EMERSON

F6450
INSTRUCTION SHEET
E85310/E84577

# APPLETON™ AND OZ/GEDNEY™ EXPLOSIONPROOF JUNCTION BOXES AND CAST CONTROL CENTERS FIELD DRILLING AND TAPPING INSTRUCTIONS

**IT IS IMPORTANT TO READ, UNDERSTAND AND FOLLOW THESE INSTRUCTIONS TO MAINTAIN THE ENCLOSURE APPROVALS. RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE.**

- Series JBEW explosionproof junction boxes are used where hazardous materials are handled or stored. These junction boxes may be used for terminals, splicing wires, pull boxes or bus boxes.
- Series CSEW explosionproof cast control centers are used where hazardous materials are handled and stored. Cast control centers allow for auxiliary devices, such as push buttons, switches, pilot devices, etc. to be installed into one enclosure to satisfy a wide range of control applications. The CSEW Series of enclosures have only been investigated and CLASSIFIED by Underwriters Laboratories as to explosion and fire hazards.
- Refer to the product nameplate for important information regarding the hazardous location rating, enclosure environmental rating, agency approval(s), and important safety information. Adhere to all warning and caution statements that may be located on the exterior or interior of the enclosure.
- Class I, Division 1 locations require a conduit seal to be installed in each conduit run within the specified distance noted on the product nameplate.
- Unused conduit openings shall have a certified close-up plug installed that has the same hazardous location ratings as the enclosure. The close-up plug must engage a minimum of five full threads.
- Only qualified personnel should install, inspect, and perform regular maintenance on the enclosure.
- Take extreme care not to damage the flat-machined flange when opening the enclosure cover. Damaging the flange could affect the enclosure's integrity to protect the hazardous area.
- Dirt, grease, and other foreign material must not accumulate on the flat-machined flange surface of the body and cover. The cover and body must fully mate against each other to provide the proper protection to the hazardous area.
- Do not attempt to repair the cover gasket if damaged; contact factory for replacement. Remove damaged gasket and continue to use the enclosure. The gasket does not affect on the enclosure's safety for use in hazardous locations. However, the enclosure's environmental rating(s) will no longer be valid.
- Install only approved drain and/or breather fittings that have the same hazardous location ratings as the enclosure. Note, if a drain and/or breather fitting are installed, care must be taken during hosedown operations. The enclosure may be watertight, but the drain and breather may not be.
- Always keep the cover bolts tight to prevent ignition of hazardous atmospheres and disconnect circuits before opening cover.
- Perform all machining operations prior to installation of the enclosure.
- The enclosure shall be installed in accordance with all national and local electrical codes, and be acceptable to the Authority Having Jurisdiction.
- Since the conditions of use are outside of our control, the purchaser should determine the suitability of the enclosure for the intended use and assumes all risk and liability in regards to the specific application.

## MOUNTING INSTALLATION

**⚠ WARNING** **TO AVOID RISK OF ELECTRICAL SHOCK TURN POWER OFF BEFORE INSTALLATION AND MAINTENANCE**

1. Enclosure may be furnished with or without drilled and tapped openings. Drilling and tapping of conduit and cover openings are subject to the limitations of maximum size, number of openings, and spacing. Perform all machining operations prior to installing enclosure. Refer to the drilling and tapping sections for additional information.
2. It is the responsibility of the installer to properly install the enclosure using the mounting feet supplied with the enclosure.
3. Mount the enclosure on a flat surface capable of supporting the enclosure, controls devices, wiring, etc. For the approximate weight of enclosure, reference **TABLE 1**.
4. Attach conduit system with seal fitting(s) in accordance with the required distance stated on the product nameplate.
5. Remove cover bolts and set aside. Take extreme care not to damage the flat-machined flange of the body and cover.
6. Pull wires into enclosure leaving enough length to make the required electrical connections.
7. To meet the NEC and CEC requirements for grounding of electrical equipment, install the grounding kit supplied with enclosure. Refer to **GROUND LUG INSTALLATION** section for information on how to install the grounding kit.
8. Inspect and perform a continuity test for all electrical connections, including an insulation resistance testing for unwanted grounds.
9. Check cover and body flat-machined flanges for scratches and/or gouges before installing cover. Clean the flanges and inspect the cover gasket for damage.
10. Line up the cover and body bolt holes. Hand start the corner bolts first, before installing the remaining cover bolts. Tighten cover bolts to the required torque.
11. Cover must fully seat against the body flange to provide a proper explosion proof joint.
12. Seal conduits entering enclosure per the manufacturer's installation instructions and the applicable national and local electrical codes.

**TABLE 1**

| JBEW / CSEW Enclosures | Maximum Conduit Opening Size | | CSEW Cover Openings | | | | | | Enclosure Approx. Weight (lbs.) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Flat Machinable Area (in.) | | Control Operator Barrel | Max. Number of Operators | Number of Rows | | |
| | NPT | Metric | Width | Length | | | Wide | Tall | |
| 030303 | 1-1/2 | N/A | 2.00 | 1.50 | Short | 1 | 1 | 1 | 6 |
| 030703 | 1-1/2 | N/A | 2.25 | 5.75 | Short | 2 | 1 | 2 | 9 |
| 031103 | 1-1/2 | N/A | 2.25 | 9.75 | Short | 3 | 1 | 3 | 11 |
| 031503 | 1-1/2 | N/A | 2.25 | 13.75 | Short | 5 | 1 | 5 | 15 |
| 031803 | 1-1/2 | N/A | 2.00 | 16.50 | Short | 6 | 1 | 6 | 17 |
| 032403 | 1-1/2 | N/A | 2.25 | 22.75 | Short | 9 | 1 | 9 | 22 |
| 033003 | 1-1/2 | N/A | 2.25 | 28.33 | Short | 11 | 1 | 11 | 26 |
| 033603 | 1-1/2 | N/A | 2.25 | 34.33 | Short | 13 | 1 | 13 | 35 |
| 040604 | 1-1/2 | M40 | 2.25 | 4.25 | Short | 2 | 1 | 2 | 15 |
| 040805 | 3/4 | N/A | 3.13 | 6.50 | Short | 3 | 1 | 3 | 15 |
| 040903 | 1-1/2 | M40 | 2.62 | 7.75 | Short | 3 | 1 | 3 | 21 |
| 041604 | 1-1/2 | M40 | 2.75 | 14.75 | Short | 6 | 1 | 6 | 22 |
| 050903 | 1-1/2 | M40 | 4.63 | 9.13 | Short | 8 | 2 | 4 | 21 |
| 060604 | 2 | N/A | 4.25 | 4.25 | Short | 2 | 1 | 2 | 20 |
| 060804 | 2 | M50 | 4.25 | 6.25 | Short | 6 | 2 | 3 | 20 |
| 060806 | 2 | M50 | 4.25 | 6.25 | Short | 6 | 2 | 3 | 20 |
| 061004 | 1-1/2 | M40 | 5.75 | 10.38 | Short | 6 | 2 | 3 | 27 |
| 061204 | 2 | M50 | 4.13 | 10.13 | Short | 8 | 2 | 4 | 25 |
| 061604 | 1-1/2 | M40 | 5.50 | 13.06 | Short | 10 | 2 | 5 | 32 |
| 061806 | 3 | N/A | 4.50 | 16.50 | Short | 14 | 2 | 7 | 35 |
| 070804 | 2 | N/A | 4.25 | 5.88 | Short | 6 | 2 | 3 | 15 |
| 071106 | 2 | M50 | 7.44 | 10.94 | Short | 12 | 3 | 4 | 35 |
| 080806 | 2 | M50 | 6.25 | 6.25 | Short | 9 | 3 | 3 | 30 |
| 081006 | 2 | M50 | 6.25 | 8.25 | Short | 6 | 2 | 3 | 36 |
| 081304 | 2 | M50 | 5.38 | 10.63 | Short | 10 | 2 | 5 | 25 |
| 081307 | 2 | M50 | 9.00 | 14.19 | Short | 15 | 3 | 5 | 30 |
| 091105 | 2 | M50 | 9.38 | 11.13 | Short | 16 | 4 | 4 | 22 |
| 091504 | 2 | M50 | 6.25 | 12.38 | Short | 15 | 3 | 5 | 33 |
| 101004 | 2 | M50 | 7.19 | 7.19 | Short | 6 | 2 | 3 | 38 |
| 101006 | 4 | M75 | 7.19 | 7.19 | Short | 6 | 2 | 3 | 44 |
| 101208 | 4 | M75 | 8.50 | 10.50 | Long | 12 | 3 | 4 | 55 |
| 101406 | 4 | M75 | 8.75 | 12.75 | Short | 20 | 4 | 5 | 55 |
| 101408 | 4 | M75 | 8.75 | 12.75 | Short | 20 | 4 | 5 | 60 |
| 102408 | 4 | M75 | 8.50 | 21.63 | Long | 24 | 3 | 8 | 120 |
| 111606 | 2 | N/A | 8.25 | 13.25 | Short | 12 | 3 | 4 | 85 |
| 112005 | 3 | M75 | 8.25 | 17.13 | Long | 21 | 3 | 7 | 85 |
| 112406 | 3 | M75 | 7.75 | 21.38 | Long | 27 | 3 | 9 | 72 |
| 113006 | 3 | M75 | 7.63 | 26.25 | Long | 33 | 3 | 11 | 113 |
| 121206 | 4 | M75 | 9.25 | 9.25 | Short | 12 | 3 | 4 | 65 |
| 121208 | 4 | M75 | 9.25 | 9.25 | Short | 12 | 3 | 4 | 70 |
| 121806 | 4 | M75 | 9.25 | 15.25 | Short | 18 | 3 | 6 | 90 |
| 121808 | 4 | M75 | 9.25 | 15.25 | Short | 18 | 3 | 6 | 101 |
| 122408 | 4 | M75 | 10.00 | 22.00 | Long | 27 | 3 | 9 | 138 |
| 123608 | 4 | M75 | 9.50 | 33.25 | Long | 39 | 3 | 13 | 218 |
| 133806 | 4 | M75 | 10.63 | 35.13 | Long | 56 | 4 | 14 | 190 |
| 141406 | 4 | M75 | 11.00 | 11.00 | Short | 16 | 4 | 4 | 98 |
| 141408 | 4 | M75 | 11.00 | 11.00 | Short | 16 | 4 | 4 | 105 |
| 141608 | 4 | M75 | 11.25 | 13.25 | Short | 18 | 3 | 6 | 120 |
| 142408 | 4 | M75 | 11.88 | 21.25 | Long | 40 | 5 | 8 | 131 |
| 142808 | 4 | M75 | 11.25 | 24.81 | Long | 36 | 4 | 9 | 170 |
| 153707 | 4 | M75 | 15.38 | 34.00 | Long | 65 | 5 | 13 | 250 |
| 161606 | 4 | M75 | 13.25 | 13.25 | Long | 25 | 5 | 5 | 132 |
| 161608 | 4 | M75 | 13.25 | 13.25 | Long | 25 | 5 | 5 | 140 |
| 161812 | 4 | M75 | 14.75 | 16.75 | Long | 42 | 6 | 7 | 150 |
| 162005 | 2 | M50 | 12.63 | 17.25 | Short | 30 | 5 | 6 | 98 |
| 162205 | 3 | M75 | 13.00 | 19.00 | Long | 35 | 5 | 7 | 130 |
| 162206 | 2 | M50 | 13.00 | 19.00 | Long | 35 | 5 | 7 | 130 |
| 162408 | 4 | M75 | 13.25 | 21.25 | Long | 40 | 5 | 8 | 180 |
| 162805 | 3 | M75 | 13.25 | 25.25 | Long | 50 | 5 | 10 | 188 |

***NOTE: JBEW and CSEW catalog numbers may contain the prefix "A", "C" or "N"***

**TABLE 1 (*continued*)**

| JBEW / CSEW Enclosures | Maximum Conduit Opening Size | | CSEW Cover Openings | | | | | | Enclosure Approx. Weight (lbs.) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Flat Machinable Area (in.) | | Control Operator Barrel | Max. Number of Operators | Number of Rows | | |
| | NPT | Metric | Width | Length | | | Wide | Tall | |
| 162806 | 4 | M75 | 13.25 | 25.25 | Long | 50 | 5 | 10 | 150 |
| 164208 | 4 | M75 | 12.25 | 38.13 | Long | 40 | 4 | 10 | 180 |
| 181806 | 4 | M75 | 15.25 | 15.25 | Long | 36 | 6 | 6 | 188 |
| 181808 | 4 | M75 | 15.25 | 15.25 | Long | 36 | 6 | 6 | 198 |
| 182408 | 4 | M75 | 15.25 | 21.25 | Long | 48 | 6 | 8 | 224 |
| 182410 | 4 | M75 | 15.25 | 21.25 | Long | 48 | 6 | 8 | 235 |
| 183008 | 4 | M75 | 15.25 | 27.25 | Long | 66 | 6 | 11 | 265 |
| 183608 | 4 | M75 | 14.50 | 33.50 | Long | 78 | 6 | 13 | 250 |
| 183610 | 4 | M75 | 14.50 | 33.50 | Long | 78 | 6 | 13 | 270 |
| 184207 | 4 | M75 | 15.63 | 39.25 | Long | 90 | 6 | 15 | 310 |
| 184806 | 3 | M75 | 14.25 | 44.25 | Long | 85 | 5 | 7 | 350 |
| 206008 | 4 | M75 | 16.00 | 56.00 | Long | 132 | 6 | 22 | 521 |
| 242408 | 4 | M75 | 21.25 | 21.25 | Long | 64 | 8 | 8 | 225 |
| 242410 | 4 | M75 | 21.25 | 21.25 | Long | 64 | 8 | 8 | 240 |
| 242416 | 4 | M75 | 21.25 | 21.25 | Long | 64 | 8 | 8 | 280 |
| 243008 | 4 | M75 | 19.88 | 25.88 | Long | 80 | 8 | 10 | 420 |
| 243608 | 4 | M75 | 21.00 | 33.25 | Long | 104 | 8 | 13 | 420 |
| 243610 | 4 | M75 | 21.00 | 33.25 | Long | 104 | 8 | 13 | 450 |
| 303808 | 4 | M75 | 31.88 | 39.88 | Long | 130 | 10 | 13 | 600 |
| 303816 | 4 | M75 | 31.88 | 39.88 | Long | 130 | 10 | 13 | 800 |
| 303817 | 4 | M75 | 26.00 | 34.00 | Long | 130 | 10 | 13 | 840 |
| ***NOTE: JBEW and CSEW catalog numbers may contain the prefix "A", "C" or "N"*** | | | | | | | | | |

## GROUND LUG INSTALLATION

**⚠ CAUTION** **DO NOT TERMINATE COPPER AND ALUMINUM CONDUCTORS ON THE SAME LUG**

1. To meet the NEC® and CEC requirements for grounding of electrical equipment, the ground lug must be installed. Contact the factory if a grounding kit was not supplied with the enclosure.
2. If the enclosure was ordered with a mounting pan, install the ground lug in the tapped hole provided using a 1/4-20 screw.
3. If the enclosure does not have a mounting pan, install the ground lug in one of the tapped mounting bosses (stand-offs).
4. Peel off and place the ground symbol sticker next to the ground lug.
5. If the ground conductor is larger than a #2 AWG, contact the factory for an additional lug (Grounding Kit CGL-500).

***GROUND SYMBOL***

## CSEW COVER OPENINGS

**⚠ CAUTION** **COVER OPENINGS SHALL BE 3/4-14 NPSM AND NOT LESS THAN 2.5 INCHES CENTER-TO-CENTER**

1. Cover openings for control operators shall be 3/4-14 NPSM with a minimum of seven threads of engagement for Class I, Group B hazardous locations; five threads of engagement for Class I, Group C & D.
2. Only use approved open type auxiliary devices that are suitable for the same hazardous locations marked on the enclosure nameplate.
3. Control operators can be placed anywhere in the flat machinable area on the cover. Cover openings may not be located outside the indicated flat machinable area. Reference **FIGURE 1**.
4. To determine the maximum number of cover operators permissible in the flat machinable area, refer to **TABLE 1**. If enclosure has window(s) consult factory for maximum number of operators permissible.
5. Openings must be at least 0.125 inch from the edge of the flat machining area.
6. Openings shall not be less than 2.5-inches center-to-center vertically and horizontally, reference **FIGURE 2**.
7. Mark the hole location on the flat machinable area.
8. Drill a 0.938 inch diameter hole in the cover perpendicular to the surface.
9. Tap the hole using a 3/4-NPS tap. Only use machining oil suitable for aluminum.
10. Enclosure covers having a thickness greater than 0.88 inches require a control operator with a long barrel. Reference **TABLE 1**.
11. Install the approved auxiliary device per the manufacturer's installation instructions and the applicable national and local electrical codes.
12. Cover openings must be properly closed with an approved auxiliary device or 3/4-NPSM plug.

***FIGURE 1***

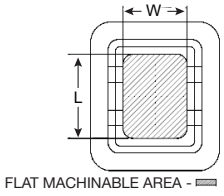
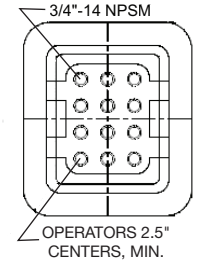



***FIGURE 2***



## JBEW AND CSEW CONDUIT OPENINGS

**⚠ IMPORTANT** **ALL CONDUIT OPENINGS MUST MEET THE FOLLOWING REQUIREMENTS**

1. Use **TABLE 3** to determine the maximum number of conduit openings permissible to be drilled and tapped on each side of the enclosure. Openings must be at least 1.5 inches from the inside adjacent sidewall and 0.75 inches from the inside bottom wall. See **FIGURE 3 and 4** for additional information.
2. Consult factory if field drilling of enclosure back is necessary.
3. For the maximum conduit opening size permissible to be drilled and tapped into the side of the enclosure, reference **TABLE 1**. Minimum allowable conduit opening that may be drilled and tapped is 1/2 inch.
4. NPT conduit openings must have at least five full threads of engagement between the conduit and enclosure body. ISO-Metric conduit openings must have at least seven full threads of engagement between the conduit and enclosure body. To determine the minimum wall thickness to engage five full NPT threads into the conduit opening without a conduit stop, see **TABLE 2**.
5. For the minimum center-to-center spacing of any two conduit opening sizes, reference **TABLE 3**. Example: Minimum spacing between a 1.0 inch NPT opening (first column) and 3.0 inch NPT opening (first row) is 4.13 inches.
6. Conduit openings shall be a modified National Standard Pipe Taper (NPT) thread, 3/4 inch per foot per ANSI/ASME B1.20.1 or ISO-Metric thread with a 6H/g tolerance fit per the Standard for General Purpose Metric Screw Threads, ISO 965 Part 1 and 3.
7. NPT conduit openings shall gauge from +1/2 to +3-1/2 turns beyond the L-1 gauging notch in lieu of the –1 to +1 turns described in ANSI/ASME B1.20.1.
8. Conduit must be able to reach wrench tight without bottoming out on the unthreaded portion of the conduit. Do not over tap conduit opening, reference **TABLE 2** for maximum number of threads.
9. All conduit openings without a conduit stop shall have a smooth and well-rounded inner end as shown in **FIGURE 5**.
10. To install a conduit stop, use an approved reducer bushing having the same hazardous location ratings, Class and Groups as the enclosure. For UL Listed Outlet Boxes and Classified Enclosures use a UL Listed reducer bushing. CSA International Certified Enclosures use a CSA Certified reducer bushing. To install the reducer bushing, drill and tap to the next larger NPT size opening using the minimum center-to-center spacing requirements in **TABLE 3**.
11. To install a conduit bushing, counter bore a 1/8-inch (maximum) larger hole than the outer diameter of the conduit to a depth that will still allow for a minimum of five full threads of engagement, reference **TABLE 2**. NPT conduit openings from 2.5 -to- 4 inches may have the conduit bushing applied to the exposed end of the conduit without counter boring.

***FIGURE 3***

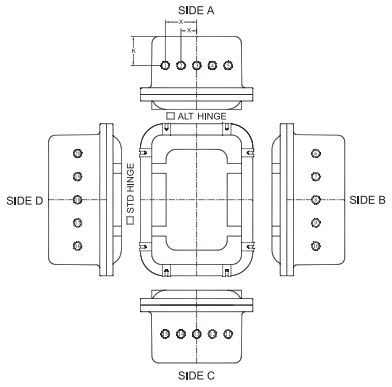



***FIGURE 4***

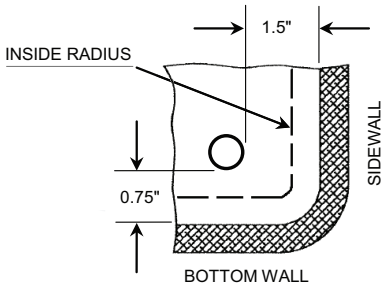



***FIGURE 5***

Conduit opening without conduit stop

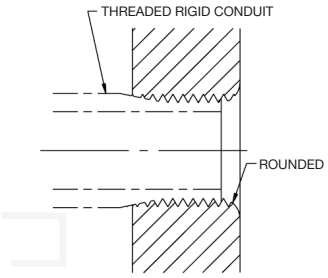



**TABLE 2**

| Conduit Size, NPT | No. of Threads per Inch | Min. Wall Thickness for 5 Thread Engagement | Max. No. of Threads |
|---|---|---|---|
| 1/2 -to- 3/4 | 14 | 0.375 in. | 7 |
| 1 -to- 2 | 11-1/2 | 0.428 in. | 8 |
| 2-1/2 -to- 4 | 8 | 0.625 in. | 9 |

**TABLE 3: CONDUIT OPENING MINIMUM CENTER-TO-CENTER SPACING, INCHES**

| Conduit Size | 1/2 (M20) | 3/4 (M25) | 1 (M32) | 1–1/4 (M40) | 1–1/2 (M50) | 2–1/2 (M75) | 2–1/2 (M75) | 3 | 3–1/2 | 4 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1/2 (M20) | 2.13 | 2.13 | 2.25 | 2.63 | 2.81 | 3.13 | 3.63 | 4 | 4.25 | 4.5 |
| 3/4 (M25) | 2.13 | 2.13 | 2.25 | 2.63 | 2.81 | 3.13 | 3.63 | 4 | 4.25 | 4.5 |
| 1 (M32) | 2.25 | 2.25 | 2.38 | 2.81 | 3 | 3.25 | 3.75 | 4.13 | 4.5 | 4.88 |
| 1–1/4 (M40) | 2.63 | 2.63 | 2.81 | 3.13 | 3.31 | 3.63 | 4.13 | 4.5 | 4.75 | 5 |
| 1–1/2 (M50) | 2.81 | 2.81 | 3 | 3.31 | 3.5 | 3.81 | 4.31 | 4.63 | 4.94 | 5.25 |
| 2 (M63) | 3.13 | 3.13 | 3.25 | 3.63 | 3.81 | 4.13 | 4.63 | 5 | 5.38 | 5.75 |
| 2–1/2 (M75) | 3.63 | 3.63 | 3.75 | 4.13 | 4.31 | 4.63 | 5.13 | 5.31 | 5.75 | 6.13 |
| 3 | 4 | 4 | 4.13 | 4.5 | 4.63 | 5 | 5.31 | 5.75 | 6 | 6.25 |
| 3–1/2 | 4.25 | 4.25 | 4.5 | 4.75 | 4.94 | 5.38 | 5.75 | 6 | 6.25 | 6.5 |
| 4 | 4.5 | 4.5 | 4.88 | 5 | 5.25 | 5.75 | 6.13 | 6.25 | 6.5 | 6.75 |

*All technical information and recommendations contained in this instruction sheet are based on industry practices and standards we believe to be reliable and accurate. It is the responsibility of the user to ensure the product is installed and used in safe manner that comply with all local and national electrical codes acceptable to the Authority Having Jurisdiction.*