How to: Index the Spark Plugs on a Ficht / Direct Injection Outboard

Identify the powerhead.

If you're working on a 60º V6 (150 or 175 hp) which is a 1999 model year or older motor, the first step you need to take, is to positively identify the powerhead. In many cases there were numerous updates or, in cases where customers experienced several powerhead failures OMC may have replaced the original style powerhead with an updated "full dressed" version. It is entirely possible to have a 1998 engine with a 2001 design powerhead. Also, at one point in time there was a lot of confusion regarding spark plugs for these engines as there were about eight different spark plugs offered. In March of 2000, OMC produced a service bulletin addressing Ficht spark plugs and this bulletin simplified spark plug selection. The information in the chart below was taken from that service bulletin, so don't be alarmed if the plugs you take out of your engine don't match the chart. Keep in mind however, if the wrong spark plugs are installed in the engine you may experience running problems which could possibly cause serious, permanent damage to the engine.

If you have difficulty identifying the engine model year, seek the assistance of a **qualified** Evinrude†/Johnson† dealer, they may need to access the engine's ECU and read the data stored in the computer's memory.

Engine Family & Horsepower	Model Year	Info	Champion† Plug# (BRP† Part#)	Gap Specification
60º V4 - 90, 115	1998 – 1999	ALL	7712 (5001111)	.030" (0,8mm)
60º V4 - 75, 90, 115	2000 & newer	ALL	XC12PEPB (5001211)	.030" (0,8mm)
60º V6 - 150, 175	1997 – 1999	Without pinned cylinder heads*	7712 (5001111)	.030" (0,8mm)
60º V6 - 150, 175	1997 – 1999	With pinned cylinder heads*	XC12PEPB (5001211)	.030" (0,8mm)
60º V6 - 135, 150, 175	2000 & newer	ALL	XC12PEPB (5001211)	.030" (0,8mm)
90º V6 - 200, 225, 250	1999 & newer	ALL	QC12PEP (5001866)	.030" (0,8mm)

*** Note:** See next section for explanation and identification.

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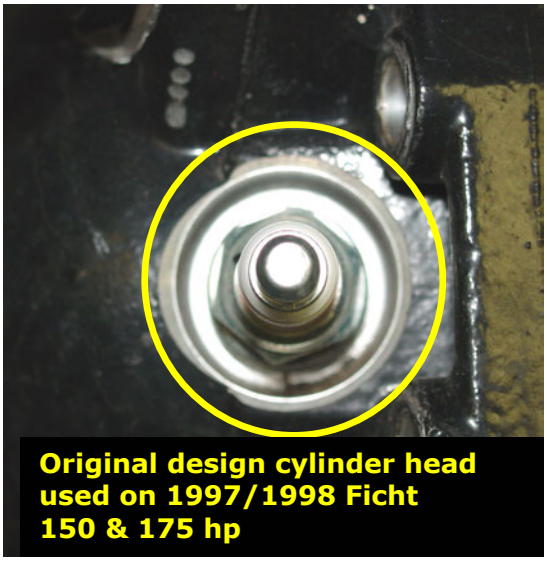
What's a "pinned cylinder head"?

In the evolution process of the Ficht technology, the OMC engineers discovered they could minimize the build up of soot which occurred on some engines by adding a "deflector pin" in the combustion chamber. This pin is placed between the fuel injector and the spark plug electrode and it helps to keep the spark plugs cleaner, longer and allows the engines to run better. If you own (or are working on) a 1999 or older 60º V6, compare the following two pictures to determine which style cylinder head is installed on your engine, this is very important to assure you purchase and install the correct spark plugs.

Identification. Cylinder heads are identified by looking at the machined recess area in which the spark plug is installed. **Note:** This id process does not apply to 2000 and newer outboards.

This is a picture of cylinder head "without pins", also known as an un-pinned cylinder head. It is identified by the "perfect circle" the machined area produces.

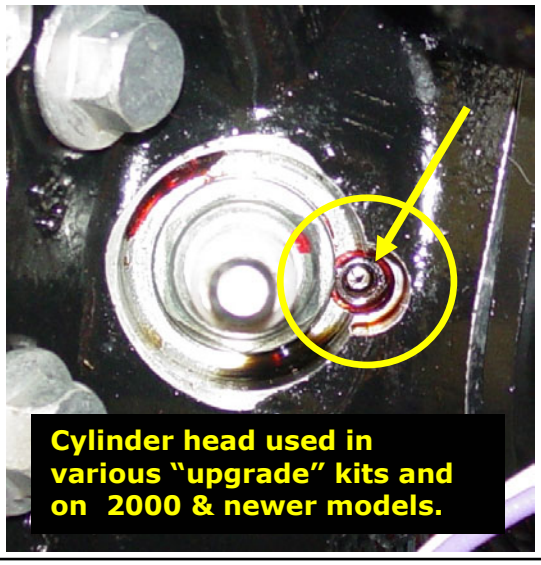


Original design cylinder head used on 1997/1998 Ficht 150 & 175 hp

This is a picture of cylinder head "with pins", also known as a pinned cylinder head. It is identified by the additional machined area located aft of the spark plug.

Notice the "hex-head" at the bottom of the smaller machined area - this is the pin.

Note: The 90º V6's (200 thru 250 hp), do not use this style of pin. The pin is actually cast inside the combustion chamber.



Cylinder head used in various "upgrade" kits and on 2000 & newer models.

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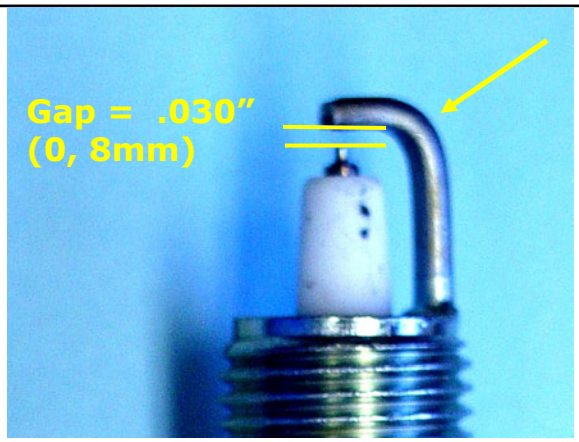
Tools Required.

- A quality torque wrench (2 types shown)
- A 3/8-drive Ratchet Wrench
- A 3/8-drive Breaker Bar (optional)
- A Sharpie† Pen
- 5/8" Spark Plug Socket
- Socket Extensions (optional, but handy)
- Universal Joint (optional, but handy)
- A Spark Plug Gapping Tool (3 types shown)

Preparing the Spark Plugs.

The first step is to set the spark plug gap to the specification. All of the factory service literature specifies a gap of .030". But it is commonly accepted to set the plug gap to .028"

Use your spark plug gap tool to measure and adjust the gap as necessary. Bend the spark plug "J" electrode at its bend (see arrow, right) to adjust the gap.



Next, you will need to use a Sharpie† pen (or other fine point marker) to draw a reference mark on the ceramic portion of the spark plug.

Draw the reference mark in line with the open end of the spark plug's electrode.

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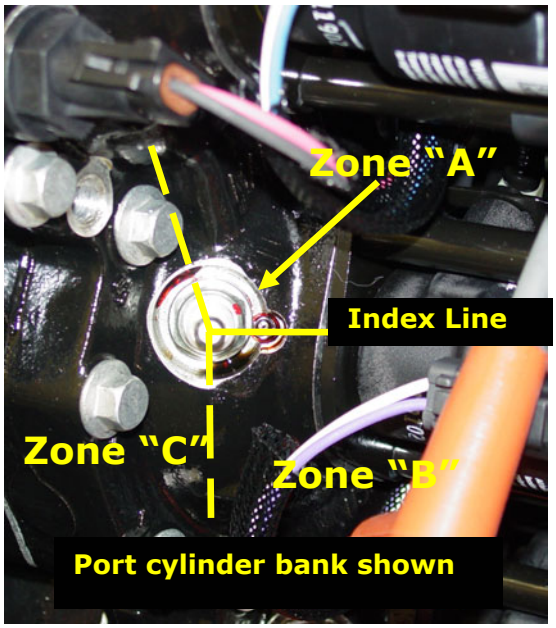
Installing and Indexing.

Be sure to read the note on torque specs below, before you begin this task.



Install a spark plug in a cylinder. Using your torque wrench and spark plug socket, torque the spark plug to **15 ft-lbs** (or 20 N-m).

- If the indexing mark you drew on the ceramic portion of the plug is in zone B, you're done with this cylinder.
- If the index mark is in zone A (see arrow, right), reset the torque wrench to **30 ft-lbs** (or 41 N-m) and continue torqueing until either the mark aligns with the pin (injector), or until the torque specification is met **(which ever comes first)**.
- If the index mark is in zone C, this spark plug will not work in this cylinder, try another spark plug in this location.

NEVER use a shim to index the spark plugs!

The port cylinder bank is illustrated, the index line and zones will be "mirror-reversed" when you do the starboard cylinder bank.

A note about the torque specs: The earliest literature regarding spark plug indexing appeared in the cylinder head upgrade kits OMC offered for the 1998 model 150/175 hp V6's. It specified an initial torque of 12 ft-lbs and a final torque of 22 ft-lbs. OMC eventually revised the initial torque to 15 ft-lbs. These specifications have been revised by BRP and I've used the specs from the 2002/2003 service manual for this article and, they are acceptable for all Ficht/DI motors. You may find older service literature that does not agree with the new specs. Lastly, keep in mind the 30 ft-lbs final torque spec is what the factory uses so that assembly workers don't waste time replacing plugs. Those of us who regularly service these engines rarely exceed a final torque of 22 ft-lbs. When spark plugs are torqued to 30 ft-lbs, you risk breaking the plug, either during installation, or in the future when its time to replace it.

-JG

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