



# POWER UNIT



Model	HPU 18
Motor	18PS
Pump	42l/min @ 150bar
Hydraulic functions	2
Hydraulic oil tank	55 l
Fuel tank	20 l
Electric start	Yes
Oil cooler	Yes
External dimensions	128 x 65 x 70 cm
Weight	190 kg

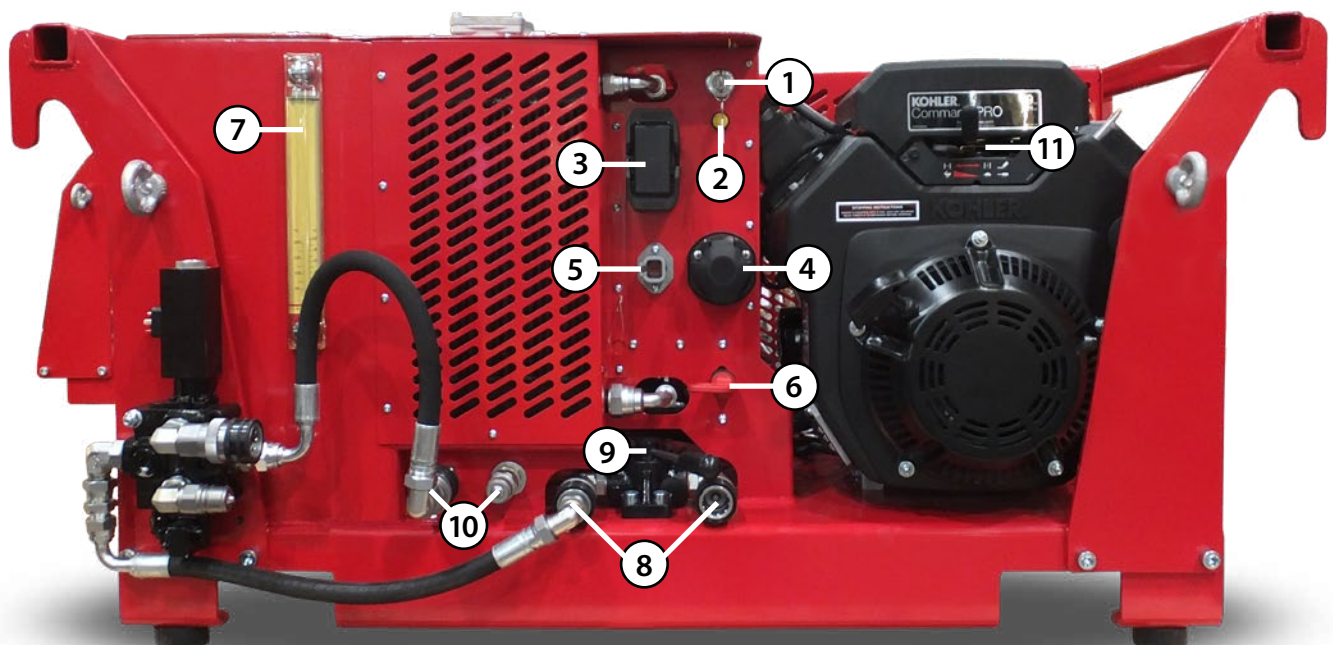
This manual includes descriptions, exploded view drawings, electrical and hydraulic diagram for the Hilltip HPU 18, and Owner's Manual for the Kohler Command Pro 18 Motor

## Power unit parts

1. Ignition switch
2. Free circulation, press and hold during start
3. Power and joystick connector
4. 7-pin trailer connector for extra equipment

Pin no	Function
1	Water pump GND
2	Water Pump
4	Water level input
5	Water level +12V

5. Optional valves for sweeper
6. Main switch
7. Sight glass with thermometer for the hydraulic oil
8. Pressure lines
9. Pressure output line selector
10. Return lines
11. Upper lever - choke  
Lower lever - throttle



Oil dipstick (yellow)

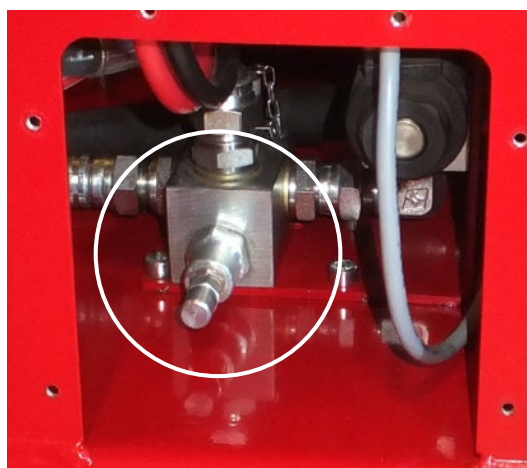
## IO-box

Visible when removing back cover



## Pressure regulator valve

Factory settings: 150 bar



## Recommended oils

### Hydraulic oil:

ISO VG 32

### Motor oil:

Winter: 5W-30 Synthetic

Summer: 10W-30 Synthetic

### Fuel:

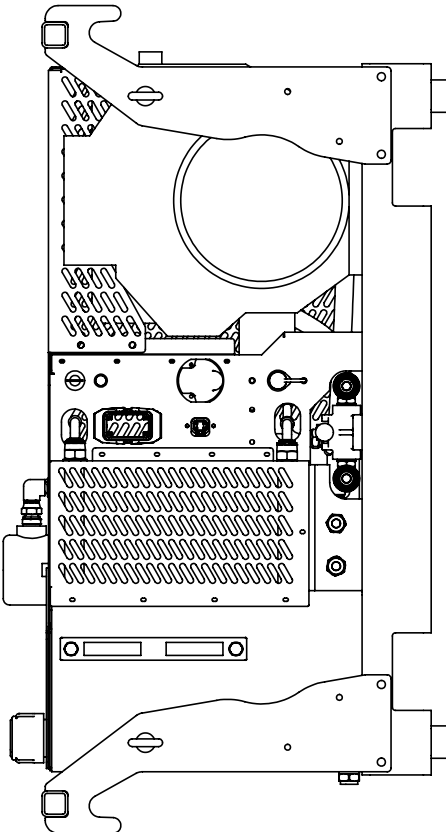
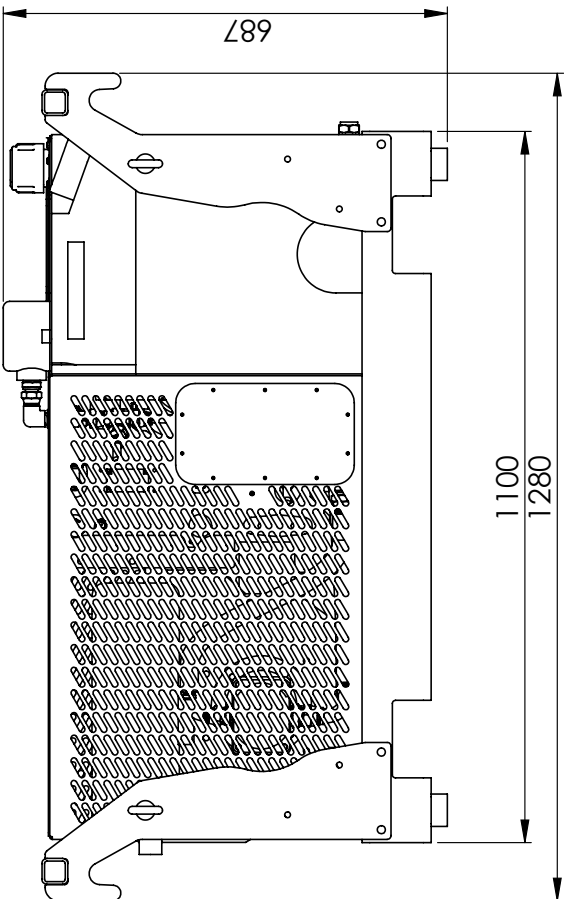
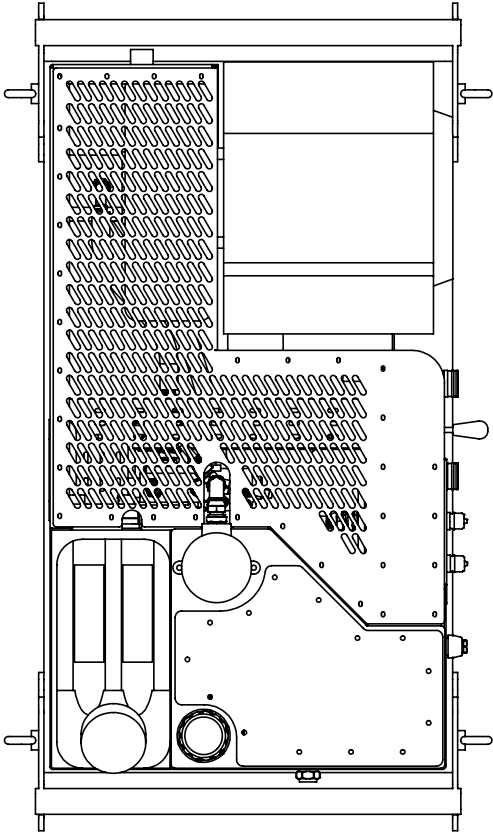
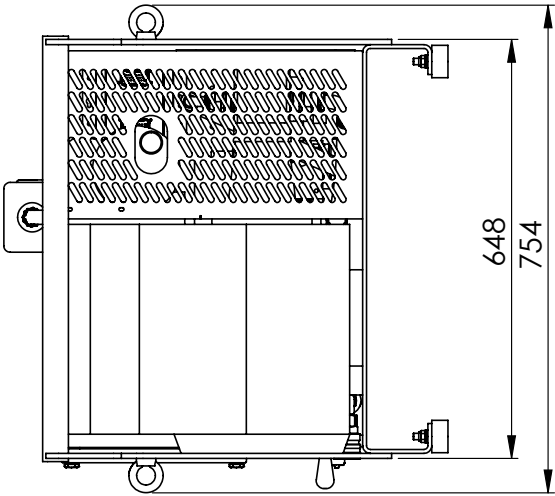
Unleaded gasoline

(95 or higher recommended, minimum 87 octane)

## Controller



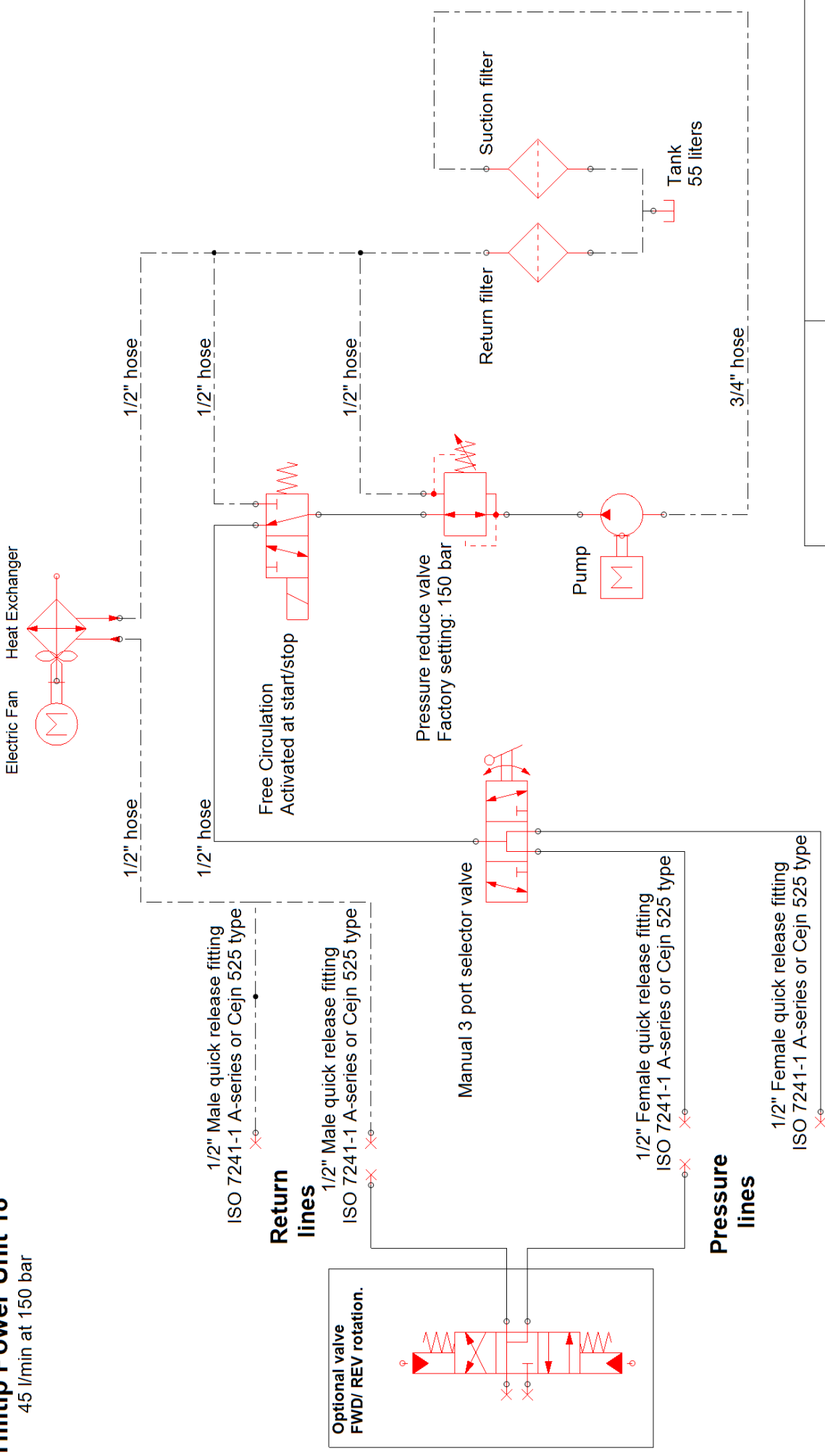
1. Start
2. Stop
3. Power indicator
4. Down pressure indicator
5. Oil pressure low indicator
6. Water level low indicator
7. Rotation forward
8. Rotation backward





**Hilltip Power Unit 18**

45 l/min at 150 bar



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PROPERTY OF OY HILLTIP AB.  
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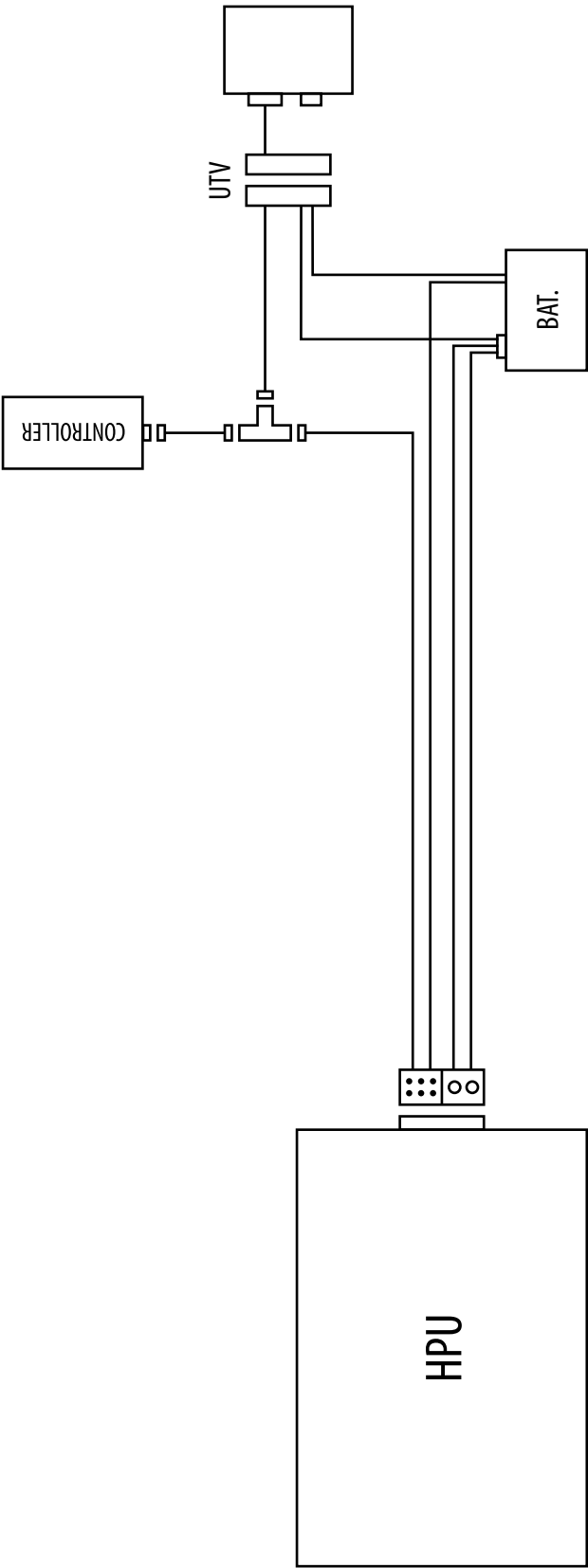
HPU18

Rev: A.1

By: KSU

Date: 19.9.2017 12:56:49





CONNECTOR 3

Phoenix	
Battery +	1
Battery -	2
GND	1
+12V	2
Activ.	3
CAN L	4
CAN H	5
(VCC	6)





**Oy HillTip Ab**

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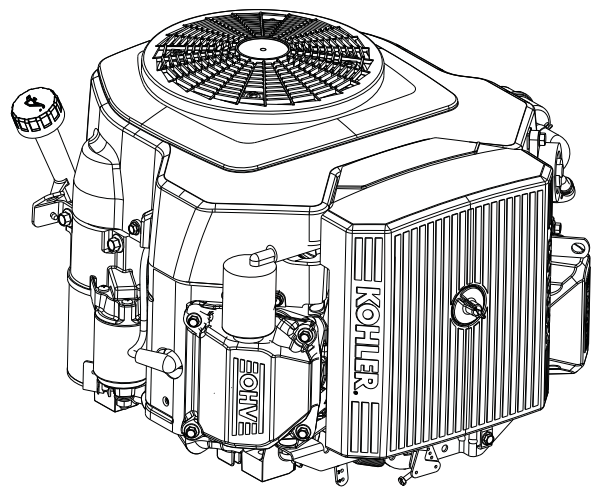
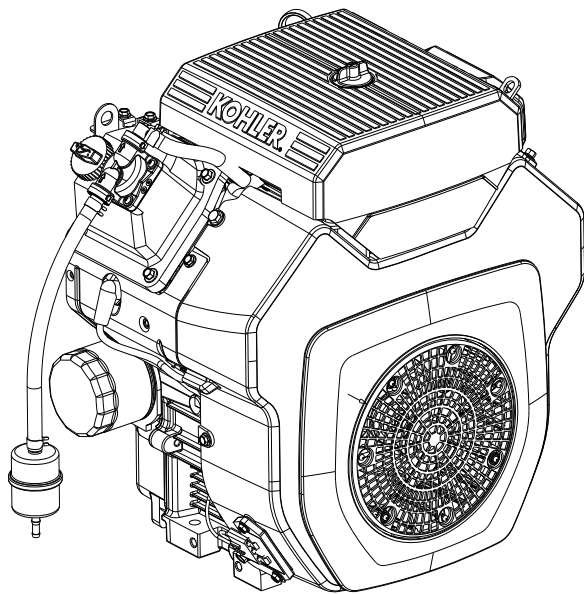
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# KOHLER® Command®

CH18-CH23, CH620-CH740, CH750  
CV18-CV23, CV620-CV740, CV750  
Owner's Manual



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**IMPORTANT:** Read all safety precautions and instructions carefully before operating equipment. Refer to operating instruction of equipment that this engine powers.

Ensure engine is stopped and level before performing any maintenance or service.

Warranty coverage as outlined in the warranty card and on KohlerEngines.com. Please review carefully as it provides you specific rights and obligations.

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Record engine information to reference when ordering parts or obtaining warranty coverage.


Engine Model \_\_\_\_\_  
Specification \_\_\_\_\_  
Serial Number \_\_\_\_\_  
Purchase Date \_\_\_\_\_


## Safety Precautions


**⚠ WARNING:** A hazard that could result in death, serious injury, or substantial property damage.

**⚠ CAUTION:** A hazard that could result in minor personal injury or property damage.


NOTE: is used to notify people of important installation, operation, or maintenance information.


	<p><b>⚠ WARNING</b></p> <p>Explosive Fuel can cause fires and severe burns.</p> <p>Do not fill fuel tank while engine is hot or running.</p>
<p>Gasoline is extremely flammable and its vapors can explode if ignited. Store gasoline only in approved containers, in well ventilated, unoccupied buildings, away from sparks or flames. Spilled fuel could ignite if it comes in contact with hot parts or sparks from ignition. Never use gasoline as a cleaning agent.</p>	

	<p><b>⚠ WARNING</b></p> <p>Carbon Monoxide can cause severe nausea, fainting or death.</p> <p>Avoid inhaling exhaust fumes.</p>
<p>Engine exhaust gases contain poisonous carbon monoxide. Carbon monoxide is odorless, colorless, and can cause death if inhaled.</p>	

	<p><b>⚠ WARNING</b></p> <p>Accidental Starts can cause severe injury or death.</p> <p>Disconnect and ground spark plug lead(s) before servicing.</p>
<p>Before working on engine or equipment, disable engine as follows: 1) Disconnect spark plug lead(s). 2) Disconnect negative (–) battery cable from battery.</p>	

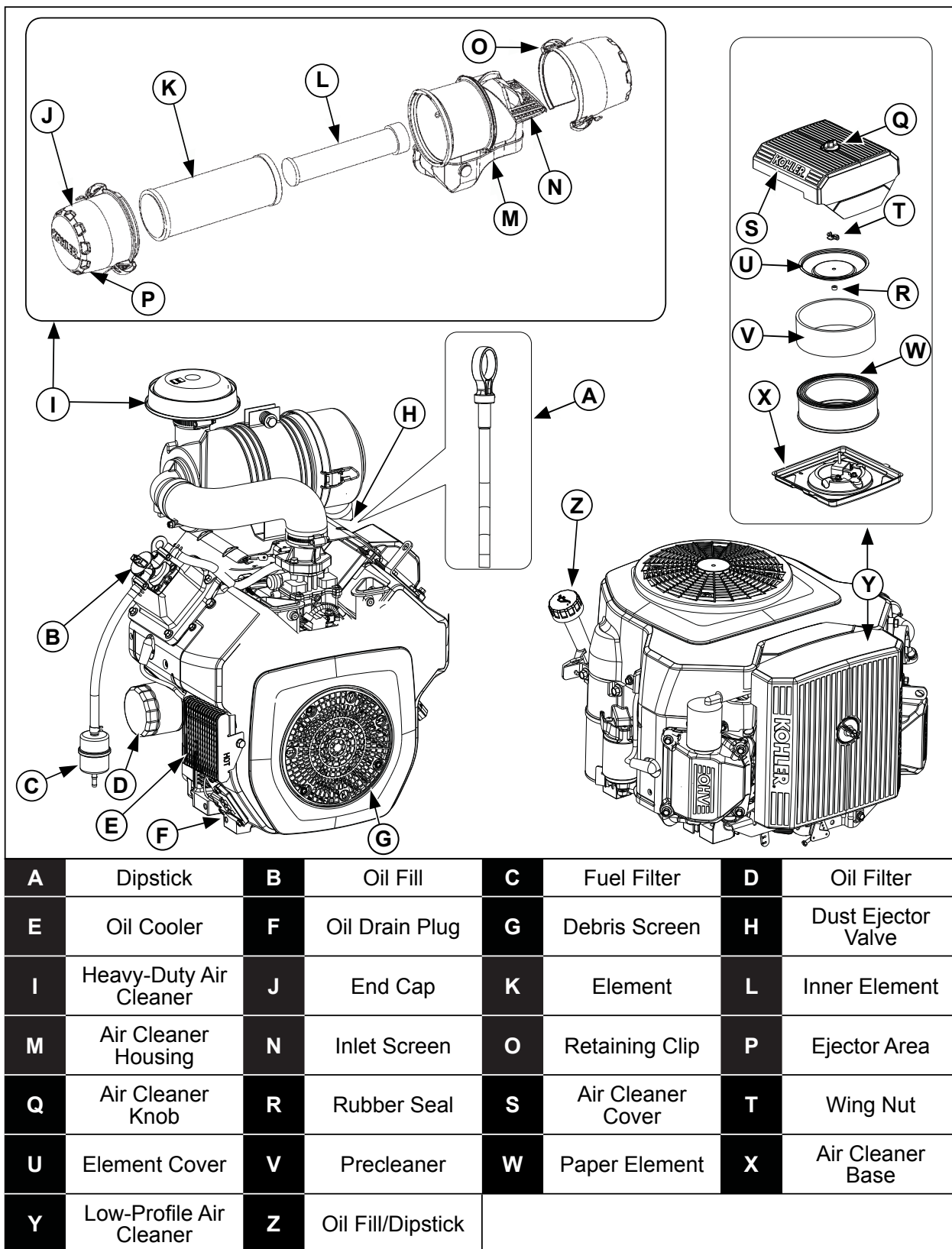
	<p><b>⚠ WARNING</b></p> <p>Rotating Parts can cause severe injury.</p> <p>Stay away while engine is in operation.</p>
<p>Keep hands, feet, hair, and clothing away from all moving parts to prevent injury. Never operate engine with covers, shrouds, or guards removed.</p>	

	<p><b>⚠ CAUTION</b></p> <p>Electrical Shock can cause injury.</p> <p>Do not touch wires while engine is running.</p>
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	<p><b>⚠ WARNING</b></p> <p>Hot Parts can cause severe burns.</p> <p>Do not touch engine while operating or just after stopping.</p>
<p>Never operate engine with heat shields or guards removed.</p>	

### California Proposition 65 Warning

Engine exhaust from this product contains chemicals known to State of California to cause cancer, birth defects, or other reproductive harm.



### Pre-Start Checklist

1. Check oil level. Add oil if low. Do not overfill.
2. Check fuel level. Add fuel if low. Check fuel system components and lines for leaks.
3. Check and clean cooling areas, air intake areas and external surfaces of engine (particularly after storage).
4. Check that air cleaner components and all shrouds, equipment covers, and guards are in place and securely fastened.
5. Check spark arrestor (if equipped).

## Starting



### WARNING

Carbon Monoxide can cause severe nausea, fainting or death.  
Avoid inhaling exhaust fumes.

Engine exhaust gases contain poisonous carbon monoxide. Carbon monoxide is odorless, colorless, and can cause death if inhaled.



### WARNING

Rotating Parts can cause severe injury.  
Stay away while engine is in operation.

Keep hands, feet, hair, and clothing away from all moving parts to prevent injury. Never operate engine with covers, shrouds, or guards removed.

**NOTE:** Do not crank engine continuously for more than 10 seconds. Allow a 60 second cool down period between starting attempts. Failure to follow these guidelines can burn out starter motor.

**NOTE:** Upon start-up, a metallic ticking may occur. Run engine for 5 minutes. If noise continues, run engine at mid throttle for 20 minutes. If noise persists, take engine to your local Kohler authorized dealer.

1. Place throttle control midway between slow and fast positions. Place choke control into ON position.
2. Turn key switch to START position. Release switch as soon as engine starts. If starter does not turn engine over, shut off key switch immediately. Do not make further attempts to start engine until condition is corrected. Do not jump start. See your Kohler authorized dealer for trouble analysis.
3. Cold engine: Gradually return choke control to OFF position after engine starts and warms up. Engine/equipment may be operated during warm-up period, but it may be necessary to leave choke partially on until engine warms up.

Warm engine: return choke to OFF position as soon as engine starts.

## Cold Weather Starting Hints

1. Use proper oil for temperature expected.
2. Disengage all possible external loads.
3. Use fresh winter grade fuel. Winter grade fuel has higher volatility to improve starting.

## Stopping

1. If possible, remove load by disengaging all PTO driven attachments.
2. Position throttle control between half and full throttle; stop engine.

## Angle of Operation

Refer to operating instructions of equipment this engine powers. Do not operate this engine exceeding maximum angle of operation; see specification table. Engine damage could result from insufficient lubrication.

## Engine Speed

**NOTE:** Do not tamper with governor setting to increase maximum engine speed. Overspeed is hazardous and will void warranty.

## Cold Weather Operation


Anti-icing kits can be installed to improve cold weather operation and are available through your local Kohler authorized dealer.

## High Altitude Operation

This engine may require a high altitude carburetor kit to ensure correct engine operation at altitudes above 4000 ft. (1219 meters). To obtain high altitude kit information or to find a Kohler authorized dealer visit [KohlerEngines.com](http://KohlerEngines.com) or call 1-800-544-2444 (U.S. and Canada).

This engine should be operated in its original configuration below 4000 ft. (1219 meters) as damage may occur if high altitude carburetor kit is installed and operated below 4000 ft. (1219 meters).

## Maintenance Instructions

	<b>⚠ WARNING</b>	Before working on engine or equipment, disable engine as follows: 1) Disconnect spark plug lead(s). 2) Disconnect negative (–) battery cable from battery.
	Accidental Starts can cause severe injury or death. Disconnect and ground spark plug lead(s) before servicing.	

Normal maintenance, replacement or repair of emission control devices and systems may be performed by any repair establishment or individual; however, warranty repairs must be performed by a Kohler authorized dealer found at KohlerEngines.com or 1-800-544-2444 (U.S. and Canada).

## Maintenance Schedule

### Weekly

- Check heavy-duty air cleaner element.

### Every 25 Hours or Annually<sup>1</sup>

- Service/replace low-profile precleaner.

### Every 100 Hours or Annually<sup>1</sup>

- Replace low-profile air cleaner element.
- Change oil.
- Remove cooling shrouds and clean cooling areas.
- Check oil cooler fins, clean as necessary (if equipped).

### Every 200 Hours

- Change oil filter.
- Replace fuel filter.

### Every 250 Hours<sup>1</sup>

- Replace heavy-duty air cleaner element and check inner element.

### Every 500 Hours<sup>1</sup>

- Replace heavy-duty air cleaner inner element.
- Replace spark plugs and set gap.

### Every 500 Hours<sup>2</sup>

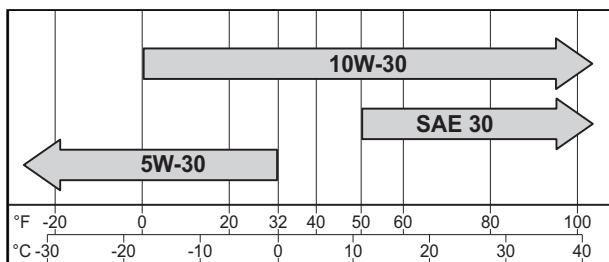
- Have crankshaft spline lubricated.

<sup>1</sup> Perform these procedures more frequently under severe, dusty, dirty conditions.

<sup>2</sup> Have a Kohler authorized dealer perform this service.

## Oil Recommendations

We recommend use of Kohler oils for best performance. Other high-quality detergent oils (including synthetic) of API (American Petroleum Institute) service class SJ or higher are acceptable. Select viscosity based on air temperature at time of operation as shown in table below.



## Check Oil Level

**NOTE:** To prevent extensive engine wear or damage, never run engine with oil level below or above operating range indicator on dipstick.

Ensure engine is cool. Clean oil fill/dipstick areas of any debris.

1. Remove dipstick; wipe oil off.
  - a. Press-in cap: reinsert dipstick into tube; press completely down.
  - or
  - b. Thread-on cap: reinsert dipstick into tube; rest cap on tube, do not thread cap onto tube.
2. Remove dipstick; check oil level. Level should be at top of indicator on dipstick.
3. If oil is low on indicator, add oil up to top of indicator mark.
4. Reinstall dipstick and tighten securely.



## Change Oil and Filter


Change oil while engine is warm.

1. Clean area around oil fill cap/dipstick, drain plug/oil drain valve.
  - a. Remove drain plug and oil fill cap/dipstick. Allow oil to drain completely.  
or
  - b. Open oil drain valve cap; if needed, attach a length of 1/2 in. I.D. hose to direct oil into appropriate container; twist valve drain body counterclockwise and pull. Remove dipstick. Allow oil to drain completely.
2. Clean area around oil filter. Place a container under filter to catch any oil and remove filter. Wipe off mounting surface.
  - a. Reinstall drain plug. Torque to 10 ft. lb. (13.6 N·m).  
or
  - b. Close oil drain valve body, remove hose (if used), and replace cap.
3. Place new filter in shallow pan with open end up. Fill with new oil until oil reaches bottom of threads. Allow 2 minutes for oil to be absorbed by filter material.
4. Apply a thin film of clean oil to rubber gasket on new filter.
5. Refer to instructions on oil filter for proper installation.
6. Fill crankcase with new oil. Level should be at top of indicator on dipstick.
7. Reinstall oil fill cap/dipstick and tighten securely.
8. Start engine; check for oil leaks. Stop engine; correct leaks. Recheck oil level.
9. Dispose of used oil and filter in accordance with local ordinances.

## Oil Sentry™ (if equipped)

This switch is designed to prevent engine from starting in a low oil or no oil condition. Oil Sentry™ may not shut down a running engine before damage occurs. In some applications this switch may activate a warning signal. Read your equipment manuals for more information.

## Fuel Recommendations

	<p><b>! WARNING</b></p> <p>Explosive Fuel can cause fires and severe burns.</p> <p>Do not fill fuel tank while engine is hot or running.</p>
<p>Gasoline is extremely flammable and its vapors can explode if ignited. Store gasoline only in approved containers, in well ventilated, unoccupied buildings, away from sparks or flames. Spilled fuel could ignite if it comes in contact with hot parts or sparks from ignition. Never use gasoline as a cleaning agent.</p>	

NOTE: E15, E20 and E85 are NOT approved and should NOT be used; effects of old, stale or contaminated fuel are not warrantable.

Fuel must meet these requirements:


- Clean, fresh, unleaded gasoline.
- Octane rating of 87 (R+M)/2 or higher.
- Research Octane Number (RON) 90 octane minimum.
- Gasoline up to 10% ethyl alcohol, 90% unleaded is acceptable.
- Methyl Tertiary Butyl Ether (MTBE) and unleaded gasoline blend (max 15% MTBE by volume) are approved.
- Do not add oil to gasoline.
- Do not overfill fuel tank.
- Do not use gasoline older than 30 days.

## Fuel Line

Low permeation fuel line must be installed on carbureted Kohler Co. engines to maintain EPA and CARB regulatory compliance.



## Spark Plugs

	<p><b>CAUTION</b></p> <p>Electrical Shock can cause injury.</p> <p>Do not touch wires while engine is running.</p>
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Clean out spark plug recess. Remove plug and replace.

1. Check gap using wire feeler gauge. Adjust gap, see specification table for adjustment.
2. Install plug into cylinder head.
3. Torque plug to 20 ft. lb. (27 N·m).

## Air Cleaner

**NOTE:** Operating engine with loose or damaged air cleaner components could cause premature wear and failure. Replace all bent or damaged components.

**NOTE:** Paper element cannot be blown out with compressed air.

### Low-Profile/Commercial Mower

Loosen knob and remove air cleaner cover.

Precleaner:

1. Remove precleaner from paper element.
2. Replace or wash precleaner in warm water with detergent. Rinse and allow to air dry.
3. Saturate precleaner with new engine oil; squeeze out excess oil.
4. Reinstall precleaner over paper element.

Paper Element:

1. Clean area around element. Remove wing nut, element cover, and paper element with precleaner.
2. Separate precleaner from element; service precleaner and replace paper element.
3. Check condition of rubber seal and replace if necessary.
4. Install new paper element on base; install precleaner over paper element; reinstall element cover and secure with wing nut.

Reinstall air cleaner cover and secure with knob.

### Heavy-Duty

1. Unhook retaining clips and remove end cap(s).
2. Check and clean inlet screen (if equipped).
3. Pull air cleaner element out of housing and replace. Check condition of inner element; replace when dirty.

4. Check all parts for wear, cracks, or damage, and that ejector area is clean.
5. Install new element(s).
6. Reinstall end cap(s) with dust ejector valve/screen down; secure with retaining clips.


## Breather Tube

Ensure both ends of breather tube are properly connected.

## Oil Cooler (if equipped)

1. Clean fins with a brush or compressed air.
2. Remove two screws securing oil cooler, and tilt to clean back side.
3. Reinstall oil cooler.

## Air Cooling

	<p><b>WARNING</b></p> <p>Hot Parts can cause severe burns.</p> <p>Do not touch engine while operating or just after stopping.</p> <p>Never operate engine with heat shields or guards removed.</p>
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Proper cooling is essential. To prevent over heating, clean screens, cooling fins, and other external surfaces of engine. Avoid spraying water at wiring harness or any electrical components. See Maintenance Schedule.

## Repairs/Service Parts

We recommend that you use a Kohler authorized dealer for all maintenance, service, and replacement parts for engine. To find a Kohler authorized dealer visit [KohlerEngines.com](http://KohlerEngines.com) or call 1-800-544-2444 (U.S. and Canada).

## Storage

If engine will be out of service for 2 months or more follow procedure below.

1. Add Kohler PRO Series fuel treatment or equivalent to fuel tank. Run engine 2-3 minutes to get stabilized fuel into fuel system (failures due to untreated fuel are not warrantable).
2. Change oil while engine is still warm from operation. Remove spark plug(s) and pour about 1 oz. of engine oil into cylinder(s). Replace spark plug(s) and crank engine slowly to distribute oil.
3. Disconnect negative (-) battery cable.
4. Store engine in a clean, dry place.

## Troubleshooting

Do not attempt to service or replace major engine components, or any items that require special timing or adjustment procedures. This work should be performed by a Kohler authorized dealer.

Problem	Possible Cause							
	No Fuel	Improper Fuel	Dirt In Fuel Line	Dirty Debris Screen	Incorrect Oil Level	Engine Overloaded	Dirty Air Cleaner	Faulty Spark Plug
Will Not Start	•	•	•		•	•	•	•
Hard Starting		•	•		•	•	•	•
Stops Suddenly	•		•	•	•	•	•	•
Lacks Power		•	•	•	•	•	•	•
Operates Erratically		•	•	•		•	•	•
Knocks or Pings		•		•		•		•
Skips or Misfires		•	•	•			•	•
Backfires		•	•			•	•	•
Overheats		•	•	•	•	•	•	
High Fuel Consumption						•	•	•

## Engine Specifications

Model	Bore	Stroke	Displacement	Oil Capacity (Refill)	Spark Plug Gap	Maximum Angle of Operation (@ full oil level)*
CH18/CH620	3.03 in. (77 mm)	2.6 in. (67 mm)	38.1 cu. in. (624 cc)	1.7-1.9 U.S. qt. (1.6-1.8 L)	0.03 in. (0.76 mm)	25°
CV18/CV620						
CH20/CH640						
CV20/CV640						
CH23/CH680	3.2 in. (80 mm)		41 cu. in. (674 cc)			
CH670						
CV23/CV680						
CV670						
CH730	3.27 in. (83 mm)		44.2 cu. in. (725 cc)			
CV730						
CH740						
CV740						
CH750						
CV750						
		2.72 in. (69 mm)	45.6 cu. in. (747 cc)			

\*Exceeding maximum angle of operation may cause engine damage from insufficient lubrication.

Additional specification information can be found in service manual at [KohlerEngines.com](http://KohlerEngines.com).

Exhaust Emission Control System for models CH18-CH23, CV18-CV23, CH620-CH740, CV620-CV740, CH750, and CV750 is EM for U.S. EPA, California, and Europe.

Any and all horsepower (hp) references by Kohler are Certified Power Ratings and per SAE J1940 & J1995 hp standards. Details on Certified Power Ratings can be found at [KohlerEngines.com](http://KohlerEngines.com).