



# SUPRA

Revolutionary technique for single-cylinder Diesel engines

## 1D81 • 1D90

5.0 - 11.2 kW • 6.8 - 15.2 HP

Exhaust reduced types on request

*EPA II / CARB II / ECE-R24*



### Design

- Aircooled single-cylinder four stroke Diesel engines.
- Vertical cylinder.
- Crankcase in light alloy, diecast. Cylinder of grey cast iron.
- Cylinder head in light alloy.
- Crankshaft and big end in plain bearings.
- Direct injection, multi-hole nozzle.
- Special valve gear, allowing reverse engine rotation, if required (patented).
- Pressure lubrication, with gear-type oil pump.
- On request, full-flow oil filter.
- Oil sump of sheet metal.
- Flywheel fan, charging alternator integrated into flywheel. No V-belt necessary.

### Characteristics

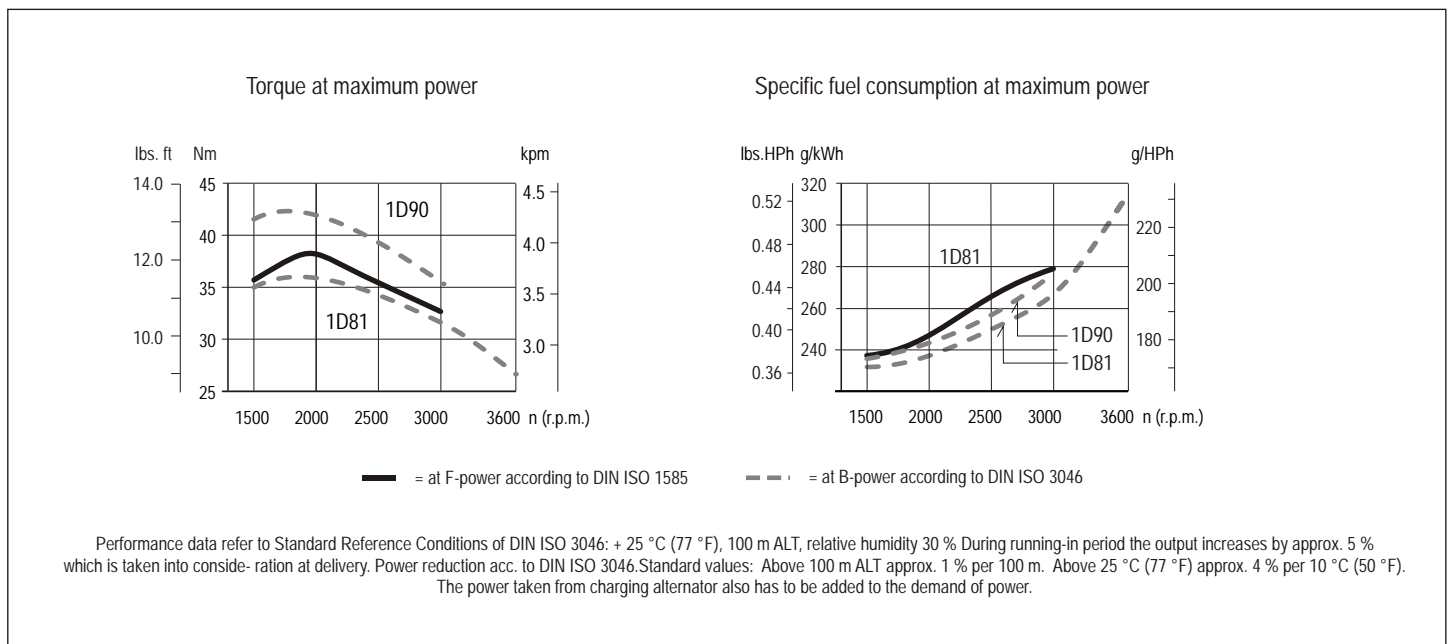
- Denoised: emission of noise reduced to the absolute minimum by means of design features and precision manufacture.
- Low fuel consumption.
- Favourable exhaust gas values – EPA / CARB certified.
- Robust: long life engine.
- Extensive interchangeability of parts within the engine family D.
- Reliable: no V-belts.
- Easy to service: automatic injection pump bleeding.
- Friendly to the environment: crankcase breather leads into the intake port.
- Reliable, effortless starting thanks to automatic extra fuel device.
- Handstart or electric start available.

Engine Type	Dimensions (mm)		
	Length	Width	Height
1D81.	360	506.5	554
1D90.	360	506.5	554

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Technical data		1D81.	1D90.
Number of cylinders		1	1
Bore x stroke	mm	100 x 85	104 x 85
	inches	3.94 x 3.35	4.09 x 3.35
Displacement	l	0.667	0.722
	cu.in.	40.7	44.0
Mean piston speed at 3000 r.p.m.	m/s	8.5	8.5
	ft/min	1673	1673
Compression ratio		20.5	20.5
Lub. oil consumption		approx. 1% of fuel consumption, related to full load	
Lub. oil capacity max. / min.	l	1.9 / 1.0	1.9 / 1.0
	US qts	2.0 / 1.06	2.0 / 1.06
Speed control	Idle speed	approx. 800 r.p.m.	
	Static speed drop	approx. 5 % at 3000 r.p.m.	



Performance table <i>SPECIAL OUTPUT ON REQUEST</i>			1D81.	1D90.
	Hatz-Stand.	r.p.m.	kW	HP
Vehicle output acc. to DIN ISO 1585	F	3000	10.3	14.0
		2600	9.5	12.9
		2350	8.9	12.1
ISO net brake fuel stop power (IFN) for strongly intermittent load acc. to DIN ISO 3046	B <sub>SI</sub>	3000	10.3	14.0
		2600	9.5	12.9
		2350	8.9	12.1
ISO net brake fuel stop power (IFN) for intermittent load acc. to DIN ISO 3046.	B	3600	10.1	13.7
		3000	10.1	13.7
		2600	9.3	12.6
		2300	8.4	11.4
		2000	7.6	10.3
		1800	6.8	9.2
		1500	5.5	7.5
ISO-standard power (ICXN) (10% overload permissible) and ISO-standard fuel stop power (no overload permissible) acc. to DIN ISO 3046. For constant speed and constant load (ICFN).	S	3000	9.3	12.6
		2600	8.4	11.4
		2300	7.6	10.3
		2000	6.7	9.1
		1800	6.1	8.3
		1500	5.0	6.8

Installation data		1D81.	1D90.
Combustion air required at 3000 r.p.m. approx. <sup>1)</sup>	m <sup>3</sup> / min	1.0	1.1
	cu.ft./min	35	39
Cooling air required at 3000 r.p.m. approx. <sup>1)</sup>	m <sup>3</sup> / min	10.5	10.5
	cu.ft./min	370	370
Permanent tilting	max. degrees	30	30
Moment of inertia	kgm <sup>2</sup>	0.51	0.51
	lb.ft <sup>2</sup>	12.05	12.05
Starter		12 V - 1.5 kW (2.0 HP)	24 V - 1.5 kW (2.0 HP)
Alternator charging current at 3000 / 1500 r.p.m.		14 V - approx. 16 A / 5A	28 V - approx. 9 A / 4A
Battery capacity	min / max Ah	12 V - 45 / 88 Ah	24 V - 36 / 55 Ah

1) For other r.p.m. there is a linear reduction in the air requirement

## Permissible load on power-take-off points

Max. permissible radial load

$$F1 = \frac{477\,000}{L1 \text{ (mm)} - 50.5} \text{ (N)*}$$

$$F2 = \frac{67\,500}{L2 \text{ (mm)} - 134} \text{ (N)}$$

$$F3 = \frac{99\,000}{L3 \text{ (mm)} - 127} \text{ (N)}$$

\*) If belt tension is upwards, outboard bearing is necessary - or contact HATZ

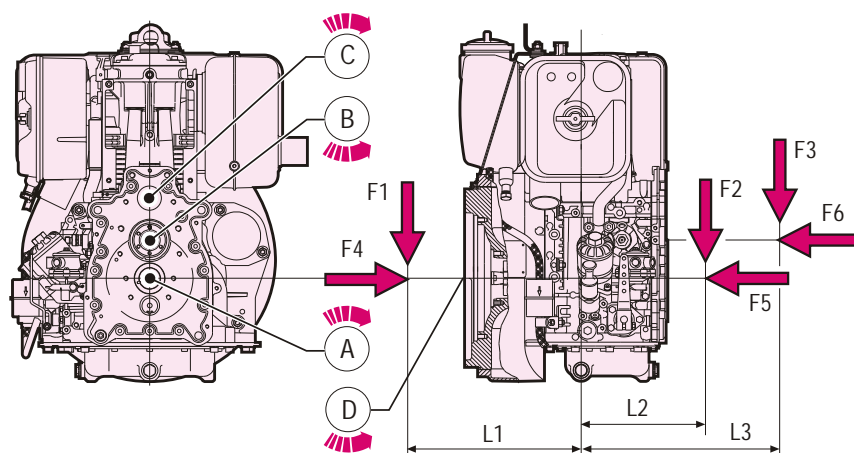
Transmissible torque:

A: 100 %

B: 43 Nm = 6.8 kW at 1500 r.p.m.

C: 21.5 Nm = 6.8 kW at 3000 r.p.m.

D: 100 %



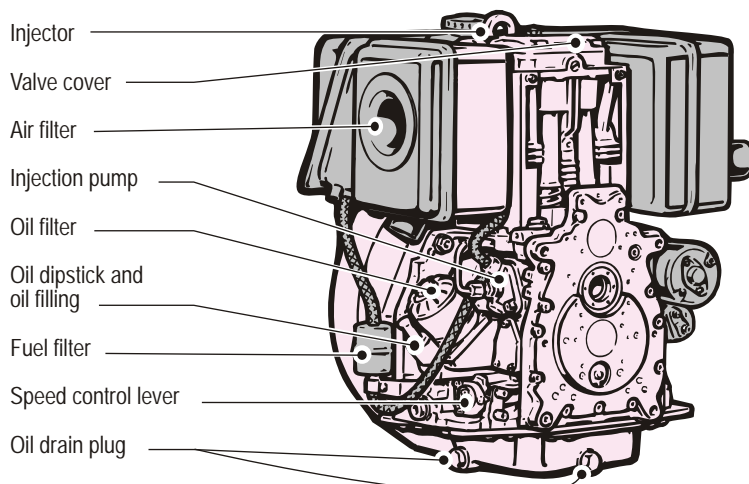
Max. permissible axial force F4 = 2250 N, F5 = 1350 N, F6 = 900 N

## Maintenance and operating points

To achieve the engines' maximum life, it is essential that the engine gets serviced meticulously at regular intervals.

The better the accessibility, the more promptly and conscientiously the engine will be maintained.

Please convince yourself personally that all service and operation points are easily accessible before delivering your machine to the customer.



## Electrical equipment

The engine-mounted components, such as starter, alternator and switches, are connected to the instrument box by means of a 2 m cable harness. The engine is started and controlled from this instrument box. Instrument box and cable harness are part of the additional equipment and supplied according

to the number of electrical safety features which are required.

If the engine has to be started at temperatures below - 10 °C, it must be equipped with a pre-heating system (glow plug) (additional equipment).

Further additional equipment includes automatic start and stop, remote control etc. Please see [www.hatz-diesel.de](http://www.hatz-diesel.de) ask drawings.

# 1D81. • 1D90.

## Power-Take-Off and Sense of Rotation

- Power-take-off at the flywheel, engine speed (figure 1).
- Power-take-off at the governor side. Crankshaft A at engine speed, camshaft B at 1/2 engine speed, Hydraulic pump drive C at engine speed (fig.2).
- Sense of Rotation see figure 1 and 2.
- Engine can be flange-mounted at governor side and flywheel side.

## Engine models

- 1D . . S: counter-clockwise rotation (fig. 1), with 50% balancing of free mass forces.
- 1D . . Z: counter-clockwise rotation (fig. 1), with 100% balancing of free mass forces. (Referring to free mass forces of first order) (fig. 3).

## Engine variants

- Var. I : Engine with handstart on governor side, heavy flywheel (fig.4).
- Var. II : Engine with handstart on governor side, standard flywheel (fig.4).
- Var. XI : Engine with electric start 12 V, standard flywheel (fig.5).
- Var. XIII : Engine with electric start 24 V, standard flywheel (fig.5).

## Weight incl. tank, air filter and exhaust silencer

	Variant I		Variant II		Variant XI		Variant XIII	
	kg	lbs.	kg	lbs.	kg	lbs.	kg	lbs.
1 D81 S	84.1	185	77.5	171	86.5	191	86.5	191
1 D81 Z	86.3	190	79.6	175	88.6	195	88.6	195
1 D90 S	85.6	189	79.0	174	88.0	194	88.0	194
1 D90 Z	87.8	194	81.1	179	90.1	199	90.1	199

## Mounting of engine

For engine speeds over 2300 – 2500 r.p.m. it is recommended to use flexible mounts.

## Scope of delivery of engine in standard equipment

Engine tested for full load on test bench. Engine fitted with flywheel-fan, variable speed governor, dry-type or oilbath air filter, automatic decompression, automatic extra fuel device, automatic bleeding, metering device for start oil, eye-hook for transport of engine (only to carry weight of the engine).

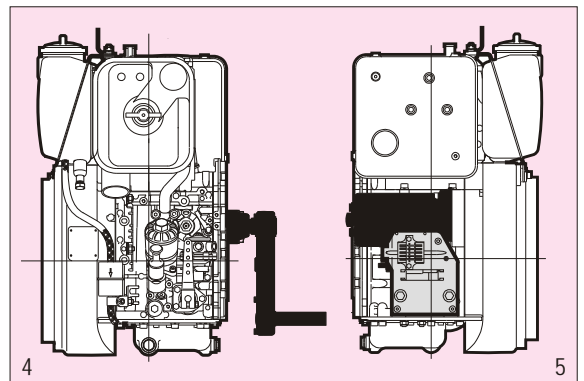
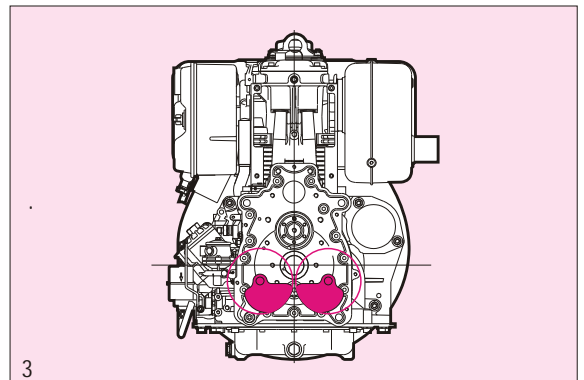
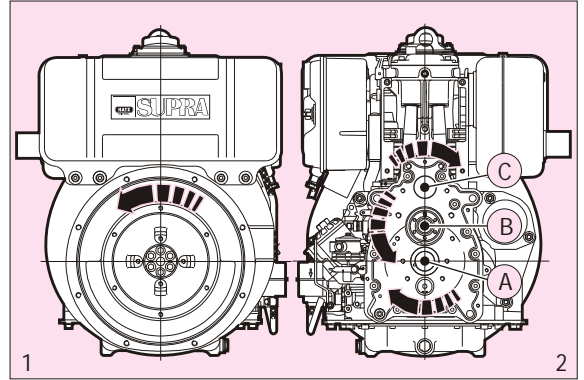
Parts made of sheet metal painted black, crankcase of light alloy not painted.

No oil in engine.

Additional equipment: Tools and gaskets for 1st maintenance

Further equipment included in engine variants:

- Variant I / II : Support for crank handle
- Variant XI : Starter 12 V, 2.0 kW, alternator 14 V, 16 A, cables, oil pressure switch, gearing
- Variant XIII : Starter 24 V, 2.5 kW, alternator 28 V, 9 A, cables, oil pressure switch, gearing



## Additional equipment

Thanks to the complete programme of additional equipment every engine can be adapted to the special requirements of every application.

As a minimum every engine needs the „additional equipment, necessary for operation“.

