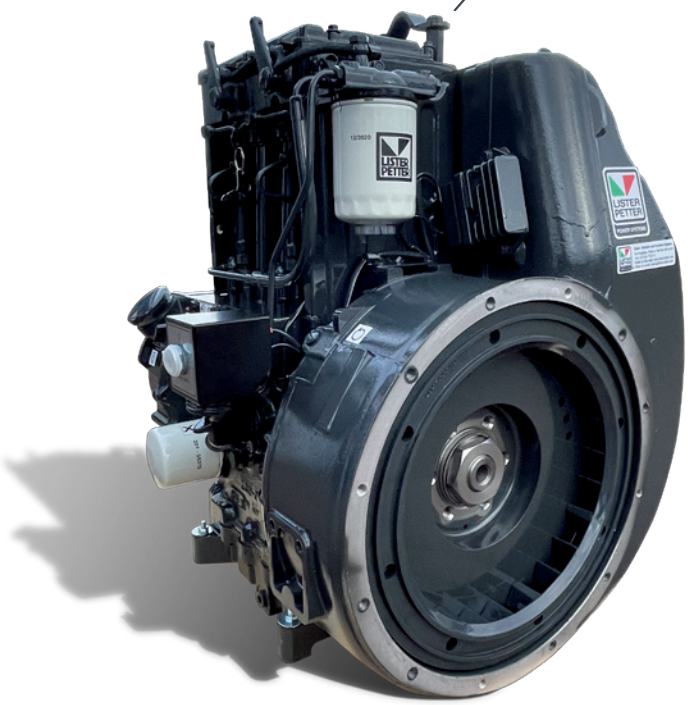
TR Industrial Engines

BUILT ON A LEGACY, FOCUSED ON THE FUTURE

TR SERIES

TR2 Industrial Engine



Note: Engine in photo is fitted with optional key start panel.

fixed speed | full-load speed range
1500 | 1800 r/min

variable speed | full-load speed range
1500 | 2500 r/min

5.5 - 28.5 kW | 7.4 - 38.2 bhp[1]

OVERVIEW

TR Industrial Engines are specifically designed to be compact power unit suitable for use in unregulated emissions territories. It is durable, reliable and easy to maintain with oil and filter changes up to 250 hours, dependant on operational conditions. It is designed for operation in ambient temperatures up to 40°C (104°F).

BASIC ENGINE CHARACTERISTICS

- diesel fuelled and approved for operation on biodiesel, that conforms with ASTM D6751 and EN14214, concentrations of up to 20%
- direct fuel injection
- 1, 2 or 3 cylinders
- air cooled
- naturally aspirated
- electric start (hand start option)

DESIGN FEATURES AND EQUIPMENT

- medium duty air cleaner *
- oil cooling by means of air flow over a deep crankcase finning
- inlet and exhaust manifolds
- fuel injection pump and self-vent fuel system
- fuel filter
- fuel lift pump *
- self-regulating plunger type lubricating oil pump
- spin-on lubricating oil filter
- decompressor levers
- flywheel with cooling fan **
- SAE flywheel housing **
- mechanical governing
- 12V starter motor *
- safety switches *
- fuel control solenoid (energised to run) *
- standard skid base packing
- 250 hour service intervals
- operators' handbook (English) *

OPTIONAL ITEMS

- 12V battery charge windings
- SAE4:5 ventilated adaptor
- SAE4:4 ventilated adaptor
- 6.5" or 7.5" drive member
- heavy duty air cleaner

See also items with asterisk under Design Features and Equipment.

* Optional items standard on most builds
** Options available
*** Please refer to Applications Department for cyclic irregularity implications

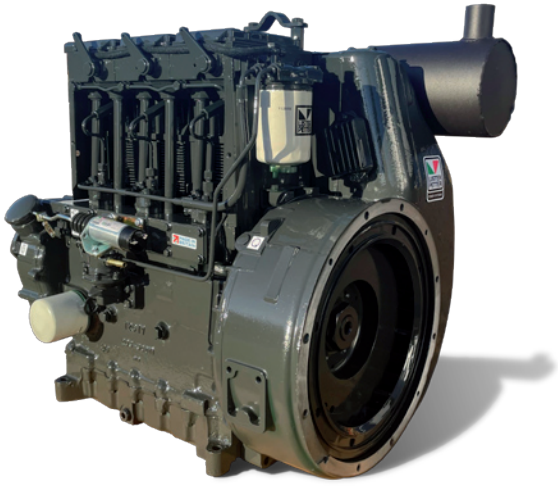
Note: These engines do not comply with Harmonised International Regulated Emissions Limits.

TR2I2500VSC-WG I 17.3 kWm IFN
Including keyswitch panel

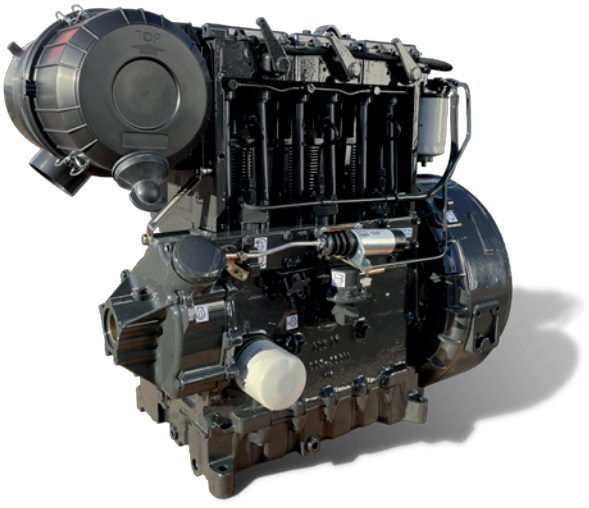
TR2I2500VS-CUSTOM I 19.0 kWm IOFN
Including SAE4 J620 7.5" engine connection and (WA) electric start panel

TR2I2500VSC-FB I 17.3 kWm IFN
Including 13.5 litre fuel tank option

TR2I2500VSC-CUSTOM I 17.3 kWm IFN
Including (BE) over centre clutch, (WA) electric start panel and (FB) fuel tank



TR3I2500VS-NA I 28.5 kWm IFON
Including exhaust silencer



TR3I2500VS-AE I 28.5 kWm IFON
Including heavy duty air cleaner

VARIABLE SPEED POWER - ISO3046 CONTINUOUS RATING (IFN)

Model	r/min	1000	1200	1500 *	1800 *	2000	2200	2500
TR1	kW	4.1	4.7	5.5	6.7	7.3	7.9	8.6
	bhp	5.5	6.3	7.4	9.0	9.8	10.6	11.5
TR2	kW	6.4	8.7	11.0	13.1	14.5	15.7	17.3
	bhp	8.6	11.7	14.8	17.6	19.4	21.1	23.2
TR3	kW	10.0	13.1	16.8	20.2	22.2	23.7	25.9
	bhp	13.4	17.6	22.5	27.1	29.8	31.8	34.7

VARIABLE SPEED POWER - ISO3046 FUEL STOP RATING (IOFN)

Model	r/min	1000	1200	1500 *	1800 *	2000	2200	2500
TR1	kW	4.5	5.2	6.1	7.4	8.0	8.7	9.5
	bhp	6.0	6.9	8.1	9.9	10.8	11.7	12.7
TR2	kW	7.0	9.6	12.1	14.4	16.0	17.3	19.0
	bhp	9.4	12.8	16.2	19.3	21.4	23.2	25.5
TR3	kW	11.0	14.4	18.5	22.2	24.4	26.1	28.5
	bhp	14.8	19.3	24.8	29.8	32.7	35.0	38.2

* For fixed speed engines the powers at these speeds are the same.

VARIABLE SPEED TORQUE - ISO3046 CONTINUOUS RATING (IFN)

Model	r/min	1000	1200	1500	1800	2000	2200	2500
TR1	Nm	39.2	37.4	35.0	35.5	34.9	34.3	32.8
	lbf ft	28.9	27.6	25.8	26.2	25.7	25.3	24.2
TR2	Nm	61.1	69.2	70.0	69.5	69.2	68.1	66.1
	lbf ft	45.1	51.1	51.6	51.3	51.1	50.3	48.7
TR3	Nm	95.5	104.2	106.9	107.2	106.0	102.9	98.9
	lbf ft	70.4	76.9	78.9	79.0	78.2	75.9	73.0

VARIABLE SPEED TORQUE - ISO3046 FUEL STOP RATING (IOFN)

Model	r/min	1000	1200	1500	1800	2000	2200	2500
TR1	Nm	43.1	41.1	38.5	39.1	38.3	37.7	36.1
	lbf ft	31.8	30.3	28.4	28.8	28.3	27.8	26.7
TR2	Nm	67.2	76.2	77.0	76.4	76.2	75.0	72.7
	lbf ft	49.6	56.2	56.8	56.4	56.2	55.3	53.6
TR3	Nm	105.0	114.7	117.6	117.9	116.6	113.2	108.8
	lbf ft	77.5	84.6	86.8	86.9	86.0	83.5	80.3

Note: Minimum full load continuous speed is 1500 r/min.

Notes:

1. Power ratings (measured at the fl ywheel) and fuel consumptions, apply to a fully run-in, non-derated engine without power absorbing accessories or transmission equipment.
2. The overload capability applies to a fully run-in engine. This is normally attained after a running period of about 50 hours.

RATING DEFINITIONS TO ISO 3046

ISO Standard Conditions

Barometric pressure 100 kPa
Relative humidity 30%
Ambient air temperature at the inlet manifold 25°C

Variable Speed (Fuel Stop): Continuous Power (IFN)

The maximum power in kW which the engine is capable of delivering continuously at the stated crankshaft speed, under ISO 3046 standard conditions, and with the provisions specified in item (1) above, but with the fuel limited so that the fuel stop power cannot be exceeded.

Variable Speed (Fuel Stop): Overload Power (IOFN)

The maximum power in kW which the engine is capable of delivering intermittently at the stated crankshaft speed for a period not exceeding one hour in any period of twelve hours of continuous running, immediately after working at the continuous power, under ISO 3046 standard conditions and with the provisions specified for continuous power in item (3) above, but with the fuel limited so that the fuel stop power cannot be exceeded.

FIXED SPEED POWER OUTPUTS - ISO3046

Engine Model	Speed, r/min	Power	Engine Power (ISO3046)			
			Gross		Net	
			kWm	bhp	kWm	bhp
TR1	1500	Continuous	5.5	7.4	5.5	7.4
		Fuel Stop	6.1	8.2	6.1	8.2
	1800	Continuous	6.7	9.0	6.7	9.0
		Fuel Stop	7.4	9.9	7.4	9.9
Engine Model	Speed, r/min	Power	Engine Power (ISO3046)			
			Gross		Net	
			kWm	bhp	kWm	bhp
TR2	1500	Continuous	11.0	14.7	11.0	14.7
		Fuel Stop	12.1	16.2	12.1	16.2
	1800	Continuous	13.1	17.6	13.1	17.6
		Fuel Stop	14.4	19.3	14.4	19.3
Engine Model	Speed, r/min	Power	Engine Power (ISO3046)			
			Gross		Net	
			kWm	bhp	kWm	bhp
TR3	1500	Continuous	16.8	22.5	16.8	22.5
		Fuel Stop	18.5	24.8	18.5	24.8
	1800	Continuous	20.2	27.1	20.2	27.1
		Fuel Stop	22.2	29.8	22.2	29.8

TECHNICAL DATA

Model		TR1	TR2	TR3
Type of fuel injection		Direct	Direct	Direct
Number of cylinders		1	2	3
Aspiration		Natural	Natural	Natural
Direction of rotation looking on flywheel end		Anti clockwise	Anti clockwise	Anti clockwise
Nominal cylinder bore	mm	98.42	98.42	98.42
	in	3.875	3.875	3.875
Stroke	mm	101.6	101.6	101.6
	in	4.0	4.0	4.0
Total cylinder capacity	litre	0.773	1.55	2.32
	in^3	47.17	94.35	141.52
Compression ratio		15.5:1	15.5:1	15.5:1
Minimum idling speed	r/min	850	850	850
Number of flywheel ring gear teeth		110	110	110
Crankshaft end thrust (maximum continuous)	kgf	132	132	132
	lbf	290	290	290
Crankcase vacuum (minimum)	mbar	2.0	2.5	3.0
	in H_2O	0.8	1.0	1.2
Crankcase vacuum (average)	mbar	3.5	4.6	7.5
	in H_2O	1.4	1.8	2.9
Lubricating oil pressure (mean) with the oil at 110°C (230°F)	bar	2.0	2.0	2.0
	lbf/in^2	29	29	29

Fixed Speed: Continuous Power (ICN)

The power in kW which the engine is capable of delivering continuously at the stated crankshaft speed, under ISO 3046 standard conditions, measured at the flywheel without power-absorbing accessories, provided that the engine is overhauled and maintained in good operating condition and that fuel to BS EN 590 Class A1 or A2, and lubricating oils to the correct performance specification and viscosity classification as recommended by Lister Petter Limited are used.

Fixed Speed (Fuel Stop): Overload Power (ICXN)

The maximum power in kW which the engine is capable of delivering intermittently at the stated crankshaft speed for a period not exceeding one hour in any period of twelve hours of continuous running, immediately after working at the continuous power, under ISO 3046 standard conditions and with the provisions specified for continuous power in item (1) above, but with the fuel limited so that the fuel stop power cannot be exceeded.

Derating

For non-standard site conditions, reference should be made to relevant BS, ISO & DIN standards.

Power Standards

The engine performance corresponds to ISO 3046, BS 5514 and DIN 6271. The technical data applies to an engine without cooling fan and operating on a fuel with calorific value of 42.7 MJ/kg (18360 BTU/lb) and a density of 0.84 kg/litre (7.01 lb/US gal, 8.42 lb/Imp gal).

ENGINE EXHAUST SYSTEM DETAIL

Parameter	Engine Model		
	TR1	TR2	TR3
Maximum allowed back pressure (kPa)	10.3	10.3	10.3
Bosch smoke level at rated output	5.5	5.5	5.5
Exhaust gas temperature, continuous (°C)	520	520	520
Exhaust gas temperature, overload (°C)	550	550	550
Exhaust pipe diameter - recommended O/D	48	48	48

ENGINE NOISE LEVELS

Parameter	Engine Model		
	TR1	TR2	TR3
Sound pressure level at 1m	≤ 94 dB(A)	≤ 93 dB(A)	≤ 93 dB(A)

ENGINE LUBRICATING OIL SYSTEM DETAIL

Parameter	Engine Model		
	TR1	TR2	TR3
Lubrication method	Pressure		
Sump capacity (L)		4.0	5.5
Total capacity (L)		4.5	6.0
Oil filter type	Full flow paper element		
Oil consumption (g/kW h)	≤ 0.25		
Lubrication oil temperature (°C)	120 (max. 135)		
Lubrication oil pressure at running conditions (kPa)	100-450		
Oil pump type	Plunger type		
Maximum operation angle (degrees)	Front / Rear / Fuel Pump Up 15 / Manifold Down - 10		

ENGINE COOLING SYSTEM DETAIL

Parameter		Engine Model		
		TR1	TR2	TR3
Cooling method		Air		
Cooling fan		Flywheel		
Cooling package operating temperatures	°C	40		
Maximum cooling airflow (litres/sec)	1500 r/min	70	110	160
	1800 r/min	90	130	200
Maximum cowling pressure (mmWG)	1500 r/min	25	30	30
	1800 r/min	37	43	43
Ducting sectional area	cm^2	190	330	530
	in^2	30	51	82

Note:
The duct trunking must be the same cross sectional area throughout its length
For trunking lengths greater than 1.5m (5ft) then the above figures are multiplied by the following factors:

* 1.5m - 3.0m (5-10ft) x1.4
* 3.0m - 7.5m (10-25ft) x2.25
* 7.5m - 15.0m (25-50ft) x3.5

VARIABLE SPEED I CONTINUOUS POWER FUEL CONSUMPTION (IFN)								
Model	r/min	1000	1200	1500	1800	2000	2200	2500
TR1	g/kWhr	253	243	239	240	242	243	245
	l/h	1.2	1.4	1.6	1.9	2.1	2.3	2.5
TR2	g/kWhr	249	240	236	237	238	239	241
	l/h	1.9	2.5	3.1	3.7	4.1	4.5	5.0
TR3	g/kWhr	246	238	230	229	231	234	237
	l/h	2.9	3.7	4.6	5.5	6.1	6.6	7.3

OPTIONAL ACCESSORIES

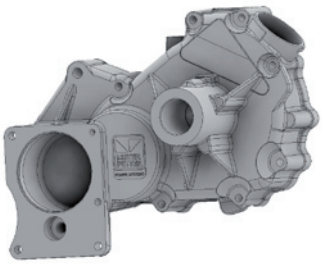
As part of your engine package from Lister Petter, we can offer you a full range of optional accessories to enhance your engine. Please consult Lister Petter for full details.

(CA) SAE 4 - SAE 5 Adapter
(CB) SAE 4 Spacer Ring

(CL) SAE J620 7.5" Drive Member
(CM) SAE J620 6.5" Drive Member

* Use with SAE Adapter (CA, CB)

(FA) 8.25L Fuel Tank
(FB) 13L Fuel Tank



(HP) Gear end hydraulic power take-off

(WG) Keyswitch Start Panel

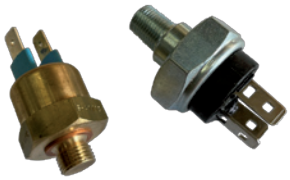
(WI) Start Panel with 12V hr Recorder

(EK) 12V Starter Motor
(EL) 24V Starter Motor

(JE) 12V Fuel Control Solenoid
(JQ) 24V Fuel Control Solnoid

(NA) Engine mounted exhaust silencer
(NJ) Exhaust outlet bend *

* Included in NA exhaust kit



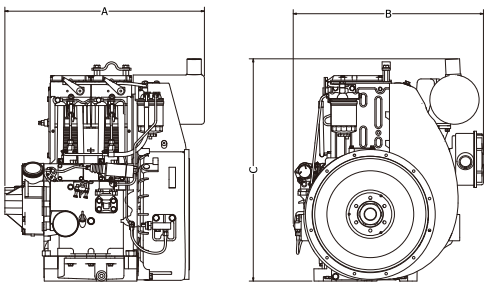
(JA) Engine temperature switch
(JD) Oil pressure switch *

* Included oil distribution block - Not shown

(EA) Short Starting Handle (TR1)
(EB) Long Starting Handle (TR2/3)

Service Kits
500, 1000, 2000, 4000 & 6000 hrs

APPROXIMATE DIMENSIONS AND WEIGHT



		TR1	TR2	TR3
Dry weight	kg	153	185	230
	lb	337	408	507
Length (A) without fuel tank	mm	476	620	747
	in	18.7	24.4	29.4
Width (B)	mm	583	591	591
	in	23.0	23.3	23.3
Height (C)	mm	691	691	691
	in	27.2	27.2	27.2

Note:
These weights are for a fully dressed G build configured engine.

TYPICAL PACKING CASE DIMENSIONS

Packing case dimensions					Container quantities	
Engine	Length (mm)	Width (mm)	Height (mm)	Gross weight (kg)	20ft	40ft
TR1	770	550	850	180	60	120
TR2				235	56	94 *
TR3	880			285	48	78 *
Note: Optional accessories require the use of wider packing cases. TR1 engine fitted with fuel lift pumps. TR1, TR2 and TR3 engines with starting panels and ducting.						
All	800	670	850	see above	42	84

* Weight limited by container

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