

Tempo



A farmer saw an opportunity

Since the first product was created on the Stark family farm in the early 1960's, Väderstad has been driving the development of innovative solutions by offering fast, precise and flexible machines for soil tillage and seed drilling.

Much of the testing of new machines is carried out in close collaboration with farmers around the world. Carrying out development work together with farmers is important for us, since this kind of collaboration often leads to improvements and new approaches.

A shining example of this is Tempo with a range of new electronic solutions; Väderstad E-Services, which has taken crop establishment by planter to a whole new level. In this system, speed and high precision are combined with ease of use. The technology also makes it easy to obtain updates and new electronic services far into the future.



Back in 1967 Väderstad presented its first harrow, a unique construction for its time that became very successful.



The NZ harrow is probably the most successful harrow series ever. It is characterised by high capacity, enormous durability and fewer passes than before.



Väderstad Tempo sets a new standard for precision at high speed. With Tempo, crop establishment can be carried out at high speed while still maintaining exceptional precision and accuracy.





Year
2
Warranty
— VÄDERSTAD —

2-year warranty
on all machines
provides extra
security in
investment.

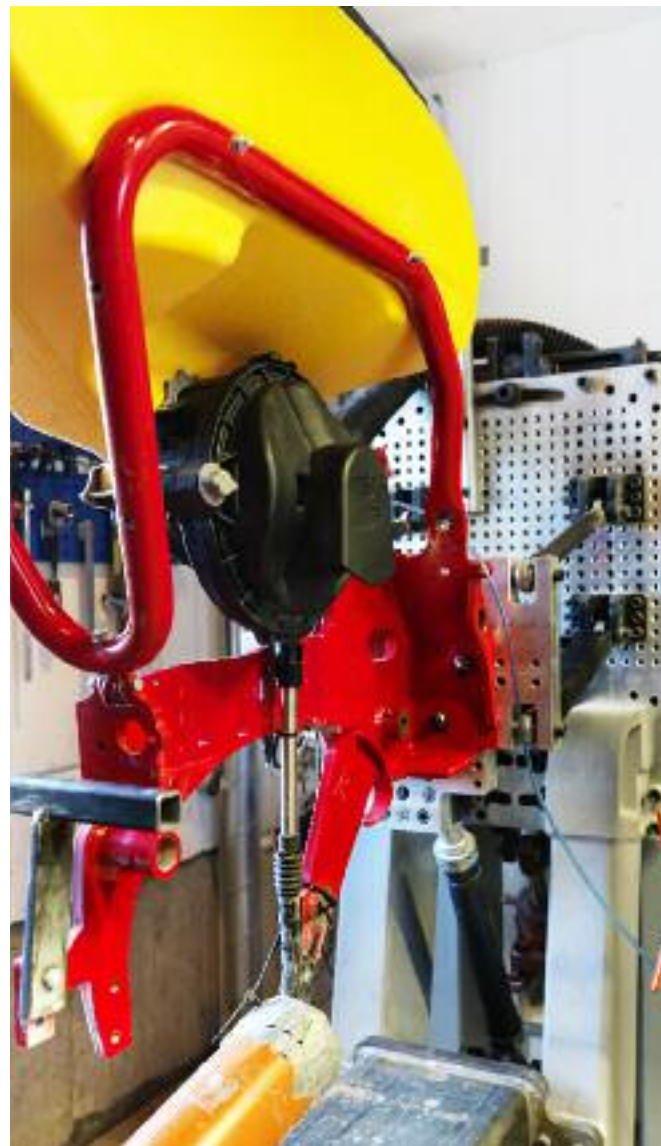


Quality provides security

Development of the Tempo seed unit was a long and careful process in which much of the work was devoted to determining what a precision seed drill should be capable of. Time was spent evaluating existing concepts and then working to produce the best solution.

'Make it to last' was an expression coined by Rune Stark, and something we continue to bear in mind during our comprehensive testing operations on machines and components. We test properties such as how corrosion-susceptible material reacts on contact with fertiliser and moisture. We test all forged connections in our shaker rig, while in our seed laboratory we measure wear on seed discs and seed coulters.

Fully assembled machines are also driven for lap after lap in a gravel pit and stone quarry, to test their durability. In these environments, the machines undergo more ruthless handling than they will ever experience again and it quickly reveals any shortcomings that need to be remedied. This results in long life and therefore good overall economics. We feel so confident about our quality that we provide a 2-year warranty on all our machines. This means that our customers can feel extra secure about their investment.



New components are tested either in the field or in these test rigs before being brought into production.



Electronic components are tested in the climate chamber.



The seed hopper can hold 70 litres, which means that around 20 hectares of maize can be drilled on a single fill with an eight-row machine.

The microgranule hopper can hold 17 litres. This hopper is available as an option and can be used to provide a starter dose of fertiliser or a pesticide. The microgranules can be placed either in the seed furrow or on the soil surface.



Zone 3	Zone 2	Zone 1
<p>The carrying wheels ensure that the row units maintain a constant drilling depth. In order to decrease the vibrations in the row units, a trailed carrying wheel is used. The unique seed metering system shoots the seed down with the aid of pressurised air. The press wheels stop the seeds as they leave the seed pipes and ensure good contact between seed and soil. The closing wheels, which have the task of closing the seed furrow, are available in three different variations. The load on these wheels can be easily adjusted, as can the working angle. An additional 150 kg of load can be transferred to the row units with the aid of a torsion spring. This means that the total load on each row unit can be increased to 325 kg.</p>	<p>The fertiliser coulters are designed to displace a minimum amount of soil at high speed. The discs and seed coulters are the well-known design found on Väderstad Rapid. Row cleaners are an optional extra and are recommended for direct drilling in fields with heavy plant trash. Fertiliser coulters are available with the option of disc or knife for many of the Tempo models.</p>	<p>The fan and the generator are driven either by a hydraulic motor or via the tractor's power take-off. This allows tractors with limited electrical power to be used to draw Tempo. The fan produces pressure for the seed meter and for fertiliser transport. An elevated air intake vent greatly reduces dust uptake and is available as an option.</p>

High accuracy even at high speed

With Tempo, drilling can be carried out at high speed without any loss of precision. The result is a unique combination of uniform seedling establishment and exceptional capacity.

Behind the qualities of Tempo lie many years of development work by our engineers. This work was followed up by hard testing in the field across a number of countries, in close collaboration with agricultural advisors and farmers.

Ingenious seed meter

The heart of the machine is the seed metering system, which functions fantastically well in almost all conditions. The seed meter is capable of amazingly high precision even at very high speeds, combined with low sensitivity to slopes and vibrations. The secret behind these properties is that the movement of the seed is controlled from when it leaves the meter all the way down to the soil.

PowerShoot

Tempo uses the excess pressure in the seed meter to move the seed a short distance at high speed. This function is called PowerShoot. The rapid transport decreases the effect of vibrations and slopes, thereby maintaining the precision.

On most precision seed drills the seed falls from the meter down to the soil through a seed pipe. This technique is called 'drop type'. At high speeds and when vibrations arise, the seed bounces in the pipe and much of the precision of the seed meter is lost. This is one of the reasons why many precision seed drills are driven at low speeds.



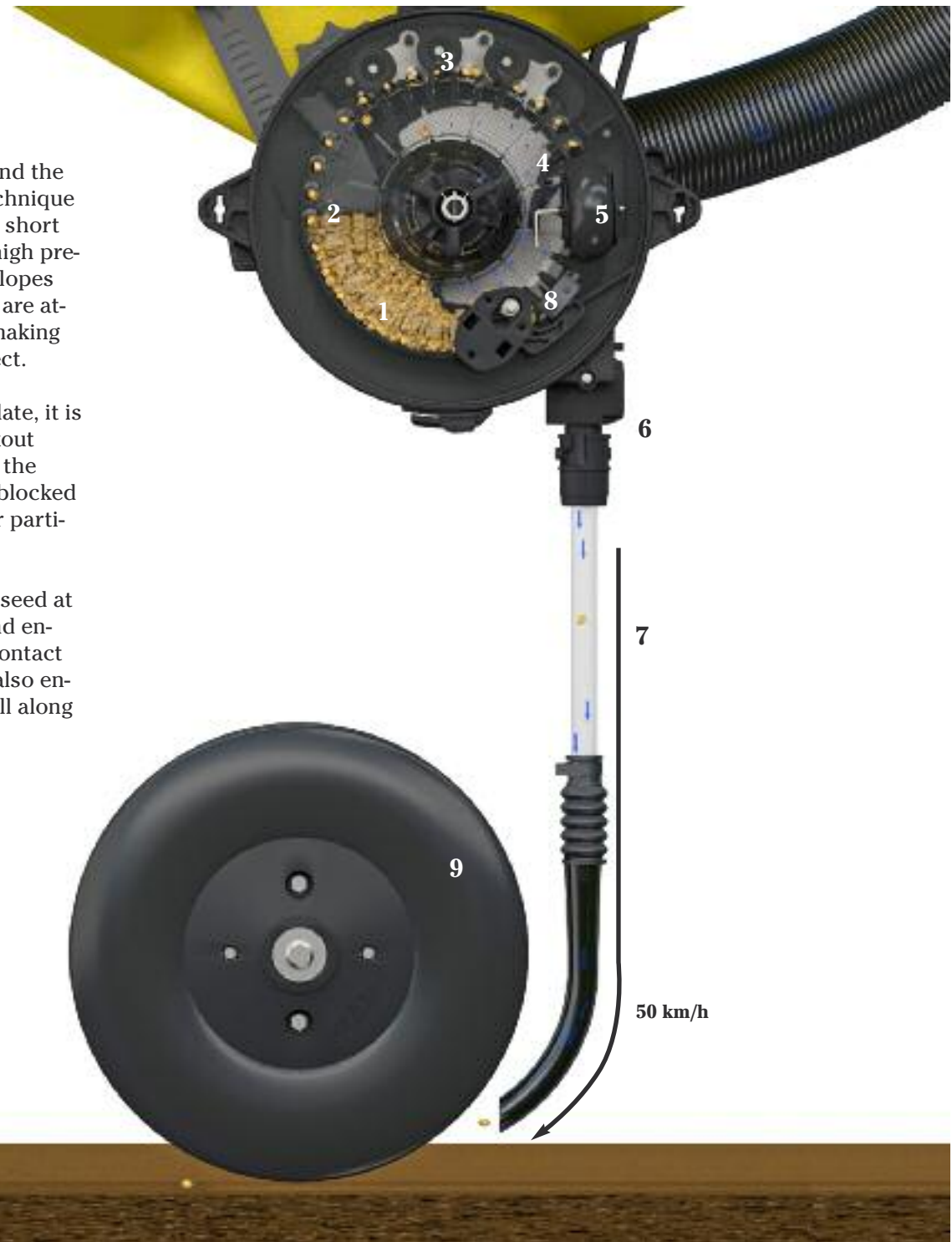
Drilling soybean with Tempo F 8.

Gilstring Seed Meter

1. Seeds enter the seed meter from the hopper.
2. As the seed plate rotates, seeds are held in the holes under pressure within the seed meter.
3. The three singulators at the top of the seed meter remove extra seeds if two have ended up in the same hole.
4. A metal rim ensures that any seeds removed by the singulators do not fall back into the seed pipe, avoiding the problem of 'doubles', i.e. two seeds in the same place.
5. A rubber wheel mounted on the lid of the seed meter shuts off the air flow through the seed plate. The seeds detach from the seed plate and are carried in a flow of air out into the seed pipe.
6. At the top of the seed pipe there is a sensor that detects all seeds that pass through and measures the spacing between them. This information is presented to the driver in ControlStation or E-Control.
7. The seed is 'shot' through the seed pipe as a result of the pressure differ-

ence between the seed meter and the surrounding air. We call this technique PowerShoot. Together with the short transport distance, it ensures high precision even with high speeds, slopes and vibrations. The seed pipes are attached with a bayonet fitting, making them easy to remove and inspect.

8. After a seed has left the seed plate, it is 'cleared' with a so-called knockout wheel. This wheel ensures that the holes in the seed plate are not blocked with fragments of seed or other particles.
9. The soft press wheel stops the seed at the end of its transport path and ensures that it comes into good contact with the soil. The press wheel also ensures that the seed does not roll along the seed furrow.



Electric drive makes work easier

The seed meter with its electric drive can be calibrated with different types of seed before the start of the season. This can be done for the entire machine, or for individual rows.

Robust electric motor

Each seed meter has an electric motor with in-built planetary drive. The motor is 50 W, which is more than sufficient to drive the meter. After the motor there is a planetary drive. Motor and gearbox are furnished with extra seals to avoid prob-

lems with dust entering the bearings. Compared with mechanical driven precision seed drills, the electric drive avoids problems with drive wheel slip or problems with chains, which can give uneven metering.

Presentation of drilling quality

The precision of the seed meter is measured with a seed sensor that sits at the lowest point of the meter. The information presented on the display includes skips, doubles, precision, seeds/ha, distance between seeds and also coefficient of variation. Doubles and skips are both presented in %-format. The precision is shown as bars or in numerical format on ControlStation, ISOBUS or E-Control.



A seed plate for maize with 32 holes and 5.5 mm diameter is standard. Seed plates with different hole sizes for sunflower, millet, sorghum, rape, sugar beet and soybean are available as options. When the seed plate is changed, the knockout wheel must also be changed.



The driver normally receives information on seed rate and speed. The bar diagram in the lower part of the display shows the drilling precision of individual rows.



Since all seed meters have electric drive, it is possible to shut off the row units one at a time.



Tempo is equipped with a hydraulically powered fan, which also drives a generator. Alternatively, a fan driven by the power take-off is available.

Individual shut-off of row units

The electric drive of all seed meters makes it possible to shut off the row units one at a time, thereby saving seed and inputs in irregular fields. When seed entry is shut off, fertiliser metering and metering of microgranules, if the machine is equipped for this, can also be shut off. It is possible to completely shut off fertiliser and microgranule metering and just continue to meter out seed. In fields with varying soil texture and humus content, it is also easy to adjust the fertiliser dose and seed rate from the cab on the move.

Trailed carrying wheels

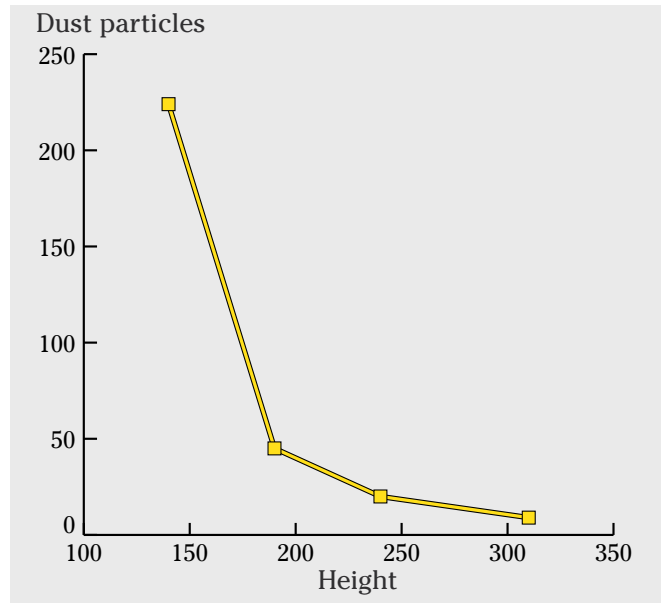
The great advantage with trailed carrying wheels is that the machine has lower inertia. In addition, the carrying wheels are mounted on a bogie unit, which maintain more uniform drilling depth in uneven field conditions.

Hydraulic or mechanically driven fan

Tempo is supplied with a hydraulically driven fan. This hydraulic fan requires a double-acting service and a free flow return. Driving the fan requires around 40 litres of oil per minute.

Tempo F can also be supplied with a mechanically driven fan. It is available with gearing for 540 or 1000 rpm.

Most Tempo machines can be fitted with an elevated air intake vent, which greatly reduces the risk of dust entering the metering system in unfavourable conditions.



The higher up the air intake position, the less dust is pressed into the seed meter.



Elevated air intake greatly reduces the risk of dust problems. Available as an option.



The carrying wheels on Tempo are trailed (1) instead of pushed (2), which is the usual solution on precision seed drills. The great advantage with trailed carrying wheels is that the machine is easier to draw and that the vibrations in the row units decrease.



In the parallel linkage there is a torsion spring that can transfer an additional 150 kg to each row unit, giving a maximum load of 325 kg per row unit. This is important when using the machine for direct drilling at high speed. The torsion spring is easy to insert without tools.



The press wheel has two tasks: 1. To stop the seed as it leaves the seed pipe. This is achieved by the press wheel being positioned forward between the seed discs and the profile of the press wheel being optimised. 2. To ensure that the seed makes good contact with the soil encouraging rapid germination.

High performing row unit

The flexible Tempo is designed for all drilling situations, tillage systems and drilling in conventional tillage systems. The same components are used on carrying wheels, press wheels, closing wheels and the carrying wheels on fertiliser coulters. All of this makes it easier to service and maintain the machine.



The seed hopper holds 70 litres, which means that around 20 hectares of maize can be drilled on a single fill with an eight-row machine.



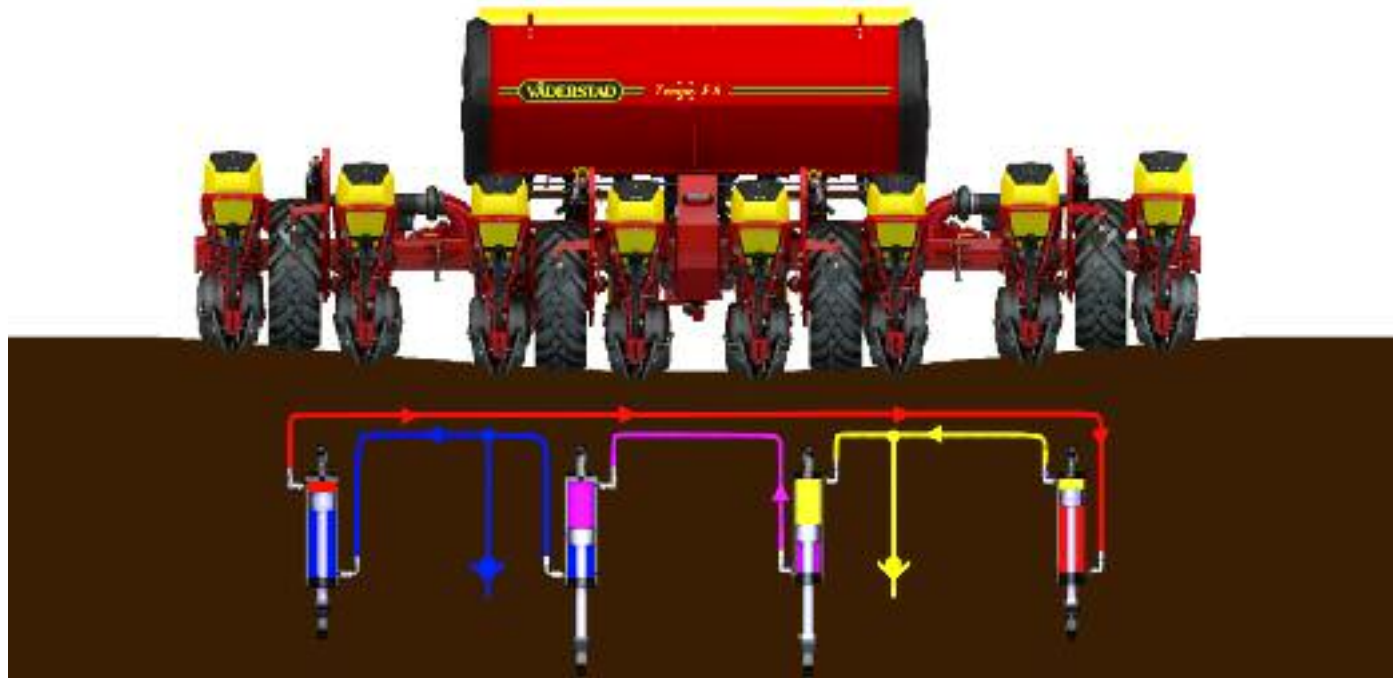
All joints on the row units have easily replaceable axles and bushings. The same greaseless bushings with seals are used on all joints of the row units.

Support wheels

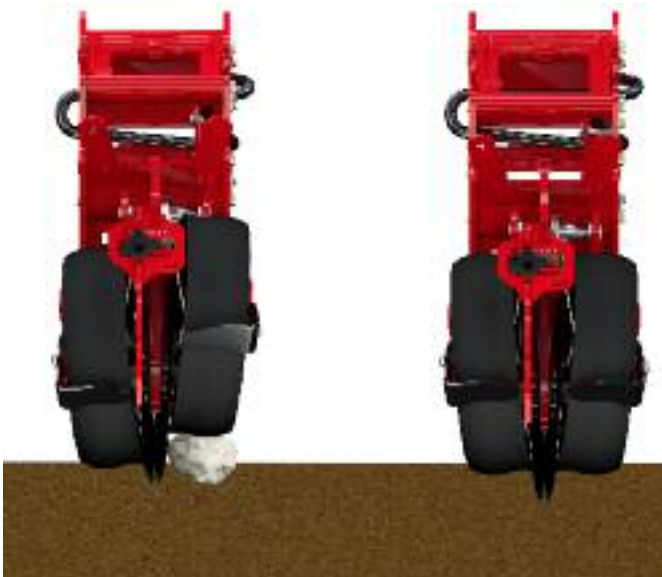
Support wheels are standard on Tempo. Where Tempo is three-point mounted, the support wheels are fixed. The six-row Tempo F has hydraulic support wheels that also function as transport wheels. The eight-row Tempo F has two extra support wheels which are coupled together to a hydraulic bogie unit, ensuring the load on all wheels is the same in the field, giving the machine a smoother ride on uneven ground.

Closing wheels

There are three different types of closing wheel to choose from. In addition to the standard model, there is a broader version which is recommended for very shallow drilling of small-seeded crops. For soils with a high clay content, where it can be difficult to close the seed furrow, the notched closing wheel is recommended.



The four support wheels on Tempo F 8 are coupled together to a hydraulic bogie unit, giving the machine a smoother ride on uneven fields.



The carrying wheels are mounted on a bogie unit, which means that the drilling depth is not affected as much in uneven field conditions. The distance between the carrying wheels and seed disc can be set without washers.



Tempo has three different types of closing wheel. From left: standard closing wheel (25 mm), wide closing wheel (50 mm) and notched closing wheel.

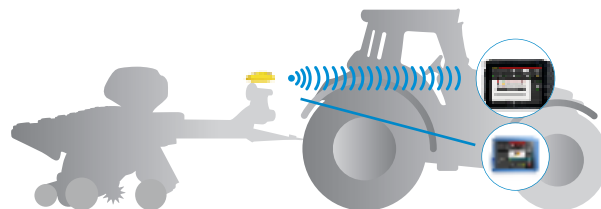
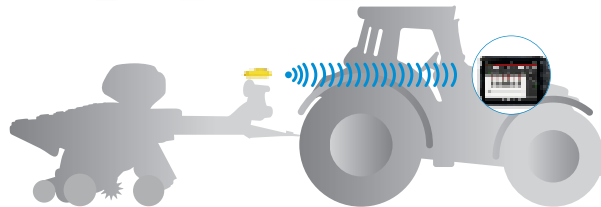
With Väderstad E-Services, Tempo is ready for the future

The introduction of Wi-Fi (Wireless Fidelity) and iPad Air into the Väderstad programme brings a range of advantages. From now on, our machines and equipment can be controlled with the help of wireless communication. User-friendliness, cost-effectiveness and ease of update are just some of the major advantages of the iPad Air solution compared with conventional systems. Väderstad's electronic solutions have been gathered together under the family name Väderstad E-Services.

Even better performance

The existing ControlStation used on Väderstad seed drills supplies a range of important functions, for example controlling the bout markers, laying tramlines, metering seed and monitoring specific functions of the machine. E-Control, which is an alternative to ControlStation on new machines, further improves the performance. This technology makes it easy for the driver to calibrate and guide the seed drill from the tractor cab, and to carry out troubleshooting relating to cables and various sensors.

Cables and sensors on the seed drill are connected to WorkStation, which is used irrespective of the terminal solution used. WorkStation is then connected to Gateway when ISOBUS or E-Control is used. Gateway sends and receives information to/from the tractor cab.



Gateway

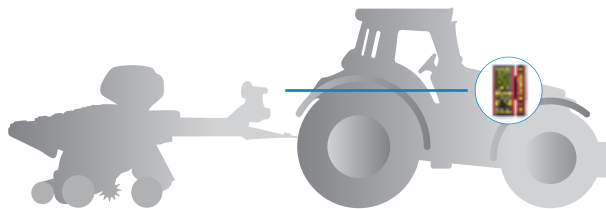
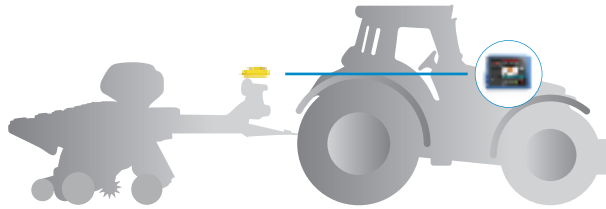
Gateway is the brain of the system. It stores machine information and communicates with the virtual terminal or iPad Air in the tractor cab. In order to log statistics together with actual position, Gateway is equipped with a GPS receiver.

E-Control

One of the most important new items is E-Control – a solution that has many similarities to the existing tried-and-tested ControlStation. In the cab, an iPad Air device is installed in a user-friendly holder, E-Keeper. E-Keeper supplies the device with power and is equipped with buttons for navigation and handling. iPad Air communicates wirelessly with the seed drill's Gateway, which is identical to that in an ISOBUS solution.

ISOBUS + E-Control

Sometimes there may already be an ISOBUS terminal in the tractor. It can be used in parallel with E-Control. For example, ISOBUS can take control of the seed drill, while at the same time E-Control is used to view metering data from the seed drill in real time. The terminal is connected to Gateway via cable, while E-Control receives information wirelessly.

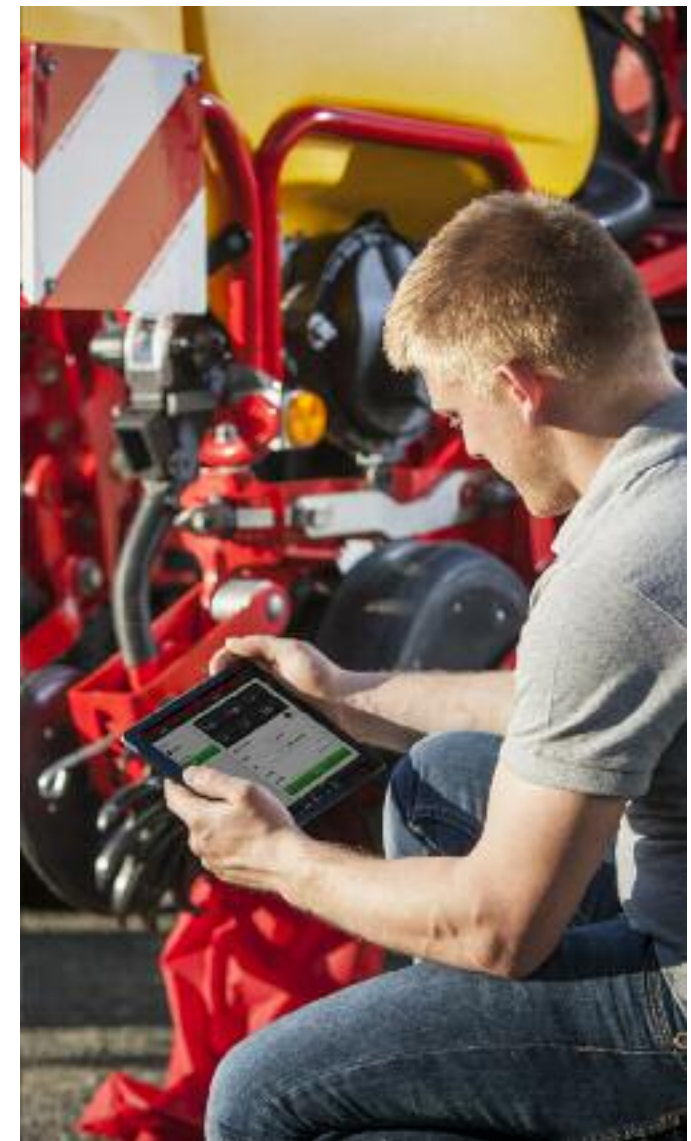


ISOBUS

The ISOBUS terminal is an alternative to machine-specific terminals for controlling machines and implements. Having the same standard model in all machines and equipment makes work easier. The user can carry out many ordinary tasks such as storing work data, troubleshooting, handling headlands and using GPS. Väderstad machines equipped with compatible ISOBUS can control the seed drill and store data via Gateway. ISOBUS and Gateway are connected by cable.

ControlStation

ControlStation is tried and tested, robust and easy to operate. It is mainly used to set and adjust seed rate, lay tramlines, set bout markers, operate half-machine shut-off etc.



Easy calibration

Calibration of Tempo is easy. Place a calibration bag under the seed unit, enter data on row spacing, planned driving speed etc. and select whether the seed rate should be expressed in seeds per hectare or distance between seeds in the row (mm). Run the row unit until E-Control shows 100% and make any adjustments necessary. Replace iPad Air in the holder and start drilling.

Three frame concepts

Tempo F is a trailed precision seed drill that is available in six-row and eight-row formats. There are four different row spacings to choose from. The eight-row version is equipped with extra support wheels that act as a hydraulic bogie to decrease vibrations in the field. Transport width is 3 metres for all versions of Tempo except for machines with 80 cm row spacing, for which the transport width is 3.3 metres. Tempo F is available as a combi with disc fertiliser coulters.

A version of Tempo F without folding is also available. It is a six-row machine with a row spacing of 90/100 cm.

Tempo T is a planter with telescopic wing retraction, carried on the three-point linkage. The machine is available in six-row and seven-row configurations with different row spacings between 50 and 80 cm. Depending on configuration, the machine has a transport width of between 3.36 and 3.5 metres. Tempo T can be ordered as a combi version with either two fertiliser containers of 300 litres each or a fertiliser tank that can hold 1200 litres. The knife fertiliser coulters are standard, but it is possible to choose disc coulters for certain row spacings.

Tempo R is a rigid machine with 4 to 12 rows that is carried on the three-point linkage. The smallest row spacing is 45 cm. The largest possible working width is 9.6 metres. Tempo R frames widths 3,4 and 4.5 m can be fitted with two fertiliser containers of 300 litres each. Tempo R can be equipped for combi-drilling with a front-mounted fertiliser tank. Disc and knife fertiliser coulters are available as options.



Tempo F 8



Tempo T 7



Tempo R 12







Combidrilling for more secure cropping

Combidrilling gives a reliable fertiliser effect and often gives higher yield. By supplying a suitable proportion of the fertiliser at the time of drilling, the number of passes in the field is also reduced. Combidrilling is more important when growing row crops than when growing grain crops, since the fertiliser can be placed at an appropriate distance from the seed. With a precision seed drill, it is also important that the fertiliser coulters do not disturb the surface so much that the carrying wheels on the row units are affected, which would alter the drilling depth, or that the seedbed is affected, which would impair the germination conditions.

Reliable metering

The fertiliser is metered out by a system similar to that used on Rapid, but instead of falling through a seed pipe, the fertiliser is transported with the aid of the fans air flow.

The fertiliser coulters are spring-loaded and can be subjected to up to 150 kg/coulter, which ensures precise seeding even during direct drilling. Tempo F is equipped with disc fertiliser coulters as standard, but knife coulters are available as an option.



The fertiliser hopper has a wide opening, which makes it easy to refill from large sacks or with a telehandler.

Two tank options

Tempo T has either a 1200-litre fertiliser tank with the same metering system as Tempo F, or it is possible to equip the machine with two fertiliser tanks of 300 litres each. Tempo T is equipped with knife-type fertiliser coulters as standard, but disc-type coulters are available as an option.

Tempo fitted with a hydraulically driven fan can also have a mixing auger in the tank. The mixing auger is available as an option.



The fertiliser is metered out by a system similar to that used on Rapid, but instead of falling through a seed pipe, the fertiliser is transported out with the aid of the fan's air flow.



Tempo T with 2x300-litre fertiliser hoppers.

Tempo R equipped for combidrilling

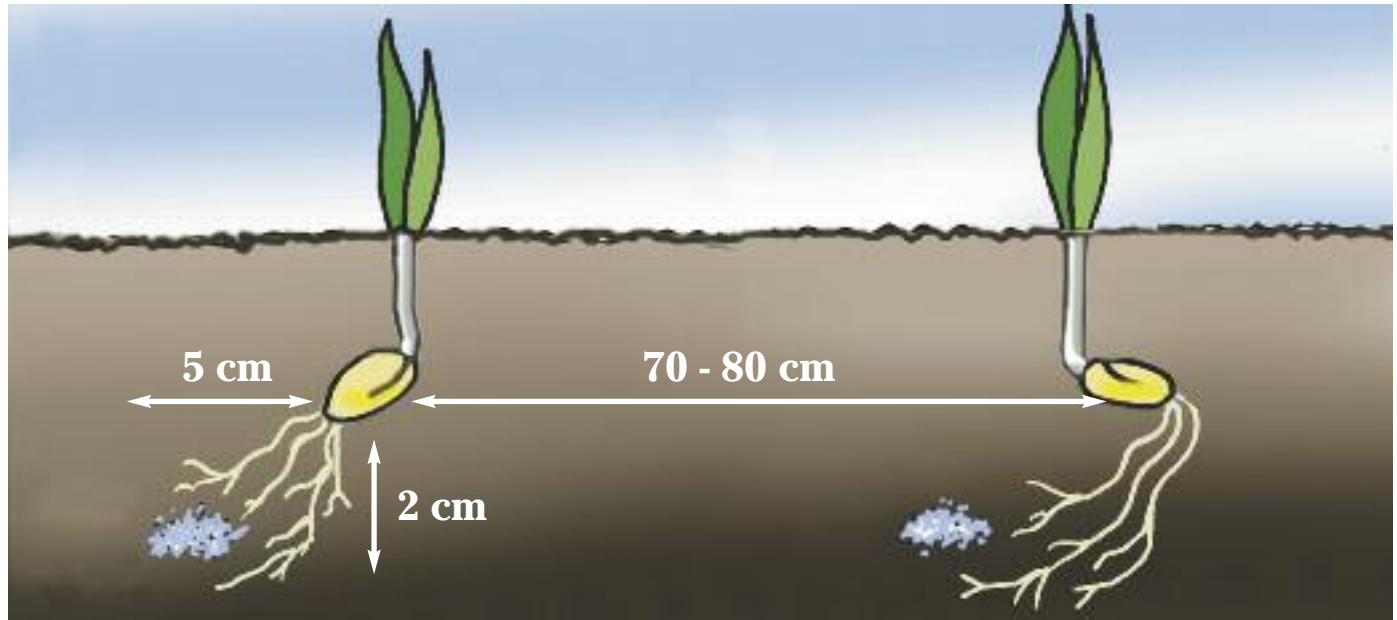
Tempo R with frame widths 3.4 and 4.5 m can be fitted with two fertiliser containers of 300 litres each. The larger Tempo R versions can be pre-ordered ready for combidrilling, solid or liquid fertiliser. In that case Tempo R is fitted with fertiliser coulters, which can be connected to a front-mounted fertiliser tank. The same solution is available for both Tempo F and Tempo T.



Knife fertiliser coulters.



Disc fertiliser coulters.



The fertiliser is placed 5 cm to the side of the seed and somewhat deeper, which gives more reliable establishment and better plant nutrient use efficiency.



Tempo T with large fertiliser hopper.

Tempo suitable in all cropping systems

Tempo is designed to cope with widely differing conditions and to meet the demands that farmers place on modern machines. The row units are built for high speed in conventional, reduced tillage and ploughless cropping systems. The design allows the user to carry out shallow or deep drilling at high speed. The seed hopper holds 70 litres and in the parallel linkage there is a torsion spring that can transfer an additional 150 kg to each row unit. Together with the weight of the actual machine, this gives a maximum load of 325 kg per row unit, which is important in direct drilling and deep drilling at very high speed. Drilling depth is easy to adjust with a lever that controls the relationship between carrying wheel and seed disc.

Drilling after conventional ploughing

In many areas where there is no drought or risk of erosion, the soil is probably ploughed at the time of drilling. First levelling off furrows with Rexius and then complementing this with two passes with NZ Aggressive creates a perfect seedbed for Tempo. There is always a risk of dry soil being harrowed down between the furrows, which can create a seedbed with variable moisture status, leading to uneven emergence. For example in shallow drilling of millet or rape. It can be beneficial to level off the furrows during or directly after ploughing in order to achieve better emergence in spring.



The most usual conditions before Tempo drilling are conventional soil tillage.



Drilling depth is easy to set with a lever that controls the relationship between carrying wheel and seed. The great advantage with trailed carrying wheels is that the machine is easier to draw and that the vibrations in the row units decrease.



Tempo copes easily with plant trash

In a ploughless crop production system where there can be a lot of plant trash left on the surface, row clearers can be used to prevent the risk of seed being placed without soil contact.

In areas with erosion problems or drought, the surface has to be left untilled in order to prevent soil erosion and save moisture for the seed. With the high load per row unit, direct drilling is no problem. In short stubble and heavy plant trash, row clearers are essential.

Where the stubble of the preceding crop is not enough to bind the soil, an intercrop is often grown to counteract erosion. In order to save time, if the crop can cope with growing in another wilting crop, it is possible to drill it directly into the intercrop without first chopping and mixing this into the upper soil layer. If the intercrop is killed off with glyphosate, this must be done at least 14 days before drilling. A half-dead intercrop has a tendency to wrap itself around the seed units.



Tempo drilling into stubble.



Rotating row clearers are an option on Tempo. They have the task of removing trash from the previous crop, clods and stones.



Direct drilling into an intercrop.

Tested for many crops

Seed plates are available in different versions for maize and sunflower. The seed plate to be used depends on the thousand grain weight. In addition, Tempo can cope with a wide range of conditions. In regions with dry conditions, direct drilling to a depth of 7-8 cm to ensure access to soil moisture is no problem.

Maize

Maize is grown in many different conditions. This places high demands on a precision seed drill, which has to be capable of good depth placement in different cropping systems. Tempo can cope with a wide range of conditions. In regions with dry con-

ditions, direct drilling to a depth of 7-8 cm to ensure access to soil moisture is no problem. In other areas with cold, wet conditions shallow drilling to 3-4 cm may be needed to achieve fast emergence.

The flexibility of Tempo and the rapid growth of maize means that maize can be direct drilled into a intercrop or after a crop harvested with a cutter bar. Seed plates suitable for different thousand grain weights are available.

Sunflower

Sunflower is relatively tolerant of drought and can be grown in many different types of soil. However, the soil should be well drained and free from compaction damage so that the sunflower roots can spread out in a good pattern. Sunflower has the ability to retrieve moisture from a depth of two metres if the soil conditions are favourable.



The young sunflower plants are sensitive to wind and wind erosion and therefore it is not uncommon for this crop to be drilled into stubble or into soil with harvest trash left on the surface. This places high demands on the ability of the precision seed drill to position the seed with good soil contact. Sunflower compensates for lower plant density with higher seed production, so the plant population can vary between 35 000 and 70 000 plants/ha. The seed is drilled 2.5-5 cm deep and drilling can be carried out rather early. Sunflower can germinate at 4°C.

Sunflower is good in areas that can have two crops per growing season. Tempo has a clear role as the precision seed drill, as its high coulter pressure can also direct drill accurately, coping with the variety of conditions in areas growing two crops.



Soybean

Soybean is best grown on heavy, nutrient-rich soils with good water-holding ability and slightly lower pH. The soil must be well drained and the seedbed must ensure that the seed makes good contact with the soil, so that it can germinate quickly. The soil temperature should be at least 15°C at the time of drilling to achieve rapid emergence, which is demanding in terms of seedbed preparation. Soybean likes deep, loose soil with no dense layers, while tillage must still be as minimal as possible to save soil moisture. Plant trash on the soil surface prevents wind and water erosion, while retaining moisture. Equipping Tempo with row clearers ensures good contact between seed and soil.

Drilling depth can vary from 2 to 5 cm, shallower on heavy soils and deeper on light soils, to ensure access to soil moisture. Row spacing can vary from 40-90 cm, but plant density should be between 250,000 and 400,000 plants ha./ha.





Millet and sorghum

Millet and sorghum are closely related and require similar conditions, although millet can cope with drier conditions slightly better and gives an earlier harvest. Both crops produce good yields on fertile and well-drained soils, but their well-developed root systems (both vertically and horizontally), tolerate soils with lower fertility and sandy soils with low pH.

Millet must be drilled to shallow depth (1-3 cm) when the soil is warm. This requires efficient seedbed preparation that saves water and mixes any plant trash into the soil effectively. Millet can be used in a no-till system, but the challenge is to place the seed in moist soil. Tempo should be equipped with row clearers to ensure that the seeds come into contact with moist soil. Once the seeds have germinated, the crop likes warm, dry conditions.



Sugar beet

Sugar beet requires a loose soil structure free from compaction damage, which can otherwise effectively prevent the sugar beet from developing. Therefore irrespective of tillage system, compaction damage must be avoided. The row spacing that is optimal for the crop varies between different regions, but is often between 45-55 cm. Tempo can deal with such spacings and also with different target plant populations. Drilling depth is around 2-3 cm, which places high demands on the seedbed.

Rape

Rape likes a loose soil where the taproot can develop to depth. If the soil is compact, the roots become malformed and the ability of the plant to access nutrients and water declines sharply. Rape should be drilled at 1.5-3 cm depth in moist soil. The seedbed must be level to allow the seeds to germinate uniformly. Rape seed requires light in order to germinate. Uneven establishment brings the risk of early developing plants shading the soil, which can cause the ungerminated seeds to become dormant. The plant population for hybrid rape is 250,000-500,000 plants/ha.



From ultra-shallow to deep loosening

Väderstad has a soil tillage range that complements Tempo well. The implements are built on stable frames of high quality, with tools that can work from just a few centimetres depth to create a false seedbed to breaking up compact soil layers at 40 cm depth.

NZ Aggressive – a high performance quality harrow

With a tine spacing of 7.5 cm distributed across five or six axles, maximum cultivation can be combined with high throughflow, saving passes and freeing up capacity. The trusswork frame rests on a bogie carriage which is in an offset position and gives the harrow two carrying lines and a stable passage where every harrow tine works at the same depth, irrespective of whether it is mounted in the first or last row.

The Control function on NZA allows the cultivation depth to be adjusted from the tractor cab on the move. This means that it is easier to adjust the working depth in fields with varying soil texture.

NZA is equipped with CrossBoard with double-acting stabiliser bars as standard to efficiently break up clods and level out irregularities.



NZ Aggressive



Carrier

Carrier - a multifunctional tool carrier

Carrier is a multi-tool for rational crop production that can cope with everything from false to real seedbed preparation. The discs are positioned in an X-shape, which means that the machine runs straight and true behind the tractor. The individually suspended discs give good depth precision and throughflow. The following roller cultivates, reconsolidates and ensures that plant residues make firm contact with the soil. Carrier can be equipped with a range of different tool-bars. CrossBoard with stabiliser bars to crush clods and level ahead of the discs, a straw harrow to spread plant trash evenly across the field or CrossCutter Knife to slice up catch crops or stubble before the discs cultivate the soil further.

The new option, CrossCutter Disc, is designed to slice up unharvested rape pods and encourage volunteer rape to germinate. The ultra-shallow cultivation also initiates breakdown of plant trash and improves profitability by decreasing the incidence of second generation rape hybrids and giving the farmer better control of pests in rape.

Carrier is available with different sizes of discs and can be adapted to crop production on the individual farm. Larger discs for deeper cultivation and large amounts of plant trash, or smaller discs for finer cultivation to give a perfect false seedbed. The discs are conically shaped so that they always maintain the same angle of approach to the soil, irrespective of degree of wear or working depth.

The two large disc sizes have sharp notches, called TrueCut, which maintain a consistent level of aggression against plant trash because wear is more even. They also have disc hubs with MultiSet, allowing the working angle to be adjusted to do the same work irrespective of cultivation depth.

Carrier is available in working widths between 3.0 and 12.25 metres.

Swift – for both wet and dry conditions

Swift is an efficient cultivator which works the soil thoroughly down to 20 cm. The unique construction, with two frame axles each carrying two rows of vibrating tines, gives excellent throughflow of large amounts of plant trash. The vibrating tines create a flow of fine soil and help keep the draught requirement low.

The larger Swift cultivators are equipped with support wheels which ensure a uniform working depth and stable passage at high speeds. The depth is regulated hydraulically from the cab. The cultivator can be equipped with different types of following harrow or a cage roller. Swift is available in working widths between 4.0 and 8.7 metres.

Cultus – a powerful cultivator

Cultus is available as a three-axled and four-axled version. This powerful machine has high performance and durability. The close tine spacing on the four-axled models and tines fitted with MixIn shins mean that the soil is mixed several times over, while large amounts of straw are efficiently distributed behind the machine and mixed into the soil. The field is ready after one pass.

Working depth is controlled hydraulically from the cab, which makes the machine flexible in fields with various soil textures. Folding tines are available as an option if it is necessary to work deeper with the same tractor. The machine works most effectively at speeds of 10-12 km/hour.

The cultivator is supplied with a steel roller or rubber roller. For the smaller trailed versions there is also a cage roller option. The three-axled versions are available as trailed or carried models with between 3 and 4 metres working width. The four-axled models are available with between 4.2 and 5 metres working width.



Swift



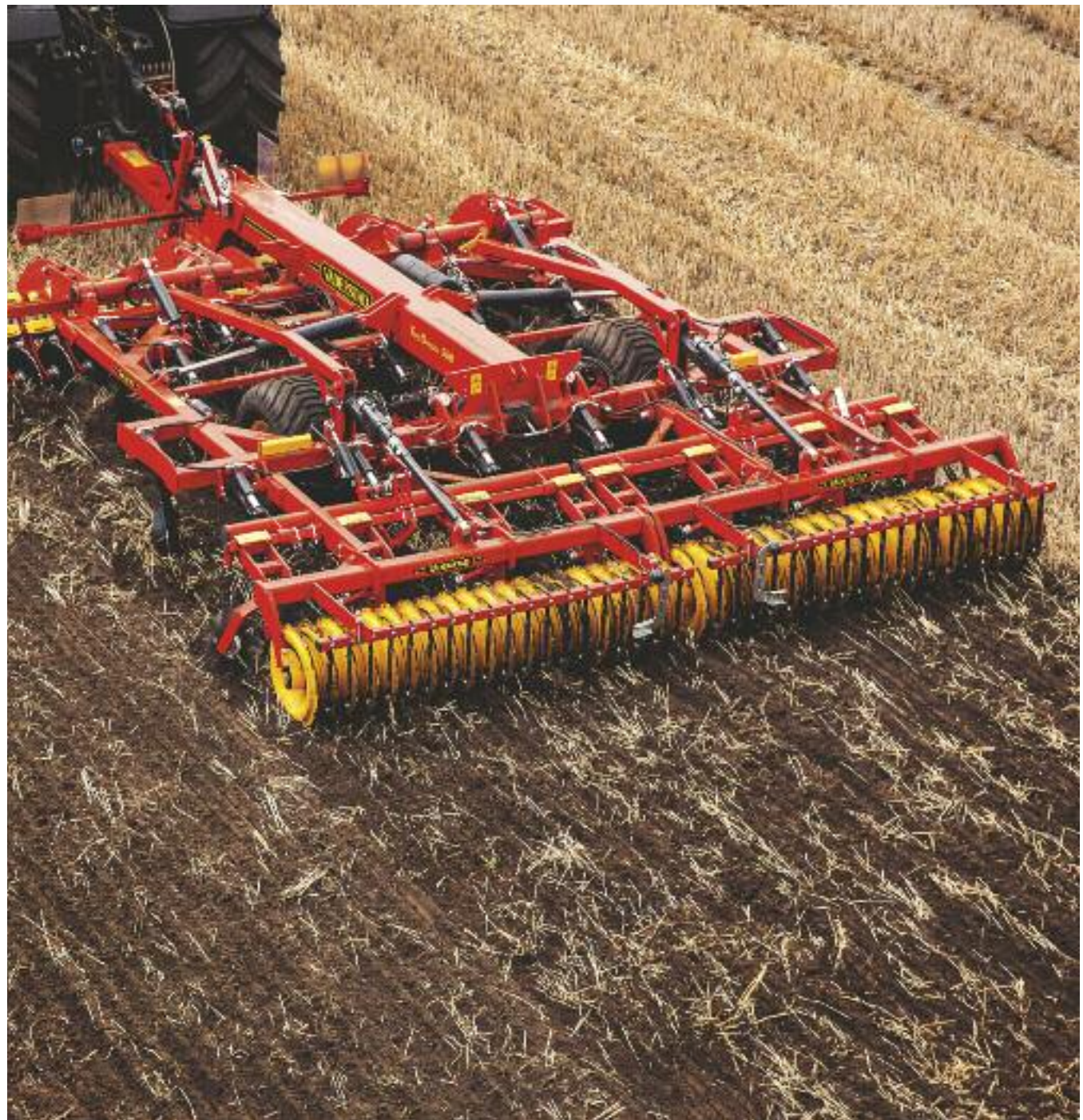
Cultus

TopDown – unbeatable flexibility

With TopDown, a single machine can create a false seedbed, break up hard soil layers down to 40 cm depth or create a perfect seedbed in one pass. TopDown is designed to slice up the entire soil surface, mix in plant trash and loosen to depth, all in a single pass. Finally, the surface is levelled and any remaining clods are crushed and reconsolidated by the roller. The advantage of TopDown is that the tine section can be lifted so that only the discs and roller are in work. Alternatively, the disc section can be lifted so that only the tines and roller are in work, or all parts of the machine can be put to work, with only the degree of reconsolidation being regulated. In wet conditions, the roller can be removed. TopDown is a versatile machine that can be used in many different conditions.

Folding tines are available as an option and can be a good alternative when working very deep with DeepLoosening points, without having to change to a larger tractor. LowDisturbance is also an alternative that requires lower draught power if the aim is only to work to depth and not invert the soil.

TopDown is available in working widths between 3 and 9 metres.



TopDown



Despite the high average speed of 18 km/h, the maize was established quickly and with high precision.

Record with Tempo F

In a 24-hour race on 24-25 April, 2013, Tempo F 8 drilled 212 hectares of maize at an average speed of 18 km/h.

Each row unit drilled 26.5 hectares, a 42% increase in capacity per row unit compared with the existing official world record, which was set with a 24-row planter in 2012.

This record attempt was made in two areas near Kiev, in the fertile black soils of this arable areas and began at 10.50 am on 24th of April and finished 24 hours later. Three drivers working in shifts drilled 212 hectares of maize at an average speed of 18 km/h. Drilling was monitored by the Ukrainian Institute for Certification of Agricultural Machinery. The soil was drilled at approx. 5.2 cm depth, with a seed rate of 85 000 seeds per hectare, and fertiliser was applied at a rate of 130 kg per hectare.



After 24 hours, 212 hectares had been drilled with very good precision.

Good emergence from the 24-hour race

The Ukrainian Institute for Certification of Agricultural Machinery has published measurements relating to the 24-hour race in Ukraine. The precision, presented as coefficient of variation (CV), in the tests was 25.5%. This can be compared with the average in Europe, which normally has a CV value of around 40%.

Serhii Marinin, Director of the Institute, oversaw the calculations.

“The quality is exceptionally good in view of the average speed of 18 km/h. In addition, the preparations were completed in less than ten days. During the planning phase, speed was the focus, which meant that we were not expecting such fantastic results” said Mr Marinin, “This shows the ability of the Tempo machine to drill with great precision at high speed”.



Serhii Marinin, seen here shaking hands with Crister Stark, was not expecting such fantastic results.



The race was run together with Titan Machinery and Case IH.

Tempo R sets new record with sunflower

Väderstad decided to challenge Tempo again and enthusiastically set to work on a 24-hour race in Bulgaria, this time with a 12-row Tempo. Much preparation and organisation was needed ahead of the race and the expectations were great.

In a 24-hour race on 3-4 April 2014, Tempo R 12 drilled 306 hectares of sunflower at an average speed of 19 km/h. The Väderstad Tempo race was held north of Sofia, together with Väderstad's Bulgarian import agency Titan Machinery and Case IH.

It showed the enormous ability of Tempo R to drill sunflower with great precision at high speed.



The tractor and machine was filled six times with sunflower seed and diesel, each filling taking five minutes.

The starting gun sounded at 1.45 pm on 3rd April and the race ended 24 hours later. Four tractor drivers took turns drilling 306 hectares of sunflower on the Agrotrade Commerce farm. This farm grows around 5000 hectares of grain and 1000 hectares of sunflower annually. Sunflower is the largest crop in south-east Europe. The field was drilled at 5 cm depth with a seed rate of 62,500 seeds per hectare.



The night shift went well. Four Bulgarian tractor drivers took turns at driving.



Iliyan Andronov, part-owner of the 5000-hectare Agrotrade Commerce farm, is delighted with the result. On the farm, 1000 hectares of sunflower are drilled annually.



Sunflower is the most important crop in south-east Europe and it is really exciting to be able to demonstrate the fact that sunflower can be drilled with great precision at high speed.

Options



Elevated air intake

Most Tempo machines can be fitted with an elevated air intake, greatly reducing the amount of waste entering the metering system in dusty conditions.



Fertiliser hopper

A central fertiliser hopper makes it easy to fill the machine with an efficient filling system.



Microgranule hopper

The containers for microgranules hold 17 litres each and are used for either fertiliser or pesticide, which is drilled in or on the same furrow as the seed.



Bout markers

The markers make a clear trace, even in minimum tillage systems.



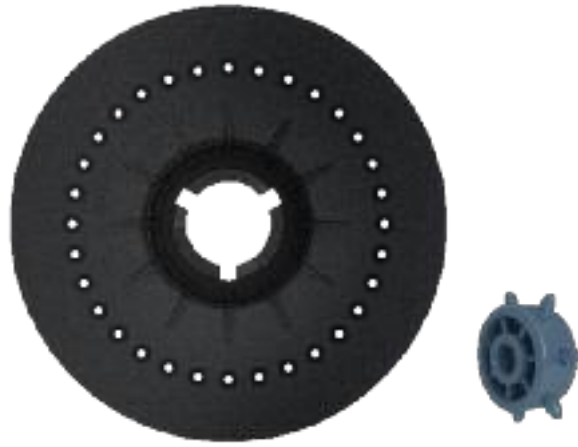
Row clearers

With minimum tillage and heavy plant trash on the soil surface, row clearers are recommended.



Hydraulic wing folding

Hydraulic wing folding is an option for those who want to unfold the wings on Tempo F easily from the cab.



Seed plates and knockout wheel

A seed plate for maize with 32 holes and 5.5 mm diameter is standard. Seed plates with different hole sizes for maize and for sunflower, millet, sorghum, rape, sugar beet and soybean are optional.



Fertiliser coulters

Fertiliser coulters are available as a disc and knife.



Filling auger

The hydraulically driven filling auger simplifies fertiliser refilling. The filling auger is manufactured from stainless steel and has a diameter of 150 mm. This filling auger is an option for TPF and for TPT with 1200-litre fertiliser hopper.



Agitating shaft

The fertiliser tank can be fitted with a agitating shaft on Tempo machines with hydraulic drive.



Brakes

Hydraulic or pneumatic brakes are available as options.

TEMPO TECHNICAL DATA

Model	Tempo T 6	Tempo T 6	Tempo T 7	Tempo T 7	Tempo T 7	Tempo F 6	Tempo F 6	Tempo F 6	Tempo F 8	Tempo F 8
Number of rows	6	6	7	7	7	6	6	6	8	8
Row spacing (mm)**	600-750	762-800	500	550	600	700-762	800	900-1000	700-762	800
Working width (m)	3,60-4,50	4,57-4,80	3,5	3,85	4,20	4,20-4,57	4,8	5,4-6,0	5,60-6,10	6,4
Transport width (m)	3,36	3,5	3,36	3,5	3,5	3	3,3	5,4	3	3,3
Transport height (m)	3,2	3,2	3,2	3,2	3,2	3,2-2,9	2,9	3,8	3,8-3,4	3,4
Weight without combi (kg) min-max*	1600-2050	1600-2050	1750-2250	1750-2250	1750-2250	2000-2700	2000-2700	2000-3100	2700-3400	2700-3400
Weight with combi (kg) min-max*	1800-2750	1800-2750	-	-	2000-2500	2700-3300	2700-3300	2800-3800	3400-4200	3400-4200
Seed hopper (l)	70	70	70	70	70	70	70	70	70	70
Microgranule hopper (l)	17	17	17	17	17	17	17	17	17	17
Fertiliser hopper	2x300/1200	2x300/1200	-	-	2x300	1275	1275	1700	1700	1700
Draught requirement (hp) from	70	70	80	80	80	70	70	90	90	90
Hydraulic requirement	2-3 DA+FR	2-3 DA+FR	2-3 DA+FR	2-3 DA+FR	2-3 DA+FR	1-4 DA+FR	1-4 DA+FR	1-4 DA+FR	1-4 DA+FR	1-4 DA+FR

*Machine weight unloaded, depending on version

**Actual row spacing (mm),

T6: 600, 650, 700, 750, 762, 800

T7: 500, 550, 600

F6/F8: 700, 750, 762, 800

F6: 900, 1000

DA=double acting FR = Free return

TEMPO TECHNICAL DATA

Model	Tempo R 4	Tempo R 4	Tempo R 6	Tempo R 6	Tempo R 6	Tempo R 6	Tempo R 7	Tempo R 8	Tempo R 9	Tempo R 12	Tempo R 12
Number of rows	4	4	6	6	6	6	7	8	9	12	12
Row spacing (mm)**	700-800	700-800	450-500	450-500	700-800	900-1000	600	700-800	600	450-500	700-800
Working width (m)	2,8-3,2	2,8-3,2	2,7-3,0	2,7-3,0	4,2-4,8	5,4-6,0	4,2	5,6-6,4	5,4	5,4-6,0	8,4-9,6
Transport width (m)	3	3,4	3	3,4	4,5	6	4,5	6	6	6	8 (700 mm) 9,1
Weight without combi (kg) min-max*	1100-1300	1100-1500	1300-1700	1300-1800	1400-1900	1700-2200	1500-2000	2000-2500	2100-2700	2500-3200	2800-3700
Weight with combi (kg) min-max*	-	1300-1750	-	1500-2250	1700-2350	-	1900-2550	-	-	-	-
Seed hopper (l)	70	70	70	70	70	70	70	70	70	70	70
Pesticide hopper (l)	17	17	17	17	17	17	17	17	17	17	17
Fertiliser tank (l)	-	2x300	-	2x300	2x300	-	2x300	-	-	-	-
Draught requirement (hp) from	70	70	70	70	100	150	100	150	150	200	250
Hydraulic requirements	1-2 DA+FR	1-2 DA+FR	1-2 DA+FR	1-2 DA+FR	1-2 DA+FR	1-2 DA+FR	1-2 DA+FR	1-2 DA+FR	1-2 DA+FR	1-2 DA+FR	1-2 DA+FR

*Machine weight unloaded, depending on version.

**Actual row spacing (mm),

R4: 700, 750, 762, 800

R6: 450, 500, 700, 750, 762, 800, 900, 1000

R7: 600

R8: 700, 750, 762, 800

R9: 600

R12: 450, 500, 700, 750, 762, 800

DA=double acting FR = Free return



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