

***** FOR COMPETITION USE ONLY Per US EPA Regulations *****

Factory Pipe
Bill of Materials
701 WaveRaider

<u>Item#</u>	<u>Qty.</u>	<u>Part Number</u>	<u>Part Description</u>
1	1	COMCST0040	B style headpipe-701 Yamaha all/XIR
2	1	COMCH70105	701 WaveRaider/Blaster Mod chamber
3	1	COMCST0230	701 WaveRaider manifold
4	1	COMST70102	701 WaveRaider stinger front
5	1	COMST70103	701 WaveRaider stinger rear
-	1	COMASM0100	701 WaveRaider hardware kit (items 6,7,9-32)
6	1	COMBRK0090	Front engine brkt Raider/Blaster Mod
7	1	COMBRK0080	L bracket Raider/Blaster Mod
8	1	COMHOS0140	2" x 18" Wet exhaust hose
9	2	COMCLP0050	100-120 mm SS hose clamp (4")
10	1	COMHOS0100	4" Silicone coupler (2-1/6")
11	1	COMHOS0080	2" Silicone coupler (2-1/2")
12	4	COMCLP0020	#32 SS hose clamp (2")
13	8	COMCLP0010	#06 SS hose clamp (3/8")
14	1	COMFTG0060	3/8" Plastic T
15	1	COMFTG0110	Side squirter (3/8" hose)
17	1	COMHOS0045	3/8" x 13" Waterline
18	1	COMHOS0004	3/8" x 4" Waterline
19	1	COMHOS0061	3/8" x 21" Waterline
20	1	COMGAS0060	WaveRaider/Octane manifold gasket
21	4	COMFAS0090	3/8"-16 SS nut
22	4	COMFAS0070	3/8" Ext. tooth washer SS
23	1	COMMNT0030	#J-11729-177 Lord mount
24	2	COMFAS0200	Fiber insulating washer
25	1	COMMNT0040	#J-11729-123 Lord mount
26	1	COMFAS0045	10 mm x 1.25 x 20 Flanged head cap
27	1	COMGAS0010	3 Bolt headpipe gasket
28	2	COMFAS0015	8 mm x 1.25 x 16.2 SS time sert
29	2	COMFAS0022	8 mm x 1.25 x 30 hex head (12 mm flats)
30	1	COMFAS0018	8 mm Hex nut SS
31	1	COMFAS0100	3/8"-16 x 3/4" Hex head bolt S.S.
32	1	COMFAS0040	10 mm Lock washer (.691" OD) S.S.

- < **CHECK CONTENTS AGAINST BILL OF MATERIALS. REPORT ANY SHORTAGES WHERE YOU PURCHASED YOUR FACTORY PIPE.**
- < **READ ALL INSTRUCTIONS CAREFULLY BEFORE STARTING INSTALLATION.**
- < **WATER INJECTION SET SCREWS ON TUNABLE HEADPIPES ARE PRE-ADJUSTED AND LUBRICATED. HOWEVER, YOU SHOULD DOUBLE CHECK ADJUSTMENT PRIOR TO INSTALLATION AND RE-LUBRICATE THEM ON A REGULAR BASIS TO PREVENT BINDING IN HEADPIPE.**

Factory Pipe
Instructions
701 WaveRaider

NOTE: We recommend that you use a Solas AI@ 15/18 variable pitch impeller or a stock WaveBlaster impeller with this application. The stock impeller is too Atall@ (17/20) and will not allow the boat to Aget on the pipe@.

Remove the complete stock exhaust system except for the hose going through the hull into the waterbox and retain the three flanged cylinder head bracket bolts.

Clean all gasket material from cylinder. Thread the 8 mm nut (item #30) halfway on to one of the 8 x 30 mm bolts (item #29). Thread one of the 8 x 1.25 x 16 mm time serts (item #28) partially onto the bolt and tighten nut against time sert. Apply red Loctite to time sert and thread into one of the top two center 10 mm manifold holes in cylinder until nut is flush. Loosen nut and remove the 8 mm bolt. Repeat procedure for other hole. 8 mm nut is no longer needed. Install the exhaust manifold gasket (item #20) using the two 8 x 30 mm bolts (item #29). Thread these bolts in about halfway and then install the Factory Pipe exhaust manifold (item #3). Secure manifold with the six of the stock bolts and Loctite 242, torque to 29 ft.-lb.

Note: Never use oil on hoses or couplers during assembly! Make sure they are free of oil or dirt.

Attach the stock 3/8" cooling line from the pump (not 2" drain hose) to barbed fitting on exhaust manifold and secure with a #6 hose clamp (item #13). Attach the 3/8" x 21" waterline (item #19) to the bottom (near 4" opening) barbed fitting on the Factory Pipe headpipe (item #1) using a supplied #6 hose clamp. Install the 4" silicone coupler (item #10) to the headpipe and secure with a 100-120 mm hose clamp (item #9). Position the clamp heads so they are accessible after installation in the hull. Now would be the time to check the water injection screws in the headpipe. We recommend starting with the bottom screw open 3/4 of a turn and the other two closed. You may adjust this later on to suit your riding style. Install the Factory Pipe headpipe using the 3 bolt headpipe gasket (item #27) to the manifold. Secure with the three stock cylinder head bracket bolts using Loctite 242 and torque to 29 ft.-lb.

Install the mag cover bracket "FRT" (item #6) to the right side of the flywheel cover with slot facing up using the stock bolts and Loctite 242, torque to 5 ft. lbs. Install the cylinder bracket "L" (item #7) to the front 10 mm hole above exhaust manifold on cylinder. With the 3/8" slot facing up, secure bracket with the 10 x 20 mm bolt with star washer (item #26,22) using Loctite 242, torque to 29 ft.-lb. Loosely install the Lord mount 177 (item #23) into the front mag bracket slot using the 3/8"-16 hardware (item #21,22). Install the Lord mount 123 (item #25) on the cylinder AL@ bracket with the 3/8-16 hardware (item #21,22). Install a fiber insulating washer (item #24) on the Lord mount 123 stud but do not put hardware on at this time.

Slip a #32 hose clamp (item #12) over each end of the 2" x 18" exhaust hose (item #8). Bend the hose in half and install it under the engine from the front to the left side. Take the aluminum stinger "S" bend (item #5) and install the large end into the stock hose at the rear of the engine compartment. (NOTE: On 95 models you will have to cut the 45 degree portion off stock hose.) Do not tighten clamp at this time. Install the other end of the stinger into the 2" x 18" exhaust hose. Do not tighten clamp at this time.

Install the 2" silicone coupler (item #11) onto the Factory Pipe chamber (item #2) and secure with a #32 hose clamp (item #12). Slip the other 100-120 mm hose clamp (item #9) over the 4" headpipe coupler. Using some water or Windex, install the chamber into the 4" coupler on the headpipe. Rotate and adjust chamber until the brackets align with the Lord mounts.

IT IS VERY IMPORTANT THAT THE CHAMBER BODY AND HEADPIPE SEAT FLUSH AND TIGHT INSIDE THE COUPLER. OTHERWISE, LOSS OF PERFORMANCE AND COUPLER FAILURE MAY OCCUR.

Tighten both 100-120 mm hose clamps and install all hardware on both Lord mounts at this time. Do not over tighten Lord mounts or use Loctite.

Take the aluminum stinger "C" bend (item #4) and install into open end of the 2" x 18" exhaust hose under the engine. Slip a #32 hose clamp (item #12) over the 2" silicone coupler on chamber body and then install other end of stinger "C" bend. Adjust stinger "C" bend until it does not rub or interfere with the engine and tighten all clamps.

Install the 3/8" plastic T (item #14) onto the other end of the 3/8" x 21" waterline (item #19) and secure with a #6 hose clamp (item #13). Attach the 3/8" x 4" waterline (item #18) to the middle leg of the T and secure with a #6 hose clamp (item #13). If you are going to race in limited class, attach the hose from the stock 4 mm side squirter to the remaining end of the T and secure with a hose clamp. If you are not racing, remove the stock side squirter and replace with the aluminum side squirter (item #15). Re-attach stock hose to new side squirter and remaining end of T. If you decide to race limited class after installing the new side squirter insert a 4 mm restrictor in the waterline. Install the other end of the 3/8" x 4" waterline to the inlet on chamber body and secure with a #6 hose clamp (item #13). Attach the 3/8" x 13" waterline (item #17) to the top fitting on the Factory Pipe headpipe and secure with a #6 hose clamp (item #13). Attach the remaining end to the front fitting on the cylinder head and secure with a #6 hose clamp (item #13). The remaining 2" black stock hose is not needed for the Factory Pipe system. Plug the end of this hose and zip tie it to a suitable location in the hull.

Carb Adjustments:

These adjustments are for sea level on a stock engine with aftermarket flame arrestors. Your specific adjustments may vary depending on engine modifications, fuel, altitude and other variables. Please consult a qualified technician if you are not familiar with tuning your carburetor.

Main jet : Stock

Pilot Jet : Stock

High speed screw : 1994 -2 turns out from closed / 1995 - 1-1/4 turns out from closed

Low speed screw : 1994 - Stock / 1995 - 3/4 turns out from closed

Needle & Seat : 1994 & 1995 - Stock

Spring : 1994 & 1995 - Stock

Factory Pipe Performance Exhaust 101

The purpose of an expansion chamber is to return to the exhaust port a negative sound wave then a positive sound wave at precisely the right time. If the pressure wave returns too late, you lose some of the fresh fuel charge in the combustion chamber and performance. If the wave returns too soon, it pushes hot exhaust gas back into the combustion chamber contaminating the fresh charge and creating hot spots on the piston. The challenge to the pipe designer is to arrive at the proper exhaust tuning that will return the sonic waves at the correct time. This challenge is made all the harder by many impeller/nozzle combinations, engine configurations, riding conditions and rider preferences.

Traditionally, if you wanted low RPM torque and high RPM horsepower, it required several pipes. A few of our competitors cast rings into their pipes to achieve pipe tuning by Acut and try. In 1992 Factory Pipe introduced the first truly tunable pipe using our variable water injection system. This system allows you to modify where and how much water injects into the exhaust by the turn of a set screw. Where our competition had you change the length of the pipe, the Factory Pipe allows you to vary the exhaust gas temperature which in turn changes the sonic wave speed within the pipe. **Changing the sonic wave speed within the pipe has the same tuning affect as changing the length of the pipe.**

Factory Pipe Tuning Your Exhaust System

Most Factory Pipe systems have our exclusive Atunable® headpipe which allows you to custom tune the pipe to your riding style. The following page gives a general overview of how this system works and how each adjustment will affect the performance of your watercraft.

Double check all hoses, bolts and clamps from your installation. For the first Aon-water® test of your new Factory Pipe we recommend closing the top and middle adjustment screws and opening the bottom screw 3/4 turn out from closed. This setting will be more water than is required but will provide a good starting point to test the pipe.

Ride the watercraft for several minutes while varying the throttle position. Open the engine cover as quick as possible after the ride and check the pipe temperature by splashing water on the chamber body directly after the headpipe coupler. **The water should lightly sizzle for the first few inches on the chamber body.**

If the water **does not** sizzle, close the bottom adjustment screw 1/8 turn and retest. If the water **sizzles rapidly**, open the bottom screw 1/4 turn and retest.

This set up will provide the best top end performance of your watercraft. With the pipe adjusted as stated above, open the top screw 1/4 turn. This will cool the exhaust in the headpipe and provide better bottom end performance at the expense of some top-end. This would be an ideal setting for running slalom or a tight buoy course.

If you want a change that is somewhere in the middle of the two settings, close the top screw and open the middle screw 1/4 turn or add another 1/8 turn to the bottom screw.

Some engines may react differently from the above. For example, while testing the 650 Super Jet we found that we gained top end performance by running the top screw open and the others closed. You may use any combination of the three screws to achieve the desired performance. However, **AT LEAST ONE SCREW MUST REMAIN OPEN AT ALL TIMES TO PREVENT DAMAGE TO THE PIPE.**