

STANDARDIZED DATA PAGES FOR RECIPROCATING ENGINES

Standardized data pages are used to present the specifications of the basic aircraft engines and airborne auxiliary units described and illustrated in the following section of the book. The arrangement of the data on the standardized data pages is as follows:

First, there is a concise description of the engine, its construction and the major accessories with which it is equipped. Then, in tabular form, there are items such as bore, stroke, displacement (swept volume), compression ratio, overall dimensions, frontal area, total weight and weight per maximum horsepower.

Fuel and lubricating oil consumptions at cruising output are given in units of weight. The fuel grade and the viscosity of the lubricating oil at 210° F. (100° C) also are specified.

Efficiency figures such as maximum power output per unit of displacement, maximum power output per unit of piston area, maximum piston speed and maximum brake mean effective pressure have been calculated for comparative purposes.

Finally, the various horsepower ratings of the engine are given, such as:

Take-off rating, or the maximum horsepower which it is permissible to use at sea level and at low altitudes.

Military (combat) rating, or the maximum horsepower which it is permissible to use for military purposes at various altitudes.

Normal rating, or the maximum horsepower which the engine can deliver continuously for climb without undue stress.

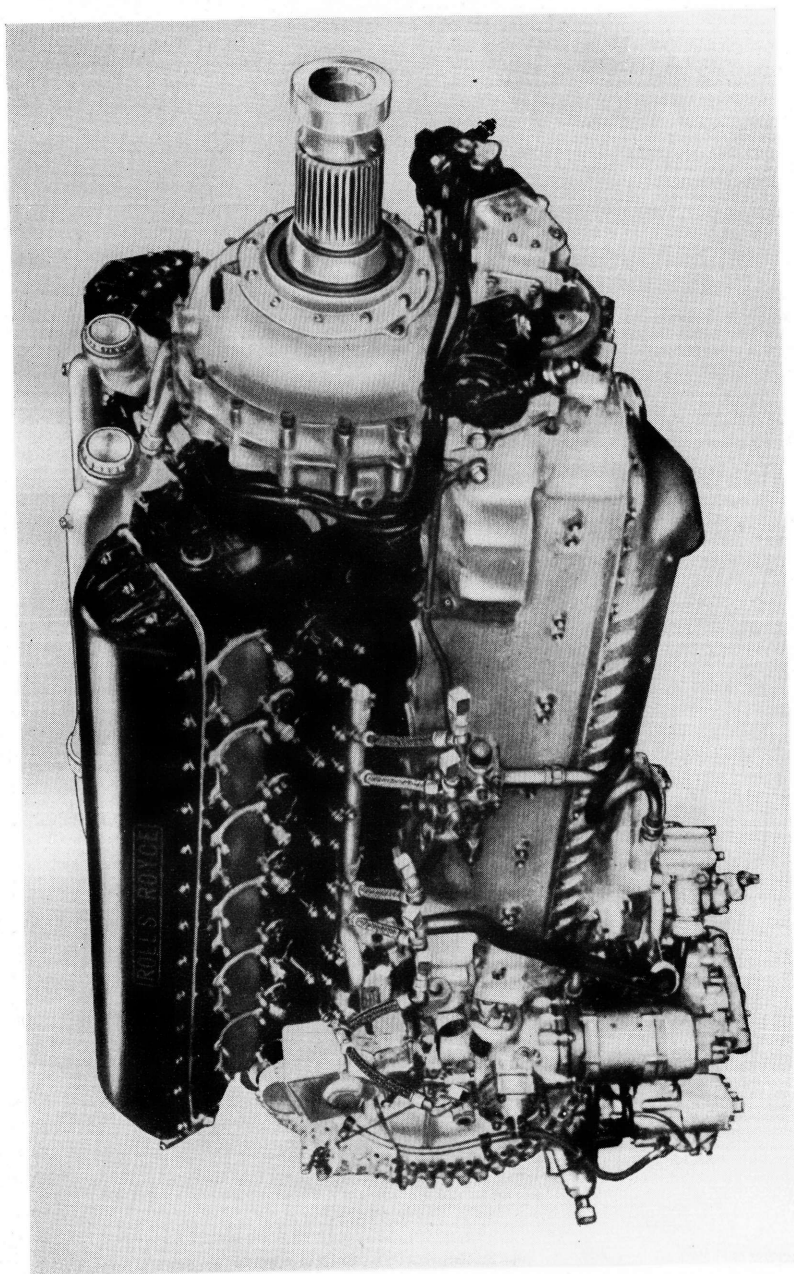
Cruising rating, or the maximum horsepower recommended for continuous operation consistent with reasonable fuel economy.

Emergency rating, or the maximum horsepower which it is permissible to use for a short period of time in an emergency.

Stand-by ratings, or the maximum horsepower which it is permissible to use continuously when one or more engines are out of operation, are given where available.

Ratings obtained with alcohol-water injection or methanol-water injection—commonly known as water injection—are indicated by the letters A.D.I. (Anti-Detonant Injection).

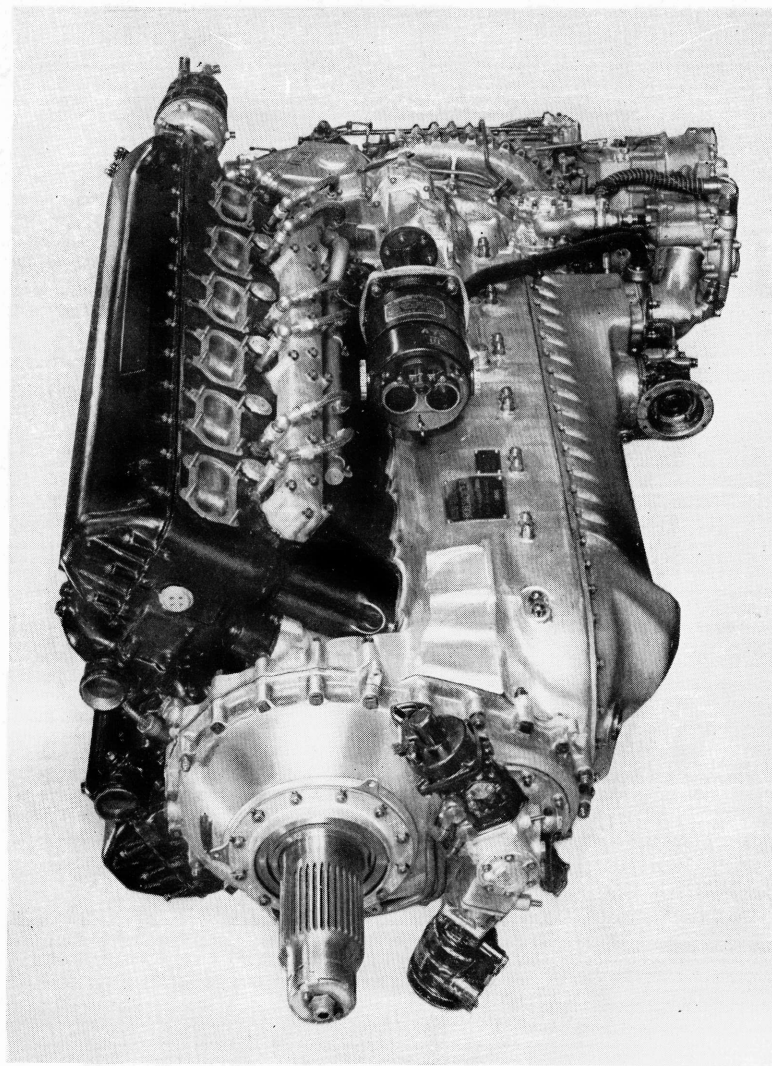
The status of the data on the standardized pages can be seen from the notation at the top of each page adjacent to the country of origin. *New* denotes completely new data. *Revised* indicates major revisions. Unmarked pages have only minor changes.



Rolls-Royce Merlin XX

Rolls-Royce Merlin XX

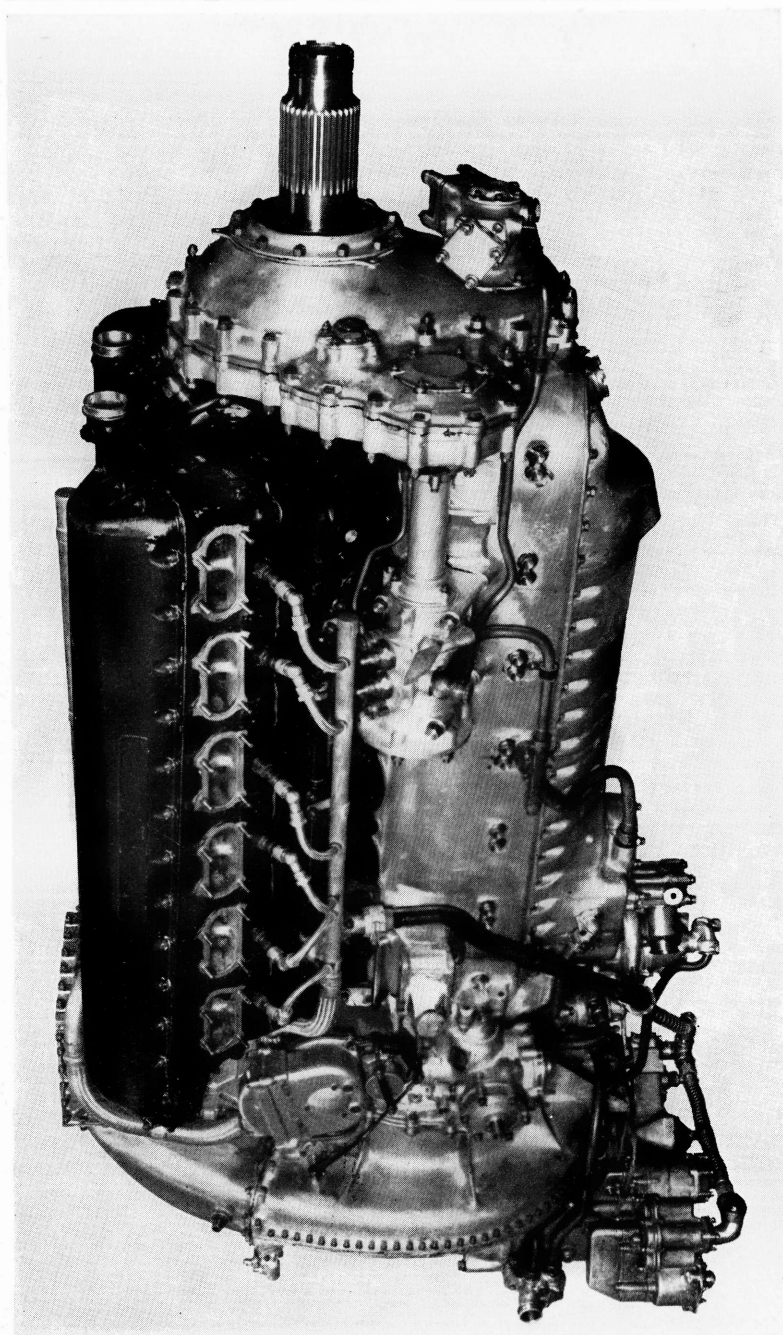
Model	Merlin XX.	
Type	12 cylinders, vee 60 degrees, pressure water cooled, geared drive, supercharged, 4-cycle.	
Construction	2-piece aluminum alloy crankcase. 2 aluminum alloy cylinder blocks with integral heads. Steel cylinder liners. 2 inlet valves and 2 exhaust valves (sodium cooled) per cylinder actuated by overhead camshaft. 6-throw 1-piece counterbalanced crankshaft supported in 7 plain bearings. Spur reduction gear, ratio 0.42:1.	
Supercharger	Gear-driven 2-speed supercharger, ratios 8.15:1 and 9.49:1.	
Carburation	1 S.U. AVT40 twin-choke updraft carburetor with automatic mixture control and automatic boost control.	
Ignition	2 B.T.H. C5SE12-S or 2 Rotax NES12-4 magnetos. 2 spark plugs per cylinder. Shielded wiring.	
Lubrication	Pressure feed, 70 lb./sq.in. (4.9 kg/cm ²).	
Starter	B.T.H. hand and electric starter.	
Bore	5.40 in.	137 mm
Stroke	6.00 in.	152 mm
Displacement	1,649 cu.in.	27.0 l
Compression ratio	6.0:1	6.0:1
Width	29.8 in.	0.757 m
Height	41.2 in.	1.046 m
Length	70.6 in.	1.793 m
Frontal area	5.8 sq.ft.	0.54 m ²
Weight	1,450 lb.	658 kg
Weight/horsepower	0.98 lb.	0.44 kg
Fuel consumption (cr.)	0.52 lb./h.p./hr.	235 g/hp/hr
Oil consumption (cr.)	0.022 lb./h.p./hr.	10 g/hp/hr
Gasoline rating	100 octane (D.E.D. 2475)	100 octane
Oil grade (viscosity)	100 S.U. (D.T.D. 472-B)	20.5 cs
Output/displacement	0.90 h.p./cu.in.	54.8 hp/l
Output/piston area	5.38 h.p./sq.in.	0.83 hp/cm ²
Piston speed (max.)	3,000 ft./min.	15.2 m/sec
B.m.e.p. (max.)	238 lb./sq.in.	16.7 kg/cm ²
Output (take-off)	1,280 h.p./3,000 r.p.m./54.3 in. (1 380 mm) Hg. boost	
Output (combat)	1,480 h.p./3,000 r.p.m./6,000 ft. (1 800 m)	
	1,480 h.p./3,000 r.p.m./12,500 ft. (3 800 m)	
Output (cruising)	1,100 h.p./2,650 r.p.m./9,250 ft. (2 800 m)	
	1,040 h.p./2,650 r.p.m./16,000 ft. (4 900 m)	
Merlin 21:	Same as Merlin XX, but has reverse coolant flow.	
Merlin 22:	Similar to Merlin XX.	



Rolls-Royce Merlin 45

Rolls-Royce Merlin 45

Model	Merlin 45.	
Type	12 cylinders, vee 60 degrees, pressure water cooled, geared drive, supercharged, 4-cycle.	
Construction	2-piece aluminum alloy crankcase. 2 aluminum alloy cylinder blocks with integral heads. Steel cylinder liners. 2 inlet valves and 2 exhaust valves (sodium cooled) per cylinder actuated by overhead camshaft. 6-throw 1-piece counterbalanced crankshaft supported in 7 plain bearings. Spur reduction gear, ratio 0.48:1.	
Supercharger	Gear-driven 1-speed supercharger, ratio 9.1:1.	
Carburation	1 S.U. AVT40 twin-choke updraft carburetor with automatic mixture control and automatic boost control.	
Ignition	2 B.T.H. C5SE12-S or 2 Rotax NES12-4 magnetos. 2 spark plugs per cylinder. Shielded wiring.	
Lubrication	Pressure feed, 70 lb./sq.in. (4.9 kg/cm ²).	
Starter	Rotax hand and electric starter.	
Bore	5.40 in.	137 mm
Stroke	6.00 in.	152 mm
Displacement	1,649 cu.in.	27.0 l
Compression ratio	6.0:1	6.0:1
Width	29.8 in.	0,757 m
Height	41.2 in.	1,046 m
Length	70.6 in.	1,793 m
Frontal area	5.8 sq.ft.	0,54 m ²
Weight	1,385 lb.	623 kg
Weight/horsepower	0.91 lb.	0,41 kg
Fuel consumption (cr.)	0.52 lb./h.p./hr.	235 g/hp/hr
Oil consumption (cr.)	0.022 lb./h.p./hr.	10 g/hp/hr
Gasoline rating	100 octane (D.E.D. 2475)	100 octane
Oil grade (viscosity)	100 S.U. (D.T.D. 472-B)	20.5 cs
Output/piston area	0.92 h.p./cu.in.	56.1 hp/l
Output/displacement	5.51 h.p./sq.in.	0,85 hp/cm ²
Piston speed (max.)	3,000 ft./min.	15,2 m/sec
B.m.e.p. (max.)	243 lb./sq.in.	17,1 kg/cm ²
Output (take-off)	1,185 h.p./3,000 r.p.m./54.3 in. (1 380 mm) Hg. boost	
Output (combat)	1,515 h.p./3,000 r.p.m./11,000 ft. (3 350 m)	
Output (rated)	1,200 h.p./2,850 r.p.m./16,000 ft. (4 900 m)	
Output (cruising)	1,060 h.p./2,650 r.p.m./14,500 ft. (4 400 m)	
Merlin 46:	1,100 h.p./3,000 r.p.m./take-off; 1,415 h.p./3,000 r.p.m./14,000 ft. (4 250 m) combat output; 1,115 h.p./2,850 r.p.m./19,000 ft. (5 750 m) rated output. Reduction gear ratio 0.48:1. 1-speed supercharger, ratio 9.1:1. 100-octane gasoline.	

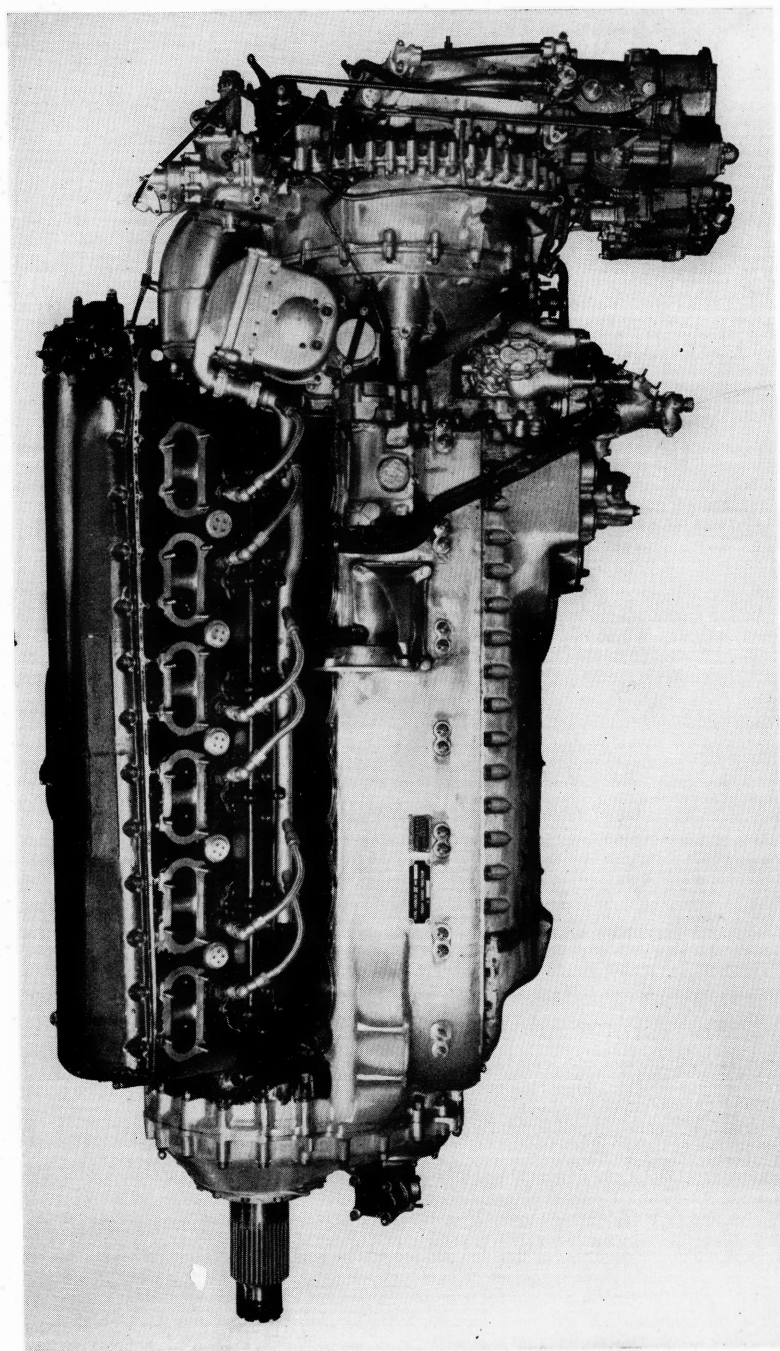


Rolls-Royce Merlin 61

Rolls-Royce Merlin 61

Model	Merlin 61.	
Type	12 cylinders, vee 60 degrees, pressure water cooled, geared drive, supercharged, 4-cycle.	
Construction	2-piece aluminum alloy crankcase. 2 aluminum alloy cylinder blocks with detachable heads for each block. Steel cylinder liners. 2 inlet valves and 2 exhaust valves (sodium cooled) per cylinder actuated by overhead camshaft. 6-throw 1-piece counterbalanced crankshaft supported in 7 plain bearings. Spur reduction gear, ratio 0.42:1.	
Supercharger	Gear-driven 2-speed 2-stage supercharger, ratios 6.39:1 and 8.03:1. Water-cooled inter-stage passages. Water-cooled intercooler.	
Carburation	1 S.U. AVT44 twin-choke updraft carburetor with automatic mixture control and progressive boost control.	
Ignition	2 B.T.H. C6SE12 or 2 Rotax NSE12-4 magnetos. 2 spark plugs per cylinder. Shielded wiring.	
Lubrication	Pressure feed, 70 lb./sq.in. (4.9 kg/cm ²).	
Starter	Rotax hand and electric starter.	
Bore	5.40 in.	137 mm
Stroke	6.00 in.	152 mm
Displacement	1,649 cu.in.	27.0 l
Compression ratio	6.0:1	6.0:1
Width	29.8 in.	0.757 m
Height	45.1 in.	1.145 m
Length	78.0 in.	1.981 m
Frontal area	6.1 sq.ft.	0.57 m ²
Weight	1,640 lb.	744 kg
Weight/horsepower	1.04 lb.	0.47 kg
Fuel consumption (cr.)	0.54 lb./h.p./hr.	245 g/hp/hr
Oil consumption (cr.)	0.022 lb./h.p./hr.	10 g/hp/hr
Gasoline rating	100 octane (D.E.D. 2475)	100 octane
Oil grade (viscosity)	100 S.U. (D.T.D. 472-B)	20.5 cs
Output/displacement	0.95 h.p./cu.in.	58.1 hp/l
Output/piston area	5.71 h.p./sq.in.	0.88 hp/cm ²
Piston speed (max.)	3,000 ft./min.	15.2 m/sec
B.m.e.p. (max.)	251 lb./sq.in.	17.6 kg/cm ²
Output (take-off)	1,290 h.p./3,000 r.p.m./54.3 in. (1 380 mm) Hg. boost	
Output (combat)	1,570 h.p./3,000 r.p.m./11,500 ft. (3 500 m)	
	1,390 h.p./3,000 r.p.m./23,500 ft. (7 150 m)	
Output (cruising)	1,090 h.p./2,650 r.p.m./16,000 ft. (4 900 m)	
	990 h.p./2,650 r.p.m./25,250 ft. (7 700 m)	

Note: At an altitude of 23,500 ft. (7 150 m) the charge is compressed to a pressure of 5.1 times that of the surrounding atmosphere.



Rolls-Royce Merlin 24 (1-stage 2-speed)

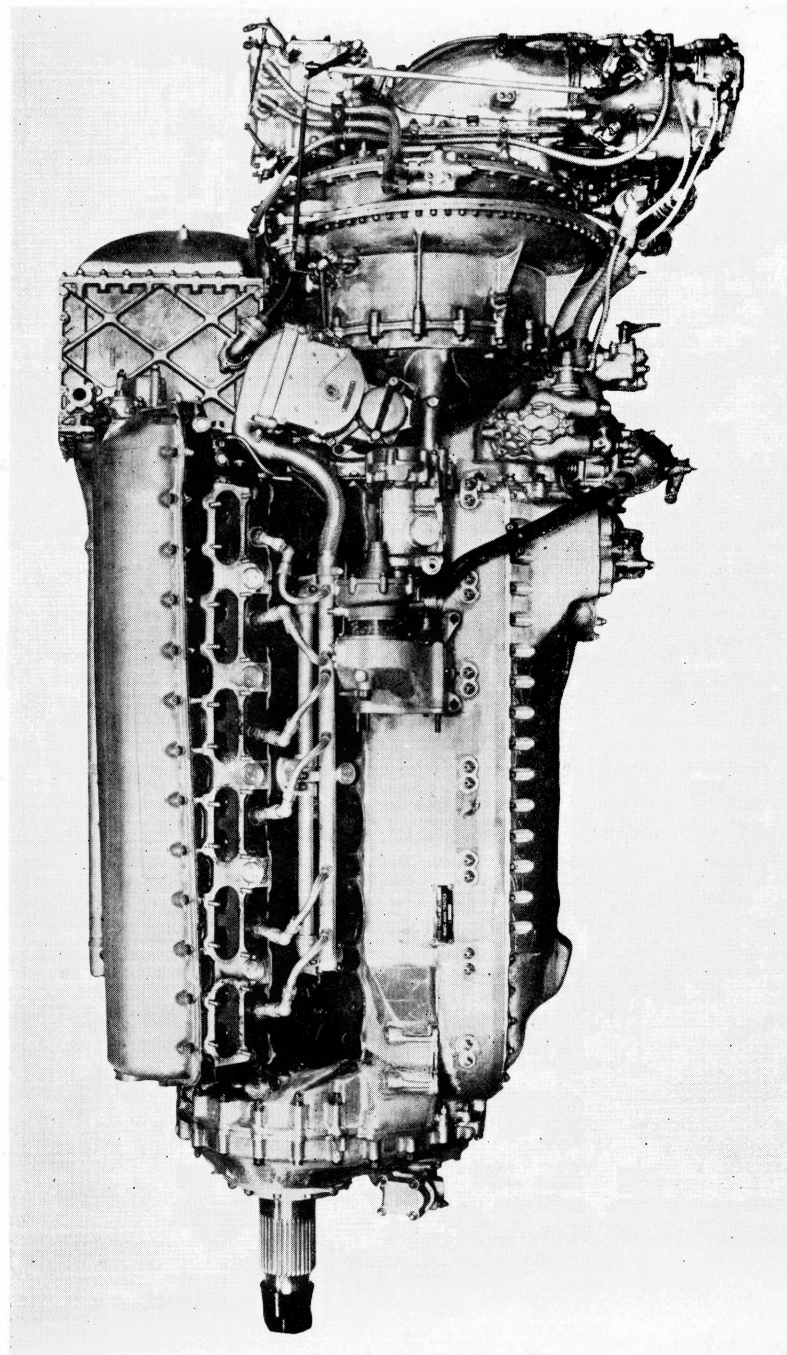
Rolls-Royce Merlin (1-stage 2-speed)

Model	Merlin 24.	
Type	12 cylinders, vee 60 degrees, pressure liquid cooled, geared drive, supercharged, 4-cycle.	
Construction	2-piece aluminum alloy crankcase. 2 aluminum alloy cylinder blocks with a detachable head for each block. Steel cylinder liners. 2 inlet valves and 2 exhaust valves (sodium cooled) per cylinder actuated by overhead camshaft. 6-throw 1-piece counterbalanced crankshaft supported in 7 plain bearings. Spur reduction gear, ratio 0.42:1.	
Supercharger	Gear-driven 1-stage 2-speed supercharger, ratios 8.15:1 and 9.49:1.	
Carburation	1 S.U. AVT-40 2-barrel updraft carburetor with automatic mixture control and boost control.	
Ignition	2 B.T.H. C5SE12-S or Rotax NES12-4 magnetos. 2 14-mm short reach spark plugs per cylinder. Shielded ignition system.	
Lubrication	Pressure feed, 70 lb./sq.in. (4.9 kg/cm ²). Dry sump.	
Starter	B.T.H. CA-4650 direct cranking electric starter.	
Bore	5.40 in.	137 mm
Stroke	6.00 in.	152 mm
Displacement	1,649 cu.in.	27.0 lit
Compression ratio	6.0:1	6.0:1
Width	29.8 in.	757 mm
Height	41.2 in.	1 046 mm
Length	71.0 in.	1 803 mm
Frontal area	7.5 sq.ft.	0.70 m ²
Weight	1,450 lb.	658 kg
Weight/horsepower	0.88 lb./h.p.	0.40 kg/hp
Fuel consumption (cr.)	0.52 lb./h.p./hr.	235 g/hp/hr
Oil consumption (cr.)	0.022 lb./hp./hr.	10 g/hp/hr
Gasoline grade	100/130 (D.E.D. 2475)	100/130 grade
Oil grade (viscosity)	100 S.U. (D.E.D. 2472B)	20.5 cs
Output/displacement	1.00 h.p./cu.in.	60.7 hp/lit
Output/piston area	5.97 h.p./sq.in.	0.91 hp/cm ²
Piston speed (max.)	3,000 ft./min.	15.2 m/sec
B.m.e.p. (max.)	264 lb./sq.in.	18.5 kg/cm ²
Rating (take-off)	1,610 h.p./3,000 r.p.m./66.4 in. (1 686 mm) +18.0 lb.	
Rating (military, low)	1,640 h.p./3,000 r.p.m./2,000 ft. (600 m)	
Rating (military, high)	1,500 h.p./3,000 r.p.m./9,500 ft. (2 900 m)	
Rating (normal, low)	1,240 h.p./2,850 r.p.m./10,000 ft. (3 000 m)	
Rating (normal, high)	1,175 h.p./2,850 r.p.m./17,500 ft. (5 300 m)	
Rating (cruising, low)	1,000 h.p./2,650 r.p.m./9,250 ft. (2 800 m)	
Rating (cruising, high)	970 h.p./2,650 r.p.m./16,000 ft. (4 900 m)	

This engine also has military ratings of 1,730 h.p./3,000 r.p.m./sea level and 1,780 h.p./3,000 r.p.m./4,000 ft. (1 200 m), with 80.8 in. (2 052 mm) + 25 lb. boost and 100/150 grade gasoline.

Merlin 25: Same as Merlin 24, but with reverse coolant flow.

Merlin 28, 29, 31, 33, 38, 224, 225: Similar to Merlin 24. Built by Packard Motor Car Company in the United States of America.



Rolls-Royce Merlin 66 (2-stage 2-speed)

Rolls-Royce Merlin (2-stage 2-speed)

Model	Merlin 66 (RM 10 SM).
Type	12 cylinders, vee 60 degrees, pressure liquid cooled, geared drive, supercharged, 4-cycle.
Construction	2-piece aluminum alloy crankcase. 2 aluminum alloy cylinder blocks with a detachable head for each block. Steel cylinder liners. 2 inlet valves and 2 exhaust valves (sodium cooled) per cylinder actuated by overhead camshaft. 6-throw 1-piece counter-balanced crankshaft supported in 7 plain bearings. Spur reduction gear, ratio 0.477:1.
Supercharger	Gear-driven 2-stage 2-speed supercharger, ratios 5.79:1 and 7.06:1. Liquid-cooled inter-stage passages and intercooler.
Carburetion	1 Rolls-Royce Bendix-Stromberg 8D-44-1 2-barrel injection type updraft carburetor with automatic mixture control and progressive boost control.
Ignition	2 B.T.H. C6SE12S, or Rotax NSE12-4, magnetos. 2 14-mm short reach spark plugs per cylinder. Shielded ignition system.
Lubrication	Pressure feed, 70 lb./sq.in. (4.9 kg/cm ²). Dry sump.
Starter	B.T.H. CA-4750 direct cranking electric starter.

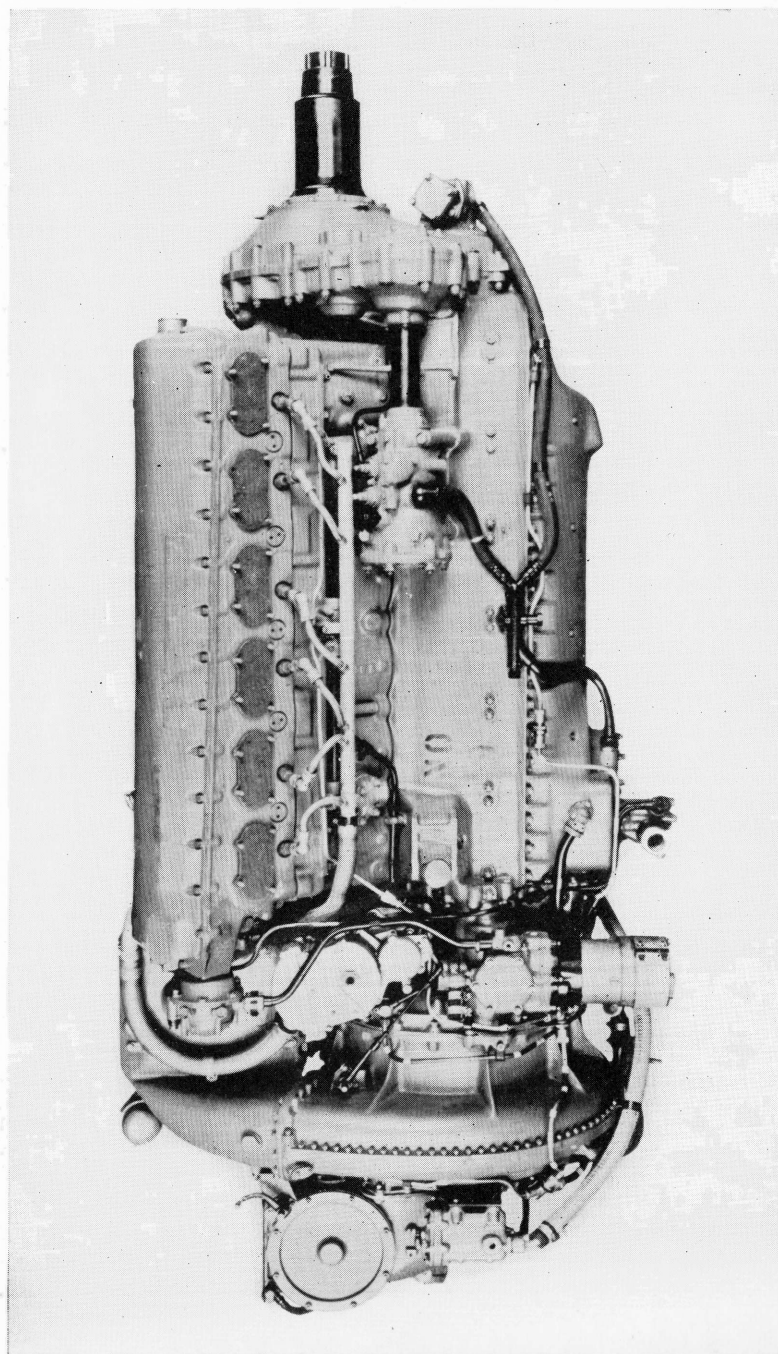
Bore	5.40 in.	137 mm
Stroke	6.00 in.	152 mm
Displacement	1,649 cu.in.	27.0 lit
Compression ratio	6.0:1	6.0:1
Width	29.8 in.	757 mm
Height	45.1 in.	1 145 mm
Length	78.0 in.	1 981 mm
Frontal area	7.5 sq.ft.	0.70 m ²
Weight	1,650 lb.	748 kg
Weight/horsepower	0.97 lb./h.p.	0.44 kg/hp
Fuel consumption (cr.)	0.53 lb./h.p./hr.	240 g/hp/hr
Oil consumption (cr.)	0.016 lb./h.p./hr.	7 g/hp/hr
Gasoline grade	100/130 (D.E.D. 2475)	100/130 grade
Oil grade (viscosity)	100 S.U. (D.E.D. 2472B)	20.5 cs
Output/displacement	1.04 h.p./cu.in.	63.1 hp/lit
Output/piston area	6.20 h.p./sq.in.	0.96 hp/cm ²
Piston speed (max.)	3,000 ft./min.	15.2 m/sec
B.m.e.p. (max.)	274 lb./sq.in.	19.2 kg/cm ²
Rating (take-off)	1,320 h.p./3,000 r.p.m./54.3 in. (1 380 mm) +12.0 lb.	
Rating (military, low)	1,705 h.p./3,000 r.p.m./5,750 ft. (1 700 m)	
Rating (military, high)	1,580 h.p./3,000 r.p.m./16,000 ft. (4 900 m)	
Rating (normal, low)	1,400 h.p./2,850 r.p.m./9,250 ft. (2 800 m)	
Rating (normal, high)	1,310 h.p./2,850 r.p.m./19,000 ft. (5 800 m)	
Rating (cruising, low)	1,100 h.p./2,650 r.p.m./11,250 ft. (3 400 m)	
Rating (cruising, high)	1,040 h.p./2,650 r.p.m./20,500 ft. (6 200 m)	

The above military ratings are with 66.4 in. (1 686 mm) + 18.0 lb. boost. This engine also has military ratings of 2,000 h.p./3,000 r.p.m./sea level and 1,860 h.p./3,000 r.p.m./10,500 ft. (3 200 m), with 80.8 in. (2 052 mm) + 25.0 lb. boost and 100/150 grade gasoline.

Merlin 65, 67 (RM 10 SM): Same as Merlin 66, but gear ratio 0.42:1.

Merlin 85 (RM 10 SM): Similar to Merlin 66, but with take-off rating of 1,750 h.p./3,000 r.p.m./72.0 in. (1 829 mm) + 21.0 lb. boost.

Other models of Rolls-Royce Merlin (2-stage) engines will be found on page 205.



Rolls-Royce Merlin 130 (2-stage 2-speed)

Rolls-Royce Merlin (2-stage 2-speed)

Model	Merlin 130 (RM 14 SM).	
Type	12 cylinders, vee 60 degrees, pressure liquid cooled, geared drive, supercharged, 4-cycle.	
Construction	2-piece aluminum alloy crankcase. 2 aluminum alloy cylinder blocks with a detachable head for each block. Steel cylinder liners. 2 inlet valves and 2 exhaust valves (sodium cooled) per cylinder actuated by overhead camshaft. 6-throw 1-piece counterbalanced crankshaft supported in 7 plain bearings. Spur reduction gear, ratio 0.42:1. Provision for Rotol remote drive accessory gear box.	
Supercharger	Gear-driven 2-stage 2-speed supercharger, ratios 5.79:1 and 7.06:1. Liquid-cooled inter-stage passages and intercooler.	
Carburetion	1 Rolls-Royce-S.U. variable-stroke fuel injection pump with injection through 1 nozzle into eye of supercharger impeller. Downdraft air intake. Automatic fuel-air ratio control.	
Ignition	2 B.T.H. C6SE12S-2, or Rotax NSE12-6, magnetos. 2 14-mm short reach spark plugs per cylinder. Shielded ignition system.	
Lubrication	Pressure feed, 70 lb./sq.in. (4.9 kg/cm ²). Main bearings lubricated by hollow crankshaft end-to-end system. Dry sump.	
Starter	B.T.H. CA-4750 direct cranking electric starter.	
Bore	5.40 in.	137 mm
Stroke	6.00 in.	152 mm
Displacement	1,649 cu.in.	27.0 lit
Compression ratio	6.0:1	6.0:1
Width	30.7 in.	780 mm
Height	39.9 in.	1 014 mm
Length	88.7 in.	2 253 mm
Frontal area	7.5 sq.ft.	0.70 m ²
Weight	1,715 lb.	778 kg
Weight/horsepower	0.94 lb./h.p.	0.43 kg/hp
Fuel consumption (cr.)	0.50 lb./h.p./hr.	225 g/hp/hr
Oil consumption (cr.)	0.014 lb./h.p./hr.	6 g/hp/hr
Gasoline grade	100/130 (D.E.D. 2475)	100/130 grade
Oil grade (viscosity)	100 S.U. (D.E.D. 2472B)	20.5 cs
Output/displacement	1.11 h.p./cu.in.	67.8 hp/lit
Output/piston area	6.66 h.p./sq.in.	1.03 hp/cm ²
Piston speed (max.)	3,000 ft./min.	15.2 m/sec
B.m.e.p. (max.)	293 lb./sq.in.	20.6 kg/cm ²
Rating (take-off)	1,645 h.p./3,000 r.p.m./66.4 in. (1 686 mm) +18.0 lb.	
Rating (military, low)	1,830 h.p./3,000 r.p.m./5,500 ft. (1 700 m)	
Rating (military, high)	1,690 h.p./3,000 r.p.m./18,000 ft. (5 500 m)	
Rating (normal, low)	1,410 h.p./2,850 r.p.m./10,500 ft. (3 200 m)	
Rating (normal, high)	1,325 h.p./2,850 r.p.m./20,750 ft. (6 300 m)	
Rating (cruising, low)	1,250 h.p./2,650 r.p.m./10,750 ft. (3 300 m)	
Rating (cruising, high)	1,190 h.p./2,650 r.p.m./24,250 ft. (7 400 m)	

The above military ratings are with 70.6 in. (1 790 mm) + 20.0 lb. boost. This engine also has military ratings of 2,020 h.p./3,000 r.p.m./1,500 ft. (450 m) and 1,845 h.p./3,000 r.p.m./14,250 ft. (4 300 m), with 80.8 in. (2 052 mm) + 25.0 lb. boost and 100/150 grade gasoline.

Merlin 100, 101 (RM 14 SM): Similar to Merlin 130. Updraft air intake.

Merlin 120 (RM 14 SM): Similar to Merlin 130, but with reduction gear ratio 0.375:1, and 2 co-axial contra-rotating propeller shafts.

Merlin 131, 133 (RM 14 SM): Same as Merlin 130, but propeller shaft rotates in opposite direction.

Merlin 132 (RM 14 SM): Same as Merlin 130.

Other models of Rolls-Royce Merlin (2-stage) engines will be found on page 205.

Additional Models of Rolls-Royce Merlin (12-stage) Engines

(Continued from pages 195 and 197)

- Merlin 63, 63A, 64 (RM 8 SM):** Similar to Merlin 66, but with supercharger ratios 6.39:1 and 8.03:1. Reduction gear ratio 0.477:1. 1,280 h.p./3,000 r.p.m./take-off; 1,710 h.p./3,000 r.p.m./8,500 ft. (2 600 m) and 1,505 h.p./3,000 r.p.m./21,000 ft. (6 400 m) military ratings; 1,400 h.p./2,850 r.p.m./12,000 ft. (3 700 m) and 1,250 h.p./2,850 r.p.m./24,000 ft. (7 300 m) normal ratings.
- Merlin 68, 69, 266P:** Similar to Merlin 63, but with supercharger ratios 5.80:1 and 7.35:1. Reduction gear ratio 0.42:1 or 0.477:1. 1,670 h.p./3,000 r.p.m./66.6 in. (1 691 mm) + 18.3 lb. boost/take-off; 1,700 h.p./3,000 r.p.m./6,400 ft. (1 900 m) and 1,490 h.p./3,000 r.p.m./19,400 ft. (5 900 m) military ratings; 1,140 h.p./2,650 r.p.m./10,600 ft. (3 200 m) and 1,020 h.p./2,650 r.p.m./23,200 ft. (7 100 m) normal ratings. 100/130 grade gasoline. Built by Packard Motor Car Company in the U.S.A.
- Merlin 70, 71 (RM 11 SM):** Similar to Merlin 66, but with supercharger ratios 6.39:1 and 8.03:1. Reduction gear ratio 0.477:1. 1,240 h.p./3,000 r.p.m./take-off; 1,710 h.p./3,000 r.p.m./11,000 ft. (3 400 m) and 1,475 h.p./3,000 r.p.m./23,250 ft. (7 100 m) military ratings; 1,360 h.p./2,850 r.p.m./13,750 ft. (4 200 m) and 1,210 h.p./2,850 r.p.m./26,000 ft. (7 900 m) normal ratings.
- Merlin 72, 73 (RM 8 SM):** Similar to Merlin 63, but with gear ratio 0.42:1.
- Merlin 76, 77 (RM 11 SM):** Same as Merlin 70, but with gear ratio 0.42:1.
- Merlin 102 (RM 14 SM):** See complete specification on page 213.
- Merlin 113, 114 (RM 16 SM):** Similar to Merlin 130, but with updraft air intake, and supercharger ratios 6.39:1 and 8.03:1. Reduction gear ratio 0.42:1. 1,535 h.p./3,000 r.p.m./66.4 in. (1 686 mm) + 18.0 lb. boost/take-off; 1,690 h.p./3,000 r.p.m./13,000 ft. (4 000 m) and 1,435 h.p./3,000 r.p.m./27,250 ft. (8 300 m) military ratings; 1,380 h.p./2,850 r.p.m./15,750 ft. (4 800 m) and 1,200 h.p./2,850 r.p.m./29,750 ft. (9 000 m) normal ratings. 100/130 grade gasoline. Also, 1,960 h.p./3,000 r.p.m./7,750 ft. (2 400 m) and 1,690 h.p./3,000 r.p.m./22,000 ft. (6 700 m) military ratings, with 70.6 in. (1 790 mm) + 25.0 lb. boost and 100/150 grade gasoline.