2016 GLEANER® Transverse vs. Axial Comparison


GLEANER

The New S9 Series

The New Gleaner Vision™ Cab

The S9 Series combines represent a number of developments that will make a significant difference in the productivity of your harvest for 2016.

Customers across the world generated feedback we used to deliver what farmers wanted in a totally new cab environment.

The Vision™ cab features 15 percent more volume (130 ft^3 versus 113 $ft.^3$) than the Comfortech™ cab it replaces. Visibility is enhanced with total glass area of 66 square feet and front glass area was increased by 22 percent to 32.9 square feet for unmatched visibility. This newly engineered cab has a much larger and deeper curved-glass windshield laminated with solar properties, narrower A-posts and B-pillars that have been moved for more room. The cab sound level is only 75.5 dba in corn, making it a very quiet environment in the noisiest crop condition.

Feeding

A number of changes have been made to the feeder house to optimize performance and improve feeding capacity in difficult crop conditions such as heavy canola swaths and green stem soybeans, where uneven feeding can occur. We have lowered the feeder house floor by half an inch and raised the feeder house runners and torque tube half an inch. This results in a 1-inch clearance under the torque tube and a half-inch clearance under the feed shaft. This change reduces stress on the shaft slightly, yet maintains

good control of crop mat in these difficult feeding conditions.

The rear feed conveyor top shaft has been moved forward 1 ½ inches and up 10 millimeters to optimize performance of the rock trap. In addition, the inside rear shaft is equipped with a larger bearing. Feed drum rings have been added to reduce the chance for rock damage to feed chain slats.

The feeder house has been lengthened 4.8 inches, which provides greater visibility to the header's cutter bar with the new Vision™ cab, and the geometry on the header lift cylinders has been redesigned to maintain excellent liftability.

Automated Drives for Greater Operator Efficiency and Comfort

The new S9 Series employs new hydraulics for the propel drive and new electronics for gearshift and parking brake, eliminating all cables and linkage and providing total operator convenience. A new variable-displacement motor provides automatic high-low shifting through the hydrostatic propel system that was accomplished manually through the XR™ two-speed shift-on-the-go transmission of the S8 Series. The programming of speed and torque sets the hydrostatic motor to optimum displacement automatically and provides speed and torque when you need it, whether you are looking for a faster road speed or climbing a hill.

The parking brake is now set with the flip of a switch, and the operator knows whether it is engaged simply by viewing the new Tyton™ terminal.

The four-speed transmission is now electronically shifted. Just select the speed on the new Tyton™ terminal, and an icon lets you know what gear you are in. With the combine at a stop, simply select the gear on the terminal screen and hit the check mark. It's that easy and convenient.

Improved Drives for Longer Life

The main drive belt in the S9 Series machines is a four-strand HB-section Opti-Belt for longer life and increased braking capability. The hydraulic spreader pump features cast iron around the gears and a closed-loop electrical system that constantly monitors the speed and adjusts the hydraulic control, maintaining constant spreader speed regardless of temperature. The propel drive belt increases in size from a three-strand to a four-strand V-belt for longer life. A new 200cc steering control unit has been integrated on all S9 models, and the Auto-Guide™ sensor is now integrated into the steering cylinder to eliminate any external linkage.

The Gleaner Gen 2 SmartCooling™ system, which consists of a variable-pitch cooling fan with reversing capability, has new fan-controlled software that uses charge pressure parameters to reduce pressure from 2,750 psi to 406 psi for improved performance and maximum efficiency.

Improved Header Lift and Lower System

The Gleaner header lift system features a new proportional valve, which provides fine tuning from the new Vision™ cab for faster or slower header response. It also provides programming to ramp the valve for better control of cutting height. Adjusting speed up and down and changing sensitivity, as well as reading pressure on the header, can be achieved all from the comfort of the Vision™ cab.

Residue Management

The chopper knives are made of a new material for several times greater life than previous knives.

For those customers ordering an impeller in lieu of our 24-knife high speed chopper, we have incorporated a 9 ¾-inch diameter pulley to provide a higher speed from 710 rpm to 940 rpm. The increased speed creates a similar vacuum to that of the high-speed chopper, which spins at 3,250 rpm for improved performance that keeps the processor clean of any potential build-up.

Processor and Separator

For specialty crop harvesting, such as grass seed, we have added special holes in the processor housing to accommodate moving of the auger trough.

In addition, we have opened up the separator frame to reduce air velocity and allow more air venting, reducing the potential for trash plugging.

Advanced Technology Sensor Harnesses

The Gleaner S9 Series 390-bushel grain bin has new sensors built in to alert you when it reaches 70 percent and 90 percent of capacity.

The new NovAtel satellite receiver resides on the front grain bin extension and when the grain bin extensions are folded, the receiver folds with it.

Gleaner vs. Case IH

Make/Model	GL S96	CIH 6140	GL S97	CIH 7240	GL S98	CIH 8240	
Class	6	6	7	7	8	8	
Horsepower (hp)	322	348	375	403	430	480	1
Maximum boost horsepower (hp)	398	411	451	468	471	555	
Engine displacement (L)	8.4	8.7	9.8	11.1	9.8	12.9	
Rated speed (rpm)	2,100	2,100	2,100	2,100	2,100	2,100	
Cooling System							
Maintenance	Reverse Cooling	N/A	Reverse cooling	N/A	Reverse cooling	N/A	
Cleaning required	No	Yes	No	Yes	No	Yes	2
Variable fan pitch feature available	Yes	No	Yes	No	Yes	No	3
Average power savings @ 80°F (hp)	35	None	35	None	33	None	
Processor							
Type	Natural Flow Feeding	Axial w/ flighting	Natural Flow Feeding	Axial w/ beater	Natural Flow Feeding	Axial w/ beater	4
Rotor length (in)	90	102.8	90	103.3	90	110	
Degrees of threshing/separation	360	156	360	180	360	180	5
Threshing and separation area (in²)	6,047	Not Published	6,047	Not published	6,047	Not published	
Cleaning area (in²)	8,721	7,947	8,721	10,075	8,721	10,075	
Cleaning method	Two-stage	Single-stage	Two-stage	Single-stage	Two-stage	Single-stage	
Accelerator roll technology	Yes	No	Yes	No	Yes	No	
% of cleaning performed on shoe	66% @ rolls; 34% @ shoe	100% @ shoe	66% @ rolls; 34% @ shoe	100% @ shoe	66% @ rolls; 34% @ shoe	100% @ shoe	6
Slope sensitivity	No, up to 23+% slopes	Yes	No, up to 23+% slopes	12%	No, up to 23+% slopes	12%	7
Approx. power required for straw chopper (hp)	45	80-90	45	80-90	45	80-90	

Advantages

1. The higher horsepower rating is lost with higher weight and parasitic loss of the machine.

2. Combine requires periodic cleaning of radiator vs. no cleaning on reverse cooling.

3. Gleaner is the only combine with a variable pitch fan that can save 66% of power at 80°F outside ambient temperature. This translates to a savings of up to 35 hp at this temperature.

4. Gleaner's flat, even crop mat means the crop doesn't have to change direction to accommodate the rotor. All axial designs have a high wear area as the crop changes direction into the rotor intake. The beater in the CIH 7240 and 8240 can break up cob and damage grain.

5. The Gleaner 360° threshing and separation is substantially greater than CIH's 156° or 180° threshing and separator grate wrap at the same 30" rotor diameter.

6. With Gleaner, 66% of the cleaning is done at the accelerator rolls of our exclusive two-stage cleaning system. Our shoe is a secondary means of cleaning, not a primary one, as in the CIH where the shoe cleans 100% of grain. Our accelerator rolls direct all of the crop through the high-air blast to the front of the cascade pan in the same location every time. Over 40+% of the 7240 and 8240 grain pan is solid at the front and is counted as sieve area, which never gets any air and so does no functional cleaning. With the Gleaner, 100% of the shoe receives air from the upper air blast off of the accelerator rolls and the pneumatic area of the shoe.

7. The CIH 7240 and 8240 have a self-leveling shoe that is mechanical, can wear out and only levels to 12% slopes. Gleaner accelerator rolls can reduce slope sensitivity up to 23+%.

Gleaner vs. Case IH

Make/Model	GL S96	CIH 6140	GL S97	CIH 7240	GL S98	CIH 8240	
Grain Handling							
Grain bin capacity	390 bu.	300 bu.	390 bu.	315 bu.	390 bu.	410 bu.	8
Power-fold bin extensions	Standard	Standard	Standard	Standard	Standard	Standard	
Average unloading rates	4.0 bu./sec.	3.0 bu./sec.	4.0 bu./sec.	3.6 bu./sec.	4.0 bu./sec.	3.6 bu./sec.	9
Time to unload grain bin (sec)	98	100	98	87.5	98	113.8	10
Unloader design	2-auger swivel	3-auger turret	2-auger swivel	3-auger turret	2-auger swivel	3-auger turret	11
Construction & Weights							
Mainframe construction	Unitized, welded	Bolt-on	Unitized, welded	Bolt-on	Unitized, welded	Bolt-on	12
Straight-through shafts	Yes	No, 90° gearboxes	Yes	CVT drive gearboxes	Yes	CVT drive gearboxes	13
Operating weight – 2WD (lbs.)†	33,923	40,276	34,223	43,288	34,233	43,988	
Power required to move operating weight difference (hp)	N/A	12	N/A	17	N/A	19	
Weight of machine w/header and full grain bin (lbs.)‡	63,093	64,924	64,233	69,249	64,973	76,063	14

† Operating weight is weight of machine with tires; full tank of fuel. ‡ As equipped with 30′ draper header (Class 6), 35′ draper header (Class 7) and 40′ draper header (Class 8).

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Advantages

8 The S96 has a 30% larger grain tank than the CIH 6140; the S97 has one 23% larger than the CIH 7240; and the S98 has one 5% smaller than the CIH 8240, but provides faster unloading. Gleaner has the largest grain tank of any class 6/7 combine.

9 S96 unloads 33% faster than the CIH 6140. S97 unloads 11% faster than the CIH 7240. The 8240 has a larger grain tank than the S98 (410 bu. vs. 390 bu.), but requires 15.8 sec longer to unload the grain tank than the S98.

10 Gleaner can unload one of the largest grain tanks in the world in just over a minute and a half.

11 Less wear, less horsepower required and less grain damage with Gleaner's shallow 29° angle from clean grain cross auger to unloading auger.

12 The Gleaner frame is stronger and lighter due to its exclusive welded unitized frame.

13 Gleaner is more efficient, and drives are easier to service.

14 Unlike Gleaner, CIH combines have a weight issue. The 8240 consumes 19 horsepower more just moving its bare weight difference through a flat field. Wet ground and hills compound the issue. Though smaller, the CIH 7240 platform still consumes 17 more horsepower versus the S97, and the 6140 consumes 12 more horsepower.

Gleaner vs. John Deere

Make/Model	GL S96	JD S660	GL S97	JD S670	GL S98	JD S680	
Class	6	6	7	7	8	8	
Horsepower (hp)	322	333	375	391	430	473	1
Maximum boost horsepower (hp)	398	382	451	449[‡]	471	540	
Engine displacement (L)	8.4	9.0	9.8	9.0	9.8	13.5	
Rated speed (rpm)	2,100	2,200	2,100	2,200	2,100	2,100	
Cooling System							
Maintenance	Reverse Cooling fan	Air scoop	Reverse cooling fan	Air scoop	Reverse cooling fan	Air scoop	2
Cleaning required	No	Yes	No	Yes	No	Yes	
Variable fan pitch feature available	Yes	No	Yes	No	Yes	No	3
Average power savings @ 80°F (hp)	35	None	35	None	33	None	
Processor							
Type	Natural Flow Feeding	Axial w/ beater	Natural Flow Feeding	Axial w/ beater	Natural Flow Feeding	Axial w/ beater	4
Rotor length (in)	90	123	90	123	90	123	
Degrees of threshing/separation	360	180	360	180	360	180	5
Threshing and separation area (in²)	6,047	4,095	6,047	4,095	6,047	4,095	
Cleaning area (in²)	8,721	7,905	8,721	7,905	8,721	9,145	
Cleaning method	Two-stage	Single-stage	Two-stage	Single-stage	Two-stage	Single-stage	6
Accelerator roll technology	Yes	No	Yes	No	Yes	No	
% of cleaning on performed on shoe	66% @ rolls; 34% @ shoe	100% @ shoe	66% @ rolls; 34% @ shoe	100% @ shoe	66% @ rolls; 34% @ shoe	100% @ shoe	7
Slope sensitivity	No, up to 23+% slopes	Yes	No, up to 23+% slopes	Yes	No, up to 23+% slopes	Yes	
Approx. power required for straw chopper (hp)	45	80-90	45	80-90	45	80-90	

[‡]Above 425 horsepower. Horsepower is limited by ECU timer.

Advantages

1. Gleaner provides a higher percentage of horsepower to the separator than the Class 6 and Class 7 John Deere combines relative to weight and less efficient drives. The higher horsepower rating with the John Deere S680 is lost with higher weight and parasitic loss of the machine.

2. John Deere's air scoop requires periodic cleaning of radiator vs. no cleaning with Gleaner's reverse cooling.

3. Gleaner is the only combine with a variable pitch fan that can save 66% of power at 80°F outside ambient temperature. This translates to a savings of up to 35 hp at this temperature.

4. Gleaner's flat, even crop mat means the crop doesn't have to change direction. All axial designs have a high wear area as the crop changes direction into the rotor intake. The beater in the John Deere can break up cob and damage grain.

5. Gleaner's 360° threshing and separation provides almost 48% more area than John Deere.

6. John Deere had to lengthen its shoe to compensate for the lack of a self-leveling device.

7. On S660 and S670 with DynaFlow™ Plus cleaning shoe, the square inches is 7,905 sq. in. The Gleaner S96 and S97 is 8,721 sq. in. On the S680 the square inches is increased to 9,145 sq. in. To minimize shoe loss you must order the *optional* Active Terrain adjustment when working on slopes. Deere states that improved shoe reduces tailings volume by 28%. This is the reason why Deere has the Active tailings system that re-threshes the return grain on the S680 machine.

Gleaner vs. John Deere

Make/Model	GL S96	JD S660	GL S97	JD S670	GL S98	JD S680	
Grain Handling							
Grain bin capacity	390 bu. standard	300 bu.	390 bu. standard	300 bu.	390 bu. standard	400 bu.	8
Power-fold bin extensions	Standard	Standard	Standard	Standard	Standard	Standard	
Average unloading rates	4.0 bu./sec.	3.3 bu./sec.	4.0 bu./sec.	3.3 bu./sec.	4.0 bu./sec.	3.8 bu./sec.	9
Time to unload grain bin (sec)	98	91	98	91	98	105	10
Unloader design	2-auger swivel	3-auger turret	2-auger swivel	3-auger turret	2-auger swivel	3-auger turret	11
Construction & Weights							
Mainframe construction	Unitized, welded	Bolt-on	Unitized, welded	Bolt-on	Unitized, welded	Bolt-on	12
Straight-through shafts	Yes	No, 90° gear boxes	Yes	No, 90° gear boxes	Yes	No, 90° gear boxes	13
Operating weight – 2WD (lbs.)†	33,923	44,077	34,223	45,930	34,223	50,649	
Power required to move operating weight difference (hp)	N/A	20	N/A	23	N/A	32	
Weight of machine w/header and full grain bin (lbs.)‡	63,093	67,384	64,233	71,613	64,973	83,016	14

† Operating weight is weight of machine with tires; full tank of fuel. ‡ As equipped with 30′ draper header (Class 6), 35′ draper header (Class 7) and 40′ draper header (Class 8).

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Advantages

8 The grain bin on Gleaner S97/S97 is 30% larger than the one on the John Deere S660/ S670. Gleaner has the largest grain bin on any Class 6/7 combine.

9 Gleaner has a 21% faster unloading rate than John Deere.

10 Gleaner can unload one of the largest grain bin in the world in just over a minute and a half.

11 Less wear, less horsepower required and less grain damage with Gleaner's shallow 29° angle from clean grain cross auger to unloader auger.

12 The Gleaner frame is stronger and lighter due to its exclusive welded unitized frame.

13 Gleaner is more efficient, and drives are easier to service.

14 Unlike Gleaner, John Deere has a huge compaction issue and consumes a large amount of horsepower just moving through a flat field. Wet ground and hills compound this issue.

Efficiency

Extra weight requires more horsepower to achieve the same result as a lighter machine. The John Deere S680[1] weighs almost 17,500 pounds more than a Gleaner S98. This extra weight requires 34 hp extra just to move the laden weight difference of the two machines through the field. That's the equivalent of pulling a John Deere 6210R, MFWD tractor behind your Gleaner.

For the CaseIH 8240, you'll have to hook up a CaseIH Farmall 140A, two-wheel-drive tractor with cab behind your Gleaner to travel up every hill, through every mud puddle and down every road.

Efficiency comparison

Model*	Operating Weight (lbs.)	Header Weight (30' draper) (lbs.)	Weight w/ Header (lbs.)	Difference vs. Gleaner (lbs.)	Power Required† (hp)	Grain Tank Capacity (bu.)	Grain Weight (lbs.) §	Total Weight (lbs.)
Class 6 Combines								
S96	33,923	5,770	39,693	NA	NA	390	23,400	63,093
S660	44,077	5,307	49,384	9,691	18.9	300	18,000	67,384
6140	40,276	6,648	46,924	9,234	12.4	300	18,000	64,924
Class 7 Combines								
S97	34,223	6,610	40,833	NA	NA	390	23,400	64,233
S670	45,930	7,683	53,613	12,780	22.9	300	18,000	71,613
7240	43,288	7,061	50,349	9,516	17.7	315	18,900	69,249
Class 8 Combines								
S98	34,223	7,350	41,573	NA	NA	390	23,400	64,973
S680	50,649	8,367	59,016	17,443	32.1	400	24,000	83,016
8240	43,988	7,475	51,463	9,890	19.3	410	24,600	76,063

NOTE: Dimensions taken from actual machines on Holtgreven digital scales within 1% accuracy, similar equipped tires and full tank of fuel. * Models compared are equipped with 2-wheel-drive. § Estimated @ 60 lbs. per bushel @ 17% moisture (soybeans). † Horsepower requirement achieved by multiplying an engineering calculation of rolling resistance (CRR) (an estimated 0.00196) by the weight difference in the Difference vs. Gleaner column.

Transport height

Even with one of the largest grain bin capacities on any combine in the industry, the Gleaner S9 Series' unique standard power-foldable 390-bushel bin extensions fold down in under 20 seconds with the push of a button on the console, to an overall height of 12.41 feet (3.78 m). This compactness can make a big difference when transporting or storing your combine.

Center of gravity

Gleaner combines have their rotor in the center, which allows the grain tank to sit low and wrap around the processor. The result is a larger grain bin capacity that also provides the machine with a low center of gravity. Our competitors must compromise their axial rotor design in order to fit their grain bin in their combines. The axial design places the weight higher, creating a higher center of gravity and ultimately, a smaller grain bin.


12.69 ft. (3.86 m)
12.41 feet (3.78 m)
12.91 ft. (3.93 m)

Threshing area

Threshing begins once the crop enters the rotor, it separates and falls through a 360° cage. It is crucial that crop be threshed only long enough to release it from heads, pods or cobs. Crop that remains in the threshing area too long can be damaged. Our 360° cage allows grain to exit the rotor cage once it is threshed. Our competitors' designs are closed on top, keeping free grain inside, where it continues to contact the rotor's threshing elements

Natural Flow™

We call our feeding system Natural Flow™ because the crop material flows straight into the combine, straight into and around the rotor and straight out the back. Our competitors shift the crop's path and change its direction, requiring more horsepower to do the same threshing and separating.

Feeder house

While Gleaner has a narrow, 30-inch feeder house compared to other combines, the opening that feeds the rotor is actually wider because Gleaner does not narrow or compress the crop mat.

Feeding

Our competitors' designs, which include either a beater or "elephant ears," have to stuff, bunch and shear the crop mat in order to feed their rotor. Our rotor is fed naturally and directly to ensure even and consistent threshing.

Slope sensitivity

Gleaner propels grain through the air blast and onto the cascade pan. Because Gleaner does not rely on gravity to move the grain, the direction of the grain stays consistent, even on slopes up to 23+%.

Competitors require the expense, complexity and wear of self-leveling shoes or undercarriages to match the hill side abilities of Gleaner.

Shoe overload

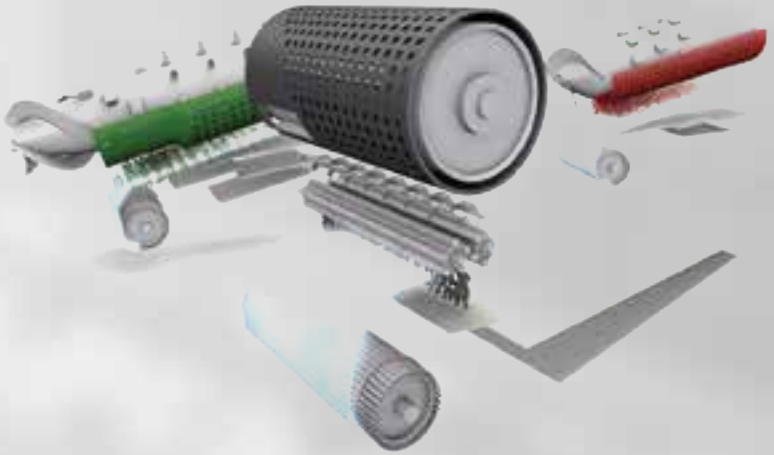
Many axial combines, due to their concave design, tend to overload the cleaning shoe on one side of the machine. As the rear portion of the shoe becomes overloaded with grain and MOG (material other than grain), grain can be carried out the back of the combine.

With Gleaner, after grain falls from the processor, a set of distribution augers keeps the crop mat consistent. The crop is then propelled by the accelerator rolls through an air blast at four times the speed of free fall and onto the grain pan. These distribution augers ensure a uniform ribbon of crop feeding into the remainder of the cleaning system, no matter where crop falls from the processor.

Air velocity

Our transverse system drops material in a position parallel to the fan, which means every piece of grain is hit with the same velocity of air. With an axial rotor, grain can drop at any point on the rotor, meaning grain that drops early is hit with one air velocity and grain that drops later with another. Gleaner's ability to preclean the grain before the shoe and use the shoe as a highly effective secondary cleaning system is why it can obtain such clean grain with low loss levels.

The same issue of where grain drops from the rotor affects the effectiveness of the shoe. Gleaner always drops its grain and material in the same position. Axial combines tend to distribute grain unevenly to the cleaning shoe, which can cause grain loss out the back of the combine.

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