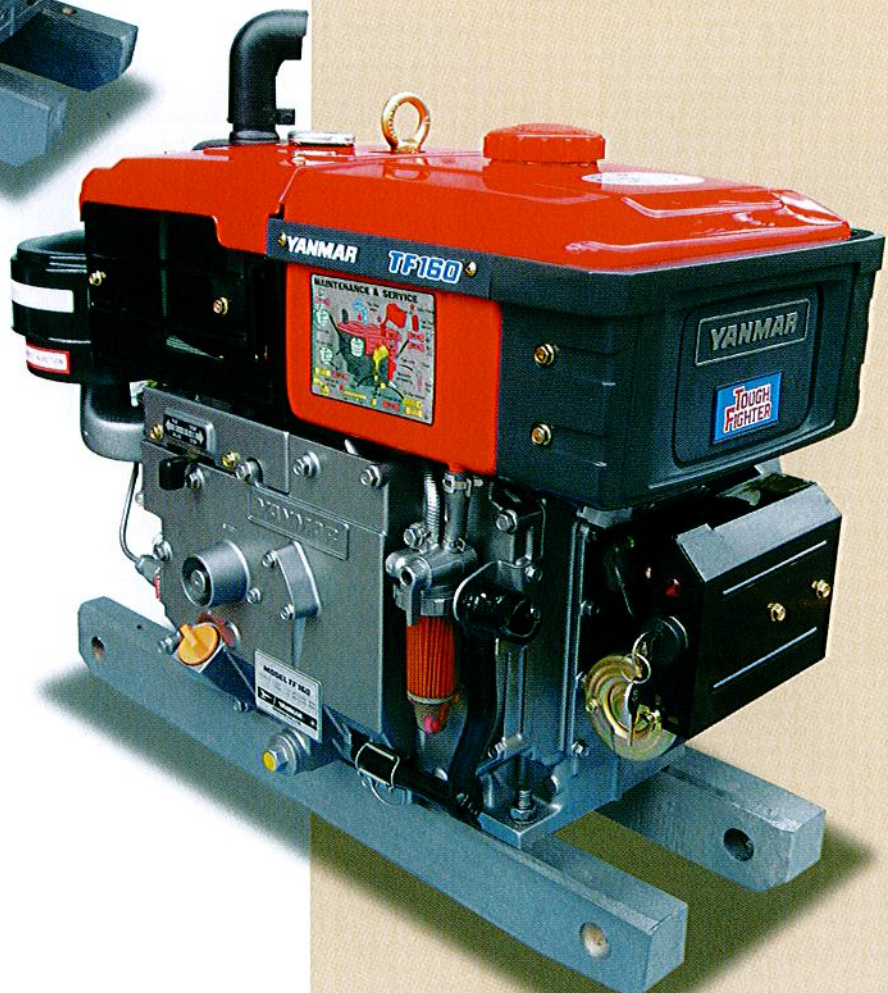


DIESEL ENGINES

TF (M), TS series
3.7 ~ 22.4 kW (5 ~ 30 hp)



YANMAR



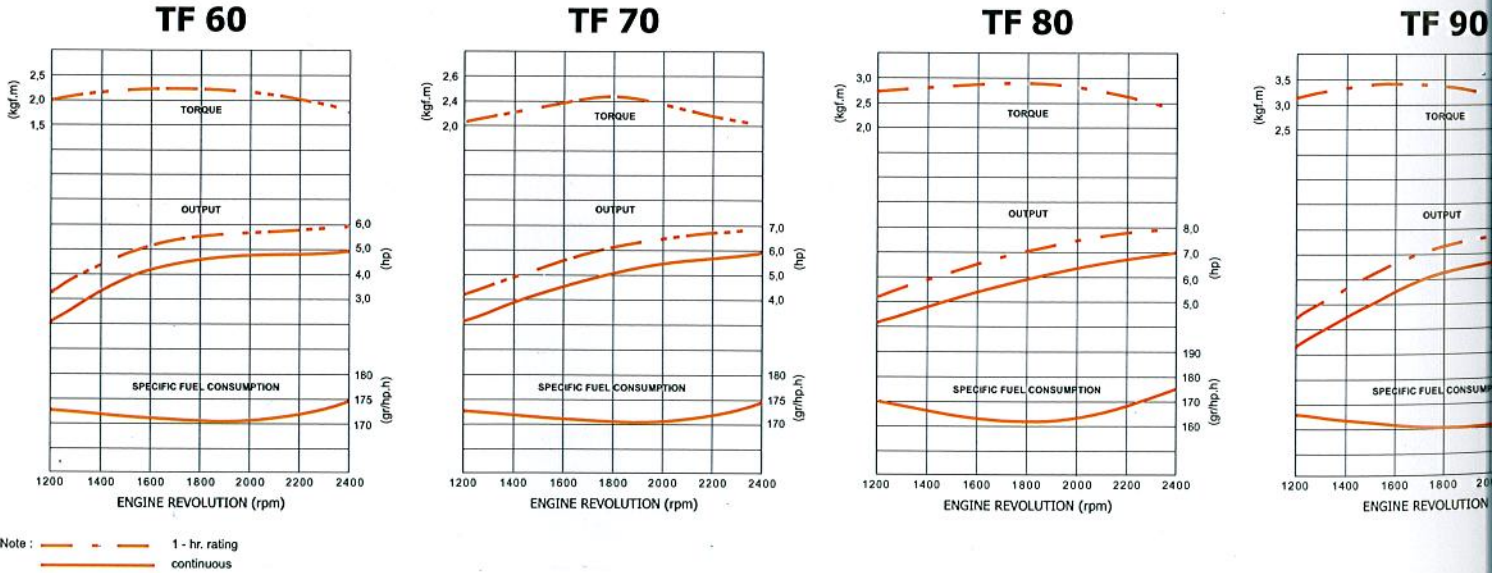
No. Reg. : 170-96/19

Photograph may show optional equipment

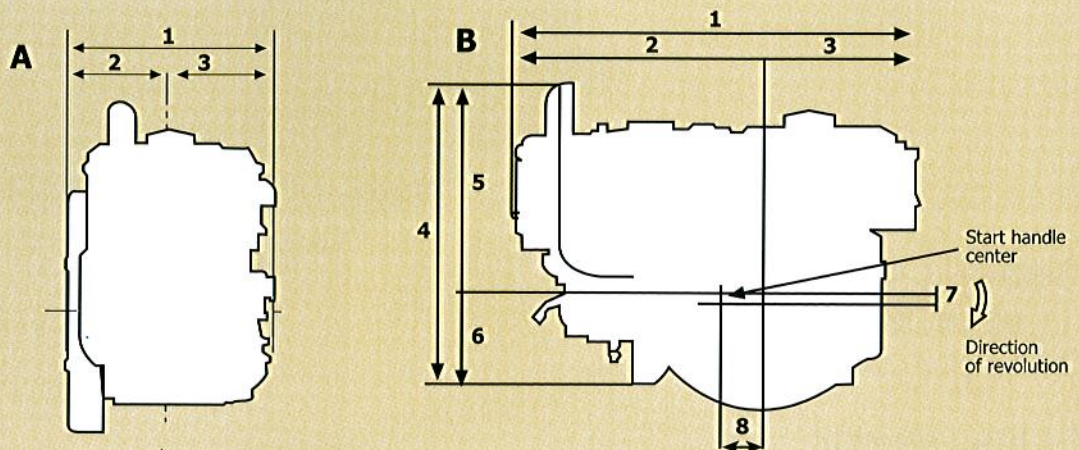
SPECIFICATIONS

| No. | Model | TF 60 H | TF 60 | TF 60 L | TF 70 H | TF 70 | TF 70 L |
|-----|------------------------------------|----------------------|----------|---------|------------------|----------|--------------|
| 1 | Type | | | | | | |
| 2 | Combustion system | | | | | | |
| 3 | Number of cylinder | | | | | | |
| 4 | Injection timing | bTDC 17° | | | | | |
| 5 | Bore x stroke | 75 x 80 | | | 78 x 80 | | |
| 6 | Displacement | 0.353 | | | 0.382 | | |
| 7 | Rated continuous output | 5.0 / 2400 (3.7) | | | 6.0 / 2400 (4.5) | | |
| 8 | At 1-hr. rated output | 6.0 / 2400 (4.5) | | | 7.0 / 2400 (5.2) | | |
| 9 | Maximum torque | 2.33 / 1800 | | | 2.48 / 1800 | | |
| 10 | Compression ratio | 17.9 | | | 18.1 | | |
| 11 | Direction of crankshaft rotation | | | | | | |
| 12 | Specific fuel consumption | gr / hp.h | | | 175 | | |
| 13 | Fuel injection pump | | | | | | |
| 14 | Injection pressure | kg / cm ² | | | | | |
| 15 | Lubrication system | | | | | | |
| 16 | F.O. tank capacity | lit. | | | 7.1 | | |
| 17 | Lubricating oil capacity (oil pan) | lit. | | | 1.8 | | |
| 18 | Lubricating oil applicable | | | | | | |
| 19 | Cooling water system | Hopper | Radiator | | Hopper | Radiator | |
| 20 | Cooling water capacity | lit. | 8.0 | 1.25 | 8.0 | 1.25 | |
| 21 | Starting system | | | | | | |
| 22 | Dimensions : | | | | | | |
| | - length | mm | | | 607.5 | | |
| | - width | mm | | | 311.5 | | |
| | - height | mm | | | 469.0 | | |
| 23 | Lamp | V - W / W | | | 12 - 25 / 25 | | 12 - 25 / 25 |
| 24 | Netto weight | kg | 65.0 | 67.5 | 68.5 | 65.0 | 67.5 |

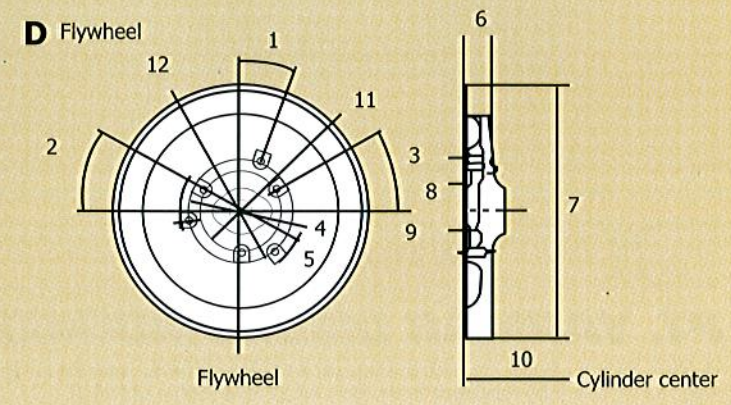
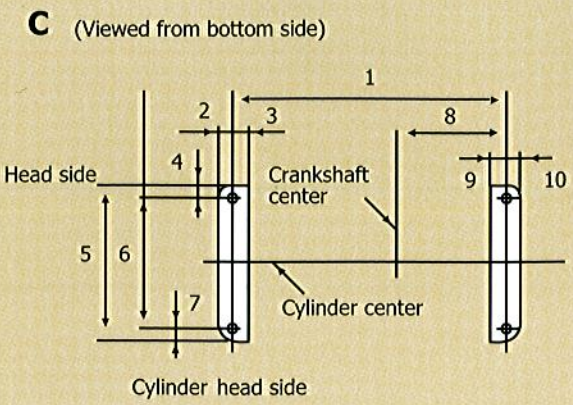
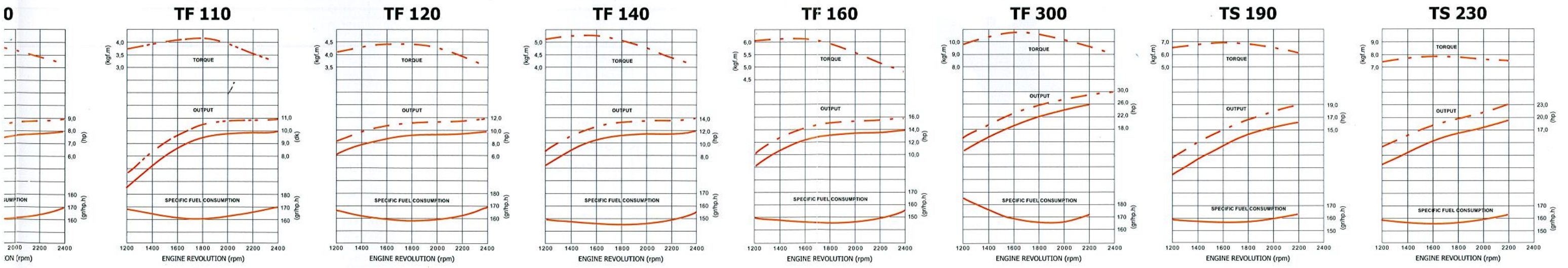
PERFORMANCE CURVES



DIMENSIONS



| TF 80 MH | TF 80 M | TF 80 ML | TF 90 MH | TF 90 M | TF 90 ML | TF 110 MH | TF 110 M | TF 110 ML | TF 120 MH | TF 120 M | TF 140 H | TF 140 | TF 160 H | TF 160 | TF 300 H | TS 190 H | TS 190 R | TS 230 H | TS 230 R | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------|--------------|----------|--------------|------------------|--------------|----------|--------------|-----------|-------------------|----------|--------------|----------|--------------|-------------------|--------------|----------|--------------|----------|--------------------|--|--------------|--|--------------|--------------------|--------------|--|--------------|--|--------------------|--|-------|--|-------|--------------------|-------|--|-------|--|--------------------|--|--|--|--|
| Horizontal, water cooled, 4-cycle diesel engine | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Direct injection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| bTDC 18° | | | | | | | | | | bTDC 17° | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80 x 87 | | | | | 85 x 87 | | | | | 88 x 96 | | | | | 92 x 96 | | | | | 96 x 105 | | | | | 102 x 105 | | | | | 125 x 120 | | | | | 110 x 106 | | | | | 112 x 115 | | | | |
| 0.437 | | | | | 0.493 | | | | | 0.583 | | | | | 0.638 | | | | | 0.760 | | | | | 0.857 | | | | | 1.472 | | | | | 1.007 | | | | | 1.132 | | | | |
| 7.5 / 2400 (5.6) | | | | | 8.5 / 2400 (6.3) | | | | | 10.0 / 2400 (7.5) | | | | | 10.5 / 2400 (7.8) | | | | | 12.5 / 2400 (9.3) | | | | | 14.0 / 2400 (10.4) | | | | | 26.0 / 2200 (19.4) | | | | | 16.0 / 2200 (11.9) | | | | | 19.0 / 2200 (14.2) | | | | |
| 8.5 / 2400 (6.3) | | | | | 9.5 / 2400 (7.1) | | | | | 11.0 / 2400 (8.2) | | | | | 12.0 / 2400 (9.0) | | | | | 14.0 / 2400 (10.4) | | | | | 16.0 / 2400 (11.9) | | | | | 30.0 / 2400 (22.4) | | | | | 19.0 / 2200 (14.2) | | | | | 23.0 / 2200 (17.2) | | | | |
| 2.85 / 1800 | | | | | 3.4 / 1600 | | | | | 4.30 / 1800 | | | | | 4.42 / 1800 | | | | | 5.45 / 1600 | | | | | 6.17 / 1600 | | | | | 10.99 / 1600 | | | | | 6.95 / 1600 | | | | | 7.75 / 1600 | | | | |
| 18.0 | | | | | 17.9 | | | | | 17.7 | | | | | 17.8 | | | | | 15.5 | | | | | 16.3 | | | | | 16.1 | | | | | | | | | | | | | | |
| Counterclockwise viewed from flywheel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 174 | | | | | 170 | | | | | 169 | | | | | 155 | | | | | 171 | | | | | 162 | | | | | | | | | | | | | | | | | | | |
| Bosch type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Forced lubrication with trochoid pump & hydraulic regulator valve | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10.5 | | | | | 11.0 | | | | | 14.3 | | | | | 29.5 | | | | | 16.6 | | | | | 13.7 | | | | | 21.5 | | | | | | | | | | | | | | |
| 2.2 | | | | | 2.8 | | | | | 3.0 | | | | | 9.8 | | | | | 3.6 | | | | | 6.0 | | | | | | | | | | | | | | | | | | | |
| API grade CB, CC or CD (SAE #30, 40, 50, 20W-50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hopper | | Radiator | | Hopper | | Radiator | | Hopper | | Radiator | | Hopper | | Radiator | | Hopper | | Radiator | | Hopper | | Radiator | | Hopper | | Radiator | | Hopper | | Radiator | | | | | | | | | | | | | | |
| 8.9 | | 1.65 | | 8.9 | | 1.65 | | 12.0 | | 2.30 | | 12.0 | | 2.30 | | 13.0 | | 3.00 | | 13.0 | | 3.00 | | 26.7 | | 16.3 | | 4.00 | | 22.8 | | 5.90 | | | | | | | | | | | | |
| Manual (hand starting) or electric starter (radiator type only) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 672.0 | | | | | 695.0 | | | | | 776.0 | | | | | 954.5 | | | | | 881.5 | | | | | 894.5 | | | | | 963.5 | | | | | | | | | | | | | | |
| 330.5 | | | | | 348.5 | | | | | 379.5 | | | | | 486.5 | | | | | 454.5 | | | | | 467.5 | | | | | | | | | | | | | | | | | | | |
| 496.0 | | | | | 530.0 | | | | | 621.0 | | | | | 795.5 | | | | | 660.0 | | | | | 657.0 | | | | | | | | | | | | | | | | | | | |
| 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | 12 - 45 / 45 | | | | | | | | | | | | | | |
| 88.5 | | 88.0 | | 89.0 | | 88.5 | | 88.0 | | 89.0 | | 102.0 | | 101.0 | | 102.0 | | 102.0 | | 101.0 | | 133.5 | | 140.0 | | 133.5 | | 140.0 | | 260.0 | | 181.0 | | 182.0 | | 196.0 | | 203.0 | | | | | | |



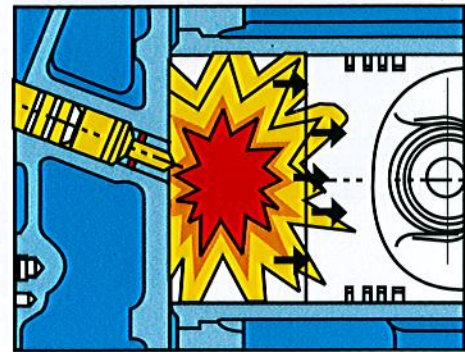
Unit : mm (identify radiator with hopper dimensions)

| Model | A | | | B | | | | | | | | C | | | | | | | | | | D | | | | | | | | | | | | |
|--------|-------|-------|-------|-------|-------|-----|-------|-------|-----|------|-------|-----|----|----|----|-----|-----|----|-----|----|----|-----|-----|-----|---|---------|---------|-------|-------|----|-------|-------|----------|----------|
| | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| TF 60 | 311.5 | 143 | 168.5 | 607.5 | 362 | 235 | 469 | 324 | 145 | 4 | 73.8 | 310 | 13 | 20 | 13 | 166 | 140 | 13 | 125 | 20 | 13 | — | 30° | 30° | — | ∅ 146H7 | ∅ 182H7 | 40 | ∅ 346 | 23 | 25 | 143 | PC ∅ 124 | PC ∅ 160 |
| TF 70 | 311.5 | 143 | 168.5 | 607.5 | 362 | 235 | 469 | 324 | 145 | 4 | 73.8 | 310 | 13 | 20 | 13 | 166 | 140 | 13 | 125 | 20 | 13 | — | 30° | 30° | — | ∅ 146H7 | ∅ 182H7 | 40 | ∅ 346 | 23 | 25 | 143 | PC ∅ 124 | PC ∅ 160 |
| TF 80 | 330.5 | 150 | 180.5 | 672 | 404 | 258 | 496 | 344 | 152 | 7.3 | 75.1 | 340 | 15 | 20 | 15 | 190 | 160 | 15 | 135 | 20 | 15 | 20° | 30° | 30° | — | ∅ 146H7 | ∅ 182H7 | 38 | ∅ 384 | 3 | 5 | 148 | PC ∅ 124 | PC ∅ 160 |
| TF 90 | 330.5 | 150 | 180.5 | 672 | 404 | 258 | 496 | 344 | 152 | 7.3 | 75.1 | 340 | 15 | 20 | 15 | 190 | 160 | 15 | 135 | 20 | 15 | 20° | 30° | 30° | — | ∅ 146H7 | ∅ 182H7 | 38 | ∅ 384 | 3 | 5 | 148 | PC ∅ 124 | PC ∅ 160 |
| TF 110 | 348.5 | 162 | 186.5 | 695 | 434 | 251 | 530 | 365 | 165 | 10.2 | 84.4 | 370 | 15 | 25 | 15 | 200 | 170 | 15 | 150 | 25 | 15 | 20° | 30° | 30° | — | ∅ 146H7 | ∅ 182H7 | 47 | ∅ 384 | 8 | 10 | 162 | PC ∅ 124 | PC ∅ 160 |
| TF 120 | 348.5 | 162 | 186.5 | 695 | 434 | 251 | 530 | 365 | 165 | 10.2 | 84.4 | 370 | 15 | 25 | 15 | 200 | 170 | 15 | 150 | 25 | 15 | 20° | 30° | 30° | — | ∅ 146H7 | ∅ 182H7 | 47 | ∅ 384 | 8 | 10 | 162 | PC ∅ 124 | PC ∅ 160 |
| TF 140 | 379.5 | 177.5 | 202 | 776 | 476 | 290 | 621 | 441 | 180 | 18 | 87 | 420 | 15 | 25 | 15 | 215 | 185 | 15 | 170 | 25 | 15 | — | 30° | 30° | — | ∅ 182H7 | 49 | ∅ 424 | 25 | 0 | 177.5 | — | PC ∅ 160 | |
| TF 160 | 379.5 | 177.5 | 202 | 776 | 476 | 290 | 621 | 441 | 180 | 18 | 87 | 420 | 15 | 25 | 15 | 215 | 185 | 15 | 170 | 25 | 15 | — | 30° | 30° | — | ∅ 182H7 | 49 | ∅ 424 | 25 | 0 | 177.5 | — | PC ∅ 160 | |
| TF 300 | 486.5 | 231.5 | 255 | 954.5 | 633.5 | 321 | 795.5 | 555.5 | 240 | 3.9 | 126.5 | 455 | 40 | 40 | 20 | 260 | 220 | 20 | 201 | 40 | 40 | — | — | — | — | ∅ 182H7 | — | 65 | ∅ 470 | 15 | — | 214.5 | PC ∅ 160 | — |
| TS 190 | 454.5 | 229 | 225.5 | 881.5 | 589.5 | 292 | 660 | 482 | 178 | 21.5 | 97.5 | 400 | 15 | 25 | 15 | 215 | 185 | 15 | 180 | 25 | 15 | — | — | — | — | ∅ 182H7 | — | 75 | ∅ 400 | 32 | — | 139 | PC ∅ 160 | — |
| TS 230 | 467.5 | 232.5 | 235.5 | 963.5 | 649 | 313 | 657 | 482 | 175 | 39.3 | 72.2 | 460 | 17 | 25 | 15 | 250 | 220 | 15 | 210 | 25 | 17 | — | — | — | — | ∅ 182H7 | — | 62 | ∅ 445 | 24 | — | 146 | PC ∅ 160 | — |

Yanmar's TF(M), TS Engine Many Way Tougher, All Ways Superior

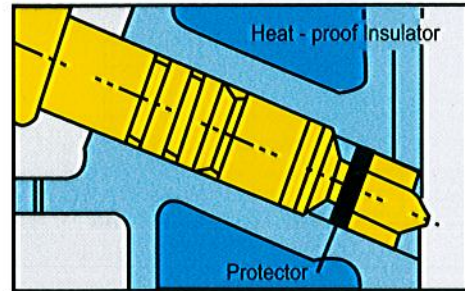
Direct Fuel Injection Produces Dynamic Power

Combustion power acts directly on the toroidal piston crown, boosting energy, decreasing thermal losses. Extra high output creates the tough torque needed for heavy duty jobs.



Durability of Yanmar's Direct Fuel Injection System enhanced by the heat-proof Insulator for the fuel Injection valve

The fuel injection valve is wrapped in heat-proof material. This improve the durability of the valve.



Bigger Displacement Gives More in Reserve

With their long stroke pistons, they can punch out much greater torque.

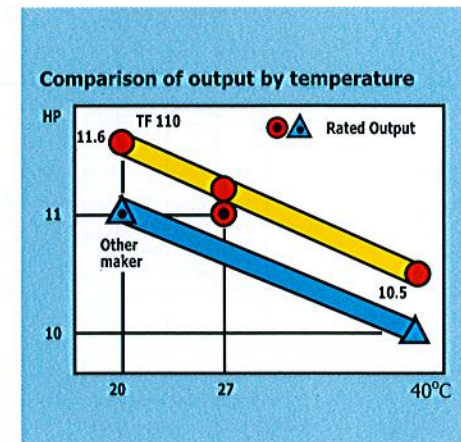
Superior Combustion Combination Direct Injection + Bosch Pump

The high pressure Bosch pump, the hole-valve type injection nozzle, and the toroidal combustion crown add up to the improved combustion formula for better firing and complete burns.

The TF and TS Delivers the power it Promise, Right Over 40°C

Another measure of TF's and TS's superiority can be taken from its power rating at the ambient temperature, Yanmar rates the hp of the TF and TS while operating at 27°C. This gives the TF110, for example, a rating of 11 hp. Other engines, rated at an ambient temperature of only 20°C specify the same 11 hp.

But at the 27°C rating they'll be giving less power than you should expect, while your Yanmar will be delivering 5.5% more! So you know that with a Yanmar you are getting output you can trust, even in ambient temperatures over 40°C.

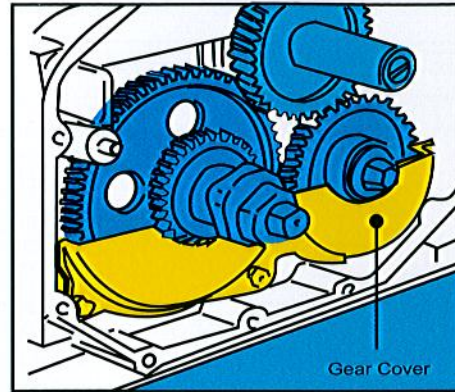


Significant Drop Fuel and Lube Expenses

Fuel used to maximum effect
The many advantages of direct fuel injection show in direct savings. You'll be getting the power you want with economy.

Dramatic Drop in Oil Consumption

A special separator keeps gear oil and crankcase oil independent, effectively controlling temperature increases. This and other unique features help the TF achieve its remarkably low lube oil consumption.



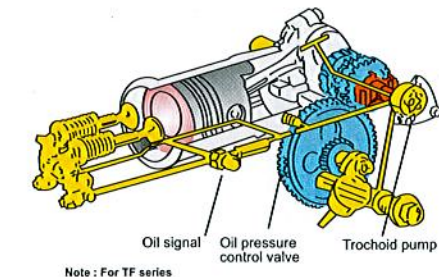
Yanmar – The Complete Diesel Maker

From the basic blocks to the sophisticated fuel systems, Yanmar builds the complete diesel engine. It's a level of integration few makers can claim.



Better Lube System Improves Reliability

- * A crank shaft-coupled trochoid pump circulates lube oil, increasing its life and effectiveness.
- * TF (M) series trochoid pump driven by camshaft.
- * Oil pressure continuously monitored and corrected automatically. Alarm signals for large pressure drops.



Note: For TF series

Easy Operation, Simple Servicing Less Vibration, Low Noise Level

Larger tanks for longer runs without fill-ups. Balancer reduces vibration (Except TF60 & TS series)

STANDARD SPARE PARTS & ACCESSORIES

STANDARD SPARE PARTS

| No. | Name | No. of unit |
|-----|-------------------------|-------------|
| 1 | Element FO strainer | 1 |
| *2 | V-belt (for fan pulley) | 1 |

*Radiator type only

STANDARD ACCESSORIES & TOOLS

| No | Name | No. of unit |
|----|------------------|-------------|
| 1 | Tool bag | 1 |
| 2 | Screw driver | 1 |
| 3 | Wrench (10 x 12) | 1 |
| 4 | Wrench (14 x 17) | 1 |
| 5 | Wrench (19 x 22) | 1 |
| 6 | V-pulley | 1 |
| 7 | Bolt M12 x 35 | 3 |
| 8 | Spring washer 12 | 3 |
| 9 | Manual book | 1 |

SIZE OF V-PULLEY, PLAIN PULLEY, STUB SHAFT (plain pulley & stub shaft are optional)

| Model | V - Pulley | | Plain Pulley (optional) | | Stub Shaft | |
|--------|----------------|----------|-------------------------|----------|------------------|----------|
| | Type x Dia. mm | Pitch mm | Dia. x Length mm | Pitch mm | Dia. x Length mm | Pitch mm |
| TF 60 | 2B x 111 | PC Ø 160 | 70 x 100 | PC Ø 124 | 32 x 55 | PC Ø 124 |
| TF 70 | 2B x 111 | PC Ø 160 | 70 x 100 | PC Ø 124 | 32 x 55 | PC Ø 124 |
| TF 80 | 3B x 111 | PC Ø 160 | 70 x 100 | PC Ø 124 | 32 x 55 | PC Ø 124 |
| TF 90 | 3B x 111 | PC Ø 160 | 70 x 100 | PC Ø 124 | 32 x 55 | PC Ø 124 |
| TF 110 | 3B x 126 | PC Ø 160 | 70 x 100 | PC Ø 124 | 32 x 55 | PC Ø 124 |
| TF 120 | 3B x 126 | PC Ø 160 | 70 x 100 | PC Ø 124 | 32 x 55 | PC Ø 124 |
| TF 140 | 3B x 126 | PC Ø 160 | 125 x 150 | PC Ø 160 | 40 x 90 | PC Ø 160 |
| TF 160 | 4B x 126 | PC Ø 160 | 125 x 150 | PC Ø 160 | 40 x 90 | PC Ø 160 |
| TF 300 | 4B x 126 | PC Ø 160 | 150 x 150 | PC Ø 160 | 40 x 90 | PC Ø 160 |
| TS 190 | 4B x 126 | PC Ø 160 | 125 x 150 | PC Ø 160 | 40 x 90 | PC Ø 160 |
| TS 230 | 4B x 126 | PC Ø 160 | 125 x 150 | PC Ø 160 | 40 x 90 | PC Ø 160 |

EXPORT SHIPMENT

| Model | No. of packing and size (mm) | Cu.m. (Cft) | Gross weight (kg) |
|--------|------------------------------|--------------|-------------------|
| TF 60 | 1 - 720 x 420 x 631 | 0,191 (6,7) | 93,5 |
| TF 70 | 1 - 720 x 420 x 631 | 0,191 (6,7) | 93,5 |
| TF 80 | 1 - 780 x 420 x 671 | 0,220 (7,8) | 110,5 |
| TF 90 | 1 - 780 x 420 x 671 | 0,220 (7,8) | 110,5 |
| TF 110 | 1 - 820 x 440 x 711 | 0,257 (9,1) | 131,5 |
| TF 120 | 1 - 820 x 440 x 711 | 0,257 (9,1) | 131,5 |
| TF 140 | 1 - 900 x 500 x 830 | 0,374 (13,2) | 173,8 |
| TF 160 | 1 - 900 x 500 x 830 | 0,374 (13,2) | 173,8 |
| TF 300 | 1 - 1162 x 660 x 931 | 0,714 (25,2) | 292,0 |
| TS 190 | 1 - 1162 x 560 x 931 | 0,606 (21,4) | 213,5 |
| TS 230 | 1 - 1162 x 560 x 931 | 0,606 (21,4) | 231,5 |

Note : All data subject to alteration without prior notice



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