Product Catalogue 2020

MachineryGuide

for precision agriculture

The MachineryGuide System

MachineryGuide devices and softwares are designed to work both as **individual units** and as a **complete system**. Devices use wireless communication (via WiFi or Bluetooth), to make installation simpler and faster. They can be connected to optimize their functioning capacity and to make it easier to transfer data between them.

Bluetooth receivers to receive GPS signals from the antenna.
- SM1 for sub-meter accuracy
- DM1 for decimeter accuracy
- CM1 and CM2 for centimeter accuracy

Cloud service to connect all MachineryGuide devices and applications.

GPS, GLONASS, SBAS and RTK antennas for connection to guidance signals.
- Easily mountable on the machinery
- Stable connection

BSC section controllers and BHC hydraulic controllers for sprayers, PSC planter controllers for planters
- BSC for manual pressure control
- BSC Plus for automatic pressure control
- BSC Pres for application rate and section
- BSC Flow for flow sensor support
- BHC
- PSC

Easily mountable automatic steering solution developed by MachineryGuide. It can place the MachineryGuide guidance system amongst the precision technology performing at the highest possible accuracy.

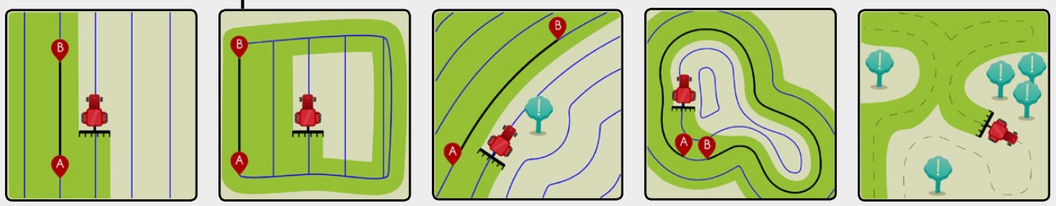
Tablet mount with MachineryGuide, Orchard application or BSC software
Flexible tablet mount for heavy-duty use

MachineryGuide Application

MachineryGuide is an agricultural guidance app for Android devices that helps the user to keep track of the cultivated area and overlaps. It also helps the user in edging along the ideal track by gearing to straight reference lines. A precision guidance system can be built by simply buying the application and an antenna.

MachineryGuide software is a practical easy-to-use and innovative solution for all, primarily small and medium sized farms.

Guidance patterns:

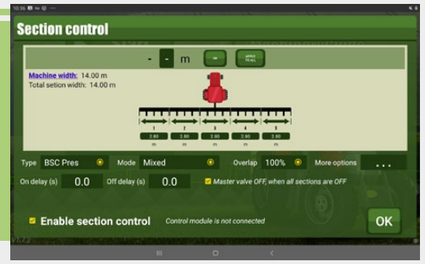


AB straight | AB sorrounding | AB curve | AB round curve | Freeland

Visual Section Control

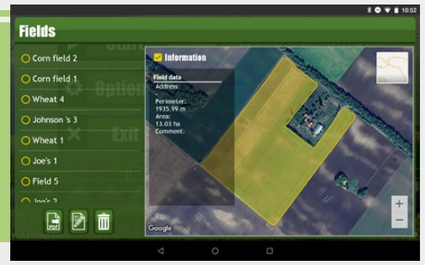
Up to 12 sections, all with individual width settings.

- Optional Automatic section control and application rate control with BSC, BSC Plus, BSC Pres or BSC Flow module



Session and Field Handling

- Detailed statistics
- PDF and KML export function
- Cloud-based data management integration

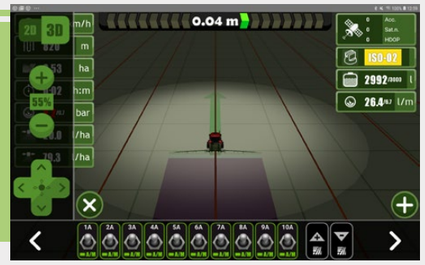


Night View Mode

Working under poor visibility due to adverse weather conditions

Customizable display settings

- 3D or 2D view
- Color settings for navigation lines



Realistic 3D Models

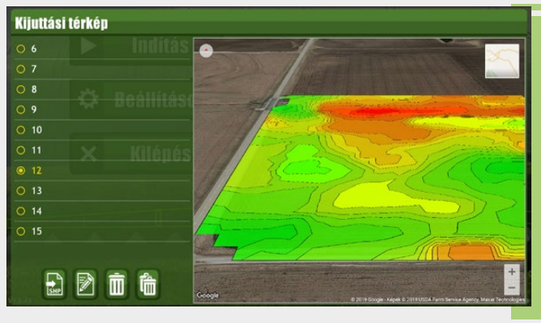
Tractor, tractor with mounted sprayer, harvester, planter and arrow models to visualize the work process on the field.

MachineryGuide Extra Functions

The development of the MachineryGuide software continues with extra functions which enable further measurements, field work efficiency and precision. The handling of application prescription maps is such a function with which farmers can have the needed work done on their field with high level of specification. The issue of having different type of trailed equipment is also solved as the application is able to follow and model such flow in the movement of the machinery, further increasing the accuracy of work on the field.



SHP Import Option



Import SHP Files

Variable rate application prescription maps can be handled by the app.
The file can have multiple attributes per map of which the user can select which one should be applied.

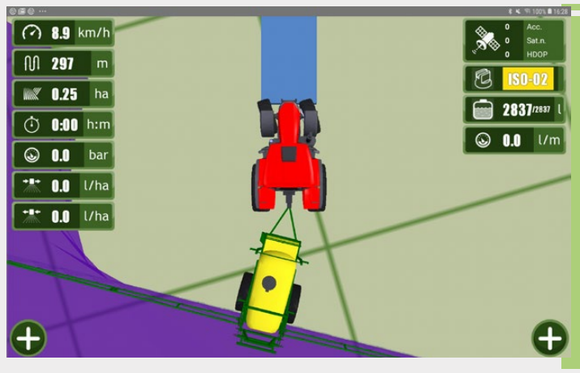
Automatic Application Rate

Farmers using BSC Pres or BSC Flow will have automatic variable rate control according to the loaded prescription map.

Visual Application Rate

Option of manual rate application.
Without any of the BSC units the farmer can still see on the map which application sector is he in and adjust the application rate accordingly.

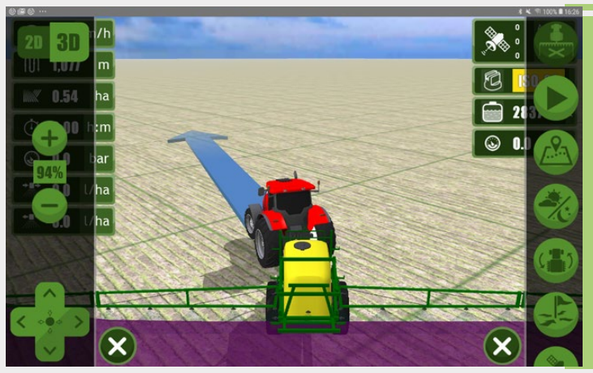
Trailed Machinery Option



Realistic Trailer Behavior

Primarily designed for section controllers to achieve a higher accuracy of overlap avoidance by realistically 3D modelling the behavior of the machinery. However, further accuracy is achieved in all farm works with a trailer.

Advanced Graphic Options



Shadows and Ground Textures

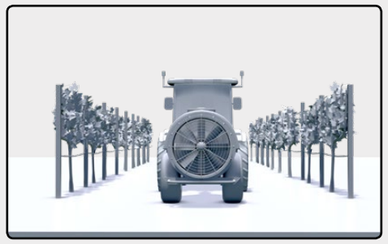
An exciting esthetical function where the showing of ground texture and the shadow of the 3D models can be enabled.

MachineryGuide Orchard

MachineryGuide is proud to introduce the world novelty MachineryGuide Orchard. There are a variety of guidance applications made for crop agriculture work, however orchard farms have been left to use precision guidance technology which were not designed for orchard use. MachineryGuide stands out by filling in the need for the orchard farmers to have their own precision guidance solution which focuses on the specific needs of field work in an orchard.

MachineryGuide Orchard is a world novelty in the area of orchard precision guidance technology, ready to be used in orchards and vineyards alike.

Orchard Visualizaton Options:



Vineyard

Orchard

High-End User Interface

No expense was spared when designing the interface of the app in order to achieve the best user experience while working in the orchard with the MachineryGuide system.

Session and Field Handling

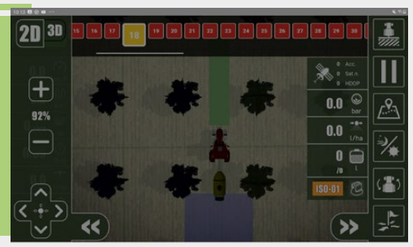
- Detailed statistics
- PDF and KML export function
- Cloud-based data management integration

Night View Mode

Working under poor visibility due to adverse weather conditions

Customizable display settings

- 3D or 2D view
- Color settings for navigation lines



Realistic 3D Models

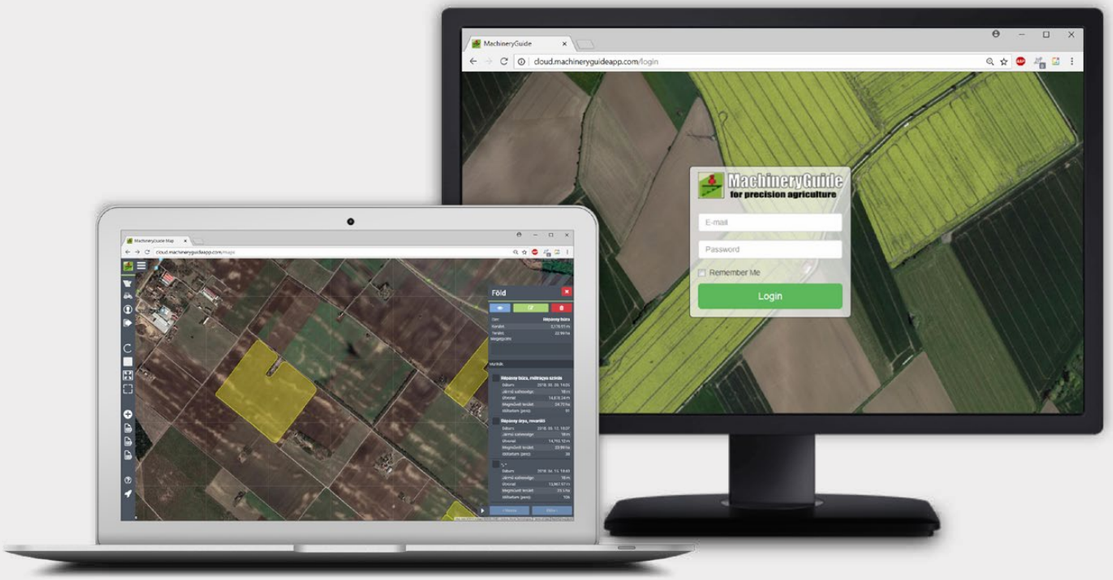
When working with a trailer sprayer, the application can realistically model the movement of the machinery to provide for an even more accurate field work.

MachineryGuide Web Services

Data stored on the tablet can be synchronized with the CLOUD service, so all the data of saved fields and jobs can be displayed and managed on any computer or smartphone at any time. The service has several functions that make data management easier. Cultivated areas, paths, overlaps and many other information can be displayed, what makes the managing of the farming diary much more simple or could even replace it.

Browser Based Service

MachineryGuide CLOUD is a browser based service, so no installation is needed to use it. This makes it highly mobile and comfortable to use. The CLOUD service can be synchronized with other MachineryGuide apps, so all the saved jobs even from multiple devices can be managed within one service.

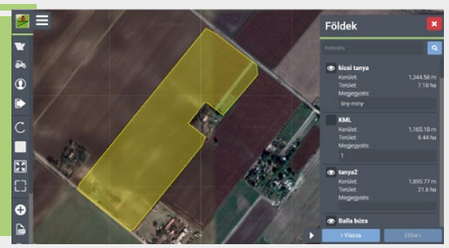


After Login

All the saved fields of the farm can be seen on the starting page after login. Previously saved jobs can be checked by clicking on its corresponding field.

Fields Menu

All the saved fields of the farm are shown in a list for easy access. Individual field with their data can be checked by selecting it from the list.



Sessions Menu

All the saved work areas of the farm are shown in a list. The path of the used machinery and the saved sessions can be managed upon selection.

Adding a New Area

There are several ways to add new areas to the service, for example by marking the boundary coordinates on the map or by importing KML, KMZ or SHP files.

MachineryGuide GNSS Receivers

Bluetooth GNSS receivers provide the connected Android device with highly accurate GPS coordinates for guidance. It is fairly easy to install the receiver and the antenna to any kind of agricultural machinery, there is no need for special adapters or connectors. The only requirements are a cigarette plug or a three pin plug as the DC source and a magnetic surface to mount the antenna.

SM1 GNSS Unit

SM1 GNSS solution provides submeter pass-to-pass accuracy, which is suitable for agricultural field activities like spraying and fertilization. The dual band antenna and receiver processes GPS, GLONASS and SBAS signals to provide high precision positioning data with a 10Hz update rate.

- GPS, GLONASS and SBAS signals
- EGNOS/WAAS/MSAS correction
- Bluetooth 2.0 connectivity
- 10 Hz position update rate
- Antenna Gain LNA: 28 dB typ.
- RF connector type: SMA
- Durable connections and aluminium case
- Submeter Pass-to-pass accuracy (+/-30-40 cm)
- Absolute position accuracy: <2.5m
- Applications: spraying and fertilization

DM1 GNSS Unit

DM1 GNSS solution provides decimeter pass-to-pass accuracy, which is suitable for most agricultural field activities. The external antenna and receiver processes GPS and SBAS signals; and uses PPP real-time calculations to provide high precision positioning data with a 5Hz update rate.

Specifications:

- GPS and SBAS signals
- EGNOS/WAAS/MSAS and PPP correction
- Bluetooth 2.0 connectivity
- 5 Hz position update rate
- Antenna Gain LNA: 40 dB typ.
- RF connector type: SMA
- Durable connections and aluminium case
- Absolute position accuracy: <1 m
- Pass-to-pass accuracy is typically 10-20 cm
- Applications: sowing, plowing etc.

CM1 RTK Unit

CM1 RTK solution provides centimeter pass-to-pass accuracy, which is suitable even for the most precise agricultural field activities. The external antenna and receiver processes GNSS signals and uses RTK correction to provide high precision positioning data with a 10Hz update rate.

Specifications:

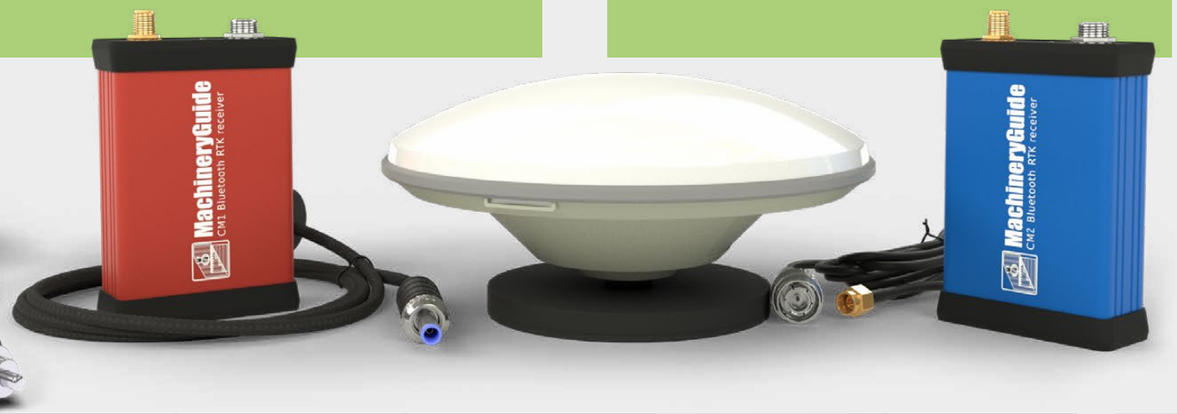
- GPS L1, GLONASS L10F frequency
- Bluetooth 2.0 connectivity
- 10 Hz position update rate
- Antenna Gain LNA: 40 dB typ.
- RF connector type: SMA
- Durable connections and aluminium case
- Centimeter Pass-to-pass accuracy (<2-3 cm)
- Absolute position accuracy: <2-3 cm
- Application: all agricultural activities

CM2 RTK Unit

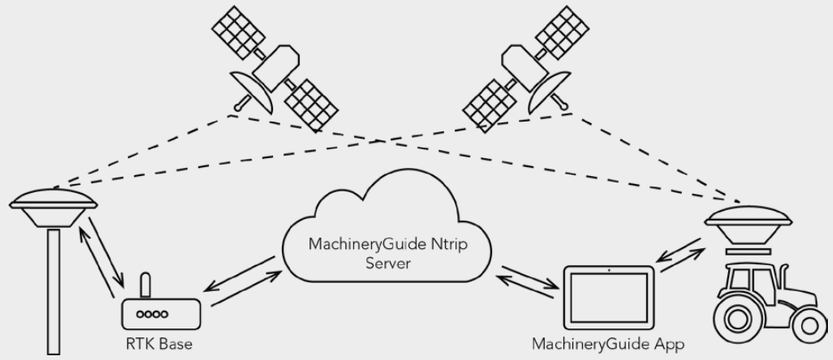
CM2 RTK dual band solution provides centimeter level pass-to-pass and absolute accuracy when receiving the RTK correction. Due to its dual band feature without receiving any correction the CM2 is still able to provide an accuracy level which is suitable for a number of farming field works. The update rate is up to 20 Hz.

Specifications:

- GPS L1C/A L2C, GLO L1OF L2OF, GAL E1B/C E5b, BDS B1I B2I, QZSS L1C/A L2C
- Bluetooth 2.0 connectivity
- Update rate: RTK up to 20 Hz
- Antenna Gain LNA: 40 dB typ.
- RF connector type: SMA
- Durable connections and aluminium case
- Centimeter Pass-to-pass accuracy (<2-3 cm)
- Absolute position accuracy: <2-3 cm
- Application: all agricultural activities



MachineryGuide RTK Base

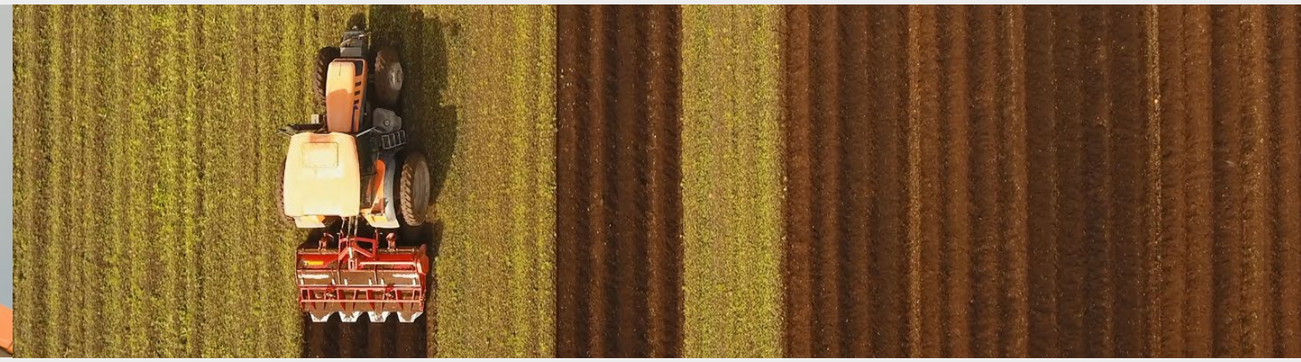


RTK Base Station

The base station is a dual frequency station. It should be placed on the highest possible building of the farm compound from where the station connects to WiFi and sends the corrections to the MachineryGuide application through the NTRIP server. After installing the base station, all the tractors of the farm can be supplied with RTK RTCM3.X correction which have the needed precision guidance unit as the CM1 or CM2.

Specifications:
- Processed signals: GPS, GLONASS, BeiDou, Galileo
- Operates using 230 and 110 volts

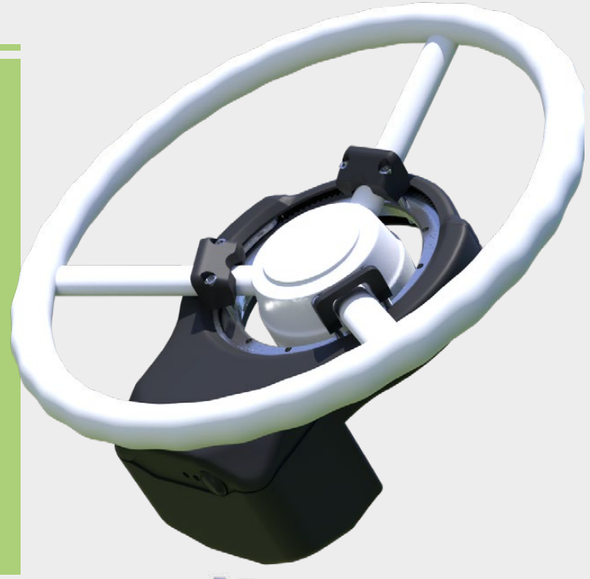
MachineryGuide Automatic Steering

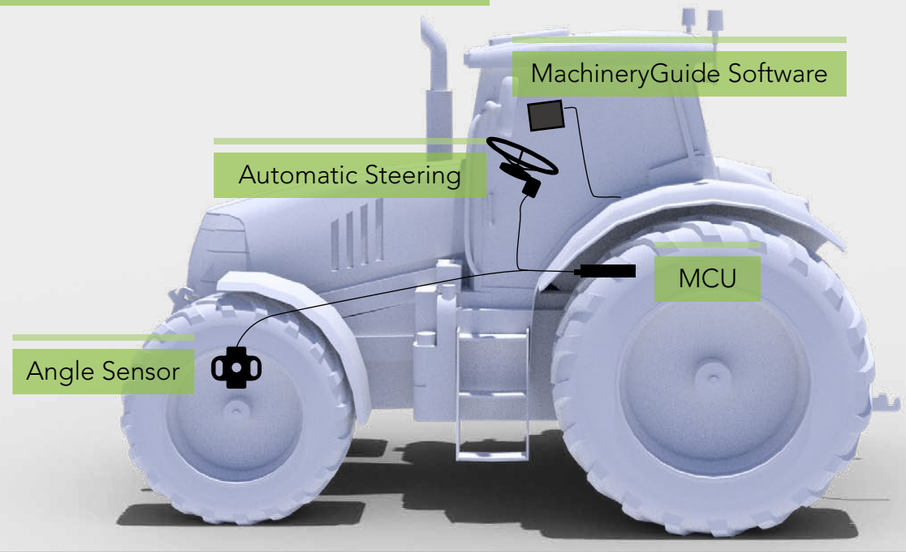


Automatic Steering

The automatic steering solution developed by MachineryGuide was purposefully designed in order for it to be easy to use and easy to install. The implementation of the device does not require the steering mechanics of the tractor to be disassembled, instead it can be attached to the outside of the steering wheel. In terms of software, the solution can be used with both the MachineryGuide guidance application and the MachineryGuide Orchard application.

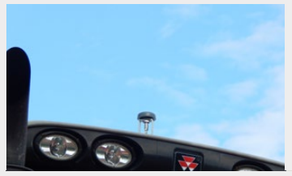
Regarding hardware compatibility, its construction makes it applicable with numerous steering wheel designs. Its accuracy is equivalent to the accuracy of the GPS unit being used in the tractor.





MachineryGuide Section Controllers

The MachineryGuide application enables automatic section control when connected with the BSC or the BSC Plus section controllers. When the BSC Pres or the BSC Flow is used however, the available work functions include automatic section control, automatic application rate control and variable rate control as well.



BSC Unit

BSC unit is an automatic boom section controller, with the ability to control the connected electric valves in both manual and automatic mode.

Specifications:
- Section control up to 12 valves
- Supports one master valve
- Compatible with 2-wire and 3-wire electric valves
- Supports multiple displays
- IP66 durable plastic case
- Wireless (WiFi) and serial interface
- Easy installation
- Ideal solution to upgrade manual valves

BSC Plus Unit

BSC Plus unit is an automatic boom section controller, with the ability to controll the connected electric valves in both manual and automatic mode and measure pressure. The unit also gives the option to manually control the volumetric valve.

Specifications:
- Section control up to 12 valves
- Suports one master valve
- Pressure sensor handling
- Volumetric valve control
- Compatible with 2-wire and 3-wire electric valves
- Supports multiple displays
- IP66 durable plastic case
- Wireless (WiFi) and serial interface
- Easy installation
- Ideal solution to upgrade manual valves

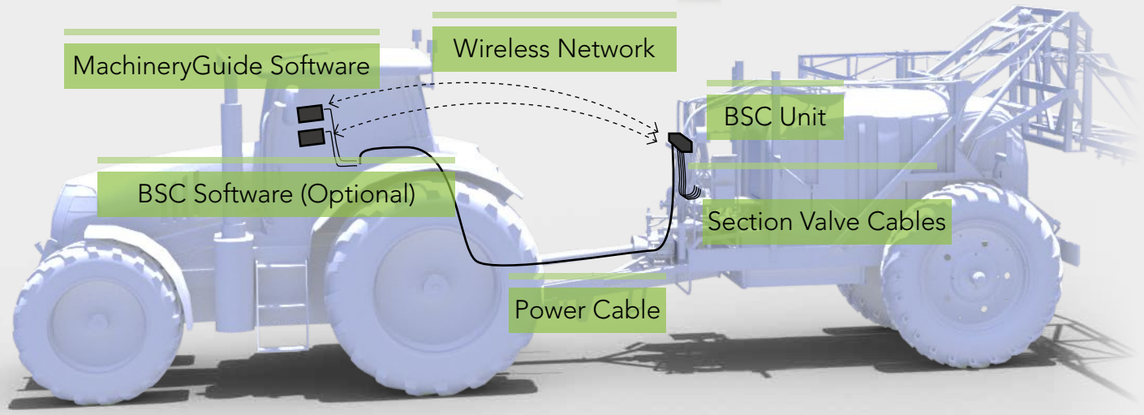
BSC Application

BSC app is the application which controls the BSC, BSC Plus. For manual section control and remote pressure control.

MachineryGuide

The MachineryGuide application can be connected to all BSC units to make work on the field more effective. When connected to the BSC unit, the application detects overlaps and automatically turns the sections on and off to minimize wasted spray.

Displayed Measurements:
- Actual speed
- Actual application rate
- Covered area
- Volume valve pressure



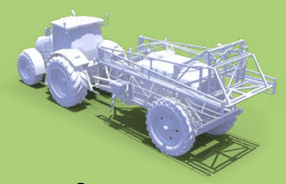
MachineryGuide Application Rate Controller

MachineryGuide application rate and section controllers are designed to be installed on any sprayer equipped with compatible electric valves. The BSC modules have an Android application, so the user can control the valves from the cabin of the machinery. The application also helps the user to maintain the set application rate at any speed. If connected to the MachineryGuide guidance software, the controller works as an automatic section controller, detects overlaps and automatically controls the valves accordingly.

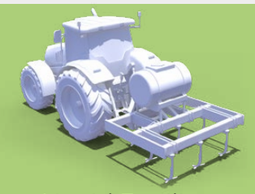
BSC Pres Unit

BSC Pres is a pressure measurement based automatic application rate controller and section controller module. The unit handles 2 and 3-way electric valves, a shut-off valve, a volumetric valve, and a pressure sensor. Speed information is received from the highly accurate GPS receiver to avoid the complex wheel-proximity sensor and its calibration.

Applications:



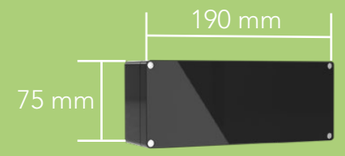
Sprayer



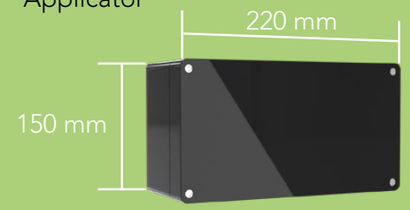
Liquid Fertilizer Applicator

Orchard Sprayer

Enclosure Options:



Small Casing



Normal Casing

BSC Flow Unit

BSC Flow is a flow measurement based automatic application rate controller and section controller module. The flow sensor makes the functioning and measurements of the unit highly accurate. The unit handles 2 and 3-way electric valves, shut-off valve, volumetric valve, and presure sensor. Speed information is received from the highly accurate GPS receiver to avoid the complex wheel-proximity sensor and its calibration.

Supported Nozzles:

- ISO-01
- ISO-015
- ISO-02
- ISO-025
- ISO-03
- ISO-04
- ISO-05
- ISO-06
- ISO-08
- ISO-10
- ISO-15
- ISO-20

Additional options to create a custom nozzle library

Main features	BSC Pres		BSC Flow	
	Small	Normal	Small	Normal
Sections up to 4	x	x	x	x
Sections up to 12		x		x
Volumetric valve	x	x	x	x
Master valve	x	x	x	x
Pressure sensor	x	x	x	x
Flow meter			x	x
Implement switch	x	x	x	x
Serial output for BHC	x	x	x	x

MachineryGuide Planter Controller

The MachineryGuide solution for making the planting process more efficient. It was designed to be compatible with vacuum seeders. A main aspect of its accuracy is achieved by measuring the number of seeds going through each seeding unit. The seeding units are then controlled by electric clutches. Furthermore, the system is compatible with the MachineryGuide Hydraulic Controller unit.

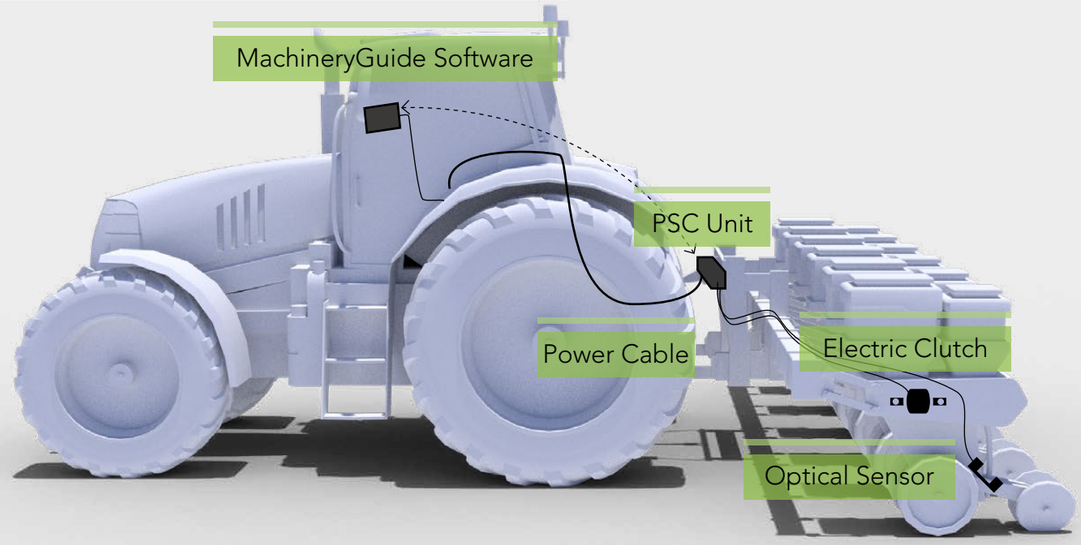
PSC Controller

The PSC controller is a stand alone unit to be used with the MachineryGuide guidance solutions. Together with the guidance unit it is able to provide automatic seeding for the planters. One PSC controller can monitor and control up to 12 seeding units, as it has 12 optical sensor inputs. However, it can be installed on seeders with more sections, in that case additional control modules can be connected to meet the needed seeder unit number through a CANbus network.

User Interface

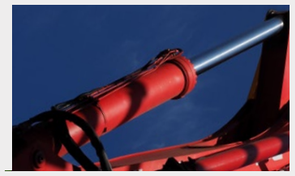
The MachineryGuide software incorporates all the functions of the planter control, providing the farmer with all the needed precision guidance under one display. In the application the planter guidance functions include the control of the seeder units automatically or half-automatically.

Another function of the application is the portrayal of the seeder units' work done on the field in relation to the set seed / hectare amount. Divergence from the set amount is shown by displaying different colors on the field work. The divergence display is shown for every seeder unit.



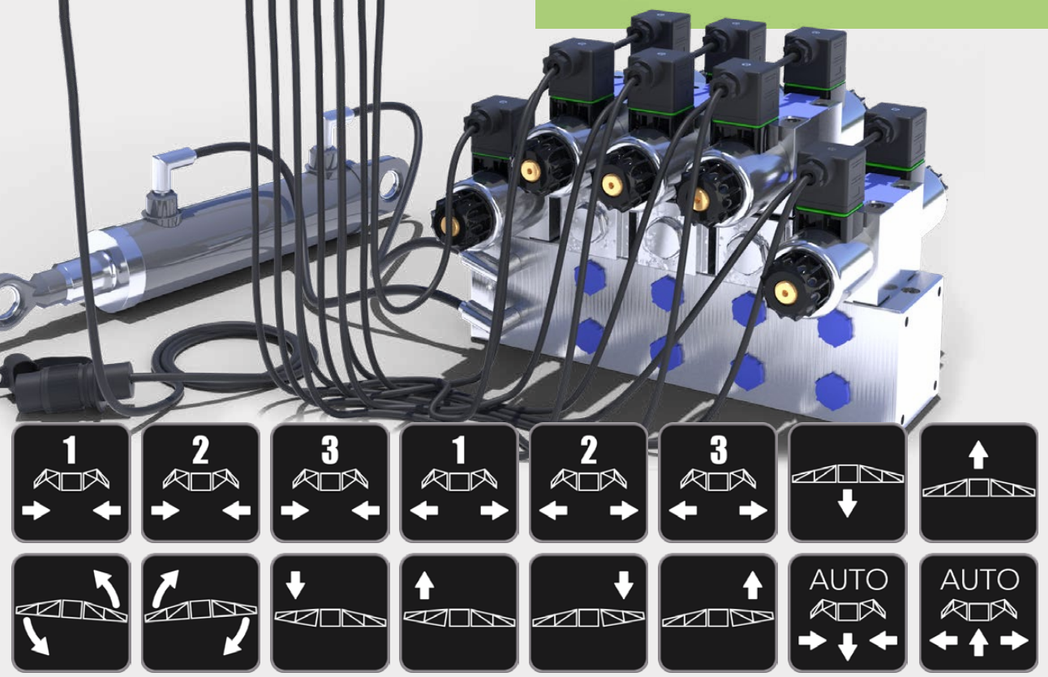
MachineryGuide Hydraulic Controller

The BHC hydraulic controller, as the other MachineryGuide products, can be modularly joined into a system. It can be used together with the BSC section controllers or even with the PSC planter controller. The use of the BHC makes the connection of tractors easier with machinery which has hydraulic cylinders. Furthermore, it enables the manual and automatic control of the hydraulics as well.



BHC Controller

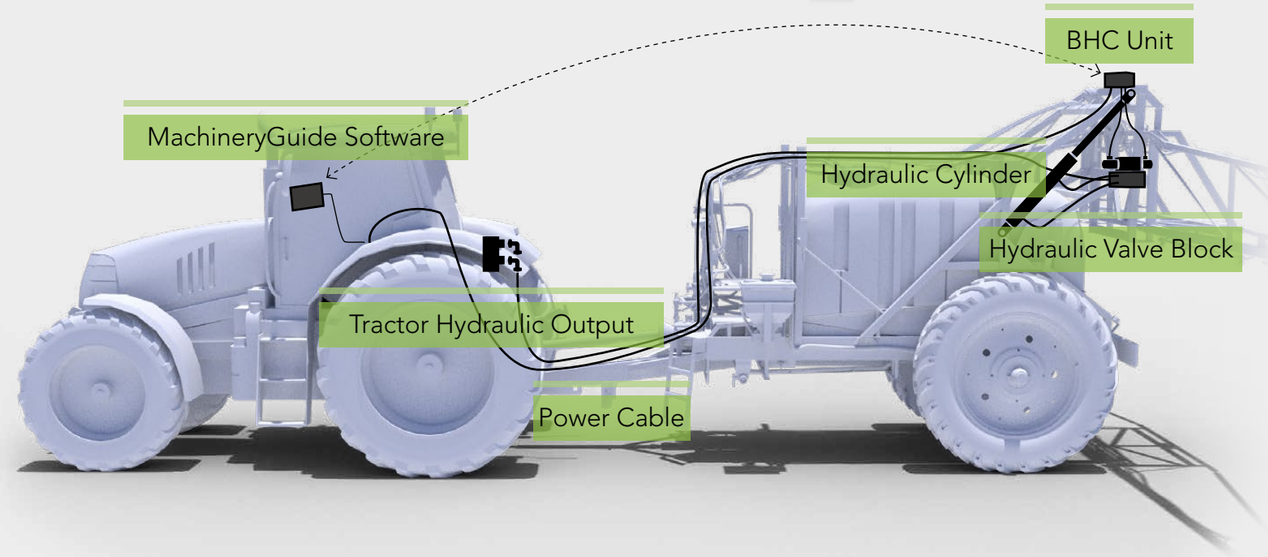
The goal of the BHC controller is to connect only one hydraulic hose to the back of the tractor, which through one hydraulic valve block can supply all the cylinders of the machinery. The BHC is able to control the coil of the hydraulic block. The system is capable of managing 18 + 1 coils which enables 9 types of movement. The manual movement functions can be placed into a timed sequence, in this way for example an entire sprayer boom can be lifted, opened and lowered with the press of a button accessible in the MachineryGuide software.



User Interface

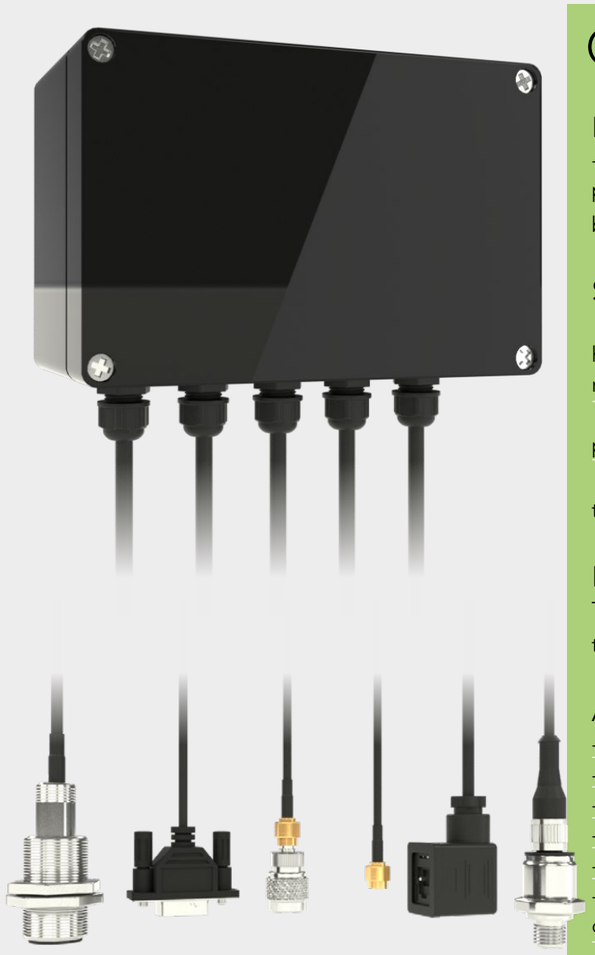
The hydraulic control function is accessible through the MachineryGuide software navigation display. With this function at hand, the farmer can, at any time during the field work, automatically or manually control the different hydraulic cylinders, simply by the use of the buttons on the display.

Display Functions
- Display of manual control buttons (14 functions)
- Display of automatic opening and closing buttons



OEM Solutions for partners

MachineryGuide offers OEM solutions for its partners. OEM solutions can involve hardware and/or software customization and unique development to accommodate the needs of the partners. All hardware presented in the catalogue is avalilable in a private labeling solution. Special hardware reqirements for partner-specific functionality can also be implemented with a generic hardware component with the possibility of handling several I/O ports, sensors or interfaces.



OEM Hardware Solutions

For existing hardware:

- Any hardware presented on the previous pages is available in a private labeling solution which means logo and name exchange based on the needs of the cooperating partner.

Solution for specific hardware requirements:

- MachineryGuide offers a generic hardware platform capable of handling several logic inputs/outputs, analoge inputs for sensor measurement, wired or wireless communication interfaces.
- The platform contains the power supply, microcontroller, protected inputs and ouputs etc.
- The implementation of hardware and embedded software into the platform is based on the partner's needs.

Hardware interfaces:

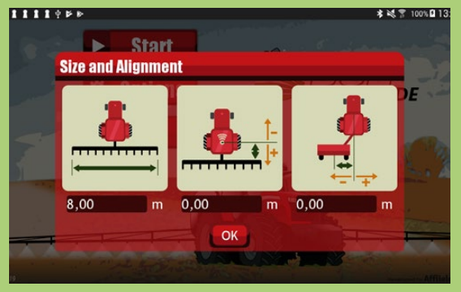
The customizable hardware interfaces are configurable based on the partner's needs.

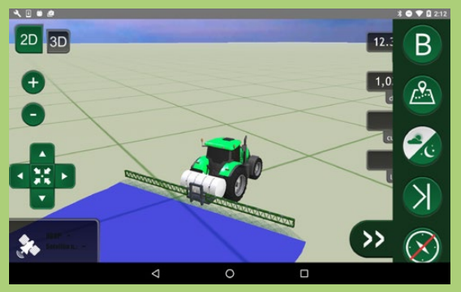
Available options:

- Several logic or analogue inputs/outputs
- RS-232 serial interface
- CAN interface
- RF input for external GPS antenna
- WiFi or Bluetooth connection
- Support for sensors with current output 4...20mA, or voltage output DC 0.5...4.5V, DC 1...5V etc.
- Compatibilty with two or three-wires electric valves

OEM Software Solutions

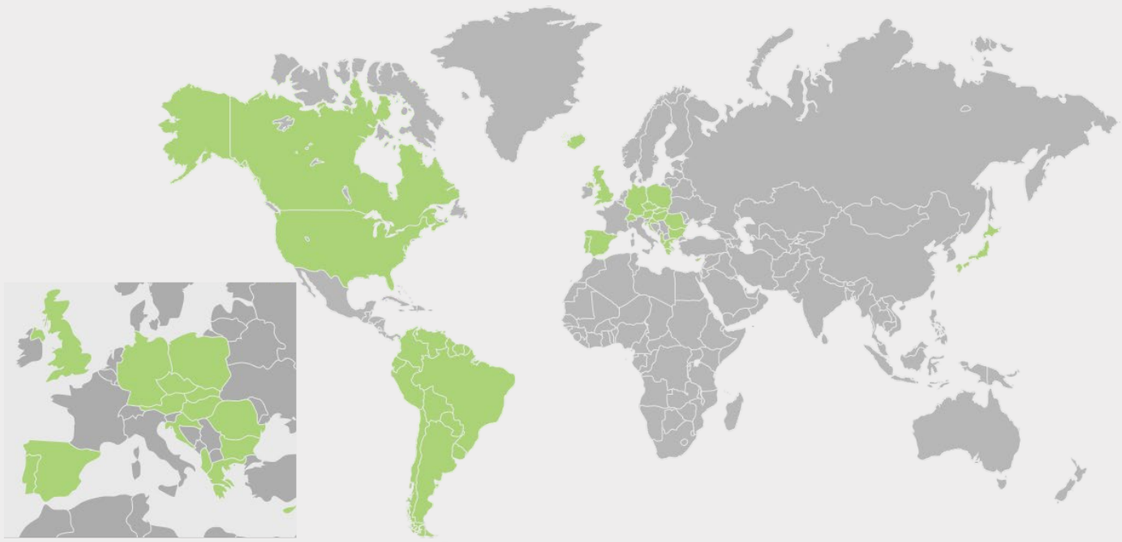
MachineryGuide offers OEM software solutions for the MachineryGuide Android application. In an OEM version the complete user interface can be changed and the 3D model of the machine can also be customized. Unique function implementations are also supported.





About Us

MachineryGuide is the brand product of Budapest, Hungary based Afflield Ltd. The development of our products started in 2014 and since then have reached international interest and are being used all around the world, helping thousands of farmers in making their work more efficient. Our aim for the future is steadfast in continuing development, while we also welcome the opportunity to connect and cooperate with local distributors and manufacturers in the sphere of agriculture.



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