

NAVMAN

DIESEL SYSTEM FAQ



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Will it work on my engine?

If the engine has a horsepower rating between 100 and 400 hp then yes.

If the engine is less than 100 hp, then maybe, but only if the returns flow is more than 25 litres per hour. Easiest way to determine that is to put the return flow into a jug or bucket for 10 or 15 minutes of running. This is not too difficult, as disconnecting the return line doesn't necessitate bleeding the fuel lines etc. It can still be messy though. Work out how much would flow in an hour of running, and if it is less than 25 litres per hour, then the present sensors are not suitable.

If the engine is over 400hp, then probably, but it will depend on the amount of fuel flowing round the system, not on the amount the engine consumes. The sensors are rated up to 350litres per hour, absolute max. If the flow through the supply line sensor is less than this, then it should be OK. Most engines have lower flows than this, right up to 600 or 700 hp, but some such as the Detroit Diesels have huge flow rates, and 400 hp is about the maximum suitable for those. The only true way to know is to check with the engine technical data, and confirm that the fuel flows (usually quoted at the lift pump) are less than 400 litres per hour.

How long are the cables?

20 metres from display head to engine flow sensors
2 metres between the supply and return sensors
4 metres from the return sensor to the tacho sensor.

Extension cables are available.

How accurate is it?

Within 1 litre per hour at low consumption rates, or 5%, whichever is the greater?

An engine at idle uses very little fuel, so the accuracy is within a litre per hour. At higher consumptions the reading is within 5% of the accurate value, usually considerably better.

Do the flow sensors have to be mounted in any particular way?

The sensors need to be installed horizontally.

Do not mount the sensors down low where bilge water could flow over them or their wiring.

Which direction does the fuel have to flow through the sensor?

The fuel can flow through them in either direction, from left to right or right to left, it does not matter. Choose the direction according to which way is easier or neater for the piping for that sensor.

How do I mount the tacho (rpm) sensor?

The tacho sensor mounting will probably require some thought and adaptation. The first requirement is to identify an external part of the engine that rotates at crankshaft speed. The crank pulley is usually the most accessible part. This is where all the drive belts for the alternator, water pump, refrigeration etc are driven from.

The pulley or flywheel will also need a reasonably flat area to stick the square of reflective tape onto.

The front face of the sensor (with the two round holes in it) needs to point towards where the square of reflective tape will pass when the engine is running. The front face of the sensor should be about 30mm (a bit more than an inch) away from the patch. The sensor works by transmitting a beam of infrared light, and then sensing reflection back to a detector. The reflective tape is made of a material very like reflective road signs – it will reflect light back the way it came. The tacho sensor needs to be placed far enough away from the rotating part that ordinary reflections from the surface of the part will not trigger the sensor but close enough so that the extra reflection from the reflective tape does trigger it.

The sensor will need to be mounted on a bracket, block of wood, metal beam or similar. Keep the sensor away from hot engine components – exhaust pipes etc.

Allow for the movement of the engine on its flexible anti-vibration mounts at starting or under load. The mounting needs to be strong enough to withstand the heavy pounding of a boat moving through rough seas at speed.

Secure the cable so that it cannot get caught up in moving parts.

How can I tell if the tacho (rpm) sensor is working?

When the engine is at idle, the little light on the back of the tacho sensor should be blinking.

If it is not lit at all, then the sensor is too far away, or not pointing where the reflective patch passes. If it is lit all the time, then the sensor is too close. Since you are working near powerful moving machinery, be sure to turn the engine off, and let it come to rest, before adjusting the angle or distance of the sensor.

What is the little tap on the flow sensors for?

The tap is a bypass valve. If the tap is turned so the handle is horizontal the fuel can flow directly from inlet to outlet, bypassing the measuring mechanism altogether. For normal operation the tap handle should be pointing down. The bypass should never need to be used – if any particles are in the fuel big enough to stop the flow sensor, then the diesel injectors are likely to have been blocked long before. However we have put the bypass there for peace of mind, and to assist in any problem diagnosis.

What is the thread on the in and out ports?

¼ inch NPT – as used by many fuel filter manufacturers.

If at all possible use ¼ inch NPT male threaded fittings.

While not ideal, it is possible to use a 1/4inch BSP thread. The fit is not perfect, and you will have to use enough thread sealant/thread tape to ensure a seal. You will also not be able to screw the thread in to its full depth – don't try to tighten the thread up fully or you risk stripping the aluminium thread in the sensor.

I have twin engines – what do I need?

Each engine requires:-

- Two flow sensors – one supply (blue) and one return (red).
- One tacho sensor to sense the rpm.
- A 20 metre cable from the supply sensor (white connector) to the display head
- A 2 metre cable to link the return sensor to the supply sensor (brown connector)
- Reflective patch

If you have two engines then you will need two of these kits.

You only need one display unit to display the information from two engines.

How does it know how much fuel is in the tank?

When the system is set up you tell it how big your tank is. Whenever you fill up or add fuel you again tell the head unit how much you added. Then as the flow sensors measure how much fuel your engine(s) use, that amount is subtracted from the starting volume, and displayed as the amount remaining. On a boat underway this gives a much more accurate value than a wildly swinging float gauge!

If you tell the display unit the wrong amount, or forget to update it as you add fuel, then the displayed "remaining" value will be nonsense.

However the displayed amount "used" will be correct. The amount used will be the total amount used since you last reset the counter to zero.

What are the two short bits of pipe in the engine kits for?

If you ever want to remove the sensors from your boat – for maintenance or to use them on another boat – you can put these pipes in the place of the sensors. They have the same thread (1/4 inch NPT) as the sensors.

If you are making an install in a new boat, it is a good idea to fit these pipes first, then run the engine to wash any particles of grit etc down into the secondary filter. If the fuel line is really contaminated, wash some diesel down the line and into a bucket. Then remove the pipe and fit the flow sensor. In this way you stop any grit that has got into the line during the install from blocking the sensor.

Do I have to calibrate the sensors?

No. All sensors are individually run and checked at 8 different flow rates throughout their range before they get packed. You can tell that by the remnants of test calibration fluid remaining in the sensors.

Are there any maintenance requirements?

No. There is only one moving part in the sensor, and it spends its entire life in filtered lubricant. There are no fine bearings or anything like that to wear out. The sensors will most probably outlast the engine they are attached to.

What is the blue plug out the back of the D3200 display head for?

That is to connect a Navman speed sensor – a through hull or transom mount paddlewheel. The Diesel display head needs distance/speed information to allow it to calculate range and economy information. You will need to enter the set-up menu, select 'speed' then adjust the setting to 'sen' to tell the instrument to get its speed data direct from a paddle wheel sensor.

What if I don't have a Navman speed sensor to attach to this display head?

Speed info can be input by either Navbus (if you have an instrument from Navman that does generate speed/distance info) or, if you have other manufacturers speed instrument, by the industry standard data NMEA. If you have an instrument from Navman that calculates speed, then all you have to do is connect the Navbus wires together. Connect the blue wire from the power/data lead of the other instrument to the blue wire in the power/data lead of the Diesel display head. Connect the orange wire from the other instrument to the orange wire in the display head cable. You may have to enter the set-up menu on the other Navman instrument and enable Navbus. Read the manuals to clarify this. If Navbus is connected, then the Diesel3200 will automatically take its speed information from Navbus.

If you have a speed/distance instrument from another manufacturer, then you will have to use the slower, industry standard, NMEA data. You will have to read the manual of the other instrument to determine which wire is their NMEA output, and you will probably have to adjust the set-up to enable NMEA speed/distance data out. You need to connect their NMEA 'data out' to the Diesel 3200 display head NMEA 'data in' wire. The Navman NMEA 'data in' wire is the white wire in the Diesel 3200 display head power/data cable. You will have to enter the 'set-up' menu of the Diesel 3200 and select 'speed' then adjust the setting to GPS to tell it to get speed information from the NMEA input. (This could be a little confusing – the setting says 'GPS' but it is really just enabling the NMEA – the other instrument might be putting out a NMEA sentence with GPS speed, or it might be putting out a NMEA sentence with water speed)

Is this 12-volt or 24 volt?

The flow sensors are designed for any voltage between 9 and 28 volts, so they can work on either.

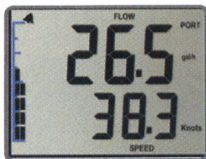
The Diesel 3200 display head is based on the Navman 3100 series instruments, and as such it is designed for 9 to 16 volts. So the Diesel3200 display head cannot be used on a 24-volt system.

All the newer instruments are being designed for 12 or 24-volt operation, so displays like the Trackfish6600 can use the diesel flow sensors on an all 24-volt system.

If using the flow sensors with a Diesel 3200 display head, then you should make the entire system a 12-volt system.

If you want to use the 'engine hours' feature of the D3200 on a 24-volt engine circuit then use a relay, (the coil powered by the 24 volt engine circuit), to switch 12 volts to the entire flow measuring system.

DIESEL 3200



COMPLETE FUEL MANAGEMENT

Navman's ingenious diesel fuel management system monitors fuel flow with a positive displacement flow sensor on both inlet and return lines to compute highly accurate fuel consumption.



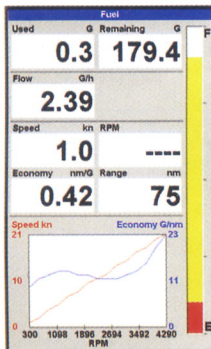
ECONOMY AND RANGE

When combined with speed data (from GPS or paddle wheel), valuable fuel economy and range information can be displayed. This data is crucial for determining optimum throttle settings for maximum engine efficiency.



DIRECT RPM INPUT

The Navman Diesel 3200 includes a digital engine tachometer input for complete engine propulsion and performance analysis



TRACKFISH 6600 WITH DIESEL

Navman's TRACKFISH 6600 will accept direct input from the diesel flow sensor. Complete diesel management information including fuel economy graphs is displayed.



Fuel Supply



Fuel Return

