

# THE IMPORTANCE OF USING THE PROPER 18AWG HOMERUN CABLE

The homerun cable is a very important component of the Cardinal ARMOR® Digital Truck Scale and if improperly installed or the wrong type of cable is used, various problems can occur preventing the scale from running smoothly or in some cases completely shutting down the system.

If the wrong type of cable is used, for example using a cable that consists of only 24AWG or 22AWG wire instead of the **required 18AWG** for the digital load cell power (V+BUS, V-BUS), low voltage errors will occur due to the excessive voltage drop caused by the smaller gauge wire. It is important to note that the further away the scale is from the indicator, the greater the voltage drop will be when using a cable with a smaller gauge wire, and the larger the number of problems will be experienced on the system.



The ARMOR Digital Truck Scale manual 0330-0153-0M describes these homerun cable requirements on page 27 (PDF page 35). These are not new requirements and have been stipulated from the first rev of the manual for proper installation.

**Current draw and voltages based on (10) SCBD75 digital load cells with 500 feet of homerun cable**

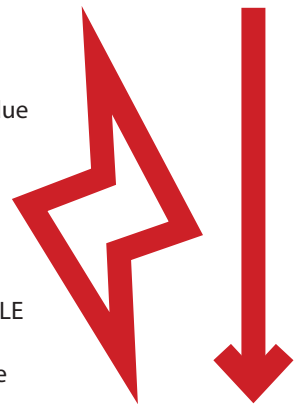
Voltage	Current	Current Draw of 10 Load Cells	Voltage Drop across 500 ft Cable		
			24AWG	22AWG	18AWG
		Amps	25.67Ω	16.14Ω	6.39Ω
9V	32.0mA	0.32	8.2144	5.1648	2.0448
10V	29.3mA	0.293	7.52131	4.72902	1.87227
11V	27.3mA	0.273	7.00791	4.40622	1.74447
12V	25.6mA	0.256	6.57152	4.13184	1.63584
15V	21.6mA	0.216	5.54472	3.48624	1.38024
24V	15.4mA	0.154	3.95318	2.48556	0.98406

**Problems encountered when using 24AWG or 22AWG for the homerun cable:**

- Excessive voltage drop reduces scale stability and increases weight errors
- The system shuts down due to LOW VOLTAGE DETECTED CELL X errors
- Low voltage results in high current draw from DLC card leading to card failures
- Long homerun cable runs cause frequent errors and system lock-ups
- Scale is unstable (weight readings fluctuate and the scale won't stay on zero)

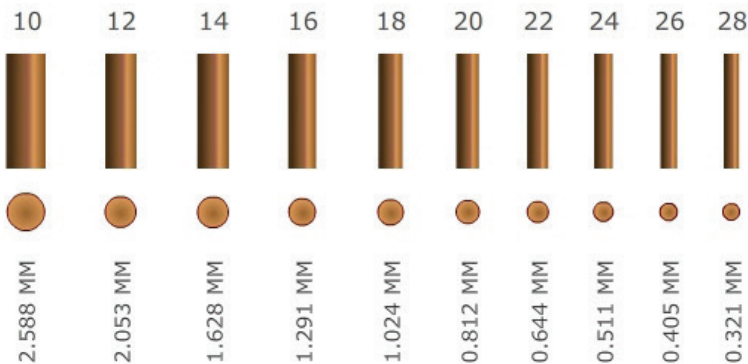
**Problems encountered when using smaller wire for the CAN-BUS cable:**

- Increased erroneous readings due to signal loss on the CAN-BUS
- The system shuts down due to LOAD CELL X NOT RESPONDING error (X = Start Node load cell)
- COMMUNICATIONS ERROR BETWEEN INDICATOR AND SCALE errors shut down the system
- Long homerun cable runs cause erratic weight readings



Similar to using too small of wire to power the load cells, using a cable that does not have a twisted pair of wires for the CAN BUS, will cause signal loss resulting in communication errors between the indicator and the scale. And just like when using too small

a wire for power, using a cable for the CAN BUS that does not have a twisted pair of wires, the further away the scale is from the indicator, the greater the signal loss will be, and the larger the number of communication errors will be experienced on the system.



**Approved Homerun Cable:**

To ensure the correct voltage to power the digital load cells and a strong CAN-BUS signal is supplied by the indicator to the scale, Cardinal Scale strongly recommends our Homerun cable P/N 6980-1092 or an equivalent cable such as Alpha Wire Xtra-Guard 4 45132. Note that our Homerun cable P/N 6980-1092 is made from five conductors, shielded PVC cable, and contains:

- Two (2) 18AWG wires for the load cell power (V+BUS, V-BUS)
- One (1) twisted pair of wires for the CAN-BUS signal (CANL, CANH)
- One (1) wire for the SHIELD wire

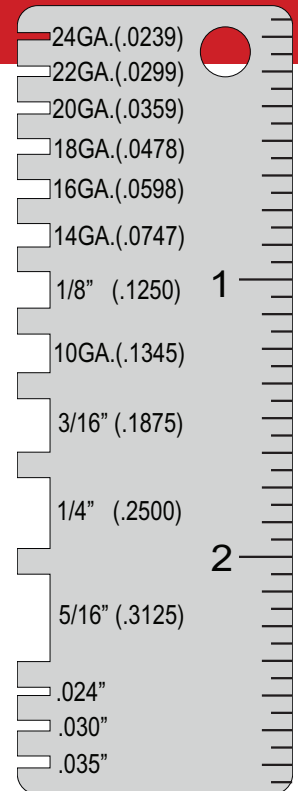
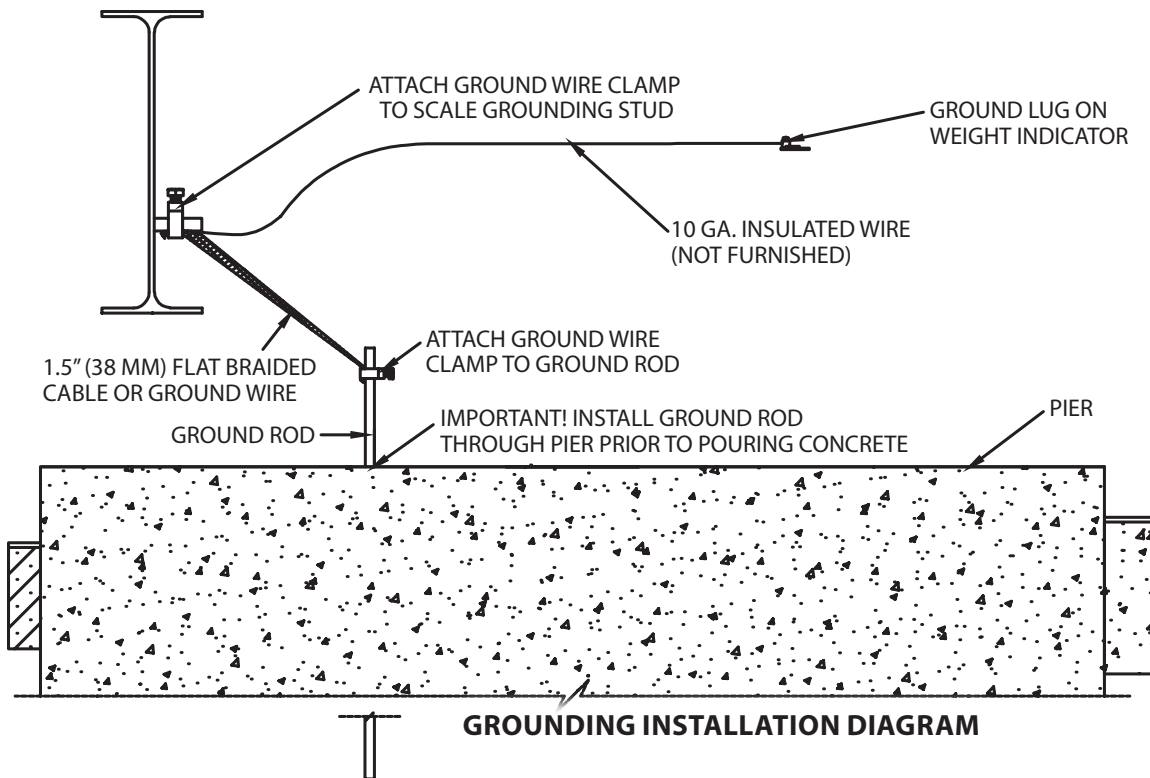
# PROPER GROUNDING OF THE SCALE AND INDICATOR

Grounding the scale and indicator properly is another area that can help to ensure the system runs smoothly. If the scale and indicator are improperly grounded, intermittent outages, weight drifting, and other inaccuracies can occur. A serious potential problem is lightning strikes. Since lightning strikes will seek the path of least resistance, an improperly grounded scale and indicator can result in damage to the indicator if the scale is struck. Another issue is static electricity build-up and discharges. Static electricity just like lightning will seek the path of least resistance. An improperly grounded indicator can cause the system to lock up or damage the indicator if the static electricity discharge is severe.

## Problems with an improperly grounded scale and indicator:

- Intermittent outages, weight drifting, and other inaccuracies
- Lightning strikes can damage the indicator
- Static electricity can build up and the discharges can cause system lock-ups or damage the indicator

To avoid these problems, the indicator should have a 10AWG insulated wire connected to its ground lug and then connected to the scale grounding stud. The scale grounding stud should be connected to a copper-plated ground rod that is a *minimum* of 0.5 in (1.27 cm) in diameter that is embedded through the scale pier and below the permanent moisture level at least 8 ft (2.44 m). Note that the ground rod should have a clean exterior surface and be free of any paint, enamel, or other non-conducting material. The ground rod should be connected to the scale grounding stud with a *minimum* 1.5 in (38 mm) braided cable or ground wire. Refer to the diagram below.



The ARMOR Digital Truck Scale manual 0330-0153-0M describes grounding instructions on pages 39 and 40 (PDF pages 47 and 48). These are not new requirements and have been stipulated from the first rev of the manual for proper installation.

DESCRIPTION	QTY.	PART NO.
GROUND ROD .625" DIA X 10 FT.	1	6980-0054
GROUND WIRE, 1 1/2" FLAT BRAID #3 AWG	1	6980-0036
WIRE 10GA STRANDED, GREEN	1	6980-0035
GROUNDING CLAMP	2	6610-5023

## IMPORTANT!

After the installation of the braided cable (or ground wire), check for continuity between the scale grounding stud and the ground rod.

Components required to assure the scale and indicator are properly grounded are available through the Cardinal Scale Parts Department at (800) 641-2045 or by email at [parts@cardet.com](mailto:parts@cardet.com).