Blockage monitoring on seed drills and fertilizer applicators

Product Overview

SeedMon is the solution for function monitoring and blockage detection on seed drills and fertilizer / slurry applicators respectively for retrofit and original equipment manufacturers. Partial blockage with reduced throughput is reliably and immediately detected. Annoying late surprises and yield losses due to faulty or underdosed application are eliminated.

SeedMon is flexibly configurable with a number (max. 255) of MSO SeeDector Sensors, (main) hubs and sub-hubs and an MSO on-board computer head unit or ECU of an OEM. The SeeDector Sensors are installed on each pipe or tube and connected to a hub or sub-hub. Up to three sub-hubs can be connected with short cables in a daisy-chain to a main hub to accommodate for the given distribution head of a pneumatic seed drill (max. 12, 24, 36, 48 pipes). Via CAN-Bus one or several main hubs (possibly with sub-hub(s)) are daisy-chained and connected to the MSO head unit or the ECU of an OEM.

The MSO SeedMon System is calibrated in normal field operation. Over 30 seconds all SeeDector Sensors of a system are calibrated to the same average level in operation. Thus systematic deviations of the distribution and between the sensors are levelled out.

In operation SeedMon is monitoring the material flow on every SeeDector sensor attached to the system. The average of the material flow of all of the SeeDector sensors is computed. The percentage deviation of every single SeeDector from this average value is checked against the alarm percentage set on the head unit. If the value of one or several SeeDector sensor(s) drops below this alarm threshold an alarm is triggered on the head unit. The MSO SeedMon head unit then beeps and displays the number of the sensor(s). In the same time the status LED on the respective SeeDector sensor(s) switches from blinking green to blinking red. The alarm stays on as long as the alarm condition stays on or the alarm is confirmed by the operator.

Monitoring and active alarms are switched off when the average value of the SeeDector sensors drops below 50 % of the average at calibration. All monitoring - also of confirmed alarms e.g. due to tramlining is switched on again when the average rises again over 50 % of the average at calibration. Thus monitoring is switched off when the machine is out of operation e.g. on headlands. In the same time monitoring of pipes where alarm has been confirmed and switched off due to e.g. tramlining are "sharp" and monitored.
Fields of Application

Fields of application

Mineral fertilizer: application of fertilizer e.g. granules, micro-granules, crushed split, powder for side-dressing with

- Precision planter e.g. maize
- Seed drills

Liquid fertilizer:

- NH3 applicators

Slurry: Tankers with distribution head(s) and subsequent hoses with

- Disc coulter
- Injector
- Harrow

Seeds: From oilseed rape/ canola to large beans

- Pneumatic seed drills
- Mechanical seed drills

Benefits

Benefits and advantages
• Early detection of a (partial) blockage of a pipe due to decreased throughput
• Optimized function monitoring
• Simple and easy installation of SeeDector Sensors with a steel sheet bracket clamped around the pipe - no cutting, nothing built into the pipe
• In contrary to optical sensors unsusceptible to dirt, dust or incrustation in the pipe
• Immediate detection of blockage on single pipes when building up, not only at total blockage when pipe is filled up to the sensor
• Detection and monitoring of switching off the flow e.g. while tramlining
• No alterations, nothing built into the flow due to SeeDector sensor being mounted around the pipe externally
• Flexible system design with hubs und sub-hubs adaptable to the specific machine depending on its number of distribution heads and number of pipes per distribution head
• Steel sheet brackets for installation of the SeeDector sensors on pipes with different diameters available
• Simple calibration in normal operation
• Stand-alone system without need of additional sensors e.g. forward speed sensor and sensor for working position
• The display of the actual average of the over-all throughput compared to the average at calibration (second bargraph on the display) enables the detection of a blockage, reduced throughput or fault of the dosing unit

Details

Hubs and Sub-Hubs
Flexible Integration of MSO SeeDector Sensors

Main hubs and sub-hubs are components of the SeedMon System which integrate and connect the SeeDector Sensors to an on-board computer head unit via CAN-Bus. (Main) Hubs can be interconnected in a daisy chain via long cables by CAN-Bus and with a head unit. The possible length of the cables allows for systems for large seed drills (Air carts). Up to 255 SeeDector Sensors can be integrated in one SeedMon System.

Up to 12 SeeDector Sensors are connected to one hub in a star topology.

One (Main) hub can be daisy-chained with short leads (30 cm) to up to three additional sub-hubs to accommodate for the given number of pipes on a distribution head.

The SeedMon System automatically detects the given configuration of hubs and sub-hubs and does enumerate the connected SeeDector Sensors.

SeedMon head unit

The "brains" of the SeedMon System

The head unit of the SeedMon blockage monitor system could either be the ECU of an OEM or the custom programmed MSO SeedMon head unit for retrofit.

The MSO SeedMon head unit is a compact device with a 3,5" (8,5 cm) TFT QVGA display with four capacitive touch keys. The unit is built into a robust aluminum enclosure. The head unit runs the special software developed by MSO for blockage detection.

The SeedMon head unit is connected to the first hub of the daisy chain (or a single hub). The calibration is carried out in normal operation over 30 seconds.
The system combines the throughput on each sensor **AND** the average of all sensors **AND** the systematic deviation / variance of the lateral distribution. This makes the system independent on installation, orientation or mounting position of the sensor on the pipe and independent on forward speed. The **SeedMon** head unit monitors the material flow in every **MSO SeeDector** connected. If the throughput drops underneath a percentage threshold set by the operator the **SeedMon** head unit sounds an alarm and displays the number of the sensor in a window that pops up. If several sensors triggered an alarm a list of their numbers is displayed. At the same time the status LED on the respective sensor(s) switches from blinking green to blinking red.

The alarm status of a sensor ends when the blockage is removed and the throughput rises again above the threshold. The alarm can also be confirmed and switched off by the operator e.g. if the alarm occurred due to the flow deliberately being switched off by an actuator while tramlining.

The **MSO SeedMon** head unit shows a bargraph with the average of all sensors corresponding to 100 % and the minimum and maximum percentage (sensor with the highest and the lowest value). The percentage threshold set by the operator is indicated by two red chevrons in the bargraph.

A second bargraph shows the actual average compared to the average at calibration (100 % line). The actual average changes with forward speed or when the dosage is changed. This second bargraph indicates an over-all problem to the operator e.g. blockage, decreased output or failure of the metering unit / dosage.

The **MSO SeedMon** head unit also features diagnosis functions like scrolling of the raw sensor data CAN messages and display of connected and detected **SeeDector Sensor**.

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**Data sheet**

Download **SeedMon Data sheet** here

and further details on **request**.

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**Gallery**

**SeedMon applications**

- ![Image](image.png)
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