

LCT Engines

Service Manual

LCT

LIQUID COMBUSTION TECHNOLOGY

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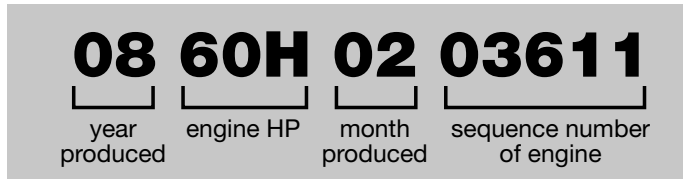
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Engine Model Number & Serial Numbering System

The first two lines of an engine's number is the model number. It is alphanumeric and engraved on the side of the block to the right of the recoil. The third line is alphanumeric and is also the serial number.

Serial Number Definitions:

- The engine serial number consists of 11 to 12 alphanumeric characters. (example: 08 60H 02 03611)
- First two digits = year produced
- Next two to three digits = engine horsepower
- Next two digits = month produced
- Last five digits = sequence number of engine



Definition of example: This engine is the 3611th 6HP engine produced in February of 2008

LCT Engine Model Numbering System Definition (see chart on page 3):

- 1. Preproduction** - This column is coded and reserved for prototype engines only.
- 2. Plant** - This column is coded and used for LCT internal use only.
- 3. Design Family** - This column is used for emissions regulations and coded for LCT internal use only.
- 4. Crankshaft** - This column indicated whether the PTO shaft (crankshaft) is configured in the engine horizontally or vertically.
- 5. Shaft** - This column is used for the description of the PTO shaft. This will aid in determining what will be the engine's primary use.
- 6. Shaft Detail** - This column references a chart that designates which LCT engineering drawing corresponds to the PTO shaft.
This is for LCT internal use only.
- 7. Horsepower** - This column is coded to designate the engine's power output (horsepower) with its corresponding size (cubic centimeters).
- 8. Paint Code** - This column is coded to which color scheme the engine is equipped with.
- 9. Starter Type** - This column is coded to which type of starting system the engine is equipped with.
- 10. Options** - This column is coded to designate which equipment options the engine is equipped with.
- 11. Emissions Label** - This column is coded for the emissions standards the engine meets.
- 12. Pack Code** - This column is reserved for LCT Packaging Department only.

NOTE:

The LCT Engine Model and Serial Number Systems is subject to be changed or edited at any time.

Engine Model Number & Serial Numbering System

Pre-Production	Plant	Design Family	Crankshaft	Shaft	Shaft Detail	HP	Paint Code	Starter Type	Options	Emissions Label	Pack Code
x	P	LM Moderate	H Horizontal	T Threaded	XX	150 1.5HP (63cc)	1 Black Recoil (Satin Black (JPC))	E 12VDC/120VAC Electric	A Fixed Speed	E1 50 State	S Single Pack
	S	LS Intermediate	V Vertical	K Straight-Keyed		250 2.5HP (98cc)	2 Black Tank (Pantone Black G (Glossy))	P Recoil	B Manual Choke	E2 49 State	M Multi-Pack
		LX Extended		P Tapered		400 4.0HP (136cc)	3 Titan Yellow Blower Housing	Z Recoil/Electric Equipped	C Catalytic Muffler	E4 California Preempt	
		LD Diesel				650 6.5HP (208cc)	4 Black Blower Housing (Pantone Black G (Glossy))	Y 220VAC Electric	D Generator Air Filter	E5 California Exh Only	
						850 8.5HP (291cc)	5 Yellow Recoil (Pantone 1235C)	X [TBD]	E Generator Muffler	E7 European Compliant	
						1150 11.5HP (414cc)	6 Yellow Tank (Pantone 1235C)	V [TBD]	F No Tank	E8 Australian Compliant	
						C1219A 4HP (219cc)	7 Black Tank (Pantone Black M (Matte))	U [TBD]	G High Oil Fill Tube	E9 [TBD]	
						C1306 6HP (306cc)	8 Black Blower Housing (Pantone Black M (Matte))	T [TBD]	H Commercial Fuel Tank (Large Fuel Tank)	E10 [TBD]	
						C1306A 7.0HP (306cc)	9 Yellow Blower Housing (Pantone 1235C)	S [TBD]	I AC Charging Coil Equipped	E11 [TBD]	
						C1418 8.0HP (418cc)	9 Yellow Blower Housing (Pantone 1235C)		J DC Charging Coil Equipped	E12 [TBD]	
						C1418A 9.0HP (418cc)	1A Titan Green Blower Housing (Pantone Green 364C)		K Evaporative Emission Equipped	E13 [TBD]	
						C1219 3.5HP (219cc)	1B Titan Green Recoil (Pantone Green 364C)		L High Output Air Filter - CA	E14 [TBD]	
						C1219A 4.0HP (219cc)	1D Black Recoil (Pantone Black M (Matte))		M Remote Throttle Control	E15 [TBD]	
							1C Carmine Red Blower Housing (RAL 3002)		N High Output Air Filter - Non CA		
							1E Blue Recoil (PMS 294C)		O Snow Equipped		
							1F Blue Tank (PMS 294C)		P Pleated Paper Air Filter		
							1G Blue Blower Housing (PMS 294C)		Q No Low Oil Sensor		
							1H Titan Orange Blower Housing		R Low Temperature Muffler		
							1I Titan Orange Recoil		S Atm. Vented Plastic Fuel Cap w/ Tether Cord		
							1J Silver Recoil (Titan Spec Silver)		T Two Low Oil Fill Plugs		
							1K Silver Blower Housing (Titan Spec Silver)		U C&U Bearings		
							1L Orange Recoil (Titan Spec Orange)		V Viton Oil Seals		
							1M Orange Blower Housing (Titan Spec Orange)		X Single Coil DC Charging System		
							1N [TBD]		Y Dual Stator Charging System		
									Z CE Compliance Package - SUMMER SERIES		

General Specifications

Item	208cc	291cc	414cc
Maximum Speed	3850±50rpm	3850±50rpm	3850±50rpm
Idle Speed	2150+/-50rpm	2150+/-50rpm	2150+/-50rpm
Compression Ratio	8.5:1	8.2:1	8:1
Displacement	208cc	291cc	414cc
Compression Release	yes	yes	yes
Cast Iron Sleeve	yes	yes	yes
Bore x Stroke	2.76" x 2.13" (70mm x 54mm)	3.15" x 2.28" (80mm x 58mm)	3.54" x 2.56" (90mm x 65mm)
PTO Rotation	CCW (measured from PTO side)	CCW (measured from PTO side)	CCW (measured from PTO side)
Fuel (DO NOT USE E85)	regular unleaded gasoline	regular unleaded gasoline	regular unleaded gasoline
Low Oil Shutoff	if equipped	if equipped	if equipped
Fuel Shutoff Valve	yes	yes	yes
Oil Fill Capacity	16oz	32oz	38oz
Spark Plug Gap	0.7-0.8mm (.027-.030 in.)	0.7-0.8mm (.027-.030 in.)	0.7-0.8mm (.027-.030 in.)
Ignition Air Gap (At Flywheel)	0.4 +/- 0.2mm	0.4 +/- 0.2mm	0.4 +/- 0.2mm
Valve Adjustment (gap) Intake	.15 +/- .02mm (.005-.007in)	.15 +/- .02mm (.005-.007in)	.15 +/- .02mm (.005-.007in)
Valve Adjustment (gap) Exhaust	.20 +/- .02mm (.007-.009 in.)	.20 +/- .02mm (.007-.009 in.)	.20 +/- .02mm (.007-.009 in.)
Dry Weight (Summer Engines)	35lbs (16.6kg)	57.32lbs (26kg)	69.45lbs (31.5kg)
Dry Weight (Snow Engines)	38lbs (17.25kg)	61.5lbs (28.9kg)	75.5lbs (34.3kg)

General Troubleshooting

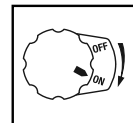
Engine will not start:

1. Check oil level- Do you have the correct amount of oil? (Ref: Engine Oil Service, pg. 10)

Remedy: Oil should be visible and to the top 2 threads of the LOWEST oil fill spout.

2. Is on/off switch on?

Remedy: Turn to the on position.



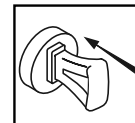
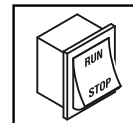
3. Snow Only:

a) Is the Run/Stop switch in the Run Position?

Remedy: Push switch to the Run Position.

b) Is the snow safety key inserted into slot?

Remedy: Push key into slot to fully engage.

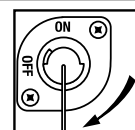
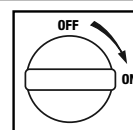


4. Do you have fuel in the fuel tank?

Remedy: Add fuel.

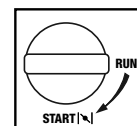
5. Is the fuel petcock turned to the on position?

Remedy: Turn to the on position.

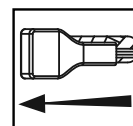


6. Was the engine choked?

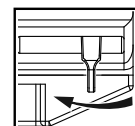
Remedy: When starting the engine the choke lever should be pushed left to the on position and after starting pushed right to the off position. If engine is equipped with twist type choke, the knob should be turned to the start position and after starting turned to the run position. If engine still does not start move to half choke and pull twice.



Twist Choke



Snow



Summer

7. Is the spark plug boot securely fastened to the spark plug?

Remedy: Slide over spark plug and fit securely.

8. Has the fuel being used been purchased within the last three months and was it stored in a plastic container?

Remedy: Replace old fuel with new fuel.

9. Is the engine flooded?

Remedy: Remove spark plug and replace with any of the spark plugs listed under Spark Plug Service, pg. 9.

• NOTICE

Using an incorrect spark plug may cause engine damage.

General Troubleshooting

Engine stops running:

1. Has the fuel being used been purchased within the last three months and was it stored in a plastic container?

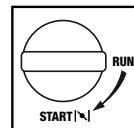
Remedy: Replace old fuel with new fuel.

2. Is the air filter dirty?

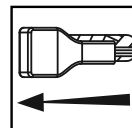
Remedy: Replace air filter element if dirty. Clean prefilter of any dirt or dust.

3. Was the engine choked?

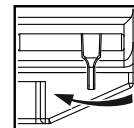
Remedy: When starting the engine the choke lever should be pushed left to the on position and after starting pushed right to the off position. If engine is equipped with twist type choke, the knob should be turned to the start position and after starting turned to the run position. If engine still does not start move to half choke and pull twice.



Twist Choke



Snow



Summer

4. Is the spark plug corroded?

Remedy: Remove spark plug and replace with any of the plugs listed under Spark Plug Service, pg.9.

• NOTICE

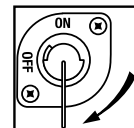
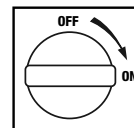
Using an incorrect spark plug may cause engine damage.

5. Has the engine run out of fuel?

Remedy: Refuel engine.

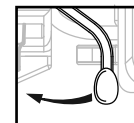
6. Is the fuel petcock turned to the on position?

Remedy: Turn to the on position.



7. Is the throttle set too low (variable speed models only)?

Remedy: Increase the throttle.



Advanced Troubleshooting – For Authorized LCT Technicians

ENGINE		
Complaint	Symptom and possible causes	Remedy
Engine will not start, or is hard to start	Compression too low	
	1. Valves out of adjustment	Adjust
	2. Worn valve guides or poor seating of valves	Repair or Replace
	3. Mistiming valves	Adjust
	4. Excessively worn piston rings	Replace
	5. Worn-down cylinder bore	Replace
	6. Poor seating of spark plug	Retighten
	7. Failed head gasket	Replace
	Plug not sparking	
	1. Fouled spark plug	Replace
	2. Wet spark plug	Dry off
	3. Defective ignition coil	Replace
	4. Spark plug wire damaged	Replace
	5. Kill switch in “OFF” position	Switch to “On”
	6. Ignition coil air gap is too wide	Reset
	7. Ignition coil failure	Replace
	No fuel reaching the intake manifold	
	1. Clogged fuel filter or fuel line	Replace
2. Dirty/gummed up carburetor	Clean	
3. Fuel petcock is turned off	Turn on	
4. Fuel tank is empty	Fill	
Engine idles poorly	1. Out of adjustment tappet clearance	Adjust
	2. Poor seating of valves	Replace or Repair
	3. Defective valve guides	Replace
	4. Worn down camshaft	Replace
	5. Too wide spark plug gap	Adjust or replace
	6. Defective ignition coil	Replace
	7. Ignition coil air gap too wide	Adjust
	8. Dirty/gummed up carburetor	Clean
	9. Stale fuel	Replace
Engine stalls easily	1. Dirty/gummed up carburetor	Clean
	2. Fouled spark plug	Replace
	3. Clogged fuel line	Replace
	4. Valves out of adjustment	Adjust

Noisy Engine	Excessive Valve Chatter	
	1. Too large valve clearance	Adjust
	2. Weakened or broken valve spring	Replace
	3. Worn tappet or cam lobe	Replace
	4. Worn and burnt camshaft journal	Replace
	Noise seems to come from piston	
	1. Worn down piston or cylinder	Replace
	2. Fouled with carbon combustion chamber	Clean
	3. Worn piston pin or piston pin bore	Replace
	4. Worn piston rings or ring grooves	Replace
	Noise seems to come from crankshaft	
	1. Rattling bearings due to wear	Replace
	2. Worn and burnt main bearings	Replace
	3. Worn and burnt pin bearing	Replace
	4. Too large endplay	Adjust
	Noise seems to come from outside of engine	
1. Loose trim item	Tighten	
Engine runs poorly in high speed range	Defective engine internal/electrical parts	
	1. Weakened valve springs	Replace
	2. Worn camshaft	Replace
	3. Valve timing out of adjustment	Adjust
	4. Too narrow spark plug gaps	Adjust
	5. Defective ignition coil	Replace
	6. Clogged air cleaner element	Replace
	7. Clogged fuel line, resulting in inadequate fuel supply to carburetor	Replace
	8. Worn bearings	Replace
	9. Blown head gasket	Replace
	10. Ignition coil air gap too wide	Adjust
	11. Dirty/gummed up carburetor	Clean
	12. Stale fuel	Replace
	Defective air flow system	
1. Carburetor gasket leak - sucking air causing engine to run lean	Replace	
Engine lacks power	Defective engine internal/electrical parts	
	1. Loss of valve clearance	Adjust
	2. Weakened valve springs	Replace
	3. Out of adjustment valve timing	Adjust
	4. Worn piston ring or cylinder	Replace
	5. Poor seating of valves	Replace
	6. Fouled spark plug	Replace
	7. Incorrect spark plug	Replace
	8. Clogged air filter element	Replace
	9. Carburetor gasket leak - sucking air causing engine to run lean	Replace
	10. Too much engine oil	Adjust
	11. Air fins clogged on engine causing to overheat	Remove debris
	12. Not enough oil in engine	Adjust

Dirty or heavy exhaust smoke	1. Too much engine oil in the engine	Adjust
	2. Worn piston rings or cylinder	Replace
	3. Worn valve guides	Replace
	4. Scored or scuffed cylinder wall	Replace
	5. Worn valve stems	Replace
	6. Defective stem seal	Replace
	7. Worn oil ring side rails	Replace
No spark or poor spark	1. Defective ignition coil	Replace
	2. Defective spark plug	Replace
	3. Open-circuit wiring connection	Check and repair
Spark plug fouled with carbon	1. Incorrect gasoline	Replace
	2. Dirty air cleaner element	Replace
	3. Too cold spark plug	Use hotter plug
Spark plug becomes fouled too soon	1. Worn piston rings	Replace
	2. Worn piston or cylinder	Replace
	3. Excessive clearance of valve stems in valve guides	Replace
	4. Worn valve stem oil seal	Replace
Spark plug electrode overheated or burnt	1. Too hot spark plug	Use colder plug
	2. Overheated the engine	Tune up
	3. Loose spark plug	Tighten
	4. Too lean fuel mixture	Check for air leak

Spark Plug Service

Recommended spark plugs: Torch Plug: F6RTC

Cross References

- Champing plug cross reference is: **RN9YC (some tables show RN9YCC)**
- **NGK** plug cross reference is: **BPR6ES**
- **BOSCH** plug cross reference is: **WR6DC**

• NOTICE

Using an incorrect spark plug may cause engine damage.

1. When engine is cool, disconnect the spark plug cap and remove any debris from the spark plug area with high pressure air.
2. Remove the spark plug with a 13/16-inch spark plug wrench.
3. Inspect the spark plug. Replace it if the electrodes are worn or if the insulator is cracked or chipped. Spark plug gap should be set to 0.027 - 0.030 inches.
4. Install the spark plug carefully to avoid cross threading. Screw in spark plug by hand until it stops turning.
5. Tighten the spark plug with a 13/16-inch spark plug wrench. Tighten 1/4 turn after the spark plug seats.

• NOTICE

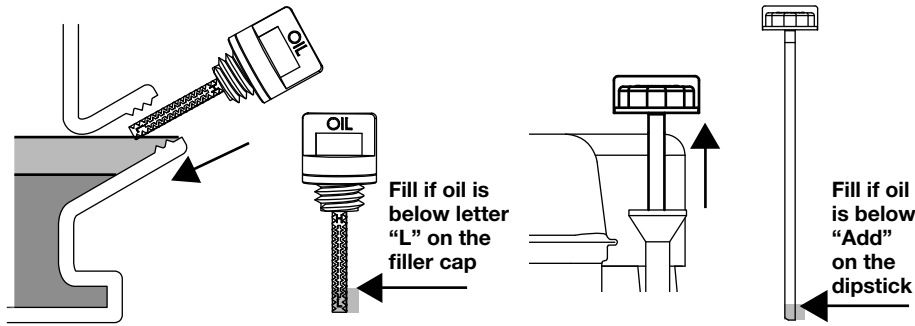
A loose spark plug can overheat and damage the engine. Over-tightening the spark plug can damage the threads in the cylinder head.

6. Attach the spark plug cap. Ensure spark plug cap snaps into place securely.

Engine Oil Level Check

Check the engine oil level with the engine stopped and with the engine in a level position.

1. Remove either side mounted filler cap dipstick or high oil fill dipstick and wipe it clean.
2. Insert and remove the dipstick without screwing it into the filler neck. Check the oil level shown on the dipstick.
3. If the oil level is low, fill to the edge of the oil filler hole with the recommended oil.
4. Securely screw in the filler cap/dipstick. Running the engine with a low oil level can cause engine damage. Always check the engine oil before start up.



Engine Oil Change

Drain the used oil while the engine is warm. Warm oil drains quickly and completely. Avoid contact with hot oil.

1. Place a suitable container below the engine to catch the used oil then remove the filler cap/dipstick and the drain plug.
2. Allow the used oil to drain completely, then reinstall the drain plug, and tighten it securely. Do not over tighten. Dispose of used motor oil in a manner that is compatible with the environment. We suggest you take used oil in a sealed container to your local recycling center or service station for reclamation. Do not throw used oil in the trash, pour it on the ground, or pour down a drain.
3. With the engine in a level position, fill to the outer edge of the oil filler hole with the recommended oil. (see fill limits right)

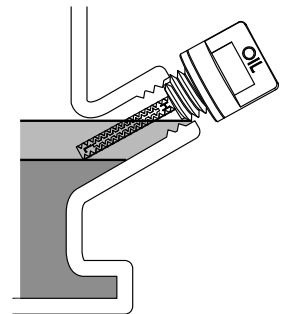
• NOTICE

Running the engine with a low oil level can cause engine damage.

4. Securely screw in the filler cap/dipstick.

Max Upper Level

Max Lower Level

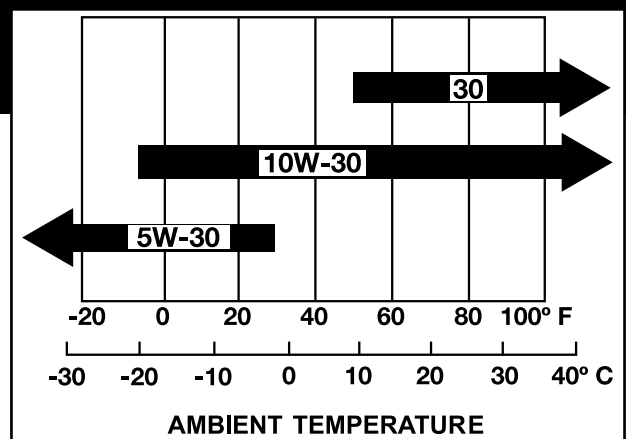


Engine Oil Recommendations

Engine oil affects performance and service life. Use 4-stroke automotive detergent oil.

SAE 10W-30 is recommended for general use. Other viscosities shown in the chart may be used when the average temperature in your area warrants.

The SAE oil viscosity and service classification are in the API label on the oil container. The manufacturer recommends you use API SERVICE category SJ engine oil, or better.



Maintenance Schedule

Normal Operating Conditions (less than 40 hrs. per year)

	EACH USE	FIRST MONTH	EVERY 6 MONTHS	ONCE A YEAR
Engine Oil Level	Check			
Engine Oil		Replace	Replace	
Air Filter	Check			Clean / Replace
Spark Plug*			Clean	Replace
Cylinder/Head Fins				Clean
Oil Leaks	Check			
Bolts	Check			
Fuel Hose Clamps	Check			

* Spark plug gap to be set to 0.027 - 0.030 inches.

Extreme Operating Conditions (greater than 40 hrs. per year)

	EACH USE	EVERY 40 HOURS
Engine Oil Level	Check	
Engine Oil		Replace
Air Filter	Check	
Spark Plug*		Replace
Cylinder/Head Fins	Check	Clean
Oil Leaks	Check	
Bolts	Check	
Fuel Hose Clamps	Check	

* Spark plug gap to be set to 0.027 - 0.030 inches.

NOTE

Following proper maintenance is critical under extreme operating conditions.

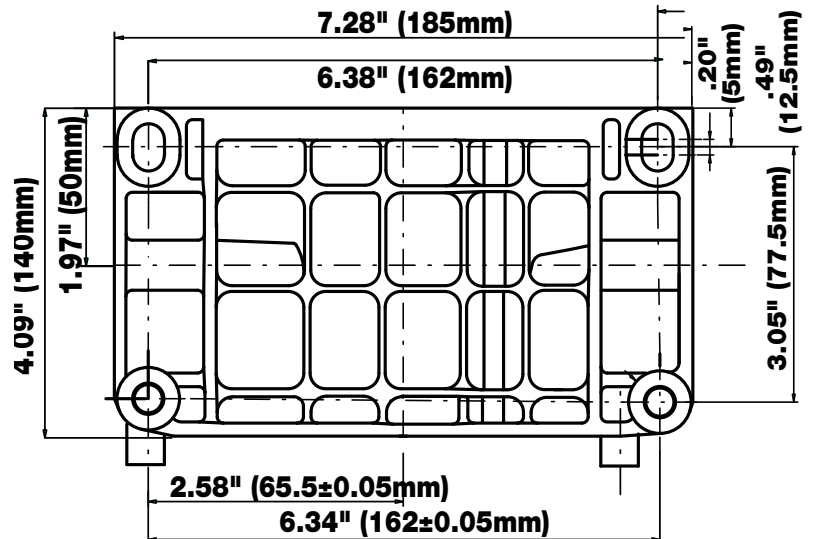
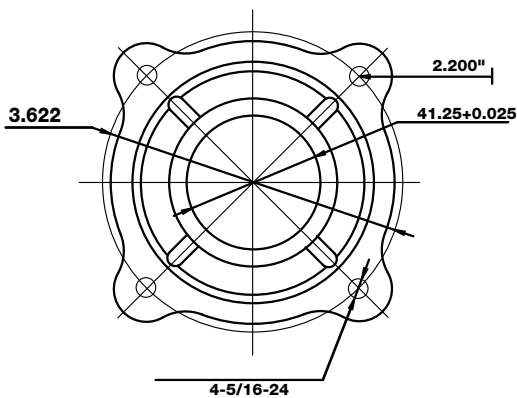
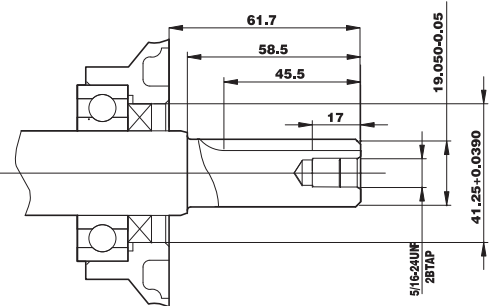
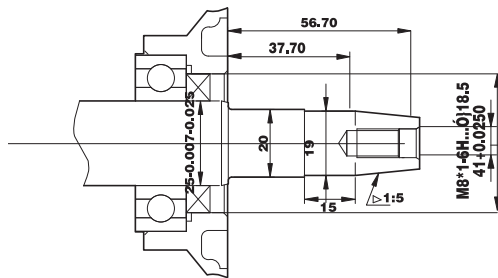
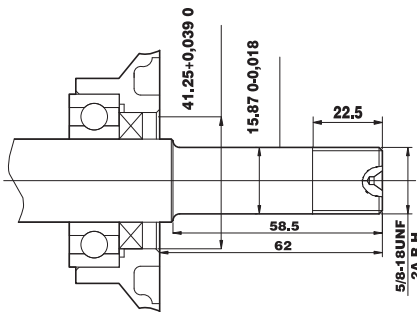
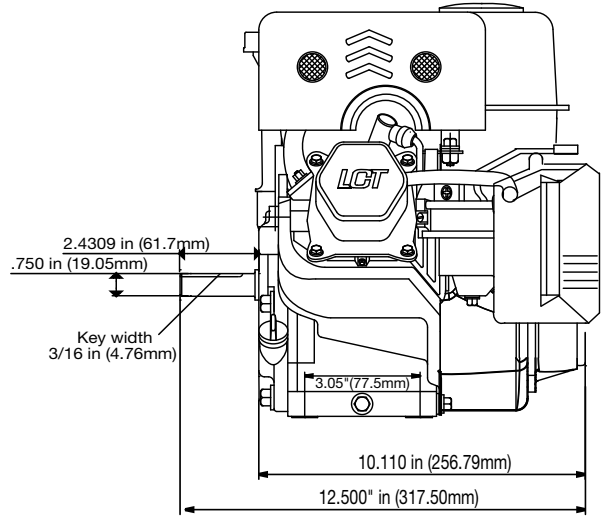
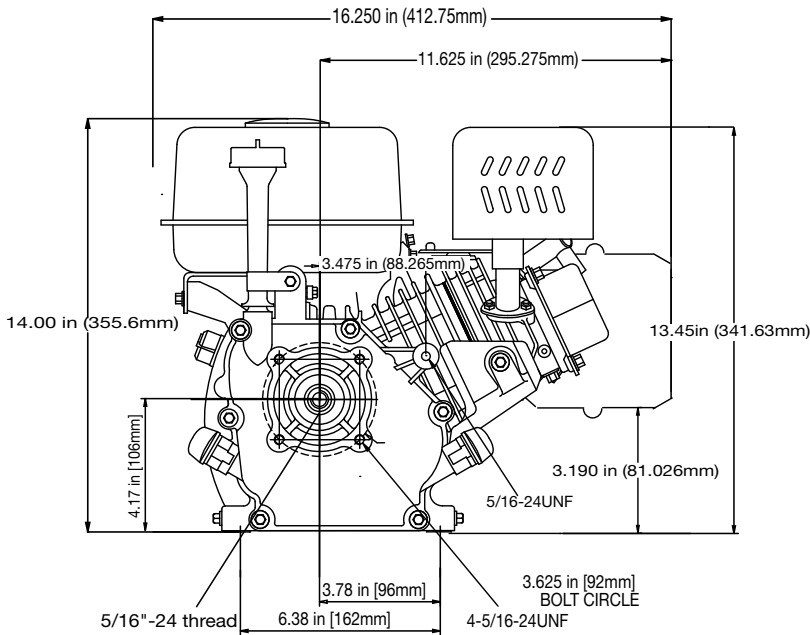
Torque Specifications

Item	208cc	291cc	414cc
	Torque (N.M)	Torque (N.M)	Torque (N.M)
Drain bolt	17-18 (150-160 in-lbs.)	24 (210-220 in-lbs.)	24 (210-220 in-lbs.)
Oil drain tube (if equipped)*	32-33 (280-290 in-lbs.)	32-33 (280-290 in-lbs.)	32-33 (280-290 in-lbs.)
Oil sensor	8 (71 in-lbs.)	8 (71 in-lbs.)	8 (71 in-lbs.)
Oil level cap	3 (27 in-lbs.)	3 (27 in-lbs.)	3 (27 in-lbs.)
Spark plug	20-25 (177-222 in-lbs.)	20-25 (177-222 in-lbs.)	20-25 (177-222 in-lbs.)
Carburetor studs	10-12 (86-106 in-lbs.)	20 (177 in-lbs.)	20 (177 in-lbs.)
Exhaust studs	20-24 (177-212 in-lbs.)	20-24 (177-212 in-lbs.)	20-24 (177-212 in-lbs.)
Pivot bolt M8	22-25 (195-222 in-lbs.)	22-25 (195-222 in-lbs.)	22-25 (195-222 in-lbs.)
Connecting rod bolt	12-14 (106-124 in-lbs.)	20 (177 in-lbs.)	20-24 (177-212 in-lbs.)
Flange bolt	18-24 (160-212 in-lbs.)	18-24 (160-212 in-lbs.)	18-24 (160-212 in-lbs.)
Distributor M6*27	10-12 (86-106 in-lbs.)	10-12 (86-106 in-lbs.)	10-12 (86-106 in-lbs.)
Flange bolt of cylinder head M8*55	36 (27 ft-lbs.)	40-42 (29.5-31 ft-lbs.)	48 (35 ft-lbs.)
Pivot adjusting nut for intake, exhaust valve	10 (86 in-lbs.)	10 (86 in-lbs.)	10 (86 in-lbs.)
Flange bolt for head cover	10-12 (86-106 in-lbs.)	10-12 (86-106 in-lbs.)	10-12 (86-106 in-lbs.)
The bolt for crankcase cover M6*14	10-12 (86-106 in-lbs.)	10-12 (86-106 in-lbs.)	10-12 (86-106 in-lbs.)
Side plate M6*12	8 (71 in-lbs.)	8 (71 in-lbs.)	8 (71 in-lbs.)
Governor support	8 (71 in-lbs.)	8 (71 in-lbs.)	8 (71 in-lbs.)
Carburetor nut M6	7 (62 in-lbs.)	8 (71 in-lbs.)	8 (71 in-lbs.)
Muffler nut M8	24 (212 in-lbs.)	24 (212 in-lbs.)	24 (212 in-lbs.)
Rocker bolt	20-25 (177-222 in-lbs.)	20-25 (177-222 in-lbs.)	20-25 (177-222 in-lbs.)
Cylinder cover bolt (crankcase/ PTO cover)	24 (212 in-lbs.)	24-26 (212-230 in-lbs.)	24-26 (212-230 in-lbs.)
Cylinder head bolt	36 (27 ft-lbs.)	40-42 (29.5-31 ft-lbs.)	48 (35 ft-lbs.)
Flywheel nut	75-80 (55-59 ft-lbs.)	96-102 (71-75 ft-lbs.)	96-102 (71-75 ft-lbs.)
Flange bolt for valve cover (head cover)	7 (62 in-lbs.)	12-13 (106-115 in-lbs.)	12-13 (106-115 in-lbs.)

*Torque values are with thread locking compound applied to the threads.

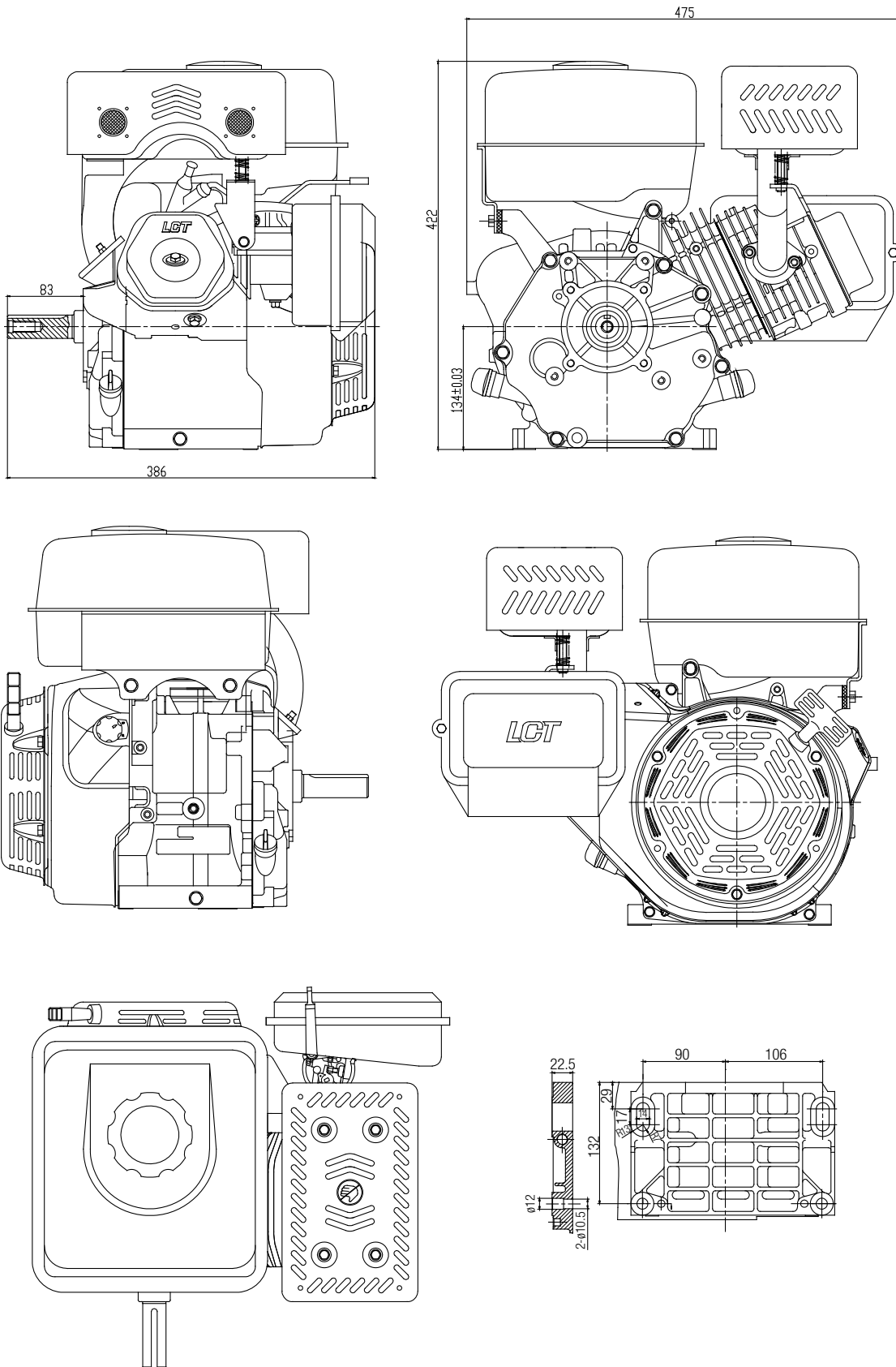
208cc Summer Engine Dimensions

*Drawings do not accurately represent actual engine appearance.



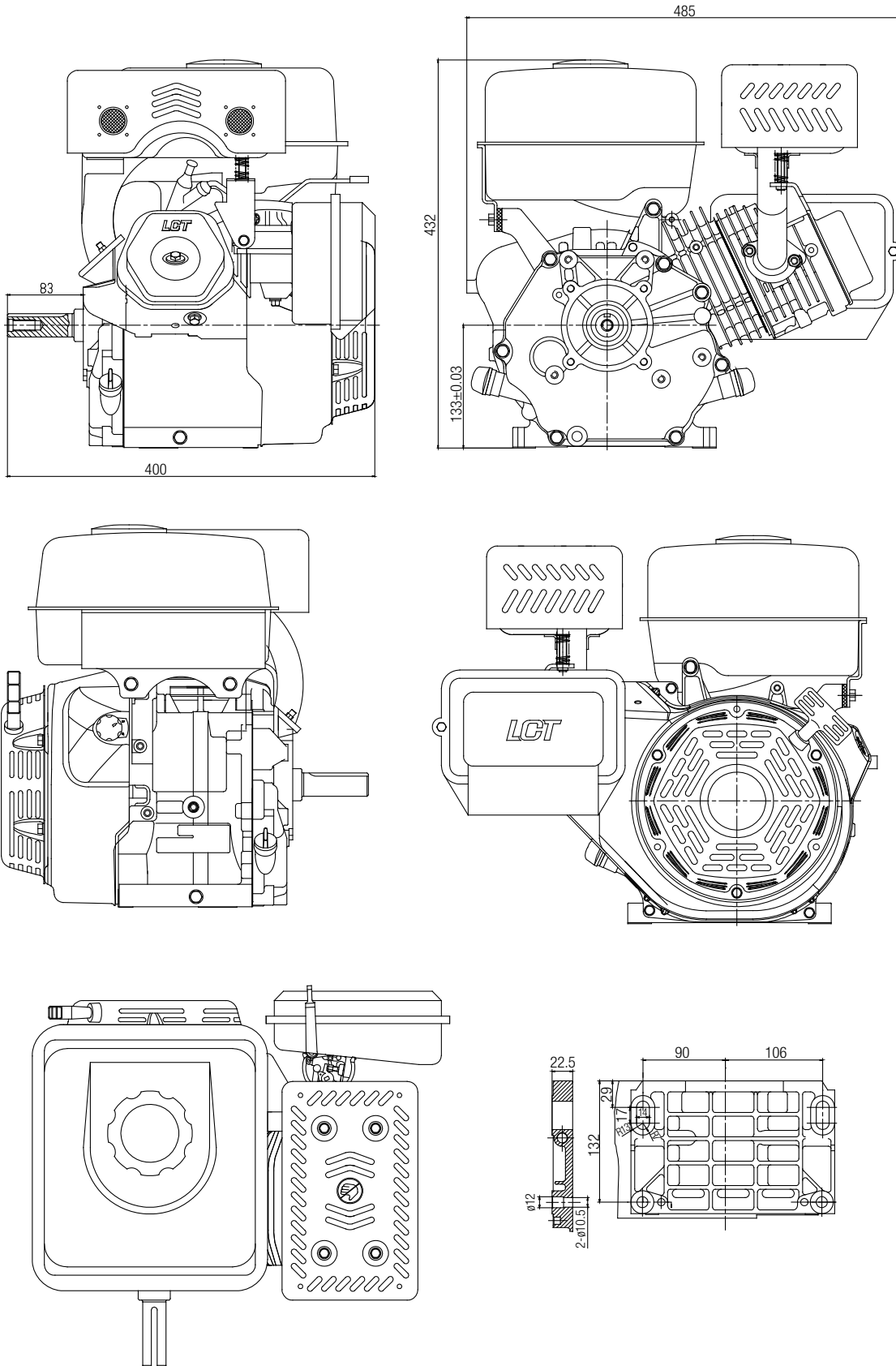
291cc Summer Engine Dimensions

*Drawings do not accurately represent actual engine appearance.



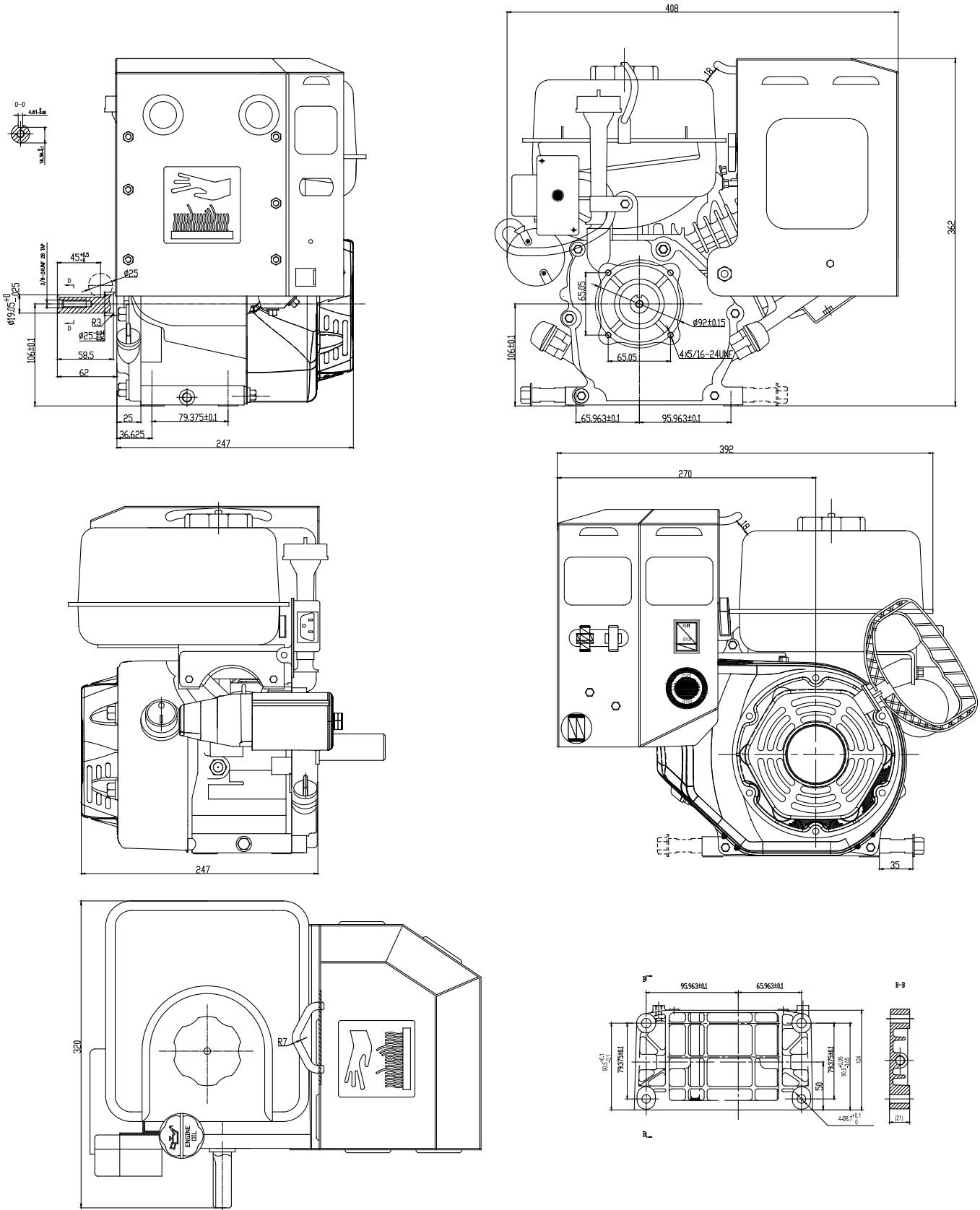
414cc Summer Engine Dimensions

*Drawings do not accurately represent actual engine appearance.



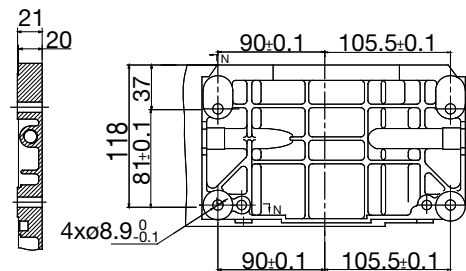
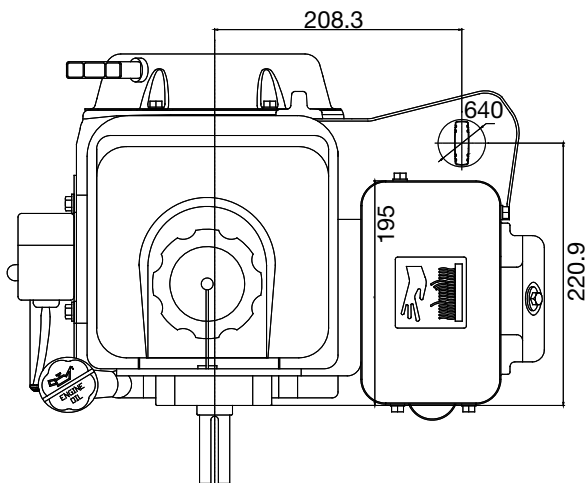
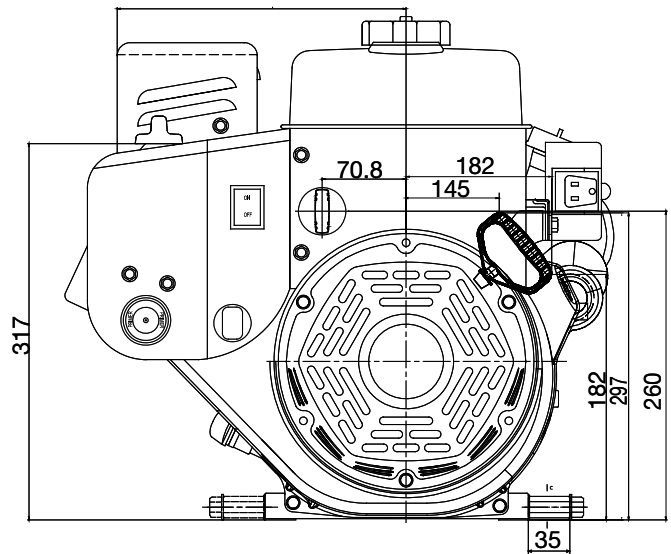
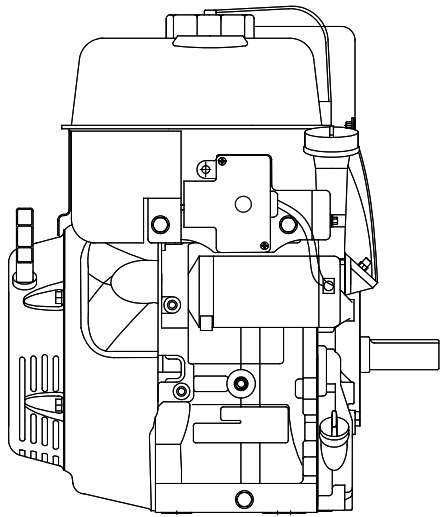
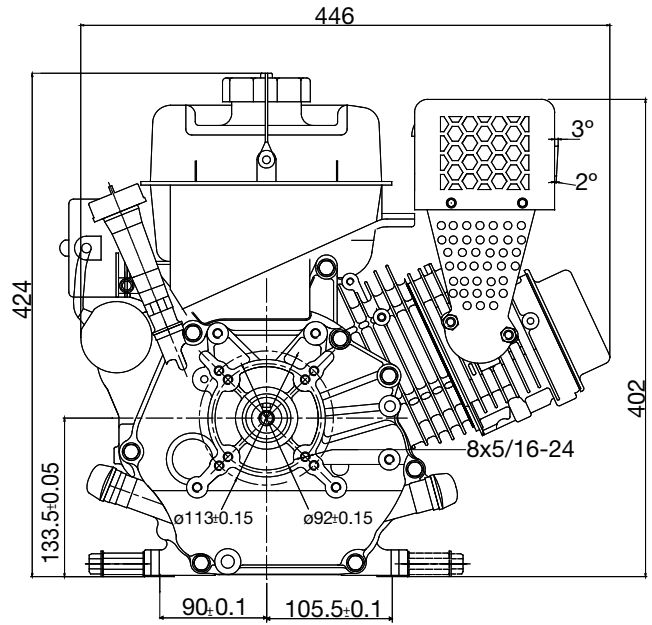
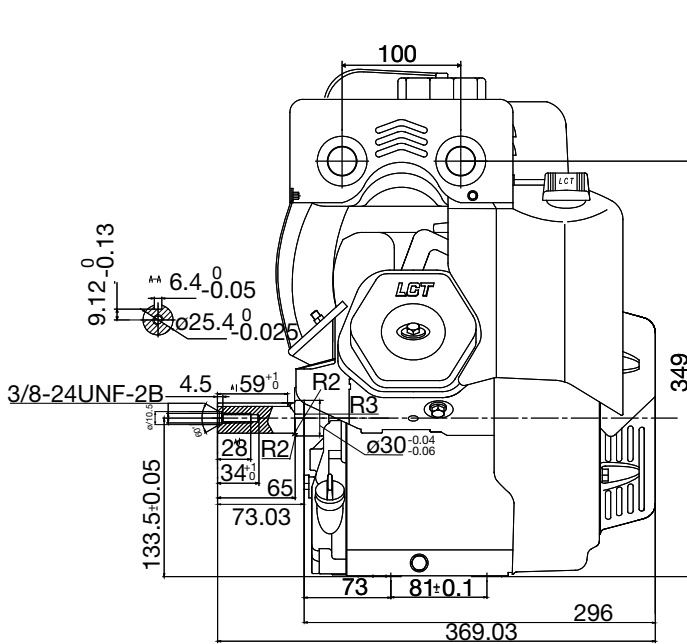
208cc Snow Engine Dimensions

*Drawings do not accurately represent actual engine appearance.



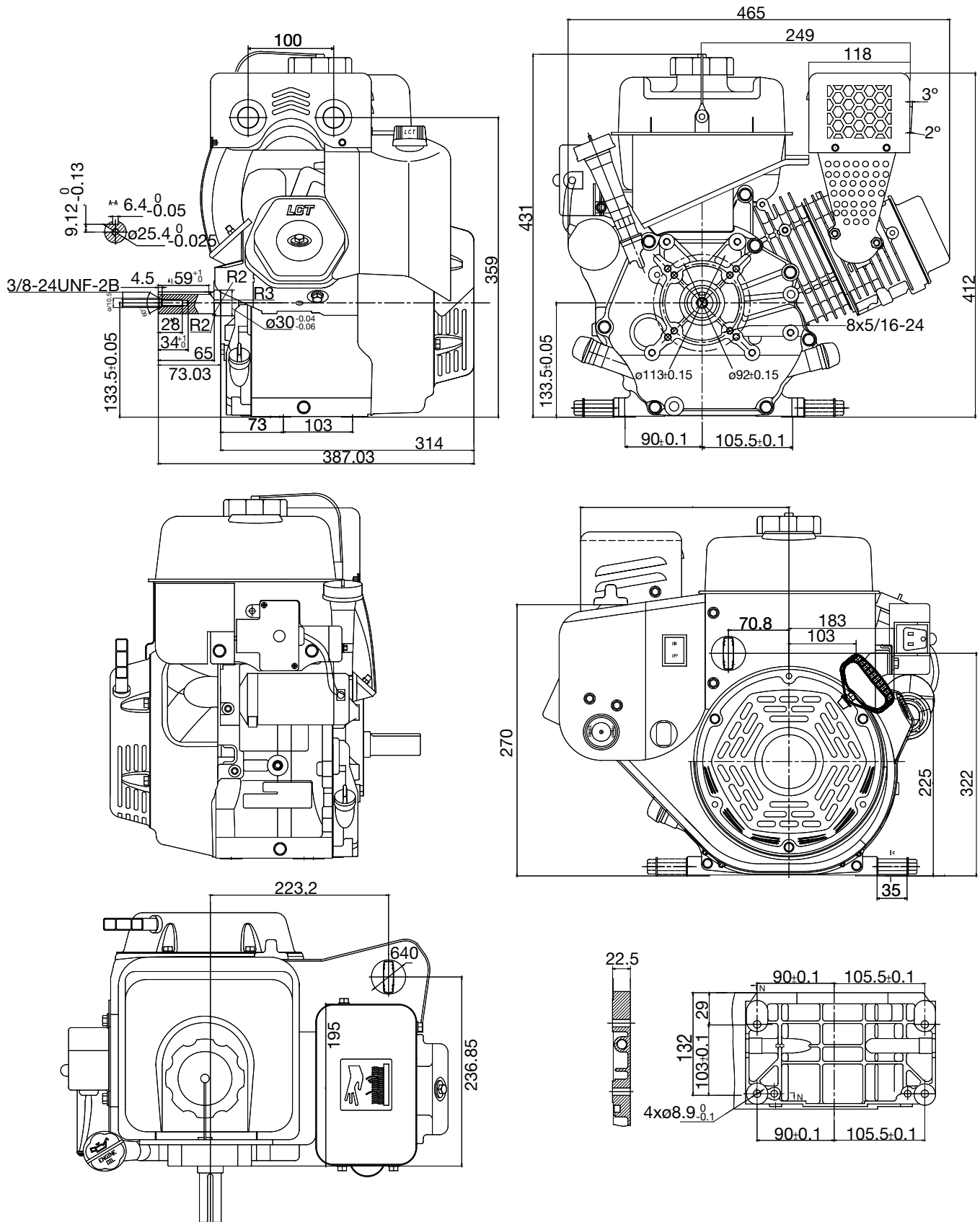
291cc Snow Engine Dimensions

*Drawings do not accurately represent actual engine appearance.



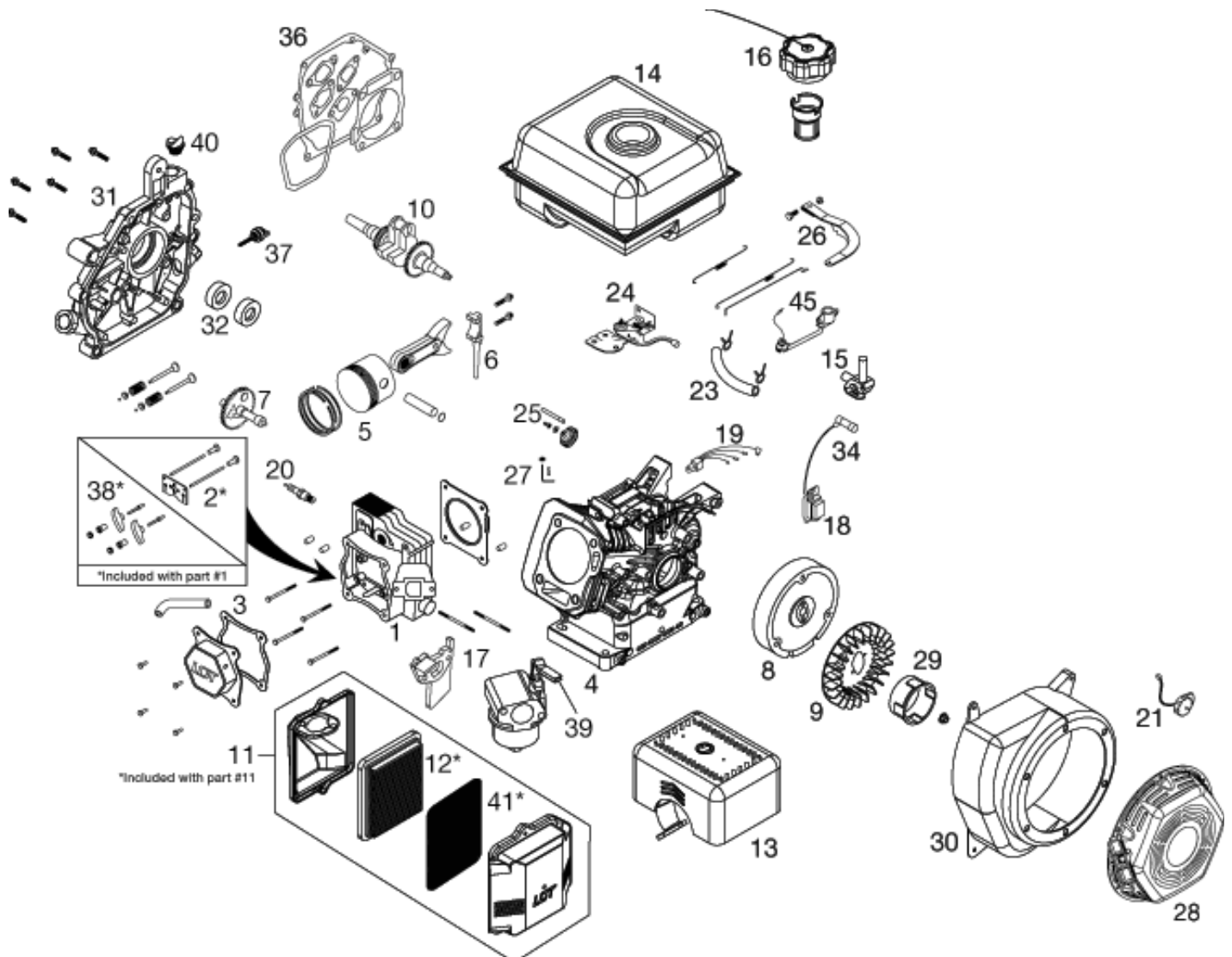
414cc Snow Engine Dimensions

*Drawings do not accurately represent actual engine appearance.



208cc Manual Start Summer Engine Service Kit

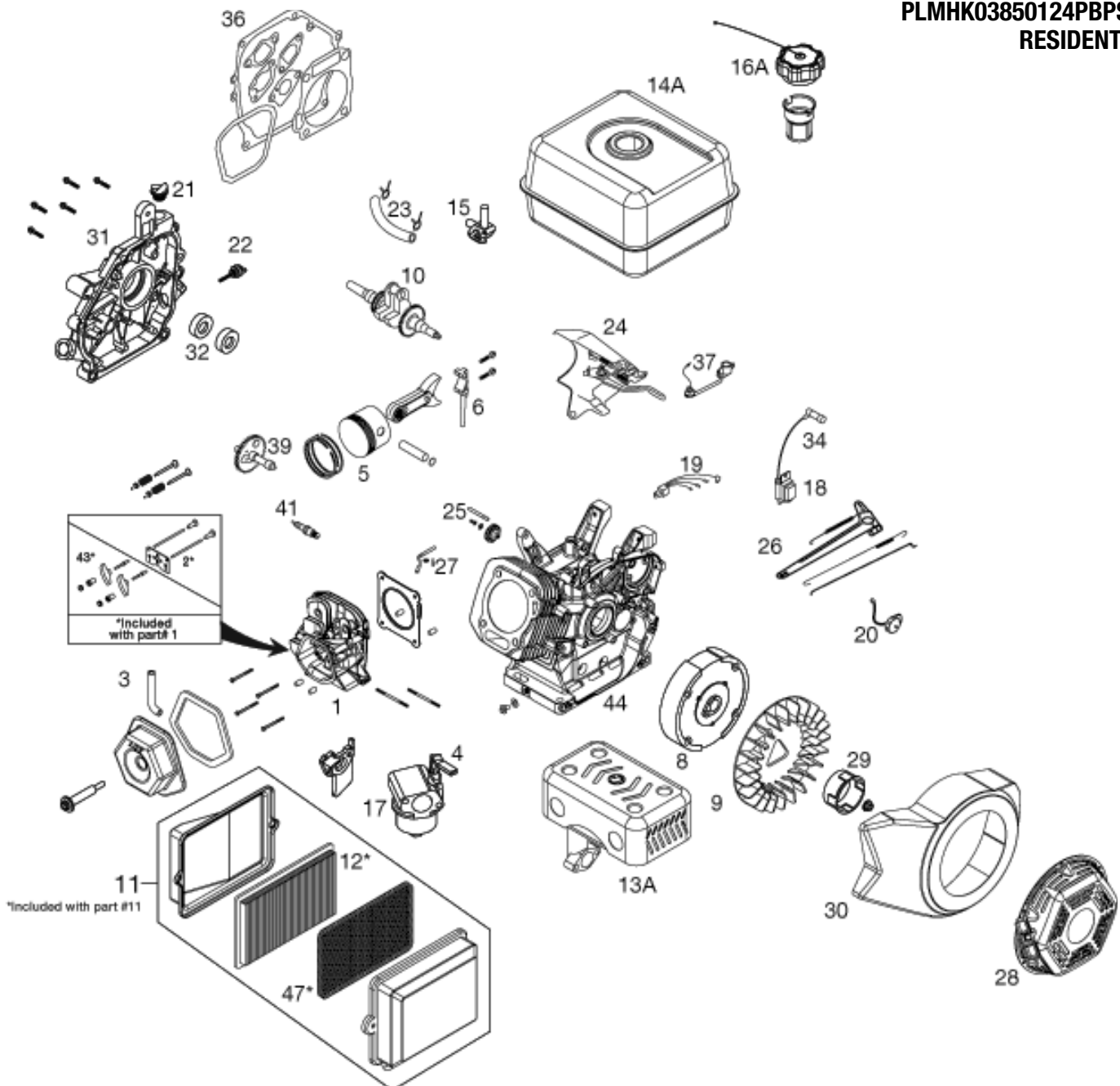
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1	Cylinder Head Assembly	SK2081000	14	Fuel Tank (Black)	SK2082200	28	Recoil Starter Assembly	SK2083200
2	Push Rod Assembly	SK2081001	15	Fuel Petcock	SK2082221	29	Starter Cup	SK2083300
3	Valve Cover Assembly	SK2084500	16	Oversized Fuel Tank Cap (click style)	SKSN0301	30	Blower Housing Service Kit	SK2083400
4	Cylinder Assembly	SK2081300	17	Carburetor Service Kit	SK2082401	31	Crankcase Cover Assembly	SK2083600
5	Piston Assembly	SK2081400	18	Ignition Coil Assembly	SK2082500	32	Oil Seal Kit	SK2083900
6	Connecting Rod Assembly	SK2081500	19	Control Module (CDI Box)	SK2082750	34	Spark Plug Boot	SK2083800
7	Camshaft System Assembly	SK2081600	20	Spark Plug	SK2083810	36	Gasket Kit	SK2084300
8	Flywheel Assembly	SK2081700	21	On/Off Switch	SK2082600	37	Small Black Dipstick	SK2083711
9	Cooling Fan, Flywheel	SK2084000	23	Fuel Hose Kit	SK2086000	38	Rocker Arm Assy	SK2081100
10	Crankshaft Assembly (Keyed)	SK2081800	24	Throttle Control Assembly	SK2082800	39	Choke Lever, Carburetor	SK2082120
11	Air Filter Assembly of Paper	SK2082002	25	Governor Gear Assembly	SK2082900	40	Non-Removable Oil Plug	SK2083705
12	Filter Element, Panel Paper	SK2082012	26	Governor Link Assembly	SK2083000	41	Foam Pre-Filter	SK2089001
13	Muffler Assembly	SK2082100	27	Governor Arm Shaft Assembly	SK2083100	45	Low Oil Sensor	SK2082700

291cc Manual Start Summer Engine Service Kit

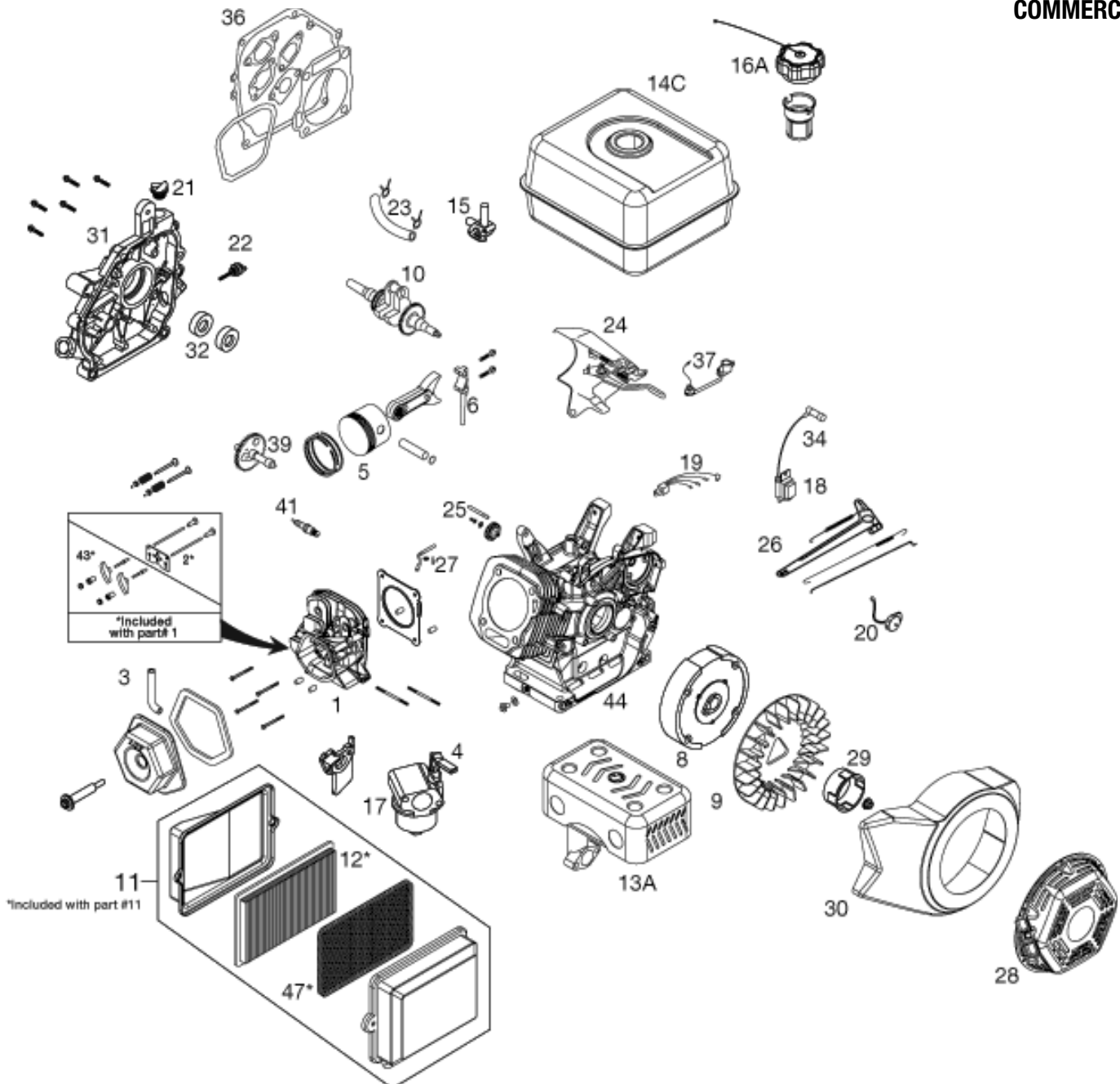
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 RESIDENTIAL



1	Cylinder Head Assembly	SK2911000	15	Fuel Petcock	SK4142220	28	Recoil Starter Assembly	SK2913200
2	Push Rod Tappet Kit	SK2911001	16A	Plastic Fuel Cap (Click Style)	SK4148300	29	Starter Cup	SK2913300
3	Valve Cover Assembly	SK2914500	17	Carburetor Assembly	SK2912400	30	Blower Housing Assembly	SK2913400
4	Choke Lever, Carburetor	SK4142120	18	Ignition Coil Assembly	SK2912500	31	Crankcase Cover Assembly	SK2913600
5	Piston Assembly	SK2911400	19	CDI Box Assembly	SK2912750	32	Seal Kit	SK2913900
6	Connecting Rod Assembly	SK2911500	20	On/Off Switch	SK2082600	34	Spark Plug Boot	SK2913800
8	Flywheel Assembly, Manual Start	SK2911700	21	Non-Removable Oil Plug	SK4143715	36	Engine Gasket Kit	SK2914300
9	Flywheel Fan	SK2914000	22	Black Oil Dipstick	SK4143711	37	Low Oil Sensor	SK2912700
10	Crankshaft	SK2911800	23	Fuel Hose Kit	SK4146000	39	Camshaft	SK2911600
11	Air Filter Assembly of Paper	SK4142002	24	Throttle Control Assembly	SK2912800	41	Spark Plug	SK2911550
12	Filter Element, Panel Paper	SK4142012	25	Governor Gear Assembly	SK2912900	43	Rocker Arm Kit	SK4141100
13A	Muffler Assembly	SK2912100	26	Governor Link Assembly	SK2913000	44	Cylinder Assembly	SK2911300
14A	Fuel Tank Assembly	SK4142200	27	Governor Arm Shaft Assembly	SK2913100	47	Foam Pre-Filter	SK4149001

291cc Manual Start Summer Engine Service Kit

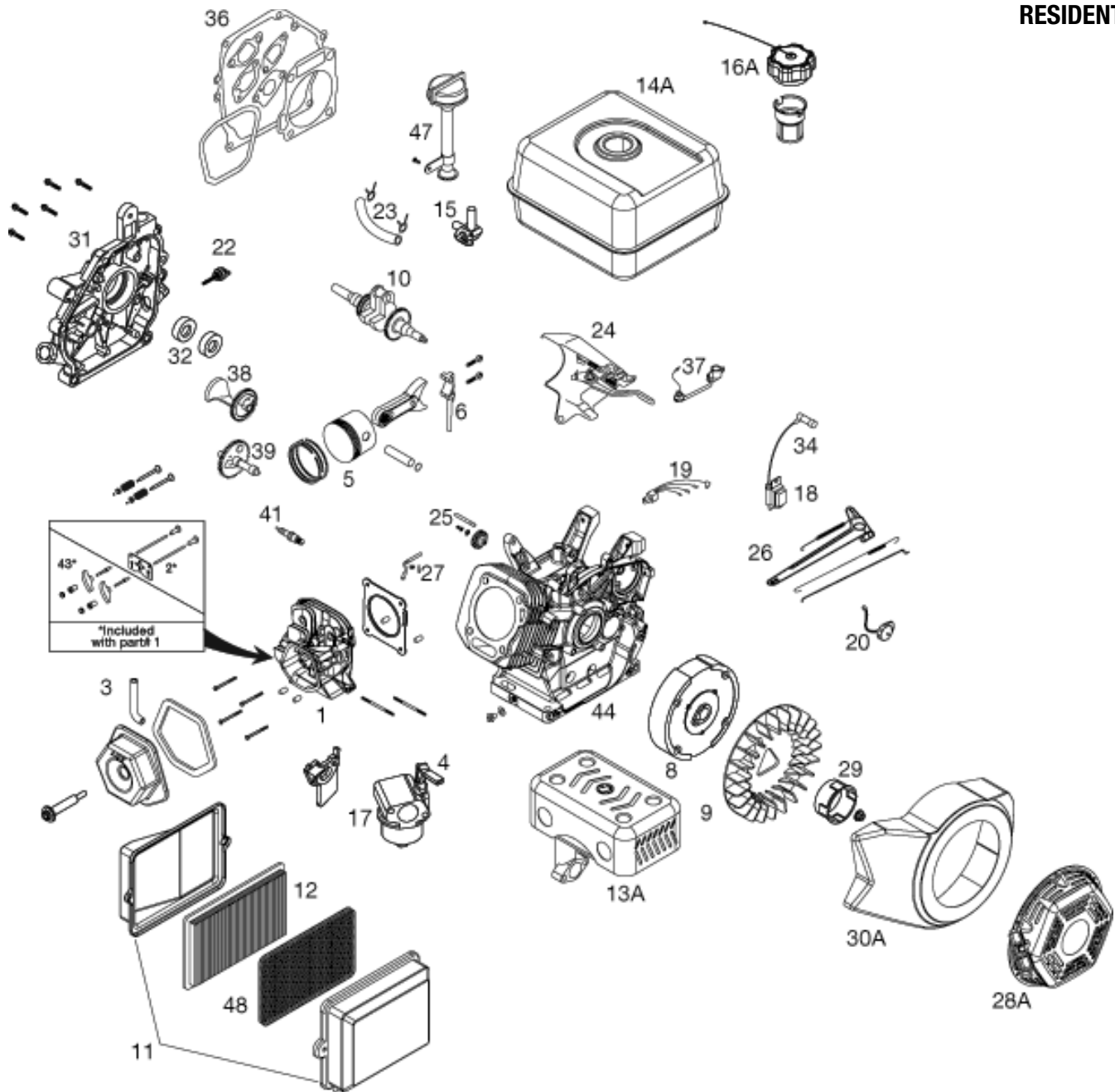
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1	Cylinder Head Assembly	SK2911000	15	Fuel Petcock	SK4142220	28	Recoil Starter Assembly	SK2913200
2	Push Rod Tappet Kit	SK2911001	16A	Plastic Fuel Cap (Click Style)	SK4148300	29	Starter Cup	SK2913300
3	Valve Cover Assembly	SK2914500	17	Carburetor Assembly	SK2912400	30	Blower Housing Assembly	SK2913400
4	Choke Lever, Carburetor	SK4142120	18	Ignition Coil Assembly	SK2912500	31	Crankcase Cover Assembly	SK2913600
5	Piston Assembly	SK2911400	19	CDI Box Assembly	SK2912750	32	Seal Kit	SK2913900
6	Connecting Rod Assembly	SK2911500	20	On/Off Switch	SK2082600	34	Spark Plug Boot	SK2913800
8	Flywheel Assembly, Manual Start	SK2911700	21	Non-Removable Oil Plug	SK4143715	36	Engine Gasket Kit	SK2914300
9	Flywheel Fan	SK2914000	22	Black Oil Dipstick	SK4143711	37	Low Oil Sensor	SK2912700
10	Crankshaft	SK2911800	23	Fuel Hose Kit	SK4146000	39	Camshaft	SK2911600
11	Air Filter Assembly of Paper	SK4142002	24	Throttle Control Assembly	SK2912800	41	Spark Plug	SK2911550
12*	Filter Element, Panel Paper	SK4142012	25	Governor Gear Assembly	SK2912900	43	Rocker Arm Kit	SK4141100
13A	Muffler Assembly	SK2912100	26	Governor Link Assembly	SK2913000	44	Cylinder Assembly	SK2911300
14C	Large Capacity Fuel Tank Assembly	SK4142201	27	Governor Arm Shaft Assembly	SK2913100	47	Foam Pre-Filter	SK4149001

414cc Manual Start Summer Engine Service Kit

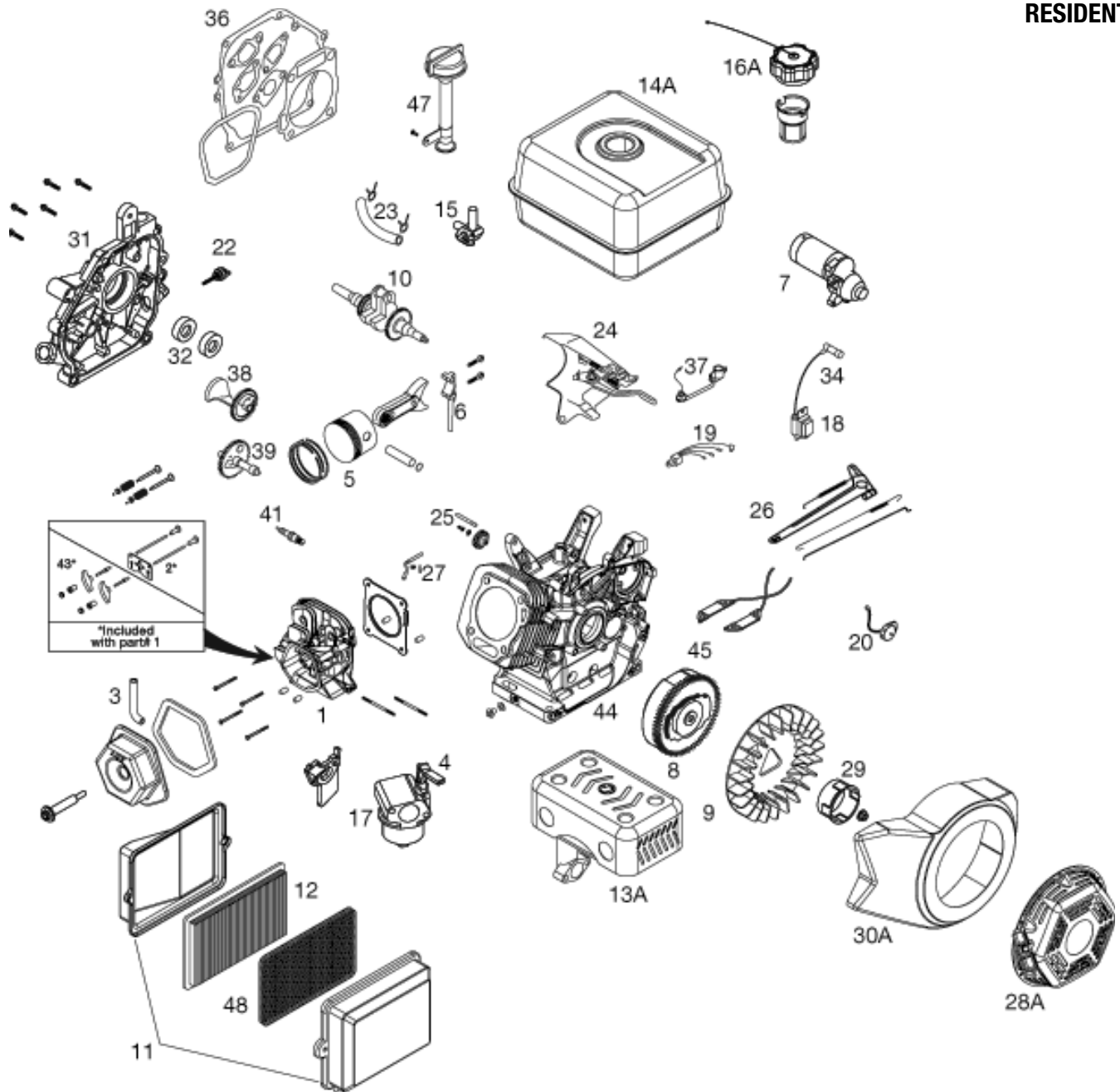
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1	Cylinder Head Assembly	SK4141050	16A	Plastic Fuel Cap (Click Style)	SK4148300	31	Crankcase Cover Assembly	SK4143600
2	Push Rod Tappet Kit	SK4141001	17	Carburetor Assembly	SK4142400	32	Seal Kit	SK4143905
3	Valve Cover Assembly	SK4144500	18	Ignition Coil Assembly	SK4142500	34	Spark Plug Boot	SK4143800
4	Choke Lever, Carburetor	SK4142120	19	CDI Box Assembly	SK4142750	36	Engine Gasket Kit	SK4144300
5	Piston Assembly	SK4141400	20	On/Off Switch	SK2082600	37	Low Oil Sensor	SK4142700
6	Connecting Rod Assembly	SK4141500	22	Black Oil Dipstick	SK4143711	38	Counter Weight Kit	SK4141650
8	Flywheel Assembly, Manual Start	SK4141700	23	Fuel Hose Kit	SK4146000	39	Camshaft	SK4141600
9	Flywheel Fan	SK4144000	24	Throttle Control Assembly	SK4142800	41	Spark Plug	SK2911550
10	Crankshaft	SK4141800	25	Governor Gear Assembly	SK4142900	43	Rocker Arm Kit	SK4141100
11	Air Filter Assembly of Paper	SK4142002	26	Governor Link Assembly	SK4143000	44	Cylinder Assembly	SKSN4444
12	Filter Element, Panel Paper	SK4142012	27	Governor Arm Shaft Assembly	SK4143100	46	Fuel Hose Kit	SK4146000
13A	Muffler Assembly	SK4142100	28A	Recoil Starter Assembly	SK4143200	47	High Oil Fill Assembly Kit	SK4143720
14A	Fuel Tank Assembly	SK4142200	29	Starter Cup	SK4143300	48	Foam Pre-Filter	SK4149001
15	Fuel Petcock	SK4142220	30A	Blower Housing Assembly	SK4143400			

414cc Electric Start Summer Engine Service Kit

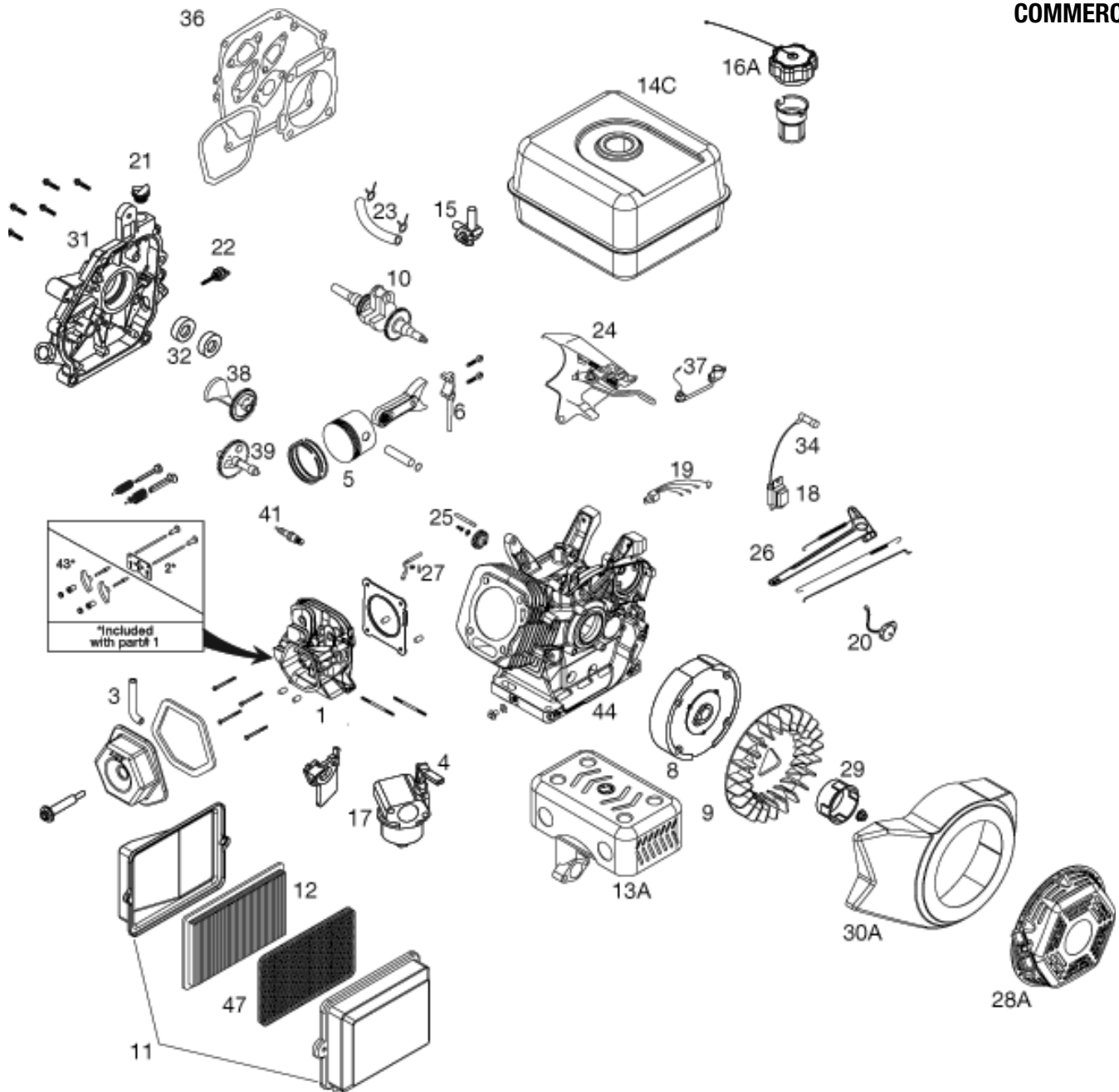
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2	Push Rod Tappet Kit	SK4141001	16A	Plastic Fuel Cap (Click Style)	SK4148300	31	Crankcase Cover Assembly	SK4143600
3	Valve Cover Assembly	SK4144500	17	Carburetor Assembly	SK4142400	32	Seal Kit	SK4143905
4	Choke Lever, Carburetor	SK4142120	18	Ignition Coil Assembly	SK4142500	34	Spark Plug Boot	SK4143800
5	Piston Assembly	SK4141400	19	CDI box Assembly	SK4142750	36	Engine Gasket Kit	SK4144300
6	Connecting Rod Assembly	SK4141500	20	On/Off Switch	SK2082600	37	Low Oil Sensor	SK4142700
7	Electric starter Assembly	SK4148050	22	Black Oil Dipstick	SK4143711	38	Counter Weight Kit	SK4141650
8A	Flywheel Assembly, Electric Start	SK4141701	23	Fuel Hose Kit	SK4146000	39	Camshaft	SK4141600
9	Flywheel Fan	SK4144000	24	Throttle Control Assembly	SK4142800	41	Spark Plug	SK2911550
10	Crankshaft	SK4141800	25	Governor Gear Assembly	SK4142900	43	Rocker Arm Kit	SK4141100
11	Air Filter Assembly of Paper	SK4142002	26	Governor Link Assembly	SK4143000	44	Cylinder Assembly	SKSN4444
12	Filter Element, Panel Paper	SK4142012	27	Governor Arm Shaft Assembly	SK4143100	45	Charging Coil AC	SK4141710
13A	Muffler Assembly	SK4142100	28A	Recoil Starter Assembly	SK4143200	47	High Oil Fill Assembly Kit	SK4143720
14A	Fuel Tank Assembly	SK4142200	29	Starter Cup	SK4143300	48	Foam Pre-Filter	SK4149001

414cc Manual Start Summer Engine Service Kit

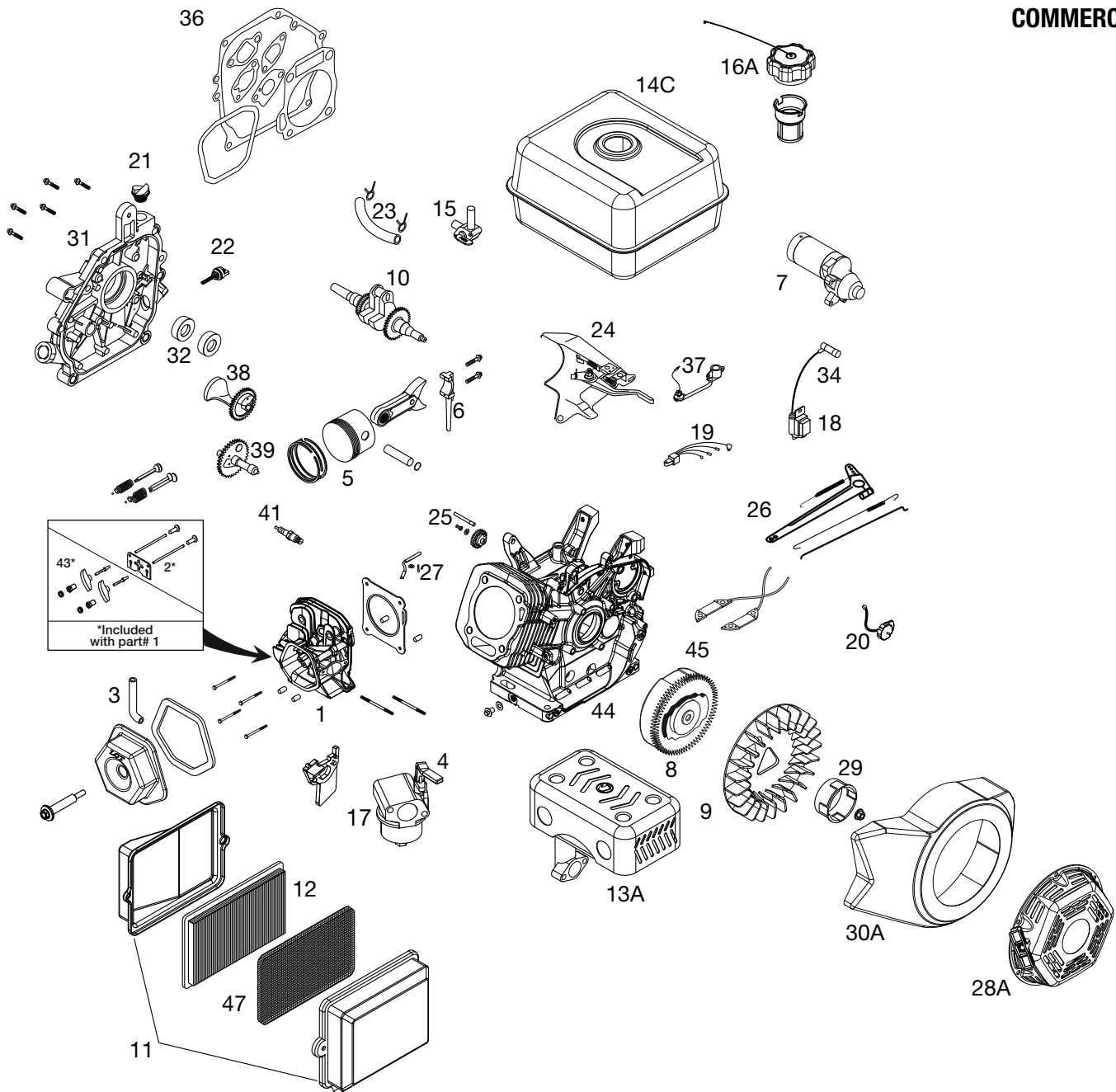
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2	Push Rod Tappet Kit	SK4141001	17	Carburetor Assembly	SK4142400	31	Crankcase Cover Assembly	SK4143600
3	Valve Cover Assembly	SK4144500	18	Ignition Coil Assembly	SK4142500	32	Seal Kit	SK4143905
4	Choke Lever, Carburetor	SK4142120	19	CDI Box Assembly	SK4142750	34	Spark Plug Boot	SK4143800
5	Piston Assembly	SK4141400	20	On/Off Switch	SK2082600	36	Engine Gasket Kit	SK4144300
6	Connecting Rod Assembly	SK4141500	21	Non-Removable Oil Plug	SK4143715	37	Low Oil Sensor	SK4142700
8	Flywheel Assembly, Manual Start	SK4141700	22	Black Oil Dipstick	SK4143711	38	Counter Weight Kit	SK4141650
9	Flywheel Fan	SK4144000	23	Fuel Hose Kit	SK4146000	39	Camshaft	SK4141600
10	Crankshaft	SK4141800	24	Throttle Control Assembly	SK4142800	41	Spark Plug	SK2911550
11	Air Filter Assembly of Paper	SK4142002	25	Governor Gear Assembly	SK4142900	43	Rocker Arm Kit	SK4141100
12	Filter Element, Panel Paper	SK4142012	26	Governor Link Assembly	SK4143000	44	Cylinder Assembly	SKSN4444
13A	Muffler Assembly	SK4142100	27	Governor Arm Shaft Assembly	SK4143100	47	Foam Pre-Filter	SK4149001
14C	Large Capacity Fuel Tank Assembly	SK4142201	28A	Recoil Starter Assembly	SK4143200			
15	Fuel Petcock	SK4142220	29	Starter Cup	SK4143300			

414cc Electric Start Summer Engine Service Kit

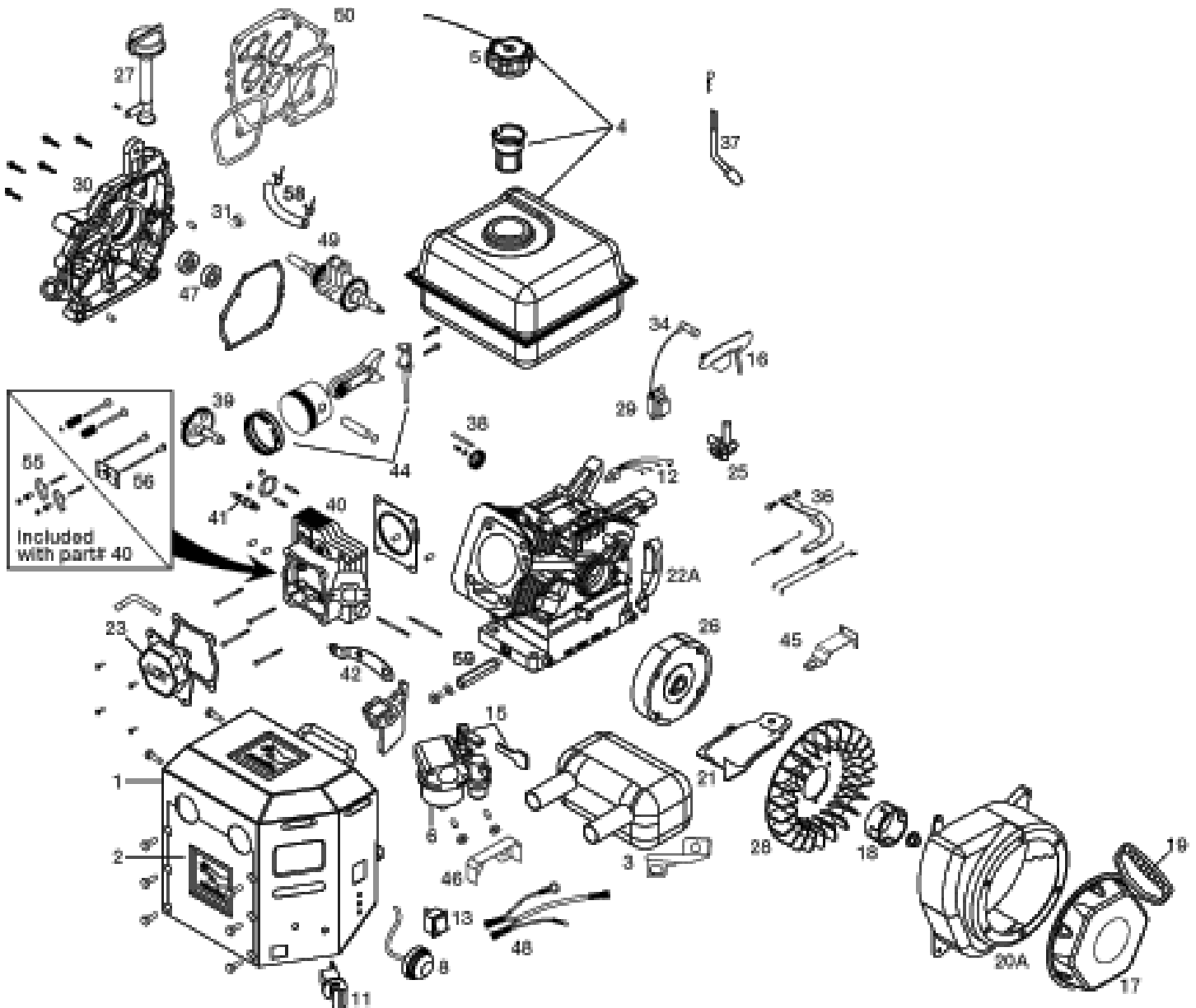
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1	Cylinder Head Assembly	SK4141050	16A	Plastic Fuel Cap (Click Style)	SK4148300	31	Crankcase Cover Assembly	SK4143600
2	Push Rod Tappet Kit	SK4141001	17	Carburetor Assembly	SK4142400	32	Seal Kit	SK4143905
3	Valve Cover Assembly	SK4144500	18	Ignition Coil Assembly	SK4142500	34	Spark Plug Boot	SK4143800
4	Choke Lever, Carburetor	SK4142120	19	CDI Box Assembly	SK4142750	36	Engine Gasket Kit	SK4144300
5	Piston Assembly	SK4141400	20	On/Off Switch	SK2082600	37	Low Oil Sensor	SK4142700
6	Connecting Rod Assembly	SK4141500	21	Non-Removable Oil Plug	SK4143715	39	Camshaft	SK4141600
7	Electric Starter Assembly	SK4148050	22	Black Oil Dipstick	SK4143711	38	Counter Weight Kit	SK4141650
8A	Flywheel Assembly, Electric Start	SK4141701	23	Fuel Hose Kit	SK4146000	41	Spark Plug	SK2911550
9	Flywheel Fan	SK4144000	24	Throttle Control Assembly	SK4142800	43	Rocker Arm Kit	SK4141100
10	Crankshaft	SK4141800	25	Governor Gear Assembly	SK4142900	44	Cylinder Assembly	SKSN4444
11	Air Filter Assembly of Paper	SK4142002	26	Governor Link Assembly	SK4143000	45	Charging Coil AC	SK4141710
12	Filter Element, Panel Paper	SK4142012	27	Governor Arm Shaft Assembly	SK4143100	46	Fuel Hose Kit	SK4146000
13A	Muffler Assembly	SK4142100	28A	Recoil Starter Assembly	SK4143200	47	Foam Pre-Filter	SK4149001
14C	Large Capacity Fuel Tank Assembly	SK4142201	29	Starter Cup	SK4143300			
15	Fuel Petcock	SK4142220	30A	Blower Housing Assembly	SK4143400			

208cc Manual Start Snow Engine Service Kit

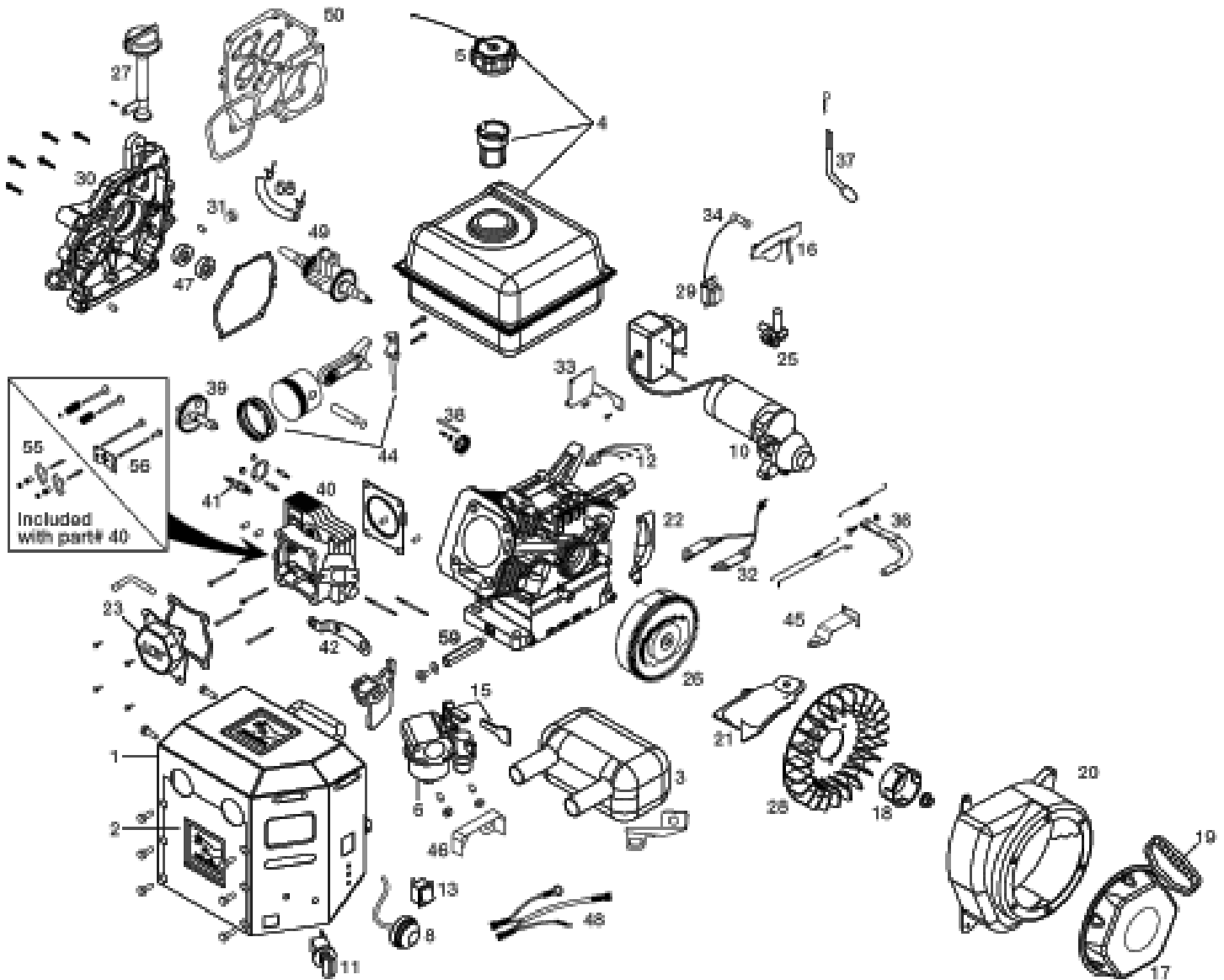
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1	Heater Box Assy	SKSN0100	20A	Blower Housing Assembly Manual Start – Snow (Black)	SKSN0612	39	Camshaft	SK2081600
2	Shield, Heater Box	SKSN0101	21	Shield, Cylinder	SKSN0608	40	Cylinder Head Assy	SK2081000
3	Snow Muffler Assy	SKSN0200	22A	Shield, Flywheel	SKSN0607	41	Spark Plug	SK2083810
4	Snow Fuel Tank Assy	SKSN0300	23	Valve Cover	SK2084500	42	CDI Box Bracket	SKSN0402
5	Oversized Fuel Tank Cap (Click Style)	SKSN0301	25	Fuel Petcock	SK2082221	44	Piston And Rod Assy	SK2081400
6	Snow Carburetor Assy	SKSN0302	26A	Manual Start Flywheel Assy	SK2081700	45	Speed Control Bracket	SKSN0150
8	Fuel Primer Bulb With Hose	SKSN0304	27	High Oil Fill Tube Assy	SK2083701	46	Vapor Shield	SKSN0155
11	Key Switch Assy	SKSN0401	28	Flywheel Fan	SK2084000	47	Seal Kit	SK2083900
12	CDI Box	SKSN0404	29	Ignition Coil Assy	SK2082500	48	Wire Harness	SKSN0160
13	On/Off Switch	SKSN0403	30	Crankcase Cover Assy	SK2083600	49	Crankshaft	SK2081800
15	Choke Lever/Choke Handle (Red)	SKSN0500	31	Non Removable Plug	SK2083705	50	Gasket Kit	SK2084300
16	Governor Linkage Shield Plate	SKSN0501	34	Spark Plug Boot	SK2083800	55	Rocker Arm Kit	SK2081100
17	Snow Recoil Starter Assy (Hex Style - Black)	SKSN0600	36	Governor Arm Assy	SK2083000	56	Push Rod Kit	SK2081001
18	Starter Cup Small	SKSN0601	37	Governor Shaft	SK2083100	58	Fuel Hose Kit	SK2086000
19	Snow Starter Grip	SKSN0603	38	Governor Gear Assy	SK2082900	59	Extended Oil Drain Tube	SKSN0700

208cc Electric Start Snow Engine Service Kit

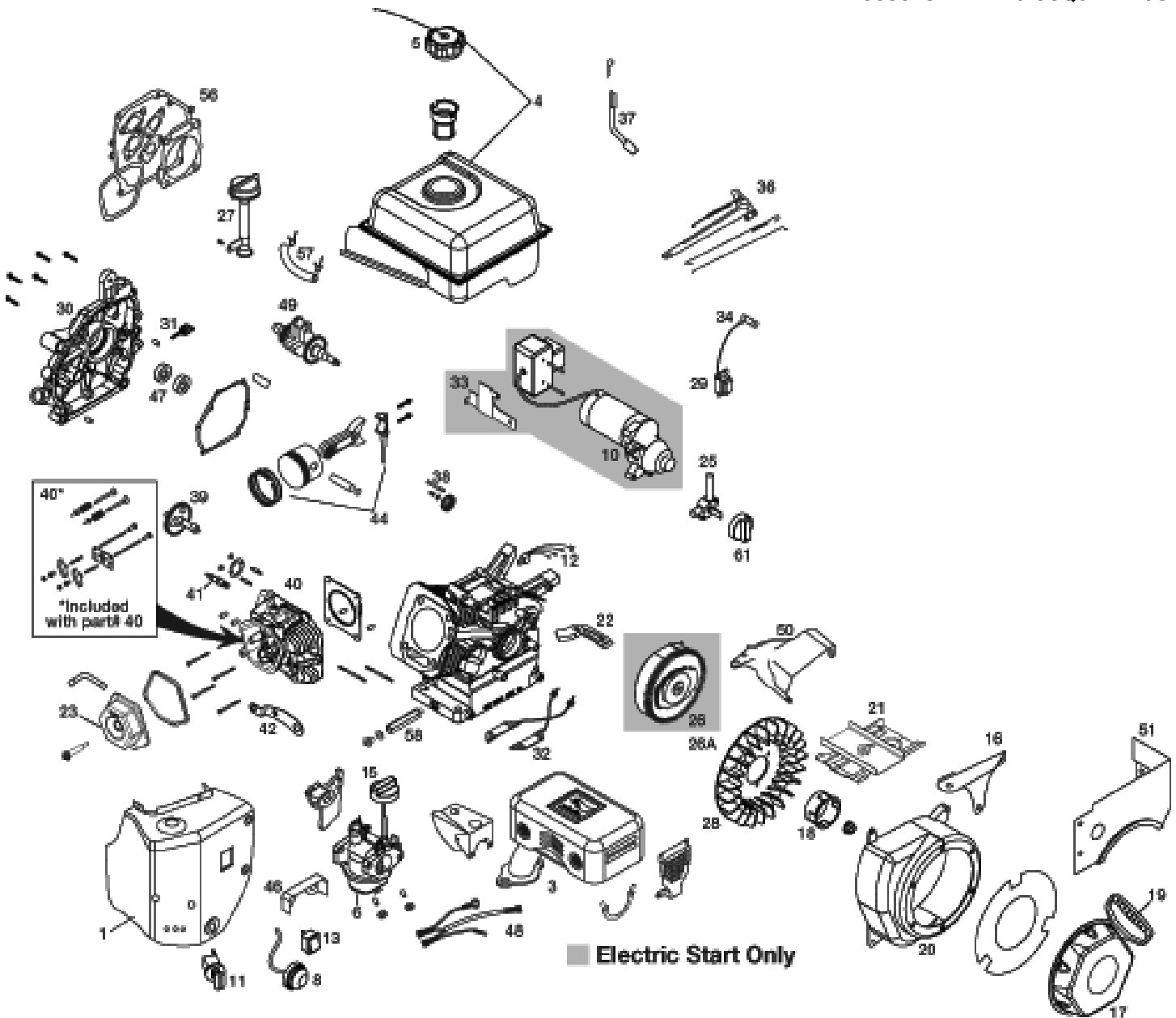
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1	Heater Box Assy	SKSN0100	20	Blower Housing Assembly Electric Start - Snow (Black)	SKSN0602	38	Governor Gear Assy	SK2082900
2	Shield, Heater Box	SKSN0101	21	Shield, Cylinder	SKSN0608	39	Camshaft	SK2081600
3	Snow Muffler Assy	SKSN0200	22	Shield, Flywheel	SKSN0605	40	Cylinder Head Assy	SK2081000
4	Snow Fuel Tank Assy	SKSN0300	23	Valve Cover	SK2084500	41	Spark Plug	SK2083810
5	Oversized Fuel Tank Cap (Click Style)	SKSN0301	25	Fuel Petcock	SK2082221	42	CDI Box Bracket	SKSN0402
6	Snow Carburetor Assy	SKSN0302	26	Electric Start Flywheel Assy	SKSN0405	44	Piston And Rod Assy	SK2081400
8	Fuel Primer Bulb With Hose	SKSN0304	27	High Oil Fill Tube Assy	SK2083701	45	Speed Control Bracket	SKSN0150
10	Electric Starter Assy	SKSN0400	28	Flywheel Fan	SK2084000	46	Vapor Shield	SKSN0155
11	Key Switch Assy	SKSN0401	29	Ignition Coil Assy	SK2082500	47	Seal Kit	SK2083900
12	CDI Box	SKSN0404	30	Crankcase Cover Assy	SK2083600	48	Wire Harness	SKSN0160
13	On/Off Switch	SKSN0403	31	Non Removable Plug	SK2083705	49	Crankshaft	SK2081800
15	Choke Lever/Choke Handle (Red)	SKSN0500	32	Charging Coil DC	SKSN0770	50	Gasket Kit	SK2084300
16	Governor Linkage Shield Plate	SKSN0501	33	Electric Starter Bracket	SKSN0606	55	Rocker Arm Kit	SK2081100
17	Snow Recoil Starter Assy (Hex Style - Black)	SKSN0600	34	Spark Plug Boot	SK2083800	56	Push Rod Kit	SK2081001
18	Starter Cup Small	SKSN0601	36	Governor Arm Assy	SK2083000	58	Fuel Hose Kit	SK2086000
19	Snow Starter Grip	SKSN0603	37	Governor Shaft	SK2083100	59	Extended Oil Drain Tube	SKSN0700

291cc Manual/Electric Start Snow Engine Service Kit

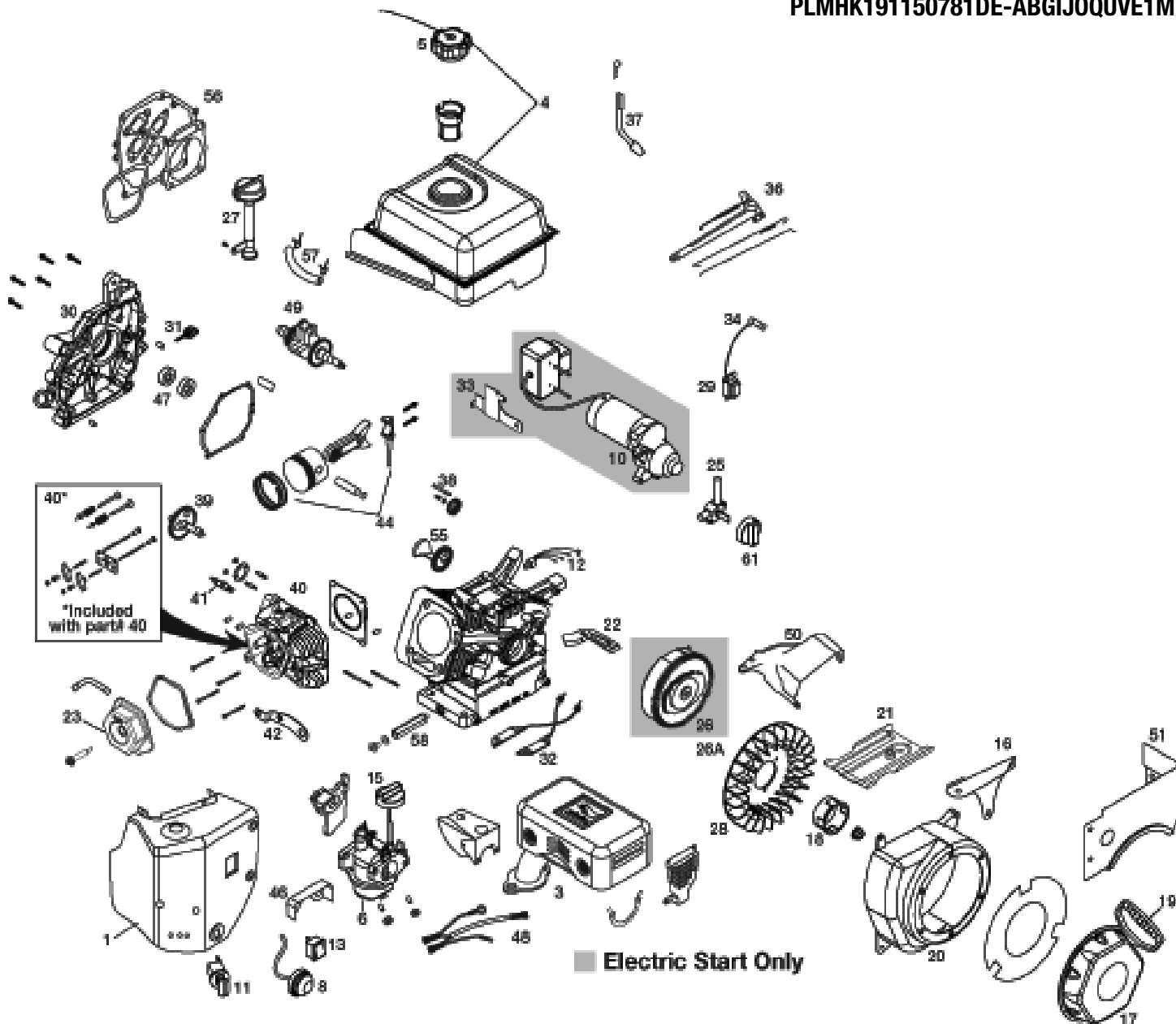
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1	Heater Box Assembly-Snow	SKSN2100	21	Shield, Cylinder	SK4141010	39	Camshaft	SK2911600
3	Muffler Assembly-Snow	SKSN4200	22	Shield, Under Flywheel Charging System-Snow	SKSN4604	40	Cylinder Head Assy	SK2911000
4	Fue Tank Assembly-Snow	SKSN4300	23	Valve Cover	SK2914500	41	Spark Plug	SK2911550
5	Fuel Tank Cap-Oversized (Click Style)-Snow	SKSN4301	25	Fuel Petcock, Snow	SKSN4900	42	CDI Box Bracket-Snow	SKSN4402
6	Carburetor Assembly-Snow	SKSN2302	26	Flywheel Assembly, Electric Start-Snow	SK2911701	44	Piston And Rod Assy	SK2911400
8	Primer Bulb Assembly w/Hose-Snow	SKSN4304	26A	Flywheel Assembly, Manual Start-Snow	SK2911700	46	Vapor Shield	SKSN4606
10	Electric Starter Assembly-Snow	SKSN2400	27	High Oil Fill Assy Kit, Snow	SKSN4911	47	Seal Kit	SK2913900
11	Key Switch Assembly-Snow	SKSN4401	28	Flywheel Fan	SK2914000	48	Wire Harness	SKSN4406
12	CDI Box Assembly-Snow	SKSN4404	29	Ignition Coil Assy	SKSN4690	49	Crankshaft	SK2911800
13	Run/Stop Switch-Snow	SKSN4403	30	Crankcase Cover Assy	SK2913600	50	Top Shield	SK4141020
15	Choke Knob-Snow	SKSN4500	31	Non-Removable Oil Plug	SK4143715	51	Fuel Tank Skirt	SKSN2101
16	Governor Linkage Shield Plate-Snow	SKSN2501	32	Charging Coil AC/DC	SK4141710	52	Rocker Arm Kit	SK4141100
17	Recoil Starter Assembly-Snow	SKSN2600	33	Electric Starter Bracket	SKSN4405	53	Push Rod Tappet Kit	SK2911001
18	Starter Cup Small-Snow	SKSN2601	34	Spark Plug Boot	SK2913800	54	Cylinder Assy	SKSN2222
19	Starter Grip-Snow	SKSN2603	36	Governor Arm Assy	SKSN2502	56	Engine Gasket Kit	SK2914300
20	Blower Housing Assembly, Electric Start-Snow	SKSN2602	37	Governor Shaft	SK2913100	57	Fuel Hose Kit	SK2916000
			38	Governor Gear Assembly	SK2912900	58	Extended Oil Drain Tube	SKSN4700
						61	Fuel Knob-Snow	SKSN4503.1

414cc Manual/Electric Start Snow Engine Service Kit

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1	Heater Box Assembly-Snow	SKSN4100	22	Shield, Under Flywheel Charging System-Snow	SKSN4604	41	Spark Plug	SK2911550
3	Muffler Assembly-Snow	SKSN4200	23	Valve Cover	SK4144500	42	CDI Box Bracket-Snow	SKSN4402
4	Fue Tank Assembly-Snow	SKSN4300	25	Fuel Petcock, Snow	SKSN4900	44	Piston And Rod Assy	SK4141400
5	Fuel Tank Cap-Oversized (Click Style)-Snow	SKSN4301	26	Flywheel Assembly, Electric Start-Snow	SK4141701	46	Vapor Shield	SKSN4606
6	Carburetor Assembly-Snow	SKSN4302	26A	Flywheel Assembly, Manual Start-Snow	SK4141700	47	Seal Kit	SK4143905
8	Primer Bulb Assembly w/Hose-Snow	SKSN4304	27	High Oil Fill Assy Kit, Snow	SKSN4911	48	Wire Harness	SKSN4406
10	Electric Starter Assembly-Snow	SKSN4400	28	Flywheel Fan	SK4144000	49	Crankshaft	SK4141800
11	Key Switch Assembly-Snow	SKSN4401	29	Ignition Coil Assy	SKSN4690	50	Top Shield	SK4141020
12	CDI Box Assembly-Snow	SKSN4404	30	Crankcase Cover Assy	SK4143600	51	Fuel Tank Skirt	SKSN4101
13	Run/Stop Switch-Snow	SKSN4403	31	Non-Removable Oil Plug	SK4143715	52	Rocker Arm Kit	SK4141100
15	Choke Knob-Snow	SKSN4500	32	Charging Coil AC/DC	SK4141710	53	Push Rod Tappet Kit	SK4141001
16	Governor Linkage Shield Plate-Snow	SKSN4501	33	Electric Starter Bracket	SKSN4405	54	Cylinder Assy	SKSN4444
17	Recoil Starter Assembly-Snow	SKSN4600	34	Spark Plug Boot	SK4143800	55	Counter Weight Kit	SK4141650
18	Starter Cup Small-Snow	SKSN4601	36	Governor Link Assembly	SK4143000	56	Engine Gasket Kit	SK4144300
19	Starter Grip-Snow	SKSN4603	37	Governor Shaft	SK4143100	57	Fuel Hose Kit	SK4146000
20	Blower Housing Assembly, Electric Start-Snow	SKSN4602	38	Governor Gear Assembly	SK4142900	58	Extended Oil Drain Tube	SKSN4700
21	Shield, Cylinder	SK4141010	39	Camshaft	SK4141600	61	Fuel Knob-Snow	SKSN4503.1
			40	Cylinder Head Assy	SK4141050			

LCT

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