

BIF - 2011

Arc Flash

Power Panels

&

Best Practice

BURNIE and LES



"Wrong movie reference, Burnie. And don't call me Houston."

ARC Flash

- What is it?
- Where does it come from?
- What can it cost you?
- How do you protect your self, your employees and your company?

What is Arc Flash?



What is Arc Flash?



What can happen?



What is it?

- A Dangerous explosive release of energy
 - Associated with :
 - Phase to ground
 - Phase to phase fault
 - What can cause this?

What can Cause it

- Dropped tools
- Accidental Contact with electrical Systems
- Conductive Dust
- Corrosion
- Improper work conditions
- Poorly trained employees

Who Cares?

- Bakers
- Equipment manufactures
- Employees
- Contract Workers

- Lawyers

- OhAnd OSHA (I think you know them)

What Must I do?

- New equipment installations
 - Proper design of control panels and switch gear
 - But the Requirements are:
 - not specifically spelled out by OSHA
- Existing panels and switch gear
 - OSHA regulations state an employer must **identify** and **assess** the electrical hazards for employees and **protect them** from those hazards.

What is Required

- **Hazard Risk Assessment**

- Before working on energized parts above 50V

- Probably every panel in your plant
- or that you manufacture to old standards

- **If a hazard exist**

- An employer must select and require employees to use protective apparel (**PPE**) (including special underwear!!!)
 - Yea Right I can see that happening when a break down occurs
- If you do that you **MIGHT** be compliant




Can you be cited by OSHA

- OSHA has been issuing citations to companies for failure to assess and identify the hazards present.
- The envelopes please:
 - Open panel during an inspection **\$7,500**
 - Someone working in an open panel **\$30,000**

Labels on a Panel that has been Risk Assessed

 WARNING	
Arc Flash and Shock Hazard	
Appropriate PPE Required	
649 mm	Flash Hazard Boundary
2.1 cal/cm²	Flash Hazard at 457 mm
Category 1	FR Shirt & Pants
480 VAC	Shock Hazard when cover is removed
00	Glove Class
1067 mm	Limited Approach
305 mm	Restricted Approach
25 mm	Prohibited Approach
Location:	ATS-A

 WARNING	
Arc Flash and Shock Hazard	
Appropriate PPE Required	
351 mm	Flash Hazard Boundary
0.77 cal/cm²	Flash Hazard at 457 mm
Category 0	Untreated Cotton
480 VAC	Shock Hazard when cover is removed
00	Glove Class
1067 mm	Limited Approach
305 mm	Restricted Approach
25 mm	Prohibited Approach
Location:	LA

You have other choices

Other Options and Methods



Warning label with a red arrow pointing to the right.

СИМВАЛ ПЕРЕКРУЖИ 400 ВОЛТ
БРОЈКА 08 00 54 50



Warning label with a red emergency stop button and text in multiple languages.

Warning label on the main cabinet door.





Emergency stop button (red) mounted on top of the left cabinet.

Clipboard with papers attached to the left cabinet door.

Blue label on the middle cabinet door.

Emergency stop button (green) mounted on the side of the right cabinet.

Yellow warning label on the right cabinet door: **DANGER HIGH VOLTAGE**

Red emergency stop button (partially visible) on the right cabinet door.

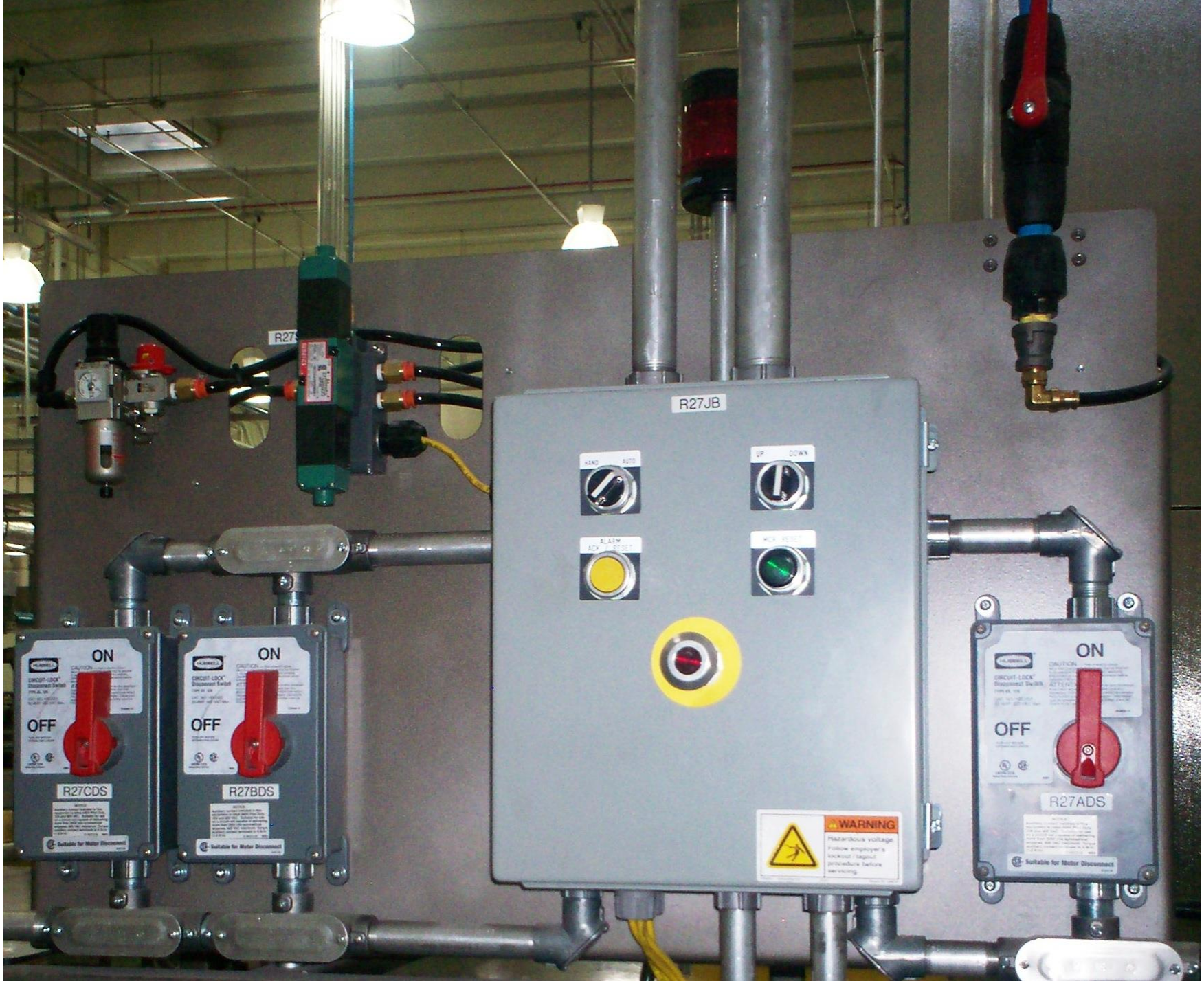
White label with technical specifications on the right cabinet door.



05/11/2011 00:33



05/11/2011 00:33



R27JB

STOP
START

UP
DOWN

STOP
START

STOP
START

STOP

WARNING
Hazardous voltage
Follow employer's
lockout/tagout
procedure before
servicing.

ON
OFF
R27CDS

ON
OFF
R27BDS

ON
OFF
R27ADS



**CAUTION
VORSICHT
ADVERTENCIA**

440/460/480 VAC
50/60 HZ
3 PHASE

DANGER VOLTAGE IF FLASHING
SAFETY PROCEDURES STILL APPLY.
TEST BEFORE TOUCHING.



DANGER VOLTAGE VOLTAGE PRE-TEST POINT



Follow Safety Procedures

Procedure: Non-Contact Voltage Detector (NCVD) Specifications Apply

1. Check NCVD to ensure voltage source.
2. Close circuit.
3. Repeat NCVD test within 10 inches of source & test ACU panel.
4. Re-verify NCVD to ensure voltage source.

DANGER VOLTAGE IF FLASHING
SAFETY PROCEDURES STILL APPLY.
TEST BEFORE TOUCHING.



WARNING!

Follow Safety Procedures
Read instructions before installing



DANGER VOLTAGE VOLTAGE PRE-TEST POINTS

L1



L2



L3



Manufacturers' Non-Contact Voltage Detector (NCVD) and Voltage Indicator (VI) Procedures Apply.

Procedure:

- 1.) Verify proper operation of VI.
- 2.) Verify NCVD to known voltage source.
- 3.) Open isolator.
- 4.) Verify NO flashing LEDs on VI.
- 5.) Insert NCVD into bottom of recess & test ALL points.
- 6.) Re-Verify NCVD to known voltage source.
- 7.) Upon completion of work, close isolator and verify proper operation of VI.

R-1A0033W-NPLPH





10,000 amperes, RMS symmetrical

CAUTION - Information regarding performance under unusual service conditions should be obtained from the General Electric Company.

Examples of unusual service conditions are:

- Temperatures above +50° C (+122° F) or below -30° C (-22° F)
- Altitudes above 6000 feet
- Corrosive or explosive environments
- Excessive vibrations, shock, or heavy or unusual operating duties.

de procéder au travail dans ce bloc. Remettez tous les éléments en place. Fixez l'écrou sur les bornes câblées. Refermez le couvercle avant de remettre sous tension.

ATTENTION - S'adresser à la General Electric en ce qui a trait aux caractéristiques en conditions d'utilisation inhabituelles telles que:

- Température ambiante supérieure à +50° C (122° F) ou inférieure à -30° C (-22° F)
- Altitude supérieure à 6 000 ft.
- Présence d'agents corrosifs ou explosifs
- Vibrations intenses, chocs, ou fonctionnement ou stationnement

Replacement Parts and Accessories

Item	GE Catalog No.
Switch Base	139C5021G2
Handle	343L75403
Fuse Base	569B394G2
Equipment Ground	TCL1

Equipment Ground



Wire Sizes

Type	Solid	Stranded
Large Holes	14-8 Cu	10-4 Cu, 8-4 Al
Small Holes	14-8 Cu, 12-8 Al	12-8 Cu-Al

Made in USA



F

⚠ DANGER VOLTAGE VOLTAGE PRE-TEST POINTS

L1 L2 L3

Follow Safety Procedures
Read Instructions

Procedure: Non-Contact Voltage Detector (NCVD) Specifications Apply

- 1.) Verify NCVD to known voltage source
- 2.) Open isolator
- 3.) Insert NCVD and test ALL points
- 4.) Re-verify NCVD to known voltage source.

GREEN
YACET
E.L.P. Inc.
Green Engineering Products, Inc.



DANGER
ELECTRIC SHOCK, BURN

Goto www.GracePort.com for more information

Features:

- Redundant Circuitry / Long Life LED' - either flashing or non-flashing
- 40-750VAC / 30-1000VDC
- Potted Construction with 6' Leads
- Phase Insensitive
- 30MM Pushbutton or Pilot Hole
- High Surge Immunity
- UL type 4X Listed

Applications:

- Circuit Breaker Disconnects - No Visible Blades
- High Energy Panels (NFPA 70e Category III and IV)
- Frequently Accessed Panels
- Mechanical LOTO: Indicating Zero Energy
- Panels with Multiple Power Sources

FRONT



P-E5P11-M3RF0: Ethernet Switch with Port P1 on front, Type A USB, and our patented Inside-Outlet® in a UL Type 4 Enclosure.

SPECIFICATIONS: ELECTRICAL OUTLET

Low voltage (data), limited to 30 VDC
High voltage supply (for computer use only)
120 VAC, 15A (UL), 5A (CSA)
230-240 VAC, 16A (CE only)

REAR

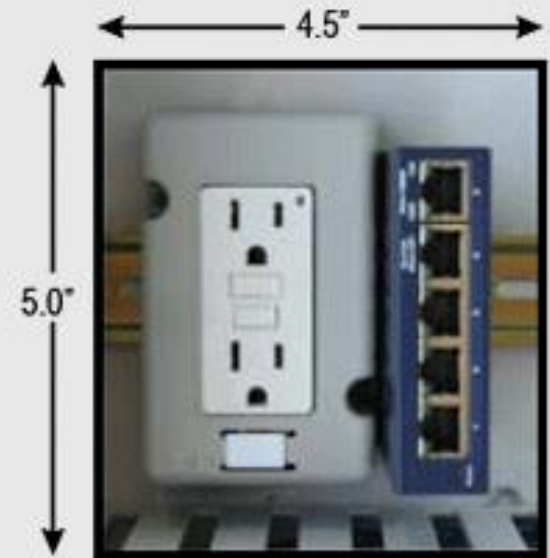


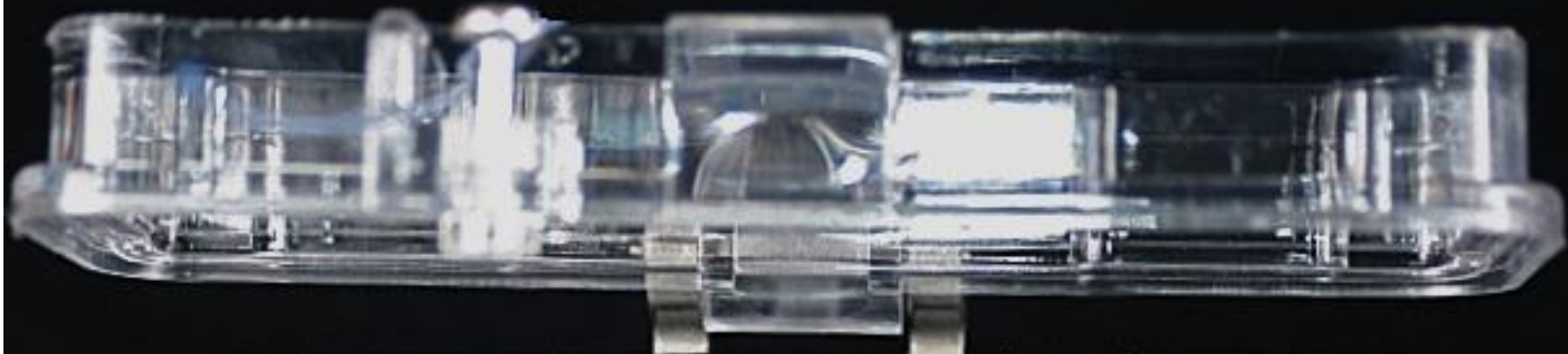
P-E5-M3RF3: Interior View Ports P2 - P5, Inside-Outlet®, 3A Circuit Breaker in a UL Type 4 Enclosure.

SPECIFICATIONS: HOUSING

Housing: Cast aluminum base
Latch: Type 304 Stainless Steel (1CR18NI19)
Cover: Polycarbonate, UV rated, V-O Flame rated
Gasket: Thermoplastic elastomer
Insert Material: Acrylic UL94HB

PANEL SPACE SAVINGS





GracePort® Interface

P-B9-H3R3



DH+



GRACE
ENGINEERED
PRODUCTS, INC.
WWW.GRACEPORT.COM

120VAC, 5A



3
AMP



UL
E297344

SR
LR110646

ENC.
TYPE 4 FOR COMPUTER USE ONLY



GracePort® interface

P-P3P5-B3RX

KEYBOARD

MOUSE

ENC.
TYPE 4

UL®
E207344

CSA
LR110641



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ENGINEERED
PRODUCTS, INC.
WWW.GRACE-ENG.COM





GracePort® Interface

GFCI Inside - Outlet®

P-R2-K3RF3

120VAC, 3A

FOR COMPUTER USE ONLY



UL®
E207344

CS®
L1110845
ENC.
TYPE 4



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ENGINEERED
PRODUCTS, INC.
WWW.GRACEPORT.COM

ETHERNET



POWERSMITHS

POWERSMITHS INTERNATIONAL CORP.

10 Devon Road, Brampton, Ontario L6T 5B5 Canada

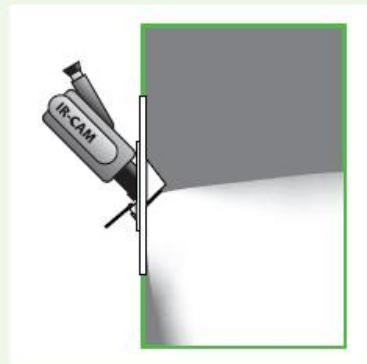
Phone: (905) 791-1493

Toll-free: (800) 747-9627

Fax: (905) 791-8870

Email: info@powersmiths.com

www.powersmiths.com

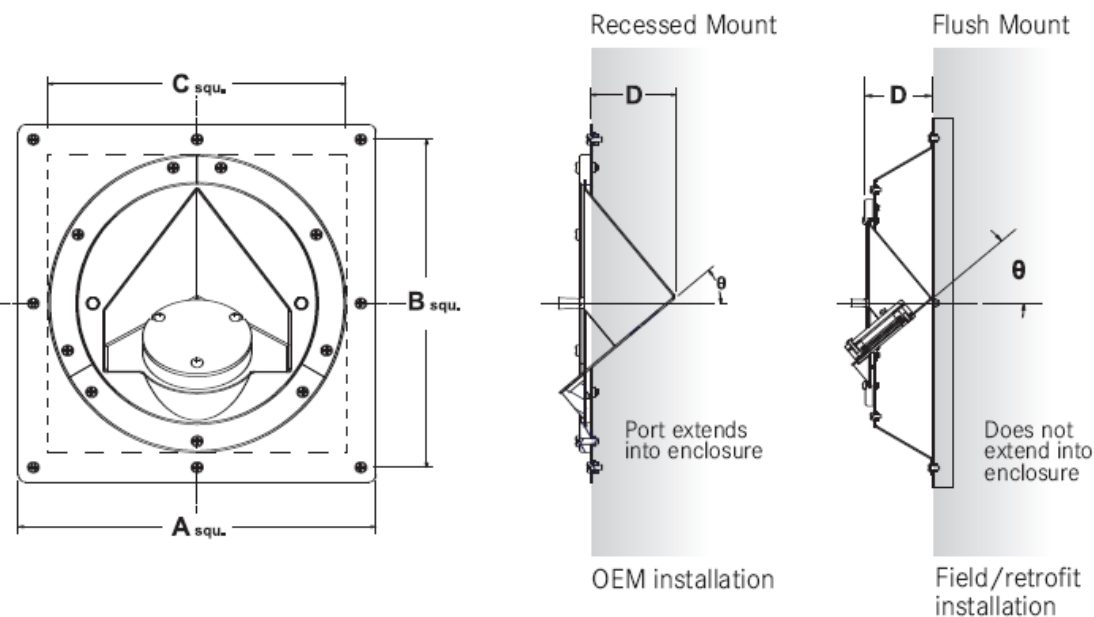


Above shows one view taken by an IR camera through the Powersmiths Rotatable IR Viewing Port.

- Enables thorough thermographic inspections without exposing personnel to live electrical components and associated Arc Flash hazards
- Substantially increases the viewing area compared to fixed IR windows
- Makes preventative and predictive maintenance programs easier and less costly to implement
- Safeguards equipment assets
- Helps avoid operational disruptions

The unit comprises three components:

- A fixed base that is mounted to the enclosure wall
- A rotatable (360°) assembly mounted to the base via a bezel
- An IR viewing port mounted to a rotatable assembly for the actual thermographic imaging



AVAILABLE MODELS

RECESSED-MOUNT PORT

Model	A	B	C	D	θ
IRP - *240	12	11	10	2.8	40°
IRP - *250	12	11	10	2.3	50°
IRP - *340	14	13	12	3.6	40°
IRP - *350	14	13	12	3.0	50°
IRP - *360	14	13	12	3.1	60°
IRP - *460	14	13	12	3.1	60°

* Window type R or C

FLUSH-MOUNT PORT

Model	A	B	C	D	θ
IRP - *250F	16.6	16	15.3	2.9	50°
IRP - *350F	19.5	18.8	18	3.67	50°
IRP - *360F	19.5	18.8	18	3.67	60°
IRP - *460F	19.5	18.8	18	3.67	60°

* Window type R or C

IRP CERTIFICATIONS: UL and cUL recognized to UL50. File No E329179

VIEWING WINDOW CERTIFICATIONS: UL recognized to UL 508A and CSA C222.2 No. 14

Questions

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Thank you