

## INSTALLATION, OPERATION & MAINTENANCE DATA FORM

### Type 60 AMP SERIES: PIN & SLEEVE PLUGS, RECEPTACLES & CONNECTORS

**PLUGS** comply with UL 1686 dimensional requirements and are interchangeable with other UL 1686 compatible devices.  
**PLUGS** can be used in HAZARDOUS LOCATIONS,  
 CLASS I, GROUPS B, C, D, CLASS II, GROUPS F† & G. Enclosure Types 3, 4 & 4X (\*see Chart 1).

All Installations Must Comply With Applicable Local, National Electric Codes and/or Canadian Electrical Code.

† To prevent ignition of hazardous atmospheres do not use in Class II, Group F locations that contain electrically conductive dusts.

### APPLICATIONS

- Designed to apply secondary power to both fixed and portable electrical equipment.
- Designed to provide for quick disconnect from the power source.
- Designed for use in locations where weatherproof, oil tight & hosedown watertight enclosures and devices are required.

### FEATURES

**Octagonal Body Style.** The octagonal shape Plug and Cable Connector bodies provide for a firm grip when separating.

**Interchangeable.** Devices are intermateable with other UL Rated 1686 devices (\*see Chart 2).

**Locking Tab.** The locking tab on the plug and cable connector bodies provides for secure assembly and disassembly as it snaps the plug shrouds and cable connector noses into place.

**Plug Locking Ring.** Neoprene gasketed plugs thread onto receptacle & cable connector with locking ring providing a Type 3, 4 & 4X union.

**Type 3, 4 & 4X Rated.** The exclusive patent pending breech lock design provides sealing ability for the lift lid on the receptacle and cable connector providing a Type 3, 4 & 4X rating when the lift lid is in the closed position. Devices are gasketed to provide a weatherproof, oil tight & hosedown watertight seal when mated with devices having the same type rating.

**Positive Cable Clamp.** Plugs & cable connectors supplied with a neoprene onion skin grommet and clamp guide assembly provide a firm fit over a wide range of cable diameters. Captive locking set screw prevents clamp guide assembly from backing out.

**Insulators & Terminals.** Insulators provide high mechanical and dielectric strength with low "arc tracking". Designed with "Allen screw" type box terminals providing secure clamping around conductors. **Funnel chambers** designed to accommodate easy insertion of all conductors at one time. The exposed portion of the conductors will be within the funnels when properly stripped (see Figure 4).

**Two Grounding Styles.** Style 1 plugs, receptacles & cable connectors ground through shell only. Copper grounding jumpers in Style 2 plugs, receptacles & cable connectors ground through shell and extra pole.

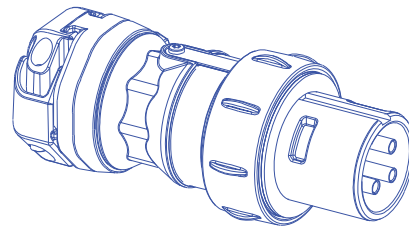
**Reverse Service.** Two screws secure the insulator assembly in the devices. Removing the screws, ground screw & stand-off permits easy "field" conversion to reverse service.

### ELECTRICAL RATING

Maximum Voltages: 600 VAC @ 50-400Hz, 250VDC;  
 Maximum continuous current: 60 Amperes.  
 Horsepower: See Catalog Data or contact factory.

General View of the 60 Amp  
 Series Pin & Sleeve Type Plugs,  
 Receptacles & Cable Connectors

**FIGURE 1**



**PLUGS**

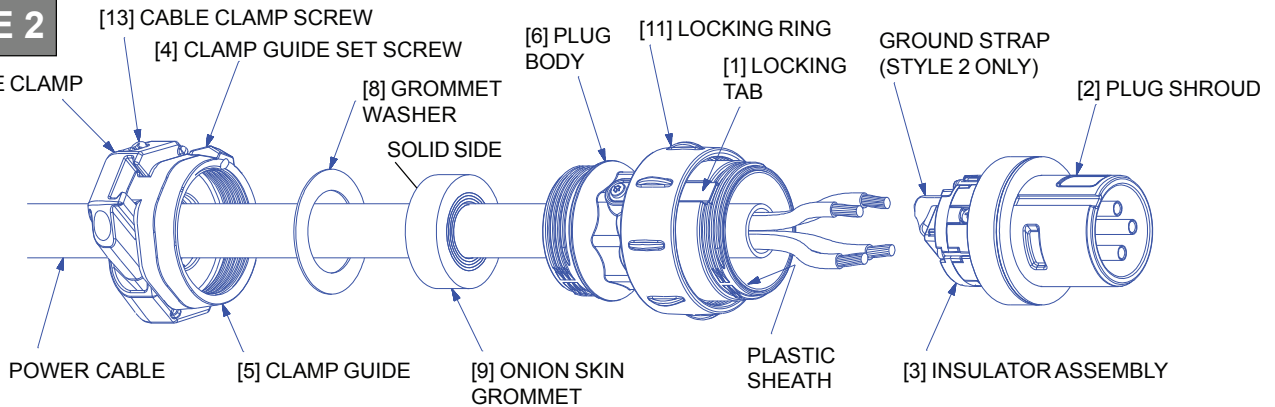
**Positive Ground.** Grounding straps assure maintained ground contact. Longer ground pin terminal in Style 2 receptacle "makes first, breaks last".

**Arcing Confined.** Contacts are made or broken in insulator chambers. In emergency, plugs can be withdrawn under full rated loads. Positive polarization prevents mismatching plugs.

**Positive Contact.** Brass contacts have **integral patented springs** for positive maintained electrical contact.

# INSTALLATION INSTRUCTIONS FOR PLUGS: 30 AMP SERIES

**FIGURE 2**



## WARNING

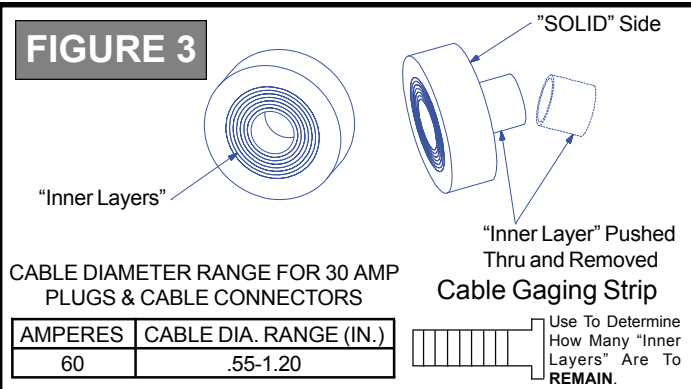
Electrical power supply **MUST BE OFF** before and during installation and maintenance. **DISCONNECT** primary power source and **LOCK OUT**. Installation and maintenance procedure must be performed by a trained and competent electrician.

**Always verify that the devices' ampere & voltage rating, style & number of poles are suitable in the area of use.**

- 1 Disassemble plug as shown in FIGURE 2. Loosen clamp guide setscrew [4] and turn clamp guide assembly [5] to remove from plug body [6]. Remove locking ring [11]. Press down on locking tab [1] with a screwdriver (see nameplate) and turn until notch on inside rim of shroud [2] stops at screwdriver (or simply remove the locking tab and screw). Remove screwdriver and then finish removing shroud assembly. It is not necessary to separate the shroud & insulator assembly [3]. **Do not disassemble the insulator assembly.**
- 2 Reference TABLE "A" to strip the cable jacket and individual wires. Refer to National Electrical Code Table 400-5 or Canadian Electrical Code Table 12 when selecting the conductor size.

- 3 Slide clamp guide assembly [5], with cable clamp [7] properly assembled, and the grommet washer [8] over the power cable being used.
- 4 Use the cable gaging strip provided to determine how many "inner layers" of the onion skin grommet [9] are to **REMAIN** or simply remove the "inner layers" until the grommet slips over the power cable. Remove the "inner layers" as needed from the grommet, **one layer at a time**, by pushing through to solid side and tearing off. See FIGURE 3.
- 5 Place the onion skin grommet [9] over the power cable with the "**SOLID**" side facing the clamp guide assembly and slide plug body [6] over power cable.
- 6 Loosen the box terminal screws [10] (**see FIGURE 4**) in the insulator assembly [3] without completely removing the screws. Insert conductors into the proper box terminals according to the established facility wiring pattern. Tighten box terminal screws [10] to 30 in.-lbs. torque. Conductors must be fully inserted into the box terminals and, if properly stripped (see Table A), the conductor insulation should be well within the funnel of the insulator assembly [3].
- 7 Slip locking ring [11] over upper part of plug body [6]. Screw plug body into shroud [2] & insulator assembly [3] until the locking tab [1] snaps into place.
- 8 Slide onion skin grommet [9] down power cable into plug body [6]. Force power cable into plug body to provide a minimum 1/8" strain relief in the wire between clamp and insulator. Place grommet washer [8] in clamp guide assembly [5]. Screw clamp guide onto plug body. Tighten clamp guide set screw [4] to 10 to 15 in.-lbs. of torque.
- 9 Tighten cable clamp screws [13] around power cable to 25 in.-lbs. minimum torque, alternating sides as needed to prevent binding.

**FIGURE 3**



## CAUTION

Use cable with diameters within the specified range given in FIGURE 3. Failure to do so may result in overstressed wire terminations which could cause the conductors to pull out of the box terminals and cause serious or fatal personal injury and/or equipment damage.

## ELECTRICAL TEST BEFORE ENERGIZING

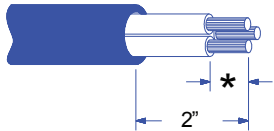
Do not connect to power before conducting the following electrical tests:

- Test continuity of wiring and assembly to verify correct polarity, phasing and grounding connections.
- Measure insulation resistance to be sure the system does not have any short circuits or unwanted grounds.

**CAUTION:** Use 75°C rated conductors (minimum). DO NOT cut into or damage the individual conductor insulation when removing the outer jacket. DO NOT cut or damage the conductors when stripping the individual wire insulation.

**TABLE A**

**TERMINAL WIRE RANGE AND STRIPPING GUIDE**



\* Strip gage on insulator:  
Small gage: #10-#8 (1/2")  
Large gage: #6 (3/4")

**TERMINAL WIRE SIZE AND ELECTRICAL RATINGS  
PLUG AND CABLE CONNECTOR RATINGS**

AMPERES	MAX. VOLTAGE	WIRE RANGE
60	600 VAC @ 50-400 Hz, 250 VDC	BUILDING #10-#6 EXTRA FLEX #10-#8

Rated for use with TYPE P, G, W, S, SO, STO portable cords or equivalent, with COPPER conductors only, of the sizes listed (75°C rated (minimum)).

**NOTE**

In Hazardous Locations, PLUGS are to be used with Type P, G, W, S, SO, STO or equivalent "extra hard usage" portable cable with copper conductors, per National Electrical Code, Articles 400, 501-11 & 502-12 and/or Canadian Electrical Code, Sections 4-010, 18-120, 18-172, 18-218 & 18-276.

**WARNING - POLARITY**

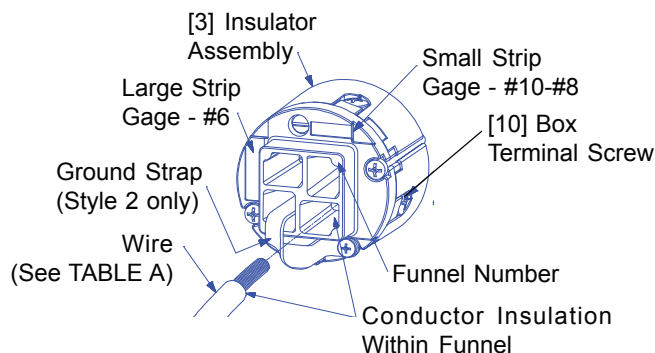
A wire pattern **MUST** be established so that the same color wire is put into the same identified funnel in all plugs, receptacles & cable connectors in the area of use. Funnels are distinctly identified on the rear of the insulator. In style 2 units only, the funnel with the conductor strap marked with a "G" is for ground conductors. This requirement provides correct polarity for the area of use and reduces possible cause of serious or fatal personal injury and/or equipment damage.

**CAUTION**

Receptacles connected to circuits having different voltages, or types of current (AC or DC) on the same premises shall be of such design that the attachment plugs

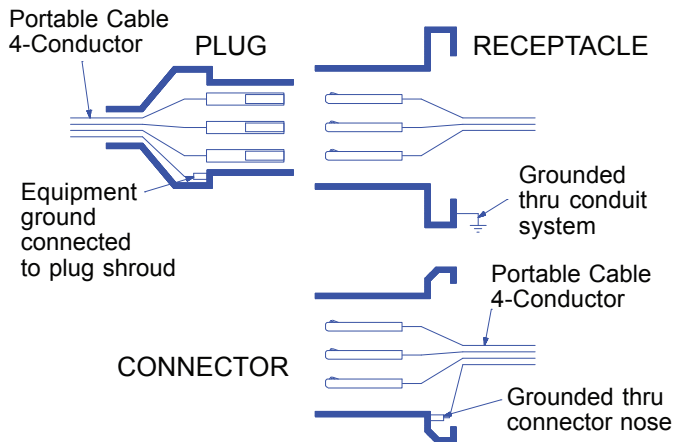
**FIGURE 4**

**NOTE:** Style 2 - Includes separate grounding contact with attached ground strap; ground strap is marked with "G".



**FIGURE 5 GROUNDING STYLES**

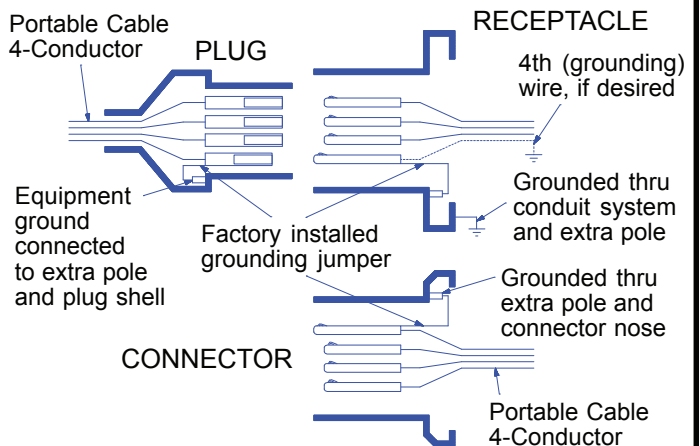
**STYLE 1 - Shell Only Grounding**



**Style 1 Plug** - Equipment grounding conductor is wired directly to the ground terminal which is connected to the ground stand-off and shroud. This, in turn, grounds the entire plug assembly housing. All contacts are "current carrying".

**Style 1 Receptacle** - Two ground straps engage the grounded plug shroud on plug insertion (plug shroud makes contact with receptacle ground straps before "line" and "load" poles engage). Grounding path is maintained until after current-carrying contacts disengage. All contacts are "current carrying". The receptacle is grounded by virtue of its being an integral part of the conduit system.

**STYLE 2 - Shell and Extra Pole Ground**



**Style 2 Plug** - Equipment grounding conductor is wired to the extra grounding pole terminal which provides a parallel ground circuit thru the extra ground pole and plug shroud. The ground stand-off and shroud are grounded to a copper alloy ground jumper installed on the extra ground pole. This, in turn, grounds the entire plug assembly housing.

**Style 2 Receptacle** - Two ground straps engage the grounded plug shroud on plug insertion (shell grounding). A copper alloy ground jumper installed on the extra ground pole is screwed on the ground stand-off and grounded to the receptacle body (extra pole grounding). The longer grounding pole "makes first and breaks last".

## REVERSE SERVICE INSTRUCTIONS FOR 30 AMP SERIES

- 1 Remove the screws mounting the insulator assembly to the shroud, receptacle and/or connector nose.
- 2 Remove the #4-40 screw from the ground stand-off.  
(Style 1 shrouds & connector noses - ground terminal & bracket will be removed with the screw).
- 3 Separate the insulator from the selected parts (Style 2 only - also remove the stand-off).
- 4 (Style 2 only - replace the stand-off into the mating parts.)  
Replace the insulator into the mating parts while aligning the stand-off and holes.
- 5 Replace insulator mounting screws.
- 6 Replace the #4-40 screw (Style 1 shrouds & connector noses - ground terminal & bracket will also need to be replaced; Style 2 devices - mount the ground straps to ground stand-off with screw).

### ELECTRICAL TEST BEFORE ENERGIZING

Do not connect to power before conducting the following electrical tests:

- Test continuity of wiring and assembly to verify correct polarity, phasing and grounding connections.
- Measure insulation resistance to be sure the system does not have any short circuits or unwanted grounds.

## CHART 1 - PLUG INTERMATEABILITY WITH HAZARDOUS LOCATION ENCLOSURES: 30 AMP SERIES

**PLUGS** for use in HAZARDOUS LOCATIONS, CLASS I, Div. 1 & 2 GROUPS B, C, D CLASS II,  
Div. 1 & 2 GROUPS F† & G & Class III.

### CROUSE-HINDS

#### FSQC Series

CL. I, Div. 1 & 2, GR. B, C, D

CL. II, Div. 1 & 2, GR. F†, G, CL. III.

### APPLETON

#### JBRB Series

CL. I, Div. 1 & 2, GR. B, C, D

CL. II, Div. 1 & 2, GR. F†, G, CL. III.

#### JBR Series

CL. I, Div. 1 & 2, GR. C, D

CL. II, Div. 1 & 2, GR. F†, G, CL. III.

#### J2BR Series

CL. II, Div. 1 & 2, GR. F†, G.

#### DBR Series

CL. II, Div. 1 & 2, GR. F†, G, CL. III.

#### EBRH Series

CL. I, Div. 1 & 2, GR. B, C, D

CL. II, Div. 1 & 2, GR. F†, G, CL. III.

#### EBR Series

CL. I, Div. 1 & 2, GR. C, D

CL. II, Div. 1 & 2, GR. F†, G, CL. III.

† **CAUTION:** To reduce the risk of ignition of hazardous atmospheres, do not use plugs or receptacles in CLASS II, GROUP F locations that contain electrically conductive dusts (most coal dusts are *not* electrically conductive).

## CHART 1A - INTERMATEABILITY FOR STANDARD LOCATION PLUGS, RECEPTACLES AND CABLE CONNECTORS: 30 AMP SERIES

<b>KILLARK</b>	<b>2W2P</b>	<b>3W3P</b>	<b>4W4P</b>	<b>2W3P</b>	<b>3W4P</b>
PLUGS	VP3022	VP3033	VP3044	VP3023	VP3034
RECEPTACLES	VR3022	VR3033	VR3044	VR3023	VR3034
CABLE CONNECTORS	VPR3022	VPR3033	VPR3044	VPR3023	VPR3034
<b>CROUSE-HINDS</b>					
PLUGS	APJ3275	APJ3375	APJ3475	APJ3385 NPJ3383 NPJ3384	APJ3485 NPJ3483 NPJ3484
RECEPTACLES	AR321 AR323 AR327	AR331 AR333 AR337	AR341 AR343 AR347	AR332 AR334 AR338 NR332	AR342 AR344 AR348 NR342
CABLE CONNECTORS	APR3253 APR3255	APR3353 APR3355	APR3453 APR3455	APR3363 APR3365 NPR3363 NPR3364	APR3463 APR3465 APR3463 APR3464
<b>APPLETON</b>					
PLUGS	ACP3022BC	ACP3033BC	ACP3044BC	ACP3023BC	ACP3034BC
RECEPTACLES	ADR3022 ACR3022	ADR3033 ACR3033	ADR3044 ACR3044	ADR3023 ACR3023	ADR3034 ACR3034
CABLE CONNECTORS	ARC3022BC	ARC3033BC	ARC3044BC	ARC3023BC	ARC3034BC

## CHART 1B - INTERMATEABILITY FOR STANDARD LOCATION BACK BOXES: 30 AMP SERIES

<b>KILLARK</b>	VRE13 1/2" HUB VRE23 3/4" HUB VRE33 1" HUB	VRC13 1/2" HUBS VRC23 3/4" HUBS VRC33 1" HUBS	VRD13 1/2" HUBS VRD23 3/4" HUBS VRD33 1" HUBS
<b>CROUSE-HINDS</b>	ARE13 1/2" HUB ARE23 3/4" HUB ARE33 1" HUB	ARRC13 1/2" HUB ARRC23 3/4" HUB ARRC33 1" HUB	ARD13 1/2" HUB ARD23 3/4" HUB ARD33 1" HUB
<b>APPLETON</b>	AEE13 1/2" HUB AEE23 3/4" HUB AEE33 1" HUB	AERC13 1/2" HUB AERC23 3/4" HUB AERC33 1" HUB	— — —



Recommendations contained in this document are based on technical information that Larson Electronics believes to be reliable. All the information and advice contained in these documents is intended for use by persons having been trained and possessing the requisite skill and know-how and to be used by such persons only at their own discretion and risk. The nature of these instructions is informative only and does not cover all of the details, variations or combinations in which this equipment may be used; its storage, delivery, installation, check-out, safe operation and maintenance. Since the installation, maintenance and use of the product are outside of the direct surveillance and control of Larson Electronics, the purchaser and/or user assumes all risk and liability whatsoever in regards to its use and suitability for his or her intended application.

## MAINTENANCE

### MAINTENANCE

Electrical and mechanical inspection of all components must be performed regularly. It is recommended that inspection be performed a minimum of once a year.

- Inspect all contact wire box terminals for tightness (**Retorque**). Discoloration due to excessive heat is an indicator of possible problems and should be thoroughly investigated and repaired as necessary.
- Check grounding and bonding for correct installation and secure connection (**Retorque**).

- Check gaskets for deterioration and replace if necessary.
- Clean exterior surfaces making sure nameplates remain legible.
- Inspect clamp guide assembly and cable grip tightness to ensure proper cable gripping.
- Torque all screws as described in instructions before reusing device.
- Inspect housing parts and replace those which are broken or excessively worn.
- Check contacts for signs of excessive arcing or burning and replace if necessary.
- Check **receptacle thread** used for plug locking ring for proper lubrication. Apply Killark's "LUB-G" type lubrication or equivalent to thread surfaces as required to prevent galling between the receptacle and locking ring threads.

**WARNING**

Electrical power supply **MUST BE OFF** before and during installation and maintenance. **DISCONNECT** primary power source and **LOCK OUT**. Installation and maintenance procedure must be performed by a trained and competent electrician.

**WARNING**

If any parts of the plug, receptacle or cable connector appear to be missing, broken or show signs of damage; **DISCONTINUE USE IMMEDIATELY!**  
**Do not modify these devices in any way.** Replace with the proper replacement part(s) supplied before continuing service. Failure to do so could cause serious or fatal personal injury and/or equipment damage.

In addition to these required maintenance procedures, we recommend an Electrical Preventive Maintenance Program as described in the National Fire Protection Association Bulletin NFPA No. 70B.

**ELECTRICAL RATING**  
 Maximum Voltages: 600 VAC @ 50-400Hz, 250VDC;  
 Maximum continuous current: 60 Amperes.  
 Horsepower: See Catalog Data or contact factory.

**MAINTENANCE MANAGER**  
 Please record the following information for your records.

Complete Catalog No. \_\_\_\_\_

Installed By \_\_\_\_\_

Date of Installation \_\_\_\_\_

**RECOMMENDED YEARLY INSPECTION**

Date \_\_\_\_\_ ; Performed By \_\_\_\_\_

Date \_\_\_\_\_ ; Performed By \_\_\_\_\_

Date \_\_\_\_\_ ; Performed By \_\_\_\_\_

Date \_\_\_\_\_ ; Performed By \_\_\_\_\_

RETAIN THIS INSTRUCTION SHEET

**LARSON ELECTRONICS, LLC.**  
 9419 US-HWY 175  
 Kemp, TX 75143  
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