



**Public Works Department
Lighting District**

**Supplemental Specifications for
Decorative Lighting Systems**

October 2014

7000 Florida Street
Punta Gorda, Florida 33950
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PURPOSE:

All work associated with the design and installation of a decorative lighting system(s) shall conform to current Florida Department of Transportation (FDOT) Design Standards, FDOT Plans Preparation Manual, Standard Specifications for Road and Bridge Construction, AASHTO Roadway Lighting Design Guide, the most current edition of the Manual on Uniform Traffic Control Devices (MUTCD), the National Electrical Code (NEC) and/or the National Electric Safety Code (NESC), and this supplement. If a contradiction in code arises between the NEC and the NESC, the NESC shall be the governing document. It is the intent of this supplement to detail installation requirements, dictated by the County, which exceed FDOT standards and NEC requirements. It is the contractor's responsibility to note these extended specifications and to adhere to the methods and requirements mandated in this document.

WORKMANSHIP:

All work is to be performed in a workmanlike manner, and all OSHA and safety procedures shall be strictly followed and adhered to. It is the contractor's responsibility to provide the labor, skilled in the appropriate areas, necessary to provide an acceptable and professional finished product. The contractor and his personnel shall have, at all times, all the necessary paperwork for completion of the job. It is expected that plumb surfaces shall be plumb. Spacing of multiple components, such as conduit stubs or straps, shall be in equal increments. All materials shall be new.

All light pole assemblies and the electrical service pole shall be leveled to the satisfaction of the Lighting District inspector.

The Charlotte County Lighting District inspector assigned to the project shall have the authority to make final determinations on whether workmanship, materials, and/or the final project(s) meet the specifications contained herein.

Charlotte County reserves the right to redirect the termination point(s) of any or all conduit(s) from what is shown on the plans. If the quantity of materials is increased, the Contractor shall be compensated according to the per unit price of this change.

Charlotte County reserves the right to add to or delete from the overall quantity of pull boxes from what is shown on the plans. If the quantity of materials is increased, the Contractor shall be compensated according to the per unit price of this change.

QUALIFICATION OF SIGNAL CONTRACTOR PERSONNEL:

The contractor, engaged in installing decorative lighting systems within Charlotte County, shall have all work performed under the supervision of a technician certified by the International Municipal Signal Association (I.M.S.A.) as a Level I, Roadway Lighting Technician or as a Level I Traffic Signal Technician Construction and or Field. This Technician shall be present on-site during any decorative lighting installation activities. The technician's certification shall be presented at the preconstruction conference or upon request.

During all working hours, the Contractor shall have a responsible, English-speaking Superintendent on the project with the capabilities and authority required by FDOT Specifications, Section 5-8.

Employees shall be trained in and familiar with the safety related work practices, safety procedures, and other safety requirements that pertain to their respective job assignments per OSHA Standard 1910 – Electrical and Federal Register 29 CFR Part 1926 Cranes and Derricks in Construction; Final Rule. Employees shall also be trained in and familiar with any other safety practices, including applicable emergency procedures that are not specifically addressed, but are related to their work and are necessary for their safety.

RESPONSIBILITY OF SIGNAL CONTRACTOR PERSONNEL:

Charlotte County Lighting District Inspection staff shall be notified in writing either via form letter (To: Charlotte County Lighting District, 7000 Florida St., Punta Gorda, FL 33950) or e-mail (LightingInspector@CharlotteCountyFL.gov) a minimum of 72 hours prior to the commencement of jobs that include overhead or underground work that will be conducted as part of construction or maintenance projects within the Charlotte County or State road right of way.

The Charlotte County Lighting District inspection staff shall be notified in writing either via form letter or e-mail (LightingInspector@CharlotteCountyFL.gov) a minimum of 24 hours prior to any and all daily work to be performed throughout the entire length of construction or maintenance projects. Any changes that necessitate the rescheduling of work that has been previously scheduled shall be provided in writing via e-mail no later than the morning that it was to be performed.

GENERAL REQUIREMENTS:

Designers of decorative lighting systems shall utilize voltages of 240 or 480 volts. The 480 volt, phase-to-ground voltage is distributed with one current-carrying conductor, one grounded conductor, and one grounding conductor.

Under no circumstances shall the neutral conductor be switched, fused, or broken in any manner.

The light type for all decorative lighting systems shall be high pressure sodium (HPS). There will be no substitutes to the wattages or light type. Designers shall utilize any combinations of 70, 100, 150, or 250 watt mogul base HPS lamps. The lamp style for 70, 100, and 150 watt bulbs shall be ED23.5 and ED18 for 250 watt lamps.

All conduits entering or exiting the load center cabinet shall use a Myers hub. Rigid conduits shall be secured to the service pole by means of a strut channel system. (i.e., Kindorf, GS Metals, B-Line, etc.).

No nails or small screws shall be used to mount cabinet, straps, etc., in place. All fastening devices shall be galvanized or stainless steel screws, sleeve anchors, or lag bolts, 5/16" x 2" or larger.

The contractor shall submit cut sheets on all materials proposed for installation of the roadway lighting system. The material submittal will be reviewed by the Charlotte County Lighting District for conformance.

The electrical load center cabinet shall be installed onto a 26' concrete service pole for overhead services or onto a 12' concrete pole for underground services. All lighting load centers are to be metered. The contractor shall furnish and install an oval eye bolt through the top of the 26' service pole for FPL to attach onto.

Each new lighting load center will utilize a Millsbank by-pass meter socket, part #U3505-XL-TG-HSP along with a 100 amp, Square D, non-fusible safety switch, part #HU363RB. The Square D, non-fusible safety switch is not required in 240 volt applications.

Each lighting branch circuit shall have its own conduit run. Installing two lighting circuits into one conduit will not be permitted. The Engineer of Record should make every effort possible to locate the roadway lighting load center in the middle of the circuits. Two circuits extending in one direction on the same side of the roadway will not be permitted. (I.E. - The only exception to this would be when the service point is supplying power to the adjacent side of the roadway for circuits 3 and 4.)

Each light pole shall have a pull box placed directly in front of or behind the light pole foundation.

All lighting circuits shall be designed to use only #6 AWG THHN/THWN stranded wire throughout the system. If the required circuits cannot be accomplished using #6 AWG, an additional contactor will be required.

CONCEALED WORK:

Work performed, that will not be readily visible upon completion, shall not be concealed until a County Lighting inspector gives approval. In the event the items listed below are concealed, it will be the contractor's responsibility to expose the questioned item(s) for the inspector's approval, at no additional cost to the County. This includes, but is not limited to:

- Buried or imbedded conduit
- Ground wire, rods, and arrays
- All Meg ohm and continuity testing shall be done in the presence of the County inspector.

SURFACE TREATMENTS:

The application of the following materials to various components shall be performed during assembly:

- Threaded Hardware - All non-electrical threaded hardware (i.e., all threaded pole hardware or any other threaded component which requires assembly) shall be coated with Ideal Noalox Anti-Oxidant Compound or County-approved equivalent. The amount of Noalox applied shall be sufficient to be visible.
- Electrical Connections - All mechanical electrical connections shall have the various components of the splice or termination coated with Ideal Noalox Anti-Oxidant Compound or County-approved equivalent.

CONDUIT:

All conduit and fittings shall be utilized for the purpose they were designed. There shall be no fabrications of non-standard sweeps by "cutting up" a standard sweep. Heat bending PVC conduit is acceptable. Conduits shall not be filled beyond the capacity stated in the National Electrical Code. PVC conduit stubs into the load center cabinet shall be plumb and evenly distributed. All PVC conduits shall be electrical grade, 2", Schedule 40 minimum. All PVC conduits shall be joined together with integral deep bell ends and special long line couplings.

The connection between the pull box and the street light base shall be by means of 1 ¼" liquid-tight flexible non-metallic (seal tight) conduit. Only one conduit should enter a light pole base.

All exposed, aboveground conduit shall be heavy-wall, galvanized, rigid conduit. All threaded, rigid conduit connections shall be coated with Ideal Noalox Anti-Oxidant Compound. The exposed, aboveground conduit shall be properly grounded at all locations within the lighting system.

All conduit ends inside a pull box shall be sufficiently notched to allow a PVC plumbing test cap to be fully installed onto the conduit. Notching of the conduit shall be done prior to the installation of any conductors. The conduits inside the pole base shall be sealed with duct seal putty.

All spare/un-occupied conduits shall have a #14 AWG, stranded XHHW tracer wire. All lighting conduits shall be placed between 30" and 36" deep. If conduits cannot be placed at a 30" minimum depth due to underground conflicts (i.e., rocks, roots, culvert pipes, etc.), the Contractor shall furnish and install 2" rigid conduit in those areas, and it shall be grounded per National Electric Code (NEC) Specifications.

GROUNDING:

The minimum size of all ground/bond wire will be #6 AWG stranded, green wire. The wire insulation shall be THHN/THWN. Bare wire will not be accepted inside conduit. The ground wire shall attach to the ground rod by means of a grounding acorn with a hex bolt. Multiple conductors shall not be joined together under a grounding acorn. One conductor shall be terminated under the acorn, and all others shall be joined with a split bolt. No heat fusion welding will be accepted.

All exposed, aboveground metal conduit shall be properly grounded with a ground bushing clamp or Myers hub.

All ground rods shall be sectional, 5/8" x 10', copper clad, bonded to a steel core. Forty (40) feet shall be installed at the load center and twenty (20) feet at all light pole locations.

PULL BOXES:

All pull boxes shall be traffic-rated (20K minimum), fiberglass-reinforced concrete, such as "Quazite-Composolite," Part #PG1324BA12 (box), and #PG1324HA__ (lid). Dashes indicate lid logo. Pull boxes placed in front of the load center and on the opposite side of the service point road crossing shall be larger than the standard lighting pull box. Stacking of pull boxes will not be permitted. The box to be used at the load center and load center crossing shall be a Quazite part #PG173OBA12 (box) and #PG173OHA__ (lid). The last two digits left blank are for the lid logo and shall be filled in by the contractor for the specific lid logo required. All pull boxes shall have cover logos identifying their specific purpose. The lid logo shall read "Street Lighting." The pull boxes shall have the FDOT APL number embossed in the cover, and the interior of the box shall be stenciled with the APL number.

Placement shall be in accordance with FDOT Design Standards; however, preference is to locate pull boxes in sidewalk areas if job conditions permit. All pull boxes not within the sidewalk areas shall have a concrete pad poured around them, per FDOT Design Standards Index 17500, Sheet 2 of 3.

Charlotte County reserves the right to add to or delete from the overall quantity of pull boxes from what is shown on the plans. If the quantity of materials is increased, the contractor shall be compensated according to the per unit price of this change.

WIRE:

All current-carrying conductors shall have continuous black or red THHN/THWN insulation, rated at 600 volts. All grounded conductors shall have continuous white THHN/THWN insulation, rated at 600 volts. All grounding conductors shall have continuous green THHN/THWN insulation, rated at 600 volts. The wire insulation color of 480 volt systems shall be black, white, and green. The wire insulation color of 240 volt systems shall utilize differing colors for the current-carrying conductors.

All splices are to be made at the light pole or in the pull box that may be directly in front of it. There shall be no other splices in the conductors at any other point within the system. All splices within pull boxes shall have linerless rubber splicing tape, vinyl electrical tape, and Scotchkote electrical coating applied to the joints. The Lighting District inspector has the authority to approve or deny the location(s) of any and all splices.

All pole riser wire shall be #10 AWG, THHN/THWN stranded. No solid wire will be accepted. The riser wire color shall be black and white for 480 volt systems and black and red for 240 volt systems.

SERVICE POINT DETAIL:

A photograph and drawings of the service point is provided within this document. The detail depicts how the service pole and components within the cabinet should be laid out. This general layout should be followed for either 480 volt or 240 volt systems. The minimum size of the service entrance conductors shall be #2 AWG stranded. The minimum size wire connecting the main breaker to the contactor and/or the contactor to the secondary breaker(s) shall be #6 AWG stranded. The minimum size of any control wire shall be #14 AWG, THHN/THWN, stranded.

LOAD CENTER CABINET ENCLOSURE:

The load center cabinet shall be manufactured by Suncoast Metal Fabricators, located at 1030 South 86th Street, Tampa, Florida (telephone 813-630-2800). The cabinet shall be constructed of aluminum and contain a Corbin (C-2) lock. Cabinet dimensions are 15"W x 29"H x 12"D, part #SMF-2.

If the contractor chooses to buy all the components which make up the load center individually and assemble them on site, it is recommended that Charlotte County perform the assembly work. Charlotte County will assemble the supplied materials, wire, and test the back panel, and the contractor will install it into the cabinet.

CONTACTOR:

The contactor shall be an electrically held heating/lighting contactor, as manufactured by Siemens, part #LEN00E003120B. The contactor shall be 3-pole, rated for 100 amps, and utilize a 120 volt coil.

CIRCUIT BREAKERS:

The main circuit breaker shall be a 100 amp, 2-pole, 480 volt, molded case circuit breaker, as manufactured by Siemens, part #ED42B100.

Secondary breakers shall be rated for the appropriate amperes, 2-pole, 480 volt, molded case circuit breakers, as manufactured by Siemens, part #ED42B___ (blank spaces indicate proper amperes required).

STEP-DOWN TRANSFORMER:

For systems designed to utilize 480 volts, the load center shall be equipped with a step-down transformer to operate the contactor coil and photocell circuit. The step-down transformer shall have a 480 volt input and a 120 volt output, with primary and secondary fusing, as manufactured by Square D, part #9070TF100D1. A step-down transformer is not needed in 240 volt systems.

LIGHTNING ARRESTERS:

The load center shall have a hard-wired secondary surge arrester wired to the load side of the main circuit breaker. The lightning arrester shall be rated at 600 volt, three-phase, four-wire, as manufactured by Delta, part #LA601, or Square D, part #SDSA3650.

Each light pole shall have a lightning arrester inside the pole hand hole. The lightning arrester shall be rated up to 600 volt, single phase, as manufactured by DITEK, part #DTK-DL480. The grounding conductor shall be attached to the pole and service ground by means of a solderless lug, sized appropriately.

POLES AND LUMINAIRES:

Whenever a lighting system is designed, the engineer of record shall use poles which place the fixture at a mounting height of 12', 16', or 22' above the finished elevation. Any deviations to the fixture mounting heights shall be approved by the Lighting District.

All decorative lighting systems shall utilize steel screw bases in lieu of concrete foundations. Steel screw bases used shall have a minimum safety factor of 2. Each base shall be manufactured to allow conduit entry thirty-six (36") below finish grade. Field modification to elongate the conduit slot will not be permitted. Each base shall be filled with soil to provide support for the installed conduits.

All decorative luminaire assemblies shall consist of "Bell shaped" Cyclone CY55 series luminaires; a nautical Cyclone M202 arm, modified as noted below; and a Nova #403 "Washington" decorative pole, mounting height as required. See drawings for dimensional details. The luminaire shall be furnished with a high power factor HPS ballast of the specified wattage and voltage and be UL/CSA labeled for "wet location" use. Ballast access shall be tool-free, by means of a hinged door. The optical assembly shall be IES type as required to meet the photometric design criteria, with a chemically brightened anodized aluminum reflector; shall be rated IP66 in imperviousness against dust and water; and shall be furnished with a flat tempered glass lens. The optical assembly shall be accessible without use of tools, by a multi-latch mechanism, with three symmetrical hinge/latch combinations at 120 degrees. The optical system shall include a mogul lamp socket for all HPS wattages specified.

The decorative arm shall be of the style and dimension shown on the drawings. Only one arm type shall be required for all three pole height options shown. Additionally, the arm shall be furnished with a strain relief hook at the top and a side access door to allow access to the strain relief hook. The arm shall be prewired with sufficient lead wire to extend 6" beyond the removable top bracket cap.

The decorative pole shall be by Nova Pole Industries, with a smooth, straight 5" extruded .250 wall shaft for the 12' MH pole and a smooth tapered 6"-5" extruded .250 wall shaft for taller poles. The pole shall be furnished with a #403 "Washington" style base. The pole shaft shall be structurally attached to the pole shaft. No clam-shell or slipover bases shall be allowed. Poles shall be designed to meet 140 mph wind load

criteria, as per AASHTO 2001. All decorative light poles shall utilize "Safety Base" breakaway light pole supports for frangibility, with a shroud for concealment of the supports. 16' and 22' poles shall be furnished with a "Stockbridge" style vibration damper. All poles shall be heat tempered to T6 after welding.

All poles shall be finished in a textured TGIC polyester powder coat, meeting AAMA605-2 standards for color and gloss retention. The finish shall carry a published manufacturer's five year warranty addressing color and gloss retention. All design features of the specified products are included by reference herein, whether or not detailed in these specifications or the associated drawings. Pole finish color to be black textured RAL9005TX.

When a project proposes lighting areas with bollards, the bollard shall be manufactured by Cyclone Lighting, part #CBM1158H-LAP-RS5-50HPS-S17-QT/120-BB2-RAL9005TX colored black. All bollards shall utilize a 50 watt high pressure sodium, ED17 bulb, medium base. Bollard finish color to be black textured RAL9005TX (BKTX). See detail sheets for component specifications.

DIRECTIONAL BORE AND DRIVEWAY CROSSING:

All road crossings shall be accomplished by means of a directional bore. The contractor shall provide Charlotte County with directional bore log(s) taken at 10' intervals for all directional bores. Conduit for the purpose of roadway lighting that will be installed by means of a directional drill shall be 2" continuous HDPE, SDR13, colored gray pipe. The contractor shall provide the appropriate manufacturer fittings when switching from the continuous conduit to standard PVC. Examples of appropriate couplings are Etc brand E-Loc couplings, part #EL237, or Electroweld. Before the directional bore begins, the contractor shall expose all underground facilities. The contractor will be responsible for cleaning up the spoil and returning the site back to the original condition after the bore operation is complete. All drainage facilities shall be properly protected (i.e., hay bales, silt fence, etc.) from directional bore spoil. In the event that drainage facilities become filled with spoil as a result of the directional bore, it shall be the contractor's responsibility to have the material removed and the facility returned to its original condition.

The depth of any directionally-drilled conduit shall not exceed 10'. Charlotte County reserves the right to reject any conduit(s) placed greater than 10' deep. Should a depth greater than 10' be required, the contractor shall obtain approval from Charlotte County prior to performing the work.

MISCELLANEOUS:

The hand/off/auto functions of the load center shall be controlled by means of a control station, as manufactured by Square D, part number 9001KYK111.

The photo cell shall be a twist lock style, 120 volt, as manufactured by Intermatic, part #K4521.

Contained within each pole, there shall be weather-proof fuse holders. The weatherproof fuse holders shall be manufactured by Bussman, parts #HEB-AW-RYC and/or #HET-AW-RYC. The HET-AW-RYC fuse holder, if used, shall contain a permanently installed solid slug. No substitutes will be accepted.

Bussman FNQ-10 fuses shall be used at all pole locations.

Noalox® Anti-Oxidant Compound



- Anti-oxidant and anti-seizing compound
- Reduces galling and seizing on aluminum conduit joints
- Suspended zinc particles penetrate and cut aluminum oxide
- Carrier material excludes air to prevent further oxidation
- Improves service life of aluminum electrical applications
- For use with all types of pressure-type wire connectors

Description	Cat. No.
1/2-oz. Tube	30-024
4-oz. Tube	30-026
8-oz. Squeeze Bottle	30-030
8-oz. Bottle with brush in cap	30-031
1-gal. Bucket	30-032
5- gal. Bucket	30-040
55-gal. Drum	30-1216

Carlton® Rigid Nonmetallic Conduit, Fittings & Accessories

Carlton® manufactures the most complete line of nonmetallic conduits and fittings in the electrical industry. Carlton Schedule 40 and Schedule 80 conduits are designed for use aboveground and underground as described in the National Electrical Code. Specify only Carlton conduits and fittings to insure raceway system integrity.

Features

Ease of Installation Nonmetallic conduits are 1/4 to 1/5 the weight of metallic systems, can be installed in less than half the time, and are easily fabricated on the job.

Safety Nonmetallic conduits are nonconductive, assuring a safe system.

Impact Resistant Carlton Schedule 40 and Schedule 80 nonmetallic conduits are resistant to sunlight and are listed for exposed or outdoor usage. The use of expansion fittings allows the system to expand and contract with temperature variations.

Corrosion Resistant Carlton conduits and fittings are nonmetallic and will not rust or corrode.

Carlton nonmetallic Schedule 40 and Schedule 80 conduits and elbows are manufactured to NEMA TC-2, Federal specification WC1094A and UL 651 specifications. Fittings are manufactured to NEMA TC-3, Federal specification WC1094A and UL514B. Both conduit and fittings carry respective UL or ETL Listings and UL or ETL labels.

Carlton Schedule 40 Rigid PVC Nonmetallic Conduit (Heavy Wall EPC)

Listed for underground applications encased in concrete or direct burial. Also for use in exposed or concealed applications aboveground. • Sunlight resistant • Rated for use with 90°C conductors • Superior weathering characteristics



ETL Listed to UL 651 in compliance to the NEC



LISTED E35297

Schedule 40 Heavy Wall

With Integral Bell*



Part No.			Std. Crate Qty.		Wt. Per	Dimensions		
10'	20'	Nom. Size	10'	20'	100'	O.D.	I.D.	Wall
49005-010		1/2"	6000'		17	.840	.622	.109
49007-010	49007-020	3/4"	4400'	8800'	23	1.050	.824	.113
49008-010	49008-020	1"	3600'	7200'	34	1.315	1.049	.133
49009-010	49009-020	1 1/4"	3300'	6600'	46	1.660	1.380	.140
49010-010	49010-020	1 1/2"	2250'	4500'	55	1.900	1.610	.145
49011-010	49011-020	2"	1400'	2800'	73	2.375	2.067	.154
49012-010	49012-020	2 1/2"	930'	1860'	124	2.875	2.469	.203
49013-010	49013-020	3"	880'	1760'	163	3.500	3.068	.216
49014-010	49014-020	3 1/2"	630'	1260'	196	4.000	3.548	.226
49015-010	49015-020	4"	570'	1140'	232	4.500	4.026	.237
49016-010	49016-020	5"	380'	760'	315	5.563	5.047	.258
49017-010	49017-020	6"	260'	520'	409	6.625	6.065	.280

Rigid nonmetallic conduit is normally supplied in standard 10' lengths, with one belled end per length. For specific requirements, it may be produced in lengths shorter or longer than 10', with or without belled ends.

Use Schedule 40 Fittings with Schedule 40 and Schedule 80 Conduit.

- Notes: 1. Special fittings and conduit sizes will be quoted on request.
 2. DON'T FORGET TO ORDER CEMENT.
 3. Carlton reserves the right to ship to the nearest unitized quantity.

Made in the U.S.A.



**DEEP BELLED SCHEDULE 40 AND 80 UL/CSA
AND NON-UL/CSA PVC CONDUIT**

In an effort meet customer demand we have changed all of PVC extrusion line belling equipment over to provide a deeper bell on all of UL Schedule 40, Schedule 80 and Non-UL Schedule 40 conduit. Over the next couple of weeks you will begin to see this product enter your marketplace as we deplete inventory of shorter belled product with that of the new deeper belled conduit.

Below please find a chart that provides our new bell depths by conduit trade size.

**Schedule 40 & 80 (All UL/CSA and Non-UL/CSA, as well as all Canadian
product)**

Trade Size	Carlon Part Number	Nominal Bell (Socket) Depth
1/2" (0.500")	49005 (UL Sch. 40), 49405 (UL Sch. 80), 59610 (Non-UL Sch. 40)	1.375"
3/4" (0.750")	49007 (UL Sch. 40), 49407 (UL Sch. 80)	1.500"
1" (1.000")	49008 (UL Sch. 40), 49408 (UL Sch. 80)	1.750"
1-1/4" (1.250")	49009 (UL Sch. 40), 49409 (UL Sch. 80)	1.875"
1-1/2" (1.500")	49010 (UL Sch. 40), 49410 (UL Sch. 80)	2.750"
2" (2.000")	49011 (UL Sch. 40), 49411 (UL Sch. 80), 59611 (Non-UL Sch. 40)	3.250"
2-1/2" (2.500")	49012 (UL Sch. 40), 49412 (UL Sch. 80), 59612 (Non-UL Sch. 40)	3.250"
3" (3.000")	49013 (UL Sch. 40), 49413 (UL Sch. 80), 59613 (Non-UL Sch. 40)	3.875"
3-1/2" (3.500")	49014 (UL Sch. 40)	3.875"
4" (4.000")	49015 (UL Sch. 40), 49415 (UL Sch. 80), 59615 (Non-UL Sch. 40)	4.625"
5" (5.000")	49016 (UL Sch. 40), 49416 (UL Sch. 80), 59616 (Non-UL Sch. 40)	5.625"
6" (6.000")	49017 (UL Sch. 40), 49417 (UL Sch. 80), 59617 (Non-UL Sch. 40)	6.375"

25701 Science Park Drive
Cleveland, Ohio 44122
216-464-3400
1-800-3CARLON (322-7566)
www.carlon.com

Rigid Nonmetallic Conduit – Couplings

Expansion Couplings



(For Use with Schedule 40 and Schedule 80)

E945 series expansion couplings are designed to compensate for length changes due to temperature variations in exposed conduit runs.



Standard Expansion Couplings

(Expands to a maximum of 6")

Part No.	Size	Std. Ctn. Qty.	Lay Lengths	
			Stop to Stop Total Closed	Stop to Stop Total Open
E945D	1/2	50	12 ¹ / ₄	18 ⁵ / ₈
E945E	3/4	50	12 ¹ / ₄	18 ⁵ / ₈
E945F	1	45	12 ³ / ₄	19 ¹ / ₈
E945G	1 ¹ / ₄	30	12 ³ / ₄	19 ¹ / ₈
E945H	1 ¹ / ₂	25	12 ³ / ₄	19 ¹ / ₈
E945J	2	15	13 ¹ / ₂	19 ⁷ / ₈
E945K	2 ¹ / ₂	10	14	20 ³ / ₈
E945KX (with male adapter)	2 ¹ / ₂	10	14 ⁶³ / ₁₀₀	20 ⁸¹ / ₁₀₀
E945KXL (special 12 trav)	2 ¹ / ₂	10	24	36
E945L	3	10	16 ¹ / ₂	23
E945LX (with male adapter)	3	10	15 ⁹ / ₁₀	22 ¹ / ₃
E945M	3 ¹ / ₂	5	16 ¹ / ₂	23
E945N	4	5	17 ¹ / ₂	24
E945P	5	3	18 ¹ / ₂	24 ¹ / ₂
E945R	6	2	20 ¹ / ₂	26 ¹ / ₂

Couplings



E32447

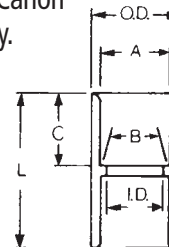
Except where noted by ▶

Standard Couplings

All socket fittings should be attached using Carlon solvent cement. Using Carlon fittings with Carlon nonmetallic conduit insures system integrity.



Socket type for joining nonmetallic conduit.



Part No.	Size	Std. Ctn. Qty.	A Typical		I.D.	O.D.	C Typical		L
			A	B			C	L	
E940D	1/2	150	.852	.836	.728	1 ⁷ / ₆₄	1 ¹ / ₁₆	1 ¹ / ₂	
E940E	3/4	100	1.064	1.046	.840	1 ⁵ / ₁₆	3/4	1 ⁵ / ₈	
E940F	1	50	1.330	1.310	1.210	1 ⁵ / ₈	1 ⁵ / ₁₆	2	
E940G	1 ¹ / ₄	30	1.677	1.655	1.535	1 ⁶³ / ₆₄	1	2 ¹ / ₈	
E940H	1 ¹ / ₂	25	1.918	1.894	1.755	2 ¹⁵ / ₆₄	1 ¹ / ₈	2 ³ / ₈	
E940J	2	30	2.393	2.369	2.190	2 ⁴⁷ / ₆₄	1 ³ / ₁₆	2 ¹ / ₂	
E940K	2 ¹ / ₂	20	2.890	2.868	2.688	3 ⁵ / ₁₆	1 ³³ / ₆₄	3 ³ / ₁₆	
E940K-CAR	2 ¹ / ₂	4	2.890	2.868	2.688	3 ⁵ / ₁₆	1 ³³ / ₆₄	3 ³ / ₁₆	
E940L	3	25	3.515	3.492	3.375	3 ³¹ / ₃₂	1 ³ / ₄	3 ¹³ / ₃₂	
E940L-CAR	3	5	3.515	3.492	3.375	3 ³¹ / ₃₂	1 ³ / ₄	3 ¹³ / ₃₂	
E940M	3 ¹ / ₂	20	4.015	3.992	3.780	4 ⁹ / ₁₆	1 ³ / ₄	3 ⁵ / ₈	
E940N	4	15	4.515	4.491	4.265	5 ³ / ₃₂	1 ²⁵ / ₃₂	3 ³ / ₄	
E940N-CAR	4	5	4.515	4.491	4.265	5 ³ / ₃₂	1 ²⁵ / ₃₂	3 ³ / ₄	
E940P	5	8	5.593	5.553	5.097	6 ¹ / ₄	1 ⁵ / ₁₆	4 ¹ / ₁₆	
E940R	6	5	6.658	6.614	6.115	7 ¹ / ₂	2 ³ / ₁₆	4 ⁵ / ₈	

Special Long Line Couplings

Short Expansion Couplings

(Expands to a maximum of 2")



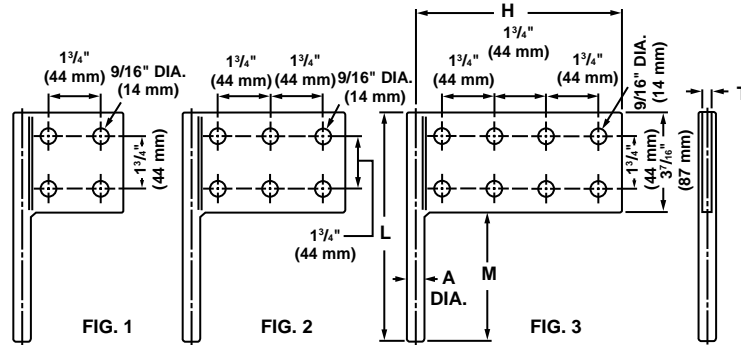
Part No.	Size	Std. Ctn. Qty.
E955D	1/2	40
E955E	3/4	40
E955F	1	25
E955G	1 ¹ / ₄	15
E955H	1 ¹ / ₂	10
E955J	2	6



Long Line Couplings

Part No.	Size	Std. Ctn. Qty.	Std. Ctn. Wt. (lbs.)
E941H	1 ¹ / ₂	40	9
E941J	2	25	8
E941K	2 ¹ / ₂	15	8
E941L	3	15	14
E941N	4	10	15
E941PF	5	4	12
▶ E941RF	6	5	21

COPPER TRANSFORMER ADAPTOR TERMINAL • TYPE FT*



Designed for multiple take-off from the transformer eyebolt secondary connector. Cast from copper and electroplated for use with copper or aluminum connectors.

Catalog Number	Fig. No.	A Stud Diameter	Approximate Dimensions							
			M		H		L		T	
			in	mm	in	mm	in	mm	in	mm
FT-4-037	1	3/8	1 3/4	44	3 5/8	92	5 3/16	132	1/4	6.35
FT-4-056	1	9/16	2	51	3 3/32	79	5 7/16	138	3/8	9.52
FT-4-075	1	3/4	2 1/2	64	3 13/16	97	5 15/16	151	3/8	9.52
FT-4-087	1	7/8	3 3/4	95	3 7/8	98	7 3/16	183	3/8	9.52
FT-4-118	1	1 3/16	4 1/4	108	4 1/16	103	7 11/16	195	3/8	9.52
FT-6-037	2	3/8	1 3/4	44	5 3/8	137	5 3/16	132	1/4	6.35
FT-6-056	2	9/16	2	51	5 15/32	139	5 7/16	138	3/8	9.52
FT-6-075	2	3/4	2 1/2	64	5 9/16	141	5 15/16	151	3/8	9.52
FT-6-087	2	7/8	3 3/4	95	5 5/8	143	7 3/16	183	3/8	9.52
FT-6-118	2	1 3/16	4 1/4	108	5 13/16	148	7 11/16	195	3/8	9.52
FT-8-037	3	3/8	1 3/4	44	7 1/8	181	5 3/16	132	1/4	6.35
FT-8-056	3	9/16	2	51	7 7/32	183	5 7/16	138	3/8	9.52
FT-8-075	3	3/4	2 1/2	64	7 5/16	186	5 15/16	151	3/8	9.52
FT-8-087	3	7/8	3 3/4	95	7 3/8	187	7 3/16	183	3/8	9.52
FT-8-118	3	1 3/16	4 1/4	108	7 9/16	192	7 11/16	195	3/8	9.52

*We recommend using Penn-Union Cual-Aid, an oxide inhibiting compound with these connectors. When connecting aluminum or ACSR wire, wire brush the conductor with Cual-Aid #11.

BRONZE GROUND ROD CLAMPS • TYPES CAB & CEB



UL US
467 LISTED
SUITABLE FOR
DIRECT BURIAL

RUS
ACCEPTED

Made from corrosion resistant cast aluminum bronze. Furnished with silicon bronze hexagon head bolt. Socket head screws can be furnished by suffixing catalog number with "-S". For example: CAB-4-S.

Type CEB is an economical ground rod clamp made from corrosion resistant cast aluminum bronze. Furnished with silicon bronze hexagon head bolt.

HEAVY DUTY CLAMP

Catalog Number	Accommodates Rod Size	Conductor Range	Wire Diameter Range†
	in		in
CAB-1M	1/2	10 Sol.-2 Str.	.102-.292
CAB-2M*	5/8	8 Sol.-1/0 Str.	.128-.375
CAB-3M	3/4	8 Sol.-1/0 Str.	.128-.375

STANDARD CLAMP

CAB-0	3/8	14 Sol.-6 Str.	.064-.184
CAB-1	1/2	10 Sol.-2 Str.	.102-.292
CAB-2	5/8	8 Sol.-1/0 Str.	.128-.375
CAB-3	3/4	8 Sol.-1/0 Str.	.128-.375
CAB-4	3/4	4/0 Str.	.528
CAB-5	1	8 Sol.-1/0 Str.	.128-.375
CAB-6	1	4/0 Str.	.528

ECONOMY CLAMP

Catalog Number	Accommodates Rod Size	Conductor Range	Wire Diameter Range†
	in		in
CEB-1†	1/2	8 Sol.-2 Str.	.128-.292
CEB-2†	5/8	8 Sol.-2 Str.	.128-.292
CEB-3*	3/4	8 Sol.-2 Str.	.128-.292



†For conversion to metric range, see page 175. †RUS accepted plain and tin plated. *RUS accepted tin plated only.
For tin plating, suffix catalog number with "-TN". * For 1/2 thread bolt and extra long body use CAB 2ML.

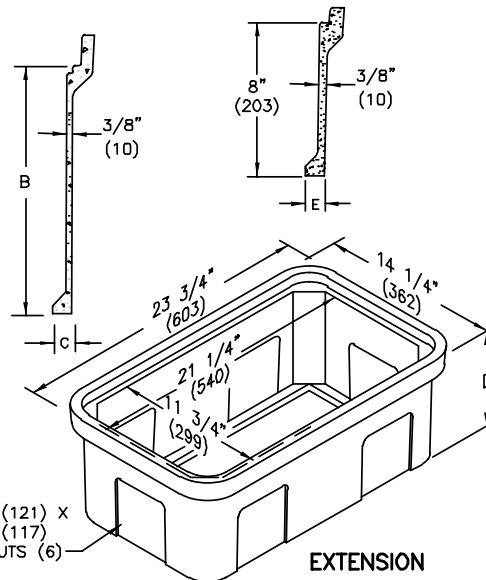
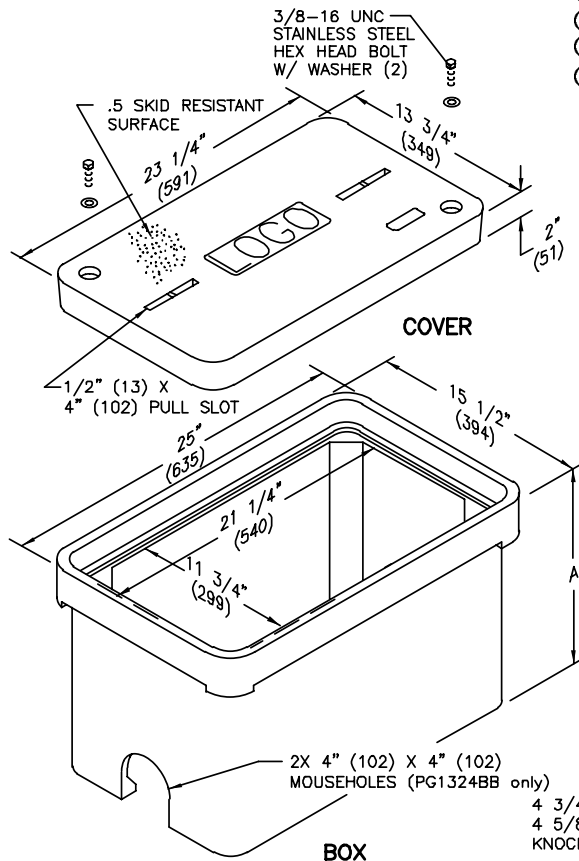
SPECIFICATIONS/DATA

13" x 24" PG Style (Stackable) Assembly

Covers (Blank unless logo is specified)

DESCRIPTION	PART NO.	WEIGHT #	DESIGN/TEST LOAD #	ANSI TIER
W/2 Bolts	PG1324CA00	32 (14.5 kg)	8,000 / 12,000	8
Gasketed w/2 Bolts	PG1324CG00	32 (14.5 kg)	8,000 / 12,000	8
No Bolts	PG1324WA00	32 (14.5 kg)	8,000 / 12,000	8
Heavy Duty w/2 Bolts	PG1324HA00	49 (22.2 kg)	15,000 / 22,500	15
Gasketed Heavy Duty w/2 Bolts	PG1324HG00	49 (22.2 kg)	15,000 / 22,500	15
Extra Heavy Duty w/ 2 Bolts	PG1324HH00	49 (22.2 kg)	22,500 / 33,750	15*

- Covers with meter lids available upon request.
- Gasketed covers and bolt grommets must be used with a gasketed box. Gaskets reduce the inflow of fluids but do not make the enclosure water tight.
- * Loadings for HH covers comply with all test provisions of ANSI/SCTE 77 except that the vertical design load is 22,500 lbs. with a test load of 33,750 lbs. over a 10" x 20" plate.



Boxes (Stackable with self-aligning, replaceable EZ-Nut)

DESCRIPTION	PART NO.	WEIGHT #	DIMENSION A	DIMENSION B	DIMENSION C	DESIGN/TEST LOAD #	ANSI TIER
Open Bottom	PG1324BA12	53 (24.0 kg)	12" (305 mm)	10" (254 mm)	1 1/4" (32 mm)	22,500 / 33,750	15*
	PG1324BA18	72 (33 kg)	18" (457 mm)	16" (406 mm)	1 1/4" (32 mm)	22,500 / 33,750	15*
Open Bottom w/ Gasket	PG1324BG12	53 (24.0 kg)	12" (305 mm)	10" (254 mm)	1 1/4" (32 mm)	22,500 / 33,750	15*
	PG1324BG18	72 (33 kg)	18" (457 mm)	16" (406 mm)	1 1/4" (32 mm)	22,500 / 33,750	15*
Open Bottom w/ 2 Mouseholes	PG1324BB12	53 (24.0 kg)	12" (305 mm)	10" (254 mm)	1 1/4" (32 mm)	22,500 / 33,750	15*
	PG1324BB18	72 (33.0 kg)	18" (457 mm)	16" (406 mm)	1 1/4" (32 mm)	22,500 / 33,750	15*
Solid Bottom	PG1324DA12	63 (28.6 kg)	12 1/2" (318mm)	10" (254 mm)	N/A	22,500 / 33,750	15*
	PG1324DA18	85 (39 kg)	18 1/2" (470 mm)	16" (406 mm)	N/A	22,500 / 33,750	15*
Solid Bottom w/ Gasket	PG1324DG12	63 (28.6 kg)	12 1/2" (318mm)	10" (254 mm)	N/A	22,500 / 33,750	15*
	PG1324DG18	85 (39 kg)	18 1/2" (470 mm)	16" (406 mm)	N/A	22,500 / 33,750	15*

* Loadings comply with ANSI/SCTE 77. These boxes meet and exceed ANSI Tier 15 test provisions.

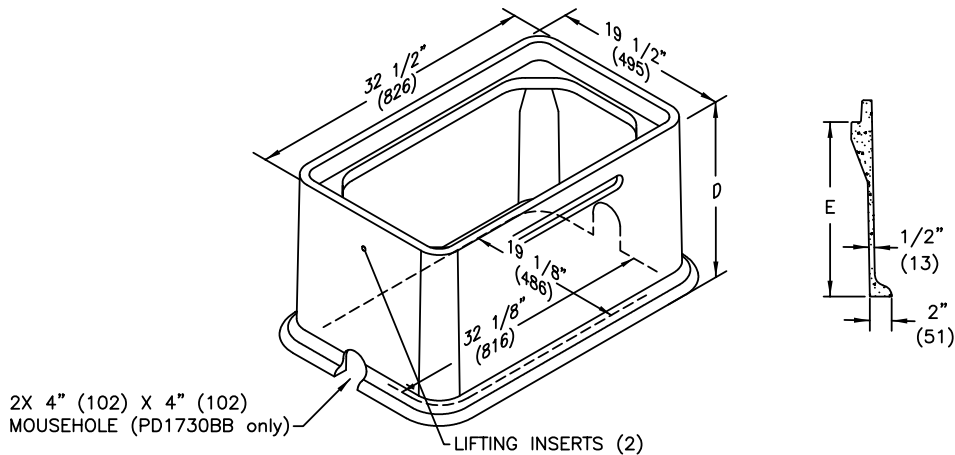
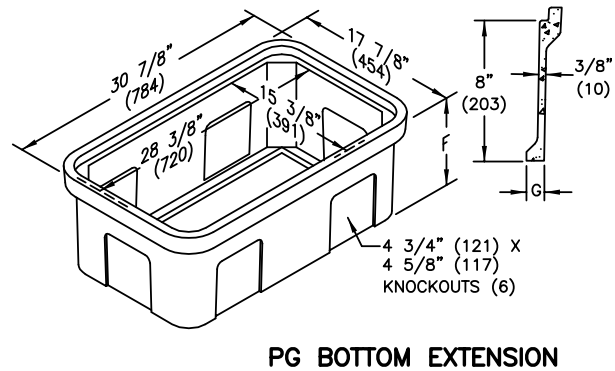
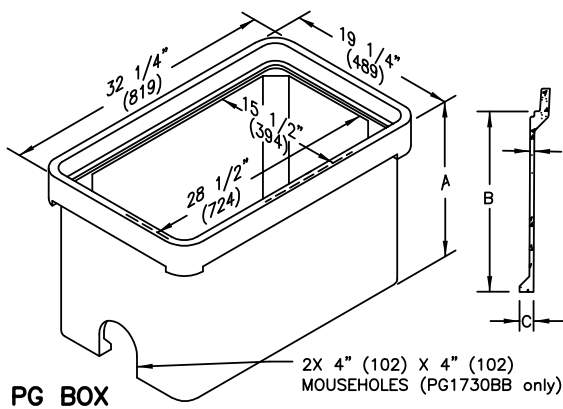
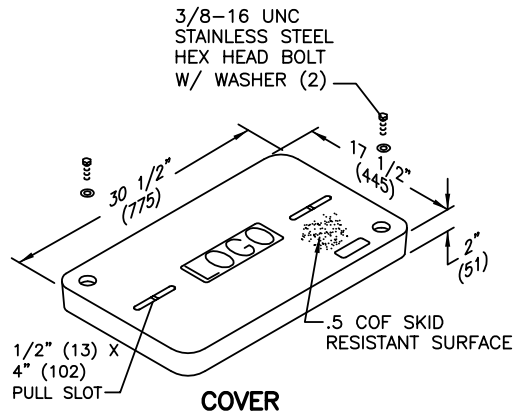
Extensions (For use under box only, one per box. For grade adjustable extension see page 44.)

DESCRIPTION	PART NO.	WEIGHT #	DIMENSION D	DIMENSION E	DESIGN/TEST LOAD #	ANSI TIER
Open Bottom	PG1324EA08	25 (11.3 kg)	8 3/4" (222 mm)	1" (25 mm)	22,500 / 33,750	15*
Solid Bottom	PG1324RA08	35 (15.9 kg)	9 1/4" (235 mm)	N/A	22,500 / 33,750	15*

* Loadings comply with ANSI/SCTE 77. These extensions meet and exceed ANSI Tier 15 test provisions. Dimensions & weights in parentheses are metric equivalent.

SPECIFICATIONS/DATA

17" x 30" PG Style (Stackable) Assembly and 17" x 30" PD Style Assembly



ENCLOSURE DRAWINGS

**17" x 30" PG Style (Stackable) Assembly
and 17" x 30 PD Style Assembly**

SPECIFICATIONS/DATA

Covers (Blank unless logo is specified)

DESCRIPTION	PART NO.	WEIGHT #	DESIGN/TEST LOAD #	ANSI TIER*
W/2 Bolts	PG1730CA00	52 (23.6 kg)	8,000 / 12,000	8
Gasketed w/2 Bolts	PG1730CG00	52 (23.6 kg)	8,000 / 12,000	8
No Bolts	PG1730WA00	52 (23.6 kg)	8,000 / 12,000	8
Heavy Duty w/2 Bolts	PG1730HA00	83 (37.6 kg)	15,000 / 22,500	15
Gasketed Heavy Duty w/2 Bolts	PG1730HG00	83 (37.6 kg)	15,000 / 22,500	15
Extra Heavy Duty w/2 Bolts	PG1730HH00	83 (37.6 kg)	22,500 / 33,750	22

- Covers with meter lids available upon request. See page 12 or page 56 for meter lid cover load rating explanation.
- Gasketed covers and bolt grommets must be used with a gasketed box. Gaskets reduce the inflow of fluids but do not make the enclosure water tight.

PG Boxes (Stackable with self-aligning, replaceable EZ Nut) **22" - 30" Deep boxes must be used as bottom of any stack.)

DESCRIPTION	PART NO.	WEIGHT #	DIMENSION A	DIMENSION B	DIMENSION C	DESIGN/TEST LOAD #	ANSI TIER*
Open Bottom	PG1730BA12	67 (30.4 kg)	12" (305 mm)	10" (254 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BA18	94 (42.6 kg)	18" (457 mm)	16" (406 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BA22	106 (48.1 kg)	22" (559 mm)	20" (508 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BA24	122 (55.3 kg)	24" (610 mm)	22" (559 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BA28	126 (57.2 kg)	28" (711 mm)	26" (660 mm)	1/2" (13 mm)	22,500 / 33,750	22
Open Bottom w/2 Mouseholes	PG1730BA30	144 (65.3 kg)	30" (762 mm)	28" (711 mm)	1/2" (13 mm)	22,500 / 33,750	22
	PG1730BB12	65 (29.5 kg)	12" (305 mm)	10" (254 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BB18	92 (41.7 kg)	18" (457 mm)	16" (406 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BB22	104 (47.2 kg)	22" (559 mm)	20" (508 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BB24	120 (54.4 kg)	24" (610 mm)	22" (559 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BB28	124 (56.2 kg)	28" (711 mm)	26" (660 mm)	1/2" (13 mm)	22,500 / 33,750	22
Solid Bottom	PG1730BB30	142 (64.4 kg)	30" (762 mm)	28" (711 mm)	1/2" (13 mm)	22,500 / 33,750	22
	PG1730DA12	85 (38.5 kg)	12 1/2" (318 mm)	10" (254 mm)	N/A	22,500 / 33,750	22
	PG1730DA18	112 (50.8 kg)	18 1/2" (470 mm)	16" (406 mm)	N/A	22,500 / 33,750	22
	PG1730DA22	124 (56.2 kg)	22 1/2" (572 mm)	20" (508 mm)	N/A	22,500 / 33,750	22
	PG1730DA24	137 (62.0 kg)	24 1/2" (622 mm)	22" (559 mm)	N/A	22,500 / 33,750	22
	PG1730DA28	143 (64.9 kg)	28 1/2" (724 mm)	26" (660 mm)	N/A	22,500 / 33,750	22
	PG1730DA30	150 (68.0 kg)	30 1/2" (775 mm)	28" (711 mm)	N/A	22,500 / 33,750	22

PD Boxes

DESCRIPTION	PART NO.	WEIGHT #	DIMENSION D	DIMENSION E	DESIGN/TEST LOAD #	ANSI TIER*
Open Bottom	PD1730BA18	129 (59 kg)	18" (457 mm)	16" (406 mm)	22,500 / 33,750	22
	PD1730BA26	166 (75 kg)	26" (660 mm)	24" (610 mm)	22,500 / 33,750	22
Open Bottom w/2 Mouseholes	PD1730BB18	127 (58 kg)	18" (457 mm)	16" (406 mm)	22,500 / 33,750	22
	PD1730BB26	164 (74 kg)	26" (660 mm)	24" (610 mm)	22,500 / 33,750	22
Open Bottom w/Gasket	PD1730BG18	129 (59 kg)	18" (457 mm)	16" (406 mm)	22,500 / 33,750	22
	PD1730BG26	166 (75 kg)	26" (660 mm)	24" (610 mm)	22,500 / 33,750	22

Extensions (For use under 12" and 18" boxes only, one per box.)

DESCRIPTION	PART NO.	WEIGHT #	DIMENSION F	DIMENSION G	DESIGN/TEST LOAD #	ANSI TIER*
Open Bottom	PG1730EA08	36 (16.3 kg)	8 3/4" (222 mm)	1" (25 mm)	22,500 / 33,750	22
Solid Bottom	PG1730RA08	55 (24.9 kg)	9 1/4" (235 mm)	N/A	22,500 / 33,750	22

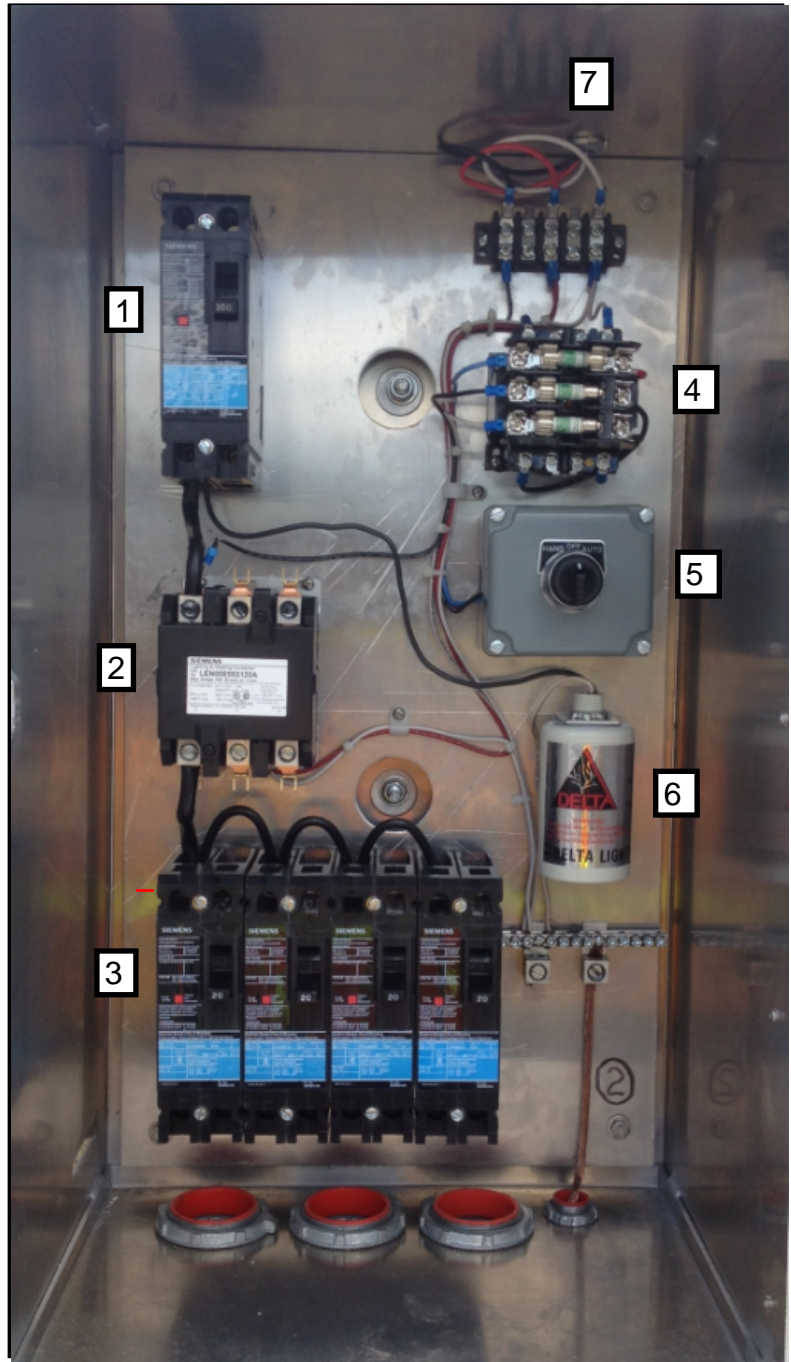
Dimensions & weights in parentheses are metric equivalent.

* Loadings comply with ANSI/SCTE 77 (see page 9).

ENCLOSURE DRAWINGS

Service Point Detail

1. 100 Amp Main Breaker
2. Contactor
3. Secondary Breaker(s)
4. Step Down Transformer
5. On/Off/Auto Switch
6. Lightning Arrestor
7. Photocell



OVERHEAD SI SERVICE

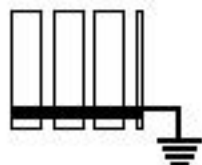
BACK

FRONT

eye bolt

3/4" UNISTRUT LOCATION
EVENLY SPACED

BOND ALL CONDUITS TO GROUND
WITH CLAMPS BELOW GRADE



100A KNIFE SWITCH

MILLS BANK METER

4.5'

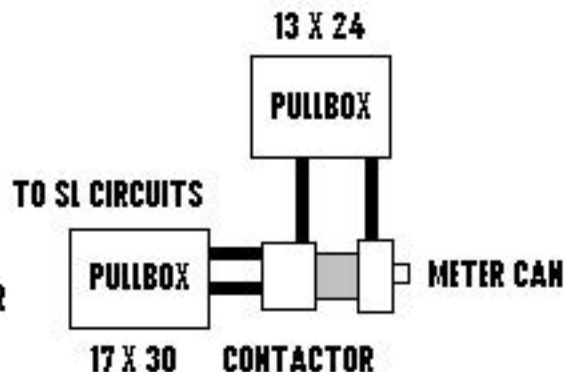
3/4" 15/8"
UNISTRUT
LOCATION
EVENLY SPACED

CONTACTOR

4'

USE 1 5/8" UNISTRUT ON CONTACTOR SIDE
AND 3/4" UNISTRUT ON METER CAN AND
RISER SIDE---USE MEYER HUBS ON ALL
CONDUITS IN CONTACTOR AND BOTTOM OF
METER CAN---USE GROUNDING BUSHINGS ON
ALL OTHERS---ALL CONDUIT SHALL BE 2"
RIGID WITH THE GROUNDING IN 1/2" RIGID

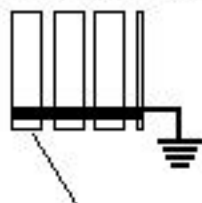
SERVICE WIRE FROM METER CAN TO
CONTACTOR WILL BE ROUTED
THRU 13 X 24 PULLBOX AND
CONDUITS FOR CIRCUITS WILL GO
THRU 17 X 30 PULLBOX



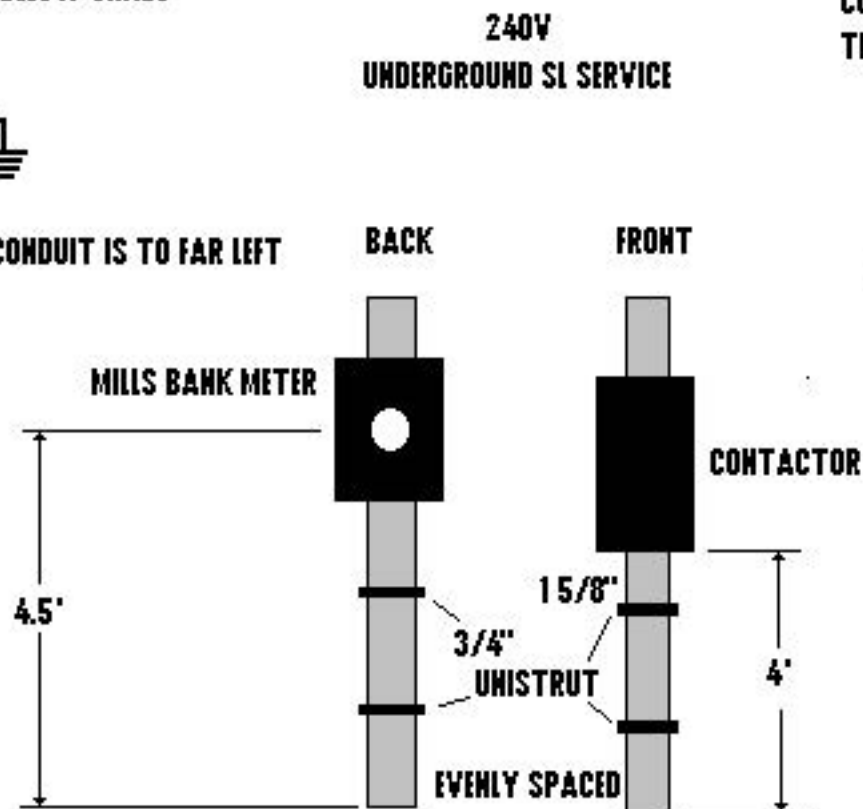
DELETE KNIFE SWITCH FOR 240V
SERVICE

USE RED, BLACK, AND WHITE SERVICE WIRES
NO PHASING TAPE WILL BE ACCEPTED.

BOND ALL CONDUITS TO GROUND
WITH CLAMPS BELOW GRADE

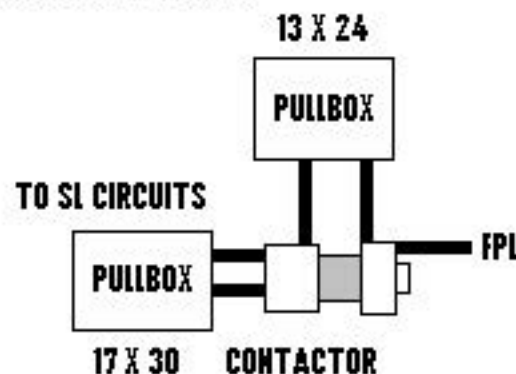


SERVICE CONDUIT IS TO FAR LEFT



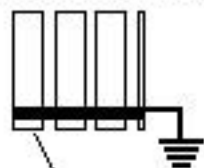
USE 1 5/8" UNISTRUT ON CONTACTOR SIDE
AND 3/4" UNISTRUT ON METER CAN
USE MEYER HUBS ON ALL
CONDUITS IN CONTACTOR AND BOTTOM OF
METER CAN---USE GROUNDING BUSHINGS ON
ALL OTHERS---ALL CONDUIT SHALL BE 2"
RIGID WITH THE GROUNDING IN 1/2" RIGID

SERVICE WIRE FROM METER CAN TO
CONTACTOR WILL BE ROUTED
THRU 13 X 24 PULLBOX AND
CONDUITS FOR CIRCUITS WILL GO
THRU 17 X 30 PULLBOX



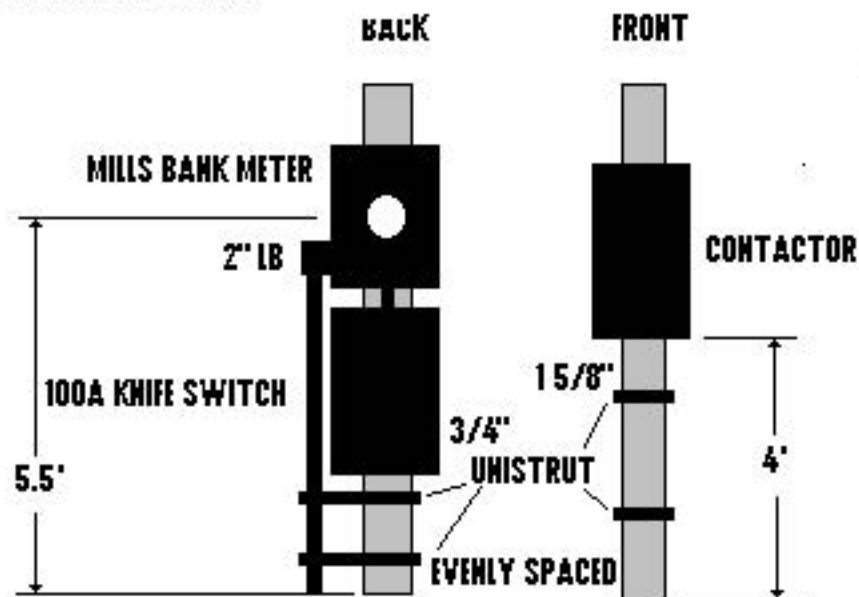
USE 1 5/8" UNISTRUT ON CONTACTOR SIDE AND 3/4" UNISTRUT ON METER CAN AND RISER SIDE---USE MEYER HUBS ON ALL CONDUITS IN CONTACTOR AND BOTTOM OF METER CAN---USE GROUNDING BUSHINGS ON ALL OTHERS---ALL CONDUIT SHALL BE 2" RIGID WITH THE GROUNDING IN 1/2" RIGID

BOND ALL CONDUITS TO GROUND WITH CLAMPS BELOW GRADE

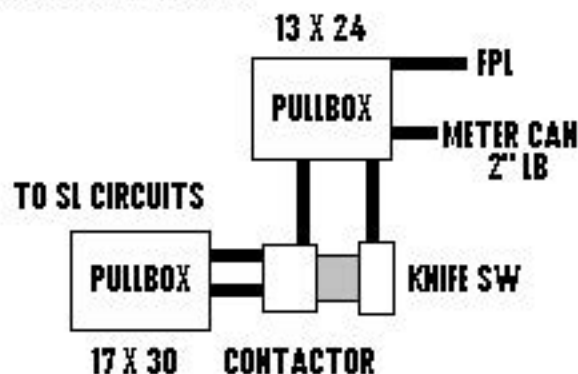


SERVICE CONDUIT IS TO FAR LEFT

480V
UNDERGROUND SI SERVICE



SERVICE WIRE FROM METER CAN TO CONTACTOR WILL BE ROUTED THRU 13 X 24 PULLBOX AND CONDUITS FOR CIRCUITS WILL GO THRU 17 X 30 PULLBOX



ALUMINUM SOLDERLESS LUGS • TYPE LA

One hole, front entrance copper or aluminum conductors 600 Volt Rated



486B
LISTED
AL9CU

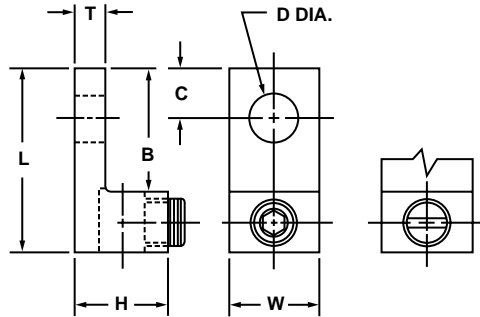


FIG. 2

FIG. 1

Body, fabricated from high strength aluminum alloy extrusion.
 Lug is 100% reusable using either screw driver or hex wrench.
 No special tools required.

Maximum conductivity, compact design light weight with ultimate strength.

Finish, electro-tin plated to assure minimum contact resistance and protection against corrosion when used with copper wire. (For added protection apply Penn-Union Cual-Aid® to cable before installation.)

Standard stud hole sizes and locations are shown on chart.

Catalog Number	Torque Value In-Lbs.	Wire Range‡	Fig. No.	Approximate Dimensions						
				L	W	H	T	B	C	D Dia.
				in	in	in	in	in	in	in
LA-6	45	14-6	1	1 ¹ / ₁₆	1 ¹ / ₂	1 ¹ / ₂	3 ³ / ₃₂	11 ¹ / ₁₆	1 ¹ / ₄	17 ¹ / ₆₄
LA-2	50	14-2	1	1 ⁵ / ₃₂	1 ¹ / ₂	35 ⁵ / ₆₄	7 ⁷ / ₆₄	11 ¹ / ₁₆	5 ⁵ / ₁₆	17 ¹ / ₆₄
LA-0	50	14-1/0	1	1 ¹⁵ / ₃₂	5 ⁵ / ₈	25 ⁵ / ₃₂	3 ³ / ₁₆	27 ⁷ / ₃₂	27 ⁷ / ₆₄	17 ¹ / ₆₄
LA-2/0	120	14-2/0	2	1 ¹⁵ / ₃₂	5 ⁵ / ₈	51 ⁵ / ₆₄	3 ³ / ₁₆	27 ⁷ / ₃₂	7 ⁷ / ₁₆	17 ¹ / ₆₄
LA-250	275	6-250	2	2	1	1 ¹ / ₈	1 ¹ / ₄	1	29 ²⁹ / ₆₄	21 ²¹ / ₆₄
LA-350	275	6-350	2	2 ¹ / ₄	1 ¹ / ₈	1 ¹ / ₄	1 ¹ / ₄	1 ¹ / ₈	1 ¹ / ₂	13 ¹³ / ₃₂
LA-500	375	4-500	2	2 ¹³ / ₁₆	1 ¹ / ₄	1 ⁹ / ₁₆	5 ⁵ / ₁₆	1 ⁹ / ₁₆	7 ⁷ / ₈	13 ¹³ / ₃₂
LA-600	375	2-600	2	3 ³ / ₁₆	1 ¹ / ₂	1 ⁹ / ₁₆	7 ⁷ / ₁₆	1 ¹³ / ₁₆	25 ²⁵ / ₃₂	13 ¹³ / ₃₂
LA-800	375	300-800	2	3 ¹ / ₂	1 ³ / ₄	1 ¹⁵ / ₁₆	1 ¹ / ₂	1 ⁷ / ₈	13 ¹³ / ₁₆	21 ²¹ / ₃₂
LA-1000	375	500-1000	2	3 ¹ / ₂	1 ³ / ₄	1 ¹⁵ / ₁₆	1 ¹ / ₂	1 ⁷ / ₈	13 ¹³ / ₁₆	21 ²¹ / ₃₂

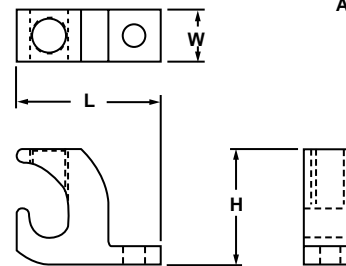
‡For conversion to metric range, see page 175.

ALUMINUM LAY-IN LUGS • TYPE LI

One hole, side entrance copper or aluminum continuous conductors



486B
LISTED
AL9CU



Catalog Number	Wire Diameter Range	Approximate Dimensions			Screw Type
		L	W	H	
LI-50S	14-4	1 ¹ / ₁₆ "	3 ³ / ₈ "	25 ²⁵ / ₃₂ "	Slot
LI-112S	14-1/0	1 ¹ / ₂ "	19 ¹⁹ / ₃₂ "	11 ¹¹ / ₆₄ "	Slot
LI-200S	6-3/0	2"	51 ⁵¹ / ₆₄ "	1 ⁹ / ₁₆ "	Socket
LI-252S	6-250	2 ¹³ / ₆₄ "	51 ⁵¹ / ₆₄ "	1 ⁵¹ / ₆₄ "	Socket

Body, fabricated from high strength aluminum alloy extrusion.

Finish, electro-tin plated to assure minimum contact resistance and protection against corrosion when used with copper wire. (For added protection apply Penn-Union Corp. Cual-Aid® to cable before installation.)

The side entrance design permits the quick installation of one continuous conductor as a jumper to multiple locations without a break in the conductor. Excellent choice for use on grounding conductors.

Lighting contactors

Siemens Lighting Contactors can be used individually for simple control schemes or as integral components in full-featured lighting control systems. They provide reliable and efficient means of local or remote switching of lighting as well as non-inductive loads. Rugged construction, heavy-duty ratings and a wide selection of control options and accessories makes the Siemens Lighting Contactors the right choice for lighting applications.



The Controls Express Lighting Contactor offering includes the following:

Class LC

- Electrically held with contacts rated up to 30A at 600V - Open or in a NEMA 1 general purpose enclosure
- Power poles can easily be added at any time based on changing need
- Power poles can be field converted from NO to NC
- Device convertible to mechanically held with conversion kit

Class LE

- Electrically held with contacts rated 20 - 400A at 600V
- Open or in a NEMA 1 general purpose enclosure
- Built-in auxiliary contacts for convenient 3-wire control

Type	Contactor Type	Amp Rating	Normally Open Poles	Coil Voltage	Enclosure	
					Open Catalog #	NEMA 1 General Purpose Catalog #
	LC	30A	3	120V	LCE00C003120A	LCE01C003120A
			6	120V	LCE00C006120A	LCE01C006120A
			8	120V	LCE00C008120A	LCE01C008120A
			10	120V	LCE00C010120A	LCE01C010120A
			12	120V	LCE00C012120A	LCE01C012120A
	LE	20A	3	120V	LEN00B003120B	LEN01B003120B
			4	120V	LEN00B004120B	LEN01B004120B
		30A	3	120V	LEN00C003120B	LEN01C003120B
			4	120V	LEN00C004120B	LEN01C004120B
			6	120V	-	LEN01C006120B
		60A	3	120V	LEN00D003120B	LEN01D003120B
			100A	3	120V	LEN00E003120B
		200A	3	120V	-	LEN01F003120A

Accessory	Contactor Type	Contactor Size	Description	Catalog #
Power Pole Kits	LC	30A	Single power pole	49LCP1A
			Double power pole	49LCP2A
Electrically Held to Mechanically Held Conversion Kit	LC	30A	2-wire, 110-120VAC	49LCCM2A
			3-wire, 110-120VAC	49LCCM5A
Auxiliary Contacts	LC	30A	1 NO or 1 NC based on mounting position	49LCAC1PA
			2 NO or 2 NC based on mounting position	49LCAC2PA
	LE	20A	1 NO & 1 NC front mounted	LEN01C006120B
		30A	1 NO & 1 NC side mounted	LEN01D003120B
60 - 200A	1 NO & 1 NC side mounted	LEN01E003120B		

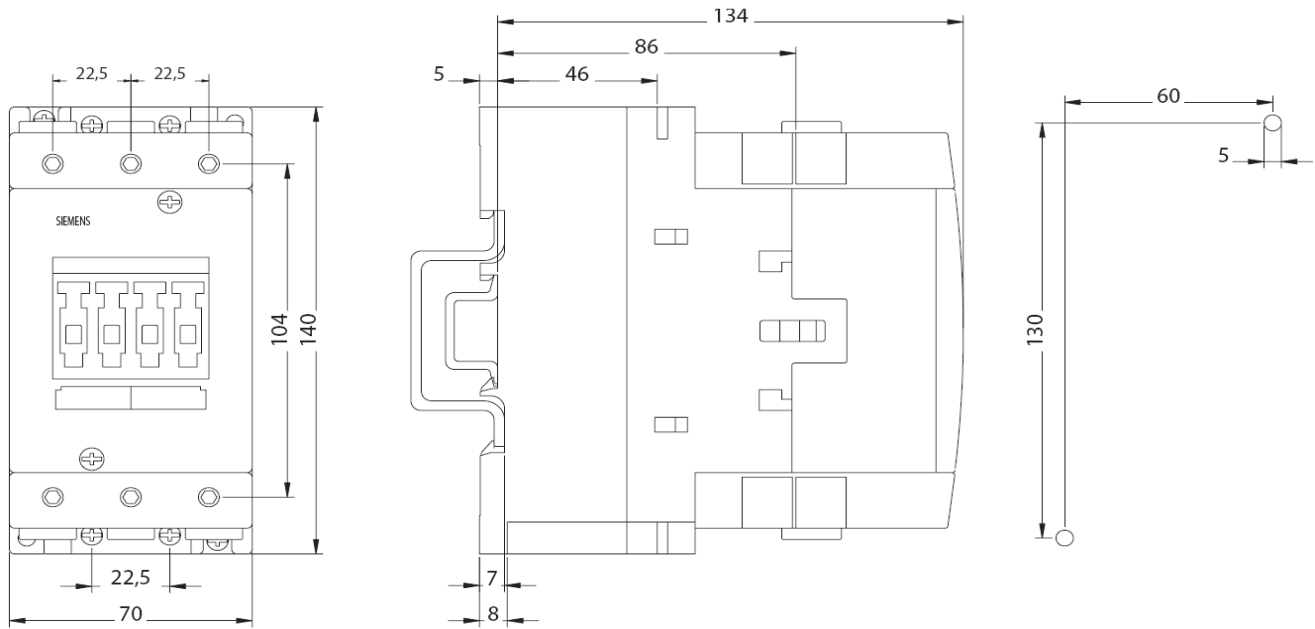


Lighting Contactor
Class LE
Electrically Held
100 Amp, 3 Pole

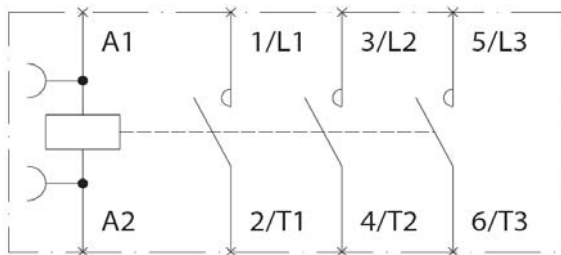
General technical data:	
Finger-safe (main circuit / control circuit)	no / yes
Degree of pollution	3
Altitude (m)	2,000
Ambient storage temperature (°C)	-55 to 80
Ambient operating temperature (°C)	0 to 40
Humidity (% non-condensing)	10 to 95
Shock resistance at rectangular impulse (g/ms)	6.8 / 5 , 4 / 10
Shock resistance at sine pulse (g/ms)	10.6 / 5, 6.2 / 10
Rated impulse voltage resistance (kV)	no data
Rated insulation voltage (V)	no data
Mechanical operating cycles as operating time:	
of contactor	10,000,000
of contactor with additional aux contacts	10,000,000
Main circuit:	
Number of NC / NO main contacts	0NC / 3NO
Typical power loss per conductor (W)	7.7
Off-load operating frequency (cycles per hour)	5,000
Current ratings:	
Tungsten (poles per phase)	100A @277V 1p 1ph
	100A @480V 2p 1ph
	100A @480V 3p 3ph
Ballast (poles per phase)	100A @600V 1p 1ph
	100A @600V 2p 1ph
	100A @600V 3p 3ph
General & resistive (poles per phase)	100A @600V 1p 1ph
	100A @600V 2p 1ph
	100A @600V 3p 3ph
Coil ratings:	
Inrush / sealed power (VA)	300 / 21
Coil voltage tolerance factor	0.8 - 1.1
Coil code 024	24VAC 50/60HZ
Coil code 120	110VAC 50HZ / 120VAC 60HZ
Coil code 208	208VAC 50/60HZ
Coil code 240	220VAC 50HZ / 240VAC 60HZ
Coil code 277	277VAC 60HZ
Coil code 347	347VAC 60HZ
Coil code 480	480VAC 60HZ
Coil code 600	600VAC 60HZ
Internal/standard auxiliary contact:	
Number of NC / NO auxiliary contacts	(must use an external/optional auxiliary contact)
Rating	NA

Installation/mounting/dimensions:	
Mounting orientation	vertical
Type of mounting: screw / DIN rail	yes / yes
Height x Width x Depth (mm)	146 x 70 x 139
Minimum clearance to sides (mm)	6
Minimum clearance to earthed parts (mm)	6
Connection type / torque for main circuit terminals	screw / 36-53 lb in
Connection type / torque for control circuit terminals	screw / 7-10 lb in
Solid & stranded conductors for main contacts (AWG)	2x(10-1/0), 1x(10-2/0)
Solid & stranded conductors for control circuit (AWG)	2x(18-14)
Conductor type for main and control circuits	75°C CU
Short circuit current rating of main circuit:	
Short circuit current rating	10kA @ 600V
Max fuse / circuit breaker (Amp)	200 / 125
Certificates:	
	cULus

Dimensions



Wiring Diagram



Molded Case Circuit Breakers

ED 125A Frame Sentron Series

Selection

Ordering Instructions

- All ED Frame Sentron circuit breakers are supplied with load side lugs. If line side lugs are required, add "L" suffix to catalog number. Consult Siemens sales office for any additional charge
- 50°C Calibration, 400HZ - see page 6-84. All ED frame circuit breakers may be reverse connected

Type ED2[Ⓢ]

Blue Label

Continuous Current Rating @ 40°C	1-Pole		2-Pole		3-Pole	
	120V AC	125V DC	240V AC	125V DC 250V DC	240V AC	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	ED21B015 [Ⓢ]	125.00	ED22B015	288.00	ED23B015	428.00
20	ED21B020 [Ⓢ]	125.00	ED22B020	288.00	ED23B020	428.00
25	ED21B025	125.00	ED22B025	288.00	ED23B025	428.00
30	ED21B030	125.00	ED22B030	288.00	ED23B030	428.00
35	ED21B035	125.00	ED22B035	288.00	ED23B035	428.00
40	ED21B040	125.00	ED22B040	288.00	ED23B040	428.00
45	ED21B045	125.00	ED22B045	288.00	ED23B045	428.00
50	ED21B050	125.00	ED22B050	288.00	ED23B050	428.00
60	ED21B060	125.00	ED22B060	288.00	ED23B060	428.00
70	ED21B070	230.00	ED22B070	470.00	ED23B070	613.00
80	ED21B080	230.00	ED22B070	470.00	ED23B080	613.00
90	ED21B090	230.00	ED22B090	470.00	ED23B090	613.00
100	ED21B100	230.00	ED22B100	470.00	ED23B100	613.00

Shipping Weights

Number of Poles	Number per Carton	Shipping Weight (lbs.)
ED2, ED4, ED6, HED4, HHED6		
1	30	38
2	10	25
3	10	38
CED6		
2	5	20
3	5	30

Lugs

Ampere Rating	No. of Poles	Catalog Number	Wire Range
Aluminum Body Lugs			
All 15-25A	1, 2, 3	Line/Load SA1E025	#14-#10 Cu #12-#10 Al
All 30-100A	1, 2, 3	Line Side LN1E100	#10-1/0 Cu/Al
ED2, 4, CED6 30-60A	1	Load Side LD1E060	#10-#4 Cu/Al
ED2, 4, CED6 70-100A	1	Load Side LD1E100	#6-#1/0 Cu/Al
ED2, 4, 6, HED4, HHED6 30-100A	2, 3	Load Side LN1E100	#10-1/0 Cu/Al
All 110, 125A	2, 3	Line/Load TA1E6125	#3-3/0 Cu #1-2/0 Al
Copper Body Lugs			
All 30-125A	1, 2, 3	Line/Load TC1ED6150 [Ⓢ]	#10-1/0 Cu only
Compression Lugs			
All ED, HHED, CED		CCE125	2/0

Type ED4[Ⓢ]

Blue Label

Continuous Current Rating @ 40°C	1-Pole		2-Pole		3-Pole	
	120V AC 277V AC	125V DC	480V AC	250V DC	480V AC	
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	ED41B015 [Ⓢ]	170.00	ED42B015	521.00	ED43B015	684.00
20	ED41B020 [Ⓢ]	170.00	ED42B020	521.00	ED43B020	684.00
25	ED41B025	170.00	ED42B025	521.00	ED43B025	684.00
30	ED41B030	170.00	ED42B030	521.00	ED43B030	684.00
35	ED41B035	170.00	ED42B035	521.00	ED43B035	684.00
40	ED41B040	170.00	ED42B040	521.00	ED43B040	684.00
45	ED41B045	170.00	ED42B045	521.00	ED43B045	684.00
50	ED41B050	170.00	ED42B050	521.00	ED43B050	684.00
60	ED41B060	170.00	ED42B060	521.00	ED43B060	684.00
70	ED41B070	289.00	ED42B070	686.00	ED43B070	804.00
80	ED41B080	289.00	ED42B080	686.00	ED43B080	804.00
90	ED41B090	289.00	ED42B090	686.00	ED43B090	804.00
100	ED41B100	289.00	ED42B100	686.00	ED43B100	804.00
110	—	—	ED42B110	1386.00	ED43B110	1594.00
125	—	—	ED42B125	1386.00	ED43B125	1594.00

Enclosures (Neutral Included)

Type	Catalog Number	List Price \$
1 (Surface)	E2N1S (15-100A)	149.00
1 (Flush)	E2N1F (15-100A)	149.00
3R	E2N3R (15-100A)	410.00
4-4X	ED6SS4 (15-100A)	2841.00
7-9	EA (15-60A)	1750.00
7-9	EB (70-100A)	2176.00
12	E2N12 (15-100A)	254.00
1 (Surface)	CED6N1S [Ⓢ]	271.00
1 (Flush)	CED6N1F [Ⓢ]	271.00
3R	CED6N3R [Ⓢ]	725.00
12	CED6N12 [Ⓢ]	449.00

Type ED6[Ⓢ]

Blue Label

Continuous Current Rating @ 40°C	1-Pole [Ⓢ]		2-Pole		3-Pole	
	347V AC		600V AC	250V DC	600V AC	500V DC
	Catalog Number	List Price \$	Catalog Number	List Price \$	Catalog Number	List Price \$
15	ED61B015	349.00	ED62B015	613.00	ED63B015	778.00
20	ED61B020	349.00	ED62B020	613.00	ED63B020	778.00
25	ED61B025	349.00	ED62B025	613.00	ED63B025	778.00
30	ED61B030	349.00	ED62B030	613.00	ED63B030	778.00
35	ED61B035	349.00	ED62B035	613.00	ED63B035	778.00
40	ED61B040	349.00	ED62B040	613.00	ED63B040	778.00
45	ED61B040	349.00	ED62B045	613.00	ED63B045	778.00
50	ED61B050	349.00	ED62B050	613.00	ED63B050	778.00
60	ED61B060	349.00	ED62B060	613.00	ED63B060	778.00
70	ED61B070	480.00	ED62B070	773.00	ED63B070	973.00
80	ED61B080	480.00	ED62B080	773.00	ED63B080	973.00
90	ED61B090	480.00	ED62B090	773.00	ED63B090	973.00
100	ED61B100	480.00	ED62B100	773.00	ED63B100	973.00
110	—	—	—	—	ED63B110	1872.00
125	—	—	—	—	ED63B125	1872.00

Modifications page 6-84
Enclosures Section 5
Accessories pages 6-36 and 6-86 to 6-91

Note: ED frame circuit breakers qualified to UL 489 Supplement SB "Naval" — See page 6-84 for additional information

- Ⓢ CSA Certified only (Not UL)
- Ⓢ For CED types and all 110-125 ampere ED frames.
- Ⓢ See Note: A, page 6-81.
- Ⓢ SWD rated.
- Ⓢ HACR rated.

■ Built to order. Allow 2-3 weeks for delivery.

Selection Guide

Selecting the Transformer

Follow these steps to select the appropriate Type T or TF industrial control transformer and accessories:

1. Determine if you require the Type T or Type TF industrial control transformer (see "Product Descriptions" on page 3). Type TF units have factory-installed primary and secondary fuse blocks.
2. From Table 3 on page 5, determine the UL rating. If a CE marking is required, determine the multiple rating.
3. Choose the voltage code from Table 4, making sure the VA rating falls within the permissible range.
4. Create the catalog number by referring to the catalog ordering scheme below.

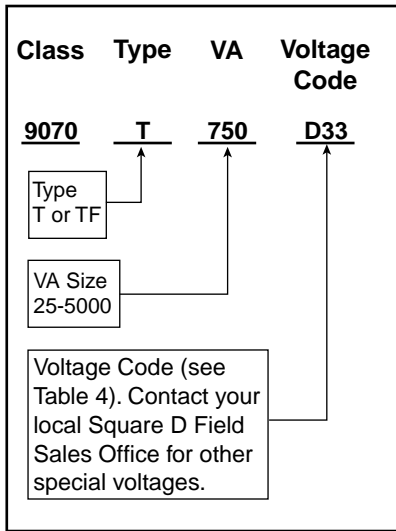


Figure 1: Catalog Number Example

Table 4: Type T and TF Transformer Selection

Application	Code	Primary Voltage	Secondary Voltage	Acc Code	Wiring Diagram	Type T Dim Table	Type TF Dim Table
	D1	240 x 480 230 x 460 220 x 440	120 115 110	I	2	17	23
	D31	240 x 480 230 x 460 220 x 440	120/240 115/230 110/220	I	8	17	23
	D86	460/480/504	120	I	13	17	23
	D101	480/575	115	I	3	17	23
	D24	120 115 110	120 115 110	I	1	17	23
	D55	120 x 240	120/240	I	8	17	23
	D3	208	120	I	1	17	23
	D51	208/277	120	I	3	17	23
	D57	208 x 416	120/240	I	8	17	23
	D100	200/208	120	I	3	17	23
	D4	277	120	I	1	17	23
	D60	277	120/240	I	7	17	23
	D93	200	115	I	1	17	23
	D84	190/200/210	110	I	13	17	23
	D33	380/400/415	115/230	I	21	17	23
	D6	380	110	I	1	17	23
	D58	347/380	120/240	I	9	17	23
	D85	360/380/400	110	I	13	17	23
	D103	400	120	I	1	17	23
	D102	400/415/440	110	I	13	17	23
	D17	415	110	I	1	17	23
	D5	600 575 550	120 115 110	I	1	17	23
	D37	600	120/240	I	7	17	23
	D18	208/277/380	95/115	II	32	19	25
	D20	208/230/460	115	II	13	19	25
	D26	208/240 x 416/480	120	II	22	19	25
	D27	208/240/480	120	II	13	19	25
	D32	240/480/600 230/460/575 220/440/550	100/120 95/115 90/110	II	32	19	25
	D34	208/480/575	120	II	13	19	25
	D39	208/380/416	95/115	II	32	19	25
	D48	208/230/460	115/230	II	21	19	25
	D90	240/347/380	120/240	II	21	19	25
	D95	208/240/480 200/230/460 190/220/440	120 115 110	II	13	19	25
	D41	208/230/400/440/460	110/115	III	41	21	27
	D44	208/220/380/460	110/115/120	III	43	21	27
	D50	240/416/480/600 230/400/460/575 220/380/440/550 208/364/420/500	99/120/130 95/115/125 91/110/120 85/100/110	III	43	22	
	D75	220/380/460/575	110	III	16	21	27
	D83	208/230/277/460	120	III	16	21	27
	D87	208/240/380/416/480	120/240	III	37	21	27
	D35	208/230/380/440/460	110/115	III	41	21	27
	D40	208/240/380/416/480	120	III	20	21	27

120, 115, 110 V
Control Circuit



Selection Guide

Table 5: Fuse Block Options

Fuse Holder Options for Type T Transformers



SF41
Field or
Factory Installed
Fuse Clips

Option	Field Installed	Factory Installed	Example Catalog Number	Current Rating	Fuse Size	Description
Primary and Secondary	NO	Yes 9070 Type TF	9070TF50D1	30	1-1/2" x 13/32"	Two fuse blocks with rejection clips, and one fuse block without rejection clips
Primary and Secondary	Yes 9070FB3A(B)	NO	n/a	30	1-1/2" x 13/32"	Two fuse blocks with rejection clips, and one fuse block without rejection clips
Primary Only	Yes 9070FB2A(B)	Yes RO2 (suffix)	9070TF50D1RO2	30	1-1/2" x 13/32"	Two fuse blocks with rejection clips
Secondary	Yes 9070SF41A(B)	Yes SF41 (suffix)	9070T50D1SF41	30	1-1/2" x 13/32"	Fuse clips installed on terminal block, limited to single voltage secondaries
Secondary	Yes 9070FB1A(B)	Yes S12 (suffix)	9070T50D1S12	30	1-1/2" x 13/32"	One fuse block without rejection clips
Secondary	Yes AP1	NO	n/a	30	2" x 9/16"	One fuse block without rejection clips
Secondary	Yes AP2	NO	n/a	30	1-1/4" x 1/4"	One fuse holder
Secondary	Yes 9070SF25A(B)	Yes SF25 (suffix)	9070T50D1SF25	30	1-1/4" x 1/4"	One fuse block

Primary fuse blocks offered by Square D, factory installed or field installed, have rejection clips requiring rejection style fuses. The primary side of the transformer also will require time delay fuses as a result of the inrush of the transformer during energizing. Rejection style fuses have an AIC rating of 200,000 A allowing end users to comply with UL 508 criteria or branch circuit status according to the NEC. The primary fuse blocks have a 30 A rating and accept 1-1/2 in. x 13/32 in. fuses. The 30 A rating limits the primary current to a maximum of 12 A when 250% sizing is used. Primary current is limited to a maximum of 24 A when 125% sizing is used. This is the limiting factor on our offering of primary fusing.



FB-3A
Field Installed
Fuse Block

Square D offers multiple secondary fuse options. The first option is one combination fuse block with the primary fusing. This block is rated at 30 A and accepts 1-1/2 in. x 13/32 in. fuses; available factory installed or field installed. The second option is fuse clips installed on the terminals. Clips are also rated at 30 A and accept 1-1/2 in. x 13/32 in. fuses; available factory installed or field installed. This option is limited to single voltage secondary. The next two options are field installed options, accepting 1-1/4 in. x 1/4 in. fuses, with a 30 A rating.



Type TF
Factory Installed
Fuse Block

The final option is also field installed and accepts 2 in. x 9/16 in. fuses, with a 30 A rating. Because all the secondary blocks have a 30 A rating, the secondary current is limited to 24 A, 125% maximum fuse size for secondary protection. This is the limiting factor on our offering of secondary fusing.

Table 6: Fuse Block Limits for Primary Voltages

Primary Voltage	VA Limit	125% Sizing Maximum	250% Sizing Maximum
200	3000	20	30 (200%)
208	5000	30	N/A
240	5000	30	N/A
277	5000	25	N/A
380	5000	17.5	30 (228%)
400	5000	17.5	30 (240%)
415	5000	15	30
480	5000	15	25
600	5000	12	20

Table 7: Fuse Block Limits for Secondary Voltages

Secondary Voltage	VA Limit	125% Sizing Maximum
12	250	30
24	500	30
110	2000	25
115	2000	25
120	2000	25
240	5000	30
277	5000	25



SF25A
Field Installed
Fuse Block

ACCESSORIES

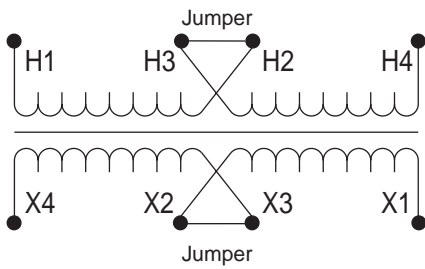
Table 8: Replacement Jumper Kits (two jumpers per kit, minimum order of 50 kits)

Part Number	Accessory Key		
	I	II	III
30033-027-53	25-200 VA	25-150 VA	
30033-027-54	250-5000 VA	200-3000 VA	25-3000 VA

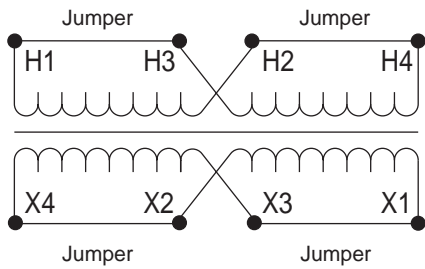


Wiring Diagrams

Example of Series and Parallel Connections



Series Connections



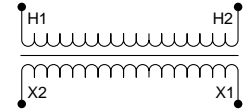
Parallel Connections

NOTE: This diagram is for illustration purposes only. Actual units will have different combinations. See diagrams for actual connections.

WIRING DIAGRAMS

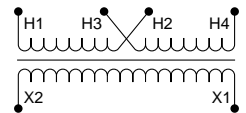
Wiring Diagram 1

Code	H1 and H2	X1 and X2
D3	208	120
D4	277	120
D5	600 575 550	120 115 110
D6	380	110
D12	480 460 440	240 230 220
D14	208	24
D16	600	24
D17	415	110
D21	120	12
D22	480	277
D24	110	110
D25	277	24
D62	600	240
D82	415	230
D88	380	24
D93	200	115
D103	400	120



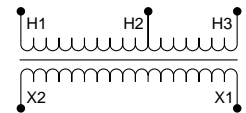
Wiring Diagram 2

Code	H1 and H4 Series	H1 and H4 Parallel	X1 and X2
D1	480 460 440	240 230 220	120 115 110
D2	480	240	24
D23	240	120	24
D38	480	240	12
D89	230	115	24
D92	460	230	24



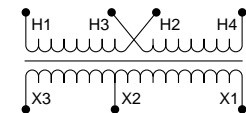
Wiring Diagram 3

Code	H1 and H2	H1 and H3	X1 and X2
D51	208	277	120
D66	208	240	24
D100	200	208	120
D101	480	575	115



Wiring Diagram 5

Code	H1 and H4 Series	H1 and H4 Parallel	X1 and X2	X1 and X3
D15	480	240	24	120





Delta Lightning Arrestors

Industrial Arrestors

Rapid Response, High Current Delta Arrestors™ For Industrial Use Help Prevent Voltage Surge and Lightning Damage to Motors and Control Equipment.

600 Series Specifications

Type of Design	Silicon Oxide Varistor™
Maximum current	100,000 amps
Maximum energy	3,000 joules per pole
Maximum number of surges	Unlimited
Response time one milliamp test	5 nanoseconds
Response time to clamp 10,000 amps	10 nanoseconds
Response time to clamp 50,000 amps	25 nanoseconds
Leak current at double the rated voltage	none
Leads	36" #12 THHN
Case material	PVC
Locknut and Washer Furnished	

LA 601



LA 602



LA 603



For 440-600 Volt Single Phase 2 Wire Service.

For 440-600 Volt Single Phase 3 Wire Service.

For 440-600 Volt 3 or 4 Wire Service.

[LA601 Pricing](#)

[LA602 Pricing](#)

[LA603 Pricing](#)

Shipping amounts posted are for shipping within the contiguous U.S. only. Please call for freight costs outside the contiguous U.S.

Available with separate ground add part No. "G"

Conduction Characteristics								8 X 20 microsecond wave shape ANSI IEEE NEMA STANDARD
DISCHARGE CURRENT	5000 A	10,000 A	20,000 A	40,000 A	60,000 A	80,000 A	100,000 A	AMPERAGE
LA 601, 602 & 603	450 V	920 V	1040 V	1500 V	2300 V	4000 V	5000 V	CLAMPING VOLTAGE LINE TO NEUTRAL
	Unlimited Operations					One Operation		
DELTA LIGHTNING ARRESTORS™, INC.								

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© 2004 Delta Lightning Arrestors



SDSA3650 Series 001
Secondary Surge Arrester
Apartarrayos secundario
SDSA3650 serie 001
Suppresseur de surtensions secondaires
SDSA3650, série 001



Retain for future use. / Conservar para uso futuro. / À conserver pour usage ultérieur.

INTRODUCTION

The SDSA3650 Secondary Surge Arrester is designed and listed for indoor or outdoor installations and surge protection of three-phase grounded electrical services up to 600 Vac.

NOTE: Do not use on ungrounded systems. Use on solidly grounded systems only.

PRECAUTIONS

INTRODUCCIÓN

El apartarrayos secundario SDSA3650 ha sido diseñado y está registrado para ser instalado en interiores o en exteriores y proporcionar protección contra sobretensiones a acometidas eléctricas de tres fases, conectadas a tierra, de hasta 600 V~ (ca).

NOTA: No lo utilice en sistemas no puestos a tierra. Utilícelo sólo en sistemas puestos directamente a tierra.

PRECAUCIONES

INTRODUCTION

Le suppresseur de surtensions secondaires SDSA3650 est conçu et répertorié pour les installations intérieures et extérieures et pour la protection contre les surtensions de branchements électriques triphasés mis à la terre jusqu'à 600 Vca.

REMARQUE : Ne pas utiliser sur des systèmes non mis à la terre. À utiliser uniquement dans un système avec mise à la terre directe.

PRÉCAUTIONS

⚠ DANGER / PELIGRO / DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow this instruction will result in death or serious injury.

PELIGRO DE DESCARGA ELÉCTRICA, EXPLOSIÓN O DESTELLO POR ARQUEO

- Utilice equipo de protección personal (EPP) apropiado y siga las prácticas de seguridad eléctrica establecidas por su Compañía, consulte la norma 70E de NFPA.
- Solamente el personal eléctrico especializado deberá instalar y prestar servicio de mantenimiento a este equipo.
- Desenergice el equipo antes de realizar cualquier trabajo en él.
- Siempre utilice un dispositivo detector de tensión nominal adecuado para confirmar la desenergización del equipo.
- Vuelva a colocar todos los dispositivos, las puertas y las cubiertas antes de volver a energizar el equipo.

El incumplimiento de esta instrucción podrá causar la muerte o lesiones serias.

RISQUE D'ÉLECTROCUTION, D'EXPLOSION OU D'ÉCLAIR D'ARC

- Portez un équipement de protection personnelle (ÉPP) approprié et observez les méthodes de travail électrique sécuritaire. Voir NFPA 70E.
- Seul un personnel qualifié doit effectuer l'installation et l'entretien de cet appareil.
- Couper l'alimentation de l'appareil avant d'y travailler.
- Utilisez toujours un dispositif de détection de tension ayant une valeur nominale appropriée pour vous assurer que l'alimentation est coupée.
- Remplacez tous les dispositifs, les portes et les couvercles avant de mettre l'appareil sous tension.

Si cette directive n'est pas respectée, cela entraînera la mort ou des blessures graves.

DTK-DL480

Physical Specifications

Product Description:	480V Single Phase Light Pole Arrester
Housing:	High Impact Plastic/Waterproof
Color:	Black
Size:	6.12 in. x 2.75 in. x 2.1 in.
Weight:	0.950



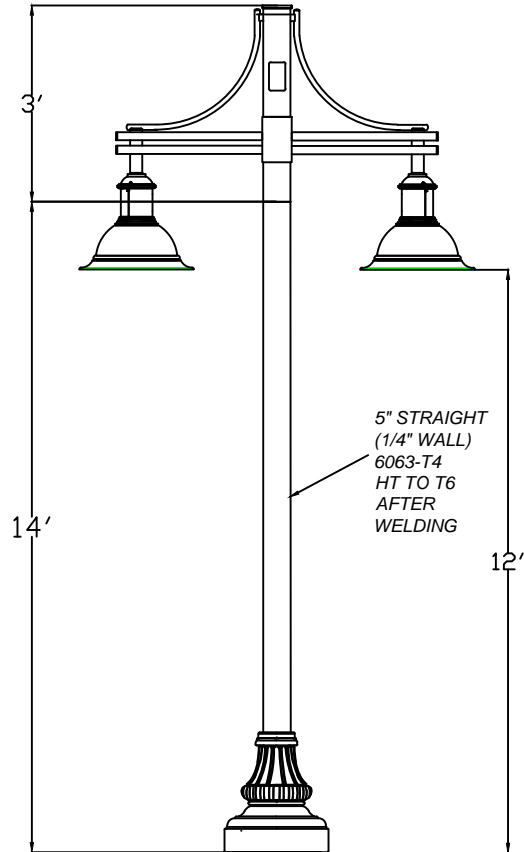
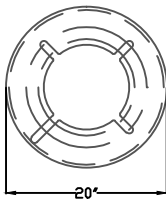
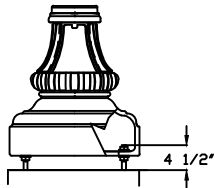
Electrical Specifications

Class:	Series Connected Light Pole Protection
Installation Point:	Pole Base
Connection Method:	Hardwire Series
Continuous Current:	20A
Response Time:	<5nSec Installed
MCOV:	550VAC
Operating Frequency:	0 - 400 Hz
AC Protection Modes:	L - N, L - G, N - G
Service Voltage:	440-480
Max Surge Current:	25,000 Amps per Mode
Max Energy Dissipation:	1240 Joules
Typical Let Through Voltage:	1000V

NOVAPOLE SPECIFICATIONS

CUSTOMER SPECIFICATIONS

POLE MOUNT HEIGHT 14'
 WALL THICKNESS .250
 POLE BASE DIA. 5"
 AMOUNT OF STRAIGHT N/A
 POLE TOP DIAM. 5"
 AMOUNT OF STRAIGHT N/A
 CRITICAL ID - OD N/A
 TENON N/A
 HAND HOLE SIZE IN BASE
 HAND HOLE CENTER N/A
 ANCHOR BASE STRUCTURAL
 BOLT CIRCLE 12 - 15"
 ANCHOR BOLTS 1"
 TOP CAP N/A
 ID TAG LOCATE N/A
 FINSH TBD



SIZE	DATE: - 21/10/2014	DWG NO. APPROVAL	REV
SO NO.	-	SHEET	1 OF 1

NP5050D14AB-WB

STEEDMAN
 CHARLOTTE COUNTY JOB

SCALE	NTS	CUSTOMER DWG NO.	-
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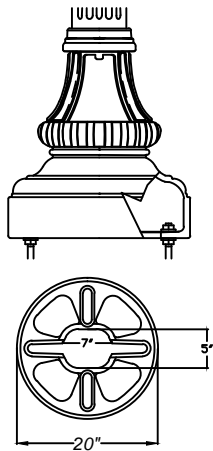
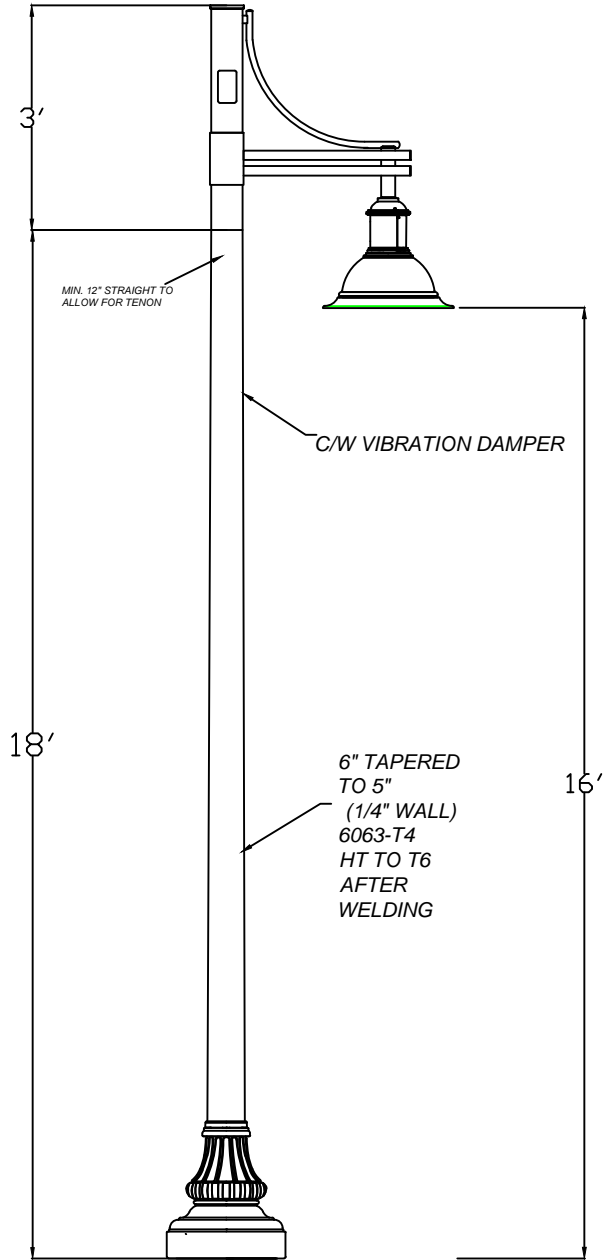
DESCRIPTION	REVISION	MADE	CHKD	SUBD	APPROVED	INSP	DATE


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NOVAPOLE SPECS

CUSTOMER SPECIFICATIONS

POLE MOUNT HEIGHT N/A
 POLE HEIGHT 18'
 WALL THICKNESS .250
 POLE BASE DIA. 6"
 AMOUNT OF STRAIGHT N/A
 POLE TOP DIAM. 5"
 AMOUNT OF STRAIGHT N/A
 CRITICAL ID -OD N/A
 TENON N/A check fixture specs
 HAND HOLE SIZE IN BASE
 HAND HOLE CENTER 18"
 ANCHOR BASE STRUCTURAL
 BOLT CIRCLE 12" - 15"
 ANCHOR BOLTS 1" DIA
 TOP CAP N/A
 ID TAG LOCATE INSIDE BASE
 FINISH BRONZE



 NOVA POLE Industries Inc.			
SIZE	DATE: - 21/10/2014	DWG NO. APPROVAL	REV
	SO NO. -	SHEET 1 OF 1	
NPT6050D18AB-WB			
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CHARLOTTE COUNTY JOB			
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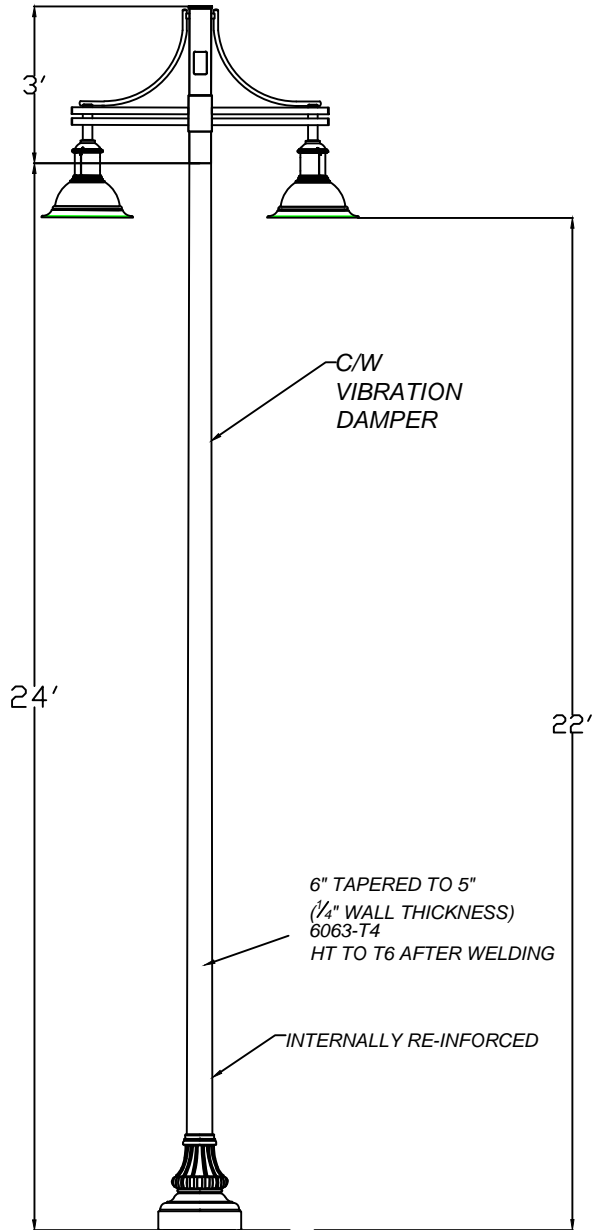
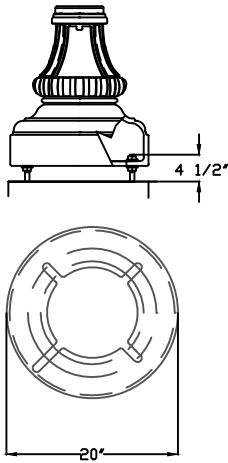
DESCRIPTION	REVISION	MADE	CHKD	SUBD	APPROVED	INSP	DATE

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NOVAPOLE SPECIFICATIONS

CUSTOMER SPECIFICATIONS

POLE MOUNT HEIGHT	<u>24'</u>
WALL THICKNESS	<u>.250</u>
POLE BASE DIA.	<u>6"</u>
AMOUNT OF STRAIGHT	<u>N/A</u>
POLE TOP DIAM.	<u>5"</u>
AMOUNT OF STRAIGHT	<u>N/A</u>
CRITICAL ID -OD	<u>N/A</u>
TENON	<u>N/A</u>
HAND HOLE SIZE	<u>IN BASE</u>
HAND HOLE CENTER	<u>N/A</u>
ANCHOR BASE	<u>STRUCTURAL</u>
BOLT CIRCLE	<u>12 - 15"</u>
ANCHOR BOLTS	<u>1"</u>
TOP CAP	<u>N/A</u>
ID TAG LOCATE	<u>N/A</u>
FINISH	<u>TBD</u>



NOVA POLE Industries Inc.

SIZE	DATE: - 21/10/2014	DWG NO. APPROVAL	REV
SO NO.	-	SHEET	1 OF 1

NPT6050D24AB-WB

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CHARLOTTE COUNTY JOB

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SCALE	NTS	CUSTOMER DWG NO.	-
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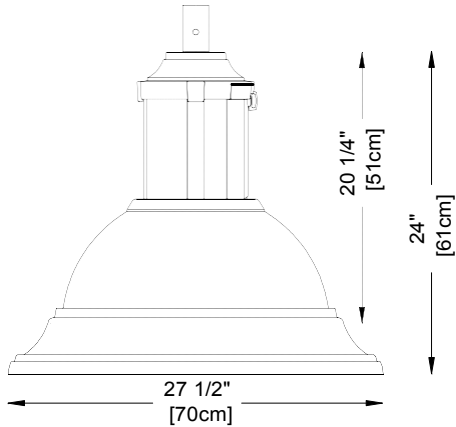
Project : Charlotte County

:

Type: A Luminaire : CY55P1-FT1GC-IES-WATTS-HPS -VOLTS-RAL9005TX-CP3922

Page: 1/2

Qty:



Luminaire components

Housing module: Cast aluminum housing. Suspended on tenon and locked with locking bolt and set screws. Complete with removable access door and "street side" sticker. For bracket having a 2 3/8"(6cm)Ø tenon with 0.154"(4mm) of wall thickness.

Flat Lens Module (FT1GC): A clear tempered glass flat lens is assembled on a cast aluminum lens frame. This module is equipped with the tool free opening system which consists of three latches (TLS), easily accessible for a fast access to the inside components. This entire luminaire is IP66 certified, thanks to the one piece "V" shape injection molded weatherproof gasket, made of heat resistant silicone (287C, 550F)

Optical/electrical components

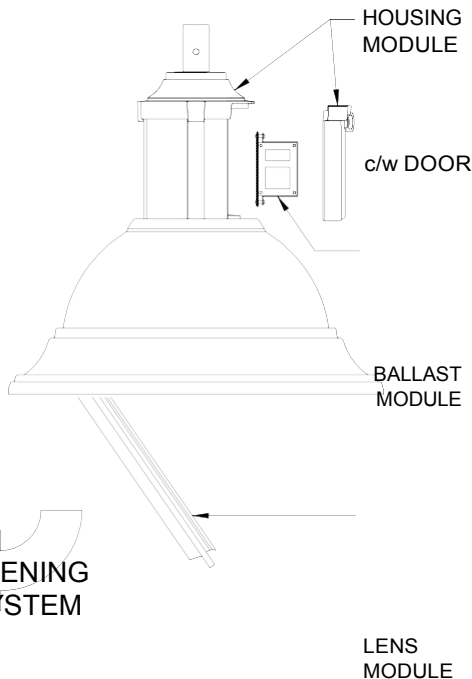
Lamp: (not included) XXX watts, mogul base.

(Note: HPS= High Pressure Sodium, MH = Metal Halide)

Optic: I.E.S. type xxx, vertical or horizontal lamp as required. The optic uses a multi-faceted reflector pre-anodized aluminum sheet (86% min. reflection), complete with a 4Kv porcelain lamp socket.

Ballast Module: A high power factor of 90%. Quad-tap ballast, tapped at xxx volts.

Minimum starting temperature: -40°F (-40°C) for HPS and -20°F (-30°C) for MH. The ballast/capacitor and starter are assembled on a single tool-free module, equipped with a "molex" quick-disconnect connector.



Generals/Options

Wiring/hardware: Type TEW 14-7. 3" (7cm) minimum exceeding from luminaire. All electrical connections between modules are made with quick-disconnect connectors. All exposed hardware is stainless steel. Silicone gasketing is applied.

Color: RAL9005TX (Jet black)/Finish: textured or smooth Application of a polyester powder coat of paint. (5 mils/127 microns). The finish meets the ASTM G7, B117 and D1654 requirements relative to salt spray and humidity resistance.. Cyclone recommends the textured finish for this product.

EPA: 1.38ft² Weight: 33 Lbs/15 Kg

Stamp/Approval
Name: _____ Date: _____

File : CY55P1 - CHARLOTTE COUNTY - REV5.DOC
Date: 03/10/2013 Page: 1/2
Designer : diwanczuk

Project : Charlotte County

:

Type: A Pole : M202-C1-T50-RAL9005TX-CP3923

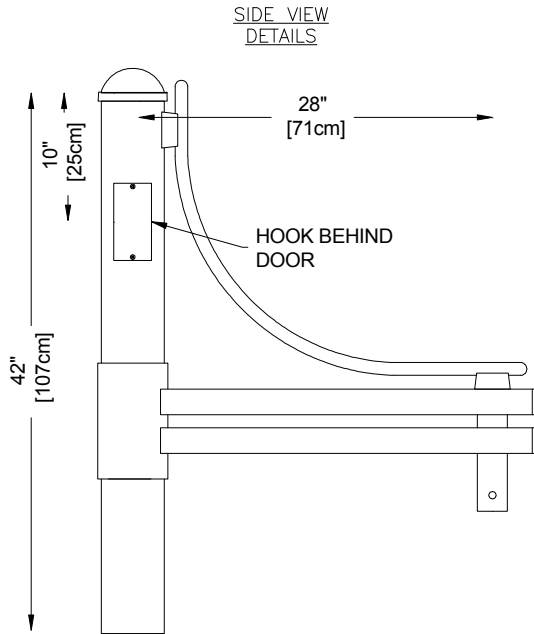
Page: 2/2

Qty:

Components

Bracket: Round, central tubing 5"(13cm)Ø made of aluminum, with two (2) arm 2"x3" and 1" round decorative element, welded together. Furnished with hook located behind a removable door. Single configuration(C1). Slip fits on a pole tenon 12" long x 4 1/2" diameter..

Suspension system: Retain luminaire with one locking bolt.



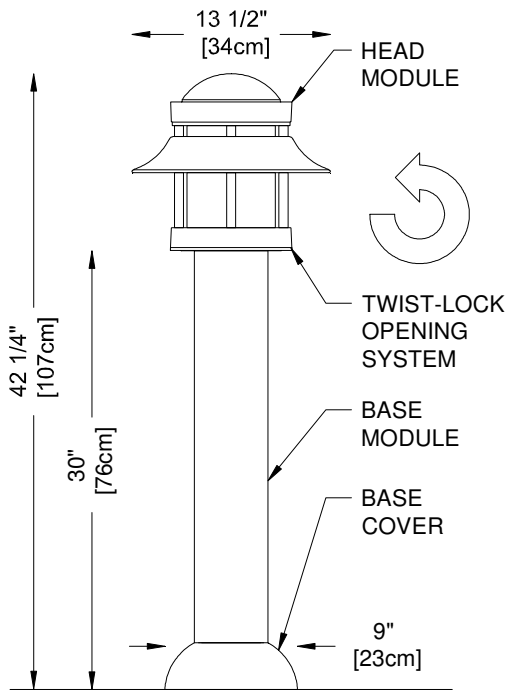
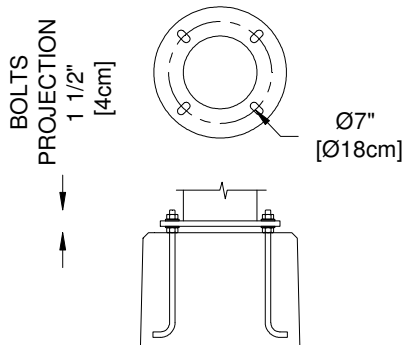
Generals/Options

Hardware: All exposed hardware is stainless steel. EPDM and/or silicone gasketing is applied

Color: RAL9005TX (Jet black)/Finish: textured or smooth Application of a polyester powder coat of paint. (5 mils/127 microns). The finish meets the ASTM G7, B117 and D1654 requirements relative to salt spray and humidity resistance. **Cyclone recommends the textured finish for this product.**

Stamp/Approval
Name: _____ Date: _____

File : CY55P1 - CHARLOTTE COUNTY - REV5.DOC
Date : 03/10/2013 Page : 2/2
Designer : diwanczuk

Project : Charlotte County Bollard Standard
Order: SQ_015195
Type: A Bollard : CBM1158H-LAP-RS5-50HPS-S17-QT/120-BB2-RAL9005TX
Page: 1/2
Qty: 1

ANCHOR PLATE

components

Head module: Round shape, cast aluminum hood tops a one-piece seamless clear acrylic (LAC) vessel (UV polymer resistant) with four (4) decorative arms. The head is mechanically assembled with an aluminum cast ring on the locking system and secured with one (1) Allen type vandal screw.

Opening system: A quarter-turn locking mechanism with constant pressure points allowing a tool-free access inside the bollard, to the lamp and ballast tray. Made with cast aluminum parts and sealed with a gasket compression system. The bollard offers an IP66 weatherproof protection. Secured with tamperproof screw.

Base: Round shape. Made from a 5"(13cm)Ø 6063-T6 aluminum tubing. Welded to both the top and the bottom of an anchor plate. Welded to both the top and the bottom of an anchor plate. **Base cover:** Round shape. A two-pieces cover made of cast aluminum, mechanically secured together.

Bolt circle (BC): 7" (18cm)Ø.

Anchor bolts: Supplied by Cyclone 3/8"Ø x12" (9"+3") long
 Partially galvanized anchor bolts c/w nuts & washers for levelling.

Optical/electrical components

Lamp: (not-included) **50 watts (HPS), ED17, medium base(S17), ANSI S68**
 (Note : HPS=High Pressure Sodium, MH=Metal Halide)

Optic: I.E.S. type V (RS5), vertical lamp base down. The optic uses a multi-faceted reflector pre-anodized aluminum sheet (86% min. reflection), complete with a 4Kv porcelain lamp socket.

Ballast module: High reactance (HX) and high power factor of 90%. Primary voltage **120/208/240/277 volts, wired at 120 (QT/120) volts.** 60 Hz. Assembled on a tool-free removable tray with quick-disconnect connectors. Minimum starting temperature: -40°F (-40°C) for HPS and -20°F(-30°C) for MH.

Generals/Options

Wiring/hardware: All electrical connections between modules are made with quick-disconnect connectors. All exposed hardware is stainless steel. Silicone gasketing are applied.

Color: RAL9005TX (Jet black) / Finish: textured or smooth . Application of a polyester powder coat of paint. (5 mils /127 microns). The finish meets the ASTM G7, B117 and D1654 requirements relative to salt spray and humidity resistance. **Cyclone recommends the textured finish for this product.**

Stamp/Approval

Name :

Date :

File : CBM1158H - SQ_015195 - CHARLOTTE COUNTY BOLLARD STANDARD.DOC

Date : 18/09/2014 Page : 1/2

Designer : vlacampo

Project : Charlotte County Bollard Standard
Order: SQ_015195
Type: A Bollard : CBM1158H- Instructions
Page: 2/2
Instructions - Turn off electrical power -
A) Luminaire installation :

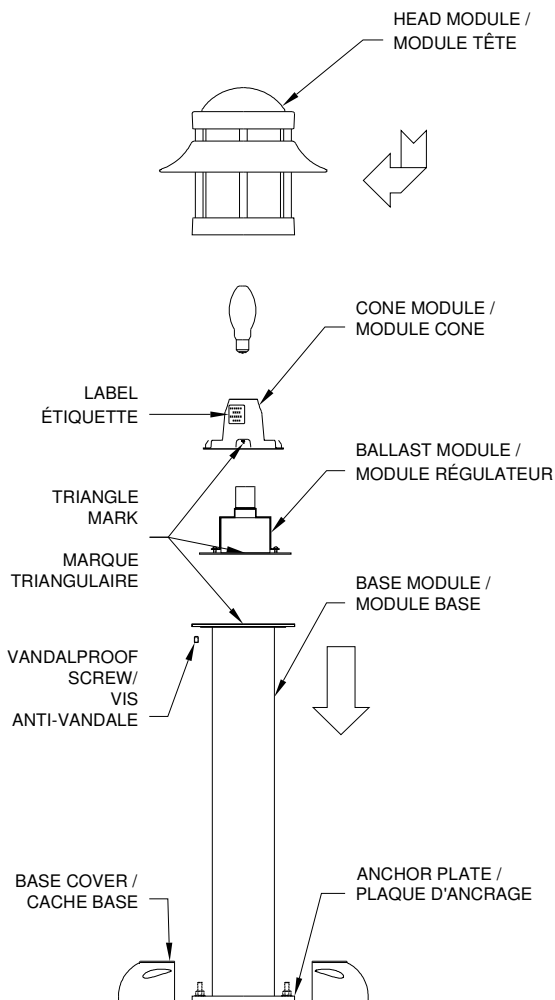
1. Install the anchor plate and connect the luminaire wires to the leads.
2. Put bollard on anchor plate and tighten screws on base.

B) Lamp installation :

1. Remove the vandal proof screw.
2. Remove the head module (1/4 turn system "counterclockwise").
3. Install lamp on base. (read label on cone module for proper model)
4. Put back the head module into position and screw it (quarter turn clock wise) until it lock. Put back the vandal proof screw.

C) Ballast replacement :

1. Remove the vandal proof screw.
2. Remove the head module (1/4 turn system "counterclockwise").
3. Remove the lamp and pull out the cone/ballast module after unlocking the 3 retaining latches.
4. Unplug the "Molex" connector.
5. Install the new cone/ballast module with the proper alignment.
6. Install lamp on base.
7. Put back the head module into position and screw it (quarter turn clock wise) until it lock. Put back the vandal proof screw.


Instructions – METTRE HORS TENSION
A) Installation du luminaire :

1. Installer la plaque d'ancrage et connecter les fils du bollard avec les fils d'alimentation.
2. Installer le bollard sur la plaque d'ancrage et serrer les vis de fixation.

B) Installation de la lampe:

1. Retirer la vis anti-vandale.
2. Dévisser et retirer le module tête du luminaire (Système « quart de tour »).
3. Installer la lampe sur la base. (Vérifier l'étiquette sur le cône pour le modèle)
4. Remettre le module tête en place et tourner un quart de tour (sens de l'horloge) jusqu'au blocage. Ré-installer la vis anti-vandale.

C) Remplacement du régulateur:

1. Retirer la vis anti-vandale.
2. Dévisser et retirer le module tête du luminaire (Système « quart de tour »).
3. Dévisser la lampe et retirer le module cône/régulateur après avoir débarré les trois patins de retenue.
4. Débrancher la fiche « Molex ».
5. Aligner et installer le nouveau module et le module cône.
6. Installer la lampe sur la base.
7. Remettre le module tête en place et tourner un quart de tour (sens de l'horloge) jusqu'au blocage. Ré-installer la vis anti-vandale.

Stamp/Approval

Name :

Date :

File : CBM1158H - SQ_015195 - CHARLOTTE COUNTY BOLLARD STANDARD.DOC

Date : 18/09/2014 Page : 2/2

Designer : vlacampo

Couplings

Standard "E-Loc"[®]



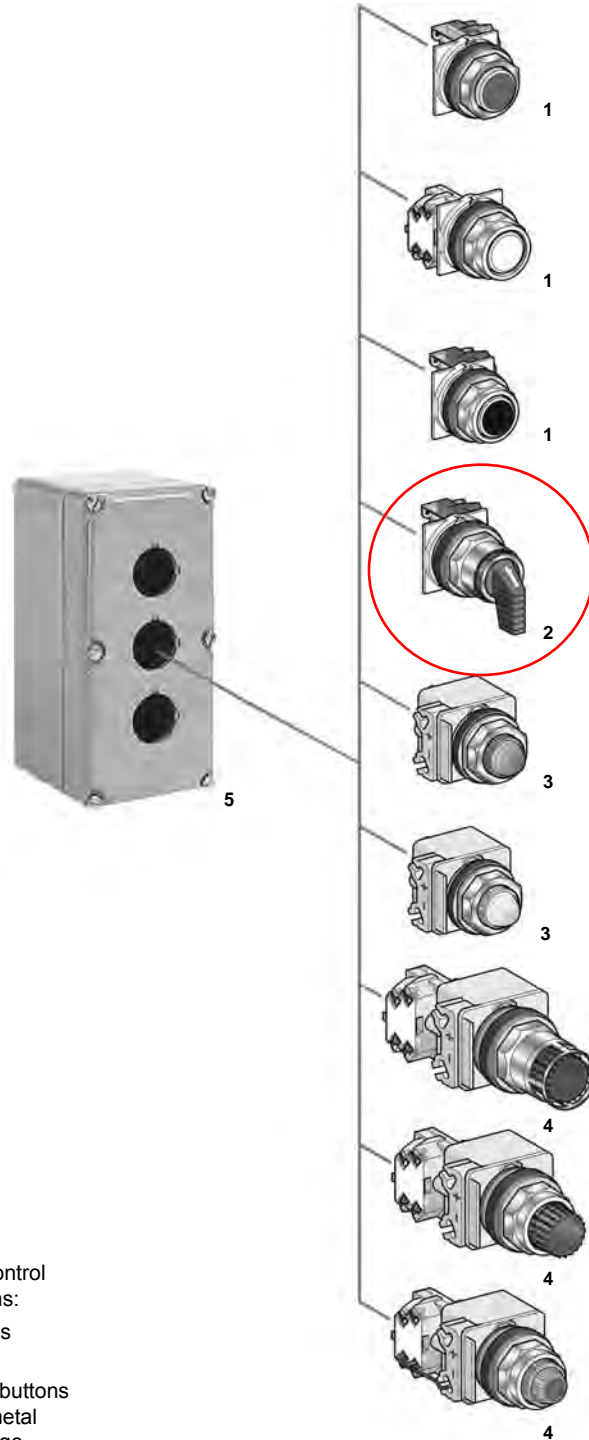
Designed for use with smoothwall OD controlled innerduct (ASTM 3035), Sch. 40 and Sch. 80 innerduct, and is pressure tight to internal pressures above 200 psi when restrained or buried. Ideal for joining PE to PVC or threaded steel conduit.

Part No.	Size	Nom. O.D.	Std. Ctn. Qty.	Std. Ctn. Wt.
EL1.050	3 /4"	1.050"	50	19
EL1.315	1"	1.315"	50	46
EL1.660	1 1 /4"	1.660"	50	36
EL1.900	1 1 /2"	1.900"	25	28
EL2.375	2"	2.375"	25	40
EL3.500	3"	3.500"	25	48
EL4.500	4"	4.500"	25	67
EL5.563	5"	5.563"	10	34
EL6.00	6"	6.625"	12	40

Harmony™ control stations and enclosures

9001KY/SKY 30 mm control stations

Components



9001KY and 9001SKY 30 mm control stations are available in two forms:

- Pre-assembled control stations
- Empty enclosures

These control stations use push buttons and pilot lights from the 9001K metal and 9001SK plastic operator range.

Control stations may include:

- 1 - Non-illuminated operators.
- 2 - Selector switches.
- 3 - Pilot lights.
- 4 - Illuminated operators.
- 5 - Enclosure.

Harmony™ control stations and enclosures

9001KY/SKY 30 mm control stations

Note: When ordering, add prefix “9001” to the reference.

Assembled Control Stations

No. of Holes	Operator Style and Features	Reference Consists of:					
		Enclosure	Operators	Contact Blocks	Legend Plates		
UL Types 1, 3, 4 and 13/NEMA 1, 3, 4 and 13 Die Cast Zinc Enclosure (1)							
1	Selector Switch (3 Pos Maintained)	KYK111	KY1	KS43B	KA1	Hand-Off-Auto	
	Selector Switch (2 Pos Maintained)	KYK110	KY1	KS11B	KA1	Off-On	
	Push Button (Momentary)	KYK11	KY1	KR1B	KA1	Start	
	Push Button (Momentary)	KYK13	KY1	KR1R	KA1	Stop	
	Mushroom Button (Momentary)	KYK14	KY1	KR4R	KA1	Stop	
	Push Button (with Lockout)	KYK15	KY1	KR3R, K4	KA1	Stop	
	Break Glass Operator	KYK116	KY1	K15	KA1	To Stop—Break Glass	
	Break Glass Operator (Red Enclosure)	KYK117	KY1S1	K15	KA1	To Stop—Break Glass	
	2	2 Push Buttons (Lockout on Stop)	KYK224	KY2	KR1B, KR3R, K4	KA1, KA1	Jog-Stop
		2 Push Buttons	KYK218	KY2	KR1B, KR3R	KA1, KA1	On-Off
2 Push Buttons		KYK26	KY2	KR1B, KR1B	KA1, KA1	Open-Close	
2 Push Buttons		KYK25	KY2	KR1B, KR1B	KA1, KA1	Up-Down	
2 Push Buttons		KYK21	KY2	KR1B, KR3R	KA1, KA1	Start-Stop	
2 Push Buttons (with Sealed Contacts) (4)		KYK223	KY2	KR1B, KR3R	KA51, KA51	Start-Stop	
2 Push Buttons (Lockout on Stop)		KYK23	KY2	KR1B, KR3R, K4	KA1, KA1	Start-Stop	
2 Push Buttons (Maintained/Interlocked)		KYK27	KY2	KR11GR	KA1	Start-Stop	
1 Push Button, 1 Mushroom Button		KYK22	KY2	KR1B, KR4R	KA1, KA1	Start-Stop	
3		3 Push Buttons	KYK31	KY3	KR1B, KR1B, KR3R	KA1, KA1, KA1	Forward; Reverse; Stop
	3 Push Buttons (Lockout on Stop)	KYK326	KY3	KR1B, KR1B, KR3R, K4	KA1, KA1, KA1	Forward; Reverse; Stop	
	3 Push Buttons (With Sealed Contacts & Lockout on Stop) (4)	KYK322	KY3	KR1B, KR1B, KR3R, K4	KA51, KA51, KA51	Forward; Reverse; Stop	
	3 Push Buttons	KYK33	KY3	KR1B, KR1B, KR3R	KA1, KA1, KA1	Open; Close; Stop	
	Red 120v Pilot Light, 2 Push Buttons	KYK317	KY3	KP1R31, KR1B, KR3R	K2, KA3	Start; Stop	
	3 Push Buttons	KYK32	KY3	KR1B, KR1B, KR3R	KA1, KA1, KA1	Up; Down; Stop	
	3 Push Buttons (Lockout on Stop)	KYK325	KY3	KR1B, KR1B, KR3R, K4	KA1, KA1, KA1	Up; Down; Stop	
UL Types 1, 3, 4 and 13/NEMA 1, 3, 4 and 13—Stainless Steel (304) (2)							
1	Push Button (Momentary)	KYSS101	KYSS1	KR1B	KA1	Start	
	Push Button (Momentary)	KYSS103	KYSS1	KR1B	KA3	Stop	
	Selector Switch (2 Pos Maintained)	KYSS110	KYSS1	KS11B	KA1	Off-On	
	Selector Switch (3 Pos Maintained)	KYSS111	KYSS1	KS43B	KA1	Hand-Off-Auto	
2	2 Push Buttons	KYSS201	KYSS2	KR1B, KR3R	KA1, KA3	Start; Stop	
	2 Push Buttons (Lockout on Stop)	KYSS203	KYSS2	KR1B, KR3R, K5	KA1, KA3	Start; Stop	
	2 Push Buttons (Maintained with Interlock)	KYSS210	KYSS2	KR11U	KA1, KA1	Start; Stop	
	2 Push Buttons	KYSS205	KYSS2	KR1B, KR1B	KA1, KA1	Up; Down	
UL Types 1, 3, 4, 4X and 13/NEMA 1, 3, 4, 4X and 13—Stainless Steel (304) (3)							
1	Push Button (Momentary)	KYSK101	KYSS1	SKR1B	KA1	Start	
	Push Button (Momentary)	KYSK103	KYSS1	SKR3R	KA3	Stop	
	Selector Switch (2 Pos Maintained)	KYSK110	KYSS1	SKS11B	KA1	Off-On	
	Selector Switch (3 Pos Maintained)	KYSK111	KYSS1	SKS43B	KA1	Hand-Off-Auto	
2	2 Push Buttons	KYSK201	KYSS2	SKR1B, SKR3R	KA1, KA3	Start; Stop	
	2 Push Buttons (Lockout on Stop)	KYSK203	KYSS2	SKR1B, SKR3R, K5	KA1, KA3	Start; Stop	
	2 Push Buttons (Maintained with Interlock)	KYSK210	KYSS2	SKR11U	KA1, KA1	Start; Stop	
	2 Push Buttons	KYSK205	KYSS2	SKR1B, SKR1B	KA1, KA1	Up; Down	
UL Types 1, 3, 4, 4X and 13/NEMA 1, 3, 4, 4X and 13—Polymeric (Plastic) (3)							
1	Selector Switch (3 Pos Maintained)	SKY111	SKY1	SKS43B	KA1	Hand-Off-Auto	
	Selector Switch (2 Pos Maintained)	SKY110	SKY1	SKS11B	KA1	Off-On	
	Selector Switch (2 Pos Maintained with Sealed Contacts) (4)	SKY122	SKY1	SKS11B	KA51	Off-On	
	Push Button (with Lockout)	SKY105	SKY1	SKR3R, K5	KA3	Stop	
2	2 Push Buttons	SKY201	SKY2	SKR1B, SKR3R	KA1, KA3	Start-Stop	
	2 Push Buttons (Lockout on Stop)	SKY203	SKY2	SKR1B, SKR1R, K5	KA1, KA3	Start-Stop	
	2 Push Buttons (With Sealed Contacts) (4)	SKY223	SKY2	SKR1B, SKR3R	KA51, KA51	Start-Stop	
	2 Push Buttons (With Sealed Contacts) (4)	SKY222	SKY2	SKR1B, SKR3R	KA51, KA51	On-Off	
	2 Push Buttons	SKY205	SKY2	SKR1B, SKR1B	KA1, KA1	Up-Down	
3	3 Push Buttons	SKY302	SKY3	SKR1B, SKR1B, SKR3R	KA1, KA1, KA3	Up-Down-Stop	
	3 Push Buttons	SKY303	SKY3	SKR1B, SKR1B, SKR3R	KA1, KA1, KA3	Open-Close-Stop	
	Red 120v Pilot Light, 2 Push Buttons	SKY315A	SKY3	SKP1R31, SKR1B, SKR3R	KA1, KA3	Start-Stop	
UL Types 1, 3, 4 and 13/NEMA 1, 3, 4 and 13 Die Cast Zinc Enclosures with Integral Guard							
1	Guarded Enclosure (grey) with 120V Red LED Pilot Light	KYG11	KYG1	KP38LRR9	—	order separately	
	Guarded Enclosure (grey) with 120V Green LED Pilot Light	KYG12	KYG1	KP38LGG9	—	order separately	
	Guarded Enclosure (Yellow Cover) with Red Push-Pull Mushroom	KYG1Y1	KYG1Y	KR9R	KA3	Emergency Stop	
	Guarded Enclosure (Yellow Cover) with Red Turn-To Release Mushroom	KYG1Y2	KYG1Y	KR16	KA3	Emergency Stop	

(1) Uses 9001K metal operators and metal legend plates.

(2) Uses 9001K metal operators and plastic legend plates.

(3) Uses 9001SK plastic operators and plastic legend plates.

(4) Control Station components are UL listed for use in Class 1, Division 2, Groups A, B, C, or D.



Fixed Position Mounting	K4021C	K4023C	K4024	K4022	K4033	K4035*	K4321C
Watts Tungsten	1800	3100-4150	3100	3600	4150	1000	1800
VA Ballast	1000	1700-2300	1700	2000	2300	4000	1000
AMPS Tungsten	15	15	15	15	15	15	15
AMPS Ballast	8.3	8.3	8.3	8.3	8.3	8.3	8.3

*Not UL or CSA Certified



Stem Mounting	K4121C	K4121M	K4124	K4122	K4123C	K4123M	K4133	K4135	K4136M	K4141C*
Watts Tungsten	1800	2000	3100	3600	3100-4150	2000-2660	4150	1000	2000-4625	3000
VA Ballast	1000	1800	1700	2000	1700-2300	1800	2300	4000	1800	3000
AMPS Tungsten	15	16.7	15	15	15	9.6	15	15	16.7	25
AMPS Ballast	8.3	15	8.3	8.3	8.3	8.6	8.3	8.3	8.6	25
Volts	120	120	208	240	208-277	208-277	277	480	120-277	120

*Not UL or CSA Certified



Stem and Swivel	K4221C	K4224	K4222	K4223C	K4233	K4235	K4236C	K4251	K4253
Watts Tungsten	1800	3100	3600	3100-4150	4100	1000	1800-4150	1800	2000
VA Ballast	1000	1700	2000	1700-2300	2300	4000	1000-2300	1000	1800
AMPS Tungsten	15	15	15	15	15	15	15	15	16.7
AMPS Ballast	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	15
Volts	120	208	240	208-277	277	480	120/208-277	120	208-277



Twist Lock Mounting	K4521	K4524*	K4522	K4533*	K4533*
Watts Tungsten	1800	3100	3600	4100	1000
VA Ballast	1000	1700	2000	2300	4000
AMPS Tungsten	15	15	15	15	15
AMPS Ballast	8.3	8.3	8.3	8.3	8.3
Volts	120	208	240	277	480

*Not CSA Certified



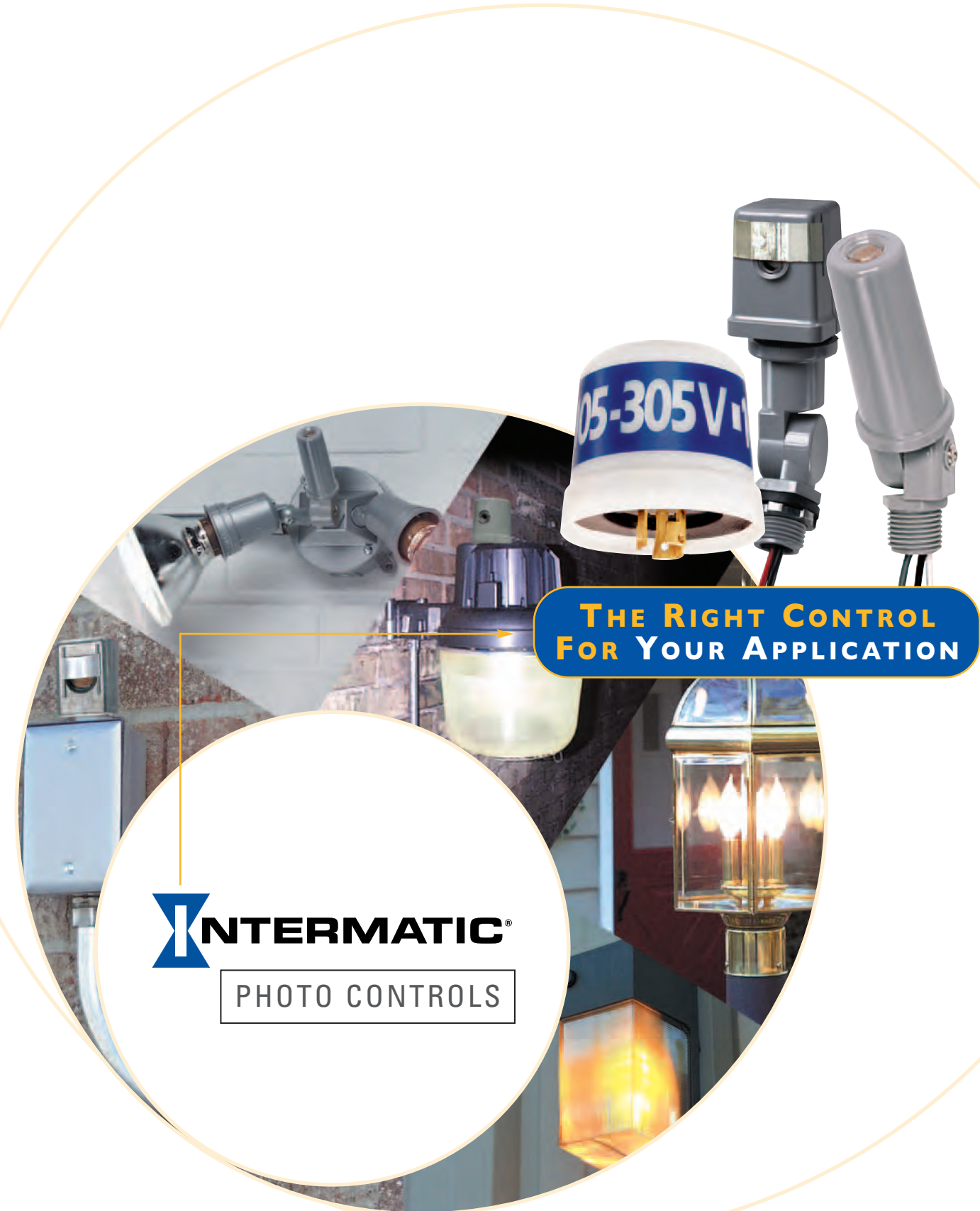
Relay Type	K1121	K1122	K1221	K1222
Watts Tungsten	1800	1800	1800	1800
VA Ballast	1800	1800	1800	1800
Volts	105-130	210-240	105-130	210-240



Low Cost Twist Lock	LC4521C	LC4523	LC4535	LC4536C	LC4521LA	LC4523LA	LC4535LA	LC4536LAC
Watts Tungsten	1000	1700-2300	7200	1000-2300	1000	1700-2300	1000	1000-2300
VA Ballast	1000	1700-2300	4000	1000-2300	1000	1700-2300	4000	1000-2300
AMPS Tungsten	15	15	15	15	15	15	15	15
Volts	120	208-277	480	120-277	120	208-277	480	120-277



Solid State Fixed	K4536SS	K4536SST
Watts Tungsten	1000	1000
VA Ballast	1800	1800
AMPS Tungsten	9.6	9.6
Volts	105-305	105-305



**THE RIGHT CONTROL
FOR YOUR APPLICATION**

INTERMATIC®
PHOTO CONTROLS

TRON® In-Line Fuseholders

Single-Pole for 1³/₃₂" × 1¹/₂" Fuses

HEB Series



Non-Breakaway Holders

Catalog Symbol: HEB-AA⁽¹⁾ (2) (3), HEB-AB⁽²⁾, HEB-AC⁽²⁾, HEB-AD⁽²⁾, HEB-AE⁽²⁾, HEB-AJ, HEB-AK, HEB-AL, HEB-AR, HEB-AY, HEB-BA⁽²⁾, HEB-BB⁽²⁾, HEB-BC⁽²⁾, HEB-BD⁽²⁾, HEB-CC⁽²⁾, HEB-DD⁽²⁾, HEB-JJ, HEB-JK, HEB-JL, HEB-JY, HEB-LL, HEB-NN, HEB-PP⁽²⁾, HEB-QQ⁽²⁾, HEB-RR⁽²⁾, HEB-SS, HEB-TT⁽²⁾.HEB-ZA.

In-Line Fuseholders

Single-Pole

Water-Resistant

Agency Information:

⁽¹⁾UL Recognized, Guide IZLT2, File E14853

⁽²⁾CSA Certified, Class 6225-01, File 47235

⁽³⁾CE

For breakaway holders See Page 2

HEB — For 1³/₃₂" × 1¹/₂" (midget) fuse. Fuseholder rated 30A, 600V Typical fuse types: BAF, FNM, FNQ, and KTK (1/10-30A).

Ordering Information:

HEB	—		
		Load Terminal	Line Terminal

Also See Table on Page 3

Example:

A single-pole, in-line holder for 1³/₃₂" × 1¹/₂" fuses. A single #12 solid copper wire is on the load side. A copper crimp is desired. Two #6 solid copper wire is on the line side. A copper set-screw is desired.

1. Choose HEB- Series.
2. Choose "A" for load side.
3. Choose "K" for line side.







Complete Catalog Number: HEB-AK.

For Insulating boots See Page 2 — Insulating boots are **not** included with **non-breakaway** parts and must be ordered separately. They come standard with the breakaway series.

When boots are utilized, extra heat retention requires that fuses are sized at a minimum of 200% of the RMS load current.

Recommended Torque on Coupling Nut: 10-20 in-lb.

Specification Data - Non-Breakaway & Load-Side Breakaway Conductor Terminals

Terminal Type	Conductor Data			Catalog Symbol Load & Line (2) & (3)
	Size	No. Per Terminal	Solid Stranded	
Copper Crimp	#12 to #8	1	• •	A
	#12	2	• •	B
	#10	2	• •	
	#6	1	• •	
	#4	1	• •	
	#8	2	• •	
	#4	1	— •	C
	#6	2	• •	
	#2	1	— •	
	#4	2	• •	D
	#20 to #18	1	• •	
	#20 to #18	1	• •	
Copper Set-Screw	#12 to #3	1	• •	J
	#12 to #3	2	• •	K
Solid Copper Terminal for Aluminum Wire Connector	#8 to #12	1	• —	S
	#10 to #4	1	— •	
Aluminum Crimp	#8	1	— •	N
	#6	1	• —	
	#6	1	— •	
	#4	1	• —	
	#3, #4	1	— •	
	#2	1	• —	
	#1, #2	1	— •	
#1/0	1	— •	T	
Aluminum Set-Screw	#12 to #2	1	• •	L
	#12 to #2	2	• •	Y

TRON® In-Line Fuseholders

Single-Pole for 1³/₃₂" x 1¹/₂" Fuses

HEB Series

Breakaway Holders

Breakaway Holders consist of two parts for a complete unit. One part is the Fuseholder, which contains the Load Terminal, and the other part is the Breakaway, which contains the Line Terminal. These can be ordered as a complete unit or as individual parts.

Catalog Symbols:

Breakaway Unit:

(Includes Fuseholder, Breakaway part and Insulating Boots)

HEB-AW-RLA, HEB-AW-RLC-A⁽¹⁾ ⁽²⁾ ⁽³⁾, HEB-AW-RLC-B, HEB-AW-RLC-C, HEB-AW-RLC-J, HEB-AW-RYA, HEB-AW-RYC, HEB-BW-RLC-A, HEB-BW-RLC-B, HEB-BW-RYC, HEB-JW-RLC-J, HEB-JW-RYC, HEB-KW-RLC-J, HEB-KW-RYC, HEB-LW-RLA, HEB-LW-RLC-J, HEB-LW-RYA

Fuseholder Only: HEB-AW⁽²⁾, HEB-BW⁽²⁾, HEB-DW⁽²⁾, HEB-JW, HEB-LW

Breakaway Part: RLC-A, RLC-B, RLC-C, RLC-J, RYC, RLA, RYA

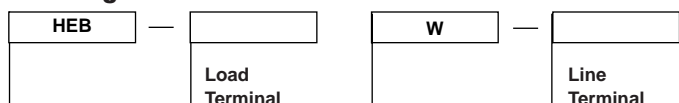
Agency Information:

⁽¹⁾UL Recognized, Guide IZLT2, File E14853

⁽²⁾CSA Certified, Class 6225-01, File 47235

⁽³⁾CE

Ordering Information:



Example:

A single-pole, breakaway, in-line holder for 1³/₃₂" x 1¹/₂" fuses. A single #12 solid copper wire is on the load side. A copper crimp is desired. Two #6 solid copper wire is on the line side. A copper set-screw is desired.

1. Choose HEB- Series.
2. Choose "AW" for load side.
3. Choose "RYC" for line side.

Complete Catalog Number: HEB-AW-RYC.

Recommended Torque on Coupling Nut: 10-20 in-lb.

Specification Data - Line Side Breakaway

Breakaway Receptacles		Conductor Data				Catalog Symbol
Terminal Type		Size	No. Per Terminal	Solid	Stranded	
Copper Crimp		#12 to #8	1	•	•	-RLC-A
		#6	1	•	•	-RLC-B
		#4	1	•	•	-RLC-C
Copper Set-Screw						
		#12 to #2	1	•	•	-RLC-J
		Aluminum Set-Screw				
		#12 to #2	1	•	•	-RLA
		#12 to #2	2	•	•	-RYC
Solid Breakaway						
		(Required with Breakaway Receptacle)				W

Insulating Boots

Catalog Numbers	Type
2A0660	Single Conductor
2A0661	Two Conductor

Two Insulating boots come standard with the Breakaway units (ex. HEB-AW-RLC-A). The insulating boots are **not** included with the **Non-Breakaway** Holders (ex. HEB-AA) or the individual pieces of the Breakaway parts (ex. HEB-AW, RLC-A). Two insulating boots must be ordered for each holder when ordering them separately. When insulated boots are utilized, extra heat retention requires that fuses are sized at a minimum of 200% of the RMS load current.

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TRON® In-Line Fuseholders

Single-Pole for Solid Neutral

HET Series



Non-Breakaway Holders
 Catalog Symbol: HET-AA, HET-AB, HET-BB, HET-JJ, and HET-JK
 In-Line Fuseholders, Single-Pole
 Water-Resistant
 For breakaway holders, see page 2

HET — A HEB fuseholder with a permanently installed solid neutral. Easily identified by white plastic coupling nut.

Example:
 A single-pole, in-line holder for a neutral is required. One solid copper #8 is on the load side, copper crimp for connection. A solid copper #6 is on the line side, and a copper crimp is required.

1. Choose HET- series.
2. Choose "A" for load side.
3. Choose "B" for line side.

Complete Catalog Number: HET-AB.

Ordering Information:

HET	—		
		Load Terminal	Line Terminal

Recommended Torque on Coupling Nut: 10-20 in-lb.

Catalog and Specification Data - Non-Breakaway Conductor Terminals

Terminal Type	Conductors Size	No. Per Terminal	Conductor Type		Catalog Symbol Load & Line (2 & 3)
			Solid	Stranded	
	#12 to #8	1	•	•	A
	#12	2	•	•	
	#10	2	•	•	
	#6	1	•	•	B
	#4	1	•	•	
Copper Set-Screw					
	#12 to #3	1	•	•	J
	#12 to #2	2	•	•	K
Aluminum Set-Screw					
	#12 to #2	1	•	•	L

Catalog Data — Insulating Boots

	Catalog Numbers	Type
	2A0660	Single Conductor
	2A0661	Two Conductor

Insulating boots are not included with non-breakaway parts and must be ordered separately. They come standard with the breakaway series. The HET-AW & HET-JW do not have the boots. These catalog items do not have a breakaway receptacle.

When boots are utilized, extra heat retention requires that fuses are sized at a minimum of 200% of the RMS load current.

TRON® In-Line Fuseholders Single-Pole for Solid Neutral

HET Series

Breakaway Holders

Catalog Symbol: HET-AW-RLC-A, HET-AW-RLC-B, HET-AW-RLC-C, HET-AW-RLC-J, HET-AW-RYC, HET-BW-RLC-B, HET-BW-RYC, HET-JW, HET-JW-RLC-J, HET-JW-RYC, and HET-AW

In-Line Fuseholders, Single-Pole

Example:




A single-pole, in-line, breakaway holder for a neutral is requested. A single #10 solid, copper crimp is on the load side. A single #10, solid wire and a copper crimp is needed on the line side.

1. Choose HET- series.
2. Choose "A" from 1st page for load side.
3. Choose "W" for breakaway requirement.
4. Choose "RLC-A" for breakaway receptacle on line side.

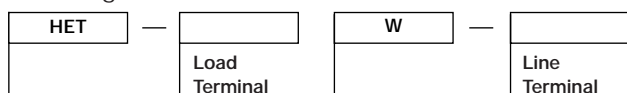
Complete Catalog Number: HET-AW-RLC-A

Catalog and Specification Data

Breakaway Receptacles

Terminal Type	Conductor Data			Catalog Symbol Line Terminal (3)
	Size	No. Per Terminal	Solid Stranded	
Copper Crimp 	#12 to #8	1	• •	-RLC-A
	#6	1	• •	-RLC-B
	#4	1	• •	-RLC-C
Copper Set-Screw				
	#12 to #3	1	• •	-RLC-J
	#12 to #3	2	• •	-RYC
Solid Breakaway				
	(Required with breakaway Receptacle)			W

Ordering Information:



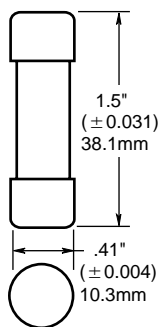
Recommended Torque on Coupling Nut: 10-20 in-lb.

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Tron® Time-Delay Fuses

FNQ

13/32" x 1-1/2" Midget
500 Volt, 1/10-30 Amps



- Fibre tube.
- Nickel plated brass endcaps.
- For motor control transformers and other circuits with in-rush currents.

Catalog Symbol: FNQ (5AG)

TIME-DELAY
 1/10 TO 30A
 500Vac (OR LESS)
Interrupting Rating: 10,000A
 UL LISTED, STD 248-14, (GUIDE # JDYX, FILE # E19180)
 CSA CERTIFIED (CLASS 1422-01; FILE 53787)

Catalog Symbol and Ampere Ratings

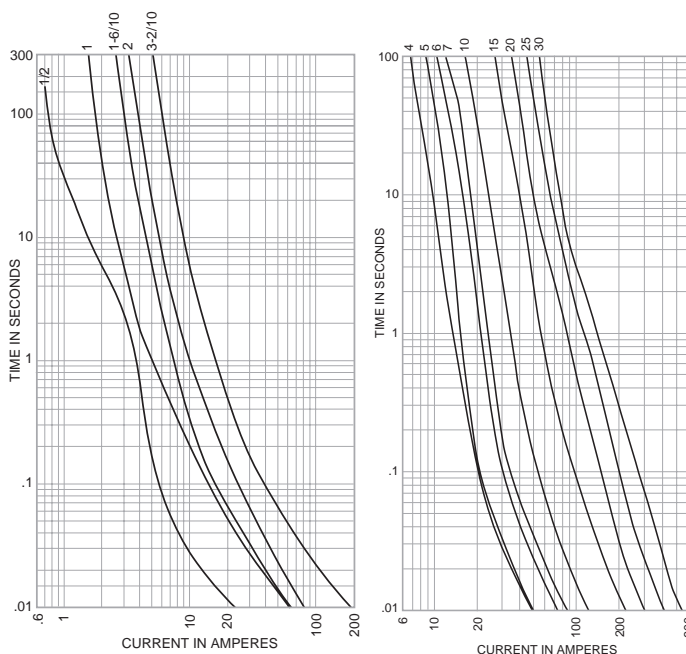
FNQ-1/10	FNQ-8/10	FNQ-3-2/10	FNQ-9
FNQ-1/8	FNQ-1	FNQ-3-1/2	FNQ-10
FNQ-15/100	FNQ-1-1/8	FNQ-4	FNQ-12
FNQ-3/16	FNQ-1-1/4	FNQ-4-1/2	FNQ-14
FNQ-2/10	FNQ-1-1/2	FNQ-5	FNQ-15
FNQ-1/4	FNQ-1-6/10	FNQ-5-6/10	FNQ-20
FNQ-3/10	FNQ-2	FNQ-6	FNQ-25
FNQ-4/10	FNQ-2-1/4	FNQ-6-1/4	FNQ-30
FNQ-1/2	FNQ-2-1/2	FNQ-7	—
FNQ-6/10	FNQ-3	FNQ-8	—

Carton Quantity and Weight


Ampere Ratings	Carton Qty	Weight*	
		Lbs.	Kg.
1-30	10	.180	.082

* Weight per carton.

Time-Current Characteristic Curve—Average Melt



RMS SYMMETRICAL IN AMPERES

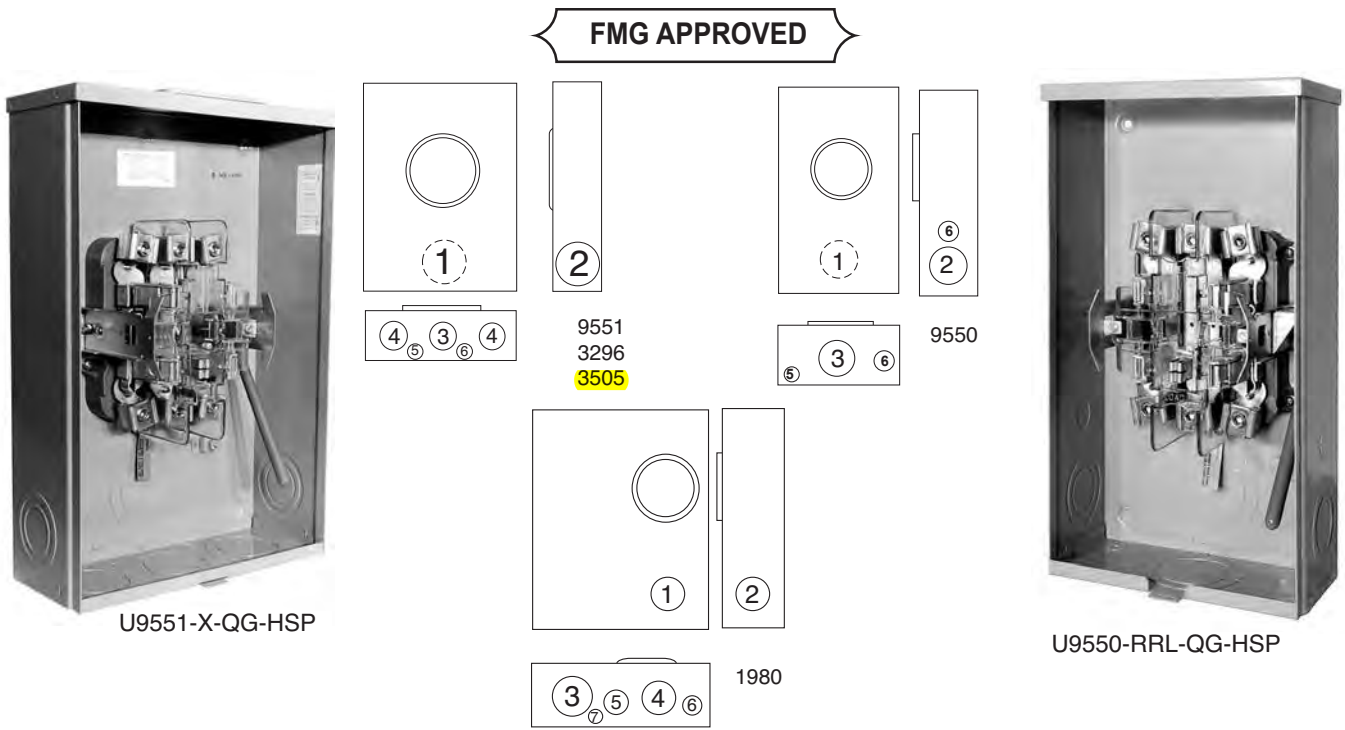


Recommended fuseblocks/fuseholders for 13/32" x 1-1/2" fuses
 See Data Sheets listed below

- Open fuseblocks - 1104, 2104
- Finger-safe fuseholders - 1109, 1102, 1103, 1151
- Panel-mount fuseholders - 2114, 2113, 2108, 2112, 2109, 2140
- In-line fuseholders - 2127, 2126

CE CE logo denotes compliance with European Union Low Voltage Directive (50-1000Vac, 75-1500Vdc). Refer to Data Sheet: 8002 or contact Bussmann Application Engineering at 636-527-1270 for more information.

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SINGLE POSITION

125 & 200 AMP-5 TERMINAL-JAW CLAMPING LEVER BYPASS-RINGLESS-600 VAC

125 AMP-5 TERMINAL-RINGLESS-1Ø3W

CATALOG NUMBER	SERVICE	HUB	CONNECTORS CU/AL	BY-PASS	DIMENSIONS			CONCENTRIC K.O.'S					
					D"	W"	H"	1	2	3	4	5	6
U3505-XL-TG-HSP	OH/UG	C.P.	#6 - 2/0	LEVER	4⁷/₈	10	18¹/₂	2	2	2	2	¼	¼, ½
UAP3505-XL-TG-HSP	OH/UG	C.P.	#6 - 2/0	LEVER	4 ⁷ / ₈	10	18 ¹ / ₂	2	2	2	2	¼	¼, ½

200 AMP-5 TERMINAL-RINGLESS-1Ø3W & 3Ø3W

CATALOG NUMBER	SERVICE	HUB	CONNECTORS CU/AL	BY-PASS	DIMENSIONS			CONCENTRIC K.O.'S					
					D"	W"	H"	1	2	3	4	5	6
U9550-RRL-QG-HSP	OH	H.O.	#6-350 kcmil	LEVER	4 ⁷ / ₈	10	18 ¹ / ₂	3	2 ¹ / ₂	3	—	¼, ½	¾
U9551-X-QG-HSP	OH/UG	C.P.	#6-350 kcmil	LEVER	4 ⁷ / ₈	13	19	3	2 ¹ / ₂	3	3	¼	¼, ½
UAP9551-X-QG-HSP	OH/UG	C.P.	#6-350 kcmil	LEVER	4 ⁷ / ₈	13	19	3	2 ¹ / ₂	3	3	¼	¼, ½
U3296-X-HSP	OH/UG	C.P.	¾"-16 STUD	LEVER	4 ⁷ / ₈	13	28 ¹ / ₄	3	3	3	3	¼	¼, ½
UAP3296-X-HSP	OH/UG	C.P.	¾"-16 STUD	LEVER	4 ⁷ / ₈	13	28 ¹ / ₄	3	3	3	3	¼	¼, ½

ALUMINUM CONSTRUCTION: To order an aluminum meter socket rather than steel, change the catalog number prefix from -U to -UAP. This designates an aluminum, painted meter socket.

HUBS: For proper hub selection, see hub suffix chart on accessory page.

CONNECTORS: Extruded aluminum connectors are tin plated. For the **U3296-X** stud-type unit, order connector kits separately. Order 2 kits to cover both line and load side: **K1539** (350 kcmil) or **K1540** (600 kcmil.) See accessory page.

BYPASS: Lever supplies clamping action on meter spades and also operates bypass device.





List Price \$817.00 USD

Availability **Stock Item: This item is normally stocked in our distribution facility.****Technical Characteristics**

Depth	6.38 Inches
Height	21.25 Inches
Width	8.50 Inches
Action	Single Throw
Ampere Rating	100A
Approvals	UL Listed
Catalog Reference Number	3100CT9801
Electrical Interlock	None
Enclosure Material	Galvannealed Steel
Enclosure Rating	NEMA 3R
Enclosure Type	Rainproof and Sleet/Ice proof (Indoor/Outdoor)
Factory Installed Neutral	No
Disconnect Type	Non-Fusible
Terminal Type	Lugs
Mounting Type	Surface
Type of Duty	Heavy Duty
Short Circuit Current Rating	200kA(max)
Number of Poles	3-Pole
Maximum Voltage Rating	600V
Wire Size	#12 to #1/0 AWG(Al) or #14 to #1/0 AWG(Cu)

Shipping and Ordering

Category	00009 - Safety Switch, Heavy Duty, 2 & 3 Pole, 30-200 Amp, Outdoor
Discount Schedule	DE1
Article Number	785901505624
Package Quantity	1
Weight	16.45 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

Table 3.10: 600 Volt—Single Throw Non-Fusible

System	Rating (A)	NEMA 1 Indoor		NEMA 3R Rainproof (Bolt-on Hubs, page 3-11)		NEMA 4, 4X, 5 ▲ 304 Stainless Steel (for 316 stainless, see page 3-7) Dust tight, Watertight Corrosion Resistant (Watertight Hubs, page 3-11)		NEMA 12K With Knockouts (Watertight Hubs, page 3-11)		NEMA 12, 3R ■ Without Knockouts (Watertight Hubs, page 3-11)		Horsepower Ratings (Max.) ♦									
		Cat. No.	\$ Price	Cat. No.	\$ Price	Cat. No.	\$ Price	Cat. No.	\$ Price	Cat. No.	\$ Price	Volts ac						dc*			
												1Ø	3Ø	1Ø	3Ø	1Ø	3Ø	250	600		
2-Wire (2 Blades)—600 Vac, 600 Vdc																					
	30	Use three-wire devices for two-wire applications.										—	—	—	—	—	—	—	—	—	—
	60											—	—	—	—	—	—	—	—	—	—
	100											—	—	—	—	—	—	—	—	—	—
	200											—	—	—	—	—	—	—	—	—	—
	400	HU265	2750.00	HU265R	3764.00	HU265DS	12812.00	—	—	HU265AWK	3212.00	—	—	—	—	—	—	50	50		
	600	HU266	4896.00	HU266R	7533.00	HU266DS	18455.00	—	—	HU266AWK	5408.00	—	—	—	—	—	—	50	50		
800	HU267	7467.00	HU267R ▼	12884.00	—	—	—	—	HU267AWK	12957.00	50	—	50	—	50	—	—	50			
1200	HU268	10226.00	HU268R ▼	17393.00	—	—	—	—	HU268AWK	17522.00	50	—	50	—	—	—	50	50			
3-Wire (3 Blades)—600 Vac, 600 Vdc																					
	30	HU361	273.00	HU361RB	488.00	HU361DS	2520.00	HU361A	689.00	HU361AWK	647.00	5	10	7-1/2	20	10	30	5	15		
	30	HU361E1Δ	638.00	HU361RBE1Δ	846.00	HU361DSE1Δ	2480.00	HU361AE1Δ	1047.00	HU361AWKE1Δ	1007.00	5	10	7-1/2	20	10	30	5	15		
	30	HU3612□	369.00	HU3612RB□	638.00	—	—	HU3612A□	710.00	HU3612AWK□	666.00	5	10	7-1/2	20	10	30	5	15		
	60	HU362	488.00	HU362RB	876.00	HU362DS	2520.00	HU362A	875.00	HU362AWK	833.00	10	20	25	50	30	60	10	30		
	60	—	—	—	—	HU362DSE1Δ	2972.00	—	—	—	—	10	20	25	50	30	60	10	30		
	100	HU363	783.00	HU363RB	1226.00	HU363DS	5102.00	HU363A	1265.00	HU363AWK	1194.00	20	40	40	75	40	100	20	50		
	200	HU364	1209.00	HU364RB	1485.00	HU364DS	6960.00	HU364A	1697.00	HU364AWK	1604.00	15	60	50	125	50	150	40	50		
	400	HU365	2804.00	HU365R	3840.00	HU365DS	14294.00	—	—	HU365AWK	4023.00	—	125	—	250	—	350	50	50		
	600	HU366	4992.00	HU366R	7683.00	HU366DS	19062.00	—	—	HU366AWK	6711.00	—	200	—	400	—	500	50	50		
	800	HU367	9978.00	HU367R ▼	13050.00	—	—	—	—	HU367AWK	13097.00	50	250	50	500	50	500	50	50		
	1200	HU368	13421.00	HU368R ▼	17867.00	—	—	—	—	HU368AWK	17940.00	50	250	50	500	50	500	50	50		
	4-Wire (4 Blades)—600 Vac, 600 Vdc ◊																				
	30	HU461 ◊	827.00	—	—	HU461DS	2586.00	—	—	HU461AWK★	915.00	10	10	20	20	25	30	10▽	15▽		
	60	HU462 ◊	914.00	—	—	HU462DS	3027.00	—	—	HU462AWK	1008.00	20	20	40	50	50	60	10	30		
	100	HU463 ◊	1647.00	—	—	HU463DS	7401.00	—	—	HU463AWK	1791.00	30	40	50	75	50	75	20	30		
	200	HU464 ◊	2399.00	—	—	HU464DS	11244.00	—	—	HU464AWK	2832.00	50	60	50	125	50	150	40	50		
	400	HU465	5201.00	—	—	—	—	—	—	HU465AWK	5672.00	—	125	—	250	—	350	50	50		
	600	HU466	9072.00	—	—	—	—	—	—	—	—	—	200	—	400	—	500	50	50		
6-Wire (6 Blades)—600 Vac ◊																					
	30	—	—	—	—	HU661DS	11903.00	—	—	HU661AWK*	3357.00	—	10	—	20	—	30	—	—		
	60	—	—	—	—	HU662DS	13254.00	—	—	HU662AWK*	3884.00	—	20	—	50	—	60	—	—		
	100	—	—	—	—	HU663DS	20643.00	—	—	HU663AWK*	4793.00	—	40	—	75	—	75	—	—		
	200	—	—	—	—	HU664DS	28316.00	—	—	HU664AWK*	10538.00	—	60	—	125	—	150	—	—		

- ▲ Complete rating is NEMA 3, 3R, 4, 4X, 5 and 12.
- ◆ Also suitable for NEMA 3R application by removing drain screw from bottom endwall.
- ♦ Refer to page 7-32 for additional motor application data.
- ★ For switching dc, use two switching poles.
- ▼ Suitable for NEMA 5 applications with drain screw installed.
- Δ Switches with E1 suffix are stocked with factory-installed electrical interlocks with one normally-open and one normally-closed contact.
- Use 60 A enclosure accessories, including electrical interlocks.
- ◊ No knockouts are provided.
- ☆ Check series number on switch for correct accessory. See page 3-15.
- ▽ HU461AWK (Series E1) is rated 5 hp@250 Vdc, 10 hp@600 Vdc.
- ◊ Not suitable for use as service equipment.
- * One enclosure for NEMA 1, 3, 3R or 12 applications. UL Listed.

UL Listed Maximum Short Circuit Current Ratings—AC only

NOTE: Consult the wiring diagram of the switch to verify the UL Listed short circuit current rating.

Table 3.11: Fusible Safety Switches

For the short circuit current rating, refer to the table below.

Heavy Duty Safety Switch Type	UL Listed Fuse Class	UL Listed Short Circuit Current Ratings
Fusible	H, K	10 kA
	R, J, L	200 kA◊

◊ On 600 V, 200 A switches, 100,000 A max. on corner grounded delta when protected by Class J or R fuses.

Non-Fusible Safety Switches

Any brand of circuit breaker or fuse not exceeding the ampere rating of the switch may be used in conjunction with a non-fusible safety switch when there is up to 10 kA short circuit current available (see table below).

Above 10 kA—When applied on systems with greater than 10 kA short circuit current available, the UL Listed short circuit current rating for Square D non-fusible switches is based upon the switch being used in conjunction with fuses or Square D circuit breakers or Mag-Gard motor circuit protectors.

Table 3.12: Non-Fusible Safety Switches

Heavy Duty Safety Switch Type	Switch Rating (A) ◊	Fuse or Circuit Breaker Type◊	3-Phase		
			240 Vac	480 Vac	600 Vac
Non-Fusible Switches	All	Any brand circuit breaker	Up to 10 kA		
		H, K			
		R, T, J, L	200 kA	200 kA	200 kA
	30-100	H □	65 kA	35 kA	25 kA
	30-100	FA	14 kA	14 kA	14 kA
	30-100	FH	18 kA	18 kA	18 kA
	200	H, J □	65 kA	35 kA	25 kA
	200	KA			
	400	LA			
	600	MA	22 kA	22 kA	22 kA
	200	KH			
	400	LH	25 kA	25 kA	25 kA
600	MH				

- ◊ Applies to NEMA 1, 3R, 4X stainless, 12 switches.
- ◊ Ampere rating of fuse or circuit breaker not to exceed switch ampere rating.
- All H and J circuit breakers are acceptable, but will only support the noted Short Circuit Current Ratings.