

ELECTRICAL HANDOUT

To clear up confusion as to the proper terminology in referring to various components of an electrical service to a dock. The following diagram of a typical dock electric service is presented:

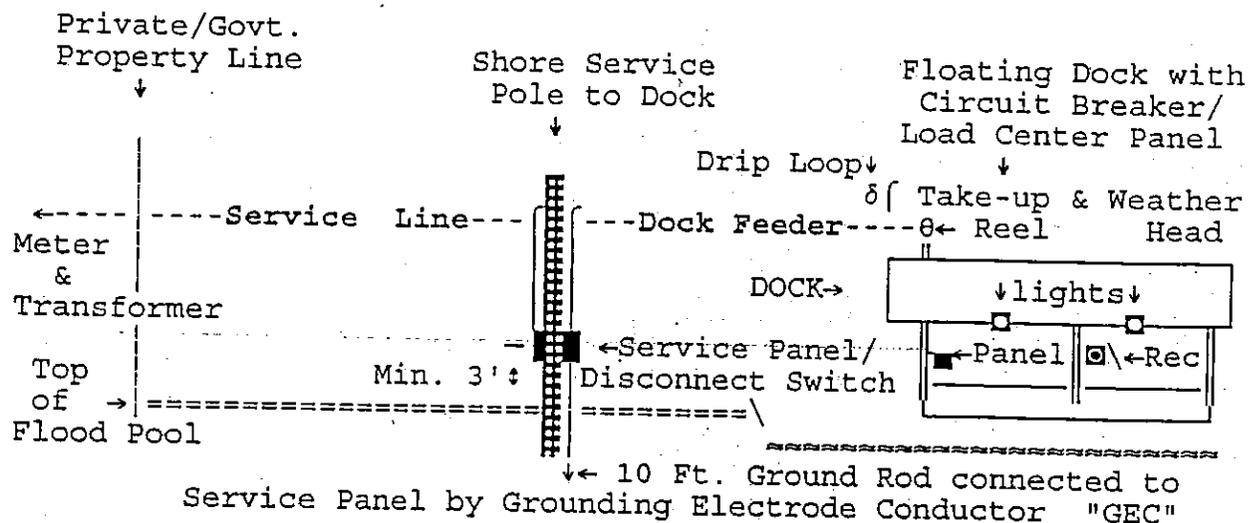


Figure 1

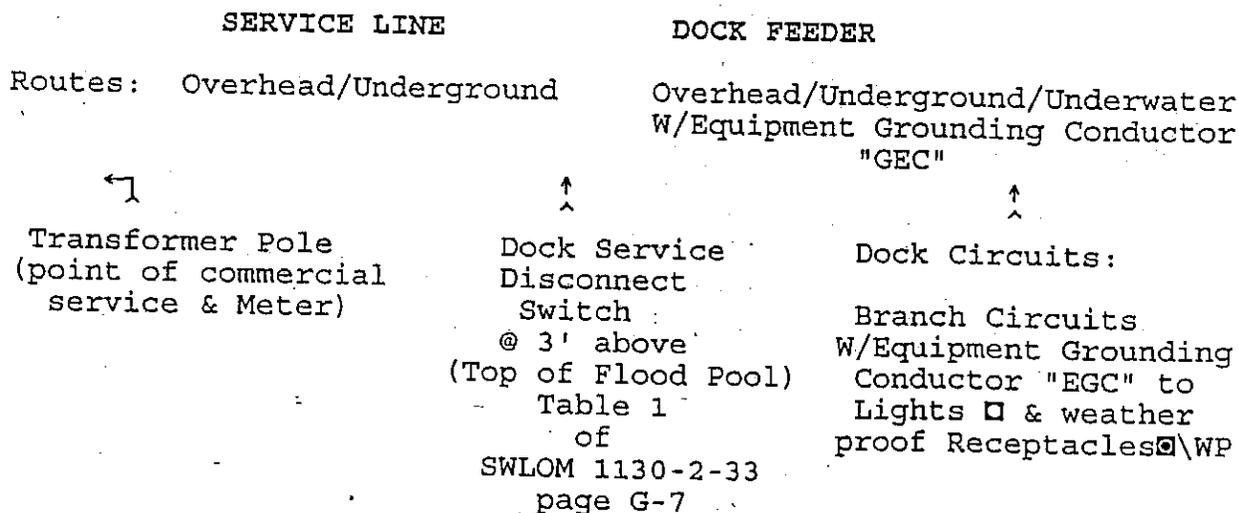


Figure 2

In general all electrical installations must be rated for the environment in which installed and adequately protected from damage both from the elements as well as people and equipment. Enclosures installed out in the weather for example must be constructed so as not to allow rain to enter the enclosure where energized electrical conductors are exposed. Where exposed to saturation under pressure enclosures and electrical devices must be rated watertight. See attached descriptive summary of ENCLOSURE TYPES. Electrical hardware is required by code to be stamped and labeled to identify that it has been inspected by independent testing laboratories for the intended purpose. Look at the label or exterior for proper identification of electrical hardware. Illustrations will be provided in this supplement to aid in the proper identification of electrical hardware.

ENCLOSURE TYPES

NEMA TYPE 1 — GENERAL-PURPOSE — INDOOR enclosures are intended for use indoors, primarily to prevent accidental contact of personnel with the enclosed equipment, in areas where unusual service conditions do not exist. Hoffman NEMA 1's are described in Bulletins A-1, A-2 and A-90. Hoffman enclosures of any other NEMA Type also meet NEMA Type 1.

NEMA TYPE 2 — DRIPPROOF — INDOOR enclosures are intended for use indoors to protect the enclosed equipment against falling noncorrosive liquids and falling dirt. The enclosures shown in Bulletin A-3 meet NEMA 2 requirements. Hoffman NEMA 4, NEMA 4X, NEMA 12, NEMA 13 enclosures and JIC boxes also meet NEMA 2 except for the drainage provision requirement.

NEMA TYPE 3 — DUSTTIGHT, RAIN-TIGHT AND SLEET-RESISTANT (ICE-RESISTANT) — OUTDOOR enclosures are intended for use outdoors to protect the enclosed equipment against wind-blown dust and water. Other Hoffman products designated as NEMA 4 or 4X also conform to Type 3.*

NEMA TYPE 3R — RAINPROOF AND SLEET-RESISTANT (ICE-RESISTANT) — OUTDOOR enclosures are intended for use outdoors to protect the enclosed equipment against rain and are constructed so the accumulation and melting of sleet (ice) will not damage the enclosure and its external mechanisms. Enclosures shown in Bulletin A-3 meet NEMA 3R. Hoffman NEMA 4 and NEMA 4X enclosures also meet NEMA 3R except for the provision for drainage. Many Hoffman JIC boxes meet NEMA 3R except for the provision for drainage (see Bulletin A-51).*

NEMA TYPE 4 — WATERTIGHT AND DUSTTIGHT — INDOOR AND OUTDOOR enclosures are intended for use indoors or outdoors to protect the enclosed equipment against splashing water, seepage of water, falling or hose-directed water, and severe external condensation. NEMA 4 enclosures can be found in Bulletins A-4, A-19, and A-51. The NEMA 4X enclosures listed in Bulletins A-4, A-17, A-19, A-45, A-50, A-51, E-1 (the "PBSS" pushbutton enclosures) E-2, E-3, and F-22 also meet NEMA 4 requirements.*

NEMA TYPE 4X — WATERTIGHT, DUSTTIGHT AND CORROSION-RESISTANT — INDOOR AND OUTDOOR enclosures have the same provisions as Type 4 enclosures and, in addition, are corrosion-resistant. NEMA 4X enclosures can be found in Bulletins A-4, A-17, A-19, A-45, A-50, A-51, E-1 (the "PBSS" pushbutton enclosures), E-2, and F-22.

NEMA TYPE 9, CLASS II, DIVISION 1 GROUP E, F OR G — INDOOR HAZARDOUS LOCATIONS — AIR-BREAK EQUIPMENT enclosures are intended for use indoors in the atmospheres and locations defined as Class II, Division 1 or Division 2, and Group E, F or G in the "National Electrical Code" to prevent the entrance of explosive amounts of hazardous dust. These enclosures are shown in Bulletin A-9.

NEMA TYPE 12 — INDUSTRIAL USE — DUSTTIGHT AND DRIPTIGHT — INDOOR enclosures are intended for use indoors to protect the enclosed equipment against fibers, flyings, lint, dust and dirt, and light splashing, seepage, dripping and external condensation of noncorrosive liquids. Hoffman NEMA 12's are shown in Bulletins A-12, A-13, A-15, A-21, A-22, A-23, A-24, A-25, A-26, A-27, A-28, A-29, A-30, and A-34. Many other gasketed products also conform to NEMA 12 as indicated in the individual Bulletins.

NEMA TYPE 13 — OILTIGHT AND DUSTTIGHT — INDOOR enclosures are intended for use indoors primarily to house pilot devices such as limit switches, foot switches, pushbuttons, selector switches, pilot lights, etc., and to protect these devices against lint and dust, seepage, external condensation, and spraying of water, oil or coolant. Most enclosures in Bulletins A-51, E-1, E-2, and C-5 meet NEMA 13 (see individual Bulletins). Other Hoffman products designated as NEMA 4 or 4X also conform to Type 13.

The preceding descriptions are not intended to be complete representations of National Electrical Manufacturers Association standards for enclosures.

The National Electrical Code, NEC, gives specific rules to be followed. However, good common sense in protecting personnel from electrical shock hazards as well as maintaining the insulating integrity of wiring and electrical devices is the major theme through out this code. All live electrical components must be insulated and guarded by enclosures from contact by personnel. Anything which will damage or compromise the insulating or protective characteristics of wiring installations is most likely covered somewhere within the text of the code. Holes which allow the entrance of bugs, water, dust, and the accumulation of excessive moisture are not generally allowed. Wiring should also be protected from sharp edges of conduits, enclosures, and structural features that can cut through either the outer cable jacket or the insulation of the conductors themselves. This would allow exposed metal objects which personnel are likely to make contact with to be energized, thereby creating a deadly shock hazard. Circuit breakers with proper grounding of the electrical system as well as Ground Fault Circuit Interrupters provide some degree of protection from shock hazards. Proper grounding of electrical installations is critical to the safety of personnel.

Starting from the incoming electrical service/meter pole we will trace the electrical service out to the boat dock electrical devices/lights/receptacles etc. Often the service/meter pole and dock shore service pole will be separate. We will cover the applicable rules and give examples and illustrations where necessary to clarify the NEC and the SWLOM 1130-2-33 dated 15 Sept. 92. Direct references will be made to the NEC and the SWLOM as needed. These should be referred to for more information when required. Refer to paragraph "1" page G-5, 6, 7, 8 and 9 of the SWLOM.

Overhead service lines must be a minimum of 12' over walkways, 18' over areas where vehicles pass, and 55' over sailboats or areas where sailboats with masts in place might pass. (NEC Art. 230-24) Also see ER 1110-2-4401, Clearances for Power and Communications Over Reserviors, dated 5 September 1986; for additional guidance.

Trees are not authorized to be used for running overhead electrical service conductors. (NEC Art. 225-26) However, Trees of adequate strength are authorized for mounting outdoor rated/ double insulated light fixtures (NEC Art. 410-16 h, 225-26, 300-5 d) provided conductors are protected from damage by conduit below 8' elevation above ground to 18" below grade level.

Recommend that trees not be utilized to support fixtures on Corp property even though NEC allows it. It has been noted that on some Corp projects that trees have overgrown conductors and even damaged insulators etc.

Overhead Feeder/Messenger cable from the Dock Service Pole to the Dock must be Quadplex consisting of three insulated conductors: hot, neutral, insulated ground, with bare messenger cable for support making four cables. The grounding electrode conductor must be insulated #8 AWG minimum (NEC Art. 250-23b) Even if the hot and neutral can be downsized for the voltage drop calculations the ground must be #8 or larger. Since Quadplex with different sizes of wire is not commercially available, #8 Quadplex is required as a minimum. Check NEC Table 250-94 for proper size of grounding electrode conductor. Minimum size for overhead service drops will be #8 copper or #6 Aluminum (NEC Art. 230-23). Note that the use of Aluminum conductors requires special lugs and connectors that are rated for connection to Aluminum due to the difference in creepage rates when subjected to heating caused by electrical current. Lugs will be stamped AL/CU when rated for this application. If a circuit breaker panel is not installed on the dock, the overhead line/messenger cable going out to the dock is classified as a branch circuit and the associated ground becomes an equipment ground conductor instead of a grounding electrode conductor in which case the ground only needs to be #12 minimum. If there is a circuit breaker panel on the dock, then the overhead line is a feeder and the associated ground is a grounding electrode conductor which must be #8 AWG copper or #6 Aluminum as stated above. Check NEC Article 555-7 (e) where the ground must be insulated. Article 555 takes precedence over Article 230-22 where an exception allows the grounding electrode conductor to be bare as Article 555-7 explains due to the highly corrosive conditions around the water and the importance of insuring the integrity of the ground for safety reasons. Wherever the Code has specific articles on a particular installation with more stringent requirements, these take precedence over the other referenced articles in the code. From the commercial point of service/ watthour meter & transformer up to the dock service pole Triplex is approved for single phase 3 wire installations.

FUSED DISCONNECT SWITCH

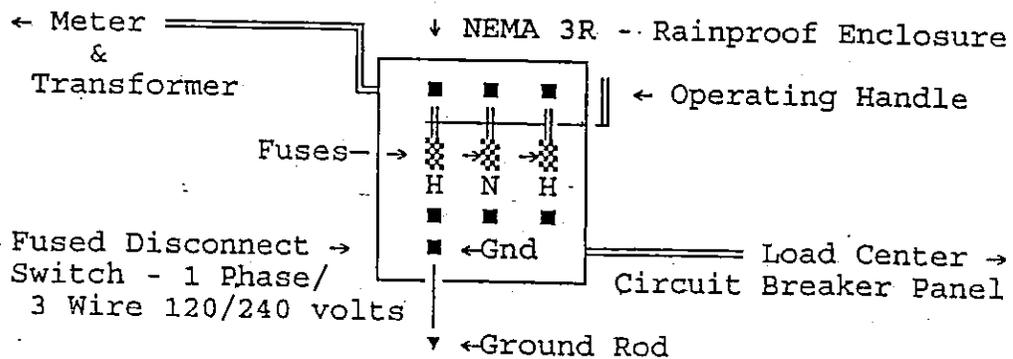


Figure 4

Note: Overhead dock feeders must a minimum of 3' above the roof from a point 3' out from the canopy or 18" if less than 6' of cable or 4' of roof on a 4 in 12 roof slope. (NEC Art 230 - 24)

Underground feeders must be rated Type "UF" (underground feeder) or "USE" (underground service entrance) for direct burial in the ground. Otherwise all other conductors must be rated for wet locations and installed in rigid conduit for underground installations. Direct buried conductors must be protected by rigid conduit with bushings from 24" below the surface and continuously above the surface as well.

In rocky locations feeders mounted on the surface must be in rigid conduit down to a point 3' below the bottom of the power pool. Conduit must be secured by concrete, stakes, or other means to prevent movement and subsequent damage. Insulating bushings need to be installed where the feeder enters the conduit to preclude the sharp wall of the conduit cutting into the cable jacket and insulation. See the following Service Pole detail:

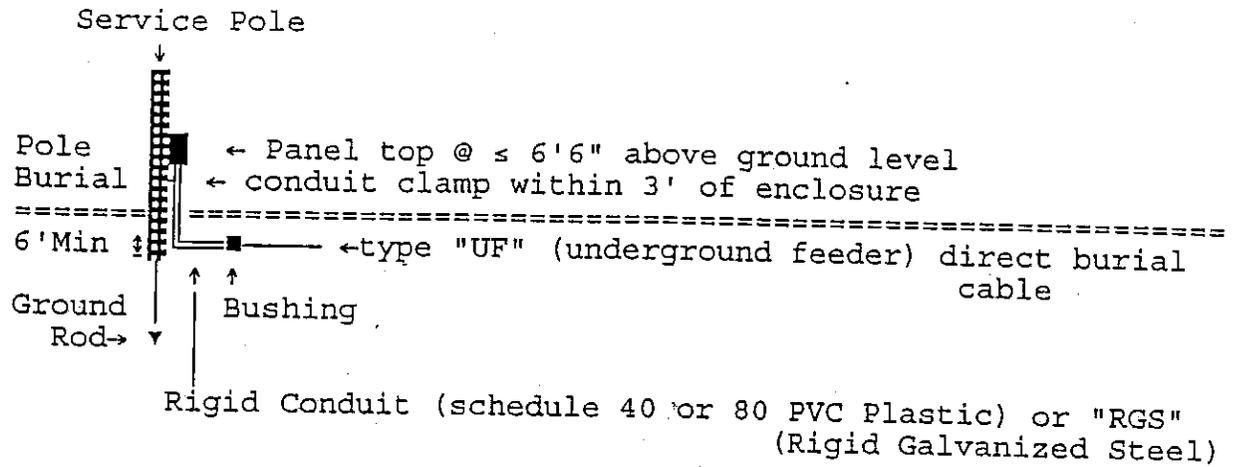


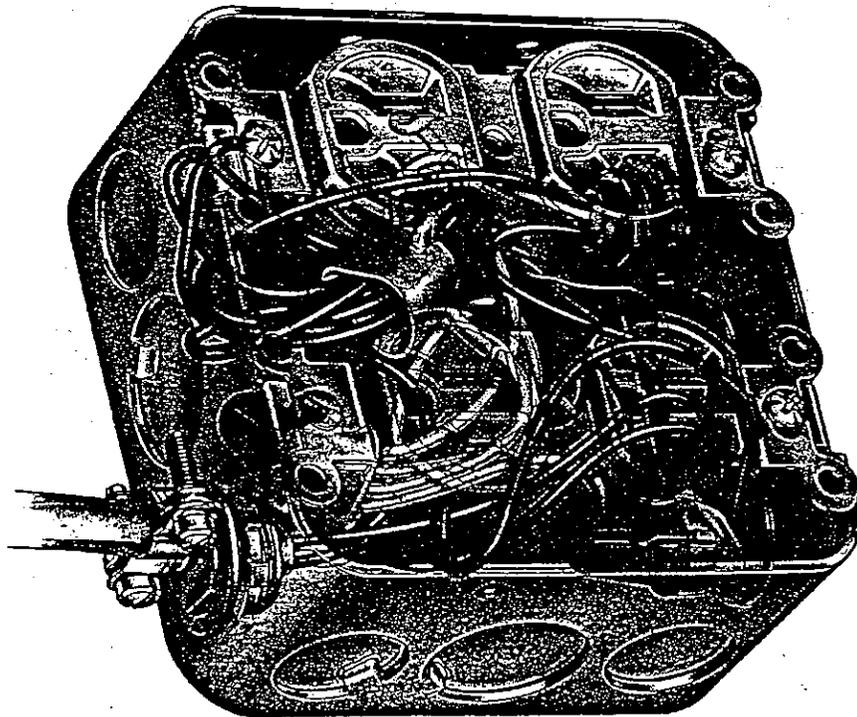
Figure 5

Note: National Standards require wooden utility poles to have a stamped label 10 Ft. from the bottom. Check for this label to be approximately 4 Ft. above ground level for proper burial depth.

Where steel conduit is used it must be properly bonded electrically to enclosures with double lock nuts gripping the solid metal of the enclosure such that circuit breakers will trip in the event of a ground fault. (NEC Art. 250-72)

Flexible cords which are laid on the ground must have a protective outer jacket to protect the conductors from the environmental hazards present. Relative to extension/flexible cords, the National Electrical Code, NEC, distinguishes between light residential usage and Hard or Extra Hard usage. Boat docks are considered Hard to Extra Hard usage. Even then special precautions in the proper usage must be followed to avoid damaging the cable jacket and exposing live conductors. (NEC Art. 400, Table 400-4) To preclude damage, cords should not be routed in water, across roadways, sharp objects, paths, stepped on, or driven over by vehicles etc. Only recently have some flat cords been rated for hard or extra hard usage. Check label's for rating's.

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All electrical hardware, light fixtures, switches, receptacles, enclosures, etc. must be rated for the environment in which it is installed. (NEC Art. 110) All docks are classified as wet locations under 30" above the water or 12" above the level of the deck due to wave action, wakes, etc. (NEC Art. 100 - Location, Wet and NFPA 303-3.4) All electrical hardware must be rated waterproof, NEMA 4. Rainproof/drip proof is not acceptable. Above 30" all docks are classified as a Damp locations (NEC Art. 100 - Location, Damp). Locations at the edge of an open canopy are still subjected to being washed down by hard driving rain and should be classified rainproof, enclosure type NEMA 3R (drip proof/rain tight) or NEMA 4 (waterproof). Unused holes on the top or sides must be sealed to preclude the entrance of water to be rainproof. To comply with all Code requirements it is recommended that Circuit Breaker Panels and Disconnect Switches be mounted with the top at 6'6" and that light switches and receptacles be mounted 36" - 48" above deck. See diagram below:

TYPICAL BOAT DOCK ENVIRONMENT

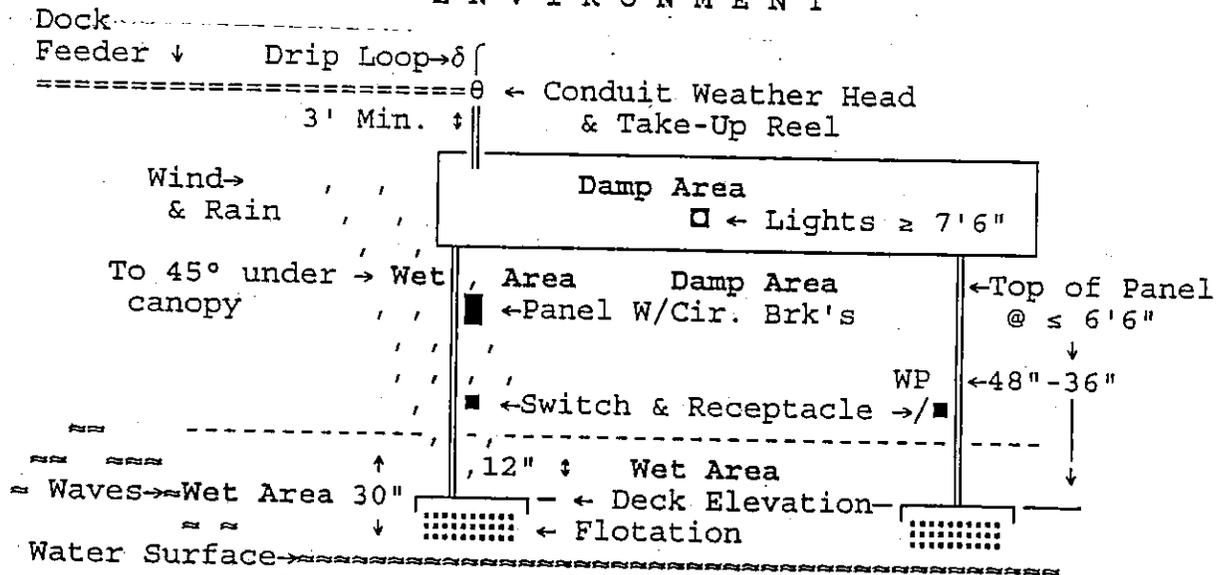
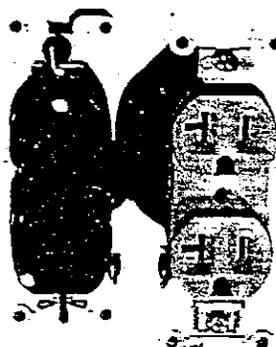
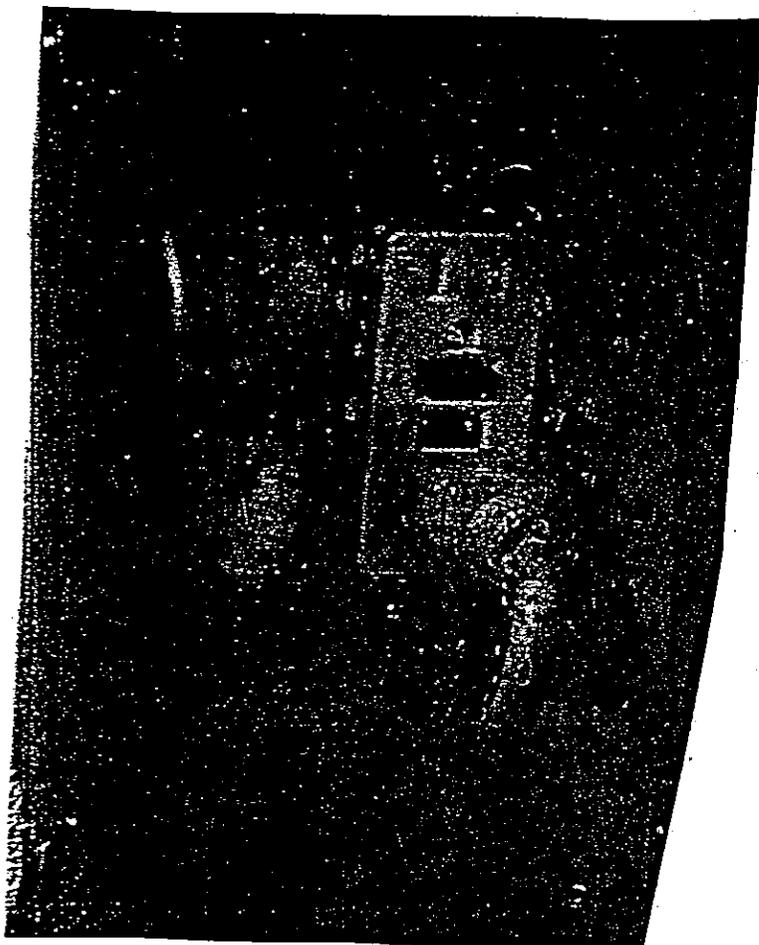


Figure 6

Hardware that is mounted below 30" must be waterproof. If holes must be drilled through the enclosures, rubber "o" rings/washers must be installed to maintain the waterproof integrity of the enclosure. (NFPA 303 - 3-18.1) Generally speaking drip proof enclosures will have a solid cover with a lip to prevent rain from entering. Waterproof enclosures will be gasketed. See previously attached summary of National Electrical Manufacturers' Association, NEMA, enclosure types. Note that NEMA types 1, 12, etc. are rated for indoor use only and would not be acceptable in an outdoor application. Sheet metal boxes with preformed knockouts are not rated for wet or damp locations. See illustration. (Sheet Metal Box)

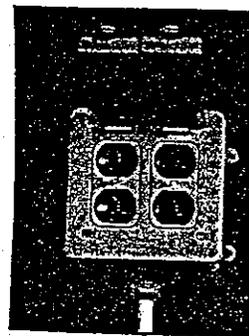
Receptacle and switch boxes must be grounded per (NFPA 303 - 3-6.2 and NEC Art. 250 - 74) unless the receptacle or switches have a ground continuity device/clip that maintains the continuity between the equipment ground and the mounting screws. See illustration #6. Otherwise a pig tail ground must be run from the receptacle ground yoke to the wall of the receptacle/switch box. Special clips are available for this purpose if the box is not equipped with a ground terminal. An equipment grounding conductor not smaller than # 12 AWG must be run to all branch circuits. All receptacles on boat docks must be protected by Ground Fault Circuit Interrupters, GFCI's (NEC Art. 555-3). Weatherproof covers are required by the new 1993 National Electrical Code (NEC Art. 410-57 (b) fig. 410-8) for unattended cords being plugged in. See left illustration # 8 below. The weather proof covers on the right are only rated watertight when closed or attended. Normal mounting height is 48" above the deck.

New Weatherproof Covers
Unattended



Ground Continuity
Clip

Weatherproof



Conduit Support Rules

CONDUITS WILL NOT BE SUPPORTED FROM OTHER CONDUITS.

BOXES WILL BE INDEPENDENTLY SUPPORTED EXCEPT FOR PULL BOXES.

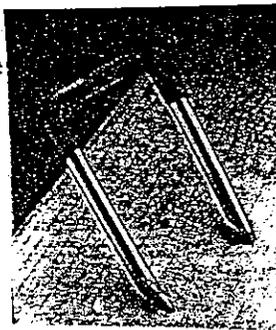
RACEWAYS WILL BE SECURELY FASTENED IN PLACE. NEC ART. 300-11a
" ADDITIONAL SUPPORT MAY BE NECESSARY." ARTICLE 348-12

NO MORE THAN 4 X 90' ELBOWS BETWEEN J-BOXES.

Minimum conductor size for branch circuits will be #12 AWG and in accordance with (NEC Art. 210-19 (a) FPN No. 4) where maximum voltage drop will not exceed 3% and for Feeders (NEC Art. 215-2(b)). Total voltage drop will not exceed 5% for feeder and branch circuits. All branch circuit wiring must be copper since no electrical devices/receptacles/lights are rated for connection to aluminum wire.

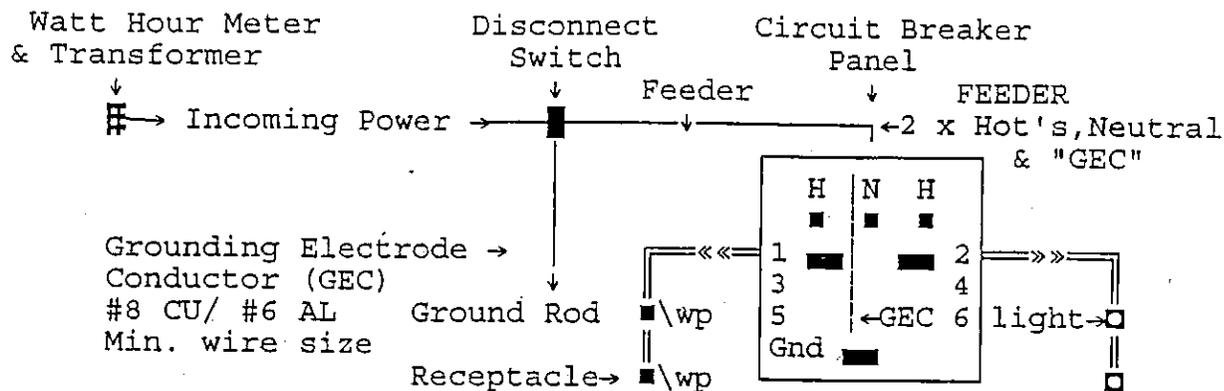
Nonmetallic Sheathed Cable commonly referred to as Romex cable must be installed above 8' or isolated from damage in conduit or concealed. (NEC Art. 336, 300, and 310). The underside of joists or beams is subject to damage below 8'. All sides of columns below 8' on a dock are subject to damage. Exposed cable must be sunlight resistant (NEC Art. 555-6). Most conduit and cable rated for sunlight resistance is gray in color. Type NM cable is rated for dry locations only. Therefore, Type NM is not acceptable for damp locations under an open canopy. Type NMC is acceptable. Special staples, ties, straps, etc. must be used to attach romex at 4 1/2 ft. intervals. (NEC Art. 336-15) (see illustration # 12). Below 8' romex where exposed to damage must be in conduit where it runs vertically down a column. See (NEC Art. 336)

Staple



GROUNDING: There has been a great deal of confusion on the National Electrical Code requirements for grounding electrical systems to boat docks. Depicted below is a typical service for a boat dock. Note that the ground is a grounding electrode conductor up to the ground bus of the circuit breaker panel and from the panel out to the lights and receptacles the ground run with the branch circuits is called the equipment ground. The ground conductor must be sized large enough to provide a low resistance path back to the panel to trip the circuit breaker in the event of an electrical fault to ground or the case/outer exposed metal skin on any electrical device, conduit, enclosure, etc. The ground must be large enough to carry the maximum possible fault current. In the case of a branch circuit this is relatively small being that only the power supplied to the one branch circuit comes into play. In the case of the entire circuit breaker panel where the grounding electrode conductor provides protection, the fault current can be much larger. Therefore, the grounding electrode conductor is required by code to be much larger to protect the numerous branch circuits originating in the circuit breaker panel or in the electrical service. Electrical faults can occur between two hot conductors, a hot and a neutral, or hot and ground. Ground consisting of the grounding conductor system, the exposed metal in the case/enclosures of electrical equipment, and metal conduit/raceway systems. This protects personnel from being electrocuted once the insulation on an electrical conductor is compromised by breaking the source of power to the affected circuit where the fault occurred. A typical electrical service will consist of a single device which provides a means of disconnecting power to the service. It will also include a panel or means of dividing up or distributing the electrical power to individual electrical devices with protection sized closely to the maximum capacity for each branch circuit and major feeder. This way the protective devices consisting of fuses or circuit breakers will interrupt the source of power to prevent major damage from occurring once a weak spot in the insulation is detected and too much current flows through the circuit or device than it was designed to carry.

A TYPICAL SERVICE



Branch Circuits # 1 & 2 for Receptacles and..... Lights consisting of a Hot, Neutral, and Equipment Ground Conductor, "EGC".

Figure 13

The Grounding Electrode Conductor, "GEC", will run from the Ground Rod to the Disconnect Switch and then extend to the Ground Bus, "Gnd", of the Circuit Breaker Panel as a part of the Feeder. Branch Circuits include an Equipment Ground Conductor, "EGC", from the Ground Bus out to the individual electrical devices such as the lights and receptacles. This can be the same size as the branch circuit conductors or #12 AWG in most cases. Depending on which portion, "GEC" or "EGC", of the service is run over the water the feeder or the branch circuit will determine what size the ground can be and whether or not it must be insulated.

OVERHEAD TO UNDERGROUND TRANSITION

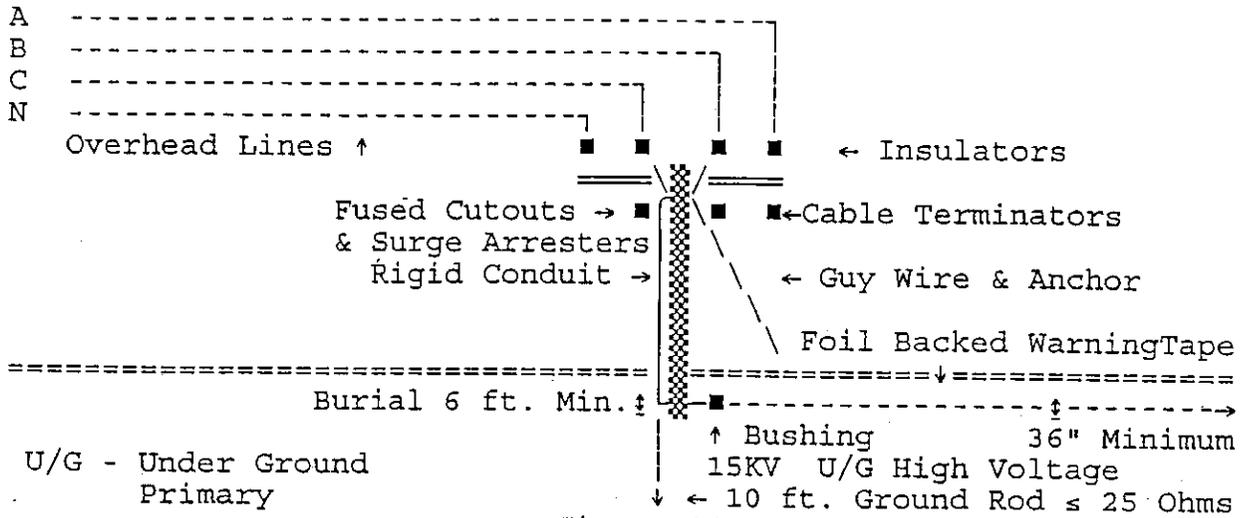


Figure 14

PAD MOUNTED TRANSFORMER

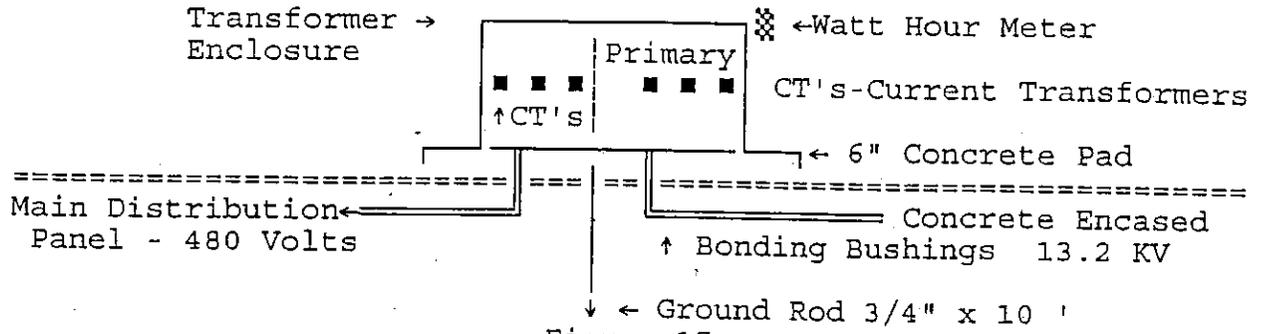
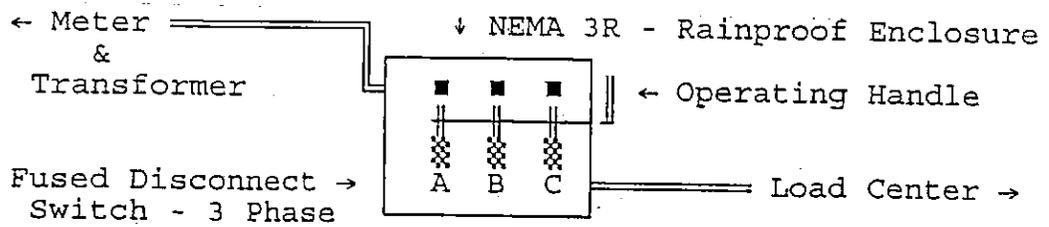
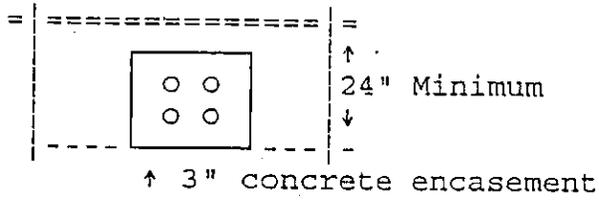


Figure 15
16

DETAILS:

UNDERGROUND HIGH VOLTAGE PRIMARY



G L O S S A R Y O F T E R M S

AL - Aluminum wire
AWG- American Wire Guage, #12 AWG etc.
EGC- Equipment Grounding Conductor (Ground conductor from Circuit Breaker Panel Ground Bus to Receptacles, lights, devices, equipment, etc.)
CT's- Current Transformers
GEC- Grounding Electrode Conductor (Ground Conductor from Ground Rod (earth ground) to service panel or circuit breaker panel ground bus)
UG- Under Ground
OH- Over Head
UW- Under Water
IAW- In Accordance With
W/O- Without
UF- Under ground Feeder Cable
USE- Under ground Service Entrance Cable
A/R- As Required
WP- Weather proof
NEMA- National Electrical Manufacturer's Association
CU- Copper wire
UL- Underwriters Laboratories Approved & Labeled
/ - and, or
Max.-Maximum
Min.-Minimum
Gnd- Ground
HD.- Head
J-Box- Junction Box - secured to threaded conduit.
Outlet Box- contains electrical devices, receptacles, lights, switches. Must be secured to structure.
Encl- Enclosure/panel
XLPE- Cross Linked Poly Ethylene cable insulation
X- Deficiency noted
✓ - OK or approved, passed
≤ - less than or equal to, within, below
≥ - greater than or equal to, above, more than
@ - at this location
Yel - yellow
W/with
Elev. - elevation
WH - Weather Head
N/A - Not Approved
NEC - National Electrical Code (updated every 3 years, 1990, 1993)

NFPA 70 - National Fire Protection Association chapter 70
(this is another name for the " NEC ")

GFCI - Ground Fault Circuit Interrupter - Receptacles and Circuit Breakers
Quadplex- 3 insulated conductors & 1 bare messenger cable
Triplex- 2 insultaed conductors & 1 bare messenger cable

CB-Circuit Breakers

Recpt. - Receptacles

TRF.- Transformer

RIGID conduit- thick walled threaded

IMC conduit- Intermediate Metal Conduit threaded

EMT conduit- Electrical Metal Tubing, not threaded, water proof with special connectors.

Sealtight conduit- Flexible conduit with waterproof jacket

Flex conduit- metallic flexible conduit, allowed for equipment connections and flexible unions where terminated in J-Boxes.

ROMEX - Non-metallic sheathed cable

THW, THWN, THHN, XHHW, RHW, THHW - Common types of insulation approved for protected wet locations such as inside of conduit.

Item	OK	Check / Inspect	Remarks/Deficiencies
4		Dock:	
a		-Panel properly secured and clean inside.	
b		-Circuit Breakers secured to bus bars.	
c		-Connections tight (AL will creep and work loose)	
d		-Circuit Breakers labeled clearly (numbered IAW legend)	
e		-Panel, Elev. of top \leq 6' 6" above deck Elev.	
f		-Panel enclosure (NEMA 4 or NEMA 3R rated weatherproof) (unused openings sealed with plugs or silicone sealant. No openings larger than 1/8")	
g		-Wiring in conduit (new docks) (\leq 8' above deck on old existing docks. Romex OK \geq 8' Elev. as long as in good condition. Must use approved insulated staples for installation @ 4 1/2 Ft. intervals)	Check for proper bushings
h		-Devices and panels secured to sound structure of dock	
i		-Conduit secured \leq 3' (within) (\leq 3' of all unions, panels, boxes, fittings & 10' Min.)	
j		-Conduits secured to panels & boxes tightly for electrical bonding/continuity. Double lock nuts required for EMT. Rigid and IMC threaded.	
k		-Lights W/guard & globe (Min. Elev. \leq 8' above deck)	
l		-Lights UL listed for damp/ weatherproof. Gasketed?	
m		-Bulbs not broken	
n		-Lights clear of flammable members (12" incandescent, 6" Flourescent)	
o		-Outlet Boxes- Boxes containing receptacles/switches/lights must be secured to structure.	
p		-J-Boxes must be secured to threaded conduit. IMC or Rigid. For EMT and Flex J-Boxes need to be secured to the structure.	
q		-Receptacles/switches \geq 30" Elev. above water and 12" above deck Elev. (This is to be out of the wet area.)	

- l -Underwater Feeder secured by Kellems Grips or other approved cable grip to dock structure.
- m -Feeder in conduit where exposed to damage.
- n -Bushings installed at conduit J-box entry point, sealed, Waterproof.
- o -Check for damaged insulation.
- p -Flex conduit is sealtight/waterproof type

- r -Conductors (three to each device, hot, neutral, and Gnd-"EGC")
- s -Bushings installed A/R, check for conductors in contact with sharp edges of conduit or panels etc.
- t -Conductors not skinned or cracked and in good condition.
- u -Conductor insulation approved for damp or wet locations (THW, THHN, THWN approved types) (inside conduit is a wet location)
- v -Conduit supports UL approved (nails, straps, not allowed in most cases)
- w -Boxes with knockouts not allowed (boxes must be NEMA 4 weatherproof/ drip proof NEMA 3R rated)
- x -Receptacles properly grounded (check for pigtail ground to box unless grounding continuity device is on yoke of receptacle)
- y -Receptacles or Circuit Breakers equipped with GFCI's. (Is there a test or reset button on the device)
- z -Receptacles equipped with weatherproof covers (must be closed when unattended unless rated for unattended usage)

TYPICAL BOAT DOCK
ENVIRONMENT

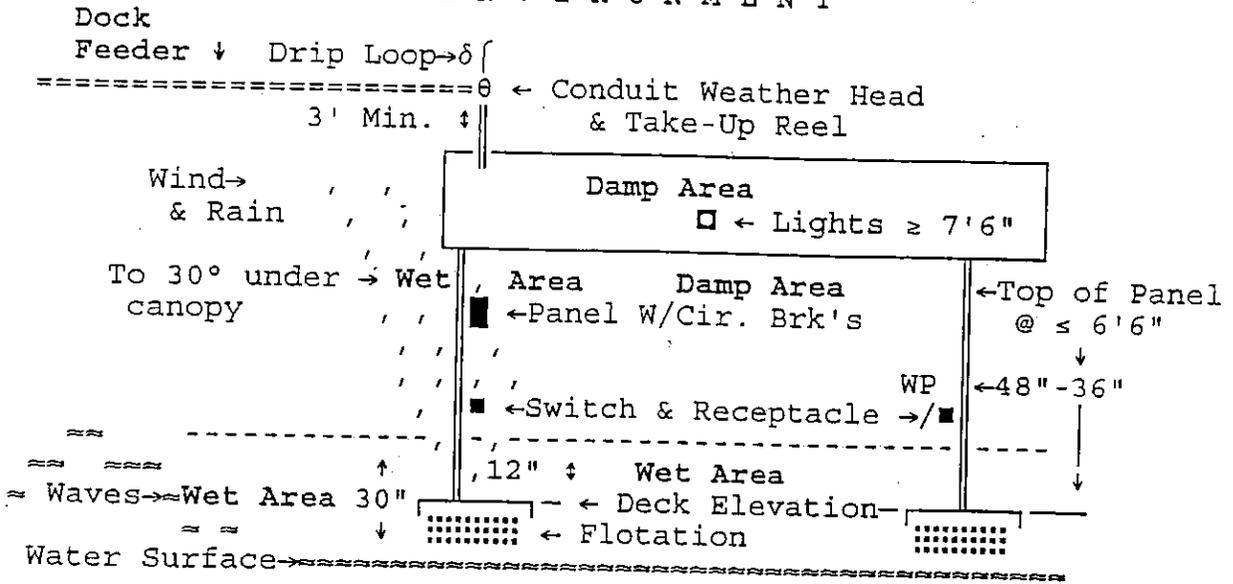


Figure 18

Item	OK	Check / Inspect	Remarks/Deficiencies
3		Dock Feeder:	
a		-Clearance ≥ 12 Ft. Walks (above) ≥ 18 Ft. Roads ≥ 55 Ft. Sail ≥ 18 Ft. Boats W/Barriers ≥ 12 Ft. Water Consider: Party Barges W/Antenna & Running Lights raised.	
b		-Take-Up Reel/Weather Hd.	
c		-Roof penetration sealed	
d		-Bushing at roof & Panel entrances	
e		-Guy wire/supports tight	
f		-Conductors Quadplex (3 insulated conductors)	
g		-Conductors #8 CU/#6 AL (Portable Cords N/A) N/A - Not Approved for purpose	
h		-Ground to dock panel "GEC" #8 CU/#6 AL Min.	
i		-In conduit ≤ 24" burial (less than) to 3' below power pool/ Navigation pool	
j		-Conduit is "RIGID" type ("RGS", schedule 40/80 "PVC") stamped on conduit	
k		-Conduit secured ≤ 3' (within 3') (≤3' of all unions, panels, boxes, fittings & 10' Min.)	

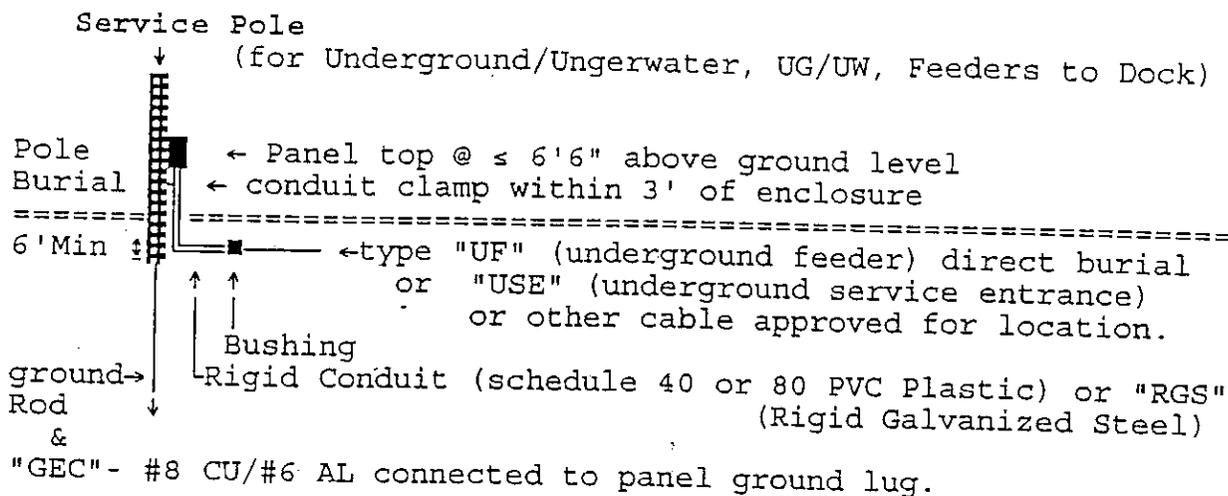


Figure 17

Item	OK	Check / Inspect	Remarks/Deficiencies
2		Service Pole:	
a		-3' above top of Fl. pool	
b		-Guy wire tight/Yel-cover	
c		-In Weather Head/Conduit below 8' above ground. Approved drip loop?	
d		-Conduit secured $\leq 3'/10'$	
e		-Panel/Switch secured & clean	
f		-Weatherproof/sealed (NEMA 4 or 3R type Encl)	
g		-Panel grounded properly W/Gnd lug (#8 CU/#6 AL to Gnd Rod)	
h		-Ground rod installed	
i		-Bushings installed A/R	
j		-Proper Operation	
k		-Lugs (AL/CU labeled) for AL wire	

I N S P E C T I O N C H E C K L I S T

Dock Owner: _____ Date: _____

Address: _____ Inspector: _____

Location: _____

Phone: _____ Lease No.: _____

Electrician: _____

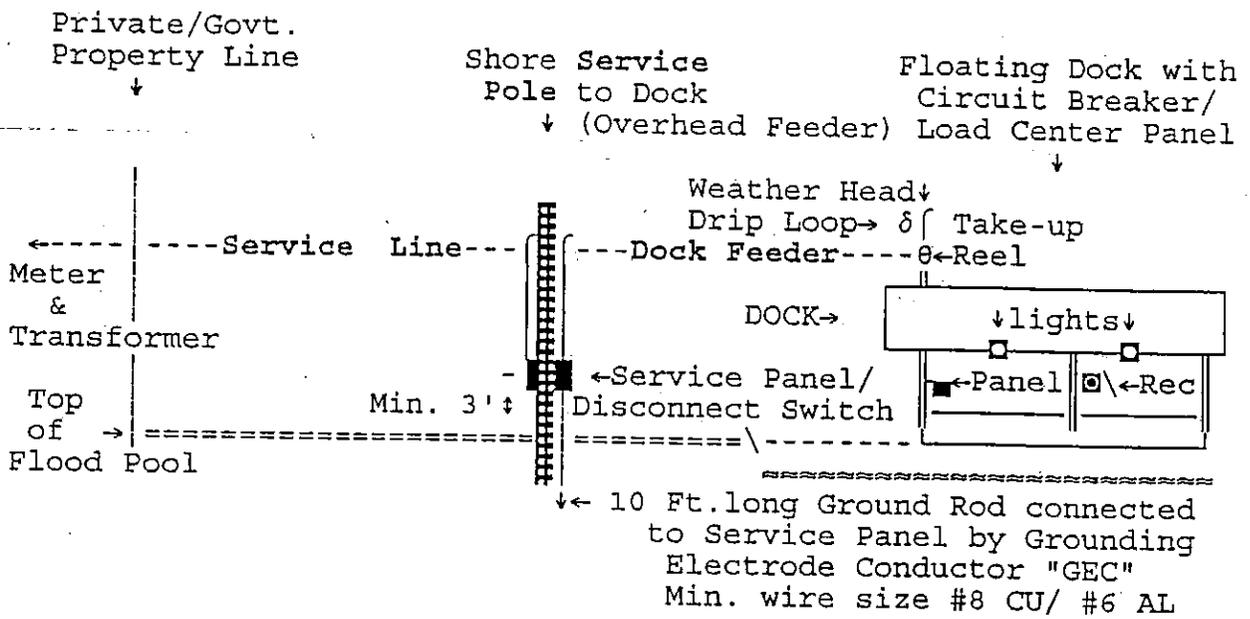


Figure 16

Item	OK	Check / Inspect	Remarks/Deficiencies
1		Incoming Service Line:	
a		-clearance ≥ 12 ft. Walks (above) ≥ 18 ft. Roads	
b		-clear of trees/limbs	
c		-approved conductors	