

ART100 Advanced Blockage Monitor



We hope that you find this manual easy to use and helpful. Contact Agtron Enterprises Inc. at **1-800-667-0640**, on the web at **agtronservice.com** or email **customerservice@agtron.com** if you have any questions.

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Warranty and Disclaimer

Warranty Terms

Once Agtron Enterprises Inc. receives a completed warranty card, your purchase is covered by a three year warranty on materials and workmanship. Without a completed warranty card, warranty is only one year.

1. Any warranty shipping costs and installation labour are the responsibility of the customer.
2. Any product failures during the warranty period will be repaired, or replaced with new or rebuilt product by Agtron Enterprises Inc. If replacement parts are sent, the customer has 30 days to return the original defective product. After 30 days the customer will be charged for the warranty replacement parts sent. A security may be required to ship parts (credit card #).
3. Damage from neglect, accidents, fire, liquids, chemicals, other substances, flooding, vibrations, excessive heat, power surges, excess supply voltage, incorrect supply voltage, radiation, electrostatic discharges including lightning, other external forces and impacts are not covered under warranty.
4. There are no customer serviceable parts. If the security screw is removed, the warranty will be void.
5. Unauthorized modifications will void the warranty.
6. Any usage outside of the intended use will void the warranty.

Product Returns

If unsatisfied, a full refund is offered within 30 days of the date of purchase. To receive the refund, contact Agtron Enterprises Inc. for a return authorization number. Product returned after 30 days will be charged a 15% restocking fee. No refund is available on product returned 52 weeks after the date of purchase.


Conditions of Use

1. Agtron Enterprises Inc. takes no responsibility for injuries, damages, or losses due to the use, misuse, abuse, or failure of this equipment. It is the responsibility of the customer to understand the operation and to ensure that it is operating properly.
2. All products produced by Agtron Enterprises Inc. are intended for use with agricultural implements. Any other application has not been considered; therefore complying with regulations is the sole responsibility of the customer.

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Congratulations on your purchase of an ART 100 Advanced Blockage Monitor! With this state-of-the-art monitor you can detect blockages in up to 120 seed or 120 fertilizer runs.

1.0 How It Works

 This symbol appears throughout this manual and indicates background and additional information in regards to the operation of the ART system.

ART 100 Advanced Blockage Monitors use infrared seed sensors to measure seed rate and check for blockages. The sensors operate on a similar principle to that of a motion detector in a security system. Sensors are connected in a loop, each communicating in turn, and each including build-in diagnostics. The system determines the number of sensors in a loop automatically. A maximum of 120 sensors can be connected in a loop.

2.0 Parts List

Standard Parts

Part Number

| | |
|-----------------------------------|---------|
| Monitor Head----- | AGRTH10 |
| Y-cable ----- | 9ARTY10 |
| Extension cable - 10 foot ----- | 9ARTM10 |
| Extension cable - 20 foot ----- | 9ARTM20 |
| Sensor Loop cable - 10 foot ----- | 9ARTX10 |
| Sensor Loop cable - 20 foot ----- | 9ARTX20 |
| Manual ----- | MNART10 |

Sensors

| | |
|--|---------|
| Seed Rate sensor - 1 inch or 25 mm (inside diameter)----- | AGSS25A |
| Seed Rate sensor - 1¼ inch or 32 mm (inside diameter)----- | AGSS32A |

3.0 Installation and Setup

3.1 Mounting

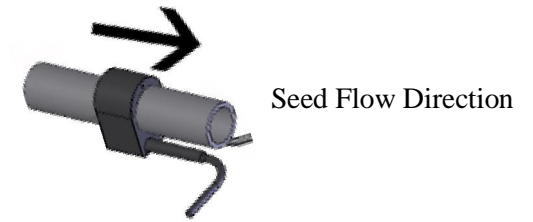
To mount the Monitor Head, remove the backing from the adhesive hook and latch strip; located on the back of the Monitor Head. Mount the Monitor Head in a location where the display can be easily seen, and all the buttons are accessible.

Note: *The hook and latch strip allows the Monitor Head to be easily moved.*

Note: *Do not mount in a location that obstructs the view of the road or work area.*



Monitor Head



i To keep plugs clean, always connect unused seed sensor cables together.

3.3 Y-Cables and Sensor Loop Cables

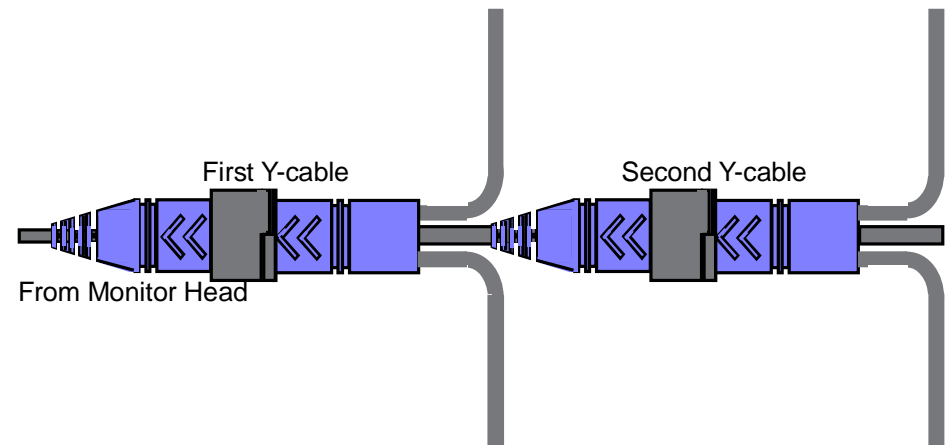
Y-Cable Installation (less than 60 sensors)

1. Select a mounting location for the Y-cable in the center of the implement.
2. Secure the ring terminal of the Y-cable to the chassis of the implement.
3. Connect the Y-cable's male Sensor Loop Cable to Seed Sensor 1 (located on the far left side of the implement) using Sensor Loop Cables as needed.
4. Connect the Y-cable's female Sensor Loop Cable to the last Seed Sensor using Sensor Loop Cables as needed.

Y-Cable Installation (more than 60 sensors)

On systems with more than 60 Seed Sensors, an additional Y-Cable must be installed in the middle of the loop to improve power distribution.

1. Connect the blue male end of the second Y-cable to the blue female end of the first Y-cable.
2. Connect the first Y-cable's male Sensor Loop Cable to Seed Sensor 1 (located on the far left side of the implement) using Sensor Loop Cables as needed.
3. Connect the first Y-cable's female Sensor Loop Cable to the last Seed Sensor using Sensor Loop Cables as needed.
4. Connect the second Y-cable's male and female Sensor Loop Cable into the middle of the seed sensor loop.



8.2 Seed Densities

| Seed | seeds/pound | seeds/kilogram |
|---------------------|-------------|----------------|
| Barley: 2 row | 10,000 | 22,050 |
| Barley: 6 row | 12,500 | 27,563 |
| Bean | 1,800 | 3,969 |
| Buckwheat | 15,000 | 33,075 |
| Canola: Campestris | 189,000 | 416,745 |
| Canola: Napus | 132,000 | 291,060 |
| Canola: Polish | 190,000 | 418,950 |
| Corn | 1,200 | 2,646 |
| Fababean | 1,150 | 2,536 |
| Fall Rye | 14,000 | 30,870 |
| Flax | 76,000 | 167,580 |
| Lentil | 10,300 | 22,712 |
| Mustard | 245,000 | 540,225 |
| Oats | 12,500 | 27,563 |
| Peas | 2,550 | 5,623 |
| Rice | 18,500 | 40,793 |
| Safflower | 12,500 | 27,563 |
| Soybean | 3,400 | 7,497 |
| Sunflower | 3,100 | 6,836 |
| Triticale | 10,150 | 22,381 |
| Wheat: Hard Red | 13,300 | 29,327 |
| Wheat: CPS | 11,400 | 25,137 |
| Wheat: Durum | 10,500 | 23,153 |
| Wheat: Extra Strong | 10,500 | 23,153 |
| Wheat: Soft White | 13,400 | 29,547 |

Fertilizer



| | | |
|--------------------|--------|---------|
| Ammonium Nitrate | 48,400 | 106,704 |
| Ammonium Phosphate | 29,600 | 65,257 |
| Potash | 18,300 | 40,345 |
| Urea | 37,800 | 83,335 |

4.0 Quick Start - Blockage Monitoring

To turn on, press the PWR key. To turn the system off, press and hold the PWR key for five seconds.



Set Sensitivity

The Sens value must be set for Block mode to function. Follow this procedure to change the Sens value.

1. Press the Sens button.
2. Use the  and  buttons to set the Sens value; see *Appendix A*.
3. Press any mode button to complete the change.

Follow one of these two procedures to set the Sens value for the Seed Rate sensors.

Method 1:

1. Manually check for any blockages.
2. Begin seeding.
3. Press the Block button.
4. Press the Sens button. If blockage alarms are not issued, use the  button to increase the sensitivity value by 10 until blockage alarms occur; repeating Step 2 to 4.
5. Use the  button to decrease the sensitivity value by three until blockage alarms are no longer issued.

Method 2:

1. Calculate the ground speed in feet or meters per second. **Ex:** *The ground speed is 8 Km/h. $(8 \text{ Km/h} \times 1000 \text{ m}) \div 3600 \text{ s} = 2.22 \text{ m/s}$.*
2. Calculate the area coverage per second. The width of the implement is required. **Ex:** *The implement width is 12 m. $(2.22 \text{ m/s} \times 12 \text{ m}) \div 10,000 \text{ m}^2 = 0.002664 \text{ hectares/s}$.*
3. Using the average of the number of seeds per pound or kilogram from *Appendix B*, calculate the application rate. **Ex:** *Two row barley has an average of 22,046 seeds/Kg. $35 \text{ Kg/Ha} \times 22,046 \text{ seeds/Kg} = 771,610 \text{ seeds/Ha}$.*
4. To calculate the application rate in seeds per second, multiply the area coverage calculated in Step 2 by the application rate calculated in Step 3. **Ex:** *$0.002664 \text{ hectares/s} \times 771,610 \text{ seeds/Ha} = 2056 \text{ seeds/s}$*
5. To calculate the Sens value, divide the application rate calculated in Step 4 by twice the number of openers. Record the product name and sensitivity value in *Appendix A*. **Ex:** *The implement has 50 openers. $2056 \text{ seeds/s} \div 100 = 21 \text{ seed/s}$. The sensitivity value is 18.*

Blocked runs are indicated but when checked and found to be clear.

- Verify the Sensitivity is not set too high.
- Check inside the distribution towers for any foreign material. This may cause blockages to move from sensor to sensor.
- If it is always the same sensor giving the blocked message, trade that sensor with one in another position. If the blocked message moves with the sensor, replace that sensor.



Monitor displays CLN ____.



- Take note of the indicated numbers. This message indicates that the eyes (optical detectors) in the Seed Sensor tube are dirty.
- Clean the indicated Seed Sensors with warm water and a bristle pipe brush.
- If the Seed Sensor still causes a CLN message, replace it.

When BLOCK mode is selected the display always shows 0.


- Verify the Sensitivity is not set to zero. If the sensitivity is set to zero, the Seed Rate sensors are disabled.

A blockage alarm is issued when a reported seed rate, in seeds per second, is below the Sens value. For more information, see the **Quick Start** section. When a Seed Rate sensor reports a blockage, the audible alarm sounds instantly for five seconds. The visual blockage alarm does not occur until the Seed Rate sensor scan arrives at the Seed Rate sensor number reporting the blockage. When the visual blockage alarm occurs, - - - followed by the blocked Seed Rate sensor number is displayed three times. When a blockage alarm occurs, look for a complete or partial blockage at the opener and distributor of the identified Seed Rate sensor.


If the hose is entirely blocked or excessive buildup on the eyes is detected for an extended period of time (approx. 1 min.) the monitor will display,  followed by the Seed Rate sensor number is displayed three times; the audible alarm will sound. When a Seed Rate sensor clean, , alarm occurs look for a complete blockage at the opener of the identified Seed Rate sensor, or the sensor requires cleaning.

Pressing the  button disables the audible alarm for every Seed Rate sensor for 20 seconds. When every Seed Rate sensor reports a blockage, pressing the  button disables the audible alarm. No further audible alarms will occur until a Seed Rate sensor reports normal operation.

A sensitivity value of zero disables Block mode; no blockage alarms occur. For more information, see the **Quick Start** section.

 Blockage alarms will not occur when the Sens key is selected.

Rate Mode

Rate mode displays an average seed rate for the entire machine; in thousands of seeds per minute. The seed rate displays a hundredths place up to 99.9; 99,900 seeds per minute. Above 9999, the seed rate is displayed in millions of seeds per minute; the decimal point flashes. If Rate mode detects a seed rate above 99.99 millions of seeds per minute,  is displayed.

Blockage messages are not displayed in Rate mode. If a blockage occurs, the audible alarm will sound and the light above the Block button will flash. Select Block mode to identify the blocked Seed Rate sensor.

Monitor Head Software Mode

The Monitor Head Software Version identifies the software in the Monitor Head. To display the software version number, simultaneously press the **Block** and **1** buttons. Once selected, all the button lights turn on, and X.YY is continually displayed; where X represents the hardware version and YY represents the software version. Press any mode button to exit.

Seed Rate Sensor Software Mode

The Seed Rate Sensor Software Version identifies the hardware and software version of each Seed Rate sensor. Simultaneously press the **Block** and **1** buttons to display the hardware and software version number of the first Seed Rate sensor. Once selected, all the button lights turn on, and x.yy followed by 1 continually cycles on the display; where X represents the hardware version, yy represents the software version, and 1 represents the first Seed Rate sensor. Use the **1** and **2** buttons to scroll through each Seed Rate sensor. Press any mode button to exit.

7.0 Troubleshooting



For this section, ___ indicates a sensor number.

Cln message (clean)

When a Seed Rate sensor can't count the seeds properly, **Cln** followed by the Seed Rate sensor number is displayed three times; the audible alarm will sound. When a **Cln** alarm occurs, look for a complete blockage at the opener of the identified Seed Rate sensor or buildup on the indicated Seed Rate sensor eyes.

Err message (error)

If a complete loop of Seed Rate sensors is not reported to the Monitor Head, **Err** followed by the Seed Rate sensor number not reporting to the Monitor Head is displayed; the audible alarm will sound. The **Err** message remains until a complete loop of Seed Rate sensors is established. When an **Err** message occurs, look for a disconnected Sensor Loop cable, Seed Rate sensor or Extension cable at the identified Seed Rate sensor location.

Situations and solutions

To effectively troubleshoot the ART100 Blockage Monitor, start with a known "good" or working system. There are five areas of possible failure; the Monitor Head, Seed Rate sensors, Y-cable, Extension cables, and Sensor Loop cables. Listed below are situations that could occur with the various parts of the ART100 Blockage monitor.

Error (ERR) Messages

Monitor displays ERR 1.

- Check all the cables and connections. If the monitor head does not detect any sensors, this error will occur.
- Bypass Sensor 1 by connecting Sensor 2 to the sensor loop cable from the Y-cable. If the message is no longer displayed, replace Sensor 1.
- Connect a Seed Sensor directly to the Y-cable's male Sensor Loop Cable. If SNR 2 ERR is displayed, replace the Sensor Loop extension cable between the Y-cable and Seed Sensor 1.
- Connect the Y-cable and a sensor directly to the monitor head. If SNR 2 ERR is displayed, replace the main extension cables. If SNR 1 ERR is displayed, either the monitor head or Y-cable is faulty - contact Agtron Service.

Monitor displays ERR one higher than total number of sensors.

- Check all the cables and connections.
- Bypass the last sensor by connecting the second last sensor to the sensor loop cable to the Y-cable. If the message is no longer displayed, replace the last sensor.
- Connect a Seed Sensor directly to the Y-cable. If SNR 2 ERR is displayed, replace the Y-cable. If SNR 1 ERR is displayed, replace the Sensor Loop extension cable between the Y-cable and the last Seed Sensor.

Monitor Displays ERR__.

- Take note of the Sensor number indicated.
- Inspect the Sensor Loop cables in the indicated Seed Sensor location for damage. Replace or bypass any damaged pieces.
- Bypass the indicated Seed Sensor number. This is done by unplugging the Seed Sensor and plugging the cables of the seed Sensor before and after together. The Seed Sensor count will be one less.
- If this results in normal operation, replace the bypassed sensor.
- If the ERR message is still displayed, bypass the Seed Sensor before the indicated Seed sensor number. If this results in normal operation, replace the Seed Sensor.
- If a Sensor Loop cable connects the two Seed Sensors, swap the Sensor Loop cable. If normal operation begins, replace the Sensor Loop cable.