



“ On field surfaces it’s a lot better, and down the road the tractor is a different beast. ”

# More than just new clothes?

## Machinery On Farm Opinion

With AGCO’s integration of its Challenger tracked tractors into its Fendt line in Europe came a redesign for the smaller models, using Fendt 1000 wheeled tractor concepts, including the VarioDrive development of the Vario CVT. *CPM* talks to an early user.

*By Martin Rickatson*

In a farm equipment sector where deep-rooted product names carry weight and product liveries are symbolic, change can be viewed with suspicion. So when AGCO announced in 2017 it would be ending the use of the Challenger name and colours and in future offering its tracked tractors under its Fendt brand, industry eyebrows were raised. And they perhaps rose higher when it was revealed the flagship 492-646hp higher-hp line would simply be re-liveried, with the products previously labelled the MT800E range in yellow becoming the 1100 MT line in green.

However, when it was also revealed that significant changes were to be made to the smaller of the two ranges before their

relaunch under the new name and colours, the value of the rebranding began to become clear to both Challenger and Fendt customers and independent observers alike. The possibility to create some commonality and exchange of technology between the tracked tractors and their wheeled cousins of similar power was obvious, particularly with Fendt being the strongest of AGCO’s tractor brands at this power level. And perhaps of most significance was the opportunity to introduce the established Fendt Vario continuously-variable transmission concept to a product line that had previously been powershift-only.

### European launch

The result was the 380/405/431hp Fendt 900 Vario MT range, which replaced the former Challenger MT700E line following a European launch at Agritechnica in Nov 2017. The new machines use the same AGCO Power seven-cylinder, 9.8-litre engines as their predecessors, albeit with structural and cooling improvements since their original incarnation. There’s also Fendt iD low engine speed technology — also used on the six-cylinder MAN-engined Fendt 1000 Vario tractors — which allows them to achieve peak power and torque at lower rpm. The latter is attained at 1200rpm and on up to 1600rpm.

Rather than use the Vario from the 900 series wheeled tractors, the CVT is adapted from the more recently developed VarioDrive CVT used in Fendt’s flagship

1000 series wheeled machines. This uses twin hydrostatic motors which work in combination below 8km/h for full power transfer, while above this speed one of the motors is progressively decoupled and the element of mechanical power transfer increases. From 20km/h up to the tractor’s top speed of 40km/h, power transfer becomes fully mechanical.

However, the 900 Vario MT machines also benefit from enhancements not only in transmission technology — the Vario CVT is the only drive system offered on them — but also in areas such as operating logic, cab fitments, lighting and ride comfort. Contributions to the latter include an air-suspended seat, two-point cab suspension, the new SmartRide primary suspension, and the reworked drive with ConstantGrip suspension.

The latter development comprises a pendulum suspension system — essentially a bogie within a bogie — to improve cushioning of the three mid-rollers as they ▶



*The Fendt 900 Vario MT range replaces the former Challenger MT700E.*

# On Farm Opinion



Operator Bob Manger says early experiences with the business's 943 MT Vario suggest CVT power consumption doubts are unfounded.

► follow ground undulations. This is also claimed to ensure even weight distribution though each roller. This is backed by SmartRide suspension for the main beam, combining helical springs with integrated pressure surge dampers and additional hydraulic shock absorbers. The 900 Vario MT is also claimed to be the first twin-tracked tractor with two-point cab suspension, blending a pair of dampers with rubber buffers up front and helical springs with integrated shock absorbers at the rear.

But CVT of any type is considerably

more expensive to develop, manufacture and — for the customer — to purchase. So would there be existing and potential tracked-tractor users who'd see sufficient benefit in the fuel-saving and operational advantages of the transmission upgrade in particular to justify the extra expenditure required?

## Figures stack up

With 1340ha of combinable crops, potatoes, onions and AD maize to establish on some challenging soil types across a wide area, Charlie and Will Lochore, of Elmsted Market, Colchester-based Allens Farm Partners, calculated that the figures would stack up for them when it came to replacing their previous Challenger MT775E.

"Because we grow root crops and maize, ploughing and cultivating remain important for us, but we want a primary tractor that leaves minimal impact on the land when doing them," explains Charlie Lochore.

"That's meant we've run rubber-tracked tractors for a while, and since we purchased our first Challenger, a used 320hp MT765 from the first MT700 series, we've subsequently had a new C-spec MT765 and, when the E series was

introduced and a larger model was added, a new 431hp MT775E."

The business has therefore accumulated considerable experience not only with rubber-tracked tractors in general but the Challenger models in particular. Until recently, though, the crawler was the only AGCO product on the farm.

"However, our dealer, Crawfords, had supported us well through the Challenger machines we had operated and, although we run a different make of wheeled tractors, when we were looking last year to change the machine at the head of our wheeled tractor fleet we had been



In the cab, the most visible injection of Fendt into the crawler line is the armrest arrangement and controls, although the joystick is a simple affair.




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sufficiently convinced by the support they provide to purchase our first Fendt, a 390hp 939 Vario."

## Fendt experience

Having gained some Fendt tractor experience, the business was better prepared for the operating logic of the new crawler when a demonstration 943 Vario MT arrived on-farm last autumn. The demo ultimately led to an order and the arrival of an identical machine in late 2018. However, as he has been the main tracked tractor operator throughout the time the business has run the machines, driver Bob Manger has spent very little time with the 939, which is usually at work at the same time as its tracked cousin.

"When it arrived, though, Crawfords helped to make sure I understood how to get the best from the machine, not only with the Vario CVT but also through the use of the Tractor Management System and the Varioterminal, which is another new element of the tractor compared with the old MT775E," he says.

The 939 is equipped with Fendt's VarioGrip variable tyre pressure system and focuses largely on drilling with an 8m Väderstad Rapid, plus working with a George Moate Tillerstar on potato land preparation. It also assists with ploughing, on a 7f fully mounted Dowdeswell. The 943 Vario MT is also occasionally used for some sowing, but its focus is on primary tillage. Its main working partners in the field include a 9f Gregoire Besson plough, an 8m Simba Cultipress and a five-leg Keeble Progressive disc/tine/subsoiler/press cultivator.

"Having roots and maize means we need to plough, but ahead of cereals it also helps us keep on top of blackgrass, and we can occasionally get away with ploughing, pressing and drilling on our lighter land if conditions are good. Sometimes land will be left for weathering a while. It'll get a flush of weeds to be

sprayed off before drilling and we then often make a further press pass pre-drilling.

"The main use for the Progressive is on land after roots. Five legs may not sound much, but we put them in deep to rectify any compaction caused at harvest, so it takes some pulling. We often also use it after ploughing before potatoes as it puts the land down less firmly than the Cultipress before the Tillerstar goes in."

Of the differences between the MT700E and 900 Vario MT models, it's perhaps unsurprising that it's the transmission Bob has found the most significant.

"We thought the CVT might absorb a noticeable amount of power driving a tracked machine, but our initial experiences suggest that's not the case. It's necessary to play around with the engine droop settings a bit to get the best performance from the



*Among the most significant developments with the Fendt MT line are the VarioDrive CVT and the track suspension system.*

engine/transmission combination, but with the tracked machine there's more room to play with, as it's not prone to slip as engine speed drops under load. ►



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*With larger midrollers in a new bogie system, ride quality has been improved both in the field and particularly on the road.*



The 943 Vario MT works with a nine-furrow Gregoire Besson plough, an 8m Simba Cultipress and a five-leg Keeble Progressive disc/tine/subsoiler/press cultivator.

► “Whilst it’s the same AGCO Power engine as before, rather than the MAN engine in the equivalent-output 1000 series tractors, there are some useful features I didn’t have before. The combination of the engine management and Vario transmission are especially useful, as rather than having to drop a powershift gear the transmission simply inches back. And while progressing in the old machine meant you really had to go for it with the transmission and throttle, the tractor now progressively and smoothly achieves and maintains the forward speed it’s been asked to meet for a job.

### Fuel consumption

“While the engine produces the same horsepower, I’m getting the rated power and torque from it in the field at 1700rpm, 500-600rpm lower than on the last machine, making a big difference to fuel consumption and noise. On the road the benefit of the Vario is also noticeable — I can do 40km/h at only 1550rpm, which not only means the machine drinks less fuel but is also noticeably quieter.

“In transport we can sometimes spend over an hour on the road to our furthest land, and we’re definitely gaining there. The larger fuel tank helps, and we can usually get through a decent day without refuelling. But whereas the MT775E used two tanks of diesel to one of AdBlue, I’m now refilling the AdBlue tank each time I fill with diesel.”

Aside from fuel efficiency and working capabilities, he particularly rates the 900 Vario MT’s upgraded ride comfort.

“It’s a vast improvement. On field surfaces it’s a lot better, and down the road the tractor is a different beast. The larger midrollers and the new bogie system have definitely helped smooth the ride over rough ground. As on our previous machines, we’ve specified wider idler rubbers, which help the tracks wear more evenly and cut vibration on the road.

“Combined with the cab suspension and the coil springs and shock absorbers in place of the rubber springs on the old machine, plus the slightly longer wheelbase, the difference is incredible. It’s most noticeable when we’ve put the tractor on our other plough, a 7f fully-mounted Dowdeswell used in tough conditions after sugar beet. Before, we couldn’t go down the road with it fully mounted as it just bucked.”

Bob reckons the linkage is more responsive on the new machine, without the need for high engine rpm when lifting heavy implements. The 900 Vario MT tractors feature a 220 l/min variable-flow load-sensing hydraulic pump, with a second unit optional, reaching maximum flow rate at 1700 rpm. Six spool valves provide 140 l/min of flow, and Fendt offers a 170 l/min option.

“The only downside in the hydraulics area is that the new mudguard styling, while doing its main job well, impedes vision down to lower link hooks. The



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camera we have on the machine helps, though.”

In the cab, one element particularly liked within the Varioterminal is the contour segments wayline feature in Fendt's VarioGuide guidance system. This allows contour segments to be recorded, calculated based on existing field boundaries, or created from existing waylines. The system automatically chooses the matching segment through driving direction and angle to the track.

## Correction signal

“On our old Challengers I'd been using John Deere Starfire via a bridging unit, but with the new Fendt machine we've moved to a Trimble system, receiving an RTK correction signal via a modem and working through Fendt's own VarioGuide autoguidance. The ability to work with contour segments is really useful. When I map one side of a field boundary, it'll be mapped parallel at the opposite side.”

While the cab uses the same frame as the E series Challenger, the internals differ considerably.

“It definitely feels like a Fendt, and is more solid and refined. Although I wasn't really familiar with Fendt controls, I got used to them pretty quickly. The dash, armrest and terminal are well-designed. We've had an issue with the dash, but AGCO and Crawfords were quick to address it.

“One disappointment was that the full-spec joystick from the Fendt 900 and

1000 tractors isn't fitted — they say it'll be an option in future — and it's a shame there's no internal fridge. On the plus side, the LED white lights fitted to the cab are very good.

“This type of machine still suits what we need from a big tractor. When fully weighted on loose ground, it's possible to scuff when turning, but there are ways of minimising it, with careful steering. When pressing we remove the front weights, which draws up the nose a bit and helps minimise the impact when turning. The downside of this is that it allows the suspension to top out on the bump stops as it doesn't compensate for load.

“But in a straight line a twin-track crawler is still putting down more power and treading lighter than a wheeled tractor. That's why a tracked machine is still



The 900 Vario MT machines also benefit in areas such as operating logic, cab fitments, lighting and ride comfort

essential for us, and in less-than-ideal conditions, if we were relying on a big tyred tractor we'd struggle to get round our land area without causing damage. For most of what we have to do, a twin-track machine works well, and the upgrades from the Challenger MT700 series to the Fendt 900 Vario MT, particularly the CVT, have been very useful.” ■

## Farm facts

Allens Farm Partners, Elmsted Market, Colchester, Essex

- **Farmed area:** 1340ha
- **Soil:** Medium to heavy clay
- **Cropping:** Winter wheat, winter barley, winter beans, potatoes, onions, maize and sugar beet
- **Staff:** Charlie and Will Lochore plus six others
- **Mainline tractors:** Fendt 943 MT Vario, 939 Vario, 2x John Deere 6210, 3x 6150; JCB Fastrac 4220
- **Combine:** 10.5m Claas Lexion 760
- **Sprayers:** 24m Sands Horizon self-propelled; 24m John Deere trailed
- **Primary cultivation equipment:** 9f Gregoire Besson plough, 7f Dowdeswell plough, 8m Simba Cultipress, five-leg Keeble Progressive disc/tine/subsoiler/press cultivator
- **Drill:** 8m Väderstad Rapid
- **Telehandlers:** 3x JCB telescopic

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