

# ACCU-BEAD™

X005502EN

Rev. A

*For measuring the flow of reflective beads when used with pavement marking applications. For professional use only.*

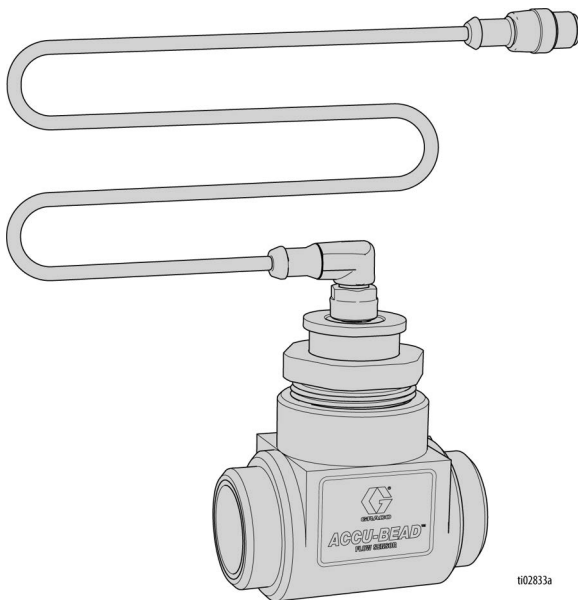
## Model 2007534

200 psi (1.4 MPa, 14 bar) Maximum Working Pressure



### Important Safety Instructions

Read all warnings and instructions in this manual before using the equipment. Save these instructions.

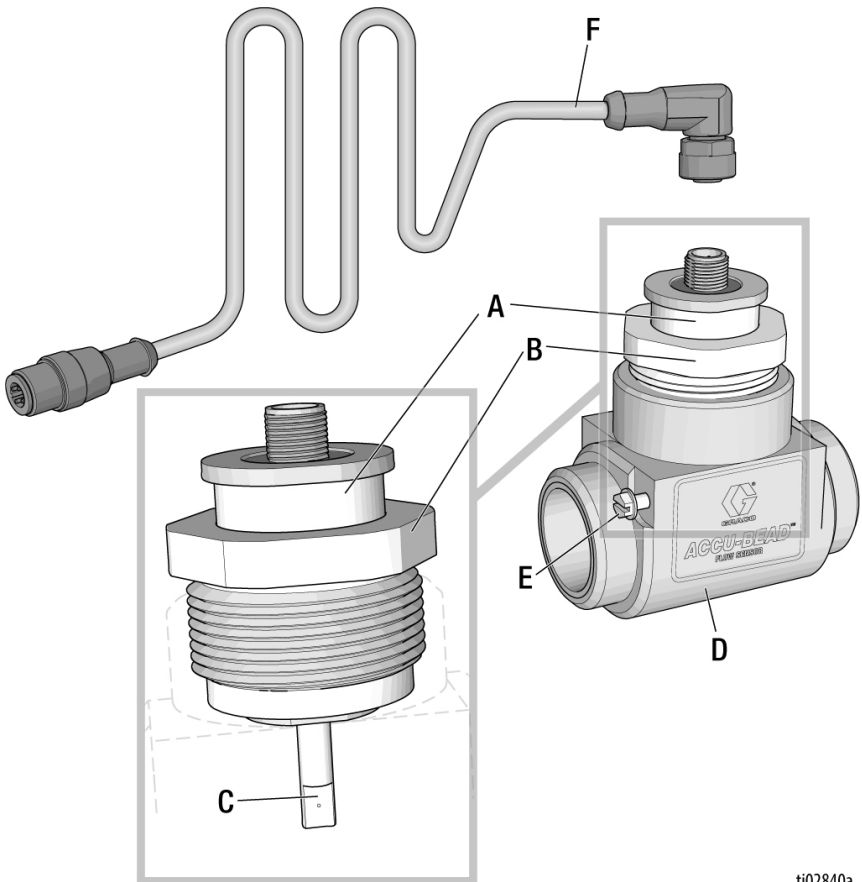


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## Contents

|                                           |           |
|-------------------------------------------|-----------|
| <b>Component Identification</b> .....     | <b>3</b>  |
| <b>Recommended Practices</b> .....        | <b>4</b>  |
| Calibration .....                         | 4         |
| Checking Calibration .....                | 4         |
| Minimize Frequency of Recalibration ..... | 4         |
| When to Recalibrate .....                 | 4         |
| For Best Accuracy .....                   | 5         |
| <b>Installation</b> .....                 | <b>6</b>  |
| Bead Flow Sensor Assembly Install .....   | 6         |
| Bead Flow Sensor Replacement .....        | 7         |
| <b>Maintenance</b> .....                  | <b>9</b>  |
| Periodic Maintenance .....                | 9         |
| Recycling and Disposal .....              | 10        |
| <b>Troubleshooting</b> .....              | <b>11</b> |
| <b>ACCU-BEAD Parts</b> .....              | <b>13</b> |
| Kit 2007534 .....                         | 13        |
| <b>Wiring Diagram</b> .....               | <b>14</b> |
| <b>Assembly Dimensions</b> .....          | <b>15</b> |
| <b>Technical Specifications</b> .....     | <b>16</b> |
| <b>California Proposition 65</b> .....    | <b>17</b> |
| <b>Graco Standard Warranty</b> .....      | <b>18</b> |

## Component Identification



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### Key:

- A Bead Flow Sensor
- B Bead Flow Sensor Swivel Nut
- C Bead Flow Sensor Beam
- D Bead Flow Sensor Housing
- E Ground Screw (#8-32 x .375)
- F Cable (12 meter)

### NOTICE

Do not handle sensor by the beam, do not drop, or side load the beam. Forces greater than 1.1 lb (4.9 N), or impacts to the bead flow sensor beam may cause damage to the sensor.

## Recommended Practices

The following recommended practices can be used as basic guidelines for the overall use of the ACCU-BEAD flow sensor. The sensor is designed to work with fixed bead gun settings, and a fixed installation and orientation of the sensor, and to measure bead flow via the control of bead tank air pressure only.

### Calibration

- If changing type of beads, be sure to completely purge the bead tank and bead system before loading new beads and calibrating. Failure to do so may affect calibration and sensor accuracy.
- Before calibrating, determine bead gun needle setting and/or orifice size for required bead flow rates; and keep fixed. Adjusting either after calibrating will affect the accuracy of readings, and require recalibration.
- During calibration, the flow needs to be smooth and continuous with no pulsation, air pockets, or sputtering. Ensure the bead tank is filled enough to provide a consistent flow during calibration, and the entire bead system (hoses, sensor assembly, and bead guns) are fully primed with beads to ensure a smooth, continuous flow with no pulsation, air pockets, or sputtering.

### Checking Calibration

- Can be performed by dispensing beads into a 5-gallon bucket (fill bucket about 1/2 to 3/4 full), weighing the beads dispensed (minus the bucket weight), and comparing it to the amount indicated on the skip timer control. This can be performed at any time to confirm accuracy.

### Minimize Frequency of Recalibration

- Choose a bead gun orifice size and needle position that will enable you to cover the entire range of desired flow rates by only adjusting bead tank air pressure.
- Calibrate the sensor at the lowest and highest tank pressures required for the bead gun and truck operation.

### When to Recalibrate

- When there are any changes to the bead gun settings, such as the needle position or orifice size.
- Every time the bead type being used is changed.
- The sensor assembly is repositioned, reoriented, or reinstalled in a new location.
- The sensor is removed and reinstalled into the housing.
- Hoses and/or fittings are replaced, or altered, that go from the bead tank to the sensor and/or the sensor to the bead gun.
- The sensor is replaced (see page 6).
- After 20,000 Lbs (9100 kg) of beads have passed through a sensor assembly, and/or the sensor was cleaned per Periodic Maintenance (page 9.)
- If desired accuracy is not achieved after checking the calibration.

## **For Best Accuracy**

- Install the sensor assembly as close as possible to the bead gun using straight fittings. Do not use 90-degree elbow fittings at the sensor assembly housing inlet.
- Ensure the FLOW direction arrow on the housing is pointed in the direction of the bead flow.
- Maintain the bead tank air pressure/bead flow rate between the calibration points during use.

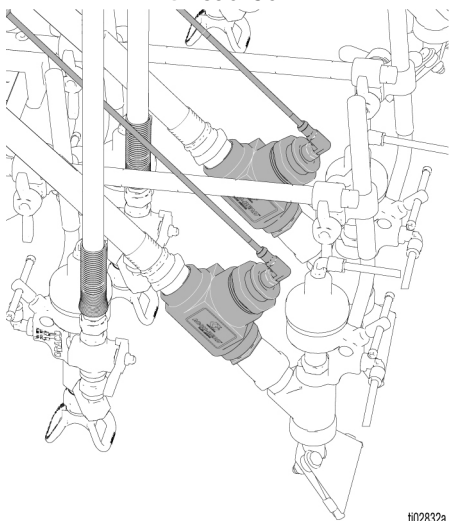
## Installation

### Bead Flow Sensor Assembly Install

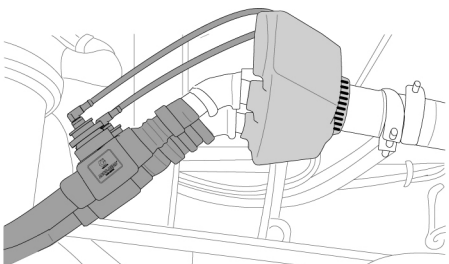
1. The bead flow sensor can be installed at the bead gun or the bead manifold using standard fittings (not supplied), with one bead flow sensor per bead gun. Sensor can be installed in any orientation, as long as the bead flow direction matches the FLOW direction as indicated on the housing.

**NOTE:** For best accuracy, mount sensor at the bead gun.

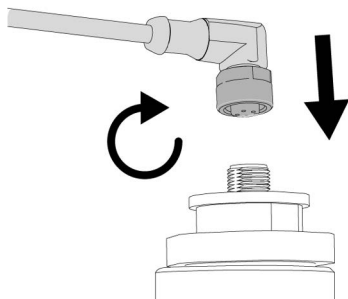
**At Bead Gun**



**At Bead Manifold**



2. Connect the cable to the sensor and route to the appropriate skip timer connection.



#### NOTICE

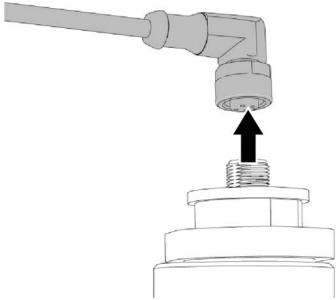
Failure to properly ground the bead flow sensor could allow electrostatic charge to build up and potentially damage the sensor. Mount the housing using metallic fittings to ensure a grounded connection to the vehicle frame, or use the grounding screw to connect a wire from the housing to vehicle ground.

#### NOTICE

Do not route cable near or against sources of heat or high temperatures; doing so may damage the cable.

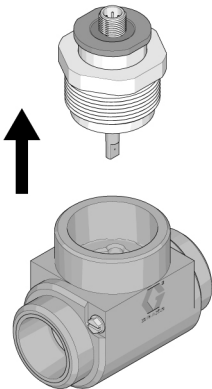
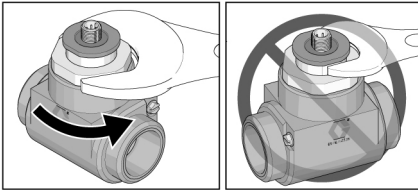
## Bead Flow Sensor Replacement

1. Disconnect the M12 connector from the bead flow sensor.



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2. Using a 44mm, 1.75", or adjustable wrench, loosen the swivel nut to remove the sensor from the housing.



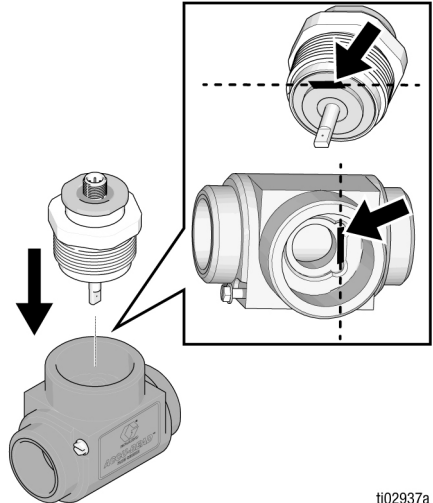
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3. Completely clear out all glass beads from inside the housing, and ensure the threads are completely clean on the housing and new bead flow sensor before installing the new sensor.

### NOTICE

Failing to completely clean the threads of the housing and the sensor swivel nut may cause galling and damage to both sets of threads.

4. Install the new bead flow sensor into the housing, and begin to thread in the new sensor by hand, making sure to align the flat in the housing with the flat on the sensor by rotating the sensor body until it drops down and fully seats into the housing. When seated properly, the sensor will only be able to slightly rotate.



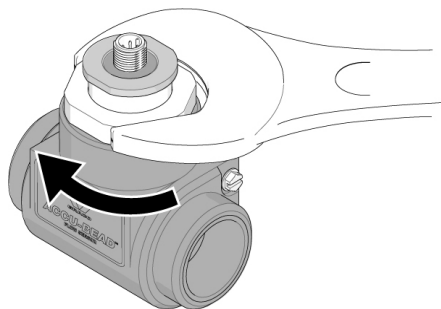
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### NOTICE

Do not handle sensor by the beam, do not drop, or side load the beam. Forces greater than 1.1 lb (4.9 N), or impacts to the bead flow sensor beam may cause damage to the sensor.

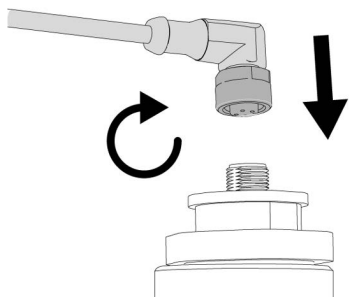
# Installation

5. Hand tighten the swivel nut until the sensor is fully seated in the housing (body of sensor should not be able to move up and down in swivel nut), then apply a final torque of  $45 \pm 5$  ft-lb (54-68 N·m).



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6. Reconnect the right angled M12 connector to the bead flow sensor.



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7. Recalibrate sensor.

# Maintenance

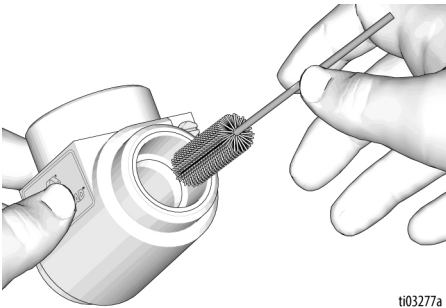
## Periodic Maintenance

**EVERY 20,000 LBS or TWO MONTHS:** For maximum accuracy, check the housing inside diameter and the bead flow sensor beam for glass dust scale buildup. If no buildup is present, reinstall the sensor and perform a calibration. If buildup is found, remove the sensor and/or housing from the truck, and clean as described, then reinstall and perform a calibration. If the housing cannot be removed, remove the sensor from the housing and clean as described, then reinstall and perform a calibration.

### NOTICE

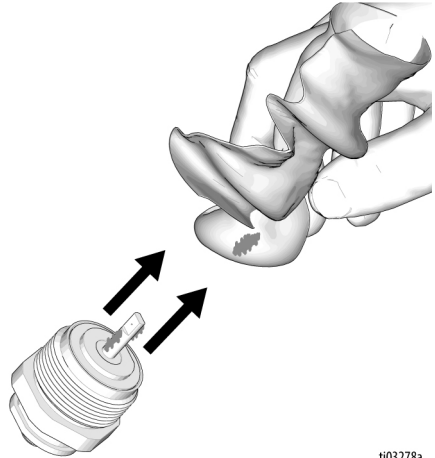
Do not handle sensor by the beam, do not drop, or side load the beam. Forces greater than 1.1 lb (4.9 N), or impacts to the bead flow sensor beam may cause damage to the sensor.

- To clean the buildup from inside of the housing, remove the sensor from the housing, and use a soft bristle brush to remove the buildup.



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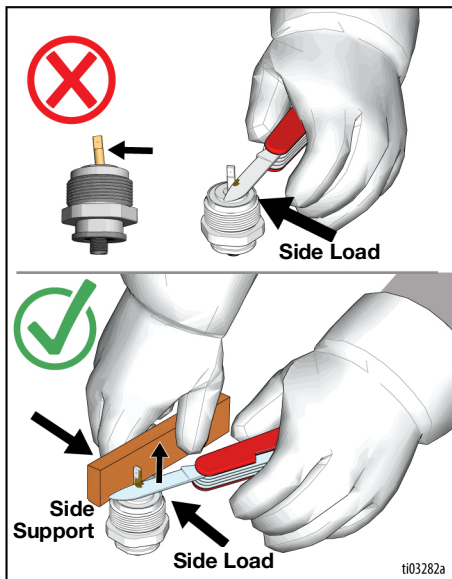
- To clean the buildup from the bead flow sensor beam, remove the sensor from the housing, and with a soft towel, gently wipe away the loose material, ensuring to put **no side load on the beam**.



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# Maintenance

- If buildup remains on the beam, **gently** scrape the buildup off of the beam while supporting the opposite side of the beam, ensuring **no side load is placed on the beam**.



## Recycling and Disposal

### End of Product Life

At the end of a product's life, recycle it in a responsible manner.

## Troubleshooting

| Problem                                                  | Cause                                                                                                                                                                                                                                                             | How to Check                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Solution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No signal voltage<br>(Typically between ~0.4v and 5.0v). | <ul style="list-style-type: none"> <li>• Cable disconnected.</li> <li>• Brown supply voltage wire disconnected.</li> <li>• Blue signal voltage wire disconnected.</li> <li>• Black ground wire disconnected.</li> <li>• Or a combination of the above.</li> </ul> | <ul style="list-style-type: none"> <li>• Visually at sensor and junction box.</li> <li>• Visually check cable for damaged or broken wires.</li> <li>• Visually check all wires are connected at the junction box.</li> <li>• Disconnect the cable from the sensor, and use a voltmeter with the red probe at pin 1 and the black probe at pin 4, in the right angled female M12 connector on the cable, for 4.75v to 5.25v supply voltage.</li> </ul>                                                                | <ul style="list-style-type: none"> <li>• Reconnect the cable.</li> <li>• Replace damaged cable.</li> <li>• Reconnect wires to junction box.</li> <li>• Verify skip time is providing 4.75v to 5.25v supply voltage.</li> </ul>                                                                                                                                                                                                                                                                |
| Signal voltage remains high (~4.75v to 5.25v).           | Sensor was overloaded in the same direction as the bead flow direction.                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>• Remove sensor from the housing, and with the cable still connected, check if the signal voltage decreases to ~0.5v with no load on the beam, then gently (1.1 Lbf / 4.9 N MAX) press on the beam in the flow direction ensuring <u>NOT</u> to exceed a signal voltage output of ~4.75v to 5.25v.</li> <li>• Connect a known good sensor; no-load signal voltage should be ~0.5v and should increase to ~4.75v to 5.25v when gently pressed (as described above).</li> </ul> | <ul style="list-style-type: none"> <li>• If the no-load signal voltage decreases to ~0.5v, and increases to ~4.75v to 5.25v when gently pressed; the sensor is good. Reinstall and recalibrate.</li> <li>• If the no-load signal voltage remains high and does not change when gently pressed; replace the sensor.</li> <li>• If the no-load signal voltage is not ~0.5v and does not increase as described when gently pressed, on a known good sensor, check skip timer control.</li> </ul> |

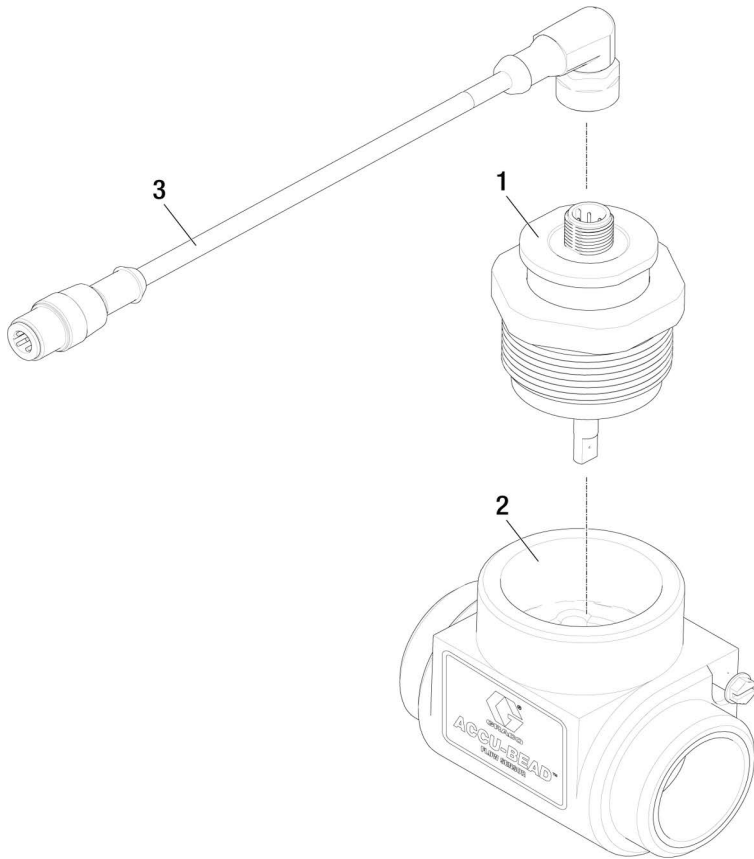
# Troubleshooting

| Problem                           | Cause                                                                       | How to Check                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Solution                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Signal voltage remains low (~0v). | Sensor was overloaded in the opposite direction as the bead flow direction. | <ul style="list-style-type: none"> <li>Remove sensor from the housing, and with the cable still connected, check if the signal voltage increases to ~0.5v with no load on the beam, then gently (1.1 Lbf / 4.9 N MAX) press on the beam in the flow direction ensuring <b>NOT</b> to exceed a signal voltage output of ~4.75v to 5.25v.</li> <li>Connect a known good sensor; no-load signal voltage should be ~0.5v and should increase to ~4.75v to 5.25v when gently pressed (as described above).</li> </ul> | <ul style="list-style-type: none"> <li>If the no-load signal voltage decreases to ~0.5v, and increases to ~4.75v to 5.25v when gently pressed; the sensor is good. Reinstall and recalibrate.</li> <li>If the no-load signal voltage remains low and does not change when gently pressed; replace the sensor.</li> <li>If the no-load signal voltage is not ~0.5v and does not increase as described when gently pressed, on a known good sensor, check skip timer control.</li> </ul> |
| Maxing out sensor signal voltage. | Too much restriction in bead gun, or flow is too high.                      | Verify signal voltage at skip timer control display is not exceeding ~4.75v.                                                                                                                                                                                                                                                                                                                                                                                                                                     | Back out needle on gun, or use a larger orifice, and/or reduce tank pressure to reduce bead flow rate.*                                                                                                                                                                                                                                                                                                                                                                                |
| Sensor signal voltage is too low. | Not enough restriction in bead gun, or flow is too low.                     | Verify signal voltage at skip timer control display is not below ~0.5v.                                                                                                                                                                                                                                                                                                                                                                                                                                          | Adjust needle inward on gun, or use a smaller orifice, and/or increase tank pressure to increase bead flow rate.*                                                                                                                                                                                                                                                                                                                                                                      |

\* Any changes to the bead gun settings, orifice, and/or plumbing related to the bead flow sensor requires a recalibration. Changing bead tank air pressure does not require a recalibration unless the pressure has been adjusted outside of the previous calibration range.

## ACCU-BEAD Parts

### Kit 2007534



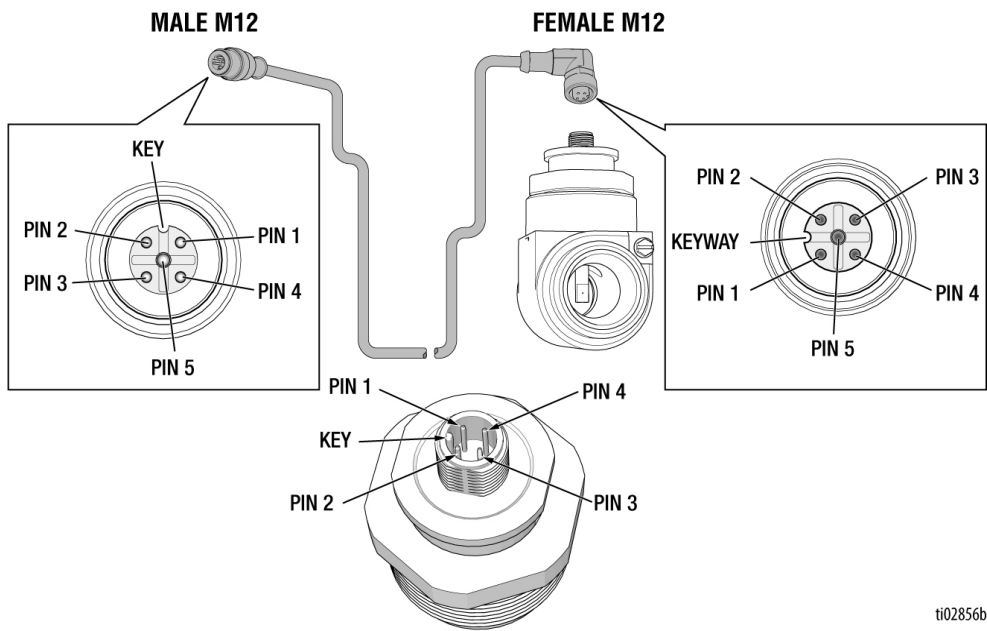
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### ACCU-BEAD Parts List (Kit 2007534)

| Ref. | Part    | Description                                                  | Qty. |
|------|---------|--------------------------------------------------------------|------|
| 1    | 2007130 | SENSOR, flow, glass bead                                     | 1    |
| 2    | 2007960 | HOUSING, bead flow sensor<br><i>includes #8 ground screw</i> | 1    |
| 3    | 2009198 | CABLE, bead flow sensor, 12m                                 | 1    |

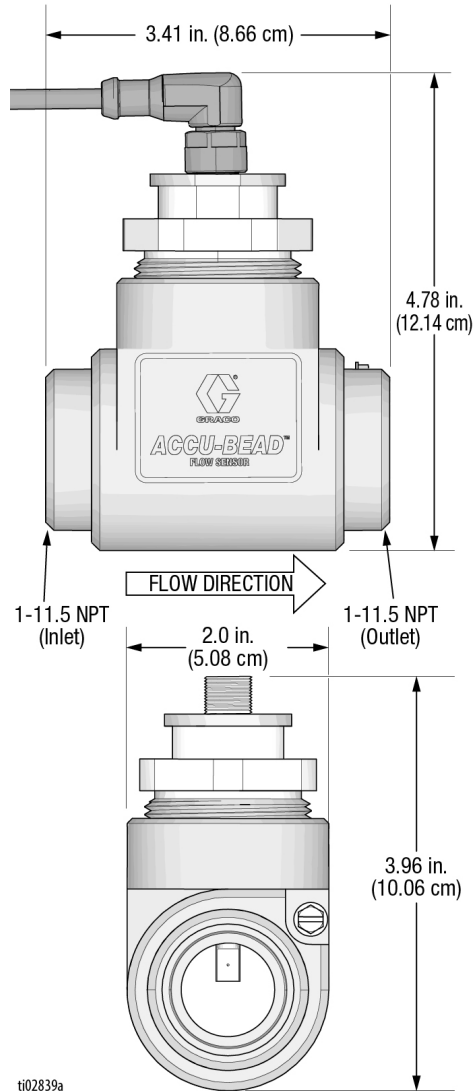
# Wiring Diagram

## Wiring Diagram



| Pinout and Wiring |                 |            |
|-------------------|-----------------|------------|
| PIN               | Sensor          | Cable Wire |
| 1                 | Supply Voltage  | Brown      |
| 2                 | (Not Connected) | White      |
| 3                 | Signal Voltage  | Blue       |
| 4                 | Ground          | Black      |
| 5                 | (None)          | Shielding  |

## Assembly Dimensions



## Technical Specifications

| <b>ACCU-BEAD Kit 2007534</b>         |                                     |                    |
|--------------------------------------|-------------------------------------|--------------------|
|                                      | <b>US</b>                           | <b>Metric</b>      |
| Maximum Operating Pressure           | 100 psi                             | 6.9 bar, 0.69 MPa  |
| Maximum Overload Pressure            | 200 psi                             | 13.8 bar, 1.39 MPa |
| Maximum Sensor Beam Overload Force   | 1.1 lb                              | 4.9 N              |
| Assembly Weight (without cable)      | 1.09 lb                             | 0.49 kg            |
| Inlet and Outlet threads             | 1-11.5 NPT female                   |                    |
| Sensor Ingress Rating                | IP67                                |                    |
| Supply Voltage                       | 4.75-5.25 VDC                       |                    |
| Current Draw                         | 1.5 mA (nominal) / 3.0 mA (maximum) |                    |
| Output Signal                        | 0.5-4.5 VDC (ratiometric)           |                    |
| Operating Temperatures               | -4 to 158°F                         | -20 to 70°C        |
| Compensated Temperatures             | 32 to 122°F                         | 0 to 50°C          |
| Bead Flow Sensor body material       | Aluminum                            |                    |
| Bead Flow Sensor swivel nut material | Aluminum                            |                    |
| Bead Flow Sensor beam material       | Stainless Steel                     |                    |
| Housing material                     | Aluminum                            |                    |

# California Proposition 65

## CALIFORNIA RESIDENTS

 **WARNING:** Cancer and reproductive harm –  
[www.P65warnings.ca.gov](http://www.P65warnings.ca.gov).

# Graco Standard Warranty

## Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

**THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.**

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

**GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO.** These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

### **FOR GRACO CANADA CUSTOMERS**

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## **Graco Information**

For the latest information about Graco products, visit [www.graco.com](http://www.graco.com).

For patent information, see [www.graco.com/patents](http://www.graco.com/patents).

**TO PLACE AN ORDER**, contact your Graco distributor or call 1-800-690-2894 to identify the nearest distributor.

*All written and visual data contained in this document reflects the latest product information available at the time of publication. Graco reserves the right to make changes at any time without notice.*

Original instructions. This manual contains English. MM X005502EN

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**International Offices:** Belgium, China, Japan, Korea

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