

This month's vehicle focus is agricultural equipment technology.

by David Alexander

Steyr pushes premium features

Steyr's European development center for tractors between 40 and 170 hp (30 and 127 kW) is located in St. Valentin, Austria. The latest 9000M tractors to emerge from this CNH plant offer more than just a facelift. The company's mid-range, 60 to 71 kW (82 to 96 hp), series offers many new features previously available only on its bigger brothers, and the engines now meet Tier II emissions standards.

Powering the range is the same four-cylinder turbocharged engine from **Sisu Diesel** used in past models, but now featuring a **Bosch** fuel-injection pump to meet new emissions standards with no sacrifice in power or performance. With maximum torque achieved at 1300 rpm and maximum power at 2100 rpm, the new 9000M line-up has received a 39% torque increase to ensure the tractors provide extra pull when required.

Where cold start performance is critical, a new grid heater is available. Situated between the turbocharger and the air inlet manifold, this system ensures that even at temperatures of -25°C (-13°F), the 9000M can be started. A 120-A alternator is specified when the grid heater is fitted and is also available for other applications where additional electrical power is required. Front hitches with PTO are optional, and can be either axle or chassis mounted.

EHR (electronic hitch response) is standard, as is dynamic ride control to eliminate implement bounce when traveling at speed. For farmers who do not need draft control, the new ELR system is available. It is based on the EHR system but without draft control, and is said to be easier to use and more sensitive than the mechanical system it replaces. The front hitch, where fitted, is easily managed using EFH (electronic front hitch) control.

Oil delivery of up to 86 L/min (22.7 gal/min) for the main hydraulic systems is available, with a separate 34 L/min (9 gal/min) pump taking care of the transmission, lubrication, and command circuit. These hydraulics provide a maximum lift of 4900 kg (10,800 lb), with up to 2500 kg (5500 lb) of lift available at the front hitch. The rear PTO is a four-speed with soft start, supplying between 430 and 1000 rpm. The front PTO supplies 1000 rpm.

Transferring power to the wheels—two- or four-wheel-drive in the 82-hp (61-kW) Steyr 9080M and four-wheel-drive only on the 90 and 98 hp (67 and 73 kW) 9090M and 9100M—is the



The Steyr 9100M is powered by an engine from Finnish supplier Sisu Diesel.

Steyr Power-2 transmission. With four speeds in two ranges and two-speed powershift, it gives a total of 16F x 16R gears. An alternative 16F x 8R Steyr Synchroshift transmission is available, which also can be specified with a crawler option for a total of 32F x 16R speeds.

The 9000M has a new hood and cab roof, which follow the design adopted by the bigger Steyr tractors. As well as featuring a new lighting arrangement that improves comfort for night work, the new hood provides a greater air intake area to ensure that the engine keeps cool in even the toughest working conditions.

Inside the cab, improvements include a new instrument cluster, a central light panel, and a cab internal mirror adapted from Steyr's top-of-the-range models.

Sound proofing measures, including the use of curved glass to reflect outside noise downward, rubber-element cab mountings, and increased structural stability to minimize vibration, all contribute to minimizing noise levels in the cab.

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Bigger windrower from Hesston

Bigger isn't always better, but according to **Hesston**, the new 9000 Series S.P. (self-propelled) windrowers are bigger and better. The machines are equipped with Tier II engines that deliver more power for smoother crop flow-through. A wheel-mounted drive system allows for more efficient power transfer.

The windrowers were designed for a farmer who harvests a hay crop three or four times a year, as well

Danfoss hydraulics. The all-new hydraulic system increases reliability and reduces sound levels. Planetary gears with direct drive to the wheels not only improve power transfer efficiency, the new final drive also reduces potential maintenance. The planetary drive with its lower ratio delivers better torque for pulling up hills.

The wide Hesston cab includes a fully adjustable seat-mounted control



The Hesston 9000 Series self-propelled windrowers have the engine power and hydraulics needed to handle heavy, high-yielding hay crops quickly and smoothly.

as the custom harvester with a daily schedule to maintain throughout the season.

A 185-hp (138-kW) intercooled **Cummins** engine powers the 12- and 15-ft (3.6- and 4.6-m) rotary disc headers of the 9260. Extra power is vital to rotary disc headers, which can quickly bog down in heavy alfalfa if underpowered. The 9260 is also available with 14-, 16-, and 18-ft (4.3-, 4.9-, and 5.5-m) dual-sickle auger headers, as well as 18- to 30-ft (5.5- to 9.1-m) center-delivery draper headers, and 22- to 30-ft (6.7- to 9.1-m) double-swath headers. Different crops require different headers, and the 9260 is designed for quick and easy change-over from disc to auger or draper headers.

The 9230 with turbocharger and the 9240 offer 85- and 110-hp (63- and 82-kW) engines, respectively. Both models are designed for use with the same headers as the 9260. Like the 9260, both the 9230 and 9240 are designed to swap headers quickly and easily.

Productivity is also improved with the addition of long-life **Sauer-**



The Cummins engines that power the Hesston 9000 series are Tier II compliant.

console, tilt-pivot steering post, and unrestricted forward visibility with 73 ft² (6.8 m²) of tinted glass. Heating and air conditioning are standard with the 9200 Series cabs. Comfort is also enhanced with the addition of new **Grammar Air Ride** seats. The auxiliary seat has been redesigned for more comfort and support. Other changes include new warning light displays for engine stop, service, water, fuel, and wait-to-start sensors. All three units feature cab-monitored and adjusted hydraulic-header flotation.



Fendt gets smarter

Innovative technology, efficiency, and heavy-duty stability are hallmarks of the Model 818 **Fendt** tractor introduced last year and the new 130-hp (97-kW) PTO Fendt 815 and 145-hp (108-kW) PTO Fendt 817. The cast-iron-framed Fendt 800 Series tractors at 16,000 lb (7260 kg) bare-chassis, or 21,000 lb (9525 kg) field-ready, are built to handle big loads.

The Vario continuously variable transmission (CVT) provides an infinite number of speeds from 0 to 32 mph (0 to 51 km/h).



The Fendt 818 Series delivers 160-hp (119-kW), and an intelligent Tractor Management System (TMS).

According to Fendt, it was the first company to introduce independent front-end suspension with all-wheel drive, to ensure that drive wheels always stay in contact with the ground. Fendt was also the first to introduce CVT stepless transmissions, using a combination of hydrostatic and mechanical components to eliminate gears and the power gaps they create.

With the introduction of the TMS (Tractor Management System), the communications link between engine and transmission is complete for maximum fuel efficiency and operator/tractor productivity. The operator can use either a foot pedal or the joystick on the armrest console to increase ground and engine speed with or without TMS. If TMS is activated, it automatically optimizes engine and transmission operation to meet the load requirement.

Variotronic Headland Management System (HMS) allows a Fendt 800 Series operator to carry out up to 13 different repetitive functions such as speeding up or slowing down engine or ground speed, activating or deactivating PTO, three-point hitch, hydraulic valves, differential lock, and others. Once the operator has recorded a series of functions, the sequence can be replayed at a push of a button in order, and to the same precise parameters. A tool bar for instance, can be programmed to lower at the same

distance into the field and to the same depth while the tractor speed resumes.

HMS can record, store, and replay up to 16 different sequences with more than 200 different parameters. All tractor systems can be monitored on the color terminal mounted on the control console armrest. Sequences can be named for easy recall at a later time. Even without TMS activated, the operator can pre-set

the PTO and three-point hitch controls for automatic activation and control via a rocker button on the joystick. The joystick is the central controller for all transmission and engine functions including starting/stopping, speed, and forward/reverse travel, and it also controls up to four hydraulic remote valves, lift and lower of the three-point hitch, and stopping the rear PTO.



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Two new from AGCO

The new **AGCO** RT tractors have a choice of transmissions that includes PowerMaxx CVT (continuously variable transmission). RTs equipped with CVT will go from 0 to 32 mph (0 to 52 km/h) while constantly adjusting for the most efficient combination of engine speed and transmission ratio. The new design allows a tighter turning radius (up to 20% smaller than previous models), while improvements in front axle and cab suspension have made life easier for the operator.

The RTs incorporate a 6.7-L, six-cylinder, liquid-cooled **Cummins** engine as part of the frame itself. This structural design helps to reduce engine sound levels, while the wastegate-turbocharged engine uses fuel more efficiently. Like all AGCO

tractors, the model number indicates PTO power. The new RTs are available in 100, 118, 135, and 150 hp (75, 88, 100, and 112 kW) PTO.

The PowerMaxx CVT is an option on all RT models equipped with power front axle (PFA). The new transmission option allows the operator to increase or decrease ground speed simply by pushing a speed lever on the console forward or back. Two preferred forward speeds can be set with console controls. Once set, the speeds are shown on a digital screen on the dash display. Another feature is foot pedal control, which allows control to be shifted from the armrest speed lever to a floor throttle. The Power Control shuttle lever mounted on the left side of the



AGCO RT tractors are available with front suspension, cab suspension, and PowerMaxx CVT (continuously variable transmission).



AGCO GT tractors have a turning radius of 10.5 ft (3.2 m).



steering column controls speed and direction. Shuttle speed forward and reverse can also be preset. Activation of the power shuttle will automatically slow, stop, or reverse direction of the tractor, and then accelerate to the programmed speed shown on the dash display.

RTs with two-wheel drive or PFA are also available with the auto Quadrashift 32F x 32R transmission, which combines four-speed powershift convenience with eight-speed synchromesh economy. Automatic powershifts and speed matching make fieldwork and transport more economical in all applications. The electronic control system regulates clutch engagement to shift smoothly and reduce shock loads to the drivetrain.

A completely redesigned cab—standard equipment on all new RTs—brings a new level of comfort to operation. Models equipped with HydraMaxx front-axle suspension and AirMaxx pneumatic cab suspension are even more efficient, stable, and comfortable. The new cab is quieter than before, with a maximum interior sound level of 71 dB.

Other new options available with the new cab include climate control. The cooling/heating system maintains the temperature at preset levels, and power-adjustable mirrors with defrost add to operator convenience and safety.

The company has also just introduced its 45- to 73-hp (33- to 54-kW) PTO AGCO GT tractors. Whether two-wheel drive or four-wheel drive, cab

or platform configuration, the GT series includes the GT45, GT55, GT65, and GT75.

GTs feature three- and four-cylinder engines with SynchroShuttle transmissions and pushbutton controls for PTO, all-wheel drive, and differential lock. The GT's three- and four-cylinder engines have fuel injectors for each cylinder that helps ensure more precise fuel control for a

more economical burn and reduced emissions. The streamlined design also allows easier access and simpler maintenance procedures.

The SynchroShuttle transmission with fully synchronized four-speed gearbox and four speed ranges, provides 16F x 8R speeds. To reverse direction, the operator simply depresses the clutch and switches the shuttle control, without having to come to a full stop.



The AGCO GT's three- and four-cylinder engines have a fuel injector for each cylinder to provide precise fuel control for economy and reduced emissions.

AGCO GTs, whether platform or cab equipped, feature a large, open, flat platform. Mechanical controls for engaging all-wheel drive, differential lock, and the PTO have been replaced by electro-hydraulic controls on the GT.

Operator control is also enhanced with the front-wheel wet disk brakes that are standard on all-wheel-drive models. Individual front-wheel brakes better handle braking loads to enhance driver control when traveling at top road speeds of 25 mph (40 km/h).

The three-point hitch offers a lift capacity of 3520 lb (1600 kg). Top-link draft sensing provides better control for mounted implements, while position control helps ensure consistent implement depth settings.

The 21.8 gal/min (82.5 L/min) hydraulic flow provides hydraulic power for combinations of implements such as loaders and rear blades. The two optional remotes can operate mounted and trailing implements.

Deere launches lots of new stuff

Combines, sprayers, balers, tractors, you name it, and **John Deere** was launching an updated product in Fall 2003. With the limited space available, here are some of the highlights.

4920 sprayer

Building off the platform of the popular 4710 sprayer, John Deere's new 4920 self-propelled sprayer features a new 120-ft (36.6-m) spray boom, 300-hp (224-kW) engine, 1200-gal (4540-L) solution tank, and 20-mph (32-km/h) top spray speed.

The new spray boom is made from high-strength material. The triangular design of the boom features round tubing and laser-cut support pieces for consistent fabrication and the strong welds. The 120-ft (36.6-m) boom will be the only option for the 2004-spraying season—other boom sizes will be available in 2005. The boom is capable of spraying in folded positions of 70- and 90-ft (21.3- and 27.4-m).

The new Auto-Boom folding feature, operated by pressing one button and a foot-switch, will automatically fold or unfold the boom in a matter of seconds.

The Solution Command System (SCS) is an automated loading and rinsing process that saves time by simplifying the filling and cleaning procedure. No more turning valves or climbing ladders to rinse the solution system. Electric and air-actuated valves are controlled by the SCS to ensure optimal settings when loading and rinsing.

The 4920 sprayer has a new electronically controlled drivetrain. This automatic four-wheel-drive system features two hydrostatic pumps that drive four bent-axis wheel motors and four final drives. Top transport speed is 35 mph (56 km/h). Slip Control manages slippage of all four wheels

by diverting power to other wheel motors until the slipping wheel regains the same speed as the other wheels.

GreenStar guidance systems are fully compatible with the new 4920 sprayers.

7020 series tractors

Deere has introduced three new models of 7020 tractors with new styling, cabs, frames, and engines. The 7920, rated at 170-hp (127-kW) PTO, is the most powerful 7000 series tractor ever built.

The new tractors feature John Deere PowerTech emissions-certified six-cylinder engines with high-pressure common-rail fuel injection: 6.8-L on the 7720, and 8.1-L on the 7820 and 7920. A high-pressure pump delivers pressurized fuel on demand to ensure efficiency with the injection system independent of engine speed. The 8.1-L, six-cylinder engines feature full electronic engine management, and an air-to-air aftercooler.

There are several transmission options available on the new 7020 tractors, and all transmissions feature a left-hand reverser control. The 16-speed PowrQuad Plus Transmission is standard equipment on the 7720 and 7820 tractors. A single range lever, with top-mounted push-button electronic gear selector, allows for clutchless shifting within four ranges. The optional 20-speed PowrQuad Plus transmission delivers higher transport speeds—up to 25 mph (40 km/h).

AutoQuad Plus, available on 7720 and 7820 tractors, offers fully automatic shifting within each range. In the AutoMode setting, the tractor will shift up or down within a range to maintain engine rpm, to ensure efficient shifting regardless of the field conditions. Infinitely Variable Transmission (IVT) is



The Deere 4920 self-propelled sprayer comes with a 120-ft (36.6-m) boom.



The Deere 7920, rated at 170-hp (127-kW) PTO, is the most powerful 7000 series tractor ever built.



The sculptured-frame design of the Deere 7020 tractors allows the front wheels to tuck under the tractor for an improved turning radius at narrow tread settings.



The new 60 Series Combines are powered by 6.8-L, 8.1-L, or 12.5-L John Deere PowerTech engines.

optional on the 7720 and 7820 tractors, and standard on the 7920 tractor.

The new cab has 25% more interior space than previous models. The Implement Management System (IMS) allows the operator to program multiple functions so they can be engaged with the push of one button. The industry-exclusive ActiveSeat, which adjusts up to 200 times per second to keep the operator level and comfortable, is available on all tractors equipped with high-transport-speed capability.

The chassis of the 7020 tractors has been redesigned for increased strength and reliability. The sculptured frame design allows the front wheels to tuck under the tractor for an improved turning radius at narrow tread settings.

Combines

The John Deere 60 series combines have been enhanced for more performance and new technology. A new fore/aft tilt-frame feederhouse is standard on all machines except the Sidehill combine. The 17° fore/aft tilt angle allows for proper positioning of the platform and ensures that the cutter bar runs parallel to the ground for all tire sizes.

A single-point header hook-up has been designed on the new machines. The electric and hydraulic connections and the feederhouse/header bottom latch pin engagement are now done with one motion of a lever. Hook-up time is reduced 75% according to Deere.

The new combines also feature a heavy-duty variable-drive feederhouse with greater capacity than previous models. Upper-variable-drive and lower-reverser-gear-case sheaves are now 50 mm (2 in) larger in diameter to provide more drive belt surface contact, which increases drive capacity and reduces friction heat. This feature is standard on corn 9760 STS and 9860

STS combines and an option on all other 60 Series machines.

The new 60 series combines are powered by 6.8-L, 8.1-L, or 12.5-L John Deere PowerTech engines.

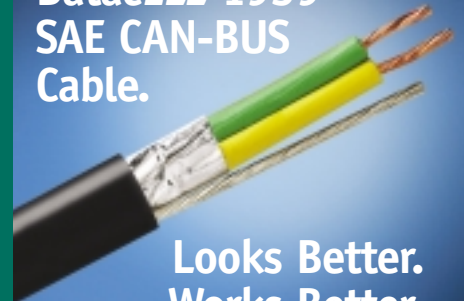
Adding to productivity is a new high-capacity unloading system. Delivering a 150% increase in the unloading rate versus previous models, the unloading system is standard on the 9860 STS and optional on the 9760 STS. The new system features larger-diameter grain-tank cross-augers that rotate slower in the grain-tank troughs. They move the grain more efficiently while reducing grain damage. The vertical auger has also been increased with a wider flighting pitch to move more grain with less steel contact.

TouchSet hydraulics are standard on all STS combines, using an independent control valve to enable the operator to have infinite variable control over the feederhouse and header raise-and-lower rates.

The GreenStar Harvest Monitor system includes a new state-of-the-art moisture sensor located at the top of the clean grain elevator in the grain tank.

All 600 series flex cutting platforms feature the new HydraFlex float system. This hydraulic float system allows the cutterbar to maintain a consistent cutting height regardless of ground conditions. A higher ground speed is possible compared to conventional mechanical float systems. Hydraulic cylinders attach to the cutterbar and improve flotation over uneven ground conditions. Optimal cutterbar float pressure can be set according to ground conditions. The operator can adjust float pressure on-the-go without affecting the cut height. To lock out the flex platform for rigid operation, the operator simply increases float pressure to the maximum setting. Mechanical lock-out brackets are available for extended operation.

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Claas shows its class

The selection of Vario cutterbars on the new **Claas** Lexion 500 series that replaces the 400 series, now includes working widths up to 9 m (29.5 ft). When working grain, the Vario cutterbar can be adjusted continuously as much as 100 mm (4 in) shorter or 200 mm (8 in) wider. When harvesting rapeseed, the cutterbar can be moved 500 mm (20 in) forward, saving the setup time required for other equipment. A completely new feature is the cutterbar brake that can bring even large cutterbars to a full stop in a fraction of a second, practically eliminating the consequential damages of foreign object intake.

The Laser Pilot, the automatic guidance system for precision travel along the cutting edge, also offers new features. Up to now, the electro-optical sensors were available only for the left side of the cutterbar. Now the Laser Pilot is available for mounting on the right side as well—a big advantage for areas that cannot be divided into sections.

Two features of the new Lexion 500 series distinguish it particularly for threshing and separation. One is the new concave



The power of the Claas Lexion 580 increased from 412 to 430 hp (307 to 320 kW) compared to the 480 it replaces.

adjustment for models 570 and 580, which features parallel guidance of both sides of the concave via a mechanical coupling rod, with the concave gap set using a single screw adjustment.

The Lexion 570 allows the separation area of the rotary sieves to be varied from the operating cabin. Particularly during the dry hours of the harvesting day this feature can significantly reduce the load on the cleaning system and lead to increased performance.

Bigger grain tanks save valuable hours and minutes during the critical phase of harvesting, and the combines have significantly more grain tank capacity, holding between 7300 and 10,500 L (260 and 370 ft³).

Choosing short or long straw is simple with the Lexion 580. With the press of a button, the operator can adjust the standard-equipped straw chopper to fit the intended use of the straw. Both spreader fans distribute the sieve pan residuals of chaff and straw over the entire width of the cut, which benefits subsequent tilling, pest and weed control, and fertilization.

The Lexion 570 uses a Special Cut II chopper for straw handling, featuring closely set knives sharpened on both sides and a cross cutter and cutting comb, which, together with the new pivoting grater unit, ensure optimal quality of the chopped material. The new radial distributor spreads the material uniformly and precisely to achieve reliable lateral distribution up to 7.5 m (24.6 ft).

The Lexion 570 and 580 achieve performances previously obtained only with self-propelled field choppers, claims Claas. The rotor units are equipped with new optimized engines from **DaimlerChrysler** and **Caterpillar**, which not only offer large reserves of power—for example, the Lexion 580 provides a power boost of 50 hp (37 kW) if the speed drops from 2000 to 1900 rpm—they demonstrate improved fuel economy even under extreme loads, thanks to electronic engine control.

The power of the Lexion 510 increased from 196 to 220 hp (146 to 164 kW) compared to the 410 model, while in the Lexion 580, power increased from 412 to 430 hp (307 to 320 kW) compared to the 480.

The Vista Cab operating cabin offers much more room than previous models. Fully automated climate control ensures a healthy, comfortable atmosphere in the cabin. There is also plenty of space for drinks in the refrigerator under the passenger seat.

If threshing work continues after dark, a new lighting system provides for proper illumination wherever it is needed.



The rotary technology in the Claas Lexion Montana automatically compensates for lateral gradients up to 17%.

The front-end lighting now includes a state-of-the-art xenon lamp—the “Side Finder”—to illuminate the side areas of the combine harvester, useful in tight places and when turning. The Lexion 500 also has new reverse travel lighting and a movable working spotlight.

On steep slopes, the rotary technology in the Lexion Montana automatically compensates lateral gradients up to 17%, and when driving up or down slopes it raises or lowers up to 6% in the direction of travel, allowing the same performance on slopes as on level ground.

A multi-contour control (MCC) system and a new axle design contribute to a high threshing yield with low losses even in steep areas. The MCC regulates the pivoting frame and cutting angle adjustment as well as Auto Contour features. The pivoting frame at the feeder housing adjusts the cutterbar to the transverse tilt and the angle of cut to the front axle position, which ensures optimal crop flow to the threshing unit even under the most challenging slope conditions.

A four-wheel-drive option is available for the Lexion. With the flip of a switch, progress continues even under the worst ground conditions. The weight of the combine harvester can be distributed on the ground even better with a spring-cushioned track roller unit. The new Terra Trac track roller unit is fully capable of travel on public roads.



Case IH reintroduces the Farmall brand

In 1923, **International Harvester** (IH) filed patent applications for the first **Farmall** tractor, beginning the era of one of the most popular tractors in history. That same year, 22 tractors were hand built for field-testing and the name was trademarked. IH's Farmall introduced the tricycle-style tractor. The front wheels were set closely together, allowing them to fit between crop rows hence it became known as a row-crop tractor. Row-crop tractors continue to be one of the most popular agricultural tractor configurations.

The lighter design was complemented with a high power-to-weight ratio to build productivity. The Farmall's high rear-drive wheels and its narrow, crop-row-straddling front wheels defined tractor design for generations. The first agricultural tractors were designed for high-power tasks like plowing, but careful work such as cultivating still required horses for precision. The row-crop IH Farmall replaced the last horses on many American farms.

Unlike other agricultural equipment of the time, the Farmall was designed to drive a variety of implements and attachments, allowing farmers to add attachments rather than purchase separate machines. **Case IH** signature

red paint was first introduced in 1937 on Farmall tractors to promote safety because so many were on the roads.

Versatility, performance, and design were the building blocks used by Case IH to create the new D and DX Series Farmall subcompact, compact, and utility tractors. The Farmall Series has 14 models ranging from 18 to 55 hp (13 to 41 kW), and ranging in PTO output from 13.7 to 47 hp (10 to 35 kW). They are available with gear or hydrostatic transmissions.

For light-duty work and mowing, the two subcompact Farmall models, DX18E and DX24E, offer nimble handling in a user-friendly package. From the 21 to 45 hp (16 to 33 kW) range, the 10 mid-range compact models are available in three different frame sizes to deliver versatility in power and size for a wide range of applications. The top-end utility models, DX48 and DX55, are at home on a full-time farming operation or on a landscaper or commercial operator's job site.

Most Farmall models feature mechanical front-wheel drive (MFD)

that get through slippery spots or soft soil with reduced wheel spin. High-capacity hydraulics deliver sufficient flow to meet the demands of loader or backhoe operations. The three-point hitch lets you operate rotary cutters, box scrapers, blades, rakes, tillers, aerators, brooms, and more. Models equipped with the optional front loader Quick-Attach faceplate are compatible with skid-steer attachments. Switching to loaders, buckets, bale spears, and forks is simple to do, and builds efficiencies with an operator's existing equipment.

With the hydrostatic transmission feature, Farmall tractors provide clutch-free convenience and smooth variable speeds. Manual gear transmissions are also available.

The sloped hood design provides good operator visibility to the front and side of the operator's work area, which translates into increased safety and productivity. The controls are easily accessible, and the seat swivels to allow safe, high-visibility operation of rear-mounted attachments like tillers, mowers, and snow blowers. The one-piece, flip-up hood feature allows for quick routine service.



The Farmall DX45 compact tractor can support a variety of different attachments.



The DX55 utility tractor is the top of the new Farmall range from Case IH.

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