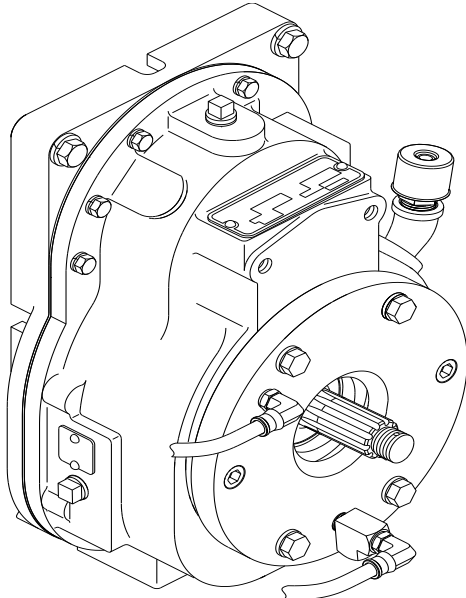




# K, T, TK, TA and KC Series Operation and Maintenance Instructions



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**Read through the Operation instructions carefully before using your Waterous Transmission.**

NOTE: Instructions subject to change without notice

F-1031, Section 2206 (Revised: 3/13/20)

## Introduction

This section contains operation and maintenance instructions for Waterous K, KC, T, TK and TA series gear drive transmissions. The term "series" used here refers to related transmissions or a basic type of transmission used with several types of pumps. The T, TA series transmission, for instance, has two basic gear sizes and several different bellhousings and drive shafts available for the various pump and engine sizes, yet all of the same basic construction. Although the transmissions differ in detail, they are all similar in general design.

The information in this section applies to the transmission and related equipment only. Refer to the pump instructions for data on the rest of the main pump, and to the accessory instructions for information on the pump accessories.

For E301-A and E302-A motor pump models, refer to instructions for T series transmissions.

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## General Description for K, T, TK & TA Series Transmissions

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Each series is available with different shafts and gears for medium and heavy duty applications. The medium duty transmission is normally used for the smaller, high speed pumps rated 500 gpm or less, while the heavy duty transmission is intended mainly for larger, slower pumps rated at 500 gpm through 1250 gpm. An extra heavy duty K series transmission is available for pumps rated above 1250 gpm.

The two helical gears in each transmission are properly sized to provide an adequate safety factor. Ball bearings are used throughout each transmission. Several gear ratios are available to permit closely matching the impeller shaft speed and power requirements to individual engine performance. The various transmissions are described in greater detail below:

### ***K Series Transmission***

This transmission is designed primarily to be driven by a power take-off or power divider. The medium-duty case has a 1-1/8 in. straight keyed shaft while the heavy duty case has a 1-3/8 in. 10 spline shaft, and the extra heavy duty case has a 1-1/2 in. 10 spline shaft.

### ***TK Series Power Take-Off***

This PTO allows the rear mounting of a fire pump. TK PTO is identical to the K-series, except that it has companion flanges on the drive and driven shafts.

### ***T, TA Series Transmission***

This case is identical to the K series, except that it includes a bell housing flange and the proper drive shaft for direct mounting on an engine bell housing.

### ***Mechanical Tachometer Drive***

A tachometer drive is available as an option for the K and T series transmissions. This accessory includes a drive gear and a driven gear with extension which operates at half the input shaft speed. The driven gear extension protrudes from its housing at a 15 degree angle from horizontal.

# Operating Instructions for K, T, TK & TA Series Transmissions

Since the K, T, TK and TA gear cases are designed to be driven by a PTO, power divider, or directly by the engine crankshaft, refer to the instruction

manual supplied with the unit or to the apparatus manufacturer's manual for specific information.

## Maintenance

### Lubrication

An oil splash system, within the gear case, lubricates the gears and other moving parts. Check oil level monthly by removing the square head pipe plug on side of gear case marked OIL LEVEL. The oil should be level with the bottom of the hole.

#### NOTICE

If oil level is low, locate the source of the leak and repair. If the oil level is high, loosen the drain plug until the oil drops to the proper level. If excessive water drains out, change the oil and determine the source of the water leakage and repair.

#### NOTICE

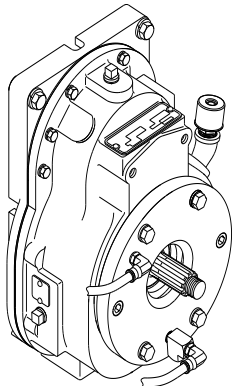
**Oil temperature hazard.**

**May cause premature seal wear and damage.**  
Oil temperature should not exceed 250° for an extended period of time in order to prevent seal wear and damage.

To add oil, remove filler plug or breather at top of gear case, and pour oil through opening until oil comes out the oil level hole. **DO NOT OVERFILL.** Use a SAE 80W-90 gear oil.

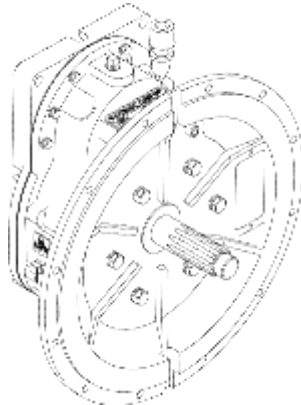
Drain gear case by removing magnetic drain plug from bottom, and refill with new lubricant annually or after each 100 hours of operation, whichever comes first. (Under severe service conditions, where pump has been used continuously at high output, change oil more frequently.) The capacity is approximately one quart. Be sure to clean drain plug and breather.

**Figure 1. K Series Transmission**  
(Vertical Mounting Position)



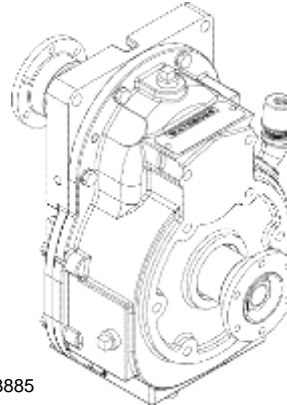
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**Figure 2. T Series Transmission**  
(Vertical Mounting Position)



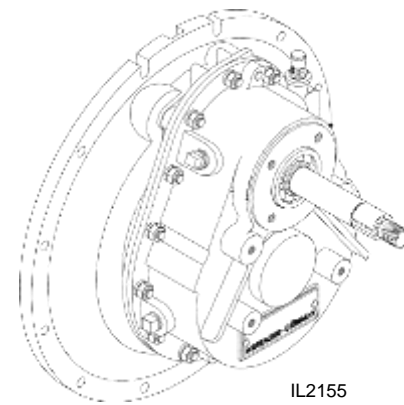
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**Figure 3. TK Series Power Take-Off**  
(Vertical Mounting Position)



IL3885

**Figure 4. TA Series Transmission**  
(Vertical Mounting Position)



IL2155

**NOTE: Location of oil level plug, drain plug and breather will vary depending on the transmission mounting position. See the Service Parts List drawing for further details.**

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## General Description for KC Series Transmission

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The KC transmission is similar to the K and T transmission discussed earlier, but includes a hydraulically engaged multiple disc wet clutch. A 12 volt hydraulic pump with control switch and indicator light allows the operator to engage or disengage the clutch with the movement of a toggle switch.

### **Electronic Tachometer Drive**

An electronic tachometer with a magnetic pick-up is available as an option for the KC transmission. This electronic pick-up senses the impeller shaft speed not the input shaft speed.

The magnetic pick-up in the transmission mates with an Amphenol connector (P/N MS3106A-10SL-4S). This connector may be wired to a wall mount receptacle on the operator's panel with a cable available from Waterous Company.

The number of teeth on the driven gear (pulse generator) varies with the different gear ratios and affects the frequency that the tachometer picks up.

The number of teeth on the driven gear can be determined from the table below.

Ratio	3.40	2.83	2.45	2.14	1.88	1.65	1.56	1.38	1.30	1.16
Number of Teeth	25	18	20	22	24	26	27	29	30	32
Correction Factor (K)	2.4	3.333	3.0	2.727	2.5	2.308	2.22	2.07	2.0	1.875

The rotational speed of the impeller shaft can be calculated by multiplying the frequency from the tachometer sensor by the correction factor, K.

$$(Hz) \times K = RPM$$

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## Operating Instructions for KC Series Transmission

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### **To Engage Clutch**

Set switch in the engage position. This will turn the hydraulic unit on to engage the clutch. Once the clutch is engaged, the green light will turn on, the hydraulic pump will stop and the system will maintain the fluid pressure.

### **To Disengage Clutch**

Set switch in the disengaged position.

Clutch engagement and disengagement is only recommended at low engine speeds. The operator should be aware of the resulting pump load and the related effects before operating the clutch.

# Maintenance

An oil splash system, within the gear case, lubricates the gears and other moving parts. Check oil level monthly by removing the square head pipe plug on side of gear case marked OIL LEVEL. The oil should be level with the bottom of the hole.

## NOTICE

If oil level is low, locate the source of the leak and repair. If the oil level is high, loosen the drain plug until the oil drops to the proper level. If excessive water drains out, change the oil and determine the source of the water leakage and repair.

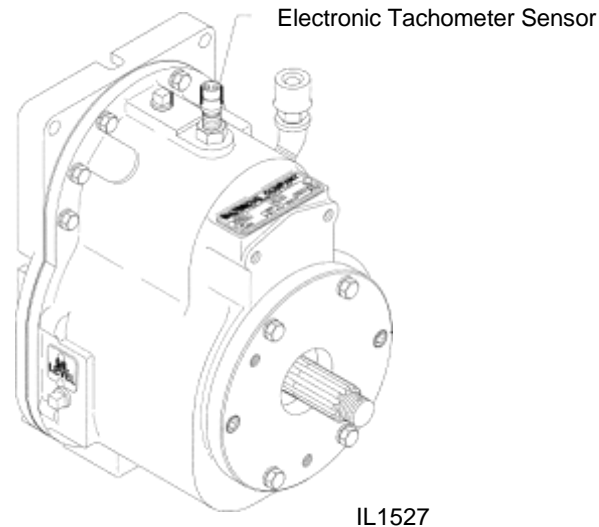
## NOTICE

**Oil temperature hazard.**

**May cause premature seal wear and damage.**

Oil temperature should not exceed 250<sup>o</sup> for an extended period of time in order to prevent seal wear and damage.

Figure 4. KC Transmission (Vertical Mounting Shown)



To add oil, remove filler plug or breather at top of gear case, and pour oil through opening until oil comes out the oil level hole. DO NOT OVERFILL. Use SAE 80w-90 gear oil.

Drain gear case by removing magnetic drain plug from bottom, and refill with new lubricant after each accumulated 100 hours of pump operation, or at least every spring and fall. (Under severe service conditions, where pump has been used continuously at high output, change oil more frequently.) The capacity is approximately 2-1/4 quarts. Be sure to clean drain plug and breather.

## Hydraulic Fluid Reservoir

Keep the fluid reservoir of the hydraulic power unit filled. The capacity is 1/2 quart. Drain and replace the fluid only if it becomes dirty or contaminated. Use ATF (Automatic Transmission Fluid) or equivalent.

Annually check accumulator's gas pre-charge pressure.

1. Bleed off hydraulic system pressure.
2. If the gas precharge pressure is below 100 psi., the accumulator should be replaced.

Figure 5. KC Hydraulic Pump Shift Unit

