



# **SWIM** **WEIGH-IN-MOTION** **VEHICLE SCALES**

**Slow-Speed In-Motion Vehicle Scales**

[www.WIMscales.com](http://www.WIMscales.com)

# SWIM Series

Slow-Speed In-Motion Vehicle Scales



**Your Total Solution for Weigh-in-Motion**

.....  
Cardinal Scale's Versatile Product Line



**Intelligent Transportation Systems**

.....  
Engineered & Customized For Your Needs

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# SWIM Series

Slow-Speed In-Motion Vehicle Scales



Major supplier of vehicle scales for over 50 years,  
leading the industry with new technology and innovations



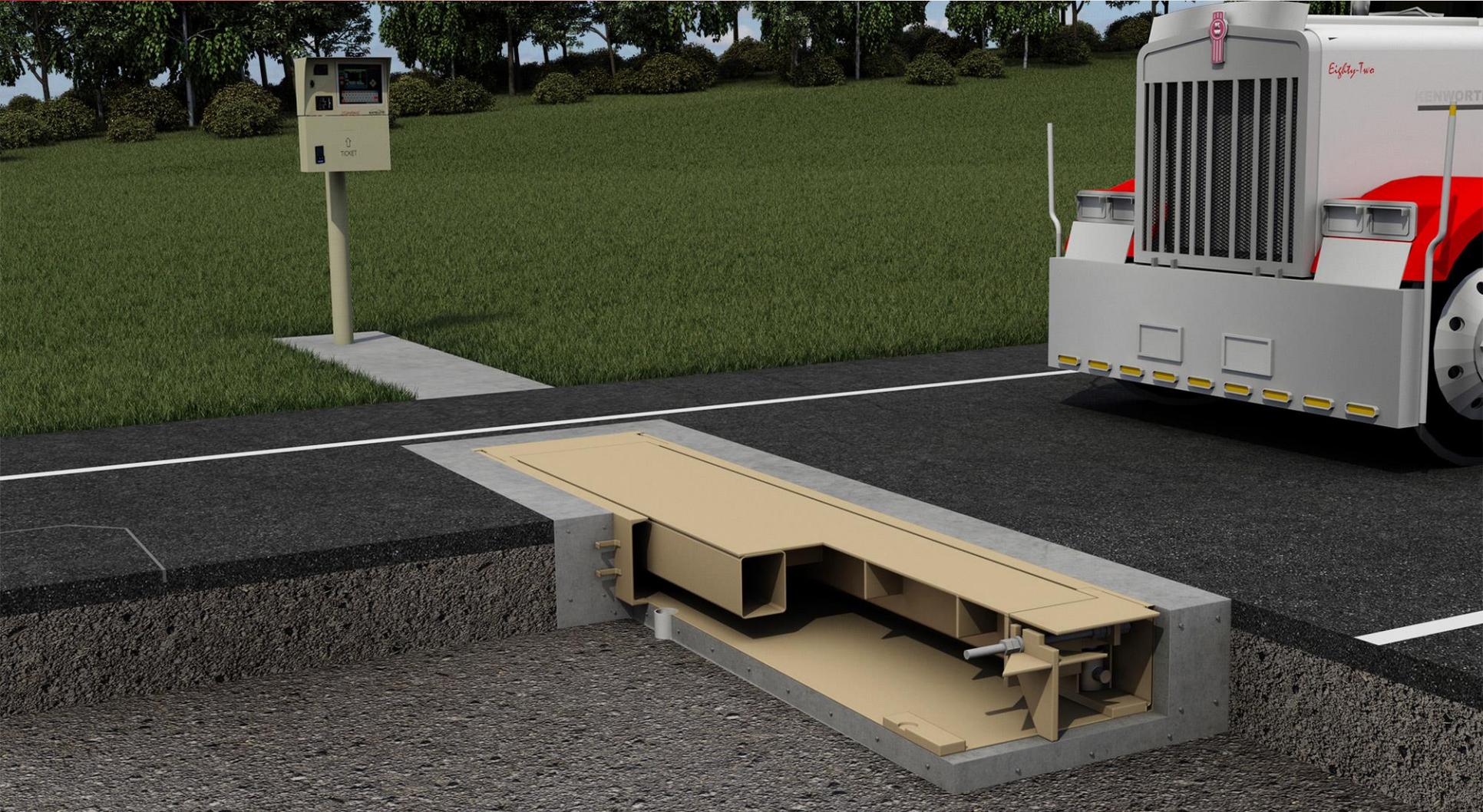
# SWIM Series

Slow-Speed In-Motion Vehicle Scales



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The Cardinal SWIM series of Slow-Speed In-Motion Vehicle Scales offers an ideal combination of:

- Accuracy
- Speed
- Size
- Quality
- Value

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## APPLICATIONS:

- Freight Terminals
- Commercial Fleet Axle Weight/Gross weight checking before exiting facility
- Mining/Rock Quarry Material
- Ports (SOLAS Regulations)
- Agricultural Applications
- Sorting and Pre-screening

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## ***SPEED***

The SWIM scale is effective at weighing vehicles without the need for the driver to stop.

This saves time and congestion at the scale site.

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## SPEED

The SWIM scale will provide reliable axle and gross vehicle weights at speeds up to 15 mph (25km/h).

\* Note: As speeds go up, accuracy will go down.

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# ACCURACY

Provides Gross Vehicle Weights within

**1%**

At speeds up to 6 mph (10km/h)

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## ACCURACY

| Speed                   | Accuracy                         |
|-------------------------|----------------------------------|
| <b>Static</b>           |                                  |
| (Static) 0 km/h (0 mph) | Gross wt. $\pm 0.1\%$ of applied |
| <b>Dynamic</b>          |                                  |
| 0-5 km/h (0-3 mph)      | Gross wt. $\pm 0.5\%$ of applied |
| 5-10 km/h (3-6 mph)     | Gross wt. $\pm 1.0\%$ of applied |
| 10-20 km/h (6-12 mph)   | Gross wt. $\pm 1.5\%$ of applied |
| 20-24 km/h (12-15 mph)  | Gross wt. $\pm 2.0\%$ of applied |

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## FRAME

Weighbridge is mounted inside a single welded framework. This lower frame is 13'-9" by 3'-1" (4.2m X 1m) and is 15" (0.4m) deep.

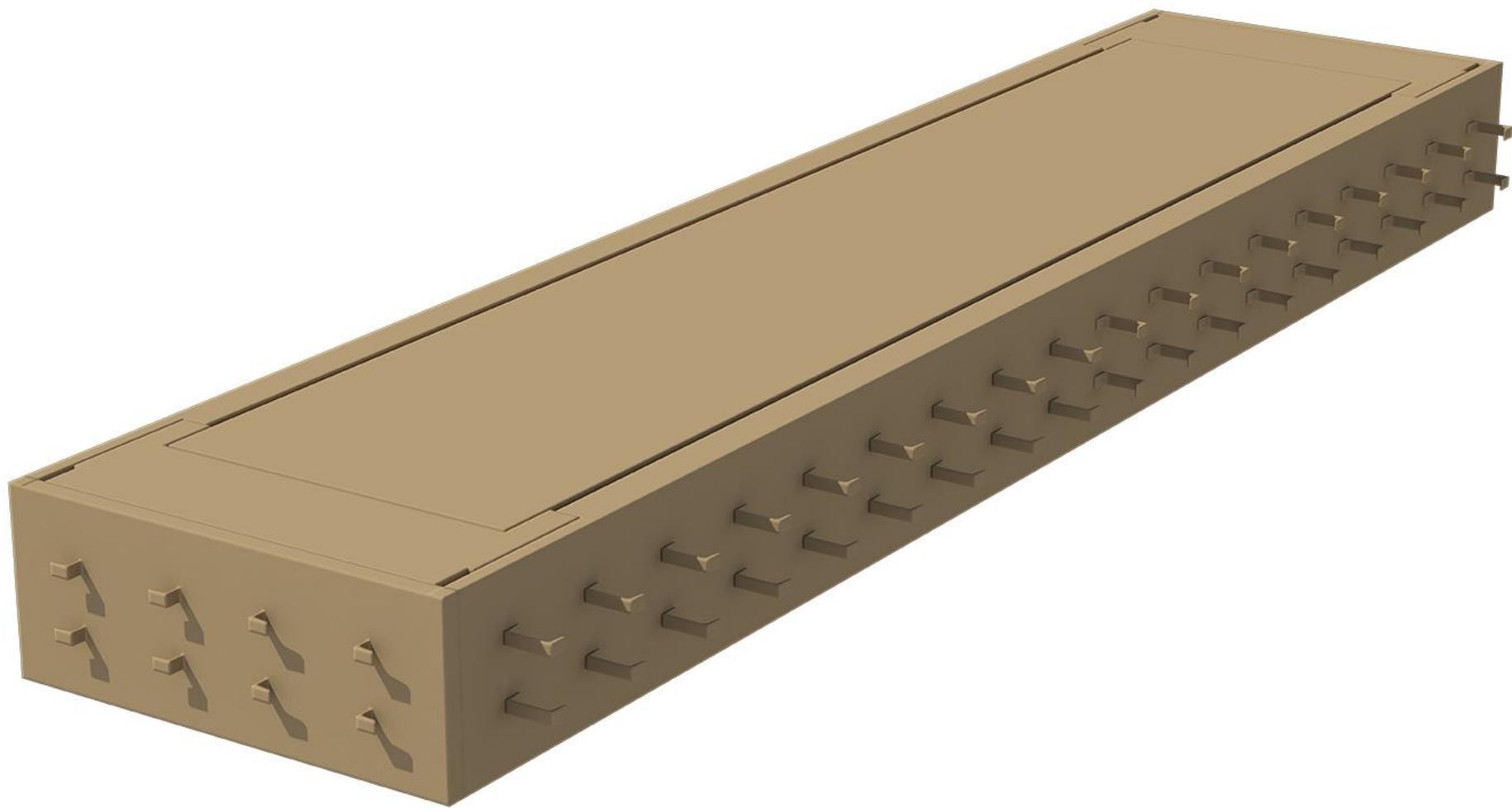
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## QUALITY

The welded steel structure is designed with performance and longevity in mind.



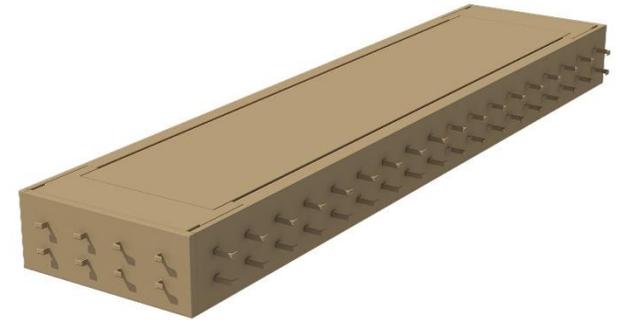
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Lower frame is installed by:

1. Excavate a pit
2. Install drain pipe and conduit
3. Suspend lower frame over pit with Cardinal supplied leveling beams
4. Pour concrete to cast lower frame into place.



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## **WEIGHBRIDGE PLATFORM**

Weighbridge platform is constructed of a single, 1/2" thick, smooth steel plate.

**Nominal Capacity of 80,000 pounds  
(36,000kg)**

(far more than you would ever need for any single axle)

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## WEIGHBRIDGE

A single  
12 ft X 2.5 ft (3.7m X 0.8m) weighbridge

Removable maintenance panels at each  
end to access the load cells, checking,  
and clean pit.

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## **WEIGHBRIDGE**

The weighbridge is supported by four 50,000-lb (23,000kg) capacity Cardinal Scale SCA series stainless steel load cells.

*These are the same load cells used in many of Cardinal's legendary static vehicle scales.*

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## 50K-SCA Load Cell

- Hermetically sealed
- Stainless steel
- NTEP and OIML certified
- Compression style cell with low deflection and high resonant frequency
- Highly accurate



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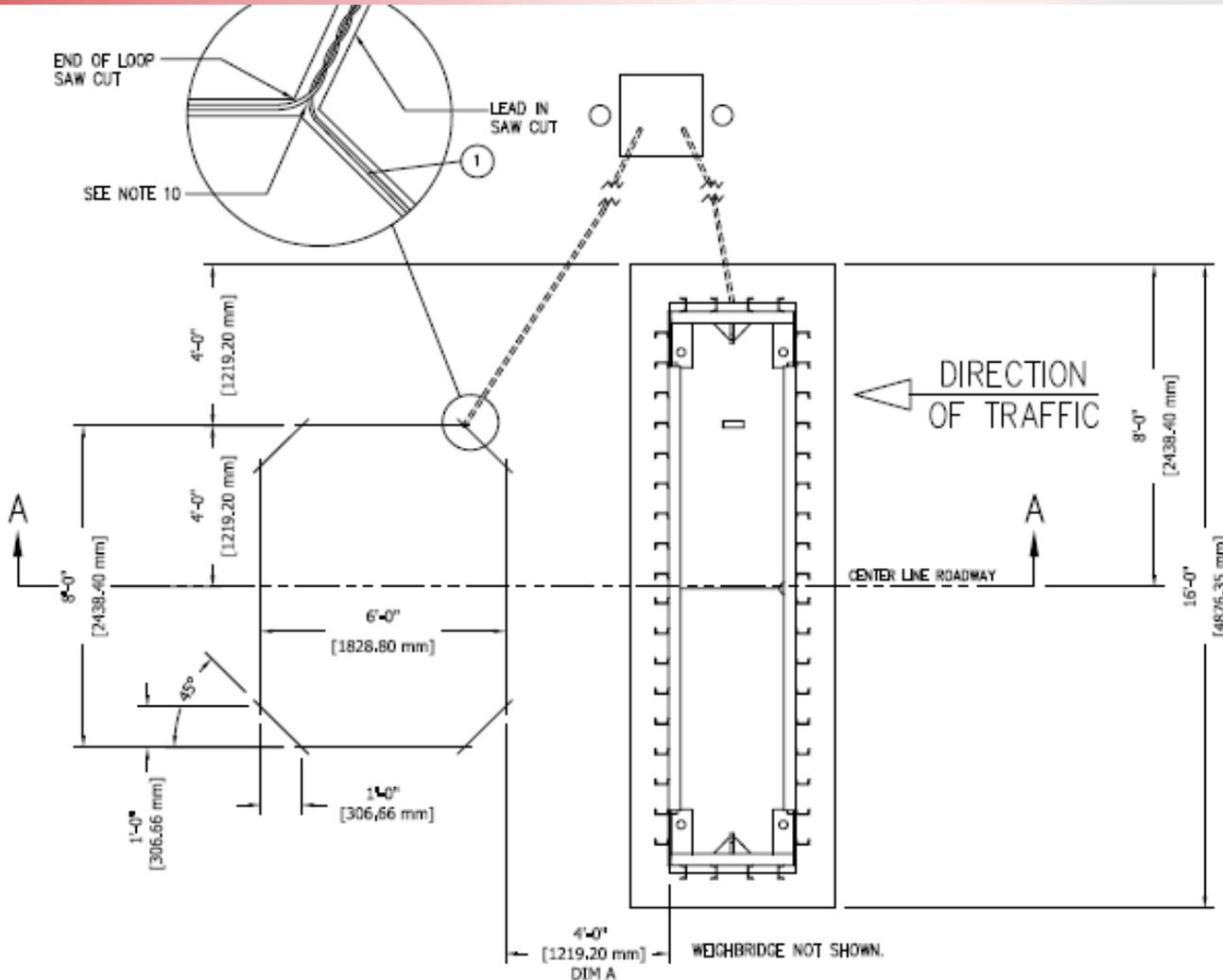
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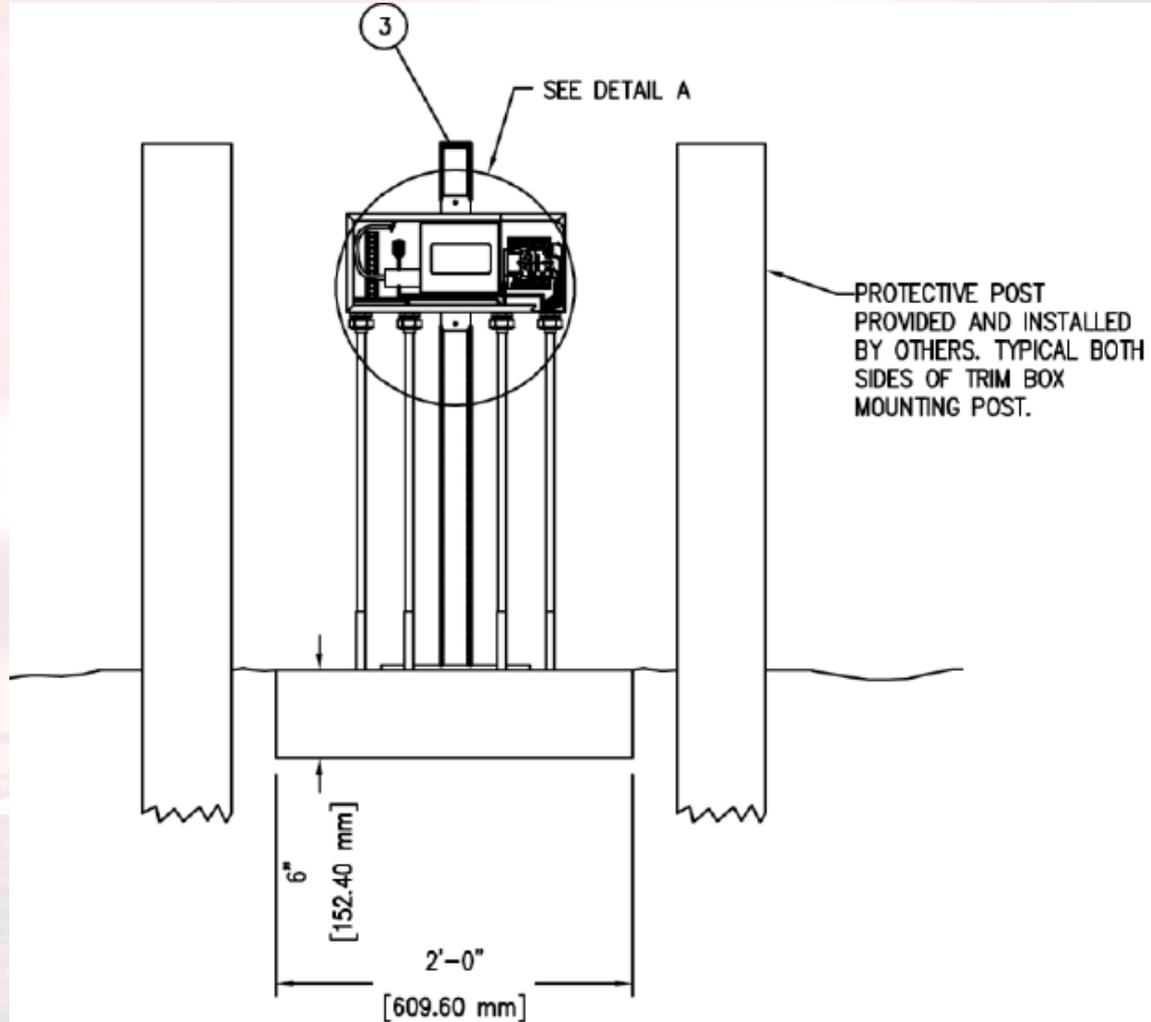
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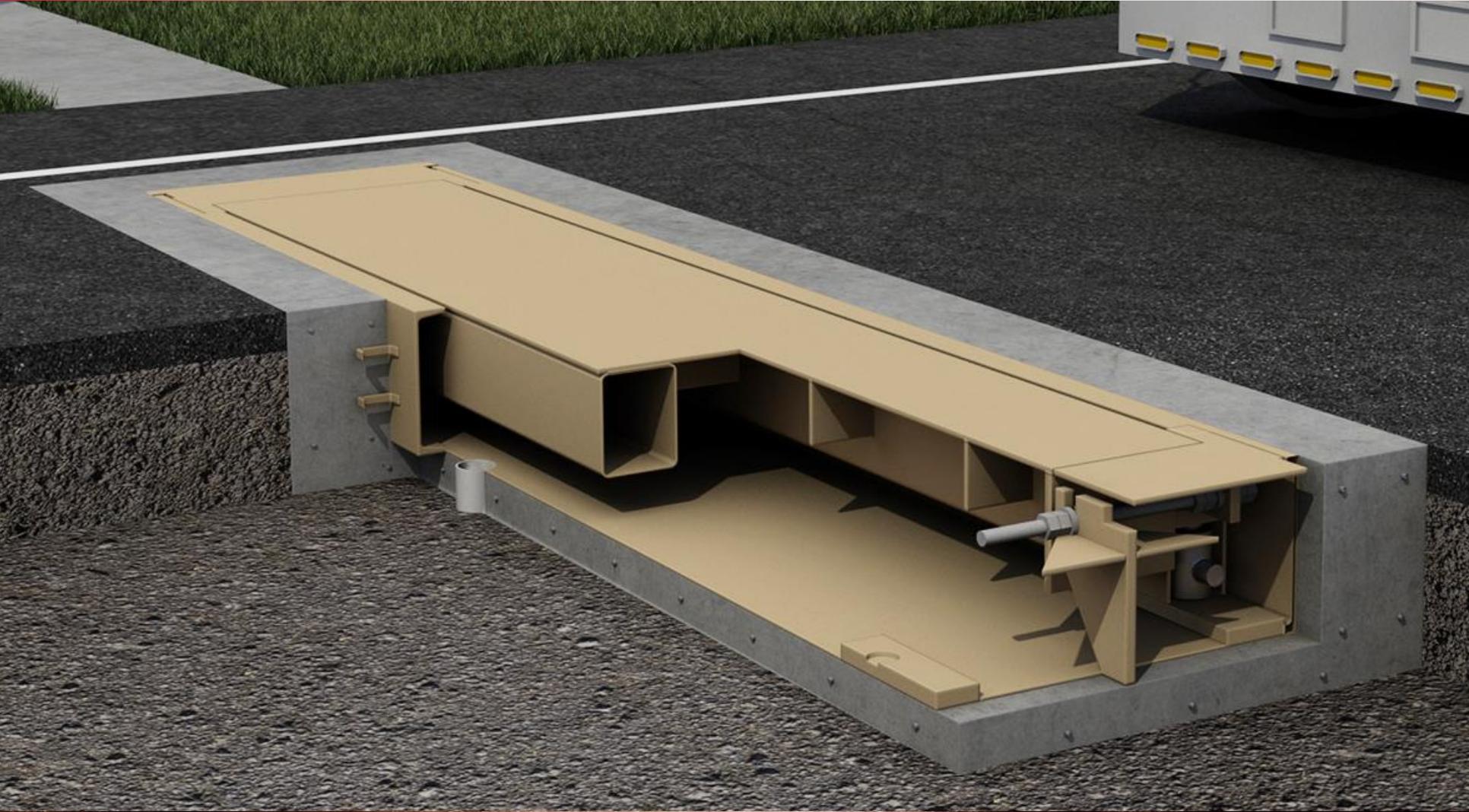
## 825 Spectrum Indicator



- 640 x 480 Pixel Full-Color LCD with Interactive Touchscreen
- Navigation Keys and QWERTY Keyboard
- IP66 Enclosure Rating
- Versatile and Extensive Truck/ID Storage Reports
- Complete Ticket Configurability
- Loaded with Applications Out of the Box
- Intuitive Setup and Configuration Menus
- 4 Bi-Directional RS232 Serial Ports
- 110/100 Base-T Ethernet Ports
- 2 USB-A Host Ports, 1 USB-B Device Port

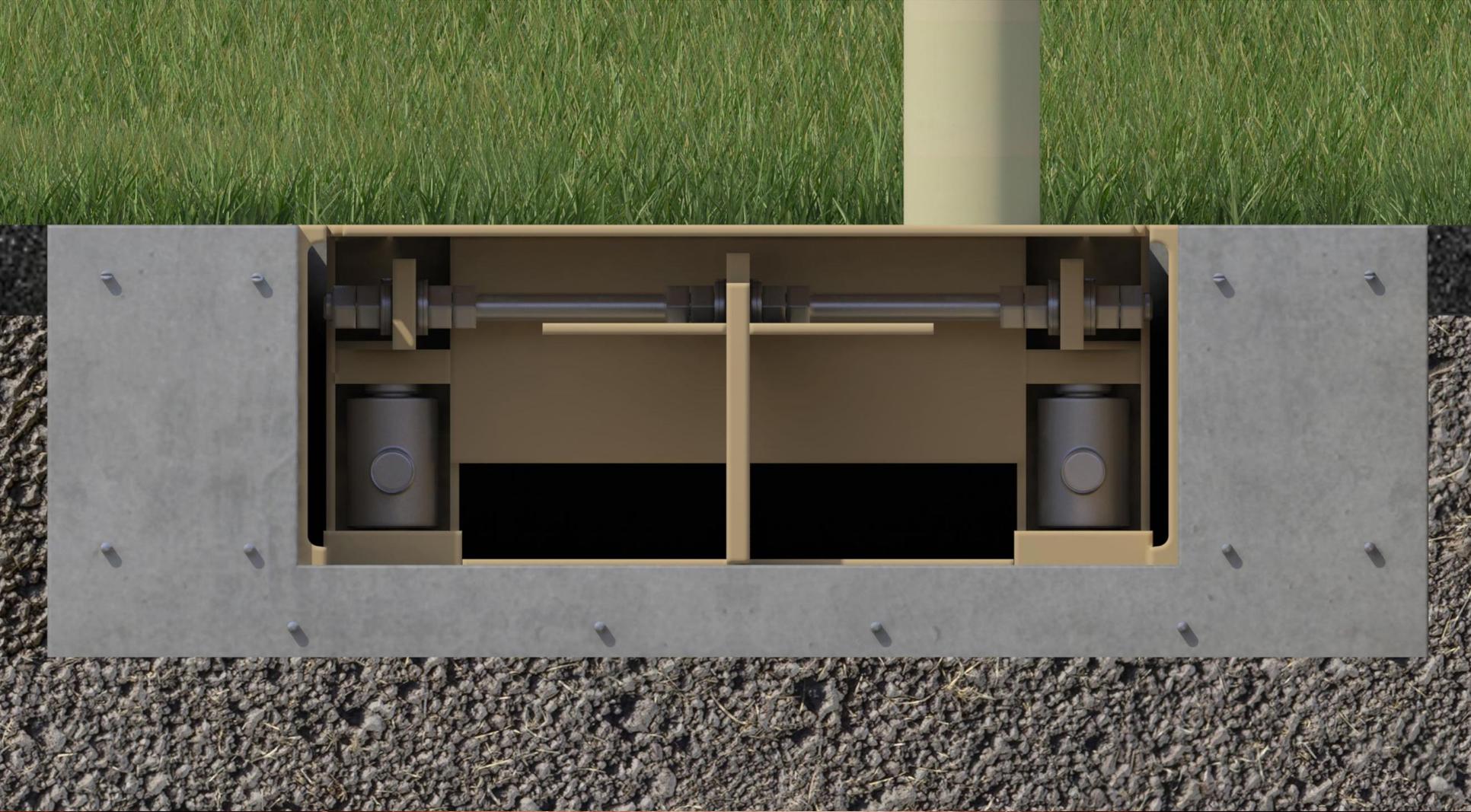
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SWIM scale will capture and provide individual axle weights.

| Axle       | Weight       | Counts        |
|------------|--------------|---------------|
| 1          | 8004         |               |
| 2          | 9227         |               |
| 3          | 11144        |               |
| 4          | 10938        | Axles overwt  |
| 5          | 9730         | 12            |
|            |              | Trucks overwt |
|            |              | 1             |
| <b>TOT</b> | <b>49043</b> | <b>14</b>     |
| Loop OFF   | -20 BZ       | ESC) MENU     |

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## ***STATIC WEIGHTS***

Cardinal's SWIM scale can also be used as a Static Scale to weigh single axles for an even more accurate measurement.

\* When used statically the SWIM meets NIST Class III tolerances.

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## Coating

The frame and weighbridge are protected by a baked-on epoxide polyester powder coat.

- Long lasting
- Low maintenance
- Prevents corrosion

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The extremely stiff and rigidly checked weighbridge, coupled with four 50,000-lb capacity strain gauge load cells, results in a...

1. Long-lasting, low-maintenance product
2. Higher resonant frequency allowing more efficient filtering of spurious weight signals

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## Low Life Cycle Cost

The Cardinal SWIM provides a low-cost alternative to traditional static weigh scales. The Cardinal SWIM is designed specifically for Weigh-in-Motion and provides axle weighing capabilities at a fraction of the cost of a traditional static scale. Maintenance costs are low and life cycle costs are very attractive.

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## ***Load Cell In-Motion Scales***

Advantages:

- High Accuracy
- Saves Time
- Small Footprint
- Low Maintenance
- Minimal Cost

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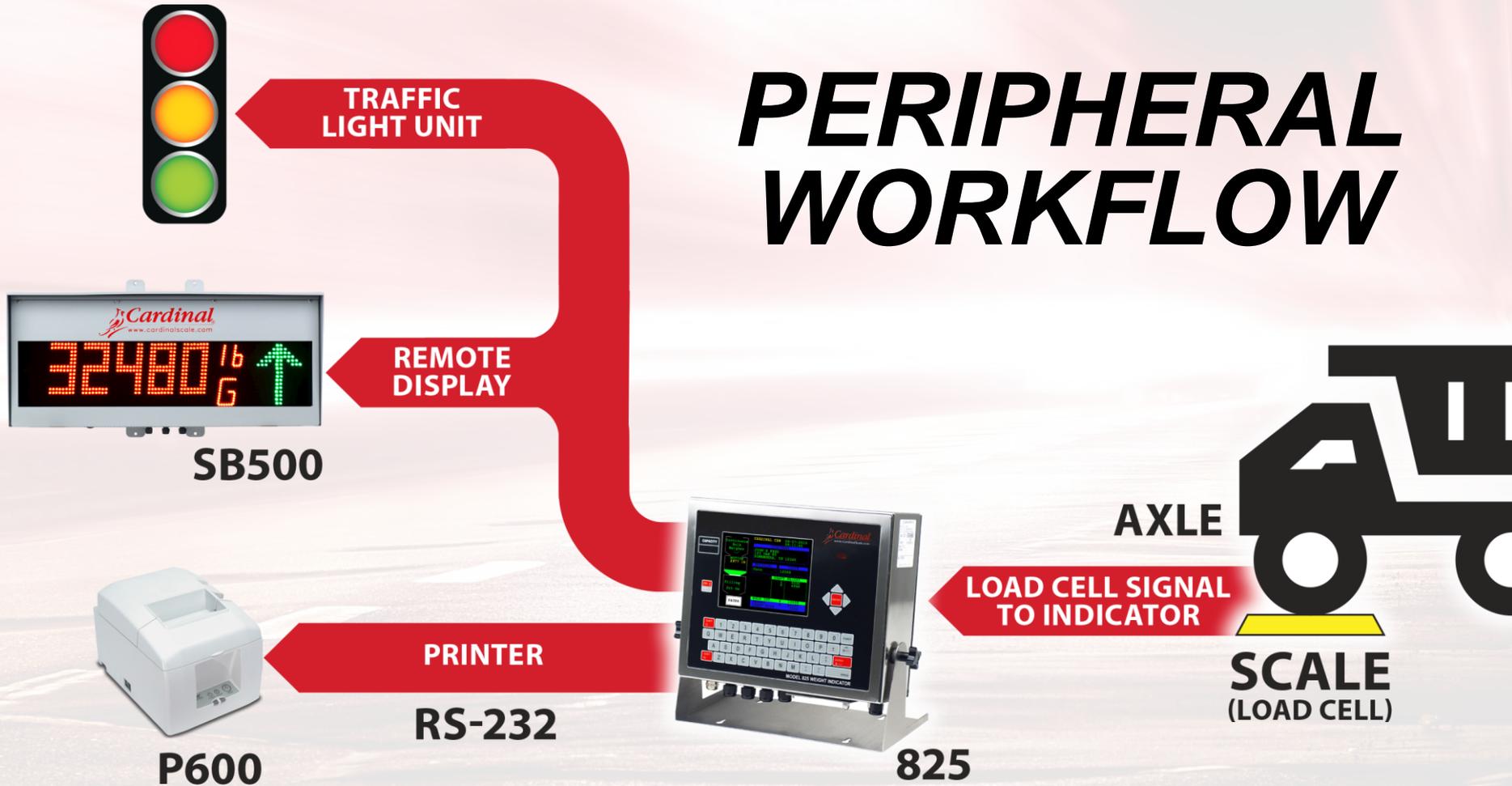
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## *Additional Components*

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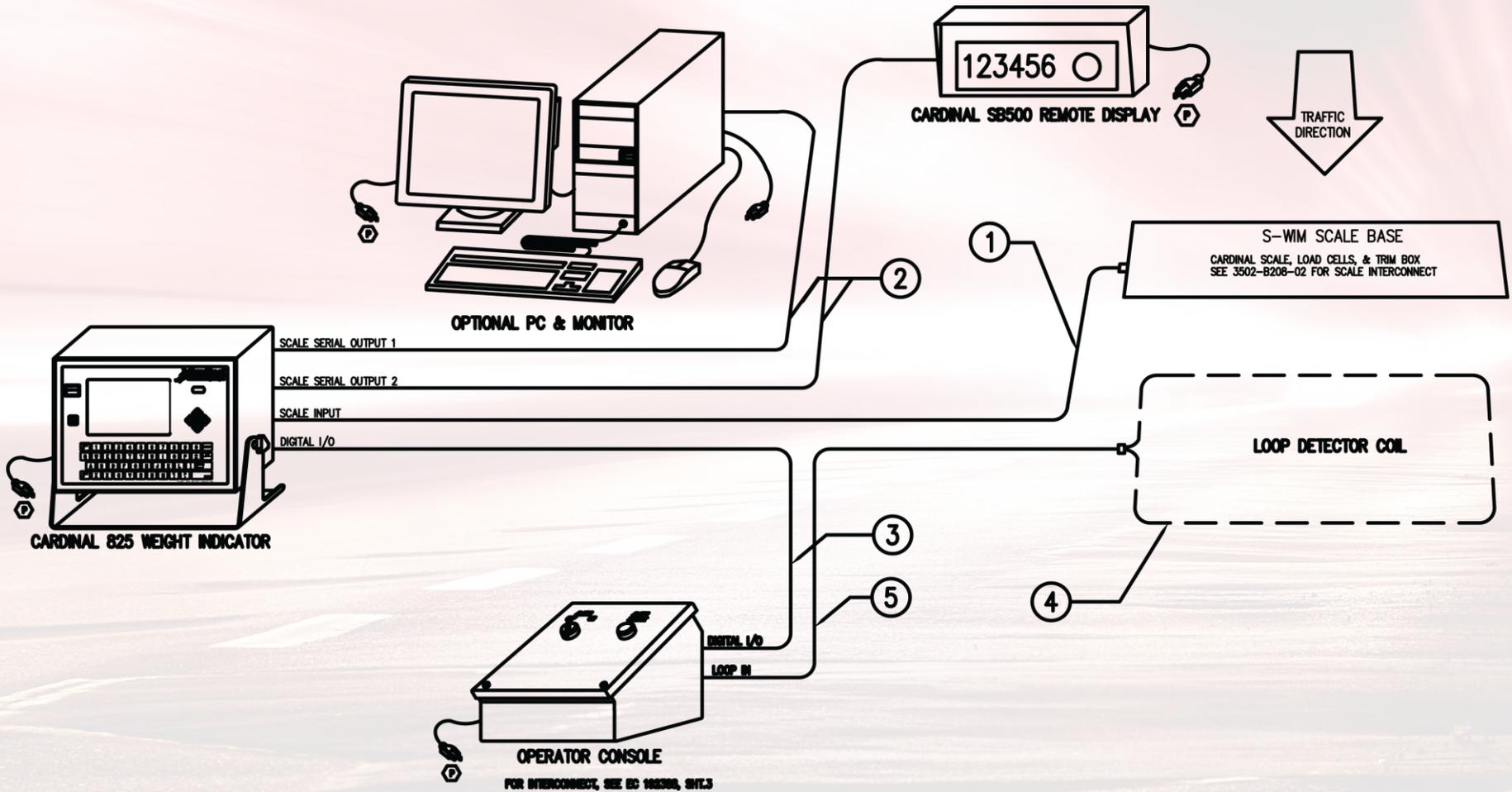
## SB500 Series 5-in-high LED



- Easy-to-see weight readouts for your truck drivers
- Giant 5-inch-high, double-row LED digits
- Easily read up to 250 feet away
- Weatherproof steel enclosure with rain hood
- Traffic directional arrows and red/green stop/go light

# SWIM Series

Slow-Speed In-Motion Vehicle Scales



3/1/2016  
4:37:00 PM

**Port of WIM - Webb City**  
Chronological S-WIM Screening Log  
*All Transactions*

WinVRS Industries Report

| <u>Seq</u>          | <u>Vehicle Class</u> | <u>Vehicle ID</u> | <u>Material</u> | <u>Date</u> | <u>Time</u> | <u>Scale</u> | <u>Axle #</u> | <u>Axle Weight</u> | <u>Gross</u>      | <u>Net</u>   | <u>Over Weight Gross</u> | <u>Over Weight Axle</u> | <u>Tandem Over weight</u> |
|---------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|---------------|--------------------|-------------------|--------------|--------------------------|-------------------------|---------------------------|
| 1                   | 6                    | 29                | Aggregate       | 3/1/2016    | 6:13:19 AM  | 1            | 1             | 11533              | 45110             | UNK          | 0                        | 0                       | 0                         |
|                     |                      |                   |                 |             |             |              | 2             | 16823              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 3             | 16754              |                   |              |                          |                         |                           |
| 2                   | 10                   | 103               | Beverage        | 3/1/2016    | 8:18:55 AM  | 1            | 1             | 13825              | 90767             | UNK          | 1                        | 0                       | 1                         |
|                     |                      |                   |                 |             |             |              | 2             | 15433              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 3             | 15344              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 4             | 13989              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 5             | 15288              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 6             | 16888              |                   |              |                          |                         |                           |
| 3                   | 5                    | 229               | Equipment       | 3/1/2016    | 9:03:05 AM  | 1            | 1             | 13093              | 29014             | UNK          | 0                        | 0                       | 0                         |
|                     |                      |                   |                 |             |             |              | 2             | 15921              |                   |              |                          |                         |                           |
| 4                   | 8                    | 91                | Livestock       | 3/1/2016    | 11:54:03 AM | 1            | 1             | 15000              | 58329             | UNK          | 0                        | 1                       | 0                         |
|                     |                      |                   |                 |             |             |              | 2             | 20102              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 3             | 12004              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 4             | 11223              |                   |              |                          |                         |                           |
| 5                   | 9                    | 37                | Mulch           | 3/1/2016    | 2:33:43 PM  | 1            | 1             | 15444              | 75629             | UNK          | 0                        | 0                       | 1                         |
|                     |                      |                   |                 |             |             |              | 2             | 15889              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 3             | 18371              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 4             | 13002              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 5             | 12923              |                   |              |                          |                         |                           |
| <b>Grand Total:</b> |                      | <b>5</b>          |                 |             |             |              | <b>20</b>     |                    | <b>298849 lb.</b> | <b>0 lb.</b> | <b>1</b>                 | <b>1</b>                | <b>2</b>                  |

3/1/2016  
4:37:00 PM

**Port of WIM - Webb City**  
Chronological S-WIM Screening Log  
*All Transactions*

WinVRS Industries Report

| <u>Seq</u>          | <u>Vehicle Class</u> | <u>Vehicle ID</u> | <u>Material</u> | <u>Date</u> | <u>Time</u> | <u>Scale</u> | <u>Axle #</u> | <u>Axle Weight</u> | <u>Gross</u>      | <u>Net</u>   | <u>Over Weight Gross</u> | <u>Over Weight Axle</u> | <u>Tandem Over weight</u> |
|---------------------|----------------------|-------------------|-----------------|-------------|-------------|--------------|---------------|--------------------|-------------------|--------------|--------------------------|-------------------------|---------------------------|
| 1                   | 6                    | 29                | Aggregate       | 3/1/2016    | 6:13:19 AM  | 1            | 1             | 11533              | 45110             | UNK          | 0                        | 0                       | 0                         |
|                     |                      |                   |                 |             |             |              | 2             | 16823              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 3             | 16754              |                   |              |                          |                         |                           |
| 2                   | 10                   | 103               | Beverage        | 3/1/2016    | 8:18:55 AM  | 1            | 1             | 13825              | 90767             | UNK          | 1                        | 0                       | 1                         |
|                     |                      |                   |                 |             |             |              | 2             | 15433              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 3             | 15344              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 4             | 13989              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 5             | 15288              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 6             | 16888              |                   |              |                          |                         |                           |
| 3                   | 5                    | 229               | Equipment       | 3/1/2016    | 9:03:05 AM  | 1            | 1             | 13093              | 29014             |              | 0                        | 0                       | 0                         |
|                     |                      |                   |                 |             |             |              | 2             | 15921              |                   |              |                          |                         |                           |
| 4                   | 8                    | 91                | Livestock       | 3/1/2016    | 11:54:03 AM | 1            | 1             | 15000              | 58329             | UNK          | 0                        | 0                       | 0                         |
|                     |                      |                   |                 |             |             |              | 2             | 20102              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 3             | 12004              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 4             | 11223              |                   |              |                          |                         |                           |
| 5                   | 9                    | 37                | Mulch           | 3/1/2016    | 2:33:43 PM  | 1            | 1             | 15444              | 75629             | UNK          | 0                        | 0                       | 1                         |
|                     |                      |                   |                 |             |             |              | 2             | 15889              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 3             | 18371              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 4             | 13002              |                   |              |                          |                         |                           |
|                     |                      |                   |                 |             |             |              | 5             | 12923              |                   |              |                          |                         |                           |
| <b>Grand Total:</b> | <b>5</b>             |                   |                 |             |             |              | <b>20</b>     |                    | <b>298849 lb.</b> | <b>0 lb.</b> | <b>1</b>                 | <b>1</b>                | <b>2</b>                  |

# SWIM Series

Slow-Speed In-Motion Vehicle Scales



## Warranty

This equipment is covered under Cardinal's standard one-year warranty against defects in materials or workmanship.

At Cardinal Scale, we stand by our products.

Service technicians and customer support staff standby for rapid response if the need arises.

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If you are not already familiar, Cardinal has a WIM website:

[www.wimscales.com](http://www.wimscales.com)

This site covers all our WIM offerings. You can go there to view This PowerPoint presentation, view 3D renderings of the SWIM product, see example views of the 825 SWIM weight display, and view peripheral device options.

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## ***INSTALLATION AND SITE CONSIDERATIONS***

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GRADE < 5% = OK

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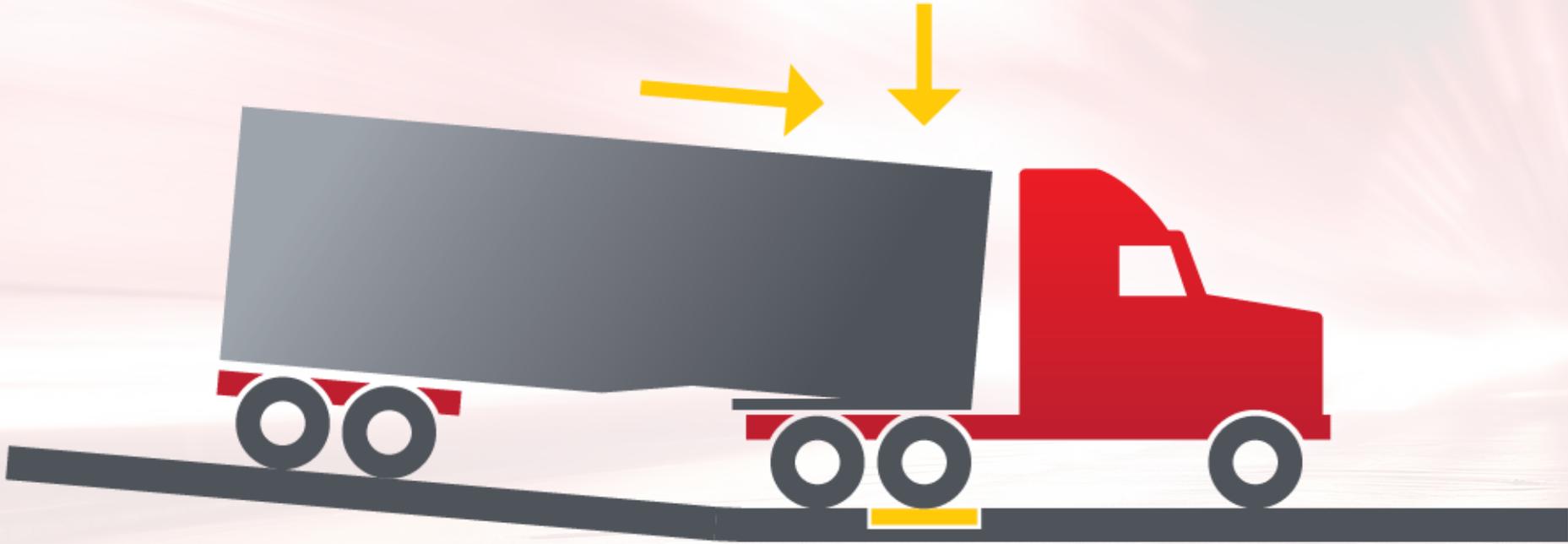
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**GRADE < 5% = OK**

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**MORE COMPRESSION = MORE LOAD**

# SWIM Series

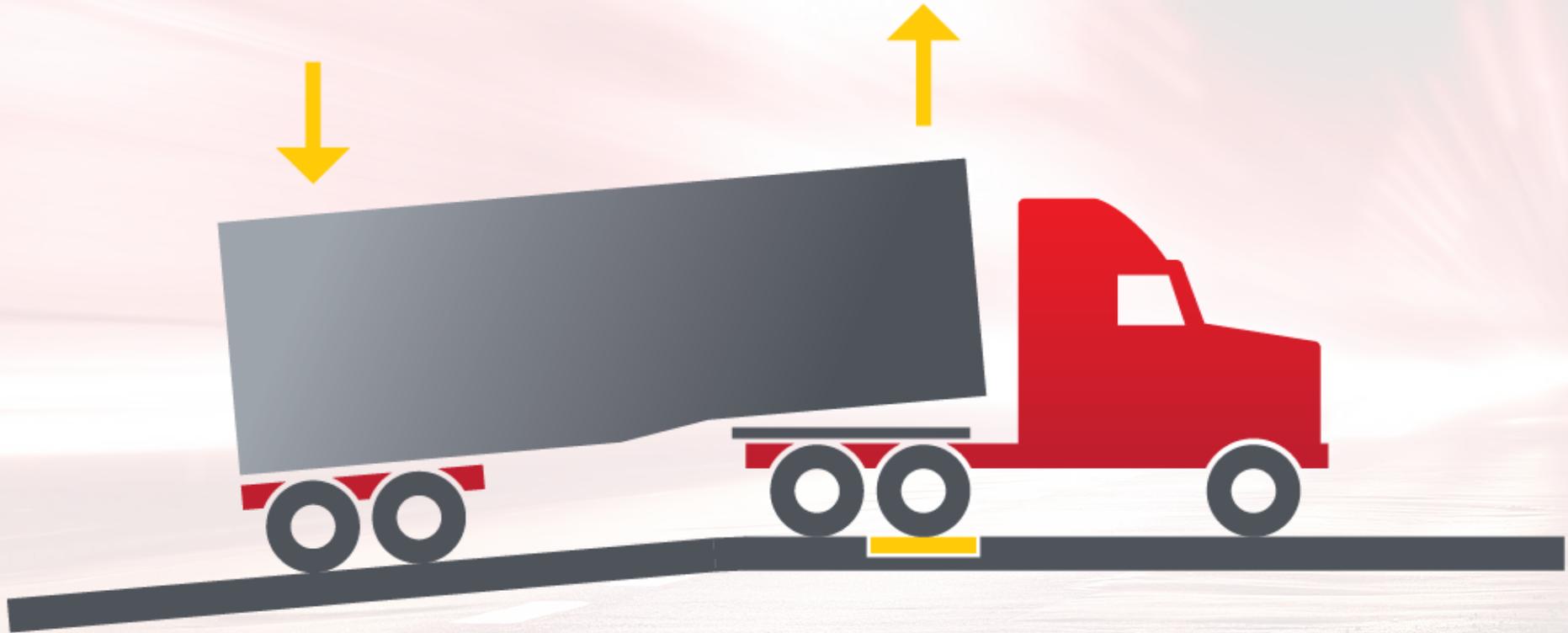
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**MORE COMPRESSION = MORE LOAD**

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**LESS COMPRESSION = LESS LOAD**

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**MORE COMPRESSION = MORE LOAD**

# SWIM Series

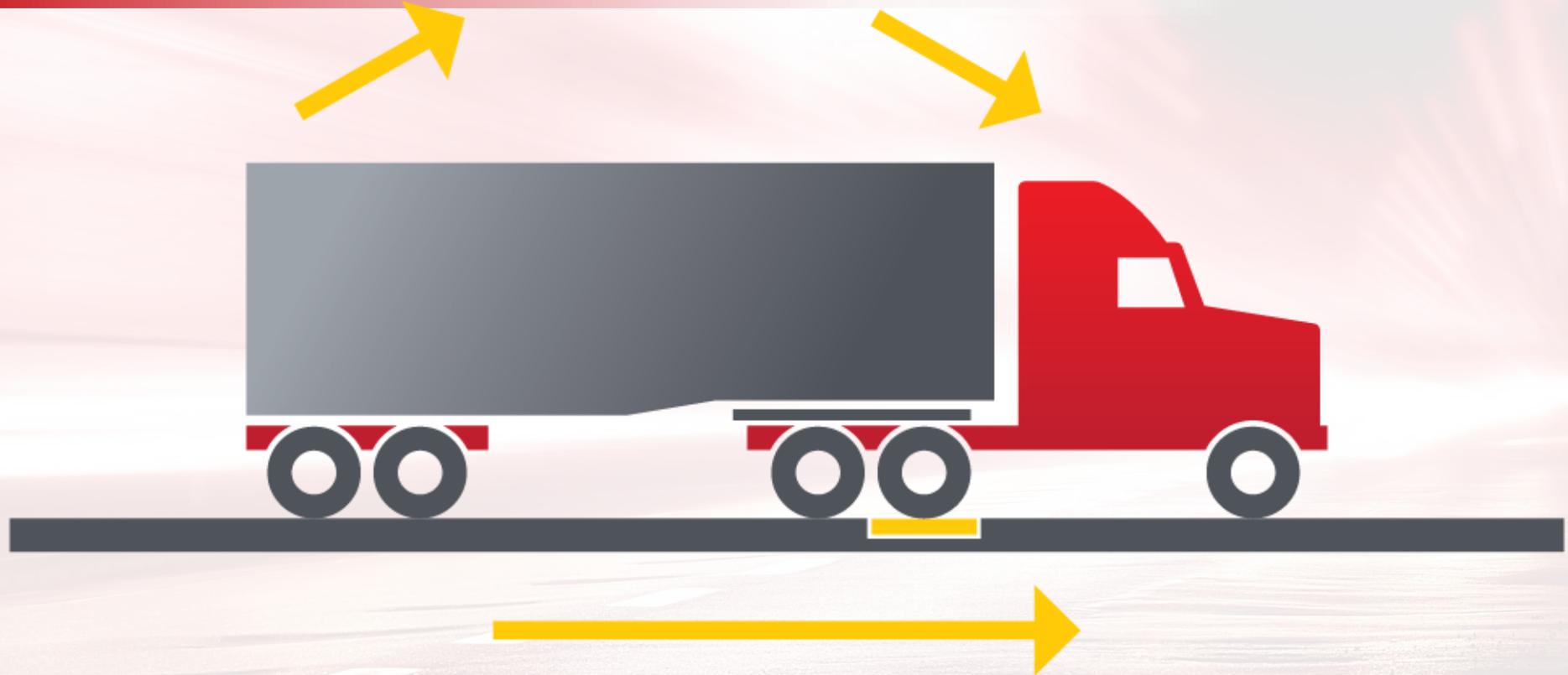
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**LESS COMPRESSION = LESS LOAD**

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**BRAKING**

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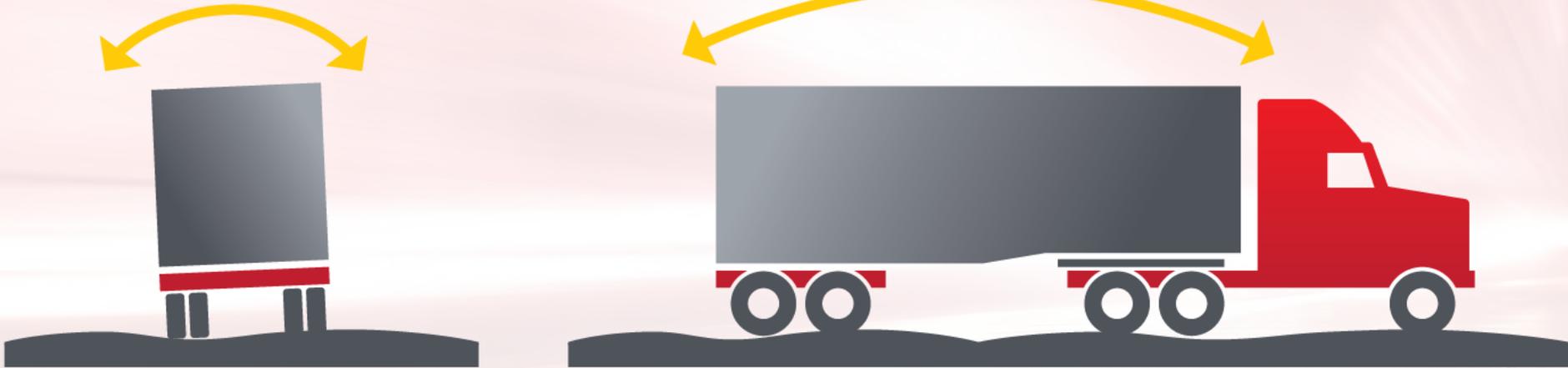
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**ACCELERATING**

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OSCILLATION = up to 5% error at 10km/hr

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To achieve the highest accuracy, the following conditions should be met:

1. The vehicle needs to approach and exit the scale in a straight line. Turning the vehicle during the weighment should be avoided. I.e. A straight approach and exit of 75 feet should be dictated.
2. All effort should be made to avoid conditions which would cause the vehicle to rock, sway, bounce, or have the suspension excited in any way. This requires pavement to be in good condition in advance and beyond the scale.
3. The vehicle should remain on a consistent grade during approach and exit from the scale. This does not mean it has to be level, but all axles should remain on the same plane during the entire pass. I strongly recommend you avoid any change in the rising or falling of approaches for 75 feet on either side of the scale. This condition would shift the weight backward or forward onto axles unevenly during the pass.



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