ROTAX® KARTING

BRP

Installation Instructions and Operators Manual

for ROTAX®-engines type

125 MAX
125 JUNIOR MAX
125 MINI MAX/125 MICRO MAX

Part no.: 297731

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Introduction

Foreword

All data and procedures are based on the state of knowledge at the time of publication and the Manual has been drawn up to the best of our knowledge, however, excluding any liability.
These instructions are only valid for engines and parts, which were supplied by BRP-Powertrain. This Operators Manual contains important information about safe operation of the engine, together with descriptions of the system and its layout, technical data, operating media and the operational limits of the engine.
If any passages of the Manual are not clearly understood or if you have questions, please contact an authorized Distributor or Service Center for ROTAX-Kart engines.

Introduction

Congratulations on choosing the ROTAX engine Type 125 MAX, 125 Junior MAX, 125 Mini MAX or 125 Micro MAX.
This ROTAX engine has been developed exclusively for use in Go-Karts, which must only be run on specified tracks. This product has many technical innovations that have been filed for patent.

In case of change of the ownership, hand over this Manual, the Engine Identity Card and the product- and service registration document to the new owner.

NOTE: Technical information contained in this document may be different to the RMC technical regulations.

Chapter structure

The Installation- and Operators Manual is subdivided into the following chapters:

Subject	Chapter
Introduction	Chapter INTRO
List of effective pages	Chapter LEP)
Table of amendments	Chapter TOA)
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Operators Manual	Chapter 2)

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BRP-Powertrain recommends products of following brands:

LEP) List of effective pages

Chapter	Page	Date
	cover page	
INTRO	INTRO-1	02 01 2014
	INTRO-2	02 01 2014
LEP	LEP-1	02 01 2014
	LEP-2	02 01 2014
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1 INSTALLATION INSTR.	1-1	02 01 2014
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NOTES

TOA) Summary of amendments

Content Summary of the relevant amendments in this context, but without any claim to completeness.

Current No.	Manual section	Chapter	Page	Date of change	Comments
0	Installation instructions	1 - 14	all	02 01 2014	-
0	Operators Manual	1 - 10	all	02 01 2014	-

NOTES

1) Installation instructions

Inhalt

This chapter describes the installation of engine types ROTAX 125 MAX/Junior MAX/Mini MAX and Micro MAX. The description is divided into subsections.

1) General precaution and safety information for engine installation

Safety information

⚠ WARNING Non-compliance can result in serious injuries or death!
Modifications on engine or equipment are not allowed.

NOTICE For the best possible engine operation, compliance with the following advice regarding installation of engine and equipment is required.

NOTICE Engine operation is permitted only with equipment supplied by ROTAX.

NOTICE Besides the engine-specific installation advice, also take note of information from the respective chassis manufacturer.

2) Unpacking of engine and accessories

General

ENVIRONMENT NOTE

All packing material is recyclable and should be disposed of accordingly

NOTICE If the engine should be placed on a flat surface, take care not to damage the electrical connection of the starter.

These parts are available at the authorized distributor or one of it's Service Centers.

These parts change the characteristics of the engine, details to follow in next chapters.

NOTE: To be able to use the battery charger in your homecountry, contact your nearest ROTAX Service Center for an adapter plug and/or an adapter cable.

Engine type 125 MAX

The engine package (equipment package) of the 125 MAX contains the following parts:

Qty	Part no.	Description	Application
PARTS SET SMALL			

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Qty	Part no.	Description	Application
2	222746	Cooling water hose	-
1	827307	Washer 6,2/18/0,5	-
2	938795	Spring 66 MM	-
1	440751	Allen screw with rounded flange head M6x16	-
2	840880	Allen screw M6x30	-
6	241930	Allen screw M8x20	-
1	841831	Allen screw M8x75	-
4	942030	Lock nut M8	-
4	242141	Nut M6	-
4	242211	Hex. nut M6	-
8	842040	Lock nut M6	-
12	244211	Washer 6,4	-
1	945752	Lock washer A8	-
4	250313	Washer 8,4	-
1	251720	Support bracket	-
1	651690	Radiator bracket	-
2	951791	Clamp 50 - 70	-
4	951870	Clamp 16 - 25	-
2	260657	Rubber buffer 25x20xM6	-
1	660767	Rubber pad	-
2	660920	Rubber buffer 30x30xM8	-
1	265580	Start button	-
1	265592	ON-OFF pull switch	-
1	266125	Wiring harness	-
11	866710	Cable tie 142x2,5	-
1	274161	Fuel filter	-
1	994483	Mikuni fuel pump	-
1	297838	Spark plug 14 IW 27	-
PARTS SET LARGE NOTE: Contains parts set small.			
1	281453	Parts set small	-
1	225015	Intake silencer case, bottom	-
1	225025	Intake silencer case, top	-

Qty	Part no.	Description	Application
1	225031	Carburetor socket	-
1	225041	Intake silencer tube	-
1	225051	Filter element	-
2	225061	Holder for filter element	-
1	251123	Battery clamp	-
1	251254	Pipe clamp set 32	-
1	260772	Reduction gear cover	-
1	660221	Battery cover	-
1	265148	Battery charger	-
1	265515	Battery 12 V - 6,5Ah	
1	265579	Ignition coil assy.	-
1	273076	Exhaust system assy.	-
1	974529	Tube A5x8/2500 mm	-
1	295928	Radiator assy.	-
1	295998	Carburetor	-
1	297122	Throttle bowden cable assy.	-
1	297461	ROTAX XPS full synth. 2-stroke oil	-

Engine type 125 Junior MAX

This engine type is identical to the 125 MAX, except for the following main parts:

NOTE: The engines 125 Junior MAX, Mini MAX and Micro MAX have cylinders without exhaust valve.

Qty	Part no.	Description	Application
1	223994	Cylinder NI SI C plated	-
as req.	281376	Upgrade kit from Junior to Max	Includes all required parts to update the engine 125 Junior Max to configuration 125 Max.

Engine type 125 Mini MAX

This engine type is identical to the 125 Junior MAX, except for the following main parts.

Qty	Part no.	Description	Application
1	273972	Exhaust socket	-

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Engine type 125 Micro MAX

This engine type is identical to the 125 Mini MAX, except for the following main parts.

Qty	Part no.	Description	Application
1	276530	Intake restrictor	-
1	276535	Intake restrictor	-
1	273130	Exhaust system assy.	-
1	295923	Radiator assy.	-

Engine Identity Card

NOTE: An Engine Identity Card stating date of delivery and company has to be issued by the authorized Service Center for the customer.

NOTE: The data entered in the Engine Identity Card is required for verification of a warranty claim. Without a completely filled-in Engine Identity Card no warranty claim will be granted.

NOTE: In case of participating in the ROTAX MAX CHALLENGE (RMC) the engine must be verified for conformity with the technical regulations and sealed. The serial number of the seal must be entered in the Engine Identity Card.

3) Verification or replenishing of oil level in gear compartment

General

The gear compartment has already been filled with the appropriate amount of oil by the engine manufacturer. However, before engine installation into the frame (chassis), the oil level must be verified and replenished if necessary.

NOTE: The filling capacity is 6.10 cu in. (0.0265 US gal).

Oil specification

Part no.	Description	Application
n.a.	Gear oil specification SAE30	gearbox

Procedures

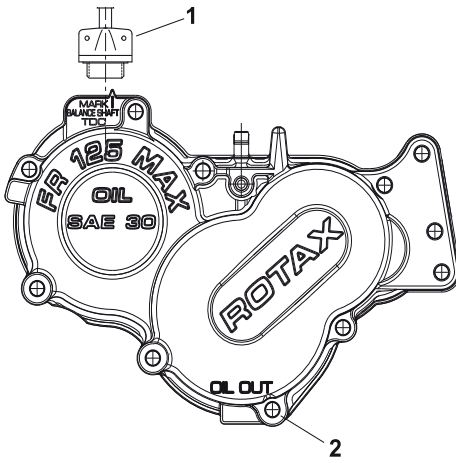
See Fig. 1.

NOTE: By removing the Allen screw (2) the oil can be drained from the gear compartment.

Step	Procedure
1	Remove venting screw (1).
2	Remove drain plug (2).
3	Drain gear oil completely.
4	Install drain plug (2) with new sealing.
5	Fill in gear oil as specifed (6.10 cu in. (0.0265 US gal)).
6	Tighten venting screw (1) by hand.

Graphic

Oil level check



1. Venting screw 2. Drain plug

Fig. 1 *K00233_b*

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4) Engine suspension on chassis

General

Using an engine pedestral for the ROTAX engine 125 MAX/Junior MAX/Mini MAX, the engine is inclined at 0° to 15° in the driving direction.

NOTICE

Do not fasten engine on chassis until chain is in position and properly aligned and tensioned.

Step	Procedure
1	Connect pedestral with engine crankcase by 4 screws M8 (minimum strengh grade 8.8). Tightening torque for the connection between pedestral and engine crankcase = 24 Nm (212 in lb.).

NOTE: Engaged thread length in crankcase to be between 16 mm (5/8“) - 24 mm (1 in.).

4.1) Fitting of the drive chain

Safety information

⚠ WARNING

Non-compliance can result in serious injuries or death!
Install a chain cover!

⚠ WARNING

Non-compliance can result in serious injuries or death!
Pay attention to instructions of the chassis manufacturer regarding the drive chain alignment.

General

The required length of the drive chain depends on chassis and transmission ratio and therefore the chain is not included in the supply volume of the engine.

Special tools/ products/parts

Recommended by ROTAX:

Part no.	Description	Application
582458	Kart chain links 219/94	Engine
582459	Kart chain links 219/96	Engine
582460	Kart chain links 219/98	Engine
582470	Kart chain o-ring 219/98	Engine
582461	Kart chain links 219/100	Engine
582471	Kart chain o-ring 219/100	Engine
582462	Kart chain links 219/102	Engine

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Part no.	Description	Application
582472	Kart chain o-ring 219/102	Engine
582463	Kart chain links 219/104	Engine
582473	Kart chain o-ring 219/104	Engine
582464	Kart chain links 219/106	Engine
582474	Kart chain o-ring 219/106	Engine
582465	Kart chain links 219/108	Engine
582475	Kart chain o-ring 219/108	Engine
582466	Kart chain links 219/110	Engine
582476	Kart chain o-ring 219/110	Engine
582467	Kart chain links 219/112	Engine
582477	Kart chain o-ring 219/112	Engine
582468	Kart chain links 219/114	Engine
582478	Kart chain o-ring 219/114	Engine
582469	Kart chain links 219/116	Engine
582479	Kart chain o-ring 219/116	Engine

Procedures

Following steps are necessary:

Step	Procedure
1	Place the chain on the sprockets of the clutch and the rear axle.
2	Verify chain alignment between front and back chain sprocket with a straight edge. Correct as required by shifting sprocket adapter along rear axle.
3	Establish required chain tension (Sag = +/- 5 mm (0.20 in.)) by shifting the engine.

⚠ WARNING

Non-compliance can result in serious injuries or death!
Take note of advice of the chassis manufacturer regarding engine suspension on chassis.

Step	Procedure
4	Fasten engine on the chassis.

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5) Electrical components

5.1) Installation of the start button and ON/OFF switch

General

Both items have to be fitted into top section (left or right) of the front shield.

NOTE: Hand-tighten the attachment nut of starter button and ON/OFF switch.

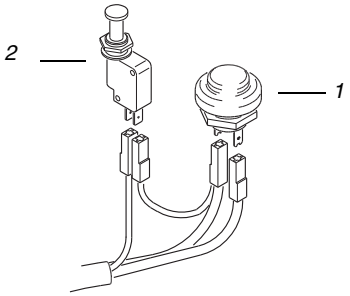
Procedures

See Fig. 2.

Step	Procedure
1	Drill a ø22 mm (1/8“) bore for the starter button (2) into either left or right side of the front shield.
2	Approx. 40 mm (1.5“) below drill a ø12 mm (0.5“) bore for the ON/OFF switch (1).
3	Attach start button furnished with rubber cap by hex. nut on front shield.
4	Attach ON/OFF switch on the front shield with the 2 nuts supplied.

Graphic

Start button and ON/OFF switch



1. Start button 2. ON/OFF switch

Fig. 2 *K00252*

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5.2) Installation of the wiring harness

General

⚠ WARNING Non-compliance can result in serious injuries or death!
The wiring harness must not touch moving parts or the track.

Establish connections in accordance with Fig. 3.

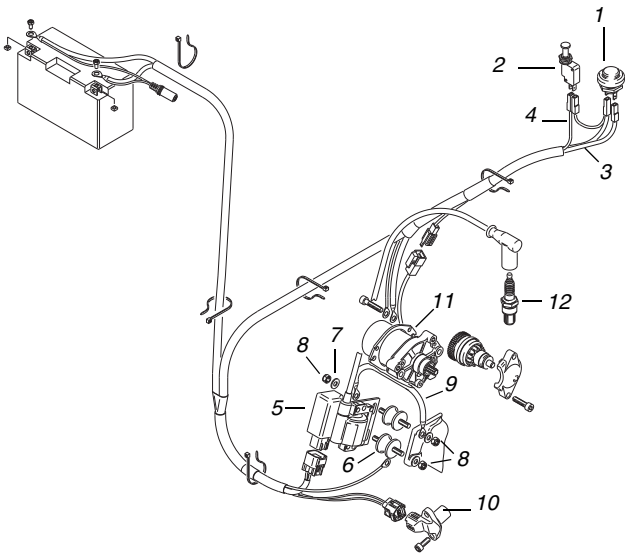
NOTICE The battery should only be connected just before starting the engine.

Disconnect any electrical plug connection only by pulling on the plugs.

NOTE: Compensate excessive length of wiring harness by routing cables in loops.

Graphic

Wiring harness



1. Start button
2. ON/OFF switch
3. Cable 6 mm^2/S.W.G. 11
4. Cable 2 mm^2/S.W.G. 16
5. Ignition coil
6. Rubber mount
7. Washer 6,4
8. Lock nut M6
9. Masseleitung
10. Trigger coil
11. Electric Starter
12. Spark plug

Fig. 3 *K00030*

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Start button and ON/OFF switch

NOTE: Polarity of the cable for start button and ON/OFF switch is optional.

Procedures

See Fig. 3.

Step	Procedure
1	Connect the two 6 mm^2 / S.W.G. 11 cables (3) with start button (1).
2	Connect the two 2 mm^2 / S.W.G. 16 cables (4) with ON/OFF switch (2).

Ignition coil

NOTE: Attach the wiring harness with the supplied cable ties to top side of chassis tubes and in the area of the ignition coil support. Make sure that plug connectors on the ignition pick-up and ignition coil are free of stress.

NOTICE

The ignition coil must be attached flexibly on the gear cover, exclusively via the two rubber mounts. Under any circumstances the ignition coil may not touch any rigid parts of the frame (e.g. seat strut).

NOTE: The location of the ignition coil is adjustable within the ablong holes in gear cover and ignition coil yoke. Position ignition coil as far as possible from the exhaust.

Procedures

See Fig. 3.

Step	Procedure
1	Attach ignition coil on the reduction cover, utilizing the supplied attachment elements 2 pcs. rubber mount (6), 4 pcs. Washer 6,4 (7) and 4 pcs. lock nut M6 (8).
2	On the top of the attachment screw of ignition coil connect also the grounding cable (9).

NOTICE

Pay special attention to proper ground connection on gear compartment cover. An interrupted grounding can ruin the ignition coil.

Step	Procedure
3	Connect the wiring harness to the ignition coil (5).
4	Connect the wiring harness to the trigger coil (10).
5	Connect the wiring harness to the electric starter (11).

5.3) Installation of the spark plug

General

NOTE: Following spark plugs are declassified by BRP-Powertrain:

DENSO IW 24-31, as standard a DENSO IW 27 is installed.

Procedures

See Fig. 3.

Step	Procedure
1	Remove the transport plug from spark plug tapping.
2	Inspect electrode gap of spark plug (12), adjust if necessary.

NOTE: The electrode gap should be between 0,4 mm (0.016 in.) and 0,6 mm (0.024 in.) (for DENSO spark plugs).

Only slight bending of the ground electrode is permitted.

Step	Procedure
3	Fit spark plug by hand and tighten to 27 Nm (239 in.lb).
4	Install spark plug connector on spark plug.

6) Installation of the battery

General

See Fig. 4.

⚠ WARNING

Non-compliance can result in serious injuries or death!
Under any circumstances, do not produce a short circuit between the terminal poles of the battery. This leads to the destruction of the battery and can lead to the explosion of the battery.

For a balanced weight distribution it is recommended that the battery should be mounted either behind the driver's seat, to the left of the driver's seat or in front of the fuel tank. For proper mounting of the battery to the frame a suitable support for the battery will be supplied by ROTAX .

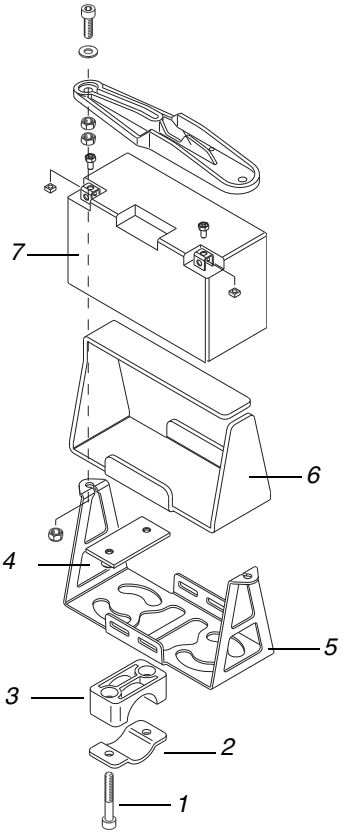
Procedures

NOTE: The pipe clamps (2, 3) are designed for a frame pipe with 30 - 32 mm (1.18 - 1.30 in.) diameter.

NOTICE

The pipe clamps (2,3) must not be overstretched during tightening of the cyl. screw (1), otherwise the pipe clamps can break.

Step	Procedure
1	Install the battery holder (5) using the pipe clamp set (1 - 4) at an appropriate location on the frame.
2	Insert the rubber pad (6).
3	Install battery (7) into battery holder, as shown in Fig. 4 and tighten it (combination of screws + nuts).
4	Connect battery to wiring harness. See section 13) Connection of the battery.



1-4. Pipe clamp set
5. Battery holder
6. Rubber pad
7. Battery

Fig. 4 *K00238*

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7) Installation of the radiator

Procedures

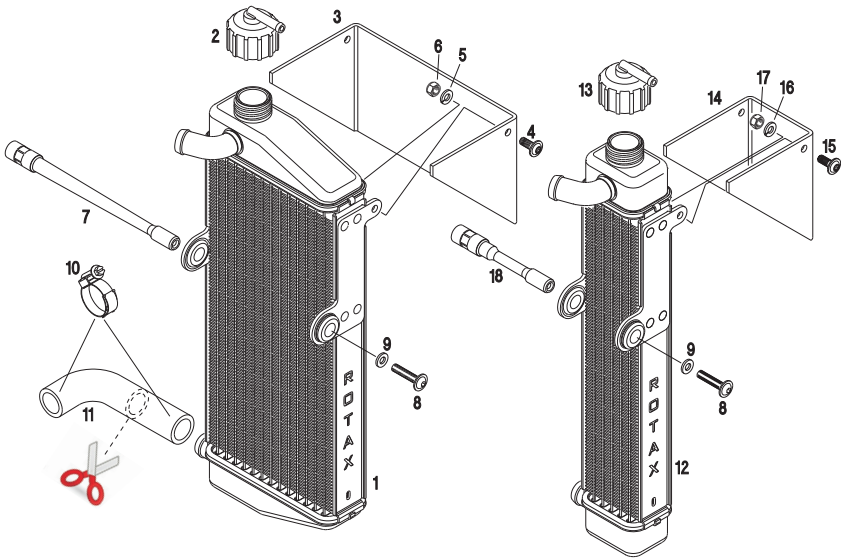
NOTICE For best possible engine cooling, ensure that the air stream covers the complete radiator.

See Fig. 5.

Step	Procedure
1	Install radiator flap (3/14) with the 2 mounting points on the radiator assy. Use therefore the allen screws with rounded flange head (4/15) and the locking nuts M6 (6/17).
2	Fasten the radiator assy. with radiator flap using the radiator bracket (7/18) and allen screws with rounded flange head together with washers (8, 9) on the chassis. Tightening torque 20 Nm (177 in lb.)
3	Install coolant hoses on the engine and radiator assy. using hose clamps (10).

Graphic

Radiator



1. Radiator assy.
2. Radiator cap Mini/Junior/Max
3. Radiator flap Mini/Junior/Max
4. Allen screw with rounded flange head M6x16
5. Washer 6.4
6. Locking nut M6
7. Radiator bracket
8. Allen screw (flange head) M6x20
9. Washer 6.2/18/0.5
10. Clamp 16-25
11. Cooling water hose
12. Radiator cap Micro
13. Radiator flap Micro
14. Radiator flap Micro
15. Allen screw with rounded flange head M6x16
16. Washer 6.4
17. Locking nut M6
18. Radiator bracket

Fig. 5 KD00262

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8) Installation of the fuel pump

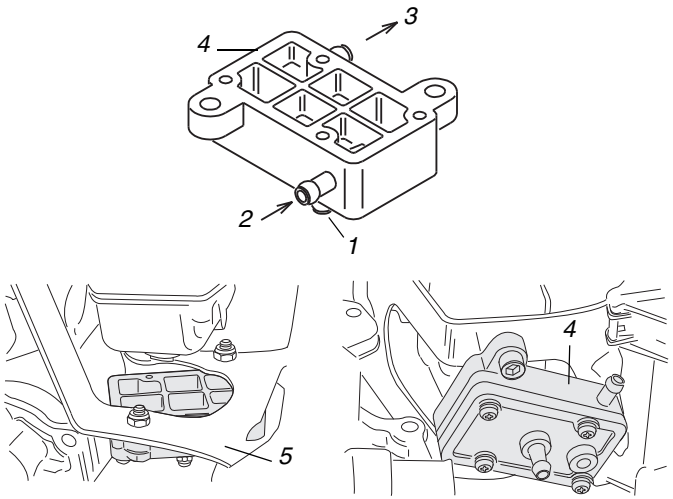
Procedures

See Fig. 6.

Step	Procedure
1	Attach the fuel pump (4) with the 2 supplied Allen screws M6x20 and locking nuts on the bottom of the bracket (5) for the intake silencer.
2	Remove the 3 lower attachment screws of the carburetor socket.
3	Then attach the bracket (5) to the cylinder utilizing the three lower screws of the carburetor socket. Tightening torque 6 Nm (53 in lb.).

NOTE: The fuel pump should be mounted so that the connection for the impulse shows down and the connection for the fuel inlet is in direction of the driver's seat.

Graphic



1. Impulse fitting
2. Fuel inlet
3. Fuel outlet
4. Fuel pump
5. Bracket

Fig. 6 *KD00065, KD00124*

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8.1) Connection of the fuel pump

General

NOTICE

Install the fuel line from the fuel tank to the fuel pump in a position where it does not touch any moving parts or the track and attach the fuel line onto the top side of the chassis tube.

NOTICE

Only the supplied GENUINE ROTAX fuel filter must be used.

NOTICE

For proper operation of the fuel pump, keep the impulse line as short as possible.

Fuel hose

See Fig. 7.

Step	Procedure
1	Cut off 2 pieces from the supplied fuel hose and fit each one on the lower impulse fitting (1) and side outlet connection (3).
2	Remove the cap from impulse fitting on the gearbox cover.
3	Connect the impulse hose of the fuel pump with impulse fitting on the gearbox cover.
4	Establish connection between the outlet of the fuel tank and the inlet (2) of the fuel pump.
5	Install the fuel filter in a proper position in the fuel line between fuel tank and fuel pump.

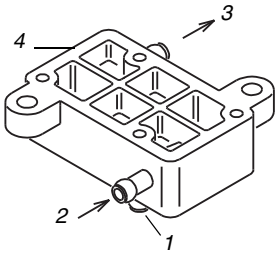
NOTICE

The flow in the impulse hose and fuel lines must not be restricted by use of cable ties.

NOTICE

If oil condensate has been collected in the impulse hose while the engine is not running, it must be drained by pulling the impulse hose off the fuel pump. Accumulated oil could impair the operation of the fuel pump.

Graphic



1. Impulse fitting
2. Fuel inlet
3. Fuel outlet
4. Fuel pump

Fig. 7 *KD00065*

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9) Installation of the carburetor

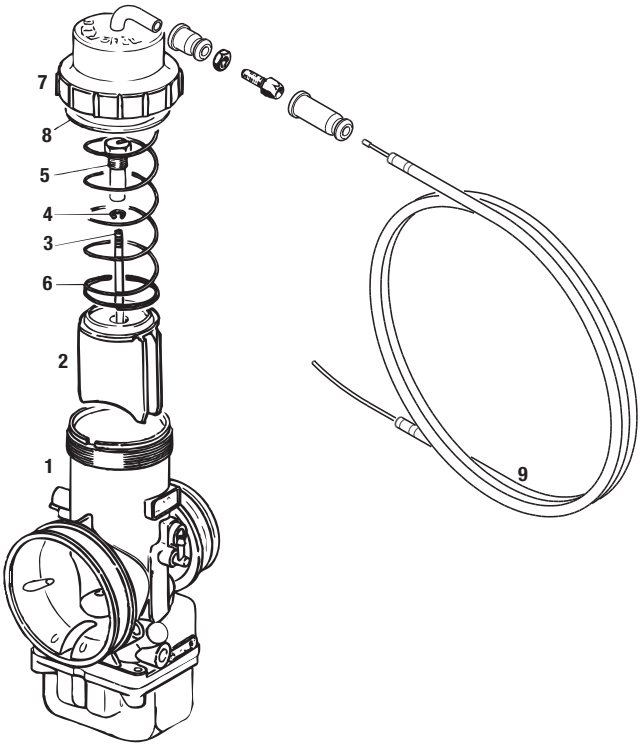
Procedures

See Fig. 8.

Step	Procedure
1	Remove the transport sticker from the carburetor.
2	Fit carburetor into carburetor socket and secure with hose clamp in vertical position.
3	Connect the outlet hose of the fuel pump with fuel inlet on carburetor.

Graphic

Carburetor



1. Carburetor
2. Carburetor slide
3. Jet needle
4. Clip
5. Nipple screw
6. Throttle valve spring
7. Carburetor cover with bent tube assy.
8. Gasket
9. Throttle bowden cable assy.

Fig. 8 *K00255*

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9.1) Installation of the Bowden cable

General

⚠ WARNING

Non-compliance can result in serious injuries or death!
The carburetor Bowden cable must not be kinked or restricted as the carburetor piston might get stuck in full throttle position.

Procedures

See Fig. 8.

NOTICE

The throttle valve spring presses against carburetor cover and might eject carburetor cover at removal.

Step	Procedure
1	Carefully remove carburetor cover with rubber ring (7, 8).
2	Remove nipple screw (5) using A/F 10 wrench from carburetor piston.
3	Engage nipple of bowden wire (9) in nipple screw (5).
4	Fit nipple screw in carburetor piston and hand tighten with A/F 10 wrench.
5	Insert carburetor slide (2) into carb body with cut-away of piston towards intake silencer.
6	Pass bowden wire through throttle valve spring (6) and through carburetor cover with gasket (7, 8).
7	Fit carburetor cover (7) on carburetor.
8	Pass bowden wire through bowden conduit and through adjustment screw on chassis.
9	Connect Bowden cable on throttle pedal. NOTE: Shorten bowden cable as required.
10	Route carburetor bowden cable on top side of chassis tubes and attach with cable ties supplied. Make sure that the bowden cable won‘t touch any moving parts or the track.
11	Set and secure the adjustment screw for bowden cable on chassis so, that the carburetor piston will remain in closed position when throttle pedal is not activated.
12	Set and secure the stop screw for throttle pedal such, that with pedal completely pressed down, the carburetor piston will be in the full open position.

10) .Installation of the intake silencer with integrated airfilter

Procedures

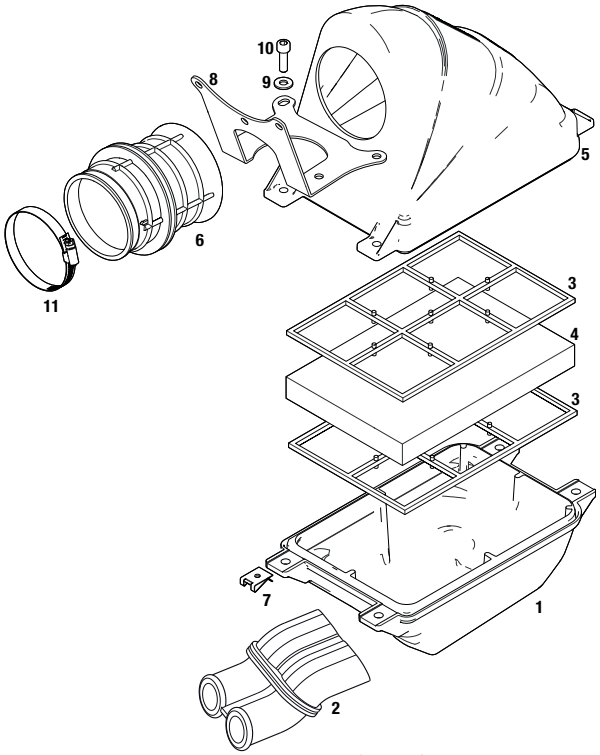
NOTICE Airstream to the radiator must not be impeded by the intake silencer.

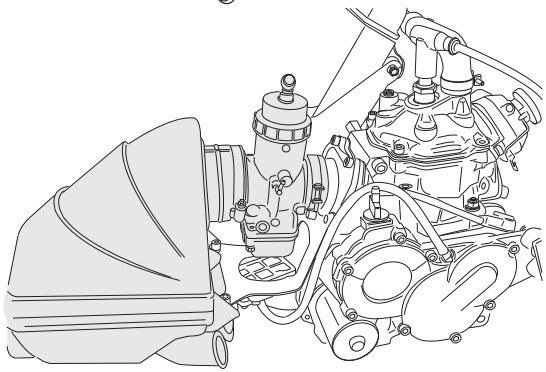
See Fig. 9.

Step	Procedure
1	Install intake silencer tube (2) in a horizontal position in the bottom half of intake silencer (1), so that the rounded intake openings point outwards.
2	Fit the carburetor socket (6) into the top half of silencer (5), so that the arrow on the socket points towards the carburetor.
3	Assemble the silencer components as shown in Fig. 9 and join the 2 silencer halves using the supplied Allen screws (10), washers (9), nuts (7) and the support bracket (8).
4	Attach the intake silencer using the supplied hose clamps (11) to the carburetor.

NOTE: The carburetor socket (6) is asymmetrical and can be turned so that the best possible position for maximum legroom can be achieved.

Graphic Air intake silencer





1. Intake silencer case, bottom
2. Intake silencer tube
3. Holder for filter element
4. Filter element
5. Intake silencer case, top
6. Carburetor socket
7. Nut M6
8. Support bracket
9. Washer 6.4
10. Allen screw M6x20
11. Clamp 50-70

Fig. 9 *K00254, K00141*

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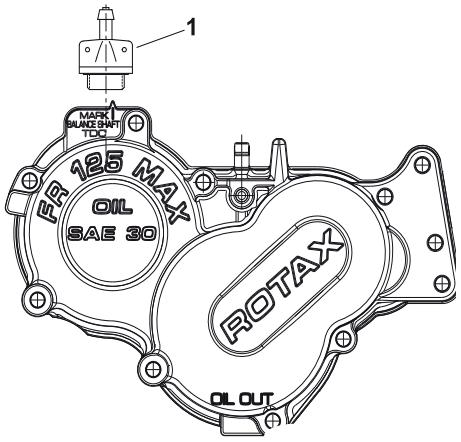
11) Venting of the gear compartment

Procedures

See Fig. 10.

Step	Procedure
1	Remove cap from the venting screw (1).
2	Establish connection between venting screw and a collecting vessel using an appropriate length of the supplied fuel hose.

Graphic



1. Venting screw

Fig. 10 *K00233_b*

12) Installation of the exhaust system

General

NOTICE Bad sealing on ball joint of exhaust systems results in poor engine performance.

NOTICE Do not over-stress the springs (2) when fitting them.

Procedures

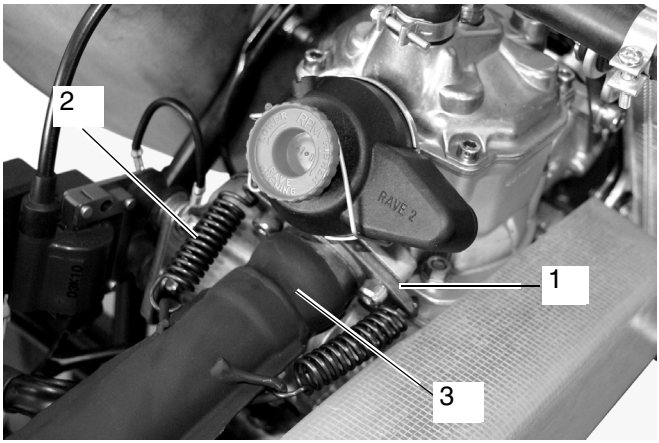
See Fig. 11.

Step	Procedure
1	Coat the exhaust socket (1) with sealant.
2	Attach springs (2) to the engine exhaust socket (1) with suitable tool (part no. 251680).

Step	Procedure
3	Attach the exhaust system to the fasteners on the framework of the Kart and use new self-locking nuts.
4	Check the exhaust (3) for secure attachment on the exhaust socket (1).

Grafik

Exhaust system, example of 125 MAX



1. Exhaust socket 2. Spring 3. Exhaust system

Fig. 11 *K00237*

13) Connection of the battery

Procedures

See Fig. 12.

Step	Procedure
1	Insert cable tie (1) into bores of battery cover (2).
2	Mount battery cover (2) on battery (3) and hand-tighten the Allen screws (4) with the locking nut (5).
3	Insert wiring harness and charging plug (7) according to Fig. 12.
4	Connect plugs with Allen screws (4) and locking nuts (6) to battery - red (+) plug to red (+) connector on battery - black (-) plug to black (-) connector on battery

NOTICE Please check carefully if connectors are connected properly to battery.

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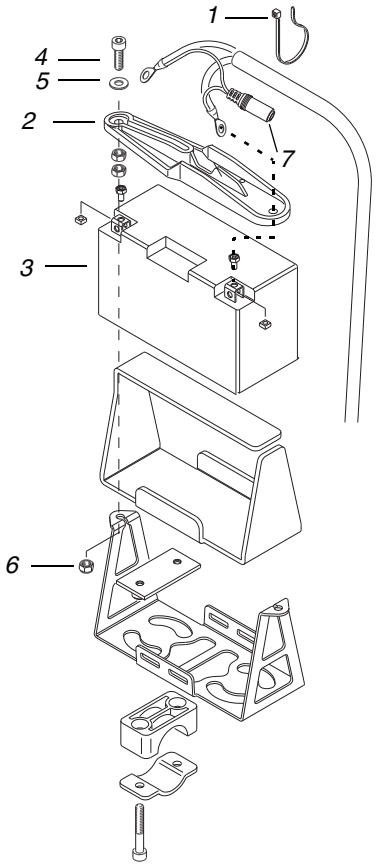
Step	Procedure
5	Fasten cable tie (1) to wiring harness and charging plug to battery cover.
6	To remove battery proceed in reverse order.

Graphic Battery



1. Cable tie
2. Battery cover
3. Battery
4. Allen screw M6x30
5. Washer 6,4
6. Locking nut M6
7. Charging plug

Fig. 12 *K00238*

DK00083.fm

14) Observation of engine speed and coolant temperature

NOTE: ROTAX is not offering a composite indicating instrument (inductive rev-counter and thermosensor).

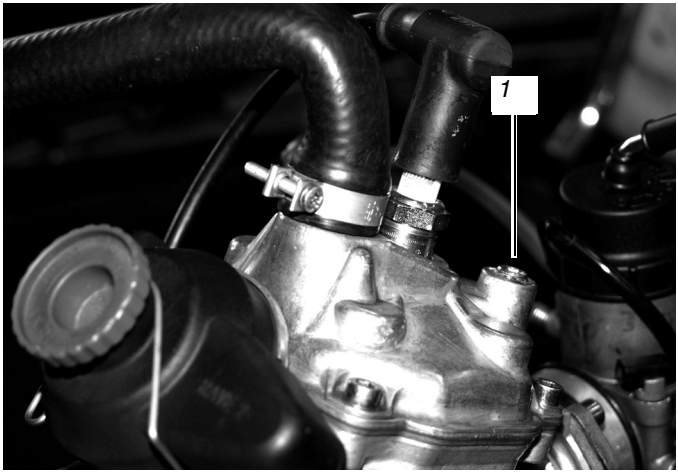
Rev-counter

To determine the best possible transmission ratio, the use of a rev-counter is required.

Analyzer for coolant temperature

To warrant engine operation within temperature limits of coolant an analyzer for measurement of coolant temperature is required.

The following graphic shows the measuring point of the coolant temperature:



1. Measuring point of coolant temperature

Fig. 13 *00206*

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2) Operators Manual

General

For information regarding repair of the engine contact an authorized Service Center or consult the Repair Manual (available under www.kart-rotax.com).

Content

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1) Design of the ROTAX Kart engine 125 MAX / Junior MAX / Mini MAX / Micro MAX

General

- Single cylinder two-stroke engine, reed valve controlled, 125 cm³ displacement
- Liquid cooled, forced flow by integrated water pump
- Balance shaft
- Integrated thermostat
- Digital battery ignition
- Integrated electric starter
- Pneumatic controlled exhaust timing (only 125 MAX)
- Crankcase impulse operated fuel pump
- Slide carburetor
- Intake silencer with integrated air filter
- Sport exhaust system with rear silencer

1.1) Operating limits

General

CAUTION The engine is only allowed to be run at maximum performance after reaching the specified operating temperature. A low operating temperature of the engine can cause a piston seizure.

CAUTION The maximum operating temperature of the engine must not be exceeded. If the temperature is too high, it may result in piston seizure.

NOTE: A speed limitation prevents engine speeds above 14.000 1/min during driving. Operating the engine without load (e.g. on the trolley) could allow speeds above 14.000 1/min, which should be avoided.

NOTE: If the engine does not reach the minimum specified operating temperature due to low ambient temperature, the cooling efficiency of the radiator must be reduced by covering the radiator using the radiator flap.

NOTE: The cooling fins of the cooler should be cleaned periodically to ensure the maximum cooling capacity of the cooler.

Maximum performance

Engine type	at engine speed [rpm]	performance [kW/hp]
125 MAX	11.500	21/28,5
125 Junior MAX	8.500	15/20,4
125 Mini MAX	8.500	10/13,6
125 Micro MAX	6.500	5/6,8

Maximum speed

Engine type	max. engine speed [rpm]
125 MAX	~ 14.000
125 Junior MAX	~ 12.500
125 Mini MAX	~ 12.000
125 Micro MAX	~ 11.000

Cooling temperature

Cooling temperature	
minimum [°C / °F]	45 / 113
optimum [°C / °F]	65 / 149
maximum [°C / °F]	85 / 185

2) Technical description

2.1) Type of engine

Single cylinder 2-stroke engine with reed valve controlled inlet. The lubrication of the engine is made by mixed lubrication. Mixed lubrication is achieved by adding oil to the gasoline in a specified mixing ratio (1:50).

2.2) Cooling circuit

The coolant is routed from the radiator through the crankcase to the water pump. The water pump is driven by the crankshaft via reduction gear and water pump transmits the coolant through cylinder and cylinder head back to the radiator.

The cooling circuit is equipped with an integrated thermostat which regulates the coolant temperature.

2.3) Balance shaft

To reduce engine vibration, the balance shaft rotates in opposite direction to the crankshaft .

2.4) Ignition unit

Ignition timing is controlled by the digital battery ignition unit consisting of the trigger coil on the crankcase and an ignition coil with the integrated electronics. Manual ignition adjustment is neither required nor possible.

The power circuit for the ignition unit is protected against current draw by an ON/OFF switch. At a forced engine stop the ignition unit still consumes current. To stop the engine and to avoid discharge of the battery on a non-running engine, the ignition circuit must be interrupted by pushing the ON/OFF switch in.

When the ON/OFF switch is pulled out, the ignition circuit is closed and the engine can be started. To stop the engine, the ON/OFF switch needs to be pushed in. This will interrupt the ignition circuit and the engine stops.

2.5) Electric starter

By pressing the start button the circuit between the battery and the electric starter will be closed. The electric starter drives the starter gear on the crankshaft via an intermediate gear with free wheeling, until the engine starts to run.

2.6) Exhaust timing control (125 MAX only)

The engine is equipped with a pneumatic exhaust control which optimizes the performance characteristics. Variable exhaust timing depending on exhaust pressure will be achieved by a slide valve in the exhaust port.

Up to a speed of approximately 7.500 rpm the exhaust slide valve projects into exhaust port.

With rising engine speed the pressure in the exhaust port increases and withdraws the exhaust slide valve from the exhaust port at approximately 7.500 rpm.

2.7) Fuel pump

The fuel pump is driven by the pulsating pressure changes in the crankcase and the pump transfers the fuel from the fuel tank to the carburetor.

An inline fuel filter (between fuel tank and fuel pump) avoids foreign particles entering the fuel pump or the carburetor.

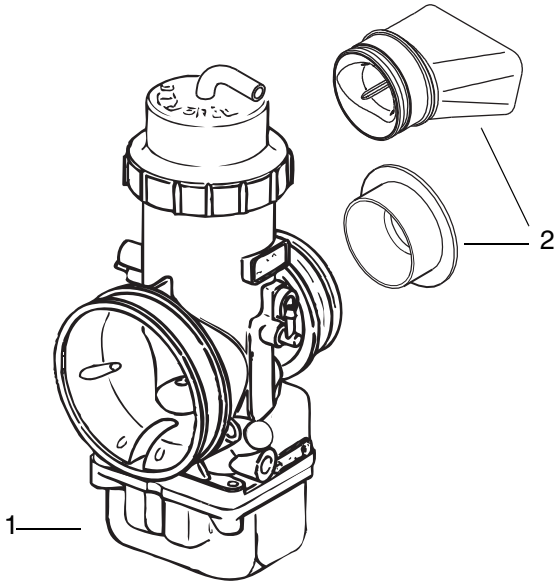
2.8) Carburetor

See Fig. 1.

The carburetor used is a piston type carburetor with floats. The standard calibration covers nearly all operating conditions. For extreme operating conditions the jetting of the carburetor has to be changed to the respective conditions in accordance with this Manual.

At the engine Type 125 Micro MAX the performance characteristic gets adapted to the age of drivers by use of an intake restrictor (Rotax part no.: 267535 or 267530).

Graphic



1. Carburetor
2. Intake restrictors Micro MAX

Fig. 1 *K00256*

2.9) Intake silencer

The intake silencer incorporates an air filter to clean the intake air. The intake silencer has been designed for optimum reduction of the air intake noise level and represents a tuned system with the engine.

2.10) Exhaust system

The exhaust system is designed as resonance system with an after-muffler and represents a tuned system with the engine.

At the engine type 125 Mini MAX and 125 Micro MAX the performance characteristic gets adapted to the age of drivers by use of an exhaust socket with integrated restrictor (Rotax part no.: 273972).

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3) Operating fluids and equipment

3.1) Coolant

General

A mixture of pure water and aluminium-compatible antifreeze has to be used as coolant. Follow the antifreeze specifications to ensure protection against freezing to a temperature of - 20 °C / - 4 °F.

Procedures

NOTE: Follow the national regulations regarding use of antifreeze on race tracks.

NOTE: With the standard location of the radiator, venting of the cooling system is not required.

Step	Procedure
1	Open radiator cap and fill the system with coolant (approx. 0.7 litre / 0.185 US gal for the complete cooling system).
2	Close radiator cap.

3.2) Battery (+Lithium) and battery charger

Safety of components

CAUTION

The life span of the battery will be drastically reduced by discharging the battery completely. Therefore it is recommended to fully recharge the battery before any operation (also race) of the Kart.

CAUTION

Use of any other battery charger can impair the battery life or may ruin the battery. Always use the right battery charger for the right battery.

General Information

NOTE: It is recommended to always carry a charged spare battery. The installed battery should be replaced by a fully charged battery before it is completely discharged.

NOTE: If the spark plug is removed, to check if the battery still generates a spark, consider the following: with the spark plug removed it is easier for the electric starter to crank the engine, which reduces current absorption of the electric starter resulting in battery voltage adequate for generating a spark. But if the spark plug is fitted again it may happen that the engine won't start.

NOTE: To charge a battery, the battery charging unit specified by ROTAX and available as an accessory should be used:

Standard battery charger ROTAX part no.: 265148, 581320

Lithium battery charger ROTAX part no.: 581325

To be able to use the battery charger in your homecountry please contact your nearest authorized ROTAX distributor or one of its Service Centers to receive an adapter plug or an adapter cable.

This battery charger automatically switches to maintenance charge, when the target voltage is reached. That provides overcharging and ruining of the battery.

Charging of battery

See Fig. 2.

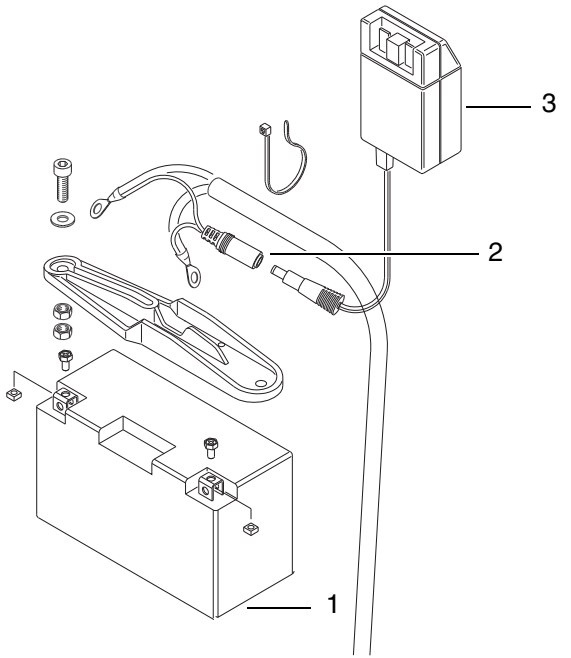
NOTE: The battery charger may be connected to the battery for a longer period, as the battery only takes the current required for achieving a full charge.

NOTE: A charging control lamp, which is still red after 24 hours of charging might indicate a faulty battery.

NOTE: Red/green blinking of the charging control lamp indicates transition from main charging to additional charging and does not signal a faulty battery charger.

Step	Procedure
1	Connect the red plug of the charging unit (3) to plus terminal of battery (2). NOTE: If the battery gets charged, while not mounted on the Kart, use the adapter cable (ROTAX part no. 266021).
2	Plug the battery charger (3) into a 110 - 230 V / 50 – 60 Hz voltage supply. During the charging process the charging control lamp will light up red.
3	At completion of the charging process the contol lamp will change to green but the charging current will remain thus warranting a fully charged battery. NOTE: The charging time is approx. 12 hours.
4	Disconnect the battery charger (3) from the voltage supply.
5	Remove the charging cables from the battery.
6	The battery (1) is now ready again for service.

Graphic



1. Battery
2. Plus terminal
3. Battery charger

Fig. 2 *K00257*

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Charging condition of battery

The charging condition of the battery can be estimated by measuring the voltage using a commercially available measuring instrument.

15 minutes after the end of charging and/or 15 minutes after the last stress of the battery, the charging condition can be estimated according to the voltage indicated.
See the following table (measured at 20 °C / 68 °F ambient temperature).

Voltage [V]	Charging condition [%]
12.30	50
12.45	60
12.60	70
12.75	80
12.90	90
13.10	100

3.3) Fuel

General

For engine operation a mixture of unleaded gasoline of at least ROZ min. 95 or 91 (RON + MON) / 2 and **fully synthetic** XPS® KART TEC 2-stroke oil (or equivalent), mixed at ratio 1 : 50 (2 % oil) has to be used.

Example:
To 10 litres unleaded gasoline add 0,2 litre **fully synthetic** XPS® KART TEC 2-stroke oil.

To 1 gal (US) unleaded gasoline add 0,076 gal (US) fully synthetic XPS® KART TEC 2-stroke oil.

Safety information

⚠ WARNING Risk of fire and explosion!
Make sure that fuel does not splash onto hot engine components or equipment.

⚠ WARNING Do not try any different sorts of fuel. This could lead to engine damage (e. g. piston seizure).

⚠ WARNING When mixing fuel and refuelling do not smoke or use open fire. Gasoline is highly flammable and explosive under certain conditions.

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⚠ WARNING Never perform mixing and refuelling in closed rooms, handle fuel in well-ventilated areas only.

⚠ WARNING Refuel the Kart only when engine is not running and with the ignition circuit open on the ON/OFF switch.

⚠ WARNING Pay attention to the safety advice of the Kart manufacturer!

CAUTION Before each refuelling, shake fuel container well to ensure adequate mixing of the gasoline with the oil.

CAUTION Too much oil in the fuel mixture (more than 2 %) could lead to engine trouble (e. g. coking of the exhaust valve).

CAUTION Insufficient amount of oil in the fuel mixture (less than 2 %) could result in engine trouble (e. g. piston seizure).

CAUTION Ensure that no contamination enters the fuel tank and the carburetor.

CAUTION Unleaded fuel has a limited storage life. Store only the quantity of fuel in a container which will be needed in the near future.

ENVIRONMENT NOTE

Don't spill fuel! Absorb spilled fuel with appropriate drying agent and ensure ecological disposal.

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Step	Procedure
1	Pour small amount of XPS® KART TEC 2-stroke oil (or equivalent) in a clean fuel container.
2	Add an amount of unleaded gasoline of at least ROZ min. 95 or 91 (RON + MON) / 2 corresponding to mixing ratio into container.
3	Shake fuel container well to reach a good mixture of oil and fuel.
4	Pour fuel into fuel tank of Kart, using a funnel. NOTE: Never fill to the brim!
5	Close fuel tank and fuel container immediately after refuelling.

4) Engine tuning

4.1) Carburetor calibration

General

The standard carburetor calibration is for an ambient temperature of 25 °C / 77 °F and 400 m / 1300 ft above sea level. At operation with different temperatures and altitudes, the main jet of the carburetor has to be changed in accordance with the following table, to optimize engine performance.

Table

NOTE: Valid as from engine no. 536536 (jetting of carburetor R 9796).

Main jet	Sea level 0 m/0 ft	Sea level 400 m/ 1300 ft	Sea level 800 m/ 2600 ft	Sea level 1200 m/ 3900 ft	Sea level 1600 m/ 5200 ft
- 5 °C / + 23 °F	178	175	172	170	168
+ 5 °C / + 41 °F	175	172	170	168	165
+ 15 °C / + 59 °F	172	170	168	165	162
+ 25 °C / + 77 °F	170	**168**	165	162	160
+ 35 °C / + 95 °F	168	165	162	160	158

CAUTION

A smaller main jet than shown in the table could lead to piston seizure under the existing conditions

CAUTION

Misfiring in the exhaust system between 10.000 and 12.000 rpm indicates that the mixture is too lean (the fuel-air mixture cannot be ignited by the ignition spark).

NOTE: If under the existing conditions a larger main jet than specified in the table is used, the engine might only reach 90-95 % of it‘s maximum speed.

NOTE: At engine operation with ambient temperatures below 10 °C / 50 °F make sure not to demand full power before the coolant temperature has reached 45 °C / 113 °F.

Performance diagram

NOTE: The graphs indicated represent the theoretically achievable values of the various engine types at optimal setting of the engine management (carburetor, etc).

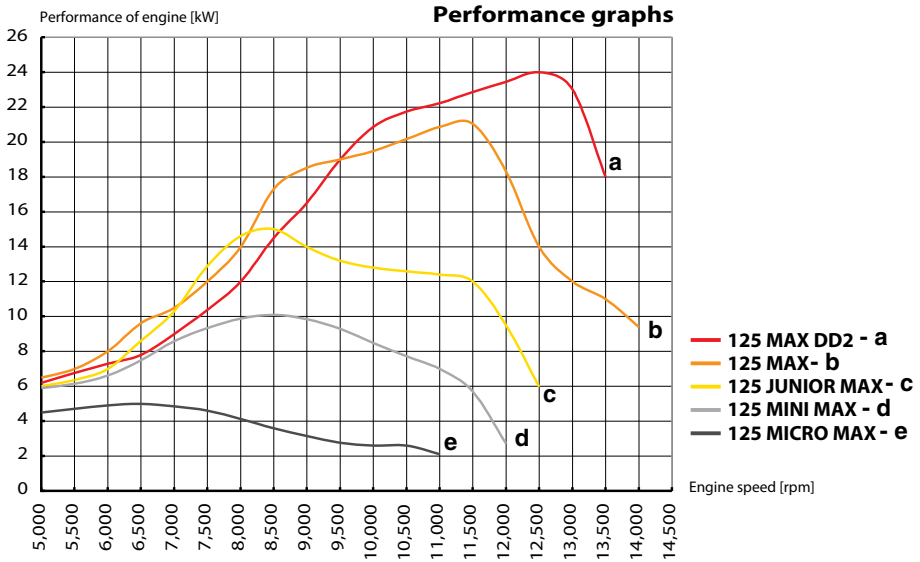

Fig. 3 *K00267*

Caburetor jetting

To change the carburetor jetting, proceed as follows.
Read the safety information in section 3.3) Fuel and see Fig. 4.

⚠ VORSICHT When removing the carburetor, make sure that the carburetor remains in a vertical position to prevent fuel from flowing out.

Step	Procedure
1	Pull off fuel supply hose from carburetor and pinch off the fuel hose to prevent fuel from flowing out.
2	Loosen the two clamps on carburetor flange and carburetor socket and remove the carburetor.
3	Drain the fuel in the float chamber into a suitable clean tray, by removing the plug screw (1) and gasket ring (2). NOTE: The fuel drained from the float chamber may be poured back into the fuel tank using a syringe (or similar extruding tool).

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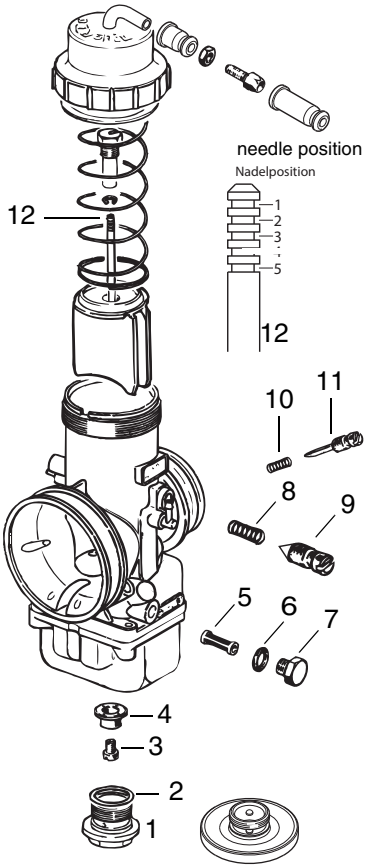
Step	Procedure
4	Remove main jet (3) and main jet cup (4).
5	Select the appropriate size of main jet. (refer to the table in this section). NOTE: The size of the jet is imprinted on the face of the main jet
6	Install the main jet cup (4) in position as depicted in Fig. 4 and mount the corresponding main jet.
7	Mount and hand tighten the plug screw (1) and gasket ring (2).
NOTE:	In disassembled condition of the carburetor, the position of the jet needle (12) can be changed too. The standard position of the jet needle is 'position 2'. If the circlip of the jet needle is set in 'position 1', the full mixture in part and full load will become slightly leaner. If the circlip is set into 'position 5', the fuel mixture will become slightly richer in the part and full-load range.
NOTE:	The fuel filter (5) must be inspected periodically and cleaned as required (Step 8 to 10).
8	Remove the hex. screw (7) and gasket ring (6).
9	Pull out the fuel filter (5) and clean the filter and fuel inlet.
10	Refit the fuel filter (5), the gasket ring (6) and hex. screw (7).
11	Install the carburetor into a vertical position and tighten the two clamps on carburetor flange and carburetor socket.
12	Connect the fuel hose to the inlet nipple of the carburetor.

NOTE: When trying to start the engine it will take a few seconds for the fuel pump to fill the float chamber and for the engine to start.

NOTE: With the adjustment screw (9), the idle speed of the engine can be adjusted. By turning in the adjustment screw the idle speed increases and by turning out this screw the idle speed will be reduced.

NOTE: With the adjustment screw (11), the fuel mixture formation can be adjusted. By turning in the adjustment screw, the air-fuel mixture will become richer at idling and by turning out this screw, the air-fuel mixture will become leaner at idling.

Graphic



1. Plug screw
2. Gasket ring
3. Main jet
4. Main jet cup
5. Fuel filter
6. Gasket ring
7. Hex. screw
8. Compression spring
9. Adjustment screw
10. Compression spring
11. Adjustment screw
12. Jet needle

Fig. 4 *K00258*

Carburetor calibration

For better understanding and as an aid for the carburetor calibration the following diagram is used to show the effectiveness of individual settings, depending on the throttle position.

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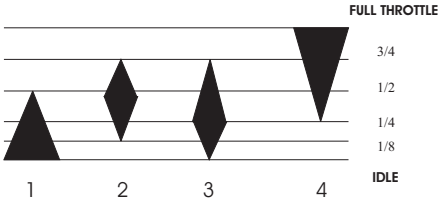


1 - AIR SCREW AND PILOT JET

2 - TYPE AND POSITION OF JET NEEDLE

3 - TYPE OF NEEDLE JET

4 - MAINJET

Fig. 5 *K00264*

4.2) Selection of the transmission ratio - 125 MAX

General

CAUTION Never run the engine without load. By revving the engine without load, speeds above 14.000 rpm can be reached and this excessive engine speed will drastically shorten the life span of some components (conrod, conrod bearings, etc).

NOTE: The maximum engine speed in Kart operation will be controlled by the ignition unit. At engine speeds above 13.800 rpm the ignition timing will be controlled so, that the engine performance will drop significantly (see Fig. 6).

Because of the special tuning used, the engine performance is very good in the speed range from 6.000 to 12.000 rpm.

Peak performance will be achieved at 11.500 rpm, but over-revving of up to 14.000 rpm is permitted.

Graphic

The power available for acceleration is in the engine speed range between 6.000 rpm and 12.000 rpm higher than between 12.000 and 13.500 rpm.
Therefore it is not always the best to use this high speed range (high top speed on straights) and to leave the higher acceleration potential (after narrow bends) at the lower speed range untapped. This is just a remark making it obvious that the best possible tuning can only be achieved with an exact knowledge of the race track.

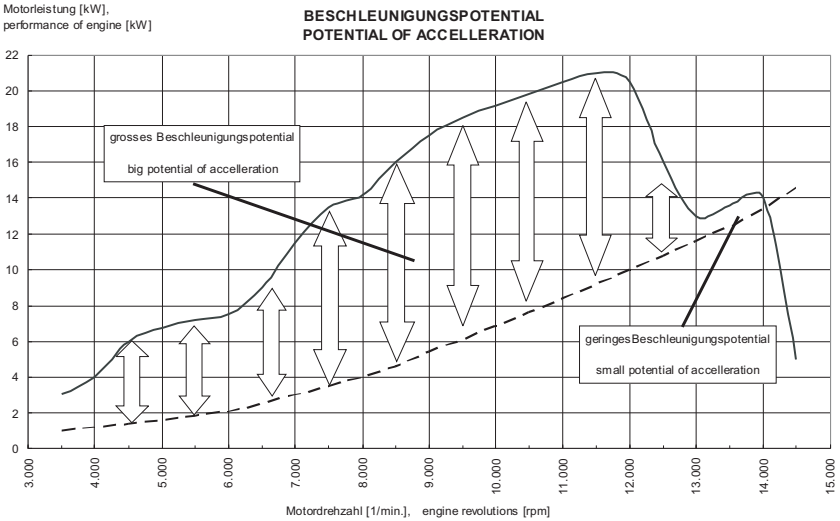


Fig. 6 *K00265*

Tip

If the speed range of 6.000 rpm to 12.000 rpm should prove inadequate due to a particular track routing, a maximum speed of 13.500 rpm should be targeted.
In this situation you can profit from an additional performance rise from 12.000 to 13.500. This increase in performance will be achieved by the advance of ignition timing to 30° B.T.D.C at 12.600 rpm.

NOTE: A basic requirement for using the speed ranges from 12.000 to 13.500 rpm is that the carburetor has optimal jetting (refer to section 4.1) Carburetor calibration).

Tables

For an approximation and/or optimization of the gear ratio consult table 1 and table 2.

NOTE: This is just a remark making it obvious that the best possible tuning can only be achieved with an exact knowledge of the race track.

Table 1

Transmission ratio	Number of teeth of the chain sprocket on the crankshaft					
No. of teeth of the chain sprocket on the rear axle	11	12	**13**	14	15	16
72	6,55	6,00	5,54	5,14	4,80	4,50
73	6,64	6,08	5,62	5,21	4,87	4,56
74	6,73	6,17	5,69	5,29	4,93	4,63
75	6,82	6,25	5,77	5,36	5,00	4,69
76	6,91	6,33	5,85	5,43	5,07	4,75
77	7,00	6,42	5,92	5,50	5,13	4,81
78	7,09	6,50	6,00	5,57	5,20	4,88
79	7,18	6,58	6,08	5,64	5,27	4,94
80	7,27	6,67	6,15	5,71	5,33	5,00
81	7,36	6,75	6,23	5,79	5,40	5,06
82	7,45	6,83	**6,31**	5,86	5,47	5,13
83	7,55	6,92	6,38	5,93	5,53	5,19
84	7,64	7,00	6,46	6,00	5,60	5,25
85	7,73	7,08	6,54	6,07	5,67	5,31
86	7,82	7,17	6,62	6,14	5,73	5,38
87	7,91	7,25	6,69	6,21	5,80	5,44
88	8,00	7,33	6,77	6,29	5,87	5,50
89	8,09	7,42	6,85	6,36	5,93	5,56
90	8,18	7,50	6,92	6,43	6,00	5,63
91	8,27	7,58	7,00	6,50	6,07	5,69
92	8,36	7,67	7,08	6,57	6,13	5,75

NOTE: If not absolutely necessary on a certain track try not to use a chain sprocket with 11 teeth, because of heavy wear of the plain bearing during use of this sprocket.

Table 2 shows clearly that in order to reach the maximum engine speed of 13.500 rpm at a transmission ratio of 6,31 (between 6,20 and 6,40) and an engine speed of 12.000 rpm, the required transmission ratio would lie between 6,98 and 7,20.

Use Table 1 and pick an appropriate combination of chain gears. For the required transmission ratio between 6,98 and 7,20, the chain gear matches 12/84, 12/85, 12/86, 13/91 or 13/92 can be selected.

NOTE: To simplify changing of the transmission ratio it is recommended to carry clutch drums with a prefitted chain sprocket of various numbers of teeth.

DK00084.fm

Table 2

Required transmission ratio to reach the engine speed of 13.500 rpm															
obtained speed [rpm]	**employed transmission ratio**														
	5,00	5,20	5,40	5,60	5,80	6,00	**6,20**	**6,40**	6,60	6,80	7,00	7,20	7,40	7,60	7,80
9.000	7,50	7,80	8,10	8,40	8,70	9,00	9,30	9,60	9,90	10,20	10,50	10,80	11,10	11,40	11,70
9.200	7,34	7,63	7,92	8,22	8,51	8,80	9,10	9,39	9,68	9,98	10,27	10,57	10,86	11,15	11,45
9.400	7,18	7,47	7,76	8,04	7,33	8,62	8,90	9,19	9,48	9,77	10,05	10,34	10,63	10,91	11,20
9.600	7,03	7,31	7,59	7,88	8,16	8,44	8,72	9,00	9,28	9,56	9,84	10,13	10,41	10,69	10,97
9.800	6,89	7,16	7,44	7,71	7,99	8,27	8,54	8,82	9,09	9,37	9,64	9,92	10,19	10,47	10,74
10.000	6,75	7,02	7,29	7,56	7,83	8,10	8,37	8,64	8,91	9,18	9,45	9,72	9,99	10,26	10,53
10.200	6,62	6,88	7,15	7,41	7,68	7,94	8,21	8,47	8,74	9,00	9,26	9,53	9,79	10,06	10,32
10.400	6,49	6,75	7,01	7,27	7,53	7,79	8,05	8,31	8,57	8,83	9,09	9,35	9,61	9,87	10,13
10.600	6,37	6,62	6,88	7,13	7,39	7,64	7,90	8,15	8,41	8,66	8,92	9,17	9,42	9,68	9,93
10.800	6,25	6,50	6,75	7,00	7,25	7,50	7,75	8,00	8,25	8,50	8,75	9,00	9,25	9,50	9,75
11.000	6,14	6,38	6,63	6,87	7,12	7,36	7,61	7,85	8,10	8,35	8,59	8,84	9,08	9,33	9,57
11.200	6,03	6,27	6,51	6,75	6,99	7,23	7,47	7,71	7,96	8,20	8,44	8,68	8,92	9,16	9,40
11.400	5,92	6,16	6,39	6,63	6,87	7,11	7,34	7,58	7,82	8,05	8,29	8,53	8,76	9,00	9,24
11.600	5,82	6,05	6,28	6,52	6,75	6,98	7,22	7,45	7,68	7,91	8,15	8,38	8,61	8,84	9,08
11.800	5,72	5,95	6,18	6,41	6,64	6,86	7,09	7,32	7,55	7,78	8,01	8,24	8,47	8,69	8,92
12.000	5,63	5,85	6,08	6,30	6,53	6,75	**6,98**	**7,20**	7,43	7,65	7,88	8,10	8,33	8,55	8,78
12.200	5,53	5,75	5,98	6,20	6,42	6,64	6,86	7,08	7,30	7,52	7,75	7,97	8,19	8,41	8,63
12.400	5,44	5,66	5,88	6,10	6,31	6,53	6,75	6,97	7,19	7,40	7,62	7,84	8,06	8,27	8,49
12.600	5,36	5,57	5,79	6,00	6,21	6,43	6,64	6,86	7,07	7,29	7,50	7,71	7,93	8,14	8,36
12.800	5,27	5,48	5,70	5,91	6,12	6,33	6,54	6,75	6,96	7,17	7,38	7,59	7,80	8,02	8,23
13.000	5,19	5,40	5,61	5,82	6,02	6,23	6,44	6,65	6,85	7,06	7,27	7,48	7,68	7,89	8,10
13.200	5,11	5,32	5,52	5,73	5,93	6,14	6,34	6,55	6,75	6,95	7,16	7,36	7,57	7,77	7,98
13.400	5,04	5,24	5,44	5,64	5,84	6,04	6,25	6,45	6,65	6,85	7,05	7,25	7,46	7,66	7,86
13.600	4,96	5,16	5,36	5,56	5,76	5,96	6,15	6,35	6,55	6,75	5,95	7,15	7,35	7,54	7,74
13.800	4,89	5,09	5,28	5,48	5,67	5,87	6,07	6,26	6,46	6,65	6,85	7,04	7,24	7,43	7,63
14.000	4,82	5,01	5,21	5,40	5,59	5,79	5,98	6,17	6,36	5,56	5,75	6,94	7,14	7,33	7,52

4.3) Selection of the transmission ratio - 125 Junior MAX

General

CAUTION

Never run the engine without load. By revving the engine without load, speeds of above 14.000 rpm can be reached and this excessive engine speed will drastically shorten the life span of some components (conrod, conrod bearings, etc).

NOTE: The decline of the engine speed during Kart operation will be controlled by the exhaust system. Above the engine speed of 11.500 rpm the effectiveness of the exhaust system decreases, resulting in a big drop of performance (see Fig. 3 in chapter 4).

DK00084.fm

Because of the special tuning used, the engine performance is very good in the speed range from 6.000 to 11.500 rpm.

Peak performance will be achieved at 8.500 rpm, but over-revving of up to approx. 12.200 rpm is permitted.

Tables

For an approximation and/or optimization of the gear ratio consult table 1 and table 2.

NOTE: This is just a remark making it obvious that the best possible tuning can only be achieved with an exact knowledge of the race track. The data should be regarded only as an approximation.

NOTE: If not absolutely necessary on a certain track try not to use a chain sprocket with 11 teeth, because of heavy wear of the plain bearing during use of this sprocket.

Table 1

Transmission ratio	Number of teeth of the chain sprocket on the crankshaft					
No. of teeth of the chain sprocket on the rear axle	11	12	**13**	14	15	16
72	6,55	6,00	5,54	5,14	4,80	4,50
73	6,64	6,08	5,62	5,21	4,87	4,56
74	6,73	6,17	5,69	5,29	4,93	4,63
75	6,82	6,25	5,77	5,36	5,00	4,69
76	6,91	6,33	5,85	5,43	5,07	4,75
77	7,00	6,42	5,92	5,50	5,13	4,81
78	7,09	6,50	6,00	5,57	5,20	4,88
79	7,18	6,58	6,08	5,64	5,27	4,94
80	7,27	6,67	6,15	5,71	5,33	5,00
81	7,36	6,75	6,23	5,79	5,40	5,06
82	7,45	6,83	**6,31**	5,86	5,47	5,13
83	7,55	6,92	6,38	5,93	5,53	5,19
84	7,64	7,00	6,46	6,00	5,60	5,25
85	7,73	7,08	6,54	6,07	5,67	5,31
86	7,82	7,17	6,62	6,14	5,73	5,38
87	7,91	7,25	6,69	6,21	5,80	5,44
88	8,00	7,33	6,77	6,29	5,87	5,50
89	8,09	7,42	6,85	6,36	5,93	5,56
90	8,18	7,50	6,92	6,43	6,00	5,63
91	8,27	7,58	7,00	6,50	6,07	5,69
92	8,36	7,67	7,08	6,57	6,13	5,75

Table 2 shows clearly that in order to reach the maximum engine speed of 12.000 rpm at a transmission ratio of 6,31 (between 6,20 and 6,40) and an engine speed of 11.000 rpm, the

required transmission ratio would lie between 6,76 and 6,98.

Use Table 1 and pick an appropriate combination of chain gears. For the required transmission ratio between 6,76 and 6,98, the chain gear matches 12/82, 12/83, 13/88, 13/89 or 13/90 can be selected.

NOTE: To simplify changing of the transmission ratio it is recommended to carry clutch drums with a prefitted chain sprocket of various numbers of teeth.

Table 2

Required transmission ratio to reach the engine speed of 12.000 rpm															
obtained speed [rpm]	**employed transmission ratio**														
	5,00	5,20	5,40	5,60	5,80	6,00	**6,20**	**6,40**	6,60	6,80	7,00	7,20	7,40	7,60	7,80
9.000	6,67	6,93	7,20	7,47	7,73	8,00	8,27	8,53	8,80	9,07	9,33	9,60	9,87	10,13	10,40
9.200	6,52	6,78	7,04	7,30	7,57	7,83	8,09	8,35	8,61	8,87	9,13	9,39	9,65	9,91	10,17
9.400	6,38	6,64	6,89	7,15	7,40	7,66	7,91	8,17	8,43	8,68	8,94	9,19	9,45	9,70	9,96
9.600	6,25	6,50	6,75	7,00	7,25	7,50	7,75	8,00	8,25	8,50	8,75	9,00	9,25	9,50	9,75
9.800	6,12	6,37	6,61	6,86	7,10	7,35	7,59	7,84	8,08	8,33	8,57	8,82	9,06	9,31	9,55
10.000	6,00	6,24	6,48	6,72	6,96	7,20	7,44	7,68	7,92	8,16	8,40	8,64	8,88	9,12	9,36
10.200	5,88	6,12	6,35	6,59	6,82	7,06	7,29	7,53	7,76	8,00	8,24	8,47	8,71	8,84	9,18
10.400	5,77	6,00	6,23	6,46	6,69	6,92	7,15	7,38	7,62	7,85	8,08	8,31	8,54	8,77	9,00
10.600	5,66	5,89	6,11	6,34	6,57	6,79	7,02	7,25	7,47	7,70	7,92	8,15	8,38	8,60	8,83
10.800	5,56	5,78	6,00	6,22	6,44	6,67	6,89	7,11	7,33	7,56	7,78	8,00	8,22	8,44	8,67
11.000	5,45	5,67	5,89	6,11	6,33	6,55	6,76	6,98	7,20	7,42	7,64	7,85	8,07	8,29	8,51
11.200	5,36	5,57	5,79	6,00	6,21	6,43	6,64	6,86	7,07	7,29	7,50	7,71	7,93	8,14	8,36
11.400	5,26	5,47	5,68	5,89	6,11	6,32	6,53	6,74	6,95	7,16	7,37	7,58	7,79	8,00	8,21
11.600	5,17	5,38	5,59	5,79	6,00	6,21	6,41	6,62	6,83	7,03	7,24	7,45	7,66	7,86	8,07
11.800	5,08	5,29	5,49	5,69	5,90	6,10	6,31	6,51	6,71	6,92	7,12	7,32	7,53	7,73	7,93
12.000	5,00	5,20	5,40	5,60	5,80	6,00	**6,20**	**6,40**	6,60	6,80	7,00	7,20	7,40	7,60	7,80
12.200	4,92	5,11	5,31	5,51	5,70	5,90	6,10	6,30	6,49	6,69	6,89	7,08	7,28	7,48	7,67

4.4) Selection of the transmission ratio - 125 Mini MAX

General

CAUTION Never run the engine without load. By revving the engine without load, speeds of above 14.000 rpm can be reached and this excessive engine speed will drastically shorten the life span of some components (conrod, conrod bearings, etc).

NOTE: The decline of the engine speed during Kart operation will be controlled by the exhaust system. Above the engine speed of 11.500 rpm the effectiveness of the exhaust system decreases, resulting in a big drop of performance (see Fig. 3 in chapter 4).

DK00084.fm

Because of the special tuning, the engine performance is very good in the speed range from 6.000 to 11.500 rpm.

Peak performance will be achieved at 8.500 rpm, but over-revving of up to approx. 11.500 rpm is permitted.

Tables

For an approximation and/or optimization of the gear ratio consult table 1 and table 2.

NOTE: This is just a remark making obvious that the best possible tuning is only possible at exact knowledge of the race track. The data should be regarded only as an approximation.

NOTE: If not absolutely necessary on a certain track try not to use a chain sprocket with 11 teeth, because of heavy wear of the plain bearing during use of this sprocket.

Table 1

Transmission ratio	Number of teeth of the chain sprocket on the crankshaft					
No. of teeth of the chain sprocket on the rear axle	11	12	**13**	14	15	16
72	6,55	6,00	5,54	5,14	4,80	4,50
73	6,64	6,08	5,62	5,21	4,87	4,56
74	6,73	6,17	5,69	5,29	4,93	4,63
75	6,82	6,25	5,77	5,36	5,00	4,69
76	6,91	6,33	5,85	5,43	5,07	4,75
77	7,00	6,42	5,92	5,50	5,13	4,81
78	7,09	6,50	6,00	5,57	5,20	4,88
79	7,18	6,58	6,08	5,64	5,27	4,94
80	7,27	6,67	6,15	5,71	5,33	5,00
81	7,36	6,75	6,23	5,79	5,40	5,06
82	7,45	6,83	**6,31**	5,86	5,47	5,13
83	7,55	6,92	6,38	5,93	5,53	5,19
84	7,64	7,00	6,46	6,00	5,60	5,25
85	7,73	7,08	6,54	6,07	5,67	5,31
86	7,82	7,17	6,62	6,14	5,73	5,38
87	7,91	7,25	6,69	6,21	5,80	5,44
88	8,00	7,33	6,77	6,29	5,87	5,50
89	8,09	7,42	6,85	6,36	5,93	5,56
90	8,18	7,50	6,92	6,43	6,00	5,63
91	8,27	7,58	7,00	6,50	6,07	5,69
92	8,36	7,67	7,08	6,57	6,13	5,75

Table 2 shows clearly that to reach the maximum engine speed of 11.500 rpm at a transmission ratio of 6,31 (between 6,20 and 6,40) and an engine speed of 11.000 rpm, the

required transmission ratio would lie between 6,48 and 6,69.

Use Table 1 and pick an appropriate combination of chain gears. For the required transmission ratio between 6,48 and 6,69, the chain gear matches 12/78, 12/79, 12/80, 13/85, 13/86 or 13/87 can therefore be selected.

NOTE: To simplify changing of the transmission ratio it is recommended to carry clutch drums with a prefitted chain sprocket of various numbers of teeth.

Table 2

Required transmission ratio to reach the engine speed of 11.500 rpm															
obtained speed [rpm]	**employed transmission ratio**														
	5,00	5,20	5,40	5,60	5,80	6,00	**6,20**	**6,40**	6,60	6,80	7,00	7,20	7,40	7,60	7,80
9.000	6,39	6,64	6,90	7,16	7,41	7,67	7,92	8,18	8,43	8,69	8,94	9,20	9,46	9,71	9,97
9.200	6,25	6,50	6,75	7,00	7,25	7,50	7,75	8,00	8,25	8,50	8,75	9,00	9,25	9,50	9,75
9.400	6,12	6,36	6,61	6,85	7,10	7,34	7,59	7,83	8,07	8,32	8,56	8,81	9,05	9,30	9,54
9.600	5,99	6,23	6,47	6,71	6,95	7,19	7,43	7,67	7,91	8,15	8,39	8,63	8,86	9,10	9,34
9.800	5,87	6,10	6,34	6,57	6,81	7,04	7,28	7,51	7,74	7,98	8,21	8,45	8,68	8,92	9,15
10.000	5,75	5,98	6,21	6,44	6,67	6,90	7,13	7,36	7,59	7,82	8,05	8,28	8,51	8,74	8,97
10.200	5,64	5,86	6,09	6,31	6,54	6,76	6,99	7,22	7,44	7,67	7,89	8,12	8,34	8,57	8,79
10.400	5,53	5,75	5,97	6,19	6,41	6,63	6,86	7,08	7,30	7,52	7,74	7,96	8,18	8,40	8,63
10.600	5,42	5,64	5,86	6,08	6,29	6,51	6,73	6,94	7,16	7,38	7,59	7,81	8,03	8,25	8,46
10.800	5,32	5,54	5,75	5,96	6,18	6,39	6,60	6,81	7,03	7,24	7,45	7,67	7,88	8,09	8,31
11.000	5,23	5,44	5,65	5,85	6,06	6,27	**6,48**	**6,69**	6,90	7,11	7,32	7,53	7,74	7,95	8,15
11.200	5,13	5,34	5,54	5,75	5,96	6,16	6,37	6,57	6,78	6,98	7,19	7,39	7,60	7,80	8,01
11.400	5,04	5,25	5,45	5,65	5,85	6,05	6,25	6,46	6,66	6,86	7,06	7,26	7,46	7,67	7,87
11.600	4,96	5,16	5,35	5,55	5,75	5,95	6,15	6,34	6,54	6,74	6,94	7,14	7,34	7,53	7,73
11.800	4,87	5,07	5,26	5,46	5,65	5,85	6,04	6,24	6,43	6,63	6,82	7,02	7,21	7,41	7,60
12.000	4,79	4,98	5,18	5,37	5,56	5,75	5,94	6,13	6,33	6,52	6,71	6,90	7,09	7,28	7,48

4.5) Selection of the transmission ratio - 125 Micro MAX

Allgemein

CAUTION Never run the engine without load. By revving the engine without load, speeds of above 14.000 rpm can be reached and this excessive engine speed will drastically shorten the life span of some components (conrod, conrod bearings, etc).

NOTE: The decline of the engine speed during Kart operation will be controlled by the exhaust system. Above the engine speed of 10.500 rpm the effectiveness of the exhaust system decreases, resulting in a big drop of performance (see Fig. 3 in chapter 4).

DK00084.fm

Because of the special tuning, the engine performance is very good in the speed range from 5.500 to 10.500 rpm.

Peak performance will be achieved at 6.500 rpm, but over-revving of up to approx. 11.000 rpm is permitted.

Tables

For an approximation and/or optimization of the gear ratio consult table 1 and table 2.

NOTE: This is just a remark making obvious that the best possible tuning is only possible at exact knowledge of the race track. The data should be regarded only as an approximation.

NOTE: If not absolutely necessary on a certain track try not to use a chain sprocket with 11 teeth, because of heavy wear of the plain bearing during use of this sprocket.

Tabelle 1

Transmission ratio	**Number of teeth of the chain sprocket on the crankshaft**					
No. of teeth of the chain sprocket on the rear axle	11	12	**13**	14	15	16
72	6,55	6,00	5,54	5,14	4,80	4,50
73	6,64	6,08	5,62	5,21	4,87	4,56
74	6,73	6,17	5,69	5,29	4,93	4,63
75	6,82	6,25	5,77	5,36	5,00	4,69
76	6,91	6,33	5,85	5,43	5,07	4,75
77	7,00	6,42	5,92	5,50	5,13	4,81
78	7,09	6,50	6,00	5,57	5,20	4,88
79	7,18	6,58	6,08	5,64	5,27	4,94
80	7,27	6,67	6,15	5,71	5,33	5,00
81	7,36	6,75	6,23	5,79	5,40	5,06
82	7,45	6,83	**6,31**	5,86	5,47	5,13
83	7,55	6,92	6,38	5,93	5,53	5,19
84	7,64	7,00	6,46	6,00	5,60	5,25
85	7,73	7,08	6,54	6,07	5,67	5,31
86	7,82	7,17	6,62	6,14	5,73	5,38
87	7,91	7,25	6,69	6,21	5,80	5,44
88	8,00	7,33	6,77	6,29	5,87	5,50
89	8,09	7,42	6,85	6,36	5,93	5,56
90	8,18	7,50	6,92	6,43	6,00	5,63
91	8,27	7,58	7,00	6,50	6,07	5,69
92	8,36	7,67	7,08	6,57	6,13	5,75

Table 2 shows clearly that to reach the maximum engine speed of 11.000 rpm at a transmission ratio of 6,31 (between 6,20 and 6,40) and an engine speed of 11.000 rpm, the required transmission ratio would lie between 6,82 and 7,04.

Use Table 1 and pick an appropriate combination of chain gears. For the required transmission ratio between 6,82 and 7,04, the chain gear matches 12/82, 12/83, 12/84, 13/89, 13/90 or 13/91 can therefore be selected.

NOTE: To simplify changing of the transmission ratio it is recommended to carry clutch drums with a prefitted chain sprocket of various numbers of teeth.

Tabelle 2

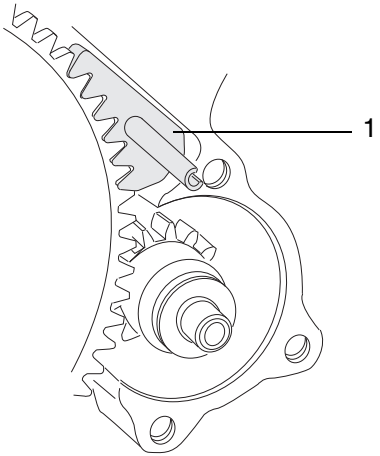
Required transmission ratio to reach the engine speed of 11.000 rpm															
obtained speed [rpm]	**employed transmission ratio**														
	5,00	5,20	5,40	5,60	5,80	6,00	**6,20**	**6,40**	6,60	6,80	7,00	7,20	7,40	7,60	7,80
9.000	6,11	6,36	6,60	6,84	7,09	7,33	7,58	7,82	8,07	8,31	8,56	8,80	9,04	9,29	9,53
9.200	5,98	6,22	6,46	6,70	6,93	7,17	7,41	7,65	7,89	8,13	8,37	8,61	8,85	9,10	9,33
9.400	5,85	6,09	6,32	6,55	6,79	7,02	7,26	7,49	7,72	7,96	8,19	8,43	8,66	8,89	9,13
9.600	5,73	5,96	6,19	6,42	6,65	6,88	7,10	7,33	7,56	7,79	8,02	8,25	8,48	8,71	8,94
9.800	5,61	5,84	6,06	6,29	6,51	6,74	6,96	7,18	7,41	7,63	7,86	8,08	8,31	8,53	8,76
10.000	5,50	5,72	5,94	6,16	6,38	6,60	**6,82**	**7,04**	7,26	7,48	7,70	7,92	8,14	8,36	8,58
10.200	5,39	5,61	5,82	6,04	6,26	6,47	6,69	6,90	7,12	7,33	7,55	7,77	7,98	8,20	8,41
10.400	5,29	5,50	5,71	5,92	6,14	6,35	6,56	6,77	6,98	7,19	7,40	7,62	7,83	8,04	8,25
10.600	5,19	5,40	5,60	5,81	6,03	6,23	6,44	6,65	6,85	7,06	7,26	7,47	7,68	7,89	8,09
10.800	5,09	5,30	5,50	5,70	5,91	6,11	6,32	6,52	6,72	6,93	7,13	7,33	7,54	7,74	7,94
11.000	5,00	5,20	5,40	5,60	5,80	6,00	6,20	6,40	6,60	6,80	7,00	7,20	7,40	7,60	7,80

4.6) Exchange of the clutch drum with chain sprocket fitted

Procedures See Fig. 7.

Step	Procedure
1	Insert fixation tool (ROTAX part no. 676205) in the starter gear assy.

Graphic



1. Fixation tool ROTAX part no. 676205

Fig. 7 *K00151*

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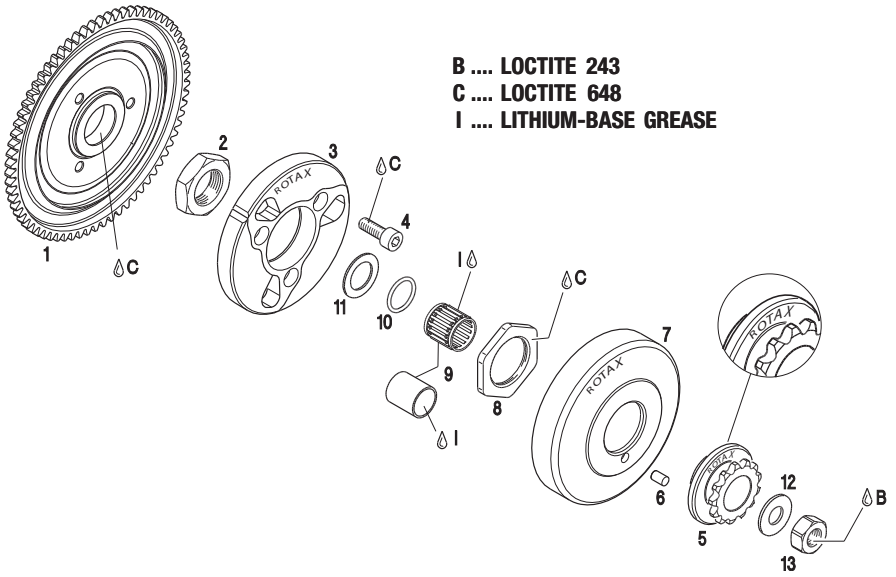
Step	Procedure
2	Remove hex. nut (13) and thrust washer (12).
3	Remove clutch drum (7) with fitted chain sprocket.
4	Clear thread of crankshaft and hex. nut (13) from remains of bonding agent and degrease.
5	Apply grease on needle cage (9) when using a chain sprocket with 12, 13, 14, 15 and 16 teeth or on plain bearing (9) for chain sprocket with 11 teeth. NOTE: For the chain sprocket with 11 teeth, use the plain bearing (9) instead of the needle cage (9). The plain bearing has to be pressed flush into the bore of the chain sprocket with chamfered end leading. NOTE: If not absolutely necessary on a certain track try not to use a chain sprocket with 11 teeth, because of heavy wear of the plain bearing (9) during use of this sprocket.
6	Mount the assembled clutch drum with the selected number of teeth. NOTE: Genuine ROTAX chain sprockets are signed with a ROTAX logo.
7	Apply LOCTITE 243 on crankshaft in the area of the hex. nut (13).

Step	Procedure
8	Install and tighten the thrust washer (12) and hex. nut (13). Tightening torque 35 Nm / 310 in lb. HINWEIS: For the chain sprocket with 11 teeth a smaller thrust washer (12) is required.
9	Remove fixation tool (Fig. 7) from the starter gear.

Graphic



1. Starter gear assy.
2. Hex. nut M20x1.5
3. Clutch
4. Allen screw M6x12
5. Chain sprocket
6. Needle pin 5x5
7. Clutch drum
8. Hex. nut M28x1
9. Plain bearing / needle cage
10. O-ring
11. Thrust washer 15,2
12. Thrust washer 10
13. Hex. nut M10x1

Fig. 8 *K00257*

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4.7) Exchange or renewal of the chain sprocket on the clutch drum

General

See Fig. 9.

The chain sprocket (2) is attached to the clutch drum (1) with a hex. nut (4) and torque is transmitted by a needle pin (3). The proper exchange or renewal of the chain sprocket is only feasible when using the appropriate fixture ROTAX part no. 277364.

Procedures

NOTE: On the chain sprocket with 11 teeth, the plain bearing must be pressed out first (the plain bearing must be renewed after pressing out).

Step	Procedure
1	Either clamp the holding device (5) for the sprocket on the long cross-sectional areas in a bench vise or fix it (4 mounting points) onto a flat and stable ground (e. g. workbench).
2	Put clutch drum with fitted sprocket into the corresponding recess of the holding device.
3	Remove the hex. nut (4) from the chain sprocket (2).
4	Clean all remains of the securing agent from the components. Degrease the chain sprocket, the clutch hub and the hex. nut
5	Place the new chain sprocket or the chain sprocket with required number of teeth on the respective centering pin of the fixture.
6	Place the needle pin (3) into the relevant bore of the chain sprocket.
7	Apply LOCTITE 243 on the contact face of the chain sprocket and on hex. nut of clutch drum.
8	Attach the chain sprocket (2) with the hex. nut (4) to the clutch drum (1). Tightening torque 100 Nm / 74 ft lb. NOTE: Mount the hex. nut (4) to that the machined face of the nut points towards the clutch drum.
9	Remove surplus securing agent.

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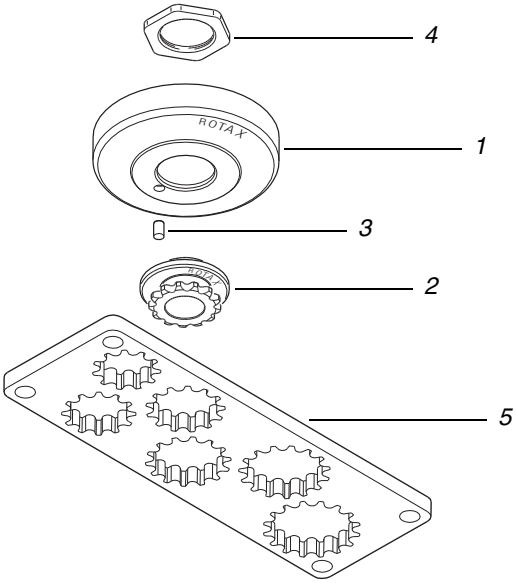
Graphic



1. Clutch drum
2. Chain sprocket
3. Needle pin 5x5
4. Hex. nut 28x1
5. Holding device

Fig. 9 *K00259*

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5) Engine operation

Safety information

⚠ WARNING Always wear protective clothing for Kart operation (helmet, overall, gloves, shoes, neck and rib guards).

⚠ WARNING Risk of burns!
Do not touch the engine, the radiator or the exhaust system during and immediately after Kart operation.

⚠ WARNING Risk of injury!
During Kart operation, beware of body or clothing contact with moving components of the Kart.

⚠ WARNING Inspect any part prone to wear (tyres, drive chain, bearings, etc) before each Kart event for good condition, in accordance with the directives of the Kart manufacturer.

⚠ WARNING Comply with the safety advice of the Kart manufacturer!

CAUTION Keep to running-in procedure as directed.

CAUTION Operate engine only within the specified limits.

CAUTION Never run the fuel tank empty.

5.1) Engine start

Preparation

Prior to engine start, verify the following:

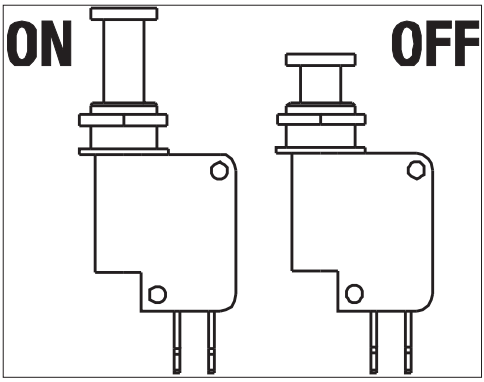
- Fuel tank full
- Battery charged and connected
- Carburetor Bowden cable is moving freely and carburetor piston connected in idle position

Engine start

At engine start proceed as follows.

Step	Procedure
1	On cold engine, pull the choke lever into a vertical position.
2	Pull ON/OFF switch (Fig. 10) out. Now the ignition circuit is closed and the battery supplies the ignition system with power.

Graphic



ON/OFF switch

Fig. 10 *K00268*

Step	Procedure
3	Press start button (max. 5 sec.) until engine starts running. NOTE: If the engine won't start, repeat starting procedure after a few seconds.
4	After engine start, take choke back slowly until engine idles smoothly without choke.

5.2) Running-in procedure for the engine

General

To ensure that components have the longest possible life span, the engine must be subject to a defined running-in period at first operation of engine or after a repair of the crankshaft or displacement parts.

CAUTION A **fully synthetic** 2-stroke oil must be used!

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To warrant the best running-in conditions we recommend to fill the fuel tank the first time with slightly oil-enriched gasoline/oil mixture of **1 : 33 (3 % oil)**.

After the end of the running-in period run the engine on the specified oil/gasoline mixture of **1 : 50 (2 % oil)**, to prevent trouble like coking of the exhaust valve.

CAUTION

Never run the engine without load. By revving the engine without load, speeds of above 14.000 rpm can be reached and this excessive engine speed will drastically shorten the life span of some components (conrod, conrod bearings, etc).

Step	Procedure
1	Start the engine and run the Kart for 15 minutes on a race track changing load and engine speed up to **8.500 rpm**.
2	**Allow cool down to ambient temperature.**
3	Then run the Kart for 15 minutes with load and speed changes up to **10.500 rpm**.

Load and speed changes means:

Fully open the accelerator until the engine reaches the speed mentioned above - lift of the accelerator completely - until the speed comes down to 5.000 rpm and accelerate again.

After this running-in period the full power of the engine may be used.

5.3) Engine stop

Procedures

CAUTION

The ON/OFF switch also serves as an emergency stop if engine operation must be interrupted (e. g. carburetor piston stuck in full throttle position).

Step	Procedure
1	Push the ON/OFF switch (see Fig. 10) in, and the engine will stop.

NOTE: Close the ignition circuit with the ON/OFF switch only for engine operation. At engine stop with the ON/OFF switch on the ignition unit will consume current thus discharging the battery completely and finally leading to damage or ruin of the battery.

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6) Setting of the exhaust valve timing (125 MAX only)

General

CAUTION The exhaust valve adjustment must never be done during operation on the track.

Engine performance graph will differ with a closed (performance graph 1) or opened (performance graph 2) exhaust valve. The best performance characteristic of the engine will be achieved when the opening time of the exhaust valve is at the intersection of the two performance graphs.

If the exhaust valve opens too **soon**, the engine acts as per performance curve 2 (for open exhaust valve) which gives less performance at this rpm range, and you loose performance and acceleration potential.

If the exhaust valve opens too **late**, the engine acts as per performance curve 1 (for closed exhaust valve) which at this rpm range gives less performance, and you loose acceleration potential.

The engine reaches maximum performance even with the exhaust valve wrongly adjusted, but you loose performance and acceleration potential.

Graphic

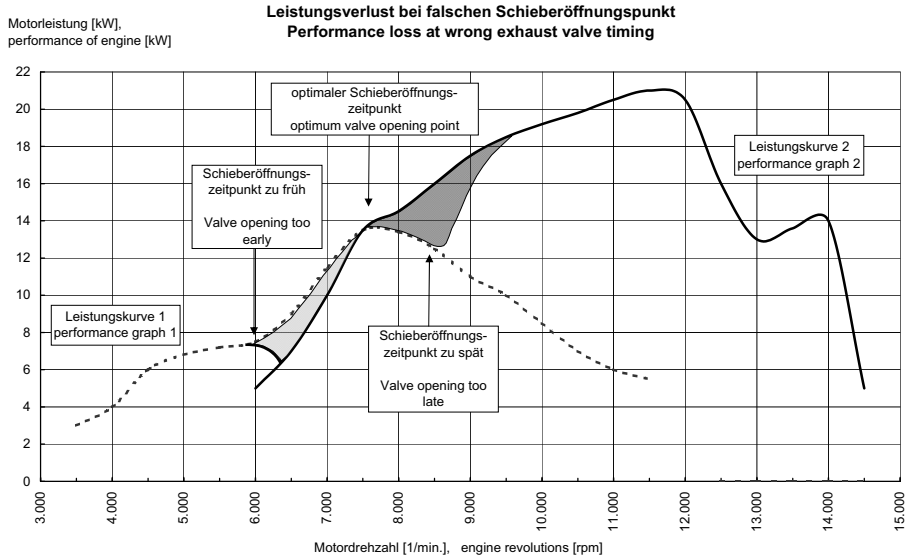

Fig. 11 *K00266*

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References

See Fig. 12.

NOTE: The opening of the exhaust valve is clearly audible. The bigger exhaust timing results in a higher sound pattern.

NOTE: The exhaust valve should open for Kart operation at the engine speed of 7.500 rpm.

NOTE: The correct setting of the opening time of the exhaust valve has to be determined during operation.

NOTE: In the basic setting, the adjustment screw (16) has a distance of 5 mm / 0,2 in. between the collar of the adjustment screw and the valve cover.

NOTE: If the exhaust valve should open before 7.500 rpm the opening time of the exhaust valve can be shifted to a slightly higher engine speed by turning the adjustment screw (16) further in.

NOTE: If the exhaust valve does not open until the engine speed of 7.500 rpm has been reached, the opening time can be adjusted to a slightly lower speed by turning adjustment screw (16) outwards.

Graphic

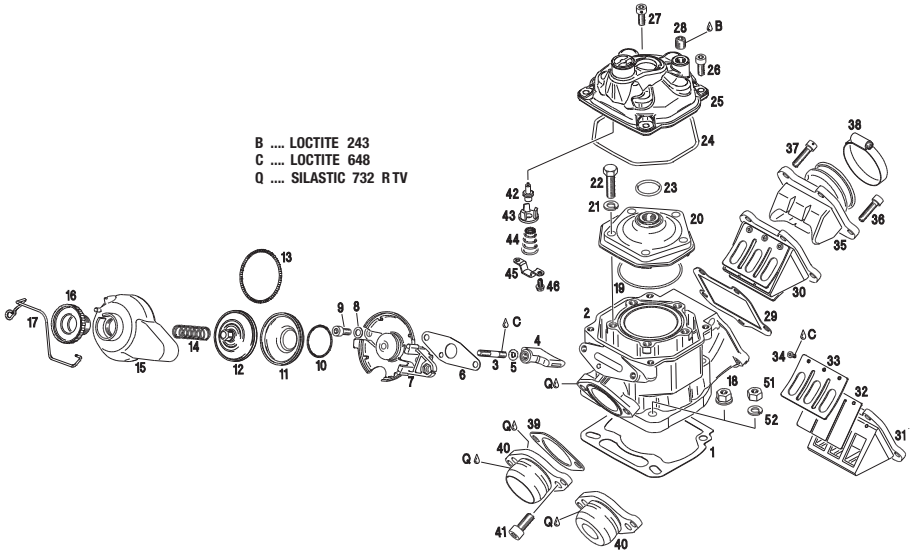

Fig. 12 *K00243*

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7) Transport of the Kart

General

If the carburetor is still filled with fuel, the transport of the Kart is only allowed in a horizontal position.

If the Kart is to be transported in a vertical position, the fuel must be drained from the carburetor first.

NOTE: If the Kart is in a vertical position at transport, the remaining fuel in the carburetor might flow into the crankcase with the result that the engine won't start at next try.

Procedures

Draining of float chamber of the carburetor. See Fig. 4.

Step	Procedure
1	Remove drain screw (1) with gasket (2) on float chamber of the carburetor and collect the fuel in a suitable container.
2	Clean drain screw (1) and gasket (2) and tighten again by hand.

8) Preservation of engine and equipment

General

CAUTION

If the vehicle gets stored at temperatures below the freezing temperature the cooling system must be filled with a mixture of distilled water and an aluminium-compatible antifreeze. The mixture must ensure protection against freezing to a temperature of - 20 °C / - 4 °F. Failure to do so will lead to engine damage (e. g. breakage of cylinder).

For longer periods out of operation (winter time), make sure that the engine will be properly preserved.

Procedures

Correct conservation.

Step	Procedure
1	Detach carburetor, drain fuel from carburetor and close carburetor openings to ensure that no dust or dirt can enter.
2	Close intake and exhaust port of engine with adhesive tape- so, that they are air-tight.
3	Apply oil on exhaust system to prevent corrosion.
4	Remove battery from the fixture and charge periodically with the specified battery charger.

9) Maintenance schedule for engine components

Before each Kart operation

Component / Fluid	Procedure
Chain sprocket	Inspection for wear and deformation of teeth.
Coolant fitting on crankcase	Verify a tight fit and non-leakage. Re-seal with securing and sealing compound 4052.
Cooling circuit connections	Verify a tight fit and non-leakage. Re-tighten or renew if needed.
Water pump	Inspect for oil or water on the leakage bore in the crankcase. At leakage, have a tear-down inspection conducted by an authorized distributor.

All 2 operating hours

Component / Fluid	Procedure
Fuel filter	Inspect for wear and dirt.
Gear oil	Check oil level, replenish as required.
Needle cage / Plain bearing of clutch drum	Clean and grease, renew as required.

All 10 operating hours

Component / Fluid	Procedure
Filter element in the intake silencer	Clean and apply oil, renew damaged filter elements.
Starter reduction gear	Cleaning and greasing of bearing seals.
Drive gears for balance shaft	Inspect for wear, renew as required.
Friction lining of the fly weights	Inspect for wear, renew as required.
Damping material of the exhaust system	Renew.

All 50 operating hours or 1x per Year

Component / Fluid	Procedure
Fuel filter	Renew
Gear oil	Renew
Tear-down inspection of engine	Have a tear-down inspection conducted by an authorized distributor.

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10) Troubleshooting

Trouble	Possible fault	Remedy
Electric starter does not run when pressing start button	Wrong connected wiring	Verify connection, see installation instructions section 5.2)
	Wiring harness damaged	Renew wiring harness
	Battery not connected	Verify battery connection
	Inadequately charged battery	Exchange or charge battery, see section 3.2)
Starter reduction gear rotates but doesn't engage	Starter reduction gear dirty	Clean starter reduction gear
Engine won't start	ON/OFF switch not actuated	Actuate ON/OFF switch, see section 5.1)
	Inadequately charged battery	Exchange or charge battery, see section 3.2)
	Faulty spark plug	renew spark plug
	Not enough fuel in fuel tank	Replenish fuel, see section 3.3)
	No fuel supply to carburetor	Verify connections on fuel pump, see installation instructions chapter 8)
	Fuel filter clogged	Clean fuel filter, see section 4.1) (step 8 to 10)
	Wiring harness damaged	Renew wiring harness
	Lost compression	Have a tear-down inspection conducted by an authorized distributor
Engine does not idle properly and stops running	Bad idling adjustment of carburetor	Adjust the idle speed, see sec. 4.1)
	Bad mixture preparation adjustment at idling	Adjust mixture preparation at idling, see section 4.1)
engine performance drops at approximately 7000 rpm (125 MAX ONLY)	Incorrect setting of the exhaust valve timing	Adjust the exhaust valve timing, see chapter 6)
	Carbon deposits on the exhaust valve	Clean the exhaust valve
Engine shows performance loss	Bad compression	Have a tear-down inspection conducted by an authorized distributor
	Jetting of the carburetor is too lean	Optimize carburetor jetting, see section 4.1)
	Insufficient fuel supply to the carburetor	Check the fuel supply to the carburetor
	Fuel filter in carburetor clogged	Clean fuel filter, see section 4.1) (step 8 to 10)

Trouble	Possible fault	Remedy
Engine does not reach the maximum of speed	Bad jetting of the carburetor	Optimize carburetor jetting, see section 4.1)
Engine misfires during Kart operation	Bad contact on connections of battery and the cable harness	Establish good connections
	Jetting of the carburetor is too lean	Optimize carburetor jetting, see section 4.1)
	Wrong spark plug gap	Adjust spark plug gap to 0.4 - 0.6 mm / 0.015 - 0.024 in.
	Inadequately charged battery	Exchange or charge battery, see section 3.2)
	After muffler isolating mat burned away	Replace isolating mat, see latest Repair Manual
	Engine usage at low ambient temperature (up to 10 °C / 50 °F)	Usage of a spark plug, which is recommended for this circumstances
Engine overheats	Inadequate amount of coolant in the cooling system	Replenish coolant
	Inactive cooling circuit	Have a tear-down inspection conducted by an authorized distributor
	Coolant emerges on leakage bore of crankcase	Have a tear-down inspection conducted by an authorized distributor
	Thermostat does not open	Check thermostat if moving freely, replace if required.
	Cooling fins of radiator dirty	Clean radiator
Engine vibrates excessively	Loose engine attachment on frame	Check engine attachment and re-tighten as required
	Drive of balance shaft worn or set incorrectly	Renew balance drive or correct adjustment
	Centrifugal clutch damaged	Renew centrifugal clutch
Centrifugal clutch is slipping at speeds above 4.000 rpm	Friction lining fouled by oil	Degrease friction lining
	Friction lining worn	Renew all fly weights
Centrifugal clutch does not release at idle speed of engine	Fouling of clutch drum	Clean clutch drum
	Fly wheel fractured	Renew all fly wheels
Excessive noise emission from exhaust system	After muffler isolating mat burned away	Replace isolating mat, see latest Repair Manual

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