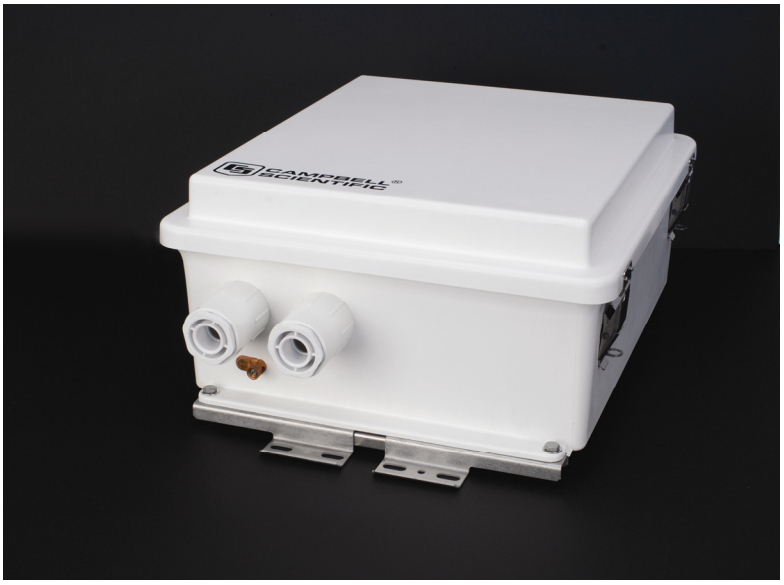
INSTRUCTION MANUAL

Campbell Scientific Enclosures

Revision: 1/13



Warranty

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Assistance

Products may not be returned without prior authorization. The following contact information is for US and international customers residing in countries served by Campbell Scientific, Inc. directly. Affiliate companies handle repairs for customers within their territories. Please visit *www.campbellsci.com* to determine which Campbell Scientific company serves your country.

To obtain a Returned Materials Authorization (RMA), contact CAMPBELL SCIENTIFIC, INC., phone (435) 227-9000. After an applications engineer determines the nature of the problem, an RMA number will be issued. Please write this number clearly on the outside of the shipping container. Campbell Scientific's shipping address is:

CAMPBELL SCIENTIFIC, INC.
RMA#_____
815 West 1800 North
Logan, Utah 84321-1784

For all returns, the customer must fill out a "Statement of Product Cleanliness and Decontamination" form and comply with the requirements specified in it. The form is available from our web site at *www.campbellsci.com/repair*. A completed form must be either emailed to *repair@campbellsci.com* or faxed to (435) 227-9106. Campbell Scientific is unable to process any returns until we receive this form. If the form is not received within three days of product receipt or is incomplete, the product will be returned to the customer at the customer's expense. Campbell Scientific reserves the right to refuse service on products that were exposed to contaminants that may cause health or safety concerns for our employees.

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ENC10/12, ENC10/12R, ENC12/14, ENC14/16, ENC16/18, PWENC12/14, PWENC14/16, and PWENC16/18

1. General Description

Environmental enclosures protect dataloggers and peripherals from water and most pollutants. Our standard enclosures include the ENC10/12, ENC10/12R, ENC12/14, ENC14/16, and ENC16/18. For cable entry, Campbell Scientific offers a choice of one 1.5" diameter conduit, two horizontally-arranged 1.5" diameter conduits, two vertically-arranged 1.5" conduits (ENC16/18 only), or individual compression fittings. Multiple cables can use the conduit(s) whereas each cable uses a separate compression fitting. The individual compression fittings provide a more water-tight seal.

Besides our standard enclosures, Campbell Scientific offers prewired enclosures that combine flexibility with ease of use. Prewired enclosures include the PWENC12/14, PWENC14/16, and PWENC16/18. Customers have the flexibility to choose their system components, but installation is easy because sensors are simply attached to prewired connectors on the outside of the enclosure.

Most of the information provided in this manual pertains to the prewired enclosures. Prewired enclosures are shipped with the same enclosure supply kit (Section 2, *Enclosure Supply Kit*) and use the same brackets for mounting to a tripod or a tower (Section 4, *Attachments to an Instrument Mount*). The maintenance information (Section 5, *When to Replace Desiccant*, and Section 6, *Resistance to Weathering*) is also applicable to our prewired enclosures.

Campbell Scientific enclosures are manufactured with non-corrosive polyester and reinforced with fiberglass. These white UV-stabilized enclosures reflect solar radiation reducing temperature gradients inside the enclosure without requiring a separate radiation shield. A door gasket, external grounding lug, stainless steel hinge, and lockable hasp are included. Our enclosures were rated NEMA 6P before being modified to include conduit(s) or compression fittings.

Dataloggers, peripherals, and brackets are mounted to an internal plate punched with a grid of one-inch-on-center holes.

NOTE The ENC10/12 and ENC10/12R have a grid of one-half-inch-on-center holes, allowing a CR1000 datalogger to be mounted horizontally within the enclosure.

An internal backplate is included with each ENC10/12, ENC10/12R, ENC12/14, and ENC14/16 enclosure. Two internal mounting plate options are offered for the ENC16/18. The -SB option provides a backplate similar to the one included with the other enclosures. The -EB option provides both a backplate and a sideplate.

1.1 Specifications

Conduit Size
(options "-SC", "-DC", "-VC"): 1.5 in diameter

ENC10/12
Internal Dimensions: 25.4 x 30.5 x 11.4 cm (10 x 12 x 4.5 in)
Weight: 4.1 kg (9 lbs)
Entry Seals (option "-ES"): (1) Medium—accepts 6 to 10 mm (0.231 to 0.394 in) cables
(2) Small—accepts 3 to 7 mm (0.118 to 0.275 in) cables

ENC10/12R
Internal Dimensions: 25.4 x 30.5 x 14 cm (10 x 12 x 5.5 in)
Weight: 4.1 kg (9 lbs)
Entry Seals (option "-ES"): (1) Medium—accepts 6 to 10 mm (0.231 to 0.394 in) cables
(2) Small—accepts 3 to 7 mm (0.118 to 0.275 in) cables

ENC12/14
Internal Dimensions: 30.5 x 35.6 x 14 cm (12 x 14 x 5.5 in)
Weight: 5 kg (11.2 lbs)
Entry Seals (option "-ES"): (2) Medium—accepts 6 to 10 mm (0.231 to 0.394 in) cables
(4) Small—accepts 3 to 7 mm (0.118 to 0.275 in) cables

ENC14/16
Internal Dimensions: 35.6 x 40.6 x 14 cm (14 x 16 x 5.5 in)
Weight: 6.2 kg (13.6 lbs)
Entry Seals (option "-ES"): (2) Large—accepts 6 to 13 mm (0.236 to 0.512 in) cables
(2) Medium—accepts 6 to 10 mm (0.231 to 0.394 in) cables
(3) Small—accepts 3 to 7 mm (0.118 to 0.275 in) cables

ENC16/18
Internal Dimensions: 40.6 x 45.7 x 22.9 cm (16 x 18 x 9 in)
Weight: 7.7 kg (17 lbs)
Entry Seals (option "-ES"): (2) Large—accepts 6 to 13 mm (0.236 to 0.512 in) cables
(2) Medium—accepts 6 to 10 mm (0.231 to 0.394 in) cables
(2) Small—accepts 3 to 7 mm (0.118 to 0.275 in) cables

PWENC12/14
Internal Dimensions: 30.5 x 35.6 x 14 cm (12 x 14 x 5.5 in)
Weight: 5 kg (11.2 lbs)

PWENC14/16

Internal Dimensions:	35.6 x 40.6 x 14 cm (14 x 16 x 5.5 in)
Weight:	6.2 kg (13.6 lbs)

PWENC16/18

Internal Dimensions:	40.6 x 45.7 x 22.9 cm (16 x 18 x 9 in)
Weight:	7.7 kg (17 lbs)

2. Enclosure Supply Kit

Each enclosure is shipped with a sealed plastic bag containing an Enclosure Supply Kit. This kit provides the materials used to seal and desiccate the enclosures. Please note that some of the items should be saved for future use. The contents of the enclosure supply kit are the following.

Qty.	PN	Description
8	505	#6-32 x .375" screws
8	6044	grommets
4	2376	3 cm cable tie tabs
6	2207	4" cable ties
6	4005	8" cable ties
1	28878	humidity indicator card
2	6596	4 oz container of sealing putty
4	4905	4-unit desiccant packs
1	6290	Phillips screwdriver
1	25745	PVC coupling

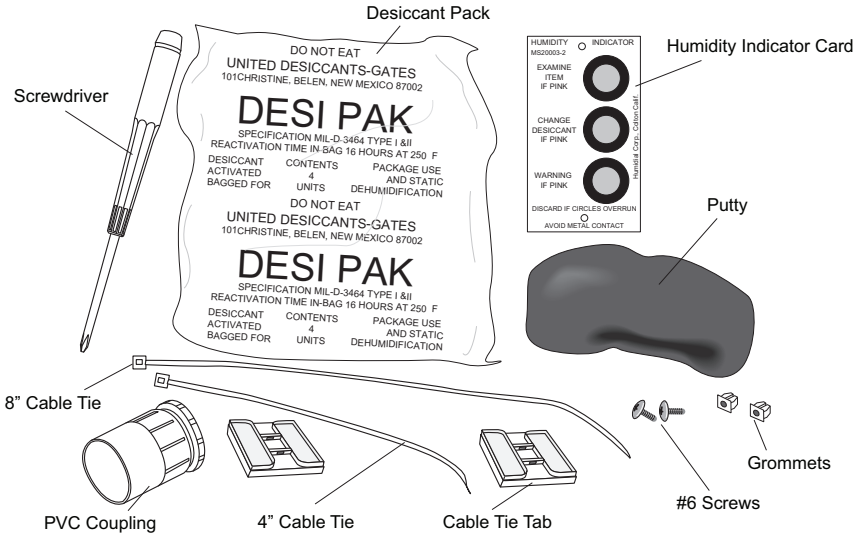


FIGURE 2-1. Components of the Enclosure Supply Kit

3. Mounting Equipment Inside the Enclosure

3.1 Enclosures with One or Two 1.5” Conduits

1. If installing the optional Door Switch Indicator, follow the procedure described in Appendix A.

2. If installing the 25458 or 28532 DIN-Rail Terminal Kit, follow the procedure described in Appendix B. The 25458 kit facilitates wiring when many wires need to be connected to one terminal.

3. If installing the 28960 Stack Mounting Kit, follow the procedure described in Appendix C. The 28960 kit allows components to be raised 3 inches above the back plate, allowing one component to be stacked above another to save space. Raising a component from the back plate is also done to improve access to a component that may be partially blocked by other, taller equipment mounted in the enclosure.

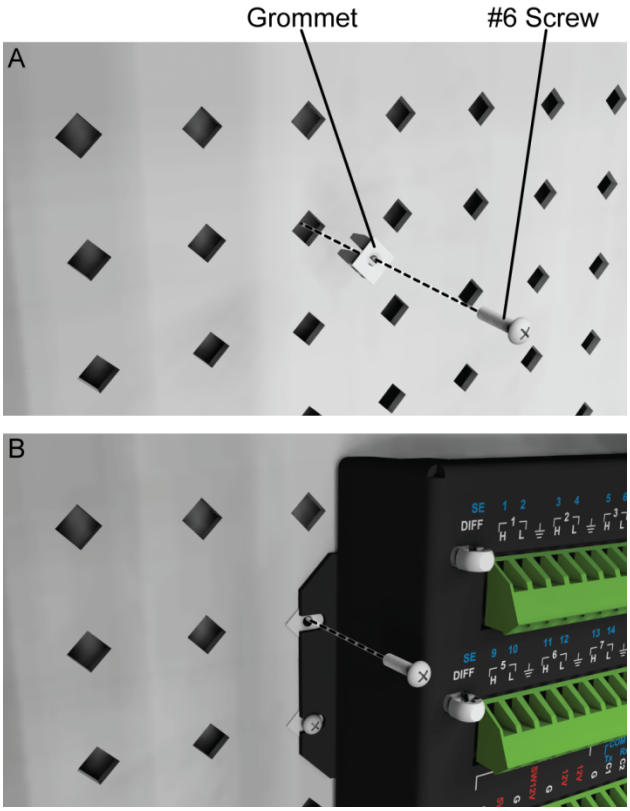


FIGURE 3-1. Securing components to the enclosure backplate

NOTE Remember to allow space for cables and cable connectors.

4. If desired, insert the 25745 PVC coupling to reduce the conduit's diameter to 0.5". Route the sensor leads through the enclosure conduit to the datalogger and peripheral terminal strips.

5. Connect sensors and peripherals to the datalogger as described in the sensor and peripheral manuals.

6. Secure sensor and peripheral leads to the side of the enclosure using 8" cable ties and cable tie tabs (see FIGURE 3-2).

NOTE The adhesive of the cable tie tab may not stick during extremely cold temperatures or extremely high humidity. In these situations, fasten the cable tie tab to the backplate using a #6 screw and grommet or run the cable tie through two of the enclosure backplate holes.

NOTE Refer to FIGURE 3-3 for steps 7-11.

7. Strain relief the sensor leads to the datalogger's strain relief flanges with the 4" cable ties.

8. Place two of the desiccant packs from the Enclosure Supply Kit inside of the enclosure. Reseal the other two inside the plastic bag to use later (see Section 5, *When to Replace Desiccant*).

9. Remove the backing from the humidity indicator card and attach the card to the right side of the enclosure.

10. Place a roll of putty around the sensor leads where they enter the enclosure.

11. Press the putty around the leads and into the conduit to form a tight seal.

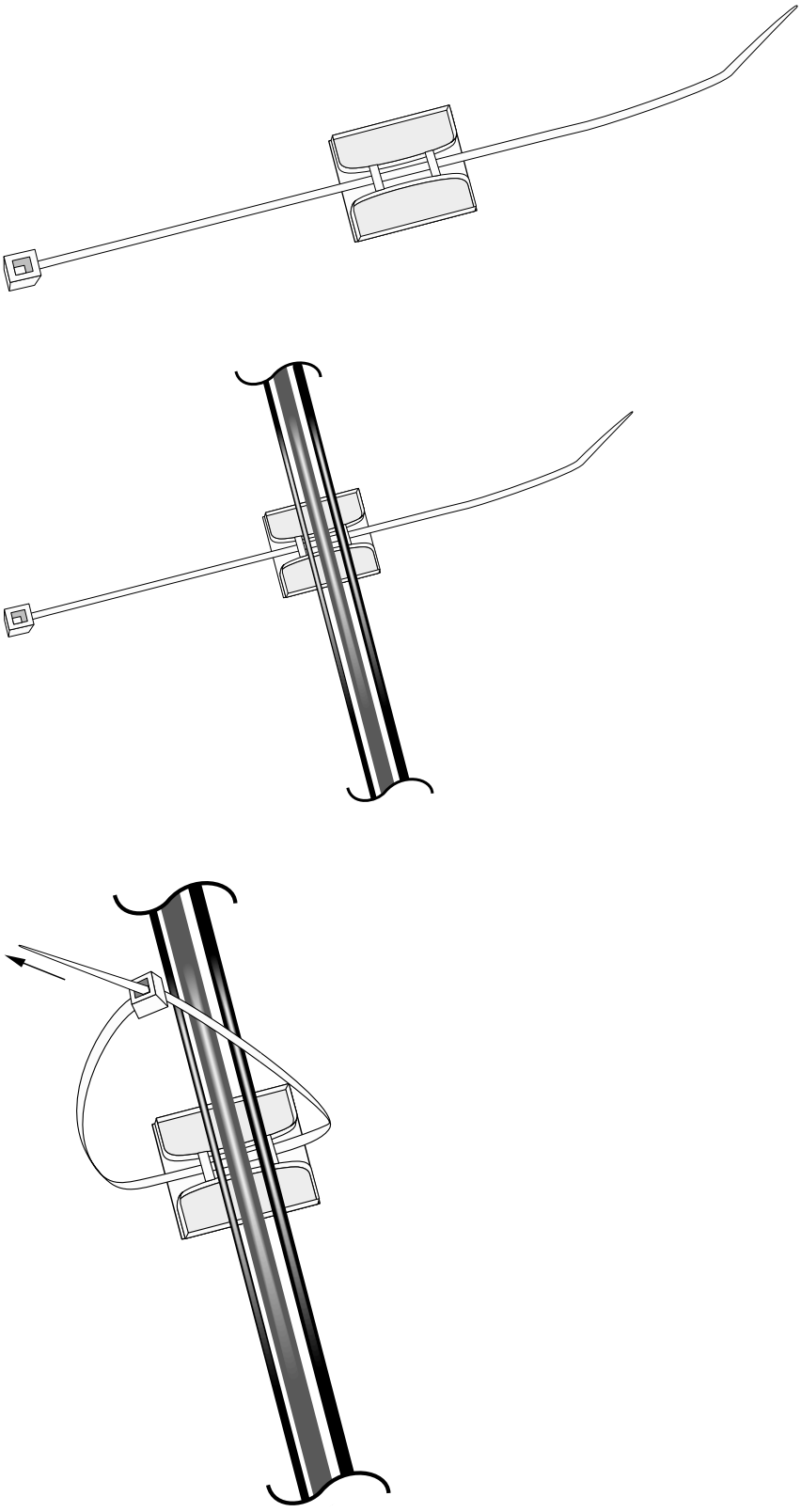


FIGURE 3-2. Securing cables to the cable tie tabs

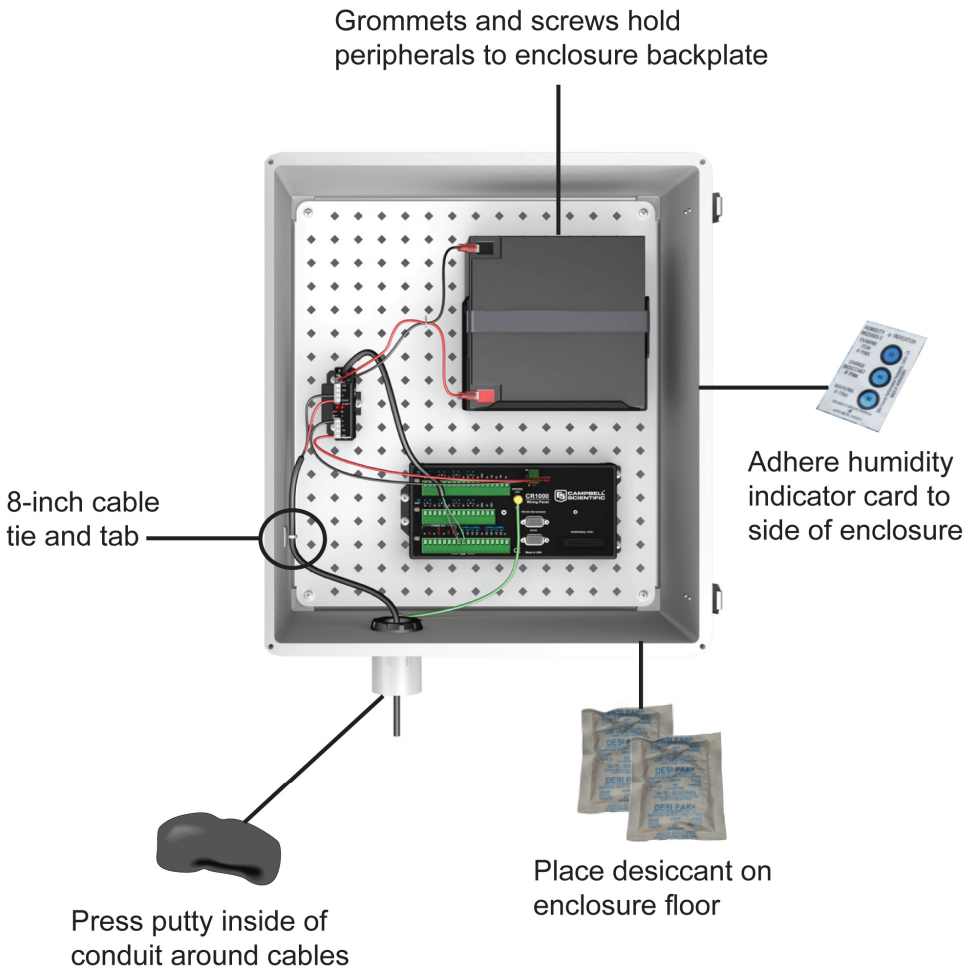


FIGURE 3-3. An ENC12/14 with one 1.5" conduit houses a CR1000 datalogger and BP24 power supply. Door not shown.

3.2 Enclosures with Individual Compression Fittings

1. If installing the optional Door Switch Indicator, follow the procedure described in Appendix A.

2. Use the #6 screws and plastic grommets (FIGURE 3-1A) to mount additional peripherals to the enclosure backplate (FIGURE 3-1B). Dataloggers, power supplies, and most peripherals are usually attached to the backplate prior to shipment from the factory or are supplied with additional screws and grommets.

   To insert the grommet, push the points of the flanges into the center of any square hole. To remove a grommet without damage, remove the enclosure backplate and use pliers to pinch the grommet flanges together.

NOTE Remember to allow space for cables and cable connectors.

3. Route each sensor and peripheral lead through a unique compression fitting (see FIGURE 3-4).

4. Connect sensors and peripherals to the datalogger as described in the sensor and peripheral manuals.

5. Secure sensor and peripheral leads to the side of the enclosure using 8" cable ties and cable tie tabs (see FIGURE 3-2).

NOTE The adhesive of the cable tie tab may not stick during extremely cold temperatures or extremely high humidity. In these situations, fasten the cable tie tab to the backplate using a #6 screw and grommet or run the cable tie through two of the enclosure backplate holes.

NOTE Refer to FIGURE 3-5 for steps 6-9.

6. Strain relief the sensor leads to the datalogger's strain relief flanges with the 4" cable ties.

7. Place two of the desiccant packs from the Enclosure Supply Kit inside of the enclosure. Reseal the other two inside the plastic bag to use later (see Section 5, *When to Replace Desiccant*).

8. Remove the backing from the humidity indicator card and attach the card to the right side of the enclosure.

9. Rotate each compression fitting so that the fitting clamps tightly against the sensor cable to provide a water-tight seal (see FIGURE 3-4).

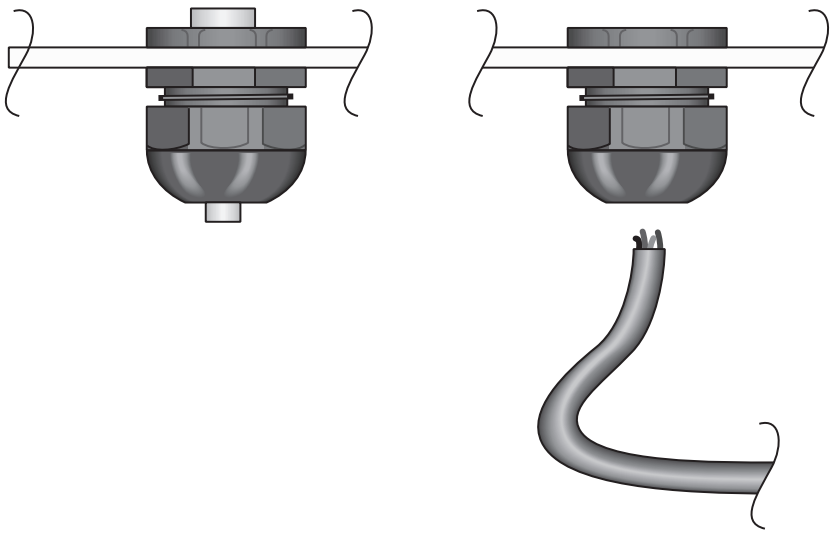


FIGURE 3-4. Cable inserted into compression fitting

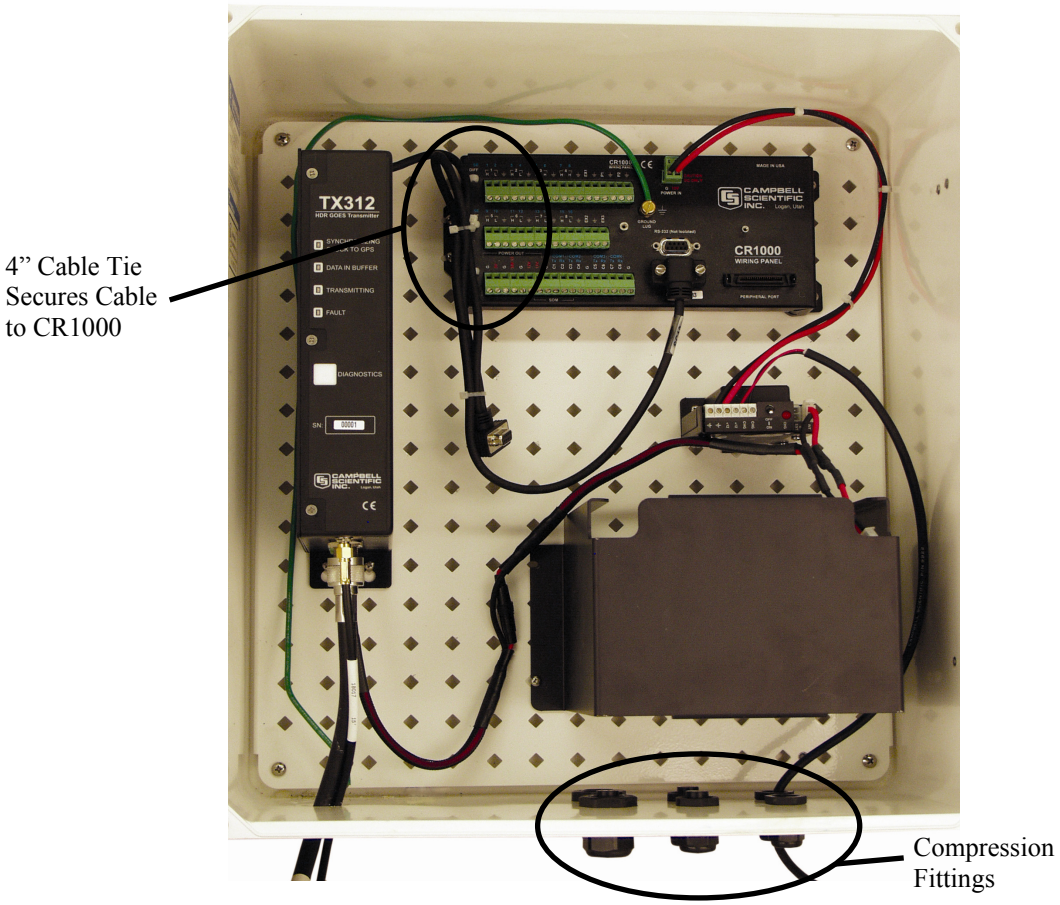


FIGURE 3-5. This ENC16/18 enclosure with the “-ES” option houses the equipment commonly used in a GOES satellite system

4. Attachment to an Instrument Mount

4.1 Tripod Mast

The “-MM” mount option is intended for mounting an enclosure to the mast of a tripod. An enclosure ordered with this option will be shipped with a three-piece bracket mounted to the top of the enclosure and an identical three-piece bracket mounted to the bottom of the enclosure (see FIGURE 4-1, FIGURE 4-2, and FIGURE 4-3).

Attach the enclosure to the mast as follows:

1. Position the enclosure on the north side of the mast.
2. Place the enclosure at the desired height. Please note that the recommended lead lengths for our sensors assume the bottom of the enclosure is mounted 3 ft from the ground.
3. Use the furnished 2” U-bolts to secure the enclosure to the tripod mast.
4. Route the 14 AWG wire from the brass tripod grounding clamp to the enclosure grounding lug. Strip one inch of insulation from each end of the wire and insert the end of the wire into the grounding lugs and tighten.

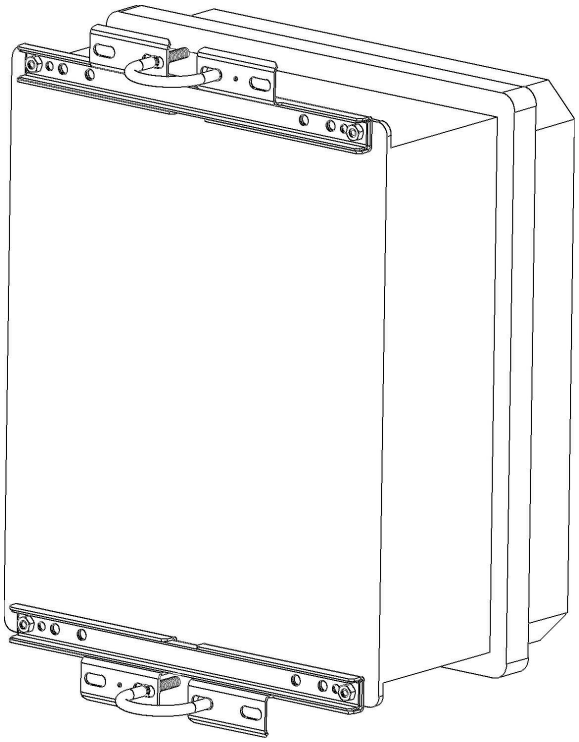


FIGURE 4-1. An enclosure with the "-MM" mounting option attaches to a tripod mast via U-bolts

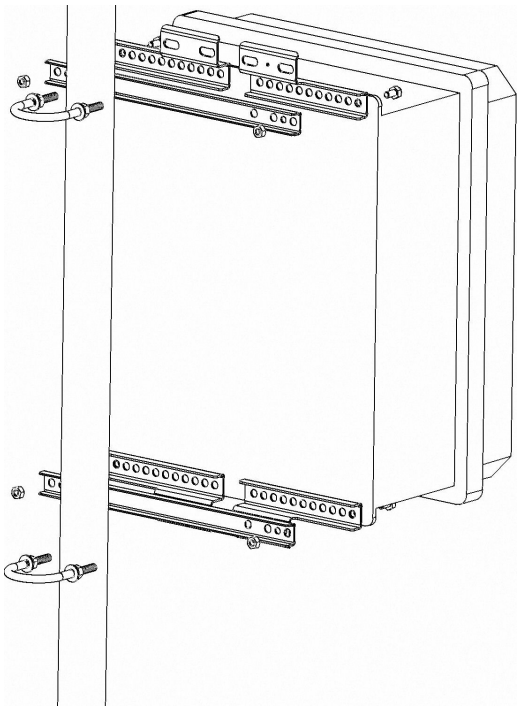


FIGURE 4-2. This exploded view shows the components of a "-MM" bracket

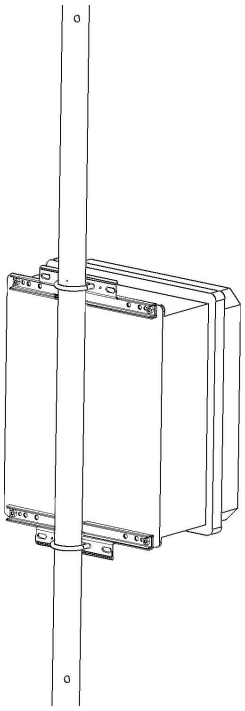


FIGURE 4-3. An enclosure attached to a tripod mast

4.2 UT10 10 ft Tower

The "-TM" option is used to attach our enclosures to a UT10 tower. An enclosure ordered with the "-TM" option will be shipped with a three-piece bracket mounted to the top of the enclosure and an identical three-piece bracket mounted to the bottom of the enclosure. This mounting bracket option uses the same three-piece brackets as the "-MM" option, except the pieces are rearranged so that the flanges are on the side of the bracket instead of in the middle. The distance between the centers of each flange needs to be 10.25" (see FIGURE 4-4, FIGURE 4-5, and FIGURE 4-6).

Attach the enclosure to the UT10's tower legs as follows:

1. Position the enclosure on the north side of the tower.
2. Place the enclosure at the desired height. Please note that the recommended lead lengths for our sensors assume the bottom of the enclosure is mounted 3 ft from the ground.
3. Use the furnished 1.5" U-bolts to secure the enclosure to the tower legs.
4. Route the 14 AWG wire from the brass tower grounding clamp to the enclosure grounding lug. Strip one inch of insulation from each end of the wire and insert the end of the wire into the grounding lugs and tighten

4.3 UT20 or UT30 Tower

The "-TM" option is used to attach our enclosures to a UT20 or UT30 tower. An enclosure ordered with the "-TM" option will be shipped with a three-piece bracket mounted to the top of the enclosure and an identical three-piece bracket mounted to the bottom of the enclosure. This mounting bracket option uses the

same three-piece brackets as the "-MM" option, except the pieces are rearranged so that the flanges are on the side of the bracket instead of in the middle. The distance between the centers of each flange needs to be 17" (see FIGURE 4-4, FIGURE 4-5, and FIGURE 4-6).

NOTE Enclosures with the "-TM" option are shipped configured for the UT10 tower. Steps 1 through 3 of the following procedure are for configuring the bracket for attachment to a UT20 or UT30 tower.

Attach the enclosure to a UT20 or UT30 tower as follows:

1. Remove the bolts and nuts connecting the bracket to the enclosure.
2. Slide out the flange sections so that the distance between the centers of each flange is 17" (see FIGURE 4-4).
3. Reattach the bracket to the enclosure using the original bolts and nuts.
4. Position the enclosure on the north side of the mast.
5. Place the enclosure at the desired height. Please note that the recommended lead lengths for our sensors assume the bottom of the enclosure is 3 ft from the ground.
6. Use the furnished 1.5" U-bolts to secure the enclosure to the tower legs.
7. Route the 14 AWG wire from the brass tower grounding clamp to the enclosure grounding lug. Strip one inch of insulation from each end of the wire and insert the end of the wire into the grounding lugs and tighten.

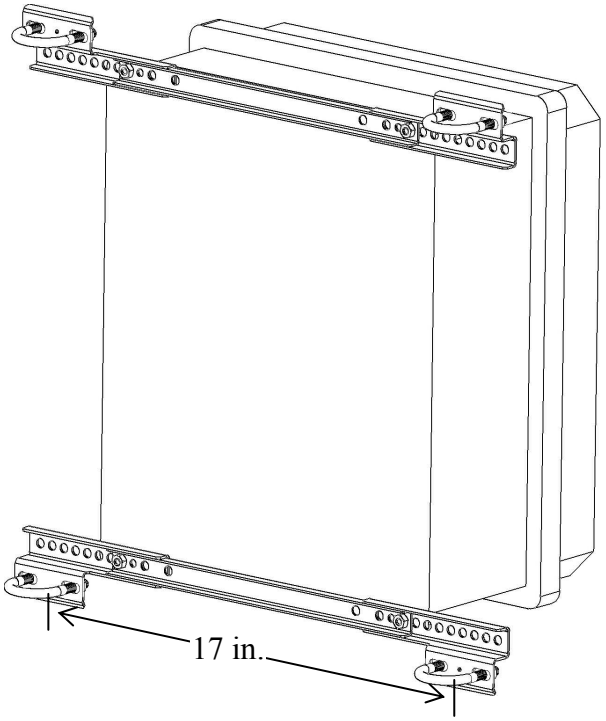


FIGURE 4-4. Enclosure brackets configured for a tower mount

The default configuration is for attaching to a UT10 tower (for example, D = 10.25”). To attach to a UT20 or UT30 tower, move the flange sections of the bracket so that D = 17”.

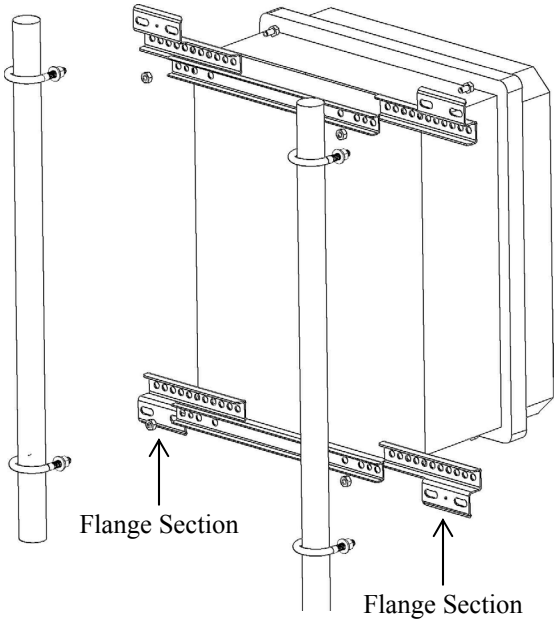


FIGURE 4-5. This exploded view shows the components of a “-TM” bracket option

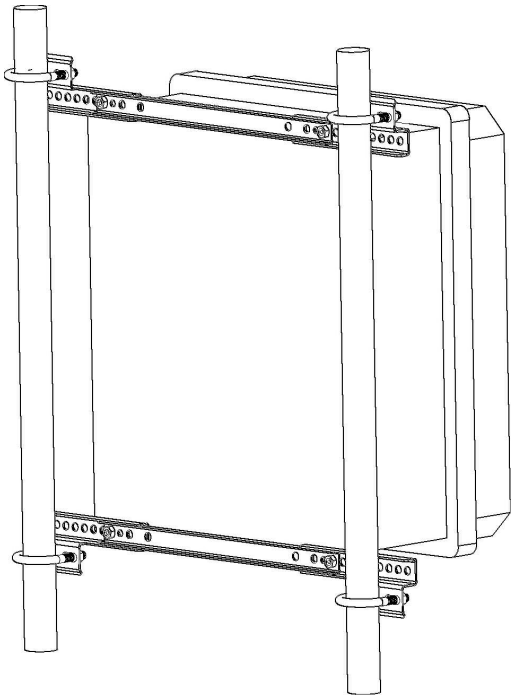


FIGURE 4-6. An enclosure attached to two tower legs

4.4 Tripod Leg Base

The "-LM" mount option is intended for attaching an enclosure to the leg base of a CM106, CM106K, CM110, CM115, or CM120 tripod.

NOTE The ENC16/18 can be mounted to the leg base of a CM106 or CM106K only.

An enclosure ordered with this option will be shipped with a bracket attached to each side of the enclosure and a U-bolt bracket. A 19124 bracket must also be attached to some tripods (see FIGURE 4-7).

NOTE For tripods requiring 19124 bracket, the bracket may not be pre-installed on the tripod at the factory. In this situation, the 19124 bracket and mounting hardware will be shipped with the tripod and will need to be installed as shown in FIGURE 4-7.

The CM106 and CM106K tripods have flanges built into the body of the tripod and do not require the 19124 bracket.

Attach the enclosure to the leg base as follows:

1. Slide the keyhole notches in the upper and lower corners of the –LM bracket over the two extended Phillips head screws located on the tripod. The CM106 and CM106K have hooks extending from the tripod body in place of the Phillips screws.

2. Place the flange of the tripod's bracket into a notch in one of the enclosure's brackets (see FIGURE 4-7, FIGURE 4-8, and FIGURE 4-10).

3. Attach the U-bolt bracket on the other enclosure bracket (see FIGURE 4-9).

4. Use the furnished 2.5" U-bolt to secure the enclosure bracket to a tripod leg (see FIGURE 4-9 and FIGURE 4-10). The CM106K requires a user-supplied 5/16-18 x 1.5" U-bolt due to the tripod's smaller leg size.

5. Route the 14 AWG wire from the brass tripod grounding clamp to the enclosure grounding lug. Strip one inch of insulation from each end of the wire and insert the end of the wire into the grounding lugs and tighten.

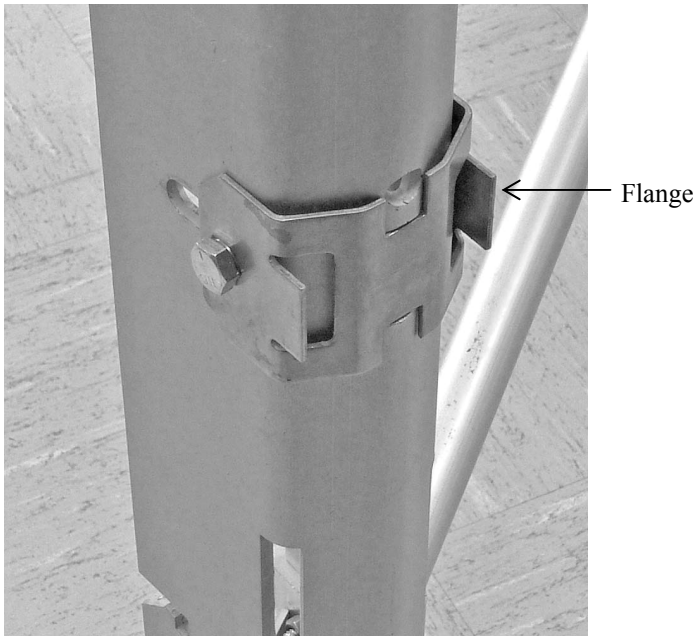


FIGURE 4-7. The 19124 bracket attached to a CM110 tripod

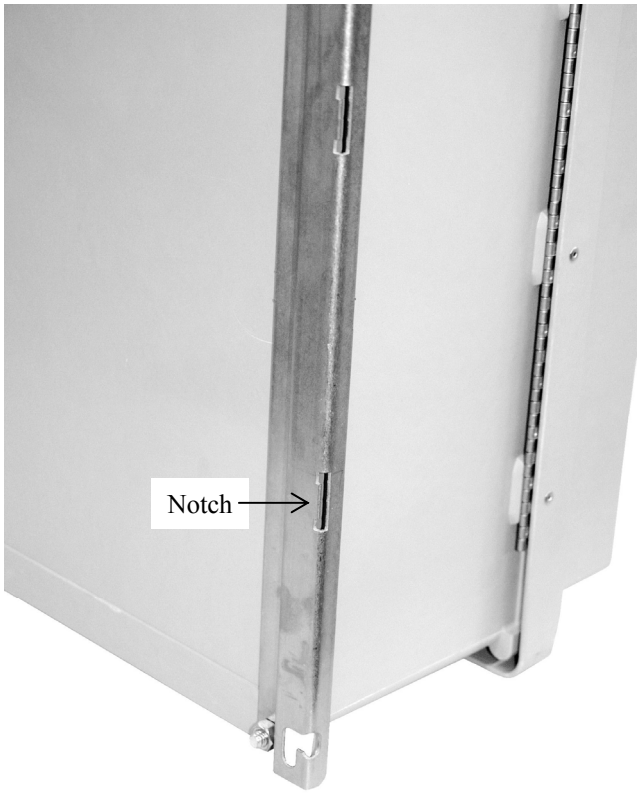


FIGURE 4-8. An ENC14/16 enclosure with a "-LM" bracket

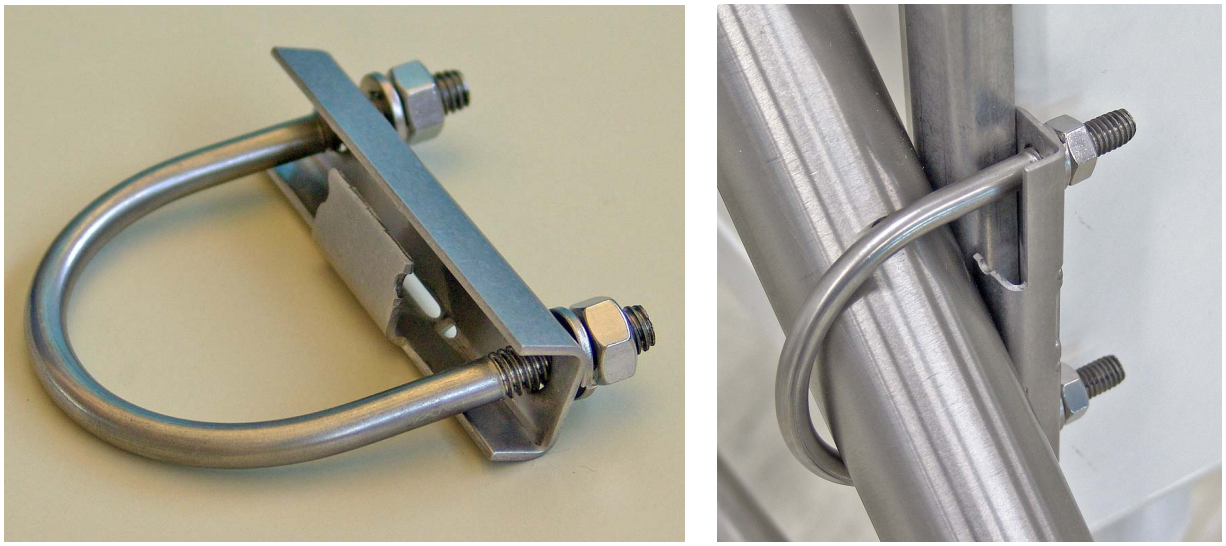


FIGURE 4-9. The U-bolt bracket

FIGURE 4-10. An enclosure attached to the leg base of a CM110 tripod

4.4.1 Mounting More Than One Enclosure on a Tripod Leg (CM110, CM115, CM120)

It is possible to mount two enclosures back-to-back on the CM110, CM115, and CM120 tripods. If the enclosures are different sizes, mount the smaller enclosure first, followed by the larger enclosure. If the enclosures are the same size, use two 5/16-18 x 3.5” bolts in place of U-bolts to anchor the two enclosures together.

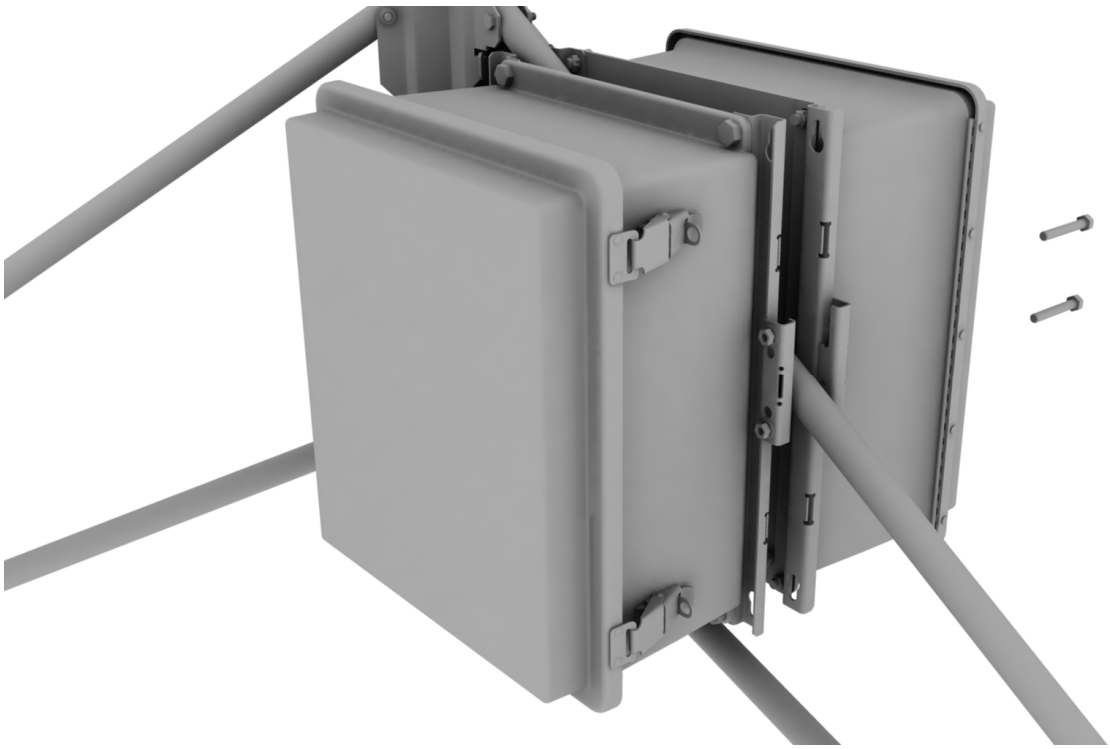


FIGURE 4-11. Mounting two enclosures on a single tripod leg

4.5 Pole Mount

The “-PM” mount option is intended for mounting an enclosure to a vertical pole. An enclosure ordered with this option will be shipped with brackets, metal bands, and mounting hardware needed to secure the enclosure. The metal bands are routed through the brackets, and then around a vertical pole. They are anchored in place using screw clamps.

Attach the enclosure to a vertical tube as follows:

1. Position a bracket at the top of the enclosure as shown in FIGURE 4-12. Secure it with a bolt, washer, and locknut at each end. Attach the lower bracket in the same manner, rotating the bracket so it extends below the enclosure.

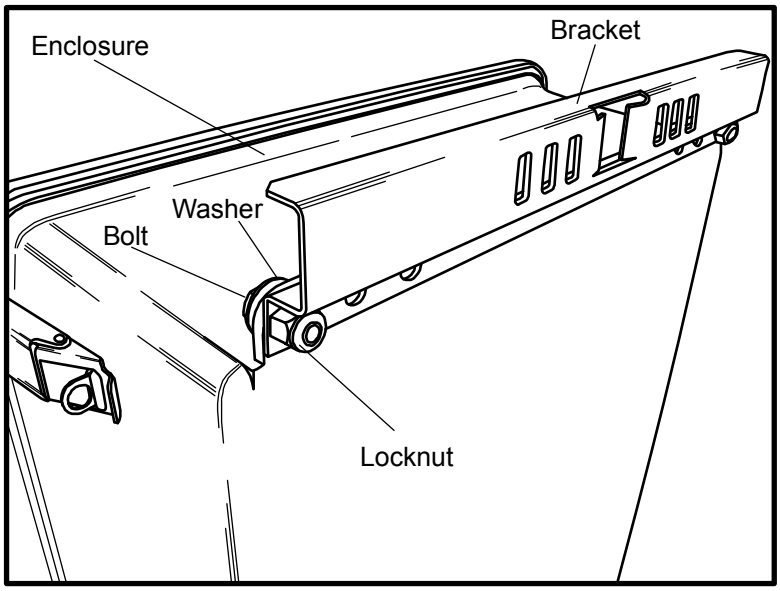


FIGURE 4-12. Attaching the pole mount bracket

2. Feed a metal band through the openings in each bracket as shown in FIGURE 4-13. Use the closest set of holes for smaller poles and the farthest set of holes for larger poles.

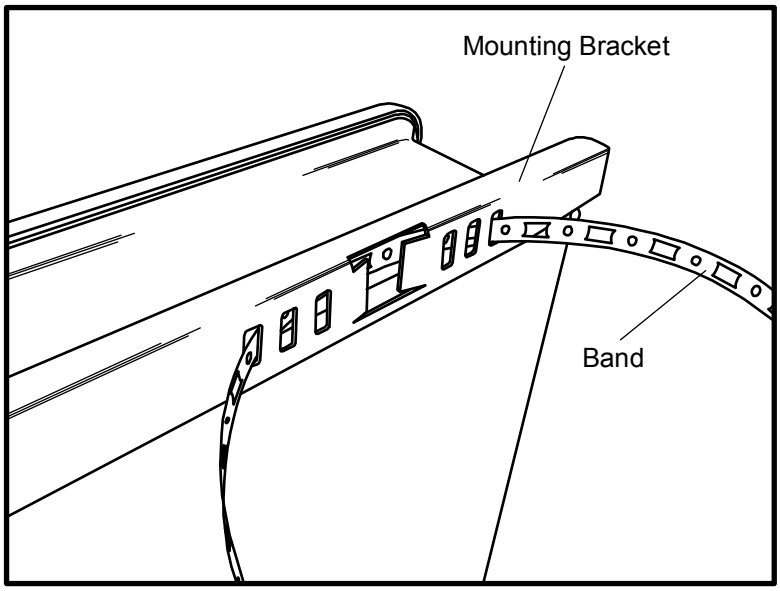


FIGURE 4-13. Inserting the metal band

3. Position the enclosure on the north side of the tower.

4. Place the enclosure at the desired height. Please note that the recommended lead lengths for our sensors assume the bottom of the enclosure is mounted 3 ft. from the ground.

5. Insert the tab on the end of the Screw Threads (FIGURE 4-14) into the hole at one end of the upper strap.

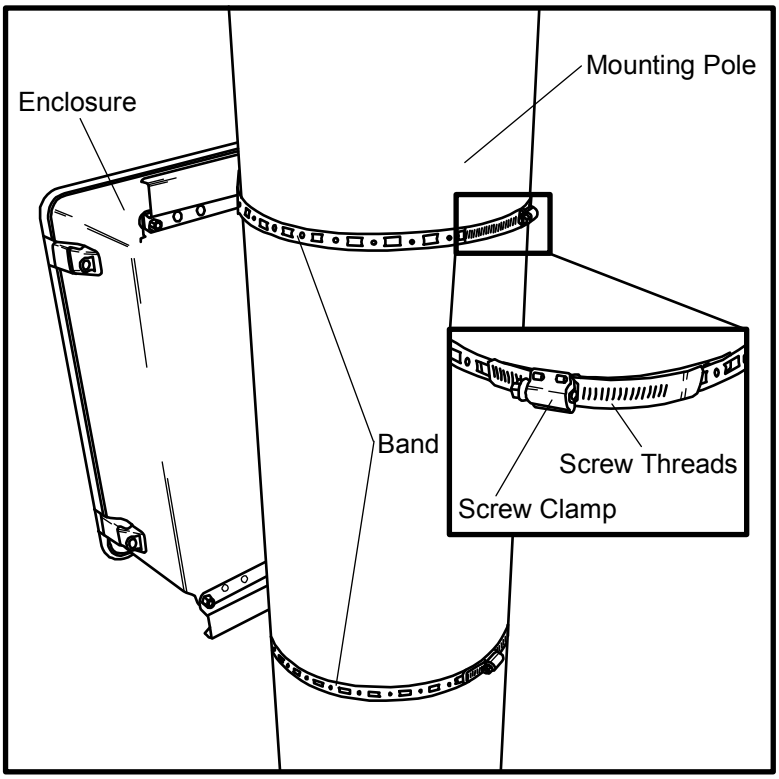


FIGURE 4-14. Securing the enclosure to a pole

6. Pull the strap tight around the pole to determine which hole to insert the Screw Clamp at the other end of the strap. Insert the clamp into this hole.

7. Use metal shears to remove any excess strap, leaving a small amount for adjustments.

8. Insert the Screw Threads into the Screw Clamp and tighten, using a flathead screwdriver or nut driver.

9. Repeat steps 4–7 for the lower strap.

10. Ensure the enclosure is properly grounded through the use of a grounding rod or similar device.

5. When to Replace Desiccant

The humidity indicator card or optional CS210 Humidity Sensor indicate when the desiccant needs to be replaced.

CAUTION Because desiccant is inexpensive, Campbell Scientific recommends replacing desiccant packets once they become saturated rather than attempting to reactivate the desiccant.

5.1 Humidity Indicator Card

The humidity indicator card has three colored circles that indicate the percentage of humidity. Desiccant packets inside the enclosure should be replaced with fresh packets when the upper dot on the indicator begins to turn pink. The indicator card does not need to be replaced unless the colored circles overrun.

5.2 Optional CS210 Humidity Sensor

The CS210 Enclosure Humidity Sensor contains an Elan HM2000 series precision bulkpolymer relative humidity sensor to measure relative humidity inside an enclosure. When the measurements exceed 35% relative humidity, replace the desiccant packets. Refer to the CS210 manual for sensor specifications, installation procedures, and programming information.

6. Resistance to Weathering

Enclosures are coated to protect them from UV rays and other weathering. However, the outer surface of enclosures exposed to extreme weather (rain, wind, and/or UV rays) may erode so that glass fibers become apparent. The depth of the erosion is superficial and only affects the aesthetic appeal (for example, does not reduce the effectiveness in protecting equipment).

Customers who are worried about weathering can periodically rub the enclosure with petroleum jelly or a Canuba-based car wax. The appearance of an enclosure that has already been eroded can be sprayed with clear acrylic paint or coated with primer and white paint. Follow the procedure provided in either Section 6.1, *Clear Acrylic Paint*, or Section 6.2, *Primer and White Paint*, to ensure proper bonding.

6.1 Clear Acrylic Paint

1. Use a rag and possibly a solvent to clean the outside of the enclosure. Solvents that can be used include rubbing alcohol, a water solution of alkaline or caustic salts, domestic cleaning products such as Spic & Span, aromatic hydrocarbon solvents (benzene, xylene), butyl acetate, and glycol acetate.

2. If a solvent was used, carefully rinse and dry enclosure.

3. Use a fine grain sandpaper to gently sand the enclosure surface; if the surface of the enclosure is sufficiently rough, this step may be skipped.

4. Spray with clear acrylic paint.

CAUTION Properly ventilate the area while using solvent and paint. Wear safety goggles, mask, and gloves while sanding.

6.2 Primer and White Paint

1. Use a rag and possibly a solvent to clean the outside of the enclosure. Solvents that can be used include rubbing alcohol, a water solution of alkaline or caustic salts, domestic cleaning products such as Spic & Span, aromatic hydrocarbon solvents (benzene, xylene), butyl acetate, and glycol acetate.

2. If a solvent was used, carefully rinse and dry enclosure.

3. Use a fine grain sandpaper to gently sand the enclosure surface; if the surface of the enclosure is sufficiently rough, this step may be skipped.

4. Spray with primer that is compatible with fiberglass.

5. Paint the enclosure with a white paint that is compatible with fiberglass and resistant to extreme weather. The paint must be white because the white color reflects solar radiation.

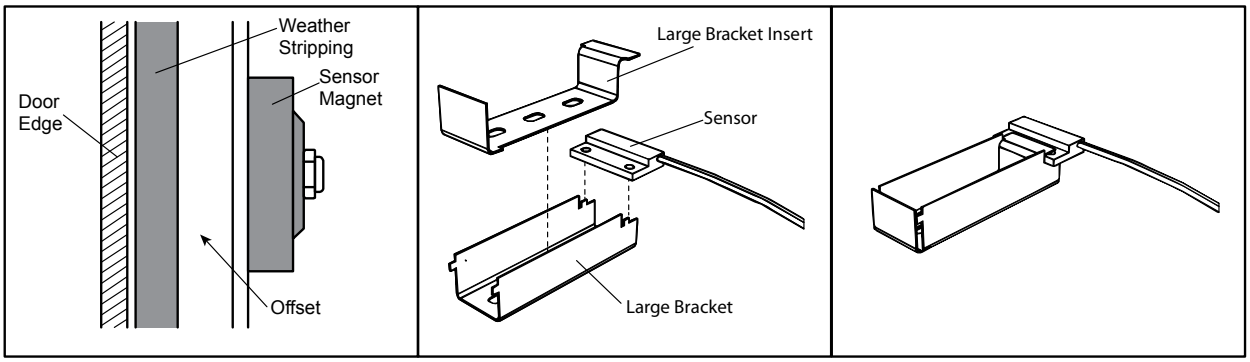
CAUTION Properly ventilate the area while using solvent and paint. Wear safety goggles, mask, and gloves while sanding.

Appendix A. Door Switch

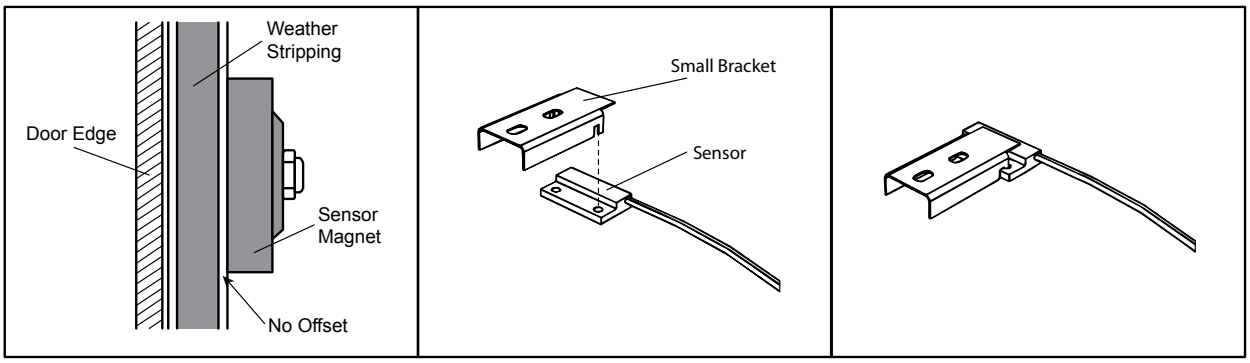
A.1 Installation Procedure

1. The Door Open Indicator Kit contains several small brackets used to mount the sensor and magnet to the enclosure case and door. Which brackets are used depends on the style of enclosure. Use the following guide to determine the proper brackets:

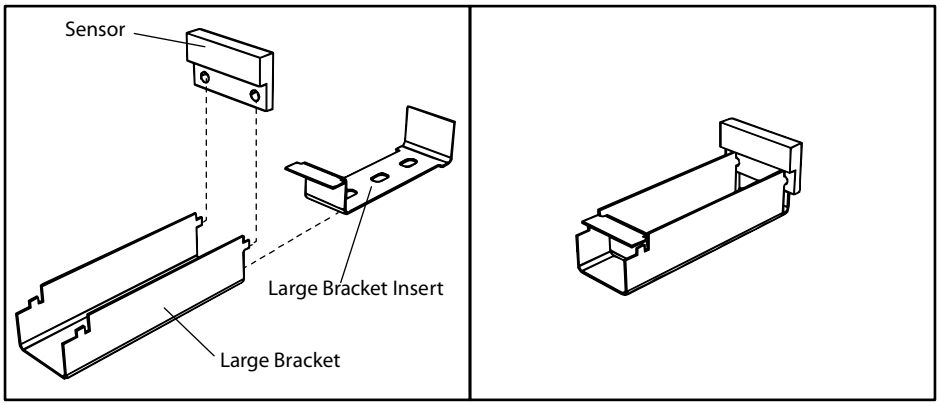
    a. The Door Open Indicator is mounted at the upper right corner of the enclosure. The enclosure **DOOR** determines which bracket is used to mount the sensor inside the enclosure **CASE**. If there is an offset near the edge of the enclosure door (see below), the sensor will be mounted with the brackets shown.



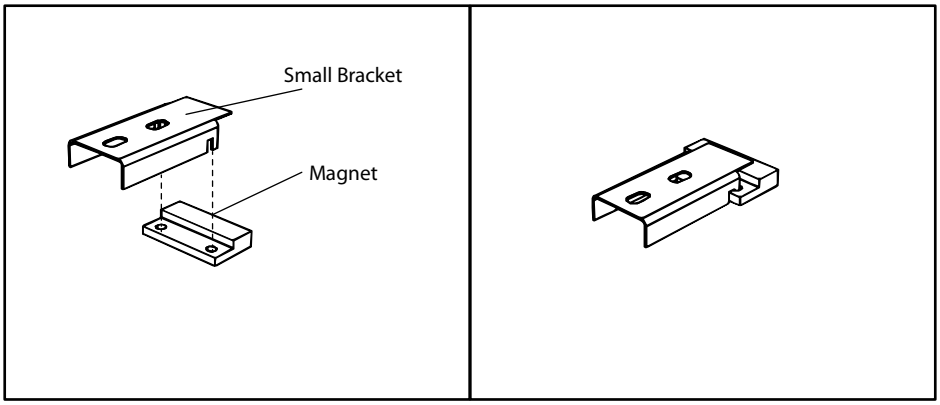
    b. If there is no offset near the edge of the enclosure door, use the bracket as shown below.



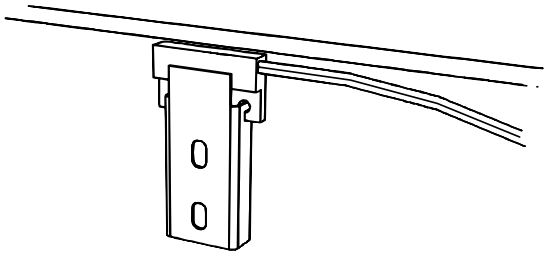
c. The bracket used for mounting the sensor magnet in the door depends on the depth of the door. If the door face is flat, the sensor magnet is mounted as shown below.



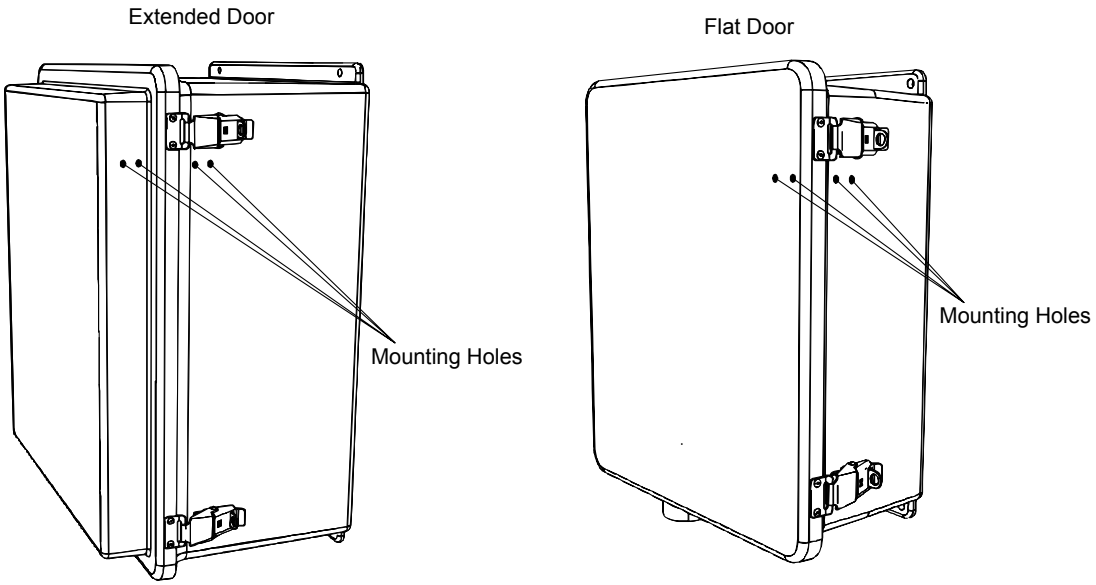
d. If the door face is extended, the sensor magnet is mounted as shown below.



2. Using the brackets determined in step 1, assemble the sensor and place it in the upper right corner of the enclosure case. Align the top of the sensor with the inside edge of the sensor case as shown. Do not allow the sensor to extend beyond the edge of the enclosure case. Using a marker, mark the locations for two mounting holes to secure the sensor bracket.



3. Assemble the sensor magnet with the bracket determined in step 1. Place the bracket in position so the edge of the sensor magnet does not extend beyond the internal edge of the door. Mark the locations for two mounting holes to secure the sensor magnet bracket. *Important: The mounting holes for the sensor magnet bracket must align with the holes for the sensor bracket for the door open switch to function properly.*



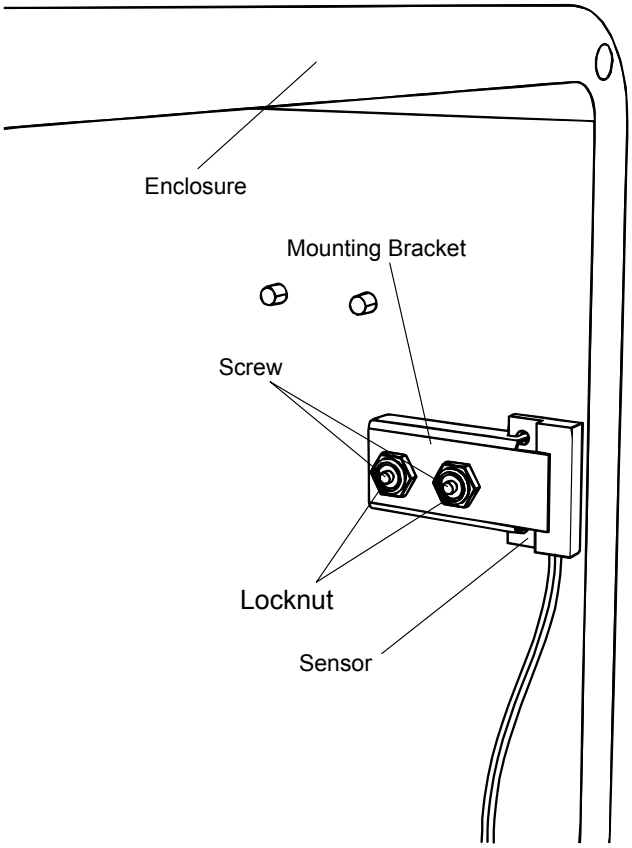
4. Drill small pilot holes for all four mounting holes from the **inside** of the case.

5. Drill the final holes for the brackets from the **outside** of the enclosure using a #22 (0.157") drill bit.

NOTE Drilling the holes in this manner will ensure the enclosure finish does not crack.

6. From the outside of the enclosure, insert two screws through the newly drilled holes in the case.

7. Place the assembled sensor bracket over the two screws, making sure the sensor is aligned with the inside edge of the case. Secure the bracket in place with two locknuts.



8. From the outside of the enclosure door, insert two screws through the new holes in the enclosure door.

9. Place the assembled sensor magnet bracket over the two screws, making sure the sensor magnet is aligned with the inside edge of the door. Secure the bracket in place with two locknuts.

A.2 Example Programs

A.2.1 CRBasic

```
'Program name: DOOR SWITCH CR1000.CR1
'Date written: 11/7/2005
'
' Door Switch Wiring
' +5V black   -  power to door switch
' C1  black   -  signal to control port 3

'\\\\\\\\\\\\\\\\\\\\\\\\ DECLARATIONS ////////////////////////
Public DOOR_open_1
Public DOOR_output

'\\\\\\\\\\\\\\\\\\\\\\\\ OUTPUT SECTION ////////////////////////
DataTable(Table101,true,-1)
  DataInterval(0,5,Min,10)
  Sample(1, DOOR_output, FP2)
EndTable

DataTable(Table102,true,-1)
  DataInterval(0,5,Min,10)
  Histogram(DOOR_open_1, FP2, 0, 1,001, 1 , 0.5, 1.5)
EndTable

'\\\\\\\\\\\\\\\\\\\\\\\\\\\\ PROGRAM ////////////////////////////
BeginProg
  Scan(1,Sec, 3, 0)
' Configure control ports as inputs or outputs
  PortsConfig (&B11111111,&B00000000)

' Measure Door switch
' (0=low=closed, 1=high=open)
  If  CheckPort(1) = true then
    DOOR_open_1 = 1
  Else
    DOOR_open_1 = 0
  EndIf

' Two of many possible methods to output the status of the door open switch
' - assumes 5 minute data:

' Method #1:  If the door is open even one reading during the output interval,
' output a 1 for the Door variable
' If (DOOR_open_1 = 1)
  Then
    DOOR_output = 1
  EndIf
    CallTable Table101
' Reset door status after output interval
  If TimeInToInterval(0,5,Min) Then
    DOOR_output = 0
  EndIf

' Method #2:  Door open status may be recorded as a fraction of the output
' interval (between 0 and 1) using the Histogram instruction.
  CallTable Table102

  NextScan
EndProg
```

A.2.2 Edlog

```
;{CR10X}

; File name = Door Switch CR10X.csi  7Nov2005

; Door Switch Wiring
;  +5V  black    - power to door switch
;  C1    black    - signal to control port 3

*Table 1 Program
  01:  1              Execution Interval (seconds)

1:  Set Port(s) (P20)                              ; Configure control ports as inputs or outputs
   1:   9999          C8..C5 = nc/nc/nc/nc
   2:   9998          C4..C1 = nc/nc/nc/input

; Measure Door switch

2:  If Flag/Port (P91)                             ; (0=low=closed, 1=high=open)
   1:   41            Do if Port 1 is High
   2:   30            Then Do

      3:  Z=F x 10^n (P30)
         1:   1              F
         2:   00             n, Exponent of 10
         3:   1              Z Loc [ DOORopen1 ]

4:  Else (P94)

      5:  Z=F x 10^n (P30)
         1:   0              F
         2:   00             n, Exponent of 10
         3:   1              Z Loc [ DOORopen1 ]

6:  End (P95)

; Two of many possible methods to output the status of the door open switch
; - assumes 5 minute data:
; Method #1:  If the door is open even one reading during the output interval, output a 1
; for the Door variable
; Method #2:  Door open status may be recorded as a fraction of the output interval
; (between 0 and 1) using the Histogram instruction.

; Method #1  ==================================

7:  If (X<=>F) (P89)
   1:                  X Loc [ DOORopen1 ]
   2:   1              =
   3:   1              F
   4:   30             Then Do

      8:  Z=F x 10^n (P30)
         1:   1              F
         2:   00             n, Exponent of 10
         3:   2              Z Loc [ DOOR_out  ]
```

```
9:  End (P95)

10:  If time is (P92)
   1:   0              Minutes (Seconds --) into a
   2:   5              Interval (same units as above)
   3:   10             Set Output Flag High (Flag 0)

11:  Set Active Storage Area (P80)
   1:   1              Final Storage Area 1
   2:   101            Array ID

12:  Sample (P70)
   1:   1              Reps
   2:   2              Loc [ DOOR_out  ]

; Reset door status after output interval
13:  If time is (P92)
   1:   0              Minutes (Seconds --) into a
   2:   5              Interval (same units as above)
   3:   30             Then Do

      14:  Z=F x 10^n (P30)
         1:   0.0            F
         2:   00             n, Exponent of 10
         3:   2              Z Loc [ DOOR_out  ]

15:  End (P95)

; Method #2  ==================================

16:  If time is (P92)
   1:   0              Minutes (Seconds --) into a
   2:   5              Interval (same units as above)
   3:   10             Set Output Flag High (Flag 0)

17:  Set Active Storage Area (P80)
   1:   1              Final Storage Area 1
   2:   102            Array ID

18:  Histogram (P75)
   1:   1              Reps
   2:   1              No. of Bins
   3:   1              Closed Form
   4:   1              Bin Select Value Loc [ DOORopen1 ]
   5:   0              Frequency Distribution
   6:   0.5            Low Limit
   7:   1.5            High Limit

*Table 2 Program
   02:  0              Execution Interval (seconds)

*Table 3 Subroutines

End Program
```

Appendix B. 25458/28532 DIN-Rail Terminal Kits

B.1 Introduction

The 25458 (5-inch) or 28532 (9-inch) kit can facilitate wiring when many wires need to be connected to one terminal. The kit contains one 15906 5-inch DIN-Rail (or one 28531 9-inch DIN-Rail) Mounting Bracket, 505 screws, 6044 grommets, and 15908 DIN-Rail Stoppers. A complete configuration will also include pn 15920 Terminal Strips, pn 15907 End Plates, and pn 15909 Jumpers. The stoppers, terminal strips, and end plates are mounted onto the DIN-Rail bracket. The DIN-Rail bracket is mounted to an enclosure backplate using the kit's screws and grommets.

One 15920 terminal strip consists of three spring-loaded "guillotine" terminals that provide connection points for individual wires. Up to 20 of these terminal strips may be fastened to the 25458 DIN-Rail bracket. The 28532 DIN-Rail bracket holds up to 36. The 15907 End Plates separate the terminal strips. The 15909 Jumpers are used to electrically connect the terminals. A stopper needs to be on each end of the terminal strip assembly.

B.2 Installation Procedure

1. Mount the 15908 DIN-Rail Stoppers, 15920 Terminal Strips, and 15907 End Plates onto the DIN-Rail Bracket (see FIGURE B-1 through FIGURE B-3).

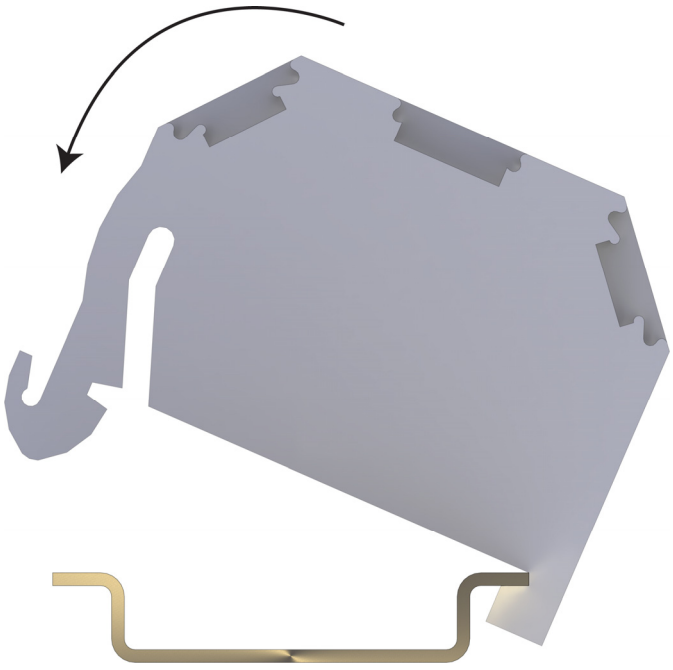


FIGURE B-1. 15908 DIN-Rail Stopper installation

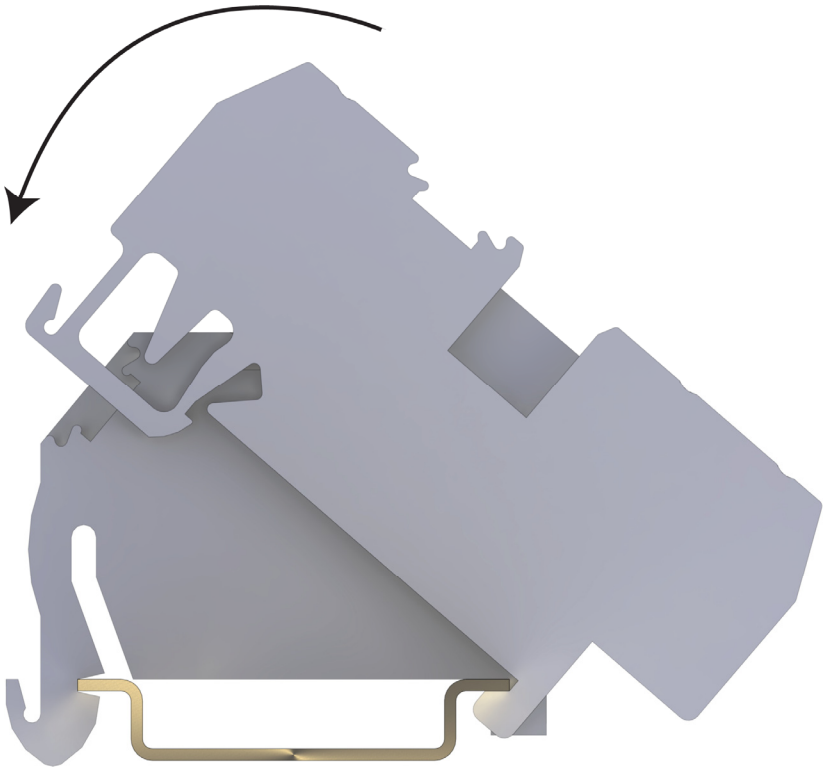


FIGURE B-2. 15920 Terminal Strip installation

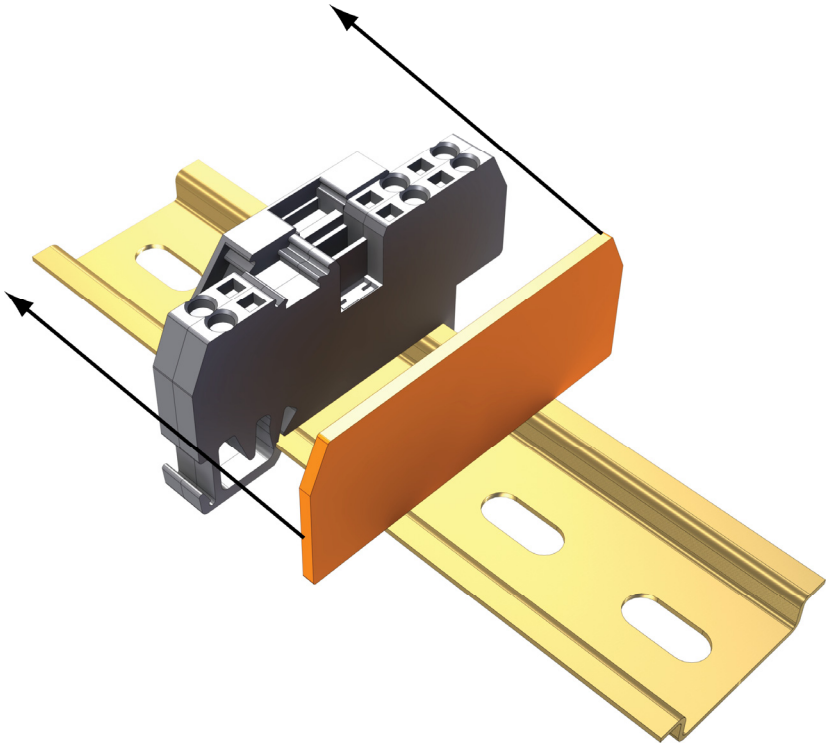


FIGURE B-3. 15907 End Plate installation

2. Insert the 15909 Jumpers in the terminal strips as shown in FIGURE B-4.

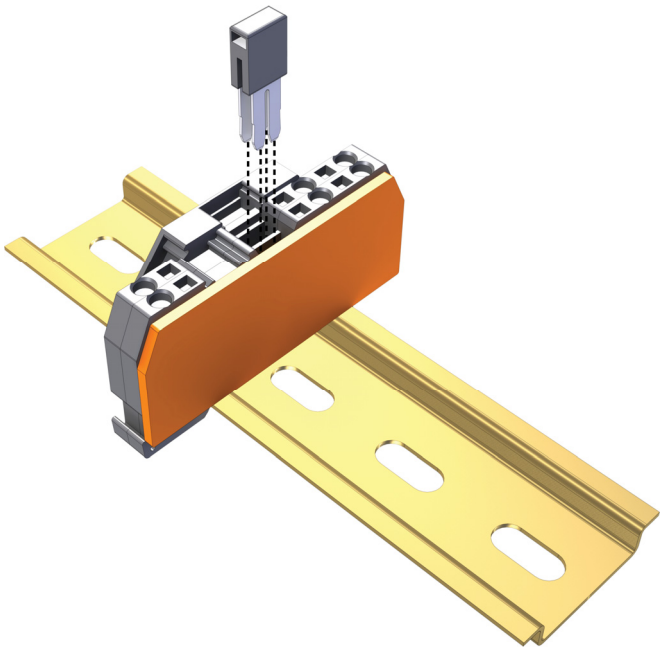


FIGURE B-4. 15909 Jumper installation

3. Mount the DIN-Rail bracket onto the enclosure backplate using two 505 screws and two 6044 grommets (see FIGURE B-5).

NOTE The 28532 includes three screws and three grommets. Use the third screw and grommet to secure the 9-pin DIN-Rail at its center.

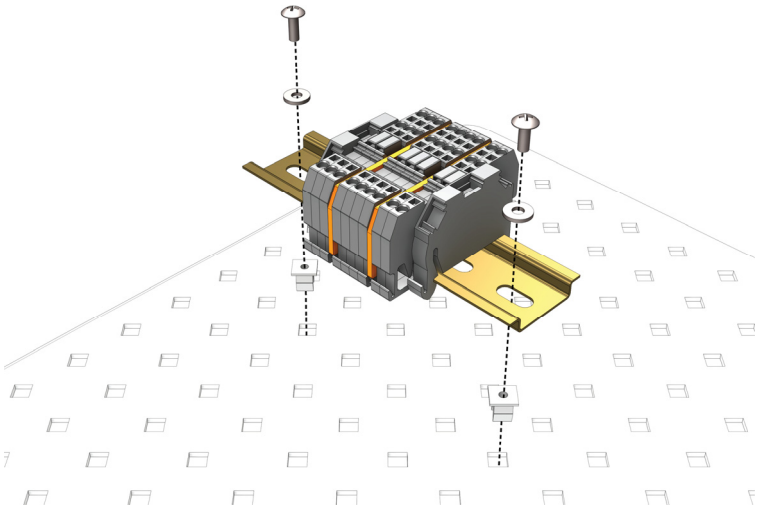


FIGURE B-5. DIN-Rail bracket mounted onto an enclosure backplate

4. Connect the wires to the terminals (see FIGURE B-6 and FIGURE B-7). The 8125 flat-bladed screwdriver is used to open the terminals' guillotines for wire entry.

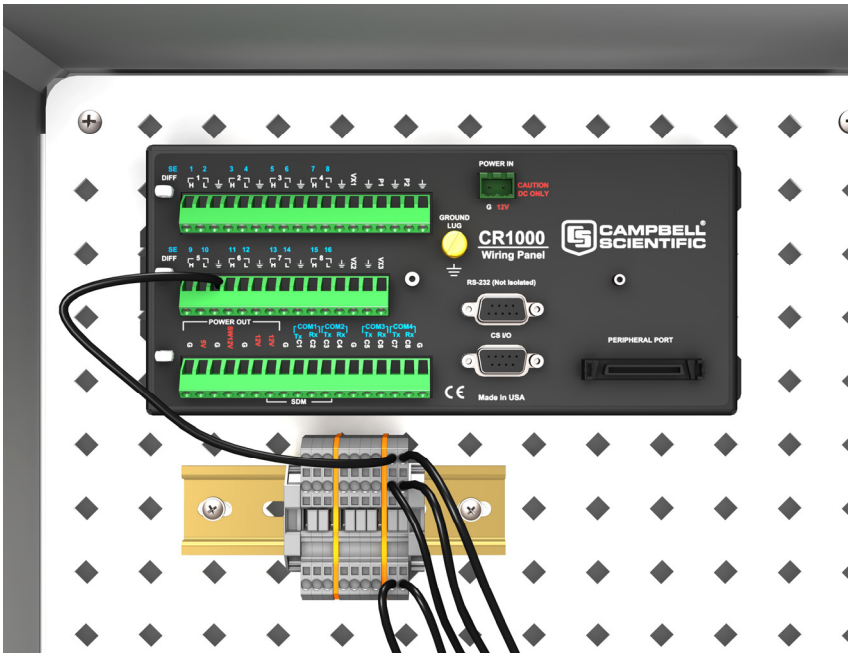


FIGURE B-6. An installed and wired 25458 DIN-Rail Terminal Kit

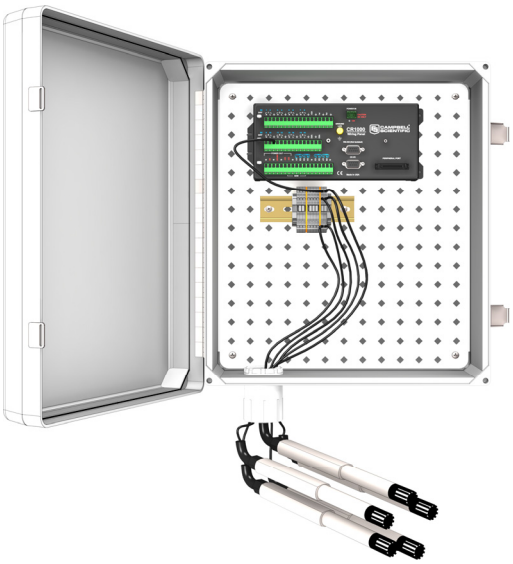


FIGURE B-7. The 25458 DIN-Rail Terminal Kit facilitates wiring of multiple sensors

Appendix C. 28960 Stack Mounting Kit

C.1 Introduction

The 28960 Stack Mounting Kit is used to raise a component 3 inches above the surface of the back plate. This is beneficial when an enclosure nears its holding capacity of components. Using the Stack Mounting Kit allows one component to be stacked above another, saving space in the enclosure. For example, FIGURE C-1 and FIGURE C-2 show a CR1000 mounted above an AM16/32B. Any component mounted below the Top Grid must be fully wired prior to installing the Top Grid. Note that in this example, the four grommets used to mount the CR1000 to the Top Grid pass through the Top Grid into the Legs using the same hole pattern as the CR1000.

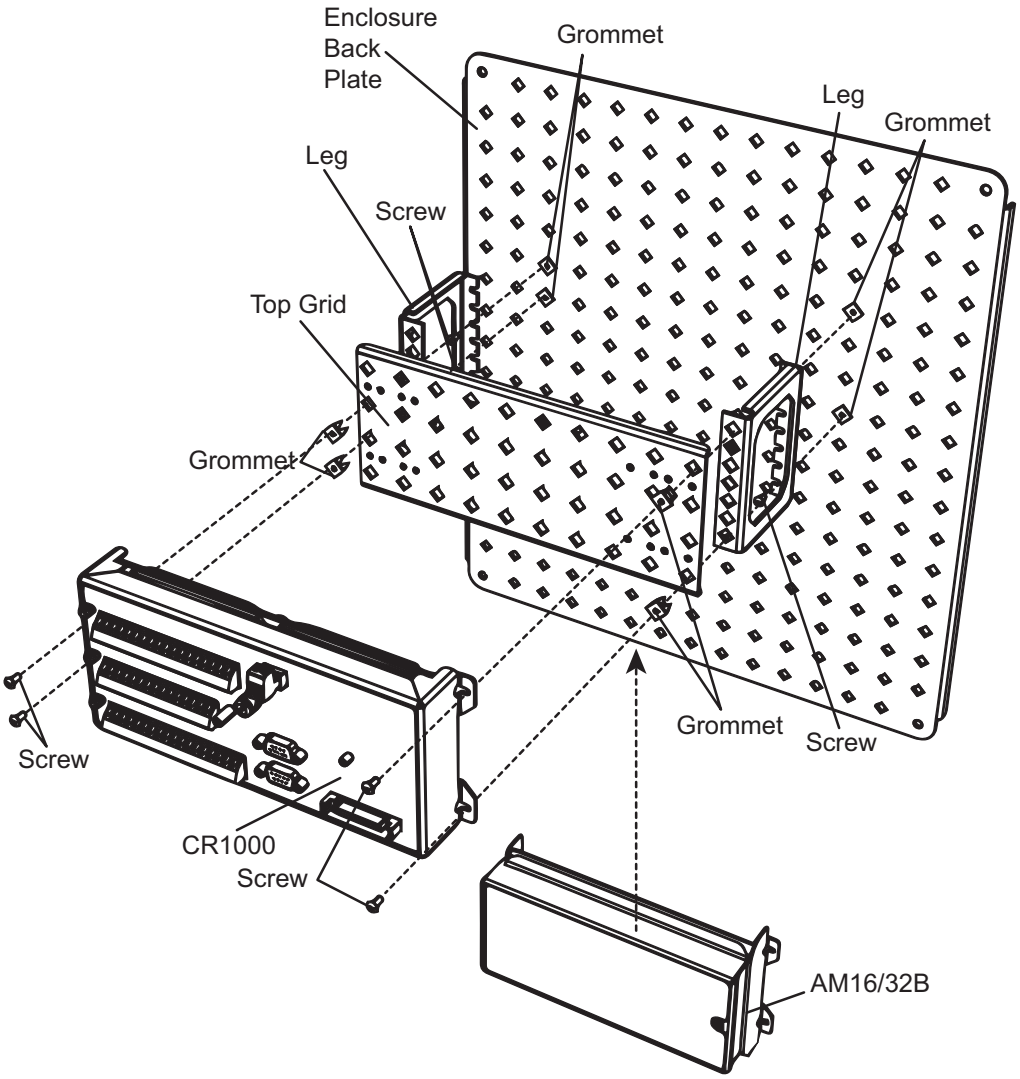


FIGURE C-1. Exploded view of a CR1000 and AM16/32B mounted on a 28960 Stack Mounting Kit

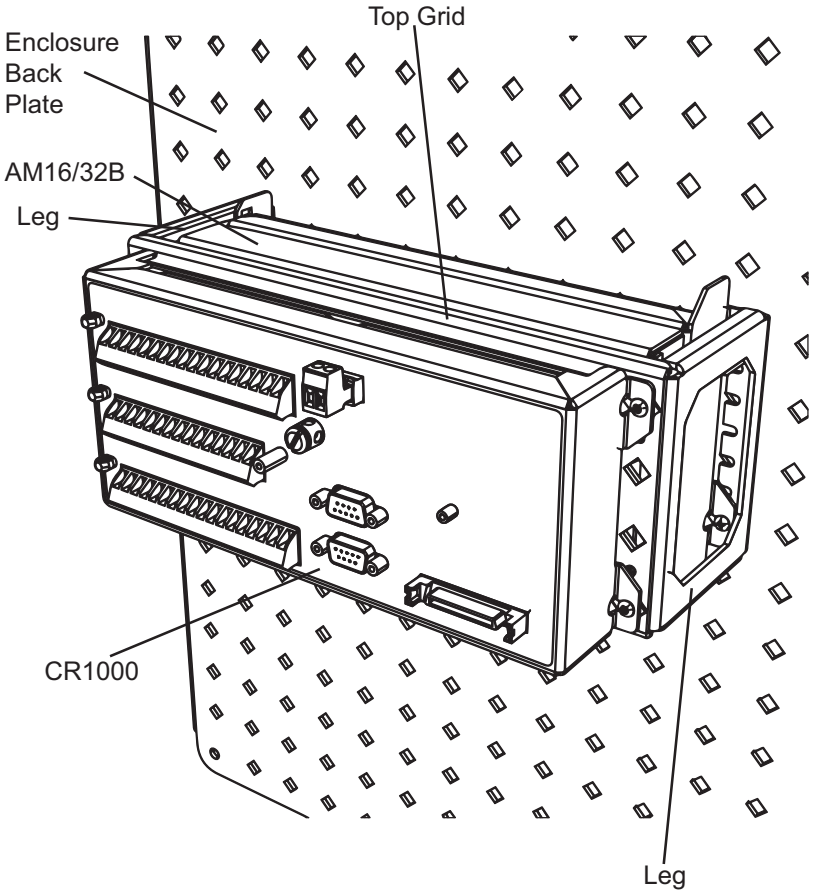


FIGURE C-2. Assembled view of CR1000 and AM16/32B mounted on a 28960 Stack Mounting Kit

The Stack Mounting Kit consists of a Top Grid, two Legs, eight Grommets, and eight Screws (FIGURE C-3). Besides the standard one-inch-on-center holes, the Top Grid also contains sixteen smaller, round holes. These holes are used by cable ties to secure any loose wiring.

If the Stack Mounting Kit is only being used to raise a single component, the Top Grid is optional. The component can be mounted directly to the two Legs using the Grommets and Screws. This allows the raised area to be tailored to the component's size. FIGURE C-4 shows a CR1000 mounted to the Legs without using the Top Grid.

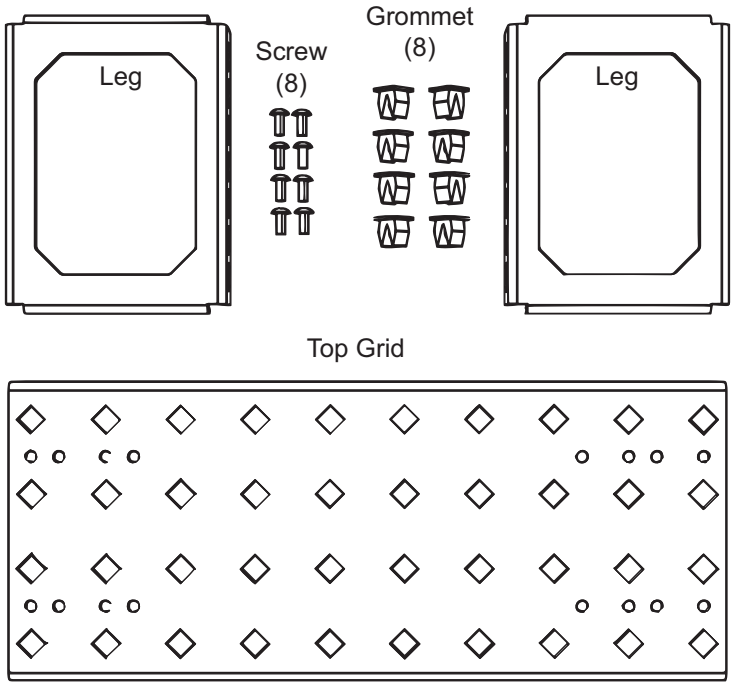


FIGURE C-3. Contents of 28960 Stacking Kit

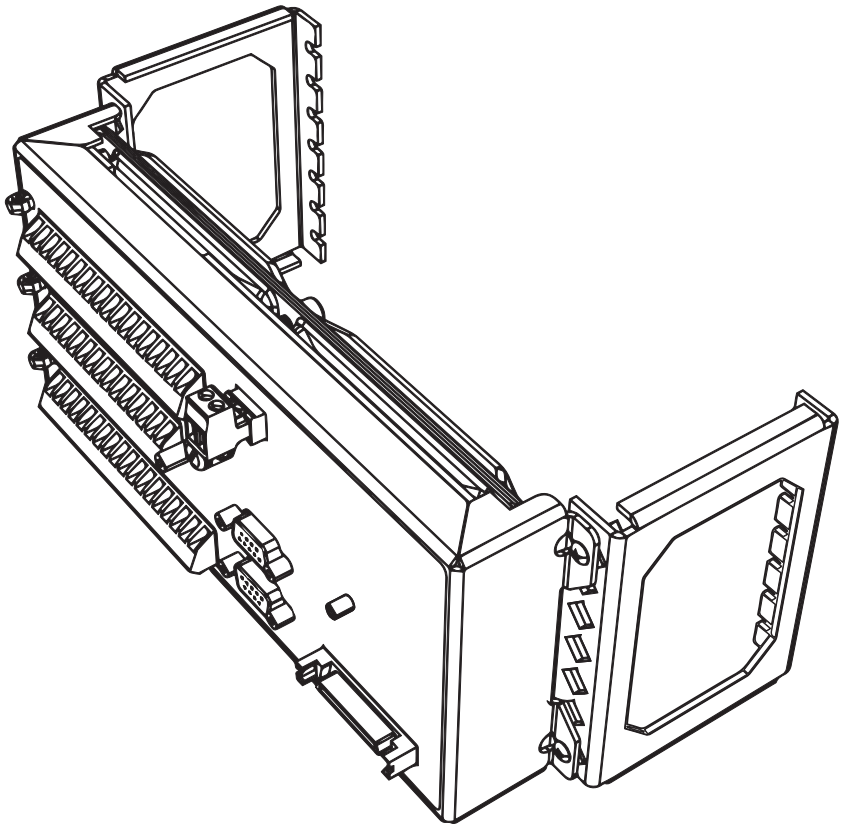


FIGURE C-4. CR1000 mounted to Stack Mounting Kit legs

C.2 Mounting Procedure

1. Determine the spacing needed between the two legs.

2. Secure the legs to the back plate using screws and grommets. If a component is to be mounted under another and shares the same mounting holes as the leg, mount the pieces in the following order.

   Back Plate < Grommet < Leg < Component < Screw

3. Fully wire the bottom component before proceeding.

4. Place the Top Grid in position over the Legs. Insert Grommets where required for the component to be mounted. If the Top Grid is not going to be used, insert the Grommets directly into the top of the Legs.

5. Place the top component in position and secure it with Screws.

Appendix D. Keeping Insects Out Of the Enclosure

Campbell Scientific has published an application note regarding how to keep pests away from the equipment. It is found on the Campbell Scientific website (*www.campbellsci.com/app-notes*) and is called "Keeping Pests Away from Equipment (5-Y)."

Here are two methods from the application note on how to keep insects out of the enclosure.

1. Place moth balls or crystals in enclosures to prevent fire ants, wasps, spiders, and other insects from nesting.

CAUTION The fumes of moth balls or crystals could be hazardous. Therefore, enclosures that contain moth balls or crystals should be opened in a well-ventilated area.

2. Put animal ear tags in the enclosure. Apparently, some ear tags are treated with an insecticide. Talk with personnel in an agricultural store to determine the best ear tag for controlling the pests in your area. (This technique originated in Southern Texas.)

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