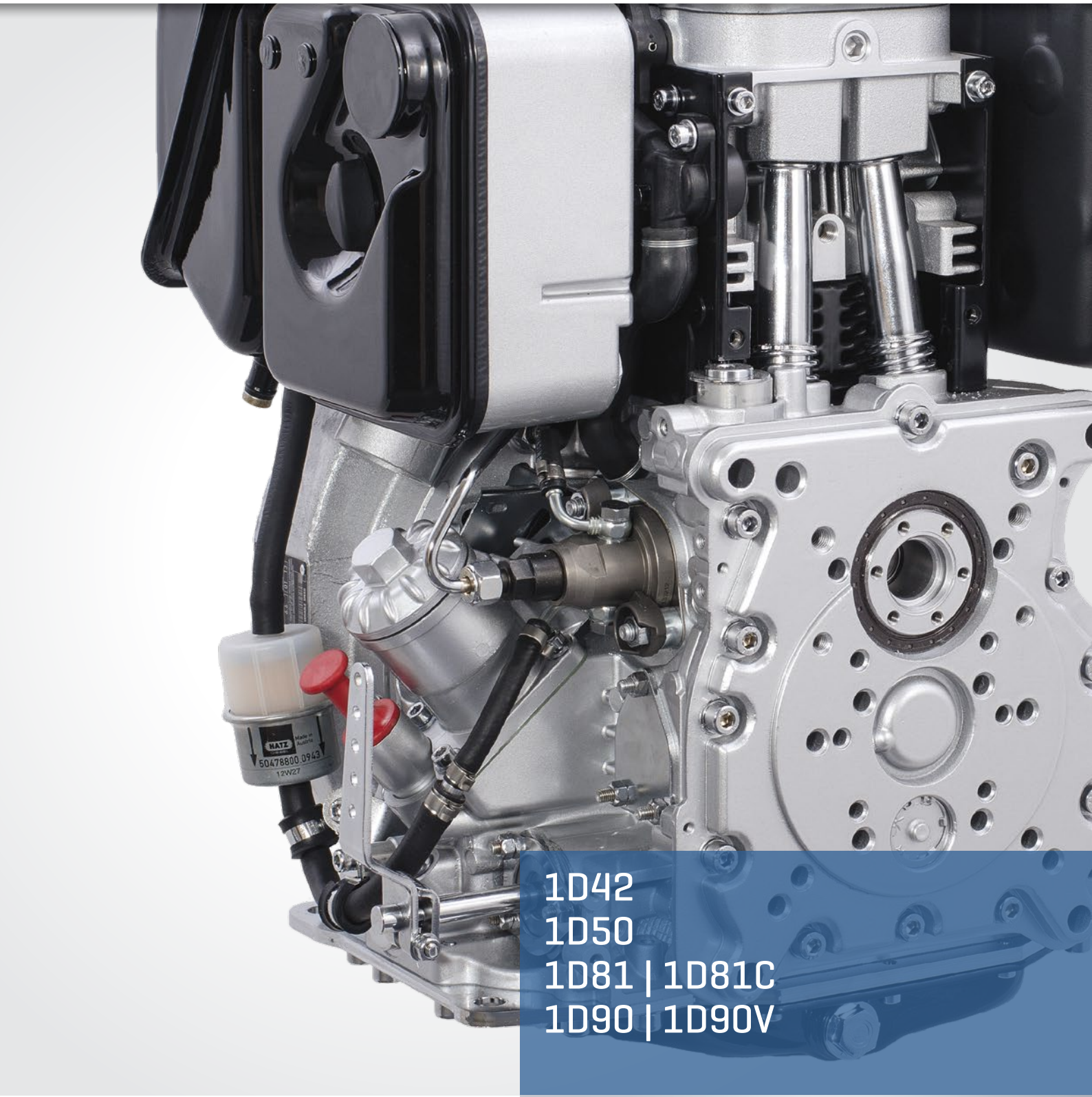
CREATING POWER SOLUTIONS.

HATZ DIESEL



1D42
1D50
1D81 | 1D81C
1D90 | 1D90V

Hatz diesel engines | data sheet

1D81C – Silent Pack
For decades Hatz Silent Packs have been setting benchmarks for quiet and reliable diesel engines. Silent Pack is more than just an engine, it is a complete installation solution where the customer no longer has to take care of anything. Position, connect, start.

1D90V/W
For installations with special requirements regarding outer dimensions, Hatz has also alternatively developed the 1D90 engine with vertical crankshaft. This allows the best possible use of the available installation space, thus avoiding unnecessary power deflections.

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. By adding the numerous available options, the engines can however also be upgraded to truly high-tech products. 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.

Environmental aspects
Even without legal provisions the Hatz D-series engines have been produced and sold in accordance with the strict US emissions standard EPA Tier 4 for many years. That is why these engines will fulfill the requirements of EU Stage V as well without any modifications.

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.

Robust and durable design


Hatz engines are designed for an exceptionally long service life. The best possible materials and components coupled with uncompromising quality assurance contribute to the fact that Hatz engines have been setting standards in the industry for many years when it comes to robustness and service life.
And should, contrary to expectations, a spare part actually be needed, more than 500 service partners in 120 countries are available quickly and dependably with advice and assistance as well as Hatz Genuine Spare Parts.

IFN rating ICFN rating F/IFN/ICFN rating

Sales area (exhaust certificate)		1D42	1D50	1D81	1D81C	1D90	1D90V
USA (EPA/CARB constant speed)	[rpm]	2000–3000	2500–3050	1500–3000	1500–3000	1500, 2600–3000	
USA (EPA 2-speed)	[rpm]	2000–3000	2500–3050	2150–3000	2300–3000	2600–3000	
USA (EPA variable speed)	[rpm]	2000–3000	–	2150–3000	2300–3000	–	
All others (non-EPA)	[rpm]	1500–3600	1500–3600	1500–3600	1500–3000	1500–3000	

Technical data, performance table

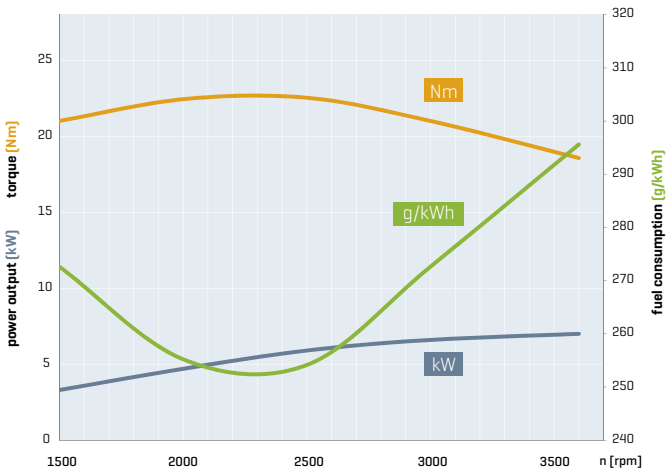
Technical data			1D42	1D50	1D81	1D81C	1D90	1D90V
Engine	Type		Air-cooled 4 stroke diesel engine					
	Cylinder		1					
	Injection system		Direct injection					
	Position of crank shaft		horizontal					vertical
	Exhaust aftertreatment only US EPA Tier 4 final		DOC	DOC	DOC	—	DOC	DOC
	Bore x stroke [mm / 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%					
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 [kW / hp]		2.0 / 2.7 (12 V) | 3.0 / 4.0 (24 V)					
	Alternator charging current @ 3000/1500 rpm [A]		approx. 9 / 4 (14 V) | approx. 5 / 2 (28 V)		approx. 16 / 5 (14 V) | approx. 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 12 V or 24 V [kg / lb]		78 / 172.0	83 / 183.0	105 / 231.4	126 / 277.7	106 / 233.6	106 / 233.6

Engine output max. [kW / hp]	[rpm]	1D42	1D50	1D81	1D81C	1D90	1D90V
Vehicle power acc. to DIN ISO 1585.	3600	7.5 / 10.2	7.9 / 10.7	— / —	— / —	— / —	
	3000	7.2 / 9.8	7.9 / 10.7	10.3 / 14.0	— / —	— / —	
	2600	6.7 / 9.1	7.5 / 10.2	9.5 / 12.9	— / —	— / —	
	2300	6.0 / 8.2	6.7 / 9.1	8.9 / 12.1	— / —	— / —	
Blocked ISO brake horsepower (IFN) for strong intermittent loading according to ISO 3046-1. EPA 2-Speed	3600	7.0 / 9.5	7.5 / 10.2	10.1 / 13.7	— / —	— / —	
	3000	6.6 / 9.0	7.5 / 10.2	10.1 / 13.7	9.6 / 13.1	11.2 / 15.2	
	2600	6.1 / 8.3	6.8 / 9.2	9.3 / 12.6	8.8 / 12.0	10.3 / 14.0	
	2300	5.4 / 7.3	6.0 / 8.2	8.4 / 11.4	8.1 / 11.0	9.5 / 12.9	
	2000	4.7 / 6.4	5.2 / 7.1	7.6 / 10.3	7.1 / 9.7	8.4 / 11.4	
	1800	4.1 / 5.6	4.6 / 6.3	6.8 / 9.2	6.5 / 8.8	7.6 / 10.3	
	1500	3.3 / 4.5	3.7 / 5.0	5.5 / 7.5	5.4 / 7.3	6.4 / 8.7	
ISO standard power output (ICXN) (10 % overload permissible). EPA variable speed; EPA constant speed	3600	6.3 / 8.6	6.8 / 9.2	— / —	— / —	— / —	
	3000	5.9 / 8.0	6.7 / 9.1	9.3 / 12.6	8.9 / 12.1	10.2 / 13.9	
	2600	5.5 / 7.5	6.1 / 8.3	8.4 / 11.4	8.0 / 10.9	9.4 / 12.8	
ISO standard power output (no overload permissible) acc. to ISO 3046-1. For constant speed and constant load (ICFN).	2300	4.9 / 6.7	5.4 / 7.3	7.6 / 10.3	7.4 / 10.1	8.6 / 11.7	
	2000	4.2 / 5.7	4.7 / 6.4	6.7 / 9.1	6.5 / 8.8	7.7 / 10.5	
	1800	3.7 / 5.0	4.1 / 5.6	6.1 / 8.3	5.9 / 8.0	6.8 / 9.2	
	1500	3.0 / 4.1	3.3 / 4.5	5.0 / 6.8	4.9 / 6.7	5.8 / 7.9	

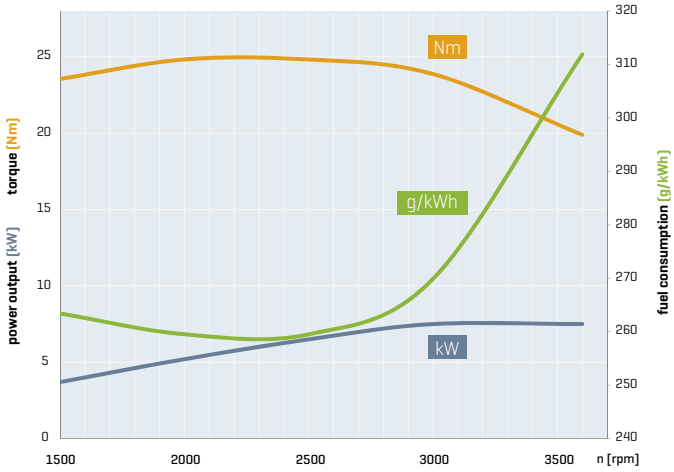
[1] For other speeds, there is a linear reduction in the air requirement.

Power output, torque und fuel consumption

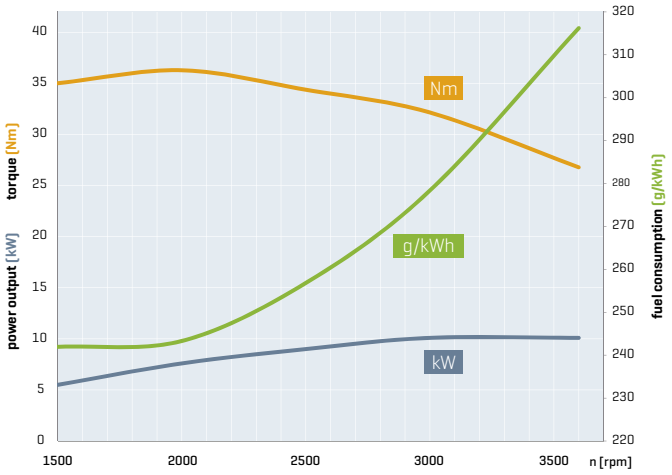
1D42



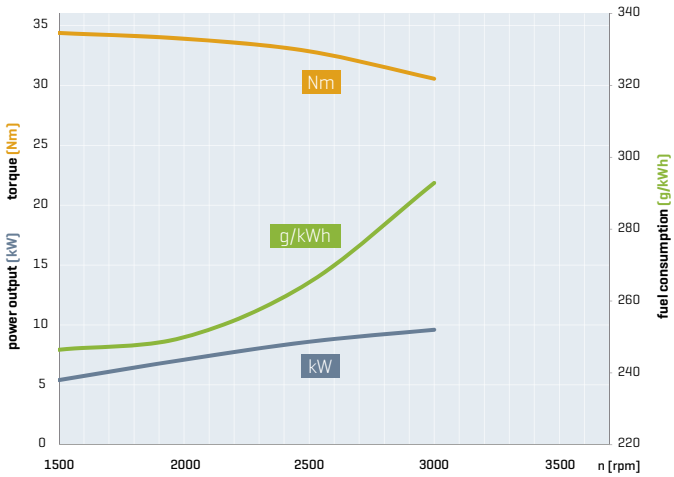
1D50



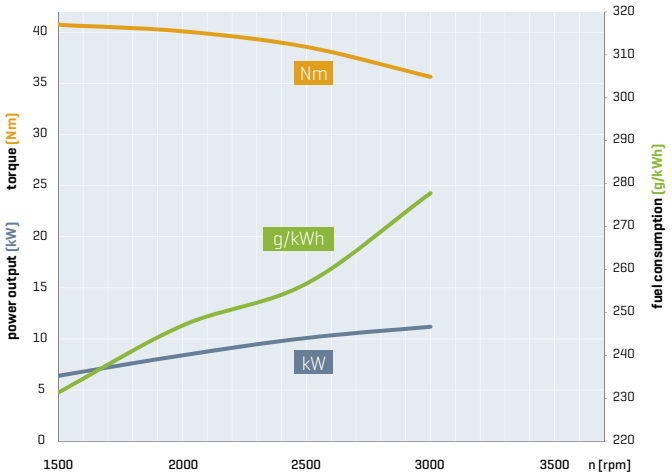
1D81



1D81C



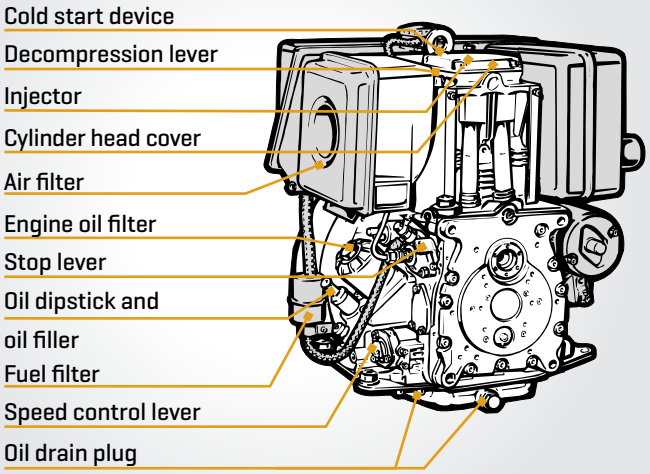
1D90 | 1D90V



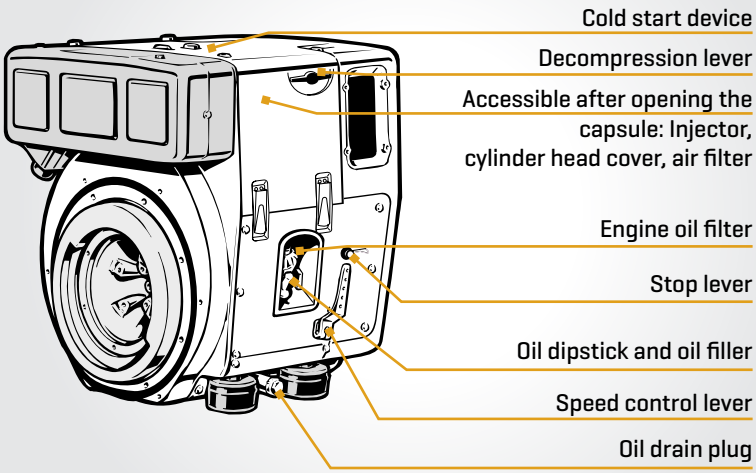
Power ratings
Power ratings refer to standard reference conditions of ISO 3046-1 (IFN): + 25 °C (77 °F), 100 kPa, relative humidity 30 %. The specified power is reached during the running-in period, and can be 5 % less on delivery.
Power reduction acc. to ISO 3046-1.
Standard values: More than 100 m 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

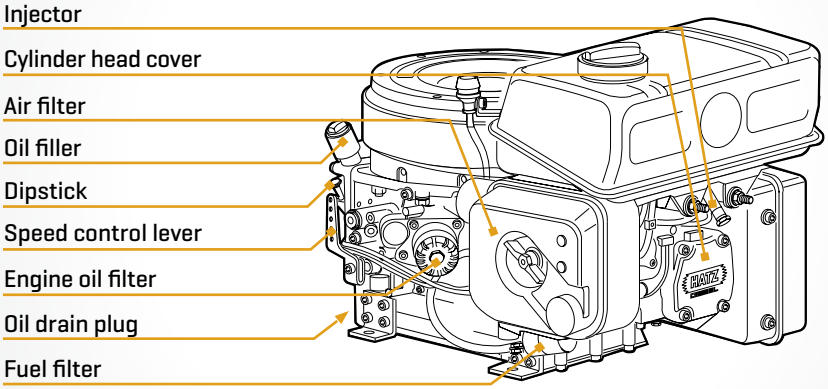
1D42 | 1D50 | 1D81 | 1D90



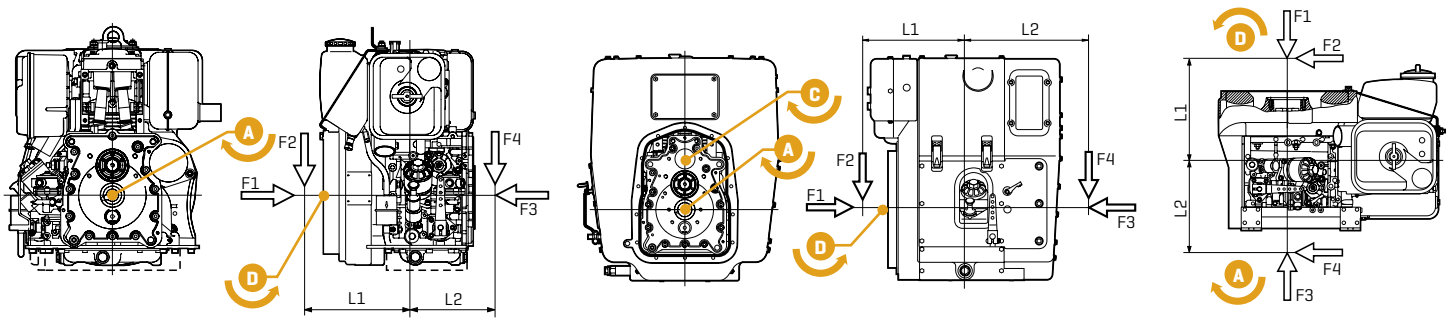
1D81C



1D90V



Power-take-off points

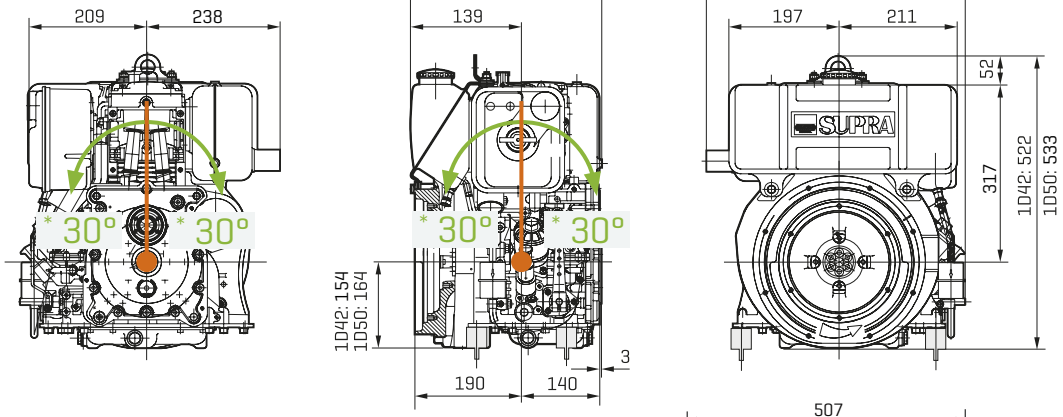


Power take off		1D42	1D50	1D81	1D81C	1D90	1D90V
Transfer-able torque	A	100 %					
	C	not available		21.5 Nm / 15.9 lb·ft (6.8 kW / 9.1 hp @ 3000 rpm)			not available
	D	100 %					
Permissible load	F1	1260 N		2250 N			
	F2	$F2 = \frac{261\,000}{L1\,[mm / in] - 42 / 1.65}$ [N]		$F2 = \frac{477\,000}{L1\,[mm / in] - 50.5 / 1.98}$ [N]			
	F3	1080 N		1350 N			
	F4[2]	$F4 = \frac{67\,500}{L2\,[mm / in] - 128 / 5.04}$ [N]		$F4 = \frac{67\,500}{L2\,[mm / in] - 134 / 5.28}$ [N]			

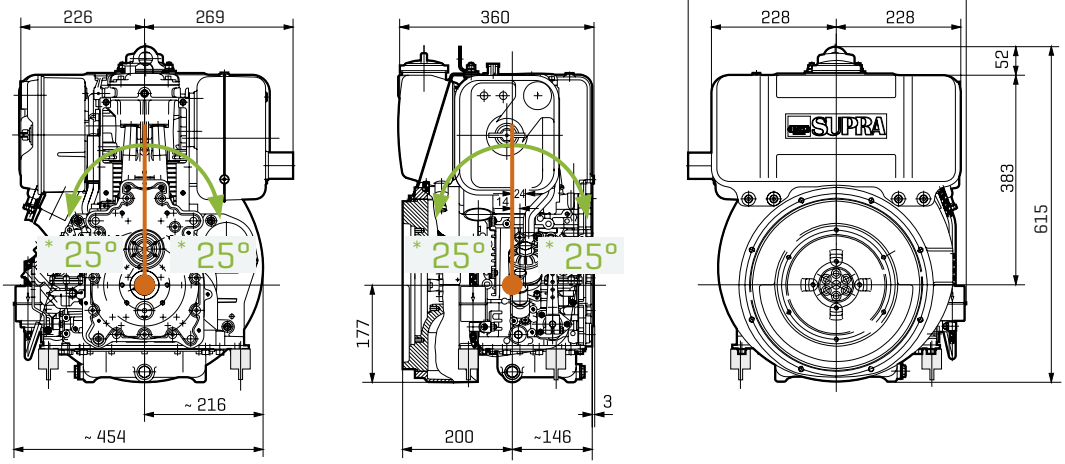
[2] If belt tension is upwards, outboard bearing is necessary.

Dimensions [mm]

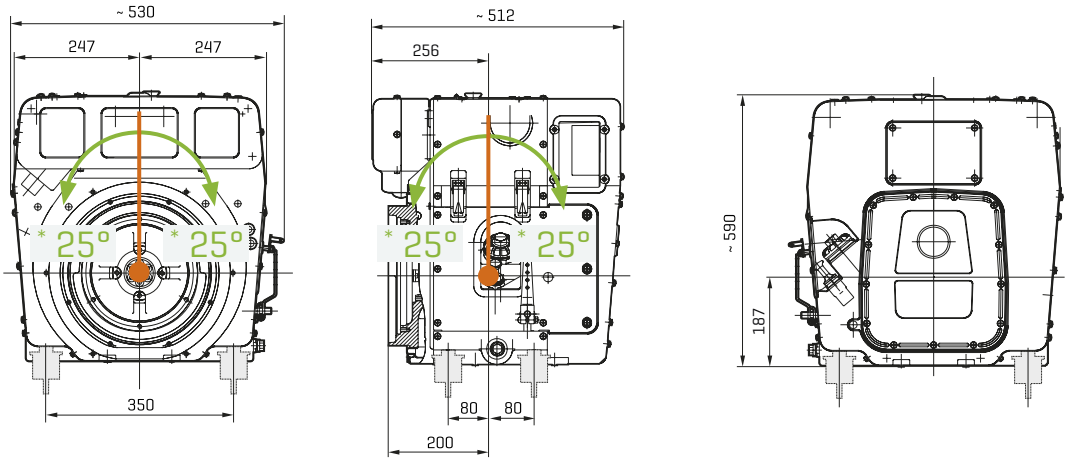
1D42
1D50



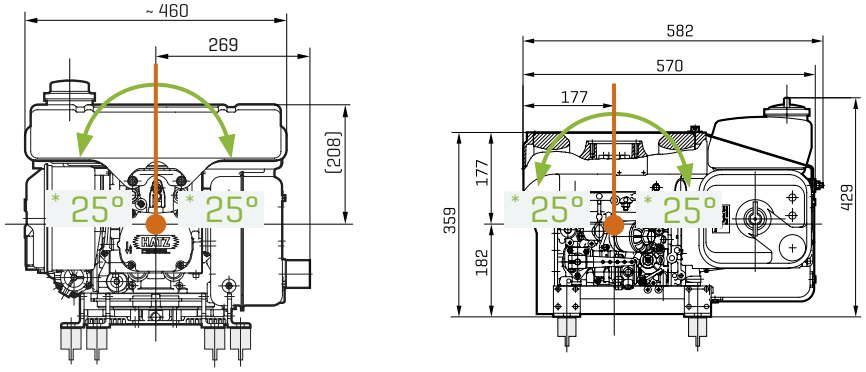
1D81
1D90



1D81C



1D90V



Spread at outlines ± 3 mm due to tolerance.
Drawings with detail and connection measures as PDF resp. DXF are shown under www.hatz-diesel.com.
* max. permanent tilting

Motorenfabrik Hatz GmbH & Co. KG
Ernst-Hatz-Str. 16
94099 Ruhstorf a. d. Rott
Germany
Phone +49 8531 319-0
marketing@hatz-diesel.de
www.hatz-diesel.com

CREATING POWER SOLUTIONS.

70252825 EN 08.18 Printed in Germany