

INSTRUCTIONS FOR THE O.S. TYPE 60B CARBURETTOR

The O.S. Type 60B is an entirely new carburettor of sophisticated design that has been developed specifically for the O.S. MAX-61SX-H and MAX-61RX-H series helicopter engines designed for F.A.I. F3C competition use.

It incorporates a total mixture control system that enables the helicopter expert to fine-tune his engine to suit individual requirements at different stages, i.e. at idling speeds, in the hovering mode and in high-speed flight. Once the adjustments have been correctly set, the carburettor automatically controls the fuel/air mixture strength through the entire performance range.

The Type 60B is also fitted with a special insulating sleeve to minimize the transfer of heat from the engine to the carburettor body. An excessively hot carburettor preheats the fuel/air mixture and lowers the weight of the charge entering the combustion chamber, thereby reducing power output. Also, variation in carburettor temperature can have an adverse effect on throttle response.

Three adjustable mixture controls are fitted to the Type 60B. They are as follows.

A The High-Speed (Main) Needle-Valve

When set to produce maximum power at full throttle, this establishes the basic fuel/air mixture strength. This is then maintained by the carburettor's automatic mixture control system to cover the engine's requirements at reduced throttle settings.

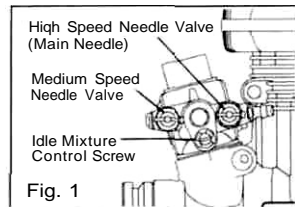
B The Idle Mixture Control Screw

This provides the means of manually adjusting the 60B's mixture control valve. -By setting the Mixture Control Screw for the best idling performance, the mixture control valve automatically ensures that fuel is accurately metered to maintain the correct mixture strength as the throttle is opened.

C The Medium Speed Needle Valve

This is an extra control that can be brought into play, if necessary, after adjusting A and B above. It provides the means of fine-tuning mixture strength over that all-important part of a helicopter's throttle range where the model is flying in, or near, the hovering mode.

Note: The Type 60B is not fitted with an adjustable throttle stop screw. The throttle linkage to the servo should be arranged so that the throttle trim lever on the transmitter can be used to set the required idling speed. This also provides the means of stopping the engine from the transmitter.



PROVISIONAL SETTINGS

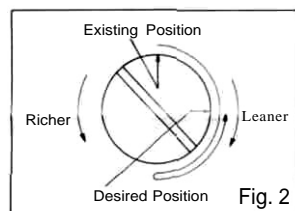
Use a muffler-pressurized fuel feed and, before starting the engine for the first time, check that the three mixture controls are set up as follows

1. High-Speed Needle Valve: exactly two turns open from the fully closed position. (**Note:** If a different muffler is used, this setting may require readjustment.)
2. Idle Mixture Control Screw : exactly two turns open from the fully closed position.
3. Medium Speed Needle Valve : exactly one turn open from the fully closed position.

ADJUSTMENT

Please observe the following before beginning to make any adjustment.

- a High-Speed Needle Valve. Turn this approximately 30 (3 to 4 clicks) at a time, when making initial adjustments; then in steps of approximately 15° (1 to 2 clicks) when making final adjustments.
- b Idle Mixture Control Screw. A special technique is required here. (see Fig. 2.) If intending to make an adjustment (e.g. 90°) in one direction, first turn the screw an extra 90° in the same direction, before returning it to the new setting. If this procedure is not followed, movement of the throttle rotor may become stiff, resulting in undue loading of the throttle servo.
- c Medium-Speed Needle Valve. Turn approximately 45° (4 to 5 clicks) at a time.



The general course of adjustment procedure is shown in the ADJUSTING CHART and is correct for a fuel containing 20% lubricant and a nitromethane content of between 10% and 30%. Bear in mind that fuels containing relatively large percentages of power-boosting nitromethane operate at richer mixture settings than are needed for mild fuels and will, therefore, require the High-speed Needle Valve to be readjusted accordingly. The type and percentage of lubricant used is also a factor here, as noted later in these instructions.

ADJUSTMENT PROCEDURE

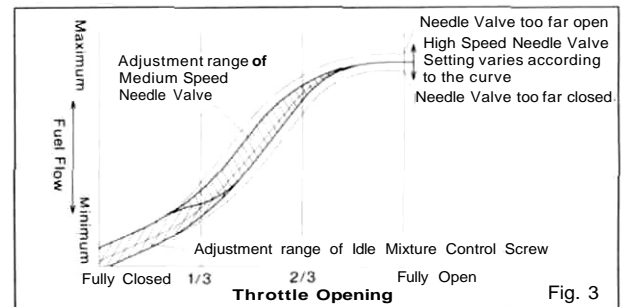
As a safety measure, first check the transmitter controls, including the throttle stick and trim lever positions, and hold the main rotor securely before starting the engine.

1. Warm the engine by allowing it to idle for about 30 seconds. If the engine stops, advance the throttle trim lever slightly to

increase the idling rpm. Then open the throttle sufficiently to 'float' the model above the ground.

If, at this time, the engine is slow to pick up and produces an excess of exhaust smoke, the mixture is too rich. Correct this condition by turning the Mixture Control Screw clockwise. If the mixture is extremely rich, engine rpm will become unstable: opening the throttle will produce a great deal of smoke and rpm may drop suddenly or the engine may stop. This condition may also be initiated by an excessively prolonged warming-up period.

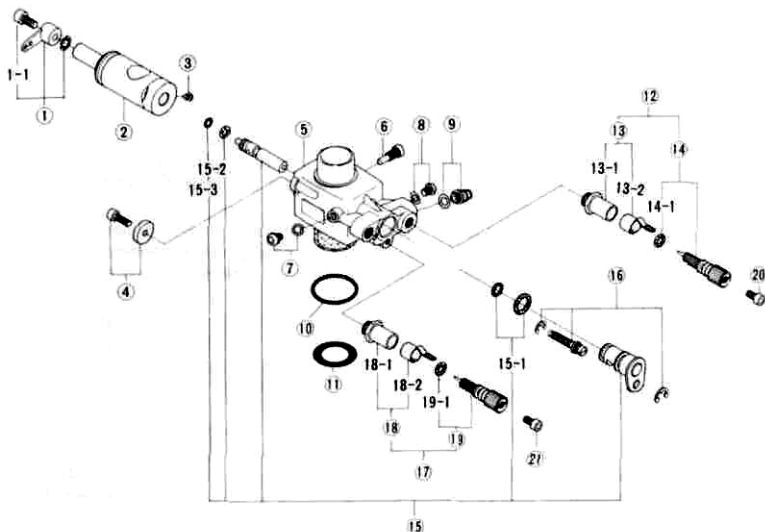
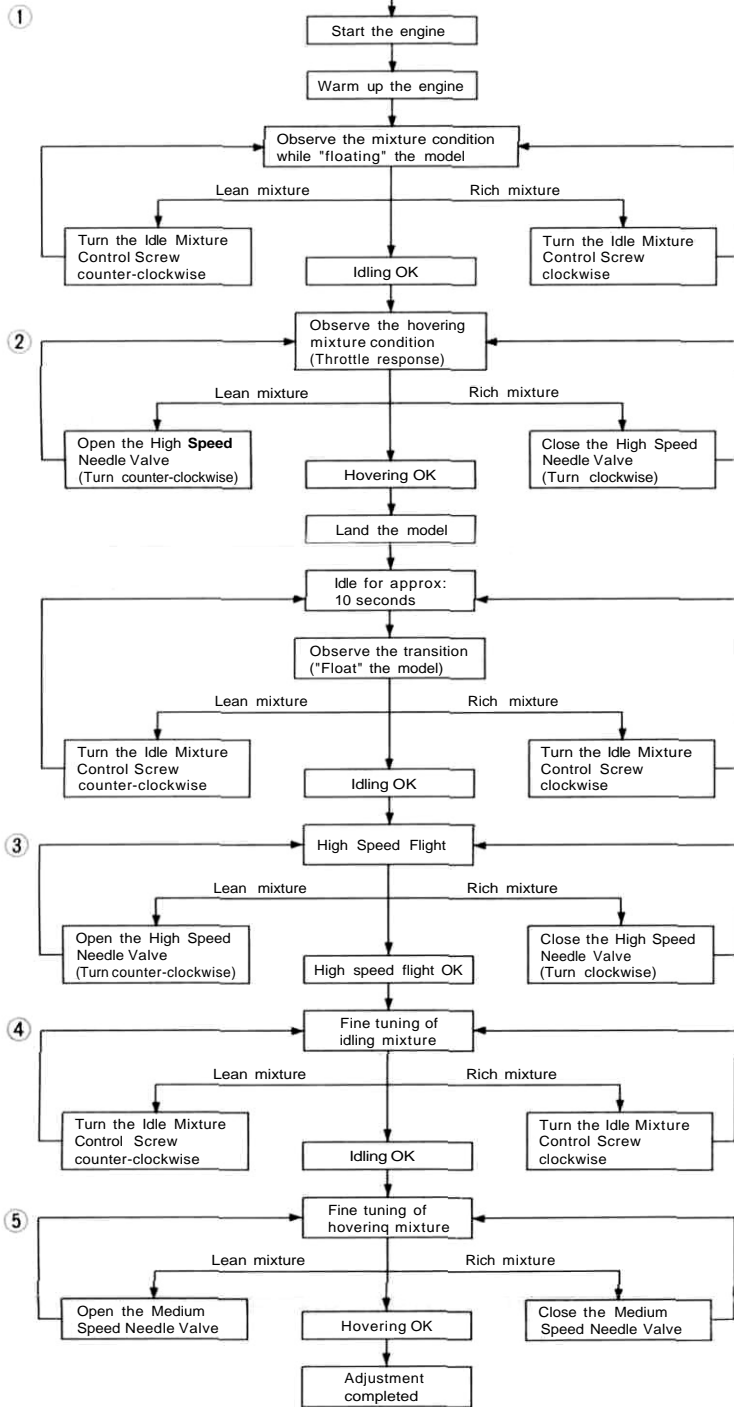
If, on the other hand, the mixture is too lean, this will be indicated by a marked lack of exhaust smoke and a tendency for the engine to cut out when the throttle is opened. In this case, turn the Mixture Control Screw counter-clockwise to enrich the mixture.



2. Having provisionally set the idle mixture, the next step is to adjust the mixture for hovering flight. Hover the model and actuate the throttle to observe response over the medium speed range. If the engine smokes excessively and throttle response is poor, the mixture is too rich: in which case, land the model and turn the High-Speed Needle Valve clockwise. Do not close the High-Speed Needle Valve more than the recommended initial adjustment (3 to 4 clicks) at a time, keeping it a little on the rich side at this stage. DO NOT touch the Medium Speed Needle Valve. If, on the other hand, hovering is not stable and response to the throttle is over-sensitive, or if the engine tends to overheat, this indicates that the mixture is too lean and should be corrected by turning the High-Speed Needle Valve counter-clockwise. When satisfactory hovering flight has been achieved, land the model again and re-check the engine's idling qualities. After about 10 seconds of idling, open the throttle to 'float' the model. If the transition is smooth, the idle mixture is O.K. If the symptoms of either rich or lean running are observed, readjust the Idle Mixture Control Screw accordingly.
- Note:** With this carburettor, neither the Idle Mixture Control Screw adjustment, nor the Medium Speed Needle Valve adjustment has any effect on mixture strength when the throttle is fully (or almost fully) open.
3. Now adjust the High-Speed Needle Valve to achieve the best performance when the model is flying at full throttle. If, at full throttle, acceleration is poor, the exhaust is unduly smoky and the model fails to reach expected straight line speed, the mixture is too rich and the High-Speed Needle Valve setting will need to be reduced. If, however, after smoothly accelerating to satisfactory high-speed straight and level flight, power is lost when the model is pulled up into a climb, the mixture is too lean. In this case, land the model immediately and readjust the High-Speed Needle Valve to a richer setting.
4. Having now found the optimum setting for the High-Speed Needle Valve, re-check the engine's idling performance, fine-tuning the Idle Mixture Control Screw, if necessary, to perfect the idle.
5. Now re-check hovering performance. It may be found that (with the High-Speed Needle Valve now set for optimum full-throttle performance) hovering will reveal symptoms of slightly lean running at medium speeds. DO NOT touch the High-Speed Needle Valve. It is at this point that the Medium Speed Needle Valve, previously kept one turn open, may be brought into operation. Open the Medium Speed Needle Valve 45°, or 4-5 clicks, then fine tune until the optimum hovering performance is obtained. If on the other hand, hovering reveals rich running, close the

ADJUSTING CHART

High Speed Needle Valve—2 turns opened from fully closed position.
 Medium Speed Needle Valve—1 turn opened from fully closed position
 Idle Mixture Control Screw—2 turns open from fully closed position



Medium Speed Needle Valve gradually until the optimum hovering performance is obtained.

Note: It is NOT necessary to open the Medium Speed Needle Valve if symptoms of lean running at hovering speeds remain unconfirmed.

SUBSEQUENT READJUSTMENT

Once the engine has been run-in (see engine instructions) and the carburettor controls properly set up, it should be unnecessary to alter the mixture settings, except to make minor changes to the Main (High-Speed) Needle Valve, occasionally, to take account of differences in climatic conditions.

However, as previously mentioned, the use of a different fuel, particularly one containing more, or less, nitromethane and/or a different type or proportion of lubricating oil, is likely to call for some modification to the High-Speed Needle Valve adjustment. As a safety measure, it is advisable to increase the High-speed Needle Valve setting by an extra half-turn counter-clockwise prior to establishing the new setting. The same applies if the silencer type is changed. A different silencer may alter the exhaust pressure applied to the fuel feed and call for a revised Needle-Valve setting.

The use of a different glowplug, or changes to the main rotor and its pitch angles may also require compensating carburettor readjustments.

HEX KEY NEEDLE ADJUSTMENT

The knurled heads of the two needle valves (High-speed and Medium Speed) are provided with diagonal slots for use with a screwdriver. Alternatively for more positive location via an Allen hexagonal key, these heads also have M2.6 internal threads, into which M2.6 x 6mm Allen cap-head screws may be fitted. To avoid risk of damage to the fuel passages when tightening these screws, remove the needle valves from the carburettor and use 'Loctite' thread-lock compound to secure the screws.

CLEANLINESS

The minute particles of foreign matter that are invariably present in any fuel, may result in a carburettor malfunction; most commonly, restricted fuel flow, which may cause the engine to cut out in flight, or to run lean, overheat and probably become damaged. Be sure to use a good filter between your refuelling container and the model's fuel tank.

O.S. 'Super-Filters' (large and small) are available as optional extras. One of these, fitted to the outlet pipe inside your refuelling container, will prevent the entry of foreign matter into the fuel tank.

To clean the outside of the carburettor, use methyl-alcohol (methanol) or glow fuel. Do not use gasoline, kerosene or other petroleum based materials which may cause the silicone rubber seals in the carburettor to swell and deteriorate.

PARTS LIST

| No. | Code No. | Description |
|------|----------|--|
| ① | 27381400 | Throttle Lever Assembly (w/Screw & Washer) |
| 1-1 | 22826131 | Throttle Lever Fixing Screw |
| ② | 27981200 | Carburettor Rotor |
| ③ | 27981920 | Metering Nozzle Fixing Screw |
| ④ | 27981220 | Rotor Guide Washer (w/Fitting Screw) |
| ⑤ | 27981100 | Carburettor Body |
| ⑥ | 27981600 | Fixed Throttle Stop Screw |
| ⑦ | 27881120 | Plug Screw (w/Gasket) |
| ⑧ | 27881120 | Plug Screw (w/Gasket) |
| ⑨ | 22881953 | Fuel Inlet (w/Gasket) |
| ⑩ | 27915000 | Carburettor Rubber Gasket |
| ⑪ | 27915100 | Carburettor Sealing Washer |
| ⑫ | 27981900 | Needle Valve Assembly |
| ⑬ | 27381940 | Needle Valve Holder Assembly |
| 13-1 | 27381941 | Needle Valve Holder |
| 13-2 | 26711305 | Ratchet Spring |
| ⑭ | 27981910 | Needle (w/"O" Ring) |
| 14-1 | 24981837 | "O" Ring |
| ⑮ | 27981300 | Mixture Control Valve Assembly |
| 15-1 | 27981850 | "O" Ring Set |
| 15-2 | 27881820 | "O" Ring (L) |
| 15-3 | 22781800 | "O" Ring (S) |
| ⑯ | 27981332 | Mixture Control Screw (w/Retainer) |
| ⑰ | 27981900 | Needle Valve Assembly |
| ⑱ | 27381940 | Needle Valve Holder Assembly |
| 18-1 | 27381941 | Needle Valve Holder |
| 18-2 | 26711305 | Ratchet Spring |
| ⑲ | 27981910 | Needle (w/"O" Ring) |
| 19-1 | 24981837 | "O" Ring |
| ⑳ | 41621000 | Screw for Needle |
| ㉑ | 41621000 | Screw for Needle |

The specifications are subject to alteration for improvement without notice

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