

HUBBELL SAFETY EVALUATION

A step-by-step checklist to help identify potential problems, from the wiring device experts...Hubbell.

.....



Wiring Device-Kellems

www.hubbell-wiring.com

WIRING DEVICE SAFETY EVALUATION

HUBBELL WIRING DEVICE SAFETY IN THE WORKPLACE

Workplace safety has a significant impact on your business. Employee safety and productivity, machine down time, and production throughput are all impacted by the condition of the work environment. Hubbell Wiring Device Kellems encourages and promotes a safe and well maintained work place, through the proper selection, use and installation of wiring devices. This brochure details applications, NEC references and product solutions to assist you in achieving those goals.

We recommend that you begin your safety inspection by reviewing the condition of existing installed wiring devices. Strong consideration should be given to upgrading to the most current wiring device technology and the latest NEC requirements.

It is extremely important that users adhere to the manufacturer's installation instructions when installing and using wiring devices. Proper product selection for the given application is important. Wiring devices are designed to perform specific tasks within the limit of their design, electrical rating and intended installation environment. Hubbell offers a complete line of wiring device products serving a wide range of applications.

Safety Evaluation Checklist

A safety checklist by product type (switches, wire management, plugs/connectors, receptacles, high-amperage products, ground fault protection and lock-out/tag-out) outlines some of the "inspection checkpoints" plant electricians should be aware of when checking various types of wiring devices. Most inspection points can be done visually without disassembling the devices.

Visual inspections not only indicate potential failures of products; for an experienced maintenance technician they are an early warning system signaling the possibility of product failure or of a potential hazard to personnel.

Common Examples:

Hazard – A receptacle or switch with a damaged or missing cover plate means that the terminal screws to which the conductors are wired are exposed and could be touched by a person. In addition to this potential hazard, grounding or short circuiting of the conductors in the receptacle or switch can cause equipment, machinery or lighting failure resulting in downtime.



Hazard – A light switch has been damaged and will not operate resulting in a loss of light. This results in lost productivity and a condition that can be dangerous.



Hazard – Plug blades or pins have been damaged or tampered with and the rating designation has been altered or removed. Altering the contact pattern and blade configuration allows undesirable interchangeability. Different configurations are designed to prevent mating of devices with different ratings. For instance, a single-phase, 125-volt, 3-wire plug will not fit into a three-phase, 120/208V receptacle. This is why it is important during inspections to make sure contacts patterns are intact.



Hubbell Recommends...

- **Qualified electricians perform all electrical work.**
- **Be aware of strict compliances to NEC and OSHA regulations.**
- **Always disconnect power and use approved lock-out/tag-out procedures while inspecting and performing electrical maintenance work.**
- **Wiring devices, as with all electro-mechanical devices, require periodic inspection and maintenance to assure the safety of the user and the proper day-to-day performance of the product.**
- **The following check list is not inclusive but may point to trouble areas in the installation of wiring devices.**



PROBLEMS & SOLUTIONS

Plug/Connector

Problem



Problem: Devices are burning out from coming in contact with water and debris.

Solution: Safety-Shrouded Twist-Lock® products that are UL Type 4X rated for use in harsh environments.

NEC Information: Article 110.11 - Refers to deteriorating agents, and Table 430.91 for environmental type ratings.

Solution



Straight Blade Receptacle 15-20 Ampere

Problem



Problem: Misapplied receptacles installed in demanding applications.

Solution: Industrial receptacles are made with impact resistant nylon faces to minimize damage from impact and abrupt pull-out. Stainless steel plates also provide excellent strength and protection.

NEC Information: Article 110.3 & 110.12(C) - Indicates requirements for the structural integrity of product.

Solution



Switch

Problem



Problem: Lighting or ventilation may require only authorized access to switch.

Solution: Barrel key locking switch prevents unauthorized on or off activation.

Solution



TrukTrak®

Problem



Problem: Electrical, pneumatic and hydraulic cables are being damaged when driven over and create a trip hazard.

Solution: Protect your cables and hoses with TrukTrak®, TredTrak® and AccessTrak® non-metallic cable protectors designed to safeguard electrical cables and cords from vehicle and pedestrian traffic.

NEC Information: Article 527.4(H) - Protection from accidental damage indicates that cords shall be protected from sharp corners and projections.

Solution



GFCI

Problem



Problem: A standard GFCI receptacle installed in a 4" square box for temporary power.

Solution: Portable GFCI products with open neutral protection as required.

OSHA Information: Meets OSHA 29 CFR 1926.404(b)(1)(ii) and 29 CFR 1926.405(a)(2)(ii)(G) requirements for portable power/lighting in confined space. Article 305-5 (A).

Solution



PROBLEMS & SOLUTIONS

Lockout Tagout

Problem



Problem: A machine is being repaired or set-up. How can employees be protected from unintentional energizing of equipment?

Solution: Plugout devices in a full range of sizes, enclose the equipment plug and secure with a keyed padlock.

NEC Information: Article 430.102 – Explains lock-out tag-out procedure.

Solution



Problem



Problem: A toggle switch controls equipment being serviced. Unintentional actuation of the switch during service presents a hazard to maintenance personnel.

Solution: Switchout devices on any standard toggle switch to mechanically lock it in the off position.

NEC Information: Article 430.102 – Explains lock-out tag-out procedure.

Solution



Mechanical Interlock

Problem



Problem: Potential for dangerous arcing when equipment is unintentionally connected / disconnected under load.

Solution: Circuit-Lock® Switched Mechanical Interlock Enclosure virtually eliminates the possibility of making or breaking the circuit under load or making a casual or “lazy” connection.

NEC Information: Article 430.103 – The disconnecting means shall open all ungrounded conductors and be designed so that no pole can be operated independently.

Solution



Disconnect Switch

Problem



Problem: Switch controls equipment that is exposed to frequent washdowns and cleaning chemicals.

Solution: Circuit-Lock Switched Enclosure with a UL Type 4X (Washdown, Corrosion Resistant) rating and a lockable handle to meet OSHA Lockout / Tagout regulations.

NEC Information: Article 430.91 – Refers to enclosure type ratings, and Article 430.102 (B) – refers to Lock-out, Tag-out requirements.

Solution



Portable Outlet Box

Problem



Problem: Using a box that is not listed for pendant application. Open knockouts and inadequate strain relief could potentially harm equipment or personnel.

Solution: Portable outlet boxes provide a safe rugged portable enclosure which can be used in many different applications.

NEC Information: Article 110.12 - Refers to unused cable openings in metallic boxes.

Solution



PLUGS, CONNECTORS & RECEPTACLES

PLUG & CONNECTORS 15 & 20 AMP

Style of device in use:

Straight Blade • Twist-Lock® • Hubbellock® • Pin & Sleeve

Application

- Is the outer jacket of the cable free of cracks and completely captured by the cable clamps?
- Does the cable appear loose in the cable clamp?
- Is the cable within the working diameter of the cord grip?
- Are the devices non-grounding or non-NEMA?
- Do any devices run warm or hot to the touch?
- Are the devices used in a wet/corrosive environment area intended for the purpose?
- Is strain relief used on plug/connector and cord drops?
- Is visibility of the device a concern?
- Would transparent housings for critical connections be desirable?
- Are cord often laid across open floors?
- Are devices securely mated? Or do they disconnect unintentionally?
- Is the plug/connector housing or enclosure free of cracks or chips?
- Are plug blades bent, twisted or distorted?
- When you replace devices do you include the mating device as well?
- Have angle plugs been considered to reduce trip hazards?

Applies

Product(s)

- All Plugs and Connectors
- All Plugs and Connectors
- All Plugs and Connectors
- Twist-Lock
- All Plugs and Connectors
- Watertight Safety Shroud Twist-Lock or Pin & Sleeve
- All Plugs and Connectors
- Chem-Marine or Elastogrip®
- Transparent Devices
- FloorTrak®, TrukTrak®, TredTrak® or AccessTrak®
- Twist-Lock or Hubbellock
- All Plugs and Connectors
- Safety-Shroud Twist-Lock or Add-a-Shroud
- All Plugs and Connectors
- Straight Blade or Twist-Lock

NEC Reference

ARTICLE 406 RECEPTACLES, CORD CONNECTORS, AND ATTACHMENT PLUGS (CAPS) – This article covers the rating, type and installation of plugs and connectors. 422.33 refers to appliance disconnecting means using plugs and connectors. 430.109(F) indicates the use of horsepower rated attachment plugs and connectors on motors.

Comments

RECEPTACLES 15 & 20 AMP

Style of device in use: Heavy Abuse • Medium Abuse • Light Abuse

Application

- Is the wall plate intact?
- Is the receptacle face broken or cracked?
- Is the receptacle firmly mounted?
- Is the receptacle properly protected in a wet/corrosive area?
- Is the device used to power electronic equipment?
- Is the receptacle grade adequate for the application's abuse levels?
- Are the receptacles installed in dimly lit areas?
- Has the ground retention level been checked recently?
- Are there receptacle outlet box drops?
- Is the controlling circuit clearly marked on the receptacle?

Applies

Product(s)

- Nylon or metal wall plate
- Impact resistant face
- Brass mounting strap
- Weatherproof Plates
- IG, TVSS
- Industrial, Commercial or Hospital Grade
- Illuminated Devices
- Hospital Grade
- Portable Outlet Box
- HBL5262, HBL5362, HBL8200, HBL8300

NEC Reference

ARTICLE 406 RECEPTACLES, CORD CONNECTORS, AND ATTACHMENT PLUGS (CAPS) – This article covers rating, type and installation of receptacles. 250.146(D) Refers to isolated ground receptacle requirements. 517.18(B) Defines the need for "hospital grade" receptacles in patient bed locations. 517.19(C) Defines the requirement of "tamper resistant" receptacles in pediatric locations..

Comments

SWITCHES & WIRE MANAGEMENT

SWITCHES

Style of device in use:

Industrial • Commercial • Construction
Lighted • Style Line® • Push Button • Manual Motor Control

Application	Applies	Product(s)
Is the switch firmly fastened to the box or enclosure?	<input type="checkbox"/>	All Switches
Do you need to identify on/off status of circuits in remote locations?	<input type="checkbox"/>	Pilot Light Switches
Is the wall plate properly secured and in good condition?	<input type="checkbox"/>	Nylon or Stainless Steel Wall Plates
Are there dimly lit areas that require quick location of switches?	<input type="checkbox"/>	Illuminated or Color coded toggle switches
Toggles are damaged frequently or broken off?	<input type="checkbox"/>	Security Wall Plates with Toggle Guards
Do you perform maintenance on equipment activated by toggle switch?	<input type="checkbox"/>	Pilot Light or Illuminated Devices with Lock Out
Is the switch used for actuation of motor loads?	<input type="checkbox"/>	HP Motor Rated Switches
Do you need to discourage or prevent unauthorized equipment use?	<input type="checkbox"/>	Keyed AC Locking Switches
Are the switches exposed to damp or wet environments?	<input type="checkbox"/>	“While in Use” Cover Plates
Are switches in difficult to activate locations?	<input type="checkbox"/>	Style Line Rocker Switches, Motion Sensors
Are cranes and hoists in use?	<input type="checkbox"/>	Pendant Stations

NEC Reference

ARTICLE 404 SWITCHES – This article applies to the installation and use of switches. Sections 404.2, 404.8, 404.9, 404.10, 404.14 and 404.15 apply to Hubbell's AC Switches.

ARTICLE 430 MOTORS, MOTOR CIRCUITS, AND MOTOR CONTROLLERS – This article explains the uses and application of manual motor controllers. Figure 430.1 depicts the location of the motor controller with respect to the motor disconnecting means.

Comments

WIRE MANAGEMENT

Style of device in use:

Kellems® Pulling Grips • Support Grips • Strain Relief • PolyTuff® I & II • PolyTrak®
Nonmetallic Surface Raceway • FloorTrak® • TrukTrak® • TredTrak® AccessTrak®

Application	Applies	Product(s)
Is strain relief used on all connections?	<input type="checkbox"/>	Strain Relief, Cord Connectors, Polytuff I & II
Are there cables that require support? (bus drops, drop cords, etc.)	<input type="checkbox"/>	Support Grips
Are wires/cables ever pulled through conduit?	<input type="checkbox"/>	Polytuff I & II Conduit Grips
Are fiber optic cables used?	<input type="checkbox"/>	Fiber Optic Grips
Is strain relief required for liquid-tight cord applications?	<input type="checkbox"/>	Strain Relief Grips
Is corrosion a problem with liquid-tight conduit and fitting applications?	<input type="checkbox"/>	PolyTuff I & II Conduit Grips
Are loose wires/cables enclosed in a raceway or duct system?	<input type="checkbox"/>	PolyTrak Non-Metallic Raceway
Are cables run unprotected across the floor?	<input type="checkbox"/>	FloorTrak, TrukTrak, TredTrak
Does the plant need to comply with ADAAG? (Americans with Disabilities Act Accessibility Guidelines)	<input type="checkbox"/>	AccessTrak

NEC Reference

ARTICLE 314.23(H)(1) – Indicates the need for flexible cord support.

ARTICLE 388 SURFACE NON-METALLIC RACEWAYS – Defines the installation uses and construction specifications of non-metallic raceway.

518.3(B) – Refers to cord protection of temporary wiring in exhibition hall and trade shows.

ARTICLE 525 CARNIVALS, CIRCUSES, FAIRS, AND SIMILAR EVENTS

525.20(G) – Defines the location for use of TredTrak/TrukTrak and AccessTrak type products.

527.4(J) – Refers to support requirements of cables in temporary installations.

Comments

GFI PROTECTION & LOCK-OUT/TAG-OUT

GROUND FAULT PROTECTION 15/20/30 AMPERE

Style of device in use:

Straight Blade • Portable • Hard Wire • Plug • Module

Application	Applies	Product(s)
Do your requirements include power in a bathroom or sink area?	<input type="checkbox"/>	All Commercial Grade GFCI Receptacles
Is your application for temporary power in an outdoor construction location?	<input type="checkbox"/>	All Portable GFCI product
Is power required in a garage area?	<input type="checkbox"/>	All Commercial Grade GFCI Receptacles
Do you have considerations for spa/whirlpool or pool installations?	<input type="checkbox"/>	All Portable GFCI product Ground Fault Plug
Are you providing power in a kitchen area?	<input type="checkbox"/>	All Commercial Grade GFCI Receptacles
Is this a medical or hospital application?	<input type="checkbox"/>	All Hospital Grade GFCI Receptacles
Do you have a demanding industrial application?	<input type="checkbox"/>	All Industrial Grade Receptacles
Will you be requiring power in damp or wet locations?	<input type="checkbox"/>	All portable GFCI product, all 30A modules
Do you have a high current application in an Industrial area?	<input type="checkbox"/>	All 30A portable and hard wired
Will you be using power tools or equipment?	<input type="checkbox"/>	All Portable GFCI product, all 30A portable and hard wired modules
Does your application include 3 phase power?	<input type="checkbox"/>	All 30A 3 phase portable and hard wired

NEC Reference

ARTICLE 210.8 defines the GFCI requirements for bathrooms, garages, outdoors, crawl spaces, unfinished basements, kitchens, wet bar sinks, boat-houses & rooftops. 517.20 Indicates GFCI receptacle requirements in wet locations of health care facilities. 525.23 Indicates GFCI requirements for carnivals, circuses, fairs, and similar events. 527.6 defines the requirements for GFCI protection in temporary wiring. 555.19 (B) refers to GFCI protection at marinas and boat yards. 680.5 indicates GFCI protection for swimming pools. 680.71 indicates GFCI protection for hydro-massage bath tubs.

Comments

LOCK-OUT/TAG-OUT

Style of device in use:

Plug • Receptacle • Switch Switched Enclosure • Mechanical Interlock

Application	Applies	Product(s)
Small equipment under repair (15 and 20A)	<input type="checkbox"/>	PLUGOUT® – HLDMP HKLD, HKLDPK2
Equipment under repair (20 and 30A Twist-lock)	<input type="checkbox"/>	PLUGOUT – HLD
Equipment under repair (20, 30 and 60A Pin & Sleeve, Hubbellock® and 50A Twist-Lock®)	<input type="checkbox"/>	PLUGOUT – HLD2
Toggle switch fixed in OFF position	<input type="checkbox"/>	SWITCHOUT – HSLDPK2

NEC Reference

ARTICLE 430.102(B) (Exception) is the section that describes the location and requirements for lock-out, tag-out.

Comments

SAFETY ENCLOSURES & HIGH AMP DEVICES

SWITCHED SAFETY ENCLOSURES

What types of environments are in the facility?

Enclosure Type 3R (Raintight) • Enclosure Type 4 (Hose directed Water)
Enclosure Type 4X (Hose Directed Water, Corrosive) • Other

Application

	Applies	Product(s)
Do employees make or break equipment connections under load?	<input type="checkbox"/>	Mechanical Interlocks
Are installed switches rated for make or break under load?	<input type="checkbox"/>	All Switched Enclosures
Are there any washdown area not utilizing 4X enclosures?	<input type="checkbox"/>	All Type 4X Switched Enclosures
Are corrosive-resistant enclosures being utilized where needed?	<input type="checkbox"/>	All Type 4X Switched Enclosures
Does your disconnect equipment have lockout/tagout capability?	<input type="checkbox"/>	All Switched Enclosures

Product Options

Unfused Disconnect	Fused Disconnect	Fused Interlock
Hubbellock® Enclosure	TVSS Panel Protection	Twist-Lock® Enclosure
Motor Starting Switch	Unfused Interlocks	
Enclosures Type 1 & 3R		

NEC Reference

ARTICLE 430 MOTORS, MOTOR CIRCUITS, AND CONTROLLER – This is the general section for these type products. Figure 430.1 indicates the location of the controller and the disconnect. Part VII is specific to motor controllers and Part IX is specific to disconnects. Table 430.91 motor controller enclosure selection is used for environment rating type selection. Table 430.102 refers to the lock-out tag-out requirement. Table 430.109(A)(6) indicates that a manual motor controller can be used for disconnecting means provided it is marked “suitable as motor disconnect”.

Comments

HIGH AMPERAGE PRODUCTS 30/50/60/100/200 AMP

Style of device in use:

Straight Blade • Twist-Lock® • Hubbellock® • Pin & Sleeve (IEC)
Pin & Sleeve (Insulgrip®)

Application

	Applies	Product(s)
Are installed products rated for make or break under load?	<input type="checkbox"/>	All Devices
Has interlocked product been considered?	<input type="checkbox"/>	Twist-Lock® and Pin & Sleeve
Have non-metallic products been considered?	<input type="checkbox"/>	All Devices
Are products installed in wet/corrosive area intended for this purpose?	<input type="checkbox"/>	Watertight Safety-Shroud Twist-Lock® and Pin & Sleeve
Would the use of a strain relief product improve the installation?	<input type="checkbox"/>	All Devices
Are the products designed to prevent unintentional mismatching?	<input type="checkbox"/>	All Devices

NEC Reference

ARTICLE 406 RECEPTACLES, CORD CONNECTORS, AND ATTACHMENT PLUGS (CAPS) – This article covers the rating, type and installation of plugs and connectors. 422.33 refers to appliance disconnecting means using plugs and connectors. 430.109(F) indicates the use of horsepower rated attachment plugs and connectors on motors.

Comments
