

Always read these instructions even if you are familiar with the installation process of M100 magnetometer sensors.

M100 sensors are the only hardware installed in-ground as part of the M100 wireless vehicle detection solution. Sensors can be installed either 'shallow' to a depth of 75mm (Method 1) or 'deep', at a depth of 165mm (Method 2) in a cored hole with a diameter of 102mm. You may find that sensors are supplied in a clear plastic clamshell. We recommend that sensors are removed from these clamshells when installing. Installation will take between 15 to 30 minutes per sensor dependent on depth. For full installation instructions, download the full guide from the 'resources' area of the Clearview Intelligence website.


#### Tools and equipment for sensor installation


- Coring bit
- Coring Drill
- Paint (mark location)
- Vacuum Cleaner
- Epoxy
- Epoxy applicator
- Cold pour asphalt
- Water (for drill)
- Hand chisel (or similar)

(see reverse page for tooling detail)


#### Battery warning

M100 wireless detection systems use Lithium Thionyl Chloride batteries in both sensors and repeater units. Improper use or handling of the batteries may result in leakage or release of battery contents, explosion or fire.

 Do not attempt sensor installation work if road surface is wet, damp or temperature is below 5C

 System sensor locations and configurations must be planned & agreed before installing equipment on site

 Suitable traffic management must be used

 Ensure that the correct Personal Protection Equipment is worn always during installation

#### Method 1: Installation instructions to install M100 sensor deep (165mm) APPROX 25-30 minutes

1. Find and mark the center of the desired M100 sensor location.
2. Ensure that the drill bit is the correct dimensions (102mm diameter x 165mm depth). On the drill bit, place a visible mark 6.5" above the leading edge.
3. Core a hole in the marked road surface. Check depth as you



drill and remove debris periodically. Do not drill past the mark of 6.5" on the drill bit. The hole should be 102mm in diameter by 165mm depth. Once the hole is drilled, use a cold chisel and club hammer or a power chisel to gouge out an even surface along the bottom of the hole.

4. Make sure to vacuum / brush the hole clear of dust and debris. Ensure that the hole is dry as moisture may impede the curing of the epoxy. If moisture is observed, use the heat-gun or torch to dry the inside of the hole completely. When using a heat-gun or torch ensure that you **do not overheat the binding element in the pavement**. If overheated, the asphalt may crumble, and the epoxy will not adhere to the sides of the core correctly.

NOTE: The hole **must** be cool before performing the next step. An overheated hole will not cure properly, trapping air in the epoxy and possibly damaging the sensor. It will also burn away the binder making the pavement brittle.

5. Add a base layer of cold pour asphalt in the hole (to level as even as possible).



6. Add approximately half a tube of epoxy on the bottom of the cored hole.
7. Make sure that you have removed the clamshell from the sensor. Place the M100 sensor in the center of the hole on top of the epoxy and verify the following:
  - Sensor is dry and clean
  - Sensor is level
  - Label arrow points in direction of traffic flow
  - Sensor location and ID are recorded

NOTE: When placing the sensor into the first application of epoxy, it must be pressed down firmly to push out any air pockets and to ensure that it does not float up when the remaining epoxy is applied to completely cover the sensor.

8. Fill the hole entirely with epoxy until flush with road surface, completely covering the M100 sensor. **3 tubes of epoxy are required per sensor installed deep.**
9. Update site installation records with the Sensor ID, physical location, lane location and date of installation.

## Method 2: Instructions to install M100 sensor shallow (75mm) APPROX 15-20 minutes

1. Find and mark the center of the desired M100 Wireless Sensor location.
2. Ensure that the drill bit is the correct dimensions (102mm diameter x 75mm depth). On the drill bit, place a visible mark 3" (75 mm) above the leading edge.
3. Core a hole in the road surface. Check depth as you drill; remove debris periodically. Do not drill past the mark on the drill bit. Once the hole is drilled, use a cold chisel and club hammer or a power chisel to gouge out an even surface along the bottom of the hole.
4. Vacuum or brush the hole clear of dust and debris.
5. Ensure that the hole is dry. If moisture is observed, use the heat-gun or torch to dry the inside of the hole.
6. Add a thin base layer of cold pour asphalt to level hole as evenly as possible.
7. Add approximately 1/8" (.32 cm) of epoxy on the bottom of the hole.
8. Place the M100 Wireless Sensor in the center of the hole on top of the epoxy. **Ensure that the clamshell has been removed**, the label is visible, the sensor is not tilted, and that the arrow on the label points in the direction of the traffic flow.
9. Note the Sensor ID if not already recorded.
10. Fill the hole with FJS epoxy until flush with road surface, completely covering the sensor and its label.
11. Update installation records with the Sensor ID, physical location, lane location and date of installation.

### IMPORTANT NOTICE:

#### Use of clamshells when installing M100 sensor

We recommend that M100 sensors are removed from the encasing plastic clamshell before install.

Sensors installed 'deep' at 165mm **do not** require use of a clamshell. It is essential you read the below information.

If a sensor is installed in a Clamshell the following precautions must have been taken. **Any M100 product warranty may become void if the below factors are not taken into consideration:**

- Clamshells must not be installed with any legs completely missing from base of clamshell. This creates a hole in the sealed unit and a potential access point for water
- Sensor must be located directly in the centre of the hole with the outer edge of the clamshell not touching the side wall of the cored hole
- A base layer of epoxy must be used before placing the clamshell in the hole and the sensor is completely covered with resin from above

### Images of clamshell use gone wrong



No resin applied to the underside of the clamshell. Water has entered the void and attenuated the sensor signal.



Sensor installed too close to road surface. Strain has cracked the top part of unit allowing mud and grime to access the sensor.



Clamshell installed slightly off centre of hole. Water has protruded through the clamshell edge, attenuating sensor signal.

### IMPORTANT NOTICE:

#### Use of NAL chambers when installing M100 sensors

Where a NAL detector chamber has been used to install an M100 sensor, ensure that the cover is watertight and the chamber has been installed in line with manufacturer specifications. Please refer to NAL for appropriate torque settings. It is imperative that the chamber is installed correctly. If there is a deviation on manufacturer installation instructions, product warranty may become void. If water ingress does occur, water will attenuate the sensor communication signal to its access point or repeater unit.

#### Tools required for sensor installation

A typical M100 Sensor installation requires the following:

- M100 Wireless Sensor(s)
- Coring bit – diamond-tip bit suitable for the type of carriageway to be cored.
- Coring drill – outfitted for wet coring operations
- Paint – to mark the pavement at the coring location
- Vacuum cleaner – to clean out the cored hole
- Leaf blower (preferable) or heat gun – hot air or propane torch to dry the hole (or roadway moisture) prior to epoxy application
- Water – used with the coring drill
- Hand chisel or similar tool – to clear and flatten out the base of the cored hole
- Tape measure – to check hole depth
- Epoxy applicator (including mixing tubes) – to mix and apply epoxy, Clearview Intelligence Part Number 008599-000
- Epoxy – Clearview Intelligence Part Number 008614-000 to fill the hole after sensor installation. **A minimum of three tubes of FJS epoxy is required for each deep (165mm) M100 sensor**
- Cold pour asphalt (cold joint paint) or sand to level hole

A 2:1 ratio pack of Fabick Joint Seal (FJS), a two-component 100% sealant is recommended. This self-leveling joint sealant displays fast cure times (approximately five minutes), and excellent adhesion to tarmac and concrete.