INSTALLATION INSTRUCTIONS FOR THE CURRENT SENSORS CSNV700 SERIES

32XXXXXX
Issue A

⚠ WARNING
PERSONAL INJURY WARNING
DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.
Failure to comply with these instructions could result in death or serious injury.

1.0 GENERAL INFORMATION

The CSNV700 Series are closed loop advanced fluxgate current sensors that use Honeywell's patented technology to bring the best combination of performance and reliability. They are non-intrusive and electrically isolated from the monitored circuit. This ensures a simple and reliable structure without loss of power to the monitored circuit. The CSNV700 Series are rated for a primary current measurement range of ±700 A dc. They are calibrated and temperature compensated for improved accuracy using multi-point temperature characterization. The CSNV700 is AEC-Q100 qualified to meet higher quality and reliability.

This document provides installation instructions for the CSNV700 current sensor for optimal performance. This document provides recommendations for shape and positioning of the primary conductor to mitigate magnetic interference caused due by external magnetic fields. For this case study, a 22 mm [0.87 in] width and 3 mm [0.12 in] thickness copper busbar is used.

2.0 INSTALLATION GUIDE

2.1 Installation Position of a Primary Conductor

When current flows through a primary conductor, a magnetic field will be generated. The CSNV700 current sensor senses the magnetic field and converts it to current readings. The primary conductor may be a cable or busbar. If the primary conductor is not properly installed, the CSNV700 current sensor accuracy may be affected. Several recommended installations are shown.

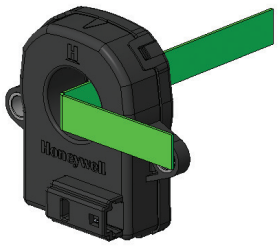
2.1(a) U shape bus bar at 180° and 5 mm [0.20 in] separation from the magnetic core housing

Figure 1. CSNV700 with U-shape bus bar



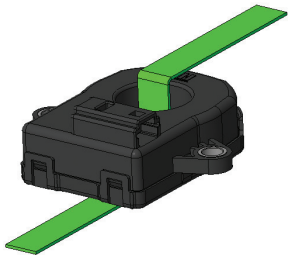
2.1(b) L shape bus bar at 90° and 5 mm [0.20 in] separation from the magnetic core housing

Figure 2. CSNV700 with L-shape bus bar



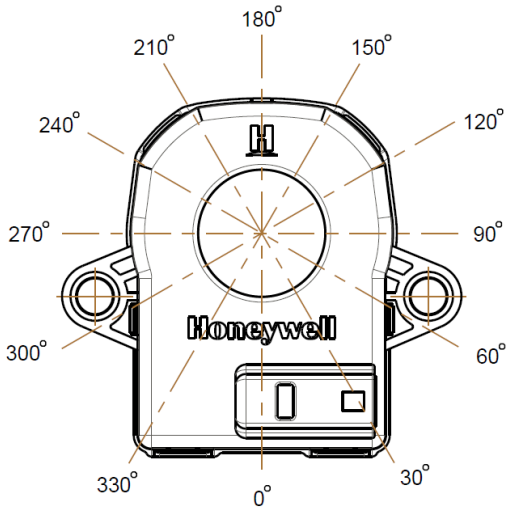
2.1(c) Z shape bus bar at 180° degree and 5 mm [0.20 in] separation from the magnetic core housing

Figure 3. CSNV700 with Z-shape bus bar



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Figure 4. Angle Definition



2.1.1 U-shape conductor

For the U-shape primary conductor, the distance between the primary conductor and the sensor, and the relative angle between them affect the sensor accuracy. Several angles and distance were tested as shown in the Figure 6.

Figure 5. U-shape busbar installation at an angle of 180°, separation distance of 5 mm [0.20 in]

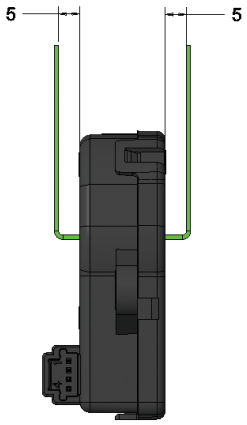
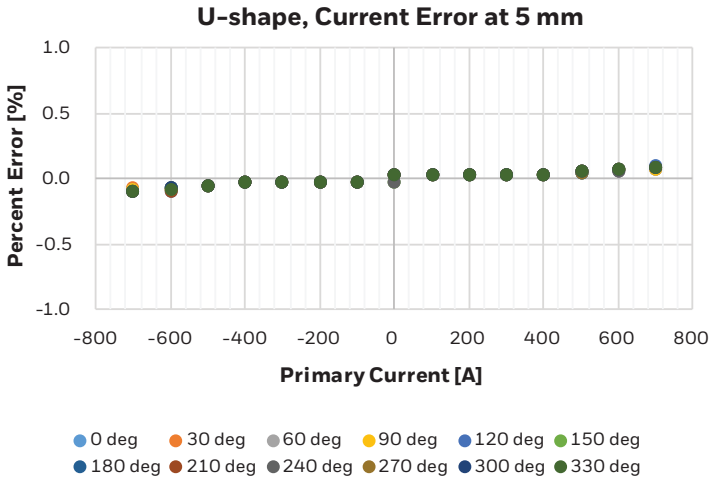


Figure 6. U-shape busbar installation test result at different angle

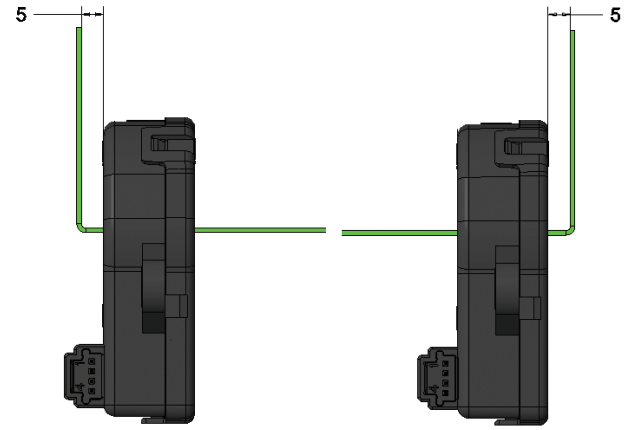


Based on the test results, the U-shape primary conductor, the distance between the conductor and the magnetic core housing, as well as the relative angle between the conductor and the current sensor have minimal influence on the accuracy of the sensor. Overall, the sensor has good accuracy at >5mm separation distance.

2.1.2 L-shape conductor

For L-shape primary conductor, the distance between the conductor and current sensor, and the relative angle between conductor and current sensor are important parameters that affect the sensor accuracy. The accuracy of various wiring configurations was tested and the results are shown below.

Figure 7. L-shape busbar installation at an angle of 180°, separation distance of 5 mm [0.20 in]



A side - L shape

B side - L shape

Figure 8. L-shape A Side busbar installation test result at different angles

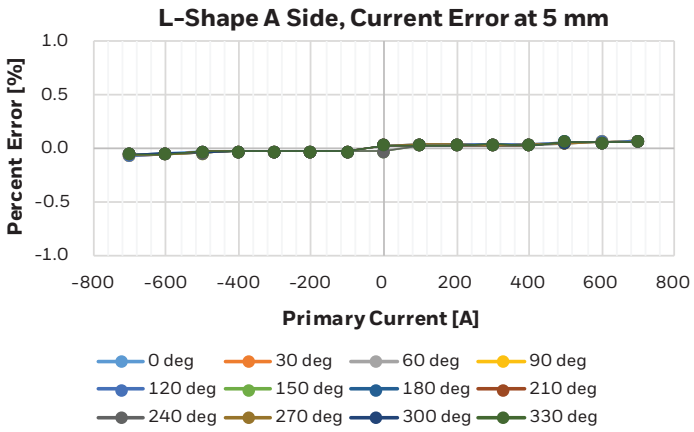
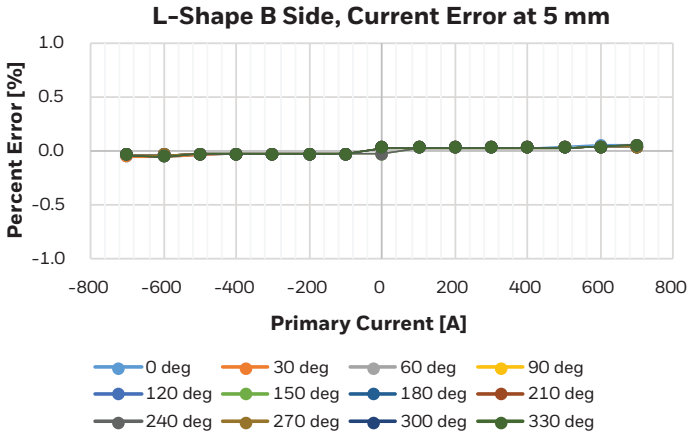


Figure 9. L-shape B Side bus bar installation test result at different angles



Based on the test results, the distance between the L-shape copper busbar and the current sensor, as well as the relative angle between the conductor and the current sensor, have minimal effect on the sensor accuracy. Better accuracy can be obtained if the distance is more than 5 mm [0.20 in].

2.1.3 Z-shape conductor

Based on the test results of the Z-shape installation, the distance and the angle of bus bar has minimal influence on sensor accuracy. To eliminate the thermal effect of the bus bar, a 5 mm [0.20 in] distance between the sensor and bus bar is recommended.

Figure 10. Z-shape bus bar installation at an angle of 180°, 5 mm [0.20 in] separation distance

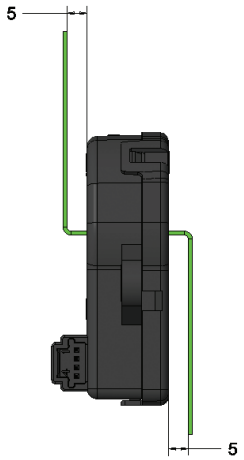
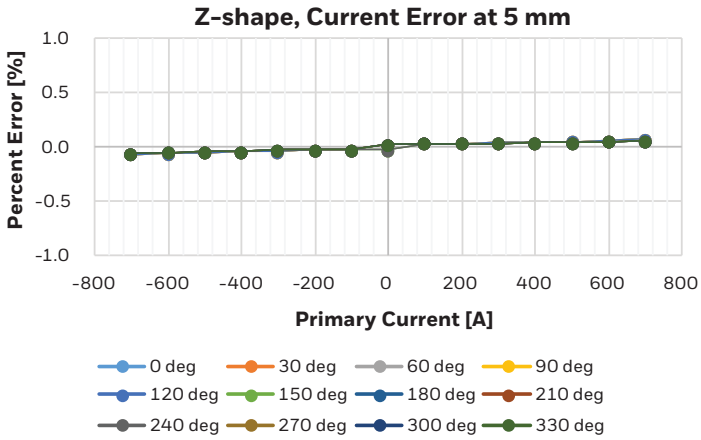


Figure 11. L-shape B Side bus bar installation test result at different angles



2.2 Installation Position of a Relay

A relay installed near the current sensor may affect the performance of the sensor. The test result shows CSNV700 has good anti-interference performance. However, relays should be installed perpendicular to the sensor and at a distance of >10 mm [0.39 in].

2.3 Nearby Ferromagnetic Material

Nearby ferromagnetic material may change the magnetic field distribution, and this may have an impact on sensor performance. Common ferromagnetic materials include iron mounting bracket, iron screw, etc.

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