# SmartSensor Matrix

INSTALLER QUICK-REFERENCE GUIDE

Introduction

Complete the steps below to integrate the Wavetronix SmartSensor Matrix system into a signalized intersection. If you need technical support, please contact Wavetronix Technical Services at 801.764.0277. For more information, see the *SmartSensor Matrix User Guide*.

1 Ensure that all necessary components are available

These components, all of which can be ordered from Wavetronix, may be needed to install your SmartSensor Matrix; for more information on any of these, see the *Wavetronix Product Catalog*.
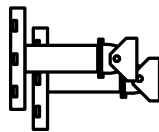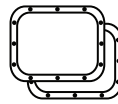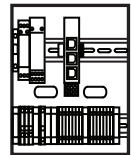

**Mount Brackets** **Sensors** **Accessory Cables** **6-conductor Cable** **Preassembled Backplate**

2 Select the sensor's location

The following are the suggested Matrix mounting locations:

1. **The back side of mast arm** – Allows the sensor to be placed near the lanes of interest and may be the best location option for wide approaches. If you mount the sensor on the back side of a mast arm, mount it near the end of the arm to reduce the possibility of the mast arm or departing traffic occluding approaching vehicles.

2. **The far side of approach –** Usually mounted on a corner vertical mast pole or strain pole. If the sensor is mounted on a vertical pole with a mast arm, you can usually avoid occlusion by mounting the sensor away from or below the mast arm.

3. **The near side of approach –** Typically best if detecting the left turn lane is less important; also allows you to mount the sensor high enough to avoid occlusion.
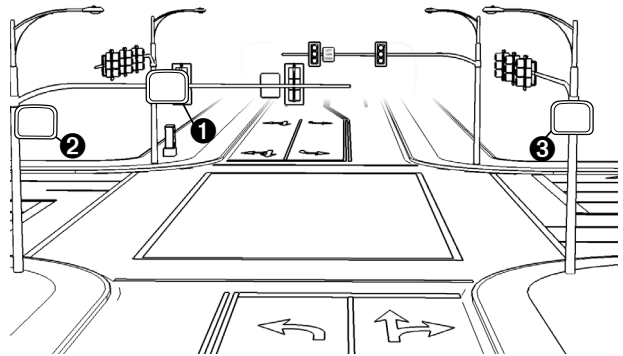
Other mounting locations may be possible; contact Wavetronix Technical Services for assistance.

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3   Determine the height and mount the sensor

Use the following guidelines to determine the best mounting height:

- The sensor should be placed at a height of roughly 20 ft., give or take 5 ft. (6.1 ± 1.5 m).
- The maximum recommended mounting height is 60 ft. (18.2 m). The minimum recommended mounting height is 12 ft. (3.6 m). (The farther you install the sensor from the first lane of interest, the higher the sensor should be mounted.)
- Take into consideration the sensor's footprint, which reaches 140 ft. (42.7 m) from the sensor. Place the sensor so that the footprint covers all the areas of interest. Be aware that in certain conditions, lanes that have stop bars or detection zones placed at extended range may show some loss in performance, even with a proper mounting height.
- The mast arm is frequently a good place to mount the sensor.
- The mounting position should have a clear view of the detection area. Poles, mast arms, signal heads or other objects should not block the view of the detection area.
- Placing the sensor higher will result in less occlusion. Placing it lower could result in more occlusion. However, if the nearest detection area is less than about 20 ft. (6.1 m) away, the sensor may perform better with a lower mounting position.

To attach the mount bracket to the pole:

1. Insert the stainless steel straps through the slots in the mount bracket.
2. Position the mount on the pole so the mount head points toward the lanes of interest at a 45° angle.
3. Tighten the strap screws.
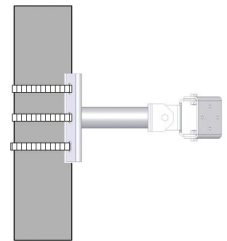
To securely fasten the sensor to the mount bracket:

1. Align the bolts on the sensor's backplate with the holes in the mount bracket. The eight-pin connector receptacle on the bottom of the sensor should be pointing towards the ground.
2. Place the lock washers onto the bolts after the bolts are in the mount bracket holes.
3. Thread on the nuts and tighten.

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4   Align sensor to roadway

The sensor's field of view fans out 45° to both sides. You will usually want to position the radar beam so that its 90° footprint covers all lanes approaching the stop bar.

Also, the field of view's front edge must be aligned to provide some coverage beyond the stop bar so you can detect vehicles that don't stop at or behind the stop line, as well as vehicles exiting queues.

1. Adjust the side-to-side angle so the front edge of the field of view provides a view downstream of the stop bar.
2. Tilt the sensor down to aim it at the center of the lanes of interest.
3. If necessary, rotate the sensor so that the bottom edge of the sensor is parallel with the roadway. This is necessary where the intersection approach has a significant grade.
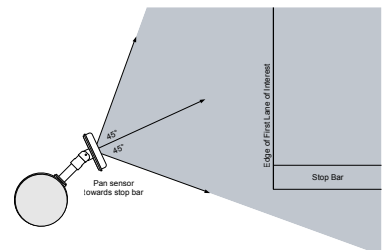
5   Attach the 6-conductor cable and ground the sensor

1   Tear the tab off the silicon dielectric compound and squeeze about 25% of it into the connector at the base of the sensor. Wipe off any excess compound.

2   Insert the cable into the connector and twist clockwise until you hear it click into place.

3   To avoid undue movement from wind, strap the cable to the pole or run it through a conduit, but leave a small amount of slack at the top of the cable to reduce strain.

The SmartSensor Matrix provides its own surge protection, so there is no need for a pole-mount box on the sensor side of the cable. Instead, the cable should run straight to the main traffic cabinet; landing the cable in the cabinet will be covered later in this document.

It is necessary, however, to ground the sensor:

1   Connect a grounding wire to the grounding lug on the bottom of the sensor.

2   Connect the other end of the grounding wire to the earth ground for the pole that the sensor is mounted on. Do not attempt to run the grounding wire back to the main traffic cabinet.

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6   Mount the preassmbled backplate in the main traffic cabinet

Once installation of the sensor is complete, the SmartSensor Matrix preassembled backplate must be installed in the main traffic cabinet.

To do so, locate the area planned for mounting the backplate; it can usually be mounted on the side panel of a NEMA-style cabinet. Then attach the backplate with the U-channel mounting screws.

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7   Wire power to backplate

Use the following steps to connect power to the AC terminal block on the bottom DIN rail:

1   Connect a line wire (usually a black wire) to the bottom of the "L" terminal block.

2   Connect a neutral wire (usually a white wire) to the bottom side of the "N" terminal block.

3   Connect a ground wire (usually a green wire) to the bottom of the "G" terminal block.

4   Turn on AC mains power.

5   Press the circuit breaker switch on the left side of the top DIN rail to switch power to the backplate.

6   Verify power is regulated by seeing that the DC OK LEDs are illuminated on the Click 201/202/204.
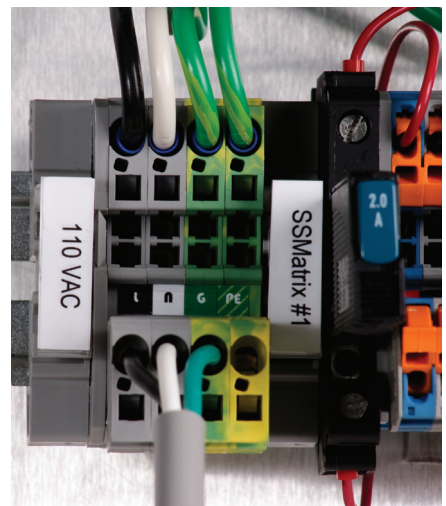
8   Terminate the SmartSensor 6-conductor cable

To land the 6-conductor cable into the terminal block section:

1   After routing your SmartSensor 6-conductor cable into the cabinet, carefully strip back the cable jacket and shielding on the service end of the cable.

2   Open the insulation displacement connectors on the plug by inserting a small screwdriver into each square slot and rocking it back.

3   Insert the wire leads into the bottom side of the plug-in terminal according to the colors of the wires and the labels on the plug. Make sure the wires are completely inserted in the terminal.

4   Close the insulation displacement connector by reinserting the screwdriver into the square slot and rocking it forward. The plug-in terminals will automatically complete the electrical connection. There is no need to manually strip the insulation on the end of each wire.

5   If you removed the plug to wire it, insert it back into the terminal block section.
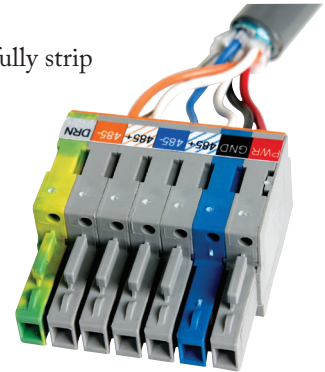
9   Connect to the detector rack cards

Finally, connect to detector rack cards. You can use the Click 104, which mounts on a DIN rail, but these instructions refer specifically to the Click 112/114 detector rack cards.

The Click 222 has three RJ-11 jacks on the faceplate; these jacks have the following functions:

- **RS-485 A –** Connects the data bus from sensor 1 to the detector rack cards.
- **RS-485 B –** Connects the data bus from sensor 2 to the detector rack cards.
- **RS-485 Bridge –** Connects the configuration buses from sensors 1 and 2 to the control bridge, to the detector rack cards, and to the T-bus. This jack combines the input from ports C and D.

Note. For information about how to configure the Click 112/114, see the *Click 100–400 Series User Guide* or the *Click 112/114 Quick–reference Guide*.

To connect to the detector rack cards:

1   Make sure the DIP switches are set.

2   Connect from the Click 222 RS-485 A port to a bus 1 port on the appropriate rack card. Connect from the Click 222 RS-485 B port to a bus 1 port on another rack card.

3   If you are using Click 112 cards, use a patch cord to share bus 1 between cards dedicated to the same sensor. If you have more than two sensors in your system, repeat steps 1–3 to connect bus 1 for all remaining rack cards.

4   Connect from a Click 222 bridge port to bus 2 of the rack cards.

5   Daisy-chain between the bus 2 ports of all of the rack cards for device configuration.