

General Recommendations

Purchase gasoline in small quantities and store in clean, approved containers. A container with a capacity of 2 gallons or less with a pouring spout is recommended. Such a container is easier to handle and helps eliminate spoilage during refueling.

Do not use gasoline left over from the previous season, to minimize gum deposits in your fuel system and to insure easy starting.

Do not add oil to the gasoline.

Do not overfill the fuel tank. Leave room for the fuel to expand.

Fuel Type

For best results, use only clean, fresh, unleaded gasoline with a pump sticker octane rating of 87 or higher. In countries using the Research method, it should be 90 octane minimum.

OVERALL DIMENSIONS

Model M8 With Side Tank

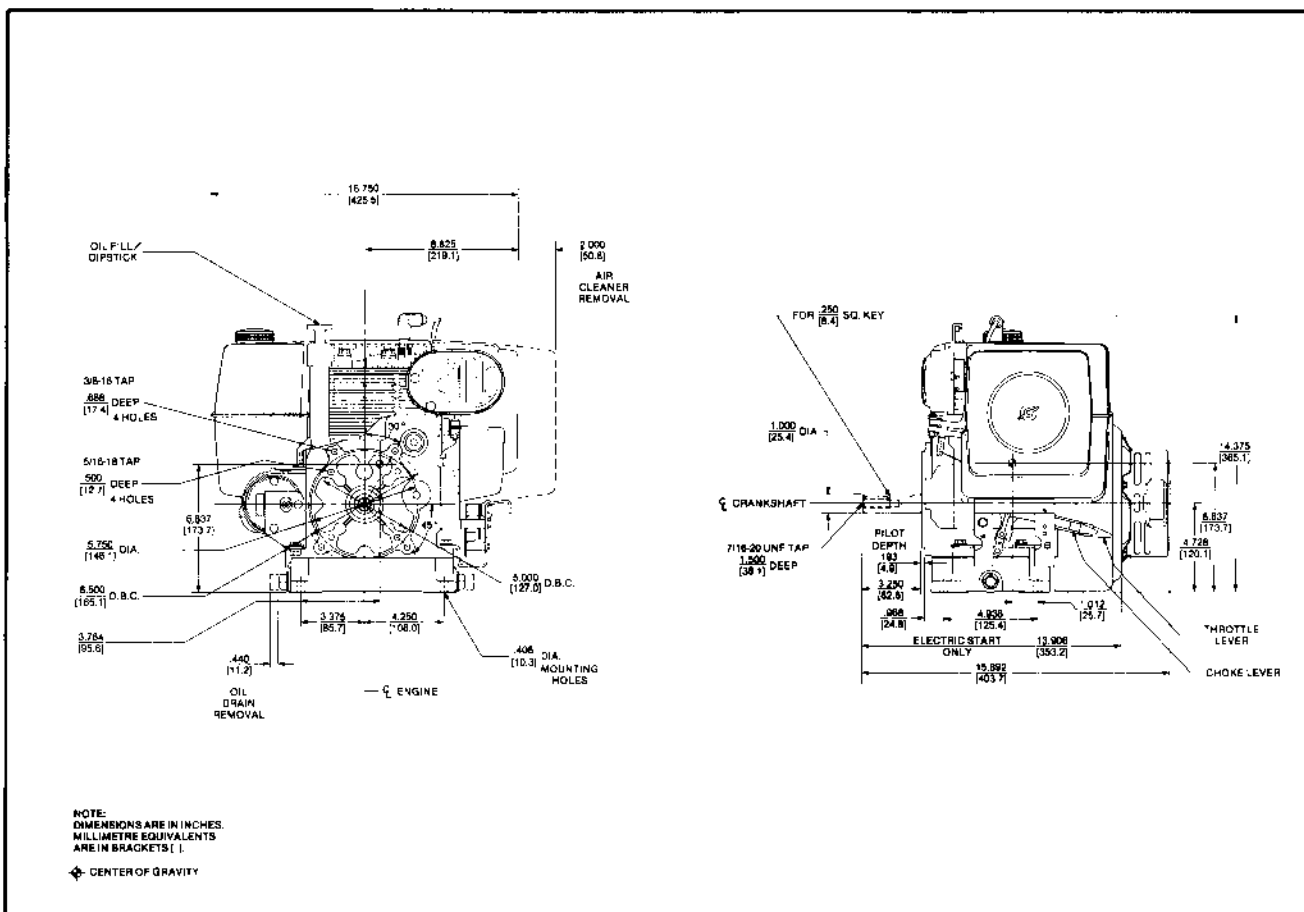


Figure 1-3. Overall Dimensions - Model M8 With Side Tank.

Unleaded gasoline is recommended, as it leaves less combustion chamber deposits. Leaded gasoline may be used in areas where unleaded is not available and exhaust emissions are not regulated. Be aware however, that the cylinder head will require more frequent service.

Gasoline/Alcohol blends

Gasohol (up to 10% ethyl alcohol, 90% unleaded gasoline by volume) is approved as a fuel for Kohler engines. Other gasoline/alcohol blends are not approved.

Gasoline/Ether blends

Methyl Tertiary Butyl Ether (MTBE) and unleaded gasoline blends (up to a maximum of 15% MTBE by volume) are approved as a fuel for Kohler engines. Other gasoline/ether blends are not approved.

STANDARD TORQUE VALUES¹

Bolts, Screws, Nuts, and Fasteners Assembled Into Cast Iron or Steel



Size	Grade 2	Grade 5 ³	Grade 8
#8-32	20 in. lb.	25 in. lb.	—
#10-24	32 in. lb.	40 in. lb.	—
#10-32	32 in. lb.	40 in. lb.	—
1/4-20	70 in. lb.	115 in. lb.	165 in. lb.
1/4-28	85 in. lb.	140 in. lb.	200 in. lb.
5/16-18	150 in. lb.	250 in. lb.	350 in. lb.
5/16-24	165 in. lb.	270 in. lb.	30 ft. lb.
3/8-16	260 in. lb.	35 ft. lb.	50 ft. lb.
3/8-24	300 in. lb.	40 ft. lb.	60 ft. lb.
7/16-14	35 ft. lb.	55 ft. lb.	80 ft. lb.
7/16-20	45 ft. lb.	75 ft. lb.	105 ft. lb.
1/2-13	50 ft. lb.	80 ft. lb.	115 ft. lb.
1/2-20	70 ft. lb.	105 ft. lb.	165 ft. lb.
9/16-12	75 ft. lb.	125 ft. lb.	175 ft. lb.
9/16-18	100 ft. lb.	165 ft. lb.	230 ft. lb.
5/8-11	110 ft. lb.	180 ft. lb.	260 ft. lb.
5/8-18	140 ft. lb.	230 ft. lb.	330 ft. lb.
3/4-10	150 ft. lb.	245 ft. lb.	350 ft. lb.
3/4-16	200 ft. lb.	325 ft. lb.	470 ft. lb.

Bolts, Screws, Nuts, and Fasteners Assembled Into Aluminum



Size	Grade 2	Grade 5	Grade 8
#8-32	20 in. lb.	20 in. lb.	20 in. lb.
#10-24	32 in. lb.	32 in. lb.	32 in. lb.
1/4-20	70 in. lb.	70 in. lb.	70 in. lb.
5/16-18	150 in. lb.	150 in. lb.	150 in. lb.

Oil Drain Plugs⁴

Size	Into Cast Iron Pans	Into Aluminum Pans
1/4"	150 in. lb.	100 in. lb.
3/8"	180 in. lb.	120 in. lb.
1/2"	20 ft. lb.	13 ft. lb.
3/4"	25 ft. lb.	16 ft. lb.
X-708-1 ⁵	20/25 ft. lb.	20/25 ft. lb.

Conversions

ft. lb. = in. lb. x 0.083
in. lb. = ft. lb. x 12
kgm = ft. lb. x 0.1383
Nm. = ft. lb. x 1.3558

SPECIFICATIONS, TOLERANCES, AND SPECIAL TORQUE VALUES²

General	Model M8	Model M10	Model M12	Model M14	Model M16
Horsepower (@ 3,600 rpm)	8	10	12	14	16
Displacement (cu. in.)	18.64	23.85	29.07	31.27	35.9
Bore	2.94	3.25	3.38	3.50	3.75
Stroke	2.75	2.88	3.25	3.25	3.25
Compression Ratio	6.8:1	6.2:1	6.6:1	7.0:1	7.3:1
Approx. Weight (lb.)	71	129	129	129	129
Approx. Oil Capacity* (U.S. Quarts)	1	2	2	2	2
Approx. Fuel Tank Capacity (U.S. Gallons)	1.25	1.5	1.5	1.5	1.5

⁴For best results, fill to "F" mark on dipstick as opposed to adding a given quantity of oil.
Always check level on dipstick before adding more oil.

	Model M8	Model M10	Model M12	Model M14	Model M16
Air Cleaner					
Element Cover Nut					
Torque (in. lb.)	50	50	50	50	50
Angle of Operation - Maximum (At Full Oil Level; Intermittent Operation) With Oil Sentry™					
Carb. Side Up	15°	15°	15°	15°	15°
Carb. Side Down	35°	23°	23°	23°	23°
Flywheel End Up	35°	30°	30°	30°	30°
Flywheel End Down	45°	45°	45°	45°	45°
Without Oil Sentry™					
Carb. Side Up	45°	45°	45°	45°	45°
Carb. Side Down	35°	23°	23°	23°	23°
Flywheel End Up	35°	30°	30°	30°	30°
Flywheel End Down	45°	45°	45°	45°	45°
Balance Gear					
End Play	—	.002/.010	.002/.010	.002/.010	.002/.010
New Stub Shaft O.D.	—	.4998/.5001	.4998/.5001	.4998/.5001	.4998/.5001
Stub Shaft O.D. Max Wear Limit	—	.4996	.4996	.4996	.4996
Camshaft					
End Play	.005/.010	.005/.010	.005/.010	.005/.010	.005/.010
Camshaft to Camshaft Pin Running Clearance	.0010/.0035	.0010/.0035	.0010/.0035	.0010/.0035	.0010/.0035
Camgear Cover Fastener Torque (in. lbs.)	—	115	115	115	115
Camshaft Pin Depth From Crankcase Surface	.275/.285	.300/.330	.300/.330	.300/.330	.300/.330
Cup Plug Depth from Crankcase Surface	.055/.065	.000/.030	.000/.030	.000/.030	.000/.030
Carburetor					
Preliminary Main Fuel Screw Setting (Turns)	2	1-1/2	1-1/2	2-1/2	2-1/2
Preliminary Idle Fuel Screw Setting (Turns)	1-1/4	2-1/2	2-1/2	2-1/2	2-1/2
Float Level	11/64 (± 1/32)	11/64 (± 1/32)	11/64 (± 1/32)	11/64 (± 1/32)	11/64 (± 1/32)
Float Drop	1-1/32	1-1/32	1-1/32	1-1/32	1-1/32
Fuel Inlet Seat Torque (in. lb.)	35	35	35	35	35
Bowl Retaining Screw Torque (in. lb.)	50	50	50	50	50
Float to Float Pin Tower Clearance	.010	.010	.010	.010	.010
Connecting Rod (Posi-Lock)					
New Service Rod Nut Torque (in. lb.) ^{41 6}	140	260	260	260	260
Used Rod Nut Torque (in. lb.) ^{41 6}	100	200	200	200	200
Rod to Crankpin Running Clearance - New	.001/.002	.001/.002	.001/.002	.001/.002	.001/.002
Rod to Crankpin Max. Wear Limit	.0025	.0025	.0025	.0025	.0025
Rod to Piston Pin Running Clearance - New	.0006/.0011	.0003/.0008	.0003/.0008	.0003/.0008	.0003/.0008
Piston Pin End I.D. - New	.6255/.6258	.8596/.8599	.8757/.8760	.8757/.8760	.8757/.8760
Rod Side Play on Crankpin	.005/.016	.007/.016	.007/.016	.007/.016	.007/.016

	Model M8	Model M10	Model M12	Model M14	Model M16
Crankshaft					
Crankshaft End Play	.002/.023	.003/.020	.003/.020	.003/.020	.003/.020
Main Bearing Surface					
O.D. - New	1.1811/1.1814	1.5745/1.5749	1.5745/1.5749	1.5745/1.5749	1.5745/1.5749
Main Bearing Surface Max.					
Wear Limit	1.1811	1.5745	1.5745	1.5745	1.5745
Crankpin O.D. - New	1.1860/1.1855	1.5000/1.4995	1.5000/1.4995	1.5000/1.4995	1.5000/1.4995
Crankpin O.D. Max.					
Out of Round	.0005	.0005	.0005	.0005	.0005
Crankpin O.D. Max. Taper	.001	.001	.001	.001	.001
Cylinder Bore					
I.D. - New	2.9380/2.9370	3.2515/3.2505	3.3755/3.3745	3.5005/3.4995	3.7505/3.7495
I.D. Max. Wear Limit	2.941	3.254	3.378	3.503	3.753
I.D. Max. Out of Round	.005	.005	.005	.005	.005
I.D. Max. Taper	.003	.002	.002	.002	.002
Cylinder Head					
Cap Screw Torque					
(ft. lb.) ^a	15/20	25/30	25/30	25/30	25/30
Max. Out of Flatness	.003	.003	.003	.003	.003
Fan/Flywheel					
Fan Fastener					
Torque (in. lbs.)	115	115	115	115	115
Flywheel Fastener					
Torque (ft. lb.) ^a	85/90	40/45	40/45	40/45	40/45
Fuel Pump					
Mounting Screw					
Torque (in. lb.)	40/45	40/45	40/45	40/45	40/45
Fuel Tank					
Isolation Mount Torque	Hand Tight ⁷	Hand Tight	Hand Tight	Hand Tight	Hand Tight
Upper Bracket to Tank					
Fastener Torque (in. lb.)	90	—	—	—	—
Lower Bracket to Tank					
Fastener Torque (in. lb.)	90	—	—	—	—
Lower Bracket to Crankcase					
Bracket Fastener Torque					
(in. lb.)	70	—	—	—	—
Top Tank Bracket to Cyl.					
Head Fastener Torque					
(in. lb.)	150	—	—	—	—
Gear Reduction Unit					
Gear Reduction Shaft					
End Play	.001/.030	.008/.030	.005/.030	.005/.030	.005/.030
Governor					
Governor Bushing					
Torque (in. lb.)	100/120	100/120	100/120	100/120	100/120
Governor Bushing to Cross					
Shaft Running Clearance	.0005/.0020	.0010/.0025	.0010/.0025	.0010/.0025	.0010/.0025
Governor Gear to Stub					
Shaft Running Clearance	.0005/.0020	.0005/.0020	.0005/.0020	.0005/.0020	.0005/.0020
Governor Cross Shaft					
End Play	.001/.056	.001/.069	.001/.069	.001/.069	.001/.069

	Model M8	Model M10	Model M12	Model M14	Model M16
Ignition					
Ignition Module to					
Magnet Air Gap	.012/.016	.012/.016	.012/.016	.012/.016	.012/.016
Spark Plug Type					
(Champion® or Equiv.)	RCJ-8	RH-10	RH-10	RH-10	RH-10
Spark Plug Gap	.025	.025	.025	.025	.025
Spark Plug Torque (ft. lb.)	18/22	18/22	18/22	18/22	18/22
Ignition Module Mounting					
Screw Torque (in. lbs.)	32	32	32	32	32
Keyswitch Nut Torque					
(in. lbs.)	—	90/100	90/100	90/100	90/100
Oil Pan/Oil Sentry™					
Oil Sentry Switch Max.					
Torque (in. lb.) ¹⁰	90	90	90	90	90
Piston and Piston Rings					
(Style "A" Pistons)					
Thrust Face O.D. @ D1					
- New ¹¹	2.9297/2.9281	3.2432/3.2413	3.368/3.365	3.4941/3.4925	—
Thrust Face O.D. @ D1 - Max. ¹¹					
Wear Limit	2.925	3.238	3.363	3.491	—
Thrust Face to Bore					
Clearance @ D1 - New ¹¹	.007/.010	.007/.010	.007/.010	.007/.010	—
Piston Ring End Gap - New	.007/.017	.010/.020	.010/.020	.010/.020	—
Piston Ring End Gap -					
Used (Max.)	.027	.030	.030	.030	—
Piston Ring Side					
Clearance - Max.	.006	.006	.006	.006	—
Piston Pin O.D. - New	.6247/.6249	.8591/.8593	.8752/.8754	.8752/.8754	—
Piston and Piston Rings					
(Styles "C" And "D" Pistons)					
Thrust Face O.D. @ D1					
- New ¹²	2.9336/2.9329	—	—	—	3.7455/3.7465
Thrust Face O.D. @ D1					
- Max. Wear Limit ¹²	2.9312	—	—	—	3.7435
Thrust Face to Bore					
Clearance @ D1 - New ¹²	.0034/.0051	—	—	—	.0030/.0050
Piston Ring End Gap - New ⁹	.010/.023	—	—	—	.010/.020
Piston Ring End Gap					
- Used (Max.) ⁹	.032	—	—	—	.030
Piston Ring Side					
Clearance - Max.	.006	—	—	—	.006
Piston Pin O.D. - New	.6247/.6249	—	—	—	.8752/.8754
Valves and Tappets					
Intake Valve to Tappet					
Clearance - Cold	.006/.008	.008/.010	.008/.010	.008/.010	.008/.010
Exhaust Valve to Tappet					
Clearance - Cold	.017/.019	.017/.019	.017/.019	.017/.019	.017/.019
Intake Valve Minimum					
Lift - Zero Lash	.2718	.318	.318	.318	.318
Exhaust Valve Minimum					
Lift - Zero Lash	.2482	.318	.318	.318	.318
Intake Valve Minimum					
Stem O.D.	.3103	.3103	.3103	.3103	.3103
Exhaust Valve Minimum					
Stem O.D.	.3074	.3074	.3074	.3074	.3074

	Model M8	Model M10	Model M12	Model M14	Model M16
Valves and Tappets (Cont.)					
Nominal Valve Seat Angle	45°	45°	45°	45°	45°
Valve Guide Reamer Size	.3125	.3125	.3125	.3125	.3125
Intake Valve Guide I.D.					
Max. Wear Limit	.006	.006	.006	.006	.006
Exhaust Valve Guide I.D.					
Max. Wear Limit	.008	.008	.008	.008	.008
Throttle Control Lever					
Remote Throttle Control					
Nut Torque (in. lb.) ^a	10/15	10/15	10/15	10/15	10/15
Engine Mtd. Throttle Control					
Nut Torque (in. lb.)	15/25	15/25	15/25	15/25	15/25
Fixed Speed Applications (Shortened Throttle Control)					
Nut Torque (in. lb.)	70	70	70	70	70

Notes:

1. Use standard torque values when specific values are not given. Standard values have a tolerance of $\pm 20\%$.
2. All dimensions are in inches unless otherwise specified.
3. Also applies to self-tapping screws.
4. Lubricate with oil at assembly.
5. 3/8-16 thread with hex head nut and fiber gasket.
6. Torque in increments to the value specified. Do not overtorque—loosen—and retorque hex nuts on Posi-Lock connecting rods.
7. Top tank models only.
8. Torque to value specified; then loosen nut 1/2 turn.
9. Top and center compression rings.
10. Turn the Oil Sentry™ float switch in approx. 5 to 6 full turns until positioned properly. Refer to the "Electrical System And Components" section for specific installation procedures.
11. Measurements @ D1 on Style "A" pistons are made perpendicular to piston pin, just below the oil ring.
12. Measurements @ D1 on Styles "C" and "D" pistons are made perpendicular to piston pin in the position shown.

