

# R1040 SERIES



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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, 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 the 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.



## Liquid-cooled diesels engineered to economise

Maximum economy and reliability are the features of Kirloskar 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 resolves many spare parts supply problems. The R1040 engine series conform to Euro I & II/COM Stage I & II and US Tier I & II norms for off-road use.

## Salient features

Designed for heavy duty Industrial applications like Tractor, Mining, Earth Moving, Construction, Material handling, Automotive market segments.

- The Piston is designed to have centralised cavity. High air to fuel ratio, injectors with smaller spray holes and large number of holes ensure proper combustion of fuel.



- Piston continuously cooled by built-in oil jet spray for minimum liner piston wear.
- 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.
- Full flow plate type lube oil filter for maintaining optimum lube oil temperature.
- No external lube oil piping for engine lubrication.
- Lube oil coolers is of modern plate type design, which is compact and efficient.
- Rigid Load bearing crank case, acts as load bearing member for application like tractor, fork lift etc.
- The rigid structure also ensures minimum cylinder bore distortion, low lube oil consumption, extended life of lube oil and reduced particulate emission.
- The rigid and integral cylinder head is equipped with replaceable valve seats and valve guides. The heads are provided with six bolts per cylinder to ensure uniform clamping. Steel backbone cylinder head gasket ensures proper sealing.
- Crankshaft is of forged alloy steel with hardened journals and pins.
- Rigid engine structure and crowned gears in gear train substantially reduce the engine noise.

- Ability to take drive from both engine ends to meet specific application requirement.
- High back up torque
- 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. Injectors are housed outside rocker cover to enable easy maintenance.
- Wet liners ensure low cost of maintenance as compared to engines with dry liners. Also wet liners are easy to replace at site without any special tooling.
- Meeting prevailing emission norms and capable to meet likely future emission norms.
- MTBO of minimum 8000 hours Low operating cost as compared to other engines in its class ( lube oil change period of 400 hours, low fuel and lube oil consumption).
- Turbocharged and Turbo After cooled versions available for 4 and 6 cylinder engines.



## User advantages

- Benefits of the same engine family covering the output range 38 to 189 BHP and variety of equipment.
- Lowest possible parts stocking to meet any field service need. 85% components are common throughout the R1040 engine family.
- As the R1040 engine family also has a very wide operating speed range upto 2500 rpm, 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 for engines used in Defence, Mining and Government sectors.



## Optional equipment

- Residential type exhaust silencer
- Heat exchanger cooling arrangement.
- Holset type flexible coupling with following unfinished bore flanges

| Engine Model | Unfinished bore / Coupling Type |
|--------------|---------------------------------|
| 3R1040       | 25 mm ( 0.12 RB )               |
| 4R1040       | 25 mm (0.12 RB)                 |
| 4R1040T      | 30 mm (0.20 RB)                 |
| 6R1080/T/TA  | 30 mm ( 0.24 RB )               |

- 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 )\*

|                 |                            |           |     |
|-----------------|----------------------------|-----------|-----|
| 3R1040          | FWH SAE3, Flywheel to suit | GP SP 111 | PTO |
| 4R1040          | FWH SAE3, Flywheel to suit | GP SP 111 | PTO |
| 4R1040T         | FWH SAE3, Flywheel to suit | GP SP 111 | PTO |
| 4R1040TA        | FWH SAE1, Flywheel to suit | GP SP 211 | PTO |
| 6R1080/<br>T/TA | FWH SAE1, Flywheel to suit | GP SP 211 | PTO |

## Standard equipment

- In line vertical liquid cooled diesel engine
- Anti clockwise rotation (looking from flywheel end).
- 12V electric starting with starter, without wiring,
- Battery charging Alternator
- MICO fuel pump
- Lube oil cooler
- Lube oil filter 'Spin on type'
- Twin bowl fuel filter
- Dry type air cleaner with pre-cleaner
- Exhaust silencer
- Expansion bellow
- Holset / equivalent coupling
- Control panel and wiring harness
- Fuel pipes
- Radiator, radiator fan
- Flywheel with starter ring
- Engine foots suitable for rigid mounting

- Standard 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°C down to minus 20°C (detail on request)
- Mud filter and water separator

\*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

| Engine   | Rpm  | Continuous Rating ICXN |                                 | Fuel Stop Power IFN |                                 |
|----------|------|------------------------|---------------------------------|---------------------|---------------------------------|
|          |      | Power HP               | Max Torque kg-m @ 1300-1400 rpm | Power HP            | Max Torque kg-m @ 1300-1400 rpm |
| 2R1040   | 1500 | 27                     | 12.9                            | 29                  | 13.8                            |
|          | 1800 | 30                     |                                 | 33                  |                                 |
| 3R860    | 1500 | 25                     | 13                              | 28                  | 14.3                            |
|          | 1800 | 30                     |                                 | 33                  |                                 |
|          | 2000 | 36                     |                                 | 40                  |                                 |
|          | 2200 | 40                     |                                 | 44                  |                                 |
|          | 2300 | 42                     |                                 | 46                  |                                 |
|          | 2500 | 45                     |                                 | 50                  |                                 |
| 3R1040   | 1500 | 38                     | 18                              | 42                  | 20                              |
|          | 1800 | 43                     |                                 | 47                  |                                 |
|          | 2000 | 45                     |                                 | 50                  |                                 |
|          | 2200 | 49                     |                                 | 54                  |                                 |
|          | 2300 | 50                     |                                 | 55                  |                                 |
|          | 2500 | 51                     |                                 | 56                  |                                 |
| 4R1040   | 1500 | 52                     | 25                              | 57                  | 28                              |
|          | 1800 | 61                     |                                 | 68                  |                                 |
|          | 2000 | 67                     |                                 | 74                  |                                 |
|          | 2200 | 69                     |                                 | 76                  |                                 |
|          | 2300 | 70                     |                                 | 77                  |                                 |
|          | 2500 | 72                     |                                 | 80                  |                                 |
| 4R1040T  | 1500 | 72                     | 34                              | 79                  | 38                              |
|          | 1800 | 85                     |                                 | 93                  |                                 |
|          | 2000 | 91                     |                                 | 100                 |                                 |
|          | 2200 | 94                     |                                 | 105                 |                                 |
|          | 2300 | 96                     |                                 | 106                 |                                 |
|          | 2500 | 100                    |                                 | 110                 |                                 |
| 4R1040TA | 1500 | 105                    | 50                              | 115                 | 55                              |
|          | 1800 | -                      |                                 | -                   |                                 |
|          | 2000 | -                      |                                 | -                   |                                 |
|          | 2200 | -                      |                                 | -                   |                                 |
|          | 2300 | -                      |                                 | -                   |                                 |
|          | 2500 | -                      |                                 | -                   |                                 |
| 6R1080T  | 1500 | 125                    | 54 @ 1600 RPM                   | 140                 | 60 @ 1600 RPM                   |
|          | 1800 | 133                    |                                 | 148                 |                                 |
|          | 2000 | 145                    |                                 | 161                 |                                 |
|          | 2200 | 150                    |                                 | 167                 |                                 |
|          | 2300 | 152                    |                                 | 169                 |                                 |
|          | 2500 | -                      |                                 | 170                 |                                 |
| 6R1080TA | 1500 | 141                    | 67 @ 1600 RPM                   | 171                 | 75 @ 1600 RPM                   |
|          | 1800 | 168                    |                                 | 185                 |                                 |
|          | 2000 | 178                    |                                 | 198                 |                                 |
|          | 2200 | 185                    |                                 | 205                 |                                 |
|          | 2300 | 187                    |                                 | 208                 |                                 |
|          | 2500 | -                      |                                 | 210                 |                                 |

Notes

Continous rating

- For NA engines as per ISO 3046 ICXN (NA - Naturally aspirated, TC - Turbocharged, TA - Turbo After Cooled)
- The power available for heavy continuous load. An over load of 10% is permissible for 1 hour for every 12 hours of consecutive running.

Fuel stop power rating

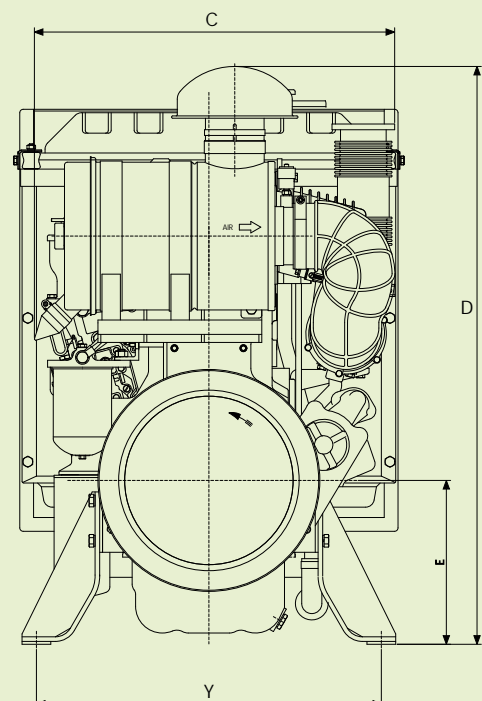
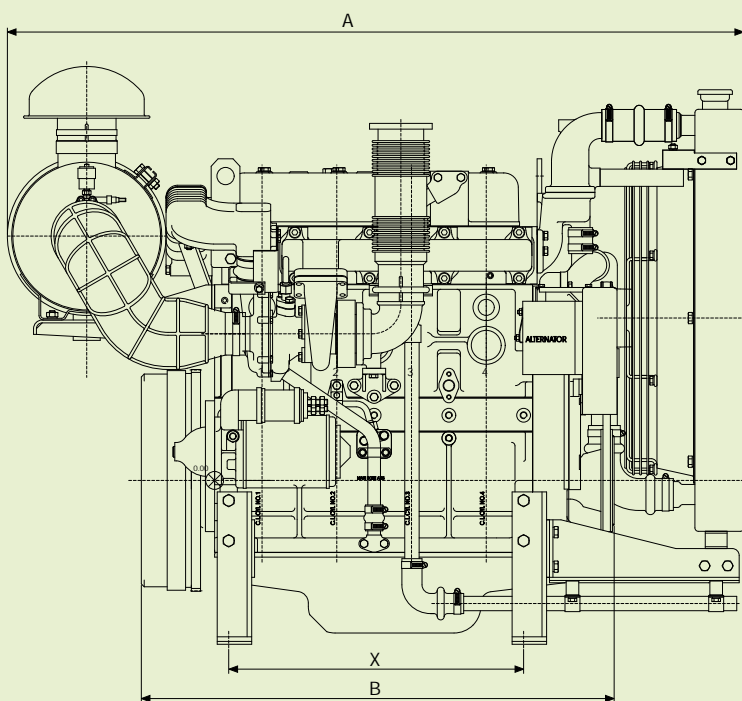
- As per power available for variable load/variable speed applications where the average load factor is as high as 70% (Approval from KOEL Engineering Dept. is essential for applying max. power rating to a particular application).

Overall dimensions and installation drawings  
 ( 2R1040/3R860/3R1040/4R1040/4R1040T/4R1040TA/6R1040TA/6R1040TA Engines )

|          | A    | B    | C    | D    | E   | X   | Y   |
|----------|------|------|------|------|-----|-----|-----|
| 2R1040   | 920  | 560  | 695  | 1087 | 285 | 254 | 600 |
| 3R860    | 1046 | 690  | 695  | 1087 | 285 | 384 | 600 |
| 3R1040   | 1046 | 690  | 695  | 1087 | 285 | 384 | 600 |
| 4R1040   | 1140 | 823  | 650  | 1093 | 285 | 514 | 600 |
| 4R1040T  | 1281 | 823  | 650  | 1093 | 285 | 514 | 600 |
| 4R1040TA | 1490 | 823  | 900  | 1094 | 285 | 514 | 600 |
| 6R1040T  | 1822 | 1137 | 909  | 1416 | 285 | 647 | 600 |
| 6R1040TA | 1822 | 1137 | 1060 | 1416 | 285 | 647 | 600 |

All dimensions are in mm

- For 3R, 4R, 4RT, 4RTA there are 4 holes,  $\phi 16$  drill through for engine foot
- For 6R, 6RT, 6RTA there are 12 holes,  $\phi 16$  drill through for engine foot
- For 4RTA, 6R, 6RT, 6RTA there are 4 slots for mounting radiator on base plate
- These dimensions may vary from alternations depending on applications.



## Brief specifications

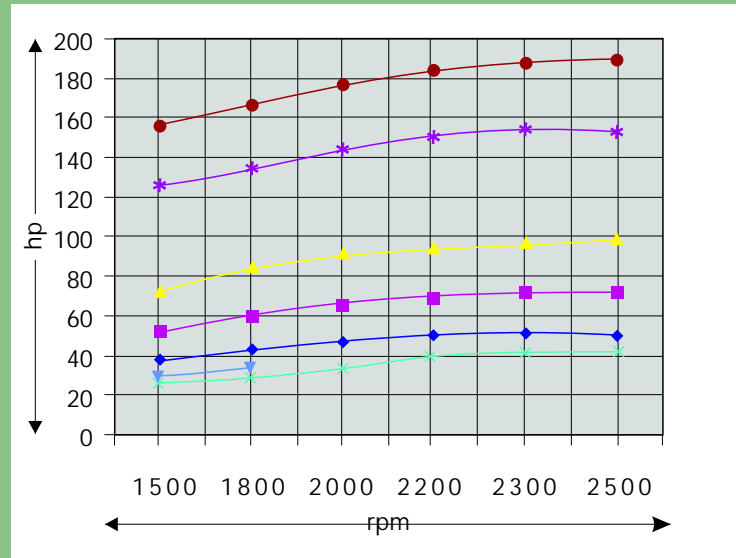
| Models   | 2R1040  | 3R860     | 3R1040    | 4R1040  | 4R1040T | 4R1040TA           | 6R1080T | 6R1080TA           |
|--|---|-----------|-----------|---------|---------|--------------------|---------|--------------------|
| Engine Description   | Vertical Liquid-cooled, compression Ignition four stroke cycle diesel engines |           |           |         |         |                    |         |                    |
| Aspiration   | Natural   | Natural   | Natural   | Natural | Turbo   | Turbo After Cooled | Turbo   | Turbo After Cooled |
| Bore X Stroke (mm)   | 105 X 120   | 100 X 110 | 105 X 120 |         |         | 105 X 125          |         |                    |
| Displacement   | 2080  | 2580      | 3120      | 4160    | 4160    | 4160               | 6480    | 6480               |
| Compression Ratio  | 18:1  |           |           |         | 17:1    |                    | 17.6:1  | 14.5:1             |
| Direction of Rotation  | Counter clockwise (looking at flywheel end)                                   |           |           |         |         |                    |         |                    |
| Speed Maximum Operation (RPM)  | 2500  |           |           |         |         |                    |         |                    |
| Minimum operating (RPM)  | 1500  |           |           |         |         |                    |         |                    |
| Dry weight of engine, with radiator , without bell housing             | 350   | 398       | 398       | 494     | 521     | 550                | 700     | 850                |
| Dry weight of engine with flywheel & SAE 3 flywheel Housing & Radiator | 391   | 424       | 424       | 535     | 564     | 591                | 741     | 891                |
| Weight of standard flywheel in kg                                      | 41  | 41        | 41        | 41      | 41      | 41                 | 41      | 41                 |

## Approximate shipping specifications with standard equipment

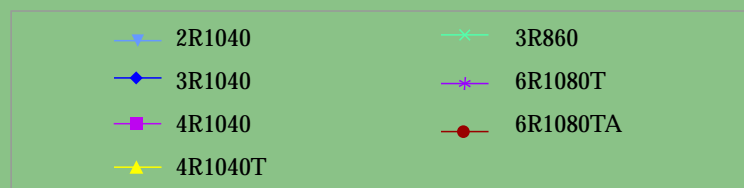
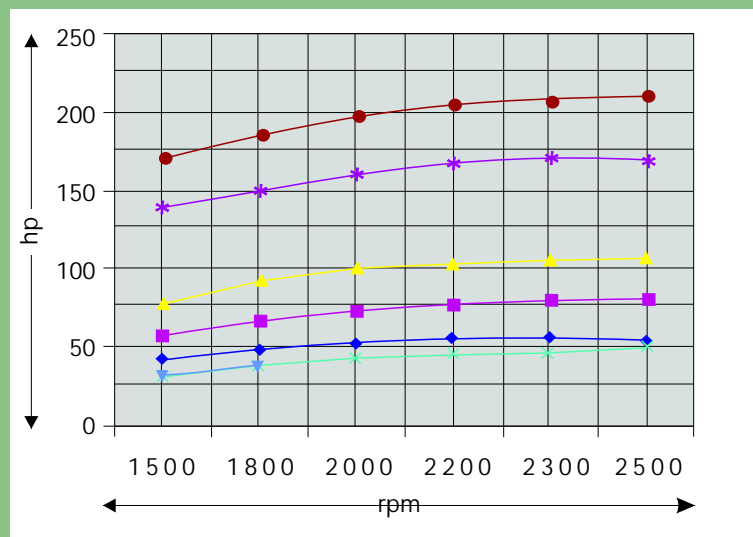
| Model    | Net Weight (kg) | Gross Weight (kg) | Packing case size (mm) |
|----------|-----------------|-------------------|------------------------|
| 2R1040   | 350             | 500               | 1470 x 900 x 1150      |
| 3R860    | 398             | 550               | 1470 x 900 x 1150      |
| 3R1040   | 398             | 550               | 1470 x 900 x 1150      |
| 4R1040   | 494             | 600               | 1500 x 930 x 1250      |
| 4R1040T  | 521             | 730               | 1510 x 930 x 1300      |
| 4R1040TA | 550             | 870               | 1500 x 930 x 1250      |
| 6R1080T  | 700             | 1150              | 1840 x 1200 x 1500     |
| 6R1080TA | 850             | 1310              | 1840 x 1200 x 1500     |

Horse power ratings as per IS 10002/BS:5514/DIN 6271/ISO 3046

### Continuous Power Curve



### Fuel Stop Power Curve



Enriching Lives

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