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New Distribution Center Opens with Daily Deliveries to Branches

JASPER officially opened its 100,000 square foot Distribution Center at its Crawford County Facility in January. This expansion is the new home of the company's product inventory, along with the docking and staging areas needed to ship the remanufactured drive train components to branch warehouses **daily** across the country.

Mike Schwenk, Vice President of Manufacturing, says the Distribution Center presently has the space to store approximately 12,000 finished units. In the future that number could grow to 24,000. Schwenk says trucks can be loaded for shipment in one of 18 docking doors located on the South side of the building.

Schwenk says JASPER has incorporated state of the art technology, to the shipping and receiving functions. "Bar-code scanners have been placed above the docking doors," says Schwenk, "So as finished product is delivered from the Jasper Facility, they are scanned automatically as they go through the doors. The scanning information tells the forklift drivers which

"Probably the biggest thing is to maintain a very accurate delivery ticket for shipment, and be as responsive as we possibly can be to the customer."

truck that product needs to be loaded onto, or whether it's for storage purposes." Schwenk says the product is scanned again whenever it is loaded onto a truck for shipping. The scanner transfers the product information onto the driver's delivery ticket.

The new Distribution Center will allow for more accurate shipping, and improved delivery times. "Probably the biggest thing is to maintain a very accurate delivery ticket for shipment, and (be) as responsive as we possibly can to the customer," he said.

Construction on the Distribution Center started in Spring of 1999 and was completed in mid-November. "The decision to build at Crawford County was based on the fact as we continue to grow, this facility will reduce the lead time to our branches along with the increasing number of deliveries," says Schwenk.

(Continued on page 5)



The new distribution center incorporates state-of-the-art technology, such as bar-code scanners mounted above the dock doors to aid in determining where the product is to be placed upon arrival at the center.



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Carl's 4 Wheel Drive & Performance Center

Carl's 4 Wheel Drive and Performance Center in Bartelso, IL has been using JASPER products for the past 8 years. Carl's specialty is the sale and installation of accessories for four-wheel drive vehicles. But the secondary side of the business is general auto and truck repair, from tune-ups to engine replacement, and transmission and differential service. They cover automotive services including high performance engines and parts, plus exhaust work and wheel alignments.

The shop, owned by Carl Huels, started with 3 bays built on the back of his family's farm property in 1978. Carl later bought a 7 1/2 acre site a mile from the farm, and built the current building at 1509 Carlyle Road to handle the company growth.

The grand opening of the new building was June 1, 1987. Carl's 8,000 square foot location includes 2,000 square feet of showroom space, and 8 service bays. The facility has 4 floor lifts and a portable strong-arm lift, an alignment rack, a brake drum and rotor turning machine, an exhaust tube bender, wire welder, automotive diagnostic equipment including scanners and meters, a tire machine, and computer balancer.

There are 9 employees at the shop, and the technicians are ASE Certified. Carl encourages his

employees to take seminars and training when offered and available. He also encourages his employees to continue their academic education.

Specializing in four-wheel drive service and accessories in a small town of 550 makes Carl's unique enough, but the amount of business they do is truly unique. They had to add two storage trailers behind the building to accommodate parts storage needs. Carl plans to add 4,000 square feet to the front of his building to increase the showroom and parts warehouse size.

Carl's 4 Wheel Drive & Performance sells an average of 30 to 40 JASPER products a year, offering engines, transmissions, differentials, and transfer cases. Carl's commitment to make his customers feel important is refreshing nowadays. And Carl uses quality JASPER products because of their warranty, and because it's a brand name well established in the customer's mind. Carl feels JASPER cares about its reputation as much as he does his.

Carl's business strategy is to keep the shop a pleasant working environment, and to keep it a pleasurable place to do business for his customers. He wants to keep growth realistic, not egotistic.



Carl's 4-Wheel Drive & Performance Center in Bartelso, IL, caters to the off-road enthusiast by selling and offering installation, too, on four wheel drive parts and accessories. In addition, they are also a general auto and truck repair shop featuring JASPER remanufactured engines, transmissions, differentials and transfer cases.

High-Tech Gauging

(Part one of a two part series)

From hands & feet to electronic micrometers

By Bob Dalton
JASPER Research and Development
Gauging Engineer



The Greek philosopher Zeno purposed the idea that between any two points in space, there is a distance divisible by an infinite number of progressively smaller units. Roughly 6000 years ago, mankind came to realize this, and the field of measurement was born. Like most human inventions, measurement was born out of necessity - specifically, the necessity to record and relate information about products, places and parcels of land. At its inception, measurement was based on the measuring instruments readily available to everyone - the parts of the body. This is still largely discernable from the names of some of the units, such as: foot, hand, and span. Other units, still used today, are based on these body part measurements. Although, their names are not as obvious, for example: yard, cubit, and inch. The yard was the distance from the tip of your nose to the tip of your middle finger. The inch was the distance across the width of the thumb. The cubit, though not used much today, was the distance from the bent elbow to the tip of your middle finger, or approximately one-half a yard.

All of these units of measurement obviously had varying degrees of accuracy associated with their relative size, and likewise had

different applications. The one common factor they did have was a serious lack of conformity to a given standard. My hand and your hand may be substantially different in size. Therefore, if I were buying a horse from you, we would probably get two different size horses. And by the way, horses are still measured in “hands” to this day.

Accuracy and consistency obviously have taken a quantum leap forward. A standard for our purposes is an established rule, or benchmark, by which information is judged. This means that when the distance between two points is specified in a particular number of units, that distance will always mean the same thing to whoever encounters it. Standards are now set to a length of a lightwave from a particular color and type of light. To date, this has proven to be sufficiently stable as a standard. There are two predominant systems of measure; the English System, used in the United States, and the Metric System, which is used throughout the rest of the world.

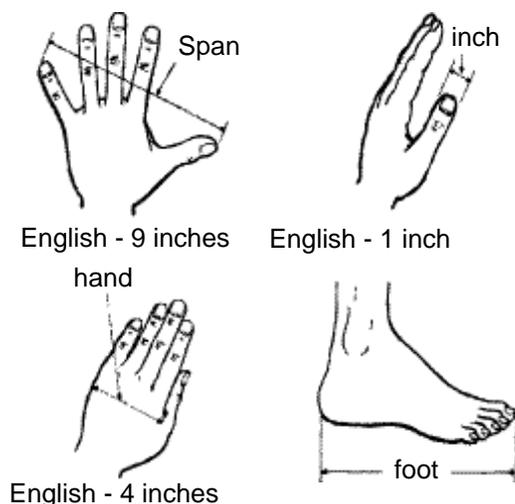
Enough on the history lesson. At JASPER, we use several methods of measuring the distances, or the lack of, between two points. Micrometers and calipers are used primarily. These are read on a

Vernier Scale. Most of the micrometers used at JASPER are of the mechanical type, and calibrated to a tenth-thousandth of an inch. JASPER also utilizes many electronic micrometers, and these are also calibrated to a ten-thousandths of an inch. The frequency of calibration is determined by use. Though most are calibrated at least quarterly, areas like the Quality Control, Crankshaft, and Camshaft departments are generally more frequent. Depth micrometers and depth gauges, both mechanical and electronic, are also used. These are calibrated to certified gauge blocks.

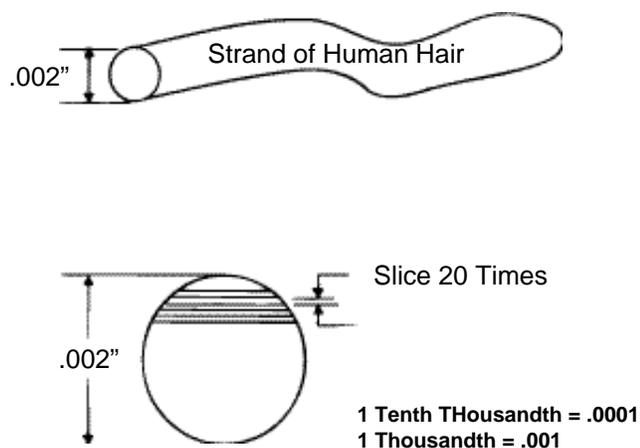
Bore gauges are used extensively throughout the JASPER facility. These gauges are used to measure cylinder bores, valve guides, line bores, cam bores, and are used to check interference fit. Most are calibrated to a ten-thousandths of an inch, and set to a certified setting ring.

JASPER also utilizes several specialty gauges throughout the plant, some that were even invented in-house. As you can tell, the accuracy of measuring any particular item has changed over the course of time, and the tolerances keep getting smaller, leaving less room for error.

“Body” Measurements



How Small is “One-Tenth Thousandth” of an Inch?



Mechanics or Technicians?

Education is an essential key, even for the customer

Where are tomorrow's automotive technicians going to come from? The answer is uncertain at this time, because the education that person receives will determine their future.

"The automotive industry has turned into a technical field," says Terry Ebert, Adviser to the Service Department at Jasper Engines & Transmissions. "Everything is controlled electronically today. And before that engine or transmission can function, you have to have the ability and understanding of electrical theory to troubleshoot before you can even get to the mechanical side of it."

The person that used to be known as a 'mechanic' a few years ago is now known as a 'technician' because of the vast electronic controls in the modern automobile. And Ebert says that's why the field is getting tougher...

"In my opinion, mechanics used to be earmarked as grease monkeys, a term not accurate in the past and certainly not today. The person might turn wrenches, but they are technicians, and they have to diagnose and figure out problems."

But Ebert says a lot of times, potential technicians are steered away from automotive careers in the schools because of the grease monkey stigma. "You want to go to school, go to college, and work on computers," he says. "But in reality, if you're working on a car, you're not just working on one computer, you're working on a various number of computers that control the car's functions."

Ebert says Jasper Engines & Transmissions is in a unique position because of the size of the company, and the number of fields the company has experts in. "If an individual is training to become a transmission diagnostic person, he will work with our transmission quality control people, our engineers (in the Transmission Department), and he will also go to electrical classes."

Independent garages and dealerships send their people to school on a regular basis. And as electronics evolves in the automotive industry, it requires more schooling, and more specialized tools. And Ebert says the end result is the customer pays for it because technicians must raise their rates.

"People have to get past the mindset that since technicians have all these computers, they can hook the car up and instantly come up with a diagnoses of the problem. Keep in mind, computers are only aids; they *help* us with the diagnoses. The technician operating it has to be able to take that information, interpret it, and *then* start troubleshooting individual components to find the problem."

Ebert says the end consumer must be educated and understand why they are getting charged for work technicians do. "You don't question a doctor bill," says Ebert. "But they really question a mechanical bill. People have to understand what is involved in fixing today's cars."

In the future, Ebert believes automobiles will still have some mechanical components. But he adds more and more engine controls will be electronically monitored to help with fuel economy and better emissions controls. "The technician's task of problem solving is going to get tougher," Ebert says. "We must do our part to encourage young people today to enter our field."

Under the Hood Tech Tips

No Overdrive Shift on Isuzu Trooper

Problem: Isuzu Trooper auto transmission will not shift into overdrive.

Solution: First check the temperature gauge to be sure that the engine temperature is in a normal mode. If the engine temperature is not getting to specification, the thermostat may be stuck in an open position. The automatic transmission uses a temperature sensor to activate the overdrive. Therefore, a stuck thermostat may be the cause of the

vehicle not shifting into overdrive. Simply changing the thermostat will repair the problem.

Antifreeze Odor Inside Cars with GM 2.3L Engines

Problem: An odor of antifreeze inside the car and a low water level may be noticed on GM 2.3 liter engines.

Solution: Do not automatically think the heater core is bad. Actually, the fresh air for the air conditioning

sucks the fumes into the car. After four to five years of wear on the engine (regardless of the total mileage on the engine), the cylinder head gasket may leak out the back of the engine on the #1 cylinder. If the surface is flat, the head can be cleaned and reassembled. If the head is warped, it must be replaced.

Source: Nashville Automotive Report Jan. 2000

Distribution Center, contin - ued from page 1

The Crawford County facility is along Interstate 64, and allows for the best access to all branch locations. The building's existing design allowed for easy expansion for the Distribution Center.

As for the space initially used for inventory at Jasper, Schwenk says each area will be used for different resources. The majority of the space will be used for manufacturing.

For Sale from Jasper Motorsports:

Two (2) Laughlin 3/4 drop snout stock cars for use on intermediate and short tracks; good show cars too. \$25,000 less motor and transmission. \$40,000 complete. Road Course car, fully loaded: \$25,000; race ready: \$40,000. Call Jeff Cheatham (704) 662-6222.

Women's Board Hits Pay Dirt with Auction

Even by Las Vegas standards, the Car Care Council's Women's Board (WB) was the big winner after their first annual silent auction, a companion event of the Women's Automotive Communication Awards. The auction/presentation brought out industry representatives who bid on over 30 items.

"We were thrilled with the response," said Donna Wagner, WB Director. "Companies are starting to realize the impact of the women's market on their bottom line. They want to support our mission, which is to educate women about automotive maintenance and careers."

Donated items ranged from a Bose radio to a bomber jacket to Indy 500 tickets. Contributors included: American Woman Motorscene, Automotive Aftermarket Industry Association, Cahners Publishing, Chicago

Rawhide, Conti Racing, Dana Engine Controls, Federal-Mogul, Jasper Engines & Transmissions, Raybestos, LPA Consulting, Lyn St. James Enterprises, Maximum Graphics, Moses Automotive, National Institute for Automotive Service Excellence, Spicer Professional Chassis, Robert Bosch, Women With Wheels, and Women Motorist.

Proceeds aid the WB in their efforts, including a new virtual mentoring web site www.carcare-council.org/mentoring.htm. For more information on the Women's Board call Donna Wagner at 1-800-466-5343 or e-mail: DonnaW@carcarecouncil.org.

Editor's note: Jasper Engines & Transmissions is pleased to be a member of the Car Care Council and to support their work, and the work of the Women's Board.

Do You Remember What You Read?

So you say you read the JASPER News & Updates from cover to cover? Now you can see how much information you've retained after you've read it. After you have answered the questions, simply clip out the coupon and send it to us. Each month we will take all the correctly answered coupons and randomly draw one out. The winner will receive a JASPER racing hat! Send to: **Jasper Engines & Transmissions • P.O. Box 650 • Jasper, IN 47547-0650**

Name _____

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JASPER News & Updates - March Issue

1. How big is JASPER's new distribution center? (In square footage) _____
2. When was the start-up date of "Carl's 4-Wheel Drive & Performance Center"? _____
3. Who was "Zeno"? _____
4. A person once referred to as a "mechanic" is now considered a "technician." T or F _____
5. What are the two types of charge air coolers? _____



Charge Air Coolers

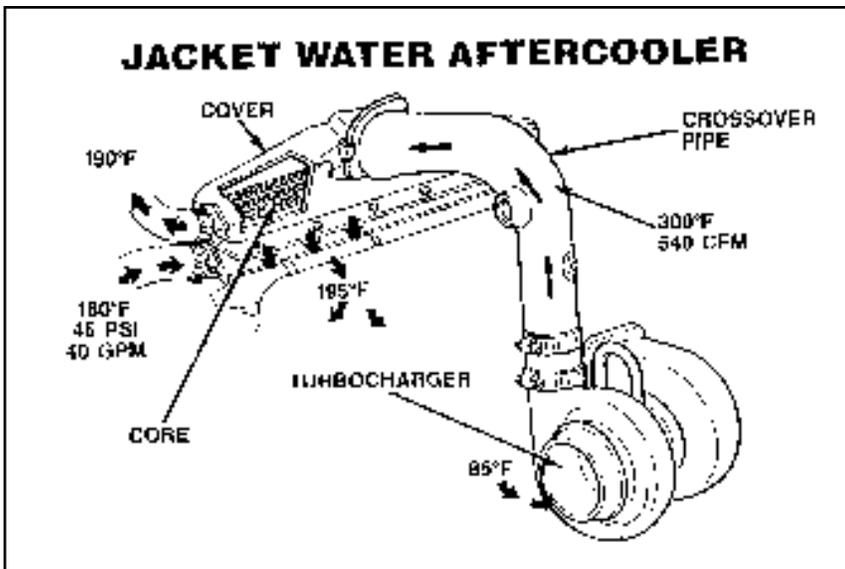
Also known as intercoolers and aftercoolers

The term intercooler and aftercooler are interchangeable descriptions used by engine manufacturers. The word 'inter' means in-between the turbo and the engine intake manifold. The word 'after' means that a cooler is located after the pressurized air leaves the compressor housing of the turbocharger. Both words indicate that the pressurized air leaving the turbo is cooled by directing it through a cooler system.

Charge air coolers are used on heavy-duty trucks, turbocharged passenger cars, marine, and off-highway applications. Charge air coolers provide increased engine power, improved fuel economy, reduced engine thermal stress, and allows the engine to meet emission laws. It is no longer possible to operate a heavy duty diesel engine in an on-highway truck and cost effectively meet emission requirements without the use of a charge air cooler.

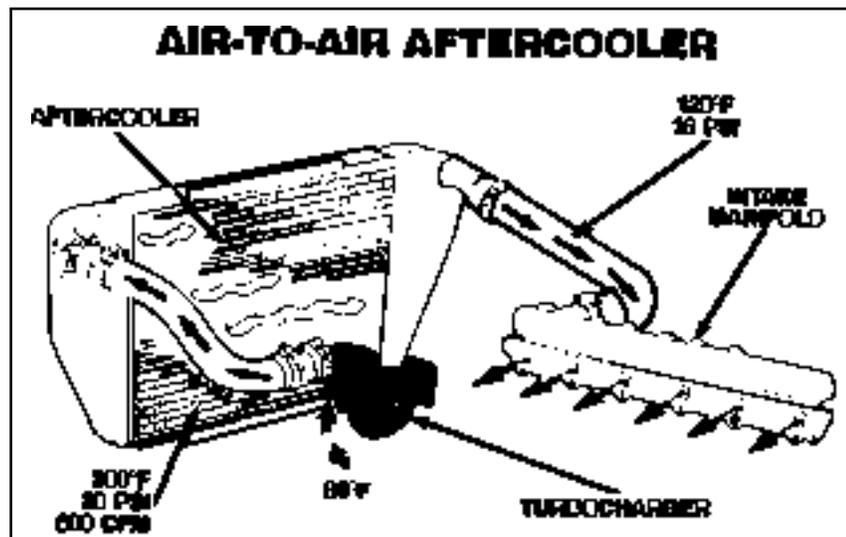
There are two types of charge air coolers. J.W.A.C. which stands for Jacket Water AfterCooled (see figure 1). And A.A.A.C. which stands for Air to Air After Cooled (see figure 2).

(Figure 1)



The jacket water aftercooled unit is engine mounted and uses water from the engine's water jacket to cool the heated air that leaves the turbocharger. The problem with this type of aftercooler is that the air passing through the core can never drop below 190 degrees because this is the temperature of the water in the water jacket, and the cooler cannot operate at 100% efficiency.

The air to air aftercooled unit is chassis mounted in front of the radiator. It uses ambient air



(Figure 2)

temperature to cool the heated air that leaves the turbocharger. Ambient air temperature will always be cooler than water jacket water temperature. Even when ambient air temperature exceeds 118 degrees, it is still far better than the jacket water aftercooler.

Jacket water aftercoolers are more suited for off-road equipment and farm machinery due to a lack of air flow through the front of the equipment.

Air to air aftercoolers are

constructed of two manifolds and a core which has hot fins and cold fins similar to a radiator. Hot compressed air, 300 degrees or higher at full load conditions, passes through the core of the aftercooler where the heat transfers from the hot fins to the cold fins. When the air leaves the aftercooler its temperature drops to approximately 120 degrees. Some late air to air aftercoolers are capable of cooling hot compressed air from 500 degrees down to as low as 110 degrees, nearly a 400 degree drop, and takes place in a fraction of a second. That's compared to a radiator which needs to have only about a 30-40 degree drop.

(continued on page 7)



(air coolers continued)

Air to air aftercoolers must be kept clean both inside and out to ensure proper heat transfer. Use a brush on the front of the cooler to remove debris. Get behind the cooler and blow out dirt and debris with compressed air. Keeping the air cleaner properly serviced will keep the inside of the cooler clean. But if a turbocharger has failed, large amounts of oil can enter the cooler core and can cause engine overspeed if a replacement turbo is installed without cleaning the air to air aftercooler core.

Before a replacement turbo is installed, the air to air aftercooler must be removed for proper cleaning. Lay the cooler down flat and fill it half full with mineral spirits. Then rock the cooler to distribute the solvent. Be careful not to leave the solvent in for more than ten minutes. DO NOT use a caustic solution or steam to clean. Drain out the solvent and the debris. Make sure all solvent is removed, and is fully evaporated from the cooler before mounting to the vehicle. Use tape or plastic caps to cover the openings while cooler is off the vehicle.

Air to air aftercoolers are not designed to be 100% leakproof. Slight leaks won't hurt due to the large quantity of air produced by the turbo.

To determine if the air to air aftercooler leaks are excessive, the cooler can be pressurized using special adapter plugs for the air inlet and air outlet connections (see figure 3). Fit a 0-60 psi gauge and an open/close air valve, preferably with an adjustable air pressure regulator to regulate the air pressure going into the aftercooler. Adjust the regulator to 25 or 30 psi, depending on the manufacturer of the aftercooler, and then shut off the valve. Then watch the gauge between the shut-off and the aftercooler. Check the amount of pressure drop in 15 seconds. Use the chart below to determine acceptability:

Caterpillar	5 psi drop @ 30 psi
Detroit Diesel	5 psi drop @ 25 psi
Cummins	7 psi drop @ 30 psi
Freightliner	4 psi drop @ 30 psi
Mack	5 psi drop @ 30 psi
Kenworth	4 psi drop @ 30 psi

These leak rates are only a mere fraction of the air passing through

the aftercooler, and will not affect boost pressure or performance.

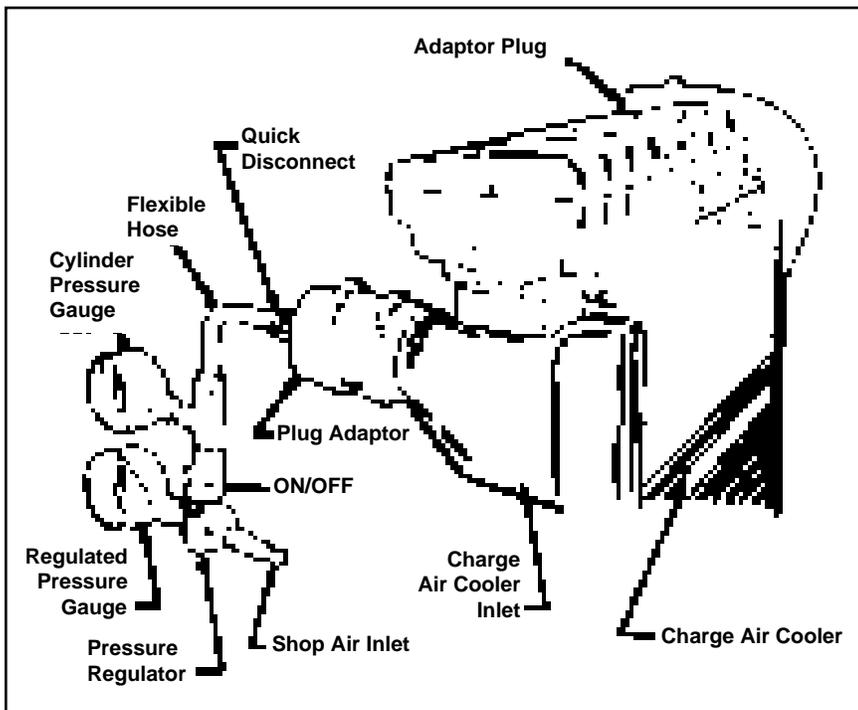
Symptoms of an aftercooler that is leaking excessively are: low power, low torque, black exhaust smoke, high fuel consumption, high exhaust temperatures. These symptoms could also be caused by a restricted air filter, turbo problems, electronic engine control system problems or fuel injector problems. Also check inlet manifold gasket and hoses, and hose clamps for possible cause of air leaks.

Air to air aftercooler failure can be caused by: excess twisting and vibration, abrasion from a hose, wiring harness etc., rubbing against the fins, or a foreign object puncturing the aftercooler core.

To reduce twisting and vibration, flexible inserts should be used between mounting brackets and chassis. Don't allow anything to vibrate against the aftercooler, as this could lead to a leak if it wears through.

Winter fronts are not recommended because they block the flow of air through the aftercooler and could allow the superheated air to enter the intake manifold of the engine. If winter fronts are used, be sure to allow sufficient air flow through the aftercooler. Even in extremely cold weather conditions, a minimum of 20 percent of the aftercooler core must be open to air flow. Winter fronts should always be completely removed when operating in ambient air temperatures above 40 degrees Fahrenheit.

(Figure 3)





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