THE HEART OF KART

M1 60cc

ASSEMBLY INSTRUCTIONS AND USER MANUAL

MAN-088

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GENERAL DESCRIPTION OF ENGINE

This engine is for propaedeutic series and for very young drivers and has been specifically designed and developed for powering of kart, either for racing purposes and hobby, but always on closed tracks.
During the design phase has been inspired to the technical solutions already adopted for high-performance engines kart, to its simplicity of installation and use, related to a parsimonious maintenance, in order to ensure the maximum durability and reliability of the components, subject to compliance with the operational limits.

The engine is single-cylinder and uses the principle OTTO two stroke.

The cylinder and the crankcase are made in aluminium alloy.
The pressed-in lineris made of centrifuged cast iron, fully machined from a solid to ensure the best stability and homogeneity of sliding.
The head is separated from cylinder and is secured to the cylinder with through studs.
The crankshaft is built and supported by ball bearings. It's made of alloy steel, hardened and tempered, as well as the connecting rod (which also undergoes a surface treatment of copper plating), which rotates on roller-bearings on both sides.

The ignition system is of analogical type with discharge capacity, is powered by a flywheel and a coil whose functions are to generate the spark energy required for a proper management of goodwill, provide the references phase by a pick-up integrated.
The plant comprises a rotor-stator, a high voltage coil, which allow the control of the advance.
The engine is equipped with a pull starter.
The engine is also equipped with a centrifugal dry clutch with low maintenance with incorporated sprocket.
The carburettor type is a diaphragm (series Tillotson HS) includes an integrated fuel pump and filter with the air manifold also.

The exhaust system, including in the supply, is already tuned and optimized to ensure the best possible performance.

ENGINE CHARACTERISTICS

The Characteristic of the engine are the following:

- Cycle: OTTO / 2 stroke
- Original cubic capacity 59.49 cm³ (60.00 cm³ max)
- Original bore: 41.80 mm
- Max. Theorical bore: 41.97 mm
- Stroke: 43.30 mm
- Lubrification: Fuel-oil mix / oil 3%
- Induction: Piston Port
- Carburettor: Diaphragm type, Tillotson HS-323A
- Cooling: Air
- Ignition: Analogical
- Clutch: Automatic, dry centrifugal

OPERATIONAL LIMITS:

Max. RPM / 1': 12.500 RPM (Without limiter)

ATTENTION:
Never exceed the above limits, no obligation of IAME exists in case the above limits are exceeded.

1- CONTENTS OF PACKING

Each engine is supplied with the accessories under shown:

EXHAUST GROUP	Quantity
• Exhaust Muffler Gasket	2
• Exhaust Manifold with restrictor Ø11.5mm	1
• Exhaust Box Muffler with cover	1
INLET GROUP	
• Tillotson HS-323A Carburettor	1
• Intake Silencer with Fixing clamp	1
• Intake Silencer Support	1
• Carburettor Gasket	2
• Screws for fixing	2+2
• Thermal Spacer	1
• Fuel Pipe	1
ELECTRIC GROUP	
• H.T. Coil (Assembled on to the engine)	1
• Kill Switch + Switch Bracket (Assembled on to the engine)	1+1
• Connective Cable H.T. Coil to Switch	1
• Sparkplug NGK BR 9 EG	1
MISCELLANEUOS	
• Clutch Cover	1
• Thermal protection safety cover + its fixing components	1

ILLUSTRATION OF ACCESSORIES

EXHAUST GROUP

SPARK PLUG NGK

CLUTCH COVER

CYLINDER & CYLINDER HEAD
THERMAL PROTECTION SAFETY COVER

INTAKE SILENCER + FIXING CLAMP

INTAKE GROUP
+ TILLOTSON HS-323A CARBURETTOR

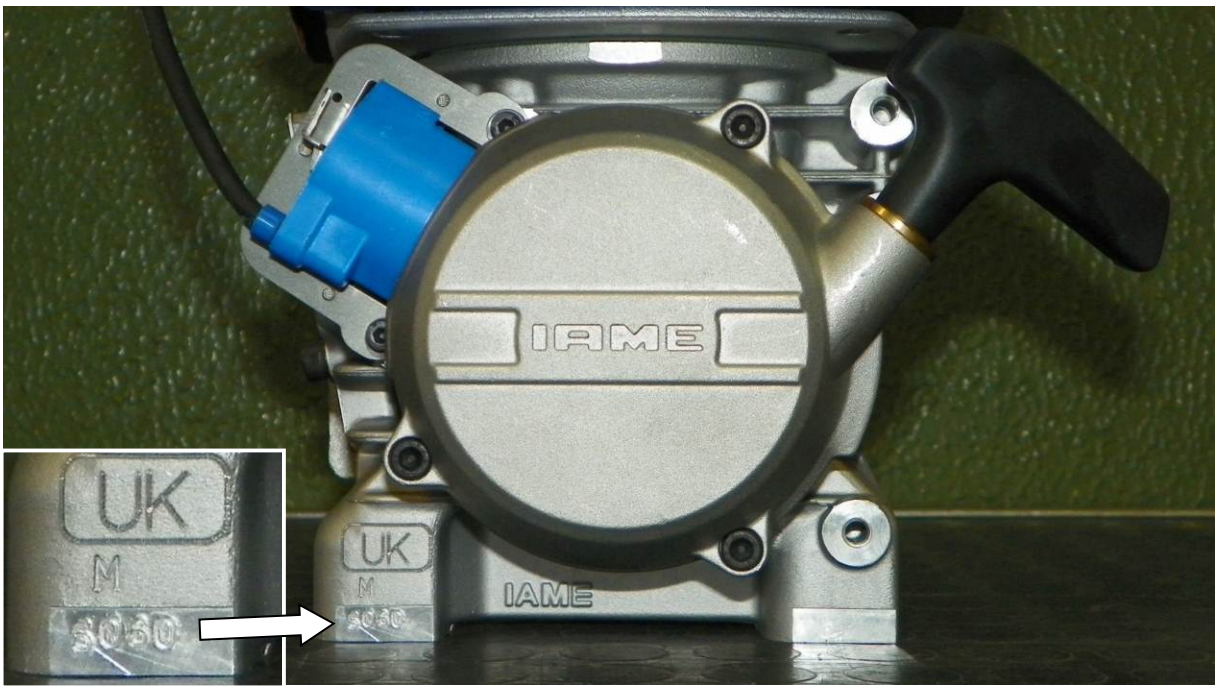
COIL-SWITCH CABLE

COIL WITH SPARK PLUG CAP

2- ENGINE IDENTIFICATION NUMBER

The official identification number can be found stamped on the left lower part of the crankcase (pull start side), next to the coil (see picture). The number normally includes a letter followed by 4 digits.
Other numbers stamped on the crankcase or other surfaces refer to various manufacturing processes and do not identify the engine.

NOTE:
In case of need for spare parts and when contacting the IAME Support Centers, please always supply to the Engine Identification Number and model.



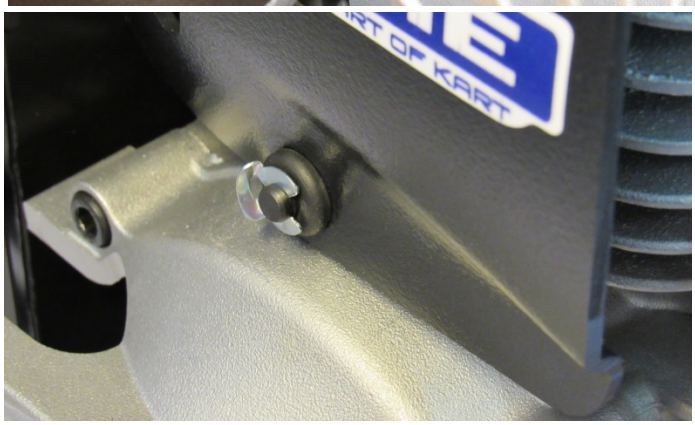
3- PREPARATION AND INSTALLATION OF THE ENGINE ON THE CHASSIS

NOTE:

In case the engine is supplied already assembled on to the chassis, it is at care of the assembler to follow these instructions. The final customer, in this case, can skip this section and can start reading from section 4. Whenever the engine or a component is disassembled, it is necessary to always follow the under shown instructions for proper reassembly.

3.1	*INSTALLATION OF THERMAL PROTECTION SAFETY COVER*	
	POSITION THE DAMPENERS IN THEIR SEATS AND INSTALL THE THERMAL PROTECION SAFETY COVER IN THE WAY TO THE FOLLOW PICTURE DOWN SIDE.	

INSTALLATION COMPLETED



3.2 *EXHAUST HEADER ASSEMBLY*

NOTE:

THE ENGINE IS SUPPLIED WITH THE EXHAUST GASKET AND NUTS ALREADY INSERTED , WHEN THE SHIPMENT IS MADE AN EXHAUST COVER GASKET IS PROVIDED TO PROTECT THE INTERNAL PARTS.

-REMOVE THE EXHAUST COVER GASKET.

-INSTALL THE SCREWS AND THE WASHER ON THE SAFETY COVER OF THE MUFFLER.

n°2 M6x95
n°1 M6x12

n°3 WASHER Ø24/Ø6.6
n°3 ELASTIC WASHER FOR M6

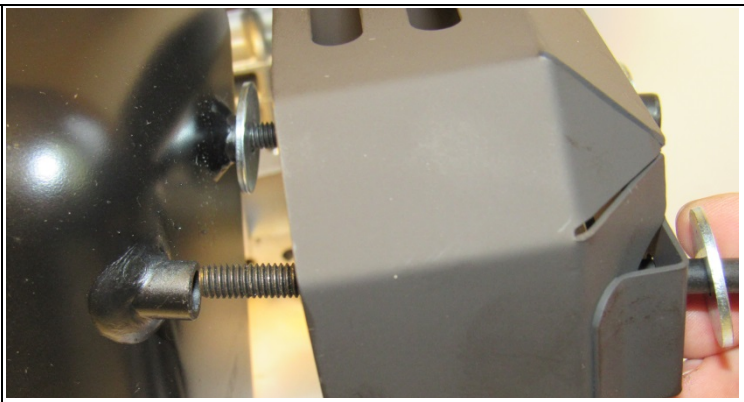
-POSITION N°2 INTERNAL WASHER

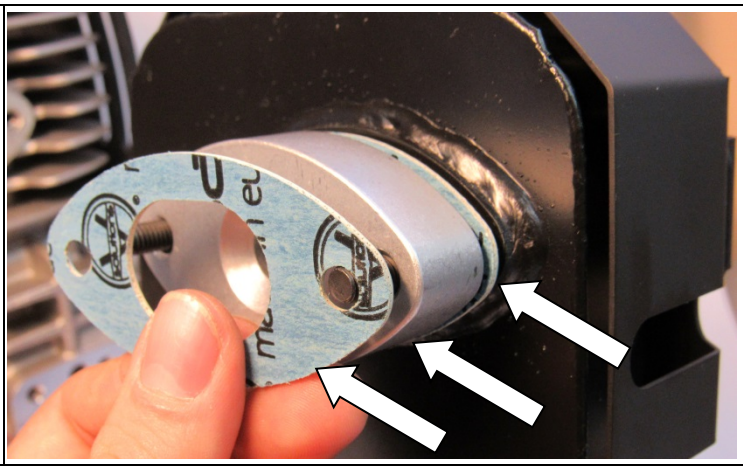
n°2 WASHER Ø24/Ø6.6

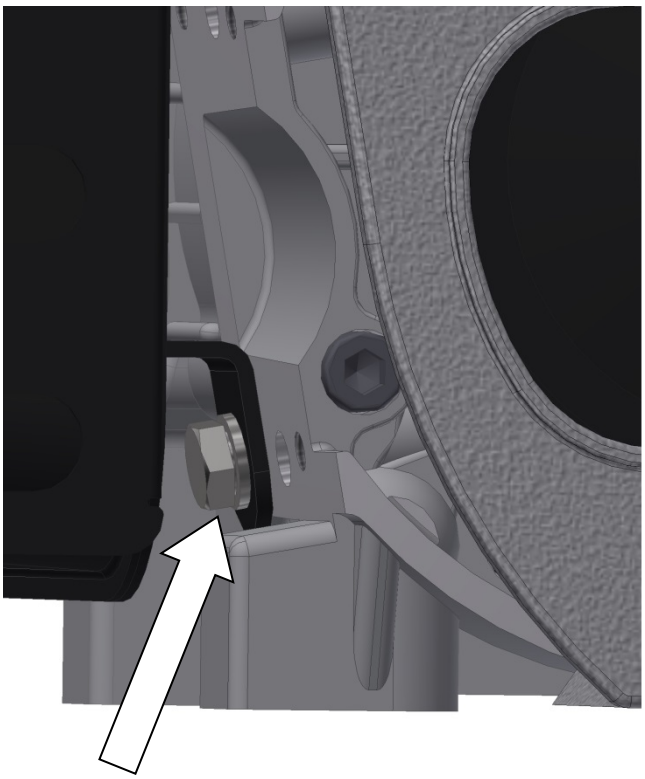
MUST BE USE LOCTITE BLUE FOR FIXING AND TIGHTENING THE SCREWS.

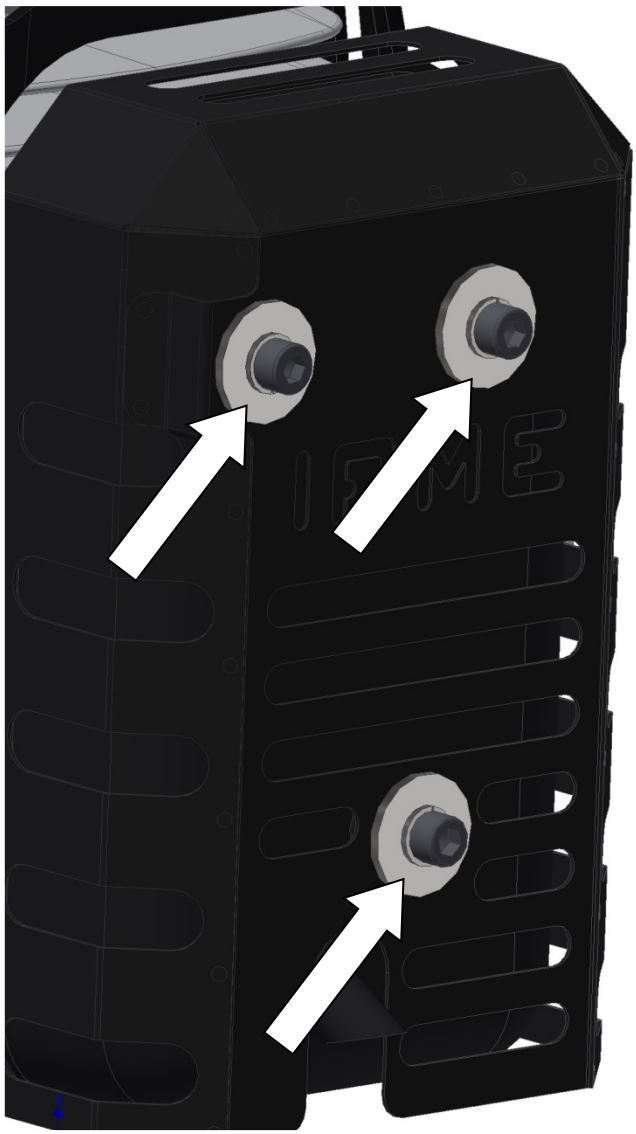
-POSITION THE SAFETY COVER ON THE MUFFLER, WAITING TO BE MOUNTED ON THE ENGINE.

(SEE FIG)



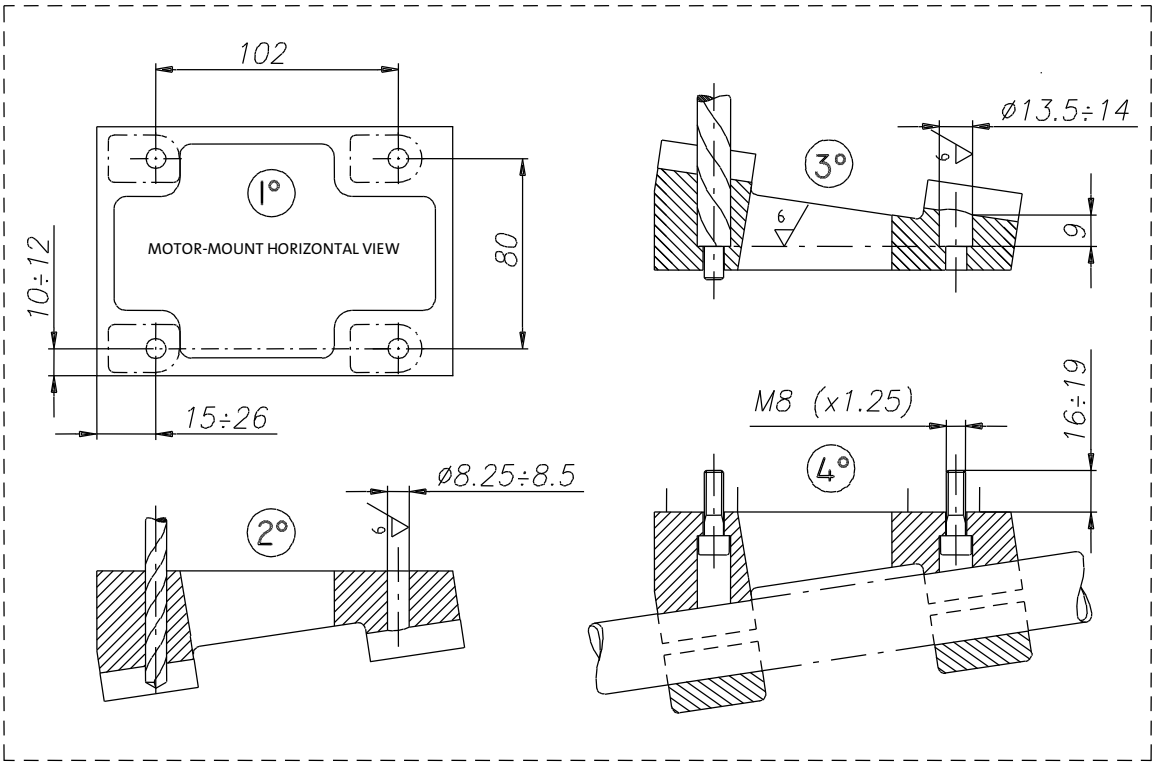
	-POSITION N°2 EXHAUST GASKET AND N°1 THERMAL SPACER RESTRICTOR (SEE FIG).	
	- INSTALL THE MUFFLER WITH ITS SAFETY COVER ON THE ENGINE AND TIGHTEN (BUT NOT DEFINITELY) ALL SCREW OF FIXING. WHEN THE POSITION OF THE ALL COMPONENTS IS CORRECT TIGHTEN DEFINITELY ALL SCREWS. N°3 SCREWS WITH 5 mm ALLEN WRENCH TORQUE THE 3 SCREWS AT 8 ÷ 10 Nm (70 ÷ 90 in-lb) N°1 EXAGONAL SCREW WITH 10mm WRENCH	





.3	PREPARATION AND INSTALLATION OF THE MOTOR-MOUNT

-DRILL 4 HOLES (DIAM. 8.5mm) INTO THE MOTOR-MOUNT.(*ALL THE DIMENSIONS ARE IN MILLIMETERS)*

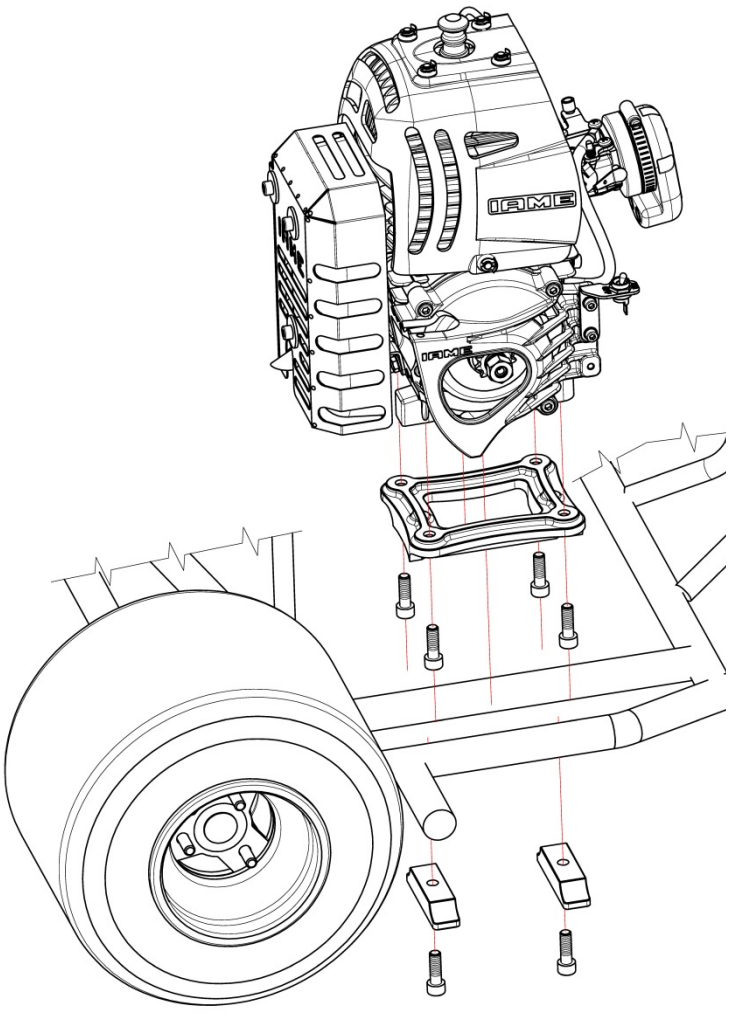


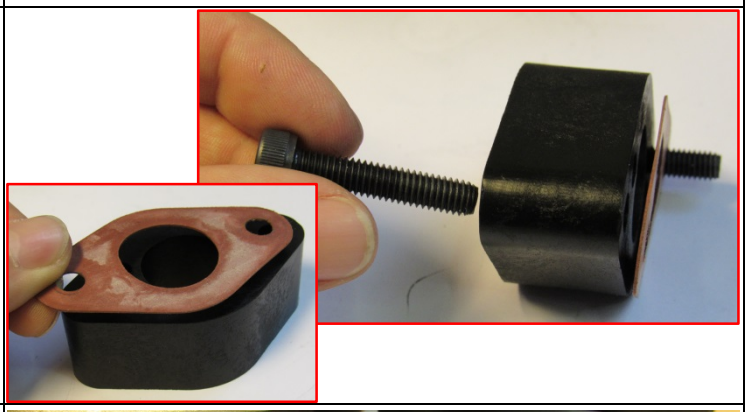
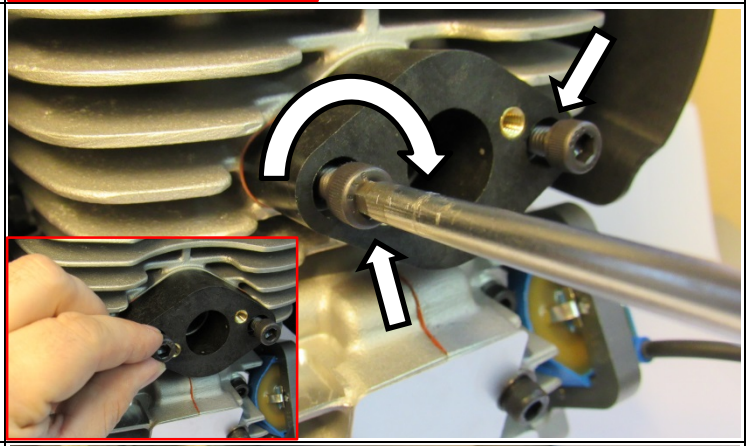
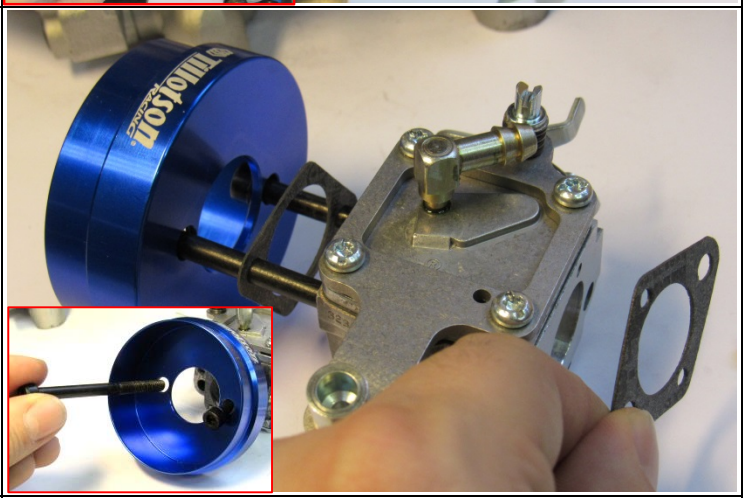
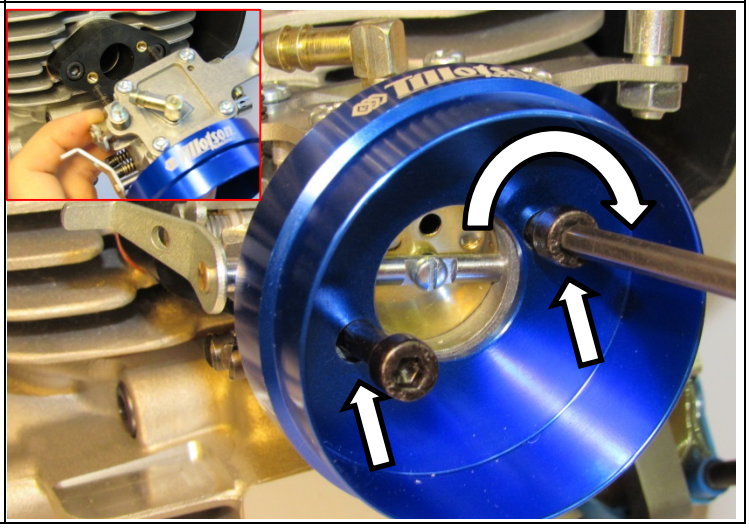
-INSTALL THE MOTOR-MOUNT. MAKE SURE TO USE M8 ALLEN SCREWS WITH A LENGTH SUCH AS TO ENGAGE, IN THE CRANKCASE, A THREADED PORTION LENGHT OF 16÷19MM (THE SCREW MUST PROTRUDE FROM THE PLATE, FOR (16÷19MM).

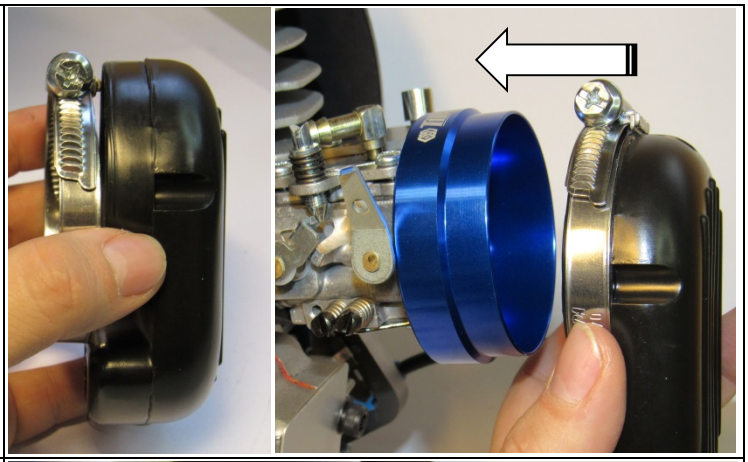
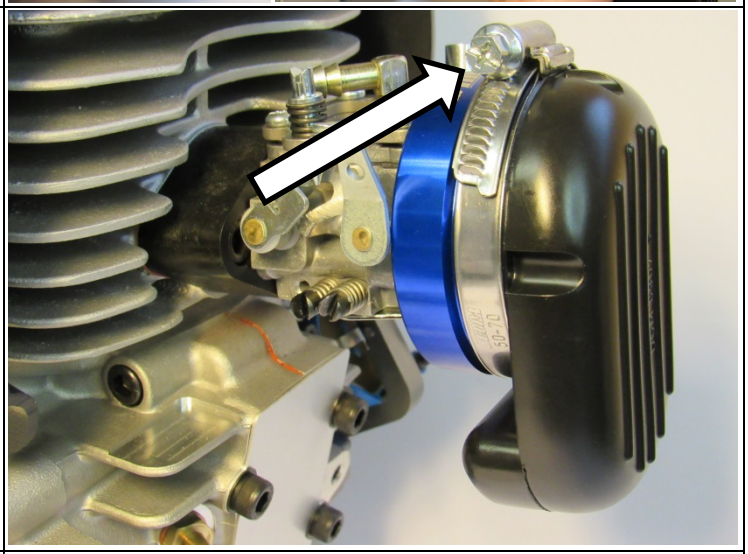
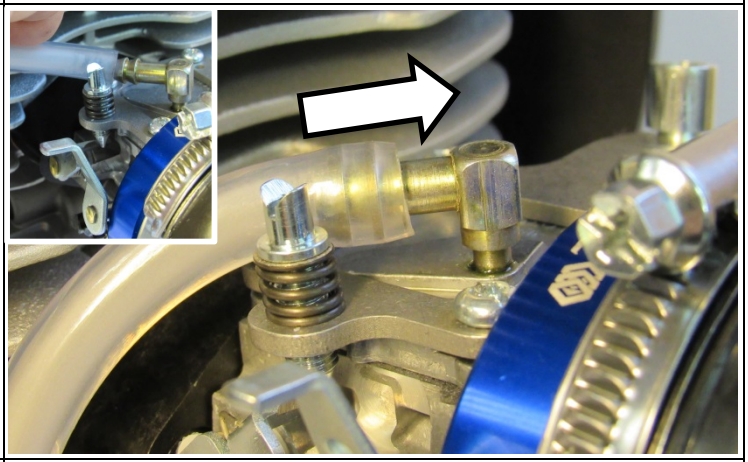
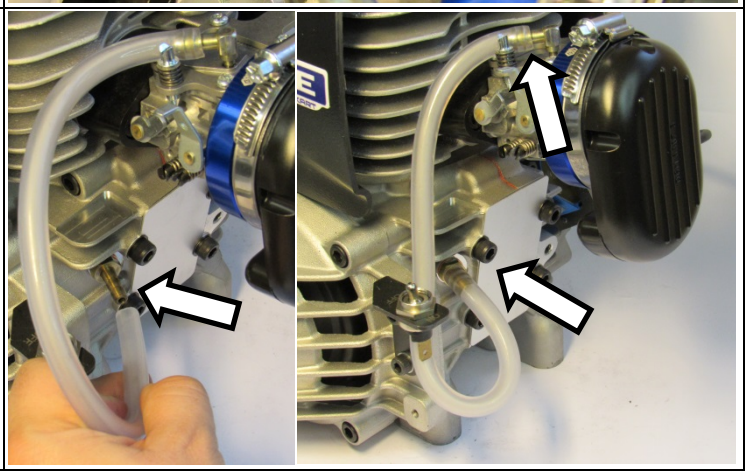
N°4 ALLEN SCREWS M8

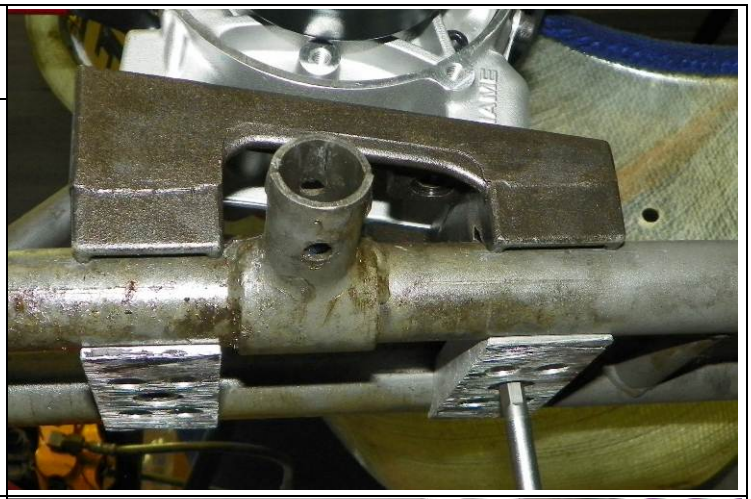
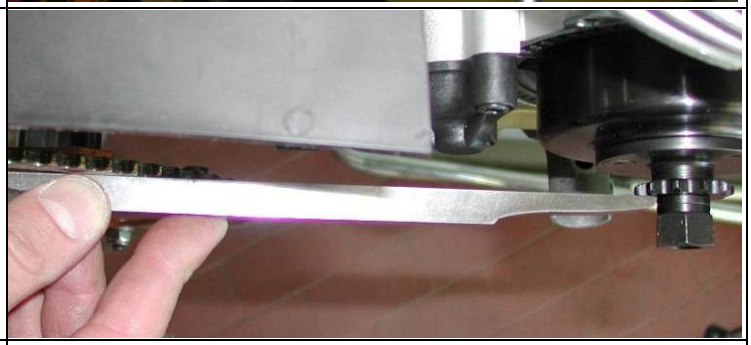
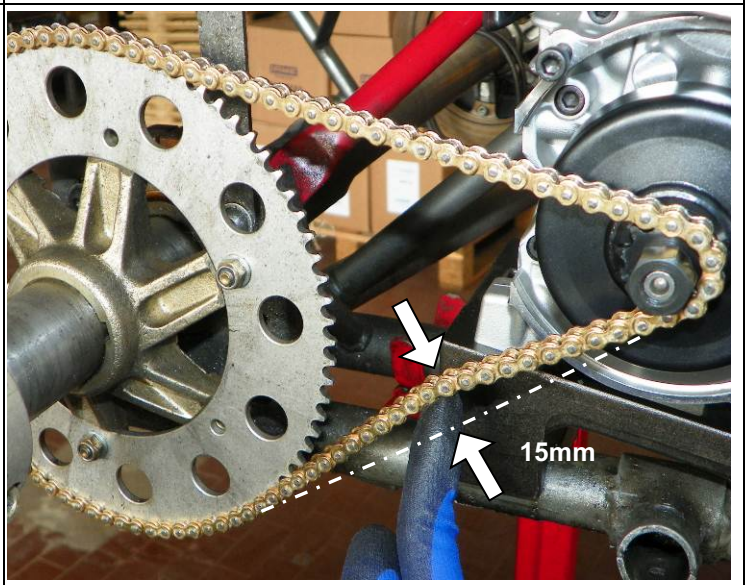
TORQUE AT 22÷24 Nm (190÷210 in-lb)

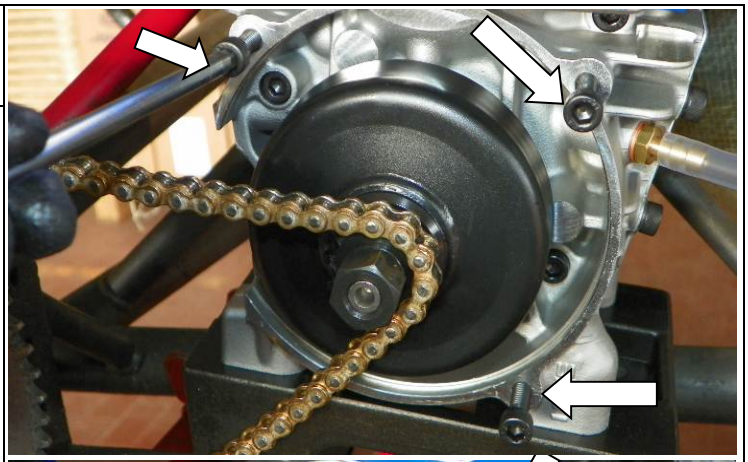
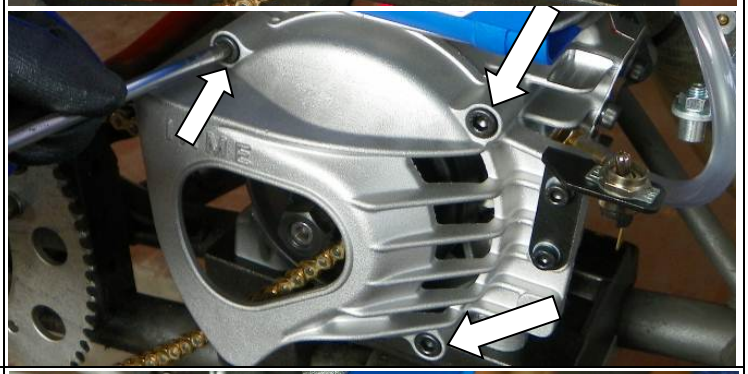
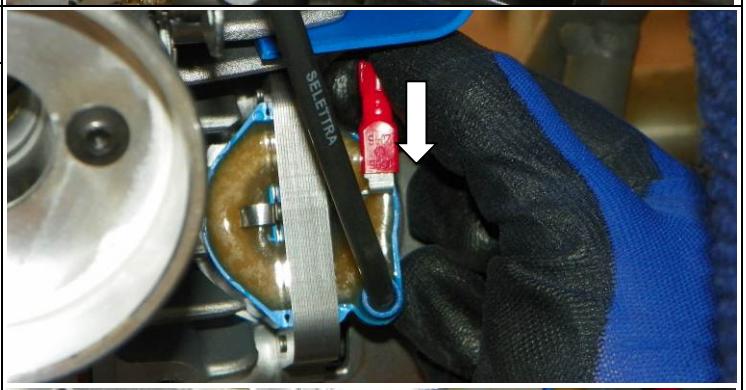
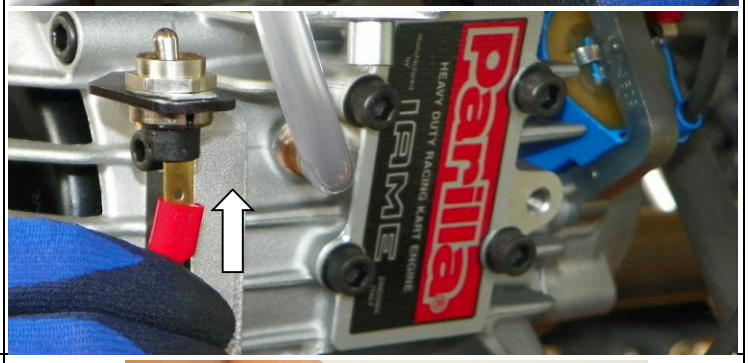
(6MM ALLEN WRENCH)



3.4	INLET SYSTEM INSTALLATION	
	Pre assembling: N°2 SCREWS M6x30 INTO THE INLET SPACER AND TAKE A POSITION OF THE INLET GASKET ENGINE SIDE AS IN PICTURE.	
	-POSITION THE PRE-ASSEMBLED INLET SPACER TO THE ENGINE INLET, COMING TO THE TIGHTEN IN MANUAL WAY FOR FIXING TEMPORARY THE SPACER. (SEE LITTLE PICTURE) AFTER TIGHTEN DEFINITELY THE SCREWS WITH THE 5MM ALLEN WRENCH TORQUE AT 6 ÷ 10 Nm (50 ÷ 90 in-lb)	
	Pre assembling: N°2 SCREWS M6x95 INTO THE INLET MANIFOLD AND TAKE A POSITION OF THE CARBURETTOR AS IN PICTURE. BETWEEN TO THE INLET MANIFOLD AND CARBURETTOR POSITION THE GASKET WITH Ø23 HOLE (WITHOUT SMALL HOLES). TO THE END OF THE CARBURETTOR POSITION THE OTHER GASKET (Ø19 WITH SMALL HOLES).	
	-POSITION THE PRE-ASSEMBLED CARBURETTOR PACK TO THE MANIFOLD INLET AND TIGHTEN THE SCREWS WITH THE 4MM ALLEN WRENCH. TORQUE AT 6 ÷ 10 Nm (50 ÷ 90 in-lb)	

	- POSITION THE FIXING CLAMP TO INLET BOX.	
	- INSTALL THE INLET BOX TO THE INLET SUPPORT AND TIGHTEN WITH THE FLATHEAD OR PHILLIPS SCREWDRIVER.	
	- CONNECT BY APPROPRIATE PIPE; THE INTAKE PRESSURE MANIFOLD ON THE CARBURETTOR AND THE INTAKE PRESSURE MANIFOLD ON THE CRANKCASE.	
	- CONNECT BY APPROPRIATE PIPE; THE INTAKE PRESSURE MANIFOLD ON THE CARBURETTOR AND THE INTAKE PRESSURE MANIFOLD ON THE CRANKCASE.	

3.5	**INSTALL ENGINE ON THE CHASSIS**	
	-POSITION THE ENGINE ON THE 2 MAIN RAILS AND FIX THE MOTOR-MOUNT WITH THE TWO CLAMPS. **SUGGESTION:** **NEVER TORQUE COMPLETELY THE CLAMPS UNTIL THE CHAIN IS INSTALLED AND PROPERLY ALIGNED.**	
	-CHECK THE ALIGNMENT OF THE ENGINE SPROCKET AND THE AXLE SPROCKET WITH A STRAIGHT EDGE.	
	-INSTALL THE CHAIN (PITCH : 7.775mm)	
	-MOVE THE ENGINE ON THE RAILS AND OPTIMIZE THE CHAIN TENSION. ***ATTENTION:*** ***THE PLAY OF THE CHAIN MUST BE APPR. 15mm (½÷¾ inch) MEASURED IN THE SHOWN POINT (SEE FIG)***	
	-TORQUE THE CLAMP SCREWS	

3.6	**INSTALL THE CLUTCH COVER**	
	-REMOVE THE 3 SCREWS M6x30 ON THE CRANKCASE (SEE FIG. 18) AND INSTALL THE CLUTCH COVER. **TORQUE THE 3 SCREWS AT 8 ÷ 10 Nm (70 ÷ 90 in-lb)** 5 mm ALLEN WRENCH	
3.7	**ELECTRICAL CONNECTION**	
	-CONNECT THE COIL CABLE (SMALL ONE) TO THE TERMINAL ON THE COIL. -CONNECT THE COIL CABLE AT THE TERMINAL ON THE ON/OFF SWITCH.	
	-INSTALL THE SPARK PLUG ON THE CYLINDER HEAD AND INSTALL THE SPARK PLUG CAP. MAKING SURE THAT THE SPARK PLUG CAP IS WELL INSERTED IN THE SPARK PLUG. HEXAGONAL PIPE WRENCH 20.8mm TOURQUE SPARKPLUG AT 20÷26 Nm (175÷230 in-lb)	

THE ENGINE IS READY TO BE STARTED

4- GASOLINE AND OIL

Use leaded or unleaded gasoline with minimum 95 ROM, mixed with oil at 3% (33:1).
Use oils containing ricinoleate which ensures optimum lubrication at high temperatures
As on the other hand use oils containing ricinoleate creates gummy residues which give origin to carbon deposits, it is necessary to check and clean, at least every 5÷10 hours, the piston and the cylinder head.

Our experience dictates use of oils such as:

- WLADOIL K 2T KART RACING OIL
- SHELL ADVANCE RACING M
- ELF HTX 909

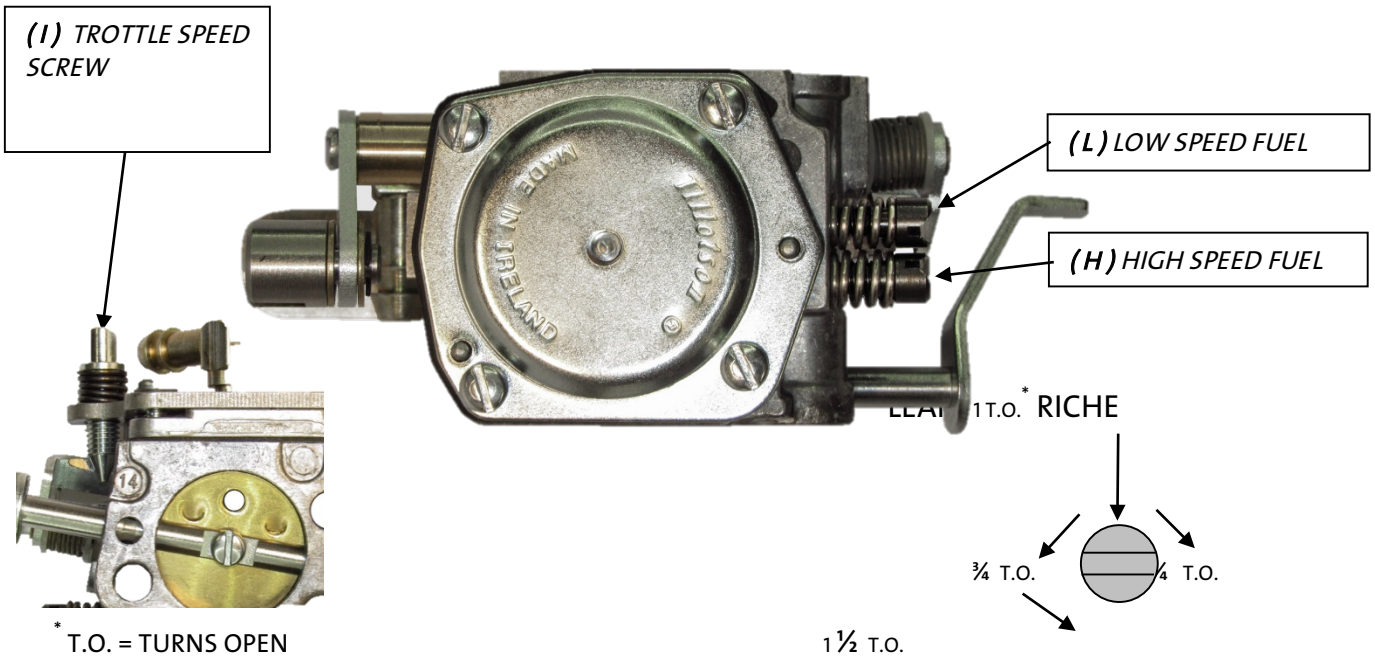
Once the fuel tank is filled, make sure that the gasoline reaches the carburettor, before starting the engine.

ADVISE:

Disconnect the plastic tube from the carburettor and pressurize the vent tube on the tank, until gasoline comes out from the tube on the carburettor side. Make sure there is no air in the tube.

Connect the tube to the carburettor.

5-TILLOTSON HS-323A CARBURETTOR ADJUSTEMENT



* T.O. = TURNS OPEN

Normally the correct setting of the mixture screws, after engine run-in, is the following:

- L (close the screw completely and then open): 1 T.O. + ½ (1 turn and 30')
- H (close the screw completely and then open): ½T.O. (30')

Based on various factors as altitude, ambient temperature etc. It might be necessary to reset the carburettor to optimize the performance of the engine.

ATTENTION:

- Never lean too much as lean mixture will overheat engine and cause seizure.

- The adjustment of the High screw is must do it with more care. Step by step to minute of adjustment because is very sensible and a changes engine behavior very fast.

- Do not force H or L closed. It may damage the precision machined orifice and render the carb. unserviceable.

- The adjustment of screw must be performed with warm engine.

6- STARTING AND STOPPING THE ENGINE

The engine is started by pulling the handle that uncoils the rope. The rope rotates the pulley that engages the ignition flywheel connected to the crankshaft.
This action, made with the appropriate energy and eventually repeated if needed, starts the engine.
First of all, the switch located on the right side of the engine and mounted on the bracket attached to the clutch cover, must be turned on the "**ON**" position. Following, grip the handle of the starter, slightly pull the first stroke of the rope and then pull it firmly, exploiting the stroke provided by rope.
WARNING: do not pull the rope to stroke end to avoid recoiling problems.
As soon as the engine starts, gently drive the rope back to its position returning the handle in its seat.
In the event of several void starting attempts, check that fuel is arrived to the carburettor.
In the event that the engine can not be started, refer to Sect. 16 "**Troubleshooting**".
The engine is stopped by simply turning the switch on the "**OFF**" position.

7- ENGINE BREAKING-IN

The breaking-in of the engine must be performed following a few fundamental rules:

Adjust the carburetion. Start with an adjustment on the rich side.

2. Warm the engine gradually for about 5 minutes at half throttle,making some laps at low speed, gently closing and opening the carb. throttle (if a tachometer is installed never exceed 6.000 RPM). Never keep the same RPM for a long time.

3. Progressively increase the speed of the kart for 5 minutes at ¾ throttle opening. Never keep the same RPM for a long time.

4. Increase the speed for 5 minutes, at max. speed on the twisty parts of the circuit and making the engine rich at half straight (cover with the hand for an instant the holes on the air filter, keeping the throttle wide open).

ATTENTION:
Once the break-in is over and the engine is cold, check the torque of the exhaust header nuts as, during the break-in, the nuts tend to loosen (refer to the attached table).

8- INLET SILENCER

Make sure that the inlet holes of the filter is not plugged.
Make sure that the clamp on the carburetor is not loosen and the intake silencer is well fastened to the chassis.

Once a while, clean the inside from oil deposits.

9- RECOMMENDATIONS ON THE EXHAUST SYSTEM

Always make sure that the screws are well tighten to the manifold and in place. **Never race the kart without all screws tighten,** as otherwise the exhaust pipe could vibrate beyond control.
Every 10 hours, cleaned the exhaust muffler and make sure that the hole on the rear are not plugged. Check that oil isn't not there into muffler.

10- CENTRIFUGAL CLUTCH

The engine has a low maintenance dry centrifugal clutch steel on steel. The following prescriptions, if carefully followed, will allow a long clutch life.

ATTENTION:
When starting the engine, make sure that the brake pedal is fully pressed to avoid sudden accelerations.
Once the engine is started and kart is still, avoid useless accelerations which can overheat and deteriorate the clutch, early. Lubrificate the chain before each test, immediately after each session and check the engine sprocket. Replace if necessary.
A bad alignment between engine and axle sprockets or lack of lubrification will damage chain and sprocket.

Check the clutch:

- Every 5 hours of use.
- When metallic noises are heard from the clutch.
- If the kart first dragging speed exceeds 4000 RPMs.
- Every time the clutch has overheated (presence of smoke or smell of burning).
- Clutch rotor and internal part of clutch drum must always be clean and dry.

Please degrease carefully the working surface every time you reassemble the clutch.
Please pay attention when lubrificating the chain, no chain lube must enter the clutch.

To check the clutch, you must remove the clutch cover and the clutch drum.

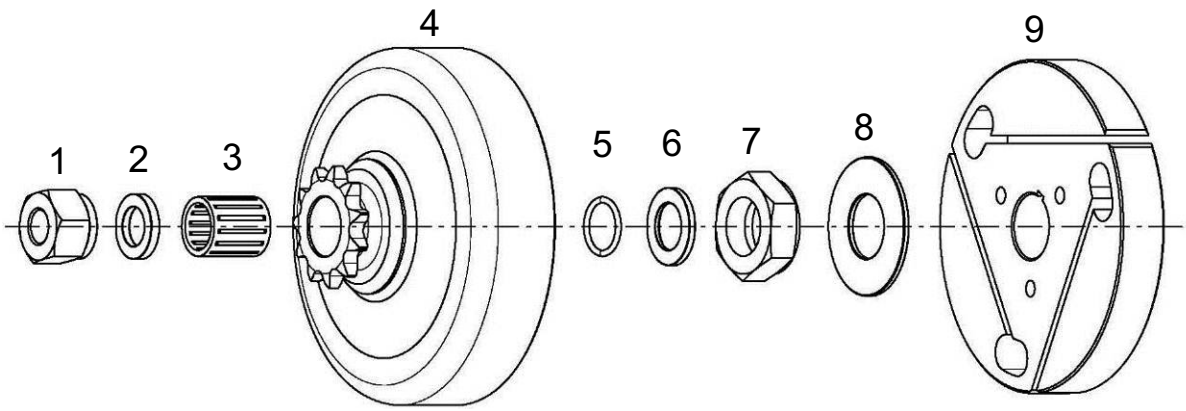
Replace the clutch

- If the body diameter is lower than 83.3mm.

11- INSTRUCTIONS FOR THE DISASSEMBLY / ASSEMBLY OF THE CLUTCH

ATTENTION:

The following operations must be performed by a skilled mechanic under the condition to have available the dedicated tools shown on the text, otherwise it is necessary to apply to an Authorized Service Center. Refer to the following drawing during the operations.



1 Drum nut
2 External washer
3 Roller cage
4 Clutch drum + Sprocket
5 O-Ring
6 Internal Washer
7 Locking nut
8 Cone safety washer
9 Clutch body

OPERATIONS	TOOLS
Clutch disassembly	
1. Remove clutch cover (N°3 screws M6).	▪ Allen wrench 5mm – T type.
2. Using the special tool S 1436/2 (or clutch wrench CH 24) and hooking itself to the clutch body for blocked the crankshaft.	▪ Clutch wrench CH 24 ▪ Special tool S 1436/2.
3. Remove drum nut (N°1 nut M10).	▪ 12 Point wrench 17 mm
4. Remove the external washer,the drum with roller cage, the O-Ring and the internal washer.	
5. Using the special tool and the clutch wrench CH24, remove the M16x1 nut and the cone safety washer. ***ATTENTION: Turn clockwise as nut has left thread.***	▪ Clutch wrench CH 24 ▪ Special tool S 1436/2
6. Apply clutch puller on clutch and remove clutch from the crankshaft, with 12 point wrench 19mm.	▪ Clutch puller: P.N. B-55614-C ▪ 12 point wrench 19mm.
7. Remove key from shaft.	

Before assembling the clutch, degrease with diluent the shaft taper, the conical hole on the clutch body, the clutch drum.

Clutch reassembly	TOOLS
1. Insert key on shaft.	
2. Install clutch body and cone safety washer on shaft.	
3. Install the M16x1 nut using the clutch wrench. ⚠ ***ATTENTION: turn counterclockwise as nut has left thread.***	▪ Clutch wrench CH 24 ▪ Special tool S 1436/2 (torque at 65 ÷ 75 Nm - 575 ÷ 665 in-lb)
5. Install the internal washer and the O-ring. ⚠ ***ATTENTION: install washer with chamfer towards internal part of engine.*** Clean the roller cage and grease it before installing on the crankshaft.	
1. Install the clutch drum and the external washer. ⚠ ***ATTENTION: install washer with chamfer towards internal part of engine.***	
2. Using the special tool S 1436/2 (or clutch wrench CH 24) and hooking itself to the clutch body for blocked the crankshaft, install and tighten the M10 nut.	▪ Clutch wrench CH 24 ▪ Special tool S 1436/2. ▪ 12 Point wrench - 17 mm (torque at 30 ÷ 40 Nm - 265 ÷ 350 in-lb)
3. Install the clutch cover (3 screws M6).	▪ Allen 5mm. (Torque at 8÷10 Nm - 70 ÷ 90 in-lb)

12- SPARK-PLUG THERMAL DEGREE

The engine is supplied with a standard **NGK BR9EG** spark plug which represents a good compromise between the needs of a good break-in and the racing needs in normal conditions.
Use of different spark plugs is possibile and, as a general information, we are attaching a correspondence list among spark plugs of other brands, based on **thermal degree**, which represents the capacity of the spark plug to dissipate the internal heat. The colour of the various parts of the spark plug more exposed to the combustion flames gives a good indication on the adequacy of the thermal degree and on the carburetion. It is necessary though to understand which of the two parameters has to be changed and only the experience tells how to identify the most proper thermal degree of a spark plug as lean or rich mixtures can generate the same final look which can be also achieved with a hot or cold spark plug.

See table:

an excessively warm spark plug shows the symptoms listed aside. ***ATTENTION:*** ***Use a warmer spark plug with cold or rainy climates***	▪ Extremely clear color, porous look and calcification of the electrodes and of the internal insulator. ▪ Irregularities in the ignition, preignition and detonation with tendency to perforate the top of the piston . ▪ ***Note: some of these symptoms can be achieved also with lean mixtures.***
A correct thermal degree shows:	▪ Color of the insulator end from yellow grey to dark brown for mixtures respectively lean or rich.
An excessively cold spark plug shows the symptoms, listed aside. ***ATTENTION:*** ***Use a colder spark plug with hot climates.***	▪ Insultator end and electrodes covered with black shady soot. ▪ Ignition difficulties. ▪ ***Note: a wet or oily electrode could also mean an excessively rich mixture.***

COMPARISON TABLE BASED ON THE THERMAL DEGREE

HOT

↑

BOSCH	NGK	CHAMPION
WO8CS	BR9EG	N54R
WO7CS	BR10EG	N52R
WO6CS	BR11EG	

↓

COLD

13 - CHOICE OF THE BEST SPROCKET RATIO

The life of an engine depends upon many factors but most of all upon the speed at which the engine is operated. If an engine is normally operated at speeds higher than what recommended by the manufacturer, the wears and stress of the various components (con-rods, roller cages, bearings etc.) will be such as to drastically reduce the life of the engine itself. It is therefore extremely important that the user respects the operating limits imposed by the manufacturer.
The operating limit for the engine is 12.500 RPM.

ATTENTION:
Never exceed the above limit. No obligation of IAME exists in case the above limit is exceed.

In case the user wishes to optimize on the track the sprocket ratio in order to achieve the best possible performance, without abusing the engine, follow the under shown recommendations.

The engines are supplied with a 10 or 11 teeth sprocket (pitch: 7.775mm).
Table 1 shows the various ratios between the sprocket on the axle and the engine sprocket given the different axle sprockets.

Tab.1

Sprocket ratio	Teeth n°- Engine sprocket		Sprocket ratio	Teeth n° - Engine sprocket	
Teeth n° Axle sprocket	10	11	Teeth n° Axle sprocket	10	11
72	7,20	6,55	83	8,30	7,55
73	7,30	6,64	84	8,40	7,64
74	7,40	6,73	85	8,50	7,73
75	7,50	6,82	86	8,60	7,82
76	7,60	6,91	87	8,70	7,91
77	7,70	7,00	88	8,80	8,00
78	7,80	7,09	89	8,90	8,09
79	7,90	7,18	90	9,00	8,18
80	8,00	7,27	91	9,10	8,27
81	8,10	7,36	92	9,20	8,36
82	8,20	7,45			

For the operation limit of 12.500 RPM the following table (tab. 2) has been prepared

SUGGESTION:

- **During the track tests we recommend use of a tachometer recording the max obtained engine RPM.**

- **Use spark plug caps with a resistance of 5KΩ to avoid eventual interferences between the engine ignition and the tachometer and/or telemetry.**

The following example should clarify the procedure for the optimization of the sprocket. Assume to use the engine with Z=10 teeth engine sprocket and that during the preliminary track tests a Z=72 teeth axle sprocket has been used.

- From table 1 with Z=10 as engine sprocket and Z=72 on the axle sprocket, a ratio of 7.20 is found.
- Make a few laps on the track and, let us assume that you read 11.000 max engine RPM.
- From the table 2 to achieve a max RPM of 12.500 RPM (operating limit for the Gazelle engine) a sprocket ratio from 8.08 and 8.31should be used (having used, during the tests, a sprocket ratio of 7.2 and having achieved 11.000 RPM max.)
- From table.1 , with these values, a sprocket ratio of 10:81 / 10:83 should be used or, having a Z=11 on the engine sprocket, a ratio 11:90 should be used.

Sprocket ratio to achieve max. 12.500 RPM Tab.2

Engine max. RPM during tests	Sprocket ratio used during test														
	6,5	6,7	6,9	7,1	7,3	7,5	7,7	7,9	8,1	8,3	8,5	8,7	8,9	9,1	9,3
10000	8,13	8,38	8,63	8,89	9,14	9,39	9,65	9,90	10,16	10,41	10,66	10,92	11,17	11,43	11,68
10200	7,97	8,21	8,46	8,71	8,96	9,21	9,46	9,71	9,96	10,21	10,45	10,70	10,95	11,20	11,45
10400	7,81	8,06	8,30	8,54	8,79	9,03	9,28	9,52	9,77	10,01	10,25	10,50	10,74	10,99	11,23
10600	7,67	7,90	8,14	8,38	8,62	8,86	9,10	9,34	9,58	9,82	10,06	10,30	10,54	10,78	11,02
10800	7,52	7,76	7,99	8,23	8,46	8,70	8,93	9,17	9,40	9,64	9,87	10,11	10,34	10,58	10,81
11000	7,39	7,62	7,85	8,08	8,31	8,54	8,77	9,00	9,23	9,46	9,69	9,93	10,16	10,39	10,62
11200	7,25	7,48	7,71	7,93	8,16	8,39	8,61	8,84	9,07	9,29	9,52	9,75	9,97	10,20	10,43
11400	7,13	7,35	7,57	7,80	8,02	8,24	8,46	8,69	8,91	9,13	9,35	9,58	9,80	10,02	10,25
11600	7,00	7,22	7,44	7,66	7,88	8,10	8,32	8,54	8,76	8,97	9,19	9,41	9,63	9,85	10,07
11800	6,89	7,10	7,32	7,53	7,75	7,96	8,18	8,39	8,61	8,82	9,04	9,25	9,47	9,68	9,90
12000	6,77	6,98	7,19	7,41	7,62	7,83	8,04	8,25	8,46	8,68	8,89	9,10	9,31	9,52	9,73
12200	6,66	6,87	7,08	7,28	7,49	7,70	7,91	8,12	8,32	8,53	8,74	8,95	9,16	9,37	9,57
12400	6,55	6,76	6,96	7,17	7,37	7,58	7,78	7,99	8,19	8,40	8,60	8,80	9,01	9,21	9,42
12600	6,45	6,65	6,85	7,05	7,25	7,46	7,66	7,86	8,06	8,26	8,46	8,67	8,87	9,07	9,27
12800	6,35	6,55	6,74	6,94	7,14	7,34	7,54	7,74	7,93	8,13	8,33	8,53	8,73	8,93	9,12
13000	6,25	6,45	6,64	6,84	7,03	7,23	7,42	7,62	7,81	8,01	8,20	8,40	8,59	8,79	8,98
13200	6,16	6,35	6,54	6,73	6,92	7,12	7,31	7,50	7,69	7,89	8,08	8,27	8,46	8,66	8,85
13400	6,06	6,25	6,44	6,63	6,82	7,01	7,20	7,39	7,58	7,77	7,96	8,15	8,34	8,53	8,72
13600	5,97	6,16	6,35	6,53	6,72	6,91	7,09	7,28	7,47	7,65	7,84	8,03	8,21	8,40	8,59
13800	5,89	6,07	6,26	6,44	6,62	6,81	6,99	7,18	7,36	7,54	7,73	7,91	8,10	8,28	8,46
14000	5,80	5,98	6,17	6,35	6,53	6,71	6,89	7,07	7,25	7,44	7,62	7,80	7,98	8,16	8,34

14- SCHEDULED MAINTENANCE

Following some simple maintenance standards will allow to perform more reliably and guarantee a longer engine life.

SCHEDULE	COMPONENTS	ACTIONS AND COMMENTS
Before using	Exhaust	Check status and fixing
	Engine sprocket	Check wear Check alignment with axle sprocket
	Engine chain	Check wear, tensioning and oil chain
	Cables and connectors	Check status and connections
	Engine mount and clamps	Check torques
After use	Chain	Check status and oil chain
	Engine	External cleaning
	Engine used in rain conditions	Clean carefully the engine interior and the clutch, after lubrificate.
Every 5 ÷ 10 hours	Exhaust muffler	Check status and clean
	Inlet silencer	Open, clean
	Engine head	Open, clean
	Clutch	Open and check status of parts
(SEE MAINTENANCE PROGRAM SEC. 15)	Piston and con-rod assembly	Check and replace worn parts
	Crankshaft	Check and replace worn parts
	Ball bearings	Check and replace worn parts

15- MAIN ENGINE COMPONENTS AVERAGE ESTIMATED LIFE

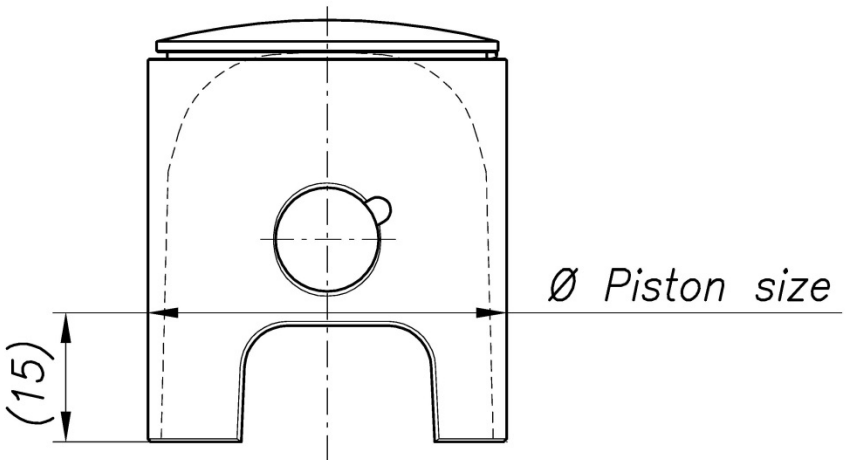
The estimated life of the different components, of the engine, changes according to the use and to the desired performance.

PISTON / CYLINDER MATCHING

The piston replacement must take place within specific intervals, measured through used mixture liters and it changes depending of the engine use, if for competitive use (so to reach the better performance) or not competitive.
IAME suggests to replace the piston any **150lt** , or before whenever the clearance between piston and cylinder exceeds **0.12mm**.

The prescribed clearance between cylinder and new piston, is **0.07mm**.

The effective piston diameter has to be verified at **15mm** from the base, perpendicularly to the piston pin.



Size of the liner to be matched with piston is marked on top of piston with a green or red dot or with letter **V** or **R**.

If the size on piston top is marked with:

- a **GREEN** dot or letter **V**; the size marked on the piston matches with liner.
- a **RED** dot or letter **R**; add 0.01mm to size marked on the piston to match the liner size.

Moreover, the clearance between the piston ring tips (installed in the cylinder) must be between **0.10÷0.15 mm**. The clearance can be checked with a feeler gauge, by inserting the ring in the cylinder

CONROD SMALL END CAGE

The replacement can be made every **150lt**.

CONROD BIG END CAGE, CRANKPIN AND MAIN BEARING

The replacement can be made every **300lt**.

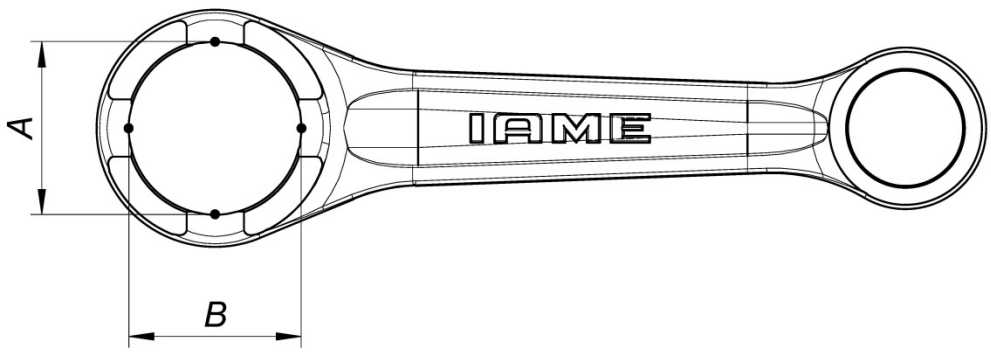
MAIN BEARING

The replacement can be made every **300lt**.

CONROD

The replacement can be made every **600lt**.

Anyway it must be replaced whenever the big end hole ovalization exceeds **0.01mm**. This value is the difference between the diameter measured in "A" and "B" as below indicated.



16- TROUBLESHOOTING

Below are some common faults, their probable causes and suggested remedy.

FAULTS	PROBABLE CAUSE	REMEDY
When pulling the handle don't start the engine	Not turned on the "**ON**" position the switch	Turned on the "**ON**" position the switch
	Bad connections cables	Check and restore
	Cable wrongly in contact with engine / chassis body	Check and restore
	Bad H.T. coil connection or coil failure	Check/Replace
	Wet spark plug	Replace
	Malfunction on fuel feed system	Check status and connections on fuel pipe (including tank pescante)
		Replace gaskets and membranes on carburetor
	The fuel don't arrive to carburettor	Check the carburettor pipe connections and replace the pipe if necessary
	Bad carburettor adjustment (H screw)	Check carburettor adjustment (see Sect. 5)
	Breaking of starter rope	Replace rope
Rough idle	Bad carburettor adjustment (L screw)	Check carburettor adjustment (see Sect. 5)
Drop in engine performance	Bad compression	Check piston
	Bad carburettor adjustment	Check carburettor adjustment (see Sect. 5)
	Insufficient fuel flow	Check fuel flow lines.
	Dirty inlet silencer	Check and clean
Burning smell, clutch smoke	Overheating of clutch	Check clutch (Sect. 10-11)
	Lubrificant accindentaly entered into the clutch	Check clutch (Sect. 10-11)
Cluth engages at too high RPMs	Excessive wear of the clutch	Check clutch (Sect. 10-11)
	Lubrificant accindentaly entered into the clutch	Check clutch (Sect. 10-11)
Cluth engages at Too Low RPMs or Clutch always engaged	Clutch body is deformed of failure	Check and replace (Sect. 10-11)
	Clutch body disassembled, or assembly no correct.	Check and replace if necessary (Sect. 10-11)
Pullstart malfunction	Pawls / Springs failure	Check and replace
	Rope failure	Check and replace
	Damage Pulley	Check and replace
	Recoil spring failure	Check and replace
Exhaust too noisy	Screws lost or bad tighten	Check and replace if necessary
	Damaged exhaust muffler	

17- ENGINE PRESERVATION

When engine has to remain unoperative for a long period it must be preserved as follows :

- Disconnect carburettor and clean it.
- Seal with tape the engine inlet and exhaust.

The external of the engine must be cleaned. Spray with protective oil the steel parts subject to oxidation.
Keep the engine in a dry ambient.

18- FASTENER TORQUE TABLE

NOMINAL SIZE	Q.TY	FASTENER NAME	WRENCH	VALUES (Nm)	VALUES (in-lb)
M14x1,25	1	SPARK PLUG	Hex.20,8	20÷26	175÷230
M8x1,25	4	CYLINDER HEAD NUTS	Hex.13 PIPE	18÷22	160÷190
M5x0,8	2	CARBURETTOR MANIFOLD SCREWS	Allen 4	5÷6	45÷50
M6x1	2	INLET MANIFOLD SCREWS	Allen 5	6÷8	50÷70
FIXING CLAMP	1	FIXING CLAMP SCREW	Screwdriver	6÷8	50÷70
M4x0,7	2	COIL SCREWS	Allen 3	5÷6	45÷50
M5x0,8	2	SWITCH BRACKET SCREWS	Allen 4	5÷6	45÷50
M5x0,8	3	IGNITION COVER SCREWS	Allen 4	5÷6	45÷50
M8x1,25	1	IGNITION ROTOR NUT	Hex.17	20÷26	175÷230
M6x1	1	PULLEY SCREW	Screwdriver	8÷10	70÷90
M6x1	3	CLUTCH COVER SCREWS	Allen 5	8÷10	70÷90
M10x1	1	CLUTCH DRUM NUT	Hex.17	30÷40	265÷350
M16x1	1	CLUTCH NUT	Es.24	65÷75	575÷665
M6x1	7	CRANKCASE SCREWS	Allen 5	8÷10	70÷90
M8x1	1	PRESSURE FITTING ON CRANKCASE	Hex.11	10÷13	90÷120
M6x1	3	EXHAUST FIXING SCREWS	Allen 5	8÷10	70÷90
M6x1	1	EXHAUST FIXING SCREW	Hex.10	8÷10	70÷90