

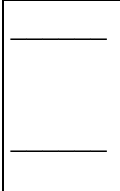
AeroTwin Assembly Instructions

Cylinder Head

*This manual must be consulted in conjunction with
"Working Clearances", and "Tension Settings" documents*

Nominal	Actual
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✓	1	Examine all surfaces to ensure that all is clean and undamaged, paying particular attention to the oil galleries, crankcase stud holes and sparkplug threads and that all the physical dimensions are to specification. Install all studs, and paying particular attention to the specific location and fit of each, ensure correct depth of engagement. Install the keyed inserts with Loctite 262, and after confirming that their heads are below the parent surface, engage the keys.	2B or better -0.020"	
	2	Collect all of the parts required for assembly.		
	3	Test fit the cam followers to confirm working clearance, and surface condition. Dress any working surface that is not perfectly smooth, with oiled 1200 grit paper, on a flat plate.	0.00075"	
	4	Test fit the camshafts to ensure that they will rotate in their respective tunnels	0.0015"	
	5	Confirm that they have the correct end-float.	0.0050"	
	6	Check that the lobes do not contact the cam follower bores.	0.060"	
	7	Stand the cylinder head on end. Ensure each valve and it's seat are both perfectly clean and that all the valve/seat cutting work is complete.		
	8	Install each valve and confirm installed height.	0.925"	
	9	<i>The valve head must be restrained against it's seat to obtain this dimension. Thumb pressure applied to the valve head via the cylinder bore whilst carrying out this measurement works well.</i> Once dimensions are within tolerance and recorded ensure that no valves are relocated.		
	10	Remove each valve and lubricate each stem and seat with a mixture of engine oil and M/D grease. Return it to it's position in the head. Install the cylinder head onto the valve head restraint tool, inlet side facing you. Install an oiled spring seat with rolled edges facing up into each inlet tappet bore, then the valve stem seal, spring pair & keeper. <i>Note; Keep the seal register as clear of oil as possible.</i>		
	11	Compress the keeper and spring assembly just far enough to fit the two collets, and release to close the collets onto the valve stem groove. <i>Note; Do not over compress the keeper, as damage to the seal will result.</i>		
	12	When all is seated correctly, lightly tap the keeper faces to settle the collets.		

			Nominal	Actual
13	✓	Repeat this process with the exhaust valves by rotating whole assembly 180° so that you now have the exhaust side of the head facing you.		
14		Ensure both working surfaces of each hat used, is flat and clean.		
15		Ensure that no heavy lubricant is used during this measurement phase, as it can create false readings.		
16		To select the correct hat to place on each valve stem, calculus based on depth gauge recordings must be completed in the following way: Place one 0.100" hat and then a cam follower on each assembled valve. Depth reading = 0.600", equals 0.100" pallet -for 0.590" camshaft base circle radius, 0.223" cam follower thickness and 0.010" lash on the intake valves. Depth reading = 0.600", is approximately the same for the exhaust, with a 0.098" pallet	0.600" 0.600"	
17		Where the valve tip is higher than the zero point for each setting, an exactly proportionate value to that recorded is removed from hat thickness. Correspondingly, where the valve tip is lower than zero, that value is added to the hat thickness.	#1 Inlet #2 Inlet #1 Exh #2 Exh	
18		When hat thickness is established, coat the valve tips with a little anti-scuff paste and install each hat in it's correct location. Lightly grease the cam followers and their bores and install them, ensuring that no hats are allowed to become dislodged from their locations on the valve stems.		
19	— —	Using depth gauge, confirm that the calculus is correct for all tappets:	#1 Inlet #2 Inlet #1 Exh #2 Exh	
20		Remove the cylinder head tool.		

Camshaft Installation

		Nominal	Actual
21	Remove the valve restraint pads from the assembly tool. Mount the cylinder head back onto the tool.		
INTAKE			
22	Lay the intake cam into it's tunnels and install the cap tools (of which there are three.)		
23	Finger tighten the fixings and check that the cam rotates freely when the lobes are not engaged.		
24	Rotate the cam until cylinder #2 is completely open. With a blade gauge confirm & record the lash on #1.	0.008"	
25	Rotate the cam until #1 is fully open. With a blade gauge confirm & record the lash on #2.	0.008"	
EXHAUST			
26	Lay the exhaust cam into it's tunnels and install cap tools (of which there are three.) Finger tighten the fixings and check that the cam rotates freely when the lobes are not engaged.		
27	Rotate the cam until cylinder #2 is completely open. With a blade gauge confirm & record the lash on #1.	0.010"	
28	Rotate the cam until #1 is fully open. With a blade gauge confirm & record the lash on #2.	0.010"	
29	Lift each camshaft off the head and place the end seals on the camshafts by guiding the seal for the flanged end of each camshaft over the rear seal surface and both lobes, so that it rests on the flanged end seal surface. Make sure that the seal lip is faced inward. Install the rear seal with its lip facing inward.		
30	Wipe the seals (outside diameter) and both mounting surfaces with degreaser and after smearing a little anti-scuff paste on each lobe and seal running surface, gently lower each cam and seals into it's respective place in cylinder head cam box. Ensure that each camshaft is fitted to the appropriate aperture.		
31	Install the perimeter seals ensuring that their ends meet with the end seals. (All four are identical.)		
32	The inlet cam carries both engine timing triggers. The six tooth trigger is above cylinder #1 and the single tooth trigger is above cylinder #2		
33	Oil the cam followers and lower bearing surfaces.		
34	Rotate each cam until the lobes are parallel with the cover face and lower each cover onto the cylinder head.		
35	With the intake ports facing you, the camshaft drive flanges should be at your right.	Right	
36	Carefully align the end seals so that they are fully engaged into their bores.		
37	Each camshaft cover has two coil fixings, and two ring dowels. After confirming the positioning of each, install the covers so that these fixings face each other, and that the cover with the probe apertures is on the inlet side of the engine.		
38	Once installed, the covers can be bolted into place and tightened, noting that the ring dowels are all in place, and that the correct nuts are used for each.	Contact +15deg	
39	The camshafts should both turn freely, unengaged.		
40	After ensuring that the sealing rings are in place, install the PCV inlet manifold assembly, and secure the set screws. The assembly is ready for further assembly when the valve timing marks can be seen to be near to their registration points on the outer parting line of the cover mating faces, but all valves are still closed.	25lb-in	
41	Install the two centre crankcase studs with thread sealant: Loctite 567. Tension to correct setting.	Loctite 567 10lb-ft	
42	Fit the camshaft drive end bungs, o-rings, drive wheels and clamp rings taking care to identify each, orienting it correctly on each camshaft.	Exhaust Flange Out-board	

43		Secure but do not tighten the fixings.		
44		Lift the cylinder head off tool and mount the assembly so that the cylinder faces and studs are uppermost.		
45		Carefully wipe the bores with the cloth and fluid kit, removing any residue on both bores and combustion chambers. This operation is complete when all surfaces are clean and dry.	Clean and dry	

Pistons & Connecting Rods

Nominal	Actual
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46		Lay out the parts required for each piston and check all physical dimensions.
47		Engage one wrist pin circlip into Piston, ensuring that it sits completely in the groove provided.
48		Fit the oil ring expander and the two rails.
49		Install the second, then the top ring, noting that the orientation marks on each ring are facing upward.
50		Arrange the ring set such that the end gaps of each ring are 120° away from the others and that the two gaps in the top ring are 180° apart.
51		Remove the cap & setscrews from each connecting rod, ensuring that the bearing location pins and dowels are fitted correctly. <i>After confirming orientation, make sure that no parts are interchanged, or rotated!</i>
52		Lightly oil the wrist pin, piston pin bores and connecting rod bush.
53		Slide the pin through the piston bores and connecting rod eye until it stops against the previously fitted circlip.
54		Ensure that each connecting rod is correctly numbered for the cylinder to which it is being fitted, and that the numbering on the connecting rods coincides with the legends on the underside of the pistons. When installed both piston and rod numbers face the same way, that is, toward the inlet side of the engine.
55		Fit the second circlip.
56		Make very sure that both circlips are fully engaged, and if stamped-out circlips are used, that the 'hard' side is presented to the outer edge of the circlip grooves.
57		After oiling the piston skirts and rings, <i>which must still be correctly oriented</i> , engage the piston and rod assembly through the compressor and into the cylinder bore. Place it just far enough into the bores for the lower edge of the skirt to clear the tool. <i>Restrain the connecting rods so as to prevent them from striking the piston skirts, or cylinder sleeves.</i>
58		Repeat this procedure for Piston #2

Crankcase Assembly

		Nominal	Actual
59	<p>Carefully examine both crank case halves, ensuring the ring dowels are in place & are not damaged in any way. Install the oil gallery plug/union at one end of the gallery, and secure it.</p> <p>Loosely fit the oil pressure switch at the other, noting model specific assembly requirements.</p>	Loctite 567 10lb-ft	
60	Install the perimeter seal into the groove on the upper half cylinder head mating face, so that the ends meet comfortably, and place the ring seals into the engaging faces of the centre stud apertures. Their lips must face inward.		
61	Smear a small amount of anti-scuff grease over the seals and mating face of the crankcase.		
62	Place the upper casing vertically on a workbench and install the starter primary pinion bearing into it's cavity through the starter nose aperture. If necessary, ensure it is restrained there by coating it with anti-scuff grease.		
63	Fit the starter intermediate gear, ensuring it is placed so that the gear teeth are positioned opposite the starter aperture. Install the shaft and ring seal and fit the restraint tab. The shaft must be fitted so that it is engaged fully into the threaded aperture in the casing, but is not tightened. Ensure adequate working clearance, and lubricate with Molybdenum grease.	0.004"	
64	Install and tighten the lockplate.	15 lb-in	
65	Carefully slide the casing down the studs until it engages fully with the cylinder head. Install the remaining four crankcase studs and tension them.	Loctite 567 10lb-ft	
66	Select and install the crankcase main bearings, noting that the locating registers differ for bearing halves fitted to upper and lower crankcase pairs.		
67	Fit the connecting rod bearing halves to the piston/rod assemblies noting that one bearing locates on the pin in the main body, and smear a coating of bearing lubricant onto these & the main bearing halves in the upper crankcase.		
68	Carefully ease the pistons to mid stroke position in the bores.		
69	Confirm all main bearing working clearances are correct for this assembly.	0.0015"	
70	Confirm all conrod bearing working clearances are correct for this assembly.	0.0015"	
71	Ensure total cleanliness.		
72	Oil the output seal lip surface, and facing the lip inward, fit it onto the crankshaft #2 end register, and ensure that it is fully engaged.		
73	Test fit the oil pump drive pin to ensure that it is a smooth slip fit in it's register and that all keyways will accept their respective keys - <i>suggest you ensure full angular contact with any flywheel/drive pulley attachment.</i>		
74	<p>Confirm flyweight bolts tensioned correctly, if fitted.</p> <p>After priming with T7471, smear Loctite 272 on the alternator drive bolt and crankshaft tapered end threads and secure them to the specified torque, using the clutch shaft as a reaction fixture at the other end, if fitted.</p> <p><i>Note; Ensure enough 272 is placed in the crankshaft to fully coat the entire length of both threads.</i></p>	80 lb-ft 150 lb-ft	

Nominal	Actual
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		Nominal	Actual
75	✓ Lower the crankshaft into the case by firstly engaging the connecting rods and then rotating it into the main bearings. The crankshaft output seal will require positioning as this operation is completed. Ensure that the seal / engagement surfaces are dry.		
76	Once the crankshaft is settled, the connecting rods can be drawn up into place. The connecting rod caps and lubricated bearings can be fitted, ensuring that the ring dowels are in the connecting rods and that the caps are fitted with the numbers correctly oriented. <i>Hand-fitting of these caps onto the main body of each connecting rod, so that they seat fully before installing and tightening the connecting rod bolts, is essential. Closing them down unevenly with the bolts can distort the dowel holes, or cause damage to the caps and main bodies.</i>		
77	Smear thread lubricant onto the cap bolts and pre-tighten them to 5lbs-foot.	Lubricate 5 lb-ft	
78	Check that the correct end-float of the connecting rods exists within the crankshaft journals. Tighten the bolts to 25lbs-foot.	End Float .015-.020" 25 lb-ft	
79	Install the two perimeter seals into the upper crankcase face, ensuring that the ends meet the #2 seal register and the oil pump perimeter groove at the other end of the crankcase, but do not encroach into them.		
80	Place the starter inertia drive assembly with its two bearings and spacers, into the upper crankcase.		
81	Ensure that it will FULLY and EASILY engage the ring gear teeth when stationary, and that it is positioned equally between the flyweight and ring gear, and has the correct end-float <i>End-float correction shims are available for this purpose.</i>	End-float, .010"	
82	Settle the crankshaft end seal into its register.		
83	Fit & lubricate the remaining main bearing halves into the lower crankcase and slide it down the studs, engaging the ring dowels. Settle the casing, pre-tighten the service fittings, and check the total end-float of the crankshaft, and rotational friction, <i>see Operation 86</i>	15lb-ft End Float .005-.008"	
84	If all is correct, remove the service fittings, and install the stud ring seals, pedestals, turbo steady, and engine bearers, noting model type.		
85	Lubricate the threads of the studs, install and pre-tighten the crank case main nuts.	15 lb-ft	
86	Slowly rotate the crankshaft and pistons. <i>There should be no resistance to movement other than normal friction generated by ring tension. If you are in doubt, check the frictional torque value.</i> Record this value.	+/- 40lb-in	
87	If all is well, tighten the case nuts and rotate the crankshaft again.	25 lb-ft	

Oil Pump

		Nominal	Actual
88	<p>Rotate the assembly until the oil pump face is uppermost. Trim the ends of the casing perimeter seals that may be protruding into the pump o-ring groove.</p> <p>After ensuring that it's working face is flat, install the pump inner thrust plate into the cavity in the pump body with the seal housing facing toward #1 crankshaft bearing, and the seal lip facing outward.</p>	Flatness, -.001"	
89	<p>After ensuring that all working surfaces and edges have been soft dressed, place the gear set into the oil pump housing and locate the starter mount plate, and outer thrust plate. With a depth gauge, check gear/thrust set end-float. Adjust with a shim, fitted behind the inner thrust plate. Ensure that the shim used is not burred, and is flat.</p> <p>When all is correct, install the pump cover mounting studs, noting that each is engaged the prescribed 10.0mm, and is secured with Loctite 262. Confirm the position of the lower damper mount stud and alternator/blower fixings- if fitted-, in particular. Grease the shim and thrust plate, and re-install them, as above.</p>	R0.010" .002" Loctite 262	
90	Engage the 4mm oil pump inner ring drive pin.		
91	Coat the oil pump inner and outer rings with assembly lube and lower them into the pump body, ensuring that the inner ring engages freely with the drive pin. Compress petroleum jelly into the working gear cavities.		
92	Install the perimeter seal into the crankcase oil pump face.		
93	Lay the starter mount bracket onto the casing with the starter mounting tabs facing away from the engine. Fit the outer thrust plate, noting the orientation of it's apertures.		
94	Grease and install the sealing ring into it's groove in the face of the spring retainer.		
95	Lubricate the pump pressure regulator piston with anti-scuff paste and slide it into it's bore - disc section first - followed by the spring, and the retainer.	10lb-ft	
96	<p>After installing the perimeter seal into it's groove in the pump housing, fit the housing.</p> <p>Install the belt tensioner pedestal, noting it's indicated orientation, ie; the direction of rotation of the crank, and then the pivot post. Coat the thrust shim and pivot working surfaces with molybdenum paste. Offer up the idler assembly, ensuring that the locating pin is engaged through the hole in the tensioner arm and into the restraint slot in the pedestal. Fit the wave washer and restraint nut and tighten it until it contacts and compresses the wave washer until flat, and the idler can barely be moved. Undo the restraint nut exactly one half turn.</p>	25lb-ft ½ turn	
97	<p>Install and tighten the pump housing fixing nuts, with the exception of the alternator fixing studs -if fitted- noting the positioning of the lower damper mount.</p> <p>Fit and secure the damper, after coating it's ball ends with Moly grease. Ensure free movement.</p>	Contact +15deg	
98	Position the engine horizontal and upright. Via the data recorded previously, re-run the frictional rotation test to confirm that the pump installation has not adversely altered this value.	Previous value	Current value

Transmission

		Nominal	Actual
99	Gather all parts required to assemble the transmission, noting the model type, ratio, and assembly orientation requirements.		
100	Examine the castings to ensure they are clean and undamaged.		
101	Ensure that the gearset is identified as being a matched pair and that it is of the correct ratio.	Pair? Ratio?	
102	Fit the bearing cups to the output shaft bores and driven gear housings by heating the casings; and cooling the cups.		
103	Place an inner race and seal into the final drive end of the outer housing & slide the propellor shaft in the housing.		
104	Slide the second race into place onto the shaft and install the large lock nut assembly.		
105	Rotate the nut until no endfloat exists, but there is no preload on the bearings.		
106	<i>Note the position of the clamping screw. If it's position coincides with the machined groove in the shaft, tighten the clamp screw. If it does not, remove the nut and skim enough material off the engaging side of the nut until it does.</i>		
107	Engage and tighten lock screw.	20lb-in	
108	Engage the quill shaft through the hub. Engage the cap, and ring seal, and secure it.	10lb-ft	
109	Fit the driving gear bearing and seal to the outer housing & the bearing and seal to the inner housing. Fit the quill thrust nut, and secure it with Loctite 267. Fit the dowels & o-ring to the crankcase. Lubricate the inner case seal lips and prime the cavity between the seal and bearing with moly grease. Slip the driving gear into it's bearing/seal aperture, and hand push until home, noting orientation. Fit and tension the clutch shaft, if not previously fitted, noting that Loctite 262 must used on the engaging thread.	10lb-ft 150lb-ft	
110	Offer the inner housing assembly up to the engine, and after locating it on it's dowels, tighten the bolts that secure it to the engine casing.	18 lb-ft	
111	<i>Note;These processes must be achieved without striking the housing to get it to fit. Hand press fit only.</i>		
112	Slide the inner races onto the driven gear and install this assembly into the outer housing.		
113	When the quill is engaged with the driven gear, slide this assembly up to the inner housing and finger tighten the perimeter bolts.		
114	Record the gap between the housings. This is corrected by placing shims between the rear outer cup and the casing.	Preload 0.003"	
115	When all is correct, fit the dowels & o-ring perimeter seal.		
116	Fit the drain plug, noting the intended orientation of the casing.		
117	Assemble the housing noting the position of the two coppered earth bolts, and bearer system.	25lb- ft	
118	Fit the 3 ball-races into the clutch drum, grease the splines of the drum with copper grease, and push it back into the driving gear, until it stops against the clutch shaft hex. Install the inner thrust ring, and the clutch carriers face to face, or springsets facing each other, with the centre ring between each, followed by the circlip. <i>Note; Always replace the circlip at each assembly</i>	20 lb-in	
119	Loosely fit the oil level indication screw, and filler cap/vent.		

Phasing the Engine

		Nominal	Actual
✓			
120	Fit the inlet side cooling shroud and secure it with the engine temperature probe. Install the starter motor with a smear of M/D grease on the machined end of the pinion and the body o-rings. <i>Take care to align it correctly as it may not be able to be rotated to meet the pedestal holes once fully engaged.</i> Tighten the starter pedestal fixings.	8lb-ft Contact + 15deg	
121	Using the coil mount as a register, locate crankshaft T.D.C. with a dial gauge.		
122	Fit the exhaust and inlet cam lock tools and once the cams are registered to their timing marks secure them enough to stop them rotating. Depress the damper and offer the belt up to the engine. Set both wheels so that any four equidistant holes in the drive flanges are centred in the adjustment slots in the wheels. When all is correct, secure the timing wheel clamp fixings. <i>Both are correctly set when the timing marks both align, with the engine at T.D.C. and the fixing screws are centred in their slots. This allows for fine adjustment to take place within the confines of the slots.</i>	15lb-ft	
123	Remove the camshaft restrainers, and rotate the engine through two full turns. Bring the crankshaft to TDC again and confirm camshaft timing registration. Fit the cover sealing screws.	20lb-in	
124	Fit the clamp ring location bolt into the locating hole in each wheel that aligns with any one of the threaded holes in the clamp plate. If required ,trim and fit the travel limiter to the damper shaft	20lb-in 7.0mm	
125	After copper lubrication of threads, install the sparkplugs and tighten them.	15 lb-ft	

Scavenge System

		Nominal	Actual
✓			
126	Locate the upper scavenge transfer manifolds and after ensuring that both sealing rings are in place, install and secure them to the cam housing apertures.	10 lb-in	
127	Fit both ring seals to the lower crankcase scavenge transfer manifolds and after identifying each –engine model dependant- tube and housing, install them onto the transfer tubes and offer each assembly to the apertures on the end of the cam housing transfer manifolds. Install the bolts and tighten each manifold. Continue this process with the outlet scavenge housings and cover plates, noting that all screws must have a smear of Loctite hydraulic sealant on their threads.	10 lb-in Loctite 267	
128	Secure the transfer tube clamp adjacent to the cylinder barrel cooling fins.	10 lb-in	

Peripherals

		Nominal	Actual
✓			
129	Fit the turbo oil outlet and sealing ring to the oil pump housing and secure it.	30lb-in	
130	Mount the spark-plug leads, noting correct orientation, and secure them into the lead clamp on the exhaust cover. Install the upper cooling shroud, ensuring correct layout of the leads through the apertures, and then fit the coil, noting the local earth tab.	20lb-in	
131	Fit the exhaust manifold sealing rings into the port registers. After establishing the correct orientation for the manifold, coat the engaging faces with copper based lubricant, and install it and its spacing tubes by sliding the pre-assembly down the exhaust studs. Tighten the nuts and secure them by bending the locking tabs onto the flats of each nut. Fit the lowermost bolt nearest the transmission into the exhaust manifold from the engine side of the flange. Install the exhaust shroud and securing screw.	20lb-ft 8lb-ft	
132	Fit the turbocharger and manifold gasket and tighten all of the bolts that secure it to the manifold. Fully engage the turbo oil feed tube and settle it, 90degree end at the pump. When it is positioned so that it clears the timing belt and runs adjacent to the PCV inlet manifold, tighten both unions and secure it to the manifold.	15lb-ft 20lb-in	
133	Fit the two timing sensors, spacers and seals and secure them, noting the orientation of the plugs.	10lb-in	
134	Install the oil filter. Fit and secure the turbo drain tube.	Contact +1/4 10lb-ft	
135	Install the exhaust down-pipe and gasket onto the turbo and secure it. Fit and secure the turbo steady tierod, ensuring slight tension is achieved.	20lb-ft 15lb-ft	
136	Fit the alternative probe aperture cap, seal and clamp into the lower casing and secure them.	10lb-in	
137	After noting the model type, fit the alternator pedestal and stator, noting cable routing. Fit the alternator rotor, noting that the drive pins must sit below the rotor engaging face by 0.250mm. Secure it with the appropriate type-dependant fixing .	Contact +15deg. 10lb-in. 35lb-ft.	
138	If required, fit the turbine shroud and secure it, noting the correct orientation, and flow direction.	8lb-in.	
139	Install the two crankcase starter housing screws noting the position of the wiring loom pedestal.	30 lb-in	
140	Install the wiring looms, remote coil earth and pedestal to the casing, the system earth terminal to its location on the inlet cam cover, and all else into their respective places, including secondary loom if fitted.	Contact +15deg	

Inlet Manifold

		Nominal	Actual
	✓		
1		Collect inventory required to assemble via reference to P8 of 17 of exploded views, with the exception of parts listed as throttle drives.	
2		Clean and inspect the inlet manifold body and ensure that all galleries and throttle shaft apertures are clean and free of burrs. Inspect the throttle shaft and ensure that it is free of burrs and all threaded holes are clean and true.	
3		Test fit the shaft through the throttle body and confirm that it runs smoothly and freely in its installed location. When satisfied with working fit, rub a small amount of molybdenum grease into bearing surfaces and slide it into place noting orientation.	
4		With the manifold supported horizontally and the injector bosses uppermost the shaft should be installed from your right and the disc flats should be facing the engine. As the shaft passes between each throttle body, place the return spring so that its larger diameter restraint rests on the top of the air balance casting and the shaft passes through its coils, then place the tensioner so that the cross mounted spring retainer can engage the spring and pass the shaft through its centre, and into the next throttle body. Leave both tensioning parts unattended at this time.	
5		90° +/- 0.005"	
6		3lb-in Loctite 262	
7		Loosely install the TPS switch onto its pedestal with the fixings midway through the positioning slots. After placing the mount adjuster, install the assembly onto the shaft and temporarily tighten the M5 fixing.	

8	<p>The assembly is ready for tuning when all fixings are in place but the switch can be moved by hand. This operation will be completed on the engine unless dedicated electronic equipment is available for the purpose. Engage the throttle return spring with the spring retainer, and from it's relaxed position, with throttle closed, rotate the retainer 1/8 of one turn into the spring and secure it via any one of the radial holes. Ensure that the now tensioned assembly closes the discs fully and repeatably without undue force.</p> <p>Install the two vacuum fittings, the fitting for the fuel pressure regulator adjacent to it, and then the ECU fitting.</p> <p>Install the studs into the body of the Plenum and secure them with Loctite 262.</p> <p>Fit the air temperature correction probe, and tighten it.</p> <p>Offer the plenum up to the manifold noting the orientation required for the model type being worked on.</p> <p>After installing the throttle cable mount under cyl#1, so that it will engage the actuating link, fit and secure the 8 flanged nuts. They are secured when engaged, plus 1/8 turn.</p>	<p>Loctite 262</p> <p>10lb-ft</p>	
9	<p>Each injector should be equipped with two manifold sealing rings-three in total. Coat these two rings with molybdenum grease and install the injectors into the manifold.</p>	<p>Moly Grease</p>	
10	<p>Coat the last 10.0mm of the threads of the fuel rail stud with Loctite 262, and secure it into the rail.</p>	<p>8lb-ft</p>	
11	<p>After ascertaining the correct orientation of the fuel rail for the engine type you are working with, install either bungs or fittings into the 1/8NPT apertures with 270 thread sealant or equivalent.</p>	<p>8lb-ft</p>	
12	<p>Collect the rail anchor, pressure regulator/s and fuel inlet fitting/s for the engine model you are working with, and after lubricating all o-rings with molybdenum grease insert each through the clamping holes in the rail anchor and into the ends of the rail. Secure them with the 4 M5 setscrews</p>	<p>10lb-in</p>	
13	<p>Particular care must be observed that the anchor is correctly oriented and that no undue force is required to insert each fitting as damage to o-rings may result. . .</p> <p>Lower the rail assembly down onto the injectors, ensuring that the clamping stud slides through the anchor rail in the manifold, and that it all settles comfortably, and smoothly onto the o-rings without undue pressure.</p> <p>Tighten the clamp stud nut until it just contacts the anchor rail, with the injectors fully engaged, and back it out 1/8 turn</p> <p>Fit and secure the rail/plenum setscrews.</p> <p>Secure this assembly to the engine noting that the o-rings are installed into the face grooves. Install the ECU assembly and secure the flanged nuts, followed by the two capscrews in the plenum housing.</p> <p><i>Note; The upper nuts may need to be installed as the assembly is engaged.</i></p>	<p>Contact + 15deg</p> <p>10lb-in</p>	

Initial Run-Up

1	Power the electronics system and set the TPS switch, throttle completely closed. Do not set idle speed trimming until the TPS is positioned.	0.795-0.805vd c	
2	Remove the loosely fitted oil pressure switch from the oil rail, and temporarily connect a suitable oil pressure gauge.		
3	Prime the oiling system with a remote pressuring pump until a minimum pressure of 10psi is recorded.	10 psi	
4	Run fuel system to check for leaks and system pressure. <i>Carry out basic system check on Dyno Facility</i>	41-43psi static	
5	Fit the turbo vane staller, and start the engine. Run at between 1500 and 2500rpm until a temperature of 90°C is recorded. Stop engine and remove turbo vane staller.		
6	Start engine and run until +90°C. Load to 25hp @3000rpm, for 1minute, noting the following; Oil pressure minimum; 30psi Fuel pressure minimum; 43psi Exhaust manifold pressure; 2.0psi Inlet manifold pressure; 2.0psi Exhaust gas temperature; 1150-1250F <i>Do not idle the engine for extended periods</i>		
7	Idle the engine @1500rpm, examine the engine thoroughly for any gas/pressure/fluid loss, and/or mechanical noise. Ensure that oil pressure does not fall below 25psi		
8	Load to 40hp @3500rpm for 2minutes, noting the following; Oil pressure minimum; 30psi Fuel pressure minimum; 45psi Exhaust manifold pressure; 5.0psi Inlet manifold pressure; 5.0psi Exhaust gas temperature; 1250-1300F <i>Ensure that any deviation from these figures is corrected at this time.</i>		
9	Carry out wide range/sweep full load test; 2000rpm-4200rpm <i>Do not exceed the stated sweep band width</i>		
10	Conduct an open throttle cylinder pressure test	120-130psi	

Date	Engine Number	Assembled By	Checked By

Notes / Observations	