or deterioration. Reverse procedure to reassemble valve. Use case when initially inserting screen into body to avoid damaging quad ring (64) or valve seat.

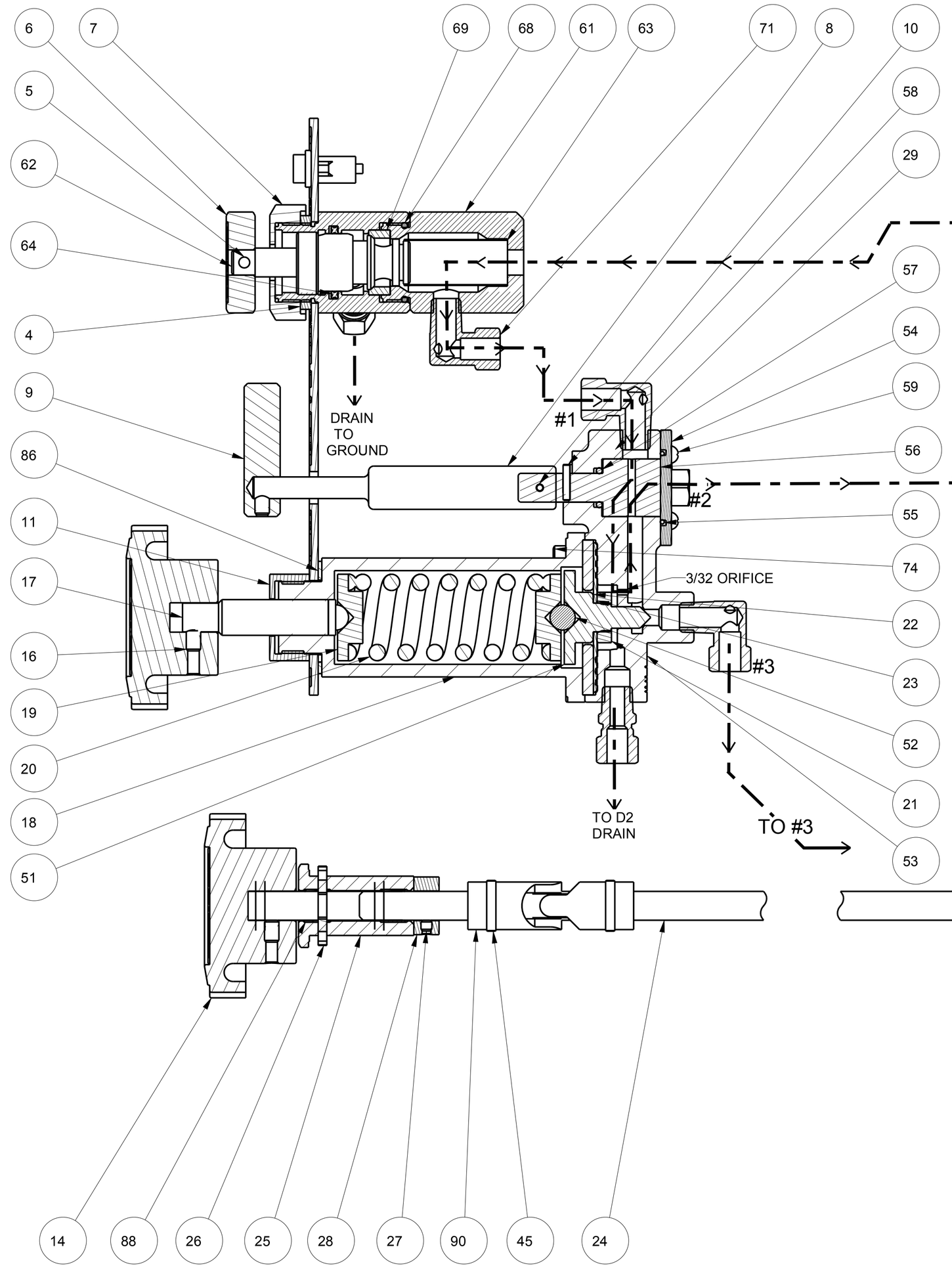
To replace flush valve seat (69), remove stem/screen assembly, disconnect tubing lines attached to (61) body half and unscrew (61) body half from (70) body half. Replace (69) valve seat. Reverse procedure to reassemble valve.

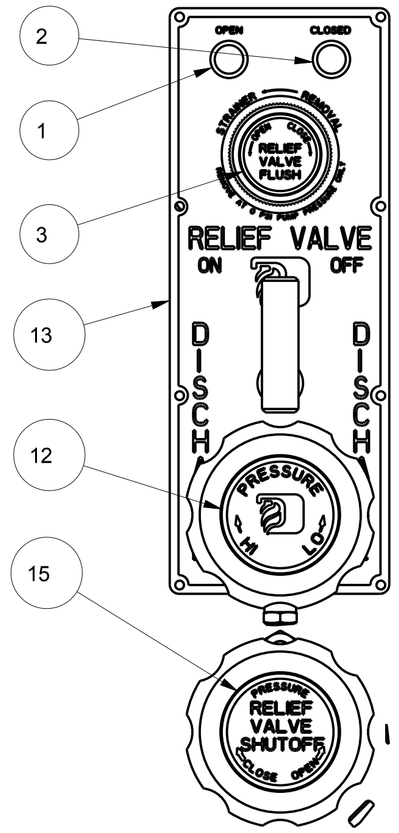
All Darley relief valves can be provided with a micro switch and either one or two pilot lights to indicate when the valve is open or closed.

IF FURTHER INFORMATION IS NEEDED, CALL W.S. DARLEY & CO. AT CHIPPEWA FALLS, WI. AT 800-634-7812 or 715-726-2650

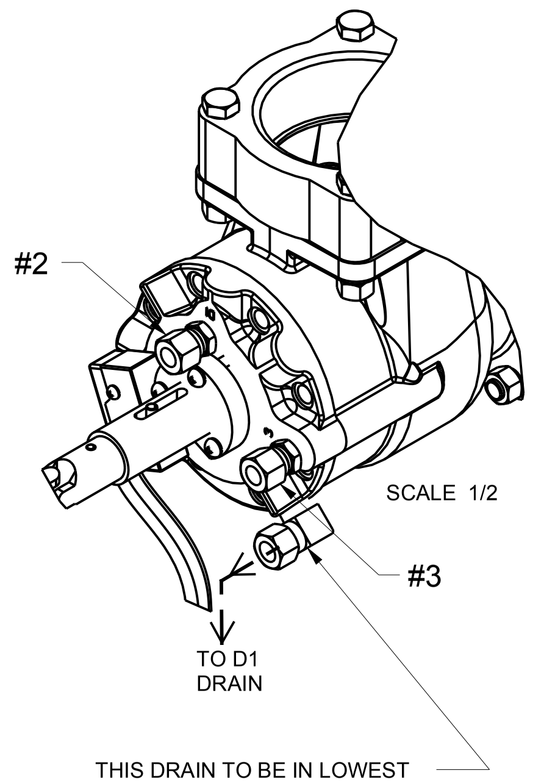
NO.	DESCRIPTION	PART NO.	QTY.
1	LIGHT - AMBER	-	1
2	LIGHT - GREEN	-	1
3	DECAL - FLUSH SCREEN	-	1
4	NUT - PANEL, FLUSH VALVE	-	1
5	SSS - NO.10-32 x 0.38, GR5	-	1
6	KNOB - FLUSH VALVE	-	1
7	NUT - PANEL, 1.38-12	-	1
8	COUPLING - RELEIF VALVE STEM	-	1
9	LEVER - R.V. ON/OFF	-	1
10	PIN - DRIVE LOK, 0.125 X 0.750	-	1
11	NUT - PANEL VALVE, 1.250-12	-	1
12	DECAL - PRESSURE, HI/LO	-	1
13	PLATE - TRIM, REMOTE HEAD	-	1
14	HANDWHEEL	-	2
15	DECAL - PRESSURE RELIEF VALVE	-	1
16	SSS - 1/4-20 x 0.38, SST	-	3
17	SCREW - SPRING TENSION	-	1
18	HOUSING - PILOT VALVE	-	1
19	RETAINER - SPRING	-	2
20	SPRING - PRESSURE REGULATOR	-	1
21	NUT - PILOT VALVE	-	1
22	RING - HOUSING PILOT	-	1
23	DIAPHRAM - PIOLET HEAD	-	1
24	SHAFT - R.V. EXTENSION, 24"	-	1
25	BUSHING - RETAINER, PANEL	-	1
26	NUT - .750, CONDUIT	-	1
27	SSS - NO.10-24 x 0.19, GR5	-	1
28	COLLAR - SHAFT. 1/2" BORE	-	1
29	SSS - .313 x 0.31, GR5	-	1
30	COUPLING - RELIEF VALVE STEM	-	1
31	MICROSWITCH - OMRON	-	1
32	PIN - SPRING, 0.19 X 1.12	-	1
33	O-RING - 0.38 x 0.50 x 0.06	-	2
34	O-RING - 0.44 x 0.62 x 0.09	-	1
35	O-RING - 0.75 x 0.94 x 0.09	-	1
36	PLATE - SEAL, VALVE STEM	-	1
37	O-RING - 3.25 x 3.38 x 0.06	-	1
38	HEAD - RELIEF VALVE, REMOTE, 3"	-	1
39	STEM - RELIEF VALVE, 3"	-	1
40	PISTON - RELIEF VALVE, 3"	-	1
41	BODY - RELIEF VALVE, 3"	-	1
42	O-RING - 3.50 x 3.69 x 0.09	-	2
43	CENTER PLUG - PISTON SPRING	-	1
44	SPRING - PISTON	-	1
45	PIN - SPRING, 0.16 X 0.88	-	4
46	QUAD RING - 2.88 x 3.25 x 0.19	-	1
47	WASHER - 0.39 x 0.61 x .06 BR	-	1
48	STEM - RELIEF VALVE SWITCH	-	1
49	SHIM - SWITCH SPACER, 0.0125	-	1
50	PLUG - PIPE, 0.125, SST SOC HD	-	1
51	PIN - PILOT VALVE	-	1
52	BALL - CAM, 0.44"	-	1
53	HEAD - PILOT CONTROL	-	1
54	COVER - ON/OFF VALVE	-	1
55	O-RING - 1.12 x 1.25 x 0.06	-	1
56	PLUG - VALVE	-	1
57	O-RING - 0.50 x 0.69 x 0.09	-	1
58	PIN - SPRING, 0.12 X 0.62, SST	-	1
59	RHMS - NO.8-32 X 0.50, BR	-	4
61	BODY - FLUSH VALVE, COMPLETE	-	1
62	STEM - FLUSH VALVE	-	1
63	STRAINER - SCREEN	-	1
64	QUAD RING - 1.00 x 1.25 x 0.12	-	1
68	O-RING - 1.19 x 1.38 x 0.09	-	1
69	SEAT - FLUSH VALVE	-	1
71	TUBE FITTING - EL, .38 x .25	-	5
72	TUBE FITTING - STR, .38 cf x .25 NPTM	-	3
73	TUBE FITTING - STR, .38 cf x .12 NPTM	-	1
74	SHCS - .250-20 X 0.88, SST	-	4
75	SHCS - .313-18 x 0.75, GR8	-	8
76	WASHER - LOCK, NO.6 ID, SST	-	2
77	RHMS - NO.6-32 X1.00, BR	-	2
79	NUT - HEX, .375-16, GR2	-	8
81	HHCS - .375-16 x 2.25, GR5	-	8
82	FLANGE - ADAPTER, 3 NPT	-	2
83	RHMS - NO.10-24 X 0.75, GR5	-	3
86	WASHER - INT. TOOTH, 1.250 ID	-	1
88	BEARING - NYLINER, 0.50 ID	-	2
90	JOINT - UNIVERSAL, .500"	-	2
91	SHIM - SWITCH SPACER, 0.025	-	1
93	WASHER - LOCK, NO.10 ID, SST	-	3
95	CONNECTOR - DUETCH DT 06-3S	-	1

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D
A	REVERSED LIGHT POSITIONS	12JUL07	2007-285	RJG
B	ADDED FLOW PATH VIEW	21NOV2007	2007-451	SMS



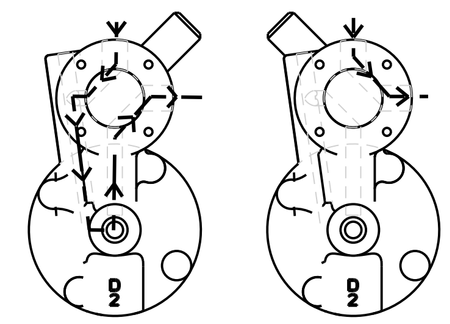


SCALE 1/2



SCALE 1/2

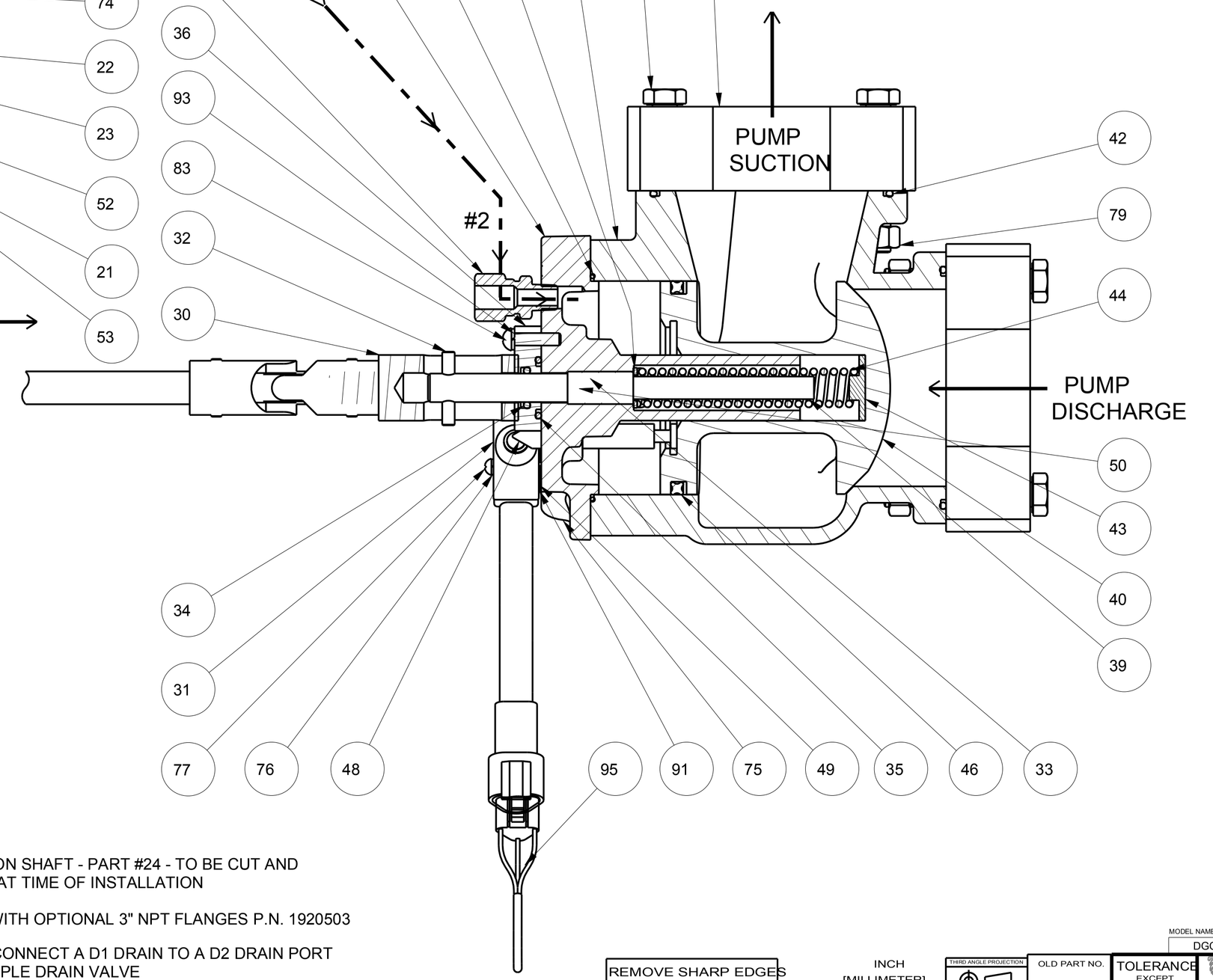
THIS DRAIN TO BE IN LOWEST PORT BY ORIENTATION AT TIME OF INSTALLATION

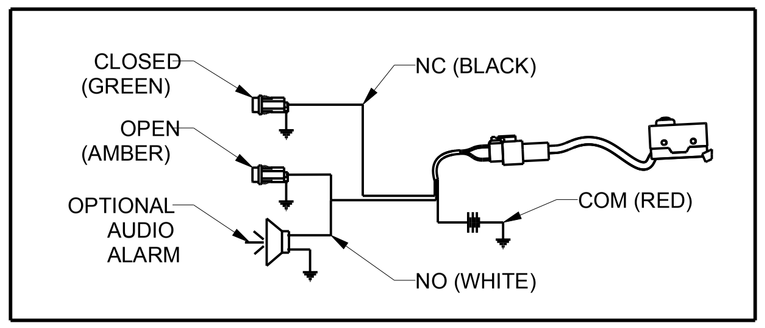


SCALE 1/2

VALVE ON VALVE OFF

(B) FLOW PATH THRU PILOT CONTROL VALVE





EXTENSION SHAFT - PART #24 - TO BE CUT AND DRILLED AT TIME OF INSTALLATION

SHOWN WITH OPTIONAL 3" NPT FLANGES P.N. 1920503

DO NOT CONNECT A D1 DRAIN TO A D2 DRAIN PORT ON MULTIPLE DRAIN VALVE
DRAIN MUST BE CLOSED DURING OPERATION

SEE DRAWING #DGC0112 FOR DETAILED LOCATION

MODEL NAME	MDL CREATED	SHEET	
DGC0141	08JUN05	1/2	D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: | MATERIAL NO. | PATTERN NO.

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

RELIEF VALVE

DRN HAL
CHKD SJL
TRCD

DATE 13-Jun-05
SCALE 3/4

DGC0141

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT

NO.	DESCRIPTION	PART NO.	QTY.
1	LIGHT - AMBER	-	1
2	LIGHT - GREEN	-	1
3	DECAL - FLUSH SCREEN	-	1
4	NUT - PANEL, FLUSH VALVE	-	1
5	SSS - NO.10-32 x 0.38, GR5	-	1
6	KNOB - FLUSH VALVE	-	1
7	NUT - PANEL, 1.38-12	-	1
8	COUPLING - RELEIF VALVE STEM	-	1
9	LEVER - R.V. ON/OFF	-	1
10	PIN - DRIVE LOK, 0.125 X 0.750	-	1
11	NUT - PANEL VALVE, 1.250-12	-	1
12	DECAL - PRESSURE, HI/LO	-	1
13	PLATE - TRIM, REMOTE HEAD	-	1
14	HANDWHEEL	-	2
15	DECAL - PRESSURE RELIEF VALVE	-	1
16	SSS - 1/4-20 x 0.38, SST	-	3
17	SCREW - SPRING TENSION	-	1
18	HOUSING - PILOT VALVE	-	1
19	RETAINER - SPRING	-	2
20	SPRING - PRESSURE REGULATOR	-	1
21	NUT - PILOT VALVE	-	1
22	RING - HOUSING PILOT	-	1
23	DIAPHRAM - PIOLET HEAD	-	1
24	SHAFT - R.V. EXTENSION, 24"	-	1
25	BUSHING - RETAINER, PANEL	-	1
26	NUT - .750, CONDUIT	-	1
27	SSS - NO.10-24 x 0.19, GR5	-	1
28	COLLAR - SHAFT. 1/2" BORE	-	1
29	SSS - .313 x 0.31, GR5	-	1
30	COUPLING - RELIEF VALVE STEM	-	1
31	MICROSWITCH - OMRON	-	1
32	PIN - SPRING, 0.19 X 1.12	-	1
33	O-RING - 0.38 x 0.50 x 0.06	-	2
34	O-RING - 0.44 x 0.62 x 0.09	-	1
35	O-RING - 0.75 x 0.94 x 0.09	-	1
36	PLATE - SEAL, VALVE STEM	-	1
37	O-RING - 3.25 x 3.38 x 0.06	-	1
38	HEAD - RELIEF VALVE, REMOTE, 3"	-	1
39	STEM - RELIEF VALVE, 3"	-	1
40	PISTON - RELIEF VALVE, 3"	-	1
41	BODY - RELIEF VALVE, 3"	-	1
42	O-RING - 3.50 x 3.69 x 0.09	-	2
43	CENTER PLUG - PISTON SPRING	-	1
44	SPRING - PISTON	-	1
45	PIN - SPRING, 0.16 X 0.88	-	4
46	QUAD RING - 2.88 x 3.25 x 0.19	-	1
47	WASHER - 0.39 x 0.61 x .06 BR	-	1
48	STEM - RELIEF VALVE SWITCH	-	1
49	SHIM - SWITCH SPACER, 0.0125	-	1
50	PLUG - PIPE, 0.125, SST SOC HD	-	1
51	PIN - PILOT VALVE	-	1
52	BALL - CAM, 0.44"	-	1
53	HEAD - PILOT CONTROL	-	1
54	COVER - ON/OFF VALVE	-	1
55	O-RING - 1.12 x 1.25 x 0.06	-	1
56	PLUG - VALVE	-	1
57	O-RING - 0.50 x 0.69 x 0.09	-	1
58	PIN - SPRING, 0.12 X 0.62, SST	-	1
59	RHMS - NO.8-32 X 0.50, BR	-	4
61	BODY - FLUSH VALVE, COMPLETE	-	1
62	STEM - FLUSH VALVE	-	1
63	STRAINER - SCREEN	-	1
64	QUAD RING - 1.00 x 1.25 x 0.12	-	1
68	O-RING - 1.19 x 1.38 x 0.09	-	1
69	SEAT - FLUSH VALVE	-	1
71	TUBE FITTING - EL, .38 x .25	-	5
72	TUBE FITTING - STR, .38 cf x .25 NPTM	-	3
73	TUBE FITTING - STR, .38 cf x .12 NPTM	-	1
74	SHCS - .250-20 X 0.88, SST	-	4
75	SHCS - .313-18 x 0.75, GR8	-	8
76	WASHER - LOCK, NO.6 ID, SST	-	2
77	RHMS - NO.6-32 X1.00, BR	-	2
79	NUT - HEX, .375-16, GR2	-	8
81	HHCS - .375-16 x 2.25, GR5	-	8
82	FLANGE - ADAPTER, 3 NPT	-	2
83	RHMS - NO.10-24 X 0.75, GR5	-	3
86	WASHER - INT. TOOTH, 1.250 ID	-	1
88	BEARING - NYLINER, 0.50 ID	-	2
90	JOINT - UNIVERSAL, .500"	-	2
91	SHIM - SWITCH SPACER, 0.025	-	1
93	WASHER - LOCK, NO.10 ID, SST	-	3
95	CONNECTOR - DUETCH DT 06-3S	-	1

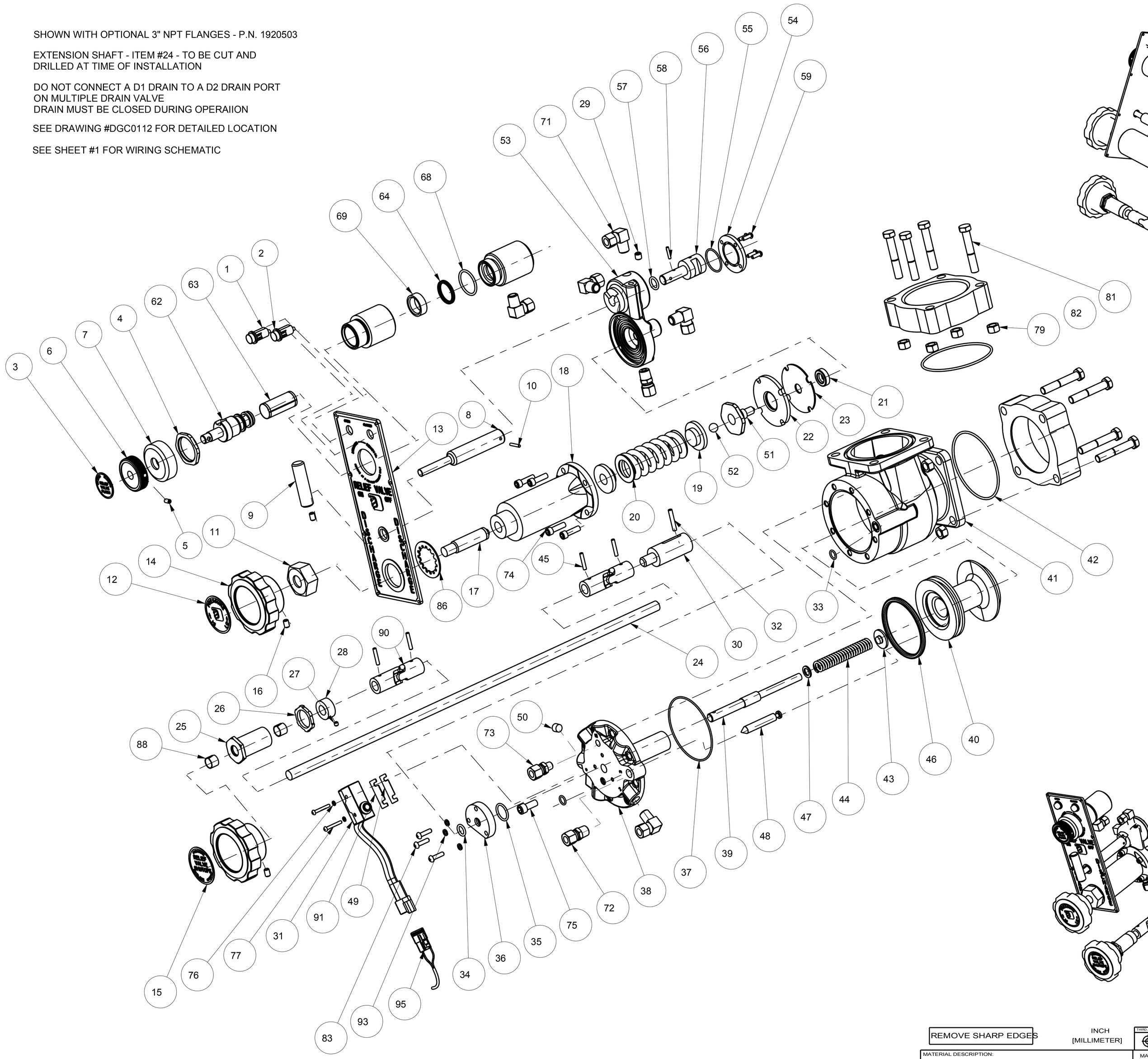
SHOWN WITH OPTIONAL 3" NPT FLANGES - P.N. 1920503

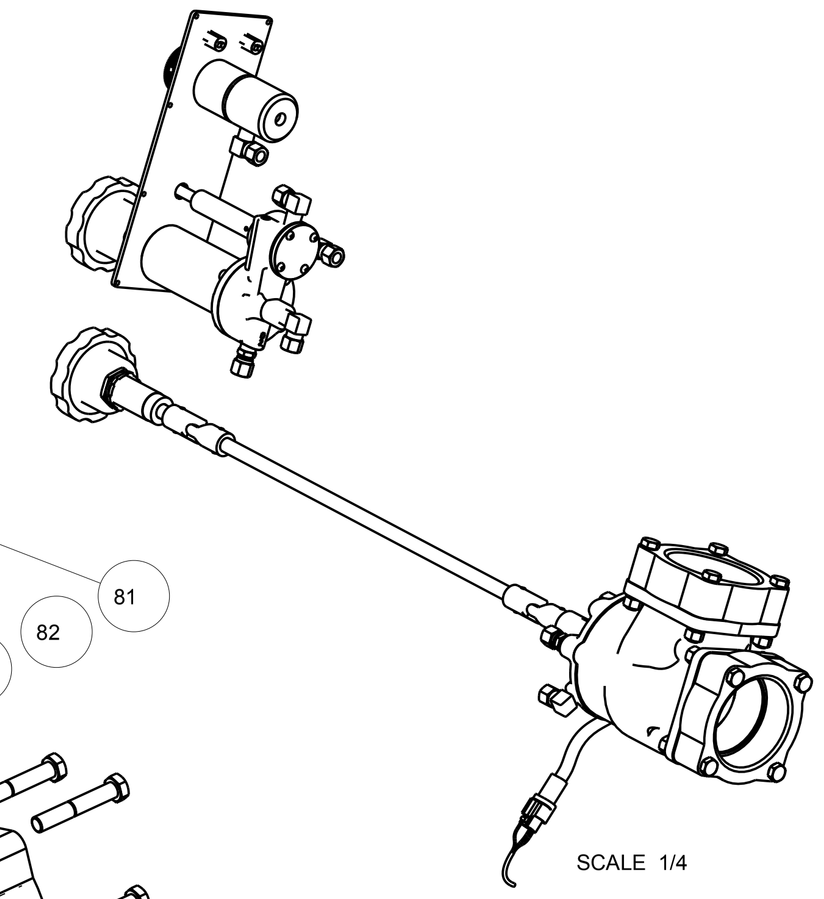
EXTENSION SHAFT - ITEM #24 - TO BE CUT AND DRILLED AT TIME OF INSTALLATION

DO NOT CONNECT A D1 DRAIN TO A D2 DRAIN PORT ON MULTIPLE DRAIN VALVE
DRAIN MUST BE CLOSED DURING OPERAIION

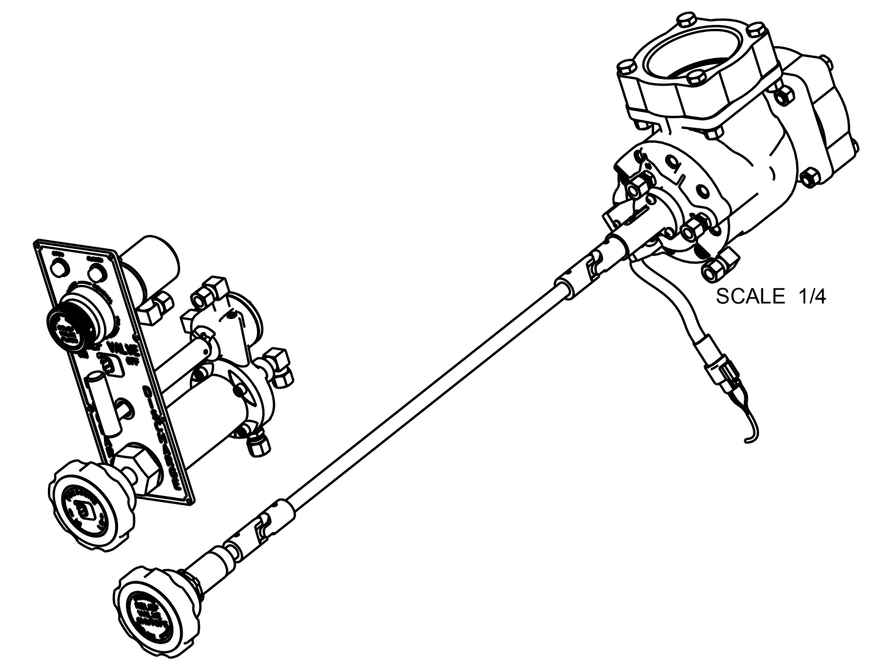
SEE DRAWING #DGC0112 FOR DETAILED LOCATION

SEE SHEET #1 FOR WIRING SCHEMATIC





SCALE 1/4



SCALE 1/4

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D

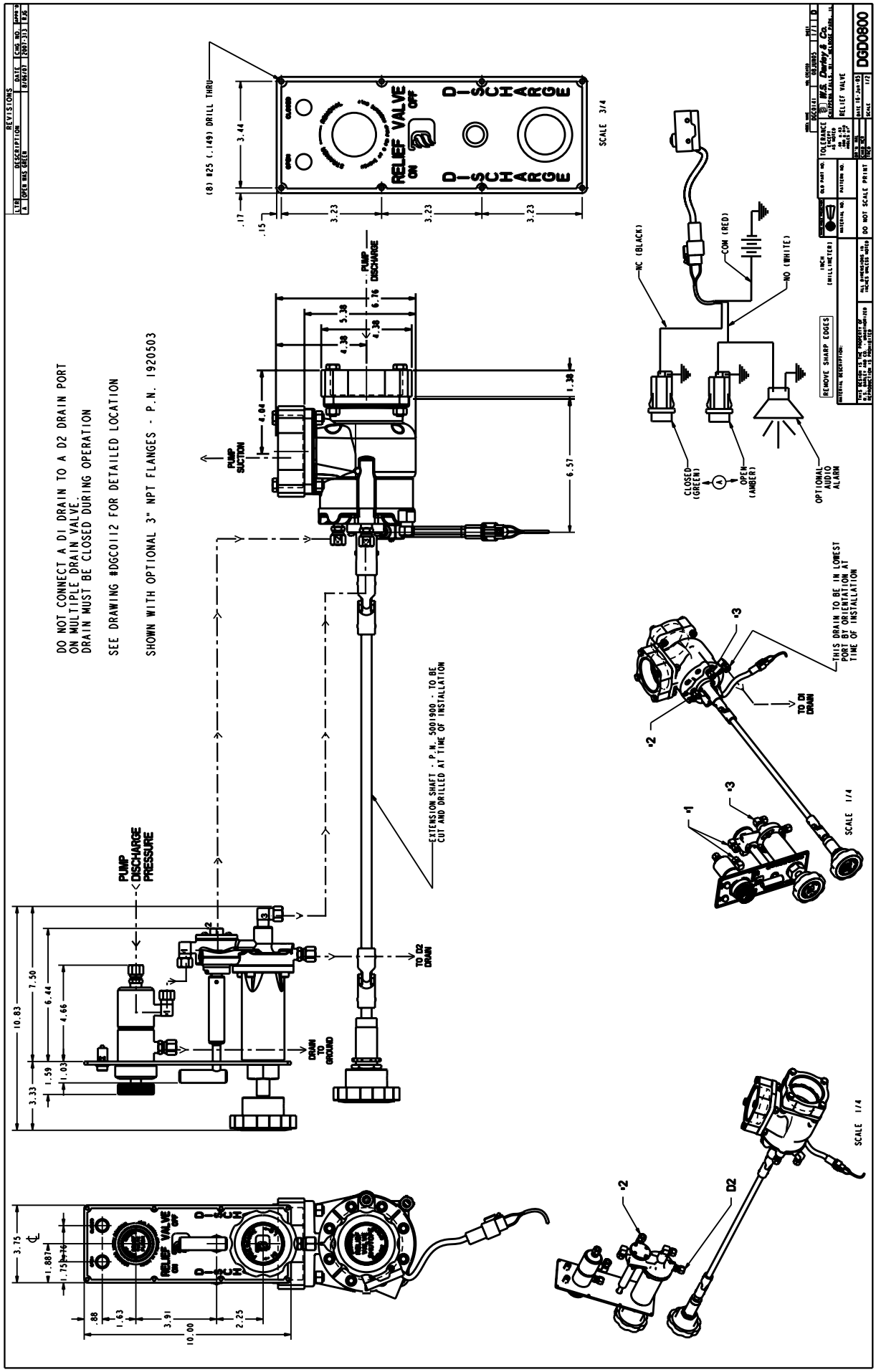
MODEL NAME	MDL CREATED	SHEET	
DGC0141	08JUN05	2 / 2	D

REMOVE SHARP EDGES	INCH [MILLIMETER]	THIRD ANGLE PROJECTION	OLD PART NO.	TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°
MATERIAL DESCRIPTION:			MATERIAL NO. / PATTERN NO.	
THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED	ALL DIMENSIONS IN INCHES UNLESS NOTED	DO NOT SCALE PRINT	DRN HAL / CHKD SJL / TRCD	DATE 15-Jun-05 / SCALE 3/4

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

RELIEF VALVE

DGC0141


DO NOT CONNECT A D1 DRAIN TO A D2 DRAIN PORT
ON MULTIPLE DRAIN VALVE.
DRAIN MUST BE CLOSED DURING OPERATION
SEE DRAWING #DGC0112 FOR DETAILED LOCATION
SHOWN WITH OPTIONAL 3" NPT FLANGES - P.N. 1920503
(8) Ø25 (.149) DRILL THRU
SCALE 3/4
RELIEF VALVE
ON
OFF
D-SCHARGE
PUMP DISCHARGE
PUMP SUCTION
EXTENSION SHAFT - P.N. 5001900 - TO BE CUT AND DRILLED AT TIME OF INSTALLATION
PUMP DISCHARGE PRESSURE
TO D2 DRAIN
DRAIN TO GROUND
NC (BLACK)
COM (RED)
NO (WHITE)
CLOSED (GREEN)
OPEN (AMBER)
OPTIONAL AUDIO ALARM
THIS DRAIN TO BE IN LOWEST PORT BY ORIENTATION AT TIME OF INSTALLATION
TO D1 DRAIN
SCALE 1/4
SCALE 1/4
D2
REMOVE SHARP EDGES
DO NOT SCALE PRINT
RELIEF VALVE
DGD0800

W.S. DARLEY & CO.

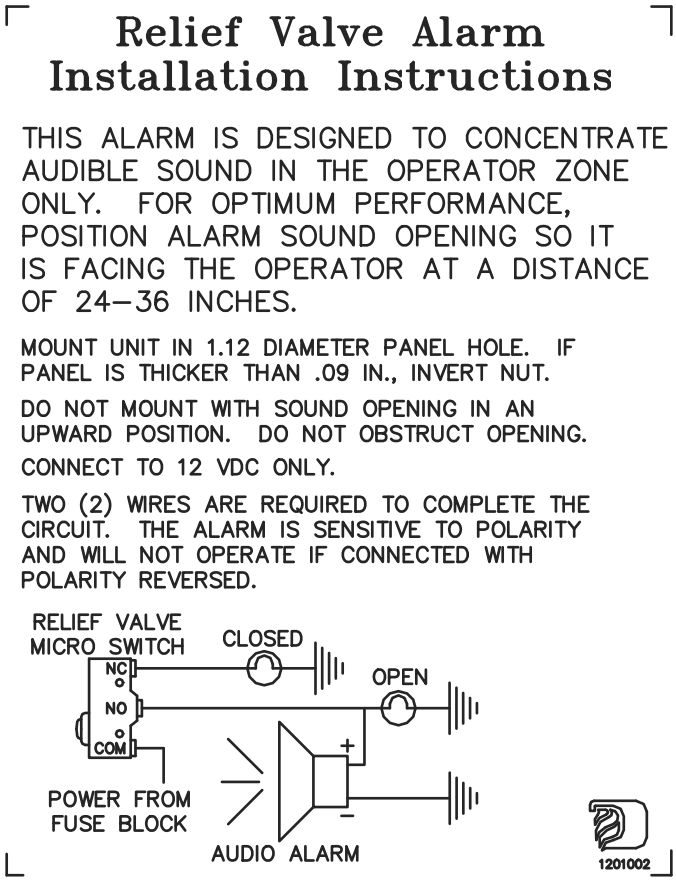
Relief Valve Alarm
Installation Instruction

This Alarm is designed to concentrate audible sound in the operator zone only. For optimum Performance, position alarm sound opening so it is facing the operator at a distance of 24 - 36 inches.

Mount unit in 1.12 diameter panel hole. If panel is thicker than .09 inches, invert nut.

Do not mount with sound opening in an upward position. Do not obstruct opening.

Connect to 12 VDC only.
Two (2) wires are required to complete the circuit. The alarm is sensitive to polarity and will not operate if connected with polarity reversed.



IF FURTHER INFORMATION IS NEEDED, CALL W.S. DARLEY & CO. AT CHIPPEWA FALLS, WI. AT 800-634-7812 or 715-726-2650

NO.	DESCRIPTION	PART NO.	QTY.
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2	LIGHT - GREEN	-	1
3	DECAL - FLUSH SCREEN	-	1
4	NUT - PANEL, FLUSH VALVE	-	1
5	SSS - NO.10-32 x 0.38, GR5	-	1
6	KNOB - FLUSH VALVE	-	1
7	NUT - PANEL, 1.38-12	-	1
8	COUPLING - RELEIF VALVE STEM	-	1
9	LEVER - R.V. ON/OFF	-	1
10	PIN - DRIVE LOK, 0.125 X 0.750	-	1
11	NUT - PANEL VALVE, 1.250-12	-	1
12	DECAL - PRESSURE, HI/LO	-	1
13	PLATE - TRIM, REMOTE HEAD	-	1
14	HANDWHEEL	-	2
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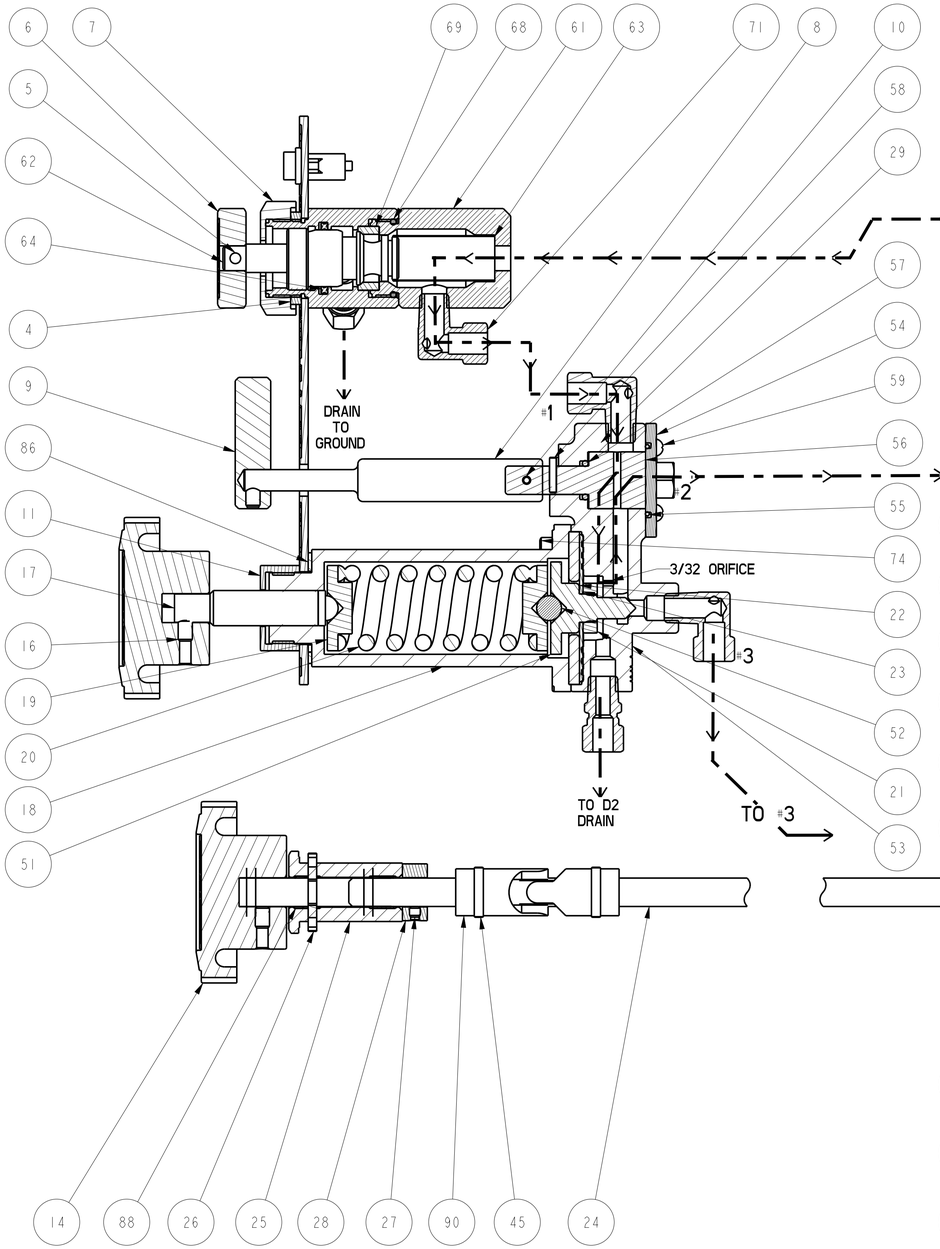
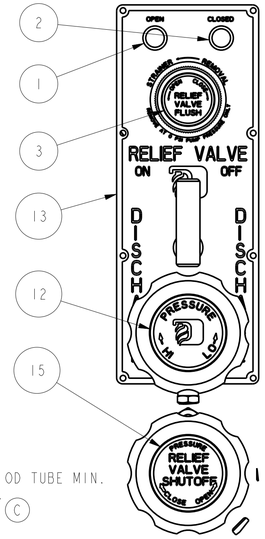
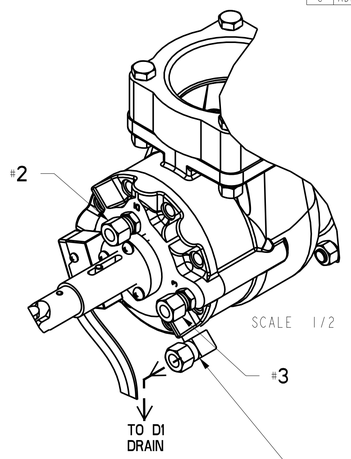
18	HOUSING - PILOT VALVE	-	1
19	RETAINER - SPRING	-	2
20	SPRING - PRESSURE REGULATOR	-	1
21	NUT - PILOT VALVE	-	1
22	RING - HOUSING PILOT	-	1
23	DIAPHRAM - PIOLET HEAD	-	1
24	SHAFT - R.V. EXTENSION, 24"	-	1
25	BUSHING - RETAINER, PANEL	-	1
26	NUT - .750, CONDUIT	-	1
27	SSS - NO.10-24 x 0.19, GR5	-	1
28	COLLAR - SHAFT, 1/2" BORE	-	1
29	SSS - .313 x 0.31, GR5	-	1
30	COUPLING - RELIEF VALVE STEM	-	1
31	MICROSWITCH - OMRON	-	1
32	PIN - SPRING, 0.19 X 1.12	-	1
33	O-RING - 0.38 x 0.50 x 0.06	-	2
34	O-RING - 0.44 x 0.62 x 0.09	-	1
35	O-RING - 0.75 x 0.94 x 0.09	-	1
36	PLATE - SEAL, VALVE STEM	-	1
37	O-RING - 3.25 x 3.38 x 0.06	-	1
38	HEAD - RELIEF VALVE, REMOTE, 3"	-	1
39	STEM - RELIEF VALVE, 3"	-	1
40	PISTON - RELIEF VALVE, 3"	-	1
41	BODY - RELIEF VALVE, 3"	-	1
42	O-RING - 3.50 x 3.69 x 0.09	-	2
43	CENTER PLUG - PISTON SPRING	-	1
44	SPRING - PISTON	-	1
45	PIN - SPRING, 0.16 X 0.88	-	4
46	QUAD RING - 2.88 x 3.25 x 0.19	-	1
47	WASHER - 0.39 x 0.61 x .06 BR	-	1
48	STEM - RELIEF VALVE SWITCH	-	1
49	SHIM - SWITCH SPACER, 0.0125	-	1
50	PLUG - PIPE, 0.125, SST SOC HD	-	1
51	PIN - PILOT VALVE	-	1
52	BALL - CAM, 0.44"	-	1
53	HEAD - PILOT CONTROL	-	1
54	COVER - ON/OFF VALVE	-	1
55	O-RING - 1.12 x 1.25 x 0.06	-	1
56	PLUG - VALVE	-	1
57	O-RING - 0.50 x 0.69 x 0.09	-	1
58	PIN - SPRING, 0.12 X 0.62, SST	-	1
59	RHMS - NO.8-32 X 0.50, BR	-	4
61	BODY - FLUSH VALVE, COMPLETE	-	1
62	STEM - FLUSH VALVE	-	1
63	STRAINER - SCREEN	-	1
64	QUAD RING - 1.00 x 1.25 x 0.12	-	1
68	O-RING - 1.19 x 1.38 x 0.09	-	1
69	SEAT - FLUSH VALVE	-	1
71	TUBE FITTING - EL, .38 x .25	-	5
72	TUBE FITTING - STR, .38 cf x .25 NPTM	-	3
73	TUBE FITTING - STR, .38 cf x .12 NPTM	-	1
74	SHCS - .250-20 X 0.88, SST	-	4
75	SHCS - .313-18 x 0.75, GR8	-	8
76	WASHER - LOCK, NO.6 ID, SST	-	2
77	RHMS - NO.6-32 X1.00, BR	-	2
79	NUT - HEX, .375-16, GR2	-	8
81	HHCS - .375-16 x 2.25, GR5	-	8
82	FLANGE - ADAPTER, 3 NPT	-	2
83	RHMS - NO.10-24 X 0.75, GR5	-	3
86	WASHER - INT. TOOTH, 1.250 ID	-	1
88	BEARING - NYLINER, 0.50 ID	-	2
90	JOINT - UNIVERSAL, .500"	-	2
91	SHIM - SWITCH SPACER, 0.025	-	1
93	WASHER - LOCK, NO.10 ID, SST	-	3
95	CONNECTOR - DUETCH DT 06-3S	-	1

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D
A	REVERSED LIGHT POSITIONS	12JUL07	2007-285	RJG
B	ADDED FLOW PATH VIEW	21NOV2007	2007-451	SMS
C	ADDED NOTE: 3/8 OD TUBE SIZE	9-18-2015	ED-11153	TED



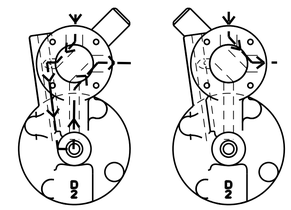


SCALE 1/2



SCALE 1/2

THIS DRAIN TO BE IN LOWEST PORT BY ORIENTATION AT TIME OF INSTALLATION



SCALE 1/2

VALVE ON VALVE OFF

(B) FLOW PATH THRU PILOT CONTROL VALVE

3/8 OD TUBE MIN. TYP. (C)

(A)

EXTENSION SHAFT - PART #24 - TO BE CUT AND DRILLED AT TIME OF INSTALLATION

SHOWN WITH OPTIONAL 3" NPT FLANGES P.N. 1920503

DO NOT CONNECT A D1 DRAIN TO A D2 DRAIN PORT ON MULTIPLE DRAIN VALVE
DRAIN MUST BE CLOSED DURING OPERATION

SEE DRAWING #DGC0112 FOR DETAILED LOCATION

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.

MATERIAL DESCRIPTION:

MATERIAL NO.

PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

DR'N HAL

CHK'D SJL

TRC'D

MODEL NAME DGC0141 | MDL CREATED 08JUN05 | SHEET 1/2 | D

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

RELIEF VALVE

DATE 13-Jun-05

SCALE 3/4

DGC0141

NO.	DESCRIPTION	PART NO.	QTY.
1	LIGHT - AMBER	-	1
2	LIGHT - GREEN	-	1
3	DECAL - FLUSH SCREEN	-	1
4	NUT - PANEL, FLUSH VALVE	-	1
5	SSS - NO.10-32 x 0.38, GR5	-	1
6	KNOB - FLUSH VALVE	-	1
7	NUT - PANEL, 1.38-12	-	1
8	COUPLING - RELEIF VALVE STEM	-	1
9	LEVER - R.V. ON/OFF	-	1
10	PIN - DRIVE LOK, 0.125 X 0.750	-	1
11	NUT - PANEL VALVE, 1.250-12	-	1
12	DECAL - PRESSURE, HI/LO	-	1
13	PLATE - TRIM, REMOTE HEAD	-	1
14	HANDWHEEL	-	2
15	DECAL - PRESSURE RELIEF VALVE	-	1
16	SSS - 1/4-20 x 0.38, SST	-	3
17	SCREW - SPRING TENSION	-	1
18	HOUSING - PILOT VALVE	-	1
19	RETAINER - SPRING	-	2
20	SPRING - PRESSURE REGULATOR	-	1
21	NUT - PILOT VALVE	-	1
22	RING - HOUSING PILOT	-	1
23	DIAPHRAM - PIOLET HEAD	-	1
24	SHAFT - R.V. EXTENSION, 24"	-	1
25	BUSHING - RETAINER, PANEL	-	1
26	NUT - .750, CONDUIT	-	1
27	SSS - NO.10-24 x 0.19, GR5	-	1
28	COLLAR - SHAFT, 1/2" BORE	-	1
29	SSS - .313 x 0.31, GR5	-	1
30	COUPLING - RELIEF VALVE STEM	-	1
31	MICROSWITCH - OMRON	-	1
32	PIN - SPRING, 0.19 X 1.12	-	1
33	O-RING - 0.38 x 0.50 x 0.06	-	2
34	O-RING - 0.44 x 0.62 x 0.09	-	1
35	O-RING - 0.75 x 0.94 x 0.09	-	1
36	PLATE - SEAL, VALVE STEM	-	1
37	O-RING - 3.25 x 3.38 x 0.06	-	1
38	HEAD - RELIEF VALVE, REMOTE, 3"	-	1
39	STEM - RELIEF VALVE, 3"	-	1
40	PISTON - RELIEF VALVE, 3"	-	1
41	BODY - RELIEF VALVE, 3"	-	1
42	O-RING - 3.50 x 3.69 x 0.09	-	2
43	CENTER PLUG - PISTON SPRING	-	1
44	SPRING - PISTON	-	1
45	PIN - SPRING, 0.16 X 0.88	-	4
46	QUAD RING - 2.88 x 3.25 x 0.19	-	1
47	WASHER - 0.39 x 0.61 x .06 BR	-	1
48	STEM - RELIEF VALVE SWITCH	-	1
49	SHIM - SWITCH SPACER, 0.0125	-	1
50	PLUG - PIPE, 0.125, SST SOC HD	-	1
51	PIN - PILOT VALVE	-	1
52	BALL - CAM, 0.44"	-	1
53	HEAD - PILOT CONTROL	-	1
54	COVER - ON/OFF VALVE	-	1
55	O-RING - 1.12 x 1.25 x 0.06	-	1
56	PLUG - VALVE	-	1
57	O-RING - 0.50 x 0.69 x 0.09	-	1
58	PIN - SPRING, 0.12 X 0.62, SST	-	1
59	RHMS - NO.8-32 X 0.50, BR	-	4
61	BODY - FLUSH VALVE, COMPLETE	-	1
62	STEM - FLUSH VALVE	-	1
63	STRAINER - SCREEN	-	1
64	QUAD RING - 1.00 x 1.25 x 0.12	-	1
68	O-RING - 1.19 x 1.38 x 0.09	-	1
69	SEAT - FLUSH VALVE	-	1
71	TUBE FITTING - EL, .38 x .25	-	5
72	TUBE FITTING - STR, .38 cf x .25 NPTM	-	3
73	TUBE FITTING - STR, .38 cf x .12 NPTM	-	1
74	SHCS - .250-20 X 0.88, SST	-	4
75	SHCS - .313-18 x 0.75, GR8	-	8
76	WASHER - LOCK, NO.6 ID, SST	-	2
77	RHMS - NO.6-32 X1.00, BR	-	2
79	NUT - HEX, .375-16, GR2	-	8
81	HHCS - .375-16 x 2.25, GR5	-	8
82	FLANGE - ADAPTER, 3 NPT	-	2
83	RHMS - NO.10-24 X 0.75, GR5	-	3
86	WASHER - INT. TOOTH, 1.250 ID	-	1
88	BEARING - NYLINER, 0.50 ID	-	2
90	JOINT - UNIVERSAL, .500"	-	2
91	SHIM - SWITCH SPACER, 0.025	-	1
93	WASHER - LOCK, NO.10 ID, SST	-	3
95	CONNECTOR - DUETCH DT 06-3S	-	1

SHOWN WITH OPTIONAL 3" NPT FLANGES - P.N. 1920503

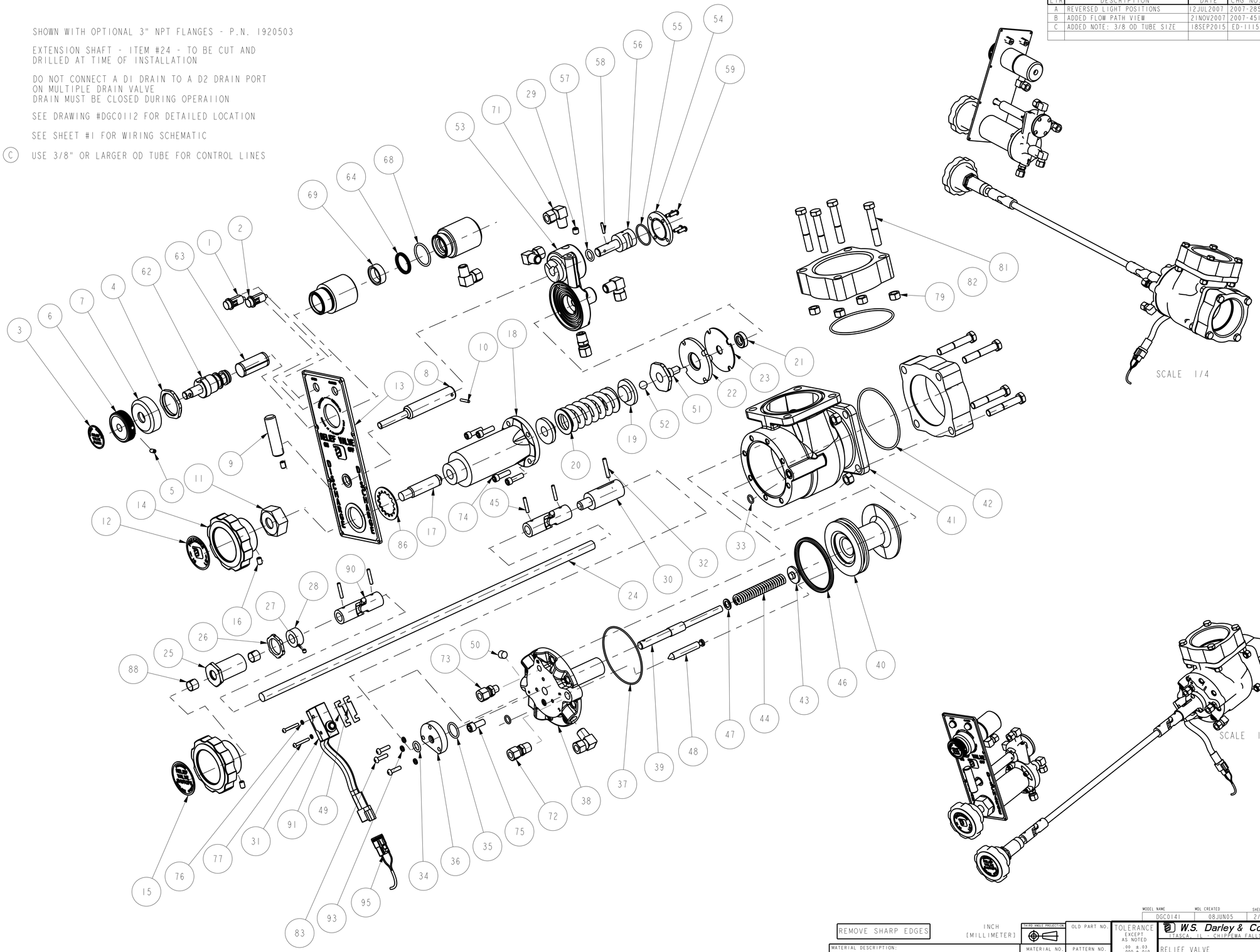
EXTENSION SHAFT - ITEM #24 - TO BE CUT AND DRILLED AT TIME OF INSTALLATION

DO NOT CONNECT A D1 DRAIN TO A D2 DRAIN PORT ON MULTIPLE DRAIN VALVE
DRAIN MUST BE CLOSED DURING OPERAIION

SEE DRAWING #DGC0112 FOR DETAILED LOCATION

SEE SHEET #1 FOR WIRING SCHEMATIC

(C) USE 3/8" OR LARGER OD TUBE FOR CONTROL LINES



SCALE 1/4

SCALE 1/4

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D
A	REVERSED LIGHT POSITIONS	12JUL2007	2007-285	RJG
B	ADDED FLOW PATH VIEW	21NOV2007	2007-451	SMS
C	ADDED NOTE: 3/8 OD TUBE SIZE	18SEP2015	ED-11153	TED

MODEL NAME	MDL CREATED	SHEET	
DGC0141	08JUN05	2/2	D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED .00 ± .03, .000 ± .010, ANGLES ±1°

DR'N HAL | CHKD SJL | TRCD

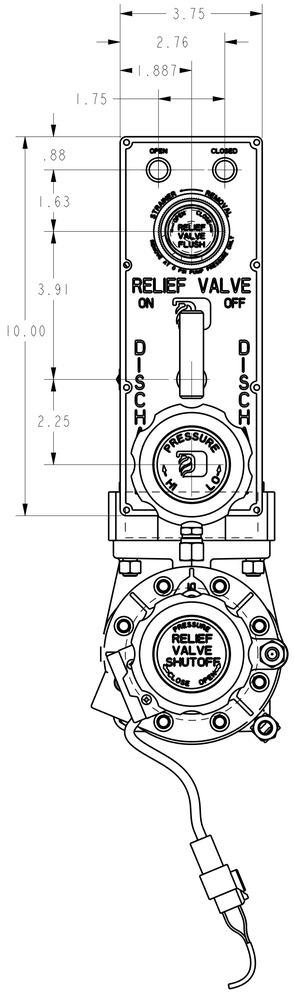
W.S. Darley & Co.
ITASCA, IL CHIPPEWA FALLS, WI

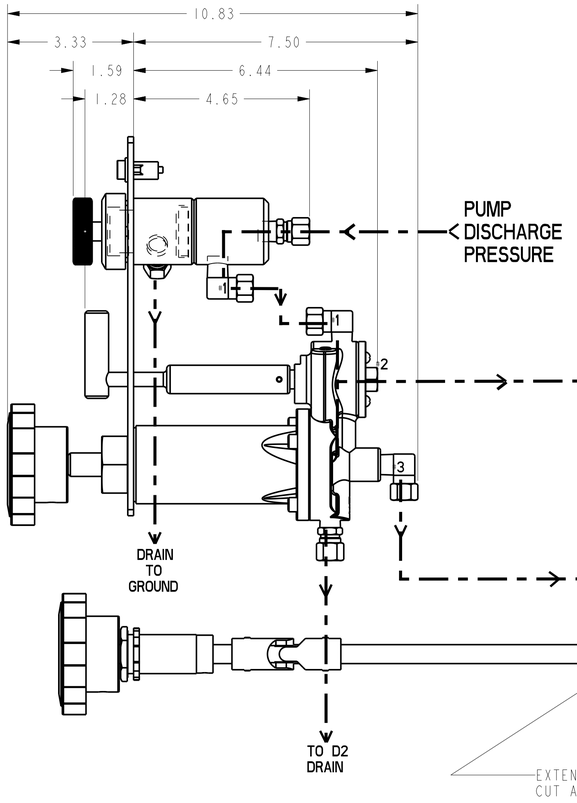
RELIEF VALVE

DATE 15-Jun-05 | SCALE 3/4

DGC0141

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D
A	OPEN WAS GREEN	8/06/07	2007-313	RJG
B	ADDED NOTE: 3/8 OD TUBE SIZE	02OCT2015	ED-11153	TED

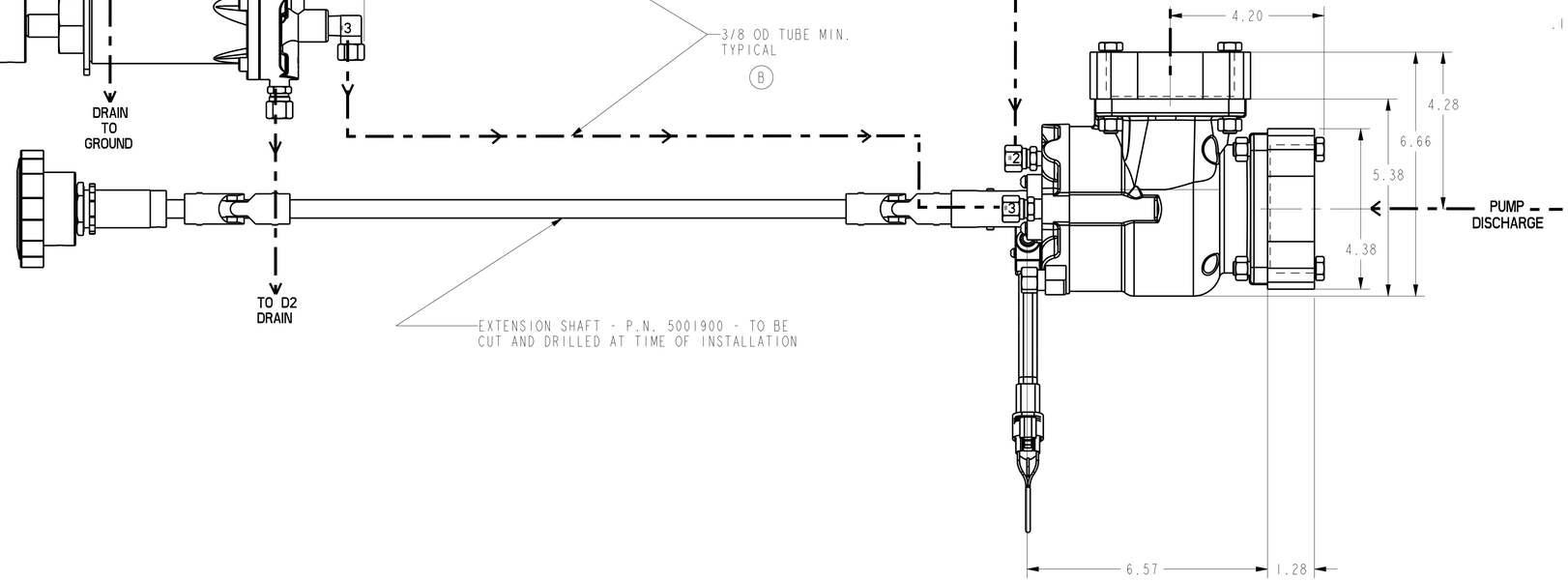


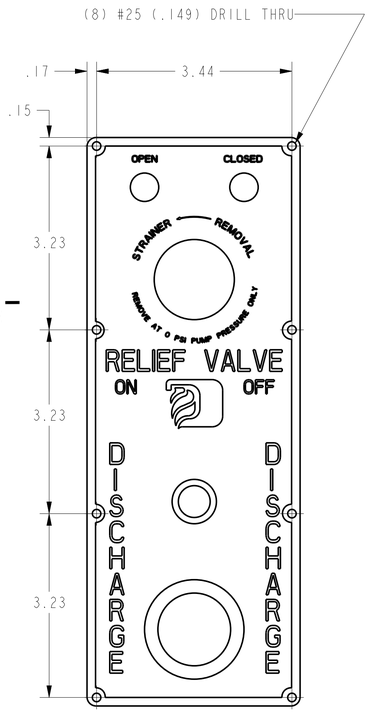


DO NOT CONNECT A DI DRAIN TO A D2 DRAIN PORT
ON MULTIPLE DRAIN VALVE.
DRAIN MUST BE CLOSED DURING OPERATION

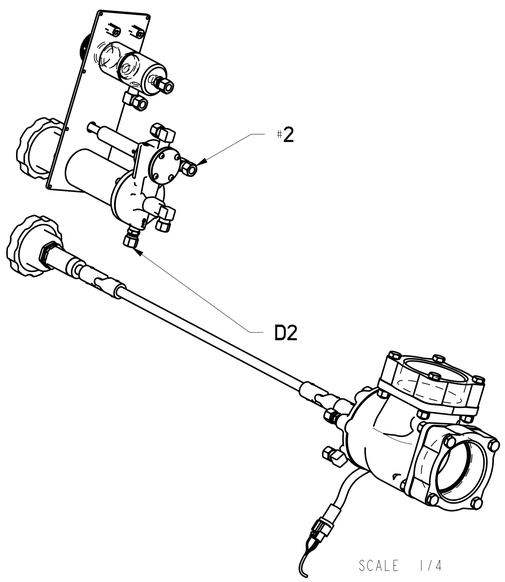
SEE DRAWING #DGC0112 FOR DETAILED LOCATION

SHOWN WITH OPTIONAL 3" NPT FLANGES - P.N. 1920503

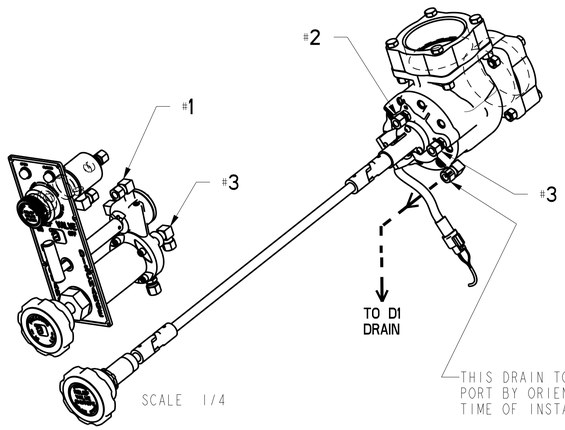




SCALE 3/4

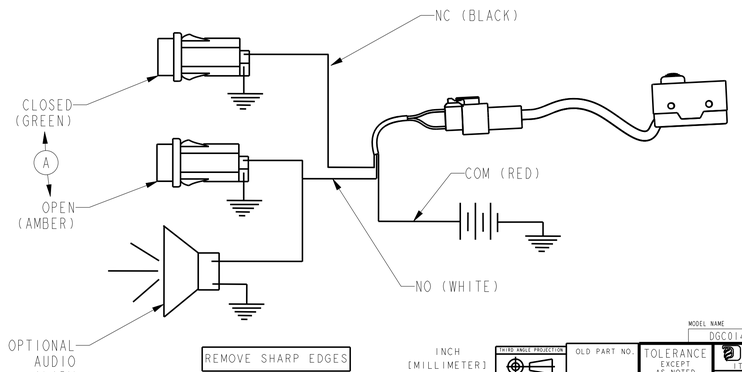


SCALE 1/4



SCALE 1/4

THIS DRAIN TO BE IN LOWEST PORT BY ORIENTATION AT TIME OF INSTALLATION



MODEL NAME	MDL CREATED	SHEET
DGC0141	08JUN05	1/1 D

REMOVE SHARP EDGES | INCH [MILLIMETER] | THIRD ANGLE PROJECTION | OLD PART NO.

MATERIAL DESCRIPTION: | MATERIAL NO. | PATTERN NO.

THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. - UNAUTHORIZED REPRODUCTION IS PROHIBITED | ALL DIMENSIONS IN INCHES UNLESS NOTED | DO NOT SCALE PRINT

TOLERANCE EXCEPT AS NOTED .00 ± .03, .000 ± .010, ANGLES ±1°

DR'N HAL
CHKD MCR
TRCD

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

RELIEF VALVE

DATE 16-Jun-05
SCALE 1/2

DGD0800

W.S. DARLEY & CO.

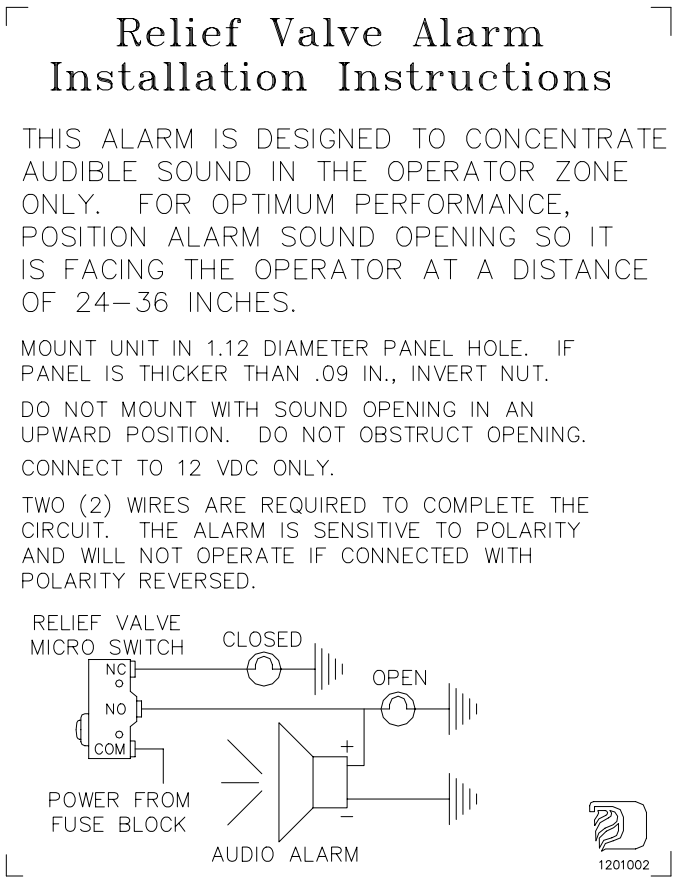
Relief Valve Alarm
Installation Instruction

This Alarm is designed to concentrate audible sound in the operator zone only. For optimum Performance, position alarm sound opening so it is facing the operator at a distance of 24 - 36 inches.

Mount unit in 1.12 diameter panel hole. If panel is thicker than .09 inches, invert nut.

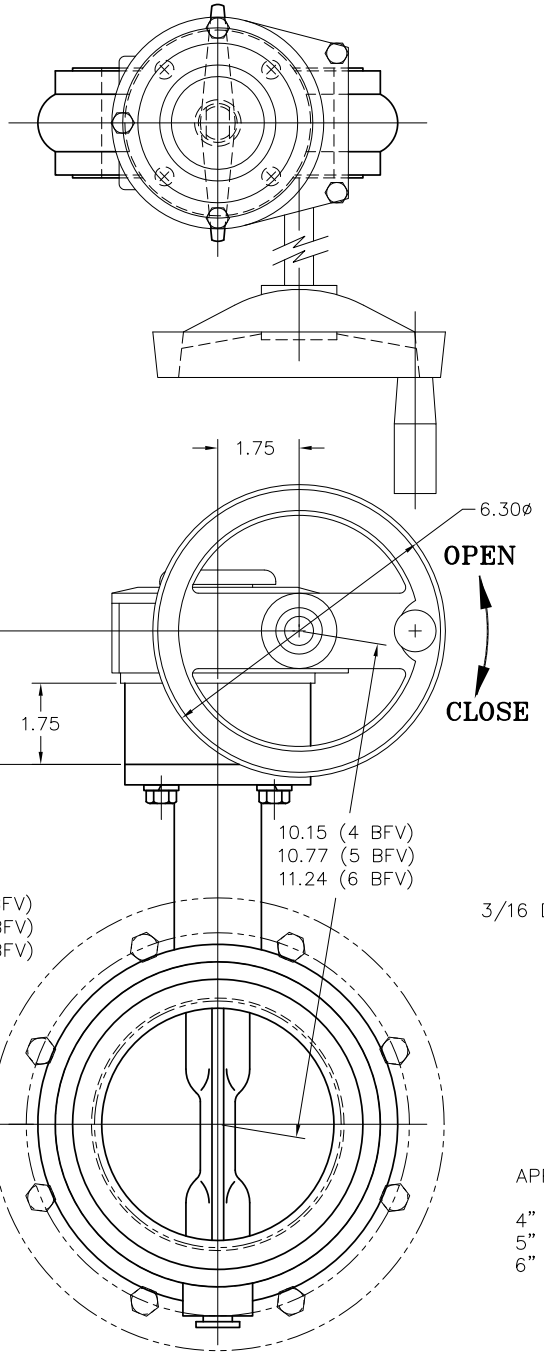
Do not mount with sound opening in an upward position. Do not obstruct opening.

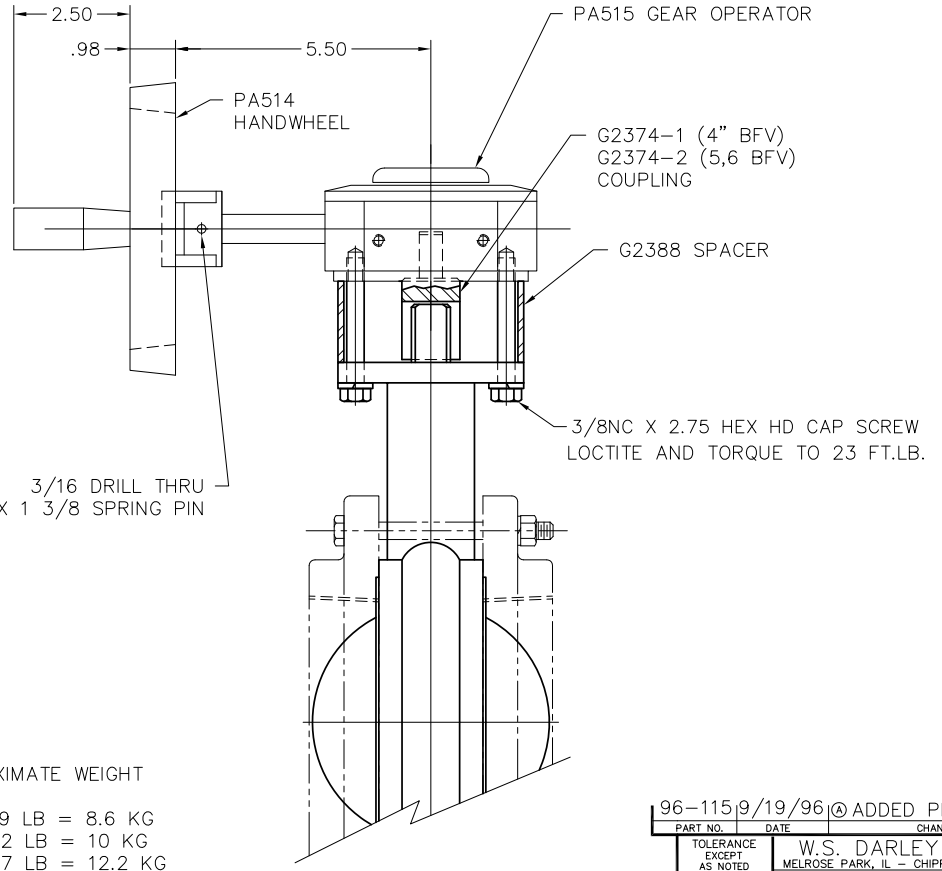
Connect to 12 VDC only.
Two (2) wires are required to complete the circuit. The alarm is sensitive to polarity and will not operate if connected with polarity reversed.



IF FURTHER INFORMATION IS NEEDED, CALL W.S. DARLEY & CO. AT CHIPPEWA FALLS, WI. AT 800-634-7812 or 715-726-2650

Butterfly Valve





ATTACH WARNING PLATE (ASSY AM00700) TO CONTROL PANEL VIA REV. NO. 96–115 (REF). Ⓐ

APPROXIMATE WEIGHT

4" – 19 LB = 8.6 KG
5" – 22 LB = 10 KG
6" – 27 LB = 12.2 KG

PART NO.	DATE	CHANGE
96–115	9/19/96	Ⓐ ADDED PLATE LMH

TOLERANCE EXCEPT AS NOTED
FRAC DIM ±.01
.00 ±.01
.000 ±.005
ANGLES ±1°

W.S. DARLEY & CO.
MELROSE PARK, IL – CHIPPEWA FALLS, WI

DWG – BTRFLY VALVE ASSY
MANUAL CONTROLLED

OLD PART NO. G2420

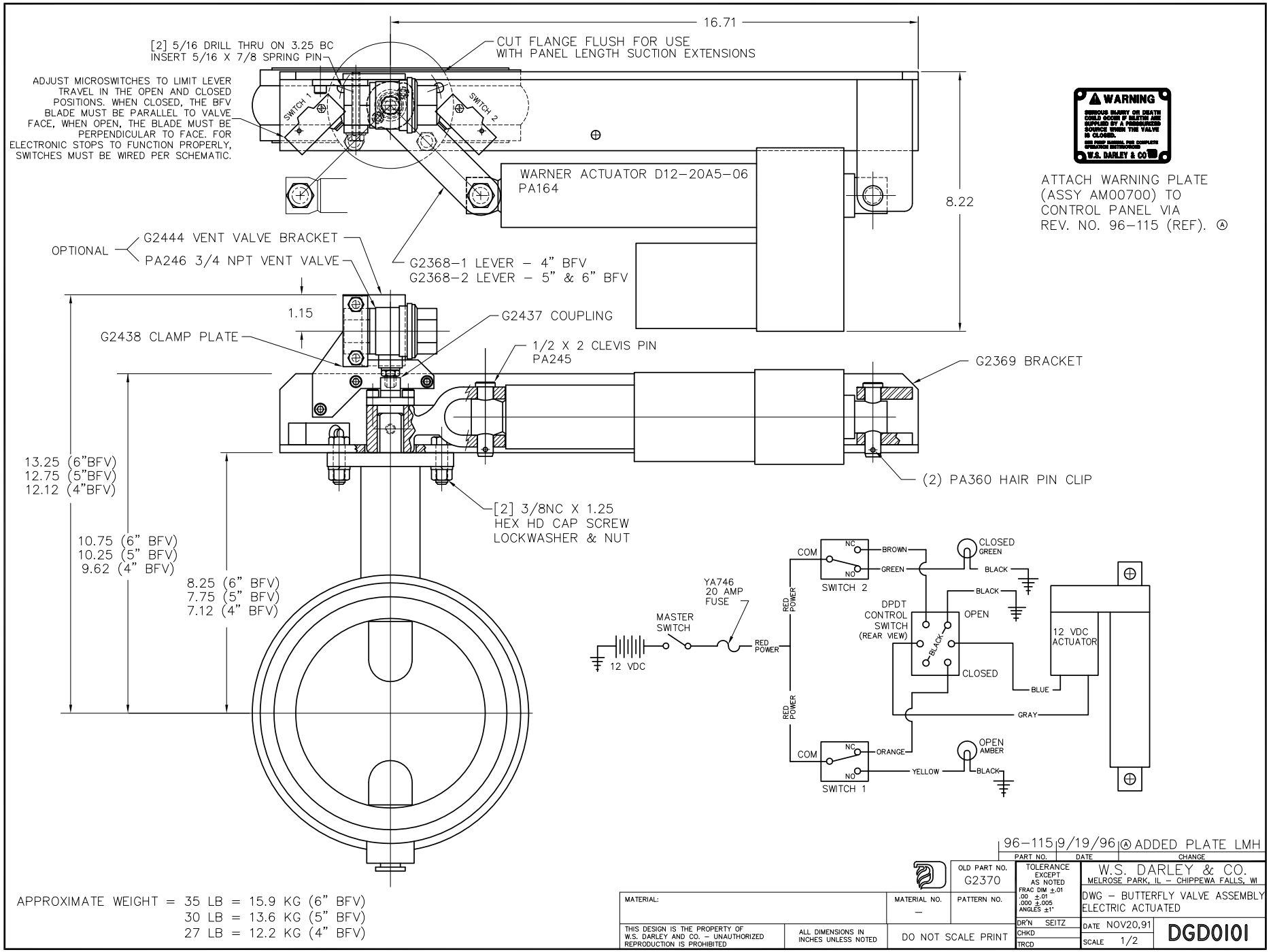
DR'N DWS
CHKD
TRCD

DATE SEP25,91
SCALE 1/2

DGD0104

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT



APPROXIMATE WEIGHT = 35 LB = 15.9 KG (6" BFV)
30 LB = 13.6 KG (5" BFV)
27 LB = 12.2 KG (4" BFV)

PART NO.	DATE	CHANGE
96-115	9/19/96	Ⓐ ADDED PLATE LMH

MATERIAL:	MATERIAL NO. –	PATTERN NO.	OLD PART NO. G2370	TOLERANCE EXCEPT AS NOTED FRAC DIM ±.01 .00 ±.01 .000 ±.005 ANGLES ±1°
THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. – UNAUTHORIZED REPRODUCTION IS PROHIBITED	ALL DIMENSIONS IN INCHES UNLESS NOTED	DO NOT SCALE PRINT	DR'N SEITZ CHKD TRCD	DATE NOV20,91 SCALE 1/2

W.S. DARLEY & CO.
MELROSE PARK, IL – CHIPPEWA FALLS, WI

DWG – BUTTERFLY VALVE ASSEMBLY ELECTRIC ACTUATED

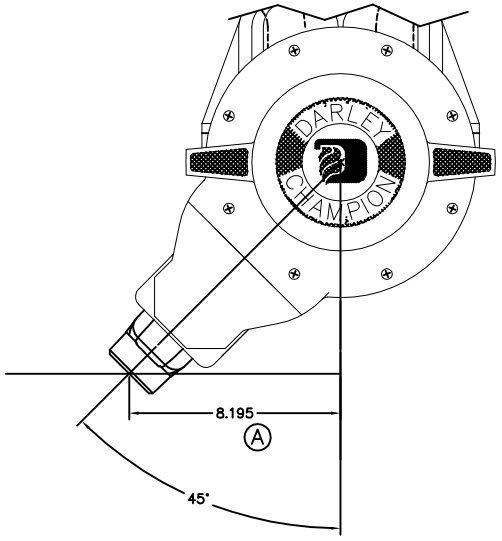
DGD0101

INLET RELIEF VALVE INFORMATION: Ⓐ

ACTUAL PRESSURE RANGE IS 90PSI – 300PSI
THERE MAY BE SOME DIMINISH IN FLOW AT HIGHER PRESSURE SETTINGS. (SETTINGS BELOW 200 PSI RECOMMENDED FOR MOST APPLICATIONS).
RELIEF VALVE IS FACTORY SET AT 125 PSI AND WHEN PRESET AT 125 PSI, THE PRESSURE RELIEF VALVE SHALL NOT ALLOW A PRESSURE RISE GREATER THAN 60 PSI AT THE DEVICE INLET WHILE FLOWING A MINIMUM OF 150 GPM.
THIS VALVE IS NFPA 2009 1901 COMPLIANT PER SECTION 16.6.6.3

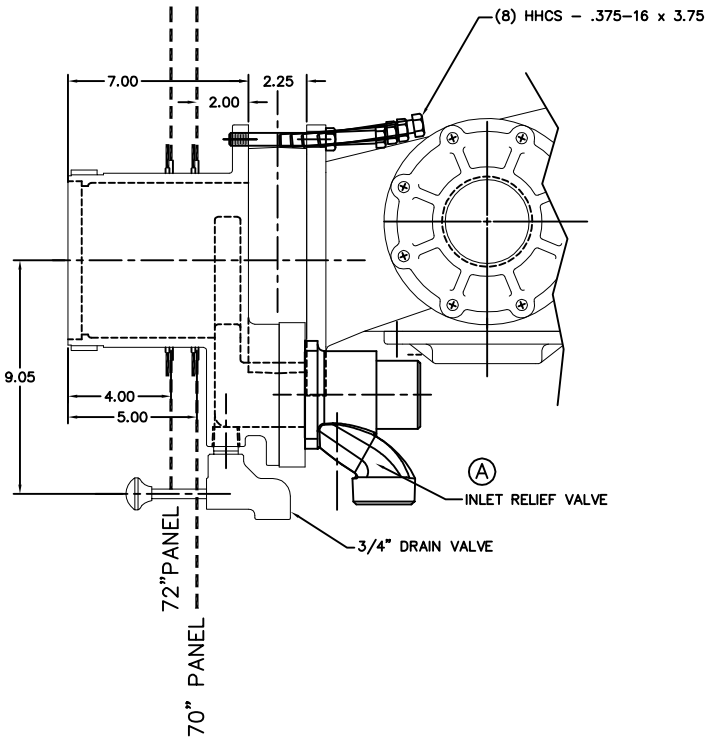
ADJUSTMENT INSTRUCTIONS (IF REQUIRED): Ⓐ

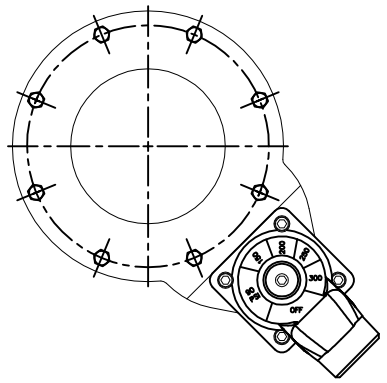
ADJUST CENTER HEX COUNTERSUNK HEX HEAD PRESSURE ADJUSTING BOLT WITH A 1/4" ALLEN WRENCH, 9/16" OR 14 MM SOCKET.
TO SET AT THE DESIRED RELIEF PRESSURE, ADJUST THE ADJUSTING BOLT HEAD SO THE TOP OF THE BOLT HEAD IS EVEN WITH THE DESIRED PRESSURE.



NOTE:
SUCTION NIPPLE WILL BE ROTATED 45° OFF CENTER WHEN MOUNTED.

Ⓐ





TYPICAL SUCTION EXTENSION CONFIGURATION FOR EM, LDM, N, & S PUMP

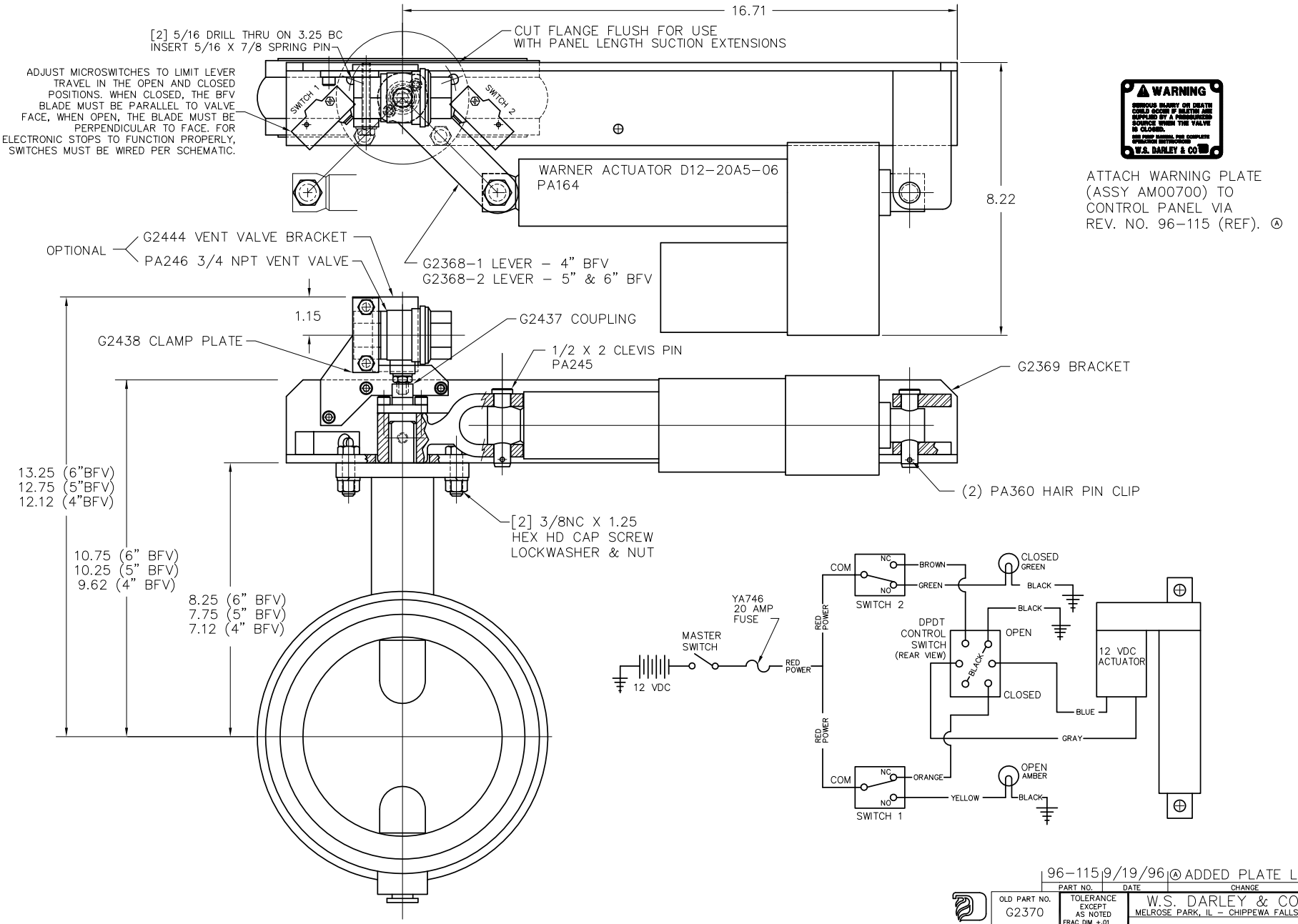
EXTENSION AND NIPPLE ARE THE SAME FOR 70 & 72" ASSEMBLIES WITH AND WITHOUT BUTTERFLY VALVES.
IF BFV IS NOT REQUIRED, THEN KC00300 ASSY W/2.25 THICK SPACER IS USED.
USE 1962503 STAINLESS STEEL PANEL TRIM RING

PART NO.	DATE	CHANGE
A – #8512	07/18/12	UPDATED DRAWING TO REFLECT USE OF TFT SUCTION RELIEF VALVE 8.20 WAS 5.22. UPDATED INFO AND ADJUSTMENT SECTION

TOLERANCE EXCEPT AS NOTED FRAC DIM ±.01 .00 ±.01 .000 ±.005 ANGLES ±1°	W.S. DARLEY & CO. MELROSE PARK, IL – CHIPPEWA FALLS, WI
MATERIAL:	INSTR – INLET RV ADJUSTMENT
PATTERN NO.	–
DR'N CKE	DATE 03FEB,00
CHKD SJL	SCALE 1/4
TRCD	I200572

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT



APPROXIMATE WEIGHT = 35 LB = 15.9 KG (6" BFV)
30 LB = 13.6 KG (5" BFV)
27 LB = 12.2 KG (4" BFV)

PART NO.	DATE	CHANGE
96-115	9/19/96	Ⓐ ADDED PLATE LMH

MATERIAL:	MATERIAL NO. –	PATTERN NO.	OLD PART NO. G2370	TOLERANCE EXCEPT AS NOTED FRAC DIM ±.01 .00 ±.01 .000 ±.005 ANGLES ±1°
THIS DESIGN IS THE PROPERTY OF W.S. DARLEY AND CO. – UNAUTHORIZED REPRODUCTION IS PROHIBITED	ALL DIMENSIONS IN INCHES UNLESS NOTED	DO NOT SCALE PRINT	DR'N SEITZ CHKD TRCD	DATE NOV20,91 SCALE 1/2

W.S. DARLEY & CO.
MELROSE PARK, IL – CHIPPEWA FALLS, WI

DWG – BUTTERFLY VALVE ASSEMBLY
ELECTRIC ACTUATED

DGD0101

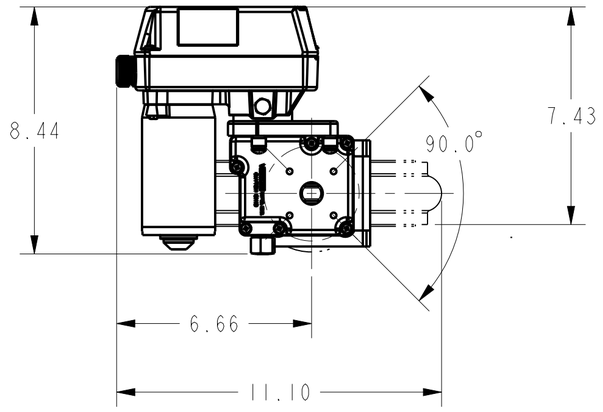
NO.	DESCRIPTION	PART NO.	QTY.
1	ACTUATOR - THUEMLING, MECH OVERRIDE	2603214	1
2	BRACKET - THUEMLING ACTUATOR	4034120	1
3	COUPLER - THUEMLING ACTUATOR	3006710	1
4	COVER - TOGGLE SWITCH	2605001	1
5	HHCS - .250-20 x 0.63, GR5	5400001	4
6	HHCS - .375-16 x 1.25, GR5	5400037	4
7	LIGHT - INDICATOR, AMBER, 12V	2602302	1
8	LIGHT - INDICATOR, GREEN, 12V	2602301	1
9	NUT - HEX, .375-16, GR2	5403002	4
10	PLATE - SWITCH	1960201	1
11	SSS - .250 x 0.25, GR5	5402602	2
12	SWITCH - TOGGLE, MOMENTARY	2600003	1
13	WASHER - LOCK, 0.250 ID	3603501	4
14	WASHER - LOCK, 0.375 ID	3603503	4
15	MISC - VALVE, WARNING PLATE	AM00700	1

A

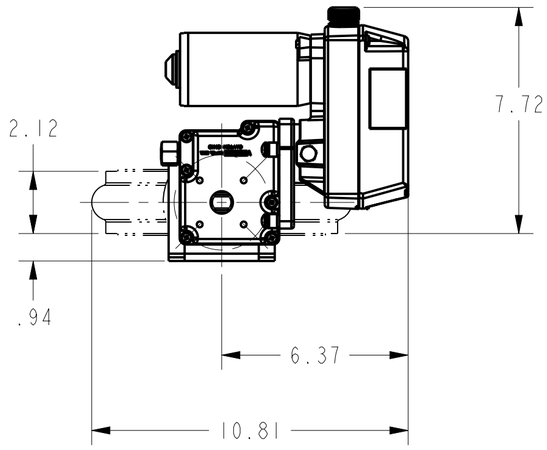
*ACTUATOR CAN BE INVERTED

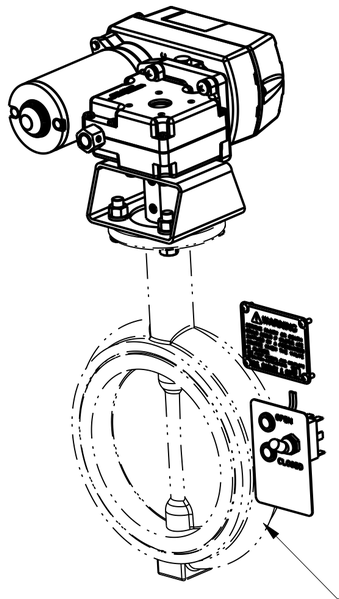
REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D
A	WAS B SIZE, REFERENCE HISTORICAL COPY FOR BOM CHANGES	12-AUG-13	10273	JAF
B	ADDED TABLE	12-AUG-13	10273	JAF
C	INVERTED THE (4) 5400037 HHCS	18SEP2014	10729	TED

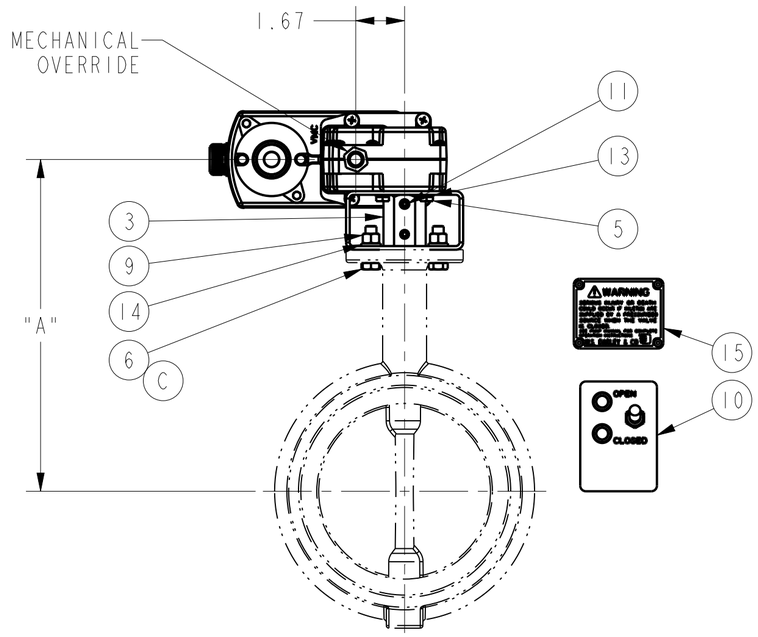
STANDARD ORIENTATION*

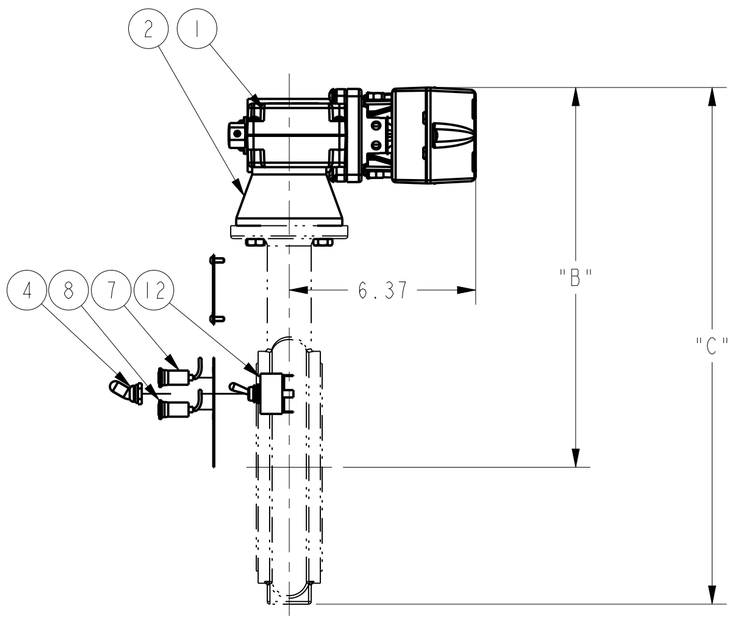


90° ORIENTATION*









SIZE	PART #	A	B	C
5	5206000	10.20	11.84	16.52
5	5206001	10.20	11.84	16.52
6	5206100	11.33	12.97	17.65
6	5206101	11.33	12.97	17.65
6	5206110	9.96	11.60	16.28
6	5206111	9.96	11.60	16.28

B

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.

MATERIAL DESCRIPTION: -

MATERIAL NO. -

PATTERN NO. -

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

DR'N JAF

CHKD RJG

TRCD

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

ACTUATOR - ASSY, ELEC THUEMLING 5"-6" BFV W/MECH OERRIDE

DATE 12-Aug-13

SCALE 1/4

MODEL NAME	MDL CREATED	SHEET	
AA00621	10-JUN-13	1/1	C

DGD0109

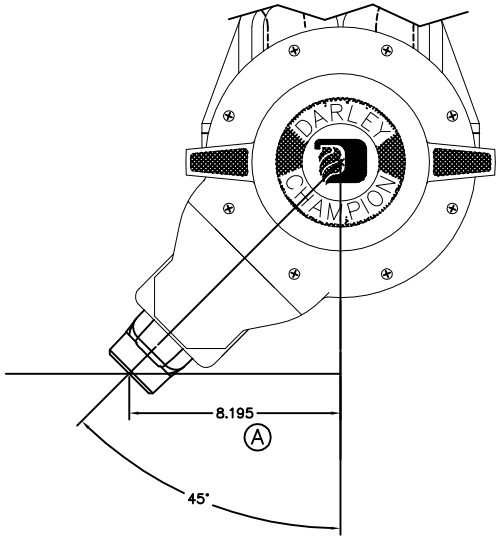
A

INLET RELIEF VALVE INFORMATION: Ⓐ

ACTUAL PRESSURE RANGE IS 90PSI – 300PSI
THERE MAY BE SOME DIMINISH IN FLOW AT HIGHER PRESSURE SETTINGS. (SETTINGS BELOW 200 PSI RECOMMENDED FOR MOST APPLICATIONS).
RELIEF VALVE IS FACTORY SET AT 125 PSI AND WHEN PRESET AT 125 PSI, THE PRESSURE RELIEF VALVE SHALL NOT ALLOW A PRESSURE RISE GREATER THAN 60 PSI AT THE DEVICE INLET WHILE FLOWING A MINIMUM OF 150 GPM.
THIS VALVE IS NFPA 2009 1901 COMPLIANT PER SECTION 16.6.6.3

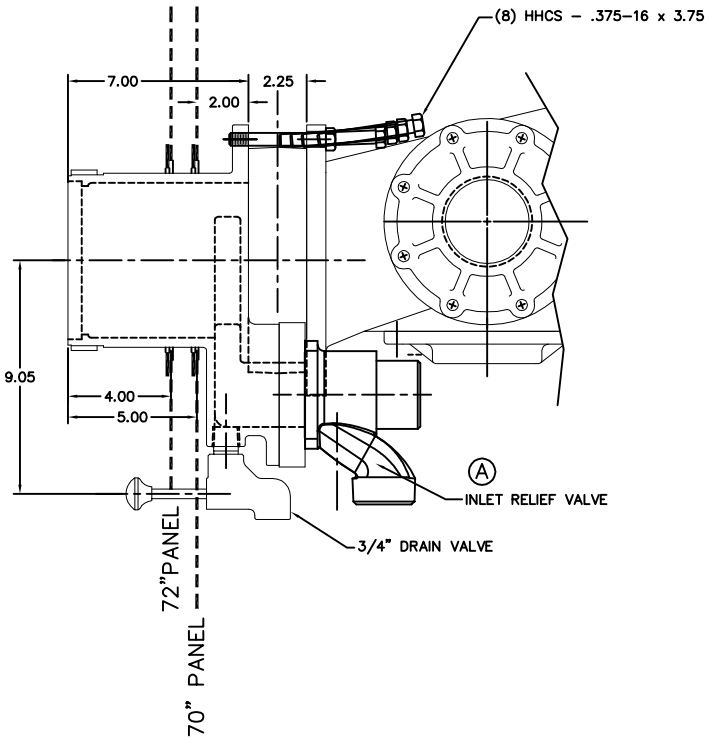
ADJUSTMENT INSTRUCTIONS (IF REQUIRED): Ⓐ

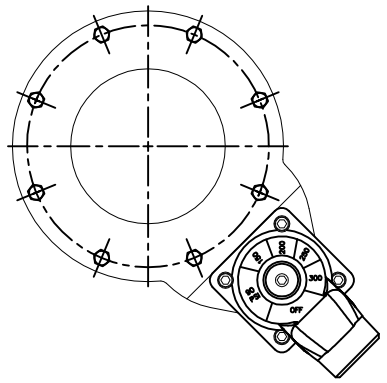
ADJUST CENTER HEX COUNTERSUNK HEX HEAD PRESSURE ADJUSTING BOLT WITH A 1/4" ALLEN WRENCH, 9/16" OR 14 MM SOCKET.
TO SET AT THE DESIRED RELIEF PRESSURE, ADJUST THE ADJUSTING BOLT HEAD SO THE TOP OF THE BOLT HEAD IS EVEN WITH THE DESIRED PRESSURE.



NOTE:
SUCTION NIPPLE WILL BE ROTATED 45° OFF CENTER WHEN MOUNTED.

Ⓐ





TYPICAL SUCTION EXTENSION CONFIGURATION FOR EM, LDM, N, & S PUMP

EXTENSION AND NIPPLE ARE THE SAME FOR 70 & 72" ASSEMBLIES WITH AND WITHOUT BUTTERFLY VALVES.
IF BFV IS NOT REQUIRED, THEN KC00300 ASSY W/2.25 THICK SPACER IS USED.
USE 1962503 STAINLESS STEEL PANEL TRIM RING

PART NO.	DATE	CHANGE
A – #8512	07/18/12	UPDATED DRAWING TO REFLECT USE OF TFT SUCTION RELIEF VALVE 8.20 WAS 5.22. UPDATED INFO AND ADJUSTMENT SECTION

TOLERANCE EXCEPT AS NOTED FRAC DIM ±.01 .00 ±.01 .000 ±.005 ANGLES ±1°	W.S. DARLEY & CO. MELROSE PARK, IL – CHIPPEWA FALLS, WI
MATERIAL:	INSTR – INLET RV ADJUSTMENT
PATTERN NO.	–
DR'N CKE	DATE 03FEB,00
CHKD SJL	SCALE 1/4
TRCD	I200572

ALL DIMENSIONS IN INCHES UNLESS NOTED

DO NOT SCALE PRINT

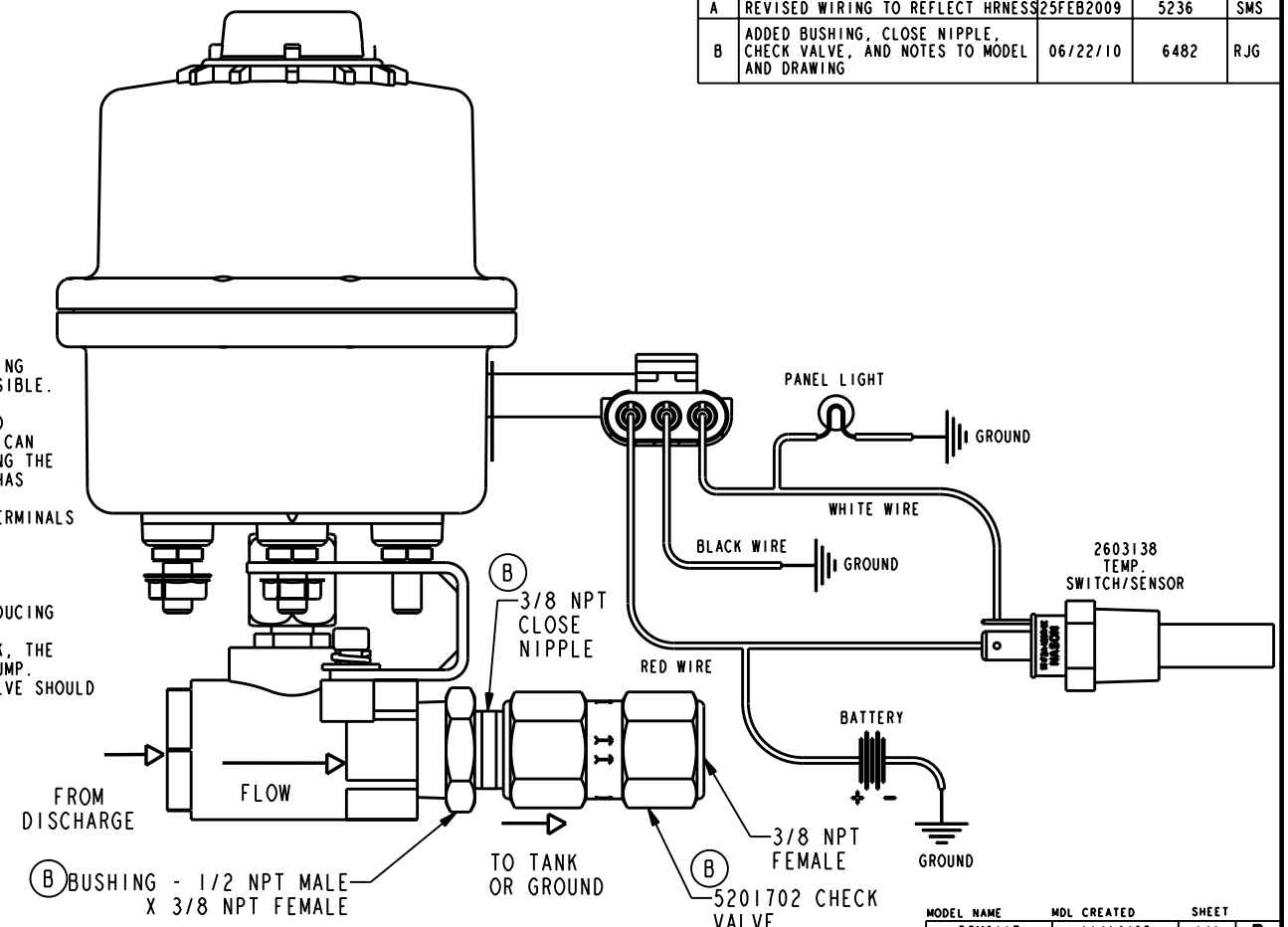
NAME:RJG OBJECT:DGM0117 DATE:22-Jun-10 14:41:12

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D
A	REVISED WIRING TO REFLECT HRNESS	25FEB2009	5236	SMS
B	ADDED BUSHING, CLOSE NIPPLE, CHECK VALVE, AND NOTES TO MODEL AND DRAWING	06/22/10	6482	RJG

INSTALLATION INSTRUCTIONS:

1) INSTALL TEMPERATURE SWITCH ON SUCTION SIDE OF PUMP, AS NEAR TO IMPELLER AS POSSIBLE, PREFERABLY BETWEEN THE IMPELLER AND THE RELIEF VALVE.
2) INSTALL THE ACTUATOR VALVE ON THE DISCHARGE SIDE OF THE PUMP. ITS LOCATION IS NOT CRITICAL.* IT CAN BE MOUNTED DIRECTLY TO THE PUMP OR POSITIONED REMOTELY AND CONNECTED WITH A 3/8 OD MINIMUM LINE.
3) VALVE DOES NOT NEED TO BE MOUNTED VERTICALLY AS SHOWN.
4) *PLUMB THE VALVE OUTLET TO TANK , IF DESIRED, USING 3/8 OD MINIMUM LINE. KEEP ALL LINES AS SHORT AS POSSIBLE.
5) ATTACH ONE LEAD OF VALVE TO THE TERMINAL ON THE TEMPERATURE SWITCH. ATTACH THE OTHER LEAD TO A FUSED VOLATAGE SOURCE. IF DESIRED, THE TEMPERATURE SWITCH CAN ALSO BE USED TO CONTROL A LIGHT ON THE PANEL NOTIFYING THE OPERATOR THAT OVERHEATING IS OCCURRING AND THE UNIT HAS BEEN ACTIVATED.
6) TO TEST THE VALVE: WITH PUMP RUNNING, JUMP THE TERMINALS ON THE TEMPERATURE SWITCH. IF THE VALVE DOES NOT DISCHARGE, IT MAY BE INSTALLED BACKWARDS OR WIRING CONNECTIONS MAY BE INCORRECT.

* CONNECTION TO TANK MAY CAUSE TANK TO OVERHEAT, REDUCING THE EFFECTIVENESS OF THIS DEVICE.
TO PREVENT FREEZING DAMAGE, WHEN CONNECTING TO TANK, THE VALVE SHOULD BE MOUNTED ON THE TANK, BUT ABOVE THE PUMP.
IF THE VALVE IS TO DISCHARGE TO ATMOSPHERE, THE VALVE SHOULD BE MOUNTED ON, OR AS CLOSE TO THE PUMP AS POSSIBLE.



MODEL NAME	MDL CREATED	SHEET	
DGM0117	11/14/08	1/1	B

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.

MATERIAL DESCRIPTION: -

MATERIAL NO. -

PATTERN NO. -

TOLERANCE EXCEPT AS NOTED .00 ±.03 .000 ±.010 ANGLES ±1°

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

DWG - THERMAL RELIEF SYSTEM
KZCO VALVE, 2603138 TEMP. SENSOR

DR'N RJG
CHKD DWS
TRCD

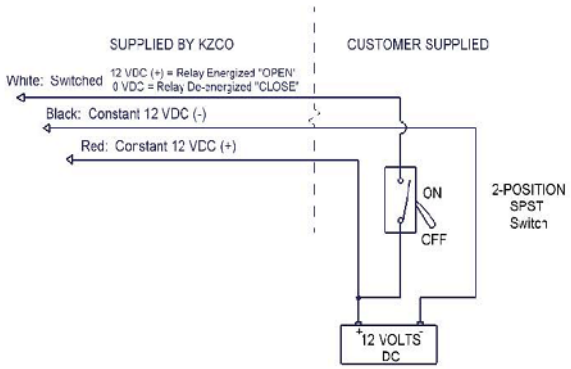
DATE 14-Nov-08
SCALE 1/1

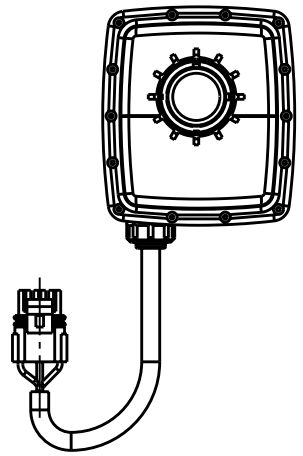
DGM0117

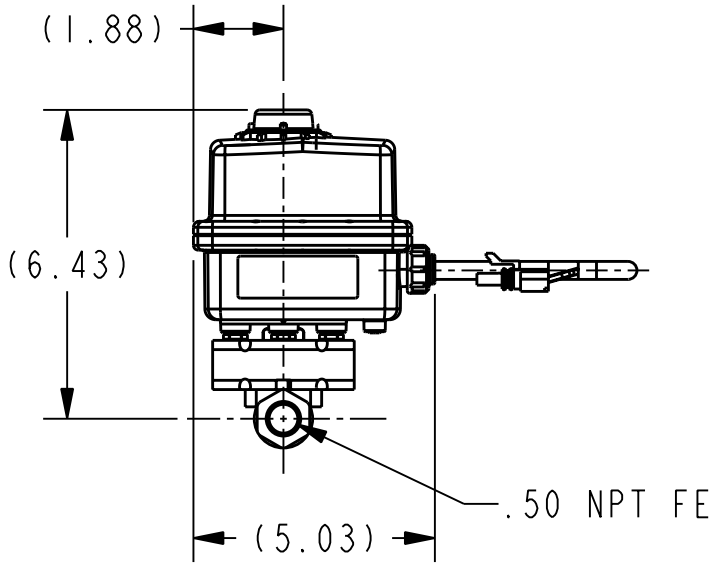
ALL DIMENSIONS IN INCHES UNLESS NOTED

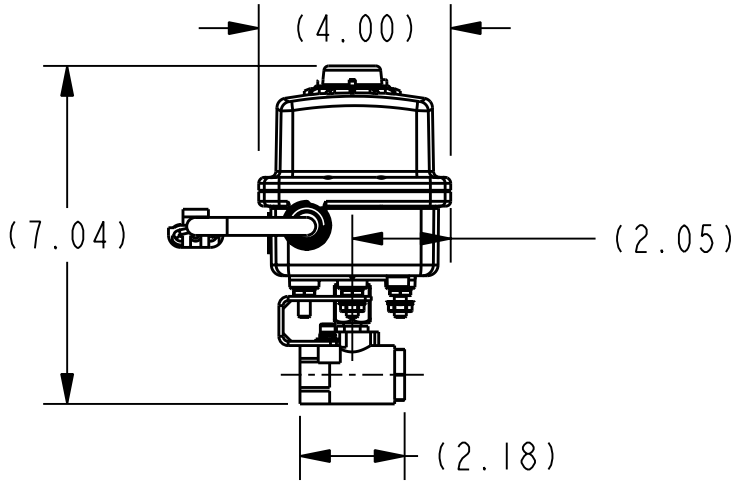
DO NOT SCALE PRINT

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D









MODEL NAME	MDL CREATED	SHEET	
5209401	11/13/08	1/2	A

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.

MATERIAL DESCRIPTION: KZCO 84D23-10D20-P01

MATERIAL NO. -

PATTERN NO. -

TOLERANCE EXCEPT AS NOTED
.00 ±.03
.000 ±.010
ANGLES ±1°

DR'N RJG
CHKD DWS
TRCD

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

VALVE - ACTUATED, 12VDC, .50NPT FE
KZCO 84D23-10D20-P01

DATE 13-Nov-08

SCALE 1/4

5209401

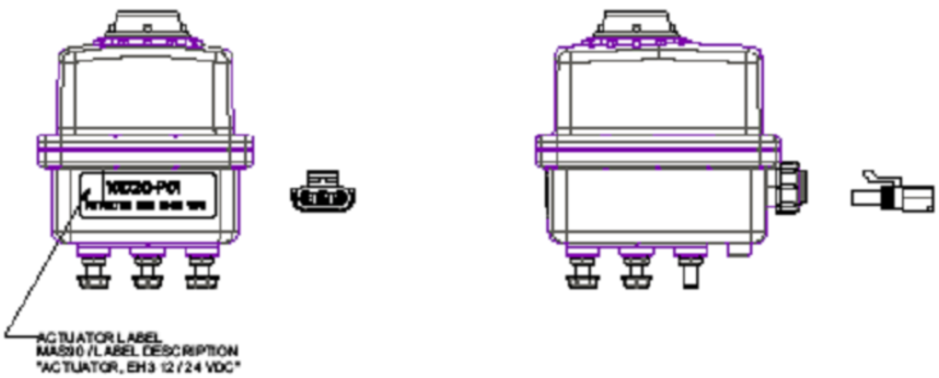
ALL DIMENSIONS IN INCHES UNLESS NOTED

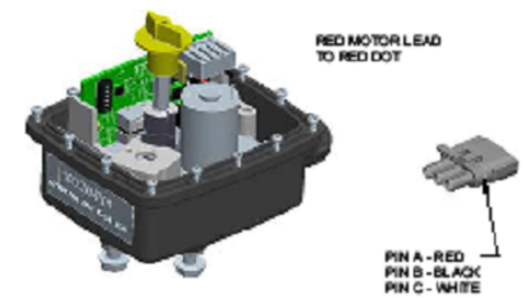
DO NOT SCALE PRINT

REV.	REVISED BY	REVISION DATE	REVISED BY
-2+		7/15/2008 9:41:57 AM	bgotschall

INPUT/OUTPUT
POWER = 12/24 VDC
1 - BLACK - POWER (-) NEGATIVE
2 - RED - POWER (+) POSITIVE
3 - WHITE - SIGNAL 1 (+) POSITIVE TO OPEN
4 - ***

DIP SX 4 'ON'





SCALE .500

PROGRAM NOTE:

MAS90 SET DATA
CONTROL INPUT = 1
FEEDBACK = 0
OPERATION = 0
MOTOR = M2
SPEED CT = 0.8
ZEROSET = 135
RANGE TOLERANCE = 1
ROTATION = CC092
ACTUATOR RANGE = 0.00.0.00
DESIGN VOLTAGE = E
DIP SX = 3
LABEL = KZCO
OPTIONS = 0
PLUG TYPE = P
TEST PLUG =

ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL
21	1	EH-502	LABEL, EH ACTUATOR, 2.5" X 1", THERMAL TRANSFER, WHITE	NO_MATERIAL
20	1	800018	HARNESS, 60A,3ST, WP3T,22.5"	
19	1	EH3-115-Y	FLAG, YELLOW	POLYPROPYLENE_TALC_20
18	1	399-0029	PCB ASSY, EH3 L1 SOLID STATE 12 VDC	
17	1	100401	GEAR MOTOR, M2 18 RPM/MOLON	NO_MATERIAL
16	3	QX-222	NUT, HEX HEAD, SERRATED FLANGE, .250-20 UNC-2B	STAINLESS_STEEL_TYPE_303
15	4	EH3-135	STUD, 1/4-20 X 1/2 MTG	STAINLESS_STEEL_TYPE_303
14	1	EH-104	RETAINER, PUSH-ON 5/16" SHAFT	STAINLESS_STEEL_TYPE_18-8
13	1	499-0100	CAM ASSY, EXTD LOBE FOR EH2/3 E-OPT	
12	1	EH-502	LABEL, EH ACTUATOR, 2.5" X 1", THERMAL TRANSFER, WHITE	NO_MATERIAL
11	1	EH-130	O-RING, DOME	SILICONE_RED_55_DUROMETER
10	1	EH3-114	DOME, CLEAR	POLYCARBONATE,
9	14	EHPT-1103	SCREW, PAN, PHILLIPS, HIGH-LOW, 5-20 X .562	STAINLESS_STEEL_TYPE_410
8	1	EH3-1001-N	LID, CASE, EH3, DOME	NYLON_DPC_6N33-L_BLACK
7	4	EH3-139	SCREW, 8-32 X 1.25 PPHMS SS	STAINLESS_STEEL_TYPE_18-8
6	1	EH-157	SCREW, 8-18 x 3/8" TSB PPH SS	STAINLESS_STEEL_TYPE_18-8
5	1	EH3-1030	O-RING, EH3, CASE I.D., #120	SILICONE_RED_55_DUROMETER
4	1	EH-139	O-RING, #006, PRESSURE TEST PORT	FLUOROCARBON_BLACK_75_DUROMETER
3	1	EHPT-140	O-RING, #112, MOTOR SHAFT, VITON	FLUOROCARBON_BLACK_75_DUROMETER
2	1	EH3-1003-N	LOWER CASE - EH3 INTERNAL MTG	NYLON_DPC_6N33-L_BLACK
1	1	498-0002	CASE KIT, EH3 IM DOME NYLON M2 MTR	

STANDARD TOLERANCES (ALL DIMENSIONS IN INCHES)

DATE: 2008-05-29	
DESIGNED: L. ERDKAMP	
DRAWN: W. FEDDE	
APPROVED: A. KOTTAS	
SCALE: .500	SIZE: B
MATERIAL:	

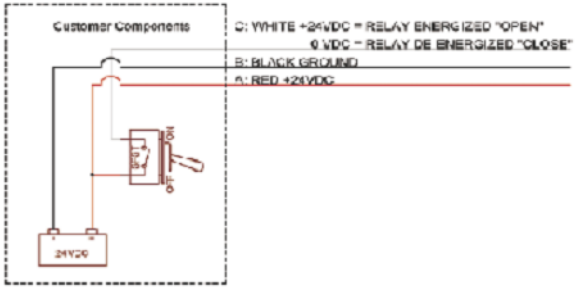
KZCO Inc.

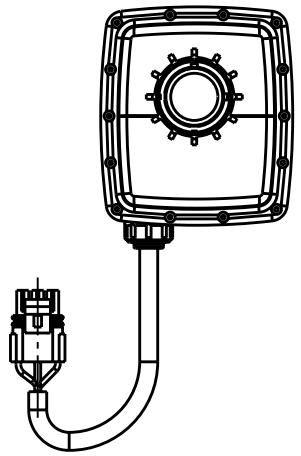
TITLE: ACTUATOR, EH3, SOLID STATE	
REF:	
PART NO: 10020-P01	REVISION: -2+
DRAWING NO: 10020-P01	SHEET: 1 OF 1

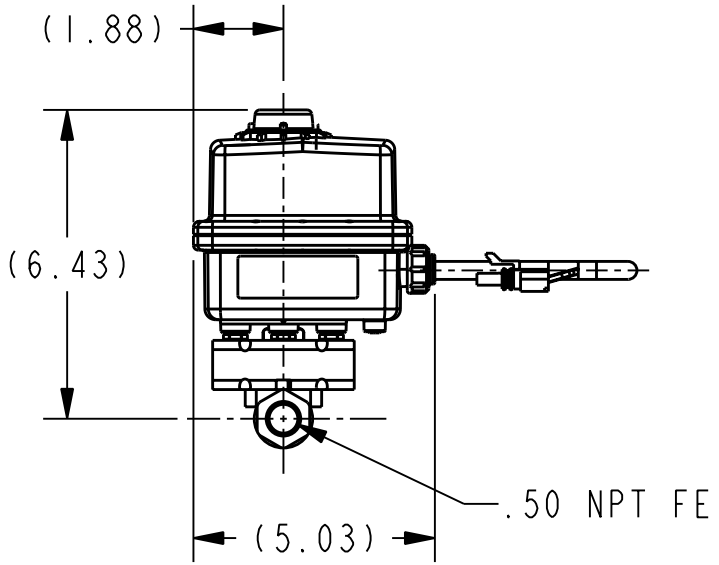
NAME:RJG OBJECT:5209401_2 DATE:17-Nov-08 11:49:19

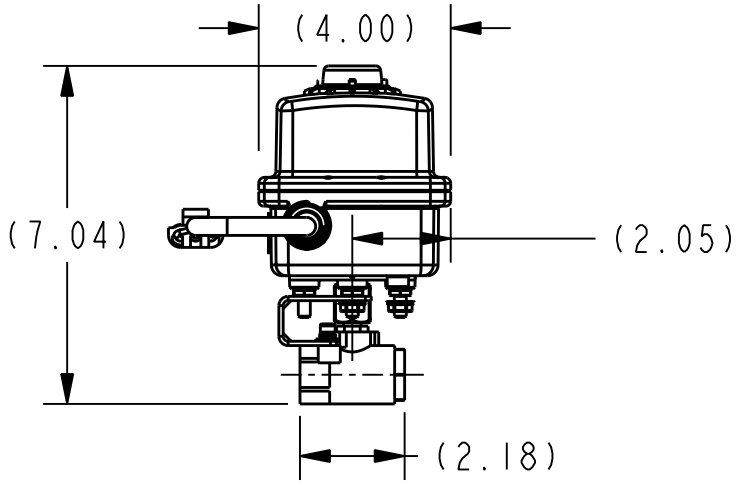
60AD WIRING
Standard On/Off applications, SPST Switch
24 VDC

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D









MODEL NAME	MDL CREATED	SHEET	
5209402	11/13/08	1/3	A

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.

MATERIAL DESCRIPTION: KZCO 84D23-60AD-M

MATERIAL NO. -

PATTERN NO. -

TOLERANCE EXCEPT AS NOTED
.00 ±.03
.000 ±.010
ANGLES ±1°

DR'N RJG
CHKD DWS
TRCD

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

VALVE - ACTUATED, 24VDC, .50NPT FE
KZCO 84D23-60AD-M

DATE 13-Nov-08

SCALE 1/4

5209402

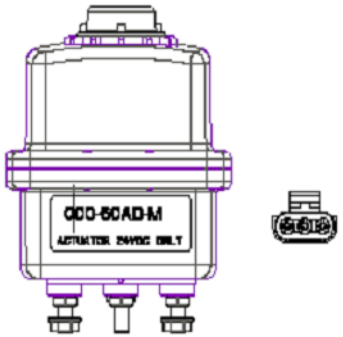
ALL DIMENSIONS IN INCHES UNLESS NOTED

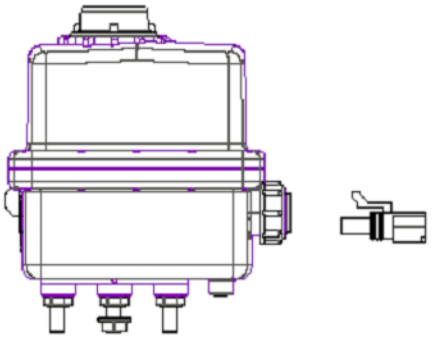
DO NOT SCALE PRINT

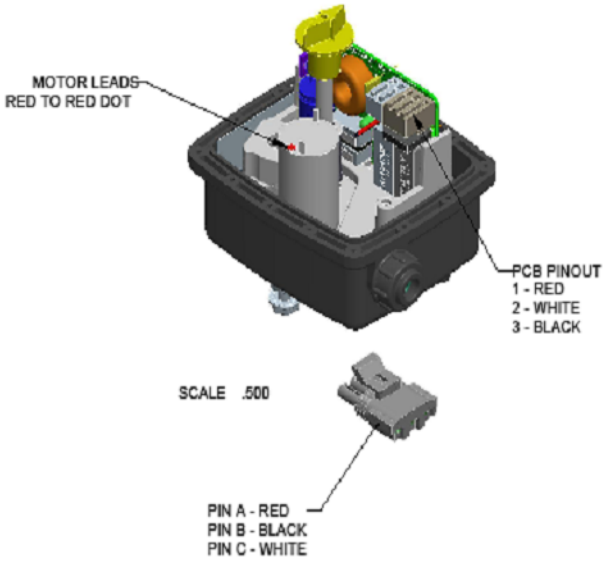
NAME:RJG OBJECT:5209402_2 DATE:19-Nov-08 13:40:13

CREATED BY: wfedde CREATED ON: 3/28/2008 1:49:38 PM REV: *** VER: .1 REL: -- LOCATION: Rod Fabs\Engineering\Parts BRANCH: --

REVMER	REVISION ECO	REVISIONVERSION DATE	REVISIONVERSION BY
*** .1		3/28/2008 1:49:38 PM	wfedde







MAS80 SET DATA
CONTROL INPUT = 1
FEEDBACK = 0
OPERATION = 0
MOTOR = M
SPEED CT = 0.8
ZEROSET = 135
RANGE TOLERANCE = 1
ROTATION = CC091
ACTUATOR RANGE = 0.00/0.00
DESIGN VOLTAGE = D
DIP SX =
LABEL = KZCO
OPTIONS = 0
PLUG TYPE =
TEST PLUG =

DET	QTY	PART NUMBER	DESCRIPTION	MATERIAL
8	1	EH-502	LABEL, EH ACTUATOR, 2.5" X 1", THERMAL TRANSFER, WHITE	NO_MATERIAL
7	2	QX-222	NUT, HEX HEAD, SERRATED FLANGE, .250-20 UNC-2B	STAINLESS_STEEL,TYPE_303
6	4	EH3-135	STUD, 1/4-20 X 1/2 MTG	STAINLESS_STEEL,TYPE_303
5	1	800018	HARNESS, 60A,3ST, WP3T,22.5"	
4	1	EH3-115-Y	FLAG, YELLOW	POLYPROPYLENE_TALC_20
3	1	800488	PCB ASSY, EH3 24VDC 60AD/60DF	
2	1	EH3-110	GEAR MOTOR, EH3 SERIES M1 18 RPM @ 12VDC	
1	1	498-0005	CASE KIT, EH3 IM DOME NYLON M1 & N1 MTR	

-STANDARD TOLERANCES-
-ALL DIMENSIONS IN INCHES [mm]-
.Xa .1
.XXa .01
.XXXa .005
XX°a1°
TOTAL RUNOUT: .005 FIM
CORNER BREAK: .001/.010
SURFACE FINISH: 125µIN

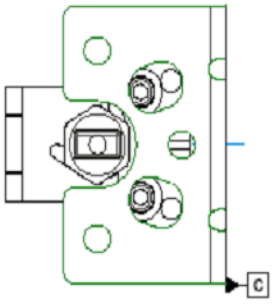
DENSITY: .047 LBM/CU IN
MASS: .592 LBM
SURF AREA: 163.793 SQ IN
VOLUME: 12.043 CU IN

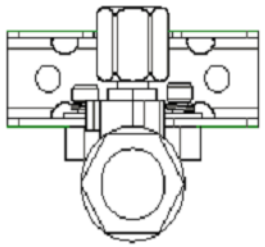
DATE: 2007-04-16
DESIGNED: L. ERDKAMP
DRAWN: W. FEDDE
APPROVED: A. KOTTAS
SCALE: .500 SIZE: B
MATERIAL:

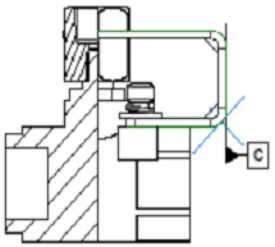
KZCO inc.
23660 KZ PARKWAY
GREENWOOD, NE 68366 USA
PHONE: +1.402.944.2767
FAX: +1.402.944.2402

TITLE: ACTUATOR, EH3, .8S @24VDC
REF:
PART NO: 000-60AD-M
REVMER: *** .1
DRAWING NO: 000-60AD-M
SHEET: 1 OF 1

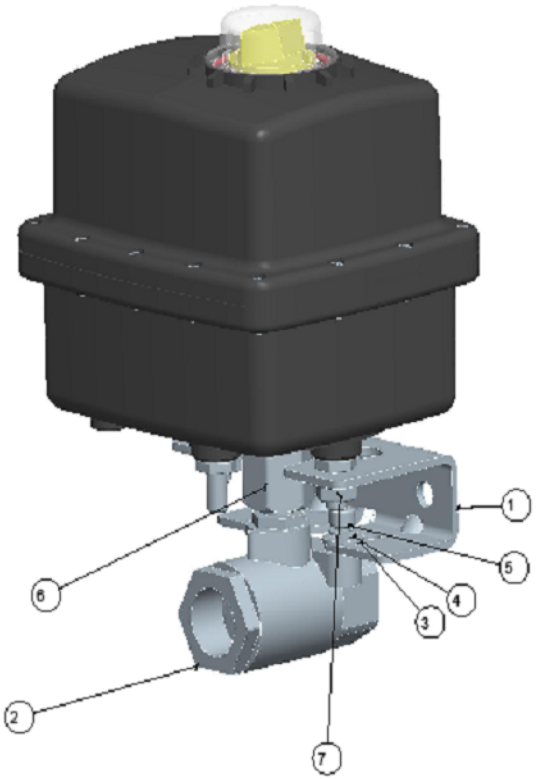
REVISER	REVISION ECO	REVISION/VERSION DATE	REVISION/VERSION BY
-.6+		8/12/2008 9:18:50 AM	bgotschall







SECTION A-A



ACTUATOR SHOWN IS REPRESENTITVE USED
ONLY TO SHOW PROPER ORIENTATION TO VALVE.

DET	QTY	PART NUMBER	DESCRIPTION	MATERIAL
7	3	QX-222	NUT, HEX HEAD, SERRATED FLANGE, .250-20 UNC-2B	STAINLESS_STEEL,TYPE_303
6	1	EH-145	COUPLER, 1/4" ~ 1/2" APOLLO	STAINLESS_STEEL_TYPE_316
5	2	EH-158	SCREW, #10-24 X 3/8" SS SOCKET HEAD	STAINLESS_STEEL,TYPE_303_OR_316
4	2	EHPT-109	WASHER, LOCK, .197 ID X .334 OD X .047 T	STAINLESS_STEEL_TYPE_316
3	2	EHPT-150	WASHER, FLAT, #10 18-8 SS	STAINLESS_STEEL_TYPE_316
2	1	EH3-84D	VALVE, 1/2" 2-WAY APOLLO 70-103-01 BRONZE BALL VALVE	BRONZE
1	1	EH3-174	BRACKET, MOUNTING EH3 SERIES	STAINLESS_STEEL_TYPE_304

-STANDARD TOLERANCES-
-ALL DIMENSIONS IN INCHES [mm]-

X±.1
.XX±.01
.XXX±.005
XX°±1°

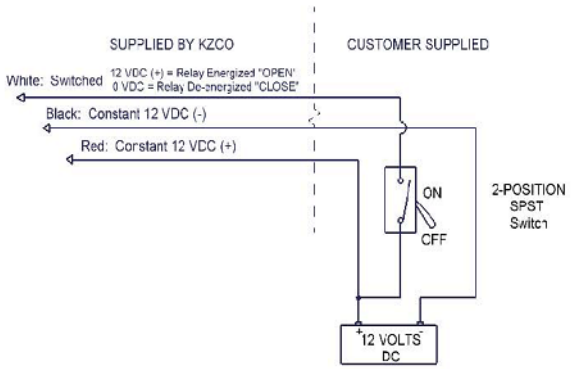
TOTAL RUNOUT: .005 FIM
CORNER BREAK: .01/.010
SURFACE FINISH: 125µIN

DENSITY: .259 LBM/CU IN
MASS: 3.134 LBM
SURF AREA: 142.873 SQ IN
VOLUME: 12.142 CU IN

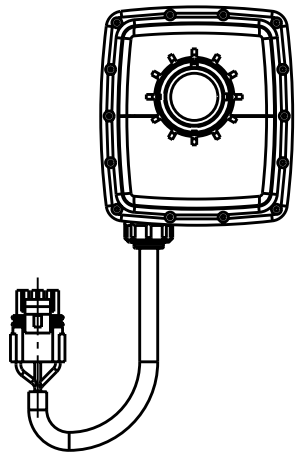
DATE: 2007-08-08
DESIGNED: L. ERDKAMP
DRAWN: C. HOWARD
APPROVED: L.ERDKAMP
SCALE: .750
SIZE: B
MATERIAL: AS NOTED

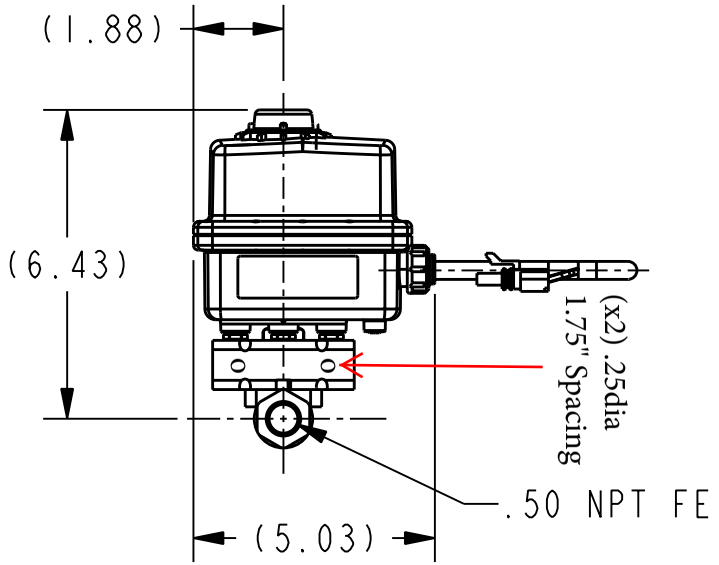
KZCO inc.
23593 KZ PARKWAY
GREENWOOD, NE 68366 USA
PHONE: +1.402.944.2767
FAX: +1.402.944.2402

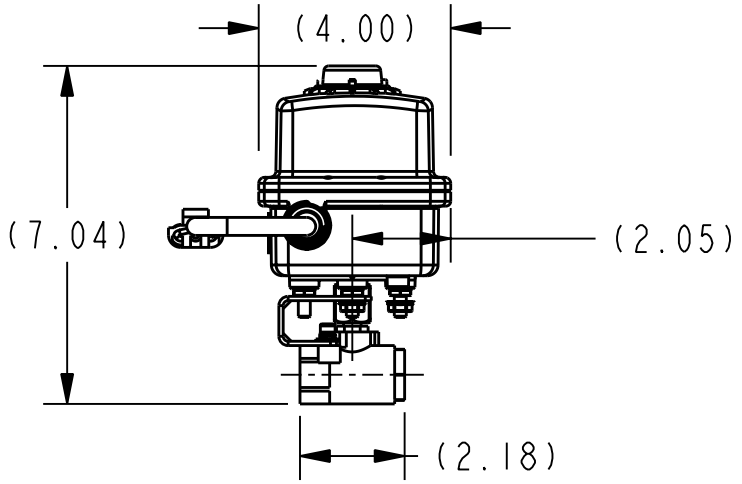
TITLE: VALVE KIT, EH3 OFFSET MTG 1/2" 2-PC BRZ
REF:
PART NO: 84D23
REVISER: -.6+
DRAWING NO: 84D23
SHEET: 1 OF 1



REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D







MODEL NAME	MDL CREATED	SHEET	
5209401	11/13/08	1/2	A

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.

MATERIAL DESCRIPTION: KZCO 84D23-10D20-P01

MATERIAL NO. -

PATTERN NO. -

TOLERANCE EXCEPT AS NOTED
.00 ±.03
.000 ±.010
ANGLES ±1°

DR'N RJG
CHKD DWS
TRCD

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

VALVE - ACTUATED, 12VDC, .50NPT FE
KZCO 84D23-10D20-P01

DATE 13-Nov-08

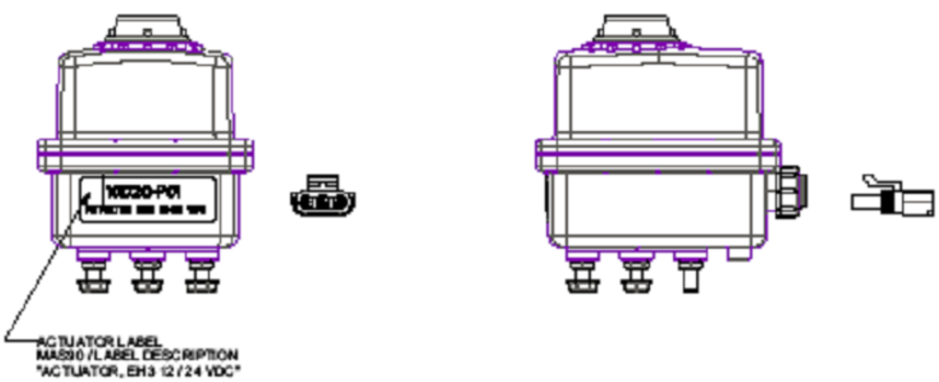
SCALE 1/4

5209401

ALL DIMENSIONS IN INCHES UNLESS NOTED

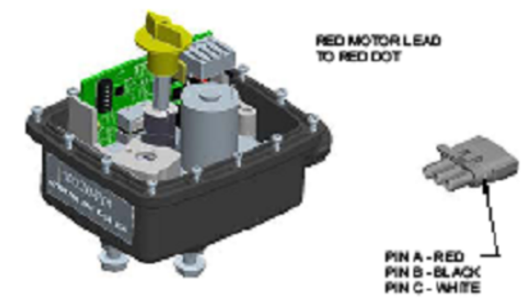
DO NOT SCALE PRINT

REV	REVISED BY	REVISION DATE	REVISED BY
-2+		7/15/2008 9:41:57 AM	bgotschall



INPUT/OUTPUT
POWER = 12/24 VDC
1 - BLACK - POWER (-) NEGATIVE
2 - RED - POWER (+) POSITIVE
3 - WHITE - SIGNAL 1 (+) POSITIVE TO OPEN
4 - ***

DIP SX 4 'ON'



SCALE .500

PROGRAM NOTE:

MAS90 SET DATA
CONTROL INPUT = 1
FEEDBACK = 0
OPERATION = 0
MOTOR = M2
SPEED CT = 0.8
ZEROSET = 135
RANGE TOLERANCE = 1
ROTATION = CC092
ACTUATOR RANGE = 0.00-0.00
DESIGN VOLTAGE = E
DIP SX = 3
LABEL = KZCO
OPTIONS = 0
PLUG TYPE = P
TEST PLUG =

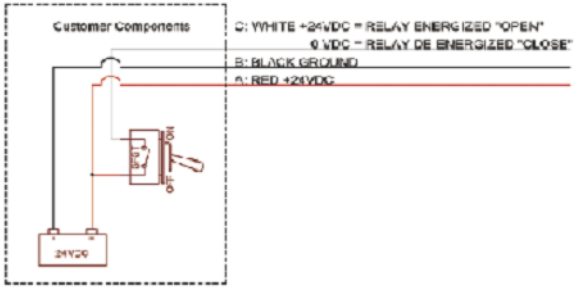
ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL
21	1	EH-502	LABEL, EH ACTUATOR, 2.5" X 1", THERMAL TRANSFER, WHITE	NO_MATERIAL
20	1	800018	HARNESS, 8A,3ST, WP3T,22.5"	
19	1	EH3-115-Y	FLAG, YELLOW	POLYPROPYLENE_TALC_20
18	1	399-0029	PCB ASSY, EH3 L1 SOLID STATE 12 VDC	
17	1	100401	GEAR MOTOR, M2 18 RPM/MOLON	NO_MATERIAL
16	3	QX-222	NUT, HEX HEAD, SERRATED FLANGE, .250-20 UNC-2B	STAINLESS_STEEL_TYPE_303
15	4	EH3-135	STUD, 1/4-20 X 1/2 MTG	STAINLESS_STEEL_TYPE_303
14	1	EH-104	RETAINER, PUSH-ON 5/16" SHAFT	STAINLESS_STEEL_TYPE_18-8
13	1	499-0100	CAM ASSY, EXTD LOBE FOR EH2/5 E-OPT	
12	1	EH-502	LABEL, EH ACTUATOR, 2.5" X 1", THERMAL TRANSFER, WHITE	NO_MATERIAL
11	1	EH-130	O-RING, DOME	SILICONE_RED_55_DUROMETER
10	1	EH3-114	DOME, CLEAR	POLYCARBONATE,
9	14	EHPT-1103	SCREW, PAN, PHILLIPS, HIGH-LOW, 5-20 X .562	STAINLESS_STEEL_TYPE_410
8	1	EH3-1001-N	LID, CASE, EH3, DOME	NYLON_DPC_6N33-L_BLACK
7	4	EH3-139	SCREW, 8-32 X 1.25 PPHMS SS	STAINLESS_STEEL_TYPE_18-8
6	1	EH-157	SCREW, 8-18 x 3/8" TSB PPH SS	STAINLESS_STEEL_TYPE_18-8
5	1	EH3-1030	O-RING, EH3, CASE I.D. #120	SILICONE_RED_55_DUROMETER
4	1	EH-139	O-RING, #008, PRESSURE TEST PORT	FLUOROCARBON_BLACK_75_DUROMETER
3	1	EHPT-140	O-RING, #112, MOTOR SHAFT, VITON	FLUOROCARBON_BLACK_75_DUROMETER
2	1	EH3-1003-N	LOWER CASE - EH3 INTERNAL MTG	NYLON_DPC_6N33-L_BLACK
1	1	498-0002	CASE KIT, EH3 IM DOME NYLON M2 MTR	

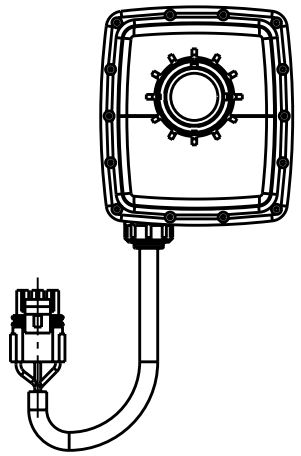
STANDARD TOLERANCES (ALL DIMENSIONS IN INCHES)	DATE 2008-05-29	KZCO Inc.	
	DESIGNED L. ERDKAMP		
	DRAWN W. FEDDE	TITLE: ACTUATOR, EH3, SOLID STATE	
	APPROVED A. KOTTAS	REF:	
	SCALE .500 SIZE B	PART NO. 10020-P01	REVISION -2+
	MATERIAL:	DRAWING NO. 10020-P01	SHEET 1 OF 1

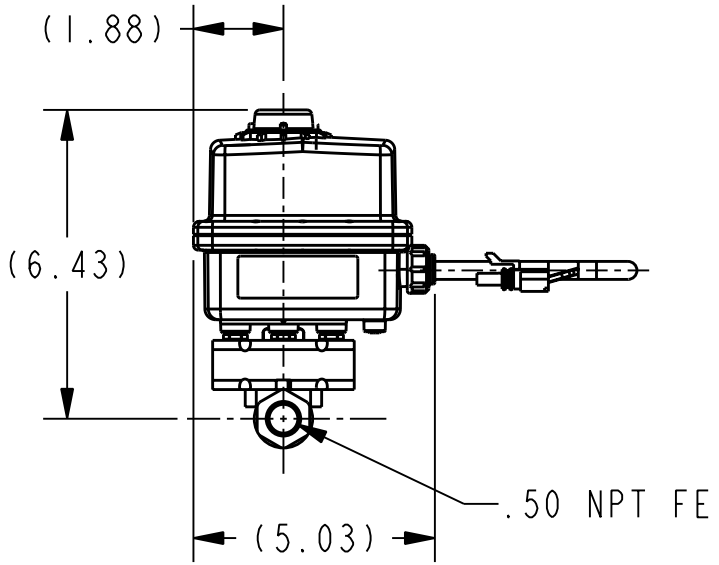
NAME:RJG OBJECT:5209401_2 DATE:17-Nov-08 11:49:19

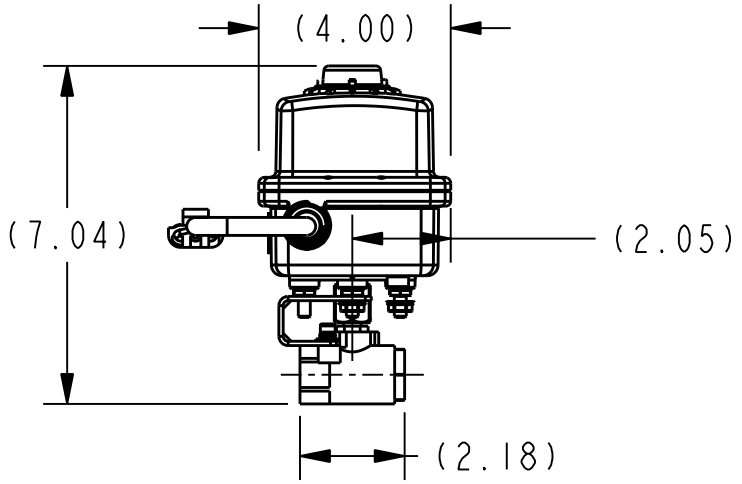
60AD WIRING
Standard On/Off applications, SPST Switch
24 VDC

REVISIONS				
LTR	DESCRIPTION	DATE	CHG NO.	APPR'D









MODEL NAME	MDL CREATED	SHEET	
5209402	11/13/08	1/3	A

REMOVE SHARP EDGES

INCH [MILLIMETER]

THIRD ANGLE PROJECTION

OLD PART NO.

MATERIAL DESCRIPTION: KZCO 84D23-60AD-M

MATERIAL NO. -

PATTERN NO. -

TOLERANCE EXCEPT AS NOTED
.00 ±.03
.000 ±.010
ANGLES ±1°

DR'N RJG
CHKD DWS
TRCD

W.S. Darley & Co.
ITASCA, IL - CHIPPEWA FALLS, WI

VALVE - ACTUATED, 24VDC, .50NPT FE
KZCO 84D23-60AD-M

DATE 13-Nov-08

SCALE 1/4

5209402

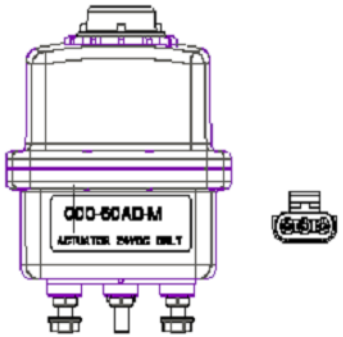
ALL DIMENSIONS IN INCHES UNLESS NOTED

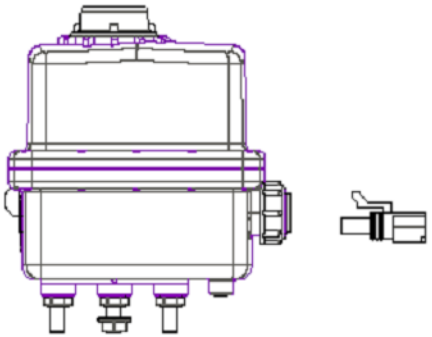
DO NOT SCALE PRINT

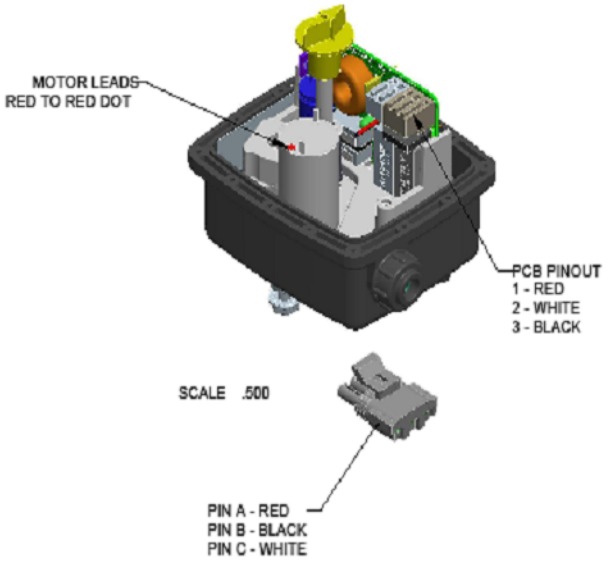
NAME:RJG OBJECT:5209402_2 DATE:19-Nov-08 13:40:13

CREATED BY: wfedde CREATED ON: 3/28/2008 1:49:38 PM REV: *** VER: .1 REL: -- LOCATION: Rod Fabs\Engineering\Parts BRANCH: --

REVMER	REVISION ECO	REVISIONVERSION DATE	REVISIONVERSION BY
*** .1		3/28/2008 1:49:38 PM	wfedde







MAS80 SET DATA
CONTROL INPUT = 1
FEEDBACK = 0
OPERATION = 0
MOTOR = M
SPEED CT = 0.8
ZEROSET = 135
RANGE TOLERANCE = 1
ROTATION = CC091
ACTUATOR RANGE = 0.00/0.00
DESIGN VOLTAGE = D
DIP SX =
LABEL = KZCO
OPTIONS = 0
PLUG TYPE =
TEST PLUG =

DET	QTY	PART NUMBER	DESCRIPTION	MATERIAL
8	1	EH-502	LABEL, EH ACTUATOR, 2.5" X 1", THERMAL TRANSFER, WHITE	NO_MATERIAL
7	2	QX-222	NUT, HEX HEAD, SERRATED FLANGE, .250-20 UNC-2B	STAINLESS_STEEL,TYPE_303
6	4	EH3-135	STUD, 1/4-20 X 1/2 MTG	STAINLESS_STEEL,TYPE_303
5	1	800018	HARNESS, 60A,3ST, WP3T,22.5"	
4	1	EH3-115-Y	FLAG, YELLOW	POLYPROPYLENE_TALC_20
3	1	800488	PCB ASSY, EH3 24VDC 60AD/60DF	
2	1	EH3-110	GEAR MOTOR, EH3 SERIES M1 18 RPM @ 12VDC	
1	1	498-0005	CASE KIT, EH3 IM DOME NYLON M1 & N1 MTR	

-STANDARD TOLERANCES-
-ALL DIMENSIONS IN INCHES [mm]-
.Xa .1
.XXa .01
.XXXa .005
XX°a1°
TOTAL RUNOUT: .005 FIM
CORNER BREAK: .001/.010
SURFACE FINISH: 125µIN

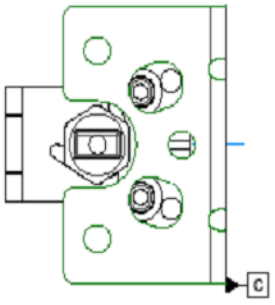
DENSITY: .047 LBM/CU IN
MASS: .592 LBM
SURF AREA: 163.793 SQ IN
VOLUME: 12.043 CU IN

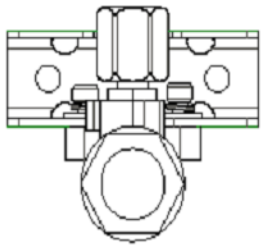
DATE: 2007-04-16
DESIGNED: L. ERDKAMP
DRAWN: W. FEDDE
APPROVED: A. KOTTAS
SCALE: .500 SIZE: B
MATERIAL:

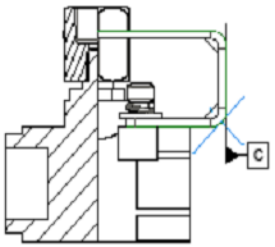
KZCO inc.
23660 KZ PARKWAY
GREENWOOD, NE 68366 USA
PHONE: +1.402.944.2767
FAX: +1.402.944.2402

TITLE: ACTUATOR, EH3, .8S @24VDC
REF:
PART NO: 000-60AD-M
REVMER: *** .1
DRAWING NO: 000-60AD-M
SHEET: 1 OF 1

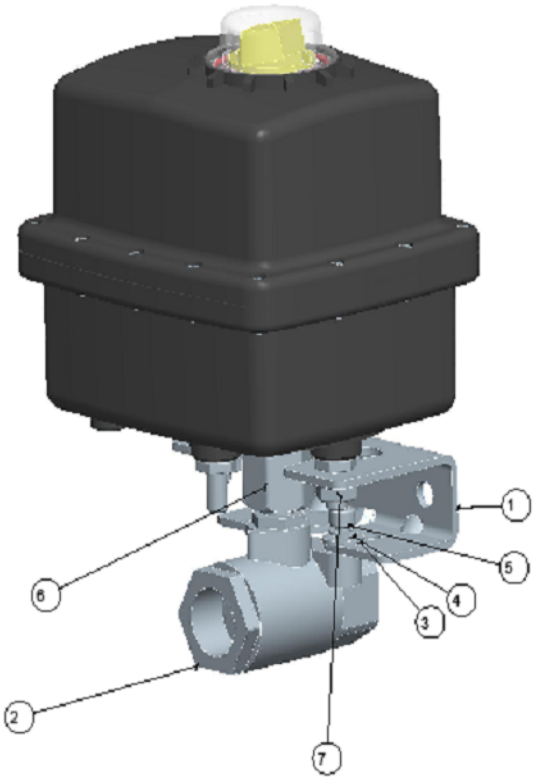
REVISER	REVISION ECO	REVISION/VERSION DATE	REVISION/VERSION BY
-.6+		8/12/2008 9:18:50 AM	bgotschall







SECTION A-A



ACTUATOR SHOWN IS REPRESENTITVE USED
ONLY TO SHOW PROPER ORIENTATION TO VALVE.

DET	QTY	PART NUMBER	DESCRIPTION	MATERIAL
7	3	QX-222	NUT, HEX HEAD, SERRATED FLANGE, .250-20 UNC-2B	STAINLESS_STEEL,TYPE_303
6	1	EH-145	COUPLER, 1/4" ~ 1/2" APOLLO	STAINLESS_STEEL_TYPE_316
5	2	EH-158	SCREW, #10-24 X 3/8" SS SOCKET HEAD	STAINLESS_STEEL,TYPE_303_OR_316
4	2	EHPT-109	WASHER, LOCK, .197 ID X .334 OD X .047 T	STAINLESS_STEEL_TYPE_316
3	2	EHPT-150	WASHER, FLAT, #10 18-8 SS	STAINLESS_STEEL_TYPE_316
2	1	EH3-84D	VALVE, 1/2" 2-WAY APOLLO 70-103-01 BRONZE BALL VALVE	BRONZE
1	1	EH3-174	BRACKET, MOUNTING EH3 SERIES	STAINLESS_STEEL_TYPE_304

-STANDARD TOLERANCES-
-ALL DIMENSIONS IN INCHES [mm]-

X±.1
.XX±.01
.XXX±.005
XX°±1°

TOTAL RUNOUT: .005 FIM
CORNER BREAK: .01/.010
SURFACE FINISH: 125µIN

DENSITY: .259 LBM/CU IN
MASS: 3.134 LBM
SURF AREA: 142.873 SQ IN
VOLUME: 12.142 CU IN

DATE: 2007-08-08
DESIGNED: L. ERDKAMP
DRAWN: C. HOWARD
APPROVED: L.ERDKAMP
SCALE: .750
SIZE: B
MATERIAL: AS NOTED

KZCO inc.
23593 KZ PARKWAY
GREENWOOD, NE 68366 USA
PHONE: +1.402.944.2767
FAX: +1.402.944.2402

TITLE: VALVE KIT, EH3 OFFSET MTG 1/2" 2-PC BRZ
REF:
PART NO: 84D23
REVISER: -.6+
DRAWING NO: 84D23
SHEET: 1 OF 1

Appendix

Detailed Specification
Darley Model 2ZSM 5500-6000

A Darley model 2ZSM 5500-6000 GPM single stage dual impeller shaft driven centrifugal end suction fire pump shall be provided and installed.

The pump shall be midship and designed to operate through an integral transmission. The pump shall be driven by a driveline from the chassis transmission. The engine, transmission and driveline components shall provide sufficient horsepower and RPM to enable the pump to meet and exceed its rated performance.

The pump casing shall be manufactured from Class 40 Cast Iron with a minimum tensile strength of 40,000 PSI. The casing shall be vertically split allowing for access to the impeller and impeller drive shaft without removing the pump from the vehicle in the event maintenance is ever required.

The pump shall contain an isolated cored heating jacket feature that, if selected, can be connected into the vehicle cooling system to protect the pump from freezing in cold climates, and to help reject engine heat from engine coolant, providing longer life for the engine.

The pump shall contain a swept 'T' dual suction head with no stream shapers, or diffusers. The dual suction head shall include all pressure ports required for UL certification testing, and a dual chamber for heater core.

The assembled pump and transmission shall be mounted in a fashion in which the pump can be disconnected from the suction plumbing and drive train, and removed directly from the bottom of the vehicle.

Pump Shaft

The pump shaft shall be precision ground 17-4 stainless steel. The shaft shall be splined to receive shaped impeller hubs, for greater resistance to wear, torsional vibration, and torque imposed by engine, as well as ease of maintenance and repair.

Impeller

The impeller shall be a high strength bronze alloy of mixed flow design, splined to the pump shaft for precision fit, durability, and ease of maintenance. Impeller shall be vacuum cast designed for maximum lift and highest capacity. The seal rings shall be renewable, double labyrinth, wrap around bronze type.

Impeller shaft oil seals shall be constructed to be free from steel components except for the internal lip spring. The impeller shaft oil seals shall carry a lifetime warranty against damage from corrosion from water and other fire-fighting fluids.

Both Impeller shaft mechanical seal primary rings shall be constructed of Silicone Carbide material with a mating ring material of Carbon. Due to the superior performance and resistance to failure in the event of "running dry," tungsten carbide or ni-resist face materials shall not meet the requirements of the specification. No Exceptions shall be made to this portion of the specification.

Chassis Transmission Driven 3 Gear Transmission

The transmission case shall be heavy duty 356T6 cast aluminum. Transmission case shall be vacuum resin impregnated to seal casting microstructure. A magnetic drain plug shall be provided. Transmission case shall include a readily accessible lubricant fill port with combination plug/dipstick for checking and maintaining oil level. Transmission case shall be equipped with a removable access plate for quick inspection of gears, shafts, and bearings inside the transmission.

The pump drive shaft shall be precision ground, heat treated alloy steel, with a minimum 2 ½" -10 spline. Gears shall be helical design and shall be precision ground for quiet operation and extended life. The gears shall be manufactured from alloy steel, carburized, and heat treated for surface hardness and strength.

The bearings provided shall be heavy duty, deep groove, radial and spherical roller type bearings. Sleeve bearings on any portion of the pump or transmission shall be prohibited due to wear, deflection, and alignment concerns. The bearings shall be protected at all openings from road dirt and water splash with oil seals and water slingers.

The pump transmission shall include an integrated, positive displacement lubrication system providing pressurized lubrication to transmission gears and bearings. The pressurized lubricant system shall include a closed loop, heat exchanger providing low operating temperatures thus extending lubricant life and change intervals. The lubrication circuit shall include a 100 mesh, stainless steel, oil pickup screen.

The transmission shall include a secondary, splash lubrication system which will provide continued bearing and gear lubrication in the event of primary lubrication system malfunction.

Driveline Installation

The chassis drivelines shall be sized for intended application and torque requirements. The installation shall comply with driveline manufacturer's guidelines as well as with the pump manufacturer's guidelines. Improper installation will void the warranties provided from the pump manufacturer.

Manuals

One manual covering the fire pump transmission and selected options of the fire pump shall be provided with the apparatus in either printed copies or on CD.

Faults

Remedies	Venturi primer cant achieve prime	Electric primer cant achieve prime	Insufficient performance	Leaking pipe or valve Connection	Improper Drip Rate on shaft seal	Pump leaks from shaft seal	packing adjustments don't improve drip rate	Freshly cleaned out and repacked packing wont stabilize	mechanical seal drip rate is visible	pressure & flow remain the same or decrease	engine speed is increased&	Whining noise from the pump transmission	The impeller shaft sealing surface is out of tolerance	impeller shaft and into the gear box	Water is running down the	Ball valve is hard to actuate	Pneumatic valve is not working	Air cylinder/air shift doesn't work	Impeller nut cotter key is warn	Pump wont pass pressure test	Oil leaks from the breather
Check air supply	x																	x	x		
Inspect priming mechanism for wear	x	x																			
Check suction screen for blockage			x									x									
check for a leak in suction pluming and hose	x		x									x									
check voltage supply		x																			
check for build up or blockage	x	x																			
Verify rating with performance curve or original			x									x									
Inspect inlet plumbing for a blockage, collapse or air leak			x									x								x	
Inspect seal rings			x									x									
inspect impeller			x									x									
Check O-ring or gaskets				x								x						x	x	x	
Remove thread tape and re-apply				x																x	
Properly Torque Fasteners				x															x	x	
Adjust packing					x	x															
Clean packing gland out and re-pack							x														
measure sealing surface on impeller shaft							x	x	x					x	x						
Check the impeller for a blockage			x									x									
replace mechanical seal									x												
drain oil and inspect for debris/ contaminants and re-fill oil to proper oil level													x								
Inspect impeller shaft for axial play													x								
inspect impeller shaft for radial movement													x								
Inspect bearings for failure													x								
Inspect gear teeth for damage or fatigue													x								
Replace Impeller shaft														x							
Check to see if the water slinger is still in place															x						
Exercise valve regularly																x					
disassemble valve clean out and rebuild																x	x				
Disassemble cylinder, lubricate, and rebuild																	x				
Inspect shift fork for wear																		x			
inspect sliding clutch gear for wear																		x			
Replace with a stainless steel cotter key																			x		
Close all pump drains																				x	
Inspect water way for cracks. Replace or repair any cracked																				x	
Check oil level - let oil drain from oil level hole if over full																					x
Check oil pressure and temperature																					x

Remedies Using a Product Related Check List

For more information regarding troubleshooting and Repair please contact Darley
TOLL FREE: 1.800.323.0244 INTERNATIONAL: 1.630.735.3500

Corporate Darley Office
325 Spring Lake Drive
Itasca, Illinois 60143-2072
Toll Free Phone: 800-323-0244
Phone: 630-735-3500
Fax: (708) 345-8993

Pump Manufacturing
1051 Palmer St.
Chippewa Falls, WI 54729
Toll Free Phone: 800-634-7812
Phone: 715-726-2650
Fax: (715) 726-2656

Apparatus Division
920 Kurth Rd.
Chippewa Falls, WI 54729
Toll Free Phone: 800-527-0068
Phone: 715-726-2645
Fax: (715) 726-2648