

Smartfield™

Growing a Greener Future



SmartCrop® Base Station Installation Guide

Only Smartfield™ trained and certified installers are authorized to install and maintain equipment.

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This guide is frequently updated to reflect changes in the product. The latest version can always be found at <http://www.smartfield.com/>

Instructions to the User

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operations with non-approved equipment or unshielded cables are likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

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Introduction

Congratulations, you have just purchased the SmartCrop® Base Station, one of the most advanced irrigation management tools available.

Listen to your crop... It's talking to you

Your crop is telling you when it is experiencing heat stress and needs water. The SmartCrop® Sensor is smart technology that uses infrared (IR) temperature sensing technology coupled with patented USDA algorithms and methodology to determine when your crop is experiencing heat stress brought on by lack of water. SmartCrop® Sensor provides growers a simple "IRRIGATE / DON'T IRRIGATE" signal that can be seen on the web or even on your cell phone. In addition to irrigation signals, the SmartCrop® Sensors provide temperature and other environmental data via the CropInsight.com web site.

SmartCrop® Base Station

The Smartfield web server is the manager and it collects all of the Sensor data, collects localized environmental data, and runs the patented USDA algorithms to determine crop stress.

How it works

The SmartCrop® Base Station can collect a large amount of data. This data is stored in the SmartCrop® Base Station's on-board flash memory and is downloaded via cell phone modem. This data consists of ambient temperature readings and canopy temperatures at each Sensor, humidity and ambient temperature, and rainfall amounts at the SmartCrop® Base Station.

The setup of the SmartCrop® Base Station is performed by placing the SmartCrop® Base Station in the learn mode and then placing each Sensor that is to be "imprinted" into the learn mode as well. While in the learn mode, the SmartCrop® Base Station is looking for a specific signal that is only sent by Sensors also in the learn mode. Once all of the appropriate Sensors have been learned, the SmartCrop® Base Station is taken out of the learn mode and is ready to collect data. During normal operation, the SmartCrop® Base Station will notify the user if power is lost, if connection to a Sensor is lost, or if a Sensor has low batteries. Connection to the SmartCrop® Base Station can be achieved via cell phone modem.

Guidebook Conventions

To highlight the most important points – we have used a set of simple icons, which draw attention to key information and settings.

Key:

	The Check Icon indicates a setting that we recommend you use or enable.
	The Info Icon highlights important facts and information about SmartCrop® Base Station, to help you make better use of the product.
	The Hazard Icon highlights areas where potential problems can arise.

Important Safety Precautions

	Only Smartfield trained and certified installers are authorized to install and maintain equipment; non-certified installations void equipment warranty.
	Important: DO NOT begin installation until all utility lines have been located and marked by your local utility company. Digging without knowing the location of utility lines can result in a damaged system, injury or death.
	This manual contains important information about the installation, operation and safe use of this product. This information should be given to the owner and / or operator of this equipment.
	Warning: Before installing this product, read and follow all warning notices and instructions, which are included. Failure to follow safety warnings and instructions can result in severe injury or property damage.
	CAUTION: To comply with FCC RF exposure compliance requirements, a separation distance of 20 cm must be maintained between the antenna of this device and all persons.

Contents - Box 1

Base Station Extension Pole Assembly
 Assembly, Battery Box – Battery NOT included
 Assembly, 10 W Solar Panel
 Base Station Pole Assembly
 SmartCrop® Installation Instruction

Contents - Box 2

Eight (8) ¾ x 2 ¾ bolts
 Two (2) ¾ x ½ bolts
 One (1) four arm knob
 Ten (10) ¼ locknut
 One (1) post spade

Contents - Pallet

One (1) six foot (6') inside pole

Tools & Materials Needed but Not Included

¾ inch open wrench	Driver cap
¾ inch deep socket wrench	GPS locator device
Dyke pliers	12 volt deep cycle battery
Post driver	Zip ties
Post level	Step stool - optional

Installation

The SmartCrop® Base Station box weighs approximately 50 lbs. Please remember to lift with your legs or get a friend to help.

After opening the box, remove the SmartCrop® Base Station and gently set aside.

- Assembling the spade pole
 - Get 6' inside pole.
 - Bolt spade into holes 10 & 11 from the bottom with two (2) ¾ x ½ bolts and two (2) ¼ locknuts.
- Driving posts
 - Select placement of the Base Station. Base Station should be placed in a convenient and accessible location. **Note:** Sensor should be at least 25' from the Base Station but no further than 1,000 to 1,200'.

Using the post level, make sure the post is level and plumb; a slight slant in this could affect the rain gauge and recorded rain measurements.

- Holding the 6' inside pole with the spade of the pole-facing north, place the provided driver cap on the top of pole. **Note:** the driver cap will prevent pole from warping while driving.
 - Using the post driver, drive the pole into the ground until spade is completely underground.
- Mounting SmartCrop® Base Station
 - Slide SmartCrop® Base Station pole, Tag 6, onto the driven pole.
 - Select the preferred height of the Base Station by sliding the mounting pole up or down on the driven pole. **Note:** the SmartCrop® Base Station should be at a height that is easily readable.
 - Secure the SmartCrop® Base Station at the preferred height using two (2) ¾ x 2 ¾ bolts and two ¼ locknuts.
 - Mount Extension Pole
 - Locate the mounting bracket, Tag 2, on the top of the Base Station extension assembly.
 - Position the mounting bracket at a 90-degree angle with the top of the post and secure by tightening the black knob.
 - Place the RF Antenna, the antenna with the 3-meter long cable, Tag 3 on top of the mounting bracket. Remove the Tag 3 from antennae.
 - Insert the Extension Pole Assembly into the 3' Base Station pole (Tag 6).
 - On the 1st and 4th hole (bottom to top), secure with ¾ x 2 ¾ bolt and 4-arm knob.



Figure 1: Showing holes 1 and 4 (bottom to top) on mounted extension pole.

Installation

- Rain Gauge Bucket
 - Open the Rain Gauge Bucket by gently turning it counter-clockwise and set aside. Clip and remove the cable tie, Tag 4, from the rain gauge to allow the gauge to operate. Re-attach the bucket by turning it clockwise.



Figure 2: Side view of inside of Rain Gauge Bucket showing cable tie.

- Cellular Antenna Placement
 - Place the Cellular Antenna, the antenna with the 1-meter long cable, Tag 5, in front of the Rain Gauge Bucket. **Note:** make sure to tighten the antennae to the magnetic base.
- Powering the SmartCrop® Base Station
 - The solar panel and battery box must be positioned to face south.
 - If the battery box is not facing south, the bolts will be too long when securing box.
 - Position the bottom of the battery box as close to the ground as possible, secure with two (2) ¾ x 2 ¾ bolts and two (2) ¼ locknuts.
 - Place a #24 Marine Deep Cycle 12-volt battery, which is provided by the authorized dealer, into the battery box.
 - Position the Solar Panel up at a 45-degree angle to the pole.
 - Position on the second hole above the Base Station mounting bracket.



Figure 3: Displaying the Solar Panel mounting location.



Figure 4: Solar Panel positioned at a 45-degree angle.

- Attach the power cord to the battery FIRST. Connect the red cable to the positive (+) terminal and the red/black cable to the negative (-) terminal.
 - Secure the power cord by stringing through the post and tie down with a zip tie or other securing devices. **Note:** Feed any excess wiring into the battery box through cable slot.
- Place top of battery box over battery by sliding the edges into the slits. If needed, secure or lock battery box.
- Open the SmartCrop® Base Station door. Run the cord through the opening at the bottom of the Base Station. Plug into the correct power socket.



Figure 5: Inside of SmartCrop® Base Station showing location of cord connecting to power socket.



Figure 6: Inside Base Station, connecting 6-volt battery to pins.



Figure 7: Inside Base Station, 6-volt battery connected to pins.

- Before closing the SmartCrop® Base Station door, record the serial number located on the inside of the base station. This information will be needed to setup field in Croplinsight™.
- The SmartCrop® Base Station should power on.



If needed, lock or secure to prevent tampering or vandalism.

Smartfield One (1) Year Limited Warranty

Smartfield's warranty obligations for these hardware products are limited to the terms set forth below: Smartfield, Inc. ("Smartfield") warrants SmartCrop®, SmartRate™, SmartRate™ PRO, SmartWeather™, PivotScout™, PivotScout™PRO, SmartProfile™, and other Smartfield-branded hardware products against defects in materials and workmanship under normal use for a period of ONE (1) YEAR from the date of retail purchase by the original end-user purchaser ("Warranty Period"). If a hardware defect arises and a valid claim is received within the Warranty Period, at its option and to the extent permitted by law, Smartfield will either (1) repair the hardware defect at no charge, using new or refurbished replacement parts, (2) exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product, or (3) refund the purchase price of the product. Smartfield may request that you replace defective parts with new or refurbished user-installable parts that Smartfield provides in fulfillment of its warranty obligation. A replacement product or part, including a user-installable part that has been installed in accordance with instructions provided by Smartfield, assumes the remaining warranty of the original product or ninety (90) days from the date of replacement or repair, whichever provides longer coverage for you. When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes Smartfield's property. Parts provided by Smartfield in fulfillment of its warranty obligation must be used in products for which warranty service is claimed. When a refund is given, the product for which the refund is provided must be returned to Smartfield and becomes Smartfield's property.

EXCLUSIONS AND LIMITATIONS

This Limited Warranty applies only to hardware products manufactured by or for Smartfield that can be identified by the "Smartfield" trademark or "SmartCrop" trademark, trade name, or logo affixed to them. The Limited Warranty does not apply to any non-Smartfield hardware products or any software, even if packaged or sold with Smartfield hardware. Manufacturers, suppliers, or publishers, other than Smartfield, may provide their own warranties to the end user purchaser, but Smartfield, in so far as permitted by law, provides their products "as is". Software distributed by Smartfield with or without the Smartfield or SmartCrop brand name (including, but not limited to system software) is not covered under this Limited Warranty. Refer to the licensing agreement accompanying the software for details of your rights with respect to its use. Smartfield does not warrant that the operation of the product will be uninterrupted or error-free. Smartfield is not responsible for damage arising from failure to follow instructions relating to the product's use. This warranty does not apply: (a) to damage caused by use with non-Smartfield products; (b) to damage caused by accident, abuse, misuse, flood, fire, earthquake or other external causes; (c) to damage caused by operating the product outside the permitted or intended uses described by Smartfield;

(d) to damage caused by service (including upgrades and expansions) performed by anyone who is not a representative of Smartfield; (e) to a product or part that has been modified to alter functionality or capability without the written permission of Smartfield; (f) to consumable parts, such as batteries, unless damage has occurred due to a defect in materials or workmanship; (g) to cosmetic damage, including but not limited to scratches, dents and broken plastic on ports; or (h) if any Smartfield serial number has been removed or defaced.

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EXCEPT AS PROVIDED IN THIS WARRANTY AND TO THE EXTENT PERMITTED BY LAW, SMARTFIELD IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY, INCLUDING BUT NOT LIMITED TO LOSS OF USE; LOSS OF REVENUE; LOSS OF ACTUAL OR ANTICIPATED PROFITS (INCLUDING LOSS OF PROFITS ON CONTRACTS); LOSS OF THE USE OF MONEY; LOSS OF ANTICIPATED SAVINGS; LOSS OF BUSINESS; LOSS OF OPPORTUNITY; LOSS OF GOODWILL; LOSS OF REPUTATION; LOSS OF, DAMAGE TO OR CORRUPTION OF DATA; OR ANY INDIRECT OR CONSEQUENTIAL LOSS OR DAMAGE HOWSOEVER CAUSED INCLUDING THE REPLACEMENT OF EQUIPMENT AND PROPERTY, ANY COSTS OF RECOVERING, PROGRAMMING, OR REPRODUCING ANY PROGRAM OR DATA STORED OR USED WITH SMARTFIELD PRODUCTS AND ANY FAILURE TO MAINTAIN THE CONFIDENTIALITY OF DATA STORED ON THE PRODUCT. THE FOREGOING LIMITATION SHALL NOT APPLY TO DEATH OR PERSONAL INJURY CLAIMS, OR ANY STATUTORY LIABILITY FOR INTENTIONAL AND GROSS NEGLIGENT ACTS AND/OR OMISSIONS. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

OBTAINING WARRANTY SERVICE

Please access and review the online help resources referred to in the documentation accompanying this hardware product before requesting warranty service. If the product is still not functioning properly after making use of these resources, please contact the Smartfield representatives using the information provided in the documentation. When contacting Smartfield via telephone, other charges may apply depending on your location. When calling, a Smartfield representative will help determine whether your product requires service and, if it does, will inform you how Smartfield will provide it. You must assist in diagnosing issues with your product and follow Smartfield's warranty processes.

Smartfield may restrict service to the fifty states of the United States of America and the District of Columbia, and provide warranty service (i) at a Smartfield repair service location, (ii) by sending you prepaid way bills (and if you no longer have the original packaging, Smartfield may send you packaging material) to enable you to ship the product to Smartfield's repair service location for service, or (iii) by sending you new or refurbished customer-installable replacement product or parts to enable you to service or exchange your own product ("DIY Service"). Upon receipt of the replacement product or part, the original product or part becomes the property of Smartfield and you agree to follow instructions, including, if required, arranging the return of original product or part to Smartfield in a timely manner. When providing DIY Service requiring the return of the original product or part, Smartfield may require a credit card authorization as security for the retail price of the replacement product or part and applicable shipping costs. If you follow instructions, Smartfield will cancel the credit card authorization, so you will not be charged for the product or part and shipping costs. If you fail to return the replaced product or part as instructed, Smartfield will charge the credit card for the authorized amount.

Service options, parts availability and response times may vary. Service options are subject to change at any time. In accordance with applicable law, Smartfield may require that you furnish proof of purchase details and/or comply with registration requirements before receiving warranty service. Please refer to the accompanying documentation for more details on this and other matters on obtaining warranty service.

If your product is capable of storing software programs, data and other information, you should protect its contents against possible operational failures. Before you deliver your product for warranty service it is your responsibility to keep a separate backup copy of the contents and disable any security passwords. THE CONTENTS OF YOUR PRODUCT WILL BE DELETED AND THE STORAGE MEDIA REFORMATTED IN THE COURSE OF WARRANTY SERVICE. Your product will be returned to you configured as originally purchased, subject to applicable updates. You will be responsible for reinstalling all other software programs, data and passwords. Recovery and reinstallation of software programs and user data are not covered under this Limited Warranty.

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