

General Operating Instructions

webra

Two-stroke Model Motors

Congratulations on your decision to purchase a Webra model motor. Our motors are produced in a European factory with a rich tradition of excellence, and all our products have the following features in common: they are robust, powerful and successful.

Innumerable national and international competitions have been won using Webra model motors, and these undisputed successes are your guarantee of quality and performance.

Webra motors are designed to satisfy the requirements of all areas of model flying, and range from power plants for everyday flying to all-out competition engines. **Webra** products are not only powerful, they are reliable, easy to operate and have a long useful life.

All **Webra** motors offer excellent performance. They are manufactured to the highest levels of precision from high-quality materials using the latest machinery and processing equipment. To maintain your motor in top condition please handle it carefully and competently. The following information is intended to advise you of the correct methods of installing and adjusting your motor, and of the safety measures and precautions you should adopt as standard (see Safety Notes).

Your local model shop will be able to supply you with a Parts Catalogue which includes complete lists of all available replacement parts. Alternatively you can obtain a copy directly from us, or view the lists on the Webra web site at <http://www.webra-austria.at>.

Introduction

1. Installing the motor

We recommend that you install your motor on a rigid aluminium motor mount, and ensure that it cannot vibrate. The motor should be fixed using screws of adequate diameter which pass right through the mount, and are secured on the opposite side using locked nuts of some type. When installing the motor it is particularly important to ensure that the arms of the mount are plane-parallel to each other, and that the undersides of the mounting lugs make full contact with the arms. If this is not the case you may distort the crankcase when you tighten the screws or nuts.

Alternatively the motor may be installed using the crankcase backplate screws, but in this case it is essential to use screws of adequate length: they must extend into the crankcase by at least 2.5 x the screw diameter.

Webra motors can be installed in any orientation, i.e. upright, inverted or "sidewinder".

2. Fuel tank system

The height of the fuel tank is important: the centre of the tank should be approximately the same height as the needle valve. Wherever possible install the tank as close to the motor as you can. We recommend the use of a pressurised fuel tank, but if the tank has to be positioned some distance away a fuel pump may be used (**Webra** membrane pump - see Main Catalogue). If you

are using a pressure tank connect the tank overflow to the pressure take-off nipple on the exhaust system using heat-resistant silicone tubing.

When assembling the fuel tank system ensure that the clunk pick-up is able to collect fuel in every possible position and attitude. Vibration tends to cause fuel foaming, and this can result in an uneven flow of fuel to the motor. You can prevent this by packing the fuel tank in foam rubber.

Fuel tubing should have an internal diameter (I.D.) of at least 2 mm. Select tubing whose walls are as thick as possible, as this reduces its tendency to kink or become squashed when deployed in a tight curve in the model. Use a filter in the fuel feed line to the carburettor or pump. Never "back-fill" the fuel tank via this filter, as this may deposit particles of dirt on the "wrong" side the filter, which may therefore reach the carburettor or pump. Filters should be checked and cleaned at regular intervals; it is always better to replace the filter if there is any indication that it may be blocked.

3. Fuels

For high performance and smooth, reliable running it is of the utmost importance to use clean fuel of the correct composition.

During the running-in phase we recommend a fuel containing 20% **high-quality castor oil** (first pressing) or a **synthetic running-in oil**. When the running-in phase is complete you can switch to any standard commercial fuel, based on the fuel table below. **Always use high-quality fuel!**

Fuel mixture	Running-in	Normal operations
Methanol	80 %	82 %
Castor oil	20 %	0 (2)%
Synthetic oil	-	18 (16)%
Nitro-methane	-	0 - 15 % *)

*) When nitro-methane is added, reduce the methanol content by the same amount.

As a general rule all Webra motors will run properly on "straight" fuel, i.e. without nitro-methane. It is possible to use "nitro", but you must ensure that the oil content is not reduced when nitro is added, i.e. you must reduce the methanol content instead. As a general rule an addition of 5 - 15% nitro-methane is sufficient; this improves the motor's idling characteristics, overall power and starting characteristics. If you wish to use higher nitro-content fuel, the motor's compression ratio must be reduced by fitting a shim washer (approx. 0.2 mm) under the cylinder head. For model aircraft motors we recommend fuels containing at least 15% high-quality synthetic oil; for model helicopters the oil content should be at least 18%. High-nitro synthetic-based fuels (more than 20% nitro-methane) generally require a higher percentage of oil. For castor-based fuels we recommend 20% oil content (25% for high-nitro fuels).

4. Silencers / tuned pipes

Webra offers matching silencer systems for all its motors. In our main catalogue you will find the correct type for your motor and model, and your local model shop should be able to show them to you. Please note that a silencer which is too small or is unsuitable in some other respect may reduce the motor's performance and might even cause damage to it.

Silencers and exhaust manifolds are attached to the motor by means of screws or studs (don't forget the gasket). Make sure these parts are properly seated and tightly fixed, as model motors are subject to extreme temperature fluctuations which tend to loosen attached components. In any case it is good practice to check all screwed joints and other connections involving the motor at regular intervals.

If you are using a tuned pipe please refer to the table printed alongside which states the approximate pipe lengths required.

The graph shows the appropriate tuned pipe lengths for various rotational speeds. Of course, the stated figures are only a guideline, as the optimum length also varies according to the type of pipe and the operating temperature. It is worthwhile experimenting with the pipe length in a series of flight-tests, as this is the only way to establish the length at which a significant power increase becomes noticeable. It is important to know that too short a pipe can damage the motor as well as produce unsatisfactory running characteristics.

5. Propeller

The correct choice of propeller is very important if you wish to exploit the full performance of which the motor is capable. The main catalogue states the recommended propeller sizes for each motor type.

Caution! All propellers must be balanced carefully before they are fitted to the motor. Unbalanced propellers generate vibration which can result in damage to motor and model, and even personal injury. Be sure to read the instructions supplied with the propeller.

6. Glowplug

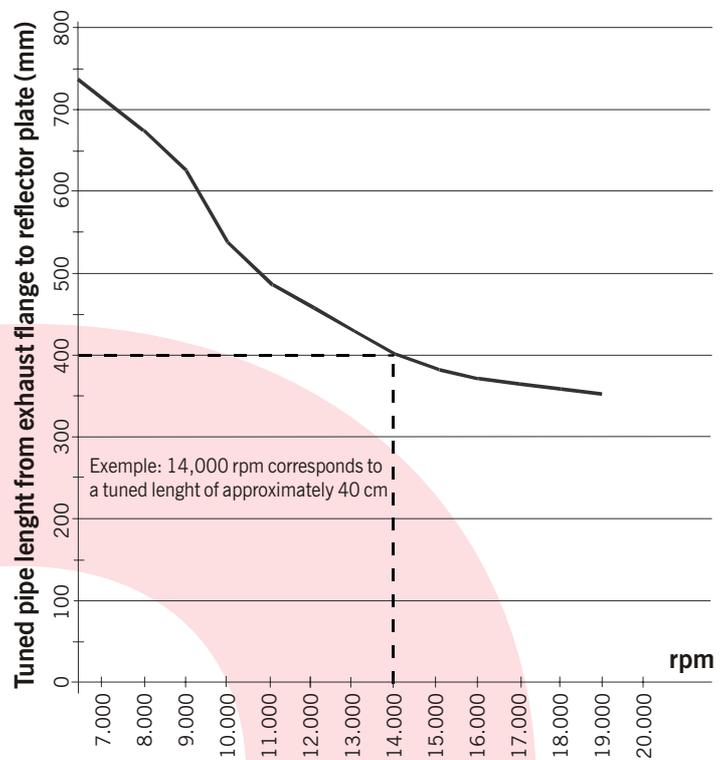
Selecting a glowplug with the correct heat rating is of similar importance, as the motor will only run smoothly at all speed ranges if an appropriate plug is in use. The basic rule is to choose a plug to suit the type of fuel and the motor's actual speed range. Low rotational speeds and low-nitro fuels require a hotter glowplug, whereas high-nitro fuels call for a colder plug. However, the only reliable way to find the correct heat rating for your application and conditions is to try out different types under practical conditions. The following **Webra** glowplugs are available from any good model shop:

Order No.	Heat rating	Application
4302	hot (short-reach)	for small motors only
4303	medium	all-purpose glowplug for 3-20 cc motors
4304	hot	for 10 - 20 cc motors (low-nitro fuel)
4306	extra-hot	for four-strokes and two-strokes running at low speed (straight or low-nitro fuel)
4307	cold	for all speeds and high-nitro fuels

7. Care and maintenance

Your model motor is a precision-made product and therefore requires a certain minimum level of care and maintenance.

Please note the following points.



We recommend that you:

- install a fuel filter between fuel tank and motor to prevent particles of dirt entering the carburettor system.
- keep fuel containers clean and properly sealed at all times
- drain the fuel tank completely at the end of the day's flying.
- allow your motor to run itself dry at the end of the day's flying session to avoid or minimise corrosion effects inside the motor. This is done by allowing the motor to run at normal operating temperature, then cutting off the fuel supply (pull off the fuel feed line or close the cut-off valve). The motor then burns all the remaining fuel completely, thereby removing residues from the motor. Leave the fuel supply line disconnected until the next day's flying.
- fit an air filter over the air intake to prevent foreign bodies entering the carburettor.
- keep the exhaust system clean. The operational cycle of two-stroke motors dictates that they suck in additional air through the exhaust port (silencer). It is therefore advisable to check your exhaust system regularly for exhaust residues, oil deposits and foreign bodies which could be ingested by the motor, and remove anything you find. To ensure long-term freedom from motor damage you may even have to replace the exhaust occasionally.
- ensure that no unburned fuel residues are allowed to enter the motor via the exhaust system. These residues are acidic and will lead to corrosion.
- clean the motor carefully and thoroughly if foreign bodies enter it (e.g. after a crash): carefully remove the cylinder head and crankcase backplate and wash the motor out thoroughly with fresh fuel. Clean all the parts, then lubricate them with non-acidic oil before re-assembly. If the motor is damaged send it to your local Webra Service Centre.
- do not dismantle the motor unnecessarily (please read the Guarantee Conditions);
- check the motor for damage and wear before laying it up for an extended period; clean it carefully and preserve it with non-acidic oil.
- store the model, with the motor installed, in a dry room with low humidity. The exhaust system and fuel tank should be free of fuel residues.

Running-in

All the components of Webra motors are precision-made, with close-tolerance fits and specially finished surfaces.

Nevertheless, every new motor requires a certain period of running-in so that the surfaces of the sliding and rotating parts are able to bed themselves in. If you have relatively little experience with model power plants we recommend that you install the motor in a firmly anchored test-stand prior to running the motor in.

Before you commence the running-in process you should ensure that you know the type of piston / cylinder combination fitted to your motor. Basically **Webra** manufactures two types of system:

- a) Unringed piston, e.g. ABC, ABN (GT)
- b) Ringed piston, e.g. steel liner / ringed piston or AAR

Important: model motors with unringed pistons (ABC, ABN) must never be turned over slowly without sufficient lubrication. This type of construction causes the piston to be a very tight fit at the top of its stroke (TDC); this is necessary so that the piston provides an optimum seal in the cylinder liner when the motor has reached its operating temperature, once the correct running-in procedure has been completed.

ABC = abbreviation of **ALUMINIUM -BRASS - CHROMIUM**: a non-ringed aluminium piston is machined to a precision fit in the cylinder liner. Its tapered shape produces an optimum seal at the top of the stroke, guaranteeing greater power. The thermal expansion coefficient of the chrome-plated brass cylinder liner is relatively high compared to steel liners, and this minimises the tendency of the piston to tighten up (motor "goes sick") if the mixture setting is slightly lean.

ABN = abbreviation of **ALUMINIUM BRASS - NICKEL**: all GT versions of **Webra** motors are fitted with this combination of piston and liner. The cylinder liner is plated with nickel which undergoes a special process (tempering) for high strength. A ringless aluminium piston is used, machined to a precision fit in the cylinder liner. The characteristics of this combination are similar to those of ABC versions.

AAR = abbreviation of **ALUMINIUM ALUMINIUM - RING**: in this case the piston and cylinder liner are both made of aluminium, but the cylinder liner is finished with a "Special Surface Coating". A rectangular-section piston ring is responsible for sealing the combustion chamber. This combination provides optimum heat dispersion, producing maximum possible performance and significantly improved durability compared to conventional piston/liner combinations.

Running-in motors for fixed-wing model aircraft

We recommend that you run-in your Webra motor using a propeller of slightly larger diameter and lower pitch than you would normally use, i.e. for flying a model (see main catalogue). Note that you may damage the motor by using a propeller of excessive pitch or insufficient diameter.

Use a fuel containing 20% **high-quality castor oil** (first pressing) or a **synthetic running-in oil**. Other types of fully synthetic lubricant should be avoided, as they may contain wear-reducing additives which prolong the running-in period or even prevent the bedding-in process occurring at all.

To start your motor squirt a few drops of fuel into the carburettor and turn the propeller over briskly in the correct direction of running (anti-clockwise as seen from the front). Adjust the carburettor so that you can see an air gap about 2 - 3 mm wide in the throttle barrel. Unscrew the glowplug. Connect the

glowplug clip to a suitable battery (1.5 - 2 V), then connect the clip to the glowplug: the plug filament should now glow bright red. Screw the glowplug into the motor again and connect it to the battery. Close the high-speed needle, then open it by about 2 - 3 full turns. The motor can now be started by "flicking" it, using fast, powerful movements of your hand and arm; alternatively use a suitable starter. When the motor starts, leave the glow clip connected to the glowplug for about half a minute to allow the motor to warm up, then disconnect it. The motor will be running very "rich" at this point; adjust the carburettor to the point where the motor is just breaking from a "four-stroke" (not firing every revolution) to a "two-stroke" (firing smoothly every revolution). Set the idle (see Carburettor Instructions) to a speed of around 4000 rpm.

The motor is now running rich, and should be operated for a total period of about 30 minutes in this condition, **varying the speed constantly** over the full range available. Allow the motor to warm up to full operating temperature, otherwise it may suffer premature wear or corrosion.

At this point it is safe to continue the running-in process in your model, flying it fairly gently at first, varying the speed between full-throttle and idle. Between flights **slowly** adjust the carburettor to obtain a leaner mixture, gradually working towards the setting at which the motor generates full power.

Running-in motors for model helicopters

The running-in procedure for helicopter motors is similar to that described for fixed-wing power plants, but please note one important point: the motor must never be run under no-load conditions whilst installed in the helicopter mechanics.

If your motor features a PROMIX or ULTRAMIX carburettor, it is important to understand from the outset that the mid-range needle (idle needle) also affects the setting of the high-speed needle (see Carburettor Instructions).

Allow the motor to warm up, then carry out a series of short hovering flights, varying motor speed constantly. Slowly increase the throttle / collective pitch setting while the motor is running. If the model fails to lift off because the carburettor is set too rich, screw in the mid-range needle in **small** increments. To establish the correct motor setting at the hover you need to adjust the mid-range needle. Adjust the needle setting in **small** increments until the motor runs smoothly (i.e. no coughing or spluttering due to an over-rich or over-lean mixture). If motor speed is then too low for the hover, increase the throttle value at the transmitter. It is important to avoid setting the mixture too lean using the mid-range needle in an attempt to increase motor speed at the hover. The optimum setting of the high-speed needle can only be made when flying the model under power at full collective pitch. This means that you must initially approach the ideal setting slowly and gradually.

The characteristic of a properly run-in motor is that its running surfaces are perfectly bedded in, and this in turn reduces the load on the bearings. The seal of a properly run-in piston and cylinder is perfect, increasing the induction volume and minimising compression losses = optimum power generation. The motor's thermal sensitivity (tendency to overheat) is also reduced.

Caution: running a motor at maximum speed with too lean a mixture may cause damage to the motor. To avoid this always adjust the carburettor so that the mixture fed into the motor is slightly richer than the optimum (see Carburettor Instructions).

We strongly advise that you take the trouble to run-in your motor carefully, as the result will be maximum performance combined with an extended useful life.

General notes on setting up:

However, different qualities of fuel will result in a need to re-adjust carburettor settings, so the following notes are intended to help you find the correct carburettor settings for your particular application. Please remember: all adjustments should be made in small increments.

a) If the motor constantly loses speed when returned to idle, then the mixture is too rich.

Remedy: screw in the idle needle/mid-range needle (max. $\frac{1}{4}$ turn) and continue to adjust this setting until the motor idles at a constant speed.

b) If the motor stops when you open the throttle, i.e. when you increase speed, then the mixture is too lean.

Remedy: unscrew the idle needle/mid-range needle slightly until the transition is smooth and problem-free.

Too lean a setting is damaging for the motor and must be avoided at all costs!

... from practice:

- The setting of the high-speed needle must be adjusted exclusively with the carburettor fully open and the motor under full load - in a model helicopter at full collective pitch and full throttle. It is not possible to set the optimum fuel quantity for a smooth, reliable motor run unless the throttle is wide open.

- **Caution:** If the motor is too rich in the mid-range, never attempt to correct this by screwing in the high-speed needle again. This can easily cause damage to the motor later when it is run at high speed under load.

- Much of the time helicopters are flown with mid-range throttle settings, i.e. in the range $\frac{1}{2}$ to $\frac{3}{4}$. However, you still need to be careful to avoid an excessively lean high-speed setting, because the carburettor may be fully opened for brief periods if you use a speed regulator (governor), even though you may move the stick in the opposite direction. In such cases too lean a setting of the high-speed needle can still cause damage to the motor.

- In particularly difficult cases you may find it advantageous to be able to fine-tune the high-speed needle when the model is in the air (mixture adjustment). The parts required for this are available from your model shop.

Guarantee Conditions **webra** model motor

Webra Modellmotoren GmbH & Co. KG (**Webra**) guarantees that this model motor is free of material and manufacturing defects for one year from the date of purchase. This guarantee may be at variance with standard statutory requirements.

This guarantee only applies to model motors which are purchased new from **Webra** or the company's official distributors. The guarantee is invalid if:

- the motor is damaged due to failure to heed the operating instructions, the use of incorrect fuel, lubricant or other accessory, or incompetent handling or usage;
- it can be shown that unauthorised modifications have been carried out to the motor;
- mechanical damage or other defects are present which did not result from, or were not caused by, manufacturing defects;
- the damage is due to normal wear and tear;
- the motor has been repaired by any person or agency other than **Webra** or an authorised Webra Service Centre.

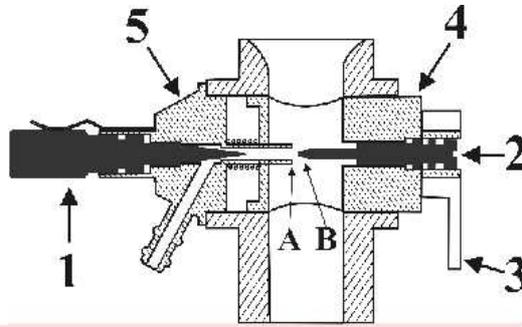
If the **Webra** model motor exhibits a material or manufacturing defect within one year of purchase, it should be sent to a **Webra** Service Centre or an authorised **Webra** dealer. Transport costs must be paid in advance. Enclose with the motor your name and address together with the purchase receipt and a concise description of the fault, stating the fuel and accessories (silencer, glowplug etc.) used. **Webra** reserves the right to provide a replacement for the defective product or repair it at no charge. If a repair is carried out or a replacement is provided, **Webra** guarantees the product for the residual period of the original guarantee. **Webra's** liability and your rights under this guarantee are strictly limited to the repair or replacement of the defective product.

No guarantee claims beyond these conditions, neither explicit nor implicit, will be considered. **Webra** does not accept liability for accidental damage, consequent or other damage, costs or expenditure, with the exception of the repair or replacement service described above. Your statutory rights are not affected by these conditions.

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Carburettors

TN II Carburettor



- 1 High-speed needle
- 2 Idle needle
- 3 Throttle arm
- 4 Throttle barrel
- 5 Spraybar

Basic settings:

Your carburettor has been set up at the factory, so normally only a slight adjustment will be necessary. However, if your carburettor has lost its factory settings for any reason, proceed as follows:

1. The first step is to adjust the travel of the throttle barrel (4) in such a way that the full area of the intake opening is exposed at the full-throttle position, and a slit about 0.8 mm wide remains open at the idle position. The barrel's travel can only be fine-tuned by adjusting the throttle servo.
2. Close the high-speed needle (1) fully, then open it by 2 - 2½ turns;
3. Close the idle needle (2), then open it by about 2 - 2½ turns.
4. Now start the motor with the throttle barrel (4) about half-open. Allow the motor to warm up for a few seconds, then apply full-throttle and set the motor to maximum speed by adjusting the high-speed needle (1).
5. The idle and mid-range settings cannot be adjusted to their optimum values until the motor has been fully run-in.

To grasp the principle of the **TN II** carburettor it is important to understand that the high-speed needle (1) only affects the high-speed range, and the idle needle (2) only affects the idle range. The tapered tip of the idle needle (B) influences the idle range in conjunction with the fuel supply opening in the spraybar (A).

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PROMIX II Carburettor



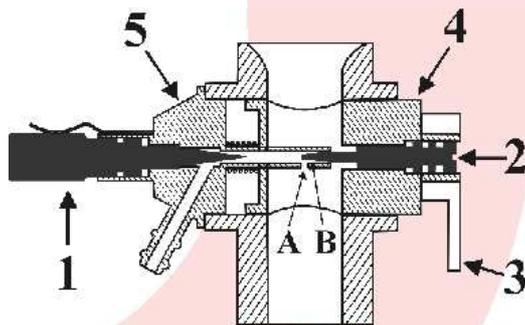
Basic settings:

Your carburettor has been set up at the factory, so normally only a slight adjustment will be necessary. However, if your carburettor has lost its factory settings for any reason, proceed as follows:

1. The first step is to adjust the travel of the throttle barrel (4) in such a way that the full area of the intake opening is exposed at the full-throttle position, and a slit about 0.8 mm wide remains open at the idle position. The barrel's travel can only be fine-tuned by adjusting the throttle servo.
2. Close the high-speed needle (1) fully, then open it by 2 - 2½ turns;
3. Close the mid-range needle (2), then open it by about 3 - 3½ turns.
4. Now start the motor with the throttle barrel (4) about half-open. Allow the motor to warm up for a few seconds, then apply full-throttle and set the motor to maximum speed by adjusting the high-speed needle (1).

5. The idle and mid-range settings cannot be adjusted to their optimum values until the motor has been fully run-in.

The **Webra PROMIX** carburettor must be operated either in conjunction with a pressurised fueltank (pressure take-off from silencer) or with a fuel pump. This carburettor is not designed to work on suction feed.



- 1 High-speed needle
- 2 Mid-range needle
- 3 Throttle arm
- 4 Throttle barrel
- 5 Spraybar

To grasp the principle of the **PROMIX** carburettor it is important to understand that the tapered tip of the mid-range needle (B) affects the full speed range in conjunction with the regulating slot in the spraybar (A). In practice this means that the mid-range needle (2) affects the entire mid-range, i.e. from the idle setting to about ¾ throttle. The high-speed needle (1) only affects the high-speed range. The advantage of this principle over conventional twin-needle carburettors (TN types) is that there is no tendency for the mixture to become excessively rich in the mid-speed range.

ULTRAMIX Carburettor

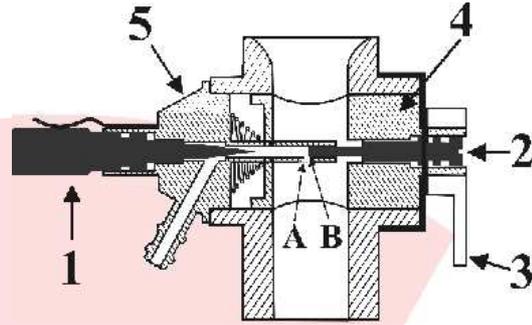


Basic setting:

Your carburettor has been set up at the factory, so normally only a slight adjustment will be necessary. However, if your carburettor has lost its factory settings for any reason, proceed as follows:

1. The first step is to adjust the travel of the throttle barrel (4) in such a way that the full area of the intake opening is exposed at the full-throttle position, and a slit about 0.8 mm wide remains open at the idle position. The barrel's travel can only be fine-tuned by adjusting the throttle servo.
2. Close the high-speed needle (1) fully, then open it by 2 - 2½ turns;
3. Close the mid-range needle (2), then open it by at least 3½ turns.
4. Now start the motor with the throttle barrel (4) about half-open. Allow the motor to warm up for a few seconds, then apply full-throttle and set the motor to maximum speed by adjusting the high-speed needle (1).
5. The idle and mid-range settings cannot be adjusted to their optimum values until the motor has been fully run-in.

The **Webra ULTRAMIX** carburettor must be operated either in conjunction with a pressurised fueltank (pressure take-off from silencer) or with a fuel pump. This carburettor is not designed to work on suction feed.



- 1 High-speed needle
- 2 Mid-range needle
- 3 Throttle arm
- 4 Throttle barrel
- 5 Spraybar

The **ULTRAMIX** carburettor works on the principle of proportional fuel metering; this provides precise throttle control over the motor's full speed range, combined with a significant power increase. To grasp the principle of the **ULTRAMIX** carburettor it is important to understand that the tip of the mid-range needle (B) affects the full speed range in conjunction with the shape of the regulating slot in the spray bar (A). In practice this means that the mid-range needle (2) affects the entire speed range, i.e. from the idle setting to full speed. The high-speed needle (1) only affects the full-throttle range

DYNAMIX Carburettor



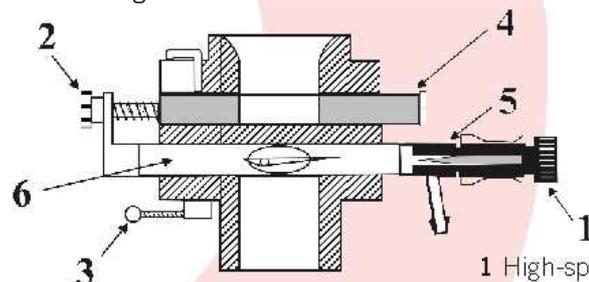
Basic setting:

Your carburettor has been set up at the factory, so normally only a slight adjustment will be necessary. However, if your carburettor has lost its factory settings for any reason, proceed as follows:

1. The first step is to adjust the travel of the throttle slider (4) in such a way that the full area of the intake opening is exposed at the full-throttle position, and a slit about 0.8 mm wide remains open at the idle position. If the throttle slider's travel is insufficient or excessive, the throttle arm (3) can be shortened or lengthened as required.
2. Close the high-speed needle (1) fully, then open it by 6 - 8 turns;
3. The idle mixture is adjusted by means of the knurled nut (2) which is located on the throttle slider (4). Note that screwing the nut in (clockwise) produces a richer idle mixture; unscrewing it (anti-clockwise) leans out the mixture.
4. Now start the motor with the throttle slider (4) about half-open. Allow the motor to warm up for a few seconds, then apply full-throttle and set the motor to maximum speed by adjusting the high-speed needle (1).

5. The idle and mid-range settings cannot be adjusted to their optimum values until the motor has been fully run-in.

The **Webra DYNAMIX** carburettor must be operated either in conjunction with a pressurised fueltank (pressure take-off from silencer) or with a fuel pump. This carburettor is not designed to work on suction feed.



- 1 High-speed needle
- 2 Idle adjuster
- 3 Throttle arm
- 4 Throttle slider
- 5 Spraybar
- 6 Regulating

The **Dynamix** carburettor provides a series of advantages:

1. Automatic mixture control, effective from idle right through to full-throttle.
2. An accelerator pump which injects fuel when the throttle is opened quickly.
3. The intake channel is not restricted by a protruding spraybar.
4. The carburettor is operated by a threaded throttle arm terminating in a ball-link; the arm is infinitely variable in length.

If your **Webra** motor does not operate correctly despite following our instructions, the following table should help you locate the problem.

Fault	Cause	Remedy
Motor fails to start	Glowplug burned out or wrong rating	Replace glowplug; fit correct type
	Glowplug not glowing bright red (check before fitting)	Recharge glowplug battery; check glowplug clip for good contact; check glowplug cable
	Motor being fed too much fuel (motor “bites back”)	Unscrew plug, turn motor over several times briskly; check carburettor settings (see Carburettor Instructions)
	Motor being fed too little fuel	Check carburettor settings (see Carburettor Instructions)
	Motor not drawing fuel	Check fuel feed line and fuel filter for leaks and blockages, check carburettor settings (see Carburettor Instructions)
Motor starts, then stops after glowplug battery is disconnecte	Glowplug burned out or wrong rating	Replace glowplug, fit correct type
	Poor fuel (e.g. excessive water content)	Use fresh fuel mix. Never leave fuel container open!
	Carburettor set too rich	Check carburettor settings (see Carburettor Instructions)
	Glowplug or cylinder head loose	Check plug / retaining screws; tighten if necessary
	Cylinder / piston worn out	Send motor to Webra Service Centre, or obtain replacement parts through local model shop
Motor stops after brief period of running	Incorrect carburettor settings	Check carburettor settings (see Carburettor Instructions)
	Fuel feed line or filter dirty	Clean fueltank systems including fuel lines and filter
	Carburettor dirty	Clean carburettor
	Glowplug burned out or wrong rating	Replace glowplug, fit correct type
	Pick-up hose to clunk faulty or kinked	Replace pick-up hose with suitable tubing
	Pressure supply to fueltank not present or inadequate	Check pressure connection between silencer / tuned pipe and clean if necessary
Motor loses power after reaching operating temperature	Motor overheating	Running-in process not completed (motor going “off song”) Continue running-in with rich carburettor setting. Improve cooling air flow in the model
	Motor “peaked out” too far	Check carburettor settings (see Carburettor Instructions)
	Cylinder / piston worn out	Send motor to Webra Service Centre, or obtain replacement parts through local model shop
Motor runs irregularly	Motor “peaked out” too far	Check carburettor settings (see Carburettor Instructions)
	Glowplug burned out or wrong rating	Replace glowplug; fit correct type
	Incorrect tuned pipe length or incorrect/ too small silencer	Check tuned pipe length (see table); check silencer, fit correct original replacement silencer if necessary
	Cylinder / piston worn out	Send motor to Webra Service Centre, or obtain replacement parts through local model shop
	Motor overheating	Running-in process not completed (motor going “off song”) Continue running-in with rich carburettor setting. Improve cooling air flow in the model
	Pressure supply to fueltank not present or inadequate	Check pressure connection between silencer / tuned pipe and clean if necessary
Glowplugs burn out regularly	Incorrect glowplug type	Replace glowplug with correct heat rating to suit type of fuel in use
	Compression too high	Fit 0.2 mm shim washer under cylinder head
Motor runs “roughly”	Unbalanced or poorly balanced propeller or other rotating part	Check true-running of rotating parts; balance propeller accurately
	Motor mounting screws loose	Secure all screws with spring washers, self-locking nuts or thread-lock fluid
	Incorrect carburettor settings	Check carburettor settings (see Carburettor Instructions)
	Incorrect speed range	Fixed-wing: fit correct size of propeller Helicopter: adjust gearbox ratio and collective pitch settings to obtain favourable motor speed range
	Compression too high	Fit spacer washer under cylinder head
Motor runs “roughly”		Send motor to Webra Service Centre



Safety Notes and Warnings relating to Model Motors



Please take the trouble to read right through the operating instructions before you attempt to run the motor for the first time.

This sheet is an integral part of the operating instructions and must be stored in a safe place. If you ever dispose of the motor be sure to pass on the full instructions to the new owner.

Please bear in mind that model motors are not "**playthings**". They are high-performance internal-combustion engines which develop more than enough power to injure you and anybody else if handled incorrectly or carelessly, or if you disregard these safety notes.

This motor must not be operated by young persons under 14 years except under the supervision of an experienced and competent adult. The motor must not be used for any purpose with the exception of that intended by the manufacturer, i.e. as the power plant for particular types of working models.

Please note: You alone bear the full responsibility for the safe handling and operation of your model motor, and are responsible for any damage or injury which it may cause.



Propellers, rotors and all rotating parts which are driven by a model represent a constant injury hazard. Never touch any such components with any part of your body. A spinning propeller can easily cut off a finger!



Never run model motors indoors as they generate lethal carbon monoxide gas, just like full-size car engines. Your motor may only be run in the open air. Model fuels are TOXIC! Do not allow fuel to contact your eyes or mouth. Model fuel must be stored exclusively in clearly marked containers, well out of the reach of children.



Model fuel is highly inflammable. Keep your model fuel well away from open flames, any hot object or environment or source of ignition. You and your companions must not smoke in the immediate vicinity of model fuels or fuel vapour.



Model motors and their exhaust systems become very hot when running. Do not touch any part of the motor or exhaust, and keep well clear of hot exhaust gases and liquid combustion residues, as they can cause serious burns. Don't touch any part of the motor or its exhaust system until they have cooled down to ambient temperature.

- In the interests of safety your motor should always be mounted in a dedicated test-stand (available from your local model shop) for running-in and testing. Never clamp your motor directly in a vice! If the motor is to be installed in a model, fix it firmly and securely to a strong, rigid motor mount. Satisfy yourself that the motor and motor mount are secured using screws and locked nuts of adequate size.

- Ensure that all screwed joints are tightened fully.

- Check that the diameter and pitch of the propeller (or rotor blades) are the correct size for your motor - information on this matter is widely available: your model's plan, the model manufacturer's data sheets, even your local model shop staff will be glad to advise. For motors of .40 cu. in. (6.5 cc) capacity and larger we recommend that you use wooden propellers exclusively. If you wish to use a non-wooden prop (plastic etc.) read carefully the handling notes supplied

by the manufacturer. Rotor blades should only ever be used in strict accordance with the recommendations of the model manufacturer and rotor blade manufacturer.

- Never stand in the rotational plane of revolving propellers or rotors. If any part should break or come loose it will fly off within that plane, and may cause serious personal injury.

- Every time you intend to start the motor check all parts connected to it, e.g. propeller, rotor, gearbox etc., for possible damage. Do not run the motor if you detect any damage; eliminate the fault first.

- Always use an effective silencer, and observe any noise restrictions and statutory quiet periods in your neighbourhood. Wear ear defenders when running your motor.

- If there are spectators or passers-by watching your activity, be sure to warn them of the possible danger - especially if there are children amongst them. Insist that they keep a safe minimum distance (at least 5 m) away from the motor.

- Do not attempt to start the motor with your unprotected fingers; use a starting aid such as an electric starter or a piece of stout wooden dowel with water hose over the contact surface.

- All carburettor adjustments should be carried out from a position behind the rotational plane of the propeller (or below the rotor plane). Keep your hands as far away as possible from the spinning propeller or rotor blades.

- It is important to be aware of the danger of loose clothing (such as wide sleeves, scarves etc.), and tools and other objects in your pockets. These can easily get dragged into the spinning propeller or fall into the rotor and get tangled, and this can be extremely dangerous.

- Don't run your motor on or close to a loose surface (e.g. sandy ground), as stones, sand and other particles can be tossed around and flung into your face, injuring you and anyone else close by. Wear protective goggles if you are not sure.

- Glowplug clips and cables should be kept well clear of the propeller, rotor or other revolving parts. Check that the carburettor linkage and control system cannot foul any moving parts.

- Be particularly careful if you have to carry your model with the motor running. Keep the rotating parts well away from yourself and other people.

- The motor should only ever be stopped by setting the carburettor to the appropriate position or by cutting off the fuel supply (operating the cut-off valve, disconnecting the fuel feed line etc.). Don't attempt to slow or stop the motor with your hands or any other object. Never throw a cloth into the propeller to stop the motor.

- Internal-combustion motors must never be run under no-load conditions (no propeller, no rotor etc.).

- When working on the running motor make sure that you are standing on a firm surface, and ensure that the model is adequately secured.

- For safe operation of any model motor, whether it is in a fixed-wing model aircraft or a model helicopter, a responsible attitude and a certain level of competence and skill are of great importance. If you are not sure of any point, ask an experienced modeller for help, or seek the advice of your local model shop staff.