

# HA SERIES

HA SERIES  
WELL THOUGHT - OUT ENGINES



Enriching Lives

## Kirloskar engines: Prime movers to the Indian nation.

Kirloskar Oil Engines Limited founded in 1946 and popularly known as KOEL is India's leading manufacturer of the finest and widest range of diesel engines - from 3 hp to 800 hp, and from 2400 hp to 11,000 hp. The engines are branded as 'Kirloskar'. With annual manufacturing Volumes exceeding 225,000 engines, Kirloskar engines are available in both air-cooled and liquid-cooled versions. The main engine manufacturing plant is at Pune, and other manufacturing locations are Nashik, Ahmednagar, Rajkot, Indore. With an investment outlay of over US\$ 200 Mn we are setting up world class engine manufacturing facility at Kagal near Kolhapur (200 Kms south of Pune). This will enhance our manufacturing capacity by 100,000 engines per year starting 2008. Kirloskar engines are available in Industrial, Agriculture, Power Generation as well as Marine Application. The engine manufacturing facilities are continually upgraded and improved to ensure the requisite quality at competitive cost. Critical components like crankcases, crankshafts, camshafts, gear casing, cylinder heads and connecting rods are manufactured in-house. KOEL also manufactures for its exclusive use, special purpose machines to achieve critical degrees of precision that international specifications demand. The prestigious ISO 9001 certification for Quality Management Systems in 1992 and ISO 14001 certification for Environmental Management Systems in 1999 & TS 16949 in 2004 are the proof of Kirloskar's commitment to quality and environment. KOEL is the first engine manufacturing company in India to be awarded the ISO 14001 certification. At Kirloskar, we believe that the industry and the environment can, and must, coexist in a mutually beneficial way. Bringing this thought into practice, is what has driven us to manufacture engines that are not only eco-friendly, but are also manufactured in an environment-friendly way.

## Product Support :

Kirloskar has one of the most extensive service networks in India. Almost 90% of Kirloskar medium engines are within 100 kilometre periphery of a Kirloskar Service Dealer. 230 Service Dealership locations provide relentless service to the customers. The location of the dealerships and their infrastructure is continually assessed based on the Kirloskar engine population build-up in each territory, and the emerging service needs of the customers. Out of these, 96 Service Dealership locations provide 24-hour service. The number of Service Dealerships that provide 24-hour service are growing day by day. Additionally, over 65 Kirloskar Territory Managers, Service Engineers and Technicians are stationed at 15 Kirloskar Area Offices. A well spread out service network manned by about 2,200 Kirloskar trained engineers and technicians ensures prompt service and easy availability of genuine spare parts, thus ensuring highest up time for Kirloskar engines.



## All pervasive IT in operations :

Having foreseen the power of IT to transform businesses, way back in 1998, KOEL installed the world's leading Enterprise-wide Solution (ERP) Oracle. This installation is noted to be one of the most comprehensive installations of Oracle in the manufacturing industry. The installation of ERP in 1998 was followed up with web-enabled business processes in 2000; comprising 26 specific modules, connecting over 2,500 stake-holders who together commit over 50,000 transactions every day. With this initiative, Kirloskar Service Dealers, OEMs, Area Sales Offices, Suppliers and Logistic Providers form a digital community that is ever ready to respond to each customer need efficiently. The Service Dealerships are able to respond to customer needs quickly and efficiently by accessing latest service information and parts availability over the internet, 24 hours a day, 365 days a year, including a leap year.

We are in the process of expanding the IT applications in the area of Customer Relationship Management [CRM]. The CRM Module will enable us to actively address the needs of its existing, as well as prospective customer base. By being always online and in real time. What started as an ERP initiative in 1998 has today become one of the largest eBusiness suites operating outside the United States.

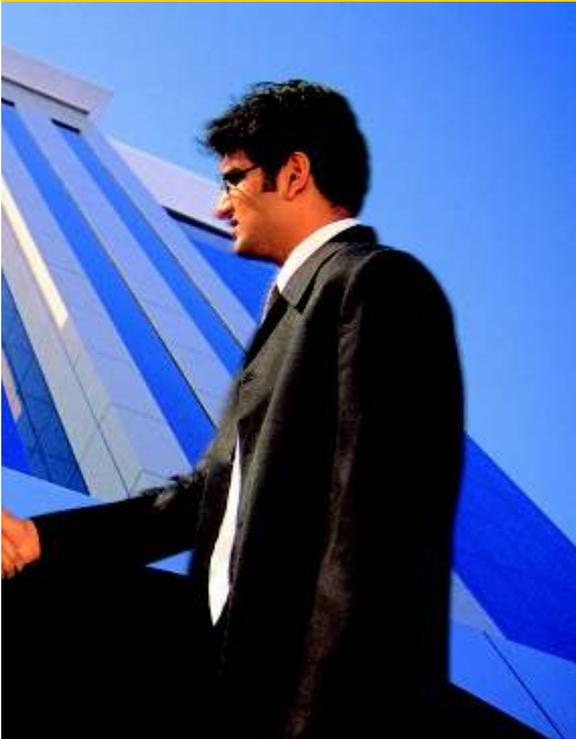
## Air-cooled diesels engineered to economise

Maximum economy and reliability combined with air cooling are the features of these diesel engines. The power units are produced to meet the high precision and quality standards symbolised by the name Kirloskar. A strictly modular design ensures component standardisation which solves many spare parts supply problems. Air-cooling makes for simpler maintenance. Being air-cooled, HA series engines work efficiently under different climatic conditions and reduce about 40% failures which could be experienced on liquid-cooled engines.

## Salient features

Various applications in industrial, power generation, tractor, mining, earth moving, construction, material and fluid handling, offshore, marine and automotive market segments.

- Piston continuously cooled by built-in oil jet spray for minimum liner piston wear.
- Auto-belt tensioning system, resulting in increased belt life.
- In-line gear driven MICO fuel pump with EP-RSV governor for ease of fuel setting and field servicing.
- Lower fuel consumption as compared with other engines in this class (upto 20%)
- Full flow block type lube oil cooler for maintaining optimum lube oil temperature
- Ability to take drive from both engine ends to meet specific application requirement.
- No external lube oil piping for engine lubrication.
- Provision for engine-mounted, belt or gear-driven compensatory, gear driven hydraulic pump to meet specific application requirements for compact installation.
- All maintenance points like fuel pump, fuel lift pump, lube oil filling, dipstick, fuel and lube oil filters on one side for easy maintenance.
- Turbocharged versions available for 4 and 6 cylinder engines.



## User advantages

Benefits of the same engine family covering the output range 19 to 128 BHP and variety of equipment :

Lowest possible parts stocking to meet any field service need. 85% components are common throughout the HA engine family. As the HA engine family also has a very wide operating speed range upto 2800 rpm, and is used on a variety of equipment. The need for training of maintenance personnel is minimized.

Better logistics support is possible due to lower weight and volume of equipment and individual engine parts, lower frequency of workshop attendance, extended MTOBs, faster maintenance, extended diesel and lube oil top-up intervals.

Agency Certification by institutions like R&D Dighi, Pune, ARAI Pune, DGS&D, for use in Defence, Mining and Govt. Sectors.

## Standard equipment

- Oil bath air cleaner with pre-cleaner and dust collector
- Exhaust silencer
- 12V electric starting with starter, without wiring, batteries and leads.
- 12V/35 amps Alternator with built- in cut out.



- Engine control panel consisting of start push button, lube oil pressure gauge, ammeters and cutout.
- Pre and micro fuel filters
- Lube oil cooler
- Fuel lift pump
- Lube oil filter
- Engine stop lever (hand operated)
- Belt guard (for Genset application engines only)
- Engine supports suitable for rigid mounting

- Torsional vibration damper on crank pulley ( for HA694/HA694TC engine only ) as applicable
- Automatic belt tension unit.
- Mechanical engine shut down system in case of 'V' belt failure

## Optional equipment

- Absorption type exhaust silencer suitable for remote mounting
- Spark arrestor type exhaust silencer
- Expansion bellow
- Exhaust manifold-cum-silencer for HA294/HA394/HA494/HA694 engine only (replaces separate manifold and exhaust silencer)
- Dry type air cleaner with evacuator valve and restriction indicator (pre-cleaner available on demand)
- Lock nut type speed adjusting unit on fuel pump
- Engine supports suitable for anti-vibration mountings
- Anti-vibration mountings
- Hand starting arrangement at gear end on HA294, HA394 AND HA494 only. (This requires extra heavy flywheel which can be accommodated only in SAE-1, Flywheel Housing)
- Holset type flexible coupling with following unfinished bore flanges

Engine Model	Unfinished bore/Coupling type
HA294/394	25 mm(0.12RB)
HA494/494TC/694	
HA694TC	25mm(0.2RB)

- Provision for gear driven hydraulic pump
- Belt / gear driven compressor
- Right angle or straight tacho-drive unit
- Automatic engine shut-down arrangement in case of low lube oil pressure, high cylinder head temperature, V belt-failure and engine over speed ( details on request )
- Industrial power take-offs ( Twin disc type )\*
  - HA294 GP 1070-CP (Spec No.GP136M)
  - HA394-GP 1080-CP (Spec No. GP 120M)
  - HA494/HA494TC-GP1110-SP (Spec No. GP 122M)
  - HA694/HA694TC-GP1110-SP (Spec No. GP122M)
- Hot air outlet ducting and fresh air intake ducting (details on request)
- Raised oil filling and raised dipstick arrangement
- Special lube oil sumps to suit high inclinations (details on request)
- Flywheel housing (SAE4,3,2 and 1)
- 24V electrical starting system
- Cold starting aid for engine starting below minus 5<sup>o</sup>C down to minus 20<sup>o</sup>C (detail on request)
- Mud filter and water separator Instruments
  - Low lube oil pressure switch (normally open type)
  - V belt failure switch
  - High cylinder head temperature switch
  - Engine over speed switch (12V/24V)
  - 12V/24V stop solenoid(in lieu of mechanical shut down)
  - Tacho-hour meter with 1m/2m/3m long cable
  - Electrical hour meter and tachometer
  - Lube oil temperature gauge



\*Note: Selection depends on application, rpm and torque to be transmitted. Consult KOEL R&E for proper selection.

Horse power ratings: as per IS:10002/BS:5514/DIN 6271/ISO 3046  
 ISO STD: Power (Continuous Rating)



ISO Net Brake Fuel Stop Power (Max Rating)

Engine	rpm	kW	bhp	Torque		Heavy Duty		Light Duty	
				KNm	Kgm	HP	Torque	HP	Torque
HA 294	1500	14	19	0.089	9.1	20	9.55	21	10
	1800	16.9	23	0.09	9.15	24.5	9.75	25.5	10.15
	2000	18.4	25	0.087	8.95	26.5	9.5	28	10
	2150	19.5	26.5	0.086	8.85	28	9.35	29.5	9.85
	2300	20.2	27.5	0.084	8.55	29	9	30.5	9.5
	2500	*	*	*	*	30.5	8.7	32	9.2
	2800	*	*	*	*	*	*	*	*
HA 394	1500	23.60	32.00	0.150	15.30	34.0	16.25	36.0	17.20
	1800	28	38.00	0.148	15.10	40.0	15.90	42.0	16.70
	2000	30.2	41.00	0.144	14.70	44.0	15.75	46.0	16.50
	2150	32.40	44.00	0.143	14.60	47.0	15.65	49.0	16.30
	2300	34.60	47.00	0.143	14.60	49.0	15.25	51.0	15.90
	2500	*	*	*	*	52.0	14.90	54.0	15.50
	2800	*	*	*	*	*	*	58.0	14.80
HA 494	1500	31.60	43.00	0.201	20.50	46.0	22.00	48.0	22.90
	1800	38.20	52.00	0.203	20.70	54.0	21.50	58.0	23.00
	2000	41.20	56.00	0.196	20.00	60.0	21.50	63.0	22.50
	2150	44.20	60.00	0.196	20.00	63.0	21.00	67.0	22.30
	2300	46.40	63.00	0.192	19.60	66.0	20.56	70.0	21.80
	2500	*	*	*	*	70.0	20.10	74.0	21.20
	2800	*	*	*	*	*	*	80.0	20.50
HA 494 TC	1500	41.00	56.00	0.262	26.70	*	*	*	*
	1800	48.00	65.00	0.253	25.80	*	*	*	*
	2000	51.50	70.00	0.245	25.00	*	*	*	*
HA 694	1500	47.80	65.00	0.304	31.00	69.0	32.90	73.0	34.80
	1800	57.540	78.00	0.304	31.00	82.0	32.60	87.0	32.60
	2000	62.60	85.00	0.298	30.40	90.0	32.20	95.0	34.00
	2150	66.20	90.00	0.294	30.00	95.0	31.60	100.0	33.30
	2300	69.90	95.00	0.290	29.60	100.0	31.15	106.0	33.00
	2500	*	*	*	*	106.0	30.40	112.0	32.10
	2800	*	*	*	*	*	*	120.0	30.70
HA 694 TC	1500	61.00	83.00	0.387	39.50	88.0	41.90	93.0	44.30
	1800	72.00	98.00	0.380	38.80	103.0	40.80	109.0	43.20
	2000	76.00	103.00	0.365	37.20	108.0	39.00	114.0	41.60
	2150	78.00	106.00	0.352	35.90	112.0	37.70	119.0	40.00
	2300	81.00	110.00	0.340	34.70	116.0	36.30	123.0	38.60
	2500	84.50	115.00	0.324	33.00	121.0	34.70	128.0	36.70



## Notes

### 1) Continuous Rating:

For NA engines IS: 10002/BS:5514/DIN271

For TC engines BS:5514/din 6271

(NA - Naturally aspirated, TC - Turbocharged)

The power available for heavy continuous load. An over load of 10% is permissible for 1 hour for every 12 hours of consecutive running.

### 2) Maximum Power Rating:

- Heavy Duty: Maximum power available for variable load/variable speed applications where the average load factor is as high as 70%
- Light Duty: Maximum power available for variable load/variable speed applications where max. load is required for short duration's and average load factor does not exceed 30% (Approval from KOEL Engineering Dept. is essential for applying maximum power rating to a particular application. )

### 3) Site deration for HA494TC/HA694TC engine is to be calculated as per BS 5514/DIN 6271

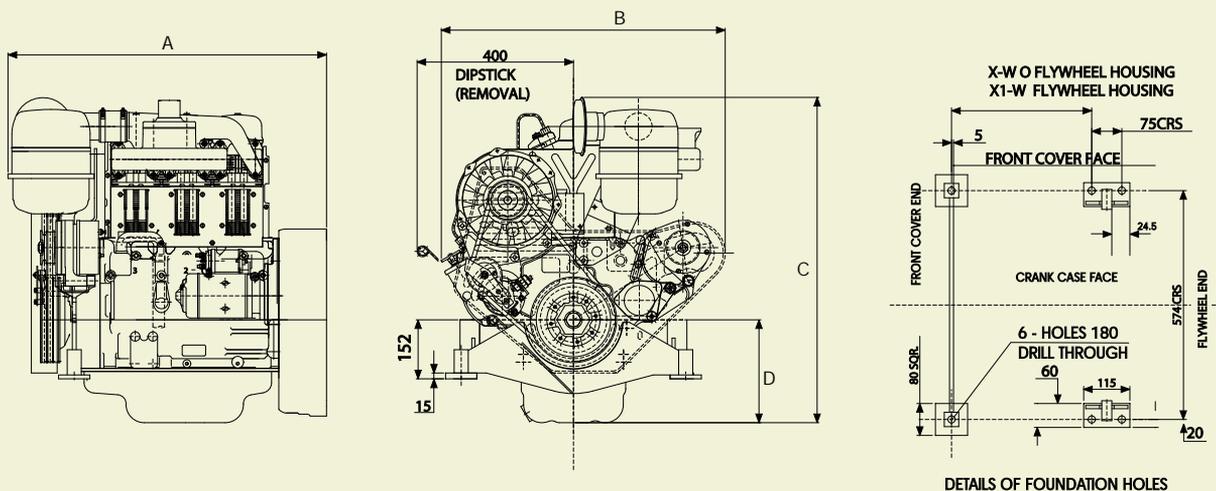
### 4) For applications demanding HA494TC engine operation beyond 2000 rpm, please consult KOEL.



## Overall dimensions and installation drawings (HA294/HA394/HA494/HA694 engines )

Engine Model	A	B	C*	D*	X	X1
HA294	678	704	872	301	342	455
HA394	808	704	868	297	272	585
HA494	938	704	868	297	602	715
HA694	1277	704	922	300	869	982
HA494TC	938	704	868	297	602	715
HA694TC	1145	760	878	300	869	982

\*All dimensions are in mm These dimensions may vary from alternations depending on applications



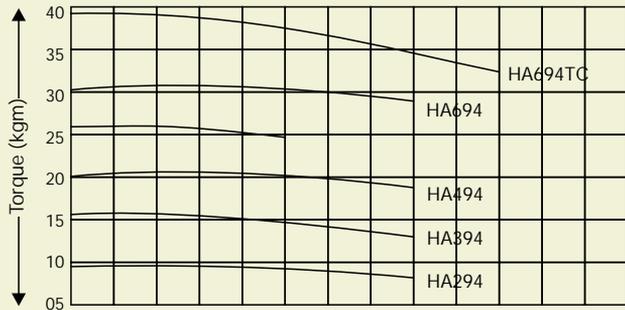
## Brief specifications

Models	HA294	HA394	HA494	HA694	HA494TC	HA694TC
Engine Description	Vertical air cooled, compression Ignition four stroke cycle Naturally aspirated Diesel Engines				Vertical air cooled , compression Ignition, four stroke cycle Turbocharged Diesel Engines	
Bore x Stroke (mm)	100 x 120					
Displacement (cc)	1884	2826	3786	5652	3768	5652
Compression Ratio	17:1					
Direction of Rotation	Counter-clockwise (looking at flywheel end )					
Speed						
Max Operating (rpm)	2300 (for continuous duty)				2000	2500
	2800 (for automotive and intermittent duty as mentioned in the table for Horse Power Ratings)					2500
Min. operating (rpm)	1500					
Low idling (rpm)	650					
Dry weight without flywheel (kg)	243	300	338	430	338	448
Weight of standard flywheel for industrial application (kg)	41	41	39	39	39	39

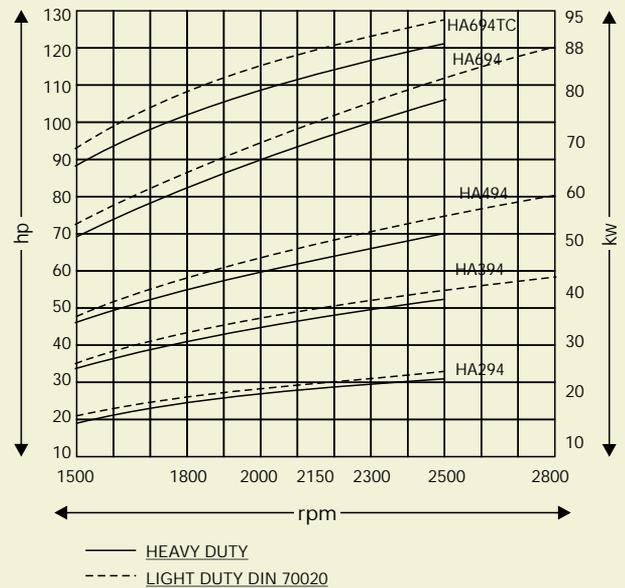
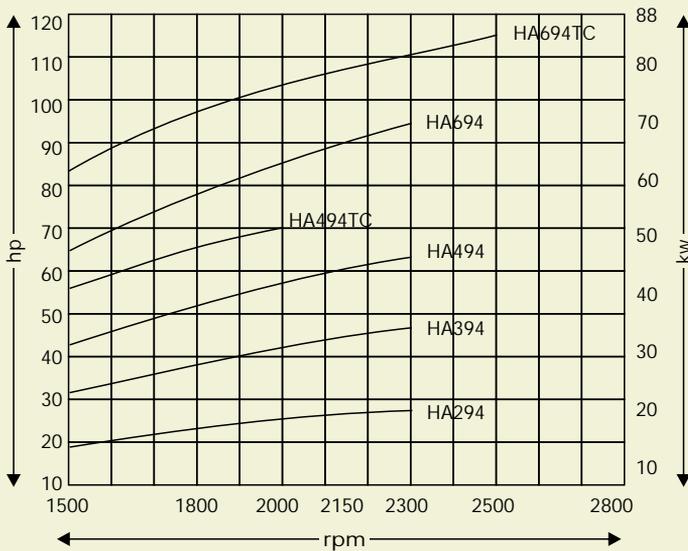
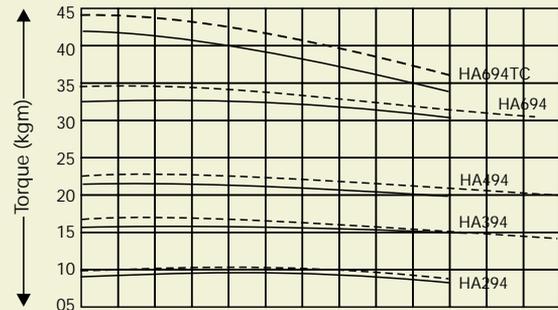
## Approximate shipping specifications with standard equipment

Model	Net Weight (kg)	Gross Weight (kg)	Packing case size (mm)
HA294	284	354	950 x 960 x 1066
HA394	341	411	1080 x 960 x 1066
HA494	377	477	1180 x 960 x 1066
HA694	469	569	1430 x 960 x 1130
HA494TC	385	485	1180 x 960 x 1066
HA694TC	495	595	1430 x 960 x 1130

HORSE POWER RATINGS  
AS PER IS: 10002/BS: 5514/DIN 6271/ISO: 3046  
(ISO STD. POWER, CONTINUOUS RATING)



HORSE POWER RATINGS AS PER  
IS:10002/BS: 5514/DIN 6271/ISO: 3046  
ISO NET BRAKE FUEL STOP POWER (Max. Ratings)



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