



MERLIN III CYLINDER HEADS

Iron & Aluminum + CNC BBC Specifications and Instructions

Technical instructions for assembled & bare head part numbers:

IRON

030040 - Bare, Oval Port, 269cc Runner
030040 - 1 Hydraulic, Oval Port, 269cc Runner
030040 - 2 Flat tappet, Hyd. Roller, Oval Port, 269cc Runner
030620 - Bare, Rect. Port, 320cc Runner
030620 - 2 Flat tappet, Hyd. Roller, Rect. Port. 320cc Runner
030620 - 3 Bare, Rect. Port, 320cc Runner
030620 - 4 Large Roller, Rect. Port, 320cc Runner
030630 - Bare, Rect. Port, 345cc Runner
030630 - 2 Flat tappet, Hyd. Roller, Rect. Port 345cc Runner
030630 - 3 Mech. Roller, Rect. Port, 345cc Runner
030630 - 4 Large Roller, Rect. Port, 345cc Runner

ALUMINUM

020650 - Bare, Rect. Port, 310cc Runner
020650 - 2 Flat tappet,, Hyd. Roller, Rect. Port 310cc Runner
020650 - 3 Mech. Roller, Rect. Port, 310cc Runner
020650 - 4 Large Roller, Rect. Port, 310cc Runner
020650 - CNC Bare, Rect. Port, 345cc Runner
020650 - 2 CNC Flat tappet, Hyd. Roller .Rect. Port 345cc Runner
020650 - 3 CNC Mech. Roller, Rect. Port, 345cc Runner
020650 - 4 CNC Large Roller, Rect. Port, 345cc Runner
020660 - Bare, Rect. Port, 350cc Runner
020660 - 2 Flat tappet, Hyd. Roller, Rect. Port, 350cc Runner
020660 - 3 Mech. Roller, Rect. Port, 350cc Runner
020660 - 4 Large Roller, Rect. Port, 350cc Runner

Specifications:

Valves: 2.300 Int. Repl. part # 830597 (For -1 & -2 Iron & Aluminum Heads)
1.88 Exh. Repl. part # 830598 (For -1 & -2 Iron & Aluminum Heads)
2.300 Int. Repl. part # 830660 (For -3 Iron, Aluminum: #830662)
1.88 Exh. Repl. part # 830666 (For -3 Iron & Aluminum Heads)
2.300 Int. Repl. part # 830670 (For -4 Iron, Aluminum: #830675)
1.88 Exh. Repl. part # 830685 (For -4 Iron & Aluminum Heads)

Valve Locks: -2 Heads have 7 degree locks. Replacement part # 830305
-3 & -4 Heads have 10 degree locks. Replacement part # 830310

Valve Seals: -2 Heads use an umbrella seal. Replacement part #830405, -3 & -4 Heads use a P.C. seal. Replacement part # 830410.

Valve Springs & Retainers:

-2 Heads: 1.550 diameter spring. Seat Pressure 150 lbs. @ 1.910, Repl. part # 830130. Iron Retainer part # 830220. Aluminum: #830225

-3 Heads: 1.550 diameter spring. Seat Pressure 225 lbs. @ 1.910, Repl. part # 830135. Iron Retainer part # 830235. Aluminum: #830230

-4 Heads: 1.640 diameter spring. Seat Pressure 250 lbs. @ 2.000, Repl. part # 830140. Iron & Aluminum, Retainer part # 830250 (Ti)

Pushrod Guide Plates: Merlin Iron uses guideplate part # 830465. Aluminum guideplate part # 830466. NOTE: Hardened pushrods MUST be used with guideplates. The guideplates MUST be adjusted to obtain proper rocker tip to valve tip alignment.

Pushrods: To obtain proper rocker arm geometry, pushrod length will need to be determined by using an adjustable checking pushrod.

Rocker Arms: Any stud mounted rocker arm, stamped, roller tip or full roller rockers are compatible. However, with the valve springs on the -2, -3 & -4 heads, it is highly recommended to use a full roller rocker arm.

Stud Girdles: Merlin III Iron heads use girdle # 832009. Aluminum heads use girdle # 832010.

Rocker Arm Studs: -1,-2 & -3 Iron cylinder heads use a 7/16 rocker arm stud. Replacement part # 830480.

-4 Iron cylinder heads use Manley 7/16 rocker arm stud, available as World part # 830484.

-2, -3, -4 Aluminum cylinder heads use Manley 7/16 rocker arm stud, available as World part # 830485.

Combustion Chamber Volume: 119cc ALL IRON AND ALUMINUM

Intake Runners: Oval Port uses a 269cc runner. Rect. Port part # 030620 uses a 320cc runner. Rect. Port part # 030630 uses a 345cc runner. Rect. Port part #020650 uses a 310cc runner. Rect. Port # 020660 uses a 350cc runner.

Head Bolts: With a Mark IV block use: ARP bolts 135-3603. With a Mark V & VI block use: ARP bolts 135-3607

Head Studs: With a Mark IV block use: ARP studs, World # 832540. With a Mark V & VI block use: ARP studs 235-4113

Head Gaskets: When using Merlin heads on Mark IV blocks use the corresponding gasket that is compatible with the bore size of the engine. We use Fel Pro 1027 (4.370 gasket bore), 1017 (4.540 gasket bore), 1057 (4.630 gasket bore), When using the Merlin heads on a Mark V or VI block, you MUST use the head gasket for the Mark V or Mark VI (whichever block is used).

Intake Gaskets: Mr. Gasket 5827 or equivalent for Oval Ports. For Rectangular Ports, Mr. Gasket 121 or equivalent.

Header Gaskets: Fel Pro 1410 or equivalent

Spark Plugs: Merlin Iron heads use a .460 reach, 5/8 hex spark plug such as an Accel 276 or equivalent. Aluminum heads use a 14mm, .750 reach plug such as Accel 416 or equivalent.

Emissions: ALL MERLIN HEADS are intended for pre-emission vehicles and off road use.

BEFORE FINAL ASSEMBLY:

1. Please inspect castings for defects or damage prior to modification, assembly or installation. Cylinder heads that have been modified, installed or used ARE NOT RETURNABLE. Then install the cylinder head with no head gasket and snug the bolts.

2. Due to different ratio rockers and different deck height blocks, now is the time to check for pushrod to cylinder head interference. If the pushrod has interference with the cylinder head, remove the cylinder head, grind the casting the needed amount, clean the head after grinding, reinstall the cylinder head using the mock up procedure and recheck the clearance. Repeat the procedure as necessary until the desired clearance is achieved.
3. The Merlin cast Iron cylinder head use a 2.300 diameter intake valve. Because of the larger diameter intake valve it is VERY IMPORTANT to check piston to valve and valve to valve pocket clearance.
4. Once everything has been checked and all the desired clearances and specifications achieved, final assembly may begin.
5. If a new flat tappet camshaft is being installed with a -2 cylinder head, it is HIGHLY RECOMMENDED to remove the inner valve spring during the camshaft break in procedure. After the cam is broken in, reinstall the inner valve spring.

ATTENTION:

ALL EXHAUST, VALVE COVER, INTAKE AND ROCKER STUDS AND/OR BOLTS MUST HAVE SEALER APPLIED TO THEM AS SOME OF THEM GO INTO WATER.

Head Bolt Torque Specs: Torque all head bolts to 75 ft. lbs.(iron heads), 70 ft. lbs. (aluminum head and studs) Before torquing, coat the head bolts and rocker studs with ARP Thread Sealing Paste. NOTE: Refer to the factory service manual for proper head bolt tightening sequence.

Rocker Arm Studs: 55 ft. lbs.

Machine Shop Specs:

NOTE: Specs are for reference only. Always measure before machining. REMEMBER: MEASURE TWICE, CUT ONCE.

Maximum Valve Diameter: 2.300 Intake & 1.900 Exhaust

Maximum Spring Seat Depth: Spring seat is cut to accept a 1.640 spring. IT IS NOT RECOMMENDED TO CUT THE SPRING SEAT DEEPER.

Maximum Spring Diameter: 1.640

Maximum Flat Mill: Approximately .050

Maximum Angle Mill: Approximately .180

Approximate Milling Guidelines: .007 per 1cc

Brackets and Accessories:

The Merlin iron & aluminum heads have accessory bolt holes drilled in the factory locations.

WARRANTY TERMS:

World Products Inc. (World) manufactures parts to meet QS 9000 specifications. In addition, all parts go through several inspection procedures before shipping. However, YOU ARE THE FINAL INSPECTOR. Please note: Inspect all parts before doing any machine work or assembly. Remember the saying "measure twice and cut once." If any defects are found or suspected, call World before proceeding. World will replace or repair at its option any defective part which has not been modified or misused within one year of INVOICE purchase date. Any modification or marine use of parts will void all warranties.

WORLD MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, REGARDING PARTS. THIS WARRANTY IS EXCLUSIVE AND IT IS EXPRESSLY MADE IN LIEU OF, AND WORLD HEREBY DISCLAIMS ANY AND ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY IMPLIED WARRANTY OR MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.

World's sole and exclusive obligation and liability with respect to parts sold is expressly limited to repair or replacement, at World's option, of parts. In no event will World be liable for any claim of any kind for direct or indirect incidental, consequential or special damages, whether known or unknown, including without limitation, cost of labor, installation, disassembly, lost revenues and profits, loss of property, production, or injury to persons and/or property. The maximum liability of World for any and all damages with respect to any part is limited to an amount not to exceed the original purchase price of the part. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. DO NOT CALL THE DEALER FROM WHICH YOU PURCHASED YOUR PARTS. If you have any questions, please contact Customer Service, World Products 631-981-1918 (Fax 631-734-0467).

WARRANTY CLAIMS:

Contact Customer Service to obtain a Return Material Authorization number directly from World Products for any warranty return. DO NOT CONTACT YOUR DEALER. DO NOT RETURN PARTS WITHOUT AUTHORIZATION. Returned product must be shipped prepaid. Collect shipments will be refused. Returned parts must have RMA number on the outside of the package, a copy of original bill of sale inside and a written explanation of the suspected defect. If the item is found defective, World Products will repair or replace it at its discretion and return it freight prepaid. No additional labor claims will be paid. There will be no exceptions to this rule.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

ALL SALES FOB RONKONKOMA, NEW YORK

WORLD PRODUCTS

51 Trade Zone Court · Ronkonkoma, NY 11779

(631) 981-1918 · Fax (631) 981-1712

www.worldcastings.com

WPL-1040

Rev 1/08