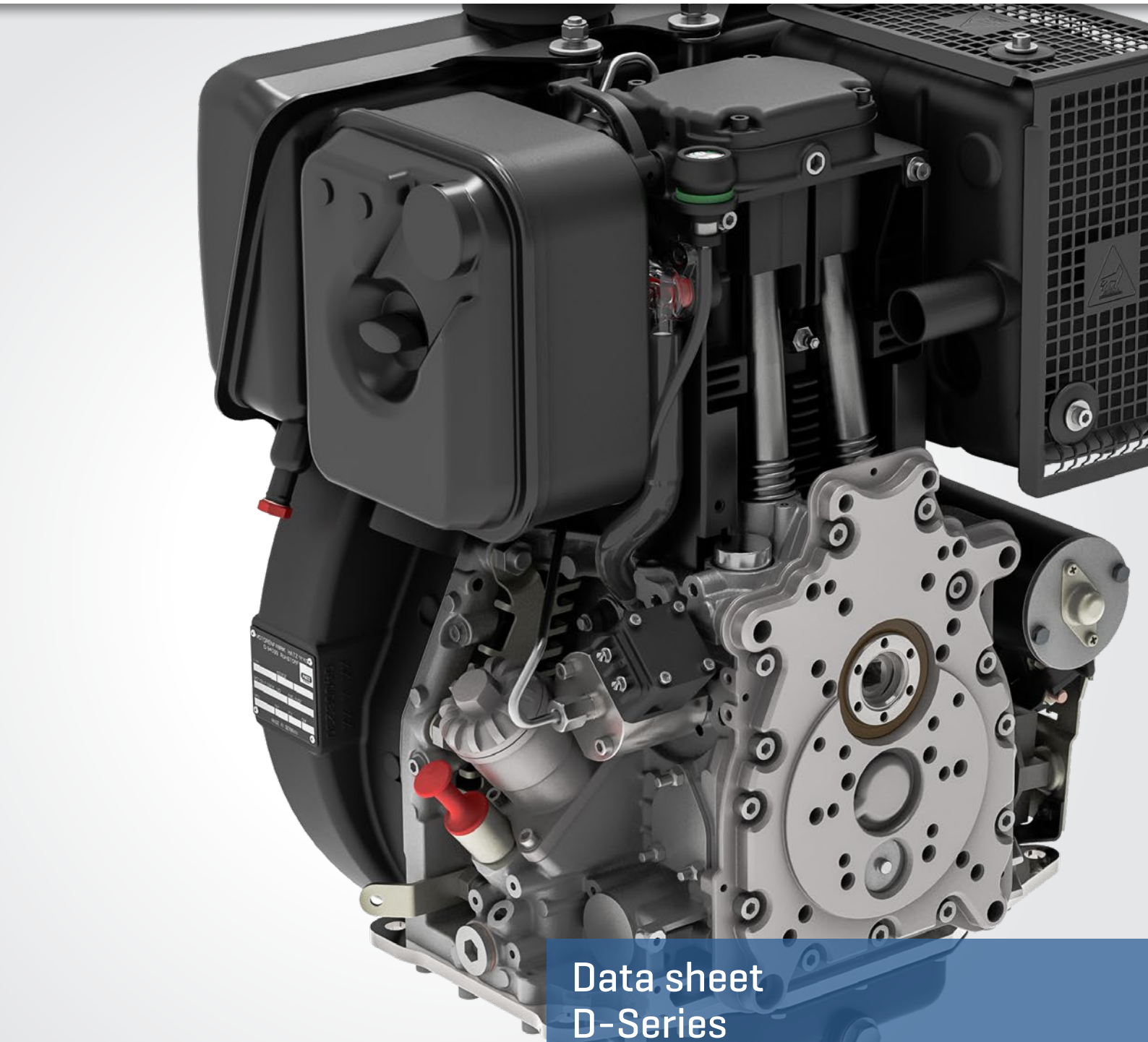
CREATING
POWER
SOLUTIONS

HATZ



Data sheet
D-Series
Industrial Diesel Engines

Hatz Drive Solutions

1D90E DPF with Diesel Particulate Filter
Although not required by law, Hatz offers the 1D90E engine with an optional passive diesel particulate filter for EU Stage V for defined applications. This makes us the only engine manufacturer to meet the strict requirements of the German BG Bau and thus contribute to keeping employees healthy.

1D81C – Silent Pack
Hatz Silent Packs have been setting standards for quiet and diesel engines for decades. The Silent Pack is more than just an engine, it is a complete installation solution where the customer no longer has to worry about anything. Install, flange on, start.

First Full Electronic and Full Variable Speed Control < 19 kW
The 1D90E, which belongs to the E1 family, can be controlled via the standardized CAN protocol J1939 thanks to the ECU. It is also possible to use CAN displays or machine controllers to monitor the motor parameters.

Hatz D-Series:
The Single-Cylinder Diesel Engine with Revolutionary Engineering

As our customers can confirm, Hatz diesel engines are the most robust and durable in this market segment. Wherever they are installed makes no difference; whether at very low temperatures or in a tropical climate, the Hatz D-Series carries out its job reliably. With regular maintenance many thousands of hours are commonplace, using Hatz Genuine Spare Parts, of course.

High performance and flexibility
The Hatz D-Series is best suited for challenging tasks. It is characterized by high performance and flexibility in particular. With 11.2 kilowatts, the Hatz 1D90 engine is the highest performance single-cylinder diesel engine in the world. The engines can be configured as required and in the basic version limited to the core engine only. With up to three different power take offs on a single engine, the Hatz D-Series provides more possibilities for the customization of a machine than any other engine on the market.

Extremely quiet running
Compensation weight on the flywheel side crank arm as well as balance weights cast in the flywheel ensure the special quiet running of the Hatz D-Series. Optionally available counter-rotating balance shafts even ensure 100 percent first order counter balance.

Single-cylinder for the digital future
The Hatz E1 technology controls the injection electronically. In the form of the 1D90E, it enters into a fruitful connection with the core engine of the D-Series, which has proven its excellence hundreds of thousands of times. This provides completely new possibilities in a digital world.

Raising digital potentials
The engines can be linked to the Hatz Digital Solutions. These allow key information on machine operation to be integrated into fleet management, thereby enabling machine operators to make better decisions. Also possible: optimization of the machine disposition and maintenance, localization and geofencing, and maximization of machine productivity.

Environmental aspects
All engines are produced and sold in the highest possible emission level, even if this not prescribed in the respective target market. The Hatz 1D90E therefore fulfills both the North American requirements of EPA Tier 4 final and the European requirements of EU Stage V. All D-Series engines meet the European requirements.

The Silent Pack
The Hatz D-Series is the first single-cylinder diesel engine series which can be equipped with an organically adapted, sound-insulated noise encapsulating housing, the Silent Pack. The Silent Pack reduces the radiated noise emission by up to 12 dezibels in a 7 meter radius.
The capsule consists of sheet metal construction with structure-borne sound insulation that is mounted on the engine. All control and service points are accessible from the outside. The sound suppressor is housed in a separate capsule over the flywheel. Due to the cooling air circulation, Silent Pack engines – like all other Hatz engines – can be used under virtually all climatic conditions.

1D90E DPF with diesel particulate filter
Although not required by law, Hatz offers the 1D90E engine with an optional passive diesel particulate filter for EU Stage V for defined applications. This makes us the only engine manufacturer to meet the strict requirements of the German BG Bau and massively reduces exposure to diesel soot.

IFN Rating F/IFN/ICFN Rating

Sales area exhaust certificate [rpm]	1D42	1D50	1D81	1D81C	1D90*E*	1D90	1D90V
US EPA T4f constant	–	–	–	–	3000	–	–
US EPA T4f variable	–	–	–	–	3000	–	–
Europe EU V constant	1500, 1800, 3000	3000	1500, 1800, 3000	1500, 1800, 3000	1500, 3000	1500, 1800, 3000	1500, 3000
Europe EU V variable	2000–3200	2400–3200	1500–3000	1500–3000	3000	1500–3000	2300–3000
Less regulated	1500–3600	1500–3600	1500–3600	1500–3000	3000	1500–3000	

Technical Data, Performance Table

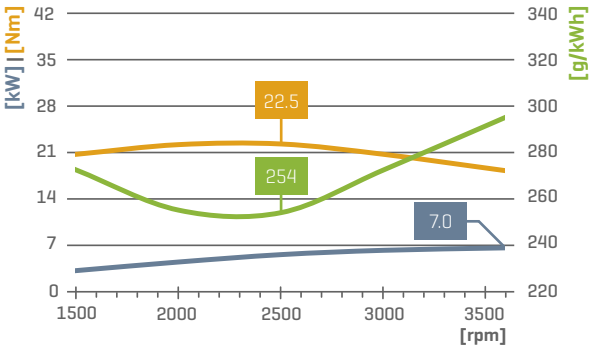
Technical data			1D42	1D50	1D81	1D81C	1D90*E*	1D90	1D90V
Engine	Type		Air-cooled 4 stroke diesel engine						
	Cylinder		1						
	Direct injection		mechanical	mechanical	mechanical	mechanical	electronical	mechanical	mechanical
	Position of crank shaft		horizontal						vertical
	Bore x stroke [mm / in]		90 x 70 / 3.54 x 2.76	97 x 70 / 3.82 x 2.76	100 x 85 / 3.94 x 3.35	100 x 85 / 3.94 x 3.35	104 x 85 / 4.09 x 3.35		104 x 85 / 4.09 x 3.35
	Displacement [l / cu in]		0.445 / 27.2	0.517 / 31.5	0.667 / 40.7	0.667 / 40.7	0.722 / 44.0		0.722 / 44.0
	Average piston speed @ 3000 rpm [m/s / ft/min]		8.5 / 1673						
	Compression ratio		21.5 : 1						20.5 : 1
	Lubrication oil consumption, related to full load		approx. 1 % of fuel consumption						
	Oil filling	max. [l / US qts]	1.2 / 1.27	1.5 / 1.59	1.9 / 2.0				1.6 / 1.7
		min. [l / US qts]	0.8 / 0.85	1.0 / 1.06	1.0 / 1.06				0.9 / 0.95
	Speed control	Lowest idle speed [rpm]	approx. 800						
		Static speed droop @ 3000 rpm	approx. 5%				configurable	approx. 5%	
		Control method	mechanical				CAN J1939, multi stage switch, analog	mechanical	
Installation information	Amount of combustion air @ 3000 rpm approx. [kg/h / cfm][1]		47.7 / 23.3	56.4 / 27.6	72.3 / 35		79.5 / 39		
	Amount of cooling air @ 3000 rpm approx. [kg/h / cfm][1]		325.1 / 159	397.4 / 195	780.3 / 380	606.9 / 297	780.3 / 380		1083.7 / 530
	Mass moment of inertia J_{engine} [kgm² / lb ft²]	Standard flywheel	0.24 / 5.67	0.41 / 9.7	0.51 / 12.05				
		Heavy flywheel	0.28 / 7.08	—	0.63 / 14.9				—
	Starter [V]		12 (2.0 kW / 2.7 hp) | 24 (3.0 kW / 4.0 hp)						
	Alternator charging current @ 3000/1500 rpm [A]		approx. 9 / 4 (14 V) | 5 / 2 (28 V)		approx. 16 / 5 (14 V) | 9 / 4 (28 V)		approx. 16 / 5 (14 V)	approx. 16 / 5 (14 V) | 9 / 4 (28 V)	
	Battery capacity min. / max. [Ah]		45 / 88 (12 V) | 36 / 55 (24 V)						
Dimensions	Engine with crankhandle start [kg / lb]		71 / 156.5	80 / 176.4	97 / 213.8	118 / 260.0	—	98 / 216.0	—
	Engine with electric start [kg / lb]		78 / 172.0	83 / 183.0	105 / 231.4	126 / 277.7	107 / 235.9	106 / 233.6	106 / 233.6
	L x W x H [mm / in]		357 x 432 x 500 / 14.1 x 17.0 x 19.7	357 x 432 x 512 / 14.1 x 17.0 x 20.2	373 x 472 x 599 / 14.7 x 18.6 x 23.6	505 x 523 x 591 / 19.9 x 20.6 x 23.2	373 x 505 x 599 / 14.7 x 19.9 x 23.6	373 x 472 x 599 / 14.7 x 18.6 x 23.6	583 x 486 x 429 / 23.0 x 19.1 x 16.9

Engine output [kW / hp]	[rpm]	1D42	1D50	1D81	1D81C	1D90*E*[2]	1D90	1D90V
Blocked ISO brake horsepower (IFN) for intermittent loading according to ISO 3046-1. For variable speed.	3200	6.8 / 9.1	7.5 / 10.1	—	—	—	—	
	3000	6.6 / 8.9	7.5 / 10.1	10.0 / 13.4	9.5 / 12.7	10.5 / 14.1	11.0 / 14.8	
	2800	6.4 / 8.6	7.2 / 9.7	9.6 / 12.9	9.1 / 12.2	10.1 / 13.4	10.6 / 14.2	
	2600	6.1 / 8.2	6.8 / 9.1	9.2 / 12.3	8.7 / 11.7	9.6 / 12.8	10.1 / 13.5	
	2300	5.4 / 7.2	—	6.3 / 8.4	8.0 / 10.7	8.8 / 11.8	9.2 / 12.3	
	2000	4.7 / 6.3	—	7.5 / 10.1	7.1 / 9.5	7.7 / 10.3	8.1 / 10.9	—
	1800	—	—	6.8 / 9.1	6.5 / 8.7	7.1 / 9.5	7.3 / 9.8	—
	1500	—	—	5.5 / 7.4	5.4 / 7.2	5.7 / 7.6	6.1 / 8.2	—
Blocked ISO brake horsepower (IFN) for intermittent loading according to ISO 3046-1. For constant speed.	3000	6.6 / 8.9	7.5 / 10.1	10.0 / 13.4	9.5 / 12.7	10.5 / 14.1	11.0 / 14.8	
	1800	4.1 / 5.5	—	6.8 / 9.1	6.5 / 8.7	—	7.3 / 9.8	—
	1500	3.3 / 4.4	—	5.5 / 7.4	5.4 / 7.2	5.7 / 7.6	6.1 / 8.2	
Blocked ISO brake horsepower (IFN) for intermittent loading according to ISO 3046-1. For variable speed. Less regulated markets	3600	7.0 / 9.4	7.5 / 10.1	10.1 / 13.5	—	—	—	
	3000	6.6 / 8.9	7.5 / 10.1	10.1 / 13.5	9.6 / 12.9	10.5 / 14.1	11.2 / 15.0	
	2800	6.4 / 8.6	7.2 / 9.7	9.7 / 13.0	9.2 / 12.3	10.1 / 13.4	10.7 / 14.3	
	2600	6.1 / 8.2	6.8 / 9.1	9.3 / 12.5	8.8 / 11.8	9.6 / 12.8	10.3 / 13.8	
	2300	5.4 / 7.2	6.0 / 8.0	8.4 / 11.3	8.1 / 10.9	8.8 / 11.8	9.5 / 12.7	
	2000	4.7 / 6.3	5.2 / 7.0	7.6 / 10.2	7.1 / 9.5	7.7 / 10.3	8.4 / 11.3	
	1800	4.1 / 5.5	4.6 / 6.2	6.8 / 9.1	6.5 / 8.7	7.1 / 9.5	7.6 / 10.2	
	1500	3.3 / 4.4	3.7 / 5.0	5.5 / 7.4	5.4 / 7.2	5.7 / 7.6	6.4 / 8.6	

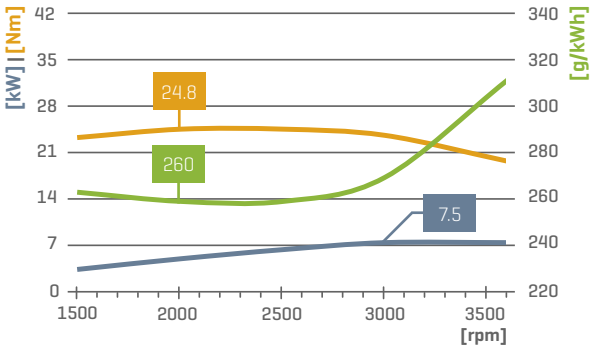
[1] For other speeds, there is a linear reduction in the air requirement. [2] Power ratings include generator power

Maximum Power Output, Torque and Fuel Consumption

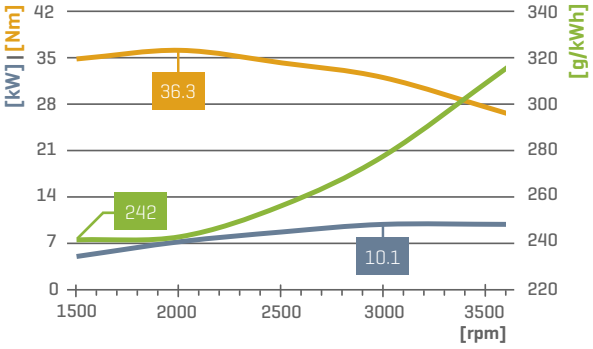
1D42



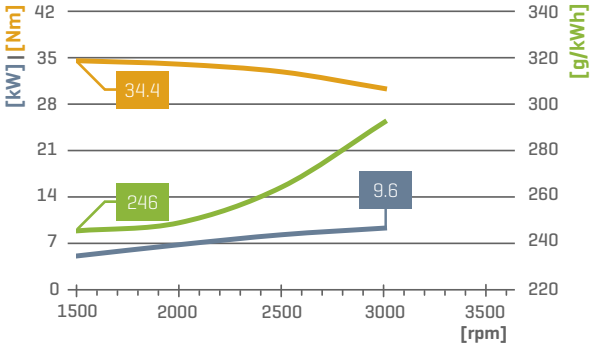
1D50



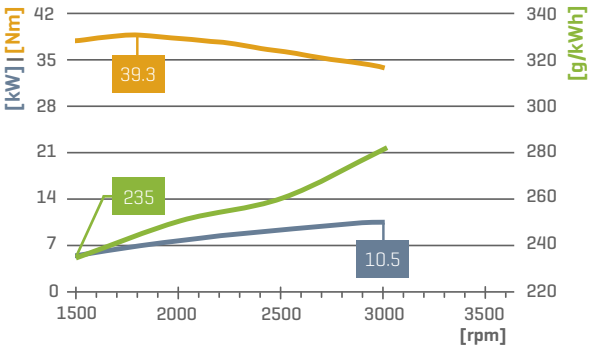
1D81



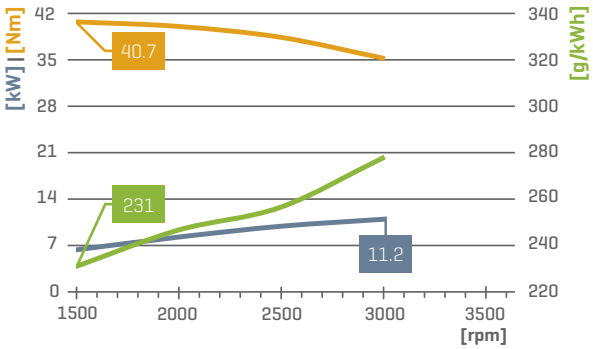
1D81C



1D90*E*²



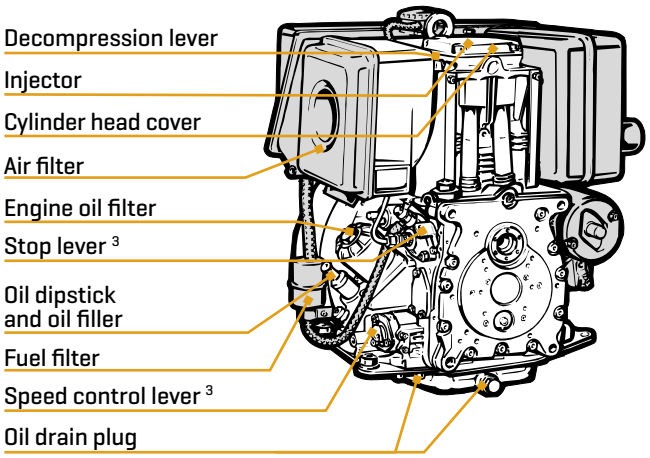
1D90 | 1D90V



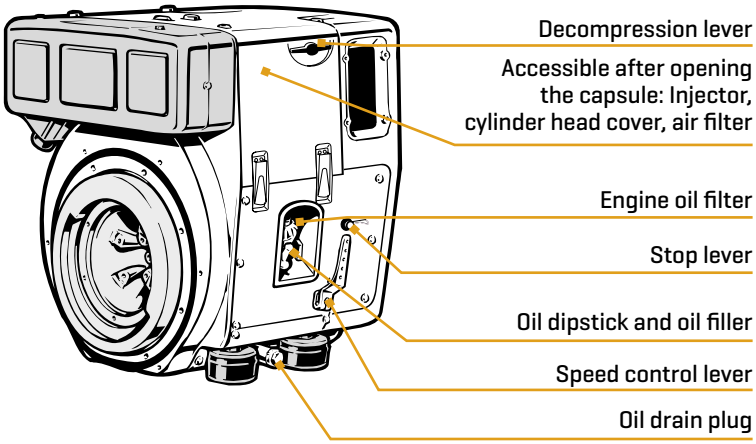
Power ratings
Power ratings refer to standard reference conditions of ISO 3046-1 (IFN):
+ 25 °C (77 °F), 100 kPa, relative humidity 30 %. The specified power is reached during the running-in period, and can be 5 % less on delivery. Power reduction acc. to ISO 3046-1.
Standard values: More than 100 m above sea level approx. 1 % per 100 m, above 25 °C (77 °F) approx. 4 % per 10 °C (50 °F).
The power taken from the alternator also has to be added to the power calculation.

Maintenance and Operating Points

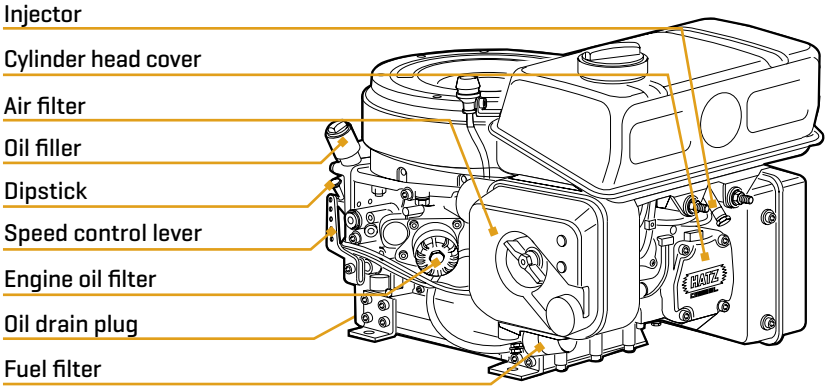
1D42 | 1D50 | 1D81 | 1D90*E* | 1D90



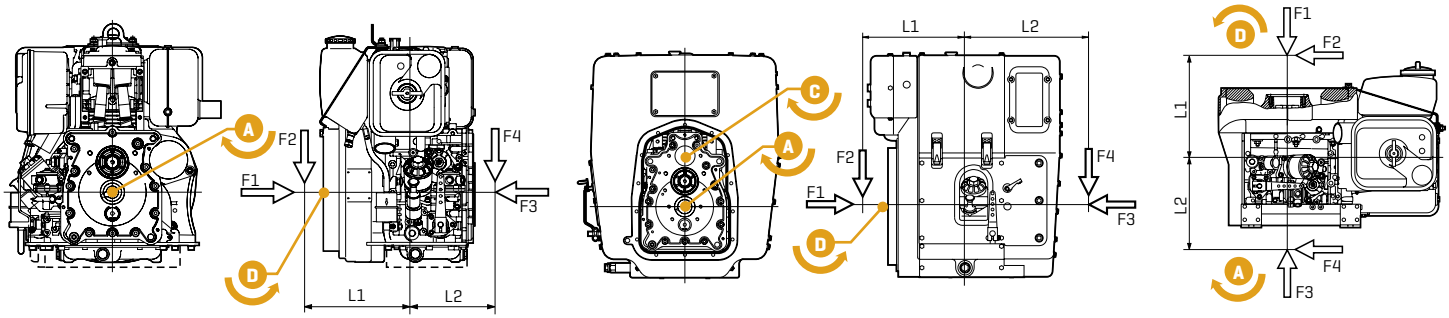
1D81C



1D90V



Power-Take-off Points



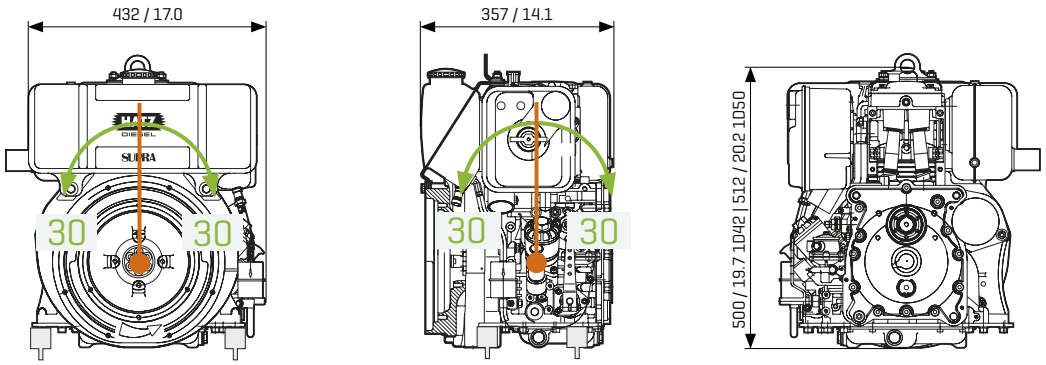
Power take off		1D42	1D50	1D81	1D81C	1D90*E*	1D90	1D90V
Transferable torque	A	100 %						
	C	not available		21.5 Nm / 15.9 lb·ft (6.8 kW / 9.1 hp @ 3000 rpm)				not available
	D	100 %						
Permissible load	F1	1260 N		2250 N				
	F2	$F2 = \frac{261\,000}{L1\,[mm / in] - 42 / 1.65}$ [N]		$F2 = \frac{477\,000}{L1\,[mm / in] - 50.5 / 1.98}$ [N]				
	F3	1080 N		1350 N				
	F4 [4]	$F4 = \frac{67\,500}{L2\,[mm / in] - 128 / 5.04}$ [N]		$F4 = \frac{67\,500}{L2\,[mm / in] - 134 / 5.28}$ [N]				

[3] Only for mechanically controlled engine types [4] If belt tension is upwards, outboard bearing is necessary.

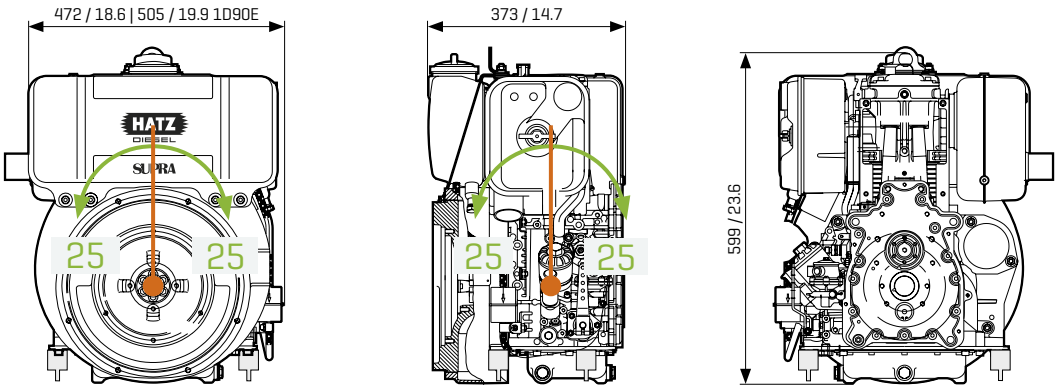
Dimensions [mm / in] and Inclinations [5] [°]

Spread at box dimensions ± 3 millimeters due to tolerance.
Drawings with detail and connection dimensions as PDF and DXF can be found at www.hatz.com.

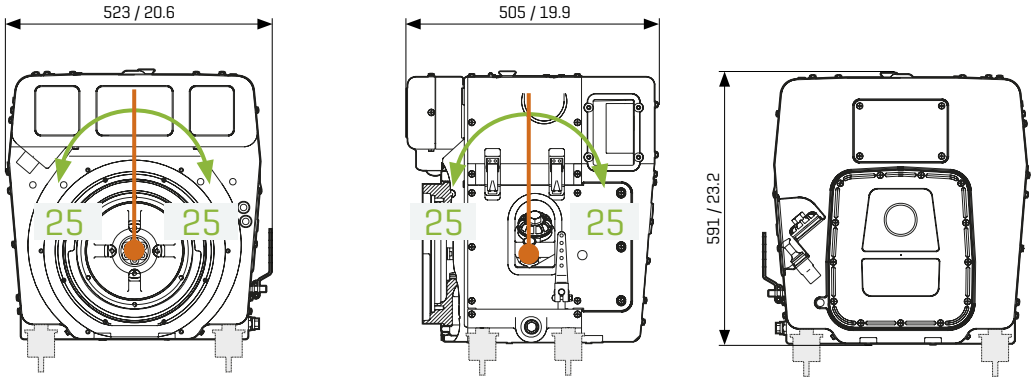
1D42
1D50



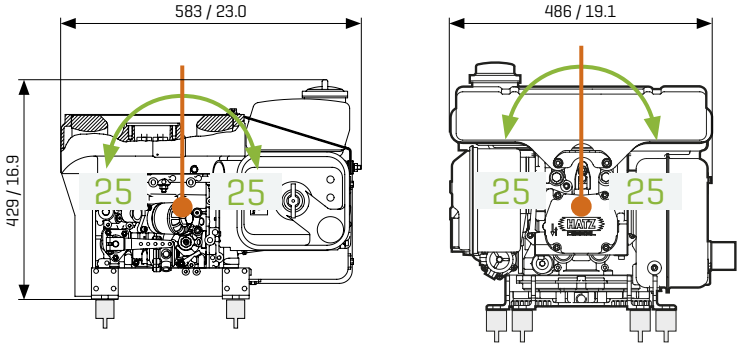
1D81
1D90*E*
1D90



1D81C



1D90V



[5] Maximum permanent inclined positions

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