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for performance



A *reputation*
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KOHLER
engines

**BORN
TO RUN™**

**SERVICE UPDATE SEMINAR
2000-2001**

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Section 1 - Product Information

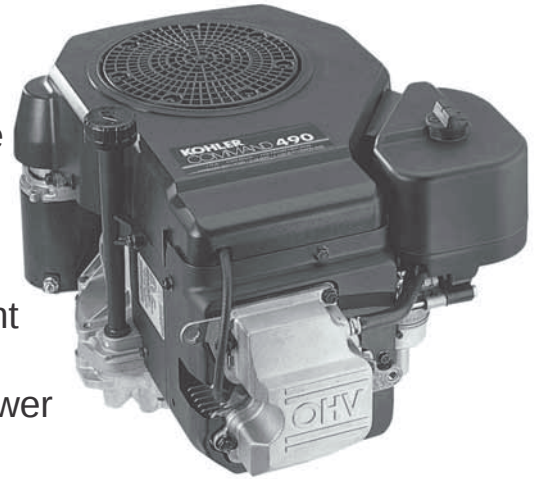
New Product

Kohler® Command® CV460 and CV490

The new Kohler Command 16 and 17 HP vertical shaft engines offer the same features as the other Command singles. These engines are designed with a longer stroke, resulting in greater displacement of 460 cc and 490 cc, to deliver increased power and torque.



Kohler Command 16 HP (460 cc)



Kohler Command 17 HP (490 cc)

Key Features

- Electronic Ignition System
- Fixed Jet Carburetor
- Automatic Compression Release

Reliability & Long-Life Design

- Full Pressure Lubrication
- Hydraulic Valve Lifters
- Full Flow Oil Filter
- Dual-Element Air Filter and Pre-Cleaner

Quiet, Smooth Operation

- Balance System
- Mechanical Governor
- CARB and EPA Certified

Options

- Advanced Muffler Design
- Oil Sentry™ Shutoff and Warning Light
- Fuel Shutdown Solenoid

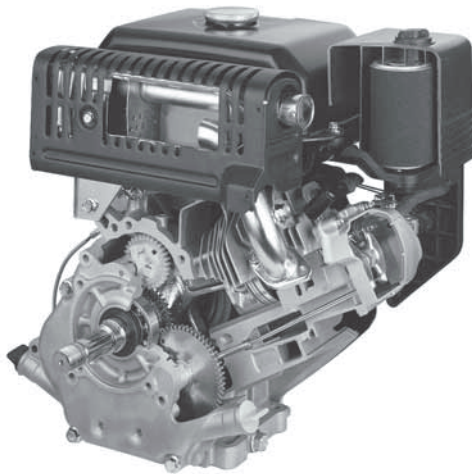
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For More Information, Contact Your Kohler Source of Supply,
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www.kohlerengines.com

Kohler® Command Pro CS® 8.5 HP, 250 cc

Power-packed with user-friendly features and specifications, the 250 cc Command Pro CS 8.5 HP is the superior offering within its horsepower range. This engine offers an unobstructed PTO face, provision for dual-directional remote throttle connections, and solenoid-shift electric starter.



Command Pro CS 8.5 HP



Command Pro CS 8.5 HP

High-Performance Power

- Advanced Overhead Valve
- Slant Cylinder Design
- Fuel Efficient
- Swirl Induction Combustion

Long-Life Design

- Dual Main Ball Bearings
- Steel Forged Crankshaft
- Cast Iron Cylinder Liner
- Stellite®-Faced Exhaust Valves with Tuftride™-Coated Stems
- Oil Sentry™

Quiet, Smooth Operation

- Integrated Exhaust System
- Silenced Air Intake
- Sound-Deadening Alloy Crankcase
- Mechanical Governor
- Balance Shaft

Service and Support

- Backed by 10,000 Dealers and Distributors
- Two-Year Limited Warranty

KOHLER®
engines

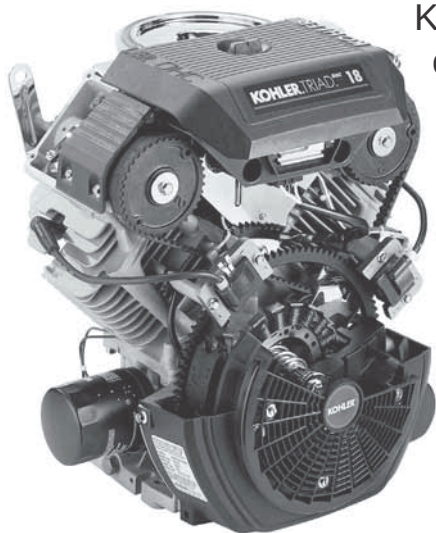
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Kohler® Triad™ OHC 16, 18, 20, and 23 HP

The Kohler Triad OHC engine achieved exclusive celebrity status by capturing the New Product Award in a national competition sponsored by the National Society of Professional Engineers. Awarded to Kohler Engines in 1998, the competition recognized the Triad OHC engine for economic contributions and impact, innovative use of engineering principles, improved function, ease of use, savings, and overall benefit.



Kohler Triad OHC 18 HP



Kohler Triad OHC 23 HP

Belt-Driven Overhead Cam Design

- Low Operating Temperatures
- Low Oil Consumption
- Extended Oil-Change Intervals
- Extremely Quiet Operation

Lost Foam Casting

- Integrated Engine Casting
- Fewer Parts and Gaskets
- Distributes Heat More Evenly
- Reduced Potential for Leaks

Superior Start-Up

- Rugged Automotive-Type Belt Eliminates Internal Gears for Less Drag
- PTO Ball Bearing
- Lower Compression Ratio
- Self-Relieving Choke

Low-Profile Rocker Arms

Patented low-profile rocker arms keep the powerful engine remarkably compact, and allow it to fit into all types of equipment.

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Kohler® Command Pro® CV26 EFI



The new Kohler EFI Command Pro vertical shaft 26 HP engine saves you money by reducing fuel consumption. In field comparisons, the EFI engine decreased fuel consumption in a range of 12-30%. Multiply that by the number of units in your fleet, and you will see big savings on your bottom line.

High-Performance Power

- Low Fuel Consumption
- Peak Power and Torque
- Excellent Cold Startability
- Optimum Throttle Response
- Low Maintenance

On-Board Diagnostic Technology

- Monitors Fuel System Performance
- Operator Alert System

Customized Specifications

Kohler will customize specifications for each OEM. Kohler also offers complete vehicle management to completely monitor the equipment performance.

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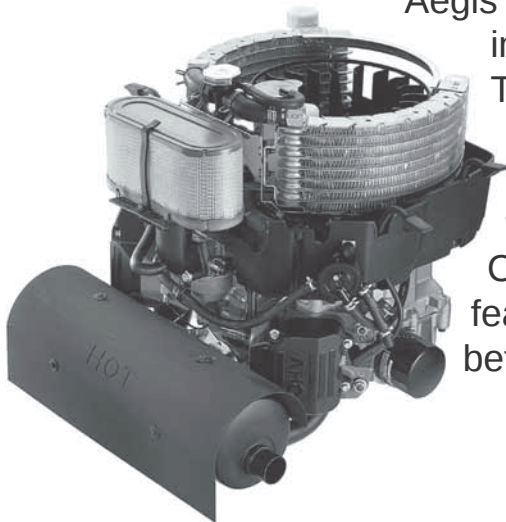
www.kohlerengines.com

Kohler® Aegis™ 17, 20, and 23 HP

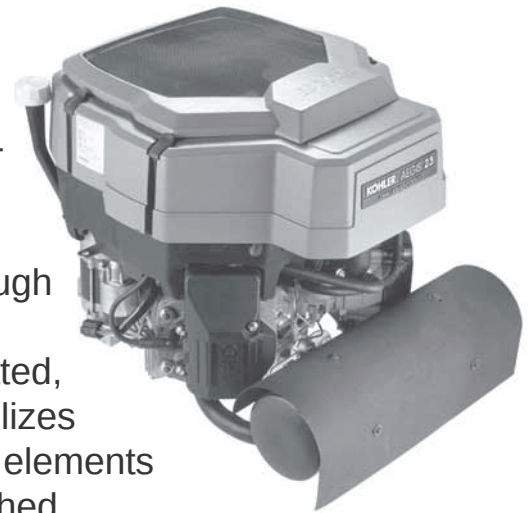
With a technologically advanced, parallel-flow cooling system and revolutionary air filtration system, the vertical shaft Kohler

Aegis engine is a breakthrough in liquid-cooled design.

The completely integrated, compact package utilizes proven performance elements from Kohler's established Command engine line and features a dynamic design never before seen in the industry.



Kohler Aegis 23 HP



Kohler Aegis 23 HP

Patented Liquid-Cooling System

- Advanced Parallel-Flow Liquid Cooling System
- Dual Heat Exchangers
- Consistent Flow
- Superior Cooling
- Less Cold-Start Friction
- Faster Warm-Up Time
- Lower Oil Temperatures
- Reduced Engine Wear
- More Power and Longer Engine Life

Air Filtration System

- Superior Sealing Dual-Element Air Filter
- Unique Hold-Down Strap
- Outer Pre-Cleaner
- Cleaner Combustion
- Maximum Power
- Longer Servicing Intervals

Reliability and Long-Life Design

- Lost Foam Cast Cylinder Heads
- High-Flow Cooling Fan
- Dual, Low-Profile Heat Exchangers
- Coolant Thermostat
- Hydraulic Valve System

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Product Update

EFI Update

In an ongoing effort to improve the features and benefits of EFI, Kohler has gone to a new ECU. The new plastic cases are considerably smaller and lighter than the original metal case. As a result, the plastic case allows more flexibility in choosing a mounting location. See Figure 1.



Figure 1.

The connection between the ECU and harness has also been improved. See Figure 2.

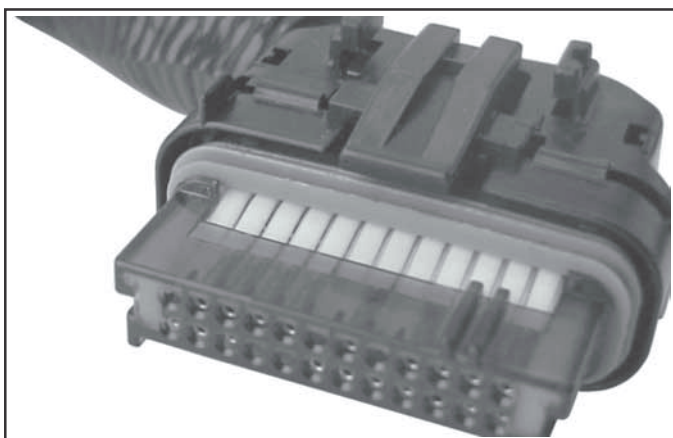


Figure 2.

The new connector provides a positive seal between the plug and housing to keep out moisture and contamination.

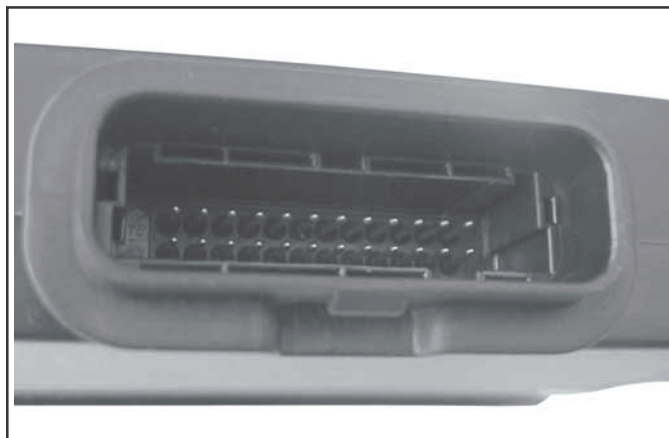


Figure 3.

Starter Change

Kohler has started using an alternate vendor for solenoid shift starters. On most of the Command engines, the Denso starters have been replaced by a comparable Delco product. Other engine models may also be switched to the Delco starters in the future.



Figure 4.

Oil Drain Adapter for Command Pro CS Engines

The quick-release oil drain valve (Kohler Part No. 25 755 14-S), offered as an engine accessory since 1992, has 3/8-18 NPTF thread. Kohler has developed two new adapters to allow the drain valves to be used with the metric drain threads on CS engines. To install a drain valve on a CS4 or CS6, use Kohler Part No. 63 755 11-S. See Figure 5. Due to the proximity of the oil drain to the mounting base, a 1/8-27 NPTF pipe nipple and 1/8-27x3/8-18 NPTF reducer coupling (customer supplied) are required with this adapter. The nipple must be long enough to extend outside the mounting plate or frame on which the engine is mounted.



Figure 5.

To install a drain valve on CS8.5, CS10, or CS12, use Kohler Part No. 63 755 10-S. See Figure 6.



Figure 6.

Breather Hose Clamps Added on Command Pro CS Engines

Kohler has made a running change on how the breather tube connects from the air cleaner body to the breather cover. We have added a short nipple to both the breather and the air cleaner base, and now use clamps to attach the hose. See Figure 7. Previously, the hose was retained by a friction slip fit through holes at either end.

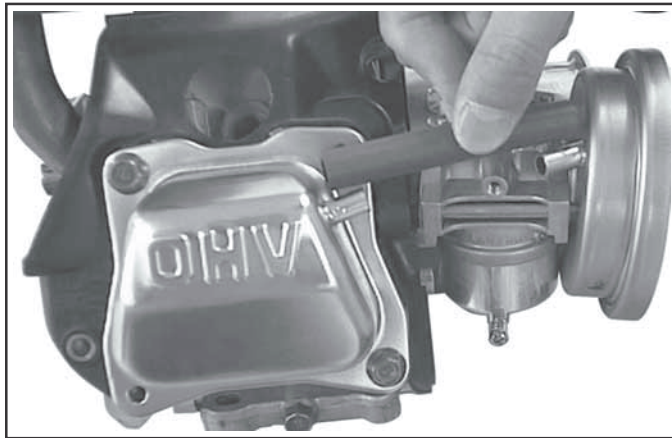
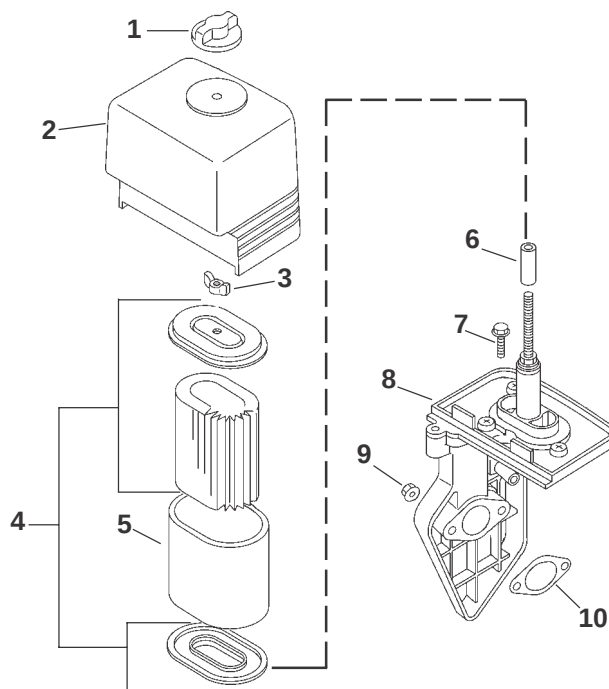


Figure 7.

Corrected Parts Breakdowns

The preliminary parts manuals (CS4 and CS6, TP-2504; CS8.5-12, TP2502-A) for the CS engines have some errors in the breakdowns for the air cleaners. Following are exploded views and corrected copy for the standard air cleaners. See Figure 8.

CS4,6

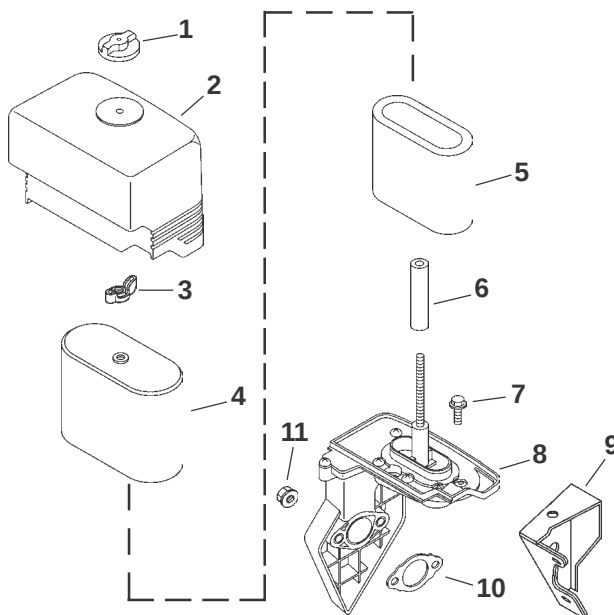


1. Knob, air cleaner cover 63 100 19-S
2. Cover, air cleaner 63 096 05-S
3. Nut, wing 63 100 06-S
4. Element, air cleaner 63 083 03-S
5. Element, precleaner 63 083 04-S
6. Seal, air cleaner 63 032 12-S
7. Screw 63 086 20-S
8. Base, air cleaner 63 094 02-S
9. Nut, air cleaner (2) 63 100 15-S
10. Gasket, air cleaner 63 041 20-S

NOT ILLUSTRATED

- Decal, air cleaner 63 113 03-S

CS8.5,10,12



1. Knob, air cleaner cover 63 100 07-S
2. Cover, air cleaner 63 096 02-S
3. Nut, wing 63 100 18-S
4. Element, air cleaner 63 083 01-S
5. Element, precleaner 63 083 02-S
6. Seal, air cleaner 63 032 11-S
7. Screw (2) 63 086 20-S
8. Base, air cleaner 63 094 01-S
9. Bracket, air cleaner 63 126 05-S
10. Gasket, air cleaner 63 041 08-S
11. Nut, air cleaner (2) 63 100 17-S

NOT ILLUSTRATED

- Decal, air cleaner 63 113 03-S

Figure 8.

Oil Fill Tube and Dipstick

A running change has been made to the dipstick and oil fill tube on the Command and Triad (OHC) horizontal twin engines. To provide a better seal, which helps maintain proper vacuum in the crankcase and prevents dirt entry, the end of the tube has been flared to accept a redesigned dipstick handle. See Figures 9 and 10.

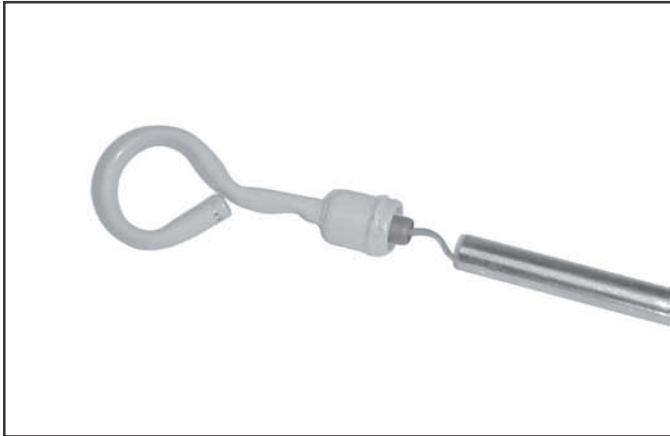


Figure 9. Old Style Oil Fill Tube and Dipstick.



Figure 10. New Style Oil Fill Tube and Dipstick.

The new tube and dipstick must be used together, so dipstick/tube kits have been developed to service and upgrade engines built with the old combination. The kit for Command twin engines is Kohler Part No. 24 755 121-S. Two kits are used for the Triad (OHC) twin engines. The kit with Kohler Part No. 28 755 35-S has a tube which ends just below the valve cover. The kit with Kohler Part No. 28 755 36-S has the longer tube which extends about 3/4" above the valve cover. This second kit is recommended for use, unless there is a clearance problem.

Heavy-Duty Air Cleaners for Vertical Shaft Engines

Last year, Kohler introduced heavy-duty air cleaner kits for horizontal twin engines. This year, we have added similar systems for the vertical shaft engines. There are two different mounting configurations to fit various applications. The front-mount kit (Kohler Part No. 24 743 30-S) is designed to allow clearance for an oil cooler or other accessories that might be mounted above the grass screen. See Figure 11. The top-mount kit (Kohler Part No. 24 743 31-S) allows clearance for accessories that may be mounted above the muffler. See Figure 12.



Figure 11.



Figure 12.

NOTE: These kits were designed primarily for commercial mower applications. On other applications, where the engine originally had the standard rectangular air cleaner cover, a carburetor change will be necessary to retain CARB/EPA certification. The following carburetors can be used in those situations.

CV18-20 (624 cc): Use kit 24 853 28-S

CV25 (725 cc): Use kit 24 853 26-S

The CV22/23 (674 cc) engines have not yet been certified for use with the heavy-duty air cleaners. Conversion of those engines is not recommended at this time. A parts bulletin will be issued when that certification has been obtained.

If a heavy-duty air cleaner installation varies from what is specified in the kit instructions, the application must be recertified.

Section 2 - Service Tips

EFI Troubleshooting, Fault Code 31

Additional knowledge about troubleshooting Fault Code 31 was gained while analyzing some reported performance problems on some commercial mowers. The information in the service manual was revised accordingly, and the updated information has been mailed to all manual holders. To benefit as many technicians as possible, the information is being shared here also.

When an EFI engine has a problem, a fault code is registered and stored in the memory of the electronic control unit (ECU). Any fault codes stored in memory can be accessed by three on/off cycles of the key switch, and the malfunction indicator light (MIL) will flash out a "blink" code. A blink code of 31 indicates that the oxygen sensor is not sending the proper voltage signal to the ECU.

The oxygen sensor is normally mounted in the center of the muffler. When the muffler temperature gets above 709°F, the oxygen sensor should start sending a fluctuating voltage signal to the ECU that varies between 0.2 and 1.0 volt. If the ECU is not receiving the fluctuating voltage signal, it will register a fault code of 31. There are usually three possible reasons for this code to be registered; the oxygen sensor is faulty, there is a problem in the circuit between the oxygen sensor and the ECU, or there is a fuel delivery/fuel mixture problem that the EFI system cannot adjust. The new troubleshooting procedure is structured to address those three possible causes.

1. Determine if there is a circuitry problem between the oxygen sensor and the ECU.
 - a. With the engine cold, trace the lead wire from the oxygen sensor to where it plugs into the wiring harness. Using a DC voltmeter with probe leads, insert the probe end of the red lead into the back of the oxygen sensor connector. Connect the black voltmeter lead to ground. Turn the key switch to the "run" position and observe the voltage reading. A reading of 450 mv (0.450 volts) should be indicated.
 - b. If the proper voltage is read, the circuit between the ECU and the oxygen sensor is good.
 - c. If there is no voltage reading, try removing and reinserting the red probe, to be certain it is making contact with the wire core inside the connector. If there is still no reading, check the connection between the oxygen sensor lead and the harness. Also, check for a good ground path by using an ohmmeter to check for continuity between the shell of the oxygen sensor and the outer surface of the muffler, and between the surface of the muffler and the crankcase.
2. Determine if the oxygen sensor is functional.
 - a. Start the engine and let it run at mid-throttle for 3-5 minutes to get the muffler up to temperature. Connect the voltmeter as in step 1a and read the voltage. The voltage should fluctuate between 200 mv (0.200 volts) and 959 mv (0.959 volts). If the voltage is relatively steady, accelerate very quickly and watch for a voltage increase. Under rapid acceleration, the voltage should start above 450 mv (0.450 volts) and increase further.
 - b. If fluctuating voltage is observed and/or the voltage increased under rapid acceleration, the oxygen sensor is functioning properly.
 - c. If the voltage would not increase above 450 mv, the engine is probably running lean. If the meter started at 450 mv and then started a steady decline with no fluctuation, you have a potential air/fuel delivery problem. Proceed to step 3.
3. Eliminate possible external factors.
 - a. Check the fuel pressure in the EFI system (fuel rail), test battery voltage and remove any loads.
4. Start the engine and listen to how it is running.
 - a. If it is not running too poorly, refer to the service manual and perform the TPS initialization procedure.
 - b. If it is running very poorly, gradually restrict the combustion airflow. If the engine starts to sound better, it was running too lean. Back the idle speed screw out one full turn and try to perform the TPS initialization procedure. If the procedure is not successful (light does not blink and go out, step 8a of initialization procedure), turn the screw back in 1/2 turn and attempt the initialization procedure again.
 - c. If you can't get the initialization procedure to complete successfully (MIL light stays on), the possible causes are:
 - Movement occurred in the TPS or throttle shaft;
 - Crankshaft rotation was detected;
 - TPS is out of position, **proceed to step 5.**
5. Loosen the TPS screws and rotate the TPS counterclockwise, toward the "closed throttle" position. Maintain a slight rotating pressure on the sensor and retighten. Now again attempt to initialize the TPS.

CV16 Wiring Diagram

The CV16 engines are very similar to the CV15, except CV16 engines have the Smart Spark™ ignition system. Following is a schematic diagram of the CV16 electrical system, which can be used as a reference or troubleshooting aid.

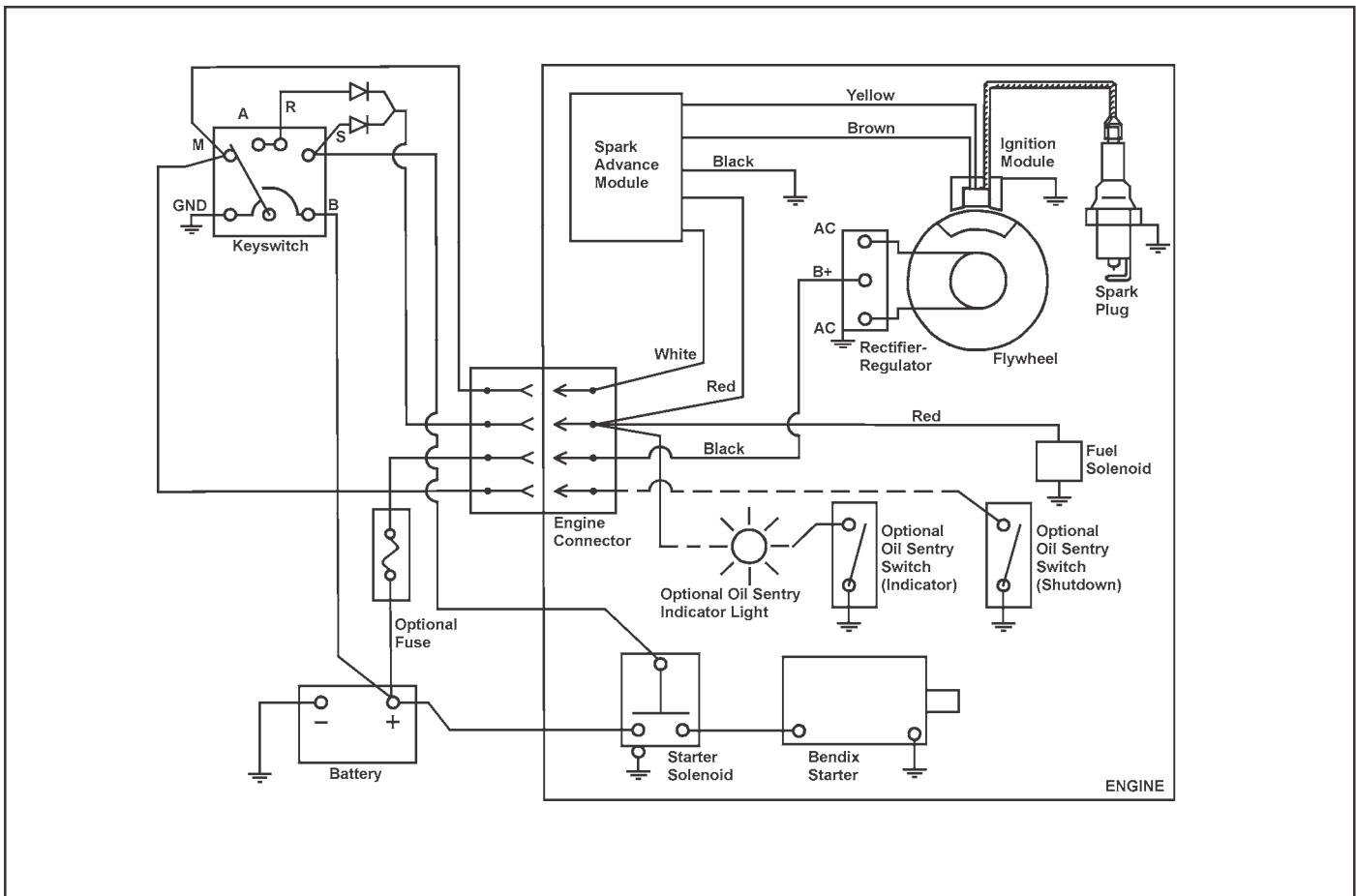


Figure 1. CV16 Wiring Diagram.

This wiring schematic is similar to the CH/CV22 and 25 engines. The main difference is that the SAM is only controlling one ignition module. We have seen very few ignition problems on the CV16, but if you do encounter one, the troubleshooting procedure is the same as the procedure for the CH/CV22 and 25 engines, refer to Service Bulletin 253.

The timing of the spark is controlled by the position of the flywheel magnet relative to top dead center, and the delay created by the SAM. The flywheel keyway position on the CV16 engines is different than the CV11-15 flywheels. **Do not attempt to convert CV16 engines from Smart Spark™ to fixed timing.**

Idle and High Speed Settings

A new publication was created to provide the recommended idle and high speed settings in a handy, quick reference format. The booklet was mailed to all master manual holders in July of 2000. Additional copies are available free-of-charge from your source of supply under form number TP-2514.

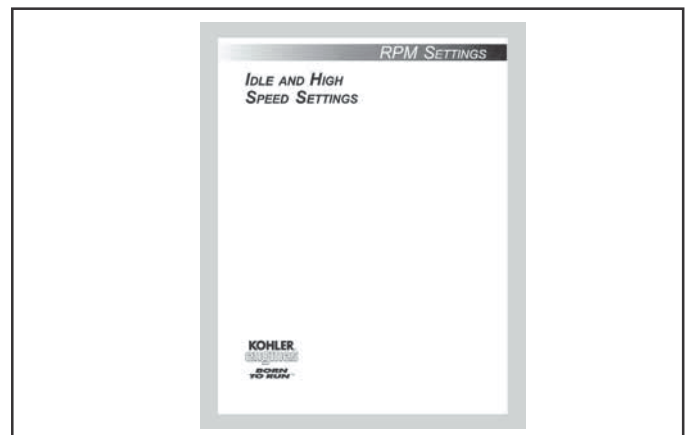


Figure 2.

Warranty Policy and Procedure Revision (TP-2303-E)

The July of 2000 master manual mailing also included a new revision of the Warranty Policy and Procedure booklet (TP-2303-E). The booklet was revised to add the flat rate schedule for the CS4-12 engines and the CH26 EFI engine.

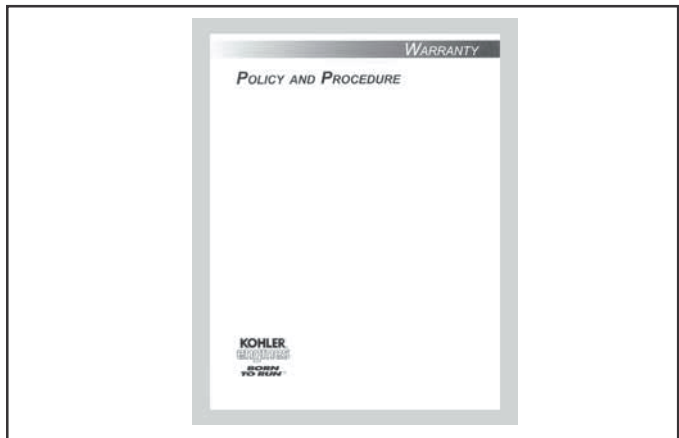


Figure 3.

Universal 25 amp Stator Kit, Kohler Part No. 28 085 02-S

We have created a universal kit to service all of the 25 amp stators. The kit includes a new stator with long leads and an assortment of terminals and connectors. The instruction sheet will instruct the user to cut the leads to the required length and install the necessary terminals and connectors to match the corresponding regulator.

Mechanical Fuel Pump Kits

There are now two standardized mechanical fuel pump kits, which can be used to service all of the CH18-25 engines. To add a mechanical fuel pump to an engine that didn't originally have one, use kit **24 559 02-S**. To replace an existing mechanical fuel pump, use kit **24 559 03-S**.

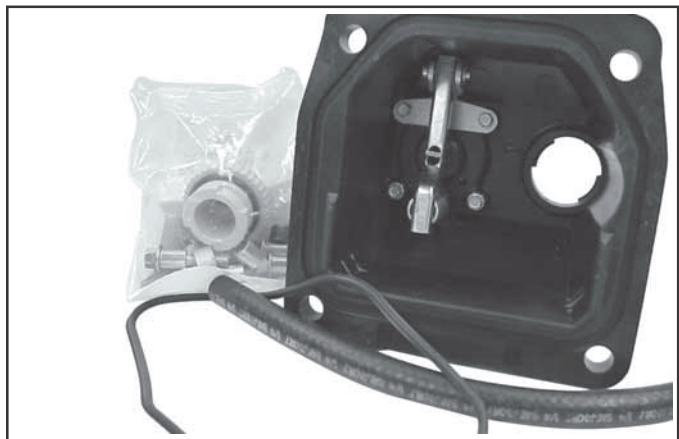


Figure 4.

New Oil Cooler Kit, Kohler Part No. 24 755 120-S

The original radiator-style oil cooler kit for the Command twin engines (Kohler Part No. 24 755 85-S) included a diverter and an adapter made of cast aluminum. To decrease the cost of the kit, we eliminated the adapter, which was not needed for most applications, and switched to a plastic diverter (Kohler Part No. 54 755 14-S). Due to sporadic reports of the plastic diverters warping and/or leaking oil, we have created a new kit, which again uses the cast aluminum diverter.

If you have a situation where a plastic diverter has cracked or broken, a replacement metal diverter can be ordered under Kohler Part No. 54 755 21-S.

High Altitude Kits

In the 1996-1997 update program (Parts Bulletin 193), we announced that the high-altitude kits were being discontinued because they were not necessary with the lean calibrations on emission-compliant carburetors. In the ensuing time, we have learned that there are some applications where they are still required, so the kits are being reinstalled. At printing time, only one of the kits had received CARB/EPA approval, kit **12 755 92-S** for the Walbro carburetors on CV11-16 engines. We will issue a parts bulletin with additional kit numbers as they are created and approved. If you have a need for a kit prior to announcement, contact the Kohler Engine Service Department.

Command Stator Screw Holes

Due to the length of the stator mounting screws used on Command 11-26 HP engines, the bottoms of the screw holes are very close to the inside wall of the crankcase. To prevent oil from weeping out through the screw holes, thread sealant should be used in the holes prior to installing the mounting screws. We recommend thread sealant with Teflon® (Loctite® 592 or equivalent). See Figure 5.

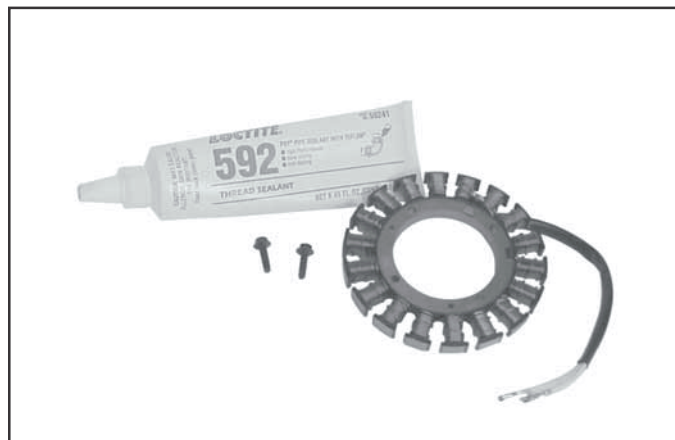


Figure 5.

LPG Fuel Systems

Proper service and repair of LPG fuel systems requires qualified technicians and special equipment. Many states require special licensing or certification for LPG repair shops and/or technicians.

With the advent of CARB certified engines, the LPG fuel system must be installed on Kohler engines at the factory. We **do not** recommend any “field installed” conversion kits.

Refer to Section 5A of your CH18-26 Service Manual (TP-2428-A) under the “Fuel Systems” section for troubleshooting information.

Spline Lubricant

In the 1999-2000 Update Handbook, we reemphasized the importance of keeping splined joints lubricated at all times. To support our recommendations and assist our valued customers, we are now packing a tube of the lubricant (25 357 12-S, see Figure 6) with engines and short blocks that have splined crankshafts. Refer to Service Bulletin 221 on the next page for more information regarding the use of the lubricant.



Figure 6.



Service Bulletin

NO.		221
MODEL		K582, M18 & M20, CH18-26, TH16, TH18
DATE ISSUED	DATE REVISED	
8/92	1/00	

Crankshaft Splined Insert Lube Interval Recommendation

While it was previously thought that spline lubricant would remain effective for as long as the pump mounting remained intact, we now recommend that splines be re-lubricated **every 500 hours** of operation.

Misalignment and lack of lubricant remain as the two major causes of premature wear and/or costly tooth damage to splined inserts. Without any recommended interval, spline service was being neglected, resulting in damage.

Every 500 hours of operation, separate the pump from the engine. Make a preliminary inspection of the spline area. The presence of rust-colored dust or powder could indicate that the spline teeth have been wearing. Clean the splines with solvent and make a closer inspection for wear or damage. If the splines are in good condition, apply a **liberal** coating of grease to the teeth. Use either Dow Corning G-N Metal Assembly Paste (Kohler Part No. 25 357 12-S) or Dow Corning #77 Assembly Paste.

As you remount the pump to the engine, be certain the mating surfaces are clean and free of any foreign material, and that the pump is correctly aligned.

If you have a splined insert that has been damaged, the following kits are available for spline replacement.

<u>Description</u>	<u>Kohler Part No.</u>
9 tooth insert	82 755 02-S
11 tooth insert	48 755 23-S
13 tooth insert	48 755 21-S

Air Cleaner Element Wing Nut Loosening on CV11-16 Engines

In May of 1998, a short seal was added to the air cleaner assembly on CV11-16 engines (see Figure 1), to prevent the element wing nut from working loose. The seal did prevent the wing nut from working loose during operation, but the tension and friction from the seal could sometimes cause the wing nut to loosen when the outer cover knob was loosened for service access. To eliminate this possibility, a further design change has now been implemented.

Effective with Serial No. 3007500011, the short seal has been eliminated, and a special locking material was added to the wing nut. See Figure 2. The locking material is pre-applied by the vendor to the internal threads and bottom surface of the wing nut, so, upon installation, it will be retained in position by the stud threads and contact with the top of the element.

The new wing nut, Kohler Part No. 12 100 08-S, will be packaged with the replacement air cleaner elements, so engines with the previous air cleaner configuration can be easily converted when the air cleaner element is replaced.

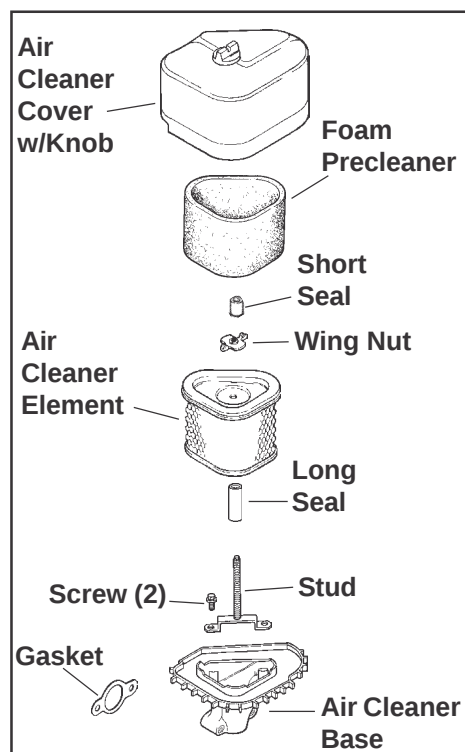


Figure 1. Previous Air Cleaner Configuration.

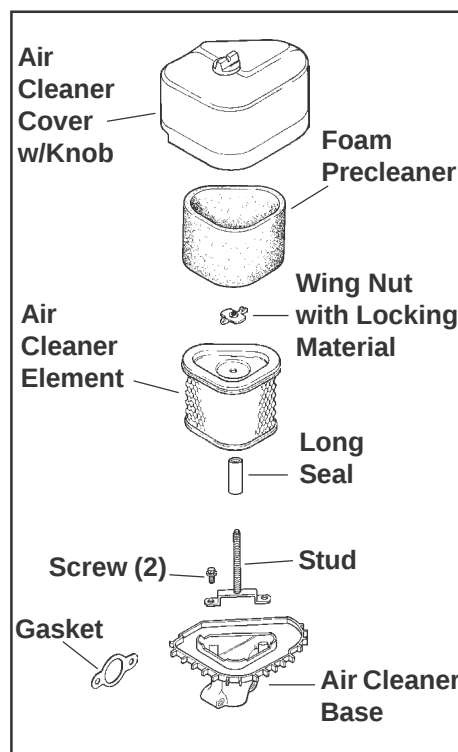


Figure 2. New Air Cleaner Configuration.



Service Bulletin

NO.

255

MODEL

CH22(674 cc),CH23(674 cc),CH25
CV22(674 cc),CV23(674 cc),CV25

DATE ISSUED

5/00

DATE REVISED

Cylinder Head Studs

As part of our continual efforts to improve our product offerings, the larger bore Command twins will now have the cylinder heads mounted with studs, washers, and nuts (part numbers below), instead of the previous hex. flange screws. Effective with serial number **3002411871**, all C25 engines, all 674cc C22/23 engines, and certain OEM specifications, will have the new mounting hardware. It will also be phased in on other Pro Series Command twins, as sufficient quantities of the new components become available.

The new mounting hardware offers several advantages when used on the larger displacement engines. It provides better torque retention, and more even, consistent clamping force. The cylinder head can be removed without disturbing the threads in the crankcase, so the studs don't need to be replaced each time, as bolts do. The **nuts** should be replaced **each** time they are removed, but the studs only need to be replaced if they are removed from the crankcase.

The nuts used on the head studs are the same size as those used on the starter and exhaust studs, but they have a better material grade (Grade 10 vs. Grade 8) and **must not** be interchanged. To make them easy to distinguish, they have a gold color, whereas the starter and exhaust nuts have a silver color. Keep some of the new nuts on hand to use as replacements any time you have to remove a cylinder head mounted with studs.

The cylinder heads used with the new mounting system have additional machining. Engines that originally had head bolts can be converted to studs **only** if the cylinder heads are replaced with heads that have the extra machining. As a convenience, we have included instructions for both the old and new fastening systems on the reverse side of this bulletin.

Part Numbers for New Hardware

Description	Part Number
Nut, hex. flange	24 100 10-S
Washer, flat	24 468 16-S
Stud	24 072 09-S

Command Twin Cylinder Head Mounting Instructions

Effective with serial number 3002411871, some Command twins now have the cylinder heads mounted with studs, washers, and nuts, instead of the previous hex. flange screws. Due to a difference in cylinder head machining, it is important to use the **same** style hardware that the engine had as original equipment from the factory. **Do not** attempt to interchange one style for the other, or intermix the components.

To Install –

Determine whether hex. flange screws or studs were originally used to retain the cylinder heads.

If **hex. flange screws** were used:

1. Refer to the applicable service manual (Section 11, "Reassembly") and install the cylinder heads as outlined under the heading "Install Cylinder Heads".
2. Torque the head bolts in two steps; first to **22.6 N·m (200 in. lb.)**, then to **41.8 N·m (370 in. lb.)**, in the sequence shown in Figure 1.

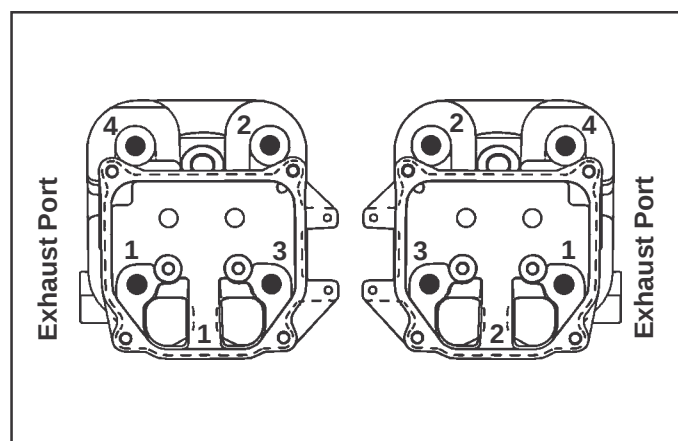


Figure 1. Cylinder Head Fastener Torque Sequence.

3. Follow the service manual to reassemble the balance of the engine.

If **studs, washers, and nuts** were used:

1. Thread two of the nuts onto the smaller threads of one of the new studs and tighten them against each other.
2. Thread the opposite end of the stud with the pre-applied locking compound, into the crankcase, until the specified height from the crankcase surface is achieved. When threading in the studs, use a steady tightening motion without interruption, until the proper height is obtained. If you pause, the friction heat from the engaging threads may cause the locking compound to set up prematurely. Remove the nuts and repeat the procedure, installing all eight new studs.

Studs **closest** to the lifters must have exposed height of **75 mm (2 15/16 in.)**.

Studs **furthest** from the lifters must have an exposed height of **69 mm (2 3/4 in.)**.

3. Refer to the applicable service manual (Section 11, "Reassembly") and install the cylinder heads as outlined under the heading "Install Cylinder Heads". Make sure each head is situated properly on the dowel pins, and flat on the crankcase/head gasket before proceeding.
4. Lightly lubricate the exposed (upper) threads of the studs with engine oil. Install a flat washer and hex. nut onto each of the studs. Torque the hex. nuts in two stages; first to **16.9 N·m (150 in. lb.)**, then to **33.9 N·m (300 in. lb.)**, in the sequence shown in Figure 1.
5. Follow the service manual to reassemble the balance of the engine.

Water Entering ECU for EFI Engines

For 2000, the Exmark Lazer Z and Toro Mid-Mount Z mowers are offered with the Kohler CH26 EFI engine. Due to the mounting location of the electronic control unit (ECU) for the EFI system, the wiring harness configuration used before May 1, 2000 could allow water to enter the main wiring harness connector plug and possibly also the ECU. If water has gotten into the plug, the engine may misfire during operation. If water has gotten all the way into the ECU, the fuel pump and ignition circuits usually will not function, so the engine will crank but won't start.

The ECU is mounted directly beneath the engine, on the underside of the same mounting plate. The wiring harness is jacketed with a polyethylene wire loom and connects to the ECU through a large 35-pin plug connector. A representation of the ECU mounting orientation and harness routing is shown in Figure 1. On engines below serial number **30122XXXXX**, the last 2-3 inches of the wire loom and the end of the connector plug are wrapped with electrical tape. If the mower is left out in heavy rain, or it is washed and water spray is directed toward the wiring, water can run down inside the wire loom, collect inside the wrapped portion, and enter the connector plug. The force of pressure washing might also push some water into the ECU.

The potential for water entering the plug can be alleviated by removing most of the electrical tape wrapping at the lower end of the wire loom, so any water that gets into the loom can drain back out. The customer/operator should also be instructed to avoid directing water spray toward the wiring harness.

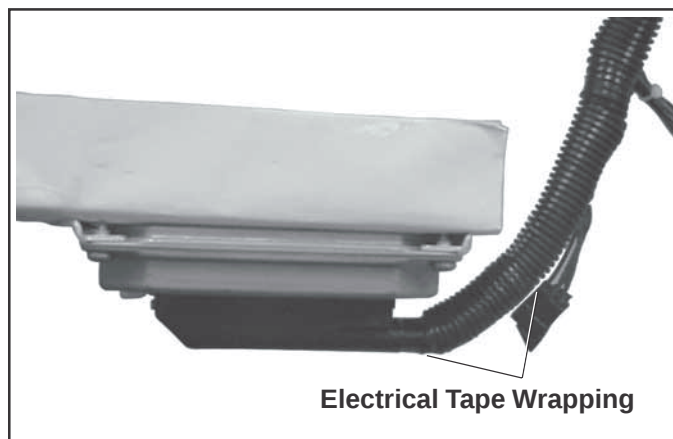


Figure 1.

Preventative Action

The following preventative measure should be performed on **all** Exmark or Toro mowers powered by CH26 engines built before May 1, 2000.

1. If you are a distributor or dealer for the Exmark or Toro mowers mentioned, check the engine serial number on all units at your location powered by CH26 EFI engines. If the first five digits are **below 30122**, locate the ECU, release the metal locking tab, and disconnect the harness plug from the ECU.

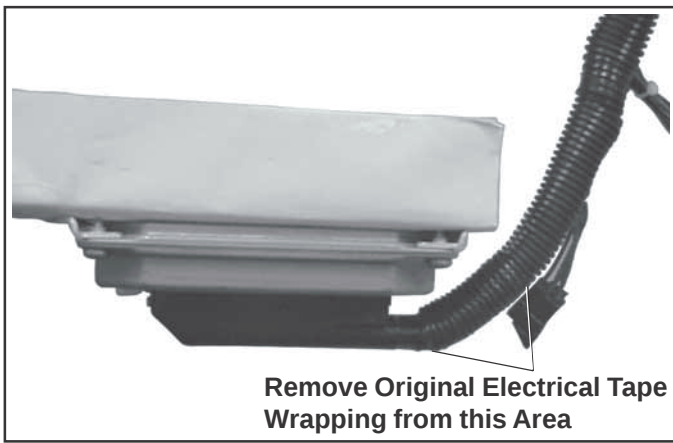


Figure 2.

- a. Refer to Figure 2 and carefully remove the electrical tape that is wrapped around the end of the plug and extends about 2 1/2" onto the wire loom. After the old tape is removed, wrap a single band of new electrical tape around the end of the wire loom, see Figure 3, to prevent the slit from spreading open. **Do not** rewrap the end of the plug. Leave the wire loom detached from the plug.

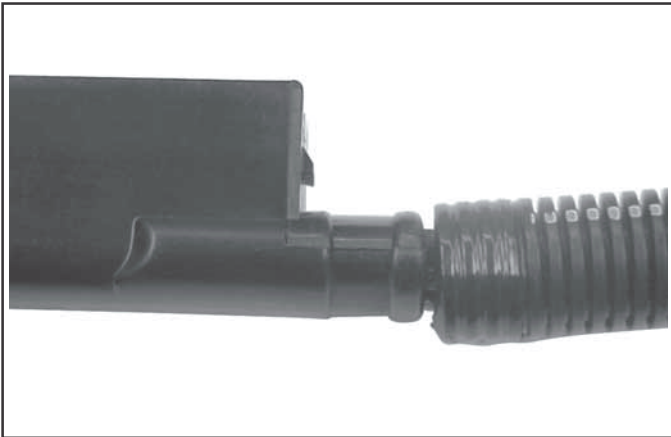


Figure 3.

- b. Check if the inside of the harness plug or the terminal block on the ECU is wet. If moisture is evident, remove the ECU from the unit and carry it to a quiet area. Hold your thumb against the metal locking tab to keep it from rattling, and shake the ECU near your ear, listening for water sloshing inside. If you detected water in the plug or ECU, be sure that you also follow the "corrective action" instructions. If no water was detected, install the ECU and reconnect the plug.

2. Contact the owners of all sold units and inform them of this necessary "preventative action". Ask them to stop by with the unit so you can make the recommended checks. It should only take five to ten minutes, so you can probably do it while they wait, to avoid taking the unit out of service. If it is difficult for the customer to bring the unit in, and you feel they are capable of performing step a of the "preventative action", provide them with that portion of the instructions. Also, please caution all customers to avoid spraying water at the harness or electrical components.

Corrective Action

If water or moisture was detected in the harness plug or ECU, these corrective measures should be followed.

1. If there was moisture in the harness plug, but not inside the ECU, it is usually only necessary to dry out the plug and take the preventative action listed previously. Use compressed air to blow out the inside of the harness plug and the terminal block on the ECU. Spray both with aerosol electrical contact cleaner and blow out again with compressed air. Install the ECU back in the unit, if it was removed. Be sure the preventative action listed previously has been performed, then reconnect the harness plug to the ECU.
2. If water got inside the ECU (engine would crank, but wouldn't start), call Kohler Co. at (920) 459-1542. Tell the service specialist that you have an ECU with water in it, and he'll give you further direction.



Service Bulletin

NO.

257

MODEL

CH/CV Twins

DATE ISSUED

6/00

DATE REVISED

Change to 8 mm Governor Shaft on Command Twins (CH/CV)

The diameter of the governor shaft on the Command Twins (CH/CV) has been increased from 6 mm to 8 mm. This was done to alleviate two conditions which sometimes occurred with the smaller shaft. In some situations, the shaft was twisting, which could affect adjustment and performance. In other cases, the governor lever was slipping on the shaft, altering the initial adjustment setting.

The larger shaft diameter eliminates the twisting. The increased circumference, combined with the bead-blasted surface finish, allows the governor lever to grip better so it doesn't slip.

This change began February 15, 2000 with **serial number 3004604141**, and the transition was completed March 30, 2000 with **serial number 3009008931**. All production **after serial number 3009008931** contains the new 8 mm governor shaft and associated parts. On engines and short blocks between the serial numbers listed, the governor shaft size should be confirmed prior to ordering any affiliated parts as the 6 mm and 8 mm parts cannot be interchanged. As existing inventory of 6 mm short blocks is depleted, the part numbers will supercede to new short blocks containing the new 8 mm shaft and corresponding parts. Engine specification numbers, however, will remain unchanged.

For your reference and use, we have provided a listing of the new 8 mm governor shaft and the associated parts, as well as those used in the original 6 mm configuration.

	6 mm Governor Shaft Part Numbers		8 mm Governor Shaft Part Numbers
Standard		Standard	
Screw, hex. flange	SM-642025-S	Bolt, round head square neck	24 211 03-S
Pin, hitch	12 380 04-S	Ring, retainer	24 018 09-S
Washer (bottom)	X-25-102-S	Washer (bottom)	24 468 15-S
Washer, nylon (top)	M-631005-S	Washer, nylon (top)	M-931010-S
Seal, governor shaft	12 032 01-S	Seal, governor cross shaft	28 032 09-S
10% Standard Governor		10% Standard Governor	
Shaft, governor cross	24 144 01-S	Shaft, governor cross	24 144 33-S
Lever, governor	24 090 14-S	Lever, governor	24 090 33-S
5% Needle Bearing Governor		5% Needle Bearing Governor	
Shaft, governor cross	24 144 10-S	Shaft, governor cross	24 144 34-S
Lever, governor	24 090 23-S	Lever, governor	24 090 34-S
Bearing, needle (lower)	52 030 03-S	Bearing, needle (lower)	28 030 05-S
Bearing, needle (upper w/seal)	52 030 04-S	Bearing, needle (upper w/seal)	28 030 05-S*

*Requires use of 28 032 09-S seal.

CH/CV Twin Cylinder Short Blocks with 8 mm (0.315 in.) Governor Shaft

This short block contains the larger diameter, 8 mm (0.315 in.), governor shaft. If it is going to be installed in an engine which originally had the smaller diameter, 6 mm (0.236 in.) shaft, follow this instruction sheet and use the necessary parts from the enclosed poly bag to complete the conversion. If the original engine had the larger governor shaft, you can transfer the original governor spring or use the new one of the same color, but always use the new governor lever.

To Install –

Follow the reassembly procedures in the appropriate service manual to assemble the external engine components to the short block, until you are ready to install the carburetor. If the original governor lever is still attached to the throttle linkage and carburetor, unhook the dampening spring and bushing, separate the lever and discard it, prior to installing the carburetor. You should now be at the service manual section titled “Install External Governor Controls”. Use the following procedure instead, to properly assemble the new governor controls.

1. Insert a 0.25 mm (0.010 in.) feeler gauge between the nylon washer and push-on retaining ring on the governor shaft. Install the new governor lever on the shaft, but leave the nut on the clamp screw loose. See Figure 1.

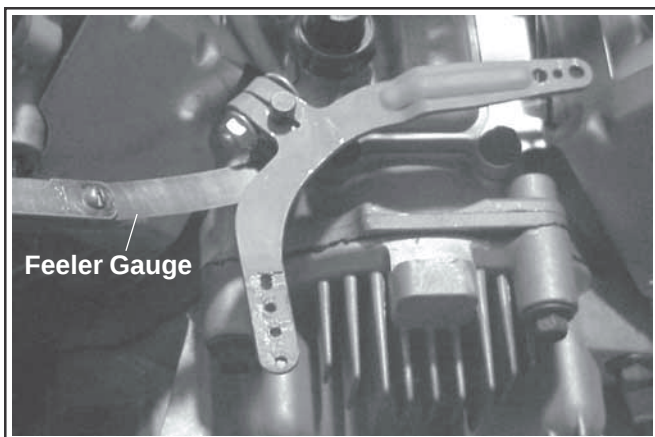


Figure 1.

2. If the throttle linkage and dampening spring were separated from the carburetor throttle lever, reattach them and then connect them to the new governor lever.

3. Move the governor lever **TOWARDS** the carburetor as far as it will move (wide open throttle), and hold it in that position. See Figure 2.

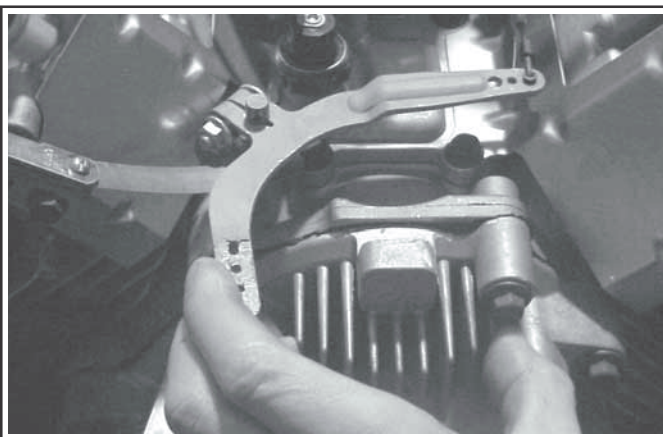


Figure 2.

4. Insert a nail or other small stiff shaft into the hole in the end of the cross shaft and rotate the shaft **COUNTERCLOCKWISE** as far as it will turn. Torque the hex. nut on the clamp screw to **9.9 N·m (88 in. lb.)**. See Figure 3. Remove the feeler gauge.

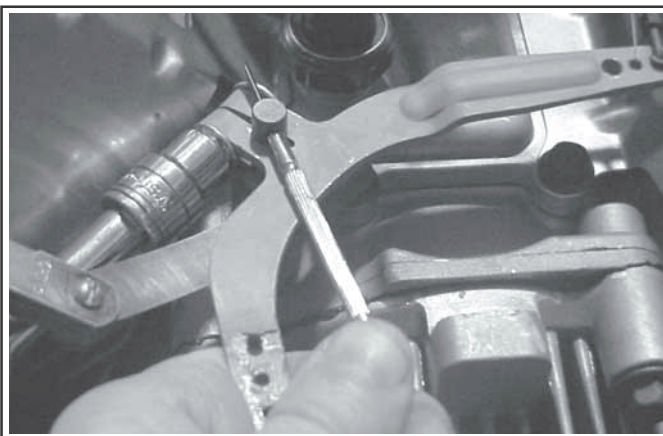


Figure 3.

5. Proceed to the next section in the service manual and install the throttle control bracket to the cylinder heads. When you get to step 3, use the appropriate chart for your engine model to select the correct color governor spring and hole location, based on the intended maximum wide open throttle (WOT) RPM, and specified engine criteria. Connect the new governor spring from the throttle control bracket, through the appropriate hole in the governor lever.
6. Follow the service manual to finish assembling the engine.

Governor Spring Color/Governor Lever Hole Position Charts

CH18 Engines

Governor Shaft Configuration	Intended Maximum RPM		Non-Accelerator Pump Carburetor		Accelerator Pump Carburetor	
	High Idle	WOT	Spring Color	Hole No.	Spring Color	Hole No.
Needle Bearing	3744	3600	Orange	2	-	-
	3120	3000	Clear	1	-	-
Standard (Parent Material)	3888	3600	Blue	4	Purple	3
	3780	3500	Orange	3	Black	3
	3672	3400	Clear	4	Red	3
	3564	3300	Blue	3	Orange	2
	3456	3200	Purple	2	Blue	2
	3348	3100	Black	2	Orange	1
	3240	3000	Red	2	Black	1
	3132	2900	Green	1	Red	1
	3024	2800	Blue	1	Clear	1

CH20-25 Engines

Governor Shaft Configuration	Intended Maximum RPM		Non-Accelerator Pump Carburetor		Accelerator Pump Carburetor	
	High Idle	WOT	Spring Color	Hole No.	Spring Color	Hole No.
Needle Bearing	3744	3600	Orange	2	-	-
	3120	3000	Clear	1	-	-
Standard (Parent Material)	3888	3600	Red	4	Purple	3
	3780	3500	Purple	3	Black	3
	3672	3400	Black	3	Red	3
	3564	3300	Red	3	Orange	2
	3456	3200	Purple	2	Blue	2
	3348	3100	Blue	2	Orange	1
	3240	3000	Orange	1	Black	1
	3132	2900	Clear	2	Red	1
	3024	2800	Red	1	Clear	1

CH26 EFI Engines

Governor Shaft Configuration	Intended Maximum RPM			
	High Idle	WOT	Spring Color	Hole No.
Standard (Parent Material)	3888	3600	Orange	3
	3780	3500	Black	3
	3672	3400	Red	3
	3564	3300	Green	2
	3456	3200	Red	2
	3348	3100	Green	1
	3240	3000	Blue	1
	3132	2900	Clear	1
	3024	2800	-	-

Spring Color	Kohler Part No.
Clear	24 089 50-S
Orange	24 089 49-S
Purple	24 089 48-S
Green	24 089 47-S
Black	24 089 46-S
Blue	24 089 45-S
Red	24 089 44-S

CV18 Engines

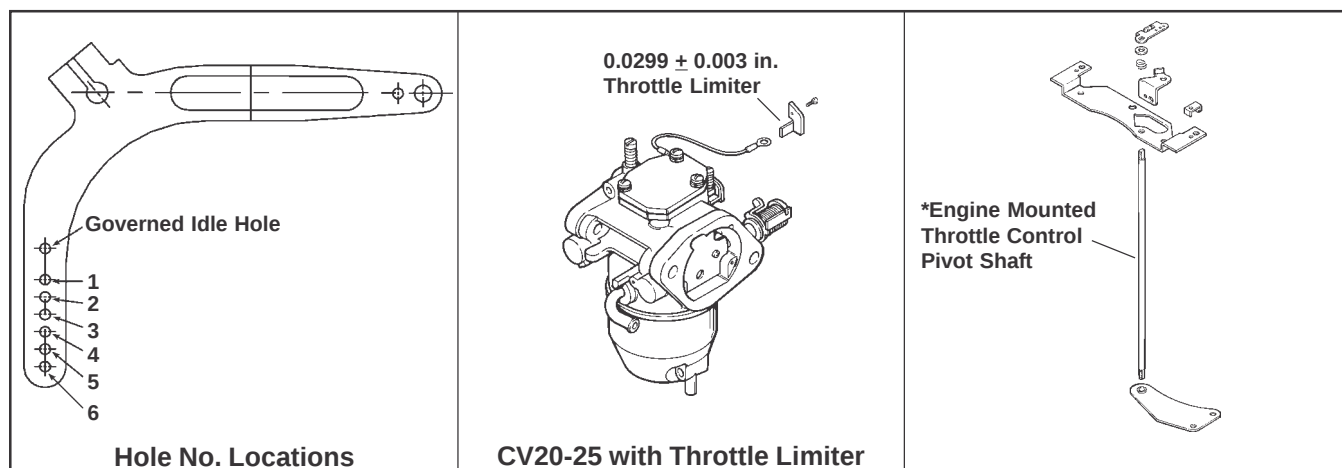
Intended Maximum RPM		Standard Throttle Control		Engine Mounted Throttle Control Pivot Shaft*	
High Idle	WOT	Spring Color	Hole No.	Spring Color	Hole No.
3888	3600	Green	4	Orange	4
3780	3500	Blue	4	Green	4
3672	3400	Orange	3	Blue	4
3564	3300	Clear	4	Orange	3
3456	3200	Red	3	Green	3
3348	3100	Purple	2	Blue	3
3240	3000	Blue	2	Purple	2
3132	2900	Orange	1	Blue	2
3024	2800	Black	1	Green	1

CV20-25 Engines with 0.0299 ± 0.003 in. Thick (22 GA) Throttle Limiter

Intended Maximum RPM		Standard Throttle Control		Engine Mounted Throttle Control Pivot Shaft*	
High Idle	WOT	Spring Color	Hole No.	Spring Color	Hole No.
3888	3600	Green	4	Purple	4
3780	3500	Blue	4	Black	4
3672	3400	Orange	3	Red	4
3564	3300	Clear	4	Purple	3
3456	3200	Red	3	Black	3
3348	3100	Purple	2	Red	3
3240	3000	Blue	2	Clear	3
3132	2900	Orange	1	Red	2
3024	2800	Black	1	Green	1

CV17, CV20-25 Engines Without Throttle Limiter

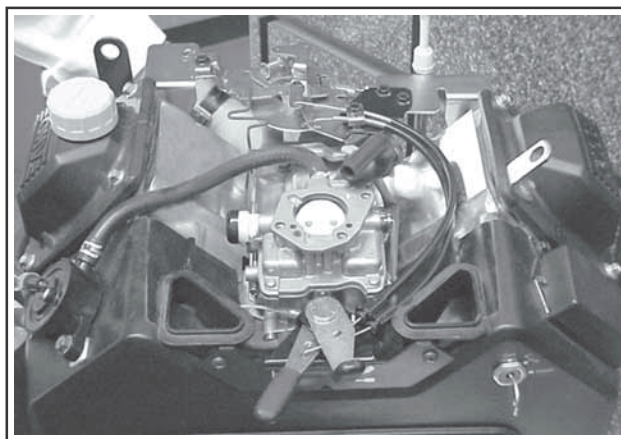
Intended Maximum RPM		Standard Throttle Control		Engine Mounted Throttle Control Pivot Shaft*	
High Idle	WOT	Spring Color	Hole No.	Spring Color	Hole No.
3888	3600	Red	4	Blue	4
3780	3500	Purple	3	Orange	3
3672	3400	Black	3	Black	3
3564	3300	Red	3	Orange	2
3456	3200	Purple	2	Green	2
3348	3100	Blue	2	Blue	2
3240	3000	Orange	1	Orange	1
3132	2900	Clear	2	Black	1
3024	2800	Red	1	Red	1



New Control Lever Assembly

In the 1999-2000 update handbook (page 19), we introduced a new control lever assembly, which had been designed for CH18-25 engines with an engine-mounted control panel (see photo below). The new throttle control is designed to hold the position set by the operator, without slipping and allowing the speed to gradually decrease from the desired setting.

The new control lever assembly has been incorporated in a new retrofit kit, Kohler Part No. **24 755 106-S**, which can be used to convert engines built with the original throttle control mechanism. Debris shield is in kit.



NO.	224
MODEL	None
DATE ISSUED	DATE REVISED
6/00	

Testing the 20/25 Amp Rectifier-Regulator, 25 403 05-S

The rectifier-regulator test kit, 25 761 20-S, was first offered as one of our "Tools of the Year" in conjunction with the 1997-1998 update program. A year later, a new rectifier-regulator (25 403 05-S) was introduced, which is used with the 20 and 25 amp charging systems. Although the tester was designed earlier, it will test the new regulator. However, an additional adapter lead is required to perform the test. See Figure 1.

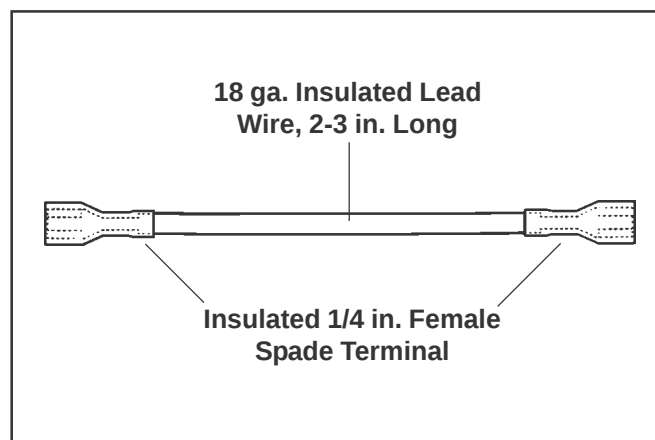


Figure 1.

The new lead has been added to all tester kits in our inventory. Kits shipped after 06/14/00, with a packing code of 024 on the label, will have the lead included. Kits which were purchased earlier and did not have the 024 code, will not have the new lead, but can be upgraded.

The components of the new lead are called out in Figure 1. If you have a tester that did not have the lead, and you have the components, the lead can be easily fabricated. If you don't have the components or don't want to bother making it up, the lead is available under Kohler Part No. 25 518 36-S at a suggested list price of \$0.60.

Once your tester has been upgraded with the new lead, you will also need the appropriate instructions. They were first printed in the 1998-1999 Kohler update handbook, on page 42, and are also reprinted on the back of this bulletin. Check the instructions that are with your tester (TT480-A), looking at the date at the bottom of the first page. If the only date is 1/98, they are the original version and do not include the instructions for using the new lead. You should save this bulletin, or make a copy of the back, and attach it to the original instructions. If your instructions also have a revision date at the bottom (Rev. 8/98), the instructions for the new lead are included.

20/25 Amp Rectifier-Regulators

1. Connect the single lead adapter in between the B+ (center) terminal of rectifier-regulator being tested and the squared single end of tandem adapter lead. See Figure 2.

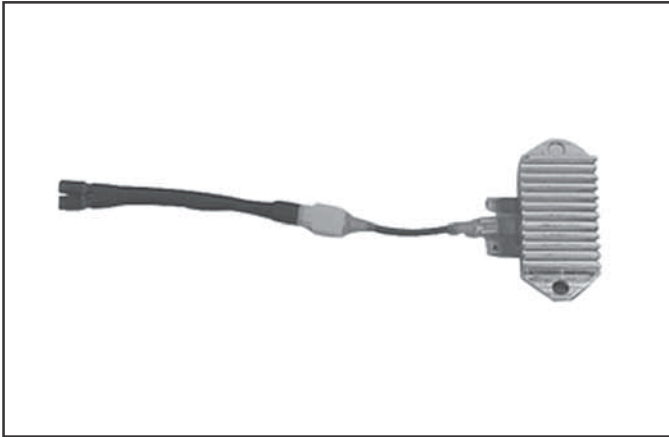


Figure 2.

2. Connect the ground lead of tester (with spring clamp), to the housing of rectifier-regulator.
3. Connect the red lead and one of the black leads from the tester to the pair of terminals on the opposite end of the tandem adapter lead. (Connections are not location specific).
4. Connect the remaining black lead from the tester to one of the outer AC terminals on the rectifier-regulator. See Figure 3.



Figure 3.

5. Plug the tester into a 110 volt AC outlet/power supply and turn on the power switch. The "POWER" light should be illuminated and one of the four status lights may be on as well. See Figure 2. This **does not** represent the condition of the part.
6. Press the "TEST" button until a "click" is heard and then release. Momentarily one of the four lights will relight indicating the **partial condition** of the part.
 - a. If the "OK" (green) light comes on, disconnect the tester black lead attached to the one AC terminal on the rectifier-regulator. Reconnect it to the other AC terminal on the opposite side and repeat the test. If the "OK" (green) light again comes on, the part is good and may be used.
 - b. If any other light or sequence is displayed* in either of the tests, the rectifier-regulator is faulty and should not be used.

*NOTE: A flashing "LOW" light can also occur as a result of an inadequate ground lead connection. Make certain the connection location is clean and clamp is secure.



Parts Bulletin

NO.		225
MODEL		CH18-25
DATE ISSUED	DATE REVISED	
7/00	8/00	

Mechanical Fuel Pumps

We have received isolated reports from the field of some mechanical fuel pumps ceasing to supply sufficient fuel for normal operation.

Investigation and review with our vendor has determined a limited quantity of the "T" linkages, used from the diaphragm to the actuating lever, were not properly heat treated. As a result, the premature wear or failure of the "T" linkage can occur.

A build date code, included as a suffix to the Kohler part number, is located on the underside of the valve cover flange. Only valve covers with the listed part numbers, containing date codes "I9" through "L9" and "A0" through "E0" have been determined to include the suspect linkages. Although not all pumps within these date codes are subject to failure, we want to assure that your parts inventory is good. NOTE: All new and reworked valve cover/fuel pump assemblies will either have a paint dot and/or part number/date code (example: 24 393 07G0) on the fuel pump body. Although some of these assemblies may have part numbers/date codes in both locations, the date code "G0" always takes precedence. Valve cover/pump assemblies manufactured in July with good "T" linkages have the part number/date code (F0) on the underside of the valve cover flange.

Fuel Pump Assembly
24 393 12-S
24 393 13-S
24 393 14-S
24 393 15-S
Fuel Pump Kit
24 559 02-S
24 559 03-S

Please inspect your inventory of fuel pumps listed above. **If any pumps have the indicated date codes** remove them from stock and prepare a "new-defective" warranty claim listing the part number(s) and quantity. In the box that says "Authorized By:" write **ME-1683-F**. Put the part(s) and the warranty claim in a box, address and send it to:

Kohler Co.
Building 604/EWR 6073
444 Highland Dr.
Kohler, WI 53044

Replenish your inventory by ordering appropriate quantities of the parts involved from your distributor. Please give this your prompt attention.

Section 3 - Sales Update

Service Parts Merchandising

Two years ago, we introduced special pricing on some of the fast-moving parts to improve our competitive position against the aftermarket suppliers. The program was so successful in generating increased sales that it was continued for the 1999-2000 with no changes. The program will be continued again for 2000-2001, but there will be a modest price increase to cover increased costs from the suppliers. When you specify genuine Kohler parts, the increased business benefits all of us.

Promotional Calendar

This year, as we have done in the past, we will offer a promotional calendar. See Figure 1. Take advantage of the quarterly specials which help your business prosper. See Figure 2. If you are planning to attend Louisville Expo on July 21-23, 2001, be sure to take advantage of the shirt special in the second quarter and your hat will be reserved for you at the show. Please remember to make your commercial customers aware of the show and the offer.



Figure 1.



Figure 2.

New Superseded Price List

Last year, we recommended that you retain your 1998-1999 Parts Price List because it was the only record of part number supersessions which occurred before January 1999. We are working on a new separate listing of those supersessions. Watch for it in a future mailing.

New Accessories Catalog (E-1953-E)

"The best kept secret at Kohler," the Accessory Catalog (E-1953-E) is an unlimited source of material to help you assist your customers and increase productivity and profit for your business.

Recently updated to add the newest offerings, the catalog has all of the latest and greatest accessories that are available. The following items may be of interest:

1. Oil temperature sensors. These fit into the oil drain hole and send a signal when temperatures exceed recommended ranges.
2. Lubricant for inertia drive and solenoid shift starters.
3. Electronic ignition, retro-fit kit for K91-K341 engines.
4. Debris clean-out ports for Command twins.
5. Electric, pulse, and mechanical fuel pumps.
6. Tamper-resistant control kits for Command and OHC twin engines.
7. Hardware kits for mounting the various exhaust systems on Kohler Command engines.
8. A complete listing of decals that are available, including one for the model, type, and specification numbers.

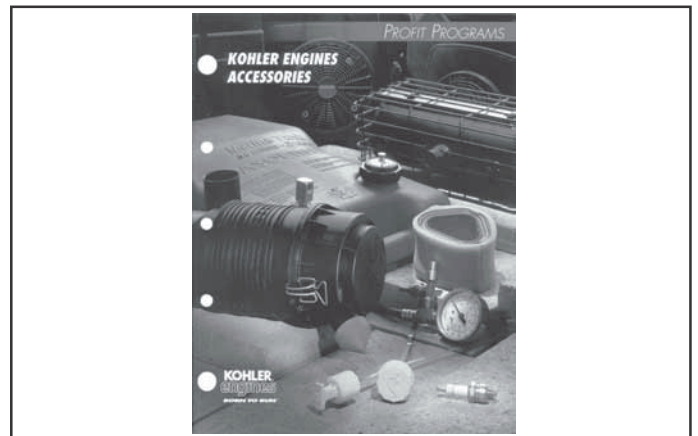


Figure 3.

Engine ID Aids and Displays

Most of you have probably seen our catalog of sportswear and gift promotional items (E-2037-A, titled "Profit Programs, Powered for Success"). The same catalog will be retained for 2000-2001. The catalog offers attractive merchandise, and the co-op pricing makes it an exceptional value.

The new ID Aids brochure (E-2068) and price sheet (E-2075) are full of the latest identification aids and display material to help you advertise your business. The new banners are bold and sure to catch the eye of your customers. We are also now offering the show displays for rental.

If you are interested in renting the displays please call (920) 457-4441, extension 77203, and our advertising coordinator will help you with the details.

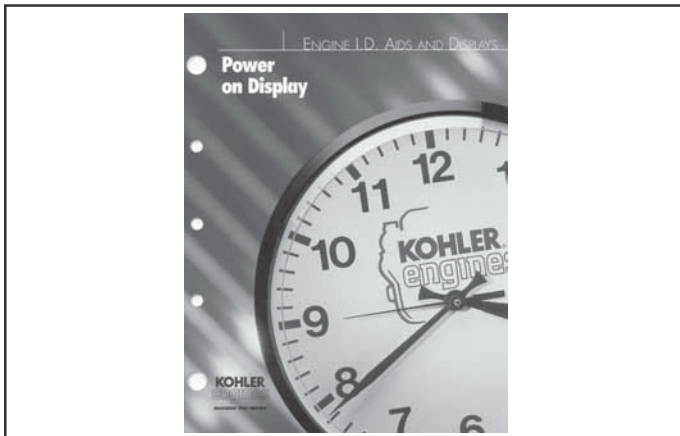


Figure 4.

Dealer Dozen

The entire Dealer Dozen program will be continued for 2000-2001.

The bulk pack option, which was introduced in 1998, has been very successful. It is just another way to offer genuine Kohler parts that help you compete against the "will-fit" market. Some key benefits to the program are:

- Greater Profits
- Easier Ordering
- Improved Selling
- Complete Satisfaction
- Better Inventory Management

Increase your sales. Now you can offer your customers two packaging options for purchasing Genuine Kohler Replacement Parts, display or bulk pack.



Figure 5. Display-pack parts.



Figure 6. Bulk-pack oil filter.

Engine Price List (TP-2389-L)

Last year we did not have the Command Pro CS engines in the price book. This year, the Engine Price List (TP-2389-L) incorporates all engines currently in production.

Basic engines have changed dramatically:

- Seven Magnum engines have been deleted.
- Ten Command Pro CS engines were added.
- Ten Triad OHC engines were added.
- Three Kohler Aegis engines were added.

Replacement engines:

- Two CV15 engines were added.
- One Triad OHC engine was added.
- One CH22 engine was added.
- One CV22 engine was added.
- One CV25 engine was added.

Repower Kits:

- Three engines were added.

Universal Engines:

- No changes were made.

Section 4 - Training, Testing, and Certification

Training, Testing, and Certification

In order to meet the demands of industry standards, there is a stronger need to have qualified service technicians in the field. Examples of this would be the introduction of the Kohler 26 HP EFI engines, and the Aegis liquid-cooled engines.

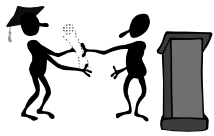
Kohler Co. offers several different opportunities to increase your knowledge and test your competency. We offer training through level I and level II schools. The invitation for these factory schools was included in mailing 4 and is reprinted on pages 36 and 37 of this book. Level I schools are also offered by our central distributors. We also offer Kohler certification tests. The application for this test is reprinted on page 38.

OPE (Outdoor Power Equipment) offers certification tests in six different areas of expertise. In order to be a Kohler Expert Dealer, you must pass the OPE test on four-stroke basics as well as the Kohler certification test. The Kohler certification test is a multiple-choice test, designed to measure your knowledge about Kohler engine products.

The Kohler certification test and OPE/ESA test can both be taken through your central distributor. Please contact them for available dates and locations. OPE/ESA study guides are also available by contacting your central distributor or ESA directly. A study guide for the Kohler certification test can be ordered through your source of supply under Kohler Part No. TP-2500.

The technician certification is valid for a three year period, after which, you are required to become recertified. This information can be found on the following pages.





KOHLER ENGINE FACTORY SCHOOLS



The small engine industry is changing more rapidly than ever before. New technology is being implemented to satisfy the wants and needs of customers and to meet stricter government standards for emissions and noise. Service outlets need on-going training to keep abreast of new technology and to stay informed about the latest troubleshooting techniques and repair procedures.

Each year we review the content of our factory school program to add new material and information and delete what is no longer pertinent. In 1999, we also added the advanced class (Level II), as indicated below. If you are a relatively new technician just getting familiar with Kohler engines, or an experienced mechanic ready to go on to the next level, we have a class for you. Look over the following information. If you would like to attend one of our classes, submit the application on the reverse side of this form. If you have any questions give us a call at 920-457-4441, ext. 74171.

Level I

The Level I course is designed to provide students with a working knowledge of Kohler air-cooled four-cycle engines and engine systems. It is assumed the students will have a basic understanding of small gasoline engines upon enrolling in the class.

Information covered will include:

- Using Parts and Service Manual
- Use of Measuring Instruments
- Electrical/Ignition Theory
- Warranty Information
- Troubleshooting
- Engine Tear Down/Reassembly
- Failure Analysis
- Fuel Systems

2000-2001 Level I School Dates:

- December 11-15, 2000
- August 6-10, 2001
- February 5-9, 2001

Level II

The Level II course is designed for students who have completed a Level I course at Kohler or at a central distributor, or have passed the Kohler certification test. The class size will be smaller to allow for more one on one instruction, and more hands-on activities.

Information covered will include:

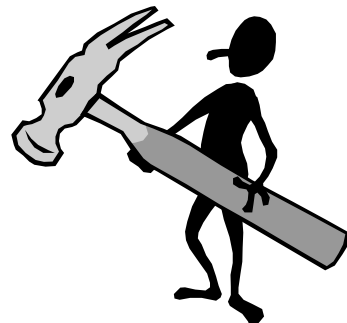
- Electrical Systems – Ignition, Starting, Charging
- Fuel Systems – Gasoline, EFI, Gaseous
- Rebuilding – Valve Service, Measuring
- Advanced Failure Analysis
- Tear Down and Reassembly Procedures
- Hands-On Diagnosis and Troubleshooting in a Variety of Areas

2001 Level II School Dates:

- January 8-12, 2001
- February 19-23, 2001
- January 22-26, 2001
- August 20-24, 2001

These classes are taught by Kohler Service Department personnel and are one week long. The classes include a tour of the engine plant and a graduation banquet. The classes are filled on a first come, first served basis.

Hands - On Training



What is the cost?

	Program Only	Program and Double Occupancy
Level I:	\$150.00	\$295.00
Level II:	\$155.00	\$310.00

The fee is fully refundable if some form of cancellation notification is received at least two weeks prior to the school date. A check, money order, or purchase order (PO) must be received with the application to reserve a place in the class. The fee includes:

- Lodging (double occupancy) Sunday evening through Friday morning. Private rooms, long distance calls, and any in-room services are additional and will be payable to the hotel/motel upon check out.
- Lunch, Monday through Thursday.
- Transportation to and from classroom.
- Instructional materials.
- Awards dinner Thursday evening.
- Framed diploma and patches.
- Factory tour (Friday morning).

How do I apply?

Fill out the application below and send it with your preferred method of payment to:

Kohler Co.
Engine Division
School Reservation, MS 102
Kohler, WI 53044.

Will I be notified of my acceptance?

Yes, you will receive notification of acceptance as to which school you have been chosen to attend.

Where are the Factory Schools held?

All Factory Schools are held in Kohler, WI.

School Application:

☐ **Level I** ☐ **Level II**

Company Name: _____	Choice of Dates: _____
Company Address: _____	1st Choice: _____ 2nd Choice: _____
City: _____ State: _____ Zip: _____	If both choices are full: _____
Company Telephone Number: _____	☐ Schedule for next earliest week
Company Fax Number: _____	☐ Return check and application
Kohler ID Number: _____	Hotel/Motel (if required) Options:
Student Name: _____	☐ Double Occupancy ☐ Smoking
Home Address: _____	☐ Private Room ☐ Non-Smoking
City: _____ State: _____ Zip: _____	☐ Saturday Stay Required
Home Telephone Number: _____	

Kohler Engine Certification Test Registration Form

Personal Information

Social Security Number: _____ Phone Number: _____

Last Name: _____ First Name: _____ Middle Initial: _____

Home Address (number, street, apt#): _____

City: _____ State: _____ Zip Code: _____

Date of Birth: _____ Sex: ☐ Male ☐ Female Recertifying? ☐ Yes ☐ No

Education/Experience

Education (circle ONLY ONE for the highest grade/year completed):

7 8 9 10 11 12

1 2 3 4

1 2 3 4

Grade/High School

Trade/Vocational

College

I have _____ years full-time experience as an outdoor power equipment repair technician.

Employment History

☐ I am presently unemployed

☐ I am presently employed (complete the following information):

Current Employer (company name): _____

Company Phone Number: _____ Company Fax Number: _____

Company Address (number & street): _____

City: _____ State: _____ Zip Code: _____

Signature of Technician: _____ Date: _____

Section 5 - Tools and Reminder

SPX Corporation Tools

While the Kohler Co. knows that specialty and diagnostic tools are a very important requirement for any servicing dealer, we also realize the importance of keeping the cost down. To help achieve this, Kohler is working with the SPX Corporation to take our current list of tools and have them marketed directly from the supplier.

Kohler's Service and Training group will continue to develop tools as needed. However, we will have SPX Corporation market them directly to the dealer and distribution system. The Service Tools Division of SPX Corporation can be contacted at phone number 1-800-533-0492 or fax number 1-800-578-7375.

There will be a listing of tools that shows the old Kohler part no. and the new SPX part no., like the example below.

SPX Part No.	Kohler Part No.	Description
KO3217	24 761 01-S	EFI Service Kit
KO3217-4	24 455 04-S	Gauge Assembly
KO3217-5	24 455 05-S	Pliers
KO3217-6	24 455 06-S	Circuit Tester
KO3217-7	24 455 07-S	Jumper Plug, Red (for metal cased ECU)
KO3217-8	24 455 08-S	Tee Valve Assembly
KO3217-9		Jumper Plug, Blue (for plastic cased ECU)

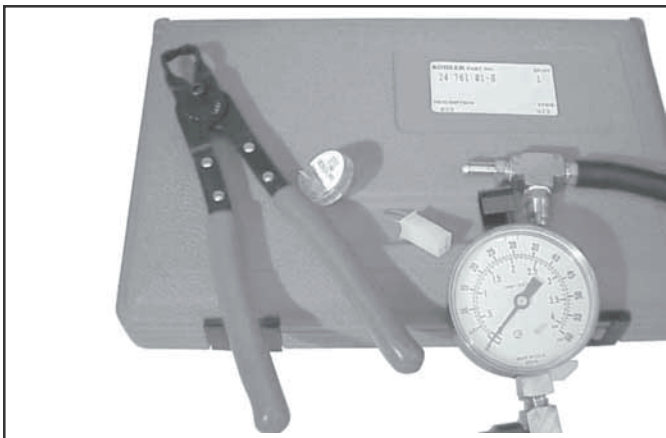


Figure 1. EFI Service Kit.

Winter Blend Oil

Due to slow sales, Kohler Co. is discontinuing the 5W-30 winter blend oil (Kohler Part No. 25 357 10-S).



Figure 2.

Kohler Survey Reminder

A survey was sent to dealers in a February mailing asking for their input and ideas regarding a Kohler Engines web site. If there are any other ideas you have regarding the web site, please feel free to express them to us. A copy of the reminder card that was sent out is on page 40 of this book.

Send information to dawn.de.haai@kohlerco.com.

Reminder! Reminder! Reminder!

In February, we sent out a mailer (reprinted below) announcing plans to make the latest information from the Kohler Engine Division available over the internet. The bottom portion of the mailer was a postage paid return card for you to provide the current addresses for your company, including any e-mail or website addresses. There was also an e-mail address provided if you wanted to respond that way. If you haven't already returned the card or responded by e-mail, we ask that you please do so.



Wow, wouldn't it be great to get all the latest service bulletins and other important information on the day they're released instead of waiting for your postal carrier to deliver the latest mailing 30 days later? Well, that's ***just what we've been working on*** here at the Kohler Engine Division. We have some other great plans too. But before we can get into full swing ***we need to hear from you*** as to the different modes of communication that you use at your dealership.

Let us know ***your e-mail address***. Bet some of you even have your own web page. So help us get the ball rolling and fill out the survey below and send it in. You can even e-mail us your information at:

dawn.de.haai@kohlerco.com (survey only). Let us know ***today!***

You've Got Mail?

Kohler Warranty Code Number: _____

Dealership Name: _____

Business Address: _____

City: _____ State: _____ Zip: _____

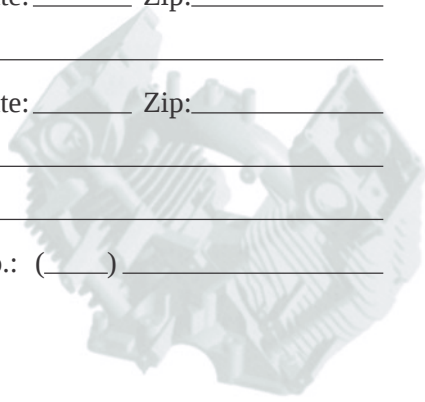
Mailing Address (P.O. Box): _____

City: _____ State: _____ Zip: _____

E-mail Address: _____

Web Address: _____

Phone No.: (____) _____ Fax No.: (____) _____



Kohler Diagnostic Tool Matrix

Kohler Part No. and Price*	Description	SPX Part No.
24 455 02-S \$6.10	Ignition Tester Used for testing output on capacitive discharge (CD) ignition systems	
25 455 01-S \$6.10	Ignition Tester Used for testing output on all other systems, except CD	
24 761 01-S	EFI Service Kit Used for troubleshooting and setting up an EFI engine	KO3217
25 761 02-S \$19.99	Water Manometer Used for testing crankcase vacuum and exhaust back pressure	
25 761 03-S	Inductive Tachometer Used for checking the operating speed (RPM) of an engine	KO3216
25 761 04-S \$20.45	Ammeter Set Used for checking current flow in charging and cranking circuits	
25 761 05-S \$69.40	Cylinder Leakdown Tester Used for checking combustion retention and if cylinder, piston, rings, or valves are worn	
25 761 06-S \$20.45	Oil Pressure Test Kit Used to test/verify oil pressure on pressure lubricated engines	
25 761 08-S \$97.38	Metric Thread Repair Kit Used to repair internal metric threads that are stripped or damaged	
25 761 18-S \$20.50	Starter Snap Ring Kit Used to remove and reinstall drive retainers on electric starters	
25 761 20-S \$86.05	Rectifier-Regulator Tester Used for testing rectifier-regulators	
25 761 21-S \$60.27	Spark Advance Module Tester Used to test the SAM on engines with Smart Spark	
25 761 22-S \$50.07	Vacuum/Pressure Tester Used like the water manometer but easier to transport and maintain	
	Engine Analysis Kit Used for testing running conditions of Kohler engines in applications	KO1000A
	Hydraulic Valve Lifting Tool Designed to remove and install hydraulic lifters	KO1044

*Suggested Kohler List Prices-subject to change depending on time of purchase and/or location.

The new policy regarding Kohler Special Service Tools provides for Kohler Service Outlets to purchase directly from our tool source, the Service Tools Division of SPX Corporation. All tools are available using Mastercard or Visa or, if you prefer open account, please fill in the form below and fax it to Service Tools Division of SPX Corporation.

Yes, I expect to be purchasing tools from Service Tools Division of SPX in the near future and would like an account established for my dealership.

Name of Service Outlet: _____

Kohler Account Number: _____

Dealer Principal or Main Contact: _____

Telephone Number: _____

Fax this completed form to: (810) 582-5830
Attention: Elzbieta Bania

Update Meeting Quiz

1. The new CV460 and CV490 engines have greater displacement by:
 - a. having a larger bore.
 - b. having a smaller bore.
 - c. having a longer stroke.
 - d. having a shorter stroke.
2. The Kohler Command Pro CS 8.5 HP engine:
 - a. has a ball bearing on PTO side only.
 - b. has a three year warranty.
 - c. cannot receive a balance shaft.
 - d. has swirl induction combustion.
 - e. none of the above.
3. The Kohler Triad OHC 23 HP engine is equipped with:
 - a. Smart Spark.
 - b. an automotive style belt.
 - c. fuel injection.
 - d. indirect injection.
4. The Kohler Command Pro 26 HP EFI vertical shaft engine has:
 - a. two cylinders for improved power.
 - b. on-board diagnostic technology.
 - c. liquid cooled technology.
 - d. none of the above.
5. The Kohler Aegis 17 HP engine has:
 - a. lower oil temperatures.
 - b. cleaner combustion.
 - c. dual, low-profile heat exchangers.
 - d. a and b only.
 - e. a, b, and c.
6. The EFI plastic case is designed to:
 - a. confuse the servicing dealer.
 - b. reduce starting effort.
 - c. improve starting effort.
 - d. make mounting more convenient.
7. The Command Pro CS engines can mount oil drain adapters by:
 - a. threading directly into the crankcase.
 - b. drilling and tapping the crankcase.
 - c. using an adapter supplied by the OEM.
 - d. using an adapter supplied by Kohler Co.
8. On Command twin horizontal engines, the fill tube and dipstick change was designed to:
 - a. prevent the potential from dirt entering the crankcase.
 - b. add extra inventory to the dealers.
 - c. add extra cost for servicing the unit.
 - d. none of the above.
9. To test the new 20/25 amp rectifier-regulator you need:
 - a. a known good rectifier-regulator.
 - b. a special high priced adapter.
 - c. nothing, it is tested the same as the 15 amp system.
 - d. an additional adapter.

10. The heavy-duty air filter kits for the vertical shaft twin engines are obtained:
 - a. by contacting the dealer's OEM.
 - b. by checking with source of supply of Kohler parts.
 - c. as a factory installed option only.
 - d. none of the above.
11. The Command twin stud kit was implemented to:
 - a. improve torque retention when used in tough environments.
 - b. make servicing easier so gaskets could be re-used.
 - c. improve cooling in the combustion chamber.
 - d. add additional service parts in the field.
12. The change to 8 mm governor shafts:
 - a. helps eliminate governor arm slippage.
 - b. have end bead-blasted to improve grip.
 - c. has improved governor response.
 - d. a and b.
13. Service Bulletin 256 mentions what potential condition?
 - a. The ECU on EFI engines could fall off the application.
 - b. The ignition module could short out.
 - c. The connection to the ECU could come loose.
 - d. There is a potential for water to build up in the harness.
14. Parts Bulletin 225 mentions a possible problem with:
 - a. carburetors flooding.
 - b. potential mechanical fuel pump failure.
 - c. an oil leak at the rocker assembly.
 - d. a potential ignition issue.
15. Loctite® 592 should be used on stator screws for:
 - a. CH18-25 engines only.
 - b. CV18-25 engines only.
 - c. CH16 engines.
 - d. CH11-26 and CV18-25 engines.
16. The Kohler Accessory Catalog was designed to:
 - a. increase productivity and profit in the dealers shop.
 - b. add additional inventory at the dealers shop.
 - c. as an unlimited source of material to help the dealer.
 - d. both a & c.
 - e. none of the above.
17. Certification for Kohler Dealers is conducted:
 - a. by the Kohler Factory only.
 - b. by the Central Distributors only.
 - c. once a year.
 - d. by the OPE/ESA only.
 - e. none of the above.
18. Kohler recertification is required:
 - a. once a year by taking the same test.
 - b. by attending the annual updates.
 - c. once every three years.
 - d. never, once you are certified, you are certified for life.

19. The new policy to acquire Kohler service tools is:
 - a. to call the Kohler factory and purchase them directly.
 - b. to order through the internet.
 - c. Kohler service tool are not necessary
 - d. to contact SPX directly.

20. Kohler Winter Blend Oil is being discontinued because:
 - a. Kohler has a new version coming out in the Spring of 2001.
 - b. it is the same type and weight as our 10w30 no need to duplicate it
 - c. due to decreasing sales volume
 - d. Kohler just felt there was no market for it.



KOHLERengines
BORN TO RUN[™]