



# Technical Bulletin

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**Summary:** Instructions for mounting, aligning, and setting up the 2100-696 Frauscher Zero-Speed Dual Gating Assembly for use with the SmartScanNG<sup>2</sup>.

**Critical (Affects safe operation of a system)**

**Informational**

**Distribution List:**

## SmartScanNG<sup>2</sup> / Frauscher Zero-Speed Transducers – Installation & Setup

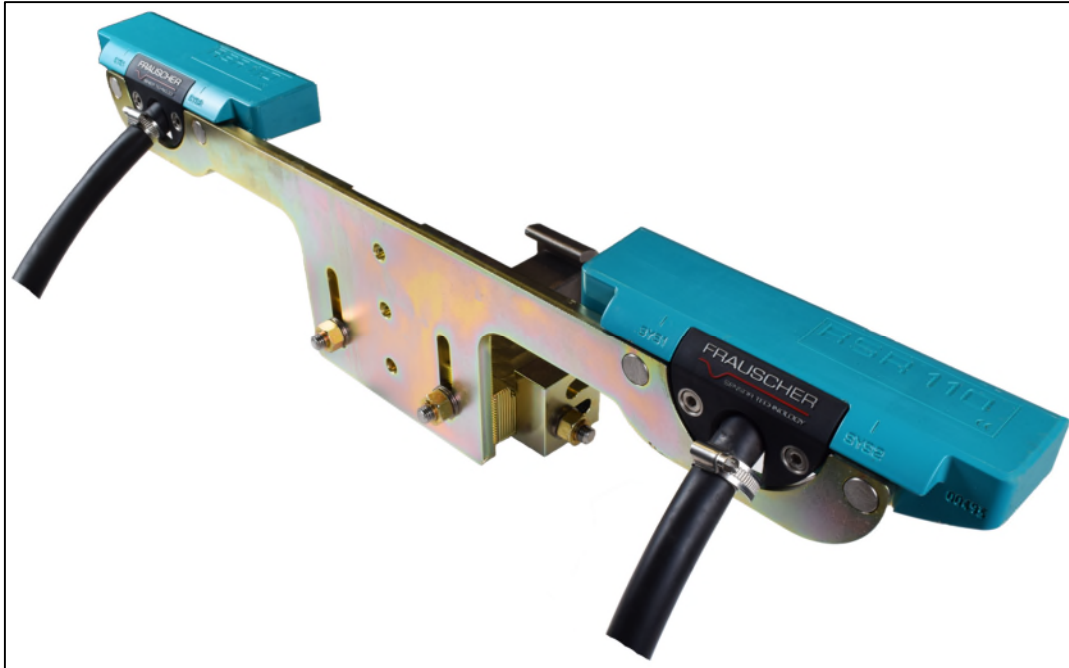
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## Introduction

### 2100-696 Frauscher Zero-Speed Dual Gating Assembly



The Frauscher Zero-Speed Dual Gating Wheel Detector Assembly is a rail-mounted device that generates precision wheel timing signals for the SmartScanNG<sup>2</sup> Defect Detector. The combination of inductive operating principles and the robust design of the RSR110 sensors guarantee high reliability, even when subjected to extreme mechanical, electromagnetic, climatic, and environmental working conditions.

The following link to our web page provides additional resources, including instructional videos.

<https://www.southern-tech.com/products/item/wheel-detector-frauscher-dual-gating>

### Acronyms

**SICM:** System Interface & Controller Module – The Electronics package mounted on the chassis provides interface circuitry and several communication modes for two onboard microprocessor modules running custom-engineered software.

**TO1, TO2:** Wheel Transducer 1 and Wheel Transducer 2 – The wheel sensors provide signals for the SICM to calculate speed, direction, and a reference location for bearing and wheel temperature measurements.

**UTB:** Universal Transient Barrier – The brand name from ERICO for electrical surge protection devices.

**WSC:** Frauscher Wheel Signal Converter – Interface device used with early versions of the SmartScanNG<sup>2</sup> before transducer incorporating interface circuitry into the SICM.

## Preparation

### Tools Required

- 11/16" Socket
- 7/8" Socket
- 7/8" Wrench
- 1-1/2" Socket
- Torque Wrench (foot-pound)
- External Retaining Ring Pliers
- 6 mm Hex Key Wrench
- Straight Slot Screwdriver approximately 1/8 inch wide.
- Wire cutters
- Wire Strippers
- #263 Red Loctite (see page 9)

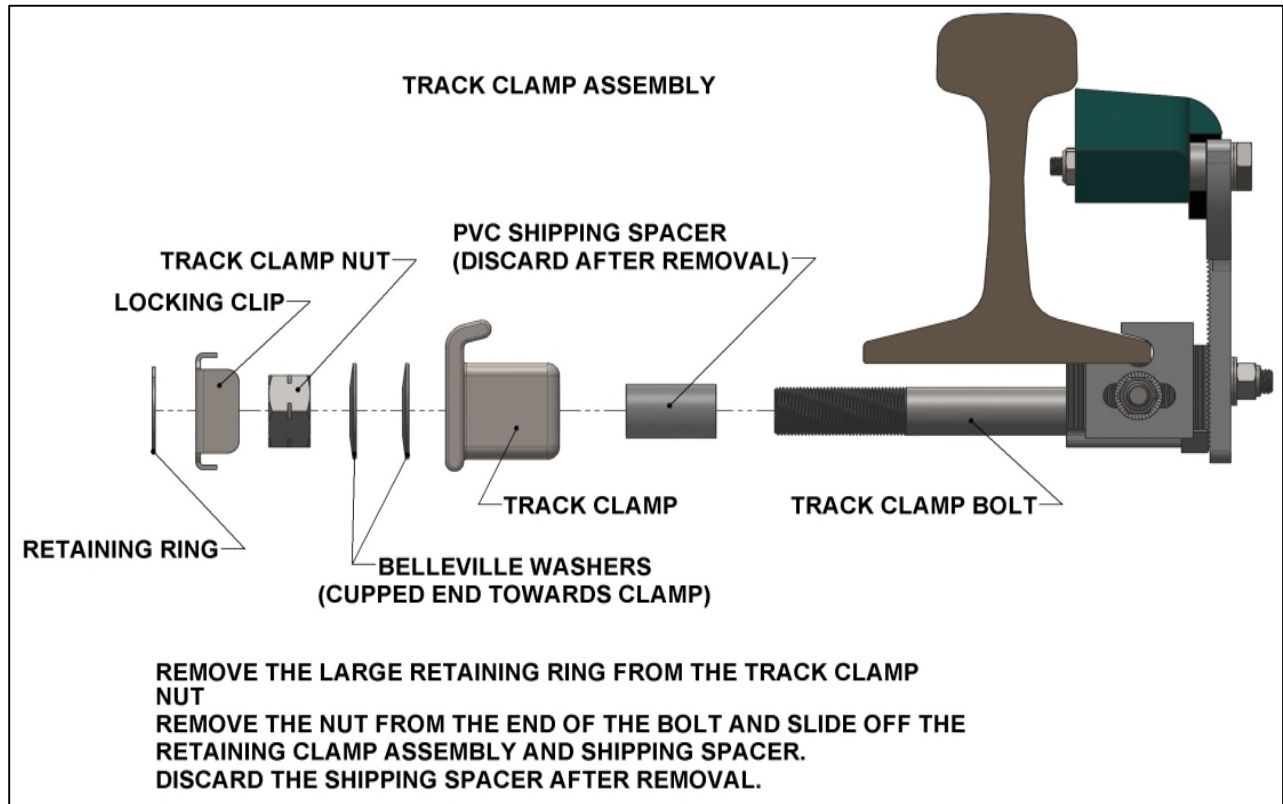
### Default Configuration



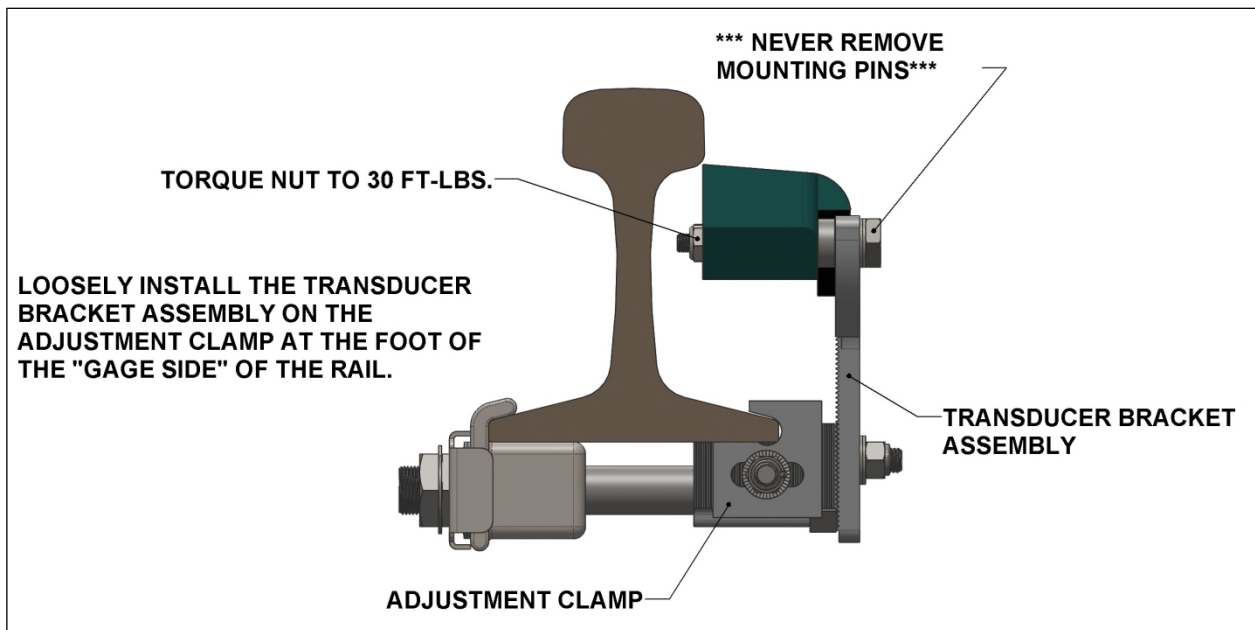
The 2100-696 Double Gating Transducer brackets are pre-adjusted for 132lb – 141 LB. rails.

## Installation

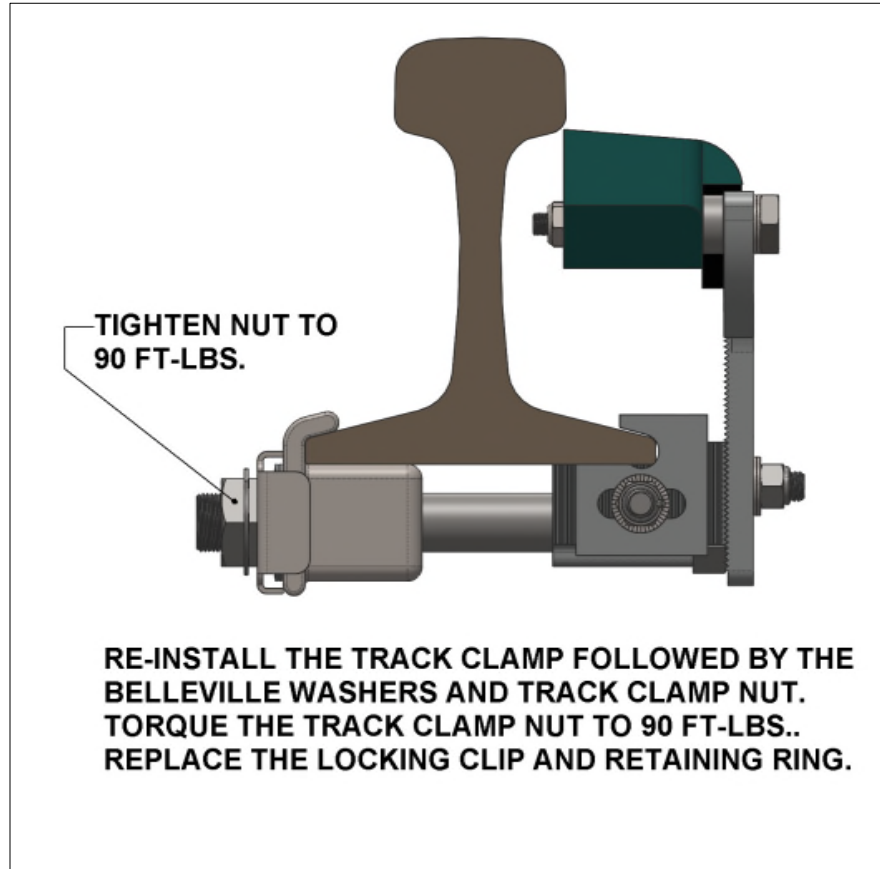
### Removal of Mounting Hardware



### Locate the Mounting Bracket on the Foot of the Rail

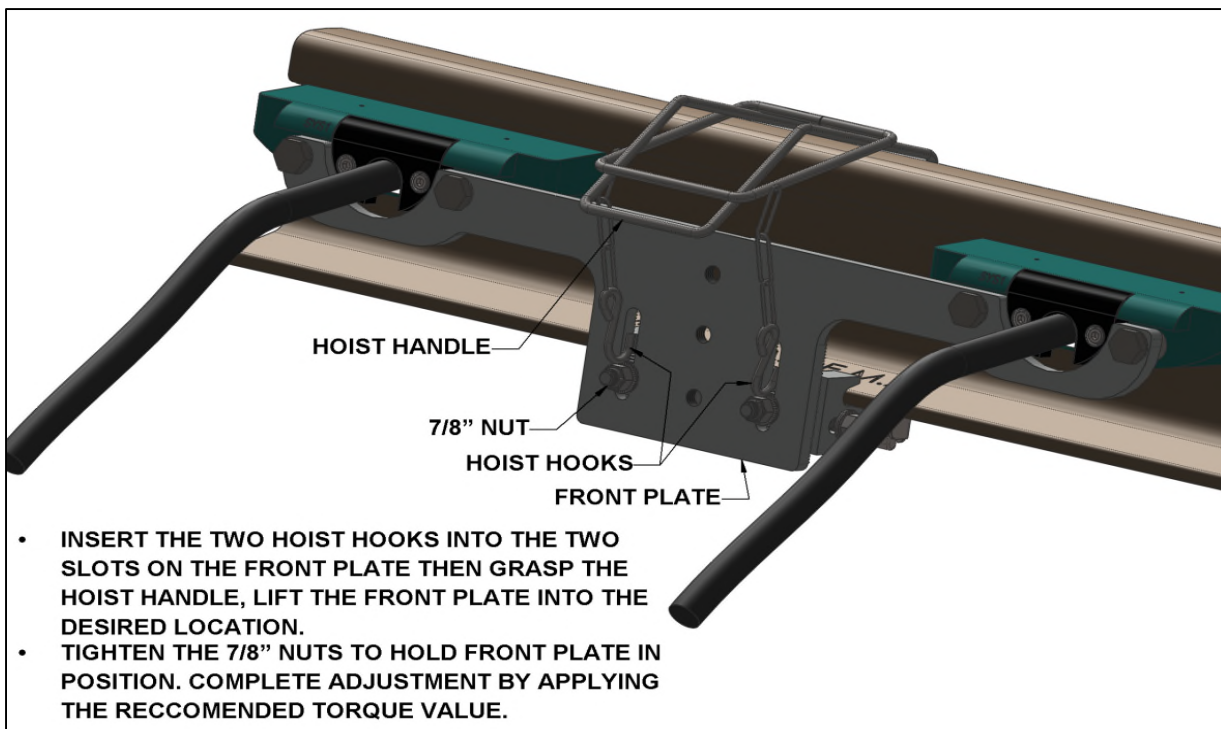
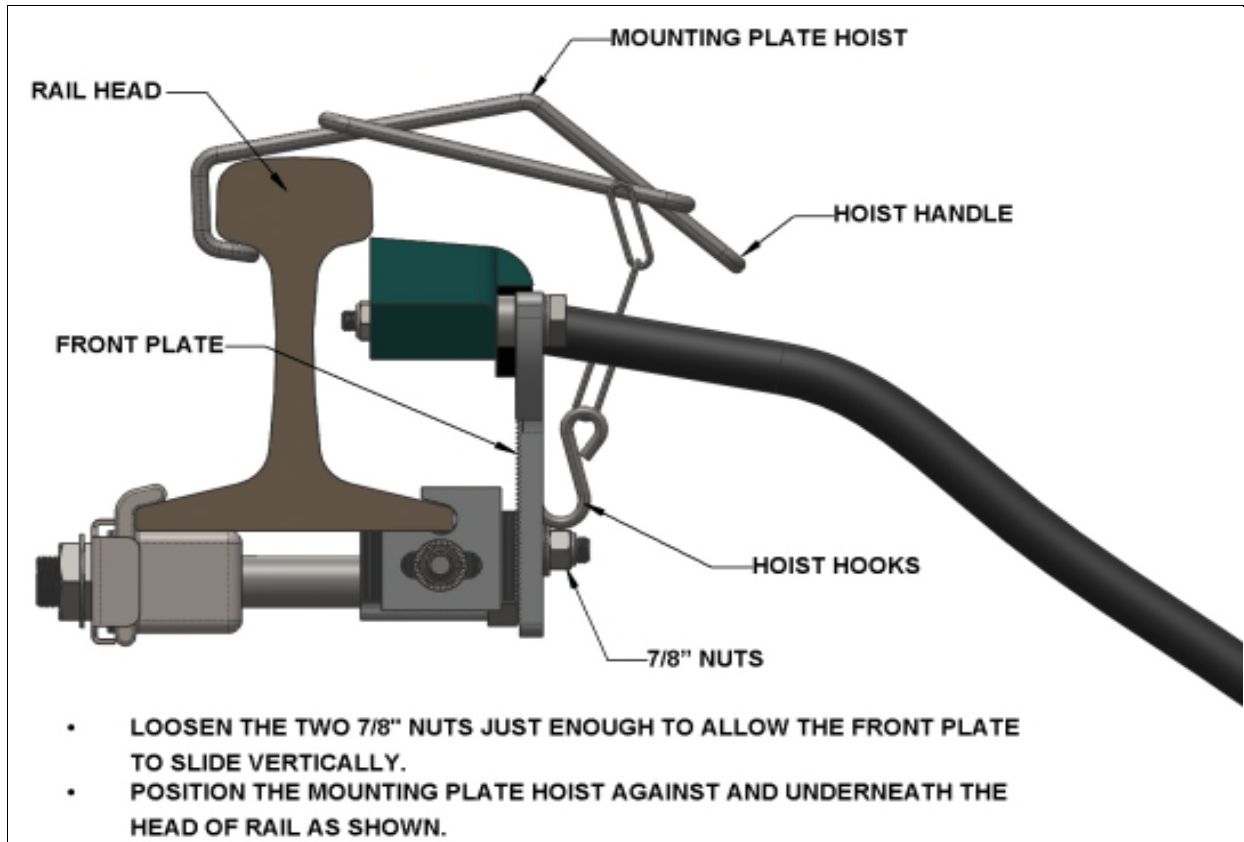


## Installation of Transducer Assembly

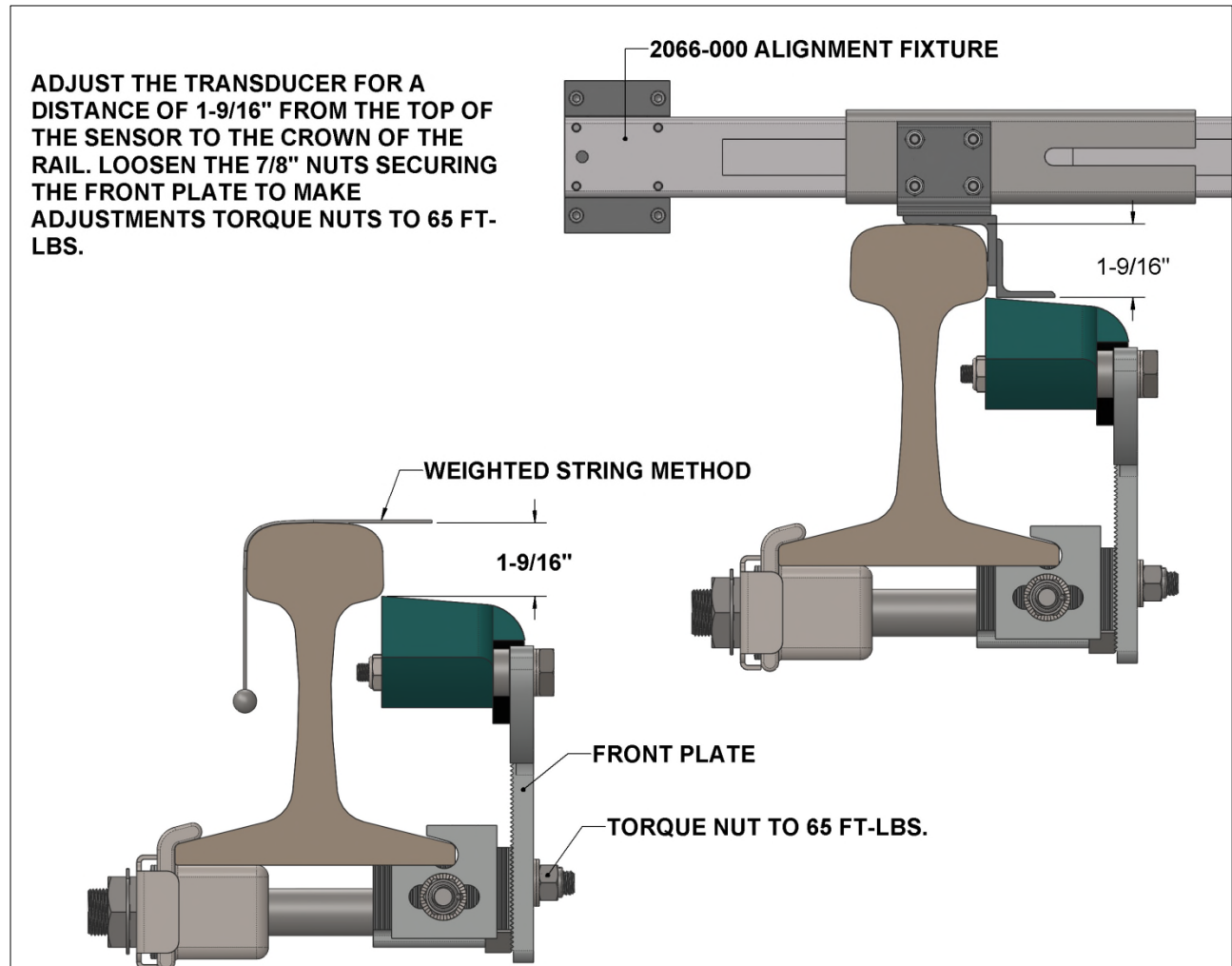


## Alignment

### Mounting Plate Hoist



## Vertical Alignment

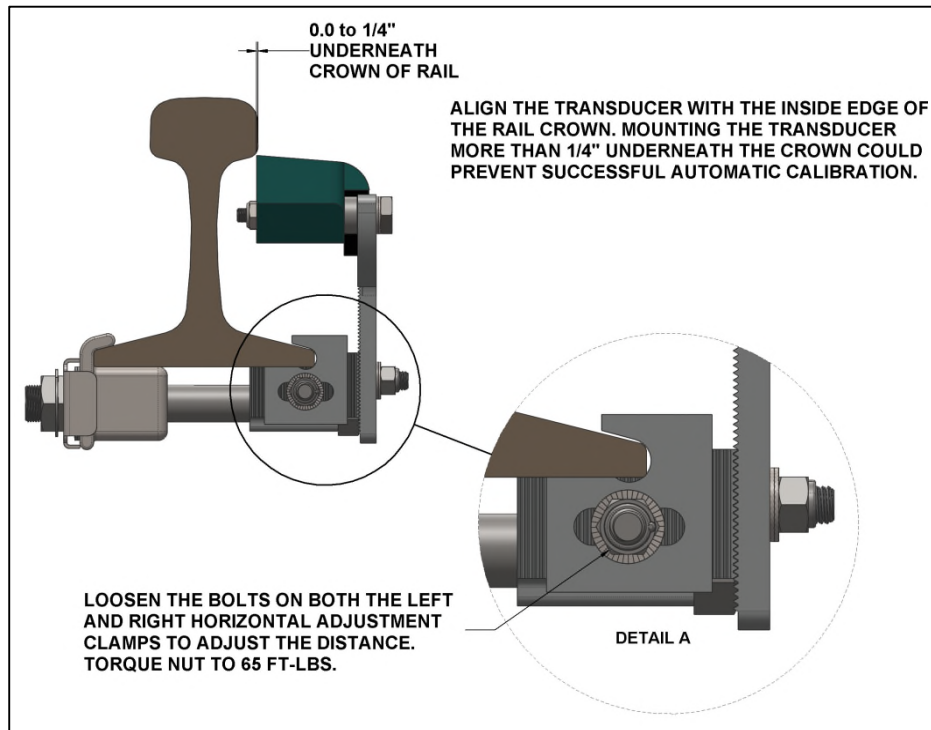


Loosen the two 7/8-inch nuts that secure the Adjustable Mounting Plate and move the transducers into adjustment, referring to the dimensions above.

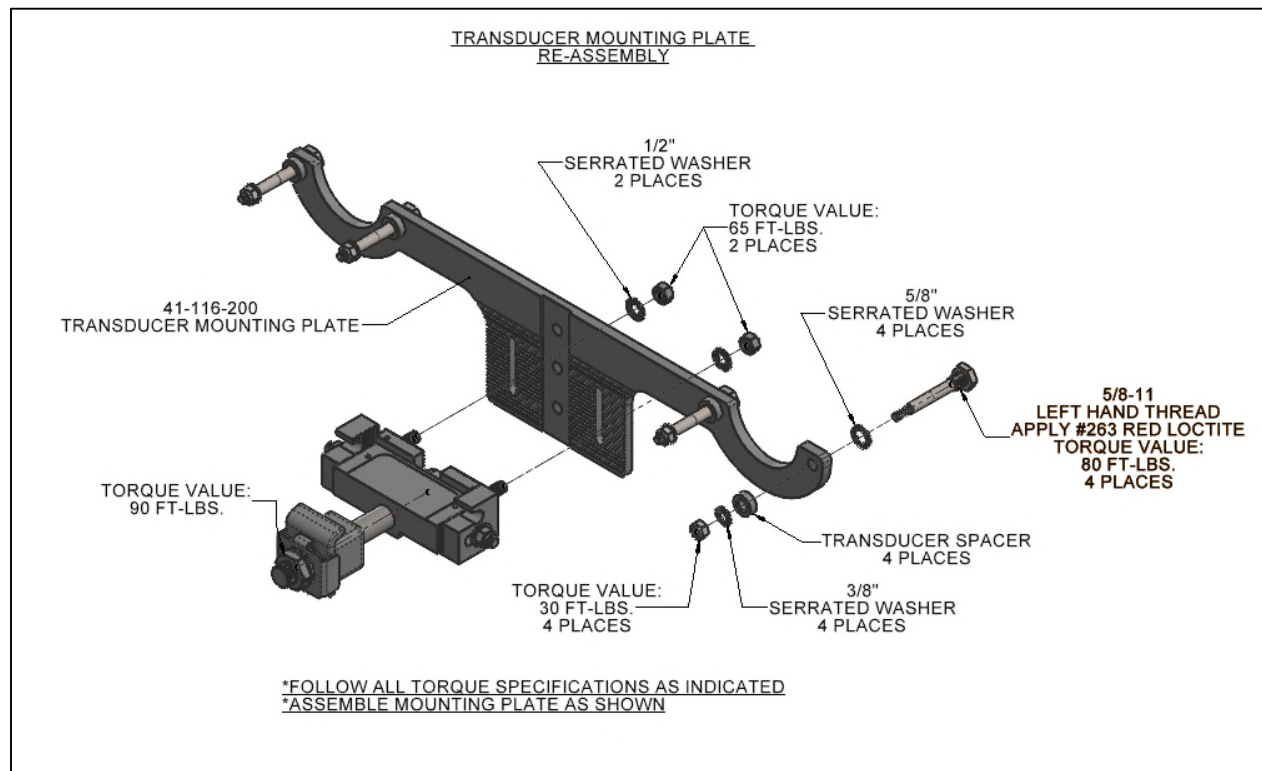
**Note:** The transducer can be lowered one or two additional adjustment detents below the Alignment Fixture and still be within specification, which on rare occasions may be necessary for successful transducer calibration. Each adjustment detent represents 0.100" inches.

**NOTE:** For proper installation and operation of the transducers, and to prevent damage, this adjusted dimension should "NEVER" be less than 1-9/16 inches.

## Horizontal Adjustment

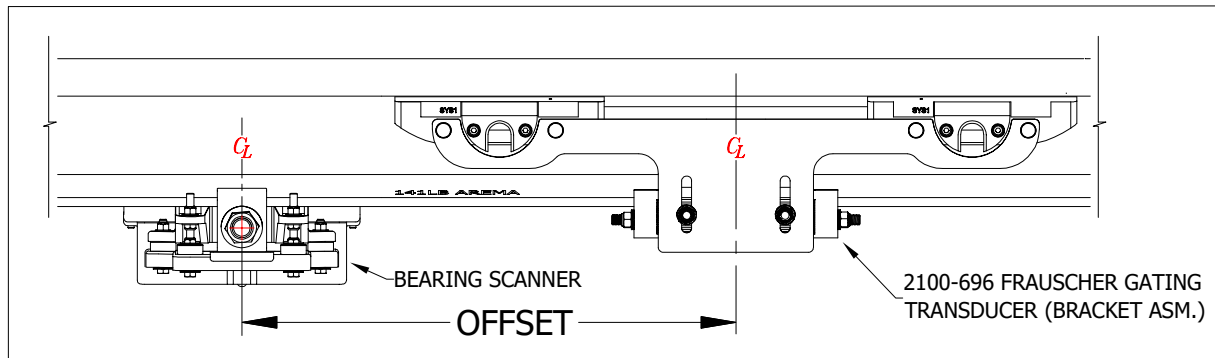


## Transducer Mounting Plate Assembly (optional)



## Offset Measurements

### Measuring the Location of the Bearing Scanners



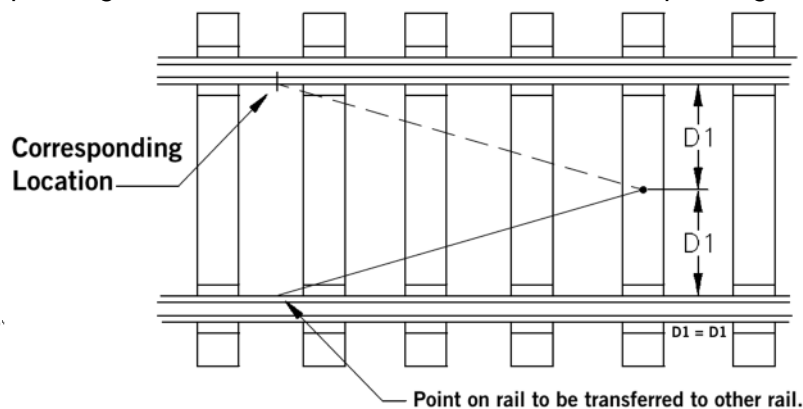
**Note:** When using the Frauscher Gating Transducers, you are not limited to mounting the Bearing Scanners and Wheel Scanners in specific locations as with the Magnetic Transducers. The scanners can be located up to one hundred inches in either direction from the gating Transducers. You can mount a Wheel Scanner directly across from the Gating Transducers on the opposite rail, but not a Bearing Scanner in that location. Centering the scanners in the crib is recommended for convenient access and isolation from vibrating crossties. Always aim the view of the Bearing Scanners in the direction of the Frauscher Gating Transducers. The OFFSET dimension cannot be more than 100 inches. Always maintain a standard installation when possible and place the Bearing Scanners in the next crib over from the Gating Transducer configuration.

- Obtain the OFFSET dimension illustrated above for the Bearing Scanner mounted on the same rail as the Gating Transducers.
- Using the method below, transfer the location from the center of the Gating Transducer mounting bracket to the other rail to establish a reference point for measuring in the next step.
- Obtain the OFFSET dimension for the second Bearing Scanner by measuring from the point you transferred to the center of the Bearing Scanner mounting bracket.
- Write down both OFFSET values. They are entered to the nearest inch in this document's "[Entering Setup Parameters](#)" section.

### Method for Transferring a Location to the Opposite Rail

Refer to the illustration below.

1. At equal distances between the rails, mark the fourth crosstie from the point to be transferred, represented in the Figure below between the two D1 dimensions.
2. Measure from the mark you made on the crosstie to the point on the rail you need to transfer to the other rail. Use this dimension in the next step.
3. Measure the same distance from the mark in the center of the crosstie to the corresponding location on the other rail. Mark the corresponding location on the rail.



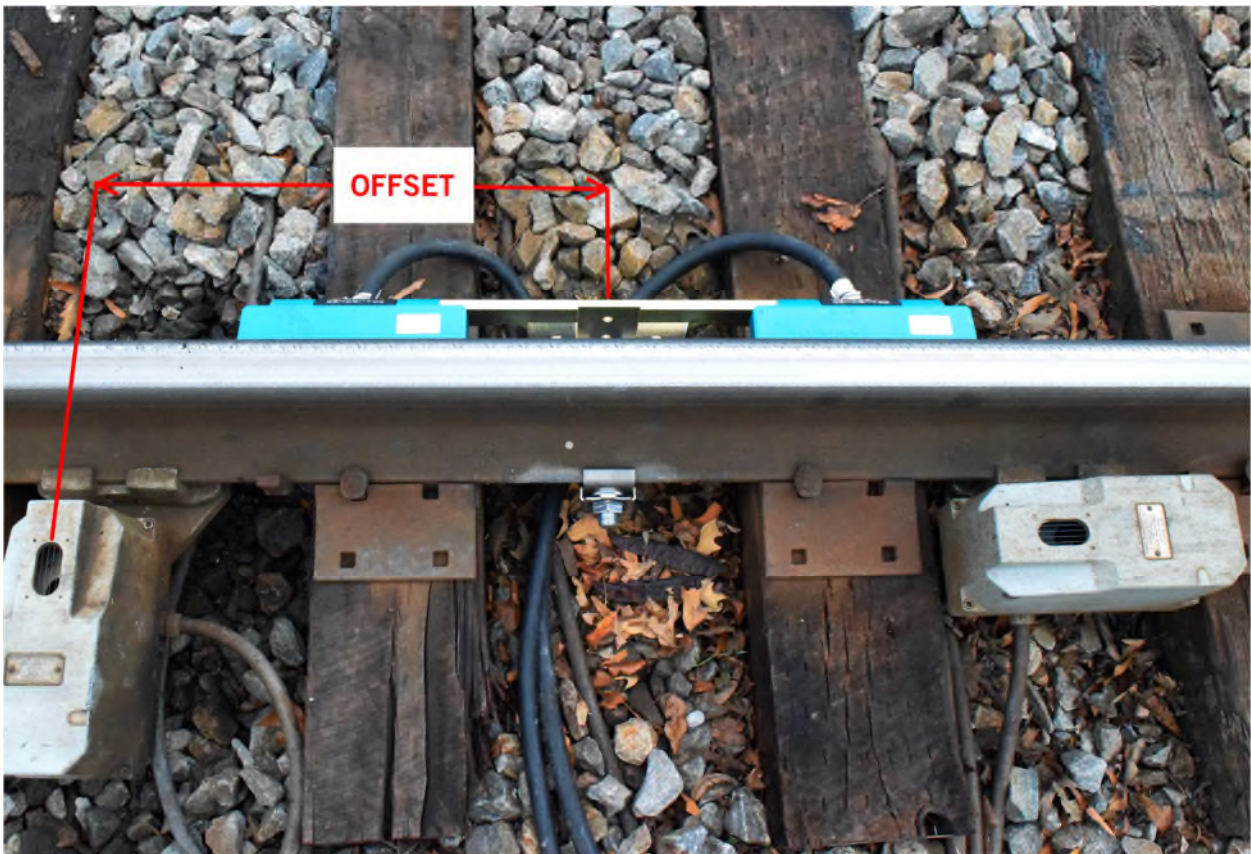
## Measuring the Location of the Wheel Scanners

**Skip this step if you are not using Wheel Scanners.**

**First Rail:** You can install the Wheel Scanner on either side of the Gating Transducer assembly on the same rail.

- If the closest crib to the Gating Transducers is unavailable, mount the Wheel Scanner in the next crib to either side of the Gating Transducers. Do not exceed 100 inches from the center of the Gating Transducer mounting bracket to the center of the Wheel Scanner bracket.
- **Second Rail:** Mount the Wheel Scanner on the opposite rail from the Gating Transducers, at the location directly across from Gating Transducers if possible. Optionally this Wheel Scanner can be mounted up to 100 inches in either direction.
  - If you have not already done so, transfer the location from the Gating Transducers' center to this rail.
  - Measure from the mark that you moved from the first rail to the center of the Wheel Scanner mounting bracket to get the OFFSET dimension for the second Wheel Scanner. *This dimension is zero if the Wheel Scanner mounts directly across from the Gating Transducers.*

Write down the OFFSET dimensions for each Wheel Scanner. You will enter them in the "[Entering Setup Parameters](#)" section of this document.

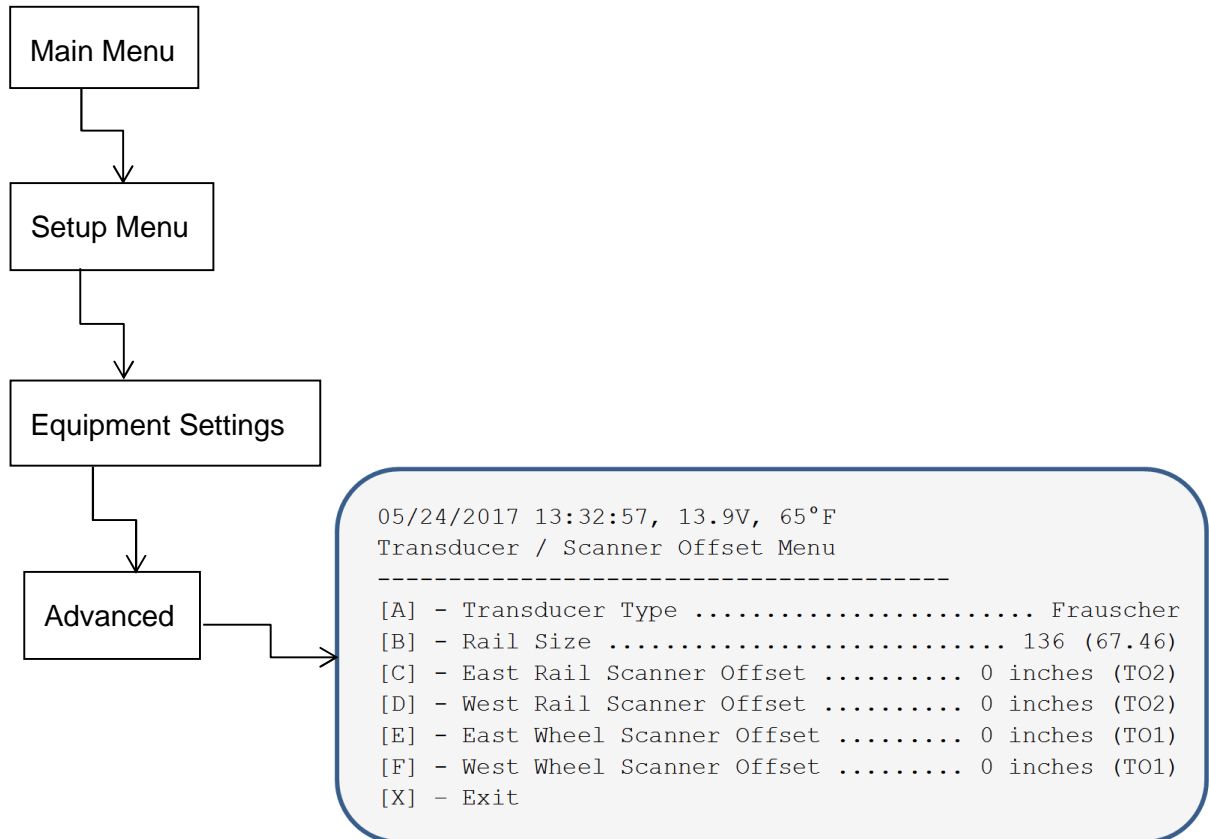


## Entering Setup Parameters

This section provides instructions for entering the OFFSET dimensions into the "Transducer / Scanner Offset" menu of SmartScanNG<sup>2</sup>. The accompanying STC video covers System Setup. <https://youtu.be/EYGXRSwpHJY>

**Note:** The setup menus shown below are available via the RS-232 interface via COM-1 or a Telnet connection.

### Drilling down to the "Transducer / Scanner Offset Menu"



1. Press the A key to select Transducer Type. The latest software version provides you with the following submenu.

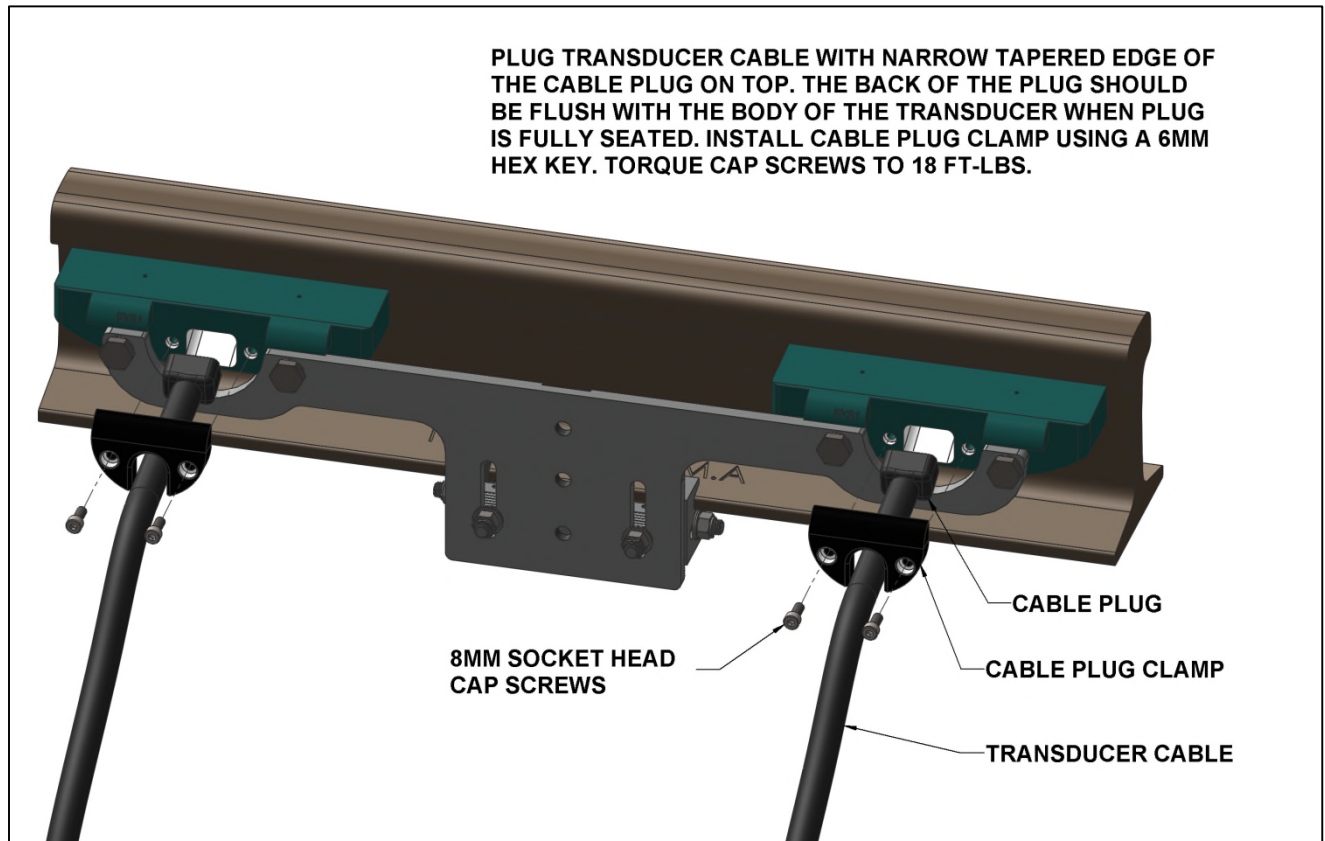
```
Select Transducer Type:  
[A] - Magnetic  
[B] - Frauscher  
[C] - Frauscher (with WSC)
```

**Note:** Earlier software versions toggle between "Frauscher" and "Magnetic" as you press the 'A' key. If you use a WSC with a SICM 1.3 or newer and are not provided with the "Frauscher (with WSC)" menu option, please get in touch with Southern Technologies technical support. [Appendix I](#) guides in determining if you need a WSC in your system.

2. Press the B key for a list of rail sizes and choose the one matching the size at your location.
3. For items C, D, E, and F, enter the measurements representing the associated scanner's OFFSET dimension to the nearest inch and reply to questions asking for the closest Gating Transducer to the scanner — TO1 or TO2.
4. Back out of the menus by pressing the 'X' key in each menu. Type "setup" when asked to do so if you want to save your entries.

## Wiring and Automatic Adjustment

### Connection of Transducer Cables



## Extend the Length of the Frauscher Cables

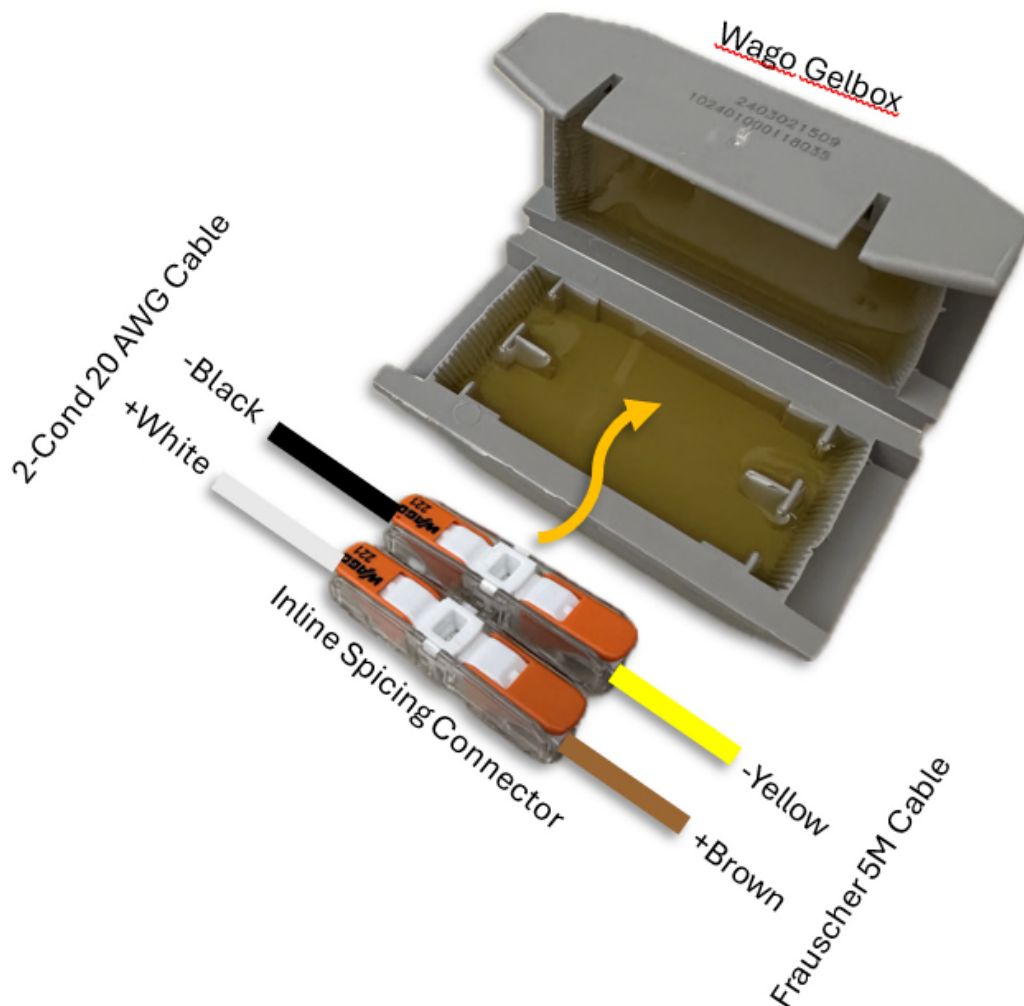
Using the included hardware, extend the length of each 5-meter Frauscher cable (#61-990-609) by splicing on 85 ft of 2-conductor 20 AWG cable (#44-101-002). Make wiring connections using Wago In-Line connectors (14-115-068) as depicted below.

- Strip back wire insulation to approximately 7/16 inch.



- Lift the locking lever of the Wago connector, insert the bare wire, and then close the lever to secure it.
- Connect the signal-positive wire (Brown) to the White.
- Connect the signal-negative wire (Yellow) to the Black.
- Gently squeeze each connector into the Wago Gelbox (14-115-069). Securely snap the gelbox closed to form a weatherproof seal.

Route the extended cable from the rail-mounted transducers into the equipment bungalow.

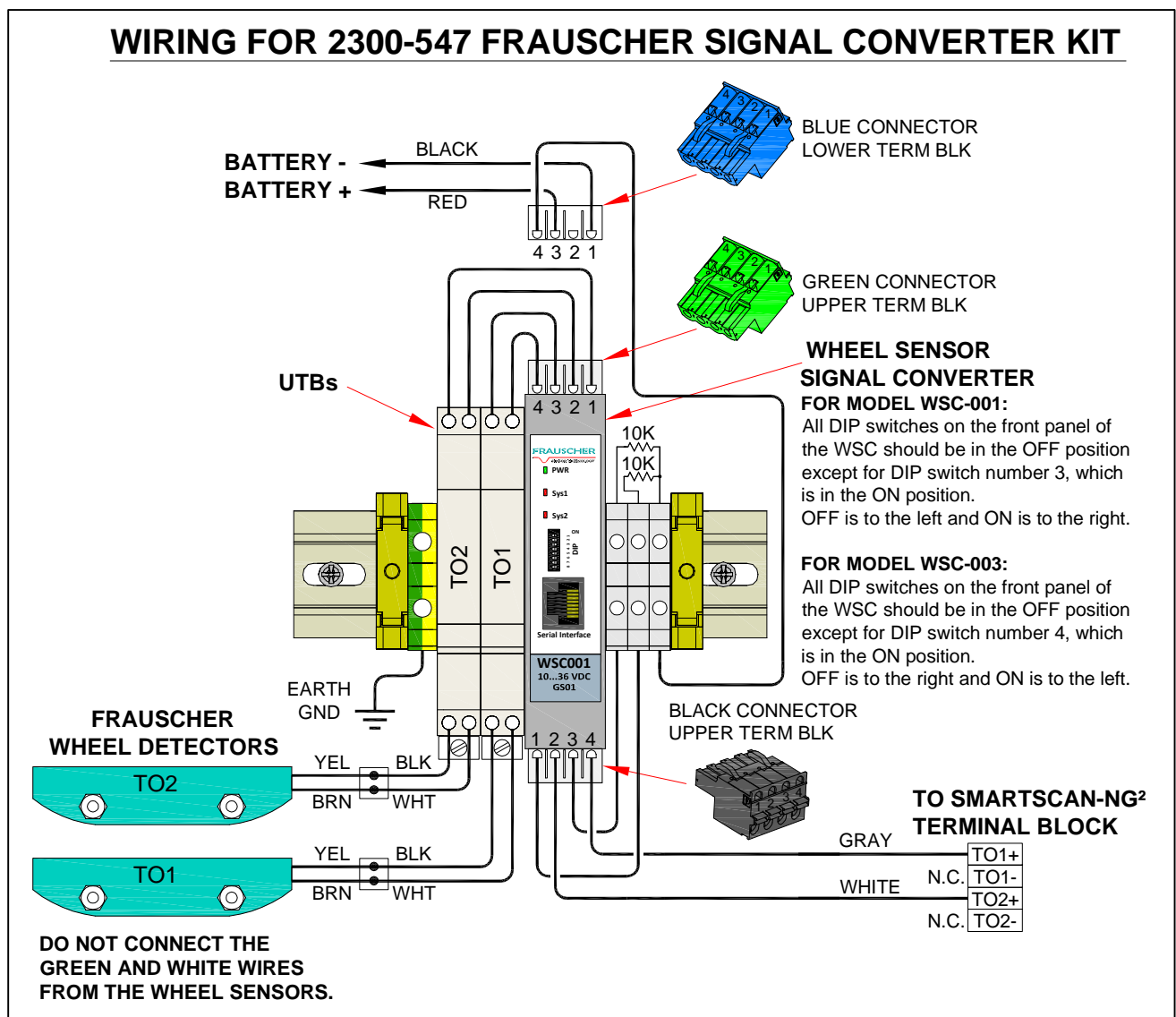


## Wiring the Frauscher Signal Converter

**Note:** Use the 2300-547 Frauscher Signal Converter Kit, shown below, with early versions of SmartScanNG<sup>2</sup> manufactured before February 2017, which do not have built-in Frauscher interface circuitry. The Wheel Signal Converter (WSC) provides an interface for Frauscher Zero-Speed transducers to the Magnetic Transducer inputs of the SmartScanNG<sup>2</sup> Hot Box Detector versions that do not have Frauscher transducer input terminals.

In February of 2017, Southern Technologies began manufacturing SmartScanNG<sup>2</sup>'s with a built-in Frauscher interface with dedicated wiring terminals and does not require the 2300-547 Signal Converter Kit. If you are not sure of the date of your system, see [Appendix I](#) for guidance.

Attach the DIN rail-mounted assembly to the wall near the Defect Detector and connect the wiring as illustrated below.



## Automatic Adjustment with Frauscher Wheel Signal Converter

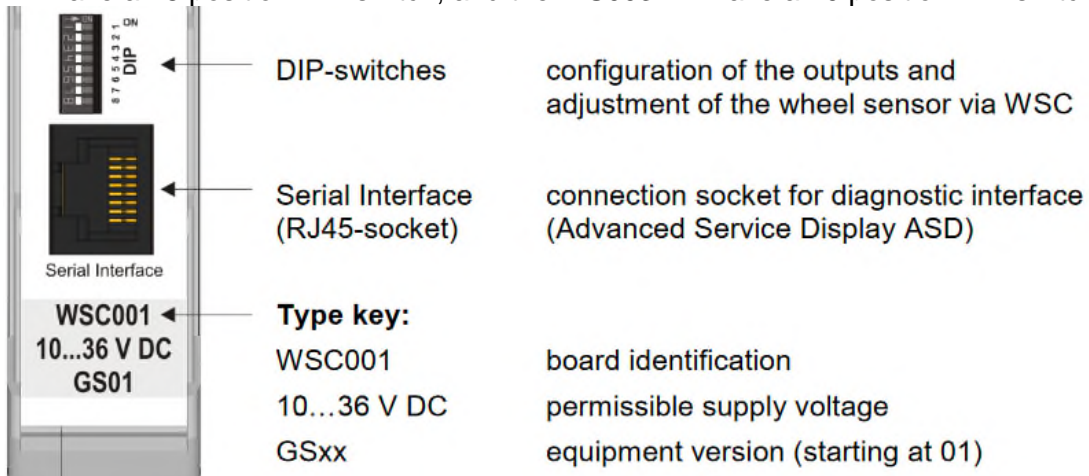
The Automatic Adjustment function nulls any influence of the rail and mounting hardware in the sensor area. Run the Automatic Adjustment process after installation and after making physical changes to the transducer alignment. Tie plates, track spikes, rail anchors, rail clips – and similar hardware – used in the area under the transducer do not interfere with the operation. Run the Auto Adjustment function after removing or adding metal hardware in the vicinity of the transducers.



Wheel Signal Converter (WSC)

Follow these steps to run the Automatic Adjustment feature.

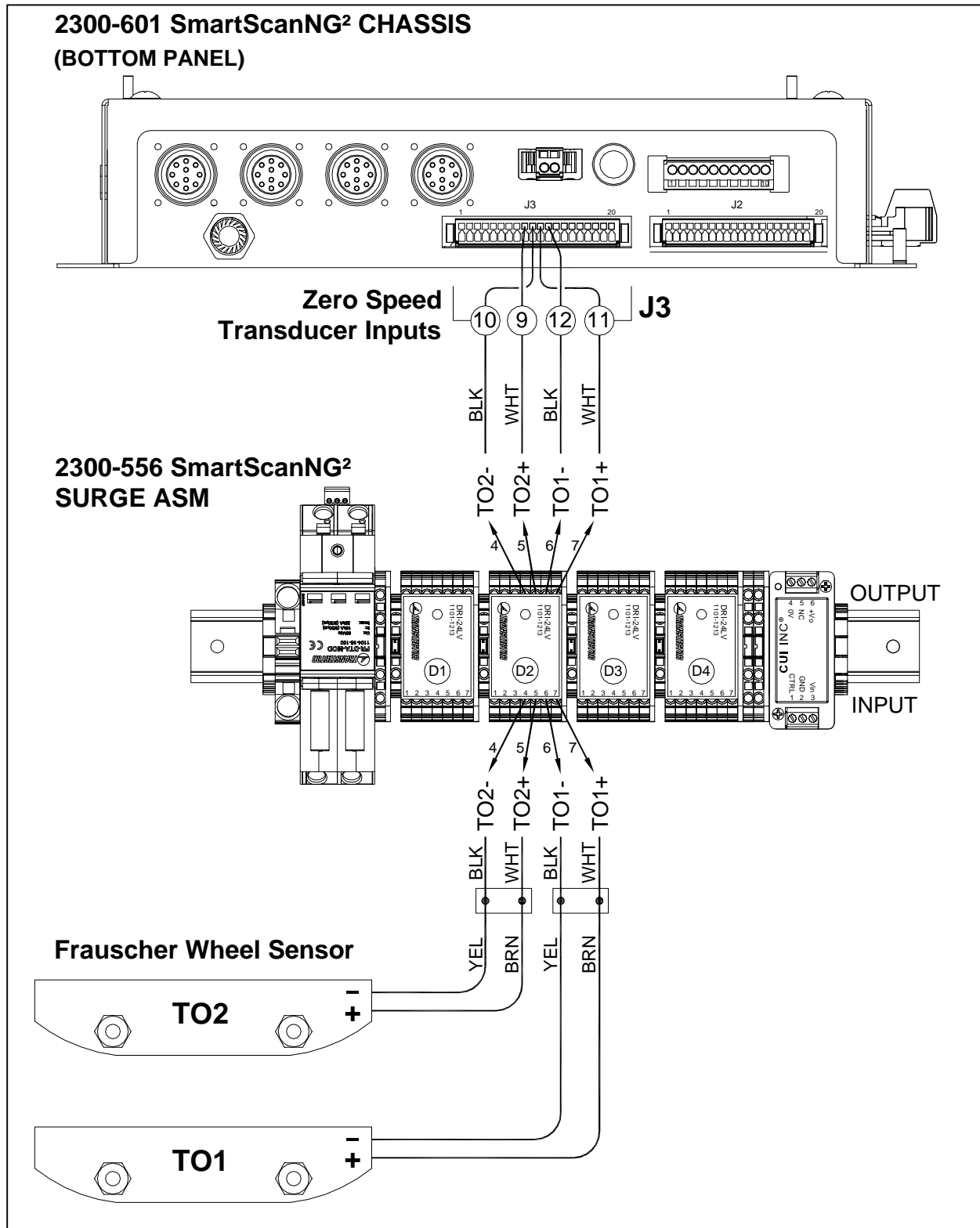
1. Connect transducers to the WSC by following the wiring diagram on the previous page.
2. Apply power to the system.
3. Confirm that the wheel sensors are mounted correctly and ready for use.
4. Determine the model number or your WSC (printed on the top label). Note the WS001 will have an 8 position DIP switch, and the WS003 will have a 10 position DIP switch.



5. Locate the DIP switches on the WSC. For Model WSC001, move DIP switch number 8 to the ON position (right) for between two and six seconds, then return to the OFF position. For Model WSC003, move DIP switch number 10 to the ON position (left) for between two and six seconds, then return to the OFF position.
6. As a result, the Sys1 and Sys2 LEDs should light up, indicating that the Automatic Adjustment function has started.
  - The WSC adjusts both wheel sensors simultaneously, requiring up to forty seconds.
  - The Sys1 and Sys2 LEDs turn off when the session finishes, indicating successful calibration.
  - After the calibration process, a blinking Sys LED means the associated sensor(s) did not adjust successfully.

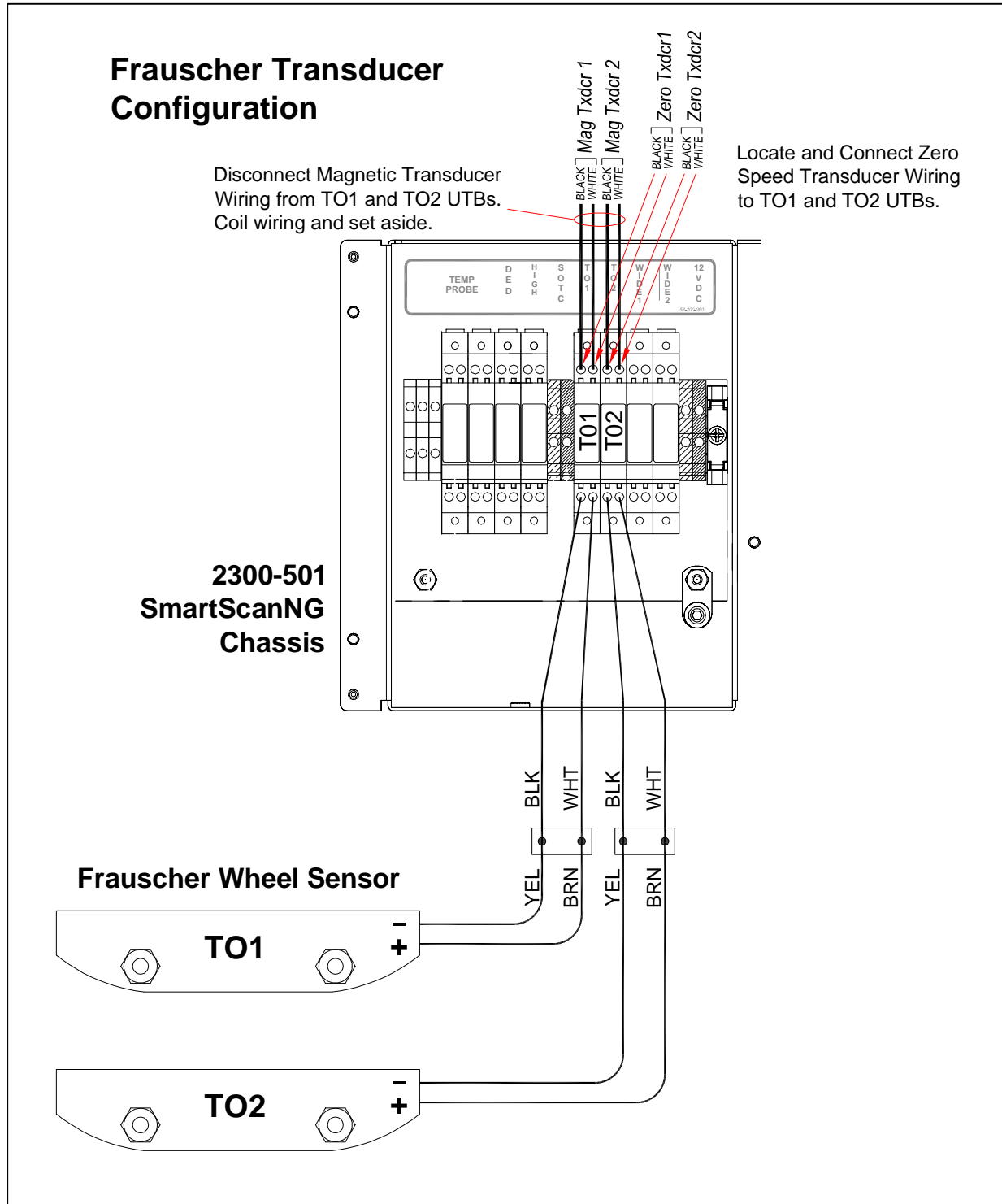
## Wiring Connections for SmartScanNG<sup>2</sup> Chassis

The drawing provided below shows Frauscher transducer wiring connections for the SmartScanNG<sup>2</sup> chassis with the 2300-556 SmartScanNG<sup>2</sup> Surge Panel. Figure 2 of [Appendix I](#) provides a photo of the SmartScanNG<sup>2</sup> chassis for further identification.



## Wiring Connections for SmartScanNG Chassis

You can use the SmartScanNG<sup>2</sup> Controller Module on the older SmartScanNG chassis as long as it has version 1.8 and up Interconnect Board. [Appendix I](#) covers version compatibilities in detail. The drawing below shows Frauscher transducer wiring connections for the SmartScanNG chassis with built-in surge suppression.



## Automatic Adjustment with SmartScanNG<sup>2</sup>

The Frauscher Automatic Adjustment function nulls out any influence of the rail and mounting hardware located in the area of the sensor. Run the Automatic Adjustment function after installation or after making physical changes to transducer alignment. Tie plates, track spikes, rail anchors, rail clips – and similar hardware – used in the area under the transducer do not interfere with transducer operation. Run the Automatic Adjustment function after removing or adding metal hardware in the vicinity of the transducers.

Initiate Automatic Adjustment via the NG<sup>2</sup> Serial Interface (see your operator's guide for login instructions). From the Main Menu, select System Functions Menu.

```
SmartSCAN NG2, MP/KP:1234.5, Track: North
03/07/2019 08:33:57, 14.8V, 34°F
Main Menu - Comm
-----
[A] - Train Summary
      .
      .
      .
[K] - System Functions Menu
[L] - Replay train
[M] - Security Menu
[X] - Exit
```

Select **Calibrate Frauscher Transducers**.

```
SmartSCAN NG2, MP/KP:1234.5, Track: North
03/07/2019 08:34:11, 14.8V, 34°F
System Functions Menu
-----
[A] - Radio Test
      .
      .
      .
[Q] - Calibrate Frauscher Transducers
[R] - Virtual gate test
[X] - Exit
```

The following prompt appears.

```
Calibration started, please wait up to 60 seconds...
Calibration complete
Transducer 1: Success
Transducer 2: Success
```

If both wheel transducers indicate Success, calibration is complete.

**Additional Information:** Calibration is successful when the voltage from the yellow transducer wire, as measured to system ground, is approximately 1.65 VDC (+/- 2%). Measure the voltage while each wheel transducer is inactive with no metal objects near the transducer SYS1 area. The "Success" indications appear on your screen if these voltages are within specification. So, manual measurements are not necessary.

## Testing

### Occupancy Detection

After successful Automatic Adjustment of both transducers, use the PB200 Test Wheel Sensor Target, shown at right, to test for occupancy detection as follows.

1. Place the Sensor Target on the SYS1 sensor of transducer TO1. Align the notch on the bottom of the Sensor Target with the hash mark on the top of the SYS1 transducer. The TO1 LED on the SmartScanNG<sup>2</sup> should light up.
2. Repeat the procedure with transducer TO2. The TO2 LED on the SmartScanNG<sup>2</sup> should light up.



**Note:** If you use the Frauscher Wheel Signal Converter (WSC) in the circuit, the SYS1 and SYS2 LEDs should correspond with the TO1 and TO2 LEDs, respectively, on the SmartScanNG<sup>2</sup>.

### Virtual Gate Description

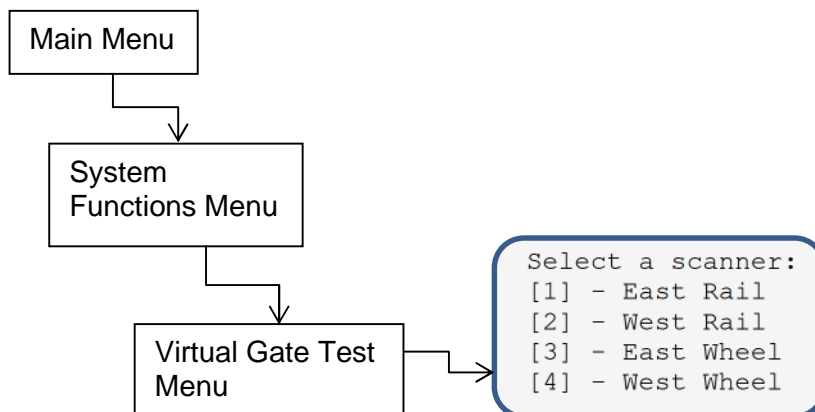
The SmartScanNG<sup>2</sup> using Frauscher transducers allows you to install each Wheel Scanner and Bearing Scanner up to 100 inches to either side of the center of the Gating Transducer Mounting Bracket. To ensure that all wheel and bearing temperatures are measured, the system records a continuous stream of data samples from each scanner, allowing it to provide bearing and wheel temperature measurements from scanners aimed outside the area defined by the Gating Transducers. Synchronizing the scanner's temperature measurements to the Gating Transducer's wheel signals is done after a given axle crosses the Gating Transducers. The correct heat samples are picked out at that time based on the axle's speed and direction. The SmartScanNG<sup>2</sup> determines the scanner's relative position to the Gating Transducers from the offset measurements entered in the "[Entering Setup Parameters](#)" section of this document.

### Verifying Virtual Gate Operation

The data you enter into the "Transducer / Scanner Offset" menu places the Virtual Gate areas at each of the scanners positioned at various distances from the Gating Transducers.

The test mode described in this section helps to double-check that the OFFSET measurements and associated entries are correct. The most accurate method to verify OFFSET is using a tape measure following the previous instructions in this document.

### Drilling down to the "Virtual Gate Test Menu"



## Simulate Wheels Passing

Virtual Gate Test Mode aims to simulate a wheel that passes over the Gating Transducers and then continues moving to the scanner under test. By cycling the shutters, the system notifies you when the simulated wheel is in the Virtual Gate area. The following steps describe how to use the Virtual Gate Test Mode, and the video located at <https://youtu.be/EYGXRSwpHJY> includes a demonstration of the procedure.

1. From the Virtual Gate Test Mode menu, select a scanner in which you want to see its Virtual Gate position.
2. Swipe across the Gating Transducers with a metal object, such as a wrench or railroad spike, in the direction of the scanner under test. Maintain a speed faster than 1.6 seconds between the transducers.
3. Swipe across the sensors again and keep moving the metal object to the scanner under test in one motion while maintaining a constant speed.
4. The scanner shutters rapidly cycle one time to indicate when the system is looking for heat in the virtual window located at the scanner, which should be when the metal object (simulated axle) passes the scanner. *If the shutters do not cycle, the entry for the closest transducer (TO1 or TO2) may be incorrect.*
5. Repeat step four, simulating various axle speeds, to confirm settings.

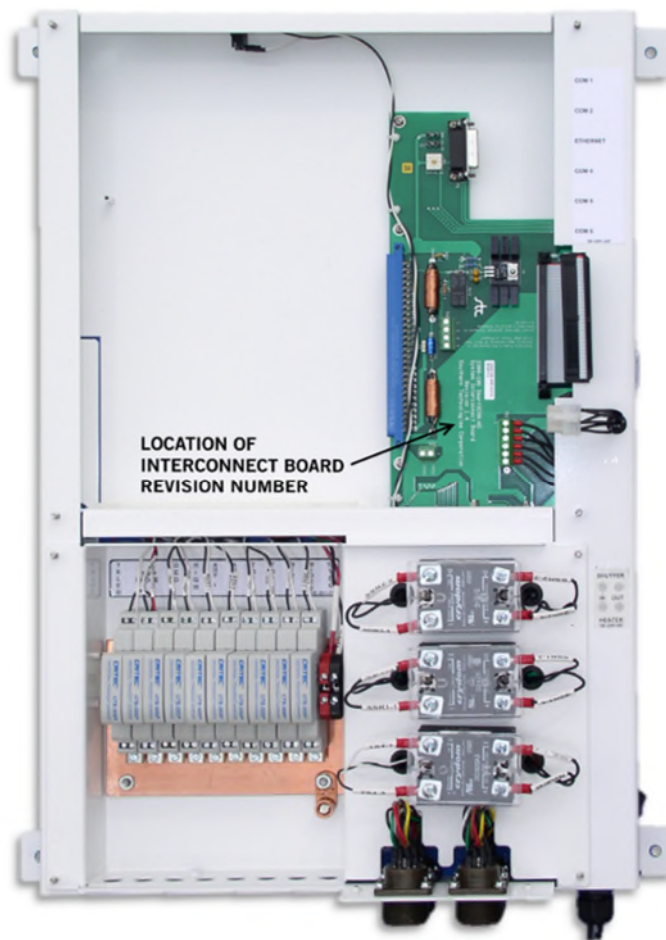
The test mode runs for two minutes before timing out. Otherwise, any keypress ends the session. Rapid shutter flutter indicates that two minutes have expired and the test has ended automatically—the event log records a canceled train at the end of the testing session.

## Appendix I – SmartScanNG<sup>2</sup> System Version Identification

This appendix provides information on whether your SmartScanNG<sup>2</sup> requires the Frauscher Wheel Signal Converter (WSC) to interface with Frauscher Zero-Speed Transducers. All the NG<sup>2</sup> systems shipped beginning in February of 2017 have built-in Frauscher interface circuitry permitting the transducer wires to be connected directly to the NG<sup>2</sup> chassis without needing the WSC. Our earlier systems required the WSC.

The first version of the Controller Module that did not require WSC had SICM Board Rev 1.3 installed. Consult the System Status Report from the NG<sup>2</sup> for the SICM Board Revision. A Controller Module with SICM Board Rev 1.3 or higher has the Frauscher interface circuitry and does not require a WSC; that is if you also have a late-model chassis.

The Interconnect Board resides in the chassis and routes external signals to the Controller Module. Interconnect Board revision 1.8 and later does not require the WSC. See Figure 1 below for Interconnect Board access and identification. All Interconnect Board versions earlier than 1.8 need the WSC regardless of the Controller Module's SICM Board version.



**Figure 1 – Location of Interconnect Board and revision number inside the SmartScanNG chassis, which is the predecessor to the SmartScanNG<sup>2</sup> chassis shown in Figure 2.**

The chassis in Figure 1, above, represents the SmartScanNG (pre-NG<sup>2</sup>) chassis, a previous chassis that is forward compatible with the SmartScanNG<sup>2</sup> Controller Module.

Figure 2 shows the SmartScanNG<sup>2</sup> Controller Module mounted on the latest NG<sup>2</sup> chassis. The NG<sup>2</sup> chassis has dedicated Frauscher transducer wiring terminals, so it does not require a Wheel Signal Conditioner interface. The configuration in Figure 2 represents the most current hardware.



Figure 2 - SmartScanNG<sup>2</sup> Controller Module and SmartScanNG<sup>2</sup> Chassis

*Summary of This Appendix*

- Revisions 1.3, 1.4, and newer of the Controller Module's SICM Board do not need the Frauscher Wheel Signal Conditioner (WSC). You must have an Interconnect Board in the chassis that is version 1.8 or newer or an NG<sup>2</sup> chassis represented in Figure 2.
- If you have an Interconnect Board older than revision 1.8, you need a WSC regardless of which Controller Module you have.
- If you purchased the complete NG<sup>2</sup> system after January 2017, do not install the WSC. The Frauscher connections are in the chassis, and the interface circuitry is in the Controller Module's SICM Board.

SICM Board Revision	Interconnect Board Revision	Wheel Signal Converter Needed
1.3 and up	1.8 and up	NO
1.2 and lower	ANY	YES
ANY	1.7 and lower	YES

## Appendix II - Troubleshooting with Frauscher Wheel Signal Conditioner

The following instructions provide methods for locating problems in the Zero-Speed transducer system with systems equipped with the Wheel Signal Conditioner.

### PWR LED Off

MEANING	POSSIBLE SOLUTIONS
No power supply	Apply power supply
Wrong polarity	Reverse polarity
Open fuse	Replace WSC

### Sys1 / Sys2 LED Flashes Slowly

MEANING	POSSIBLE SOLUTIONS
WSC did not initiate Automatic Adjustment correctly	Run Automatic Adjustment Function
Wire break in the wheel sensor circuit	Check wiring for open circuit
Overcurrent in the wheel sensor circuit	Check wiring for short circuit

## Appendix III - Checking the Sensor for Correct Current Flow

The following information outlines a procedure to measure and verify current flow through a Frauscher wheel transducer. Doing so may rule out a possible faulty wheel transducer while troubleshooting a system.

Approximately five milliamps of current flow through the sensor when it is working correctly and not sensing a target. During this procedure, disconnect the yellow sensor wire and connect a DC milliamp meter in series with the transducer wiring, thus providing a means to measure current flow through the transducer.

### *Tools Needed*

- A digital Volt/Ohm meter (VOM) with a milliamps setting.
- Small bladed straight slot screwdriver approximately 1/8 inch wide.

### *Procedure*

Set the VOM to DC milliamps and connect in series with the yellow transducer wire as follows.

1. Measure the voltage from the brown wire to the battery ground. A voltage reading of from 23 to 24 VDC indicates that the transducer is powered.
2. Set the VOM to measure DC milliamperes as follows. Unplug the red meter lead from the voltage jack on your VOM and plug it into the milliamps jack on the VOM.
3. Disconnect the yellow sensor wire from any connection between the transducer and the SmartScanNG<sup>2</sup>. Then connect the black VOM probe in its place under the terminal.
4. Touch the red meter probe to the loose yellow sensor wire you removed from the terminal. You now have the VOM set for milliamps and connected in series with the yellow sensor wire.
5. The meter should measure 5 mA, within a tolerance of +/- 2%.
6. The current measurement should decrease from 5 mA (+/- 2%) as a metal object comes near the sensor. The SmartScanNG<sup>2</sup>'s TO-1 or TO-2 LED should indicate presence as the current measurement drops.

### *Troubleshooting*

If the current flow is not correct, try the following.

- Run the Automatic Adjustment function.
- Check for breaks in the sensor wiring.
- Rule out the possibility of a faulty surge suppressor.
- Replace sensor.

## Appendix IV – What To Do If the Transducer Will Not Successfully Calibrate

This section applies to SmartScanNG<sup>2</sup> systems that *do not* use the Frauscher Wheel Signal Converter (WSC). On systems not using the WSC, the brown and yellow transducer wires from the wheel transducers connect to surge protection devices and then to terminals on the SmartScanNG<sup>2</sup> chassis.

### *Possible Causes of Unsuccessful Calibration*

- The brown and yellow transducer wires from the wheel transducer(s) could be connected in reverse polarity.
- Transducers could be adjusted too close to the rail.

Before checking the wiring polarity, verify that both COP LEDs are blinking on the SmartScanNG<sup>2</sup> and that no metal object, except the rail, is near the SYS1 area of either wheel transducer. Use a DC voltmeter to measure from the system ground (same as battery ground) to the transducer's brown wire and also to the transducer's yellow wire from the system ground. Verify that the voltage measured on the yellow wire is less than the brown wire's voltage. If the brown wire's voltage is less than the yellow wire's voltage, then swap the two wires and recalibrate the transducers by running the [Automatic Adjustment](#) function.

If calibration is not successful with the correct wiring, the next step is to verify the correct transducer mounting positions. A transducer adjusted too close to the rail prevents successful calibration.

First, verify the accuracy of the Horizontal and Vertical Adjustments as per the drawing in the "[Installation](#)" section of this document. Then, lower the transducer's Vertical Adjustment by one notch (0.100") on the transducer bracket. Up to 0.200 inch of space between the alignment gauge and the top of the transducer is still within specification, but 0.300 inch of clearance is too low for reliable operation. Each adjustment detent in the transducer mounting bracket represents 0.100". If the calibration is unsuccessful after lowering by one notch, drop the transducers by a total of two detents (0.200") below the alignment fixture and recalibrate. Remember that the bracket may rise while tightening, so recheck your measurement before continuing.

**Detailed Troubleshooting With a Volt Meter** *The following voltage measurements refer to transducers wired directly to the SmartScanNG<sup>2</sup>, not the WSC (Wheel Signal Conditioner).*

A voltage measurement from the brown transducer wire to ground of approximately 23.5 to 24.8 volts is typical for a correctly wired transducer. After successful calibration, the yellow transducer wire's voltage, measured to ground, represents the transducer signal and should be 1.65 VDC (+/- 2%). This voltage decreases as a metal object moves near the transducer.

**Alternate Method of Calibration** Wiring a Frauscher transducer in reverse polarity into a SmartScanNG<sup>2</sup> or a Frauscher WSC cannot cause damage to the transducer, NG<sup>2</sup>, or the WSC. However, this is an alternate way to make the transducer run its Automatic Adjustment function. Since it cannot detect wheels with the wires swapped, you must correct the wiring and check for proper voltage (1.65VDC +/- 2%) on the yellow wire to determine if the calibration was successful. The Frauscher Automatic Adjustment function requires about 40 seconds to complete. Be sure to correct the wiring after calibration is completed.

**More Help:** If the transducer does not calibrate successfully after performing all the steps above, consult with a customer service technician at Southern Technologies Corporation at 1-423- 892-3029. Please reference this Technical Bulletin and that you are working on calibrating Frauscher transducers used with a SmartScanNG<sup>2</sup>. Please provide your name, railroad name, and call-back telephone number; let us know if this is a new or existing installation, and tell us what you have tried.

## Appendix V – Troubleshooting Transducer Miscounts

This section provides troubleshooting guidance for a SmartScanNG<sup>2</sup> system experiencing transducer miscounts.

The system should perform as follows.

- Each transducer's axle count reported for a given train should be an even number and equal in value.
- Neither transducer should report an odd number of axles for any train.
- The number of axles for a given train should match the count from each transducer.

If the system is not carrying out all of the above functions, perform the following.

### *Possible Solutions*

- 1 Calibrate the transducers by running the Automatic Adjustment function. If you are working with a SmartScanNG<sup>2</sup> that *does not* have the Frauscher Wheel Signal Conditioner (WSC), run the [Automatic Adjustment](#) function using the menu system, either while on-site or from a remote location. If the system includes a WSC, refer to the "[Automatic Adjustment with Frauscher Wheel Signal Converter](#)" section of this document.
- 2 Check the transducer mounting bracket and the transducers for a secure fit. If necessary, tighten the mounting hardware to the torque specifications in the "[Installation](#)" section of this document. It is required to recalibrate after adjusting the position of the wheel transducers.
- 3 Verify secure wiring connections.
- 4 Temporarily bypass the surge arrestors in the transducer circuit. If the transducers perform correctly, replace the surge arrestors, and monitor the system for accurate counts.

## Appendix VI – Rail Temperature Imbalance

A general health check of the system determines if the Bearing Scanners are reporting roughly the same temperature for both sides of each train. This appendix guides in making that determination and, if necessary, provides solutions for correcting the problem.

### *What to do if the difference in average rail temperatures are consistently more than 4° F*

From the Main Menu, select the Train Summary Report. On the Train Summary Report, locate the "Avg Bearing" heading. Under this heading are two columns, one for each rail, representing the average temperature read by the bearing scanners on a train-by-train basis. With a properly functioning system, the two average temperatures reported for each train are within approximately four degrees of each other. If the difference in average temperatures per train is consistently higher than four degrees, do the following.

- Referring to the "[Offset Measurements](#)" section, confirm that the measurements entered into the system are correct. Re-measure and ensure all entries are accurate. Incorrect Offset Measurements result in the system looking at the wrong point in time for the bearings or wheels as a train moves through the site. Note that since you do not have to mount the scanners across from each other, as with traditional Hotbox Detectors, there are separate Offset Measurements associated with each rail as covered in the "[Offset Measurements](#)" section.
- Realign and recalibrate the scanners. See the instructions for scanner alignment and calibration in the SmartScanNG<sup>2</sup> Track Hardware Manual located at <https://www.southern-tech.com/our-services/resources>.

## Appendix VII – Preventive Maintenance

Periodically perform the following maintenance work with frequency adapted to the track's conditions, but at least every two years.

- Visual and mechanical check.
- Check the wheel transducers for excessive dirt build-up. Clean as necessary.
- Check the wheel transducers for visual damage. It may be required to replace the transducer.
- Check the mounting bracket for a secure fit on the rail. Using a torque wrench, tighten the rail clamp nut to 90 ft-lbs.
- Check the transducer mounting plate for vertical and horizontal movement. Torque each adjustment nut to 65 ft-lbs.
- Check the transducers for a secure fit to the mounting bracket. Torque each to 30 ft-lbs.
- Check the rubber conduit tube for damage.
- Check cable connection terminals for a secure fit.

## Revision History

- Revision 2: Rearranged /formatted sections and added an appendix.
- Revision 3: The introduction of the Mounting Plate Hoist begins on page 7.
- Revision 4: Addition to note on page 10 that instructed not to mount a bearing scanner directly across from the Frauscher Gating Transducers and added Revision History section.
- Revision 5:
- Revision 6: Added optional Transducer Mounting Plate Assembly instructions on page 9.
- Revision 7: Correcting the 2300-547 wiring diagram on page 14.
- Revision 8: Added section "Extend the Length of the Frauscher Cables" and changes to Appendix IV.