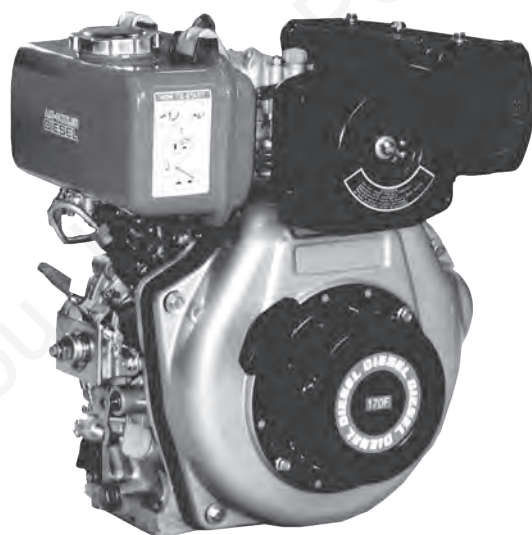


AIR-COOLED *DIESEL ENGINE*

OPERATION MANUAL

EPA CERTIFIED ENGINE
Single Cylinder Series



HLDE1FA/V2017-B



SINGLE CYLINDER SERIES DIESEL ENGINES

Thank you for purchasing our product.

This Operation Manual tells you how to operate and service your new engine. Please read it before using the engine to insure proper handling and operation. Follow the instructions carefully to keep your engine in the best running condition. If you have any question concerning this manual, or any suggestions, please contact your nearest dealer.

This Operation Manual deals with the main points for operation of the engine.

In order to insure safe working conditions, be sure to read the precaution statements for safe operation of the engine.

Pay special attention to statements preceded by the following words.

WARNING:

Indicate a strong possibility of severe personal injury or loss of life if instructions are not followed.

CAUTION:

Indicates a possibility of personal injury or equipment damage if instructions are not followed.

Note:

Gives helpful information.

If a problem should arise, or if you have any questions about the engine, consult an authorized dealer.

WARNING:

The Single Cylinder Series engine is designed to give safe and dependable service provided that it is operated according to instructions. Read and understand the Operation Manual before operating the engine. Failure to do so could result in personal injury or equipment damage.

TIPS ON SAFETY

WARNING:

1. PREVENTING FIRES

Never add fuel to the fuel tank while the engine is running.

Wipe away all fuel spills with a clean cloth. Keep gasoline, kerosene, matches and other explosives and inflammables away from the engine, because the temperature around the exhaust muffler is very high during operation.

- To prevent fire hazards and to provide adequate ventilation, keep the engine at least 3 ft (1m) away from buildings and other equipment during operation.
- Operate the engine on a level surface as flat as possible. The allowable inclination of the engine for continuous use is 20 degrees. There may be fuel spillage if the engine is tilted exceeding the limit.
- Do not put the engine or the engine mounted machinery indoors while the engine is still hot.

2. PREVENTING EXHAUST GAS INHALATION

- Exhaust gas contains poisonous carbon monoxide.
- Never use the engine in poorly ventilated locations, such as indoors and inside tunnels. If indoor operation is unavoidable, provide proper ventilation so that people and cattle will not be affected.

3. PREVENTING BURNS

- Never touch the muffler, muffler cover or engine body while the engine is running or hot.

4. OTHER SAFETY TIPS

- Know how to stop the engine quickly and understand how to operate all of the controls. Never permit anyone to operate the engine without proper instruction.
- Always wear a helmet and safety shoes (non-skid soles) and proper clothes.
- Do not operate under influence of alcohol.
- Keep children and pets away from the engine when it is in operation.
- Keep away from rotating parts while the engine is running.
- When the engine is coupled with a machine, be sure to provide suitable covers for the belt, coupling and other dangerous parts.
- A spark arrester is provided as an optional part for this engine. It is illegal in some areas to operate the engine without a spark arrester. Check local laws and regulations before operating the engine.
- Work according to the rules and regulations of the work area.
- Use the correct tools and equipment.

5. WHEN CHARGING THE BATTERY

- Battery electrolyte contains sulphuric acid. Protect your eyes, skin and clothing. In case of contact, flush thoroughly with water and get prompt medical attention, especially if your eyes are affected.
- Batteries generate hydrogen gas, which can be highly explosive, do not smoke or allow flames or sparks near a battery, especially during charging.
- Charge the battery in a fully ventilated place.
- Be sure to confirm battery polarity.

CONTENTS

1.Specifications and name of parts	1
1-1.Specifications	1
1-2.Name of parts	2
2.Installation	
2-1.Installation	3
2-2.Allowable overhang	3
2-3.Belt-pull angle	4
2-4.Inclination angle	4
2-5.Electrical wiring	4
3.Handling your engine	4
4.Preparations for starting	5~6
5.How to start your engine	
5-1.Recoil starting	7~8
5-2.Electric starting	9
5-3.Starting aid	9
6.Operating your engine	
6-1.Operating your engine	10
6-2.Checks during operation	10
7.Stopping your engine	11
8.Periodic checks and maintenance	12~14
9.Long-term storage	15
10.Troubleshooting	15
11.Overall dimensions and installation	16
12.Performance curves	16
13. 170FA diesel engine assembly	17
14. 178FA diesel engine assembly	18
15. 186FA/188FV diesel engine assembly	19
16.List of diesel engine parts	20~43
17.Easy destroyed and other parts	
17-1.Easy destroyed parts	44
17-2.Ring sets	45
17-3.Bearings	45
17-4.Seals	45
17-5.Gasket sets	45
18.Valve clearance	46
19.Torques of main bolt&nut	46
20.Electric schematic diagram of electric starting	47

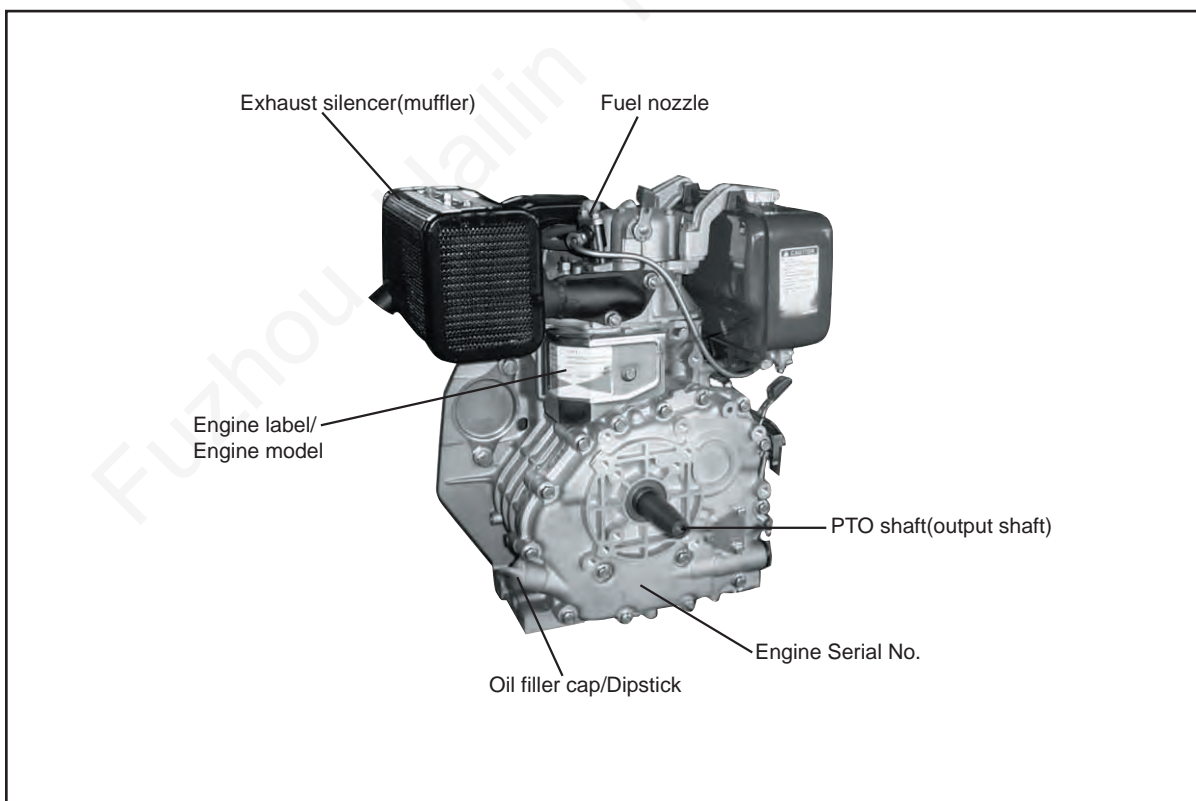
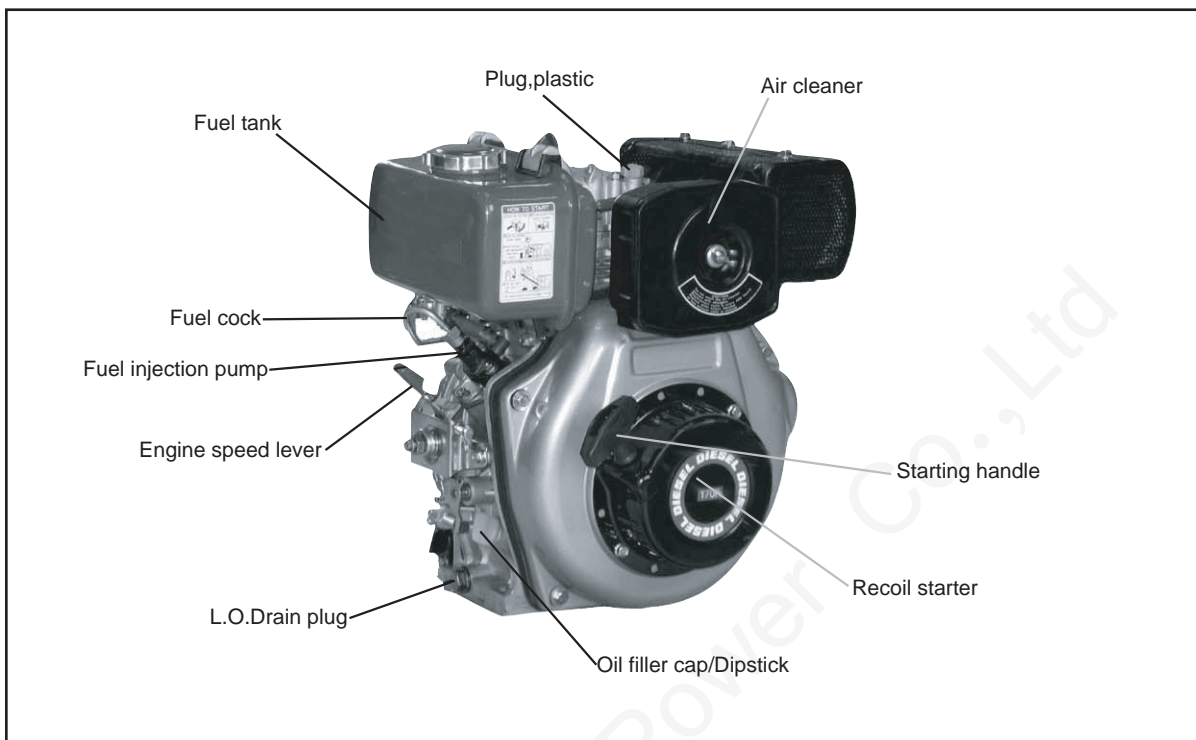
1.Specifications and name of parts

1-1.Specifications

Model		170FA 170FA-E	178FA 178FA-E	178FS 178FS-E	186FA 186FA-E	186FS 186FS-E	188FV 188FV-E
Type		Air-cooled, 4-cycle,direct injection Diesel Engine					
No.of cylinders		1					
BoreXStroke	mm	70X57	78X64	78X62	86X72	86X70	88X78
Displacement	cc	219	306	296	418	406	474
Continuous rated output	kW/rpm (hp/rpm)	2.5/3000 (3.4/3000) 2.8/3600 (3.8/3600)	【 1500 】 3.68/3000 (5.0/3000)	【 1800 】 4.0/3600 (5.44/3600)	【 1500 】 5.66/3000 (7.7/3000)	【 1800 】 6.3/3600 (8.6/3600)	7.0/3000 (9.5/3000) 7.5/3600 (10.2/3600)
Max.output	kW/rpm (hp/rpm)	2.8/3000 (3.8/3000) 3.1/3600 (4.2/3600)	【 1500 】 4.0/3000 (5.44/3000)	【 1800 】 4.4/3600 (6.0/3600)	【 1500 】 6.3/3000 (8.6/3000)	【 1800 】 6.9/3600 (9.4/3600)	8.0/3000 (10.9/3000) 8.5/3600 (11.6/3600)
Revolution direction		Counterclockwise(Viewed from output shaft)					
Cooling system		Forced air by flywheel fan					
Lubricating system		Forced lubrication and Splash lubrication					
Starting system		Recoil or Recoil / 12V Electric					
Fuel tank capacity (ℓ)		2.4	3.3		5.4		
Lube oil capacity	Full (ℓ)	0.80	1.10		1.65		
	Effective (ℓ)	0.55	0.65		1.0		

Note: The output shaft of FS model is the camshaft. (【 】 :camshaft rpm)

1-2.Name of parts



2. Installation

2-1. Installation

- 1) Use an engine mount which is strong enough to prevent misalignment and play during engine operation. Fasten the engine base firmly to the engine mount with adjustable shims.
- 2) Ensure accurate centering for coupling with the output shaft.
- 3) Check that the pulley's shaft hole (fitting hole) and the key groove fit the output shaft precisely.

STOP **WARNING:**

Too much play in the output shaft coupling may cause an accident. Be sure to tighten the output shaft bolts firmly.

- 4) For belt driving, select a pulley which is a suitable size for the engine and which matches the revolution speed and pulley size of the driven machinery. The proper pulley size for the engine can be obtained by the following formula:

$$\text{Engine's pulley dia} = \frac{\text{Driven machinery pulley dia} \times \text{Driven machinery revolution speed}}{\text{Engine's service speed}}$$

CAUTION: Use of an unsuitable pulley overloads the engine, and this shortens the engine life.

- 5) Belt tension

Ensure proper belt tension.

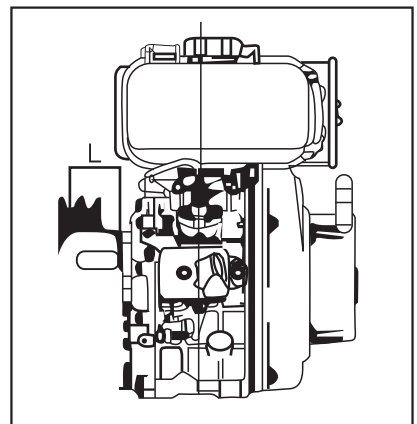
CAUTION: Too much tightness overloads the engine at starting and stretches the belt, making it prone to damage. The output shaft may also be broken, and other accidents could occur. Too much looseness causes belt slippage during high output and high speed operation.

2-2. Allowable overhang

The v-pulley's belt grooves should be as close as possible to the engine side, though in accordance with the matching for the driven machinery. The overhang distance should be within the range listed below.

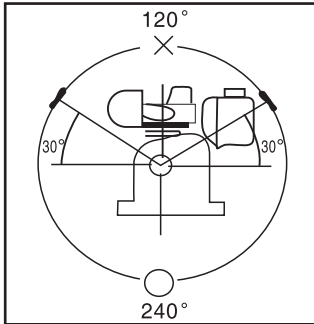
NOTE: (1) The overhang distance "L" is the distance between the PTO shaft shoulder and the center of the pulley groove at the farthest outside position.
 (2) The allowable overhang distance varies according to the type and number of V-belts (determined by the driving load of the driven machinery), and the V-belt tension. For details, consult your nearest dealer.

		170FA	178FA	186FA 188FV
Belt	Type	A	B	B
	No. of belt	2	2	3
L		within 80mm	within 95mm	within 70mm



2. Installation

2-3. Belt-pull angle



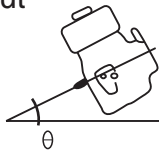
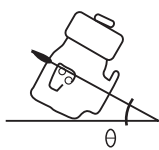
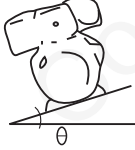
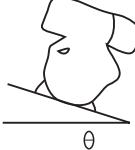
(1)Crankshaft PTO:

The belt-pull angle should be within 240 degrees,as illustrated.

(2)Camshaft PTO(S type):

Belt-pull can be made in all directions(360 degrees).

2-4. Inclination angle

Allowable inclination(for continuous use)	Output shaft				
	$\theta \leq 20$				

Keep the engine inclination within the specified range.

NOTE:Place the engine on the level when refilling with engine oil.

2-5. Electrical wiring

●For the wiring of electrical equipment contact your nearest dealer.

Recommended batteries (20hrs.rating)	170FA-E	178FA-E	186FA-E / 188FV-E
	18AH~24AH	24AH~36AH	36AH~45AH

3. Handling your engine

While your engine is still new,applications of heavy loads may shorten the life of the engine.Follow the breaking-in procedures during the first 20 hours.

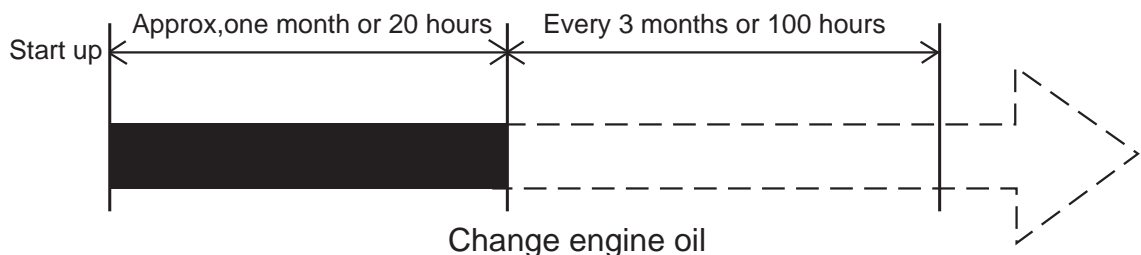
●**Avoid overloads**

Avoid applying any heavy load during the breaking-in period.

●**Change engine oil regularly**

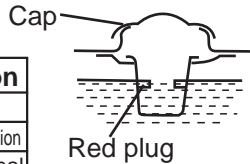
Change the engine oil after 20 hours of initial operation or at the end of the first month,and every 3 months or 100 hours thereafter.

NOTE: Be sure to drain the oil while the engine is warm. When cold,it may be difficult to drain the oil completely.



4.Preparations for starting

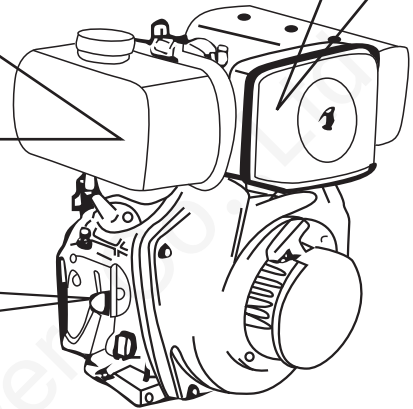
	170FA	178FA	186FA 188FV	Fuel tank
Fuel tank capacity (effective) ℓ	1.9	2.7	4.7	Use diesel fuel. Take care not to enter dust and water into the fuel and the fuel tank.
Diesel fuel specification	Location			
No.2-D, No.1-D, ASTM D975-94	USA			
EN590:96	European Union			
ISO 8217DMX	International			
BS 2869-A1 or A2	United Kingdom			
GB252	China			
KSM-2610	Korea			
JIS K2204 Grade No.2	Japan			



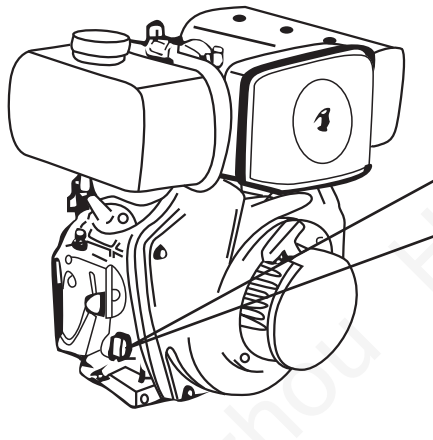
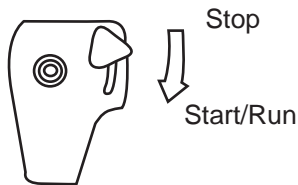
Overfilling is dangerous. Do not fill the tank beyond the top of the red plug inside the fuel tank filter.

Air cleaner element

Do not wash the air cleaner element because this is a wet type element. When the engine output tends to drop or the exhaust colour changes adversely, replace the element. Do not perforate the element and never run the engine without it.



Engine Speed Lever



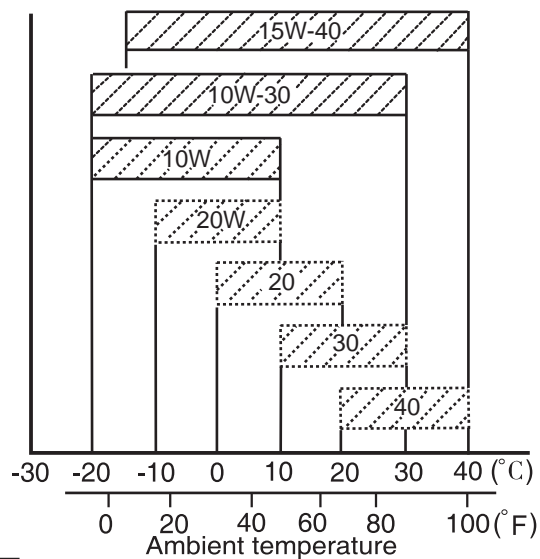
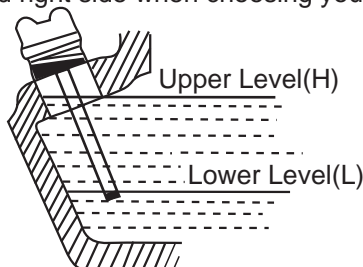
Lube Oil Filler Port

Fill the Oil up to the mouth of the filler port with the engine placed on the level. When checking the Oil, simply dip the dipstick into the Oil pan. Do not screw in the dipstick.

	170FA	178FA	186FA 188FV
Lube Oil capacity ℓ (us qts.)	0.80 (0.85)	1.10 (1.16)	1.65 (1.74)

Engine Oil

We recommend A.P.I engine service classification of CD or higher. Always use Oil with the right viscosity for the ambient temperature in which your engine is being operated. Use the chart mentioned right side when choosing your engine Oil.



▨ Recommended Value □ Usable Limit

4.Preparations for starting

Plastic Plug(170FA-178FA)

In cold weather,when the engine is hard to start,remove the plastic plug and add 2cc of engine oil,put the plug back in place.

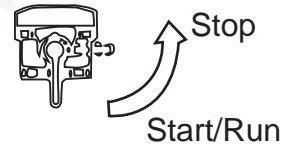
NOTE:Always keep the palstic plug in place.If it is removed,the engine will suck in dust band be damaged.

Decompression Lever

Do not use decompression lever to stop the engine.

Muffler

Fuel cock



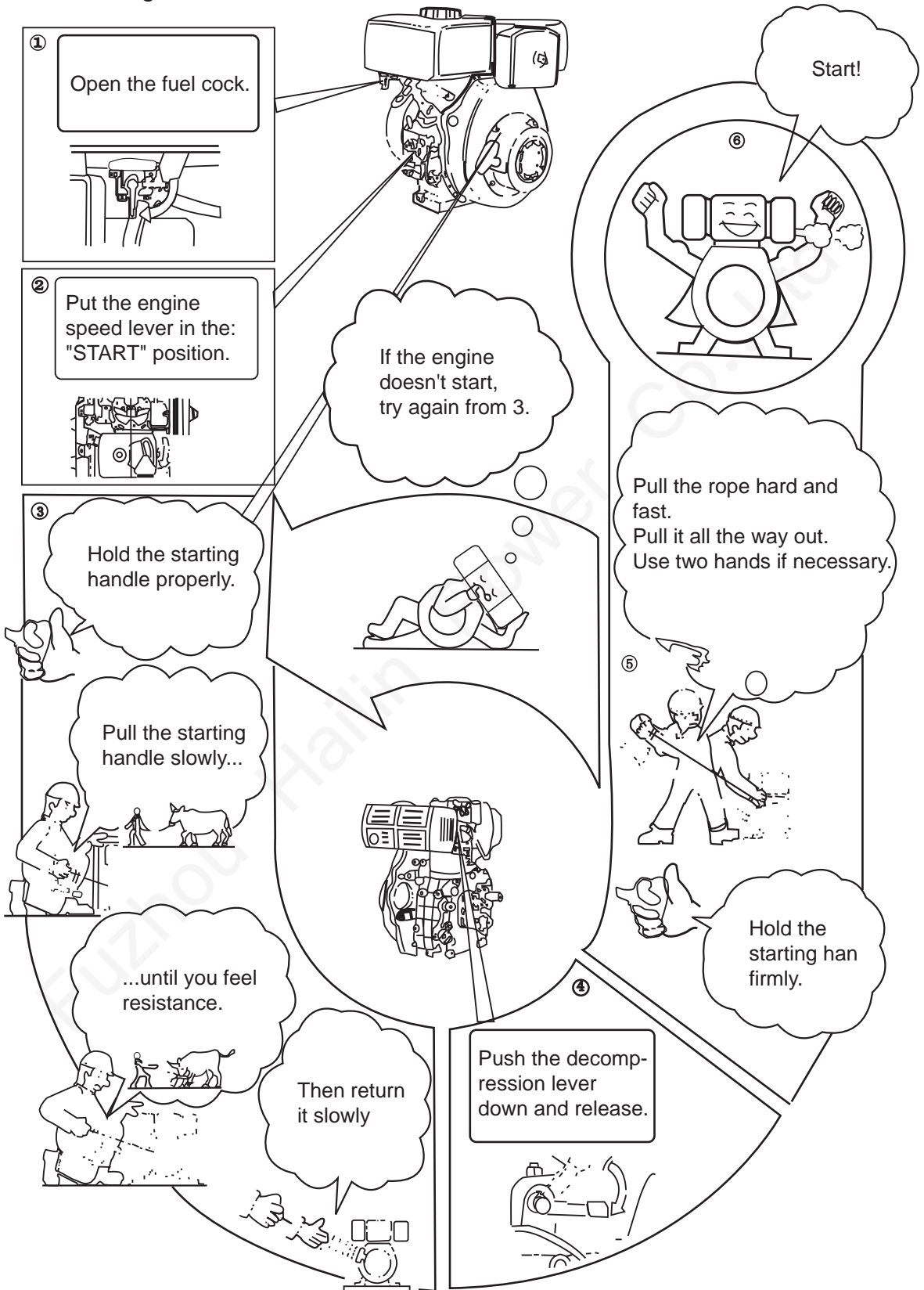
Oil filler cap/Dipstick

L.O.Drain plug

Lube oil filter

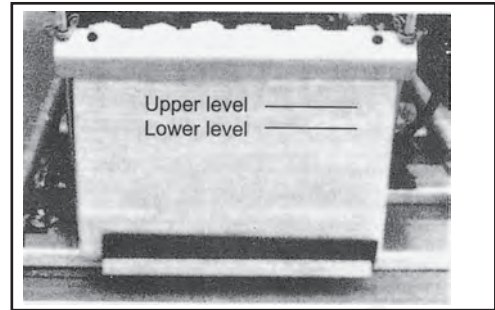
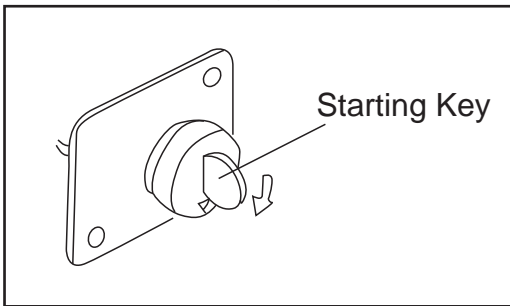
5.How to start your engine

5-1.Recoil Starting



5.How to start your engine

5-2.Electric Starting



(1)Starting

The preparations for electric starting are the same as for manual(recoil)starting.

- ① Open the fuel cock.
- ② Set the engine speed lever at "START" position.
- ③ Turn the starting key clockwise to "START".
- ④ Remove your hand from the key as soon as the engine starts.
- ⑤ If the starting motor doesn't start after 10 seconds,wait a while(for about 15 seconds) before attempting to start again.

⚠ CAUTION:

If the starting motor is turned for too long,the battery will go flat and the motor will seize up.Always leave the starting key turned on,in the "ON" position,while the engine is running.

(2)Battery

Check the level of the fluid in the battery once a month.When the level has dropped to the lower mark,replenish with distilled water up to the upper mark.

⚠ CAUTION:

- **If the battery fluid is low,the engine may not start because too little electricity is reaching the starter motor.Always keep the fluid level within the upper and lower limits.**
- **If too much battery fluid is supplied,the fluid may spill and corrode the surrounding parts.**

5-3.Starting aid

In cold weather,when your engine is hard to start,remove the plastic plug of the rocker arm cover and add 2cc of engine oil before starting.

⚠ WARNING:

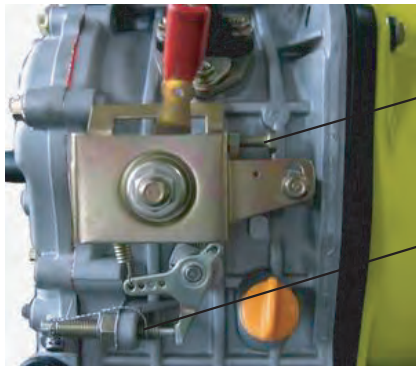
Never use gasoline,paint thinner or any other volatile liquid as a fuel starting aid put through the air cleaner.Explosions may occur.

⚠ CAUTION:

Keep the plastic plug in the cover except when adding oil.If the plug is not in place,rain and dirt or other contaminants may enter the engine and cause accelerated wear of internal parts.This can cause serious problems.

6. Operating your engine

6-1. Operating your engine



Rev. speed limiting bolt

Fuel injection limiting bolt

- (1) Warm up the engine without load for about 3 minutes.
- (2) Turn the engine speed lever to the desired speed position and fasten the thumb nut.

⚠ CAUTION:

- Be sure to use the engine speed lever to control the engine speed.
- Do not loosen or readjust either the revolution speed limiting bolt or fuel injection limiting bolt. Performance may be affected.

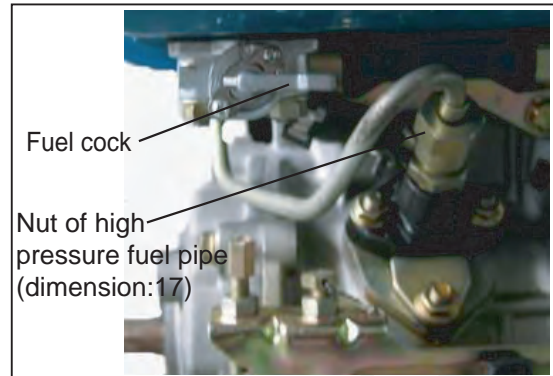
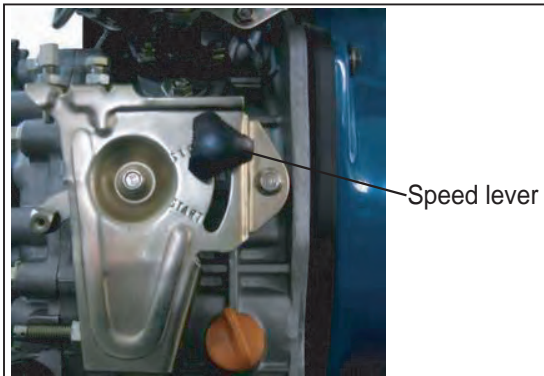
6-2. Checks during operation

- (1) Any abnormal sound or vibration?
- (2) Is the engine misfiring or running rough?
- (3) What about the color of the exhaust gas? (Is it black or too white?)
If you notice any of the above, stop the engine and consult your nearest dealer.

STOP WARNING:

If the engine has been running, the muffler will be very hot. Be careful not to touch the muffler.
Never refill the fuel while the engine is running.

7. Stopping your engine



- (1) Before stopping the engine, move the engine speed lever to low speed, and run the engine for about 3 minutes with no load.
- (2) Return the engine speed lever to the "STOP" position.
- (3) In electric-start models, return the starter key to the "OFF" position.
- (4) Set the fuel cock lever to "S" (closed) position.
- (5) Slowly pull out the recoil handle until pressure is felt (that is, to the point in the compression stroke where the intake and exhaust valves are closed), and leave the handle in this position. This prevents rust from forming while the engine is not in use.

⚠ CAUTION:

- When stopping the engine, reduce the load slowly. Don't stop the engine suddenly since this may cause the temperature to rise abnormally.
- Do not stop the engine with the decompression lever.

STOP WARNING:

If the engine keeps on running even after the speed lever is placed at "STOP" position, stop the engine either by closing the fuel cock ("S" position) or by loosening the nut of the high pressure fuel pipe on the pump side.

8.Periodic checks and maintenance

Periodic checks and maintenance are very important for keeping the engine in good condition and durable.The chart below indicates which checks to make and when to make them.

Item \ Operation hours	Daily	First month or 20 Hrs	Every 3 months or 100 Hrs	Every 6 months or 300 Hrs	Every 1 year or 1000 Hrs
Check and tighten bolts and nuts	<input type="radio"/>				
Check and resupply lube oil	<input type="radio"/>				
Replace lube oil		<input type="radio"/> 1 st time	<input type="radio"/> 2nd time and thereafter		
Clean and replace lube oil filter			<input type="radio"/>	<input type="radio"/> Replace if necessary	
Check lube oil leakage	<input type="radio"/>				
Replace air cleaner element		Service more frequently when used in dusty areas		<input type="radio"/>	
Drain the fuel tank	Monthly				
Clean and replace fuel filter			<input type="radio"/> Clean	<input type="radio"/> Replace	
Check fuel injection nozzle				●	
Check fuel injection pump				●	
Check fuel piping				<input type="radio"/> Replace if necessary	
Adjust intake/exhaust valves head clearance		<input type="radio"/> 1 st time		<input type="radio"/>	
Check and lap intake/exhaust valves seat					●
Check battery liquid	Monthly				
Oil bath type air cleaner: Oil level check and cleaning of element	<input type="radio"/> Oil level check	<input type="radio"/> Clean Monthly or 50 Hrs			

Note: The mark(●) indicates that special tools and skills are required.

8. Periodic checks and maintenance

Cleaning and replacement of fuel filter

The fuel filter has to be cleaned regularly to insure maximum engine output. Remove the filter from the fuel tank and clean.

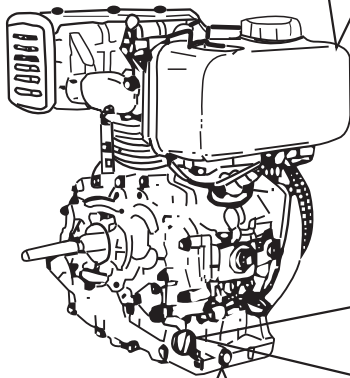
Clean	Every 3 months or 100 hours
Replace	Every 6 months or 300 hours

Pull out the filter.



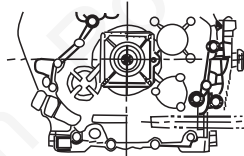
Loosen the nut and remove the cock,

Remove the fuel hose.



Replacement of lube oil filter

Clean	Every 3 months or 100 hours
Replace	Every 1,000 hours or during engine disassembly

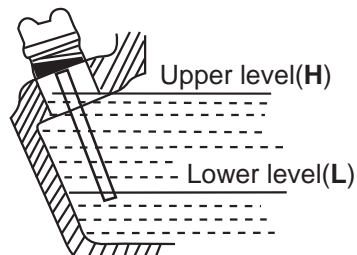


Pull out the filter with pliers.

Replacement of lube oil

Lube oil replacement	Operation hours
1 st time	First month or after 20 hours
2nd time and thereafter	Every 3 months or 100 hours

	170FA	178FA	186FA 188FV
Lube oil capacity (ℓ)	0.80	1.10	1.65



Refill up to the top of the filler port with the engine on the level.

8.Periodic checks and maintenance

Changing the air cleaner element

Do not wash the air cleaner element with detergent because this is a wet type element.

⚠ CAUTION:
Never run the engine without the element or with a defective element.

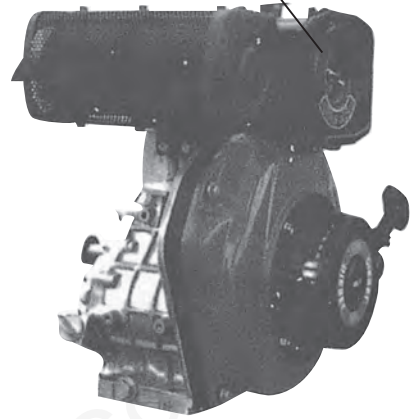
Note:

- A clogged element hinders the flow of air to the combustion chamber. This reduces engine output, increases lube oil and fuel oil consumption and makes starting difficult.
- Make sure you clean your element regularly.

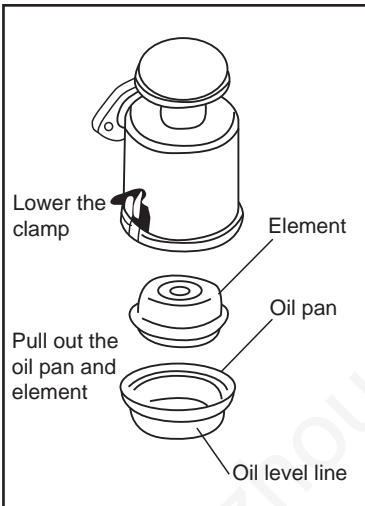
Change

Every 6 months or 300 hours

Air cleaner



Cleaning of the air cleaner element (Oil bath type air cleaner)



Wash the dirty element with diesel fuel. After dipping it in the oil and squeezing out the oil from the element, remount it. Fill new engine oil to the oil level of the oil pan.

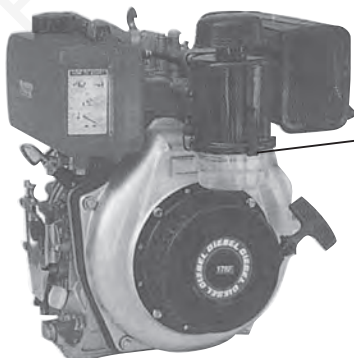
STOP WARNING:
Never use gasoline or low flash point solvents.

Oil level check

Daily

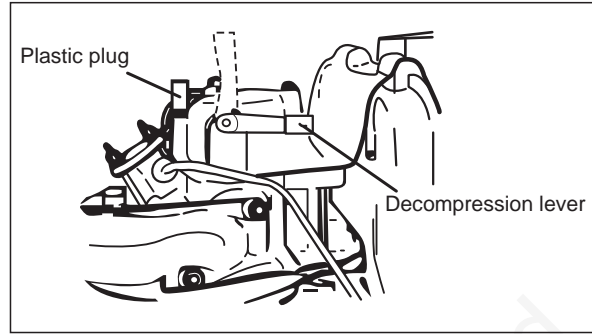
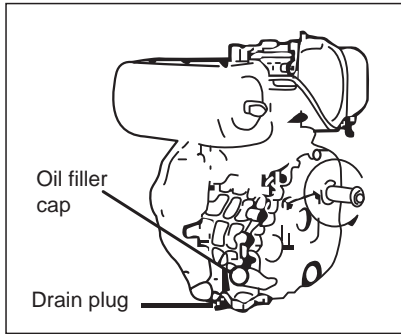
Cleaning of element

Every 1 month or 50 Hrs



Oil bath type air cleaner

9. Long term storage



If store your engine for long periods, make the following preparations.

- (1) Operate the engine for about 3 minutes and then stop.
- (2) Stop the engine. Drain the engine lube oil while the engine is still warm and fill with new oil.
- (3) Remove the plastic plug on the rocker arm cover and add about 2cc of lube oil. Put the plug back in place.
- (4) Recoil starting
Push the decompression lever down (non-compression position) and hold it while you pull the recoil starter 2 or 3 times. (Don't start the engine.)
Electric starting
Turn the engine for 2~3 seconds with the decomp. lever set at the non-compression position, and the starter key at the "START" position. (Don't start the engine.)
- (5) Pull the decompression lever up. Pull the recoil starter slowly. Stop when it feels tight. This closes the intake and exhaust valves (in compression position) and helps prevent rust from forming.
- (6) Wipe the oil and dirt from the engine and store in a dry place.

NOTE: This plug is not provided to the engines supplied for some tropical areas. With these engines, delete (3) and (4) procedures.

10. Troubleshooting

When the engine will not start:

- (1) Is there enough fuel?
- (2) Is the fuel cock at the "O" (OPEN) position?
- (3) Is diesel fuel reaching the fuel injection pump or nozzle?
- (4) Is the speed control lever in the "START" position?
- (5) Is the lube oil level correct?
- (6) Is the fuel injection nozzle working properly?
- (7) Is the recoil starter pulled sufficiently quickly and firmly?
- (8) Is the spark arrester clogged by carbon?
- (9) Is the battery discharging?

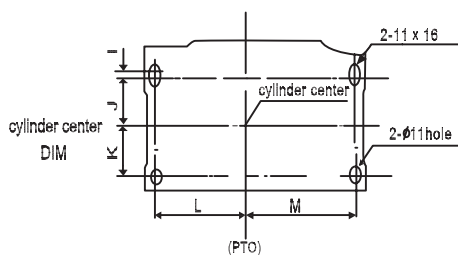
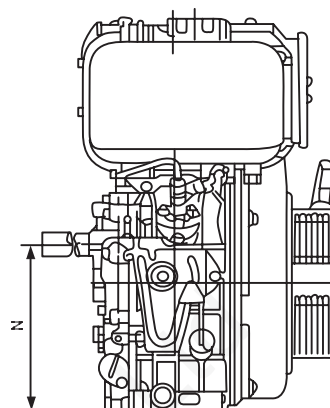
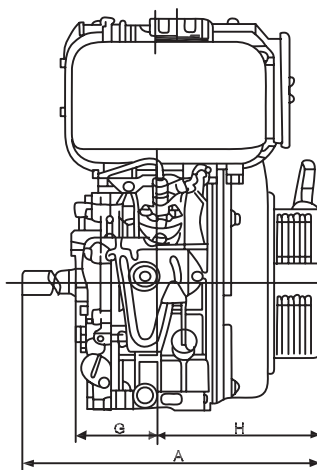
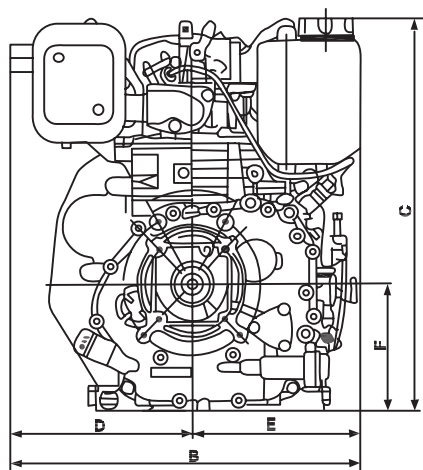
STOP WARNING:

Keep away from the injection nozzle when performing the injection spray test.

NOTE: Always pull the recoil starter quickly and firmly.

(See the section, "How to start your engine".

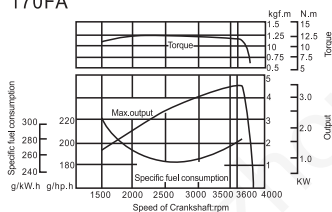
11. Overall dimensions and installation:



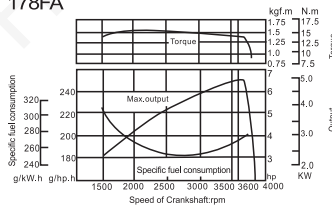
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
170FA	324	392	416	218	192	130	86	185	5	36.5	38.5	95	115	160
178FA	358	421	450	218	203	145	96	199	5	41.5	43.5	104	144	171.5
186FA	415	475	494	247	223	155	105	224	5	43.5	51.5	117	155	173.7
188FV	415	475	498	247	223	155	105	224	5	43.5	51.5	117	155	173.7

12. Performance curves:

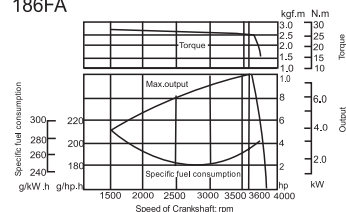
170FA



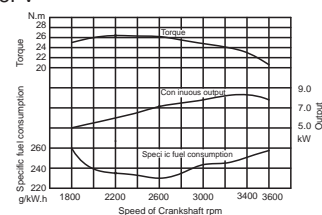
178FA



186FA



188FV



**Performance measured after 30 hours running-in,
with air cleaner and exhaust silencer.**

Atmospheric conditions:

ISO 3046/1

Temperature:

25°C[298K]

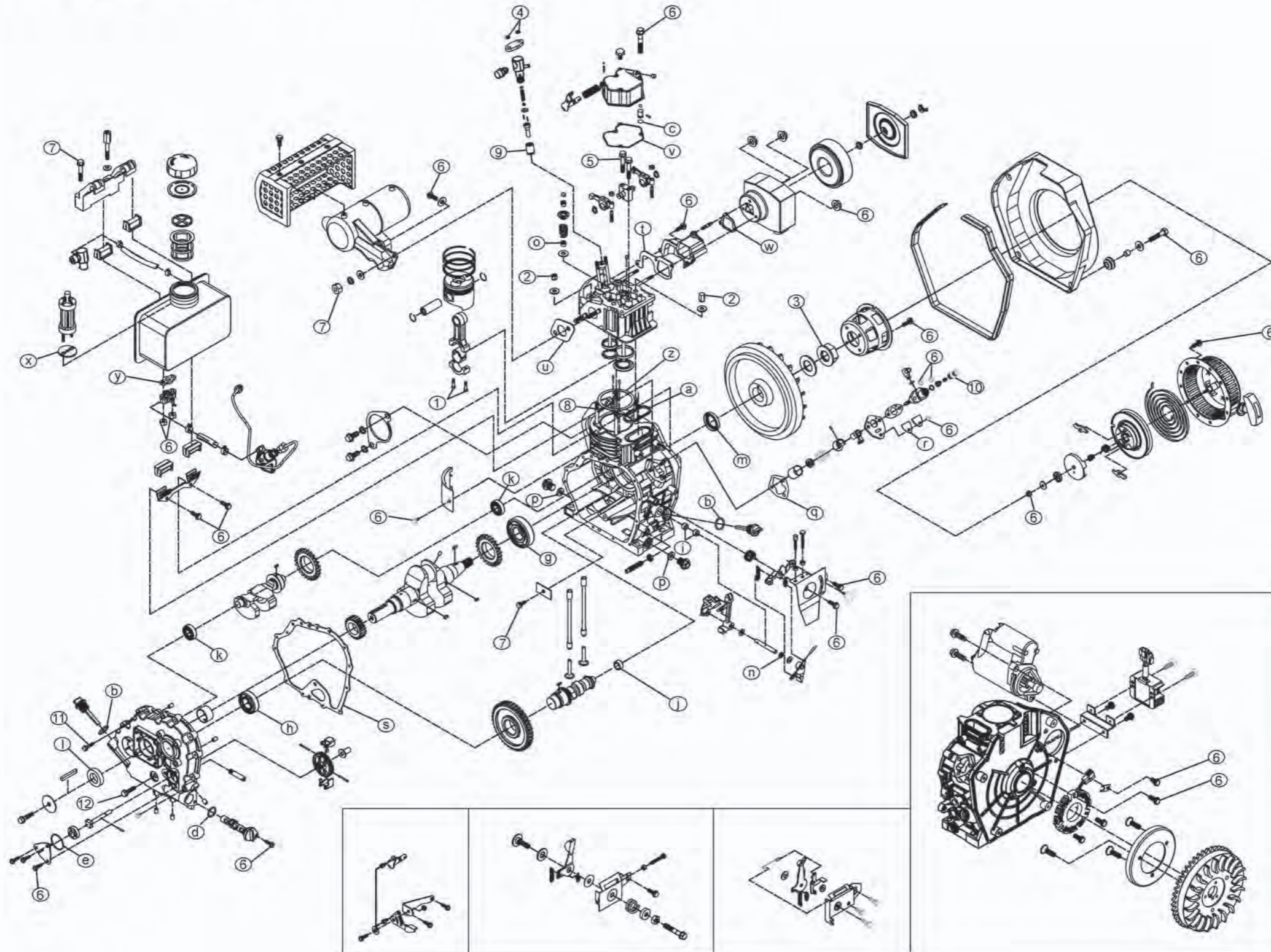
Barometric pressure:

100kPa[750mmHg]

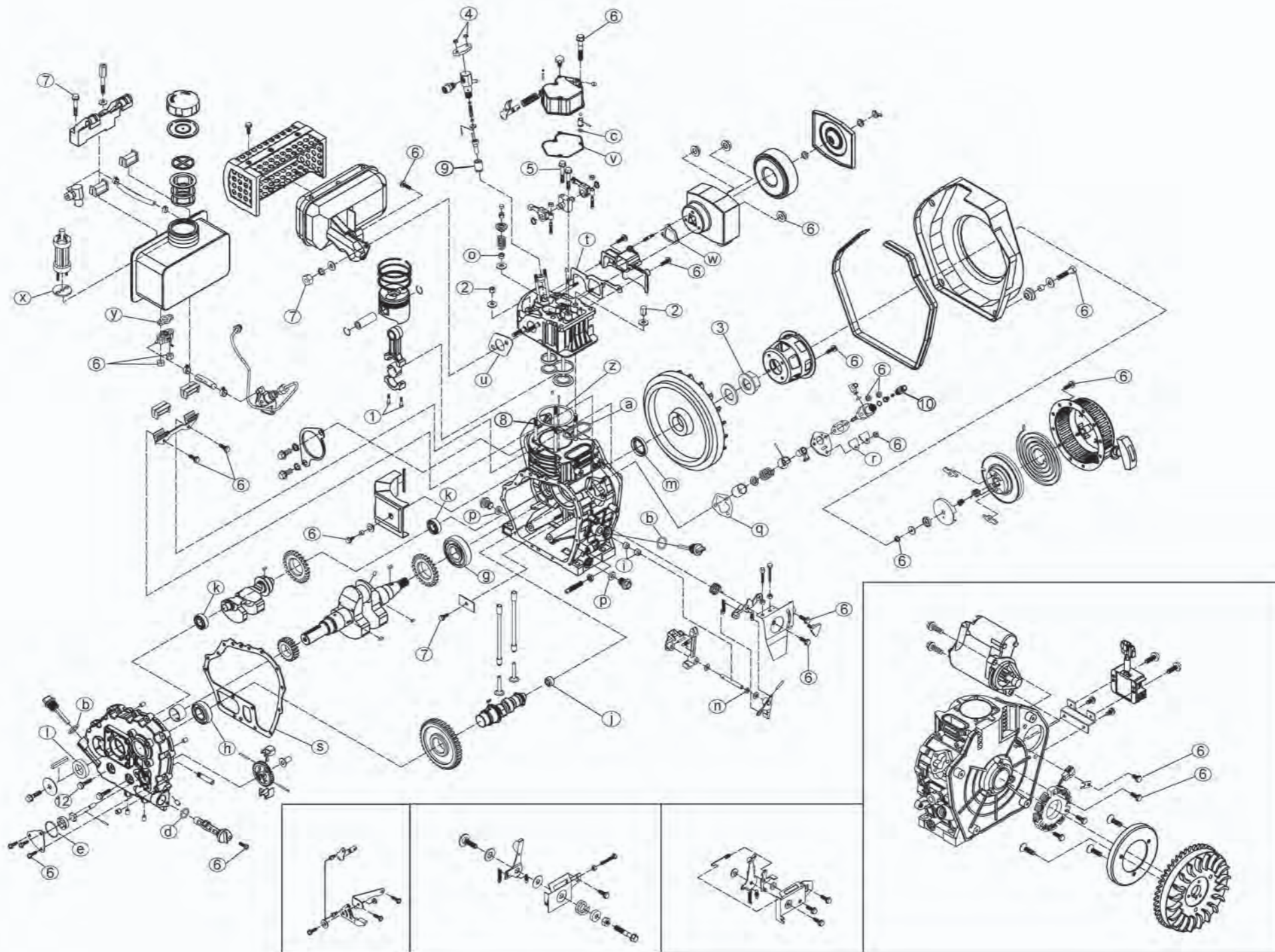
Humidity:

30%

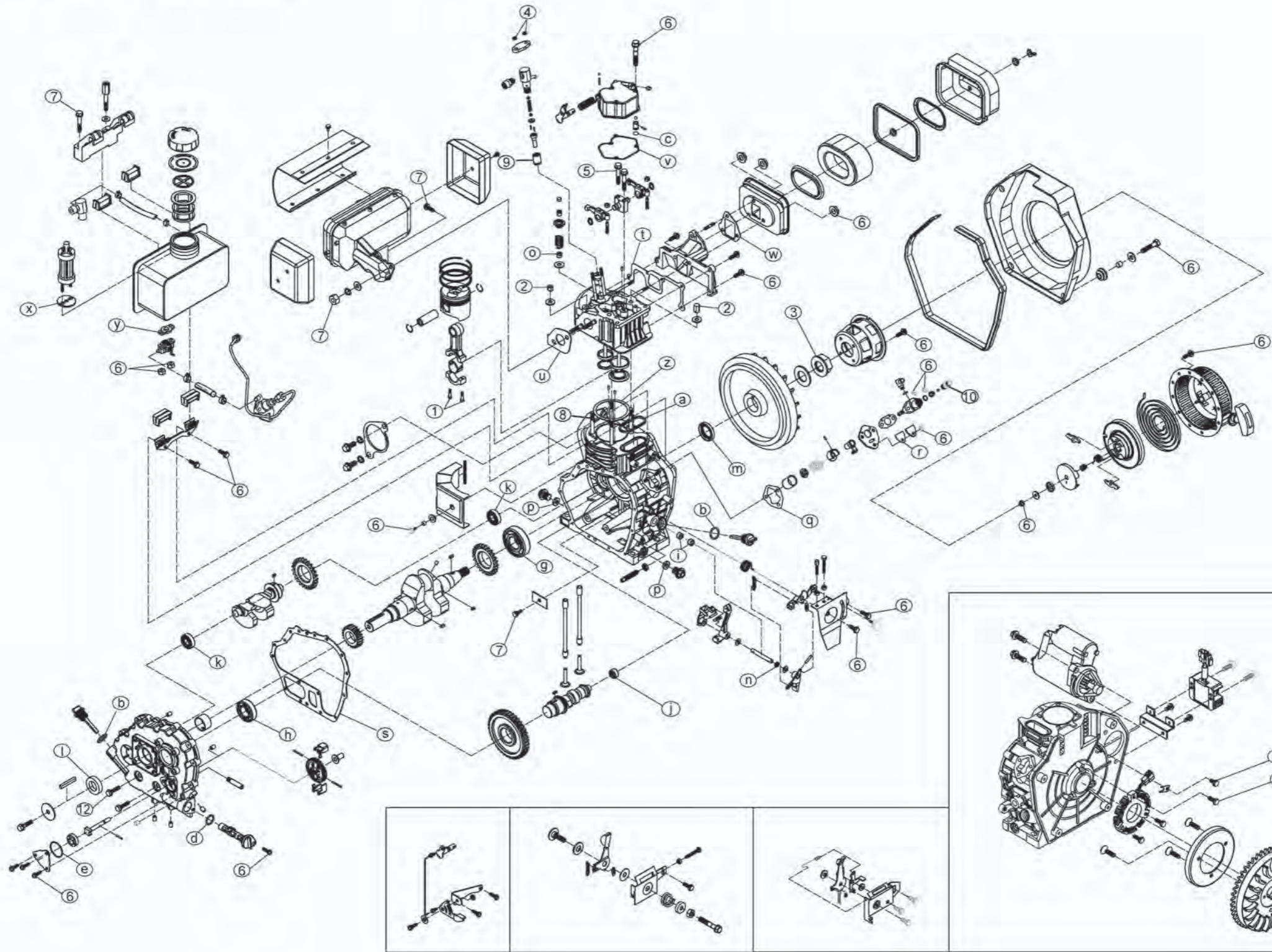
13. 170FA Diesel Engine Assembly



14. 178FA Diesel Engine Assembly

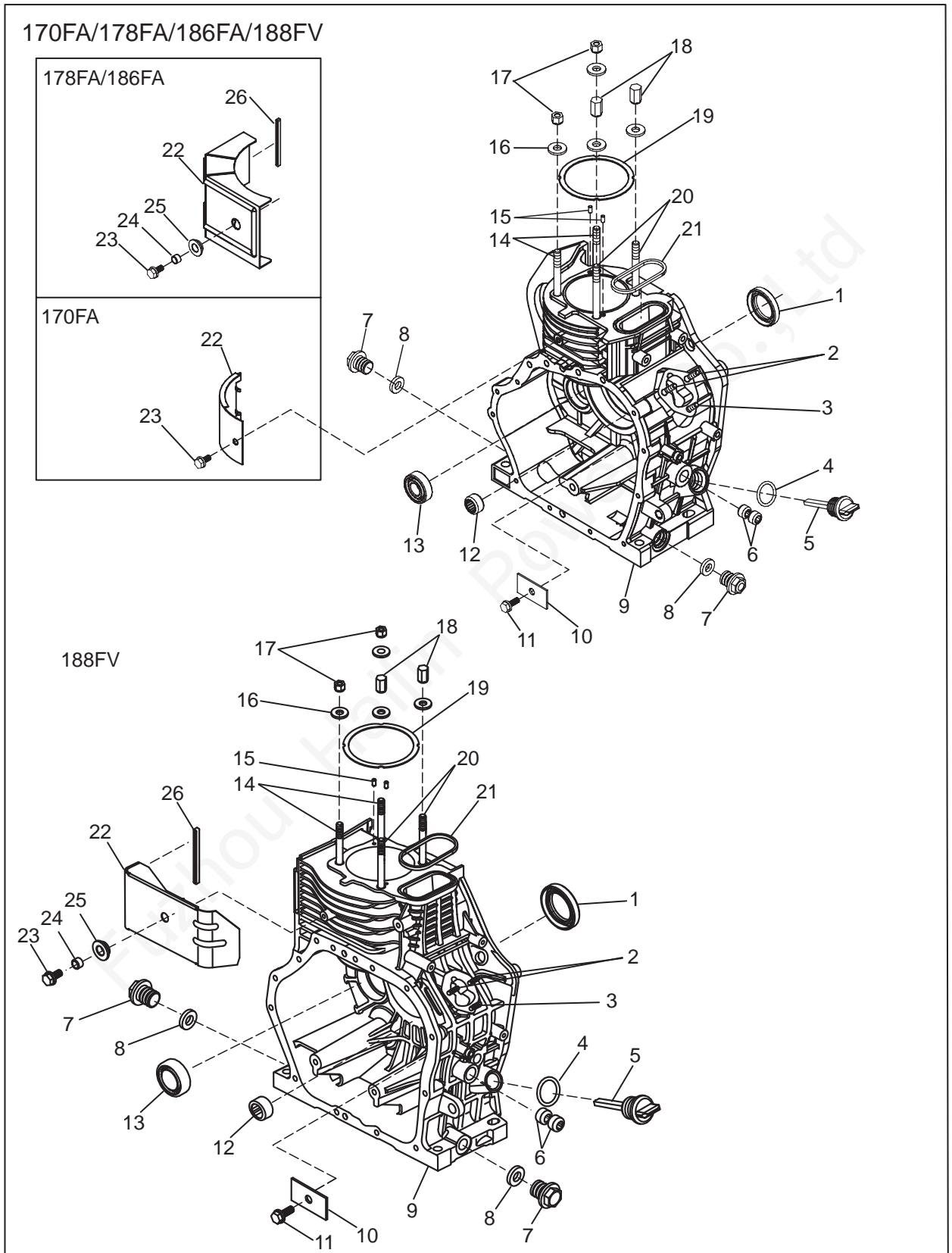


15. 186FA/188FV Diesel Engine Assembly



16. List of Diesel Engine parts:

(1) Cylinder Block Assembly<1>

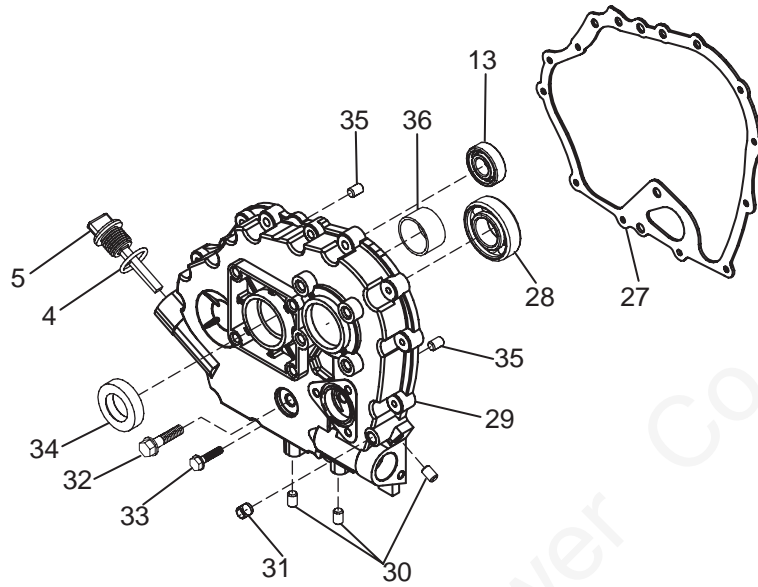


(1) Cylinder Block Assembly<1>

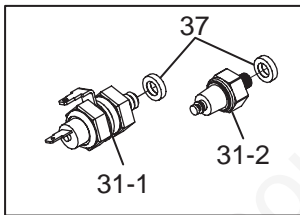
NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	9877.1-304508		9877.1-355008		Oil Seal 30X45X8		Oil Seal 35X50X8		1			
2	170F-01011				Stud M6X24				2			
3	170F-01012				Stud M6X18				1			
4	3452.1-190265				O-Ring 19X2.65				2			
5	170F-01002	178F-01002			Lube Oil Filler Cap,Dipstick				2			
6	290-HKH0810				Needle Bearing 081410				2			
7	170F-01017				Drain Plug M16X1.5				2			
8	170F-01100				Oil Plug Seal Assy				2			
9	170FA-01001	178FA-01001	186FA-01001	188FV-01001	Cylinder Block				1			
10	170F-01009	178F-01009	170F-01009		Retainer				1			
11	5789-08014A2				Bolt M8X14				1			
12	290-HK1512			290-HK1520	Needle Bearing 152112		HK152120		1			
13	276-6202P6		276-6203P6	276-6304P6	Ball Bearing 6202P6		6203P6	6304P6	2			
14	170F-01003	178F-01003	186F-01003	188FV-01003	Cylinder Head Stud (short)				2			
15	119.1-04008				Pin 4X8				2			
16	170F-01005	178F-01005	186F-01005		Flat Washer				4			
17	170F-01004	178F-01004	186F-01004		Cylinder Head Nut (short)				2			
18	170F-01007	178F-01007	186F-01007		Cylinder Head Nut (long)				2			
19	170FA-01013	178FA-01013	186FA-01013	188FV-01013	Cylinder Head Gasket				1			
20	170F-01006	178F-01006	186F-01006	188FV-01006	Cylinder Head Stud (long)				2			
21	170F-01008	178F-01008	186F-01008		Rectangle Ring				1			
22	170F-01204	178F-01204	186F-01204	188FV-01220	Air Cover				1			
23	5789-06012A2	5789-06016A2		5789-06020A2	Bolt M6X12	Bolt M6X16		Bolt M6X20	1			
24	/	178F-01202			/	Collar			1			
25	/	178F-01201			/	Cushion,Rubber			1			
26	/	178F-01203			/	Seal,Rubber			1			

(1) Cylinder Block Assembly<2>

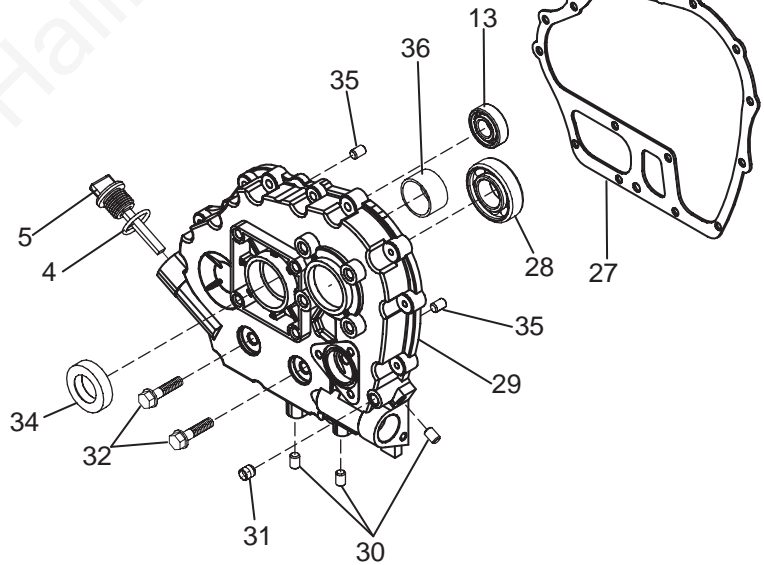
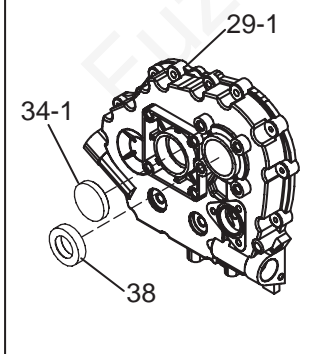
170FA



178FA/186FA/188FV



178FS/186FS

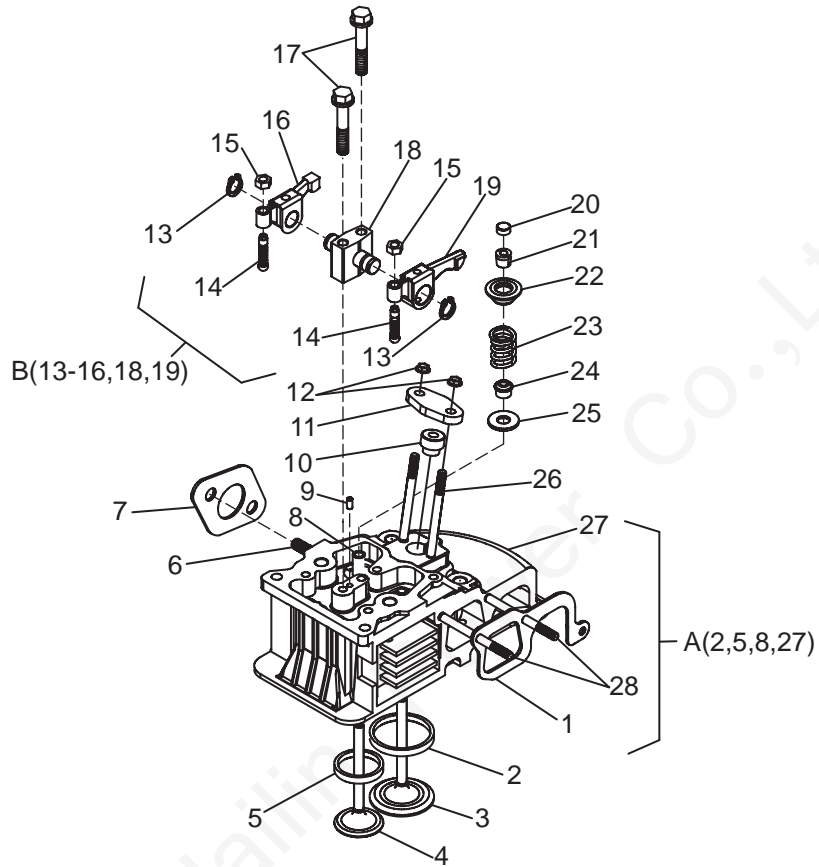


(1) Cylinder Block Assembly<2>

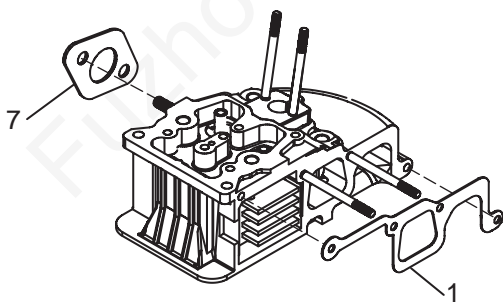
NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
27	170F-01015	178F-01015	186F-01015		Crank Case Gasket				1			
28	276-6205P5	276-6206P5	276-6207P5	/	Ball Bearing 6205P5	6206P5	6207P5	/	1			/
29	170F-01016	178F-01016	186F-01016	188FV-01016	Crank Case Cover				1			
30	170F-01021				Plug 8X10,Aluminium				3			
31	170F-01018				Plug NPT 1/8"				1			
31-1	170F-01300B				Oil Pressure Sensors				1			
31-2	170F-01300A				Oil Pressure Sensors				1			
32	5789-08033A1				Bolt M8X33.5				1	15	16	
33	5789-06028A1	/	/	/	Bolt M6X28	/	/	/	14	/	/	
34	9877.1-254210	9877.1-304510	9877.1-355010		Oil Seal 25X42X10	Seal 30X45X10	Oil Seal 35X50X10		1			
35	119.1-08012				Pin 8X12				2			
36	170F-01014	178F-01014	186F-01014		Main Bearing				1			
37	170F-01310				Washer,Rubber				1			
178FS/186FS												
1-1	/	9877.1-304508S	9877.1-355008S	/	/	Seal 30X45X8(S)	Seal 35X50X8(S)	/	/	1		
29-1	/	178FS-01016	186FS-01016	/	/	Crank Case Cover		/	/	1		
34-1	/	178FS-01022	186FS-01022	/	/	Plug 45	Plug 50	/	/	1		
38	/	9877.1-304510	9877.1-355010	/	/	Seal 30X45X10	Seal 35X50X10	/	/	1		

(2) Cylinder Head Assembly

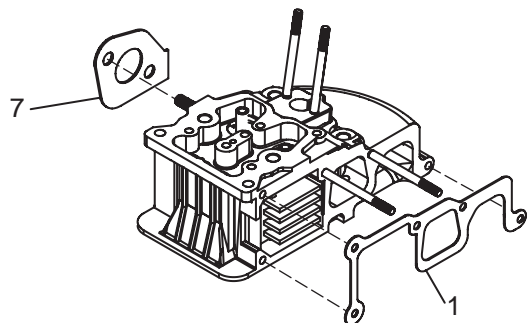
170FA



178FA



186FA/188FV

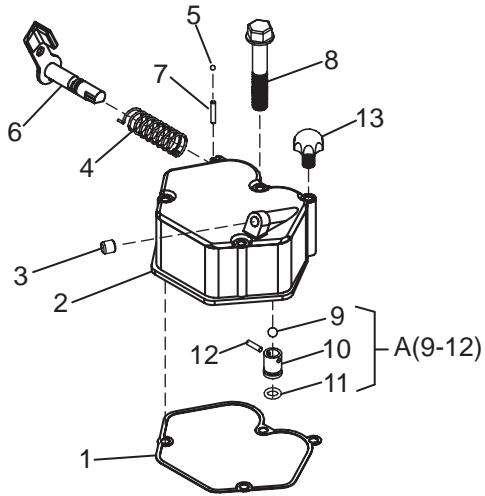


(2) Cylinder Head Assembly

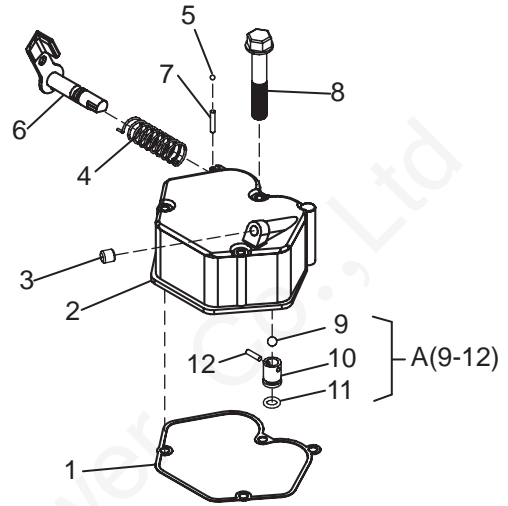
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	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	170F-02011	178F-02011	186F-02011		Air Intake Gasket				1			
A	170FA-02200	178FA-02200	186FA-02200	188FV-02200	Cylinder Head Assy				1			
2	170F-02203	178F-02203	186F-02203	188FV-02203	Intake Valve Retainer				1			
3	170F-02004	178F-02004	186F-02004	188FV-02004	Intake Valve				1			
4	170FA-02003	178F-02003	186F-02003	188FV-02003	Exhaust Valve				1			
5	170F-02204	178F-02204	186F-02204	188FV-02204	Exhaust Valve Retainer				1			
6	899-08020A2				Stud M8X20				2			
7	170F-02012		186F-02012		Muffler Gasket				1			
8	170F-02201	178F-02201	186F-02201		Valve Guide				2			
9	119.1-04008				Pin 4X8				1			
10	170FA-02009				Spacer				1			
11	170F-02008				Nozzle Retainer				1			
12	6177.1-06000A2				Nut M6				2			
B	170FA-02100		186FA-02100		Rocker Arm Assy				1			
13	894.1-12B		894.1-15B		Retaining Ring				2			
14	170F-02105		186F-02105		Adjusting Screw				2			
15	170F-02107		186F-02107		Nut M6				2			
16	170FA-02103		186FA-02103		Exhaust Valve Rocker Arm				1			
17	170FA-02106		186FA-02106		Bolt M6X45	Bolt M8X50			2			
18	170FA-02102		186FA-02102		Rocker Arm Support				1			
19	170FA-02104		186FA-02104		Intake Valve Rocker Arm				1			
20	170F-02013	178F-02013	186F-02013		Valve Adjusting Plate				2			
21	170F-02001	178F-02001	186F-02001		Valve Collet				2			
22	170F-02002	178F-02002	186F-02002		Valve Spring Retainer				2			
23	170FA-02005	178F-02005	186F-02005		Valve Spring				2			
24	170F-02006	178F-02006	186F-02006		Valve Stem Seal				2			
25	170FA-02007	170F-02007	186F-02007		Valve Spring Washer				2			
26	900-06065A2	900-06055A2			Stud M6X65	Stud M6X55			2			
27	170FA-02202	178FA-02202	186FA-02202	188FV-02202	Cylinder Head				1			
28	900-06060A2		900-06075A2		Stud M6X60		Stud M6X75		2			

(3) Cylinder Head Bonnet Assembly

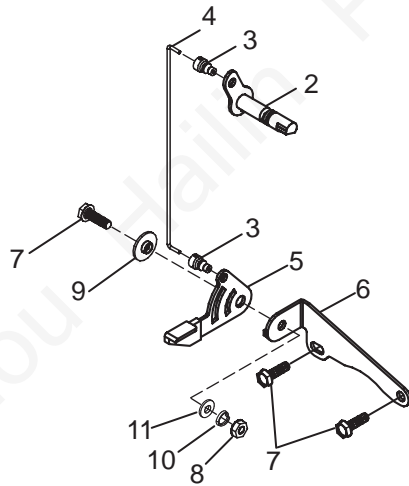
170FA/178FA



186FA/188FV



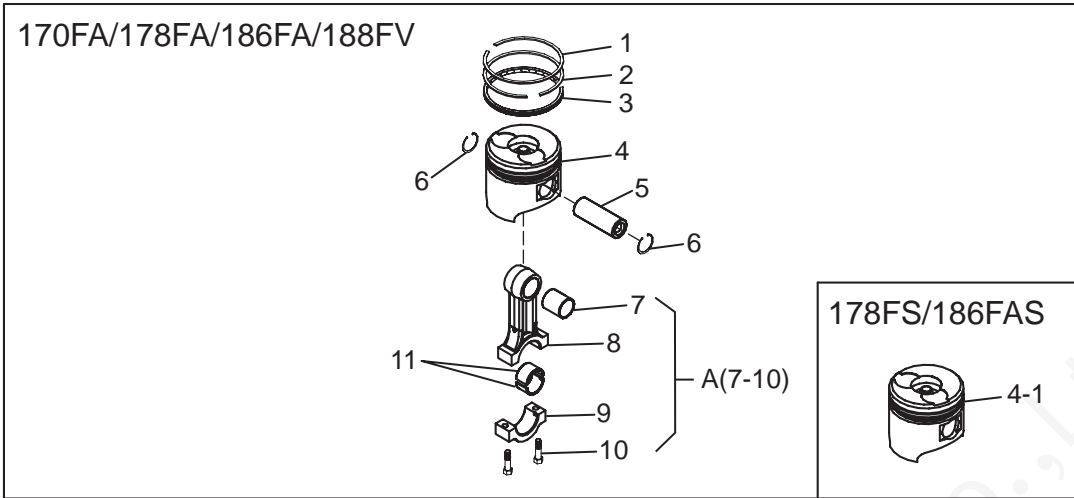
W-Model



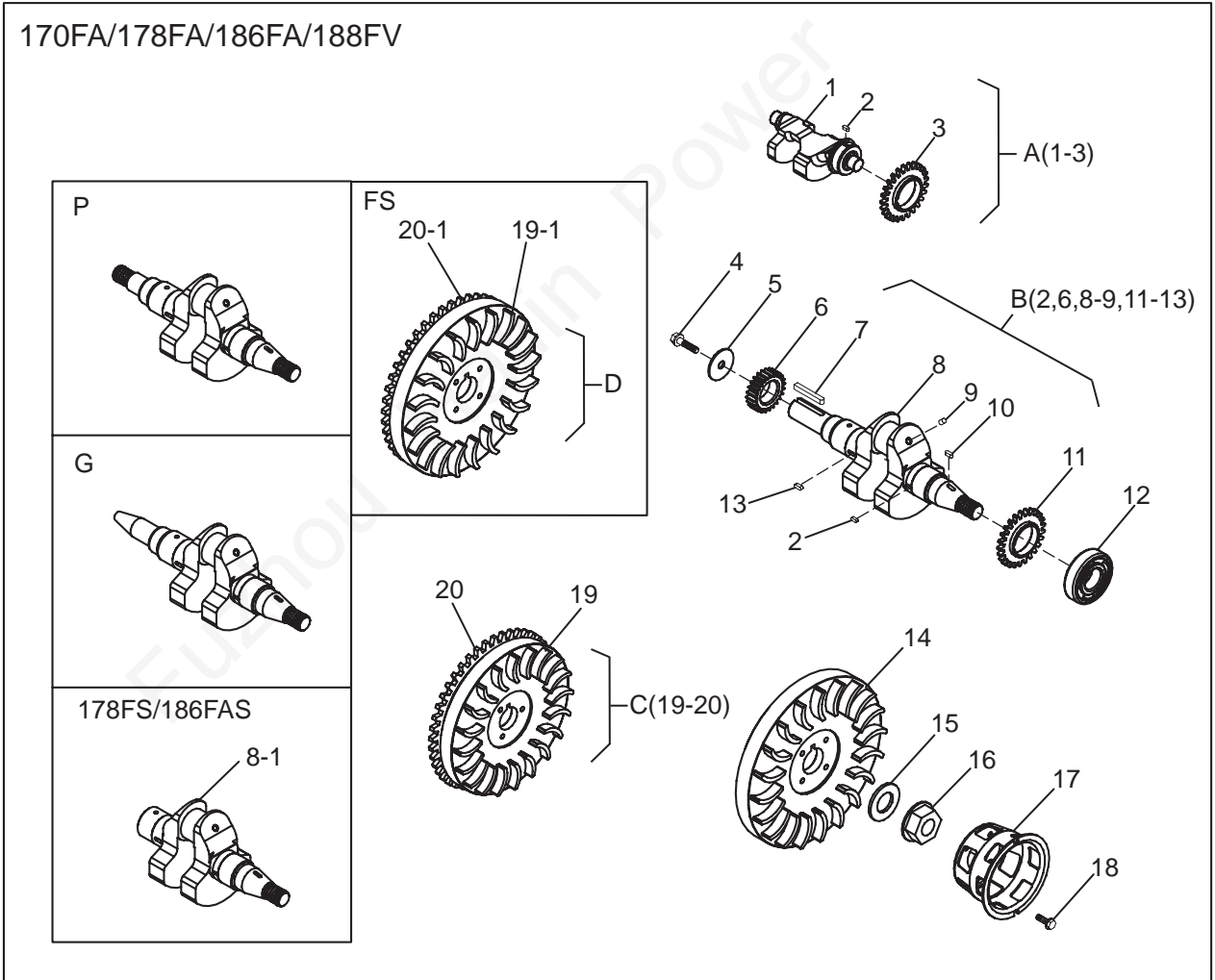
(3) Cylinder Head Bonnet Assembly

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	170FA-03003		186FA-03003		Bonnet Gasket				1			
2	170FA-03001		186FA-03001		Cylinder Head Bonnet				1			
3	170F-03006				Plug 8X8,Aluminium				1			
4	170F-03004a				Decompression Spring				1			
5	308-03175				Steel Ball 1/8"				1			
6	170F-03100a				Decompression Shaft Assy				1			
7	119.1-03016				Pin 3X16				1			
8	5789-06055A2		5789-06070A2		Bolt M6X55		Bolt M6X70		3			
A	170F-03200a				Breather Assy				1			
9	170F-03201a				Breather Ball				1			
10	170F-03202a				Breather Seat				1			
11	3452.1-093150				O-Ring 9.3X1.5				1			
12	170F-03203				Breather Pin				1			
13	170F-03002		/		Oil Screw Plug		/		1		/	
W-Model												
2	170F-03100W				Decompression Shaft Assy				1			
3	170F-03012W				Decompression Pulling-string Collar				2			
4	170F-03011W	178F-03011W	186F-03011W	186FV-03011W	Decompression Pulling String				1			
5	170F-03009W				Decompression Handle				1			
6	170F-03008W				Decompression Handle Support				1			
7	5789-06014A2				Bolt M6X14				3			
8	6170-06000A2				Nut M6				1			
9	170F-03013W				Decompression Handle Collar				1			
10	93-06A				Washer 6				1			
11	97.1-06A				Flat Washer 6				1			

(4) Piston&Connecting Rod Assembly



(5) Crankshaft &Flywheel Assembly



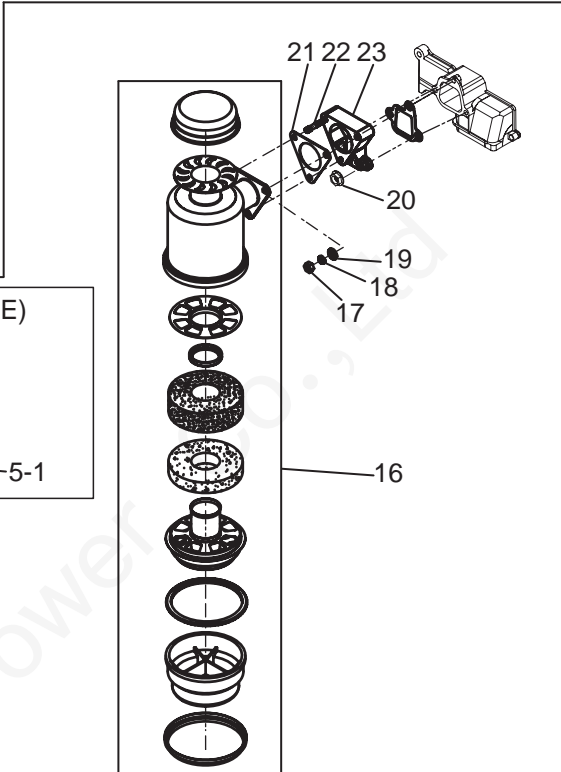
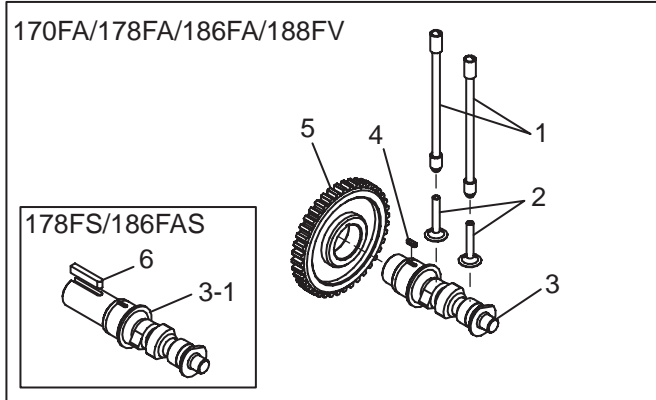
(4) Piston&Connecting Rod Assembly

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	170F-04001	178F-04001	186F-04001	188FV-04001	First Gas Ring				1			
2	170F-04002	178F-04002	186F-04002	188FV-04002	Second Gas Ring				1			
3	170F-04100	178F-04100	186F-04100	188FV-04100	Oil Ring Set				1			
4	170FA-04003	178FA-04003	186FA-04003	188FV-04003	Piston				1			
5	170F-04004	178F-04004	186F-04004	188FV-04004	Piston Pin				1			
6	893.1-19B	893.1-21B	893.1-23B		Circlip 19	Circlip 21	Circlip 23		2			
A	170F-04200	178F-04200	186F-04200	188FV-04200	Connecting Rod Assy				1			
7	170F-04204	178F-04204	186F-04204		Connecting Rod Bushes				1			
8	170F-04201	178F-04201	186F-04201	188FV-04201	Connecting Rod Body				1			
9	170F-04202	178F-04202	186F-04202	188FV-04202	Connecting Rod Cover				1			
10	170F-04203	178F-04203	186F-04203		Connecting Rod Screw				2			
11	170F-04005	178F-04005	186F-04005		Connecting Rod Bearing				1			
178FS/186FAS												
4-1		178FS-04003	186FAS-04003		Piston				1			

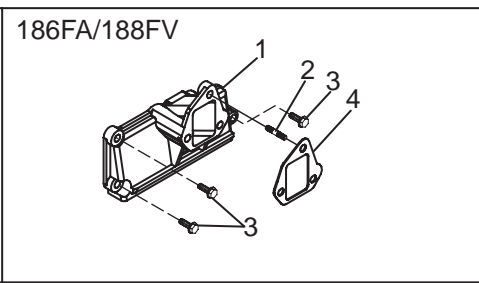
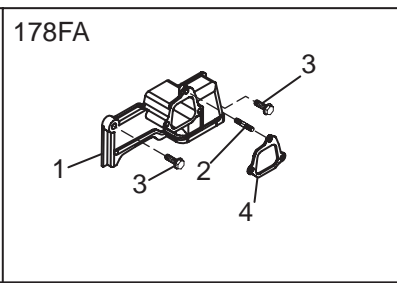
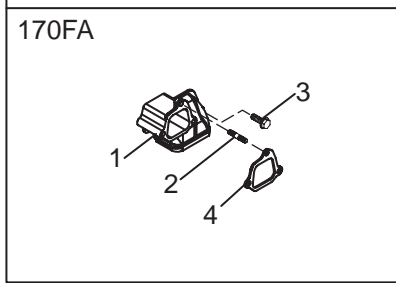
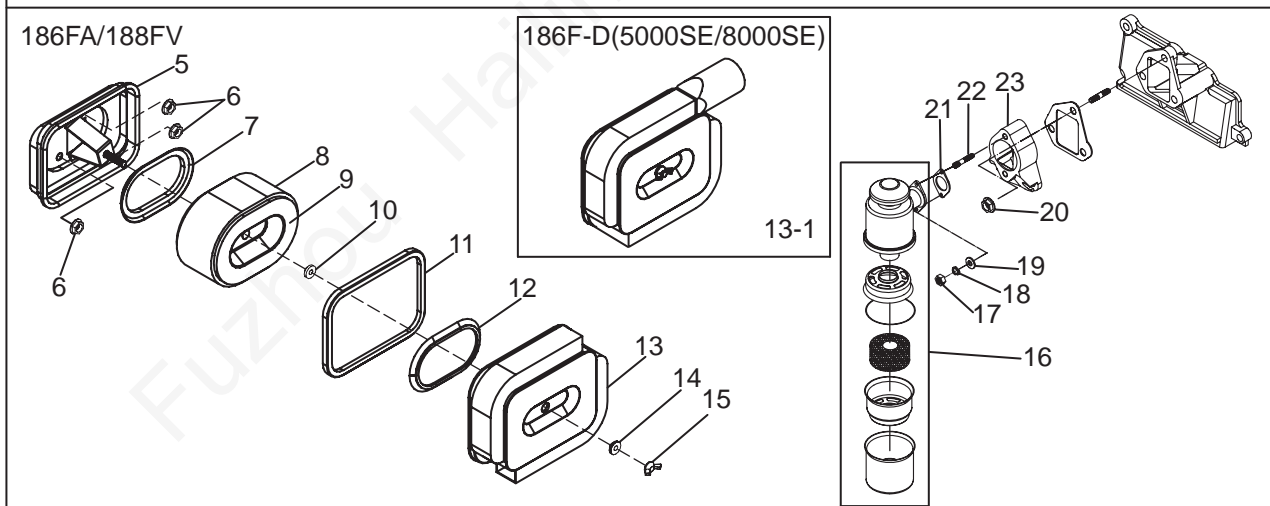
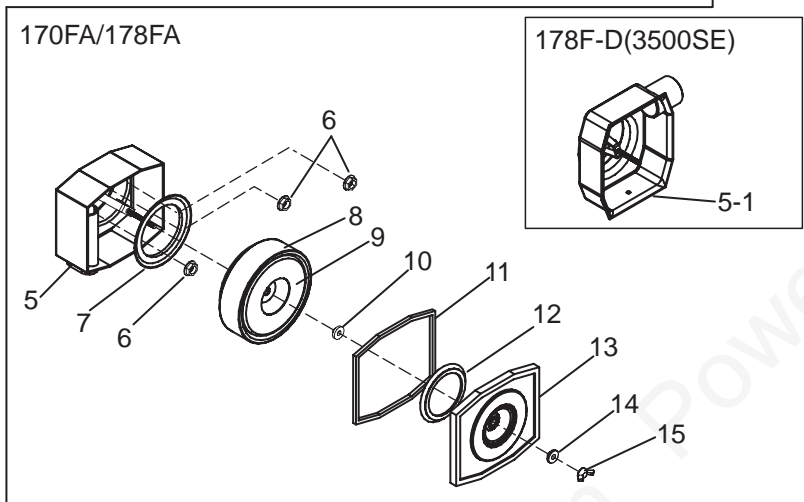
(5) Crankshaft &Flywheel Assembly

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
A	170F-05300	178F-05300	186F-05300	188FV-05300	Balancer Shaft Assy				1			
1	170F-05301	178F-05301	186F-05301	188FV-05301	Balancer Shaft				1			
2	170F-05303				Key 5X7				2			
3	170F-05302	178F-05302	186F-05302		Balancer Gear				1			
4	170F-05006	178F-05006			Bolt				1			
5	170F-05005	178F-05005			Washer				1			
B	170FA-05200	178FA-05200	186FA-05200	188FV-05200	Crankshaft Assy				1			
6	170F-05203	178F-05203	186F-05203	188FV-05203	Crankshaft Timing Gear				1			
7	1096-A05045	1096-A06056			Key 5X45	Key 6X56			1			
8	170FA-05201	178FA-05201	186FA-05201	188FV-05201	Crankshaft				1			
9	308-06350				Steel Ball 1/4"				1			
10	1096-A05012		1096-A05014		Key 5X12		Key 5X14		1			
11	170F-05004	178F-05004	186F-05004	188FV-05004	Balancer Drive Gear				1			
12	276-6306P5	276-6307P5	276-6308P5		Ball Bearing 6306P5	6307P5	6308P5		1			
13	1096-A05012				Key 5X12				1			
14	170F-05101	178F-05101	186F-05101	188FV-05101	Flywheel				1			
15	170F-05003		186F-05003		Flywheel Nut Washer				1			
16	170F-05002		186F-05002		Flywheel Nut				1			
17	170F-05001	178F-05001	186F-05001		Starter Pulley				1			
18	5789-06012A2				Bolt M6X12				3	4		
C	170FE-05100	178FE-05100	186FE-05100	188FVE-05100	Flywheel Assy (Electric)				1			
19	170FE-05101	178FE-05101	186FE-05101	188FVE-05101	Flywheel (Electric)				1			
20	170FE-05102	178FE-05102	186FE-05102		Flywheel Gear (Electric)				1			
178FS/186FAS												
8-1		178FS-05201	186FAS-05201		Crankshaft							1
D		178FSE-05100	186FSE-05100		Flywheel Assy (Electric)							1
19-1		178FSE-05101	186FSE-05101		Flywheel(Electric)							1
20-1		178FSE-05102	186FSE-05102		Flywheel Gear(Electric)							1

(6) Camshaft Assembly



(7) Air Cleaner Assembly



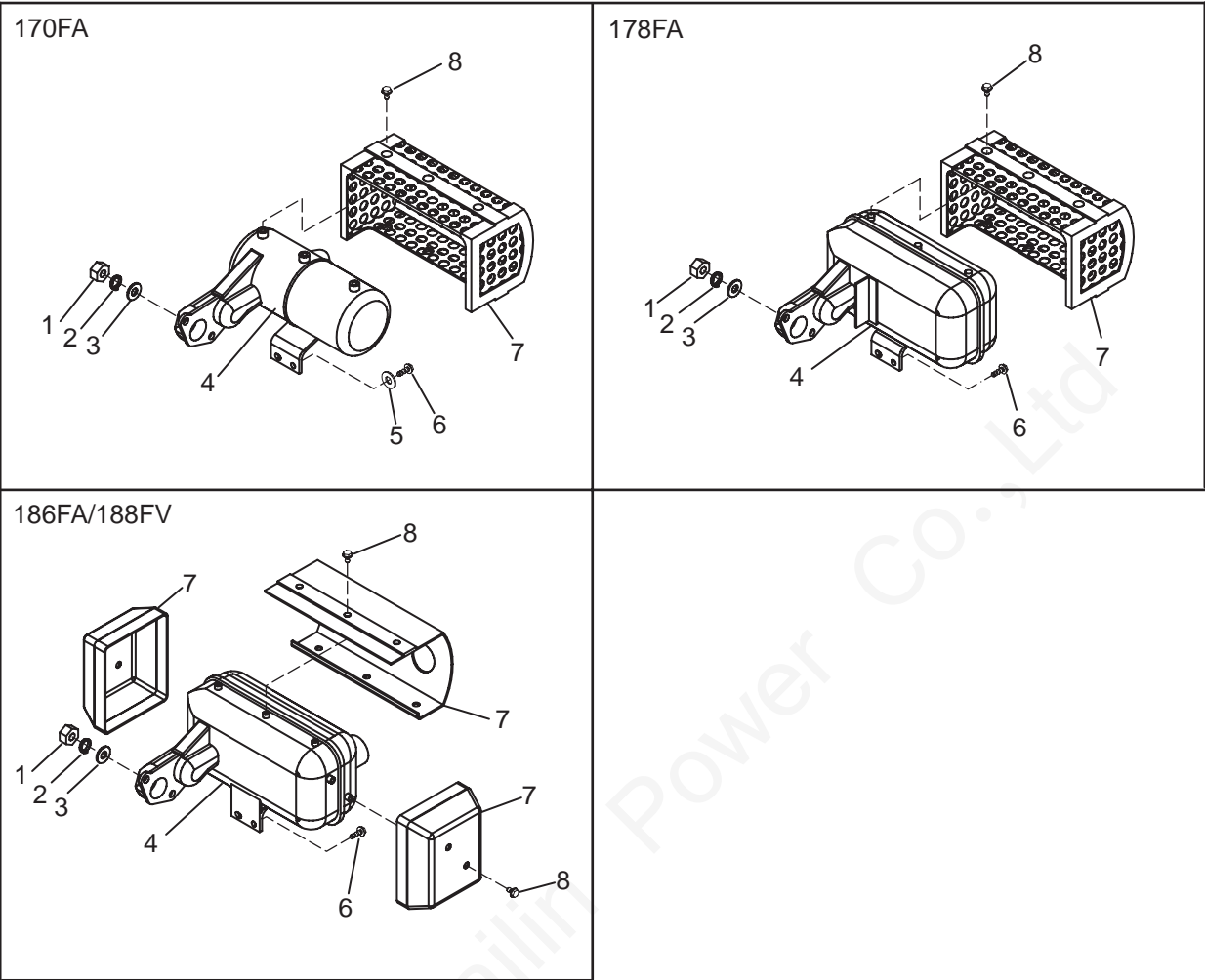
(6) Camshaft Assembly

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	170F-06100	178F-06100	186F-06100	186FV-06100	Valve Rod Assy				2			
2	170F-06003		186F-06003	186FV-06003	Valve Tappet				2			
3	170FA-06001	178FA-06001	186FA-06001	188FV-06001	Camshaft				1			
4	1096-A05014	1096-A04012	1096-A05014		Key 5X14	Key 4X12	Key 5X14		1			
5	170F-06002	178F-06002	186F-06002	188FV-06002	Camshaft Timing Gear				1			
178FS/186FS												
6	/	1096-A08045		/	/	Key 8X45		/	/	1		/
3-1	/	178FS-06001	186FAS-06001	/	/	Camshaft		/	/	1		/

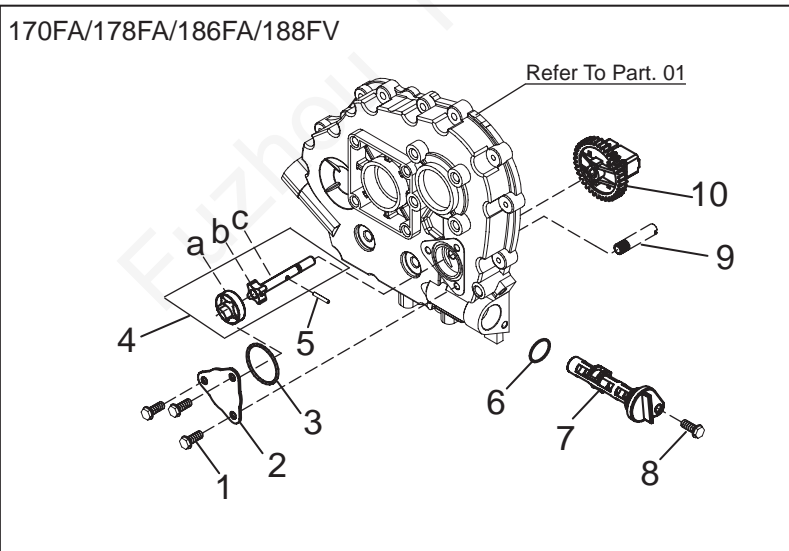
(7) Air Cleaner Assembly

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	170F-07401	178F-07401	186F-07401		Intake Pipe				1			
2	170F-07402				Air Cleaner Stud				1			
3	5789-06022A2		5789-06025A2		Bolt M6X22		Bolt M6X25		1	2	3	
4	170F-07001		186F-07001		Air Cleaner Gasket				1			
5	170F-07300		186F-07300		Air Cleaner Body Assy				1			
5-1	/	178F-07300D	/		Air Cleaner Body Assy				/	1	/	
6	6187.1-06000A2				Nut M6				3			
7	170F-07303		186F-07303		Shakeproof Seal Ring II				1			
8	170F-07108		186F-07108		Prefilter				1			
9	170F-07100		188FV-07100		Air Cleaner Element Assy				1			
10	170F-07101		186F-07101		Vibration Proof Pad				1			
11	170F-07201		186F-07201		Seal Ring				1			
12	170F-07203		186F-07203		Shakeproof Seal Ring I				1			
13	170F-07200		186F-07200		Air Cleaner Cover Assy				1			
13-1	/		186F-07200D		Air Cleaner Cover Assy				/	1		/
14	170F-07210		186F-07210		Shakeproof Seal Ring Assy				1			
15	62-06000C		62-08000C		Fly Nut M6		Fly Nut M8		1			
16	178FS-07500		170FAIT-07500		Oil-bath Air Cleaner Assy		Oil-bath Air Cleaner Assy(long)		1			
17	6170-06000A2		6170-08000A2		Nut M6		Nut M8		3	2		
18	93-06A		93-08A		Washer 6		Washer 8		3	2		
19	97.1-06A		97.1-08A		Flat Washer 6		Flat Washer 8		3	2		
20	6177.1-06000A2				Nut M6				3			
21	178FS-07501		186FS-07501A		Oil-bath Air Cleaner Gasket				1			
22	170F-01012		899-08020A2		Stud M6X18		Stud M8X20		3	2		
23	178FS-07502		186FS-07502A		Oil-bath Air Cleaner Spacer Flange				1			

(8) Muffler Assembly



(9) Lube Oil System



(8) Muffler Assembly

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	6170-08000A2				Nut M8				2			
2	93-08A				Washer 8				2			
3	97.1-08A				Flat Washer 8				2			
4	170F-08200	178F-08200	186F-08200		Muffler				1			
5	96.1-06A				Flat Washer 6				2			
6	5789-06016A2	5789-08016A2			Bolt M6X16	Bolt M8X16			2			
7	170F-08100	178F-08100	186F-08100		Muffler Cover				1			
8	5789-06008A2				Bolt M6X8				6	10		

(9) Lube Oil Assembly

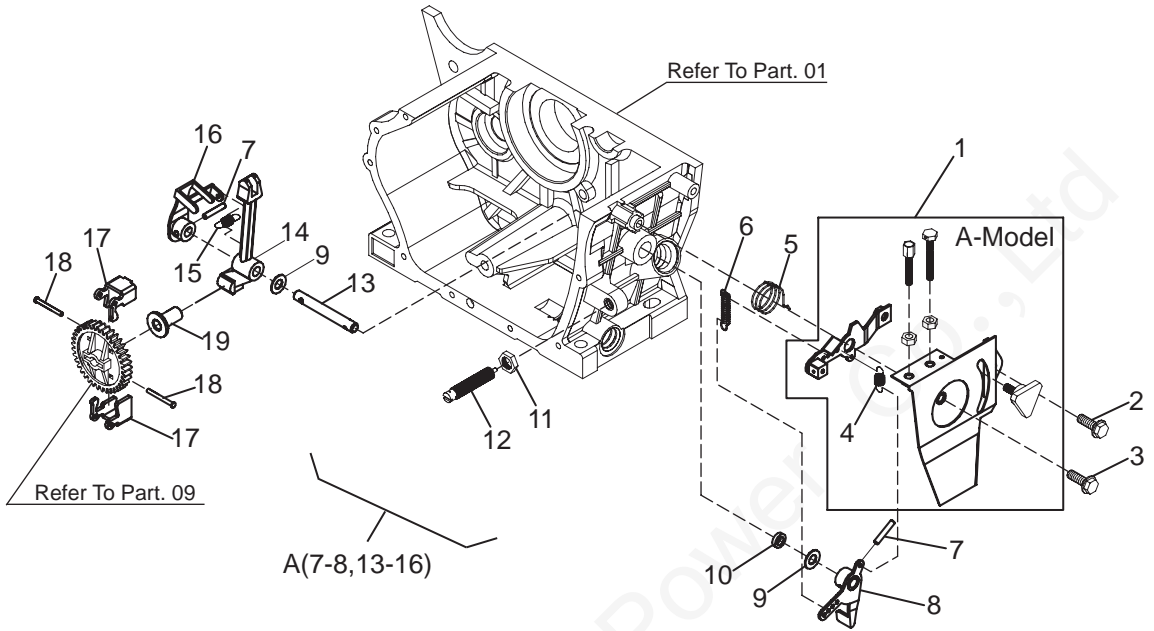
NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	5789-06012A2				Bolt M6X12				3			
2	170F-09001				Oil Pump Cover				1			
3	3452.1-345180				O-Ring 34.5X1.8				1			
4	170F-09100		186F-09100		Lube Oil Pump Assy				1			
a	170F-09103				Outer Rotor				1			
b	170F-09101				Inner Rotor				1			
c	170F-09102		186F-09102		Oil Pump Shaft				1			
5	119.1-03016				Pin 3X16				1			
6	3452.1-190265				O-Ring 19X2.65				1			
7	170F-09200				Lube Oil Filter Assy				1			
8	5789-06014A2				Bolt M6X14				1			
9	170F-09003				Lube Oil Pipe				1			
10	170F-09002b				Oil Pump Gear				1			

(10) Fuel Tank&Fuel Pipe Assembly

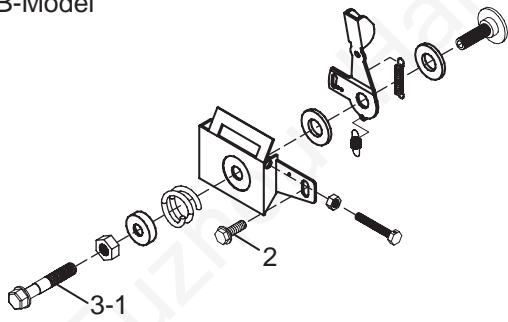
NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
A	170F-10100P				Fuel Tank Cap Assy				1			
1	170F-10101P				Fuel Tank Cap				1			
2	170F-10102P				Fuel Tank Cap Gasket				1			
B	170F-10020a				Fuel Cup Assy				1			
3	170F-10022a				Fuel Level Mark				1			
4	170F-10021a				Filter Cup				1			
5	170F-10300	178F-10300	186F-10300		Filter Element Assy				1			
6	170F-10007				Filter Gasket				1			
7	170F-10405				Fuel Tank Cock Gasket				1			
8	170F-10400				Fuel Tank Cock Assy				1			
8-1	170F-10400A				Fuel Tank Cock Assy				1			
9	170FA-10500	178FA-10500	186FA-10500E		Fuel Injection Pipe Assy(For small fuel tank)				1			
			186FA-10500G		Fuel Injection Pipe Assy(For large fuel tank)				1			
	178FA-10500D		186FA-10500D		Fuel Injection Pipe Assy(For silence type)				1			
10	170F-10009				Fuel Oil Pipe				1			
11	170F-10011				Clamp				2			
12	6170-06000A2				Nut M6				2			
13	5789-06014A2				Bolt M6X14				2			
14	170F-10014			186FV-10014	Lower Stay Assy				1			
15	170F-10002				Damper				4			
16	170F-10200P	178F-10200P	186F-10200P	186FV-10200	Fuel Tank Assy				1			
17	170F-10012				Fuel Oil Return Pipe				1			
18	170F-10013				Clamp				2			
19	170F-10001	178F-10001	186F-10001	186FV-10001	Upper Stay				1			
20	97.1-08A				Flat Washer 8				1			
21	170F-10003				Lifting Bolt				1			
22	5789-08045A2				Bolt M8X45				1			
23	97.1-06A				Flat Washer 6				2			
24			186FA-10015	186FV-10015	Pipe damper				1			

(11) Governor&Control System

170FA/178FA/186FA/188FV

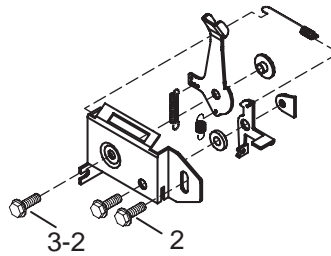


B-Model



1-1

C-Model



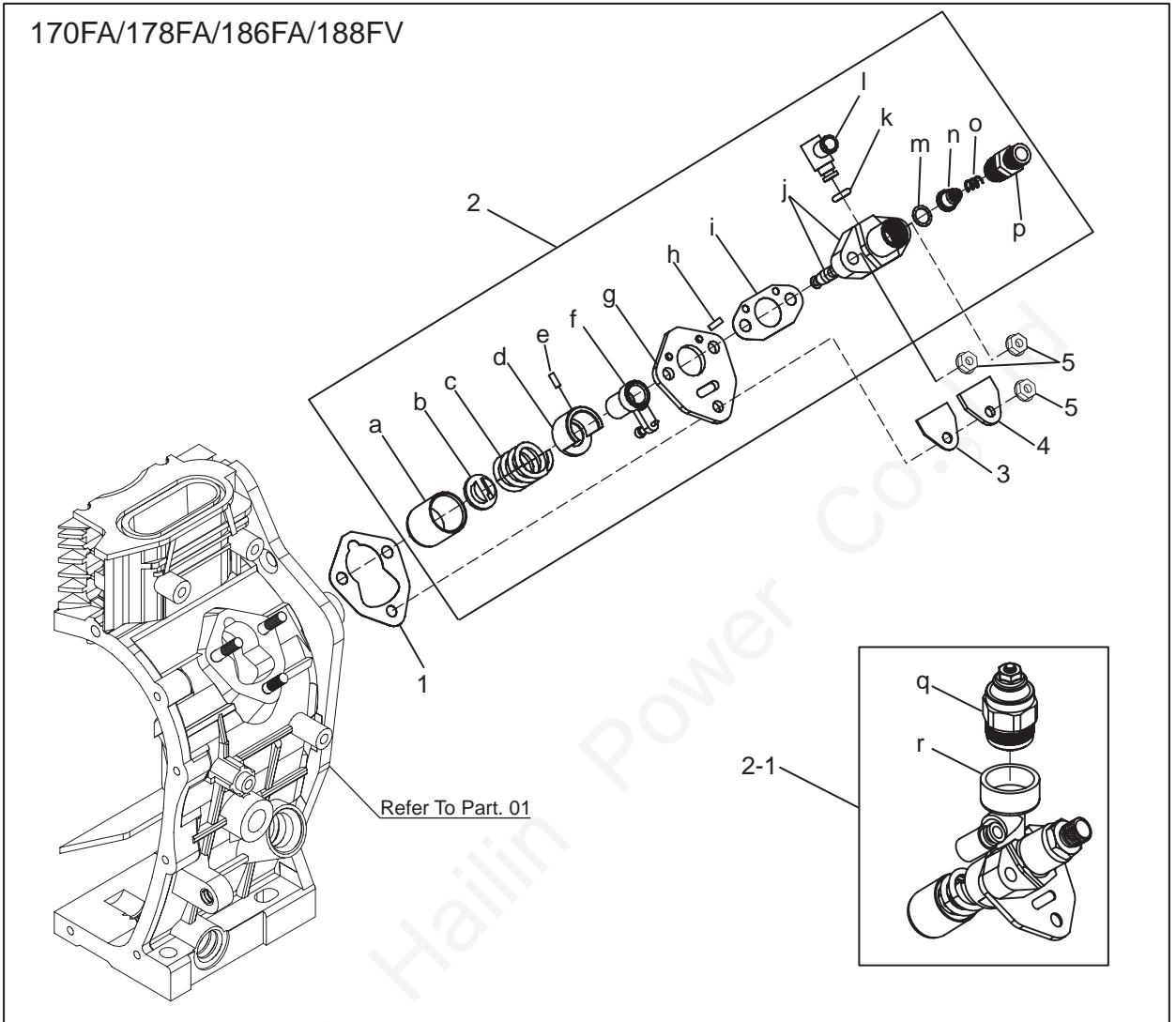
1-2

(11) Governor&Control System

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	170F-11300AM				Handle Bracket Assy				1			
1-1	170F-11300BM				Handle Bracket Assy				1			
1-2	170F-11300CM				Handle Bracket Assy				1			
2	5789-06014A2				Bolt M6X14				1			
3	5789-06020A2				Bolt M6X20				1			
3-1	5789-06045A2				Bolt M6X45				1			
3-2	5789-06025A2				Bolt M6X25				1			
4	170F-11006				Return Spring II				1			
5	170F-11005				Return Spring I				1			
6	170F-11007a		186F-11007a		Governor Spring				1			
A	170FA-11100	178FA-11100	186FA-11100	186FV-11100	Lever Fork Assy				1			
7	117-03022				Taper Pin 3X22				2			
8	170F-11110				Lever Fork Part				1			
9	170F-11003				Lever Shaft Washer				2			
10	170F-11008				Lever Shaft Oil Seal				1			
11	6173-10125A2				Nut M10X1.25				1			
12	170F-11200				Fuel Limiter Assy				1			
13	170FA-11102				Lever Shaft				1			
14	170FA-11101	178FA-11101	186FA-11101	186FV-11101	Lever Fork				1			
15	170FA-11103				Spring				1			
16	170FA-11120				Balancer				1			
17	170F-11001				Governor Weight				2			
18	170F-11002				Pin				2			
19	170FA-11004			170F-11004a	Tappet Speed Regulator				1			

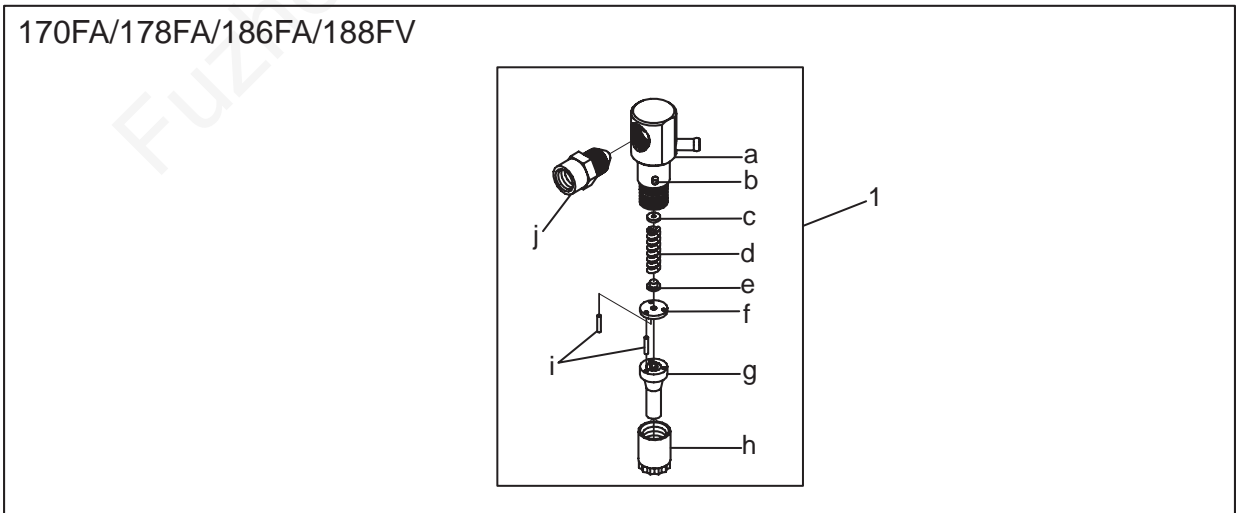
(12) Fuel Injection Pump Assembly

170FA/178FA/186FA/188FV



(13) Fuel Nozzle Assembly

170FA/178FA/186FA/188FV



(12) Fuel Injection Pump Assembly

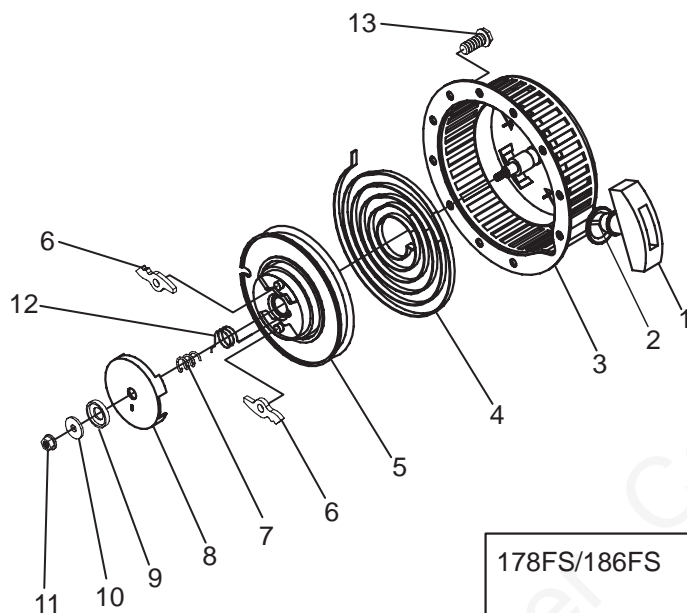
NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	170F-12001				Shim Set				1~3			
2	170F-12000	178F-12000	186F-12000	186FV-12000	Fuel Injection Pump Assy				1			
2-1	170F-12000D	178F-12000D	186F-12000D	186FV-12000D	Fuel Injection Pump Assy				1			
a	170F-12300			186FV-12300	Tappet				1			
b	170F-12009				Spring Seat				1			
c	170F-12008				Plug Spring				1			
d	170F-12007				Spring Supporting Mass				1			
e	879.1-03008				Spring Pin 3X8				1			
f	170F-12006				Fuel Metering Sleeve				1			
g	170F-12005				Flange				1			
h	879.1-02006				Spring Pin 2X6				2			
i	170F-12004				Paper shim				0~1			
j	170F-12200	178F-12200	186F-12200	186FV-12200	Fuel Oil Pump Body&Plunger Assy				1			
k	3452.1-057150				O-Ring 5.7X1.5				1			
l	170F-12400				In-line Joint Assy				1			
m	170F-12011				Delivery Valve Seal Gasket				1			
n	170F-12100	178F-12100		186FV-12100	Delivery Valve Assy				1			
o	170F-12012			186FV-12012	Delivery Valve Spring				1			
p	170F-12013			186FV-12013	Delivery Valve Holder				1			
q	170F-12500D				Solenoid Valve Assy				1			
r	170F-12601D				Solenoid Valve Seat				1			
3	170F-12003				Seal Gasket				1			
4	170F-12002				Seal Plate				1			
5	6177.1-06000A2				Nut M6				3			

(13) Fuel Nozzle Assembly

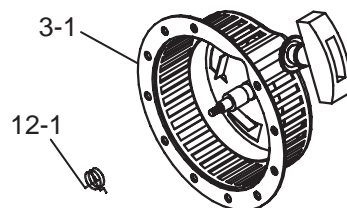
NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	170FA-13000	178FA-13000	186FA-13000	186FV-13000	Fuel Nozzle Assy				1			
a	170FA-13200			186FV-13200	Fuel Nozzle Holder Assy				1			
b	879.1-03009	879.1-03005			Spring Pin 3X9	Spring Pin 3X5			1			
c	170FA-13007				Pressure Regulation Shim				1~3			
d	170FA-13006				Nozzle Spring				1			
e	170FA-13005				Spring Seat				1			
f	170FA-13003				Valve Spacer				1			
g	170FA-13100	178FA-13100	186FA-13100	186FV-13100	Nozzle Valve				1			
h	170FA-13002				Nozzle Nut				1			
i	170FA-13004				Pin				2			
j	170F-13300				Edge Filter Assy				1			

(14) Recoil Starter Assembly

170FA/178FA/186FA/188FV

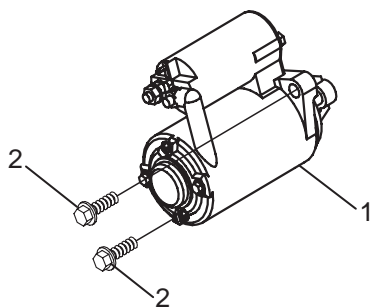
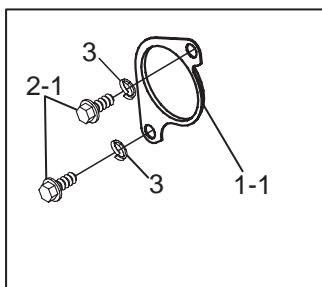


178FS/186FS

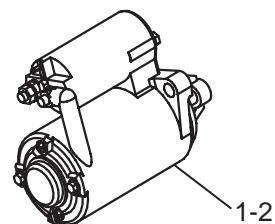


(15) Starter Assembly

170FA/178FA/186FA/188FV



178FS/186FS



(14) Recoil Starter Assembly

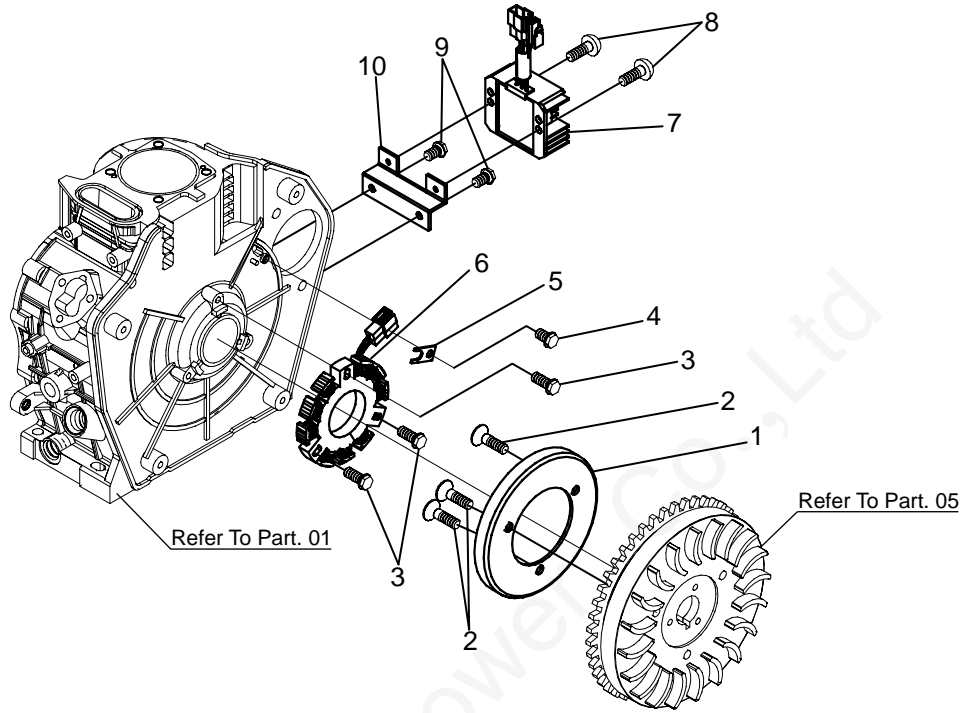
NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	170F-14007	178F-14007			Starter Handle				1			
2	170F-14005	178F-14005			Starter Rope				1			
3	170F-14100	178F-14100	186F-14100		Case Assy				1			
4	170F-14006	178F-14006	186F-14006		Spiral Spring				1			
5	170F-14001	178F-14001	186F-14001		Reel				1			
6	170F-14008	178F-14008			Starting Claw				2			
7	170F-14009	178F-14009			Friction Spring				1			
8	170F-14004	178F-14004			Guide of Starting Claw				1			
9	170F-14002	178F-14002			Friction Plate				1			
10	170F-14003	178F-14003			Washer				1			
11	6187.1-06000A2				Lock Nut M6				1			
12	170F-14011	178F-14011			Return Spring				1			
13	5789-06008A2				Bolt M6X8				4			
178FS/186FS												
3-1	/	178FS-14100	186FS-14100	/	/	Case Assy			/	/	1	/
12-1	/	178FS-14011		/	/	Return Spring			/	/	1	/

(15) Starter Assembly

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	170FE-15100A				Starter Motor Assy(0.80kW)				1			
	170FE-15100B				Starter Motor Assy(0.90kW)				1			
	170FE-15100C				Starter Motor Assy(retarding mechanism)				1			
1-1	170F-15200				Cover of Starting Motor Hole				1			
2	5789-10030A2				Bolt M10X30				2			
2-1	5783-10020A2				Bolt M10X20				2			
3	93-10A				Washer 10				2			
178FS/186FS												
1-2	/	178FS-15100		/	/	Starter Motor Assy(0.80kW)			/	/	1	/

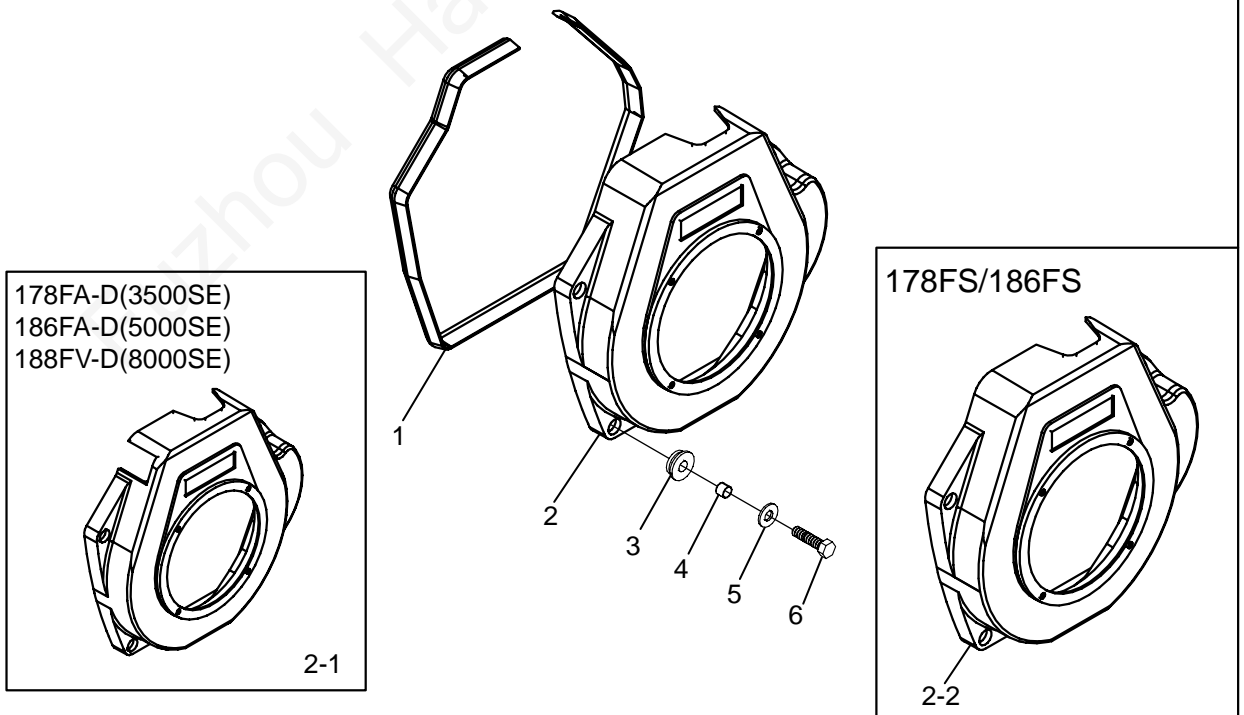
(16) Dynamo Assembly

170FA/178FA/186FA/188FV



(17) Cooling Device Assembly

170FA/178FA/186FA/188FV



(16) Dynamo Assembly

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	170F-16100				Rotor Parts of the Dynamo				1			
2	819.1-06014A3				Screw M6X14				3			
3	5789-06020A2				Bolt M6X20				3			
4	5783-06012A2				Bolt M6X12				1			
5	170F-16001				Cord Clamp				1			
6	170F-16200				Stator Parts of the Dynamo				1			
7	170F-16400A				Regulator				1			
	170F-16400B				Regulator				1			
8	5789-06012A2				Bolt M6X12				2			
9	5789-06014A2				Bolt M6X14				2			
10	170F-16301				Bracket				1			

(17) Cooling Device Assembly

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
1	170F-17003	178F-17003	186F-17003		Fan Case Seal				1			
2	170F-17100	178F-17100	186F-17100	186FV-17100	Fan Case Assy				1			
2-1	/	178F-17100D	186F-17100D	186FV-17100D	Fan Case Assy				/	1		
3	170F-17002				Cushion,Rubber				4			
4	170F-17001				Collar				4			
5	96.1-06A				Flat Washer 6				4			
6	5783-06022A2		5783-06025A2		Bolt M6X22		Bolt M6X25		4			
178FS/186FS												
2-2	/	178FS-17100	186FS-17100	/	/	Fan Case Assy		/	/	1		/

17.Easy destroyed and other parts

17-1.Easy destroyed parts

NO	PART NUMBER			DESCRIPTION			Q'TY			Whereabouts		
	170FA	178FA	186FA	170FA	178FA	186FA	170FA	178FA	186FA	170FA	178FA	186FA
1	170F-10300	178F-10300	186F-10300	170FA	178FA	186FA	170FA	178FA	186FA	170FA	178FA	186FA
2	170F-07100		188FV-07100									
3	170FA-13100	178FA-13100	186FA-13100									
4			170FA-02009									
5	170F-14000	178F-14000	186F-14000									
6	170FA-03003		186FA-03003									

17-2. O-Ring Sets

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
a	170F-01008	178F-01008	186F-01008		Rectangle Ring				1			
b	3452.1-190265				O-Ring 19X2.65				2			
c	3452.1-093150				O-Ring 9.3X1.5				1			
d	3452.1-190265				O-Ring 19X2.65				1			
e	3452.1-345180				O-Ring 34.5X1.8				1			

17-3. Bearings

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
g	276-6306P5	276-6307P5	276-6308P5		Ball Bearing 6306P5	6307P5	6308P5		1			
h	276-6205P5	276-6206P5	276-6207P5		Ball Bearing 6205P5	6206P5	6207P5		1			
i	290-HKH0810				Needle Bearing 081410				2			
j	290-HK1512			290-HK1520	Needle Bearing 152112			HK152120	1			
k	276-6202P6	276-6203P6	276-6304P6		Ball Bearing 6202P6	6203P6	6304P6		2			

17-4. Oil Seals

NO	PART NUMBER				DESCRIRTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
l	9877.1-254210	9877.1-304510	9877.1-355010		Oil Seal 25X42X10	Seal 30X45X10	Seal 35X50X10		1			
m	9877.1-304508		9877.1-355008		Oil Seal 30X45X8	Seal 35X50X8			1			
n	170F-11008				Lever Shaft Oil Seal				1			
o	170F-02006	178F-02006	186F-02006		Valve Stem Seal				2			

17-5. Gasket sets

NO	PART NUMBER				DESCRIPTION				Q'TY			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
p	170F-01100				Oil Plug Seal Assy				1			
q	170F-12001				Shim Set				1~3			
r	170F-12003				Seal Gasket				1			
s	170F-01015	178F-01015	186F-01015		Crank Case Gasket				1			
t	170F-02011	178F-02011	186F-02011		Air Intake Gasket				1			
u	170F-02012		186F-02012		Muffler Gasket				1			
v	170FA-03003		186FA-03003		Bonnet Gasket				1			
w	170F-07001		186F-07001		Air Cleaner Gasket				1			
x	170F-10007				Filter Gasket				1			
y	170F-10405				Fuel Tank Cock Gasket				1			
z	170FA-01013	178FA-01013	186FA-01013	188FV-01013	Cylinder Head Gasket				1			

18. Valve Clearance

Unit:mm

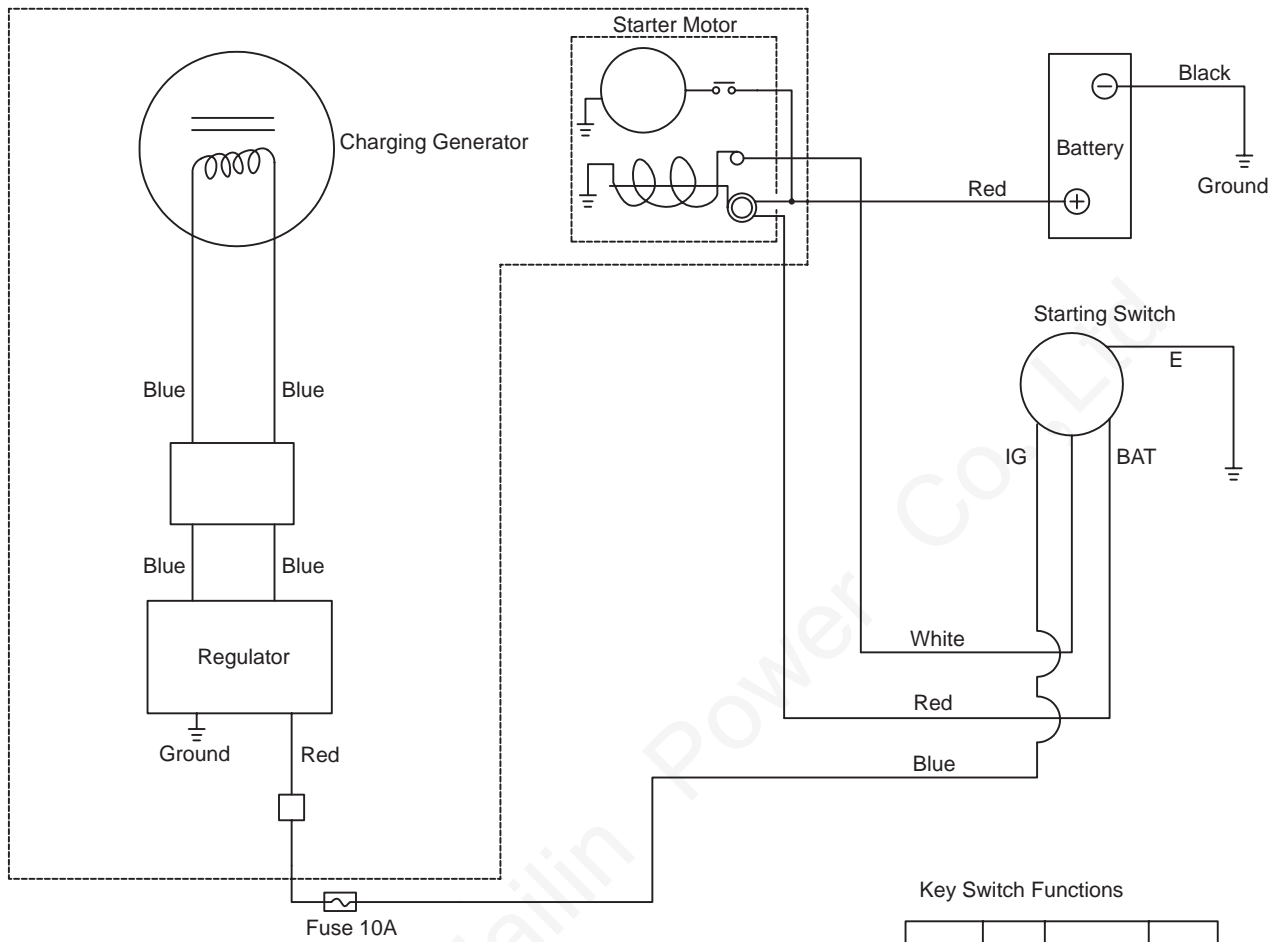
Model Description	170FA	178FA	186FA/188FV
Intake valve	0.10~0.15 (Cold state)		
Exhaust valve	0.10~0.15 (Cold state)		

19. Torques of main bolt&nut

Unit:N.m

NO	DESCRIPTION				SPECIFICATION				TORQUE			
	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV	170FA	178FA	186FA	188FV
①	Connecting rod screw				2-M7X1.0		2-M8X1.0		28~30		42~46	
②	Cylinder head nut / bolt				4-M8X1.25	4-M9X1.25	4-M10X1.5		28~32	42~46	58~62	
③	Fly wheel nut				1-M16X1.5		1-M18X1.5		100~110		210~230	
④	Nozzle retainer nut				2-M6X1.0				10~12			
⑤	Rocker arm screw				2-M6X1.0		2-M8X1.25		13~15		22~25	
⑥	Standard bolt&nut				M6				7~10			
⑦	Standard bolt&nut				M8				18~20			
⑧	Head stud bolts(stud side)				4-M8X1.25	4-M9X1.25	4-M10X1.5		13~15	15~17	25~29	
⑨	FO nozzle case nut				1-0.605-40UNS-2B				40~45			
⑩	FO pump stud bolts(stud side)				1-M14X1.5				30~35			
⑪	Crank case cover bolt				14-M6X1.0				13~15			
⑫	Crank case cover bolt				15-M8X1.25				25~27			

20. Electric schematic diagram of electric starting



Charging Generator	Model	GP9587
	Output Current	1.8~8.0A(DC)
	At Charging Start	$\geq 1600\text{rpm}$ (13V)
	Allowable Ambient Temperature	-20~+65°C
	Combination of Regulator (model)	RS2190
Starter Motor		12V-0.8kW

Key Switch Functions

	E	IG/BAT	ST
OFF	○		
ON		○	
START		○	○

OFF ON START

Part Introduction

- 1) Battery: $\begin{cases} 170\text{FA-E:18~24AH} \\ 178\text{FA-E:24~36AH} \\ 186\text{FA-E/188FV-E:36~45AH} \end{cases}$

- 2) Battery Cable: \oplus & \ominus (BVR16)