VOLKSWAGEN marine
SUPERIOR TECHNOLOGY

Engines for displacing boats

- SDI 40-4
- SDI 50-4
- SDI 60-4
- SDI 55-5
- SDI 75-5
- TDI 100-5
- TDI 120-5

Volkswagen has taken to sea – carrying many good news for the engine room of your boat.

The decision of a globally leading motor company to make a substantial investment into marine engine technology was not something evident. While we look at a tremendous and continously increasing success of our high performance diesel technology, “TDI” used to be a shore-based synonym.

Car markets all over the world are huge and far over 20 million diesel engines made by our group clearly manifest how important this leading technology is for us. On the other hand, the marine engine market is small. Exclusive but small.

Which means that there must have been a particular motivation for us to develop our own engines for boats. And yes, there was such a motivation. That motivation is You.

It was yachtsmen like you who challenged us to offer uncompromising Volkswagen engine technology for boats. The Volkswagen Marine engine became a project and then a reality.

The advantages for you at a glance:

Intelligent Engineering.

- Exceptionally compact design plus low weight
- The same smooth running characteristics that made direct injection diesel engines in Volkswagen passenger cars so popular – based on two-stage injection and years of research.
- Huge performance potential and mighty torque available over a wide engine speed range
- Electronic engine control unit specially designed for marine use, therefore called Marine Diesel Control (MDC)
- Innovative instrument panels, featuring integrated onboard computer [1]

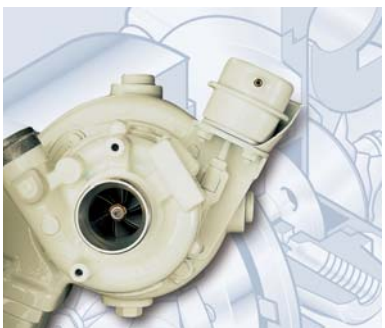
[1] Individual instrumentation alternatively available

Love for detail:

– Extensive corrosion protection for engine and all add-on parts, including non-corroding screws and attachment components
– Multi layer, specially fine tuned dual component paintwork
– Volkswagen standards apply not only to the base engine, but also the marinisation which is fully done in house!

Minimised maintenance, outstanding reliability and a long engine life.

– Check free valve clearance adjustment by means of hydraulic tappets
– Check free drive belt trimming via automatic tensioners – no worry, instead maximised drive belt life
– Oil change only every 200 hours or once per year, depending on which occurs first. The operation as such is child's play thanks to built in electric drain pump and vertically mounted oil filter which comes off dry when detached. Do it all cleanly and at the touch of a button.



Utmost attention to environmental aspects.

– Minimised fuel consumption saves ressources
– Minimised emissions
– No visible exhaust smoke
– Easy compliance with EU-emission regulations and all expected future emission laws. You can run our engines legally on waters where many other combustion engines are banned.
– All Volkswagen Marine engines shown in this brochure are designed to use "biodiesel" (RME) alternatively to regular diesel fuel
– Well thought-through recycling: Nearly all engine components can be disposed of cleanly or may be re-used.

A service philosophy that set standards.

We invested a lot of effort and patience in establishing a specialised marine dealer network – because a marine engine and its installation require marine service and nothing else. Regarding spare parts supply, however, we use the massive and extremely efficient structure of Volkswagen group – at very fair pricing for you!

About bits, bytes and reliability of electronic controls.

The Marine Diesel Control (MDC) is capable of establishing the perfect fuel injection amount and -timing up to 50 times per second, taking into account parameters like engine speed, temperature of turbocharging air and fuel temperature.

It must be said that today's requirements of optimum performance and low emission simply require the employment of modern electronics. Being aware of the special operating conditions at sea, we put great emphasis on reliability.

And if developed by Volkswagen, such an electronic control unit will withstand corrosion impacts much better than mechanical systems of the past!

The complete unit is housed in a specially sealed, well-protected case which is attached directly to the engine. The MDC serves as brain for all electrical and electronic functions and is individually tuned for each engine specification.

The MDC further features an emergency operation program and a memory that functions essentially as an electronically kept engine logbook.

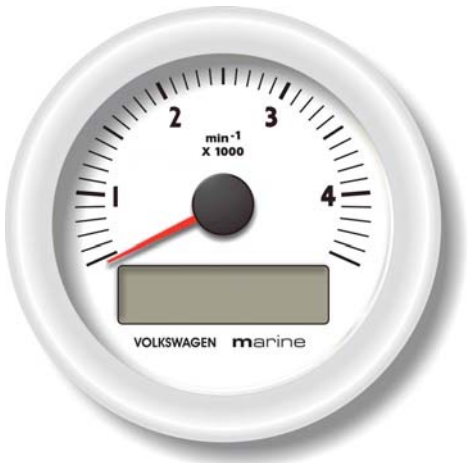
This "logbook" can be read out by our Volkswagen Marine partner within minutes during annual service.

We have been using electronic management from the beginning and on all models – because there is only one standard for a Volkswagen marine engine.

Also included in the standard delivery, and individually fine-tuned to each engine type, is a sophisticated instrument panel, which incorporates our so-called "Multi Function Display": Postioned in the centre of the rev counter, it provides you with information from the onboard computer at the push of a button. That includes data such as:

- Actual and average fuel consumption per hour, nautical mile, statute mile or kilometer [1]
- Overall fuel consumption
- Distance made good [1]
- Speed in various scales [1]
- Engine service hours and engine speed.

[1] if interfaced with navigational instruments



“Safety at sea” means “being properly informed at all times”.

We offer our engines intentionally only in combination with rather extensive instrumentation, as we regard that as crucial for safe assessment of available range and safety at sea in general.

On top of that, we deliver all engines with a surveillance system that is otherwise unusual for marine engines used in pleasure craft application:

We install an electric monitoring system in the fuel filters of all marine engines that warns of a rather common and dangerous hazard at sea: “Water in the fuel” occurs much more often aboard small boats than, for example, on the road. And not even Volkswagen Marine engines can burn water instead of fuel.

In such a case, Volkswagen Marine skippers are warned optically and acoustically and can easily drain the water from the filter. They can then simply proceed, rather than floating around without power in a potentially dangerous situation!

The panel is connected to the engine’s electronic system via one central plug (wiring available in various lengths). And finally, the entire wiring is designed shock- and vibrationproof as well as carefully sealed watertight. Alternatively, a solution with individual instrumentation is offered.

Volkswagen Marine engines are designed to meet highest reliability standards. Nevertheless, some components are invariably subject to natural wear and tear. We made it a mission to ensure that all Skippers who trust Volkswagen Marine engines can rely on prompt and easy supply of practical accessories plus, needless to say, immediate availability of spare parts.

This includes, for example, our 230 V generator package for most of our engines which provide you with up to 3,5 kW electricity for any normal home appliance from your main engine – without the noise, expense, weight and fuss of a separate generator set.

Your Volkswagen Marine dealer will inform you about the wide range of available combinations with Z-Drives and gear units. We offer more than an engine: Support, perfect after sales service and peripherical technology are just as important.

Four cylinder compact class – state of the art or a little beyond.

The mechanical base of this engine family is among the most successfull engine designs ever made – millions of these power plants are serving our customers in variants of up to 150 absolutely reliable, stunningly economic horsepowers.

The marine version is a largely re-engineered construction, which focuses in all details on marine application:

The layout of these engines aims at sailyachts and smaller motorboats. We invested special high technology to achieve an exceptional level of refinement, especially at idling and lower engine speeds.

Our four cylinders SDI 40-4, 50-4 and 60-4 are mechanically identical and we deliberately chose to design them naturally aspirated. That offers the following advantages:

– Turbocharged engines prefer to be used for longer periods so that the hot turbine remains free of corrosive residuals. These compact engines, however, also face use profiles where they are used only for minutes, for example aboard sailyachts.
– The torque curve of naturally aspirated engines is exemplarily flat and therefore ideal for water displacing craft.

But a closer look at these engine's specifications reveals that we spent a lot of more thought:

Minimised maintenance.

– Just like on our bigger designs, oil change is done within minutes at the touch of a button-spilled oil will neither appear in the bilge of your boat nor on your fingers.
– No drive belt trimming and no valve clearance adjustment required – both takes place automatically and with ultimate precision.
– We use exactly the same sophisticated electronic control unit as for the bigger engines. One read-out of the electronic memory, a short visual inspection and your service partner can return to his car.

Maximised comfort.

– Ample electrical power. We fit a generous 90-ampere-alternator as standard.
– Rigging for water heating available as an option.

Finally, we hardly need to emphasize that the relatively modest power ratings of all three types ensure immense thermical and mechanical reserves. Like all Volkswagen Marine engines, they are designed to sustain continous operation at full power.

By the way: We had very good reasons to offer this engine in three different versions with a specially worked out electronic control profile for each.

As the engines reach their rated performance in accordance with engine speed, you are kindly advised to order the version which you really need, and not automatically the most powerful one.

If, for example, 29 kW(40 hp) are sufficient for your profile of use, you may combine an SDI 40-4 with a relatively heavy propeller – giving you ample thrust even at lowest rpm's.

Choosing SDI 50-4 or 60-4 requires also use of a lighter propeller in order to allow the engine to reach those 3.000 or 3.600 rpm – which will produce correspondingly less thrust at very low engines speeds. So, if you share our diligence about this, you will be rewarded with greatest possible silence on board.

Whichever version you choose: All design work was based on the SDI 60-4, and even that version's maximum speed of 3.600 rpm is far away from other typical use profiles for the base engine – continous use at 4000 rpm in industrial applications is sustained without a problem!

SDI 40-4

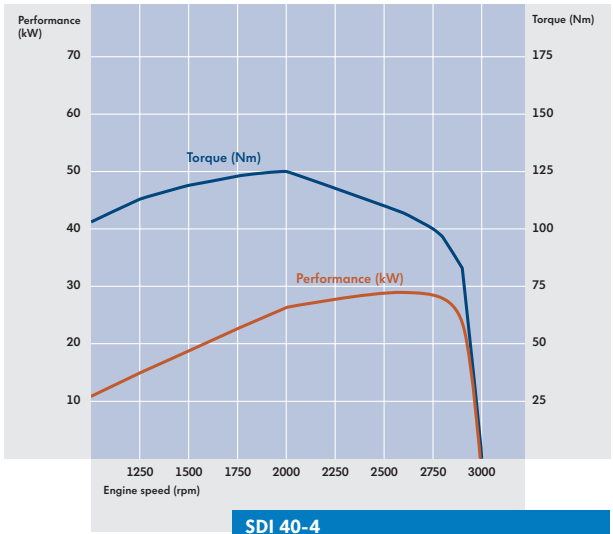
Naturally aspirated 4-cylinder diesel engine

If you do not mind being asked by marina neighbours whether your boat uses electric propulsion, take a closer look at this engine.

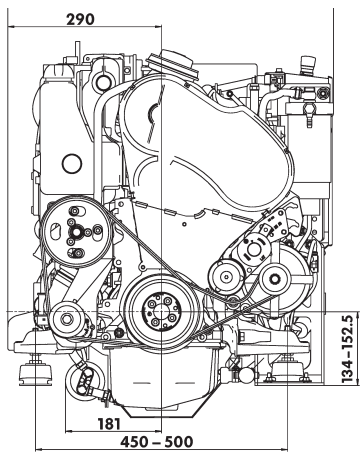
The effect is not, however, achieved through magic but through engineering facts:

– The engine uses four cylinders in a performance class where three cylinders are customary.
– The SDI 40-4 achieves maximum and continous power at only **2.600 rpm**, so real physical challenges will simply not occur. A sophisticated base engine still allows a dry weight below 200 kg, and exceptionally compact dimensions.

Easily meets EU emission standards and all expected future emission standards for marine engines.



SDI 40-4	
Capacity	1.896 cm³
Performance	29 kW (40 hp) at 2.600 rpm
Max. Torque	125 Nm at 2.000 rpm
Weight	198 kg (dry, without gear unit)



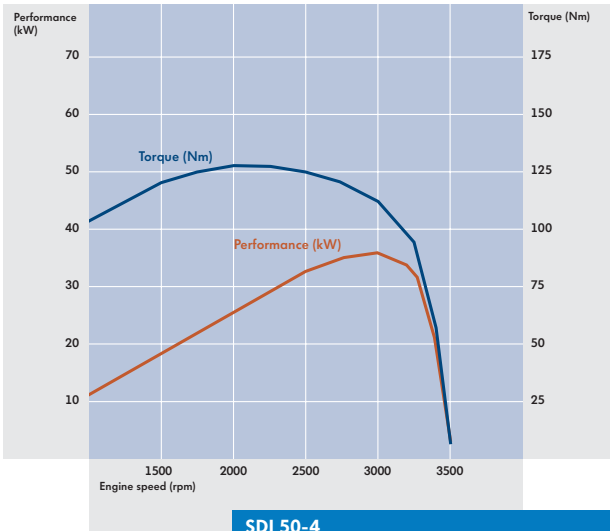
Frontal view of SDI 40-4, 50-4 and 60-4

SDI 50-4

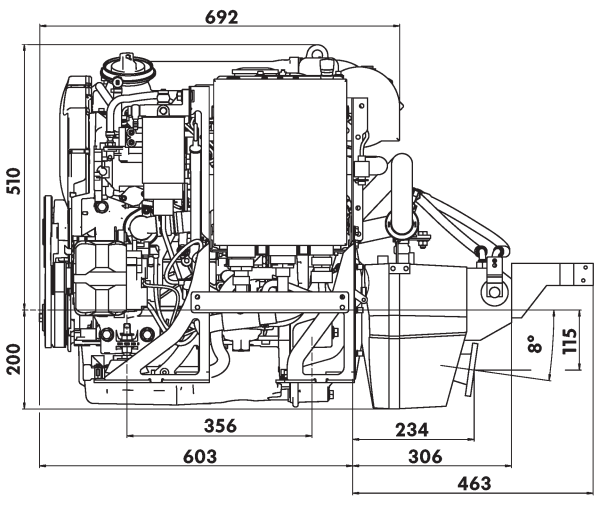
Naturally aspirated 4-cylinder diesel engine

This engine should be your choice whenever scenarios are faced where 40 hp could become insufficient – let us assume a larger sailyacht being used in very tough coastal conditions with heavy tides. In direct comparison with SDI 40-4, you will still enjoy impressive thrust at low engine speeds but in addition, there are those extra few hundred rpm's up your sleeve whenever you need them.

Easily meets EU emission standards and all expected future emission standards for marine engines.



SDI 50-4	
Capacity	1.896 cm³
Performance	37 kW (50 hp) at 3.000 rpm
Max. Torque	125 Nm at 2.000 rpm
Weight	198 kg (dry, without gear unit)



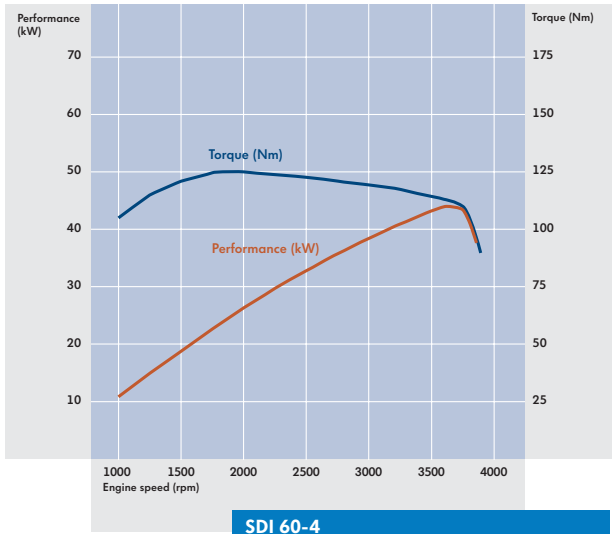
Lateral view of SDI 40-4, 50-4 and 60-4

SDI 60-4

Naturally aspirated 4-cylinder diesel engine

That type is a multi-talent. While being a perfect choice for more sporty sailyachts where its very favourable weight-performance ratio comes into play, it is also an ideal companion aboard small motor cruisers or the increasing community of modern fishing boats around 20 feet. SDI 60-4 will provide ample power to such boats, along with low noise level and impressive range – thanks to its impressively low fuel consumption!

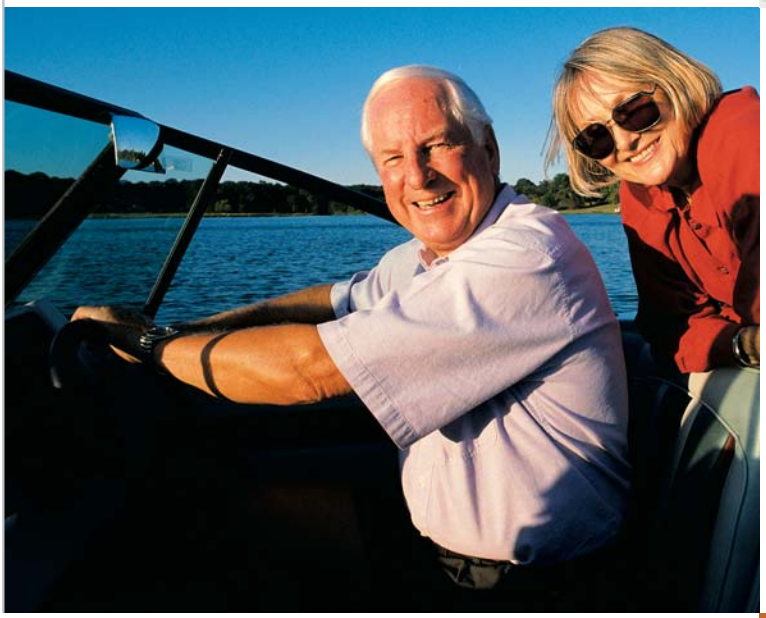
Easily meets EU emission standards and all expected future emission standards for marine engines.



SDI 60-4	
Capacity	1.896 cm³
Performance	44 kW (60 hp) at 3.600 rpm
Max. Torque	125 Nm at 2.000 rpm
Weight	198 kg (dry, without gear unit)

Specifications	SDI 40-4	SDI 50-4	SDI 60-4
Engine type	4-cylinder Diesel	4-cylinder Diesel	4-cylinder Diesel
Fuel system	direct injection [1]	direct injection [1]	direct injection [1]
Cylinders	inline 4	inline 4	inline 4
Displacement [cm³]	1.896	1.896	1.896
Stroke [mm]	95,5	95,5	95,5
Bore [mm]	79,5	79,5	79,5
Compression ratio	19,5:1	19,5:1	19,5:1
Performance (ISO 3046) [kW]	29	37	44
Performance [hp]	40	50	60
at	2.600 rpm	3.000 rpm	3.600 rpm
Specific power output [kW/l]	15,3	19,5	23,2
Appr. piston speed [m/s]	8,3	9,5	11,5
Max. torque [Nm]	125	125	125
at	2.000 rpm	2.000 rpm	2.000 rpm
Min. specific fuel consumption [g/kWh]	220	220	220
Weight [kg] [2]	198	198	198
Alternator	90 A	90 A	90 A
Electrical system	12 V	12 V	12 V
Oil change	Once a year or after 200 hours of operation (depending on which occurs first)		
Cooling	Thermostatically controlled double circuit cooling system with heat exchangers, water cooled collective exhaust pipe, oil cooler, hydraulic oil cooler		
Standard delivery includes	Wiring and instrumentation, onboard computer, electric oil drain pump for oil change, engine mounts		
Options	Piping for hot water preparation or heating Bipolar wiring		

[1] distribution injection pump [2] dry, without gear unit (ZF 25A: + 25 kg)



Calm, yet irresistable power: Our luxury cruising class.

Aboard a well-designed water displacing craft, traveling itself can become the destination.

For boats of that kind, Volkswagen Diesel Technology can offer a lot: We were the first to bring direct diesel injection to passenger car comfort level, and all our know-how comes into play: One of many examples are our twin-spring fuel injectors. They split each injection process into two phases: A first, tiny amount of fuel is pre-ignited at low pressure, and the computer-controlled full amount is sprayed into the ongoing combustion. The results are steady build-up of combustion pressure, less mechanical stress on the engine, minimised emissions and minimised combustion noise. An additional benefit is our noise absorption cover, reducing noise by another 2 db/A.

The current Volkswagen five cylinder range for displacers comprises 2 naturally aspirated engines (SDI 55-5 and SDI 75-5) and the turbocharged TDI 100-5 and TDI 120-5.

The differences between those four engines reach far beyond their individual power ratings – we spent thought when defining them:

The naturally aspirated engines are ideal for heavier sailyachts and for the regular abuse aboard smaller work- and patrol boats. The difference in maximum output of 15 kW (20 hp) is achieved through differing engine speed levels, and you have the choice between a more flexible power plant with a wide engine range and an especially low-revving one, which will provide utmost power at any setting below 2.500 rpm.

The TDI versions, on the other hand, are more than simply "turbocharged". The particular chargers used offer two major benefits, which separate them from the competition:

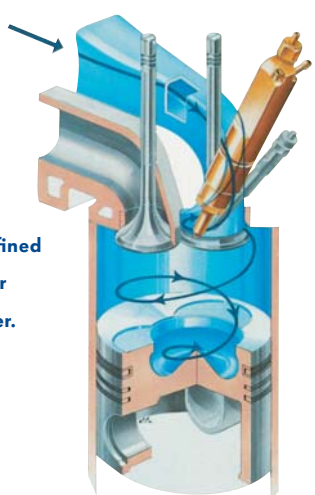
– Variable turbine geometry (VTG) offers full boost from only 1.700 rpm onwards, which results in impressive, immediately available thrust even at lowest engine speeds
– This charger is not only variable, but also water cooled. That keeps engine room temperatures low.

The combination of VTG-turbocharging and low engine speed level makes TDI 100-5 and TDI 120-5 extremely comfortable power plants for heavier motorcruisers.

Whatever your individual needs may be, the following characteristics apply for all our "cruising engines":

– Exceptional refinement achieved, among other aspects, through our "two stage direct injection".
– Mighty torque, yet extreme fuel efficiency
– Minimised vibration
– Exceptionally compact design and low weight
– Dual Mass Flywheel for smooth running at low engine speeds, reducing drive train vibration and -noise
– Innovative Instrument Panel [1] including an onboard computer which is integrated in the rev counter
– Prepared for optional installation of an additional 12, 24 or 230 V Generator for particularly comfortable power supply on board (may also be fitted ex factory)

[1] alternatively individual instrumentation possible



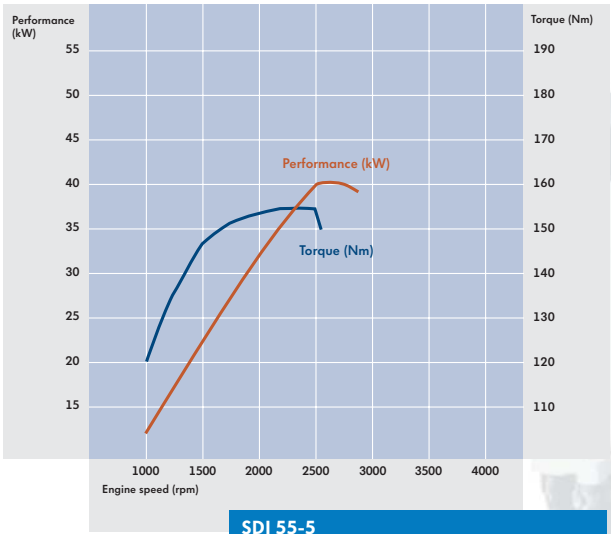
The particular shape of the cylinder orifice gives the induction air a predefined twist movement, ensuring optimum air distribution in the combustion chamber. As a result, the injected fuel is burned with ultimate efficiency.

SDI 55-5

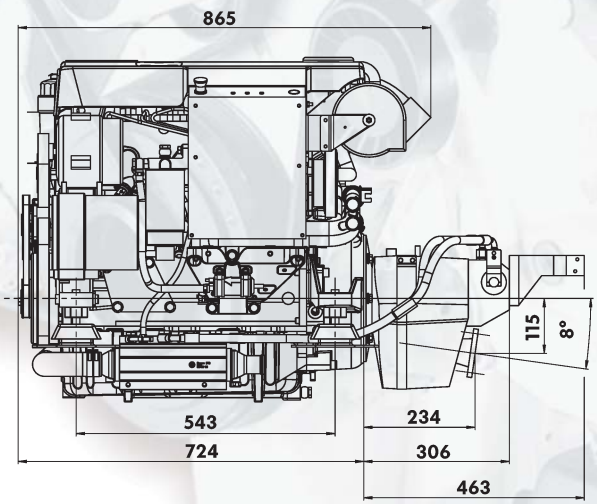
40 kW (55 hp) – naturally aspirated 5-cylinder diesel engine

Thanks to its low engine speed level a particularly comfortable power plant for cruisers aboard which silence and thrust are most important. As a naturally aspirated engine, it is especially suitable for sailyachts whose engine is often started merely for minutes of use, which means that normal running temperatures cannot be reached. Direct injection engine with electronically controlled distribution injection pump (Marine Diesel Control), low fuel consumption and low engine speed level for maximised comfort.

Easily meets EU emission standards and all expected future emission standards for marine engines.



SDI 55-5	
Capacity	2.461 cm³
Performance	40 kW (55 hp) at 2.500 rpm
Max. torque	155 Nm at 2.250 rpm
Weight	245 kg (dry, without gearbox)



Lateral view SDI 55-5 and SDI 75-5

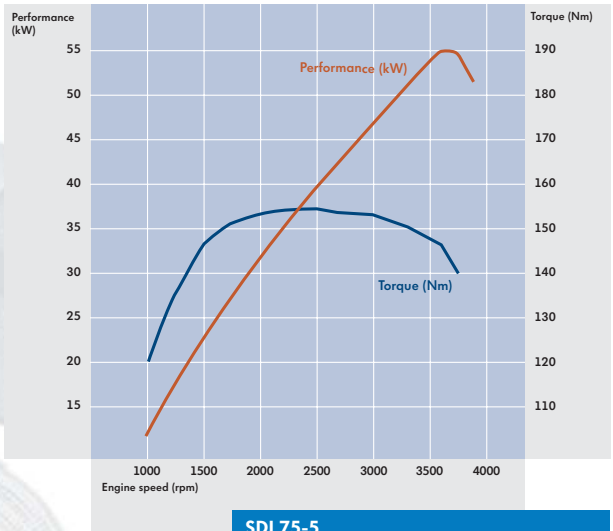
SDI 75-5

55 kW (75 hp) – naturally aspirated 5-cylinder diesel engine

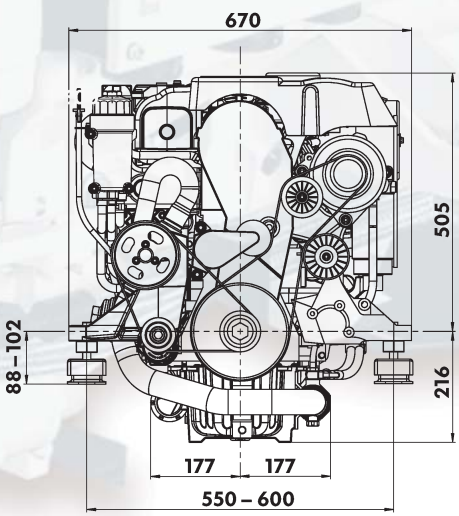
SDI engine with wide and universally usable range of performance and torque.

Direct injection via electronically controlled distribution injection pump (Marine Diesel Control). Extremely refined engine with favourable weight-performance ratio. The SDI 75-5 convinces not only with high torque – in excess of **150 Nm** from **1.750** to **3.000 rpm** – but also with its environmentally friendly characteristics such as low fuel consumption and low emissions.

Easily meets EU emission standards and all expected future emission standards for marine engines.



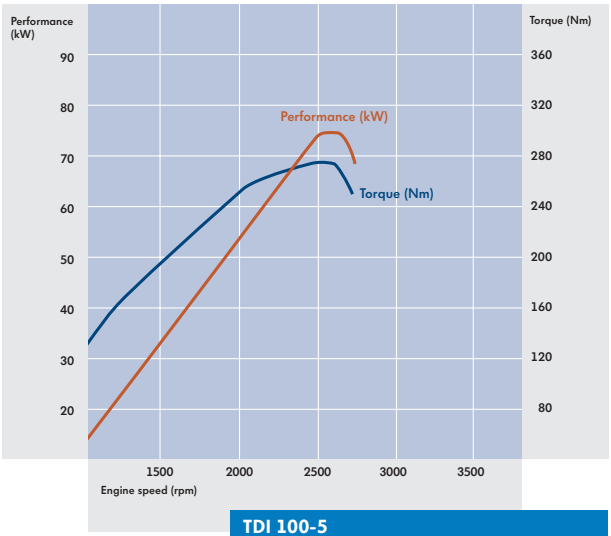
SDI 75-5	
Capacity	2.461 cm³
Performance	55 kW (75 hp) at 3.600 rpm
Max. Torque	155 Nm at 2.250 rpm
Weight	245 kg (dry, without gearbox)



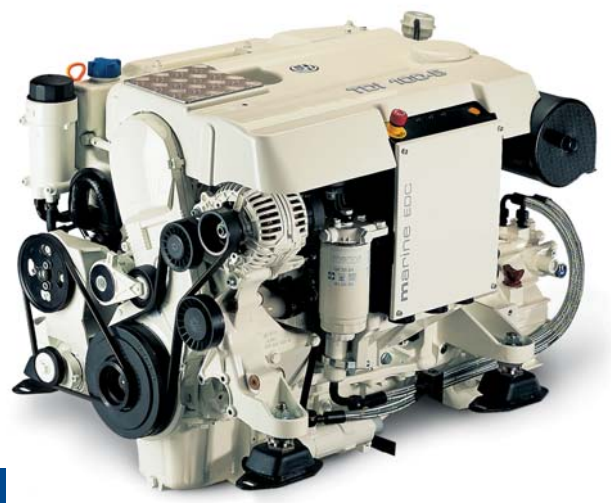
Frontal view of SDI 55-5 and SDI-75

TDI 100-5

74 kW (100 hp) – turbocharged 5-cylinder diesel engine



TDI 100-5	
Capacity	2.461 cm³
Performance	74 kW (100 hp) bei 2.600 rpm
Max. Torque	275 Nm at 2.500 rpm
Weight	255 kg (dry, without gearbox)

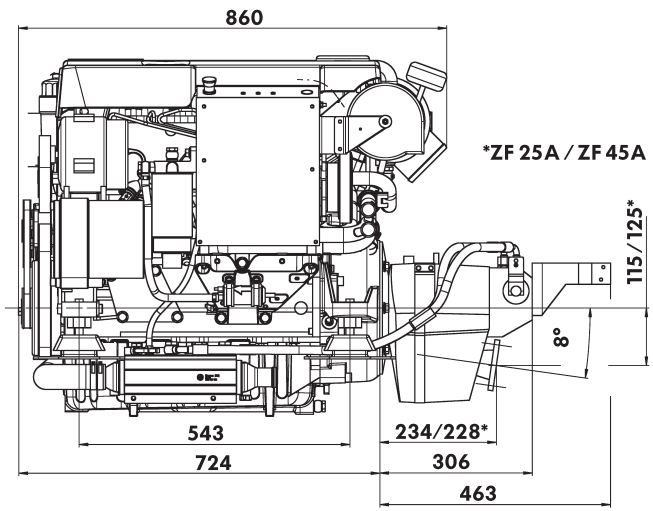


Turbo boost out of 5 cylinders at a maximum engine speed of no more than **2.600 rpm**!

In the particular case of this engine, our water cooled "VTG"-turbocharger (Variable Turbine Geometry) primarily ensures extremely high torque at low engine speeds. This allows especially silent cruising and makes maneuvering in tight spots easy. An additional benefit of our charger is that its watercooling keeps engine room temperatures low, which is good for safety on board and assists engine efficiency.

This engine is intended as a special comfort solution for water displacing cruisers. For very heavy boats (e.g. big sailing yachts) or semi-displacers, we recommend the mechanically identical TDI 120-5 for its wider engine speed range.

Easily meets EU emission standards and all expected future emission standards for marine engines.



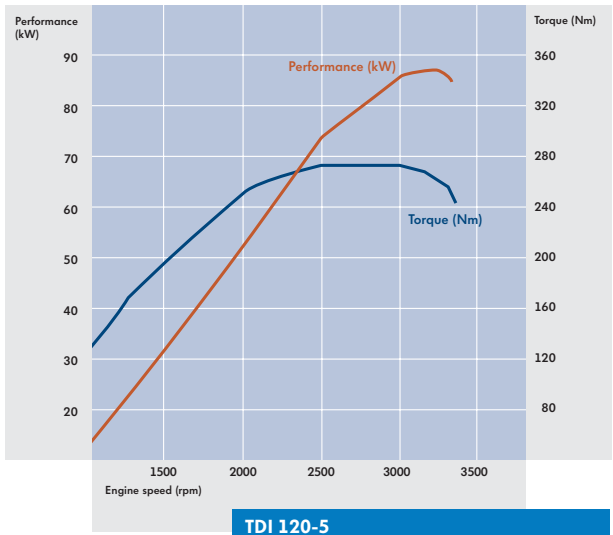
Lateral view of TDI 100-5 and TDI 120-5

TDI 120-5

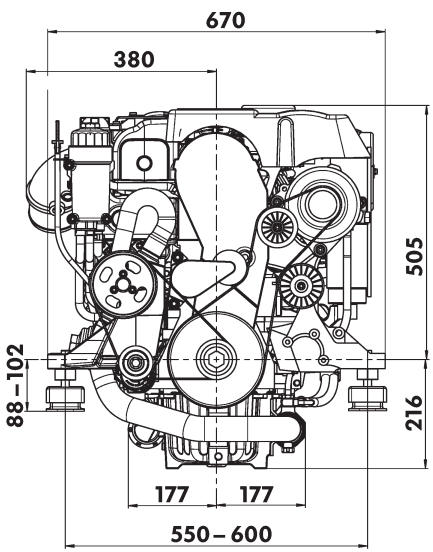
88 kW (120 hp) – turbocharged 5-cylinder diesel engine

Ample power – ample reserve! TDI-diesel with 2.5 litre engine capacity, favourable weight-performance ratio and a mighty torque of over **250 Nm** at any engine speed between **1.900** and **3.200 rpm**. Thanks to those characteristics,the perfect engine for a wide range of heavier boats – with all the fuel economy and low emissions that you expect from us. Direct injection engine with electronically controlled distribution injection pump (Marine Diesel Control) and watercooled VTG-turbocharger (Variable Turbine Geometry).

Easily meets EU emission standards and all expected future emission standards for marine engines.



TDI 120-5	
Capacity	2.461 cm³
Performance	88 kW (120 hp) at 3.250 rpm
Max. Torque	275 Nm at 2.500 rpm
Weight	255 kg (dry, without gearbox)



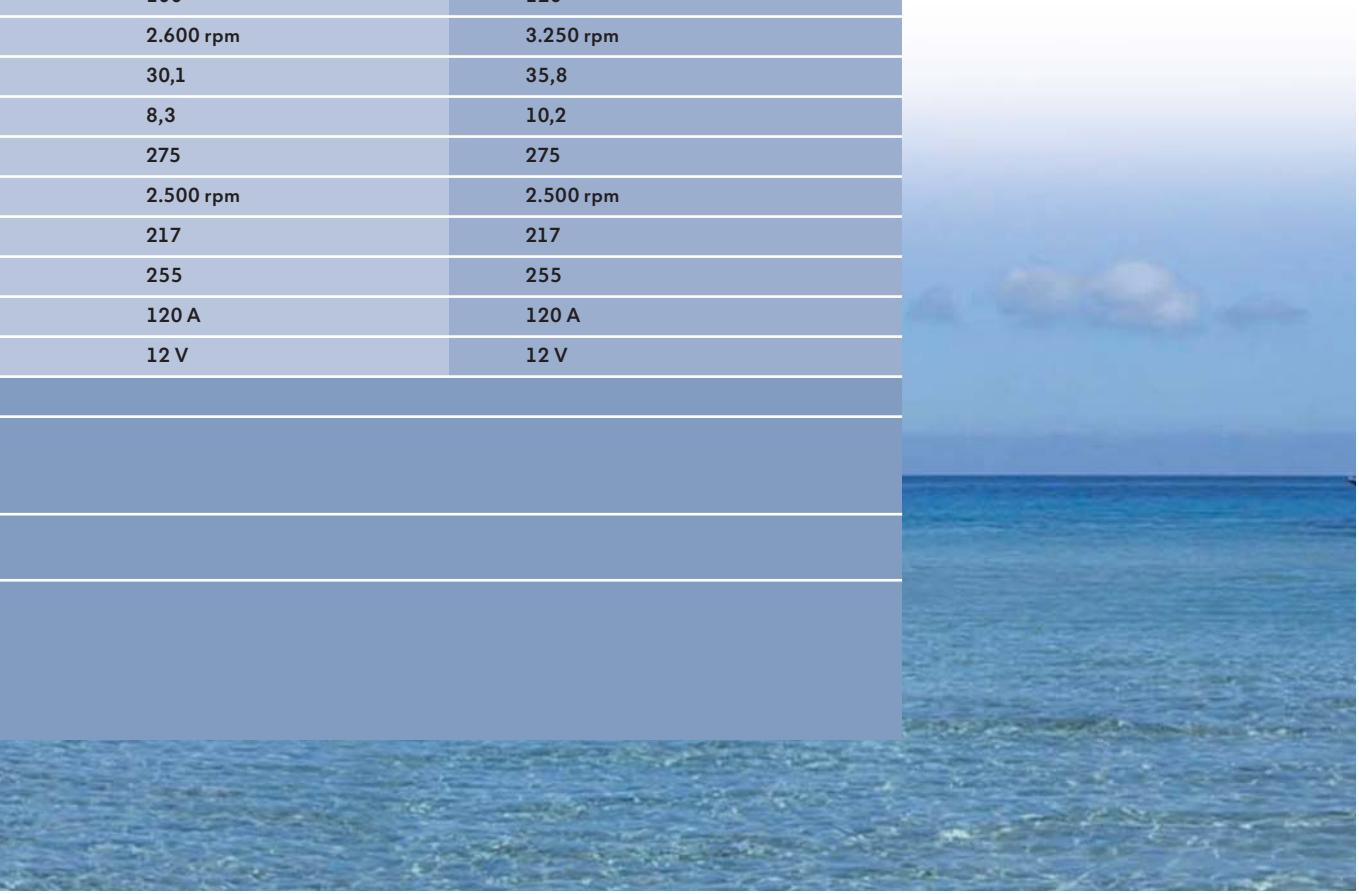
Frontal view of TDI 100-5 and TDI 120-5

Specifications	SDI 55-5	SDI 75-5
Engine type	5-cylinder Diesel	5-cylinder Diesel
Fuel system	direct injection [1]	direct injection [1]
Charge	–	–
Cylinders	inline 5	inline 5
Displacement [cm³]	2.461	2.461
Stroke [mm]	95,5	95,5
Bore [mm]	81,0	81,0
Compression ratio	19,0:1	19,0:1
Performance (ISO 3046) [kW]	40	55
Performance [hp]	55	75
at	2.500 rpm	3.600 rpm
Specific power output [kW/l]	16	22,3
Approx. piston speed [m/s]	7,9	11,5
Max. torque [Nm]	155	155
at	2.250 rpm	2.250 rpm
Min. specific fuel consumption. [g/kWh]	233	233
Weight* [kg]	245	245
Alternator	120 A	120 A
Electrical system	12 V	12 V
Oil change	Once a year or after 200 hours of operation (depending on which occurs first)	
Cooling	Thermostatically controlled double circuit cooling system with heat exchangers, collective exhaust pipe and water-cooled exhaust turbocharger (if applicable), oil cooling, fuel and hydraulic oil cooling	
Standard supply includes	Piping for hot water preparation or heating, wiring and instrumentation, on-board computer, electric oil drain pump for oil change, engine mounts	
Options	Bipolar electrical system Power steering pump 230 V-generator set	

[1] distribution injection pump
[2] water-cooled turbosupercharger with variable turbine geometry
* dry, without gear unit (ZF 25A: + 23 kg; ZF 45A: + 35 kg)

TDI 100-5	TDI 120-5
5-cylinder Turbo-Diesel	5-cylinder Turbo-Diesel
direct injection [1]	direct injection [1]
exhaust turbocharger VTG [2]	exhaust turbocharger VTG [2]
inline 5	inline 5
2.461	2.461
95,5	95,5
81,0	81,0
19,0:1	19,0:1
74	88
100	120
2.600 rpm	3.250 rpm
30,1	35,8
8,3	10,2
275	275
2.500 rpm	2.500 rpm
217	217
255	255
120 A	120 A
12 V	12 V

Subject to change without prior notice



Änderungen vorbehalten

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