

## [Link to our YouTube channel](#)

### \* TRS Technical bulletin – updated May 5<sup>th</sup> 2021

**Application: 2016 and newer model TRS brand motorcycles.**

#### **Fluid types for hydraulic brake system:**

DOT4 is OEM in the front and rear brake systems.

**NOTE:** Alternatively, we have for many years been using **DOT 5 silicone brake fluid** and have had excellent results.

#### **Transmission oil:**

**Gearbox capacity:** 325~335 cc *when completely drained* - **NOTE:** *Electric start engine uses 425cc*

##### **Gearbox oil:**

Universally recommended and obtainable world-wide is type: ATF DEXRON III

##### **Alternatives:**

Common lightweight off-road gear oil. For example; Maxima MTL 75W lightweight gear oil.

#### **Oil type considerations:**

Use of heavier weight or some synthetic-type oils when used in the transmission/clutch are often “thicker and/or stickier” than factory recommended viscosities. And these types of oils when trapped within the areas between the clutch plates can contribute substantially to excessive clutch drag.

Additionally, we have found from many years of experience with the clutch plates used in most trials motorcycles of all makes, that some brands of synthetic oil will chemically react when mixed with water that may have entered the gearbox and cause premature failure of the clutch fiber plates. (Water can enter the gearbox from condensation, submersion of the machine in streams, competition in the rain).

We have been told that this reaction alters the pH factor of some types of oil (primarily synthetic types). This acidic condition accelerates corrosion of steel engine parts, and may over time loosen the bond of the clutch fiber plate material. If your gearbox oil is milky, the source of this water contamination should be addressed and corrected as soon as possible to prevent additional damage to internal engine components.

## Oil change, most 2016~2020 models:

There are two points that the oil can be drained. There is a drain plug under the gear-shift pedal and there is an identical drain plug on the clutch cover at the rear lower corner. Jim prefers to drain the oil from the plug under the shift pedal and he makes a simple “trough” to guide the oil from the engine protector plate into his drain pan. See image example



The engine oil is filled by removing the plug that is on the left side of the engine near the carburetor and reed valve intake manifold. (Just behind the rubber gearbox vent hose and nipple) Simply move the vent hose to one side to access the filler plug and after opening this, with a small funnel, the oil can be poured into the gearbox.

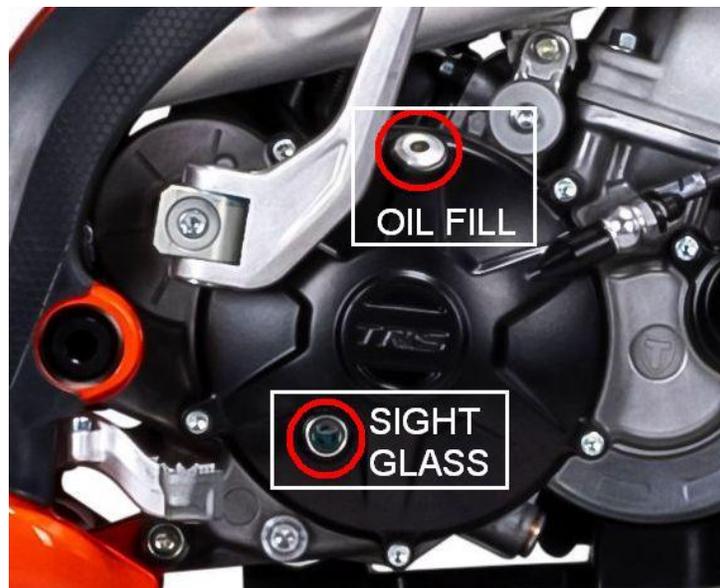
Location of engine gearbox oil filler



### Oil change, most 2021 models:

The engine oil is filled by removing the plug that is on the right side of the engine (small outer clutch cover) with a small funnel, the oil can be poured into the gearbox. There is also an oil level “sight glass” on these models. When the oil level is seen to be half-way in the glass window, the level is correct.

*The above mentioned oil capacities did not change.*

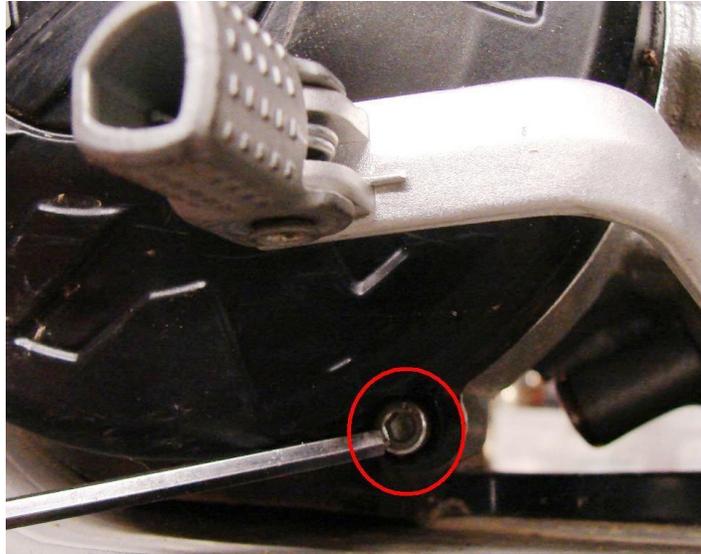


## **NOTE: ADDITIONAL DRAIN REQUIRED ON E-START MODELS:**

The engine oil is also found inside the magneto (left side of engine) on the electric-start models as they have an “oil bath magneto” which is actually quite common. There is a small amount of oil trapped inside the magneto and this must also be changed when changing the gearbox oil. (about 100cc). In the images below you can see the screw that is removed to drain the magneto oil. When refilling the gearbox, the oil will pass back into the magneto on its own. Only when draining the gearbox oil must this procedure be of concern. After removing the bolt in the lower right corner of the cover, the oil will drain. *(There is a small “arrow” embossed on the cover to point to the correct bolt. I have highlighted it in silver color in one of these images below)* There is a copper washer on this bolt to seal the oil drain, be sure not to lose this washer.

**[LINK TO YouTube VIDEO COVERING THIS MATERIAL](#)**





## GENERAL CLUTCH INFORMATION

These machines use mineral oil in the hydraulic clutch system.

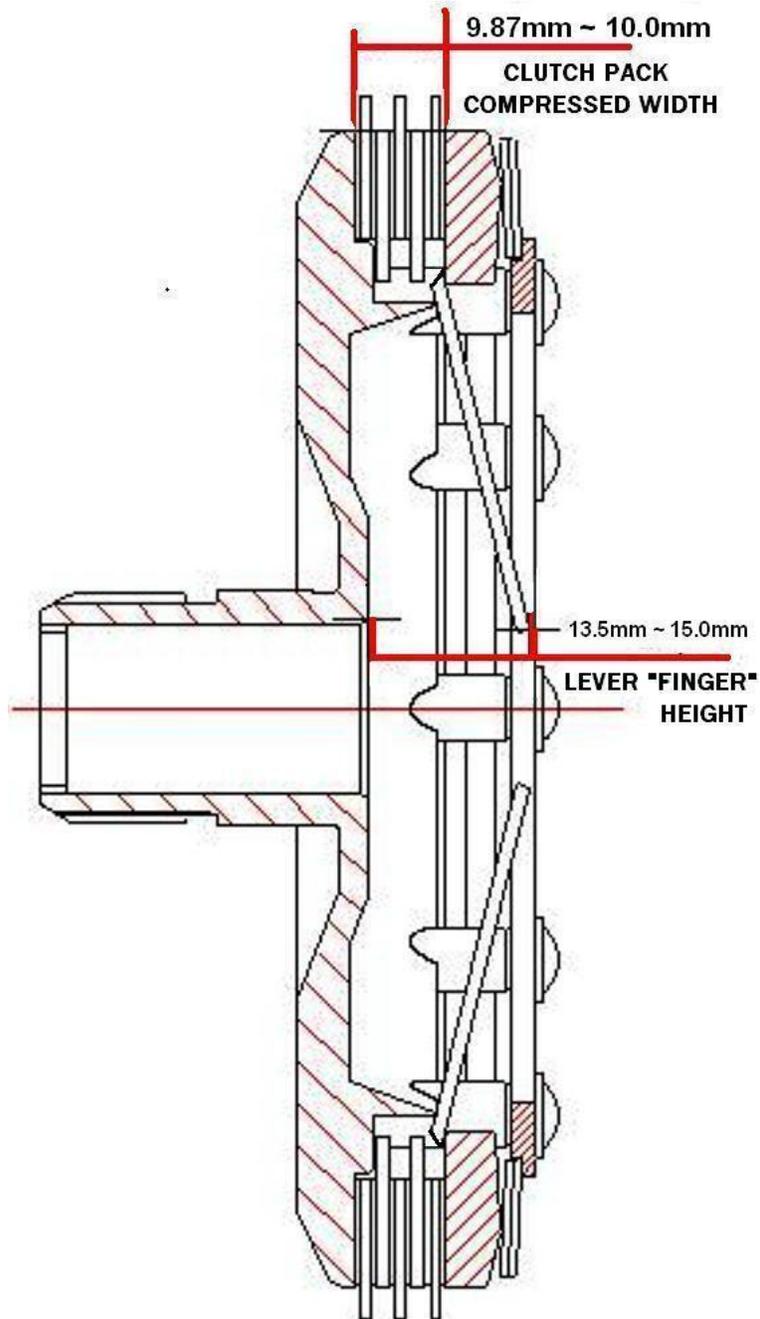
**Important note:** This is not in any way similar or the same as mineral oil from the drug-store.

**NOTE: THE BRAKES USE DOT 4 FLUID. NEVER INSTALL MINERAL OIL IN A BRAKE SYSTEM!**

## Clutch pack measurement:

In the diagram and images below, you will see measurements for proper functioning of the TRS clutch. If you see that the measurement of the complete disc pack is higher or lower than specified range, you should replace the pack.

**Complete clutch pack. Fiber and metal discs: TRS part number 05018MT100**



## How to measure the clutch finger height with a caliper:

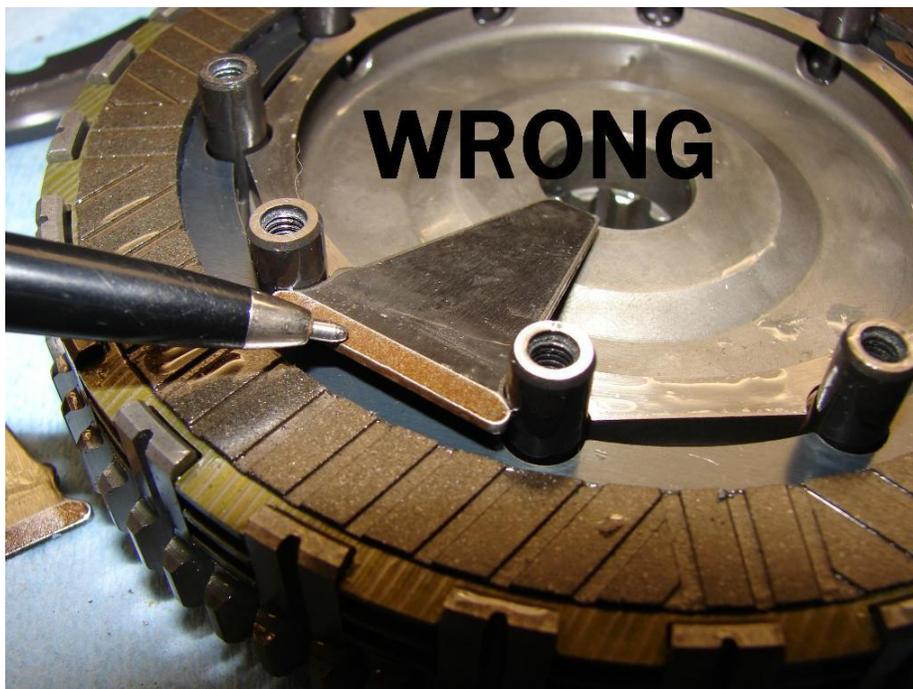
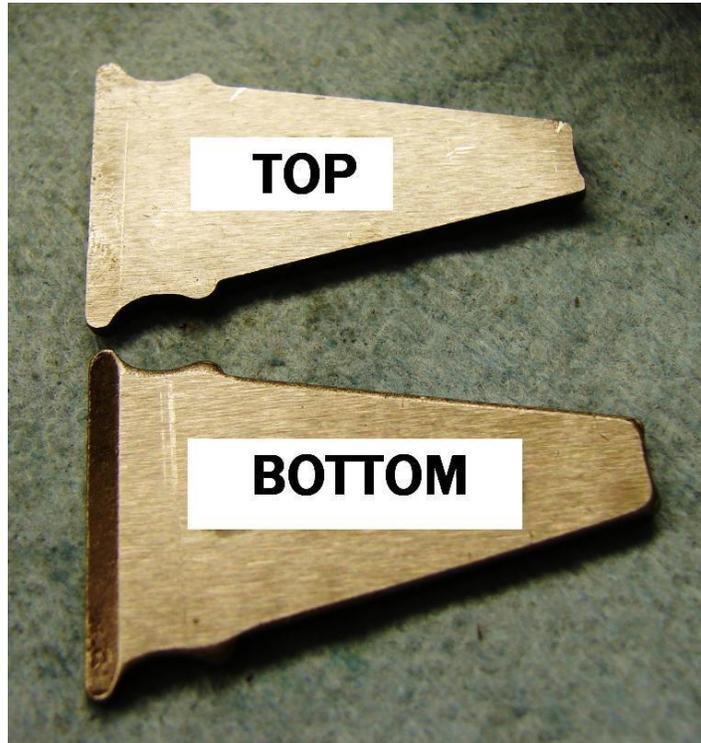
Simply rest the caliper base gently upon the fingers and drop the inner caliper slide into the interior of the clutch to the machined flat surface seen in the photo.



The clutch “fingers” or levers are not symmetrical as in some other brands.

There is a top and bottom on the TRS ones.

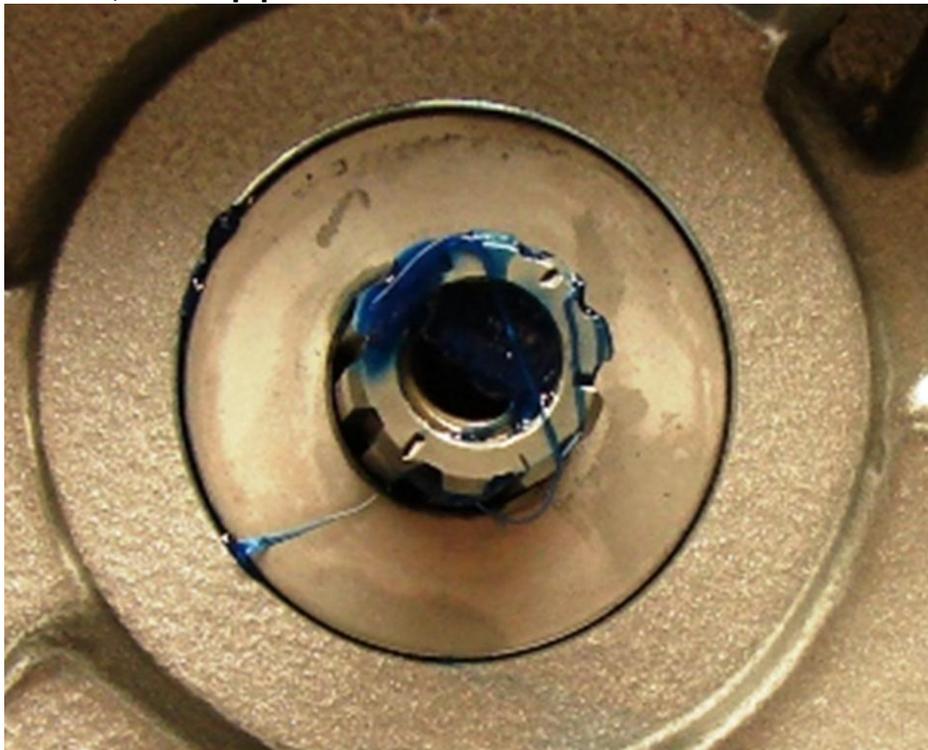
See images below



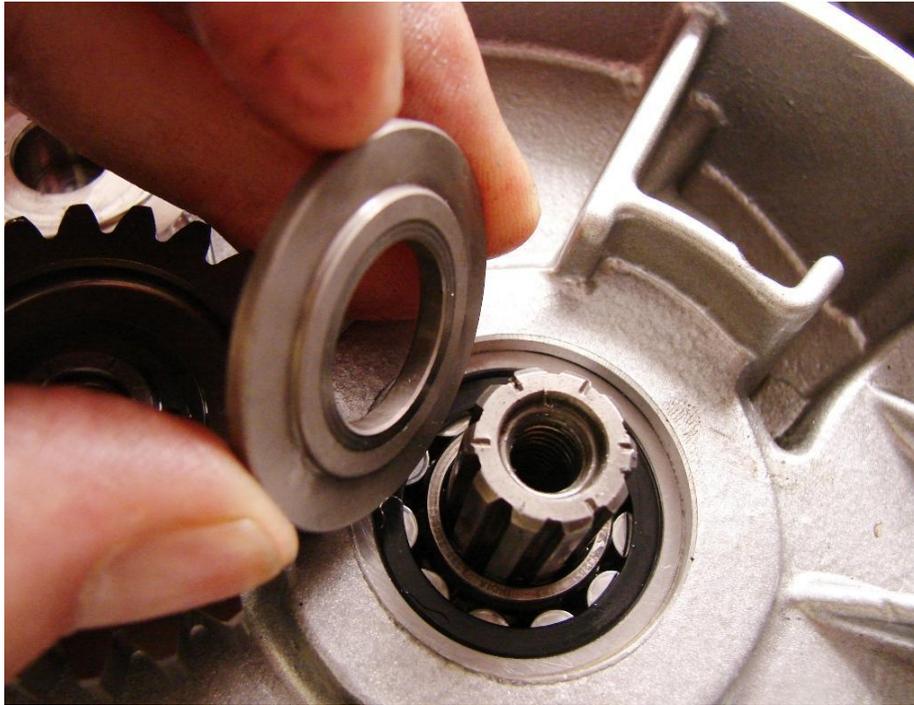
**When assembled, the TRS clutch should look like this.**



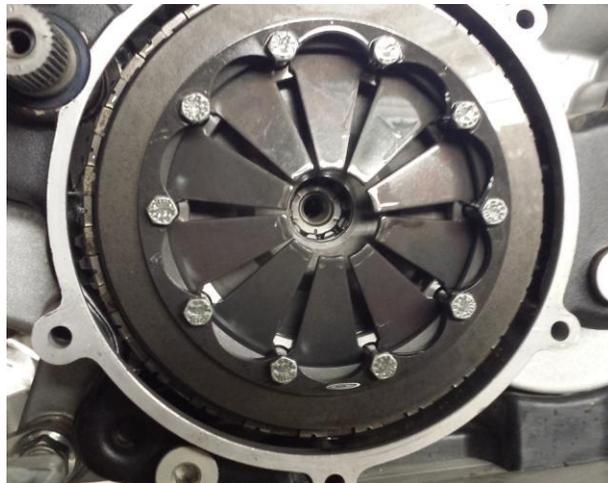
**NOTE: If you remove the clutch assembly it is possible that a thick flat washer can fall off the transmission primary shaft. It has a step on one side. When properly installed, the step points inward and it looks like this when installed.**



**The image below shows another view of the stepped washer and you can also see the robust roller-bearing inside the interior of the TRS engine that supports the gearbox shaft and clutch components.**



**The TRS clutch looks like this when installed on the engine.**



**There is a thick thrust washer and hollow bolt that retain the clutch assembly to the transmission primary shaft.**



**Assembly sequence of clutch slave components (ALL)**





The clutch cover uses 2 o-rings inside the “slave cylinder piston”. These rubber compounds are designed for mineral oil.

**Clean hands;** do not contaminate the o-rings with fluids or cleaners. Be clean and the repair will last for a long time. Petroleum based oil on your hands can contaminate the o-rings during assembly.

### **Helpful hints:**

**NOTE: Always work clean, with no oil contaminants on the parts.** (Use "carb cleaner" on the metal parts, blow dry to absolute clean. Drain or disconnect the hydraulic hose from the cover so fluid doesn't enter while you work.)

Use "sparingly" **only silicone grease** to lubricate parts for assembly.

(Find the grease at NAPA or Car Quest etc..) On mineral oil systems, you may obtain mineral Oil from your TRS dealer and most off-road shops dealing in European brands as this type of oil is common in the hydraulic clutch systems on most off road machines.

## Basic 'industry standard' Engine Torque Specifications

	PART NAME	lb·ft
<b>E N G I N E</b>	<b>Spark plug</b>	8.1
	Stator plate bolts	5 - 6
	Clutch bolt.	5 - 6
	<b>Cylinder stud bolt</b>	18
	<b>Reed cage/manifold bolts</b>	5 - 6
	Clutch pressure plate bolts	2.2 - 2.9
	<b>Crankcase bolts</b>	5 - 6
	<b>Water pump housing bolts</b>	5 - 6
	<b>Clutch cover bolts</b>	5 - 6
	<b>Flywheel magneto</b>	29.5
	<b>Ignition cover</b>	5 - 6
	<b>Engine drain plug</b>	8.8
	<b>Kickstart pedal screw</b>	5 - 6
	<b>Shift pedal bolt</b>	5 - 6
	<b>Cylinder head bolts</b>	8.5 - 9.5

## TRS FUEL REQUIREMENTS & JETTING SPECIFICATIONS

COMPILED BY JIM SNELL, TRS-USA ~ REVISED March 12<sup>th</sup> 2020

**Gasoline - 95 Minimum octane USA - (R+M)/2  
(Ethanol content must be 0%)**

we recommend 98 OCTANE race gas, no ethanol

Premix ratio - 100:1 (absolutely no richer than 80:1)

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# **SUGGESTED JETTING**

## **250cc 280cc AND 300cc MODELS**

### **2016-2020 TRS One and Xtrack 205,280,300cc**

with Dellorto PHBL26 (26mm) carburetor

MAIN JET: 118 (120 OK)

PILOT JET: 35 (38 OK)

NEEDLE: D36 - CLIP POSITION 2nd DOWN FROM TOP

SLIDE: 60

FUEL SCREW: 3.5 TURNS OUT (NOTE: THIS IS A FUEL SCREW)

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### **2017-2018 "RR" ADAM RAGA RACING, 250cc,280cc,300cc**

With KEIHIN PWK28(28mm)

FLOAT HEIGHT: 19mm

MAIN JET: 125

PILOT JET: 45

NEEDLE: JJH (3rd "center" clip position)

SLIDE SIZE: 3.5

CHOKE JET (starter jet): 62

Air screw standard position (factory setting) - 1.5 turns out

### **HIGH-ALTITUDE ABOVE 5,000FT ~ 1,500M RR "RAGA RACING" and GOLD EDITION 250cc,280cc,300cc**

WITH KEIHIN PWK28(28mm)

MAIN: 118

PILOT: 52 (55 PILOT ABOVE 10,000FT ~ 3,000M)

NEEDLE: JJH (2nd FROM BOTTOM OF FIVE POSITIONS)

SLIDE: 3.5

AIRSCREW: 2.25 TURNS OUT (APPROX)

### **VERY HIGH ALTITUDE "RACE GASOLINE ONLY"**

### **ABOVE 8000FT ~ 2,400M RR "RAGA RACING" and GOLD EDITION 250cc,280cc,300cc**

WITH KEIHIN PWK28(28mm)

MAIN: 122

PILOT 50 (58 if you must use "Premium" pump gas)

NEEDLE: JJH (3rd "center" clip position)

SLIDE: 3.5

AIR SCREW: 1.5 TURNS OUT

ABOVE SPECIFICATIONS AS PER TRS COLORADO DEALER Bill Haskell

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### **ALERNATIVE JETTING, 2018-2019 GOLD EDITION 250cc WITH BOYESEN "DUAL STAGE" REED VALVES**

WITH KEIHIN PWK28(28mm)

MAIN: 122

PILOT: 45 (48 OK)

NEEDLE: JJH (SECOND FROM THE TOP OF FIVE POSITIONS)

SLIDE: 3.5

AIRSCREW:  $\frac{3}{4}$  TO 1.5 TURNS OUT

FLOAT HEIGHT: ARMS IN LEVEL PLANE WITH FLOAT BOWL BASE (PARALLEL)

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## **2019-2020 "RR" ADAM RAGA RACING, 250cc, 280cc, 300cc**

With KEIHIN PWK28 (28mm)  
FLOAT HEIGHT: 19mm  
MAIN JET: 125  
NEEDLE: JJH (3rd "center" clip position)  
SLIDE SIZE: 3.5  
PILOT (slow) JET: 48  
CHOKE JET (starter jet): 62  
AIRSCREW:  $\frac{3}{4}$  TO 1.5 TURNS OUT

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## **2018-2019 GOLD EDITION 250cc**

### **ALTERNATIVE JETTING & BOYESEN "DUAL STAGE" REED VALVES**

WITH KEIHIN PWK28 (28mm)  
MAIN: 122  
PILOT: 45 (48 OK)  
NEEDLE: JJH (SECOND FROM THE TOP OF FIVE POSITIONS)  
SLIDE: 3.5  
AIRSCREW:  $\frac{3}{4}$  TO 1.5 TURNS OUT  
ADOVE SPECIFICATIONS AS PER AARON AND ANDY MILLER, NEW YORK

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## **125cc MODELS**

## **2018-2020 "RR" ADAM RAGA RACING, 125cc**

With KEIHIN PWK28 (28mm)  
FLOAT HEIGHT: 19mm  
MAIN JET: 125  
NEEDLE: JJH (3rd "center" clip position)  
SLIDE SIZE: 3.5  
PILOT: 50 (45 standard on some early bikes but 50 works better)  
CHOKE JET: 62  
AIRSCREW:  $\frac{3}{4}$  TO 1.5 TURNS OUT

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## **ALERNATIVE 125cc RR "RAGA RACING" and GOLD EDITION**

WITH KEIHIN PWK28 (28mm) carburetor.  
MAIN: 125  
PILOT: 55 (50 MAY BE OK)  
NEEDLE: JJH (CENTER OF FIVE POSITIONS)  
SLIDE: 3.5  
AIRSCREW:  $\frac{3}{4}$  TO 1.5 TURNS OUT  
FLOAT HEIGHT: ARMS IN LEVEL PLANE WITH FLOAT BOWL BASE (PARALLEL)  
NOTES: *BOYESEN CARBON REEDS SEEM TO MAKE AN IMPROVEMENT ON THE LOW END ENGINE POWER.*  
ADOVE SPECIFICATIONS AS PER AARON AND ANDY MILLER, NEW YORK

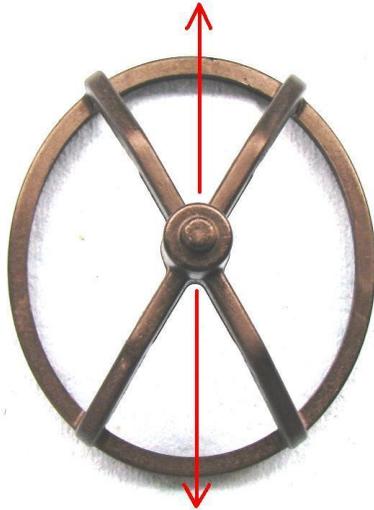
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## **2019-2020 TRS Xtrack 125cc**

with Dellorto PHBL26 (26mm)  
MAIN JET: 120  
PILOT JET: 35  
NEEDLE: D36 clip position (THIRD DOWN FROM TOP)  
SLIDE: 60  
FUEL SCREW: 3.5 TURNS OUT (NOTE: THIS IS A FUEL SCREW)

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**Air filter and proper installation**  
**Jim has done a nice video covering the air filter**  
**[This is the link](#)**



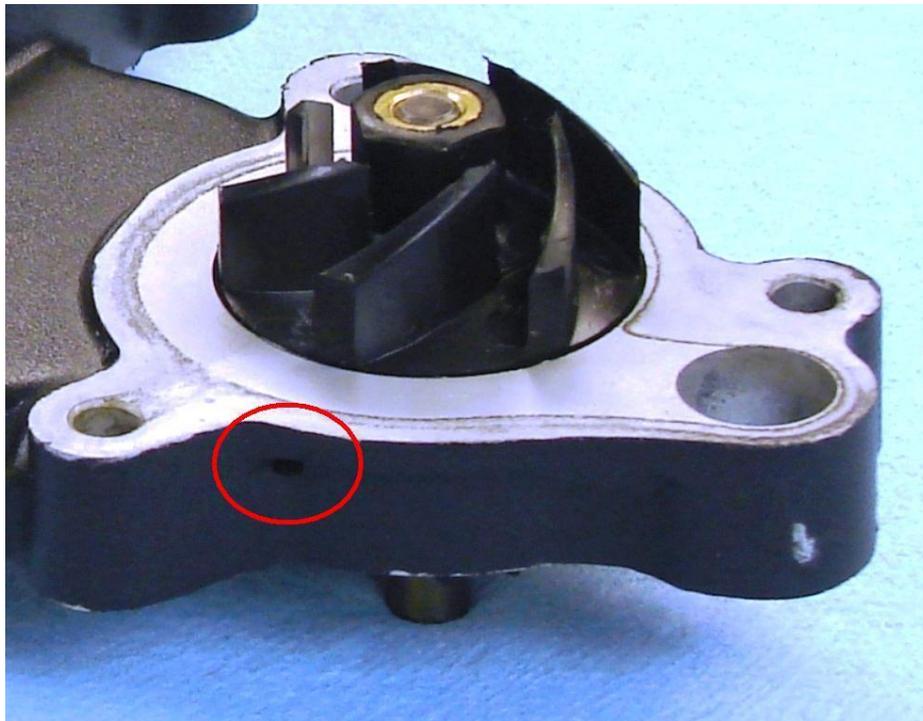


**Water Pump information:  
Jim has done a nice video covering the water-pump.**

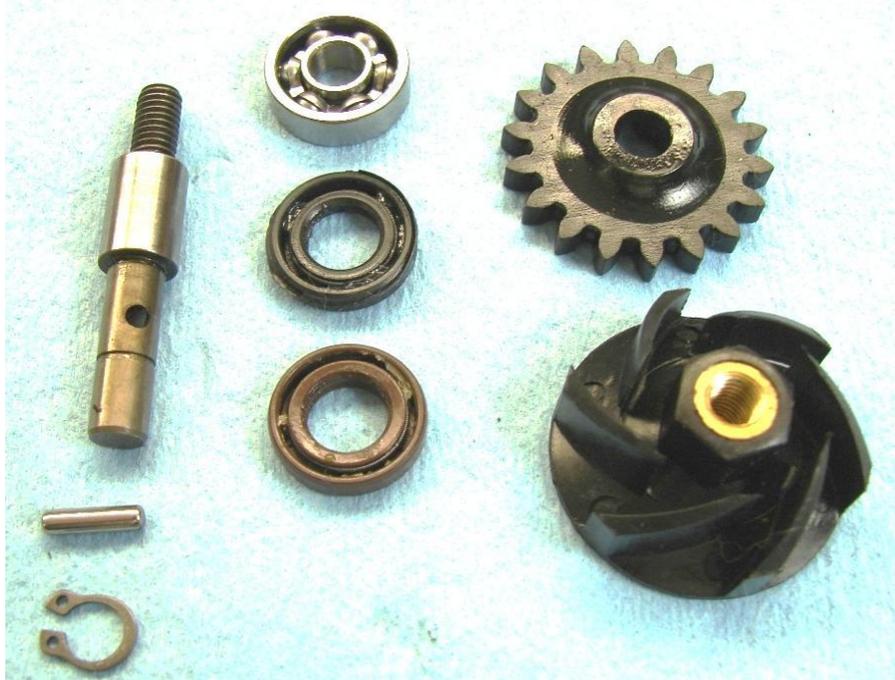
**[This is the link](#)**

There is a very small weep-hole in the clutch cover under and forward of the water-pump outer housing. This is designed to tell you when you are having water-pump problems that are developing. When a small amount of gearbox oil drips from this hole, it may be indicating that you have the “inner water-pump seal” going bad (or that your crankcase is pressurized for some reason. See below about crankcase venting) If coolant drips from this small hole it is an indication that your “outer water-pump seal” may be going bad or that you have an over-pressurization of the coolant system. (See below about cooling system pressure)

In this image (circled in red) you can see the small “weep hole” on the underside of the clutch cover that allows the user to know that there is a problem with the water-pump. *(This design is common in MX and Enduro machines from several manufacturers)*



These are the internal components in the TRS water-pump



## Operating range of thermostatic switch for 12V D/C cooling fan/motor

FAN THERMOSTAT	(FAE) <u>TRIAL</u>
TEMPERATURES	CONNECTION AT ..... 71°C ~ 160°F
	DISCONNECTION AT ..... 66° C ~ 151°F

### Radiator/cooling system pressure –

It is important to be certain that the radiator breather valve is not fouled. This valve is located next to the radiator filler cap on top of the radiator tank and has a release-pressure in the range of 1.0 BAR (15 PSI). If this small “Check-ball and spring” valve does not operate correctly, it is possible that it can adversely affect the cooling system. If this valve malfunctions or is fouled, the pressure in the system may be too low which lowers the “boiling point” of the coolant. Or the opposite in which an increase in pressure may cause leakage of the water pump seal and coolant may escape from the weep hole in the clutch cover.

**Jim’s DIY video about radiator & valve pressure testing.** [link](#)

1.0 BAR (15 PSI) radiator pressure release valve circled in red



## Front wheel and axle

Take the time to familiarize yourself with how the front wheel and axle is put together. There is a "pinch-bolt" under one side of the fork leg that secures the axle. Unless you loosen this bolt, you cannot remove the axle. Do not over-tighten the front axle. It is designed to be "snug" As the front wheel rotates on only one plane within the front suspension legs it is not necessary to make the axle extremely tight. If the front axle is too tight this will put the wheel bearings under side pressure and this added friction against the bearing races can restrict the free rotation of the wheel may cause the bearings to overheat which will lead to premature failure. There are two steel spacers that are inserted into the front brake disc rotor protector. These must always be in place. When replacing the protector you must transfer these spacers to the new piece. You cannot run the machine without this protector installed as this can cause the front brake caliper bolts to be too far into the interior of the caliper and they may interfere with the operation of the front brake. The front brake disc rotor is of the "floating" type and it is designed to appear to be somewhat loose. It is secured by the bushings and bolts that hold it to the hub. This is something that was worked-out in the trials industry in the early 1980s and all brands and models of trials machines feature a floating rotor design. *This may be different to the brakes seen on MX, Enduro, dual-sport and street machines as they often have "floating calipers" but the end mechanical and braking results are the same.*

## Rear wheel and axle

**Before use and periodically thereafter it is important to check that the four rear sprocket mounting nuts are tight.** This is a critical area is if they come loose some damage can be done to the rear hub. The rear brake disc bolts should also be checked for tightness periodically.

**Before putting the motorcycle into operation you should check the rear axle,** first by loosening it, then to tighten it again. Do not over-tighten the rear axle as this can make it very difficult to remove and can also damage the rear wheel bearings.

**IMPORTANT NOTE:** There is a sequence of events that can cause a problem related to the "rounding-out" of the rear axle Allen key-way. *This has happened with a few isolated end-users at some point after the machine was put into use.*

The root cause of this scenario seems to be related to the TRS having a very high quality drive-chain as delivered from the factory, *making chain adjustments due to stretch much less frequent than what is typical on some of the other brands.* For this reason, a longer period of time may pass before the operator first attempts to loosen the rear axle for a chain adjustment.

In these long periods between adjustments, the threads on the axle and in the interior of the right hand side adjustment slide-plate may become dry and partially dry-seized. The factory is aware of this and they are applying anti-seize "silicone grease" during assembly, but it is also advisable that upon initial set-up of the machine when new, to verify this, and if needed, to apply "anti-seize" or some type of thick lubricant to the threads on the rear axle right side "nut plate".

**IMPORTANT REAR AXLE ALLEN KEY SIZE NOTE:** It has been brought to our attention on more than one occasion that some users may not possess the proper 10mm Allen key for loosening and tightening the rear axle.

NOTE: An SAE (USA type) Allen in size 3/8 inches *IS NOT ACCEPTABLE* as a substitute for the correct 10mm size rear axle Allen key, and in fact, even though it seems to fit, it is too small. Using the improper size or a badly worn 10mm Allen key will almost certainly round-out the center of the rear axle Allen key-way.

*If you round-out the Allen key-way on your rear axle, it is not the end of the world as the key-way end can be easily drilled-out to remove the axle but of course this will require replacement of this axle.*

**Reminder: Do not over-tighten the rear axle.** The TRS system by design is a very secure way of attaching the rear wheel and preventing it from slipping from its adjustment points. *Much more secure in fact than the common "snail-cam" adjuster systems.*

PROPER REAR AXLE TORQUE should be only about 18~20 ft lbs. *(Preventing the wheel from sliding back when doing splatters and ledges is as simple as keeping the interior "pinch" surfaces of the swing-arm and axle adjustment slider plates free of oil and grease contaminants.)*

Example of *anti-seize compound* is shown here on the rear axle threads



## Chain tension

Proper chain tension is shown in this image. The “Tensioner block” is circled in red. Chain tension is controlled by adjusting the position of the rear axle.



## THE FLYWHEEL MAGNETO

The magneto is housed within the machined cast aluminum outer magneto cover. There is a sealed bearing inside the cover which attaches to the machined end of the left side of the crankshaft. This effectively adds an additional “crankshaft bearing” and dampens engine vibration and adds strength to the internal components while assuring perfect alignment of the magneto to the flywheel. (NOTE: Due to the much smaller crankshaft, the outer bearing is not used on the 125cc model engine)

The magneto flywheel is of the “reverse type” and is held-on by a large nut that is conventional “right-hand thread” and is a 27mm wrench size. The flywheel has external threads for removal and correct alignment on the crankshaft is done by a typical woodruff keyway.



The flywheel magneto removal tool looks like the one depicted in the image below and can be obtained from your TRS dealer.



## **TRS TRIAL MOTORCYCLES - Periodic revisions:**

### **Engine oil –**

One of the most important things for the proper operation of your TRS motorcycle is the clutch, and for the clutch, the most important thing is the proper type of transmission/clutch oil, and that it is clean at all times. The quality of the oil in the engine can make all the difference in the performance of the clutch and gearbox.

The oil in a trial engine gearbox, apart from the lubrication of the gears, has the responsibility of dissipating the clutch heat. Due to the importance and constant use of the clutch in trial, it is normal that the oil deteriorates very quickly.

In order to have correct operation, TRS recommends a frequent periodic exchange of the engine oil. The moisture that can be produced by water coming into the engine when the machine is operated in streams or wet weather or by internal condensation because of humidity and/or extremes of temperature can adversely affect the operation of the clutch. (Remember that the clutch discs are made from organic materials that are very sensitive when they are exposed to water or humidity).

The oil that is readily available globally and is acceptable is ATF (Automatic gearbox Dexron III Mercron)

### **Crankcase venting –**

It is also very important to always have the crankcase vent hose properly routed to a high place in the chassis so as to prevent the entry of water. Making sure that this vent hose is not pinched by any components or cable ties, and that it is free to breathe. As the internal engine temperatures vary, and with variances in altitude the gasses inside the crankcase must be allowed to equalize with the outside atmospheric pressure.

In addition, you must be certain that you always replace the center clutch-hub bolt with the one that has a small hole in its center. This is the passageway for the crankcase to breathe into the vent-nipple which is located on the left side of the engine near the front chain sprocket.

### **General nuts and bolts –**

Before and soon after first putting the motorcycle into service it is important to do a thorough inspection of all mounting hardware throughout the chassis. Pay close attention to the rear engine protector plate (skid-plate ~ bash-plate ~ sump-guard) mounting bolts as they may loosen over time from impacts of the plate to obstacles in the sport of trials. In fact, you may wish to apply a non-permanent thread locking compound to these bolts.

*(“blue” Loctite for example. Be sure everything is perfectly clean before using thread locking compound or it will not work properly.)*

**Pay close attention to the four Allen bolts that attach the air filter box to the chassis as they may initially loosen from vibration.** When removing and reinstalling the air-box to the chassis, pay close attention so as to not cross-thread these four mounting bolts. As they are securing the plastic filter box to the chassis some care must be taken so as to not over-tighten these fasteners. Be certain to properly install and align the rubber air intake hose to the back of the carburetor and tighten the retention hose-clamp. When removing and installing the air filter box be certain all wires, hoses, and cables are properly routed so as not to foul things such as the throttle or to melt these things upon the hot exhaust.

Pay close attention to the exhaust system mounting bolts as they may loosen over time and from vibration.

After some initial use it is also a good idea to check the bolts and nuts that comprise the rear suspension linkage to be sure everything is tight in this area.

**Pay close attention to the two lock nuts that attach the handlebar clamps to the top triple-tree, as they may initially loosen from vibration.**



**FRONT FORK INFORMATION**  
**TECH BRAND (GOLD PLATED COLOR) W/STEEL LEGS AS USED ON THE "RR" MODELS**  
Information supplied by Jordi Tarrés

**OIL CAPACITY:**

**LEFT SIDE:** 400cc (or also with the purged system 110mm)

**RIGHT SIDE:** 410cc (or also with the purged system 55mm)

**OIL TYPE:** OJ01 (OR KYB O1 MOTOCROSS OR SHOWA 05 MOTOCROSS)

**INITIAL REGULATIONS:**

**Rebound damping:** from completely closed - open 25 click

**Compression right damping:** from completely closed - open 3 turns

**Compression left damping:** from completely closed - open 2 turns

**Spring preload:** from completely closed - open 6 turns

## REIGER REAR SHOCK RR MODELS

Reiger shock absorber damping is factory pre-set as follows.

**Bottom adjuster (flat head screwdriver) after all the way in (Clockwise) return out 30 clicks**

**Top adjuster (Purple knob) after all the way in (Clockwise) return out 10 clicks**

**As always, specifications are subject to change without notice.**