

DRAFT

SUBJECT : Nimbus PL-2, Temperature Display Unit (TDU)/RS-232 Modem
Installation Instructions

PURPOSE : Nimbus PL-2, (TDU Installation Instructions For Newly Assigned
COOP Stations, With/Without Modem

EQUIPMENT :
AFFECTED

PARTS REQUIRED :

SPECIAL TOOLS :
REQUIRED

MODIFICATION :
PROCUREMENT

EFFECTIVITY :

ESTIMATED TIME :
REQUIRED

EFFECT ON OTHER : None.
INSTRUCTIONS

AUTHORIZATION :

VERIFICATION :
STATEMENT

GENERAL:

This maintenance note provides Cooperative Program Managers (CPM) the installation instructions for Nimbus PL-2 TDU and its modem and lightning protection circuitry.

PROCEDURE:

The instructions and procedures for installation of the Nimbus PL-2 and its RS-232 modem and lightning protection circuitry are attached. CPMs should have already received the primary protector assembly (PPA) with MOVs, rigid and flexible sensor cabling, sensor line clamping unit, 115 volt AC LED surge protector, Nimbus PL-2 TDU and its 12 volt DC power supply, and the RS-232 modem and cabling.

CAUTION

Do not connect the ground wire to an outside water tap as this point is not always properly grounded.

REPORTING INSTRUCTIONS:

Report completed modification on a WS Form A-26, Maintenance Record, using the instructions in Engineering Handbook No. 4 (EHB-4), Engineering Management Reporting System (EMRS), part 2, attachment F. Include the following information on the A-26:

Equipment code of **AGTA** in block 7

Serial number of the GTA radio in block 8

Modification number as **2** in block 17a

A sample WS Form A-26 is provided as attachment B.

Mark Paese (Acting)
Chief, Maintenance, Logistics, and Acquisition Division

Attachment A NIMBUS PL-2 Temperature Display Unit and RS-232 Modem and Lightning
Protection Circuitry Installation Instructions

Attachment B WS Form A-26 Sample

Attachment A
Nimbus PL-2 Temperature Display Unit and RS-232 Modem
and Lightning Protection Circuitry Installation Instructions

NATIONAL WEATHER SERVICE
OFFICE OF SYSTEMS OPERATIONS
ENGINEERING DIVISION
May 2002

TABLE OF CONTENTS

Section	Page
Attachment A Nimbus PL-2 Temperature Display Unit and RS-232 Modem and Lightning Protection Circuitry Installation Instructions	A-1
Nimbus PL-2 Temperature Display and Lightning Protection Installation Plan	A-3
Purpose	A-3
Service Entrance Panel (SEP) Installation	A-4
General	A-4
PPA Installation	A-5
Installation	A-6
IP232 Modem Installation and Operating Instructions	A-7
Appendix 1 Ground Identification Guidance	A-13
Appendix 2 List of Materials Provided by NOAAHQ	A-14
Appendix 3 Material Provided by Installing Activity	A-15
Attachment B WS Form A-26 Sample	B-1

LIST OF FIGURES

Figure 1 SEP Installation	A-8
Figure 2 Cable Entrance Details	A-9
Figure 3 Primary Protector Installation	A-9
Figure 4 Primary Protector Wiring	A-10
Figure 5 Ground Clamp	A-11
Figure 6 Grounding Clamps	A-11
Figure 7 Drawing C450-5-SD002	A-12

Nimbus PL-2 Temperature Display and Lightning Protection Installation Plan

Purpose

This plan, hereafter called Service Entrance Panel (SEP) includes an installation scheme to provide lightning surge protection for the Nimbus PL-2 and its associated circuitry. The SEP installation is required at all newly assigned Nimbus PL-2 COOP stations. See Figure 1 for an overview. The SEP plan provides the maximum protection for the Nimbus PL-2, observer, and facility. The entry of the data lines near the SEP enables the best arrangement for grounding the primary protector assembly (PPA) to the facility ground. This optimum grounding provides the least risk of shock, arcing, and Nimbus PL-2 damage.

NOTE: If the facility does not use a grounding type receptacle, that is, one with a third or grounding position, the SEP plan cannot be used. The site must be configured to a third ground or be abandoned.

Service Entrance Panel (SEP) Installation

General

All new Nimbus PL-2 installations are to be installed so the sensor cable enters the facility in close proximity to the AC power SEP. A primary protector assembly (PPA) is installed outside the facility at this point. The PPA is grounded to the facility ground. The rigid cable from the thermistor sensor is terminated on the line side of the PPA. From the PPA load side, the flexible cable is connected to the clamping unit, which is connected to the Nimbus PL-2 display. See Figure 1 for a typical installation and Figure 2 and Figure 3 for a typical facility entrance hole and PPA installation. The remainder of the instruction provide the details of the installation. The installation list of materials (LOM), Appendices 2 and 32, should be reviewed to ensure that all necessary materials are available. Some materials are site specific and cannot be identified until the site has been visited and the installation details determined. The protector installed by the telephone company on the phone lines is similar to the installation of the PPA on the Nimbus PL-2 sensor lines. If the installation of the phone at a particular site has been done by a Bell System company, it could serve as a reliable overview of the installation of the PPA.

NOTE: Installation of other similar systems such as cable TV, satellite dishes and TV antennas shall not be used as examples.

The National Electric Code (NEC), 1987, was used extensively in developing this plan. While the NEC does not expressly cover this particular type of installation, this plan complies with the intent of all appropriate sections. The following references are to aid in answering questions regarding code compliance:

The section of the NEC that best applies to our application is Article 800, Communication Circuits. Grounding system, bonding, and connections to grounding system are covered in Article 250. Of particular importance to this installation are, Section G, Bonding; Section H, Grounding Electrode System; and Section K, Grounding Conductor Connection.

PPA Installation

Pre-installation Planning

NOTE: This is the most important step in the installation.

1. Identify the ground point for the protection system. Care in identifying the proper ground point is the best way to assure trouble free PPA operation. The PPA must be grounded to the facility or building grounding electrode system. The grounding electrode system is basically the building ground or ground system. The electrical service panel will, in almost all cases, be connected to the grounding electrode system by a grounding wire, called the grounding electrode conductor. In most residences, the grounding electrode system or house ground is the metal cold water piping system. The ground wire (the grounding electrode conductor) between the service panel and the cold water piping system will confirm the piping system as the grounding electrode system. The grounding electrode conductor, if used, will have been previously installed. Either the cold water piping system or grounding electrode conductor is an adequate ground point. Select the one closest to the PPA.

NOTE: The CPM is not to install the grounding conductor, if used, it will have been previously installed. The CPM is not to install the grounding electrode conductor or any other connection inside the circuit breaker panel.

If the cold water pipe is selected, the grounding point on the cold water pipe system must not be separated from the grounding electrode conductor connection point by nonconductive piping such as PVC pipe.

The grounding point used by the telephone system protector is a good guide to the identification of the proper grounding point. However, it must meet the criteria of this step or Appendix 1.

If the cold water system cannot be identified as the grounding electrode system, see Appendix 1 for alternative grounding points.

If the building ground point cannot be positively identified, or if there is reason to doubt the quality of the ground, the advice of a qualified electrician (licensed for your county) must be obtained.

After selecting the ground point, obtain an appropriate grounding clamp for that type of ground point. See Figure 6 and the list of materials in Appendix 3.

2. Select the PPA installation location and sensor cable entrance points. Install the PPA to provide the shortest straight line grounding cable run to the grounding point selected above. The sensor cable entrance point must not bring the sensor cable within 6 inches of any conductive materials.

The installation must maintain at least 1 foot separation between the cable from a the sensor and the cable to the display. Entrance through exterior aluminum siding is permissible if done through an insulating bushing such as plastic pipe as shown in Figure 2. The PPA should not be installed on a conductive surface.

Installation

1. Mount the PPA at the location selected above.
2. Mount the bonding clamp to the grounding point.
3. Make a slanted opening in the facility structure at the cable entrance point. Slant the opening to prevent entry of water from the outside, as shown in Figure 2, installing the insulating bushing, if required.
4. Extend the sensor cable through the entry hole to the vicinity of the PPA. Seal the entry hole on the outside and inside with silicone caulk. Install caulk so the cable is not touching the entry points to reduce possible cable chaffing. Support the cable run with appropriate clamps. Do not use staples on the sensor or display cables.
5. Terminate the two data conductors and drain wire with spade lugs and attach to the line side of the PPA as shown in Figure 4. Support the cable with a clamp as near as possible to the PPA.
6. Install the MOV assembly on the line side of the PPA.
7. Terminate the two data conductors of the cable from the thermistor sensor with spade lugs and attach to the load side of the PPA as shown in Figure 4. The flexible cable from the PPA to sensor line clamping unit can be attached outside as long as it is not buried and a minimum separation of 1 foot from the sensor cable is maintained. The drain wire is optional, but if present, terminate as shown in Figure 4. Support the cable with a clamp as near as possible to the PPA. Do not run the display cable near the sensor cable (minimum of one foot).
8. Run the ground wire from the line side of the PPA to the ground point. Any bends in the cable should be gradual rather than sharp right angles. Support the ground wire with staples or clamps. Attach the wire to the ground clamp. Terminate the other end with a spade lug and attach to the PPA as shown in Figure 4.
9. Install the AC LED surge protector strip.

IP232 Modem Installation and Operating Instructions

The IP232 should be located in proximity of the Nimbus Display unit and away from other equipment to prevent inadvertent disconnection. Connect the IP232 as outlined in Figure 1.

CAUTION

DO NOT CONNECT THE NIMBUS 12 VDC POWER SUPPLY TO THE IP232 MODEM.

There is a difference in polarity between the Nimbus 12 VDC power supply and the modem's 9 VDC power supply. The Nimbus plug is interchangeable with the modem, but the modem plug is not interchangeable with the Nimbus. An inadvertent connection runs the risk of damaging the IP232 and making the unit inoperable and voiding the warranty.

Installation connections:

- a. Nimbus 12 VDC power (Must be connected first to prevent inadvertent hookup and damage to the modem.
- b. Nimbus sensing line
- c. Install Nimbus 9 volt DC battery
- d. RS232 connector cable
- e. Modem 9 volt DC power
- f. RJ-11 phone cables (2 each)

The following outlines the requirements necessary to make the IP232 modem operational and receive temperature information from the Nimbus display unit.

NOTE: The time and date are set to Greenwich Mean Time

- a. Set the Nimbus display's internal hourly clock as outlined on Page 4 of the Nimbus PL Operating Manual.
- b. To communicate with the modem and set the date, set up the Hyperterminal in accordance with the instructions starting on Page 11 of the Operating Manual.
- c. The following commands to change the date are:
 1. `ats0=mm/dd/yy`
 2. Verify the date is correct with the command `ats0`
- d. Check battery: If battery fails and power is lost, the Nimbus display will require reprogramming of the date and time.

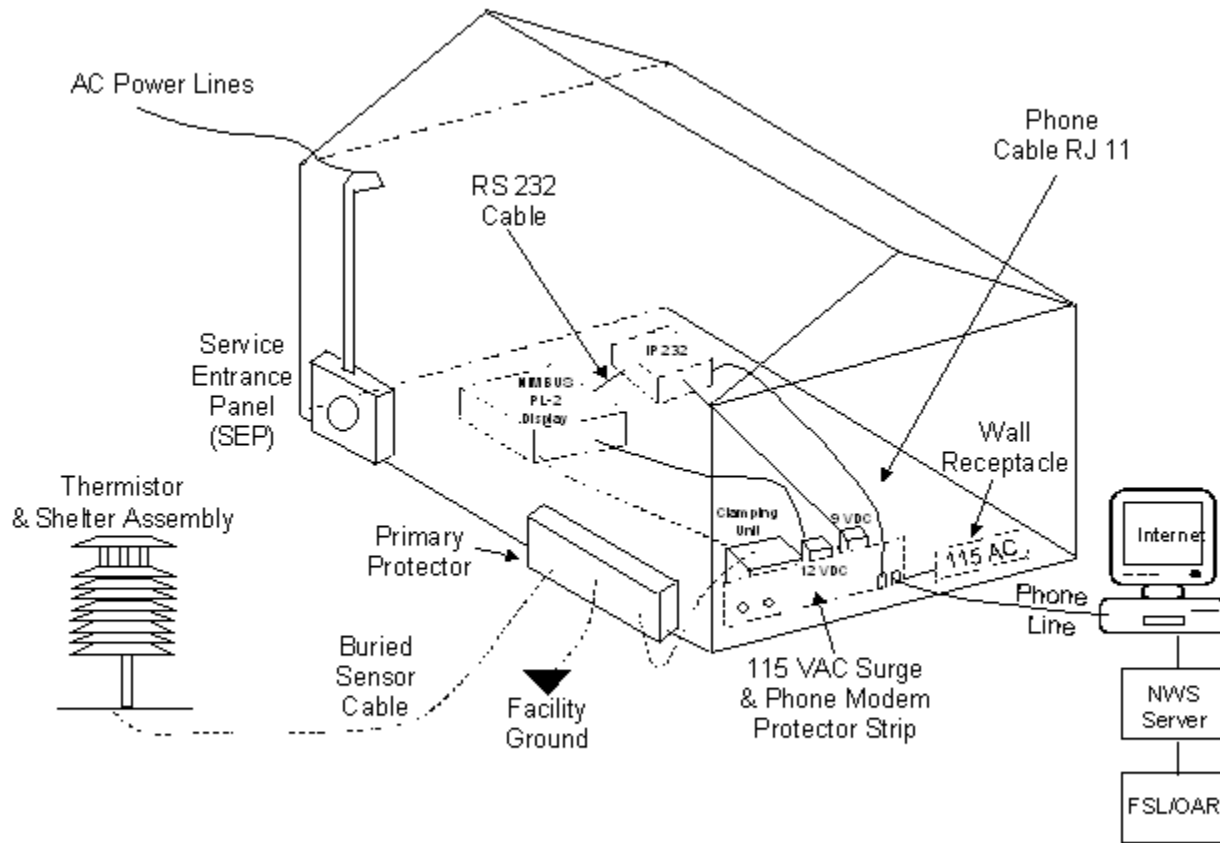


Figure 1 SEP Installation

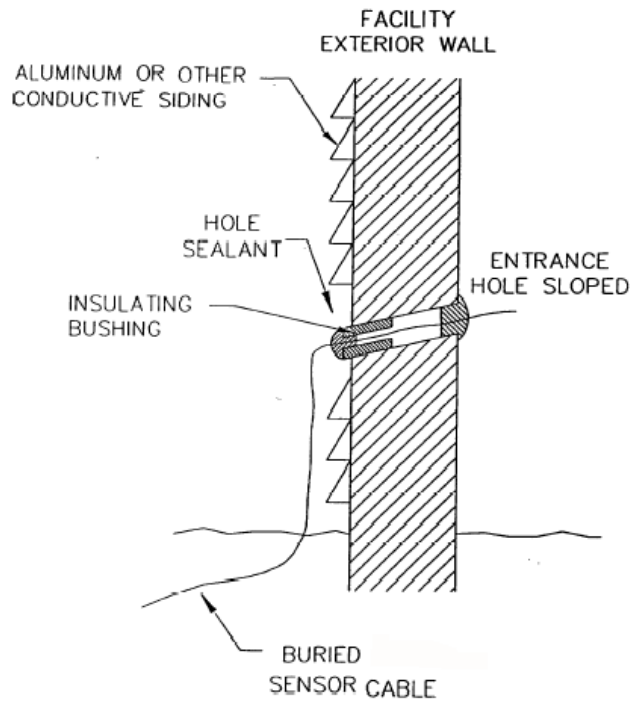


Figure 2 Cable Entrance Details

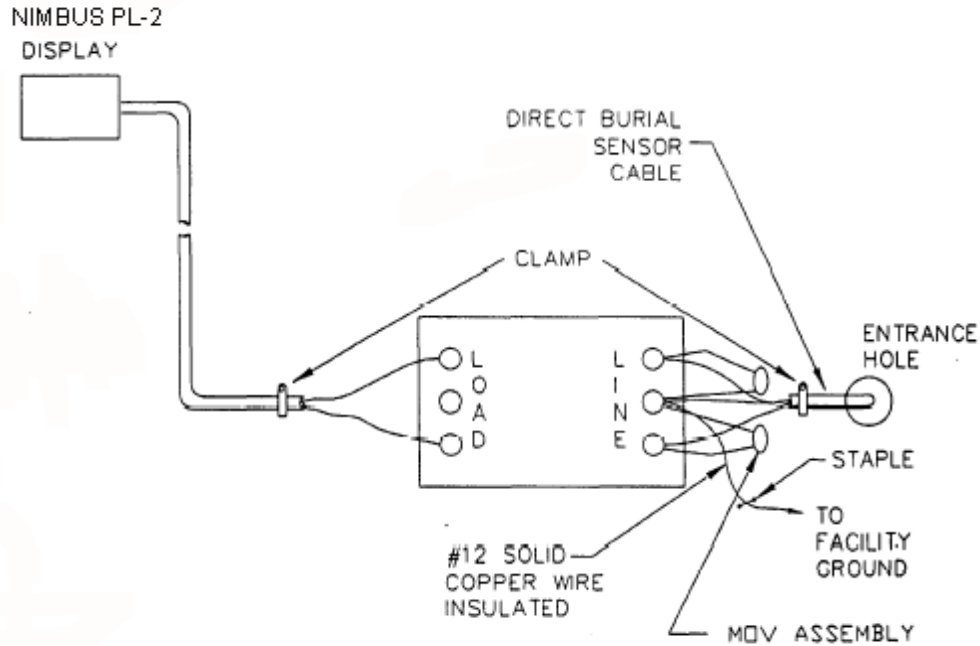


Figure 3 Primary Protector Installation

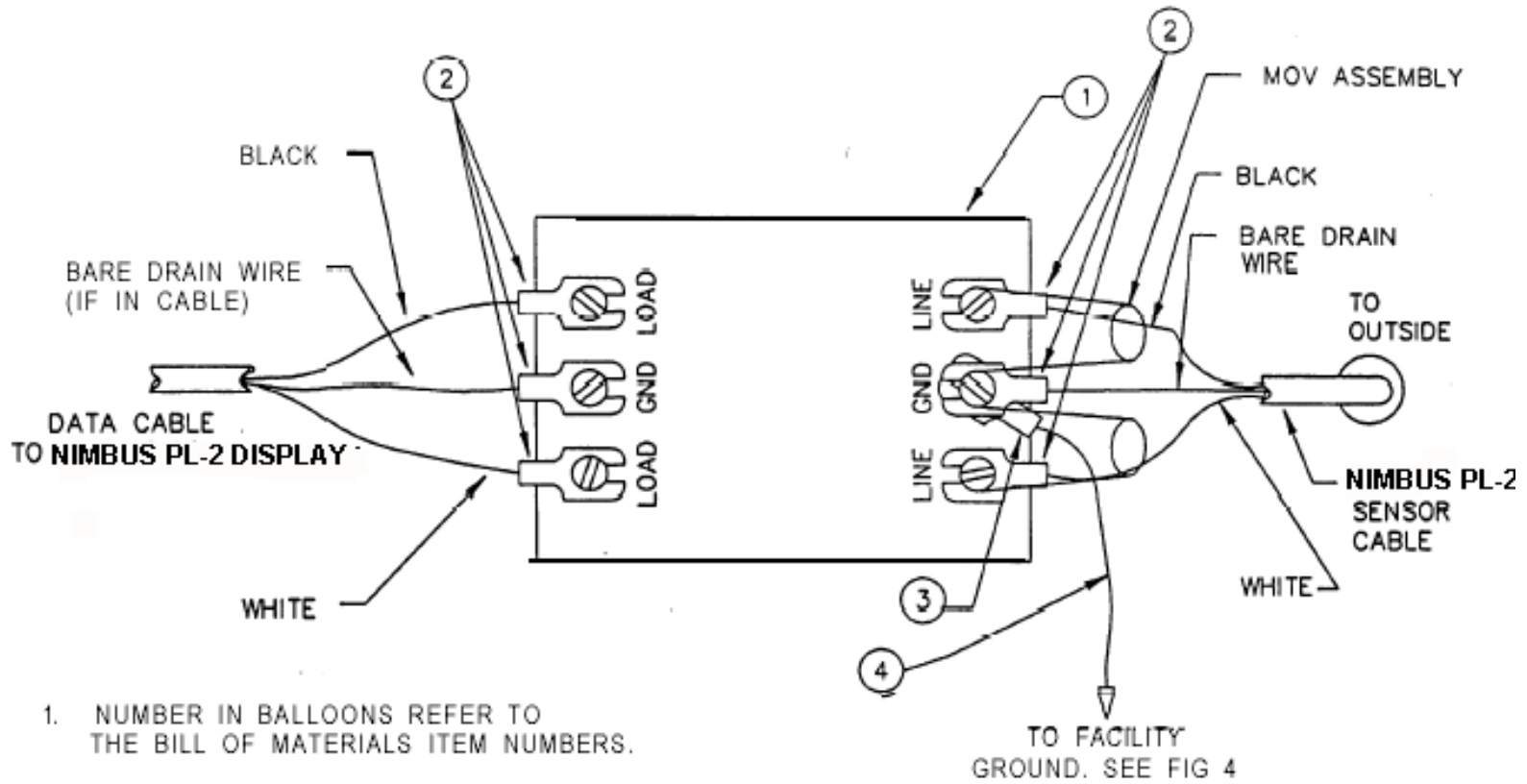


Figure 4 Primary Protector Wiring

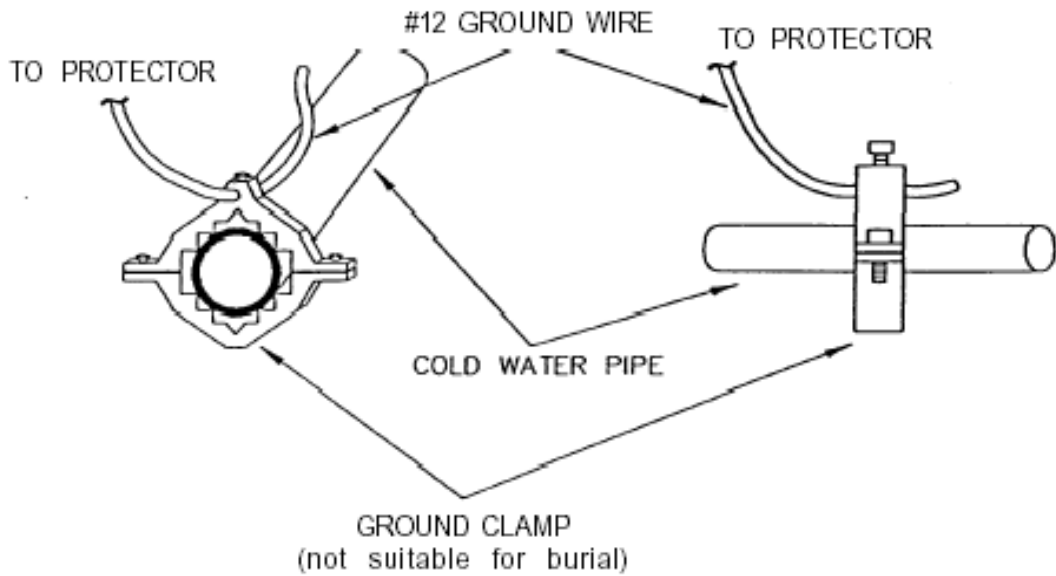


Figure 5 Ground Clamp

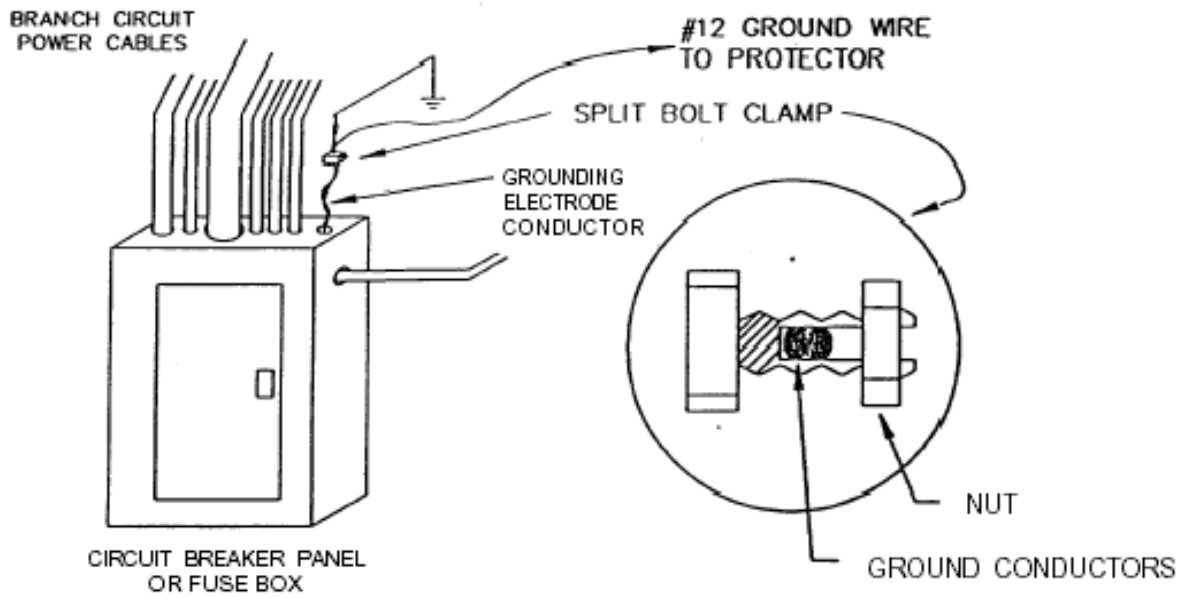


Figure 6 Grounding Clamps

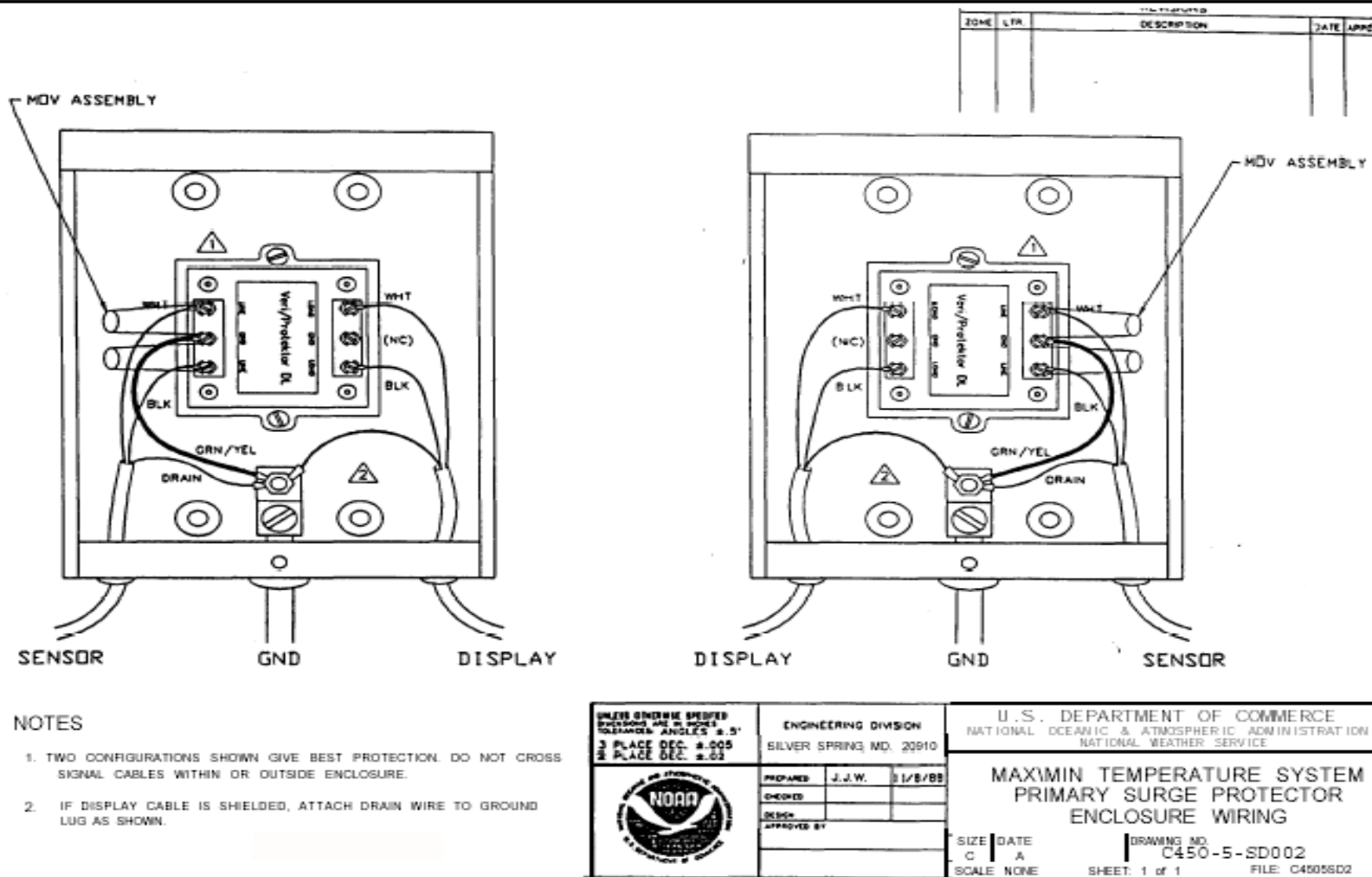


Figure 7 Drawing C450-5-SD002

EHB-8
Issuance 02-

Appendix 1

Ground Identification Guidance

The following, which is paraphrased from the National Electric Code (NEC, 1987), is provided as guidance in the identification and selection of a grounding point. If a grounding point cannot be positively identified, assistance from a qualified electrician (licensed for your county) must be contacted.

- a. The building or structure grounding electrode system. The grounding electrode system, in general, consists of the following items (when available) bonded together by jumpers: metal underground water pipe, grounded metal frame of building, concrete-encased electrode, or ground ring. These bonded items will be connected to the SEP box by a grounding electrode conductor. In a residence, all this normally reduces to the metal cold water piping system which is connected to the service entrance by a grounding electrode conductor. Any of the above items, when it is certain that they are part of the grounding electrode system, are suitable as the grounding point. For example, if the cold water piping system is the grounding electrode system as indicated by its connection by grounding electrode conductor to the SEP, then the point on the cold water piping system nearest the PPA is the proper grounding point. However, the grounding point must not be separated from the SEP grounding electrode connection point by nonconducting piping such as PVC piping.
- b. The power service accessible means external to the enclosure. The NEC (Section 250-71b) specifies that for dwellings a provision for externally connecting grounding conductors to the enclosures is to be provided. In addition to the metallic power service raceway and the grounding electrode conductor covered in the next paragraphs, provisions for other approved means are given. An example of the approved means is a #6 AWG copper conductor bonded to the service equipment and made accessible on the outside wall of the dwelling. [NEC Section 250-71b (3)].
- c. The metallic power service raceway (not normally used in a residence).
- d. The grounding electrode conductor or the grounding electrode conductor enclosure. (The conductor enclosure is not normally used in residences.)
- e. The service entrance enclosure. This grounding point should only be used if no other grounding point is available. Entry into the enclosure is not normally allowed except by an authorized electrician. The means of connection must be an approved means.
- f. If none of the above is available, then an effectively grounded metal structure may be used or a continuous and extensive underground metal gas piping system, which is acceptable to the gas supplier and the authority having jurisdiction, may be used. Steam or hot water pipes may not be used.

Appendix 2

List of Materials Provided by NOAAHQ

1. Primary Protector, ASN-C450-5
2. Metal Oxide Varistor (MOV) assembly, 2 ea per package, C460-3
3. Sensor Line Clamping Unit, C460-1
4. Connector AMP, 2 ea per package, C450-3P1
5. Connector Pin, 4 ea, for pins 1 and 3, C450-3P1MP1 (2 packages required for each new installation)
6. Cable Shielded, Exterior, 20 AWG, C450-3W1
7. Cable, Interior, 22 AWG, C460-1W1
8. Temperature Display Unit, Nimbus PL-2, C451-N1
9. Temperature Display Unit, Nimbus PL-2, 12 VDC power supply, C451-N1-PS1
10. Shelter, C450-2
11. VAC LED surge protector, C451-EF1 with RJ-11 cable
12. Insulators, 10 ea. per package, 017-i-1-2
13. RS-232 Modem, C451-N1-IP
14. RS-232 cable, C451-N1-W1, RJ-11 cables, and 9 VDC power supply

Appendix 3

Material Provided by Installing Activity

1. Spade lug for #20 and #22 AWG wire, crimp on type, #6 stud size. Amp Part No. 32562
2. Panduit Part No. PV18-6F-C or *equal
3. Spade lug, for #12 AWG wire, crimp on type, #6 stud size. Amp Part No. 324581
Thomas and Betts Part No. RC10-6F or *equal

NOTE: Radio Shack crimp on lugs are acceptable if they match the wire and stud size.

4. Copper wire, #12 AWG, solid insulated, green or green with yellow stripe, standard house wiring acceptable.
5. Cable clamp, for 1/1-inch diameter cable, SPC Part No. ECC-4 or *equal
6. Staples, uninsulated or insulated, suitable for LOM, Item #4.
7. Ground clamp, metal water pipe type, shown in Figure 5. Suitable for the pipe size and pipe material used as ground point.
8. Ground clamp, split bolt type, shown in Figure 7, sized for the grounding electrode conductor and #12 AWG wire. If the grounding electrode conductor is aluminum, the clamp must be suitable for both aluminum and copper.
9. Replace Primary Protector, ASN-C450-5 ground screw with stainless steel (18-8, 1", dia 1/4, 20 threads per inch)
10. AC outlet analyzer, Radio Shack (MICRONTA), Catalog No. 22-101 or equal
11. Spare 9 VDC battery for each COOP site

Attachment B
WS Form A-26 Sample