



Norstar RS6000 Installation Guide

February 2024

[Inputs](#)

[Bottom left 12-pin input A](#)

[Top middle 8-pin input B](#)

[Wiring Installation](#)

[Boom Switch Wire Installation](#)

[Ground wire installation](#)

[SpraySync Box Mounting](#)

[Pole Mount](#)

[Screw Mount](#)

[Velcro Mount](#)

[Tablet Mount](#)

Inputs

There are 2 inputs on the SpraySync WT1 Monitor box for connecting into the sprayer.

- Bottom left 12-pin Input A
- Top middle 8-pin Input B



Figure 1. SpraySync WT1 Monitor Box Inputs

Connecting with the Norstar RS6000 we only use the Bottom left 12-pin Input A that can read the 12v boom switch electrical signal. This SpraySync WT1 Norstar 12 pin 6 foot cable is shown below in Figure 2 and 3.



Figure 2 and 3 - SpraySync WT1 12 pin cable

The connector pushes in and you should hear it lock into place. Then to remove, you press the silver tab down and pull it back out. No twisting needed.

The other input B is used to connect up non-powered electrical switches, for example a flow switch for doing a hose reel. It is a smaller version of the bigger connector but only 8 pins. This SpraySync Flow Switch Cable 8 pin 12 foot is shown below in Figure 4 and 5.



Figure 4 and 5 - SpraySync WT1 8 pin flow switch cable

The connector pushes in. Then to remove, you press the silver tab down and pull it back out.

I'll be ignoring the possibility of using a hose reel monitored by a flow switch for this installation guide. We'll be focusing on tracking the 9 boom sections that the Norstar RS6000 allows you to activate.

There is another input on the box for the USB. This is a special USB connection that we use a custom USB cable that has a screw type of connector.



Figure 6 and 7 - SpraySync USB Cable

You first connect the USB part of the cable to the USB connector on the SpraySync Monitor Box, the arrows help align the USB connector. Then you screw the plastic collar around until it creates a tight connection with the screw threads on the monitor box.

Bottom left 12-pin input A

This is an input for 12v signals that indicate a boom section or nozzle is on when the input is 12V. With the 12 pins, there are 11 signals (pins 1 - 11) and a gray ground wire (pin 12). Specifically for a Norstar RS6000, because there are only 9 boom switches, a couple of the pins are unused (pin 10 and 11). These two wires are not present in the SpraySync WT1 Norstar 12 pin 6 foot cable, but sometimes we may send or use a fully pinned cable so just ignore those extra wires if so.

Connector Pin	Color (Same color on Norstar and SpraySync cable)	Norstar RS6000 Boom Switch	SpraySync Input (number in Vehicle Switch Config)
1	Brown	1	1
2	Red	2	2
3	Orange	3	3
4	Yellow	4	4
5	Green	5	5
6	Blue	6	6
7	Purple	7	7
8	White	8	8
9	Black	9	9
10	Yellow/black	Not used	Not used
11	White/black	Not used	Not used
12	Gray	Ground (Typically a black wire on Norstar not to be confused with black wire used for boom switch 9)	12

Top middle 8-pin input B

This is an input only for non-powered (passive) switches, like flow switches or unpowered side of a DPST switch. No voltage can be put on these pins. They are paired, 1 is paired with 2. 3 is paired with 4. 5 with 6, 7 with 8. As an example, this means if you have a switch, you would put pin 1 on one terminal and pin 2 on the other terminal so both green wires would go to the switch.

Connector Pin	Color	SpraySync Input
1	Green	12

2 (paired with 1)	Green	
3	Blue	13
4 (paired with 3)	Blue	
5	Yellow	14
6 (paired with 5)	Yellow	
7	White	15
8 (paired with 7)	White	

Wiring Installation

To connect to the Norstar RS6000, we look at the back of the unit. Below in Figure 8 is a RS6000 unit with all cables removed so you can see what we are trying to do a little more clearly:

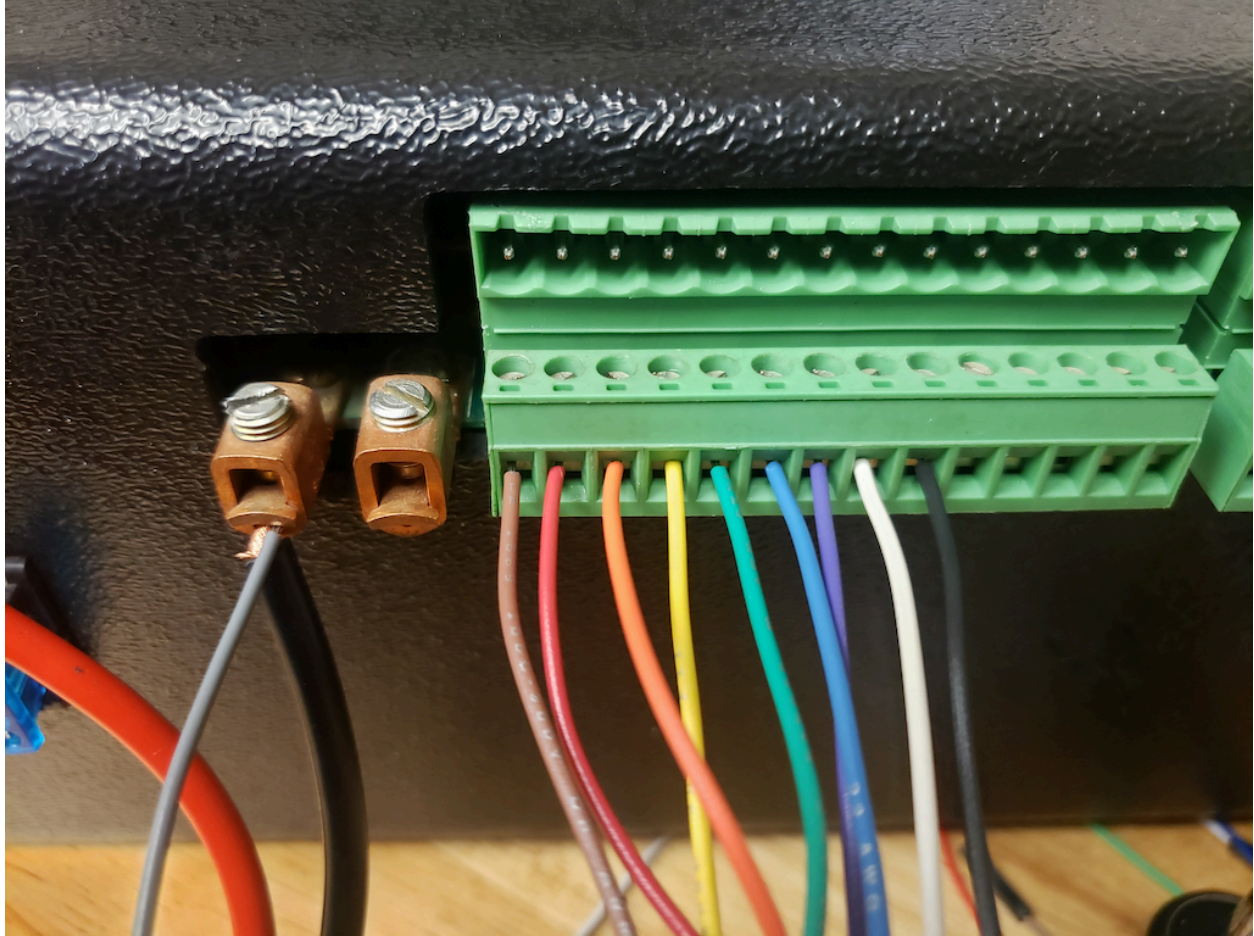


Figure 8. Norstar RS6000 Rear with no sprayer wires, only SpraySync wires

There are 4 green screw terminal blocks. Figure 9 shows the two screw terminal blocks that are on the left. The 9 boom switches go into the bottom left green screw terminal block. In the picture above I've removed the top left screw terminal block. The bottom left screw terminal block, from left to right it has wires for boom switches 1-9.

Here is the Norstar RS6000 manual picture of the wiring in Figure 9 below.

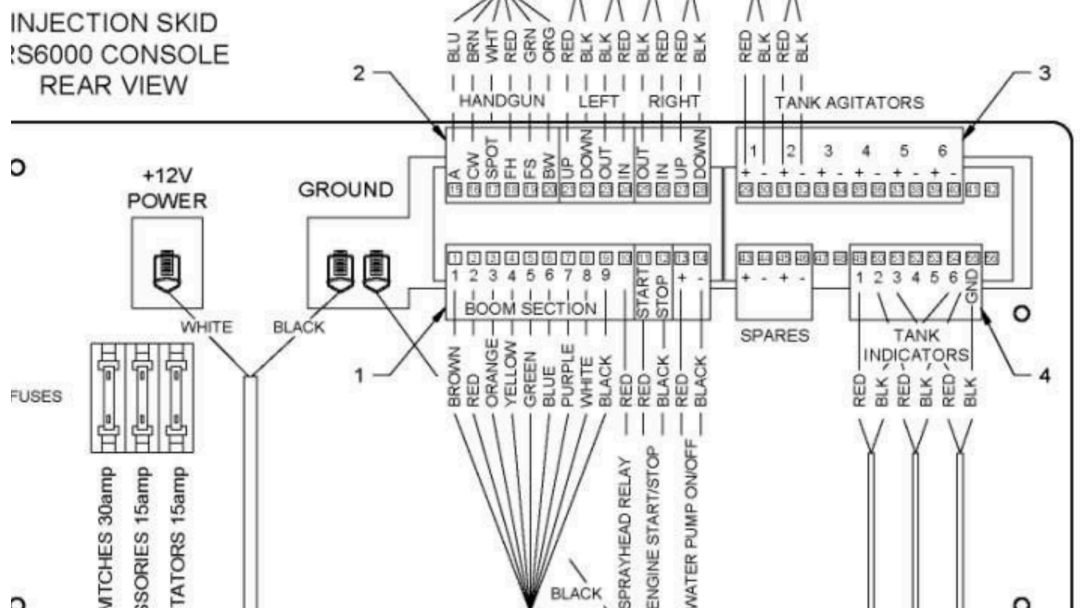


Figure 9. Norstar RS6000 Manual wiring diagram

Specifically zooming into the bottom left screw terminal block section we are interested in with Figure 10 below.

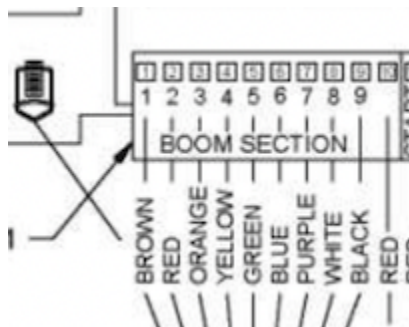


Figure 10. Norstar RS6000 Wiring diagram bottom left screw terminal block for boom switches

This wire color scheme, from left to right, matches exactly the colors of the wires in the SpraySync WT1 Norstar cable pins 1-9. The extra wire in our SpraySync cable, the Gray wire, pin 12, is for ground. You can see that in the above Figure 8, the gray ground wire from our cable is connected to one of the two copper screw ground terminals off to the left of the green screw terminal blocks

Our goal is to add one extra wire into each of the 9 screw terminal slots (1-9 starting from the left) of the bottom left screw terminal block. The typical Norstar RS6000 wire setup prior to SpraySync installation is to have 2 wires into each screw terminal. We will add a small 22 AWG wire into each screw terminal. After we are done, there will be a total of 3 wires in each screw terminal.

Boom Switch Wire Installation

First step, turn off the key in the vehicle, remove the key and set it somewhere in the vehicle or in your pocket, and ensure that the power switch is off on the Norstar RS6000. We want to be safe so that nobody accidentally turns on the vehicle while we are in the middle of the installation.

The next step is to remove the top left green screw terminal block from the Norstar RS6000. We leave all of the wires in. We are removing it so we can get access to the screw terminal block underneath it. Space might be tight with all of the wires so we want to remove that to make our job easier. The wires aren't very flexible, you may not be able to move it far, but you'll want the extra space from having it free.

Here is a picture from a real sprayer, back of RS6000 unit being shown, and I have already removed the top left screw terminal block:

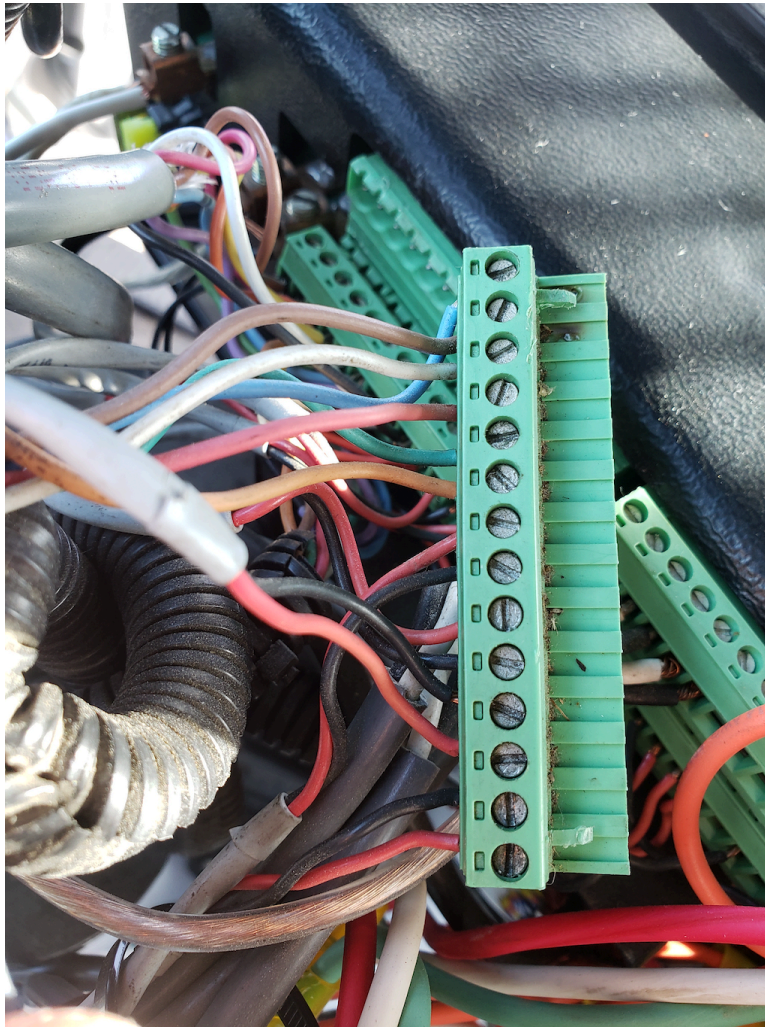


Figure 11. Norstar RS6000 Sprayer Top Left Green Screw Terminal Block removed

As a guide for removing that screw terminal block, see the two plastic tabs on the top that latch in, you may have to loosen those up, you can see these in Figure 11. I suggest a small screwdriver to wedge in and use as a lever on each side.

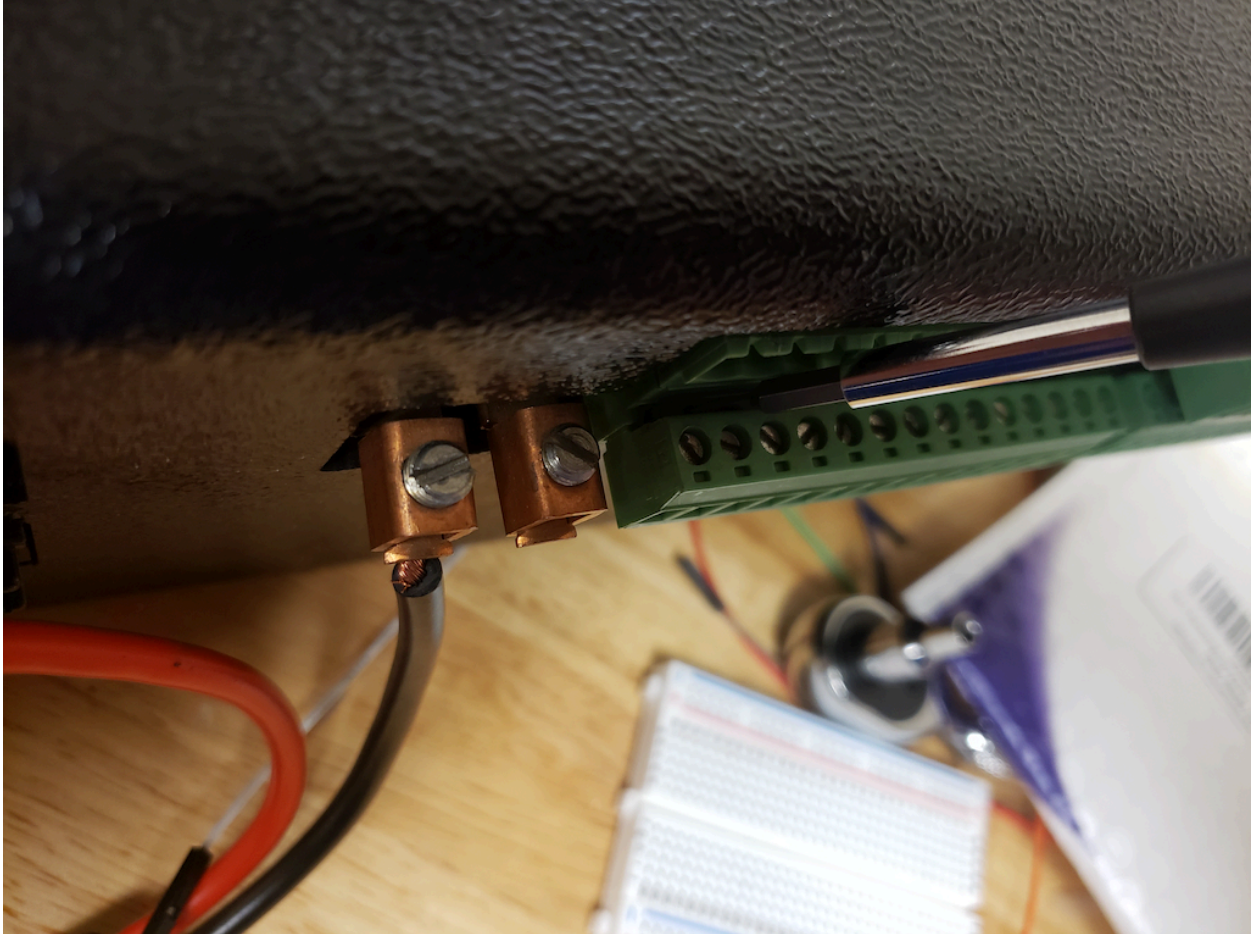


Figure 12. Norstar RS6000 small screwdriver prying out screw terminal block left side

Then once one side is loose and free of the small tab, get the other side loosened up and slide it out. It won't require much force.

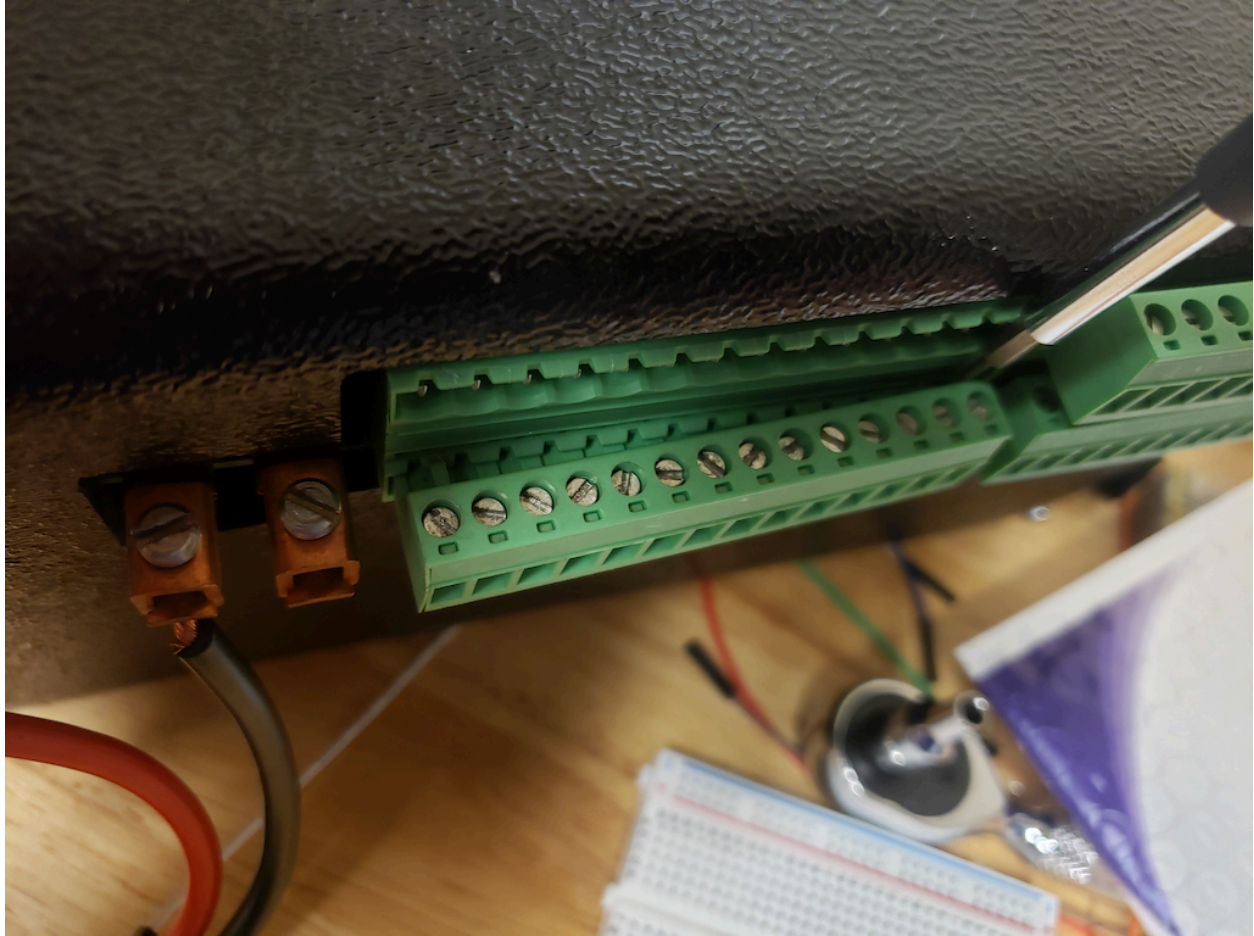


Figure 13. Norstar RS6000 small screwdriver prying out screw terminal block left side

Once that top left green screw terminal block is removed, you have access to the bottom left green screw terminal block that is the one we are interested in adding our wires to.

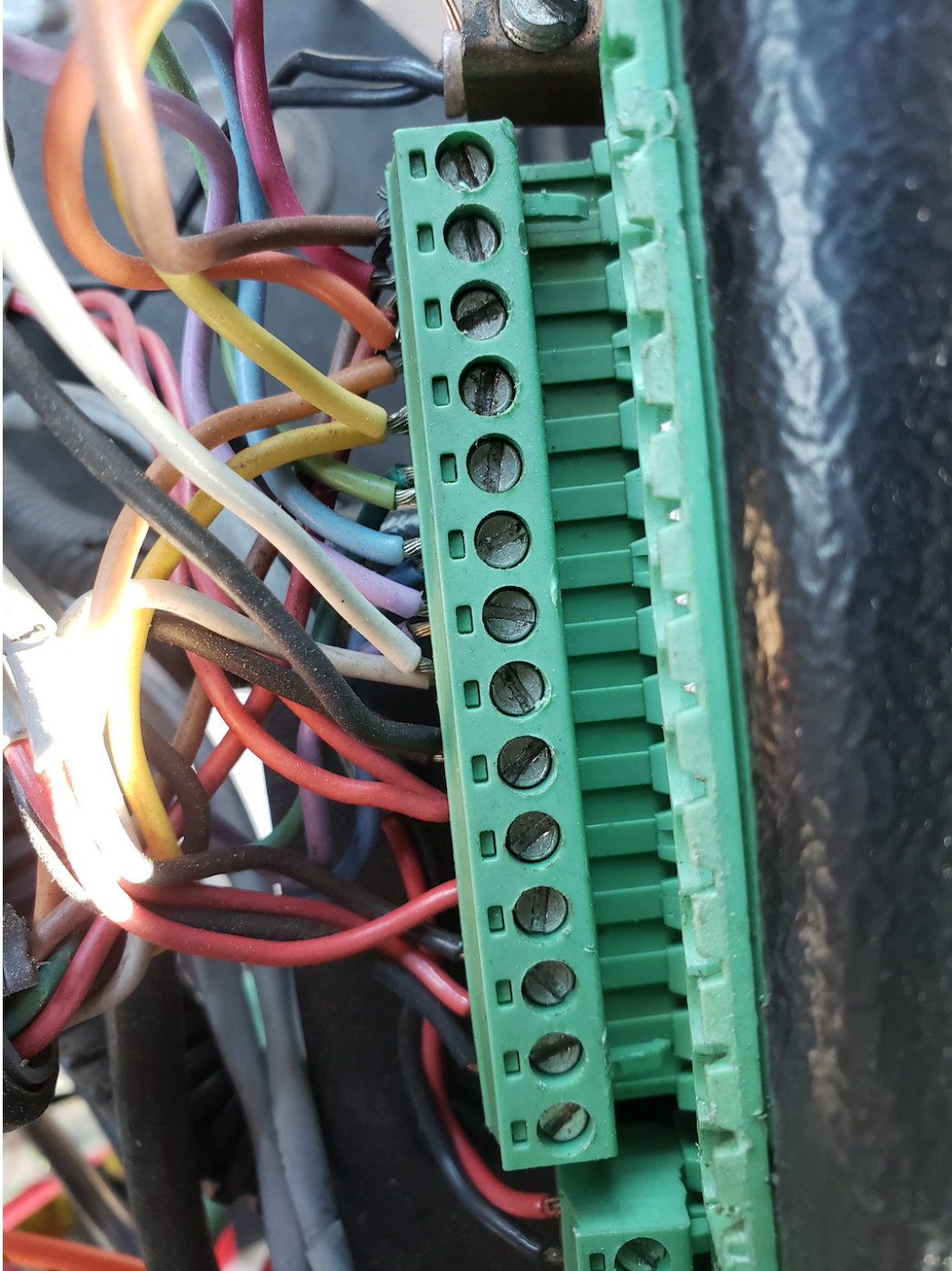


Figure 14. Norstar RS6000 sprayer wired up and boom section bottom left screw terminal block partially removed

See how this one, from top to bottom in Figure 14 above, has the color ordering mentioned above in the table, and in the Norstar RS6000 manual wiring diagram.

- Brown
- Red
- Orange

- Yellow
- Green
- Blue
- Purple
- White
- Black

In Figure 14 above, you can also see there are two wires going into each. We need to add our same colored wire into each screw terminal so there are 3 total wires in each screw terminal.

To give us more room, we also suggest removing this screw terminal block from the unit. The same way we removed the top left one. It gives us just enough flexibility to have easier access with the many wires that are coming from the back of the unit. Use the same technique described above for removing the top left screw terminal block, wedging a small screwdriver in and using leverage to slide it out, loosening the two plastic tabs on the top side if necessary.

Now with the bottom left screw terminal block also removed, but all the wires left intact, we need to add our 3rd wire into each of the 1-9 screw terminals. There are many techniques that a person can try. The best technique that we have found is to unscrew a single input at a time, leave the existing wires in there, and try to slide the new wire in directly on top. That way when you screw it back down, it will be pinching all 3 wires together vertically. To test your install, you want to check for 3 things:

- All 3 wires are in with no exposed stray wires
- All 3 wires are secured down and can pass a tug test and stay secure
- All 3 wires are not touching any adjacent wires of a different color

For the tug test, you shouldn't pull crazy hard, nothing will be able to survive that. Just give it a little tug with a needle nose pliers and ensure it stays in.

To test adjacent wires, it would be best to use a multimeter and touch the top of the screws of adjacent screw terminals with opposite ends of a multimeter. Have the multimeter set into "beep" mode where it will beep when you have a successful connection. You should expect to be able to touch any two screw terminals and not hear any "beep". That will make sure that wires are not touching adjacent wires. The consequences of having wires accidentally touching can differ quite a bit. In the best case, when you turn on a boom switch it will turn on two booms instead of only one. You'll have to watch for that as you spray. Worst case, you could cause a fuse to blow in the Norstar RS6000 or the vehicle. It shouldn't cause any problems with the SpraySync box, but anything is possible. Check twice before you turn on the vehicle and power.

However, this triple stacking without removing the original two wires first technique just doesn't always work.

Another strategy is after you unscrew the individual screw terminal input, instead of leaving the two existing wires in, you remove the two existing wires out but leave them together, then place our SpraySync wire on top, then slide all 3 wires back in at the same time. The two wires that you pull out may be slightly soldered together, or have a shape they have settled into being pinched together, just leave them that way. Put our SpraySync wire right on the top and try to slide all 3 of them together. Then tighten the screw terminal down. You may have to squeeze the wires together with your fingers or a needle nose pliers. Make sure there are no stray wires sticking out, and follow the tests above for the tug test also.

These two techniques are the two methods we've had success with, but it can still be tedious. All of our Norstar trucks we have set up can use these two methods to successfully get them in. Depends on how persistent you are. We've set up several trucks and still takes a bit of time and trial and error to get it right. It can take an hour to get them all in.

We've tried other techniques like removing the two wires, and twisting our SpraySync wire around them. That usually ends up making too much wire that needs to be put back into the screw terminal.

If you are having a real tough time doing it, one other option instead of putting all 3 wires together into the same screw terminal, is to get something better suited for joining multiple wires together like a Wago connector. You may have these at a local hardware store or online at many places, here is a link to [Wago connectors at Home Depot](#). These are clamp down multi wire connectors. As an example, with a 4 input Wago connector, you could put the 3 wires into it and have the 4th wire come out so you only have a single input into the green screw terminal block. If you do that, make sure the wago connector is current rated high enough, is one designed to take stranded wire, it is sized properly for the size of wire, and that the 4th wire you use to go into the screw terminal is at least as big as the biggest of the 3 wires going into the screw terminal (probably 18 AWG from experience). One drawback is that these wago connectors are big, and add to the bulk that you have behind the unit.

Another option could be screw on plastic wire nuts, but those are mostly used for only solid wires so you may not be successful.

I would avoid using solder as it's nice to avoid a permanent connection, solder doesn't hold up to vibration that well, takes a lot more time, and it'll add more to push into the screw terminal. You could solder together 4 wires and leave the extra single wire for putting into the screw terminal. I've had a lot of difficulty in the past trying to solder any more than 2 wires together so I don't advise this.

Once everything has been screwed down and passed the tug test and continuity test with screw terminals next to each other using the multimeter, slide the screw terminal blocks back in. Put the bottom left screw terminal block in first, push all the way in. Then put the top left screw terminal block in last.

Ground wire installation

As mentioned earlier, we have a gray wire in our SpraySync Norstar cable that goes to ground on the RS6000.

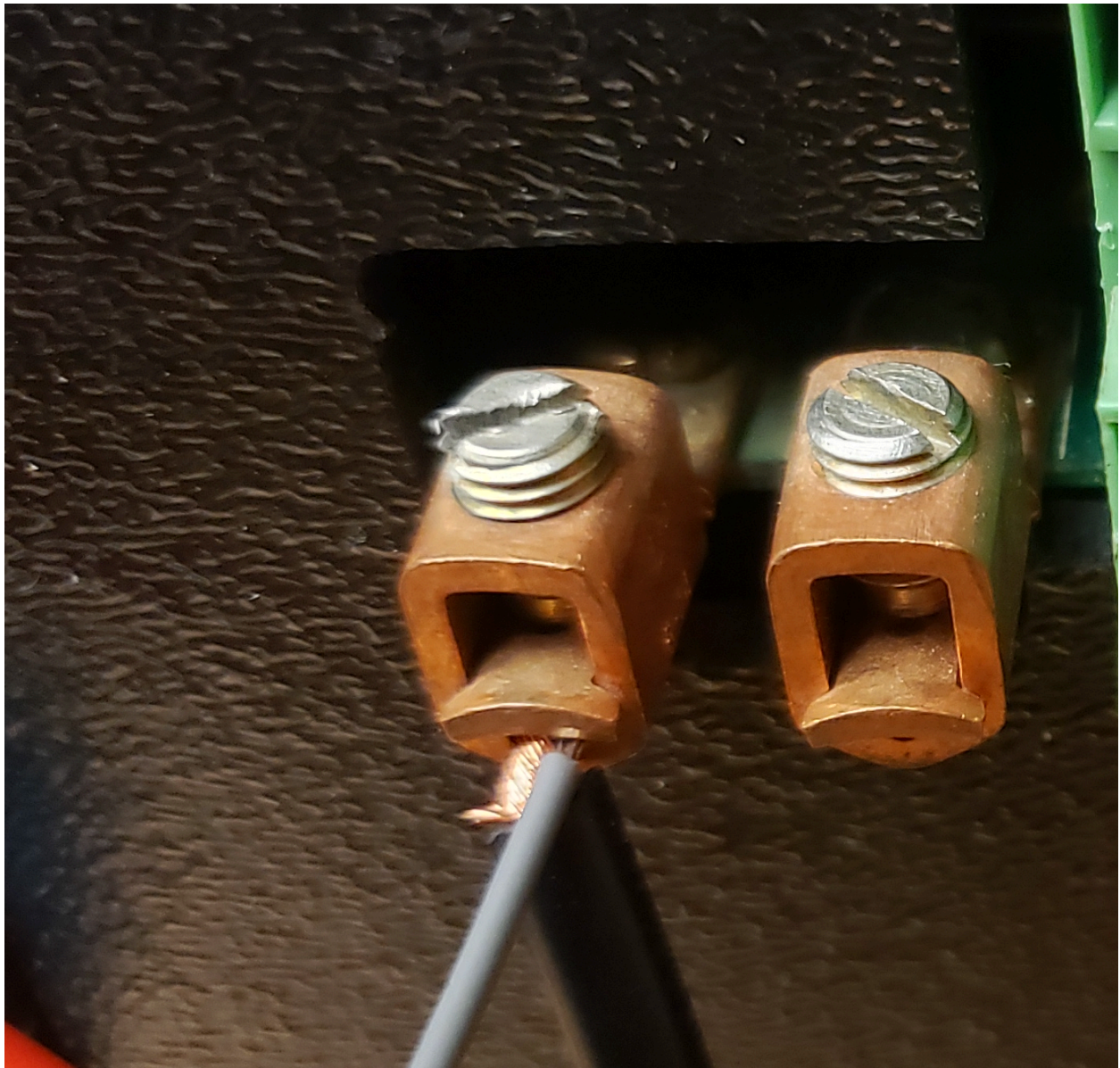


Figure 15. Norstar RS6000 ground screw terminals

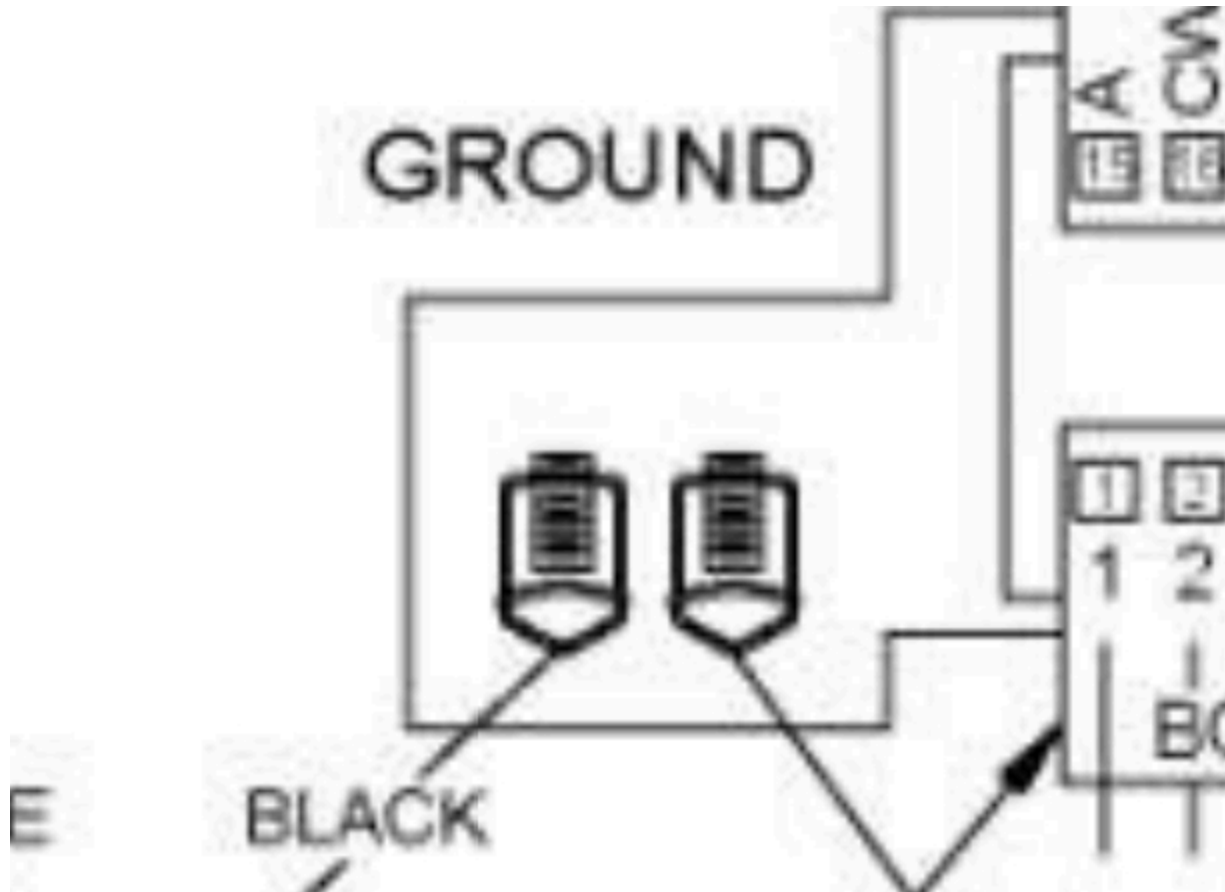


Figure 16. Norstar RS6000 ground screw terminal wiring diagram

Just choose whichever terminal you want of the two there. They are both ground.

Because our ground wire is small, 22 AWG, you will need to choose a terminal that already has a wire in there. The reason being is that the terminal is too big for only a 22 AWG wire.

You'll have to loosen one of the ground terminals up, slip our gray 22 AWG wire on top of the already existing wire, and then tighten it back up. You can try and wrap our cable's ground wire around the existing bigger ground wire a few times, but it'll take a lot of wire to wrap our small wire around the much bigger wire. Ultimately, whatever gives you the most secure install is the goal. But we've had the best luck by just setting it on top of the wire so it's clamped down. This is much easier than the other screw terminals because there will be far fewer wires, and a lot more room in these big screw terminals.

A general goal in wiring is to not have wire touching insulation, so when putting the two wires together, I recommend you line up the insulation of both wires, and then cut the bare wire accordingly to a good reasonable length if there is too much.

SpraySync Box Mounting

We have a few different options for mounting. Interfacing directly with the rear of the Norstar RS6000 controller means that we can keep the SpraySync monitor box in the cab and close to the RS6000. We typically send a 6 foot cable since there are plenty of mounting options in the cab to keep it close. The most common mounting option for the Norstar RS6000 is our pole mount option.

After the box is mounted, it's important to use zip ties to provide strain relief and cable security for all of the cables coming out of the SpraySync monitor box. You are trying to prevent the following situations from damaging the box, cables, or the RS6000 unit.

- Vibration causing cables to loosen their connections over time
- Accidental damage from catching the cable on something and being pulled with excessive force
- Pulling out one of the extra wires added into the rear of the RS6000 controller

Zip ties are a simple way to prevent lots of issues. Keep wires off of the ground. Keep runs of unsecured cables to a minimum of 6 inches. The SpraySync Norstar cable end that goes into the RS6000 needs to be zip tied as closely to the green screw terminal blocks as you can to provide strain relief as the vehicle vibrates to avoid the wires coming out.

Pole Mount

Below in Figure 17 is a SpraySync Monitor box using our pole mount kit into a post in a RS6000 sprayer.



Figure 17. SpraySync pole mount option in a Norstar RS6000 truck

Below in Figure 18 is a picture of the box and pole mount kit by themselves.

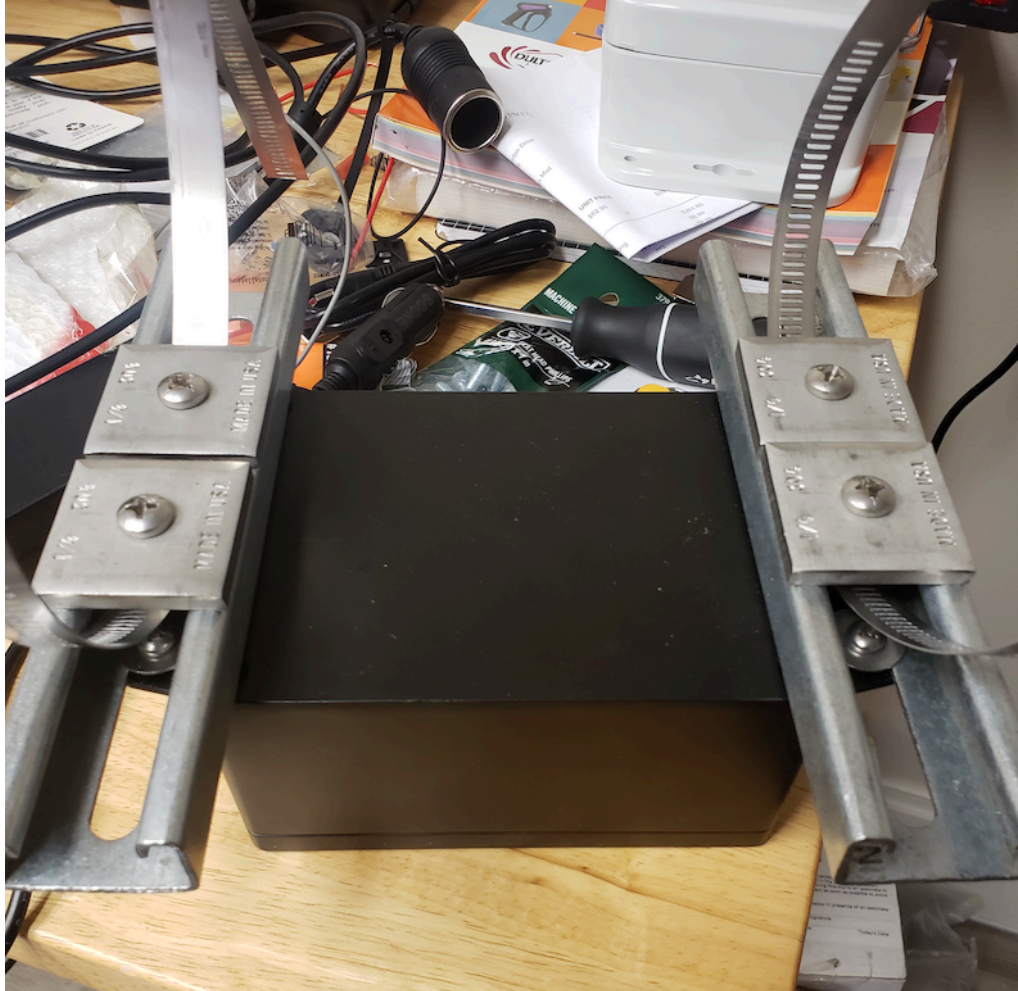


Figure 18. SpraySync monitor box with pole mount kit installed

The SpraySync box has a flange for mounting, the pole mount kit bolts into that.



Figure 19. Closeup of pole mount kit bolted into monitor box flanges.

An exploded view of the screws and where everything goes is here in Figure 20

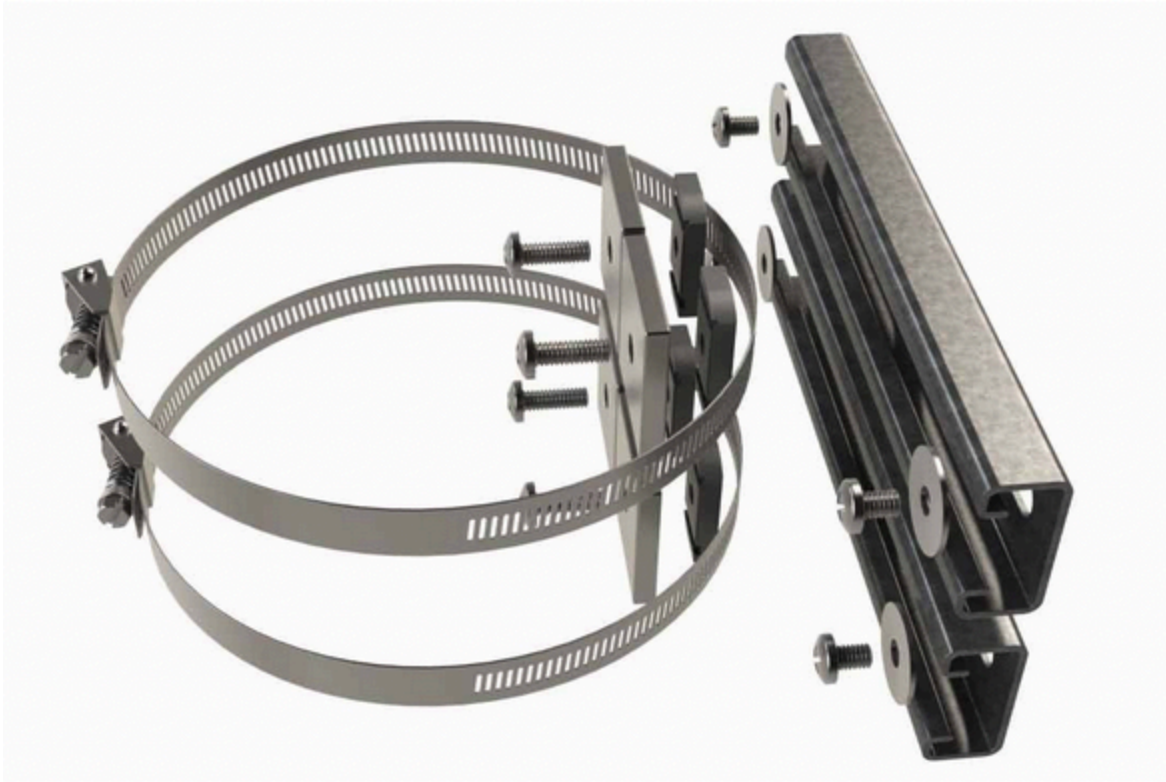


Figure 20: Exploded rendering of the pole mount kit.

Here is the original installation document included with the pole mount kit in Figure 21.

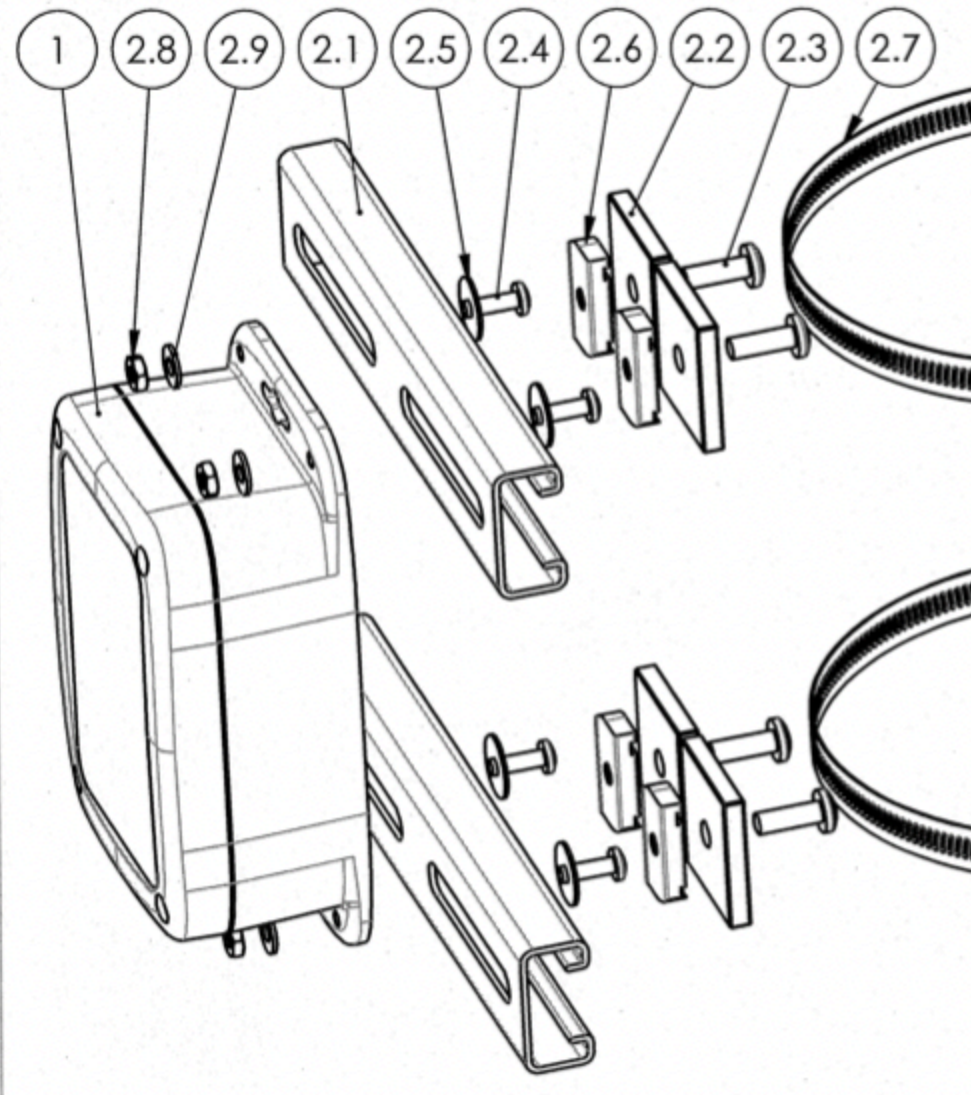


Figure 21: Pole mount kit schematic

The labels above are included in this table in Figure 22

ITEM NO.	PART NUMBER	Rev.	Description	Material	QTY.
1	ML-45F*15	-	ASSEMBLY		1
2	PK-xxx	-.02	POLE MOUNT KIT		1
2.1	SC-080	-	Strut Channel P4100SLPG	PRE-GALV STEEL	2
2.2	SW-001	-	Strut Channel Washer 1/4	304 SST	4
2.3	SCREWS-031		CR PHMS 0.25-20x0.75	SST	4
2.4	SCREWS-030		CR-PHMS #10-24x0.625	SST	4
2.5	W-002		WASHER #10 X .734 X .04	SST	4
2.6	SN-001	-	Strut Channel NUT 1/4-20	316 SST	4
2.7	CL-01	-	Hose Clamp, 2" to 12.25" ID, 35 in.-lbs. Max Torque	201 SST, ZINC SCREW	2
2.8	N-001		NUT #10-24	SST	4
2.9	W-012		#10 SAE WASHER, SST	SST	4

Figure 22: Pole mount schematic part legend.

Screw Mount

The monitor box has flanges on it, see Figure 23 below, so if you want to screw it down to the floorboard, or a wooden board that you mount somewhere, that is another mounting option.



Figure 23: SpraySync monitor box side view showing mounting flanges.

Velcro Mount

One other option that is more popular in ATV/UTVs is to place it in a glovebox. To keep it from sliding around in the glovebox, we typically mount a large rectangular piece of Velcro on the bottom of the box and put the other side where we want it to stay. It's important to keep it from sliding around so the cables don't get knocked around.

Tablet Mount



Figure 24: Norstar RS6000 with Tablet mount installed

We use a RAM Mount diamond shaped ball plate bolted onto the left side of the bracket holding the Norstar and Mid-Tech electronics, see Figure 25 below.



Figure 25: Ram Mount diamond shaped ball mount

We don't have any great closeup pictures of this as mounted. But we find the diamond shaped ball plate only needs 2 holes, and is small enough to fit not necessarily straight up and down, but at a slight angle, within the width of the left side of the bracket. Be careful to pick your hole placement to safely fit in the space in between the Mid-Tech unit on top and the RS6000 unit below. You may want to loosen each of those units up so you can swivel them out of the way to give you more room. We mark the holes with a punch or a pencil, then drill the holes. Then use the included bolt to attach the diamond shaped ball plate to the left side of the bracket, and use the included washer and nylon lock nut on the other side. Loosening up those Mid-Tech and RS6000 unit will help a lot to give you the room to use a wrench to tighten.

The tablet mount is intended to have a RAM Mount round plate with ball mounted on the backside. The ball mount is similar to Figure 26 below.



Figure 26: RAM Mount round plate with ball

There will be 4 screws inside the tablet mount box to screw down the ball mount to the tablet mount.

Included is a RAM Mount double ball socket arm, shown in Figure 27, that connects the two and allows for some flexibility in positioning.



Figure 27: Ram Mount double ball socket

The tablet mount with the ball plate mounted will be as pictured in Figure 28.



Figure 28: Tablet mount with ball mount plate attached