



PARTS PRO CLASSIC

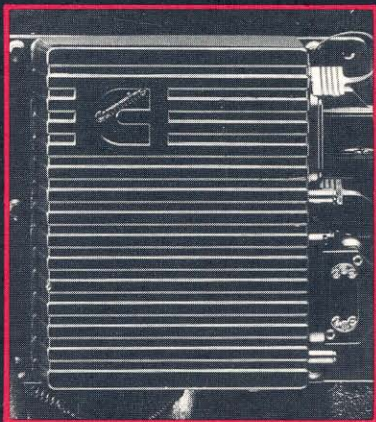
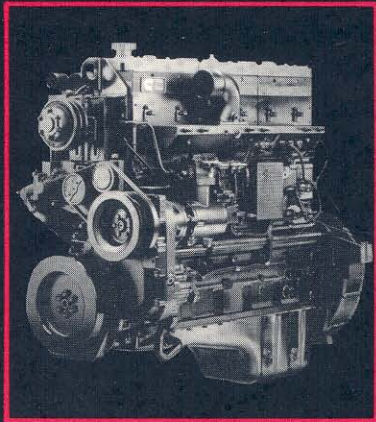
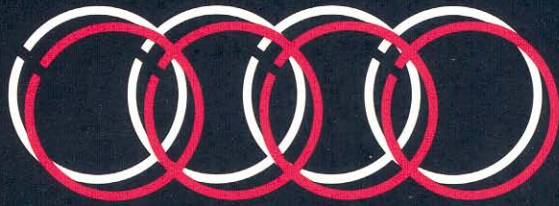
CLASSIC EDITION #15

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Welcome to Parts Professional #15!

In this issue, we will cover the new N14 COMMAND engines and the new integral electronic fuel system for the COMMAND engine, CELECT™. There are also some hot new Tips from our Professionals.

Please feel free to use the enclosed reply card to let us know what you think about the program. Be sure to use the peel off label on the book since it has your Professional Identification Number on it. This is especially important if you are using the card to send us a change of address. Keeping your address up to date will ensure that you continue to receive Parts Professional issues. If you know of someone who would like to sign up, have them fill out the enrollment card completely and send it in.

Now, for the exciting news! Back in the beginning of the year, I took on a new position here at Cummins. As a result a new person, Melissa Blackford, was hired to take over the production of Parts Professional. She is well qualified and is excited about the program. As a matter of fact, she did most of the work on this issue! Please join me in welcoming her to the team of Cummins Parts Professionals.

One last time, then,
Good Luck and good selling!



Kristin G. Bridges
and



Melissa Blackford
Editor

P.S. Thanks to Mark Chapple for his technical advice on this issue!

TIPS

from the Professionals

Bill Reidy of Auto Clutch & Parts Service in Chicago says that every time he sells a Cummins ReCon head, he suggests to the customers that they should replace the head bolts. Bill reminds the customer that after all the time and mileage on the old bolts, there has to be some kind of stress and wear on them. This is an easy service to customers that they rarely think of, and a sales strategy that, for Bill and Auto Clutch & Parts Service, increases sales.

A great tip from Lou Nathan out of Cummins Mid-States Power, Inc. in Illinois can not only save the customer money, but Lou's tip can also increase sales for Genuine Cummins Parts. As a parts sales representative, Lou has a great pitch when selling Fleetguard air filters. He lets the customer know that Fleetguard air filters have a filter minder air restriction gauge that monitors the air restriction while the engine is operating. Lou informs the customer that this gauge indicates the reading and how much of the air filter's service life remains before fuel consumption begins to increase. This is a good selling point to help customers save money as fuel prices are rising. It is also an excellent strategy for selling Genuine Fleetguard air filters.

More tips for promoting Genuine Cummins Parts comes from Eunice Davis who is in oil sales at the Central Distribution Center in Alabama. In order to keep customers using Genuine Cummins Parts, Eunice says that the most important trait that our Parts people must have is knowledge of Genuine Cummins Parts and the latest technology on the performance of each part. For example, when selling Genuine Parts, the warranty should be gone over in full detail. It should be explained that the warranty covers parts and labor throughout North America and the point stressed that a customer's oil and antifreeze is included. Also, let the customer know that when they use Cummins Blue Oil, they are not only getting the highest grade oil and the best performance, but they will find the same oil at any Cummins Distributorship. These are key points that work for Eunice Davis when selling Genuine Cummins Parts in Alabama.

Here are some great selling guidelines that have helped the folks at Cummins Cumberland, Inc. in Louisville, Kentucky when they're doing an overhaul. Charlie Ruckriegel, the General Parts Sales Manager, says that when a customer asks for an overhaul, the salesperson should ask about ReCon heads, injectors and turbochargers. If the customer does not want to exchange these items, then the salespeople ask if they can water check and vacuum check the cylinder heads, clean and repair the injectors or put a seal kit in for the turbochargers. Charlie says that if the customer agrees to any of these suggestions, this will be additional parts sales and labor for the shop.

T. Silvester (Sil) from Inland Kenworth in Williams Lake, BC has sent us another great tip that works for Sil and his people. He says that a happy customer will come back again and again, and Sil has some tips that keep his customers happy. Sil found that by giving his customers a broad smile greeting and a happy "hello", the client responds in the same way. He and his people also try and remember repeat customers' names, making it a more relaxed and personal experience to come into their store. Another sales aid they found also works well is if they are tied up with another customer, they still greet arriving clients, tell them they will be with them as soon as possible, and point them to the Cummins Literature rack. By reading current information, the customer can become more familiar with products, and may spot something he had forgotten about. The final extra effort that Sil and his workers give is a sincere "Thank You." T. Silvester says that if these tips work for someone else as well as they do for them, look forward to a 20 percent increase in Cummins product sales.

Larry McMullen from Memphis, Tennessee reminds us of the increase in independent truckers, and the importance of the information given to these folks from the person at the parts counter. Larry believes that when these truckers spend their hard earned dollars, they need to know about DC-4 to protect their valuable new liners, Premium Blue to protect their bearings, and how much money can be saved by a simple upgrade. Every customer should be offered a simple brochure with each parts purchase stressing the importance of these items. Larry makes a good point when he

says that after all, the word carries fast on CB radios about service received at parts counters, dealers and truck stops.

M. Joel Suszek of Alpena Diesel Service, Inc. in Alpena, Michigan has a simple but helpful hint that can make looking up parts much easier. Joel suggests that when you have your business cards printed, have the back side printed with spaces for the truck Make, Model, and V.I.N. numbers and the engine serial number and C.P.L. Then, when you give out your card, help your customer fill in the spaces and have him keep the card in his wallet or truck. When this customer comes to the parts counter, they can easily supply you with the proper engine numbers to assure that they get the proper parts. It will also give the customer a reason to hold on to your card long after many others are thrown away.

Winning Tip

Our winning tip for Parts Professional #15 comes from Larry Revard, a Journeyman Parts Man at Cummins Michigan, Inc., Grand Rapids, Michigan. Larry and all the people at CMI have an idea in use that might prove to be helpful to other distributors and Cummins dealers.

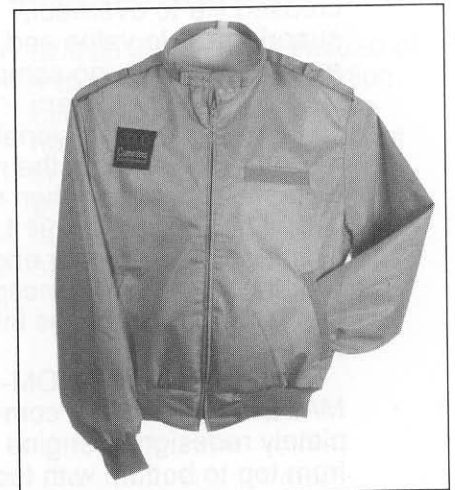
As you all know, scheduled repair times (SRT) and shop productivity are both major concerns in today's repair facilities. Larry's department has come up with a mechanic's Parts Order Form, listing all components involved in an overhaul. This form provides Larry and his people with not only the chance to review the parts on paper, but also allows them to order once and only once for the total overhaul.

This method has proved to CMI, that by faithfully using these forms, their SRT times can be greatly reduced along with their productivity picking up. Larry's reasoning behind that is, if a mechanic only comes to the counter once with the order, instead of 10 to 15 times without it, his valuable time is spent working on the truck. Thus, his productivity goes up and SRT times are easier to meet. This handy form also gives Larry and all the Parts People at Cummins Michigan more time to spend on the front counter building plus sales. We've included in the reference section a copy of the form Larry Revard and the parts people at Cummins Michigan are using.

Larry will be receiving a personalized jacket with the Parts Professional patch on it, as well as five Parts Professional patches for his uniforms and a Parts Professional cap. In addition, our other seven Tippers this time will receive the Parts Professional cap and the patches. Send in your suggestions now for your chance to win prizes and to see your Tip printed in the next Parts Professional!

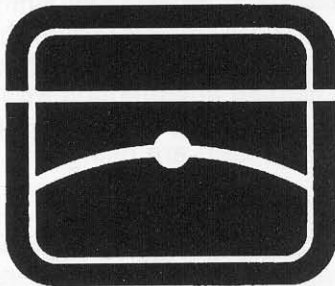
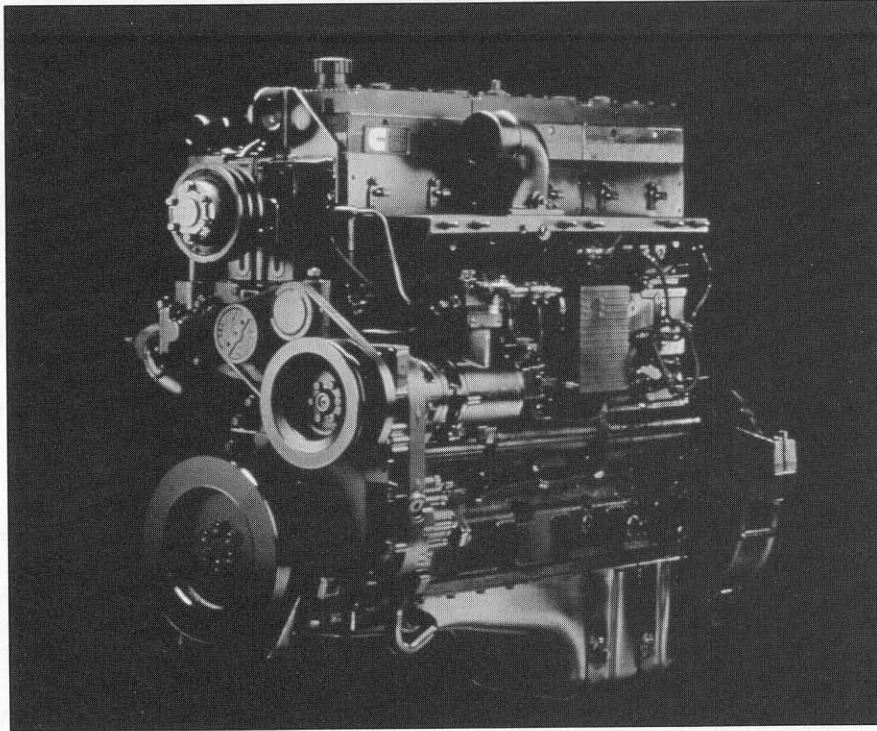
Send your Tips to:

Melissa Blackford
Editor - Parts Professional M/C 40911
Cummins Engine Company, Inc.
Box 3005
Columbus, IN 47202-3005



Rules: The Tips must be compatible with Cummins standard practices. They must relate to the sale of New or ReCon Genuine Cummins Parts or Premium Blue Oil.

N14 Command



In order to improve on its 30 years of NT engine tradition, Cummins set several ambitious goals for its new N14 product line: an increased life to overhaul, superior resale value and, most importantly, no compromises in performance.

In parts professional #14, we talked about the new Command concept when we introduced you to the 91 LIO. The 91 N14 is another engine with the Command concept that is driving Cummins into the future.

The new N14 COMMAND engines are a completely redesigned engine from top to bottom with technological advances that boost fuel efficiency, increase durability, provide unprecedented power and torque in

their operating ranges, and at the same time, meet strict 91 emissions standards.

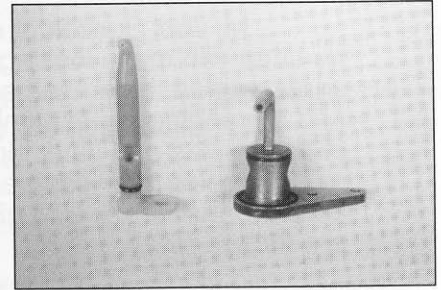
The changes in the N14 were a direct result of its increased cylinder pressure capabilities from 1950 to 2250 PSI. Most of the engine had to be beefed up to handle this pressure.

There are two choices for fuel systems on the 91NT. Like the LIO we discussed in Parts Professional #14, it will be available with the familiar STC mechanical fuel system, as well as the new CELECT electronic fuel system. This new electronic fuel system will be featured in this Parts Professional following the N14 article.

Now let's break the N14 down and go over all the parts that have changed.

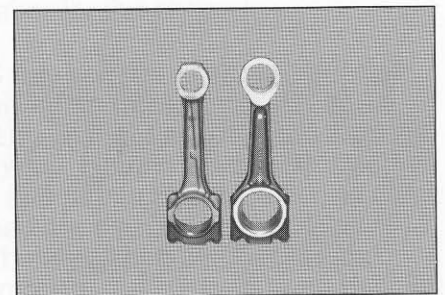
As mentioned before, most of the changes to the N14 were made to accommodate the higher cylinder pressure. The most significant change is that of the block. The N14 block has several new design features that will improve reliability and durability.

First of all, the block has precision targeted piston



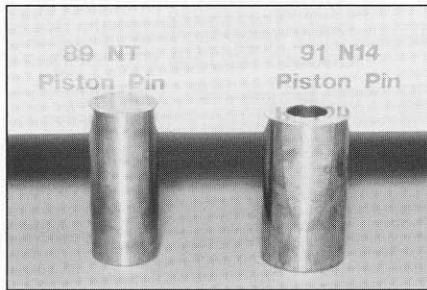
cooling nozzles with higher oil flow rates to improve cooling of the piston. This is further enhanced by a larger piston cooling rifle which improves oil flow. Building on cooling features, design changes have been made in the cylinder core area to incorporate a mechanical water dam for more uniform coolant flow around the liner.

One of the main considerations in the designing of the 91 N14 was to minimize leaks. Within the block, straight thread plugs and "O" ring seals are used to do just that. Another block change which is customer driven is the strengthening of the main bearing webs to reduce noise and vibration. The block skirt area is also redesigned to provide a mechanical clearance for a larger connecting rod.



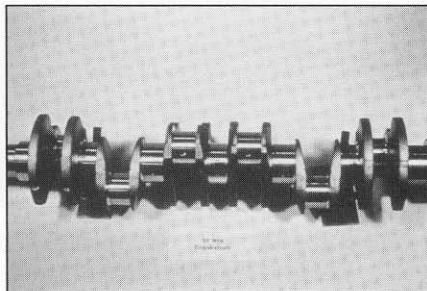
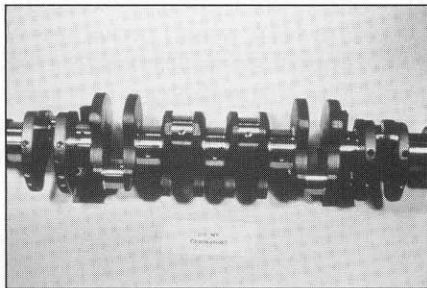
The new, larger connecting rod is designed for added strength. It is stronger than ever since the rod crank pin bore diameter has been increased by 12 percent to withstand higher loads through much larger rod bearings. The pin diameter was increased for durability and higher cylinder pressure capability through larger

bearing areas on the rod and piston. The piston pin has



been made hollow in order to keep weight down. Even with the hollow design, the piston pin has more than enough strength to do its job.

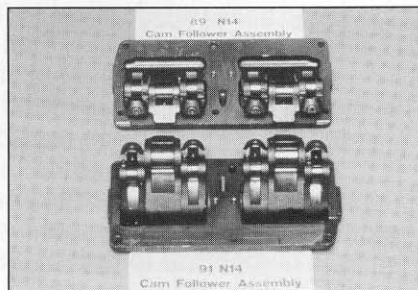
There are additional changes that were made to the crankshaft other than the increase in the diameter of the crank pin. The height of the pin tops has increased to allow more side bearing area on the connecting rod. A final change from 12 to 8 counter-



weights is a weight reducing effort to help offset the weight increase due to the larger crank pin and pin tops, yet there is still a slight increase in total crank weight. One of the few parts that did not change on the N14 is the main bearing journals which are the same as the 88NT and will use 88NT main bearings.

Continuing with the many changes, two new

camshafts are required for '91 N14 engines, one for STC and a second for CELECT. The injector lobe profile is new on both camshafts. The injector plunger strokes are longer and quicker to increase injection pressure for improved emissions and performance. The cam injector lobes and injector follower rollers are increased .250" in width to handle the loads of higher injection pressure and higher C Brake horsepower. The intake and exhaust profiles remain unchanged from '88.

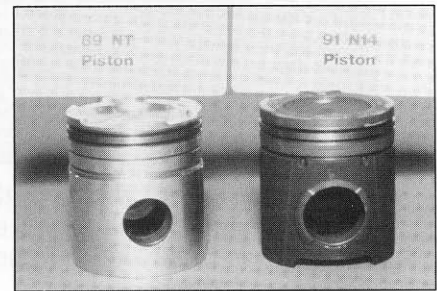


The cam follower assembly also has many changes as a result of the higher injection pressure. The cam follower housing has been redesigned to accommodate a larger cam follower shaft. The injector cam follower roller is now 30 percent larger in diameter and 30 percent longer than the '88 roller for greater strength. The roller now utilizes a stronger, larger diameter and longer pin. Also, the injector lever forging increased in size. The end result of all these changes to the cam follower assembly is an increase in the injection pressure and C-Brake load capacity.

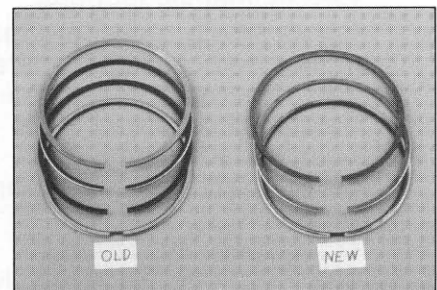
As we move up the engine, we need to mention the new lubricating oil pump with increased size and flow capacity. This pump is required to provide additional oil flow for piston cooling, overhead, and cam followers, with no increase in oil pressure.

There is a new premium, dual Ni-resist aluminum

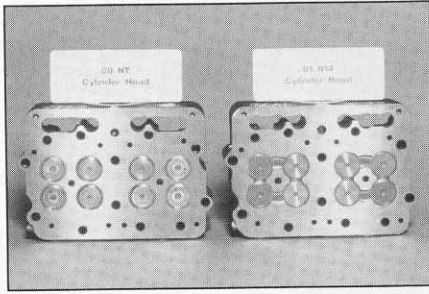
piston that is made to handle increased cylinder pressure. The N14 piston bowl is anodized for the higher rated



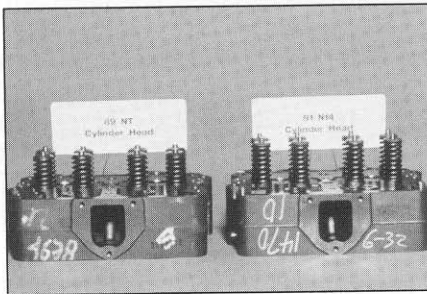
engines, such as the 460E. This is a surface treatment that increases surface/metal strength to resist cracking and gives the piston a dark gray color. This new piston is better able to resist cracking and corrosion and handle the higher temperatures encountered at the high torque output ratings of these engines. This anodized design increased piston cooling flow; thus, improving piston durability. The lower rated N14s will continue to use non-anodized pistons. The new piston also



utilizes 3 new rings instead of 4 to reduce oil consumption. Finally, the piston pin bore has increased by 25 percent in diameter to spread the bearing load over a much larger area, reducing bore stress.

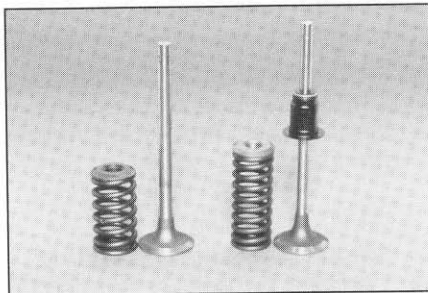


Another new part that is specifically designed for the '91 N14 is the cylinder head. The head has flush valve heads for improved volume to surface ratio, improved performance and to meet emissions. This new head has



scallops cut out between the valve ports on the combustion face to improve thermal fatigue life by reducing stress in the head casting at operating temperature. Larger diameter oil passages have been added in order to increase oil flow to the rocker assembly.

There are several changes to the '91 N14 valves worth noting. Both the geometry and materials are new for '91. Those long familiar with the NT valve will readily



notice the longer, thinner valve stem of the '91 compared to all other NT valves since the 1950s. The longer stems are required because

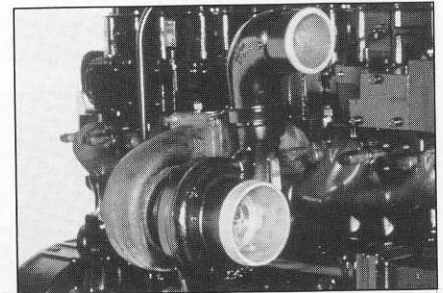
the rocker shafts are moved upward to accommodate longer injector plunger strokes. They also improve valve to seat alignment. The smaller diameter also lets us standardize the stem diameter with LIO and C series for more cost effective manufacturing. There were two new exhaust valves released for '91 N14s, one for CELECT and the other for STC engines. Both are of three piece construction, having similar high strength stem material, and both are Stellite faced for durability. STC engines will use a valve head material identical to '88 NTs while the CELECT engines use a new Inconel valve head material to withstand the higher temperatures expected in these engines. While the intake valve geometry is new for '91, the intake valve material is identical to that of '88 NTs, with the same intake part number used for both '91 STC and CELECT engines.

Another change in the cylinder head was the valve guides to accommodate the smaller diameter valve stem. There is a new valve stem seal, similar to those used on C series, that is used on both the intake and exhaust valves for good oil control and to help meet emissions requirements. Finally, a stemless cross-head has been added which has significantly higher strength for durability and better C Brake performance. The cross-head was a T-shape on the old NT.

We will now take a look at the completely redesigned rocker housing assembly for the N14. The housing is cast iron (similar to the K engine) with the water manifold as an integral part of the casting. It has short jumper tubes to connect the water passage. Each rocker box contains two rocker shafts bolted in place, one for each cylinder, which can be removed independently. A note to remember when repairing: the rocker

shafts must be removed before an injector can be changed. Another important change was the shafts being raised approximately 3/4" to accommodate the longer injector stroke, resulting in added height to the engine. Because of this increased height, a new, longer push tube is required. A final change to the rocker housing assembly is but one more beefing up process of the train joints which have a larger ball and socket to improve train wear and increase load capacity. All of these changes to the rocker box assembly have been made to handle the increased injection pressure and C-Brake load capability.

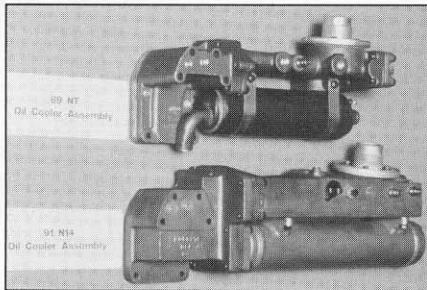
As we near the top of the engine, we need to talk about the new exhaust manifold and turbocharger. A new exhaust manifold is used on the N14 which provides improved flow characteristics. The turbocharger is a new BHT3C that was released to enhance engine performance. The turbocharger compressor



outlet connection utilizes an O-Ring "V" band clamp arrangement for improved sealing and flexibility to adapt to OEM air connections.

The '91 N14 oil cooler is a two pass design with im-

proved cooling capacity and a transfer housing that has been changed to a 15" core. The oil cooler housing and front support will be cast iron with



the combination full flow/ bypass lubricating filter and coolant filter mounted below the assembly. This oil cooler is more reliable and durable and allows 500 hp cooling capacity.

In order to increase coolant flow capacity and durability, the '91 N14 has an improved water pump. It too has been completely rede-



signed to include a new body casting, water pump impeller, beefed up bearing packs and idler, and increased grease flow capabilities. The water pump drive is similar to the BCIII inside idler with a poly vee six rib belt.

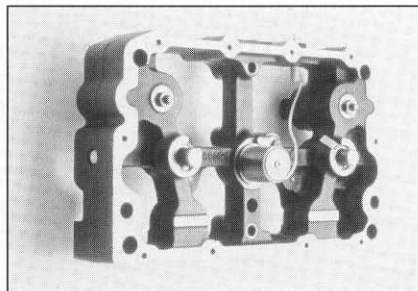
The N14 utilizes the conventional high flow coolant



system; therefore, only one thermostat is used. This thermostat is mounted on the water manifold to make a high flow cooling circuit similar to the BCIII system. Plumbing is internal where possible in this system as another effort to make the N14 virtually leak free.

The '91 N14 now has charge air cooling. The hot, high pressure air from the turbo compressor is cooled by running it through a cooler core mounted out in front of the radiator, letting the outside air cool it down. It is then brought back to the engine. This process provides a greater amount of cooler, denser air to help meet emissions restrictions and gives the engine more power. This method eliminates the engine mounted water/air aftercooler used on previous NT engines.

Finally, we will look at an optional feature of the new N14 that has changed. The '91 C-Brake, while similar in operation, has been exten-



sively redesigned to mate with the new rocker housing and tolerate much higher braking loads. It now provides up to 460 brake horsepower at 2100 RPMs on the CELECT version and 327 brake horsepower at 1800 RPMs on the STC version.

As discussed earlier, the housing and pistons have been beefed up, and changes to push tubes, cross-heads and other train components permit higher braking horsepower by opening the exhaust valves later in the cycle. Both

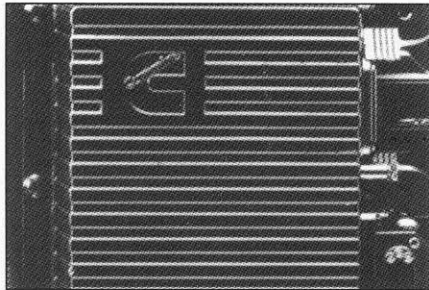
STC and CELECT camshaft injector lobe profiles have been optimized to give maximum braking ability, with the STC providing more braking power than was available on the '88 NT; however, the CELECT system permits a more optimum lobe profile for better braking than even the STC.

Take all of these changes, add them up, and the weight of the overall engine increased by only 150 lbs. This is very reasonable considering all of the beefing up that has been done and the high power/torque output of the '91.

Cummins new N14 COMMAND engines are designed to "take COMMAND of the '90s" with technological advances to make the engine more durable, reliable, and driver friendly. With the Parts Professional Program as your guide, you can in turn take Command in promoting this technology to your customers and providing them with complete information and service.

CELECT™

CELECT™ is based on proven technology created by Cummins Engine Company that will be offered on both N14 and



L10 COMMAND engines. The fully electronic CELECT fuel system offers more features and greater flexibility than any system currently available. CELECT lets customers select many performance-improving and fuel economy features, including:

- Road speed governing, which allows the customer to gear the truck more efficiently and to control top road speed for improved tank mileage. Test results show that for every mile per hour that road speed is lowered, fuel economy can be increased by up to one-tenth of a mile per gallon;
- Gear-down protection that limits maximum road speed to the top gear for greater fuel efficiency;
- Cruise control for increased driving comfort and fuel efficiency. In-cab switches are available for setting and maintaining road speed above 30 mph and 1000 rpm;
- In-cab adjustable low idle speed that can be set up or down in 25 rpm increments;
- Power take-off control, which provides a convenient method to set and maintain a precise engine speed for PTO operation;

- An idle shutdown feature that can be adjusted to automatically shut the engine off after a specified amount of idle time between three and 60 minutes;
- An option for setting progressive shifting parameters;
- A choice of automotive or variable speed engine governors to match driver preference or application.

Standard features on the CELECT fuel system include an engine protection system and self diagnostics. The engine protection system monitors coolant temperature, oil temperature, intake manifold temperature, oil pressure and coolant level (optional). This investment protection feature will also alert the driver with a visual and/or audio alarm when critical conditions occur. There are also two fault lamps in the cab panel which luminate when an engine electronic fuel system fault occurs.

Compulink™ is the service and diagnostic tool available for the CELECT system. The Compulink can be used to program and troubleshoot the CELECT system. Its troubleshooting capabilities include fault code information and system monitoring.

Here's how CELECT works. Fuel leaves the tanks and passes through the Electronic Control Module (ECM) cooling plate. It then passes through the fuel filter on route to the gear pump. A fuel shutdown solenoid is mounted on the output of the gear pump. This solenoid is controlled by the ECM. As fuel leaves the shutdown solenoid, it flows to the electronically controlled unit injectors, which are mechanically activated by the camshaft.

The solenoid valve on top of the closed-nozzle injector controls the amount of fuel and the timing for each injector. This is done upon command from the engine's ECM. Throttle input is sent to the ECM from a throttle position sensor. This sensor eliminates the mechanical throttle linkage.

With CELECT, your customers will see improved fuel economy through the electronic control of fuel injection timing and metering, excellent cold starting capabilities, reduced cold smoke and improved driveability.

CELECT will be the only fuel system available on the N14 460E that is discussed in this issue. On the lower horsepower N14s to come, there will be an option of either mechanical, mechanical with road speed governing or the fully electronic CELECT system.

Fact Sheet

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<u>Product</u>	<u>Feature</u>	<u>Advantage</u>	<u>Benefit</u>
N14 COMMAND Engines	New Piston Cooling nozzles	Higher flow capacity and improved piston cooling	Improved Durability
	Coolant Dam in the cylinder block core	Uniform cooling	Improved Durability
	Straight thread plugs and "O" ring seals in the block	Improves sealing	Reduced Leakage
	Larger Connecting rod	Allows for larger crank pin	Improved Strength and Durability
	Hollow Piston Pin	Lighter weight	Helps to offset weight increases in other components
	High Crankshaft pin tops	Increases side bearing area	Increased Durability
	8 Crankshaft counterweights	Reduces weight	Helps to offset weight increases in other components
	Longer, quicker injector plunger strokes	Increases injection pressures	Improved emissions and performance
	Wider cam injector lobes and follower rollers	Tolerates higher injection pressures and C Brake HP	Improved emissions and performance
	Beefed up cam follower assembly	Tolerates higher injection pressures and C Brake HP	Improved emissions and performance
	Increased lube pump size and flow capacity	Increases oil flow without increasing oil pressure	Improved Durability
	Premium dual-Ni resist insert aluminum piston	Reduces ring and groove wear	Longer life to overhaul
	Anodized piston bowl design in higher horsepower ratings	Tolerates higher cylinder temperatures at the high torque levels	Longer life to overhaul
3 piston rings	Improves oil control	Reduced oil consumption	
Increased piston pin bore diameter	Reduces bearing stress	Increased life to overhaul	

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Fact Sheet

<u>Product</u>	<u>Feature</u>	<u>Advantage</u>	<u>Benefit</u>
	Valves flush with cylinder head	Improves volume to surface ratio	Improved emissions and performance
	Scalloped combustion face in cylinder head	Improves head resistance to thermal fatigue	Improved Durability
	Increased oil passage diameter	Increases oil flow to rocker assembly	Improved Durability
	Longer and thinner valve stems and smaller valve guides	Allows longer injector plunger strokes and improves valve to seat alignment	Improved emissions and performance
	Two new exhaust valves (one for CELECT and one for STC)	Similar high-strength stem materials and Stellite face	Improved Durability
	New exhaust valve head materials for CELECT engines	Withstands higher temperatures	Improved Durability
	New valve stem seal	Improves oil control	Reduced oil consumption and improved emissions
	Stemless cross-head	Increases strength	Improved durability and C Brake performance
	Rocker housing assembly	Cast iron body with cast-in water manifold	Improved durability and C Brake performance
	Larger ball and socket on injector train joints	Increases load capacity	Improved durability and C Brake performance
	Two rocker shafts per rocker box	Allows increased injector stroke	Improved durability and C Brake performance
	Redesigned exhaust manifold	Improves flow characteristics	Improved performance
	New BHT3C turbo	Specifically matched to each N14 rating	Improved engine performance
	New 15" oil cooler core transfer housing	Improves cooling capacity	Improved durability

Cummins Parts Professional

Fact Sheet

<u>Product</u>	<u>Feature</u>	<u>Advantage</u>	<u>Benefit</u>
CELECT	Cast iron oil cooler housing and front support	Increases strength	Improved reliability and durability
	New water pump body casting, impeller, and beefed-up bearing packs and idler	Allow increased coolant flow capacity	Improved reliability and durability
	High flow cooling circuit	Only one thermostat	Improved reliability
	Charge air cooling	Increases amount of cooler, denser air for combustion	Improved emissions and performance
	Redesigned C Brake	Tolerates higher braking loads	Increased life of service brakes and improved safety
	Optional features	Road speed governing, gear-down protection, cruise control, adjustable low idle speed, power take-off control, idle shutdown, progressive shifting, engine governor type	Performance and fuel economy
	Standard features	Engine protection system and self diagnostics (Compulink)	Increased engine life

N14 Command Ratings

Engine Model	Hp @ the Command Point	Command Range	Command Torque @1200 rpm
N14-310P	310	1100-1700	1400 LB-FT
N14-330	330	1100-1700	1350 LB-FT
N14-310P	310	1100-1700	1250 LB-FT
N14-370	370	1200-1800	1400 LB FT
N14-460E	460	1100-2100	1550 LB FT

MECHANICS PARTS ORDER FORM

PLAN _____ CUST. NAME _____ E.S.N. _____ CPL _____
 NEED BY _____ ENG. HP _____ BAY # _____ CLOCK # _____

HEAD BOLTS S _____ L _____
 HEAD BOLT WASHERS _____
 FUEL CROSSOVER _____
 CROSSHEADS _____
 PUSH TUBES INJ _____ VLV _____
 EXHAUST CLAMPS _____
 EXHAUST FLEX _____
 TURBO STUDS S _____ L _____
 TURBO PRESSURE LINE _____
 TURBO FITTINGS _____ PRESS. _____ DRAIN _____
 TURBO RX _____
 TURBO INTAKE HOSE _____
 TURBO INTAKE CLAMPS _____
 TURBO DRAIN STROTO _____ SILICONE _____
 TURBO DRAIN SLEEVE _____
 H2O FILTER _____
 FUEL FILTER _____
 PRIMARY OIL FILTER _____
 ADAPTER O-RINGS _____
 BYPASS OIL FILTER _____
 O-RINGS BEVEL. _____ SQUARE _____
 777 DRAIN STRATO _____ SILICONE _____
 AIR FILTER _____
 PAN PLUG _____ WASHER _____ INSERT _____
 OIL SUCTION TUB _____ SLEEVE _____ O-RINGS _____
 AFTER COOLER HOSES _____
 AIR COMPRESSOR INTAKE HOSES _____
 BYPASS HOSE _____
 WATER PUMP RX _____ IDLER _____
 INJECTORS RX _____ O-RINGS _____
 HOSE CLAMPS _____
 SILICONE _____
 THERMOSTAT _____ SEAL _____ GASKET _____
 PAINT _____ COLOR _____
 STARTING FLUID _____

AIR GOV. GASKETS _____
 CAM FOLLOWER RX _____
 CAM FOLLOWER ROLLERS INJ _____ VLV _____
 CAM FOLLOWER PINS INJ _____ VLV _____
 CAM FOLLOWER LOCK PINS _____
 TIMING GASKETS _____
 FUEL PUMP GASKET _____ SPIDER _____ ASA _____

PARTS FOR PLANS

3 CYL. HEADS
 6 CYL. KITS
 1 HEAD SET
 1 MAIN BEARING
 12 ROD BEARINGS
 6 GALLONS COMPLETE
 1 PAN GASKET
 1 SUCTION TUBE GASKET
 4 TURBO NUTS
 8 CROSSOVER SCREWS
 2 FUEL FITTINGS
 4 COPPER WASHERS
 6 LINER SHIMS
 6 ROCKER BOX O-RINGS
 6 SHORT TIES
 6 LONG TIES
 6 RING SETS

CAMSHAFT _____ GEAR _____ KEY _____
 CAMBUSHINGS _____ THRUST _____ SUPPORT _____
 SUPPORT O-RINGS _____ SHIM PACK _____
 FRONT COVER GASKET _____ BUSHING _____ SEAL _____
 ACC. DRIVE SEAL _____ WEAR SLEEVE _____
 L RUBBER _____
 ACC. DRIVE MOUNTING GASKET _____
 ACC. DRIVE THRUSTS _____ BUSHINGS _____
 AIR COMP. GASKETS _____

EXTRAPARTS _____

Test Your Professional Knowledge

(Answers will appear in Parts Professional #16)

- 1) Most of the changes to the N14 were a direct result of
 - a. the need to improve the appearance of the engine
 - b. the need to decrease the weight of the engine
 - c. increased cylinder pressure capabilities
 - d. electronics

- 2) The larger connecting rod on the new N14 COMMAND
 - a. controls timing and metering precisely
 - b. provides added strength and durability
 - c. helps keep the engine weight down
 - d. is simply a cosmetic change

- 3) The height of the pin tops on the crankshaft has increased in order to
 - a. match the increased height of the engine
 - b. reduce weight
 - c. allow less side bearing area on the connecting rod
 - d. allow more side bearing area on the connecting rod

- 4) When compared to the '88 NTs, the new N14 COMMAND engines are approximately
 - a. 150 pounds lighter
 - b. 75 pounds lighter
 - c. the same weight
 - d. 150 pounds heavier

- 5) The block now has precision targeted piston cooling nozzles with higher flow rates to improve cooling of the piston.
 - a. True
 - b. False

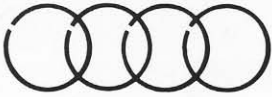
- 6) The anodized surface on the piston bowl increases surface/metal strength to resist cracking.
 - a. True
 - b. False

- 7) CELECT's standard features are
 - a. an engine protection system
 - b. progressive shifting
 - c. self-diagnostics
 - d. both (a) and (c)

New Parts Catalogs

Application	Bulletin Number
Revised	
6C, CT, CTA8.3 Construction	3884236-01
KTA50 Construction	3884255-01
KT, KTA19 Construction	3884227-01
4BT3.9 Automotive	3384252-01
4B, BT3.9 Generator Drive	3884223-01
4B, BT, BTA3.9 Construction	3884232-01
KTA19 Generator Drive	3379559-03
New	
VTA28 Power Unit	3884353
VTA28 Generator Drive	3884342
VTA28 Marine	3884354
4A2.3 Low Speed Generator Drive (Heat Exchanger Cooled)	3884356
6A3.4 Low Speed Generator Drive (Heat Exchanger Cooled)	3884357
N14 Automotive CELECT 460E	3884359
V903 Construction	3884361
6CT8.3 Marine	3884360
6CTA8.3 Marine	3884333

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