Deco, Continentals & 1/2 Midget

Tech Manual

General Rules

This manual applies only to the following approved engines to be running in POWRI.

a. Continental models AU7R & 717.
b. Detroit Engine model # DE7R.
c. Deco Grand models DE2R & DE7R.
d. Deco DE 7R-300
e. Modular engine (MB&T) aluminum block and cylinder and iron cylinder.
f. Other similar engines and components specifically approved by POWRi replacement engines.
g. See below for 1/2 midget specifications.

The following engine rules are for use with the preceding engines when used in the Jr. & Sr Stock, Modified, "B" Modified and "AA" Modified classes.

In Deco classes all engines will be four (4) cycle, normally aspirated, air-cooled and American made. Blocks will be cast iron or similar ferrous material. No overhead valves, fuel injection, blowers or free spinning flywheels. The gearbox will not be considered a part of these engines; therefore any gearbox may be used. (MB&T blocks and cylinders are made of aluminum)

All special (aftermarket, of the same or different basic design) engines must be approved.

All component parts, unless specifically exempt from tech inspection, are subject to technical inspection. All aftermarket and special parts that are subject to tech inspection by these rules may be required to be approved by the Tech Committee.

Continental blocks may be machined so as to bring them to Deco block dimensions.

No modifications, alterations, additions, subtractions, deletions, or other changes are permitted to be done to these engines or component rules unless approved by the Tech Committee.

MEASUREMENTS AND TOLERANCES

1. Unless otherwise stated in this manual all measurements will be made to plus or minus 1/2 of the least significant decimal place of each stated dimension. Dimensions given in fractional form are for reference only and will be converted to three place decimals for all technical measurements.

JR. STOCK& SR. STOCK, MODIFIED

Fuel Spec: Gasoline, no racing fuel, No additive

RESTRICTORS

All Jr. Stock will run an approved restrictor plate between exhaust flange and port.
Hole size 0.500″ plate thickness min 0.047″ max 0.052**″.**

BORE AND STROKE:

Engine Bore and Stroke: Bore: 2.125" +.030" + .004" equals maximum bore of 2.159". Stroke: 2.00" + or -. 015". Stroke minimum equals 1.985". Stroke maximum equals 2.015".

TECH

Check bore with plug gages. If not available, use dial calipers or inside micrometers.

CARBURATERS

Carburetors approved for use on Sr. Stock engines are the Deco pumper, Tillotson HL-357 w/restrictor plate.

Air Passageway. They must remain stock. Deco pumper carburetor Venturi size 0.540″ max, this carburetor can only be used with a Deco manifold, manifold length minimum 3.700″, 4.00″+/- 0.100 max, inside diameter 0.8510″ Ref. Tillotson HL-357 Venturi size 0.630″ max. Tillotson HL-357 must run an approved restricer plate; hole size 0.660 Plate thickness will be 0.050″. Tillotson HL-357 must run stock Deco manifold FA410 style.

DECO pumper: Carburetor must remain as cast. No boring or polishing or altering in Any way is allowed. Single pump stack only.

Specifications:
Manifold length: 3.700″ min., 4.100 max.
Manifold inside diameter: 0.850″ min/max.
Deco Manifold aftermarket: Manifold length 3.700″ min., 4.100 max.
Manifold inside diameter min. 0.847″ to 0.853 max.″
Intake manifold may be cut and hose placed in-between to clock in Carburetor if it hits the frame. Max length 4.100″max.
Venturi size 0.540″ max.
Dump tube length: 0.912″ min/max.
With taper gauge at the back of the carburetor, must see the light under gauge.

TECH

Check Venturi with no go gauge, 0.540″ max. Check the rear carburetor with a taper gauge with gauge inserted to rear carburetor you should see a gap between the flat of the taper gauge and the base of the carburetor.

Tillotson HL-357: Venturi bore: 0.630 REF.
Modifications of any kind are not allowed on the Deco pumper and Tillotson HL-357.

Air Cleaner

The air cleaner adapter must not be over 1.375" in length, straight walled, flat bottomed and parallel with the carburetor air passageway. Must be affixed to stock carburetor using an existing air cleaner mount holes. If the air cleaner is removed, the air cleaner adapter must also be removed.

TECH PROCEDURE:

Check the dimensions and corner radiuses.

MANIFOLD

Stock or aftermarket intake manifold P/NAA7-F-444 or AA7-FA-410 only.

Check for any alterations to the inside of the manifold, no grinding or polishing or coating will be allowed. The earlier aftermarket aluminum manifolds had a ring ground just inside the flange of the manifold so they would fit on the jig for machining of the flange. These will be legal.. There are two intake manifold aftermarket manufacturers companies that were manufacturing this intake manifold. One company was using shot balls, and the other was using glass beads to clean the manifold after it was cast. The shot tends to darken and smooth the aluminum. It is not a performance enhancement.

CARBURETOR AND MINIFOLD GASKETS

Any make of the fiber manifold gasket with a maximum thickness of.063" (1/16) may be used. There is to be no slots, perforations, or alterations that would allow additional air into the engine. No loose bolts, warped flanges, etc. that will allow additional air into the engine. All air and fuel entering the engine must pass through the carburetor**.**

TECH

Check the gasket for maximum thickness. Check for any slots, perforations, loose bolts, warped flanges, or alterations that could allow additional air into the engine.

HEAD

Only the stock, unaltered cylinder heads part numbers AA7-A-504 and AA7-A-508 or approved aftermarket heads may be used. All heads may have a 14mm Heli-coil or similar threaded insert installed to repair spark plug threads. The insert must be installed square to head and in its original location. Heads may be bead blasted or wire Brushed to clean off the carbon. Removed material from inside the combustion chamber area is illegal.

TECH

The stock head gasket or gaskets of stock inside configuration made of copper, or aluminum may be used. Thickness .040" minimum to .066" maximum

Stock heads may not alterations except the following:

The head sealing bead may be lightly sanded, but must not be removed. The sealing bead ranges from .005" to .014" (reference only). The combustion chamber above valves should measure between .263" to .270" (reference only).

The top side of the head bolt holes of the head may be spot faced flat. No material may be removed from the cooling fins. All holes in the head must be in original location and not moved in any way, Example: tipped, moved over, up or down.

Spark plug hole may be Heli –coiled.

TECH

Check for any alterations inside of sealing bead area. Sealing bead and number must not be removed. Removal of material from cooling fins. All holes in the head must be in its original location.

NO TIMING RULE

POINTS AND CONDENSER

Any automotive type mechanical contact points may be used. Any automotive type condenser may be used. Only one set of points and one condenser may be used. The condenser must be mounted on the engine. The chip type condenser may not be used. The points can only be mounted horizontally on the point plate.

TECH

Remove point cover and check for automotive type points and condenser. Only one condenser is allowed. No chassis mounted condensers are allowed.

POINT PLATE AND COVER

Any style point plate and cover may be used.

INGNITION

All stock engines must run battery ignition. Any lobe type on distributor shaft.

PISTON EXTENSION

Piston not over .020" above top of block deck at T.D.C

TECH

Check with indicator mounted on deck of block, set the indicator at "0" setting on deck, swing over piston and turn crank to a maximum extension of the piston out of block. Other methods may be used. Carbon may be removed.

FAN SHROUD & BACK PLATE

Any shroud and backing plate allowed.

CYLINDER AND HEAD BAFFLES:

Any may be used

FLYWHEEL

Any type of flywheel may be used, maximum 32 ounces or 907 grams, minimum 27 ounces or 765 grams. Balancing is OK. Multi-piece flywheels must function the same as a one-piece flywheel.

TECH

Check the weight of the flywheel

CAM LIFT

Cam Lift Measured Off of Valve
Maximum lift on the exhaust. 177", maximum lift on intake .202"

TECH

Check with indicator mounted on valve head and all valve to tappet lash Removed Check from the lowest point on Cam lobe. Maximum only, no minimum.

CAMSHAFT LOBE CENTERLINE SPEC

The difference between camshaft lobe centerlines must be between 102.25 and 104.25 camshaft degrees when measured in the following manner.

TECH

Method of measurement: Install a shim between each tappet and valve stem of sufficient thickness to remove all valve lash. Install dial indicators above valves and attach the degree wheel to flywheel. Set pointer to approximate T.D.C. Rotate crankshaft in the direction of normal running (clockwise) only.
The following procedure is to be used to determine the centerline lobe.

1. Set dial indicator to read "0" at the highest point of valve lift (peak of lobe). Rotate crankshaft clockwise until valve begins to lift. Then take the degree wheel reading before and after the peak at the tech officials choice of the following dimensions: .020", .030", .040", .050" or .060".
2. Add before peak and after peak degree readings together and divide by 2. This is the centerline of this lobe. Degree readings must always be in reference to T.D.C. on the degree wheel.
3. Repeat steps 1 and step 2 for the other lobe.
4. Add intake and exhaust centerline degree reading together and divide by two. This is the number of camshaft degrees between the lobe centerlines. This must be between 102.25 and 104.25 degrees. If it is, then the center line is legal and no further tests are to be done. If not, continue with step 5.

5. Repeat 1 and 2 using 3 different readings of which 2 must be between 102.25 and 104.25 degrees. If 2 have not, then repeated steps 1 and 2 using all 5

readings of which 3 must be between 102.25 and 104.25 degrees. If 2 out of 3 does not pass and then 3 out of 5 does not pass, then centerline is not legal.

EXAMPLE

Exhaust Lobe .020" before peak reading = 139.0 degrees B.T.D.C., .020" after peak reading = 72.0 degrees B.T.D.C. 139.0 + 72.0 = 211.0 divided by 2 = Exhaust centerline of 105.5 degrees B.T.D.C. Intake Lobe .020" before peak reading = 80.0 Degrees A.T.D.C., .020" after peak reading = 124.0 degrees A.T.D.C. 80.0 + 124.0 = 204.0 divided by 2 = Intake centerline of 102.0 degrees A.T.D.C. 105.5 exhaust + 102.0 intake = 207.5 crankshaft degrees divided by 2 = 103.75 camshaft degrees. Difference in cam lobe centerlines = 103.75 camshaft degrees.

VALVE SPRINGS

Any type

VALVE SPRING SEAT

Valve spring seat may be spot faced

KEEPER & RETAINER

Any retainers and keepers allowed

VALVE GUIDES

Any size valve guides may be used. They must be installed so that the centerline of the valve guide bore is parallel to centerline of the corresponding tappet guide bore (no tipping or offsetting of guides).

TECH

Check for tipping or offsetting to increase lift. The valve location plate will be bolted to deck surface and engine slowly rolled over by hand. Valves must pass through holes in plate. Three bolts MININUM will be used to locate plate.

VALVES

The stock and aftermarket valves may be used, and the following specifications must be met.

A. Intake Valve:

1. Diameter of head .925" maximum.
2. Edge of the valve must be above the deck surface of the block.

B. Exhaust Valve:

Same as the intake valve accept the following:

1. Diameter of head .852" maximum.

VALVE SEAT

Valve seats may be installed or replaced if necessary. Inside diameter must remain stock, intake .825" maximum, exhaust .755" maximum. No limitation on outside diameter of valve seat. Must be installed flat with the deck. Any seat angle may be used. Top cut diameter shall not exceed 1.000".

TECH

Check inside diameter of seat for maximum dimension of .825". Outside diameter of top cut is very hard to measure, use dial calipers.

INTAKE PORT

(Super Stock, Modified) The intake port shall be round at the flange and valve seat within 0.015" and 0.825" maximum diameter at the flange, 0.250 from the port flange down must be 0.825" maximum diameter at the valve seat. The port may be polished, ground, machined, or sleeved to suit. Welding, brazing or epoxy and like substances may be used to repair or fill the port. The top of the port shall be no more than .375" from the head deck of the block. This dimension shall be checked with a dial caliper or ball micrometer. The port flange shall be perpendicular within 1 degree max to the head deck surface. Parameter shall be checked with a suitable protractor. The original manifold bolt hole locations shall be used. Threads may be repaired as necessary. From the edge of the valve seat to port flange max 1.050".

TECH

Check port size with plug gages or dial calipers.

EXHAUST PORT

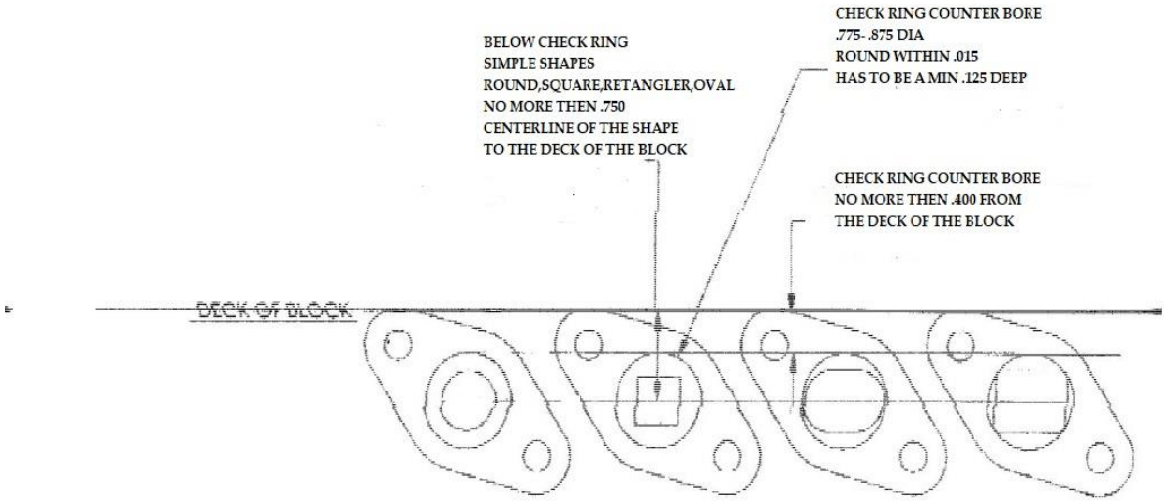
(Sr. Stock, Modified) The exhaust port shall be round at the flange and valve seat, within 0.015" and measure no more than 0.755" at the valve seat and 0.875" max at flange, min from the flange up 0.125" max 0.015" out round and a min round of 0.775". The port may be polished, ground, machined, or sleeved to suit. Welding, brazing, or epoxy and like substances may be used to fill or repair the port. The top of the port shall be no more than .400" from the head deck of the block. This dimension shall be checked with a dial caliper or ball micrometer. The port flange shall be perpendicular within 1 degree maximum of the head deck surface. Parameter shall be checked with a protractor.

EXHAUST PORT (BELOW COUNTER BORE)

A. Port center line will be no more than .750" from deck of block
B. To determine the port center, measure port opening height perpendicular to the deck of block (example .625")
C. Divide the port height by 2 (example. 625/2-.3125)
D. Measure port wall to block deck thickness (example .428")
E. Add line items 3 and 4 together (example .428"+.3125=.7405")
F. Port opening must be square, rectangular, or oval in shape. No complex shapes permitted.

TECH

Specifications is to limit excessive port relocation and exclude unusual port configurations that would make the determination of port center complicated. (No "drop port" or "tilt port configurations" permitted)
Check port size with plug gages or dial calipers.



PISTON

Any flat top piston is allowed. No part of the piston may protrude more than .020″ above block deck at top dead center (carbon may be removed).

TECH

Check for flattop

RINGS Any type allowed.
ROD Any connecting rod allowed.
CRANKSHAFT Any crankshaft allowed.
CAMSHAFT Stock or aftermarket.

Heel to Peak - Exhaust .988" maximum -.975" minimum Intake 1.013" maximum -1.000" minimum. Heel to Heel – Exhaust .811″ minimum .821" maximum Intake .811" minimum .821" maximum. Difference or total lift: exhaust .177" maximum Intake .202" maximum. Maximum lift on exhaust .177", maximum lift on intake .202". Base circle maximum .007" out of round. Heel to heel minimum .811" maximum .821". A new gear may be installed. The camshaft must be a one piece and of conventional design other than press on gear. Cam and gear must be made of ferrous metal. Lobes must fit through template. Cam pinhole may be drilled to a larger size. An additional cam pin may be used.

TAPPET GUIDES

Any size valve guides or tappet guides is allowed. They must be installed so that the centerline of the valve guide bore is parallel to the centerline of the corresponding tappet guide bore and intersect the centerline of the cam axel shaft bore.

TAPPETS

Any flat-based tappets may be used. Maximum allowance for wear (dished) is .002". Any size tappet guides may be used

DECK HEIGHT

Measured from the block deck to the center of the point/distributor shaft, 4.670" max

TECH

Measure from the block deck to point/distributor shaft, with depth micrometer thorough valve guide and tappet guide. Add 1/2 of the diameter of point/distributor shaft to micrometer measurement to obtain deck height.

OIL PAN

Any oil pan may be used. Oil pump may be run in this class.

CRANKSHAFT BUSHING OR BEARING

Any bushing or bearing may be used.

BLOCK

Machining is allowed so as to bring continental block to the Deco block dimensions. The block may be externally strapped and broken block may be brazed or welded. Welding, brazing or other repairs may be done in ports or combustion area. The breather may be added, except block may be drilled to hold breather baffle. The boss on block may be removed to receive gearbox. Welding inside block is allowed, but must not alter any original dimension or location of holes. Except as allowed above any block altered or repaired in any way that causes the original dimensions to be changed is illegal for the stock class.

TECH

Visually check block for any alterations that change the original dimensions.

SLEEVES

Any type allowed.

TECH

Visual check

MISCELLANEOUS ITEMS

Any kind of nuts, bolts, studs or washers are allowed and may be safety wired. Stripped out threads may have Heli-coil or similar threaded inserts installed provided the original hole location and the same thread size are retained. Gear Box is not considered a part of the engine; therefore any type gear reduction may be used.

MODIFIED CLASS

ENGINE: Same as Jr & Sr Stock. Bore 2.159" maximum. Stroke 2.000" + or - .015".

All modifications allowed in this class except for the following:

Deck Height

Same as Jr & Sr Stock.

Tappets and Tappet Guides

Same as Jr & Sr Stock

Valves and Valve Guides

Same as Jr & Sr Stock

Valve Seats

Same as Jr & Sr Stock.

Cylinder Head

Same as Jr & Sr Stock.

Head Gasket

Same as Jr & Sr Stock

Piston

Same as Jr & Sr Stock

Exhaust Port

Same as Jr & Sr Stock

Block

1. Broken blocks may be repaired by welding, brazing or strapping. Welding, brazing or other repairs may be done in ports or combustion area.
2. Cylinder sleeves may be of any material. Cylinder bore must be centered on and parallel to the original cylinder bore centerline.
3. Intake and exhaust valve centerline must remain parallel to the original valve centerline.
4. Tappet centerline must remain parallel to the original tappet centerline.
5. Combustion chamber surfaces must remain the same as Jr & Sr Stock.

Camshaft

Cam and cam technical procedures are the same as Jr & Sr Stock. Cam pin hole may be drilled to a larger size. An additional cam pin may be used.

Intake Port

Same as Jr & Sr Stock

Gasket on intake port to manifold is optional

TECH

Check port size with plug gages or dial calipers

Flywheel

Any type of flywheel may be used, maximum 32 ounces or 907 grams, minimum 27 ounces or 765 grams. Balancing is OK. Multi-piece flywheels must function the same as a one-piece flywheel.

CLASS: "B" MODIFIED

FUEL SPECIFICATION: Same as Jr & Sr Stock**.**
DRIVE WHEEL: Two wheel rear drive optional.
ENGINE: Bore 2.125" + .060" + .004" or 2.189" maximum Stroke 2.000" +/- .015".
INTAKE VALVE Maximum intake valve size 1.480

All modifications allowed in this class except the following:

1. Camshaft Same as Jr & Sr Stock.
2. Flywheel Same as Modified.
3. Any Type of Tappet and Tappet Guides Allowed.

CLASS: "AA"

FUEL SPECIFICATION: Gasoline is the same as Jr &Sr Stock or straight methanol, no additives allowed.

HEAD BOLTS Head bolts must remain in stock location

DRIVE: Two wheel rear drive optional.

ENGINE: Bore 2.250" + .060" + .004" clean up, 2.314" maximum. Stroke 2.000" plus or minus .015". No overhead valves. Must be air-cooled.

All other engine modifications allowed in this class.

CLASS: 1/2 MIDGET

FUEL SPECIFICATION: Gasoline is the same as Jr. & Sr Stock or straight methanol, no additives allowed.

ENGINE

Any American or foreign made. 253 cubic centimeters or 15.439 cubic inches maximum displacement made 4-cycle engine.

To calculate displacement using the formula (Bore divided by 2) squared x 3.1416 x stroke = displacement.(Example: If bore = 2.659" and the stroke = 2.000", then 2.659 divided by 2 = 1.3295, squared = 1.76757025 x 3.1416 x 2.000 = 11.105997 cubic inches.)

If using a World Formula or Animal Block a Scatter Plate must be used.
If scatter plate is not in place this will be a DQ.

EXHAUST

All ½ midget mufflers must be Briggs & Stratton Part # 294599 or equivalent. No drilling baffles. Cutting the thread off and welding a washer on the flange for a place to apply safety wire will be allowed. (All exhaust must pass though the mufflers when going over scale)