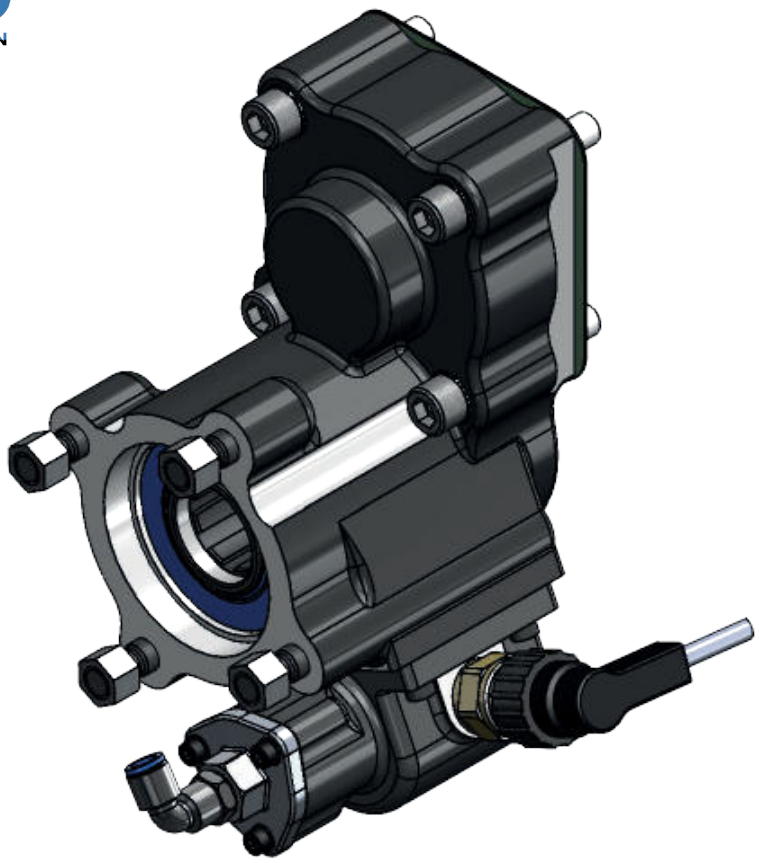
KMS
POWERTRAIN SOLUTION

DETROIT
VOLVO
ZF
SCANIA
MERCEDES

KUP 3 SERIES



APPLICATIONS

SEPTIC TRUCK
GARBAGE TRUCK
BUCKET TRUCK
WATER TRUCK
GARBAGE TRUCK
CRANE TRUCK
DUMP TRUCK
FIRE FIGHTING TRUCK
TOW TRUCK

KUP 3 SERIES PTO MODEL NUMBER DESIGNATOR & SPECIFICATIONS

DT-KUP3-1-P-1-E

OEM
- **DT** - Detroit
- **VLV** - Volvo
- **ZF** - ZF
- **SCA** - Scania
- **MB** - Mercedes
- **EAT** - Eaton

Type
KUP3

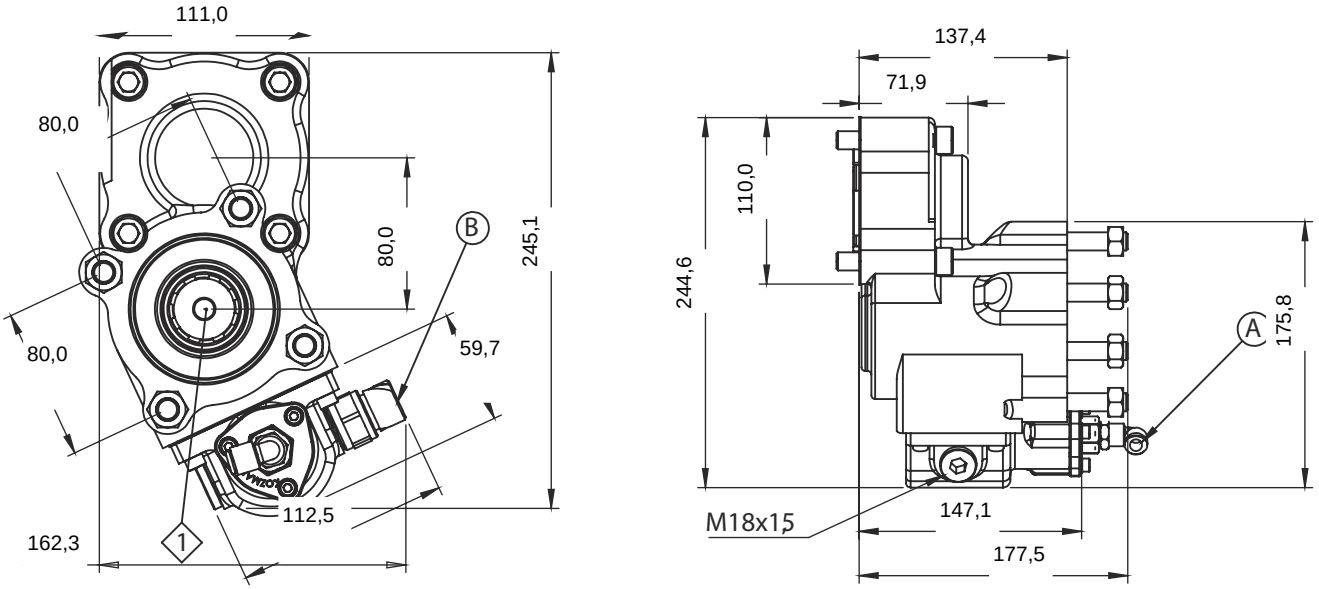
Ratio
1 = 1,2

Shift Type
P = Pneumatic

Output
- **A** = 1410 Series Companion Flange
- **B** = SAE-B 2 or 4-Bolt Flange, SAE B Shaft (7/8”-13 T)
- **C** = 1¼” Round Keyed Shaft
- **D** = SAE-B 2 or 4-Bolt Flange, SAE BB Shaft (1”-15 T)
- **E** = DIN 5462 8x32x36 ISO 4-Bolt
- **F** = SAE-C 2 or 4-Bolt Flange, SAE C Shaft (1¼-14 T)
- **G** = SAE-C 2 or 4-Bolt Flange, SAE C Shaft (1½”-23 T)

Arrangement
- **1** - Type 1 Detroit
- **2** - Type 2 Detroit
- **3** - Type 1 Volvo I-shift
- **4** - Type 2 Volvo I-shift
- **5** - Type 1 ZF
- **6** - Type 2 ZF
- **7** - Type 3 ZF
- **8** - Type 4 ZF
- **9** - Type 5 ZF
- **10** - Type 6 ZF
- **11** - Type 7 ZF
- **12** - Type 1 Scania
- **13** - Type 2 Scania

KUP 3 SERIES TECHNICAL DETAILS

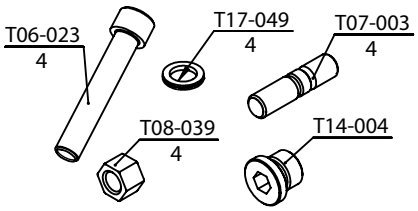


DIMENSIONS IN mm

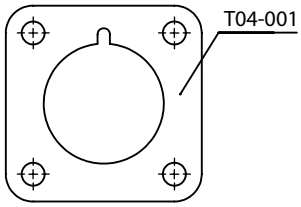
Power @ 1000 RPM (kW) : 44.74 or 60 Hp	
Continuous Torque (Nm) : 429.79	
Max Working RPM : 2500	
Optimum Working Temp. : 25-80 °C	
Short-term Working Temp. : 80-90 °C	
Risking Working Temp. : Over 90 °C	
Body Material : US 65-42-42	
Sense of Rotation : CCW (Use with CW Pump)	
Weight : 11.34-18.14 kg	
Varies Depending on Output Type	

1	DIN 5462 8x32x36 ISO 4-Bolt
A	Air Inlet 6.35 mm OD (6.21-7.93 bar)
B	Engage/ Disengage Sensor

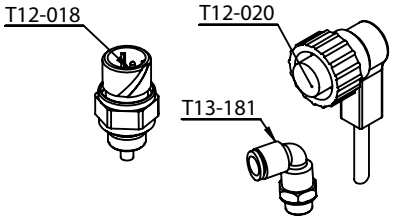
Transmission Mounting Parts



Transmission Gasket

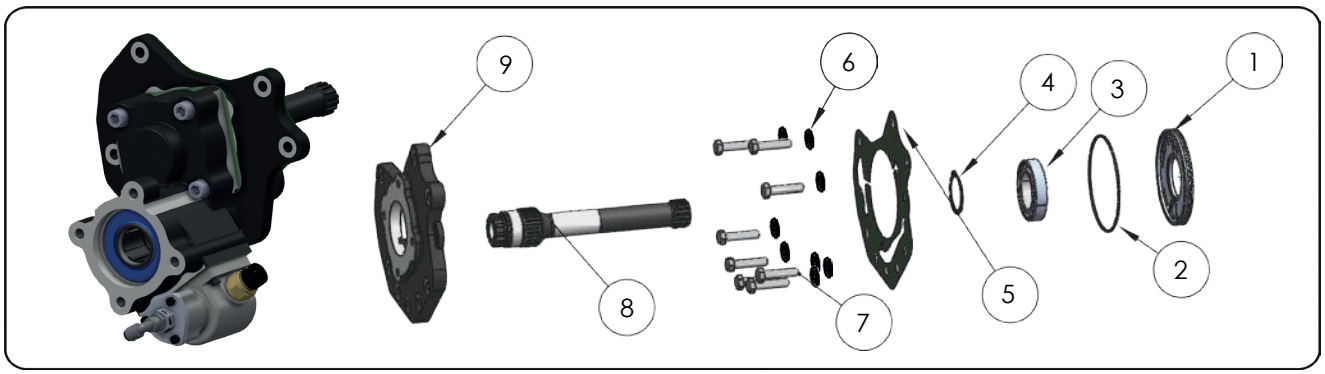


Sensor and Connector

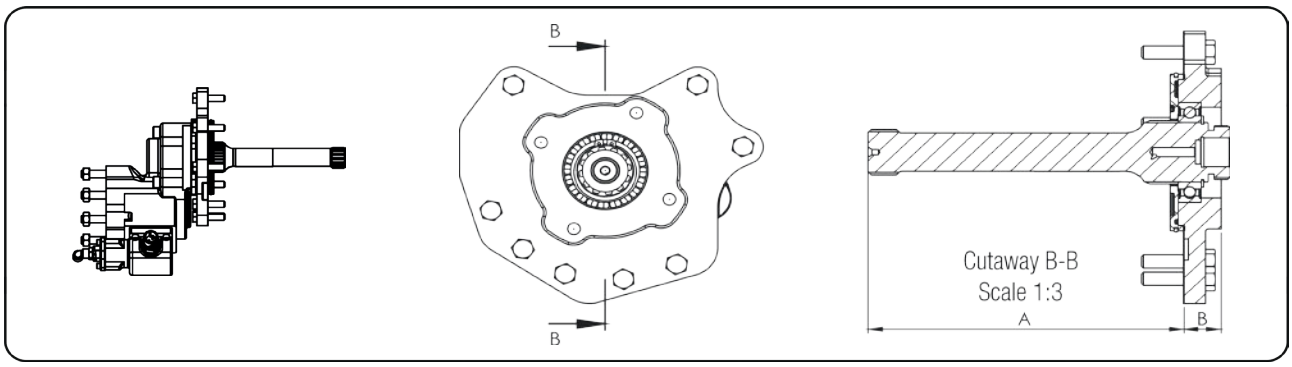


No	Code	Description	Qty
1	T06-023	M12x70 Allen Bolt 8*8	4
2	T17-049	M12 Nord Lock Washer	4
3	T07-003	M12x40 Stud	4
4	T08-039	M12 Reinforced Nut (H:12)	4
5	T14-004	M18x1,5 Allen Blind Plug	1
6	T04-001	Cd Kup Face Gasket	1
7	T12-018	Engage-disengage Status Switch(NC)	1
8	T12-020	Switch Socket	1
9	T13-181	R1/4"-1/4" Od Pneumatic Swivel Elbow Fitting	1

DETROIT KIT



Quill Shaft	Gearbox Type	A (")	B (")
Type 1 Detroit	DT12-OB/DB G230/G211	8,74	1 1/32
Type 2 Detroit	DT12-OD/OC/DC (MB340/271/340) DT12 OA/DA (MBG281/330-12)	9,37	1 1/32

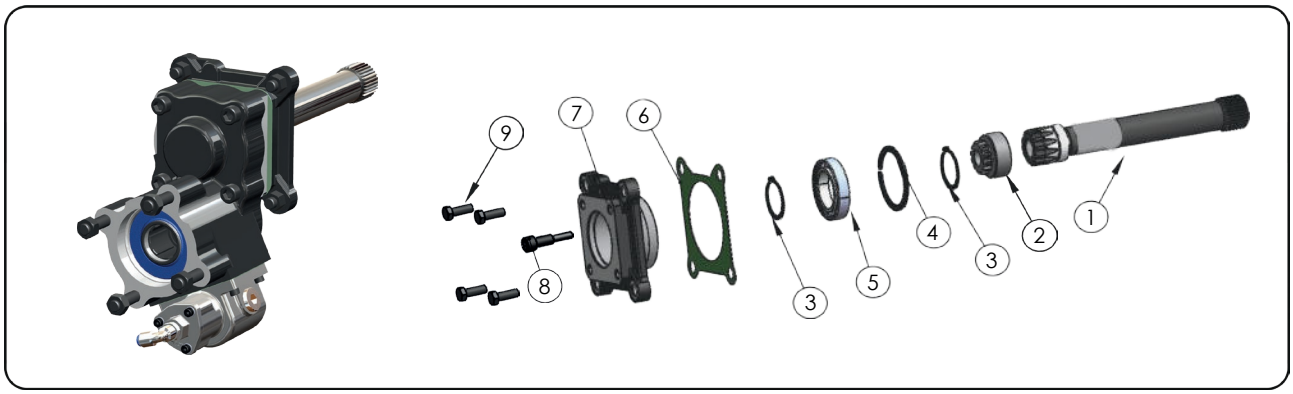


No	Code	Description	Piece
1	D05-037	Lub. Pump Plate	1
2	T03-105	114x3 O-Ring	1
3	T01-004	6009/C3 Bearing	1
4	T05-015	DIN471 Ø45x1,75 Retaining Ring	1
5	T04-140	Gasket (0,5mm)	1
6	T17-019	M10 Washer	8
7	T06-149	M10x1,5 L:35mm Hexagonal Bolt 8*8	8
8	KM-MB-GNL-222	DT-12OB PTO Shaft	1
	KM-MB-GNL-238	DT-12OD PTO Shaft	1
9	D05-025-1	Plate (30mm)	1

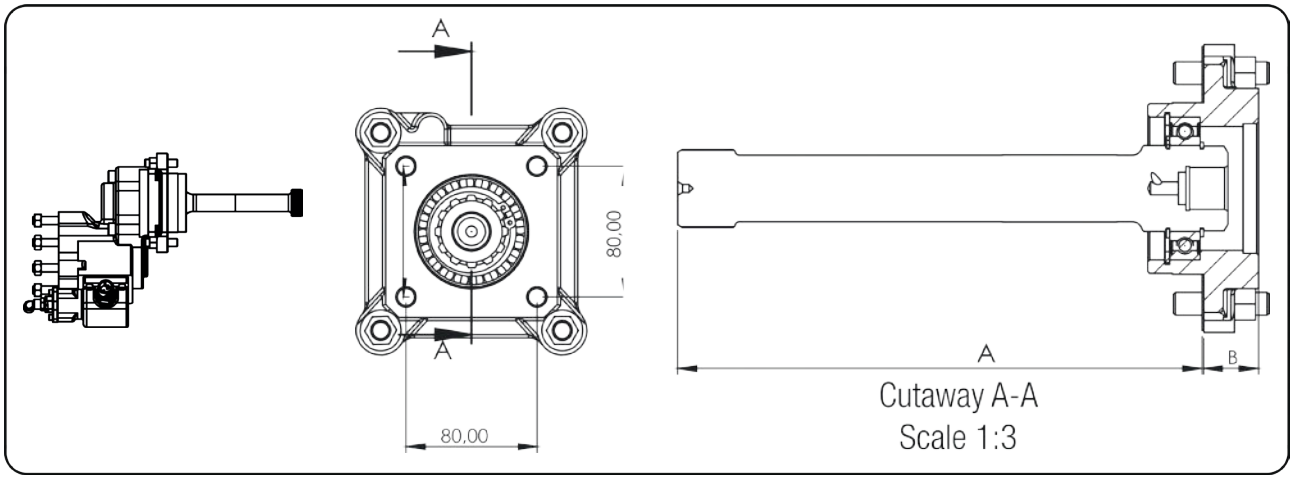
FINAL SPEED RATIO - COMPARED TO ENGINE %

DT-12	Split	DT-KUP3-1
DT12-Direct Drive	Split Low	93
	Split High	120
DT12-Over Drive	Split Low	120
	Split High	155

VOLVO KIT



Quill Shaft	Gearbox Type	A (")	B (")
Type 1 Volvo I-Shift	AT 2412D / AT 2512C	8,07	1 1/8
Type 2 Volvo I-Shift	ATO 2612D (14,94) I-SHIFT VOLVO-RVI Automatic Transmission	9,68	1 1/8



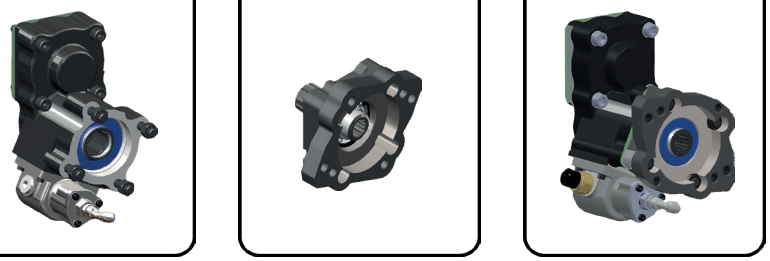
No	Code	Description	Piece
1	KML-2412K-2	PTO Shaft (AT2412C) (219mm)	1
	KML-2412U-2	PTO Shaft (AT2412C) (260mm)	1
2	C04-114	Z1:12 Module:3 Z2:12 Spline	1
3	T05-015	DIN471 Ø45x1,75 Retaining Ring	2
4	T05-016	472x75 Retaining Ring	1
5	T01-004	6009/C3 Bearing	1
6	T01-029	SR 1700 Gasket	1
7	D05-009	R7 Plate	1
8	T06-389-1	M12x1,75 (10/9) PTO Shaft Spline Bolt	1
9	T06-101	M12x1,75 L:35mm Hexagonal Head Bolt	4

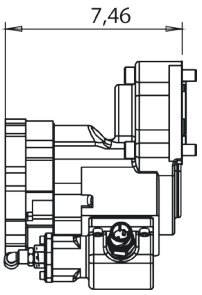
FINAL SPEED RATIO - COMPARED TO ENGINE %

PTO	AMT Overdrive		AMT Direct	
	Low	High	Low	High
VLV-KUP3-1	108	138	84	108

OUTPUT OPTIONS

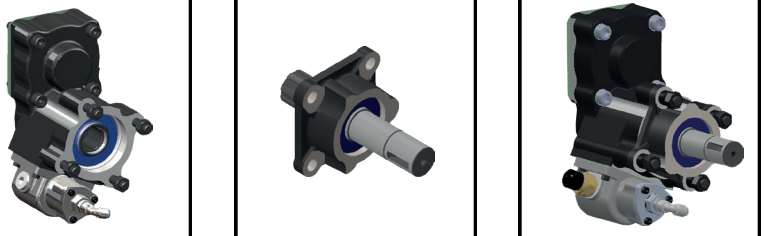
"E" TYPE OUTPUT "E" TYPE OUTPUT	+	ADP.DIN-SAEB13T ADP.DIN-SAEB15T	=	"B" TYPE OUTPUT "D" TYPE OUTPUT

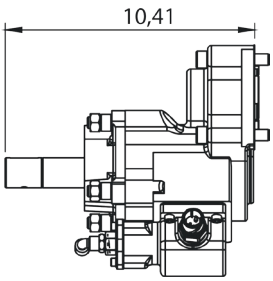




B-D Type Output
SAE-B & SAE-BB
2 or 4-Bolt Flange

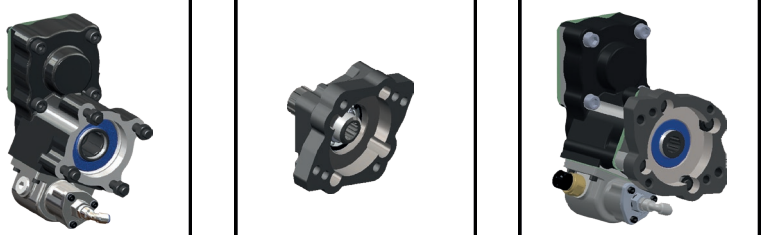
"E" TYPE OUTPUT	+	ADP.DIN-R1-1/4	=	"C" TYPE OUTPUT

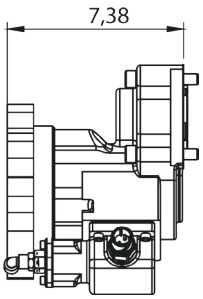




C Type Output
1¼" Round Keyed
Shaft

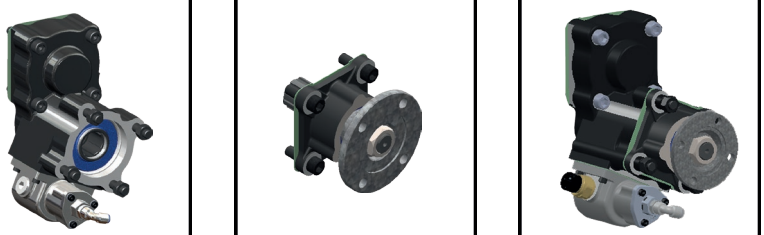
"E" TYPE OUTPUT "E" TYPE OUTPUT	+	ADP.DIN-SAEC14T ADP.DIN-SAEC23T	=	"F" TYPE OUTPUT "G" TYPE OUTPUT

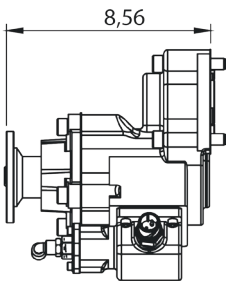




F-G Type Output
SAE-C & SAE-CC
2 or 4-Bolt Flange

"E" TYPE OUTPUT	+	ADP.DIN-F1410	=	"A" TYPE OUTPUT

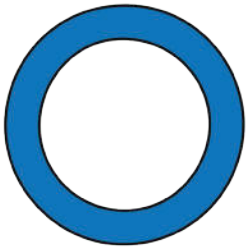




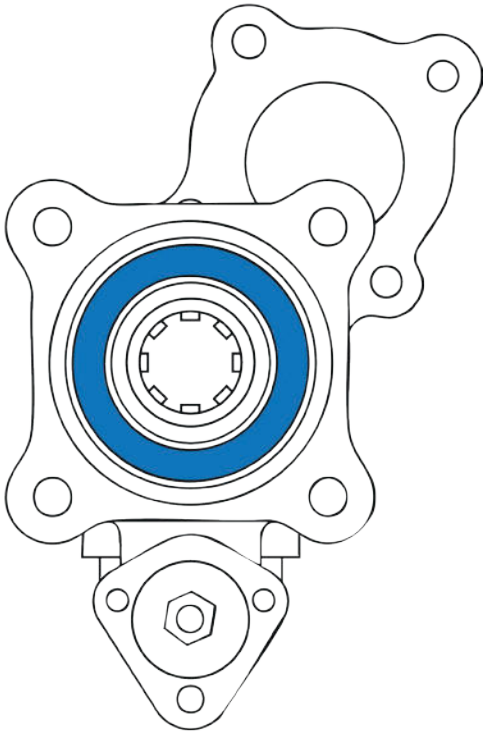
A Type Output
1410 Companion
Flange

ADAPTER INSTALLATION INSTRUCTIONS

1) Remove the output seal from PTO as shown. Removed seal can be thrown away.

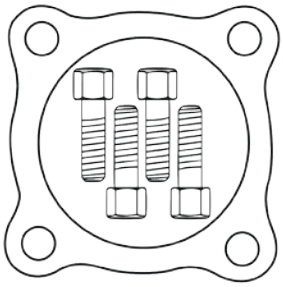


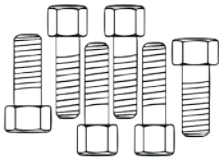


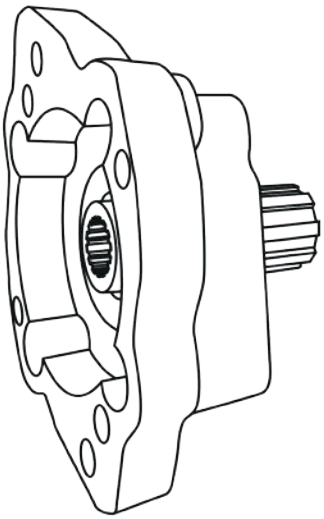


2) Apply anti-fretting, High Pressure, High Temperature grease on spline before direct mounting the adapter.

3) Mount adapter flange using gasket to seal contact surface and the 4 studs.

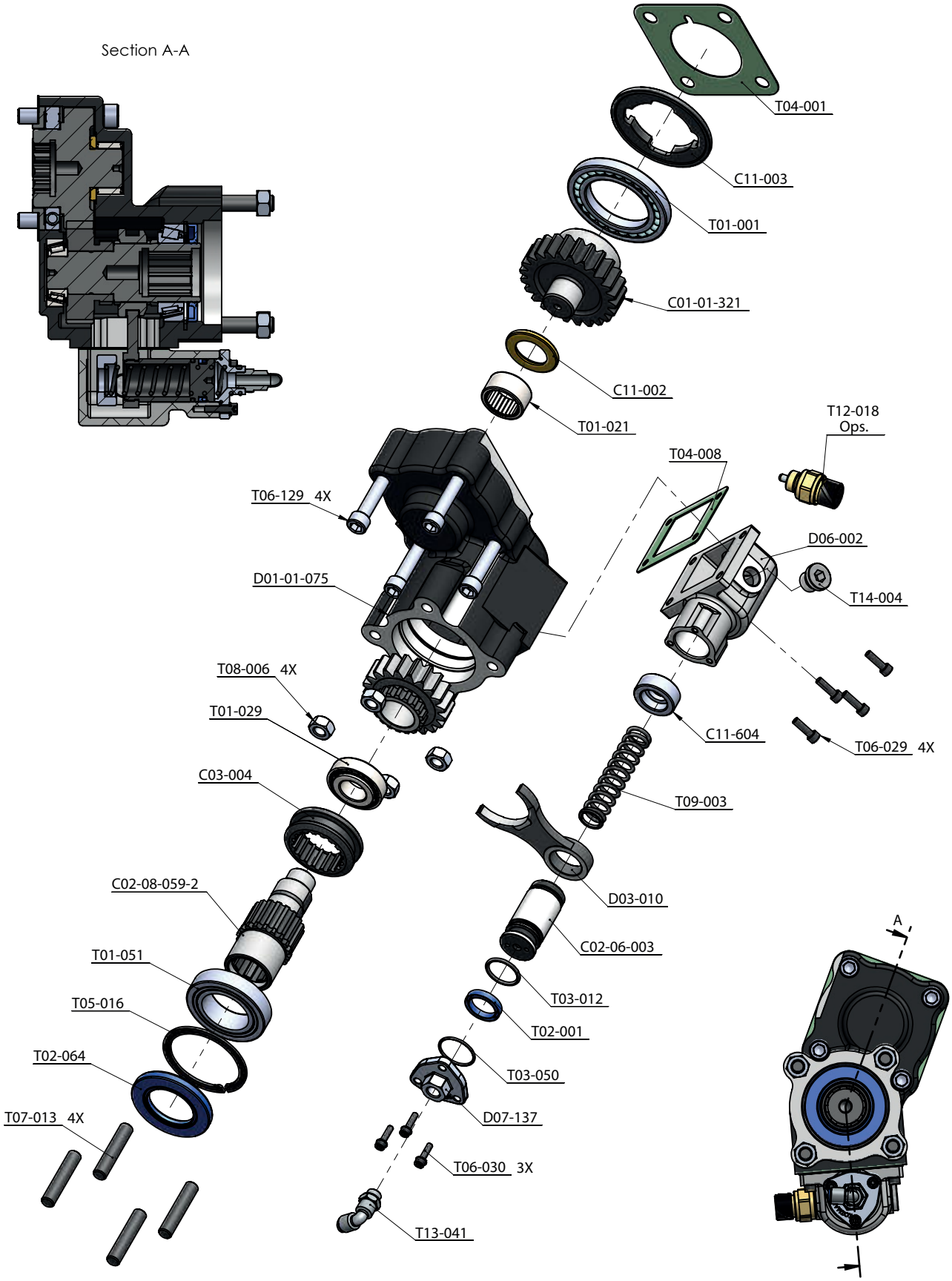






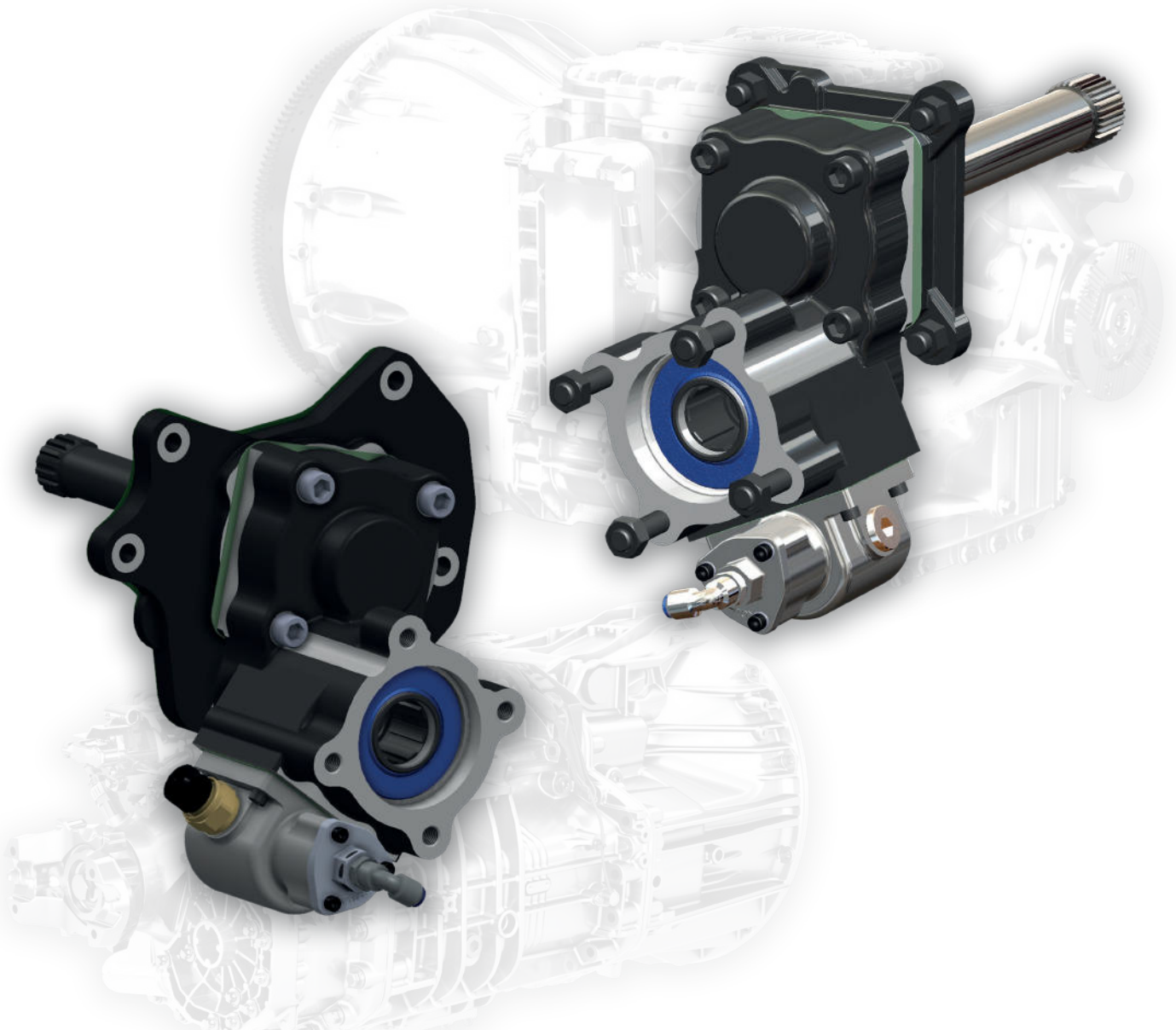
4) Apply medium strength, thread locking product (such as Loctite 243) to prevent loosening due to vibration on all threads.

KUP3 EXPLODED VIEW



KMS
POWERTRAIN SOLUTION

REAR MOUNTING PTO



USER MANUAL

Your is our SUCCESS

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11.2 Situations Which Terminate Warranty Obligations

The pictures used in this manual are for demonstration purposes and may not be identical to the actual purchased products.

1. Safety Information

The following information is for your safety. Make sure to read and understand them before attempting to use the equipment.

1.1 Overall Safety

- ✔ Carefully read the user manual provided and take notice of the instructions indicated.
- ✔ The important sections for operator safety and a prolonged product life are marked with symbols. Take notice of such symbols.
- ✔ Never work alone when doing repair or maintenance works under the vehicle.
- ✔ Make sure to check if the instructions you follow and the tools you use are intended for the work you are engaging in.
- ✔ Never use worn or damaged parts.
- ✔ Do not attempt any modification on the PTO or any other drive components of the vehicle.
- ✔ Ensure to mount the parts properly.
- ✔ Check backlash when engine is stopped.
- ✔ Do not go under the truck when the engine runs.

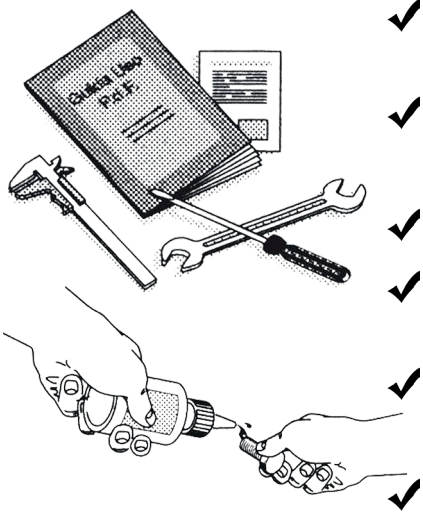
2. Instructions for Operation in Cold Weather

The disengaged PTO might transmit high levels of instant torque in cold weather (0°C and below), leading to rotation on the output shaft. This motion might result in injuries or damage to the PTO.

For prevention of injuries and damage to the equipment:

- ✔ Check the drive components of the vehicle.
- ✔ Do not attempt to use drive components without warming up the vehicle.

3. General Rules for PTO Installation



- ✔ Use the appropriate tools and instruments such as torque wrenchs, gauges and thickness gauges.
- ✔ Use only gaskets supplied by the Manufacturer. Use paste gasket only if recommended.
- ✔ Mastic is forbidden if used together with paper gaskets.
- ✔ It is advisable to use medium thread locking fluid for locking bolts and studs.
- ✔ Perform all Installation operations with the vehicle standing on a level surface, otherwise oil levels cannot be checked.
- ✔ Operate with engine and gearbox at ambient temperature.
- ✔ Check that the PTO is equipped with the correct mounting kit.

Fastaner Size	ft-lb (Nm)
M6 Standart bolt 8.8	7±1 (10±1)
M8 Standart bolt 8.8	18±3 (24±4)
M10 Standart bolt 8.8	35±6 (48±8)
M12 Standart bolt 8.8	63±11 (85±15)
M14 Standart bolt 8.8	103±18 (140±25)
M16 Standart bolt 8.8	140±26 (190±35)
UNC 3/8	19±3 (25±4)
UNC 7/6	44±7 (45±8)

For some aluminium gearboxes, the tightening torque needs to be reduced by 30%. Note on the tightening torque: the tightening torques reported are only meant as a guide and do not replace the indications given by the vehicle's manufacturer or the gearbox manufacturer.

4. Vehichle Mounting of Rear Mounted PTO

Steps to follow;

1. Take the vehicle to a level ground for installation.

2. Empty the gearbox oil, check cleanliness. If oil is dirty or contaminated it should be replaced. If the level is low, add from the type recommended by the manufacturer in the quantity recommended.

3. The vehicle to be mounted the PTO must be fixed on a suitable platform for the operation (a canal or lift etc.). The parking brake is to be applied, the gear must be in neutral position and the engine is to be stopped.

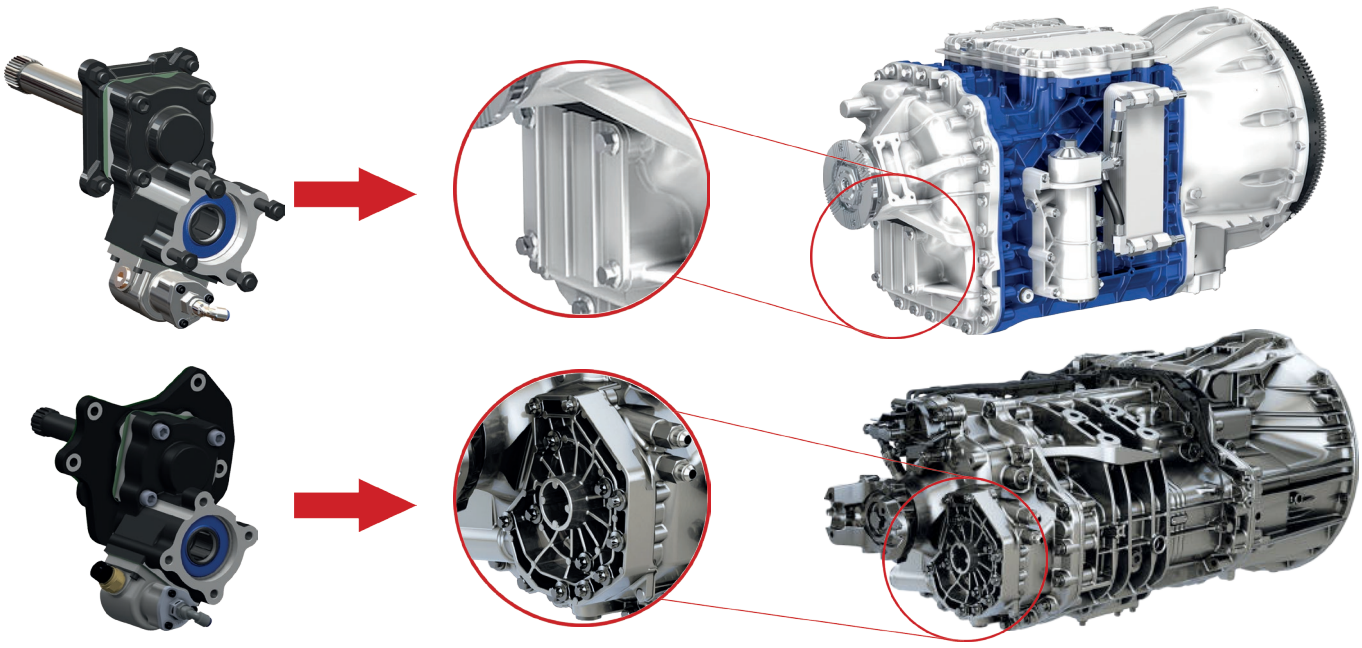


Figure -1- PTO Connection Surface

Figure -2-

4. Remove the bolts and cover. (Figure 2)

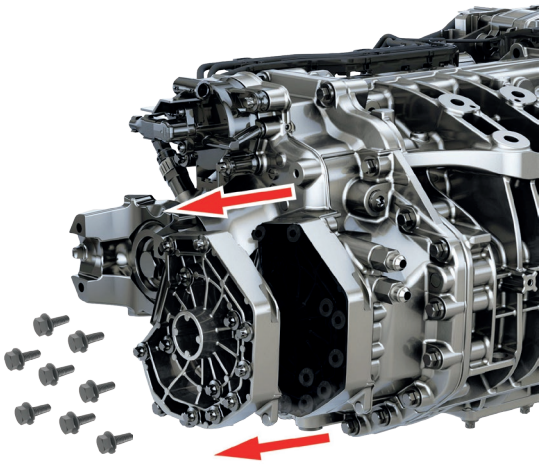


Figure -3-

5. Clean surface carefully. when cleaning the surface to avoid foreign objects entering the transmission. Make sure that oil lube pump is inside and seats in its location. (Figure 3)

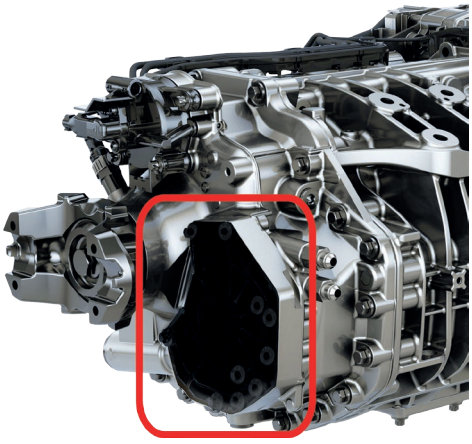


Figure -4-

6. Insert lub. pump plate. Pin should be same center of lub. Pump plate hole. (Figure 4)

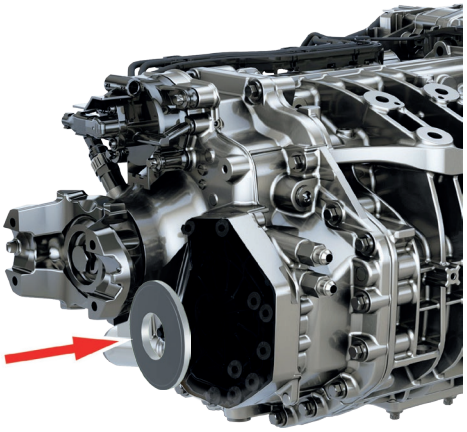


Figure -5-

7. Insert the quill shaft with bearing

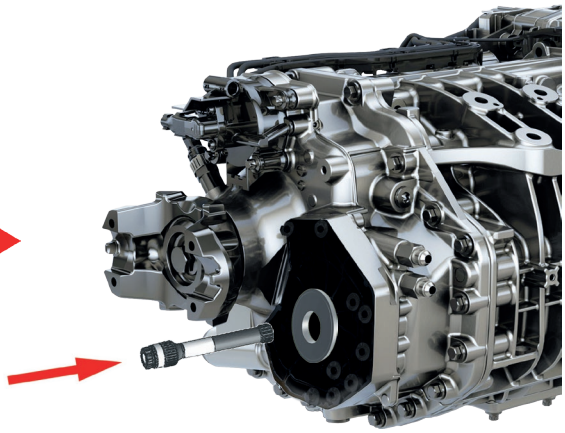
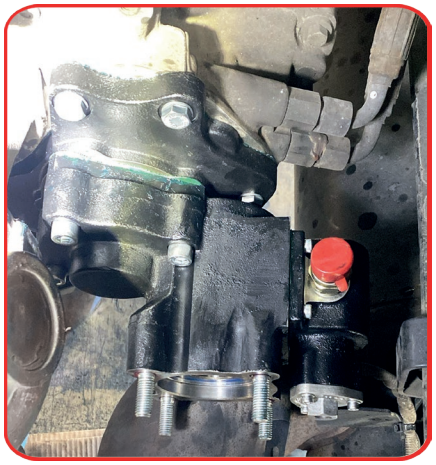


Figure -6-

8. During the mounting operation, apply a film layer of grease on the front and rear faces of the gasket, then attach it between the main transmission and PTO Plate connection surfaces. Mount the Studs on the Transmission using suitable torque value. Please also apply threadlocker glue on studs to prevent loosening due to vibration. (Figure 6)



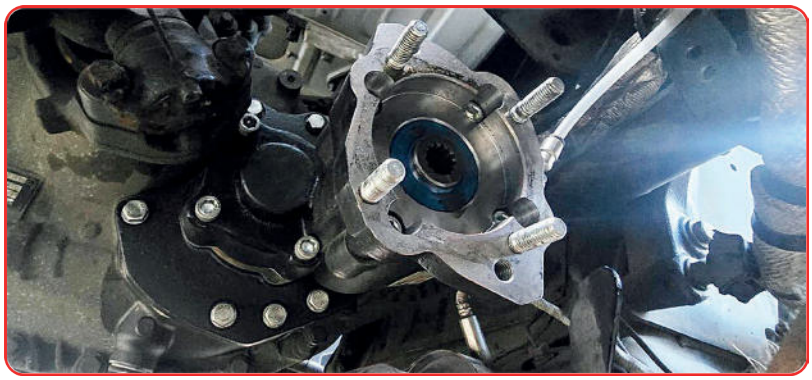


9. During the mounting operation, apply a film layer of grease on the front and rear faces of the gasket, then attach it between the PTO Plate and PTO connection surfaces. Mount the Studs on the Transmission using suitable torque value. Please also apply threadlocker glue on studs to prevent loosening due to vibration. (Figure 7)

10. Once PTO mounting has been completed, the connection components need to be inspected just in case.

11. The main transmission oil is then poured back into it from the container it had been put into, and then oil plug is fastened (If the oil has expired, new oil must be added).

12. PTO Engaging System will be assembled. (This can be air hoses, control cable&lever or electric wiring, depending on control Type)



13. For DT12-OC (DT12-OHE/-OV, G320-12) DT12-DC (DT12-DHE/-DV, G271-12)/ DT12-OD (DT12-OVX, G340-12) Lube line should be be assembled. Same lube line needs to be installed for heavy or long-term continous working condition of Volvo PTOs.

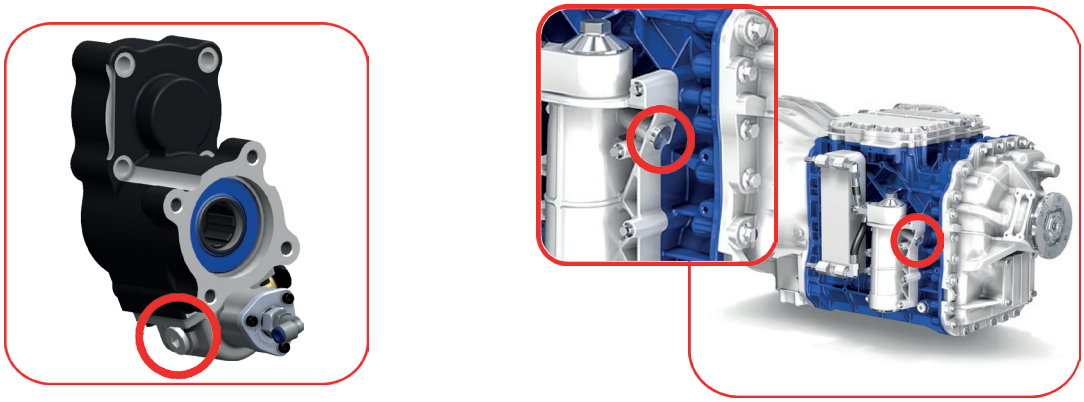


Figure -7- Lube Line Port

Step 6 is only for Detroit PTO Mountings. Disregard step 6 for Volvo I-Shift PTO installation.

KUP3-1-P-E



VLV-3



DT-1&2



RECOMMENDED WIRING DIAGRAM FOR INDICATOR SWITCH

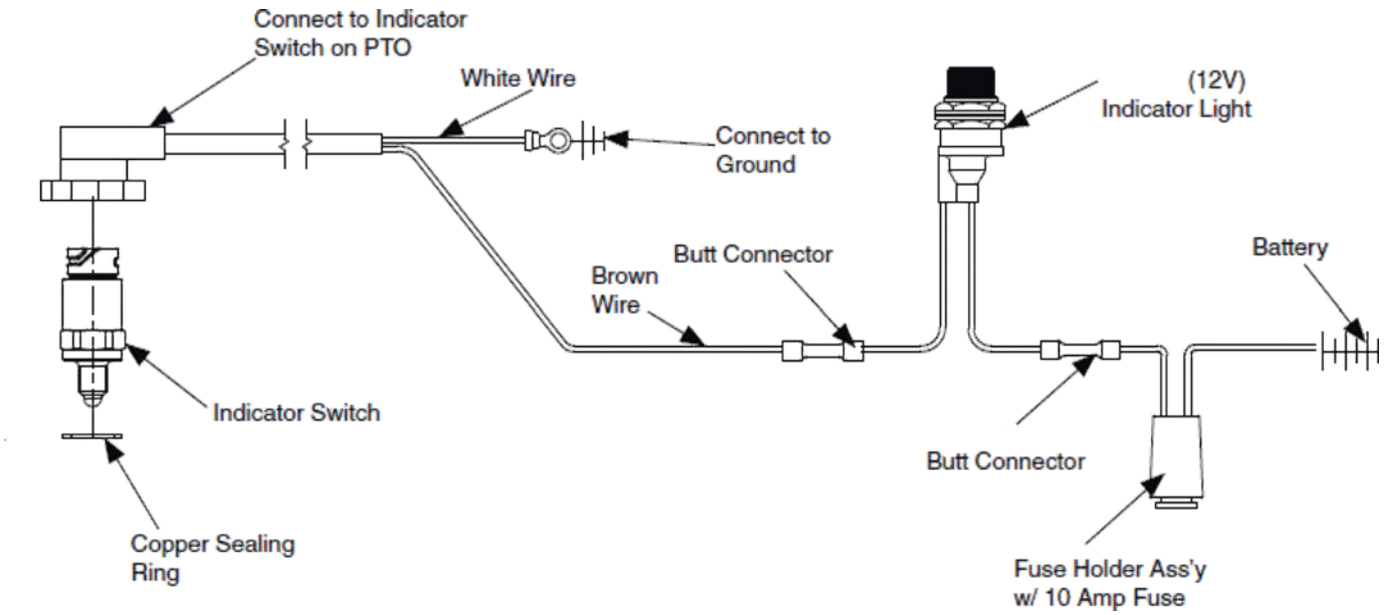
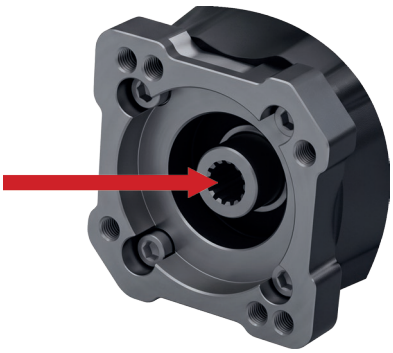




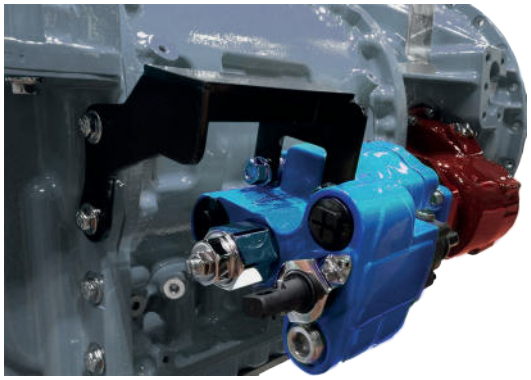
Figure -8- Illustration of Side and Rear Mounted PTOs

14. Run the engine (transmission and PTO in neutral position) for a few seconds and check if there are any unnatural noises. Stay away from rotating shafts and components.

15. Apply high-pressure, high-temperature, anti-fretting grease to the splines before install the hydraulic pump or adapter.



16. In case the hydraulic pump, which will be installed on the PTO, is 40 lbs or heavier and the length is 12" or longer, the pump must be supported by a bracket to avoid damaging the PTO. Otherwise, the PTO will carry all the load and may get damaged over time.



Supported Pump Example Image

Once mounting is over, the vehicle needs to be started and kept in idle rotation for about 30 seconds to achieve lubrication of the system. Next, inspect the PTO-main transmission connection for oil leakage.

- ✓ PTO temperature might sometimes have a negative influence, and the temperature needs to be lowered in case of overheating.
- ✓ More frequent oil changes must be conducted in heavy-duty operations.
- ✓ Where the PTO is side-mounted, make sure to inspect the backlash.
- ✓ Where the PTO is rear-mounted and used in heavy-duty operations, extra lubrication must be provided.

5. Points to be Considered During Mounting

5.1 Points Regarding Mechanical PTOs;

It must be definitely ensured when installing PTO control cable that cable support point is located either on the PTO or main transmission. If the installation is done on the chassis, the cable might get damaged or the PTO might accidentally engage due to individual vibration of the chassis and the PTO while the vehicle is moving. In consideration of these points, it must be definitely ensured that the cable is not installed on the chassis.

5.2 Points Regarding Pneumatic PTOs;

The pressurized air from the compressor must be checked. The pressure value should be between 90-116 psi. Water deposits might form inside the air tube due to the moisture while the compressor is running. A separate conditioner (air dryer) must be installed on the compressor to prevent this. To counter both risks, the water deposit inside the air tube must be periodically drained through relief plug. Moreover, it must be ensured that air transmission hoses do not get buckled.

5.3 Points Regarding Vacuum PTOs;

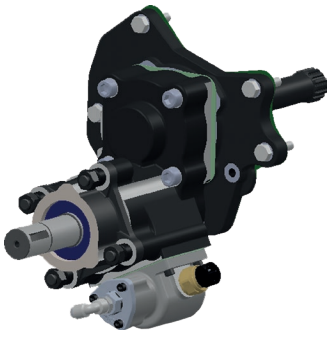
PTO vacuum leakage must be inspected on the PTO and system. It must be ensured that vacuum installation hoses do not get buckled. Vacuum suction value must be inspected. The vacuum value should be between -11 and -14 psi.

5.4 Points Regarding Electric PTOs;

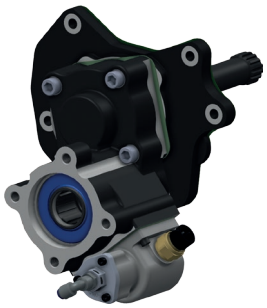
The volt value of the electrical system of the vehicle (12V or 24V) must be determined, and a PTO with a suitable coil should be ordered. Attention must be paid to connecting the (+) and (-) poles of the vehicle accumulator correctly on the coil. Care must be taken to integrate the electrical control unit on the PTO body.

5.5 Points Regarding Hot-Shift (Hydraulic Driven Electric) PTOs;

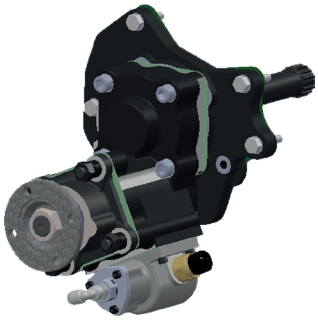
The electrical installation on the vehicle must be integrated with the PTO coil. The oil pressure sensor must be introduced to the vehicle computer while the engine is running after the PTO installation has been completed. Support must be sought from the vehicle main transmission authorized service point for this operation. Otherwise it might cause inefficient operation of the PTO and failure. Also it must be ensured to check coil of the vehicle electrical system (12V, 24V).



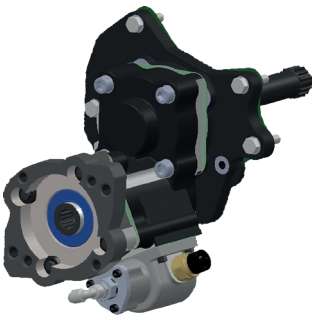
Round Keyed Shaft



5462 DIN ISO Flange



Companion Flange



SAE-B Flange

Figure -9- PTO output types

6. Shaft Mounting

The shaft leads to vibrations due to twisting and axial curving. High levels of shaft angle produce potential vibrations and hence negative effects on the components attached to the shaft. Thus, the shaft must be mounted properly as described below.

1. The connection flanges must be parallel to each other and both corner curves must be identical.

2. Sliding and balanced shafts must be used.

3. Shaft angle should be max. 12°

Max. Speed (RPM)	Max. Angle
2500	7°
2000	8°
1500	11°
1000	12°

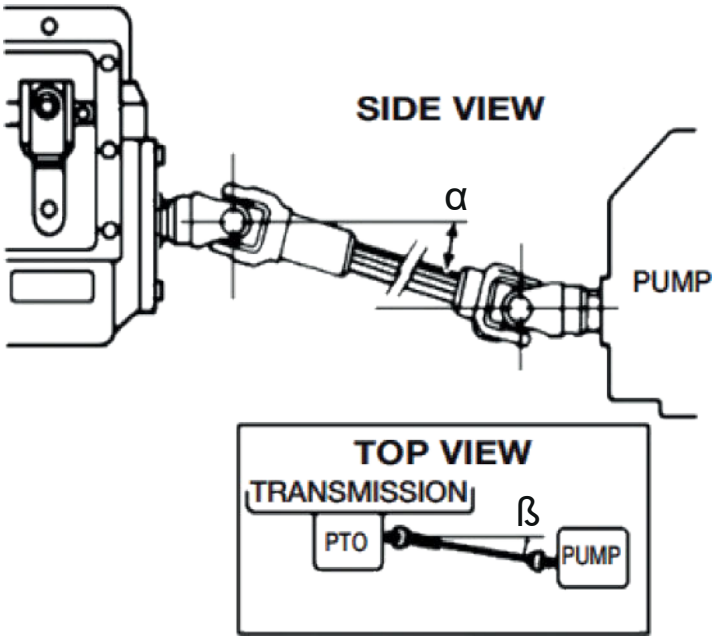


Figure -10-

7. Engaging / Disengaging

During engage/disengage process of the PTO, transmission gears should not run, this will damage the PTO and transmission gears. This is an important part of the process.

7.1 For Manual Transmission Vehicles

Engine runs at idle gear, transmission should be in neutral position

Engage;

1. Press the clutch for 5-7 seconds,
2. Activate PTO (depending on control type, pneumatic, electric..etc),
3. Release the clutch pedal slowly.

Disengage;

1. Press the clutch for 5-7 seconds,
2. Activate PTO (depending on control type, pneumatic, electric..etc),
3. Release the clutch pedal slowly.

7.2 For Automatic Transmission Vehicles

For automatic transmission, depending on gearbox features, procedures might change. Please contact your truck supplier to get guidance, or contact us with information about the automatic transmission model.

***Do not forget to disengage the PTO before the vehicle moves.**

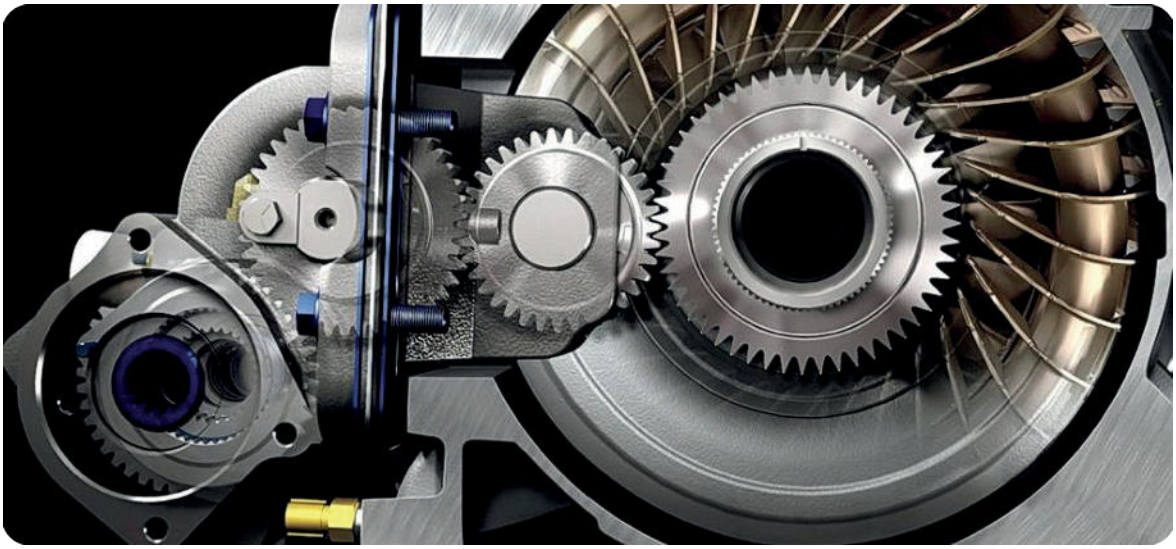


Figure -11- Transparent View of the PTO and Main Transmission

8. Servicing and Maintenance

Oil Leakage Detection

Check for oil leakage periodically. Watch for oil leakage at vehicle operation site or surroundings. Upon detecting leakage, take required action. After checking the available oil level, add oil into the main transmission where necessary. Contact us if the oil leakage persists in spite of the intervention.

MATERIALS WHICH REQUIRE REPLACEMENT FOR MAINTENANCE

✔ Do not forget that this is a technical product, and change there placement parts on time for its maintenance.

✔ The sealing components (orings, seals etc.) must be replaced once a year or every other year depending on the intensity of operation.

✔ The bearings might be needed replaced in 2-4 years depending on the frequency of operation.

Contact us in case of a technical failure. Removal of the PTO by someone other than authorized technician or notified servicing point would put the equipment out of warranty coverage.

9. Precautions for Emergency

If the PTO is to be disengaged in case of emergency, this must be done through the emergency stop system to be installed by the superstructure manufacturer.

10. Actions for Potential Failures

Issues	Likely Cause	Remedy	Precaution
PTO does not Engage/Disengage	Pneumatic pathway might be soiled or clogged; otherwise the hose might be twisted or bent.	Clean the pneumatic hose. Eliminate the twists or bends if any. Replace if required.	Check pneumatic hoses. Take precautions against cracking, puncture and twisting. There should be a conditioner (air dryer) on air compressor.
PTO does not Engage/Disengage	There is not enough pneumatic or vacuum pressure.	Check if the pressure is 90-116 psi before running the PTO. The vacuum pressure must -11/-14 psi.	Inspect if there is any issue with the pneuamtic or vacuum system.
PTO does not Engage/Disengage	The clutch, synchromesh or gear might not have matched its position when putting into gear.	Fully press the clutch pedal before engaging the PTO and properly engage the PTO once the assembly gear stops.	Always make sure to follow the instructions in the usage manual.
No air in the PTO	Control mechanism worn out or damaged	Check the control mechanism. Replace any damaged part.	Contact us if the problem persists.
No air in the PTO	Air compressor might be damaged.	Check the air pressure. It must be 90-116 psi.	Contact the vehicle servicing point
No air in the PTO	Pneumatic valve might have failed.	If the pneumatic hose is intact make sure that the air is available by removing the hose from the fitting and engaging/disengaging the mechanism.	If there is no air, then replace the solenoid valve that controls the pneumatic system.

Issues	Likely Cause	Remedy	Precaution
Oil leakage in the PTO	Gasket deformed or product life expired.	Replace if deformed or expired.	Install the gasket as per the instructions. Replace if damaged.
Oil leakage in the PTO	Gasked missing orwrong gasket used	Use the gasket that comes with the PTO. Ask the manufacturer if required.	Do not use any other method for sealing other than the original gasket.
Oil leakage in the PTO	Diverging from the mounting instructions provided by the manufacturer.	PTO to be installed according to the instruction.	PTO needs to be installed by trained personnel.



Contact us in case of a technical failure. Removal of the PTO by someone other than authorized technician or notified servicing point would put the equipment out of warranty coverage.

11. Warranty

11.1 Warranty Terms

1. Warranty period is one (1) year from the delivery of the product.
2. In the event that the product fails during the warranty period, the following apply;
   - Failure repair time is 1 to 8 working days depending on it's nature.
   - Where the repair time lasts more than 7 working days (except transportation time), a new product shall be supplied to the customer till the failure has been repaired.
3. Where a failure occurs within the warranty period because of manufacturing fault, the product shall be repaired free of charge.

11.2 Situations Which Terminate Warranty Obligations

The warranty obligations shall become null and void in following situations;

- Using the product for a purpose other than the intended use,
- Changes to the product that are not approved by us,
- Digression from defined specifications and reference limits,
- Failing to perform indicated product maintenance,
- Having a repair, carry out maintenance works or replace parts of the product service provide, other than the Authorized Service Point within the warranty period.
- Using the product against the usage terms set forth in the usage instructions,
- Where the product is damaged due to the improper mounting,
- Contact us in case of a technical failure. Removal of the PTO by someone other than Authorized Technician or notified servicing point would put the equipment out of warranty coverage.

9001:2015

14001:2015



Certificate of Registration

This certificate has been awarded to

KOZANOĞLU KOZMAKSAN HİDROLİK POMPA ARA ŞANZIMAN VE PTO İML. SAN. TİC. LTD. ŞTİ.

1175. Sokak no:9 TR-06370 OSTİM Fabrika: Erkunt Cad. No:6 1.OSB TR-06930 SİNCAN/ANKARA, Turkey

in recognition of the organization's Quality Management System which complies with

ISO 9001:2015

The scope of activities covered by this certificate is defined below

Design, Manufacture, Sales and After-Sales of Power Take Offs, Split Shaft PTOs, Reducers, Hydraulic Pumps

Certificate Number:	Date of Issue: (Original)	Date of Issue:
201430/A/0001/UK/En	27 September 2018	27 September 2018
Issue No:	**Expiry Date:**	
1	26 September 2021	

Issued by: On behalf of the Schemes Manager



Certificate of Registration

This certificate has been awarded to

KOZANOĞLU KOZMAKSAN HİDROLİK POMPA ARA ŞANZIMAN VE PTO İML. SAN. TİC. LTD. ŞTİ.

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in recognition of the organization's Environmental Management System which complies with

ISO 14001:2015

The scope of activities covered by this certificate is defined below

Design, Manufacture, Sales and After-Sales of Power Take Offs, Split Shaft PTOs, Reducers, Hydraulic Pumps

Certificate Number:	Date of Issue: (Original)	Date of Issue:
201430/B/0001/UK/En	11 October 2018	11 October 2018
Issue No:	**Expiry Date:**	
1	10 October 2021	

Issued by: On behalf of the Schemes Manager

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METRIC CONVERSION REFERENCE

Supplement to KUP 3 Series catalogue - European / SI units

Page 1	7/8 in shaft	22.225 mm nominal shaft
Page 1	1 in shaft	25.4 mm nominal shaft
Page 1	1 1/4 in shaft	31.75 mm nominal shaft
Page 1	1 1/2 in shaft	38.10 mm nominal shaft
Page 3	8.74 in / 9.37 in	222.0 mm / 238.0 mm
Page 3	1 1/32 in	26.19 mm
Page 4	8.07 in / 9.68 in	205.0 mm / 245.9 mm
Page 4	1 1/8 in	28.575 mm
Page 5	7.46 in / 10.41 in	189.5 mm / 264.4 mm
Page 5	7.38 in / 8.56 in	187.5 mm / 217.4 mm
Page 12	ft-lb tightening torque	Nm values already shown in parentheses
Page 17	40 lb pump threshold	18.14 kg
Page 17	12 in pump length threshold	304.8 mm
Page 18	90-116 psi air pressure	6.21-8.00 bar
Page 18	-11 to -14 psi vacuum	-0.76 to -0.97 bar (gauge)
Page 22	90-116 psi air pressure	6.21-8.00 bar
Page 22	-11 to -14 psi vacuum	-0.76 to -0.97 bar (gauge)

Notes: SAE interface, spline, flange and nominal thread designations are retained.

Page 2 drawing dimensions are converted from inches to millimetres.

Values are rounded for presentation; verify tolerances against approved CAD drawings.

Source page 2 specifies 90-115 psi, while the user manual specifies 90-116 psi.