125 – 155 kW

American-made
photovoltaic string inverters

usa.siemens.com/pvinverters

SIEMENS

The trendsetter among inverters

Features

125 TL3

- Optimized for solar power plants with 1500 volt modules
- Extensive grid management functions
- Special properties for extreme climatic conditions
- Farsighted technical features for future requirements
- Lean commissioning and maintenance via remote services
- 5 year standard warranty; optional 10 year warranty available

155 TL3

- Optimized for solar power plants with 1500 volt modules
- Extensive grid management functions
- Farsighted technical features for future requirements
- Lean commissioning and maintenance via remote services
- 5 year standard warranty; optional 10 year warranty available

Technical Data

DC input data	125 TL3	155 TL3
MPP range	875 – 1300 V	875 – 1300 V
Operating range	875 – 1450 V	875 – 1450 V
Rated DC voltage / start voltage	900 V / 1000 V	900 V / 1000 V
Max. no-load voltage	1500 V	1500 V
Max. input current	160 A	183 A
Max. short circuit current $I_{sc\ max}$	300 A	300 A
Number of MPP tracker	1	1
Connection per tracker	1 - 2	1 – 2

AC output data	125 TL3	155 TL3
Rated output	125 000 VA	155 000 VA
Max. power	137 500 VA	155 000 VA
Line voltage	600 V (3P+PE)	600 V (3P+PE)
Voltage range (Ph-Ph)	480 – 760 V	480 – 690 V
Rated frequency (range)	50 Hz / 60 Hz (45 – 65 Hz)	50 Hz / 60 Hz (45 – 65 Hz)
Rated current	3 x 120.3 A	3 x 149.5 A
Max. current	3 x 132.3 A	3 x 152.0 A
Reactive power / cos phi	0 – 100 % Som / 0.3 ind. – 0.30 cap.	0 – 100 % Snom / 0,30 ind. – 0,30 cap.
Max. total harmonic distortion (THD)	≤ 3 %	≤ 3 %
Number of grid phases	3	3

Technical Data (continued)

General data	125 TL3	155 TL3
Max. efficiency	99.2 %	99.1 %
Europ. efficiency	99.1 %	98.9 %
CEC efficiency	99.0 %	98.9 %
Standby consumption	< 10 W	7 W
Circuitry topology	transformerless	transformerless

Mechanical data	125 TL3	155 TL3
Display	LEDs	LEDs
Control units	webserver, supports mobile devices	webserver, supports mobile devices
Interfaces	Ethernet (Modbus TCP, Sunspec) RS485 (Modbus RTU, Sunspec, KACO-protocol) USB, optional: 4-DI, WIFI	Ethernet (Modbus TCP, Sunspec), RS485 (KACO-protocol), USB, optional: 4-DI, WIFI
Fault signalling relay	potential-free NOC max. 30 V / 1 A	potential-free NOC max. 30 V / 1 A
DC connection	cable lug, max. two pairs of 240 mm² (500 MCM) Cu or Al conductors or one pair of 300 mm² (600 MCM) Cu or Al conductors	cable lug, max. two pairs of 240 mm² (500 MCM) Cu or Al conductors or one pair of 300 mm² (600 MCM) Cu or Al conductors
AC connection	cable lug, max of 240 mm² (500 MCM) per phase Cu or Al conductors	cable lug, max of 240 mm² (500 MCM) per phase Cu or Al conductors
Ambient temperature	-13 °F - +140 ° / -25 °C – +60 °C ①	--13 °F - +140 °F / 25 °C – +60 °C ①
Humidity	0 – 100 %	0 – 100 %
Max. installation elevation (above MSL)	9843 ft / 3000 m	9843 ft / 3 000 m
Min. distance from coast	1640 ft / 500 m	1640 ft / 500 m
Cooling	temperature controlled fan	temperature controlled fan
Protection class	IP66 / NEMA 4X	IP66 / NEMA 4X
Noise emission	59.2 db (A)	59.2 db (A)
H x W x D	28.3 x 27.5 x 17.7 in / 719 x 699 x 450 mm	28.3 x 27.5 x 18.1 in / 719 x 699 x 460 mm
Weight	172.4 lb / 78.2 kg	172.4 lb / 78.2 kg

Certifications	125 TL3	155 TL3
Safety	UL62109-1, UL1741 SA, UL1741 SB (pending), CSA-C22.2 No. 62109-1, CSA-C22.2 No. 62109-2, CSA-C22.2 No. 107.1, IEC 62109-1/-2, EN 61000-6-1/-2/-3, EN 61000-3-11/-12	IEC 62109-1/-2, EN 61000-6-1/-2/-4, EN 61000-3-11/-12, EN 55011 group 1, class A EN 62920 Emission class A / Immunity class A UL62109-1, UL1741 SA, UL1741 SB (pending), CSA-C22.2 No.107.1, CSA-C22.2 No.62109-1, CSA-C22.2 No.62109-2
Grid connection rule	overview see homepage / download area	overview see homepage / download area

① Power derating at high ambient temperatures

Versions	S	XL
Number of DC inputs	1 - 2	1 - 2
DC switch	–	✓
DC SPD	Type 1 + 2	Type 1 + 2
AC SPD	○	○
RS485 interface SPD	○	○
Ethernet interface SPD	○	○
PID Set	○	○

standard = ✓ upgradeable = ○

Legal Manufacturer

Siemens Industry, Inc.
7000 Siemens Road
Wendell, North Carolina 27591
United States of America

Telephone: +1 (800) 347-6659
usa.siemens.com/pvinverters

Order No.

Federal Pacific

GRIDCONNEX®
Federal Pacific

Medium Voltage Grid Connection Solutions for Solar Farms, Battery Energy Storage Systems and Other Distributed Generation

Why GridConnex?

GridConnex is an excellent alternative to traditional pole mount medium voltage service equipment for the solar, battery storage, or wind energy provider.

Gridconnex Advantages

Significantly reduces installation time while remaining aesthetically pleasing.

The GridConnex product offers a significant reduction in installation time. A single GridConnex is capable of replacing 4 to 5 poles! This allows for rapid deployment and ease of installation.

Before GridConnex

After GridConnex

Not only is the pad-mounted GridConnex product easier and quicker to install, gain the benefit of an aesthetically pleasing alternative to unsightly utility poles.

GridConnex Advantages

Exceptionally reliable, easy to service, and cost-effective.

GridConnex is exceptionally reliable because it is wired and tested in the factory. Also, the equipment is housed in a sturdy, environmentally controlled, II-gauge steel enclosure. Assuring the components are not vulnerable to vandalism, vermin, lightning, or storms.

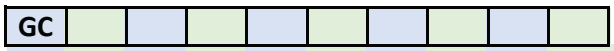
Since GridConnex is a pad-mounted product, serviceability is greatly improved. Bucket truck deployment is not needed to service equipment. Just open the door!

GridConnex is cost-effective because many required components are combined into a single enclosure. Simply stated, gang-operated air brake switches, reclosers, control power transformers, metering clusters, and fuse cutouts can be replaced with one prefigured product. The field labor savings are substantial.

A fully loaded GridConnex product will include revenue grade metering, a visible disconnect for safe isolation and the ability to lockout, and circuit breakers replacing very expensive reclosers. (GridConnex comes standard with three independent circuit breakers. Tripping is three-phase, but open phase commissioning is possible with safe individual phase tripping).

How to Order: Select from the options below. If your requirements are not listed, please contact Federal Pacific at **https://www.federalpacific.com/contact/**

GridConnex Configured Number Designations



Enclosure Color
WH - White (Standard)
GN - Green (Munsell 7GY3.29/1.5)
GY - Grey (ANSI 61)

Feeder Protection
0 - None
1 - Yes (50/51 Relay and Test Switch)
2 - Yes (50/51 Relay, Test Switch & Vsync LEA)

Revenue Grade Metering
0 - None
1 - Yes (Current / Voltage Measuring, Meter, Test Switch)

Uninterruptable Control Power
C - Customer Supplied
F - Factory Supplied

Lightning Arrestors
0 - None
1 - Utility Side
2 - Solar Side
3 - Both Utility and Solar Side

Visable Disconnect
AJ - Autojet Switch
XX - No Visable Disconnect

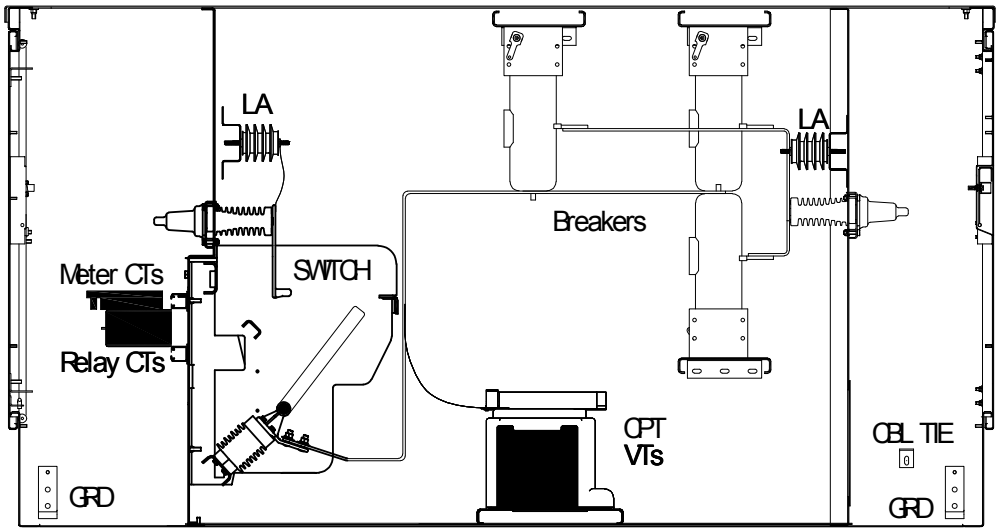
Breaker Configuration
1 - Triple Single Phase Breakers
3 - Three Phase Breaker

Bushings
2 - 200 Amp
6 - 600 Amp

System Voltage
A - 12,470
B - 13,200
C - 13,800
D - 14,400
E - 22,860
F - 24,940
G - 34,500
X - Other (Please Specify)

Product Designation
GC - GRIDCONNEX

The example below depicts a section view and one-line diagram of a typical configured GridConnex. See the configuration key located on page 4 for available options.



GridConnex with Switch (Typical, 15kV Shown) - Section View

Part Number GCA61AJ3F11WH

Position	0	1	2	3	4	5	6	7	8	9
Configured Part Number										

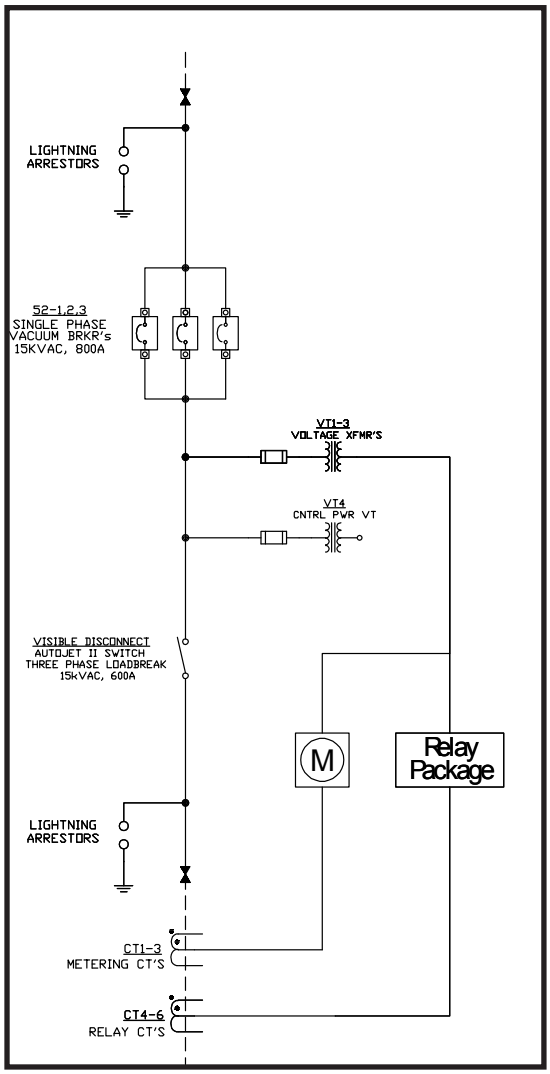
GridConnex™ Overall Equipment Ratings					
Rated Voltage	**Continuous Current**	**Frequency**	**Basic Impulse Level (BIL)**	**Dielectric Strength**	**Rated Short-Circuit Current (SYM)**
15kV	200/600A*	60Hz	95kV	36kV	20kA
25kV			125kV	60kV	16kA
35kv			150kV	80kV	

* Continuous current rating based on bushing or bushing well selection. Switchgear conforms to selected ANSI, NEMA, and IEEE standards.

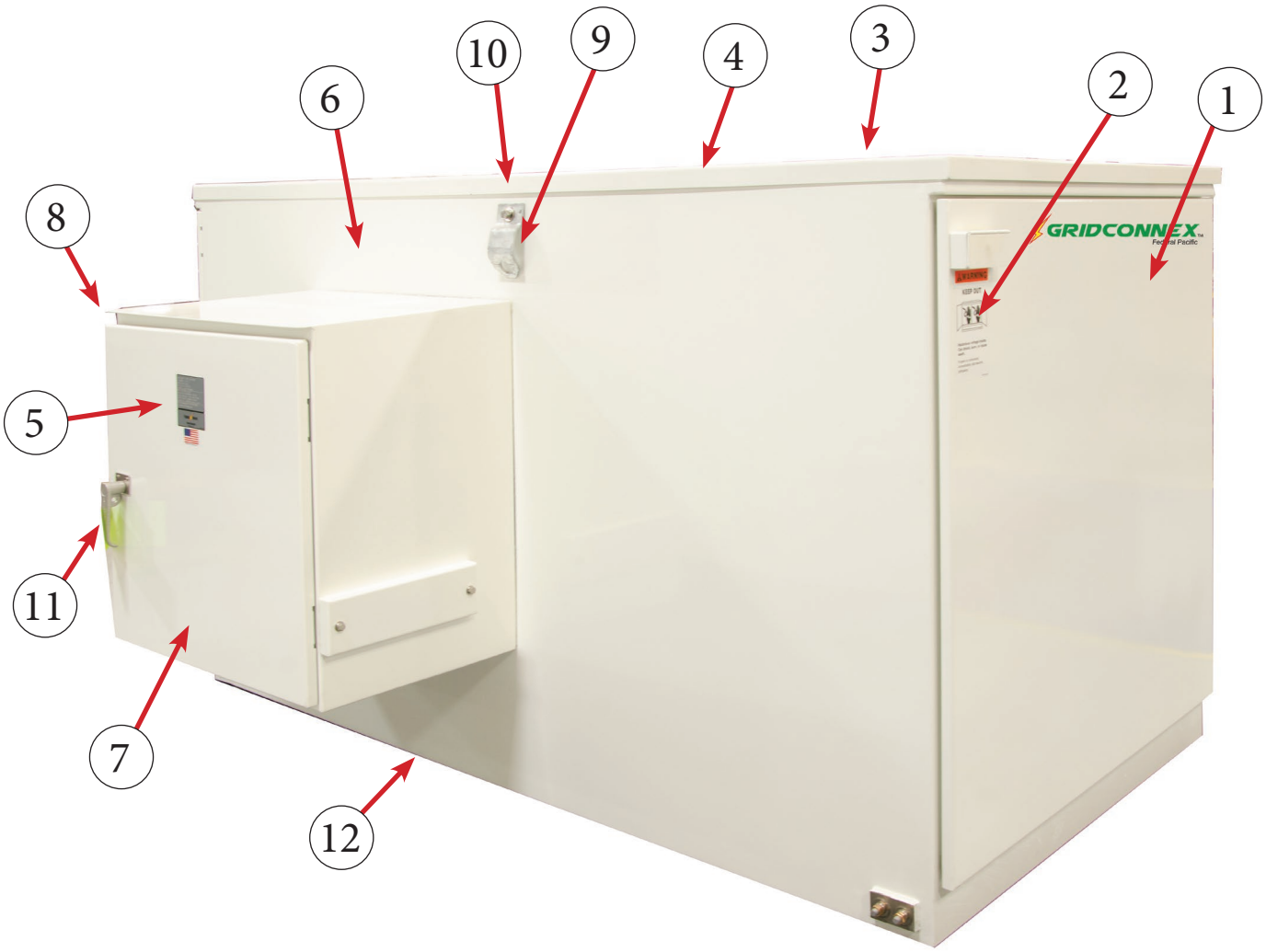
GridConnex Typical Dimensions - With AJ Switch			
Rated Voltage	**Height**	**Width**	**Depth**
15kV	56	48	104
25kV	72	60	116
35kV	85	57	132

GridConnex Typical Dimensions - Without AJ Switch			
Rated Voltage	**Height**	**Width**	**Depth**
15kV	56	48	82
25kV	72	60	106
35kV	85	57	122

NOTE - All dimensions in inches

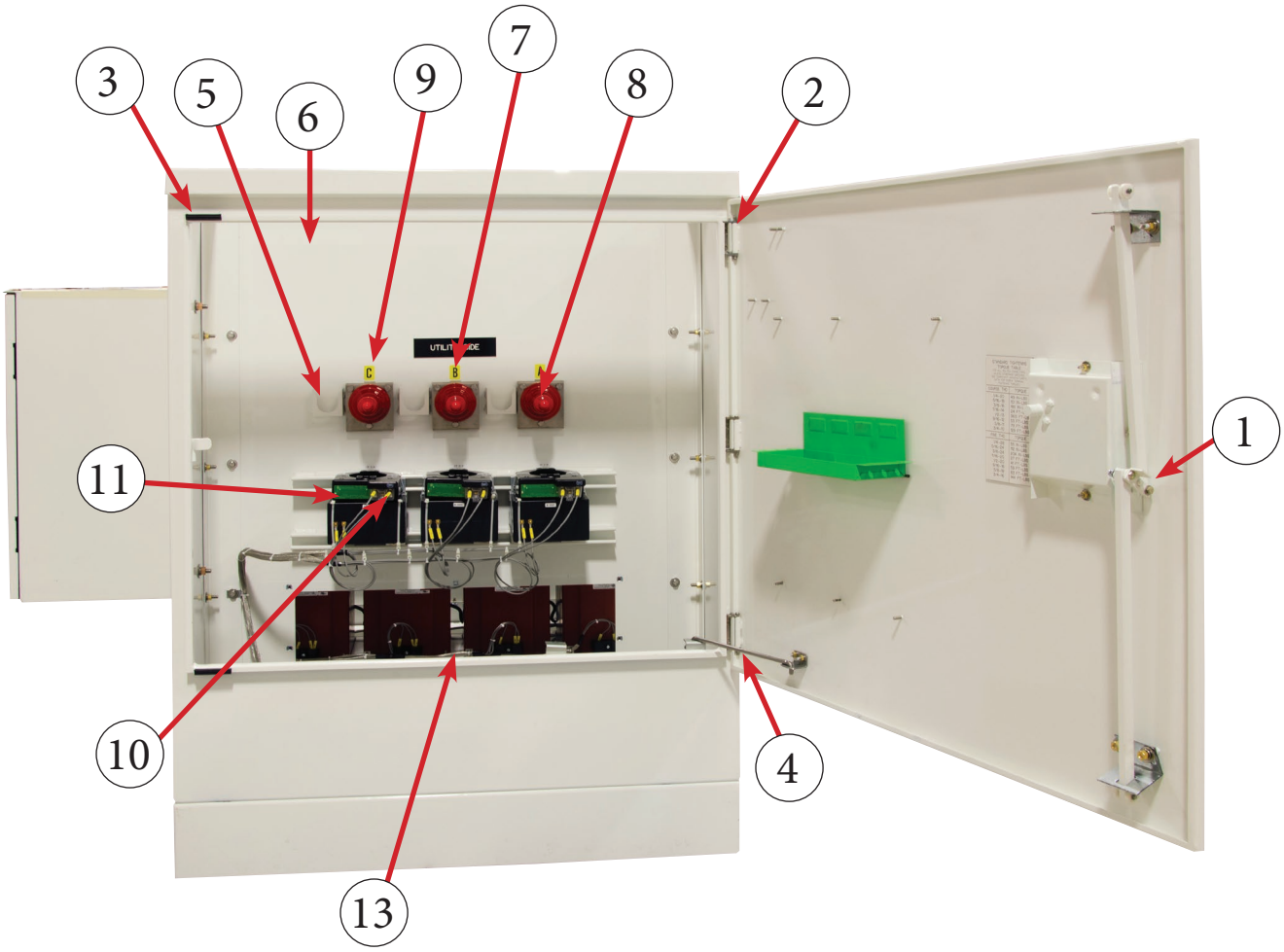


Typical One-Line Diagram



Enclosure Exterior of Federal Pacific Pad-Mounted GridConnex Solution.

1. II-Gauge Steel Doors
2. Hazard-Alerting Warning Signs on Exterior
3. One-Piece, Cross-Kinked II-Gauge Steel Roof
4. Insulating No-Drip Compound on Underside of Roof
5. Silk-Screened, Aluminum Stamped Nameplate
6. II-Gauge Steel Welded Enclosure
7. Control Compartment Sealed to Enclosure
8. Drip-Shield over Control Compartments
9. Galvanized-Steel Lifting Brackets
10. Closed-Cell Cushions Isolate Enclosure from Lifting Bracket
11. Stainless-Steel Handles on Control Compartment
12. Closed-Cell Gasket at Bottom Isolates Enclosure from Mounting Surface



Customer Connection / Current Transformer Compartment.

I. II-Gauge Steel Doors with 3 point Latching System
2. Three Stainless Steel Hinges and Hinge Pins Per Enclosure Door
3. Bumper Gasket Cushions Door Interface, Prevents Metal to Metal Contact
4. Stainless Steel Wind brace
5. Stainless Steel Parking Stand for each Bushing
6. Formed Steel Equipment Mounting Panels Isolate Medium Voltage Components from Termination Compartment.
7. 600 Amp Cycloaliphatic Epoxy Bushings with All-Copper Conductor on Stainless Steel Clamping Bracket (optional 200A Bushing Wells)
8. Removable Silver Plated All-Copper Stud on all Bushing with Red Protective Dust Covers.
9. Phase Identification Labels
I0. Relay Current Transformers (when present)
II. Revenue Grade Current Transformers (when present)
I3. Wide View Clear Polycarbonate Window for Volting Transformer Fuse Access. (when present)

Construction

Enclosure Construction

Standard Enclosure features include heavy, 11-gauge hot-rolled pickled-and-oiled steel, all-welded construction, cross-kinked roof to eliminate potential for standing water, stainless steel hinges and switch operating pockets, deadfront compartment access doors with 3-point auto-latch door mechanisms and padlockable door handles with penta-head security bolts. These standard features, along with a rugged tamper-resistant design, provide a unit that meets the stringent security requirements of IEEE C57.12.28.

Enclosure Finish

The electrostatically deposited, baked-on powder epoxy finish provides a tough, durable high glass finish with protective qualities to ensure long-term enclosure protection. The standard color is white. Consult the factory for custom colors.

Bushings and Bushing Wells

Insulators of cycloaliphatic epoxy (CAE) polymers have been used in the power industry for over fifty years and have proven field experience globally in both indoor and outdoor applications. These polymers are light-weight, homogeneous, and readily molded by automatic pressure gelation (APG) process in both simple and complex contours. The formulation is balanced for high voltage, high strength, non-tracking, self-scouring, non-weathering applications in extremes of high temperature and sub-zero cold.

Federal Pacific's bushings and bushing wells are of cycloaliphatic epoxy and meet all the criteria set forth in ANSI/IEEE 386, which establishes ratings and design interface to accommodate industry-standard insulated separable elbow connectors. All bushings and bushing wells feature high conductivity copper rod contacts and include removable silver-plated copper studs. In addition, bushings and bushing wells all carry an engraved serial number for quality audit if the need should ever arise and are traceable to the particular switchgear assembly.

Federal Pacific cycloaliphatic bushings and bushing wells have all copper conductors and silverplated removable studs. Semi-conductive coating isolate bushings and dust covers protect high-voltage interfaces

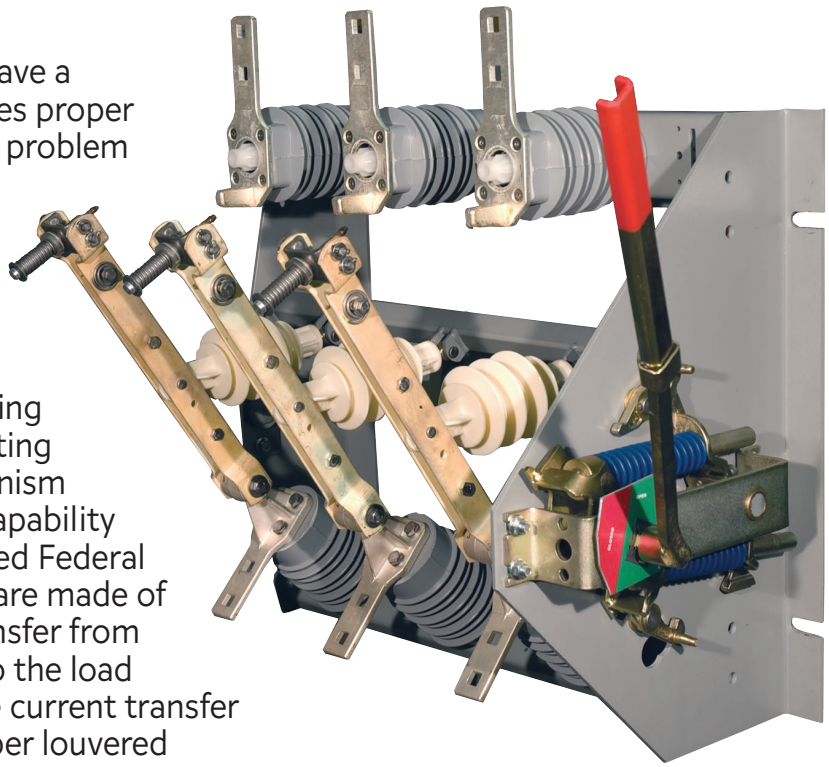
Circuit Protection Devices

The Tavrida Circuit Breaker Modules contain the most advanced design elements of any MV breaker on the market. All components are assembled along a single axis, with three mono-stable magnetic actuators (one per pole). The actuators are mounted in a steel frame and are mechanically linked by a synchronizing shaft. The actuators drive a pulling insulator that, in turn, connects to the advanced Tavrida vacuum interrupters at the top of the breaker. This simple design results in the highest reliability available today. Tavrida delivers a maintenance-free breaker with a life expectancy of up to 150,000 close-open operations. The CM_16 Control Module serves as the interface between the Circuit Breaker Module and the Schweitzer SEL-751 relay.

Meets or exceeds IEEE C34.04, C37.06, C37.09, C37.09a and IEC 62271-100
ETL Recognized

Vacuum Circuit Breaker Ratings						
Rated Voltage	**Rated Current**	**Short Circuit Current**	**BIL kV**	**Frequency (Hz)**	**Manufacturer**	**Breaker Type**
5-15kV	800A	20kA	95	60	Tavrida	LD
27kV	800A	16kA	125	60		LD
35kV	1200A	16kA	150	60		OSM

Auto-Jet Switch



All Federal Pacific Auto-Jet switches have a heavy-gauge steel frame, which assures proper contact alignment and eliminates any problem of switch-to-enclosure alignment. An optional stainless-steel switch is available (current-carrying parts are not stainless-steel). A quick-make, quick-break stored-energy mechanism with heavy-duty, long-life die springs provides high-speed opening and closing independent of the operating handle speed. This high-speed mechanism assures the duty-cycle fault-closing capability and load interruption with the patented Federal Pacific interrupter. The switch blades are made of high conductivity copper. Current transfer from the switch-blade through the hinge to the load terminals is accomplished by a unique current transfer means, consisting of a beryllium-copper louvered contact band encircling a copper pin at the hinge point. Magnetic forces, due to a higher-than-normal current flow, tend to rotate the louvers on the contact band toward a vertical position, providing a higher contact pressure for fault-current duty.

Switch Ratings						
kV		Amperes				60 Hz Withstand
Nom.	Max. Design	Continuous & Interrupting	Momentary RMS ASYM*	Fault-Closing RMS ASYM	BIL kV	
14.4	17	600	40,000	40,000	95	36
25	27	600	40,000	40,000	125	60
34.5	38	600	40,000	40,000	150	80

* The Auto-Jet switch has a three time fault close capability at 40kA and a single time fault close capability at 61kA.

Current and Voltage Sensing

Relay Class Current Transformers provide overcurrent sensing
Standard relay class of C50.
Manufactured to meet the requirements of IEEE C57.13
UL and CSA Recognized

Metering Class Extended range high accuracy current transformers for revenue grade metering.
IEEE 0.15 accuracy class from 1% of rated current though rating factor.
Manufactured to meet the requirements of IEEE C57.13

Revenue grade voltage transformers for voltage sensing and metering.
Accuracy class – 0.3% WXMY at 100% rated voltage
Manufactured to meet the requirements of IEEE C57.13
UL and CSA Recognized

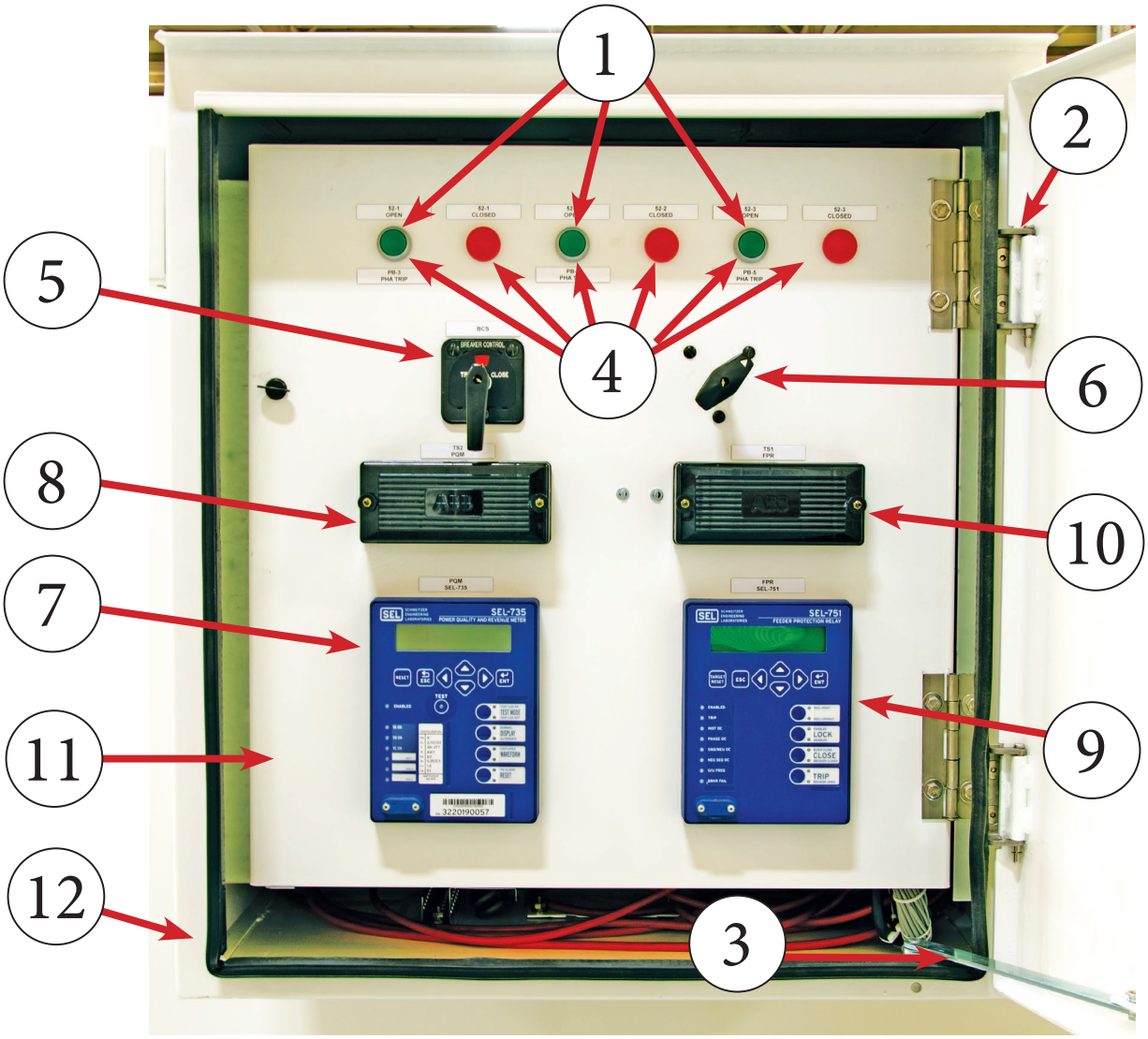
Uninterruptible Power Supply

The supplied UPS provides adequate battery backup for the SEL-751 relay, SEL-735 meter, and vacuum circuit breakers when control power has been lost regardless of cause. The UPS ensures that the equipment is always capable of performing its intended function whether or not the normal control-power source, the voltage transformers, is available. The UPS also includes a battery charger and associated alarm circuits (1) in the event AC input to the battery charger is diminished or lost and (b) output from the battery is diminished below acceptable levels or lost.

Optional Accessories

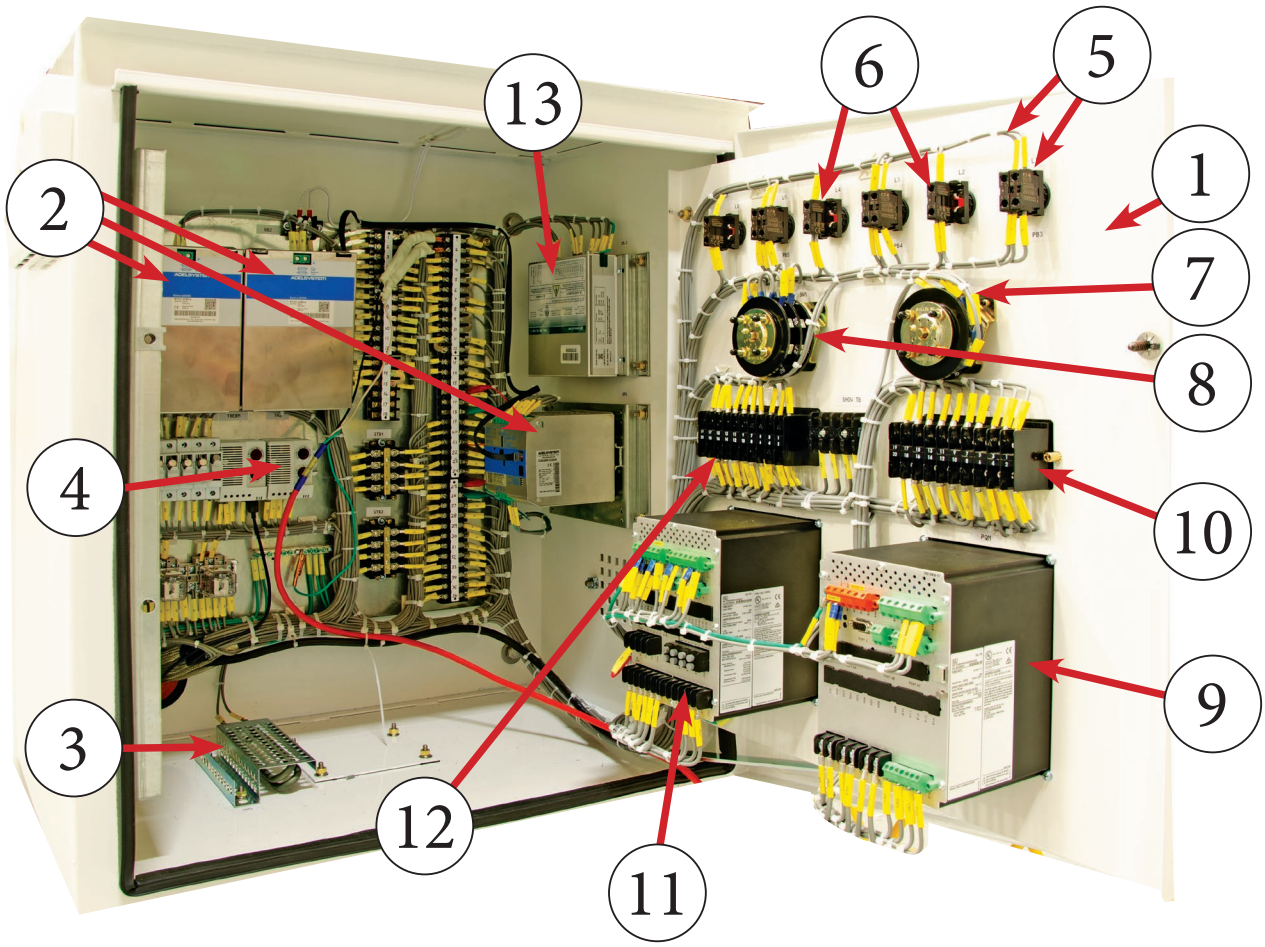
Lightning Arrestors – Distribution class surge arrestors are used to limit the voltage due to lightning strikes and/or switching transients. Arrestors can be located at the Utility connection point, DG connection point, or at both locations.

Low-Energy Analog Voltage Sensors (LEAs) – Sensor is used in conjunction with VTs and the SEL-751 relay to coordinate voltage sync between the Utility and Solar Farm / Battery Energy Storage Systems / Other DGs.



Low-Voltage Control Compartment (typical).

1. Individual Phase Trip Pushbuttons for Commissioning.
2. Stainless Steel Hinges and Hinge Pins
3. Stainless Steel Wind brace
4. Breaker Open / Close Indication LED's
5. Breaker Control Switch
6. Local / Remote Control Switch
7. SEL-751 Feeder Protection Relay (optional)
8. FT Style Test Switch (when present)
9. SEL-735 Power Quality and Revenue Meter (optional)
10. FT Style Test Switch (when present)
11. Swing-Out Control Panel
12. Fully Gasketed Door Opening on Low Voltage Control Compartment



Low-Voltage Control Compartment (Interior, typical)

1. Swing-Out Control Panel. (Door-in-Door Construction)
2. UPS for Continuous Control Power. (optional)
3. Heater for Compartment Interior
4. Humidistat / Thermostat
5. Individual Phase Trip Pushbuttons for Commissioning
6. Breaker Open / Close Indication LEDs
7. Breaker Control Switch
8. Local / Remote Control Switch
9. SEL-75I Feeder Protection Relay (optional)
10. FT Style Test Switch (when present)
11. SEL-735 Power Quality and Revenue Meter (optional)
12. FT Style Test Switch (optional)
13. Breaker Control Module

Relays and Metering

The Federal Pacific GridConnex equipment uses the Schweitzer SEL-751 relay for feeder protection. Comprehensive protection capabilities, including time overcurrent, directional overcurrent, auto-reclosing, over-/undervoltage, frequency, cable/line thermal, and more.

Standard offering includes:

Directional Power Detection

2x16 LCD with 4 Push Buttons

Ethernet and EIA-485 communications with optional Multi-Mode Fiber ST

Current Inputs (Optional Voltage Inputs)

LEA Vsync / Vbat (300Vdc / 4 Arc-Flash Detection Inputs (Optional)

Meets IEC 60255-26:203, IEC 60255-27:2013, UL 508, CSA C22.2 No. 14-05

UL Listed to U.S. and Canadian Safety Standards.

Revenue Grade metering is accomplished by incorporating Metering class CTs and VTs with the Schweitzer SEL-735 meter. The SEL-735 ensures high-accuracy measurements with a ±0.06 percent watt-hour (Wh) guarantee at unity power factor and a ±0.02 percent typical rating.

Standard offering includes:

Basic PQ and recording 128MB, 16 Channels of LDP, 1 kHz waveform, 270 VSSI summary events, and up to 15th-order harmonics

Form 9 (Four-Wire Wye, 3Ps 3 CTs Meter Form)

Ethernet and EIA 485 Communications

Current and voltage inputs optimized for low-end accuracy

Various supported communication protocols including Standard SEL ASCII, SEL LMD, SEL FastMeter, SEL Compressed ASCII, MV-90 Transition, Modbus RTU/TCP, Mirrored Bits Communications, Telnet, DNP3 Level 2 Outstation and LAN/WAN, and Syncrophasors.

Meets ANSI C12.1-2014, IEC 62052-11:2013.

UL Listed to U.S. and Canadian Safety Standards.

Electro-Mechanical Overview

Electro-Mechanical is an American-owned company founded in 1958. It is headquartered in Bristol, Virginia (USA) and for more than 60 years has manufactured a wide variety of products used in the generation, transmission, distribution and control of electricity. These products, along with various electrical equipment repair and maintenance services, are used by a diverse mix of Energy (coal, oil, and gas), Electric Utility and Industrial customers worldwide. Federal Pacific medium-voltage metering, collector, and gird connection gear for the renewable markets is offered under the GridConnex® trade name.

Electro-Mechanical has earned a "customer oriented" reputation by keeping its focus on providing the best value to its customers through quality products and services. With six manufacturing companies and two repair and service companies, Electro-Mechanical has over 650,000 square feet of modern manufacturing facilities, located in Virginia and Mexico.

Electro-Mechanical consists of:

Federal Pacific - Dry-type transformers from .050 KVA through 10,000 KVA single and three phase, up to 25 kV, 110 kV BIL with UL® approval through 15 kV; Vacuum pressure impregnation and vacuum pressure encapsulation. Medium voltage switchgear including air-insulated live-front, dead-front, SCADA-controlled, automatic transfer, primary metering and wall-mounted pad-mounted and metal-enclosed switchgear. The quality systems of Federal Pacific have been certified by DQS Inc. to the ISO 9001:2015 Standard.

Federal Pacific

Line Power Manufacturing - Custom engineered electrical distribution and control apparatus including low and medium voltage metal-enclosed switchgear, power control centers, motor controls, and substations. Electrical power distribution systems and components used in mining. The quality systems of Line Power have been certified by DQS Inc. to the ISO 9001:2015 Standard.

MAFESA - Electro-Mechanical's manufacturing facility in Mexico for stock low-voltage transformers.

Engineered Solutions - Innovative engineered solutions are offered by Federal Pacific and Line Power meeting specific customer application needs. Products include custom medium voltage switchgear serving data centers and renewable energy, switchgear value propositions, and portable substations.

Line Power Manufacturing

Line Power Parts & Rebuild - New parts, complete electrical equipment remanufacturing and onsite electrical equipment service. The parts service department provides replacement components manufactured by Electrical Group companies as well as commonly used OEM parts.

Mirus International, Inc. - Designs and develops world class power quality improvement products for mission critical operations. Our specialized product line includes highly efficient harmonic filters, transformers, autotransformers and Data Center power distribution equipment. Mirus' solutions minimize disruption to the power supply, improve reliability and adhere to the strictest of regulatory requirements while also saving energy and reducing operating costs.

Mirus International

Federal Pacific Switchgear Products

Live-Front Pad-Mounted Switchgear - 15 kV • 27 kV
    Manual, Automatic Transfer, Remote Supervisory Controlled Models
Live-Front/Dead-Front Pad-Mounted Switchgear - 15 kV • 27 kV
    Manual, Automatic Transfer, Remote Supervisory Controlled Models
Dead-Front Pad-Mounted Switchgear - 15 kV • 27 kV
    Manual, Automatic Transfer, Remote Supervisory Controlled Models
Pad-Mounted Capacitor Banks
Primary Metering Dead-Front Pad-Mounts - 15 kV • 27 kV • 38 kV
Fused Sectionalizer Dead-Front Pad-Mounts - 15 kV • 27 kV
Metal-Enclosed Switchgear - 5 to 38 kV
    Manual, Automatic Source Transfer, Remote-Supervisory Control, Shunt Trip
Wall-Mounted Equipment - 15 kV • 27 kV
    Wall-Mounted Switch Cabinets, Wall-Mounted Fuse Cabinets
Unit Substations - 5 to 38 kV
Vacuum Reclosers - 15 kV
Custom-Engineered Products - 5 to 121 kV
    Portable Substations - Trailer, Skid and Track Mounted
Components
    Micro-Processor and Stored-Energy Switch Operators, SCADA-Controlled Switch Operators

Federal Pacific Dry-Type Transformer Products

Industrial Control - 50 through 750 VA
Encapsulated 600 Volt Class
    Three-Phase 3 through 15 kVA • Buck-Boost 50 VA through 5 kVA • Single-Phase 50 VA through 25 kVA
Ventilated 600 Volt Class
    Single-Phase 15 through 167 kVA • Three-Phase 15 through 1000 kVA • K-Factor Rated
    Three-Phase 15 through 500 kVA • Motor Drive Isolation Three-Phase 7.5 through 750 kVA
High Voltage General Purpose
    Three-Phase 2.4 and 5 kV Class, 15 through 1500 kVA • Three-Phase 8.6 and 15 kV Class, 112.5 through 1500 kVA
Pad-Mounted
    Single- and Three-Phase 2.4, 5 and 15 kV Class, 112.5 through 2500 kVA
Unit Substation and High Voltage Power
    Three-Phase 2.4 through 25 kV Class, 112.5 through 10000 kVA High Voltage General Purpose
    Three-Phase 2.4 and 5 kV Class, 15 through 1500 kVA • Three-Phase 8.6 and 15 kV Class, 112.5 through 1500 kVA
Vacuum Pressure Impregnated (VPI) and Vacuum Pressure Encapsulation (VPE)
    600 Volt Class through 25 kV Class, 112.5 through 10000 kVA
Specialty Transformers
    600 Volt Class through 25 kV Class, 50 VA through 10000 kVA
ABS Certified Marine Duty Transformers for Marine, Petro-Chem and Offshore Applications

FP-GRIDCONNEXSOLUTIONS-04/2022

1075 Old Airport Road • Bristol, VA 24201
276-669-4084 • www.federalpacific.com

Q.PEAK DUO XL-G11S SERIES

590 - 605 Wp | 156 Cells
21.7 % Maximum Module Efficiency

MODEL Q.PEAK DUO XL-G11S.3 / BFG

Bifacial energy yield gain of up to 21%

Bifacial Q.ANTUM solar cells make efficient use of light shining on the module rear-side for radically improved LCOE.

Low electricity generation costs

Q.ANTUM DUO technology with optimized module layout to boost module power and improve LCOE.

A reliable investment

Double glass module design enables extended lifetime with 12-year product warranty and improved 30-year performance warranty[1].

Enduring high performance

Long-term yield security with Anti LID and Anti PID Technology[2], Hot-Spot Protect.

Frame for versatile mounting options

High-tech aluminum alloy frame protects from damage, enables use of a wide range of mounting structures and is certified regarding IEC for high snow (5400 Pa) and wind loads (3750 Pa)[3].

Innovative all-weather technology

Optimal yields, whatever the weather with excellent low-light and temperature behavior.

[1] See data sheet on rear for further information.
[2] APT test conditions according to IEC / TS 62804-1:2015 method B (–1500 V, 168 h) including post treatment according to IEC 61215-1-1 Ed. 2.0 (CD)
[3] See Installation Manual for instructions

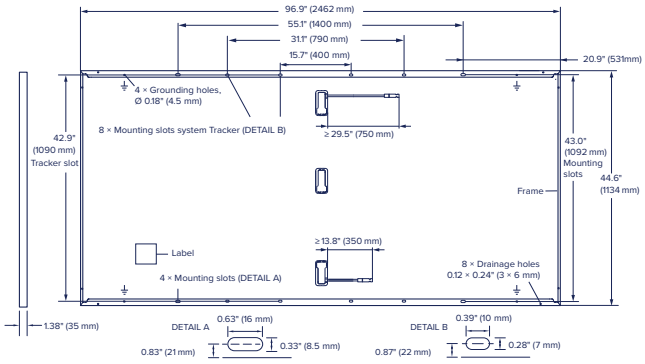
The ideal solution for:

Ground-mounted solar power plants

Q.PEAK DUO XL-G11S SERIES

Mechanical Specification

Format	96.9 in × 44.6 in × 1.38 in (including frame) (2462 mm × 1134 mm × 35 mm)
Weight	76.9 lbs (34.9kg)
Front Cover	0.08 in (2.0 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	0.08 in (2.0 mm) semi-tempered glass
Frame	Anodised aluminium
Cell	6 × 26 monocrystalline Q.ANTUM solar half cells
Junction box	2.09-3.98 × 1.26-2.36 × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥29.5 in (750 mm), (−) ≥13.8 in (350 mm)
Connector	Stäubli MC4; Stäubli MC4-Evo2; - IP68



Electrical Characteristics

POWER CLASS | **590** | **595** | **600** | **605**

MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / −0 W)

					BSTC*		BSTC*		BSTC*		BSTC*
Minimum	Power at MPP[1]	P_{MPP}	[W]	590	645.4	595	650.8	600	656.3	605	661.8
	Short Circuit Current[1]	I_{SC}	[A]	13.74	15.04	13.77	15.07	13.80	15.10	13.90	15.21
	Open Circuit Voltage[1]	V_{OC}	[V]	53.60	53.79	53.63	53.82	53.66	53.85	53.69	53.88
	Current at MPP	I_{MPP}	[A]	13.12	14.36	13.17	14.41	13.25	14.50	13.33	14.58
	Voltage at MPP	V_{MPP}	[V]	44.96	44.95	45.18	45.17	45.30	45.27	45.40	45.39
	Efficiency[1]	η	[%]	≥21.1		≥21.3		≥21.5		≥21.7	

Bifaciality of P_{MPP} and I_{SC} 70 % ±5 % • Bifaciality given for rear side irradiation on top of STC (front side) • According to IEC 60904-1-2

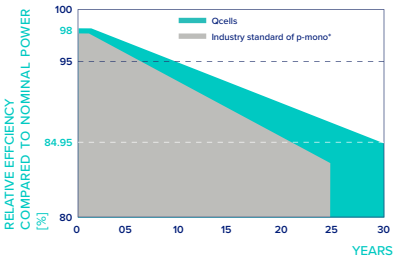
[1]Measurement tolerances P_{MPP} ±3 %; I_{SC}, V_{OC} ±5 % at STC: 1000 W/m²; *at BSTC: 1000 W/m² + φ × 135 W/m², φ = 70 %, 25±2 °C, AM 1.5 according to IEC 60904-3

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]w

Minimum	Power at MPP	P_{MPP}	[W]	444.2	448.0	451.8	455.5
	Short Circuit Current	I_{SC}	[A]	11.07	11.09	11.11	11.20
	Open Circuit Voltage	V_{OC}	[V]	50.69	50.72	50.75	50.78
	Current at MPP	I_{MPP}	[A]	10.34	10.38	10.45	10.51
	Voltage at MPP	V_{MPP}	[V]	42.97	43.15	43.24	43.33

[1]Measurement tolerances P_{MPP} ±3 %; I_{SC}; V_{OC} ±5 % at STC: 1000 W/m², 25±2 °C, AM 1.5 according to IEC 60904-3 • [2]800 W/m², NMOT, spectrum AM 1.5

Qcells PERFORMANCE WARRANTY

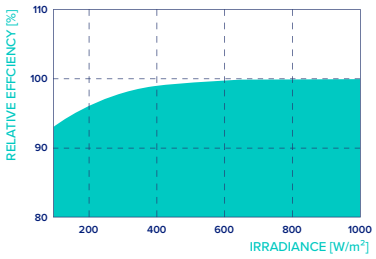


At least 98 % of nominal power during first year. Thereafter max. 0.45 % degradation per year. At least 93.95 % of nominal power up to 10 years. At least 84.95 % of nominal power up to 30 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Qcells sales organisation of your respective country.

*Standard terms of guarantee for the 5 PV companies with the highest production capacity in 2021 (February 2021)

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	−0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	−0.34	Nominal Module Operating Temperature	NMOT	[°F]	108±5.4 (42±3 °C)

Properties for System Design

Maximum System Voltage	V_{SYS}	[V]	1500	PV module classification	Class II
Maximum Series Fuse Rating		[A DC]	25	Fire Rating based on ANSI / UL 61730	TYPE 29[4]
Max. Push Load[3], Test / Design		[lbs / ft²]	113 (5400 Pa) / 75 (3600 Pa)	Permitted Module Temperature on Continuous Duty	−40 °F up to +185 °F (−40 °C up to +85 °C)
Max. Pull Load[3], Test/Design		[lbs / ft²]	78 (3750 Pa) / 52 (2500 Pa)		

[3] See Installation Manual for instructions

[4] New Type is similar to Type 3 but with metallic frame

Qualifications and Certificates

UL61730-1 & UL61730-2, CE-compliant,
IEC 61215:2016,
IEC 61730:2016,
U.S. Patent No. 9,893,215
(solar cells)

www.tuv.com
ID 1111220277

Find product recycling details at QR code above

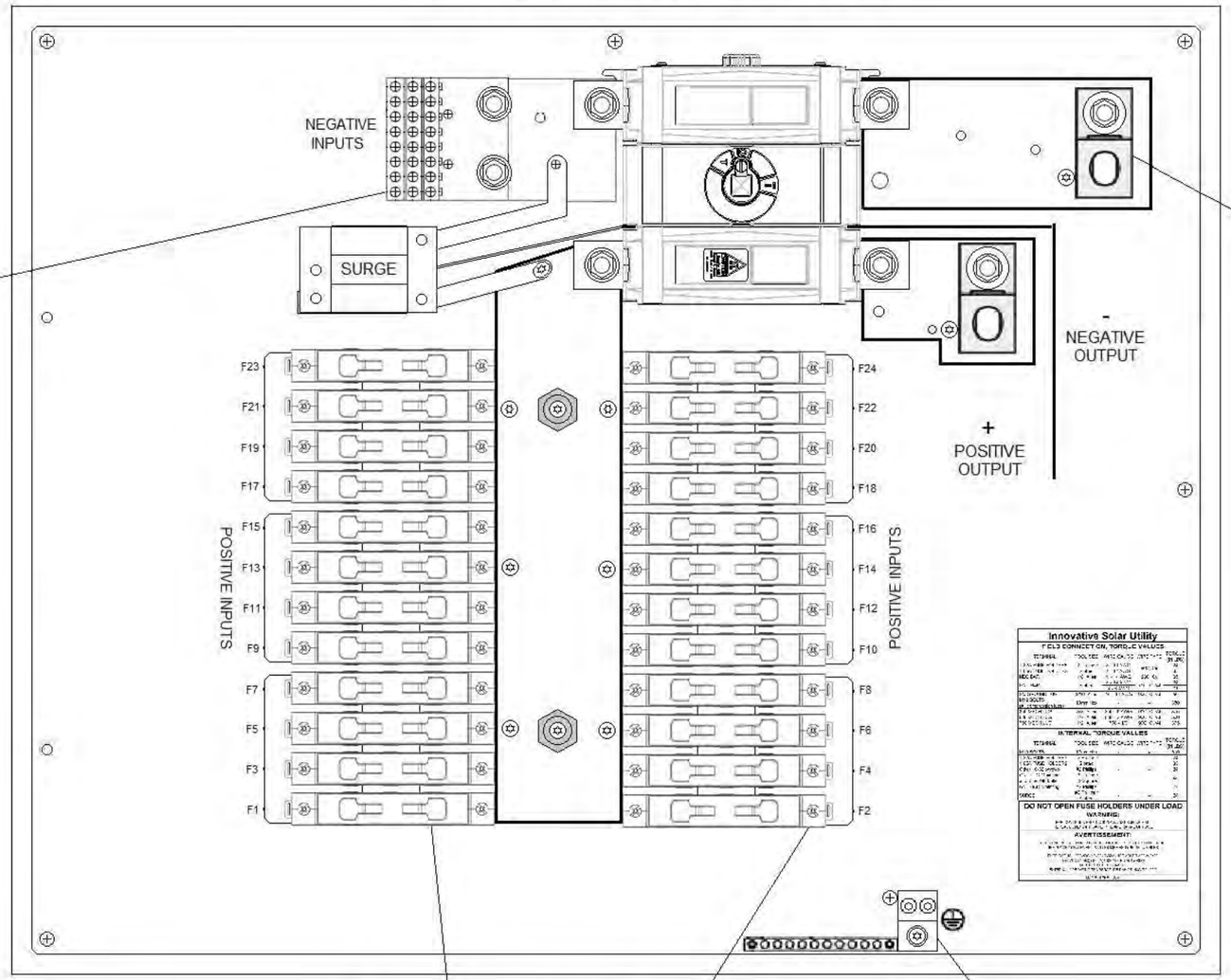
* Contact your Qcells Sales Representative for details regarding the module's eligibility to be Buy American Act (BAA) compliant.

Qcells pursues minimizing paper output in consideration of the global environment.

Note: Installation instructions must be followed. Contact our technical service for further information on approved installation of this product.
Hanwha Q CELLS America Inc. 300 Spectrum Center Drive, Suite 500, Irvine, CA 92618, USA | TEL +1 888 249 7750 | EMAIL na.support@qcells.com | WEB www.qcells.com/us

REVISIONS					
ECO No	ZONE	LTR	DESCRIPTION	DATE	APPROVED
		A	INITIAL DRAWING	10-22-22	

24 X 30, 24 INPUTS, UP TO 32A



CB15-400U-24x__N-F1-S

FEATURES:
Color: White
Enclosure Type: Fiber Glass, 24 x 30
Disconnect: 1500V, 400A Rated 2-Pole Load-Break Disconnect. 100% rated to 55°C. Visible break.
32A finger safe fuse holders (10 x 85).
No fuses are provided.
1500V Surge arrestor.
Combiners shall have continuous hinge, and pad lockable provisions
Compliance:
CSA C22.2 No. 290-15
Listed to UL1741
NEMA Rated 4X
NEC 2017 / 2020

NOTES: UNLESS OTHERWISE SPECIFIED.

1. PACKAGE SHIELD AND FUSES SEPARATELY, IF REQUESTED TO DO SO BY PURCHASE ORDER.

QTY	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL	REF #	ITEM NO
X	–	–	–	–	1

INTERPRETATION PER ANSI Y14.5 WORKMANSHIP STD 74-032009-06

SURFACE FINISH: SEE NOTE 4

HEAT TREAT: SEE NOTE 3

THIRD ANGLE PROJECTION

UNLESS OTHERWISE NOTED: X = –, XX = ±.01, XXX = ±.005, ANGLES = ±1°

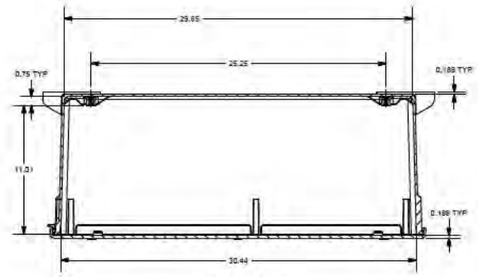
APPROVALS		DATE
DRAWN	D. HAYES	1-11-22
CHK'D	J. PEPLINSKI	1-11-22
ENGR	J. PEPLINSKI	1-11-22
MGR		

DO NOT SCALE DRAWING

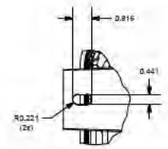
ISI Innovative Solar, Inc. Designed Strongboxing

TITLE: SHOP DRAWING, 24 STRING (stock)

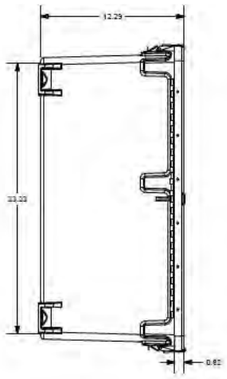
SIZE: D | DWG NO: 1342-00 | REV: A | SCALE: 1/1 | SHEET 1 OF 3

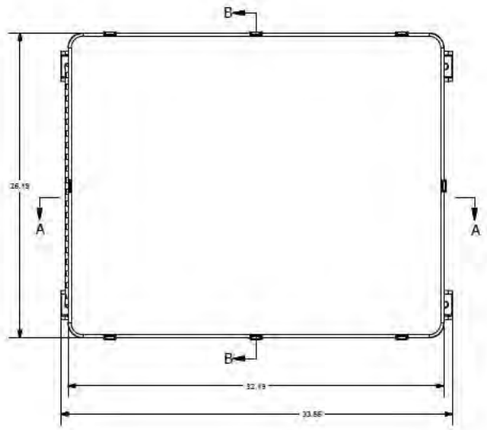


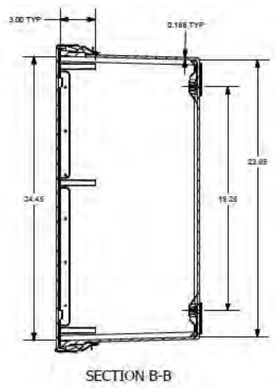
SECTION A-A



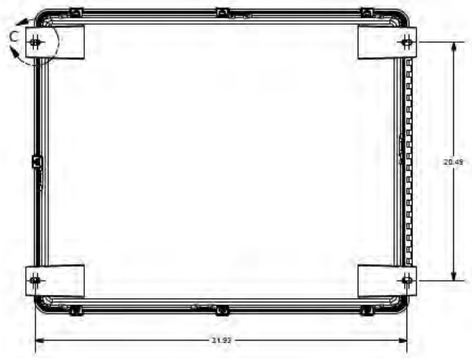
DETAIL C
(4x)

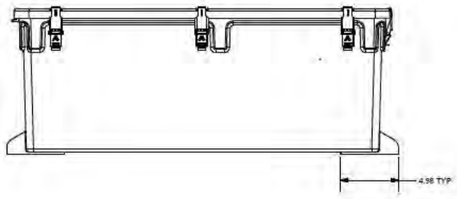






SECTION B-B





QTY -00	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL	REF ID	ITEM NO.
X	–	–	–	–	1

INTERPRETATION PER ANSI Y14.5 M-1994/ASME Y14.5-1994/R1998

SURFACE FINISH

FINISH: SEE NOTE 4

MATERIAL: SEE NOTE 3

THIRD ANGLE PROJECTION

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED

X = –

XX ± .01

XXX ± .005

ANGLES ± 1°

APPROVALS		DATE
DRAWN	D. HAYES	1-11-22
CHK	J. PEPLINSKI	1-11-22
ENGR	J. PEPLINSKI	1-11-22
MFGR		

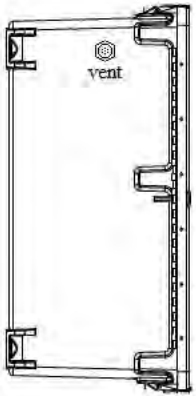
DO NOT SCALE DRAWING

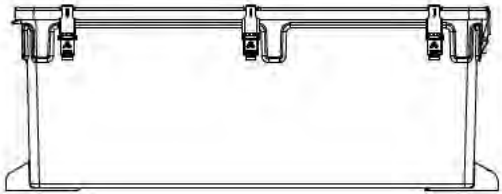
ISI Innovative Solar, Inc.
Design and Innovation

TITLE: SHOP DRAWING, 24 STRING (stock)

SIZE: D | DWG NO: 1342-00 | REV: A

SCALE: 1/1 | SHEET 2 OF 3





SHOP DRAWING,
24 STRING (stock)

1342-00

A

DO NOT SCALE DRAWING

REVISIONS					
ECO No	ZONE	LTR	DESCRIPTION	DATE	APPROVED
		A	INITIAL RELEASE.	10-22-22	

SAMPLE

Innovative Solar Utility

www.InnovativeSolarInc.com

C US 274986

UL 1741 CSA C22.2 No. 290-15

SOLAR COMBINER BOX

MODEL#: CB15-400U-14x30N-F-S
SERIAL#:

RATINGS	
Range of Operating Voltage	0-1500VDC
Max Number of Input Circuits	24
Max Output Current	400 A
Max ISC Per Input	24 A
Max Input Fuse Rating	30A

Operating Ambient Temperature: -40 C to +50 C
Storage Temperature Range: -40 to +80C
Type of Enclosure: Type 4X

Made in U.S.A.

For more details about product specifications, refer to the User Manual

INPUT -00

Innovative Solar Utility

www.InnovativeSolarInc.com

CSA

C US 274986

UL 1741 CSA C22.2 No. 290-15

SOLAR COMBINER BOX

MODEL#: CB15-400U-24x__N-F1-S
SERIAL#: xxxxxxxxxx

RATINGS	
Range of Operating Voltage	0-1500VDC
Max Number of Input Circuits	24
Max Output Current	400 A
Max ISC Per Input	20.5
Max Input Fuse Rating	32 A

Operating Ambient Temperature: -40 C to +50 C
Storage Temperature Range: -40 C to +80 C
Type of Enclosure: Type 4X

Made in U.S.A.

For more details about product specifications, refer to the User Manual

NOTES: UNLESS OTHERWISE SPECIFIED.

1. APPLICABLE STANDARD / SPECIFICATIONS
   ANSI Y14.5M-1994. DIMENSIONING AND TOLERANCING
   ANSI Y1.1 1989 ABBREVIATIONS.
2. CREATE A LABEL WITH THE BRADY PRINTER (BBP33) THAT LOOKS LIKE THE SAMPLE ON THE LEFT. USE THE INPUT ON THE RIGHT TO MODIFY THOSE FIELDS SHOWN IN RED.
3. MATERIAL: LABEL STOCK B33-55-483 (Phoenix Contact Label / Part # 0830731)
   RIBBON B30-R6000

QTY -00	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL	REF ID	ITEM NO
X	–	–	–	–	1

INTERPRETATION PER ANSI Y14.5 WORKMANSHIP STD 74-0124000-00
SURFACE FINISH
FINISH: SEE NOTE 4
MATERIAL: SEE NOTE 3
THIRD ANGLE PROJECTION

DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED
X = –
XX ± .01
XXX ± .005
ANGLES ± 1°

APPROVALS		DATE
DRAWN	D. HAYES	4-6-18
CHK	J. PEPLINSKI	4-6-18
ENGR	J. PEPLINSKI	4-6-18
ENGR		

DO NOT SCALE DRAWING

ISI Innovative Solar, Inc. Designed Manufactured

TITLE: LABEL, NAMEPLATE, 24 STRING (STOCK)

D | DWG NO 1343-00 | REV A | SCALE 1/1 | SHEET 1 OF 1

Utility 1500 volt

Disconnect Combiner Box

- Innovative design reduces heat resulting in longer life and avoids blown fuses and nuisance tripping
- Visible blade switch (2- Pole)
- Fuses up to 65A included in listing
- Up to 32 inputs circuits
- Mounts at any angle
- Reduced O & M costs with optional IR window
- 90°c terminals with NEMA bolt pattern
- Disconnect only versions also available

DC Combiner

Utility 1500 Volt Disconnect Combiner

The new generation in utility devices are based on the successful platform which delivers maximum reliability with little to no maintenance. Working hand in hand with all popular central and string inverters, making them user friendly and safe. Installation flexibility is achieved with the ability to mount horizontally or vertically. The ISU combiner is designed for use in all markets. Even the most demanding requirements are met by our premium component selection, making ISU the solution for your code requirements.

Designed & Manufactured by:
INNOVATIVE SOLAR UTILITY

INNOVATIVE SOLAR UTILITY

Utility 1500 volt Disconnect Combiner Box		
Size Enclosure	Standard	Over-Size
Operating Voltage Range	0 – 1500 VDC	
Max Output Current	400 A	
Number of fused inputs	6 to 24	6 to 32
Fuse Size Range (A)	3 – 32, 40, 50A, 60, 65A (1 leg only, per NEC 2017)	
Non-fused leg	Switched (per NEC 2017)	
Input Conductor Size	10 – 8 AWG Copper only (up to 1/0 for 40 – 50A)	
No. of output conductors	1 or 2 (per polarity)	
Output Connection	Dual M12 (1/2") studs, 1.75" Spacing (Optional Mechanical Lugs)	
Max Output Conductor Size	1000 MCM (Dual 600 MCM)	
Ground Connections	(2) 2/0 + (10) 14 – 4 AWG	
Surge	Optional	
Enclosure Fiberglass (Standard)	NEMA 4X	
Dimensions H x W x D (inches)	24 x 30 x 10	Not Available
Net weight (approx.)	75 lb.	Not Available
Enclosure – Powder Coated CRS (Optional)	NEMA 3R/4	
Dimensions H x W x D (inches)	24 x 30 x 10	30 x 30 x 10
Net weight (approx.)	80 lb.	100 lb.
Environmental		
Operating temperature	-40°c to 50°c (-40°F to 122°F)	
Storage temperature	-40°c to 85°c (-40°F to 185°F)	
Certifications	UL1741, UL1669B, CSA 22.2 No. 290-15	
Standard Limited Warranty	2 Years	
Standard Features		

White exterior finish; Breather vent; Padlockable door; Door interlocked with switch; Integral mounting ears on fiberglass

Optional: UL listed combiner cables (whips) at 8AWG or 10AWG

INOSYS LBS UL 98B

Load Break Switches for DC & PV applications
from 100 to 600 A, up to 1500 VDC

inosy_158.psd

INOSYS LBS
2-poles

The solution for

- Combiner box
- Recombiner box
- Rapid shutdown systems
- Solar Inverter
- Energy Storage Inverter
- Battery Energy Storage Systems
- DC Drives

Strong points

- High-performance switching in a compact frame
- Safe & reliable operation
- Easy to install
- Modular solution
- Visible contact indication

Conformity to standards

- UL 98B
  Guide WHVA
  File E346418
- IEC 60947-3
  DC-21B & DC-PV2

Compatible with requirements:

- IEC 60364-7-712

Function

INOSYS LBS are load break switches available in manual operation. They can be operated using the handle to disconnect all or part of the electrical installation.

They make and break under all load conditions, provide safety isolation for any low voltage circuits up to 1500 VDC and are suitable for emergency switching. They are available for DC-PV2 utilization category.

Advantages

High-performance switching in a compact frame

INOSYS LBS switches integrate a patented technology that offers high switching capacity. The 500 and 750 VDC per pole provides 1500 VDC in 2 poles only with optimum arc containment and significant power loss reduction - all within a compact device.

Safe & reliable operation

- Reliable position indication through visible contacts.
- The opening and closing of the switch is fully independent from the speed of operation, ensuring safe operation under all conditions.
- High temperature withstand: no derating up to 131° F (55 °C), functional from -40 to +122 °F (-40 to +50 °C).

Designed for harsh environments

- Vibration testing (from 13.2 to 100 Hz at 0.7 g).
- Shock testing (15 g during three cycles).
- Humid temperature testing (2 cycles, 131 °F/55 °C with 95% humidity level).
- Salt mist testing (3 cycles with humidity storage, 104 °F/40 °C, 93% humidity after each cycle).

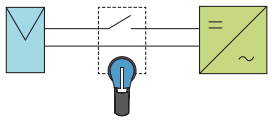
Easy to install

- Wiring: as the switch is non-polarized all types of wiring and connections are possible.
- Easy access without tools to integrate auxiliary contacts (located within the switch footprint).
- Mechanism can be centered or left aligned (in the factory) to accommodate installation requirements.

Modular solution for a flexible configuration

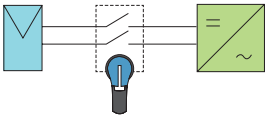
- Single or dual polarity switching
  The same switch can be used for installation with either grounded or floating networks by choosing the wiring configuration.

sirco-mc_084_a



Single polarity switching

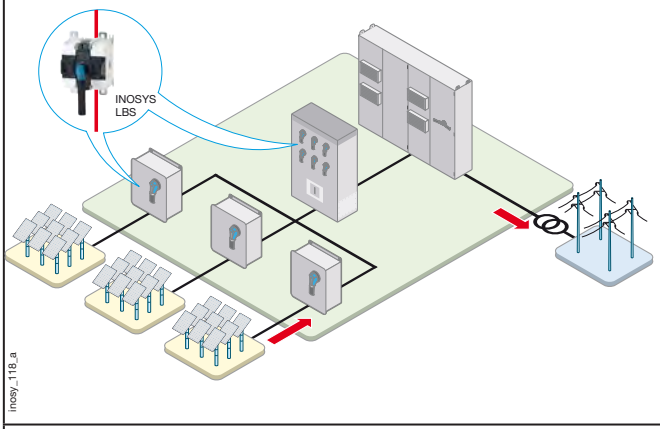
sirco-mc_026_a



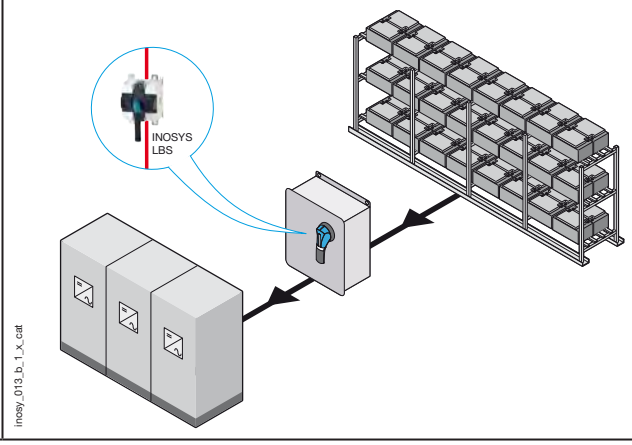
Dual polarity switching

Typical applications: local and remote safe disconnection for DC and PV applications

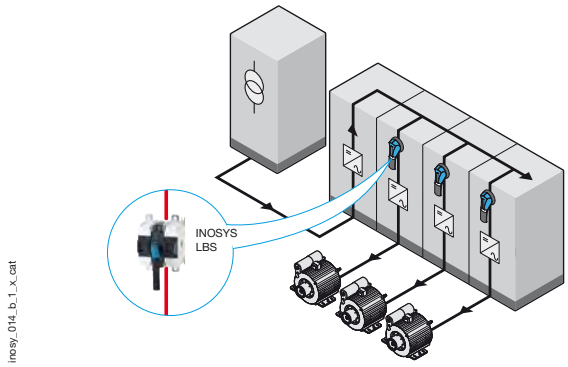
PV installation: Combiner box, Recombiner box or Inverter



Battery protection



Isolation of DC processes



The SOCOMEC solutions

SIRCO PV

Manual operation PV switches

up to 2000 A at 1000 VDC
up to 400 A at 1500 VDC
up to 4 circuits

INOSYS LBS

Up to 1500 VDC with visible contact indication

up to 500 A at 1000 VDC
up to 600 A at 1500 VDC

Overview

inosy_058_a_1_x_cat.psd

1. INOSYS LBS 400 A - 1500 VDC
2. Door interlocked external operation handle
3. Shaft for external handle
4. Auxiliary contact
5. Inter-phase barrier
   (shipped with the switches)
6. Terminal screens
7. Bridging bars for connecting poles in series
8. Captive nut
9. Holding insert
10. Terminal lugs

References

INOSYS LBS

1000 VDC - 1 circuit

Rating (A)	Frame size	No. of poles per circuit	Switch body (1)	External operation	Aux. Contact	Bridging Bar (2)
100 A	F2	2 P	87P0 **2010**	Shaft 12.6 inches 320 mm 1400 **1032**	NO/NC 8499 **0001**	8409 **0016**
250 A	F2	2 P	87P0 **2025**	S2 type handle Black 3R,12 - 4,4X 742D **2111**		
400 A	F3	2 P	87P0 **2040**	Shaft 12.6 inches 320 mm 1400 **1032**		8409 **0040**
500 A	F3	2 P	87P0 **2050**	S2L type handle Black 3R,12 - 4,4X 14AD **2111**		8409 **0041**

(1) The switches are supplied without accessories.
(2) For grounded network, single polarity switching.

1500 VDC - 1 circuit

Rating (A)	Frame size	No. of poles per circuit	Switch body (1)	External operation	Aux. Contact	Bridging Bar (2)
100 A	F2	2 P (1 P+, 1 P-)	87P0 **2011**	Shaft 12.6 inches 320 mm 1400 **1032**	NO/NC 8499 **0001**	8409 **0016**
			87P1 **1011**(3)			8409 **0024**
200 A	F2	2 P (1 P+, 1 P-)	87P0 **2021**			8409 **0016**
			87P1 **1021**(3)			8409 **0024**
250 A	F2	2 P (1 P+, 1 P-)	87P0 **2026**	S2 type handle Black 3R, 12 - 4, 4X 742D **2111**		8409 **0016**
			87P1 **1026**(3)			8409 **0024**
		3 P (2 P+, 1 P-)	87P0 **3025**			2x 8409 **0025**
400 A	F3	2 P (1 P+, 1 P-)	87P0 **2041**	Shaft 12.6 inches 320 mm 1400 **1032**		8409 **0040**
			87P1 **1041**(3)			8409 **0039**
500 A	F3	2 P (1 P+, 1 P-)	87P0 **2051**			8409 **0039**
			87P1 **1051**(3)	S2L type handle Black 3R, 12 - 4, 4X 14AD **2111**		8409 **0041**
600 A	F3	2 P (1 P+, 1 P-)	87P0 **2061**			8409 **0063**
			87P1 **1061**(3)			

1500 VDC - 2 circuits

Rating (A)	Frame size	No. of poles per circuit	Switch body (1)	External operation	Aux. Contact	Bridging Bar (2)
400 A	F3	2 P (1P+, 1P-)	87P2 **2041**(3)	Shaft 12.6 inches 320 mm 1400 **1032** S2L type handle Black 3R, 12 - 4, 4X 14AD **2111**	NO/NC 8499 **0001**	8409 **0041** 8409 **0063**(4)
500 A			87P2 **2051**(3)			8409 **0063**
600 A			87P2 **2061**(3)			

(1) The switches are supplied without accessories.
(2) For isolated networks.
(3) Centered mechanism.
(4) In side mounting.

Accessories

Door interlocked external operation handle

Use

Door interlocked external operation handles include an escutcheon and are padlockable. External handles must be utilized with an extension shaft.

Example

As the handle is interlocked in the “ON” position the operator must safely disconnect and isolate the circuit prior to accessing the panel for maintenance procedures.

Opening the door when the switch is in the “ON” position can only be done by defeating the interlocking function with the use of a dedicated tool (authorized personnel only). The interlocking function is restored when the door is re-closed.

S2 type handle

Frame size	Handle type	Handle colour	Degree of protection	Front operation	Lateral operation
				Reference	Reference
F2	S2	Black	3R,12	742F **2111**	
F2	S2	Black	4,4X	742D **2111**	142J **6111**
F2	S2	Red	4,4X	742E **2111**	
F3	S2L(1)	Black	3R,12	14AF **2111**	
F3	S2L(1)	Black	4,4X	14AD **2111**	14AJ **2111**
F3	S2L(1)	Red	4,4X	14AE **2111**	

(1) S2L handles have an extended grip; please refer to the dimensions section.

Direct operation handle available, consult us.

Shaft for external handle

Frame size	Handle type	Length (in/mm)	Reference
F2 - F3	S2, S2L	7.87/200	1400 **1020**
F2 - F3	S2, S2L	12.6/320	1400 **1032**
F2 - F3	S2, S2L	15.75/400	1400 **1040**

Other lengths: please consult us.

Shaft for S2 and S2L type handle

Auxiliary contact

Use

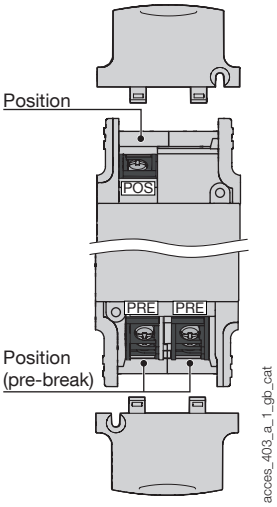
The function of the auxiliary contact depends on where it is mounted on the mechanism.

Characteristics

Changeover type: NO/NC,
IP2X with front operation (cover tap screwed).
10,000 operations.
Maximum 3 per switch.

acces_402_a_1_cat

Frame size	Connection type	Type	Reference
F2 - F3	Screw	NO/NC standard	8499 **0001**
F2 - F3	Screw	NO/NC low level	8499 **0002**
F2 - F3	Screw	NC > 600 V	8499 **0003**



acces_403_a_1_gb_cat

Characteristics

Auxiliary contact type	Min. current (A)	I_{th} (A)	Electrical characteristics per UL 60947-5-1
Standard	12.5 mA / 24 V	10	A300 - R300 - Q150
Low level	1 mA / 4 V	10	A300 - R300 - Q150
> 600 V	10 mA / 24 V	10	A600

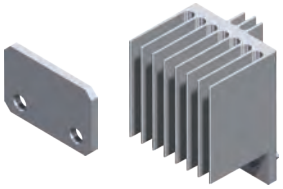
Accessories (continued)

Bridging bar for poles in series

Use

The bridging bars enable the poles to be connected in series, allowing the following configurations for 1500 VDC.

Connection diagrams,
see “Pole series connection” pages.



acce_411_a_1_cat

acce_410_a_1_cat

1000 VDC - 1 circuit

Frame size	Rating (A)	No. of poles	Quantity to be ordered	Reference
F2	100	2 P	1	8409 **0016**
F2	250	2 P	1	8409 **0016**
F3	400	2 P	1	8409 **0040**
F3	500	2 P	1	8409 **0041**
F3	600	2 P	1	8409 **0063**

1500 VDC - 1 circuit

Frame Size	Rating (A)	No. of poles	Quantity to be ordered	Reference
F2	100	3 P	2	8409 **0016**
F2	100 … 250	2 P	1	8409 **0024** (1)
F2	250	3 P	2	8409 **0025**
F3	400 … 600	2 P	1	8409 **0039** (1)
F3	400	2 P	1	8409 **0040**
F3	500 ... 600	2 P	1	8409 **0041** 8409 **0063**

1500 VDC - 2 circuits

Frame Size	Rating (A)	No. of poles	Quantity to be ordered	Reference
F3	400	2 P	2	8409 **0041** 8409 **0063**
F3	500 ... 600	2 P	2	8409 **0063**

(1) Centered mechanism.

Terminal screen

Use

Provides top and bottom protection against direct contact with terminals or connection parts.

Advantages

Small holes in the screen to allow for thermographic inspection. Mounting requires holding inserts (supplied with the terminal screens).

acces_408_a_1_cat

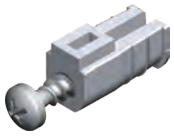
Frame size	No. of poles	Position	Reference(1)(2)
F2	2 P	Top and bottom	8499 **3222**
F2	3 P	Top and bottom	8499 **3232**
F3	2 P	Top and bottom	8499 **3722**

(1) Each reference comprises 2 terminal screens for top and bottom protection.
(2) When used with interphase barriers, please consult us.

Holding insert

Use

Used to secure terminal shrouds / inter-phase barriers on the switch.



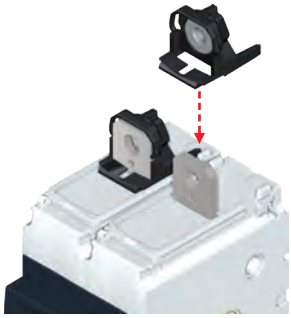
acces_409_a_1_cat

Frame size	Pack (unit)	Reference
F2 - F3	10	8499 **6220**
F2 - F3	100	8499 **6221**

Captive nut

Use

This accessory enables simple one-handed connection to the power terminals. It can be mounted on either side of the terminal for front or rear connection.



acce_399_a_1_cat

Frame size	Pack (unit)	Reference
F2	12	8499 **6120**
F2	120	8499 **6121**
F3	12	8499 **6130**
F3	120	8499 **6131**

Voltage tap

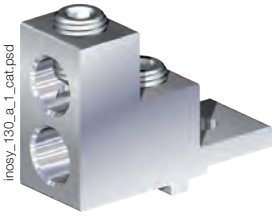
Use

Allows connection of voltage sensing or power cables, with fast-on connection.

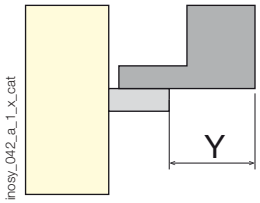
acce_412_a_1_cat

Frame size	Pack (unit)	Reference
F2	12	8499 **9012**
F3	12	8499 **9013**

Terminal lugs



inosy_130_a_1_cat.psd



inosy_042_a_1_x_cat

Frame size	Number and size (min. - max.) of cables	Type of cable	Openings per lug	Quantity per reference	Dimension "Y" (mm/in)	Type	Reference (1)
F2	2 conductors (#12 - 2/0)	Cu / Al	2	2	32,5 / 1.29	IHI 2S2-0-TP-STK-34-49-HEX	3954 **2023** (1)
F2		Cu / Al		3			3954 **3023** (1)
F2		Cu / Al		4			3954 **4023** (1)
F3	2 conductors (#2 - 600 KCMIL)	Cu / Al	2	2	69,7 / 2.74	CMC PV2-600	3954 **2060** (1)
F3		Cu / Al		3			3954 **3060** (1)
F3		Cu / Al		4			3954 **4060** (1)

(1) Captive nut 84996xxx is mandatory.

Characteristics

Characteristics according to UL 98B

Rated current In	**100 A**	**200 A**	**250 A**	**400 A**	**500 A**	**600 A**
Frame size	**F2**	**F2**	**F2**	**F3**	**F3**	**F3**
Number of poles(s) in series per polarity - 1000VDC	2 P	2 P	2 P	2 P	2 P	2 P
Number of poles(s) in series per polarity - 1500VDC	2 P / 3 P	2 P / 3 P	2 P / 3 P	2 P	2 P	2 P
Number of pole(s) of the device - 1000VDC	2 P	2 P	2 P	2 P	2 P	2 P
Number of pole(s) of the device - 1500VDC	2 P / 3 P	2 P / 3 P	2 P / 3 P	2 P	2 P	2 P
Short-circuit capacity at 1000 & 1500VDC (with protection)						
Prospective short-circuit current (kA rms DC)	10(1)	10(1)	10(1)	10(1)	10(1)	10(1)
Mechanical characteristics						
Durability (number of operating cycles)	8,000	8,000	8,000	8,000/6,000(2)	8,000/6,000(2)	8,000/6,000(2)
Power loss/pole (W/Pole)	2	5,1	11,2	13	21,6	29,3

(1) Without fuse during 50 ms.
(2) 8,000 for LBS.

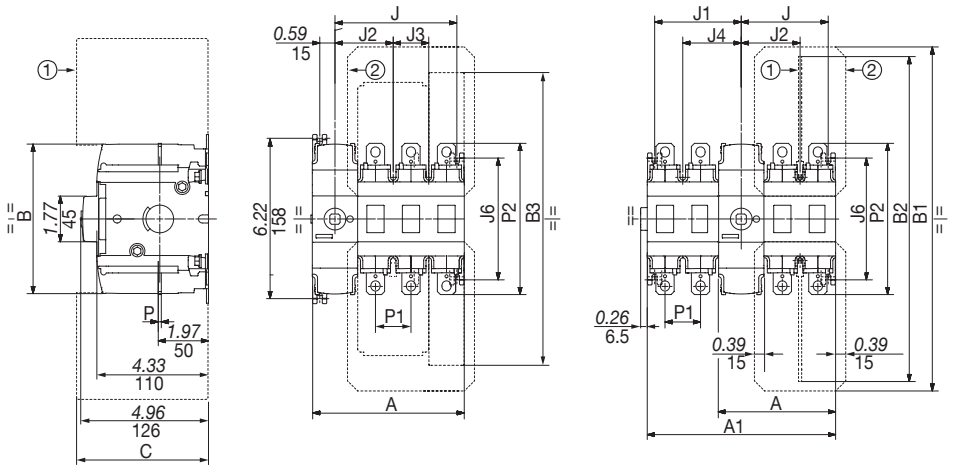
Characteristics

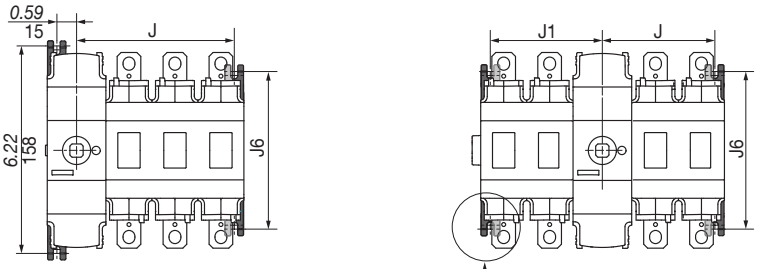
Characteristics according to IEC 60947-3

Rated current I_n			**160 A**	**250 A**	**315 A**	**400 A**	**630 A**	**800 A**
Frame size			**F2**	**F2**	**F2**	**F3**	**F3**	**F3**
Thermal current at 40°C (A)			160	250	315	400	630	800
Thermal current at 50°C (A)			160	250	315	400	630	760
Thermal current at 60°C (A)			160	250	315	400	570	685
Rated insulation voltage U (V)			1500	1500	1500	1500	1500	1500
Rated impulse withstand voltage U_{imp} (kV)			12	12	12	12	12	12
Number of circuits	**Rated voltage**	**Utilization category**	**I_e (A)**	**I_e (A)**	**I_e (A)**	**I_e (A)**	**I_e (A)**	**I_e (A)**
1 circuit	1000 VDC(1)	DC-21 B	160	250	315	400	630	800
1 circuit	1500 VDC(2)	DC-21 B	160	250	315	400	630	-
Number of circuits	**Rated voltage**	**Utilization category**	**I_e (A)**	**I_e (A)**	**I_e (A)**	**I_e (A)**	**I_e (A)**	**I_e (A)**
1 circuit	1000 VDC(1)	PV2	-	-	-	-	-	-
1 circuit	1500 VDC(2)	PV2	160	250	315	400	630	-
2 circuits	1500 VDC(2)	PV2	-	-	-	400	630	-
Short-circuit capacity at 1000 & 1500VDC (without protection)								
Rated short-time withstand current I_{cw} 1s (kA eff.)			5	5	5	8	8	8
Rated short-circuit making capacity I_{cm} (kA peak) - 60 ms			10	10	10	10	10	10
Connection								
Recommended Cu rigid cable cross-section (mm²)(3)			70	120	185	240	2 X 185	2X 240
Recommended Cu busbar width (mm)(3)			20	20	20	25	25	25
Mechanical characteristics								
Durability (number of operating cycles)			8,000	8,000	8,000	8,000/6,000(4)	8,000/6,000(4)	8,000/6,000(4)
Power loss/pole (W/Pole)			4.5	11.2	13	13	30.2	50

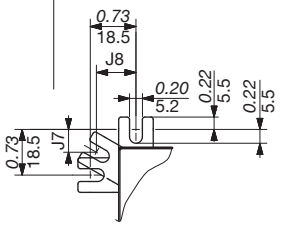
(1) 2 poles in series.
(2) 2 or 3 poles in series.
(3) For aluminium connection, please consult us.
(4) 8000 for LBS.

INOSYS LBS



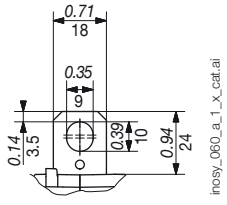


1. Inter-phase barrier.
2. Terminal screens..



inosy_166_a_1_x_cat.ai

Connection terminal F2



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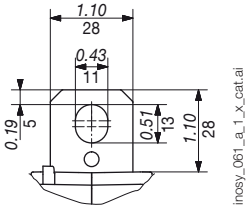
Connection terminal F3



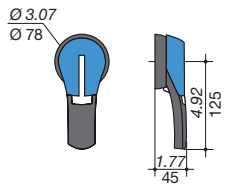
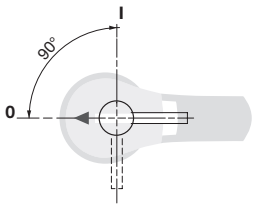
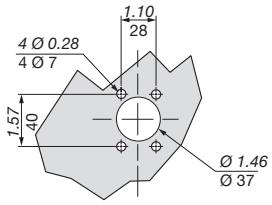
inosy_061_a_1_x_cat.ai

			A		A1	J	J1	J	
Rating (A)	Frame size	Units	2 P	3 P	1+1 P / 2+2 P	1+1 P / 2+2 P	1+1 P / 2+2 P	2 P	3 P
100 … 250	F2	in	4.60	5.98	4.60 / 7.36	1.97 / 3.37	2.05 / 3.44	3.35	4.72
		mm	117	152	117 / 187	50.5 / 85.5	52.5 / 87.5	85.5	120.5
400 … 600	F3	in	5.40	7.17	5.40 / 8.94	2.36 / 4.15	2.44 / 4.23	4.13	-
		mm	137	182	137 / 227	60.5 / 105.5	62.5 / 107.5	105.5	-

Rating (A)	Frame size	Units	B	B1	B2			B3	C		J2	J3	J4	J6	P1	P2
					IEC short	IEC long	UL		IEC	UL						
100 … 250	F2	in	5.90	13.35	7.85	12.61	10.31	11.64	4.33	4.33	2.26	1.38	2.34	4.72	1.38	5.87
		mm	154	339	199	320	262	296	110	110	57,5	35	59,5	120	35	149
400 … 600	F3	in	5.90	16.28	9.35	14.11	15.5	14.12	4.33	5.31	2.64	1.77	2.72	6.22	1.77	7.87
		mm	154	414	237	358	394	359	110	135	67.5	45	69.5	158	45	200

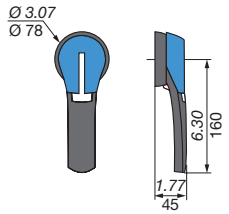
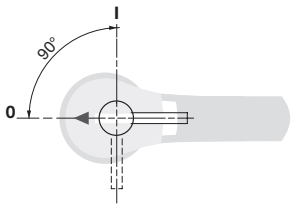
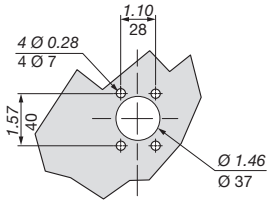
Dimensions for external handles (in/mm)

F2 frame size

Handle type	Front operation Direction of operation	Door drilling
S2 type 		

poign_013_b_1_us_cat.eps

F3 frame size

Handle type	Front operation Direction of operation	Door drilling
S2L type 		

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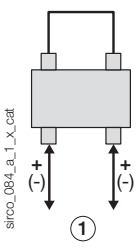
Pole series connections

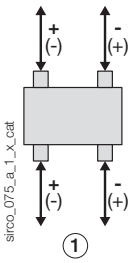
1 PV circuit - 1000 & 1500 VDC

F2-F3 - 2 P

Grounded network



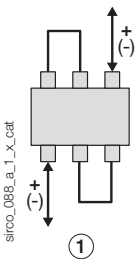
Floating network



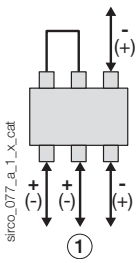
1 PV circuit - 1500 VDC

F2 - 3 P

Grounded network



Floating network



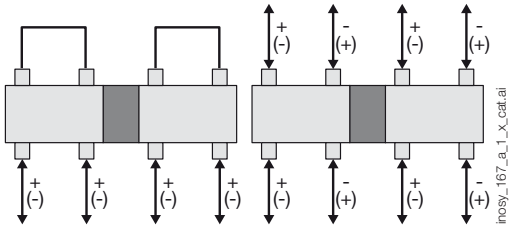
1. Circuit 1
2. Circuit 2

2 PV circuits - 1500 VDC

F3 - 2 P

Grounded network

Floating network

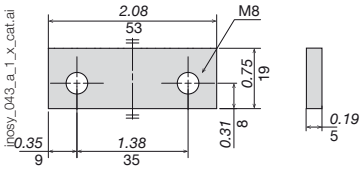


Bridging bars (in/mm)

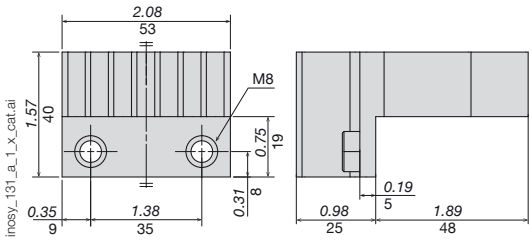
F2

8409 0016 (1)

(1) Kit comprises 2 identical bars.



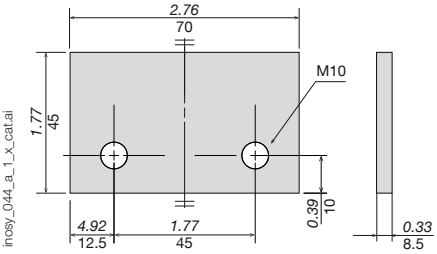
8409 0025



F3

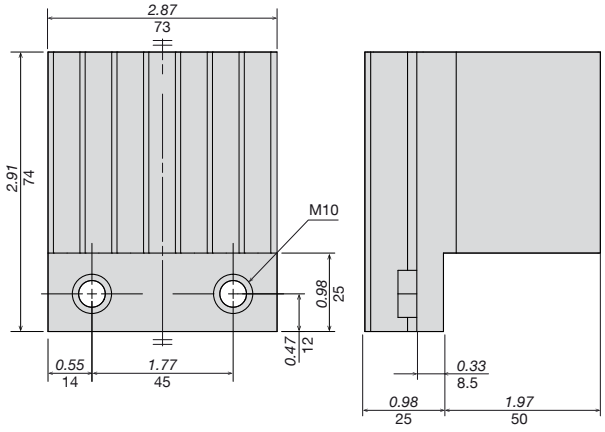
8409 0040 (1)

(1) Kit comprises 2 identical bars.

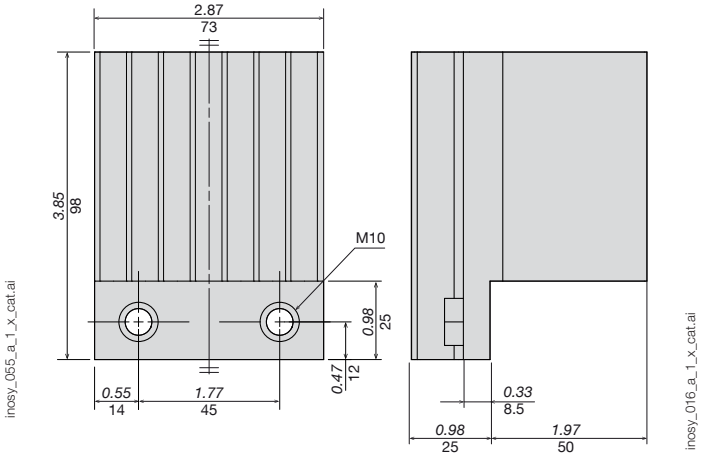


F3

8409 0041



8409 0063



Mounting orientation

F2 - F3

All mounting orientations are possible. Derating may apply - please consult us.

socomec
Innovative Power Solutions

87P11041

General information

Product Range: INOSYS LBS DC PV MANUAL

Long Description:
INOSYS LBS 1500VDC MANUAL 400A UL98B, Direct or external operation, Back mounting, 2P, Handle, shaft and other accessories not included

Short Description: INOSYS LBSM DC 2P 1500 400A UL

Certificates and declaration

Conformity to standard #1: UL98B

Conformity to standard #4: E346418 Vol. 1 Sec. 12

Proposition 65 California:
WARNING This product can expose you to chemicals including Styrene, which is known to the State of California to cause cancer. For more information go to : www.P65Warnings.ca.gov

Container Information

EAN13: 3596033045042

Package Level 1 Units:

Main

Reference: 87P11041

Ordering

Country of origin:	FR

Technical characteristics

Connection terminals

Max. connection section / AWG:	600MCM
Min. connection section / AWG:	#4

Mechanical characteristics

Endurance (number of operating cycles):	8000

Short-circuit capacity

Short-circuit capacity at 1000 VDC / Prospective short-circuit current (kA rms):	10
Number of Poles:	2
Rated operating voltage (Ue):	1500VDC
UL General use rating (A):	400

socomec
Innovative Power Solutions

87P11051

General information

Product Range: INOSYS LBS DC PV MANUAL

Long Description:
INOSYS LBS 1500VDC MANUAL 500A UL98B, Direct or external operation, Back mounting, 2P, Handle, shaft and other accessories not included

Short Description: INOSYS LBSM DC 2P 1500 500A UL

Certificates and declaration

Conformity to standard #1: UL98B

Conformity to standard #4: E346418 Vol. 1 Sec. 12

Proposition 65 California:
WARNING This product can expose you to chemicals including Styrene, which is known to the State of California to cause cancer. For more information go to : www.P65Warnings.ca.gov

Container Information

EAN13: 3596033045059

Package Level 1 Units:

Main

Reference: 87P11051

Ordering

Country of origin:	FR

Technical characteristics

Connection terminals

Max. connection section / AWG:	600MCM
Min. connection section / AWG:	#4

Mechanical characteristics

Endurance (number of operating cycles):	8000

Short-circuit capacity

Short-circuit capacity at 1000 VDC / Prospective short-circuit current (kA rms):	10
Number of Poles:	2
Rated operating voltage (Ue):	1500VDC
UL General use rating (A):	500

Account Details

Account No.	9025865_USS1_10_10
Account Name	CARLTON-BATES COMPANY (CBC)
Address	CARLTON-BATES COMPANY (CBC), 905 W HOWARD LN, , AUSTIN, Texas, 78754-3000, United States
Sales Org.	ABB IS United States
Sales Channel	Distribution
Currency	USD
As on Date	12-13-2021

| Catalog No. 1SCA158215R1001

Product Details

UPC: 6417019873206

Details: A fully optimized two-pole DC switch-disconnector for 1500V utility-scale photovoltaic power plants covering 315-630A current range. The new design offers both a size reduction and an increase in efficiency and performance to help manufacturers adapt to the industry's rapid adoption of 1500V DC solutions. The two-pole 1500V DC concept helps manufacturers improve system efficiency, reducing switch losses by up to 35 percent. Measuring just 150mm wide and 122mm high, the OTDC range of 1500V DC switches is also up to 30 percent smaller than conventional solutions. The compact size of the new OTDC range makes it possible for manufacturers to reduce the size of combiner boxes and inverters. Main characteristics for this particular OTDC type: Disconnect single PV circuit, Approved according to UL98B and IEC 60947-1,-3

Product Details

Details

Catalog No.	1SCA158215R1001
Description	2P 400A PV SW 1500VDC
Std. Package Weight	8.598 LB
Product Family	P0N
Restock Fee	0%

UPC	6417019873206
GSA Compliance	No
Discount Schedule	P0
CCC	
Currency	USD

Customer Reference No.	
Minimum Order Qty.	0

Notes	
Package Qty.	1
Country of Origin	Finland

Specifications

General Characteristics

Category	Rotary Disconnects
Product Name	DC Disconnect
Product Main Type	OTDC400U
Standards	UL98B and IEC 60947-1, -3
Ampere Rating UL/CSA	1500VDC 400 A
Number of Poles	2
Quantity / Count	1

Dimensions and Classifications

Account Details

Account No.	9025865_USS1_10_10
Account Name	CARLTON-BATES COMPANY (CBC)
Address	CARLTON-BATES COMPANY (CBC), 905 W HOWARD LN, , AUSTIN, Texas, 78754-3000, United States
Sales Org.	ABB IS United States
Sales Channel	Distribution
Currency	USD
As on Date	12-09-2021

| Catalog No. 1SCA146055R1001

Product Details

UPC: 6417019679785

Details: OHB125LH12 HANDLE

Product Details

Details

Catalog No.	1SCA146055R1001
Description	PSTL HDL 12X125MM BLACK 4/4X
Std. Package Weight	0.375 LB
Product Family	P0L
Restock Fee	0%
Customer Reference No.	
Minimum Order Qty.	0

UPC	6417019679785
GSA Compliance	No
Discount Schedule	P0
CCC	
Currency	USD
Notes	
Package Qty.	1
Country of Origin	Finland

Specifications

General Characteristics

Category	Rotary Disconnects
Product Name	Accessories
Accessory Type	Handles
Accessory Sub Type	Pistol handles
Product Main Type	OHB125
Quantity / Count	1

Dimensions and Classifications

by ABB

go.abb/industrial.com

Created On: 12/09/2021

Account Details

Account No.	9025865_USS1_10_10
Account Name	CARLTON-BATES COMPANY (CBC)
Address	CARLTON-BATES COMPANY (CBC), 905 W HOWARD LN, , AUSTIN, Texas, 78754-3000, United States
Sales Org.	ABB IS United States
Sales Channel	Distribution
Currency	USD
As on Date	12-09-2021

| Catalog No. OXP12X250

Product Details

UPC: 6417019141374

Product Details

Details

Catalog No.	OXP12X250
Description	PISTOL SHAFT 9.8FT 12X250
Std. Package Weight	0.639 LB
Product Family	P0L
Restock Fee	0%
Customer Reference No.	
Minimum Order Qty.	0

UPC	6417019141374
GSA Compliance	No
Discount Schedule	P0
CCC	
Currency	USD
Notes	
Package Qty.	1
Country of Origin	Finland

Specifications

General Characteristics

Dimensions and Classifications

by ABB

go.abb/industrial.com

Created On: 12/09/2021

BH300 1500V Fuse Holder

DESCRIPTION:

The BH300 touch safe holder is designed for 10x85mm fuse links, especially for use with photovoltaic equipment.

FEATURES:

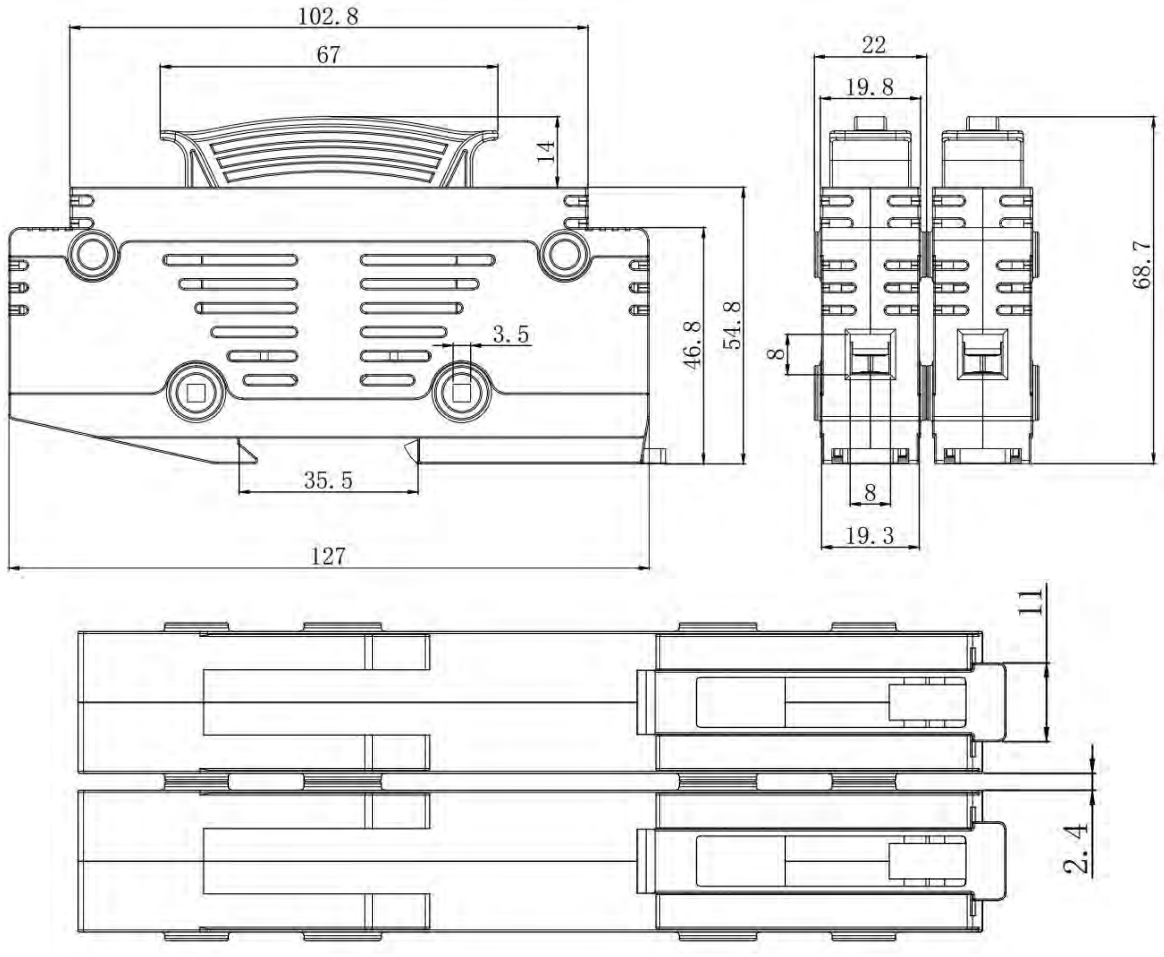
ADLER BH300 touch safe fuse holders are designed for standard 10x85mm PV fuses such as ADLER A75 series and other cylindrical fuses up to Ø10 x 85mm. With current ratings up to 30A at 1500 VDC, it can effectively protect 1500 VDC circuits and equipment in photovoltaic applications.

Note: SCCR is limited to the interrupting rating of the installed fuse or 50kA, which ever is less.

SPECIFICATIONS:

- Rated Voltage: 1500 VDC
- Rated Current: up to 30 A
- Short Circuit Current Rating(SCCR): 50 kA
- Standards: UL 4248-18, EN 60947-3
  (30 kA@1500 VDC)
- Material Flammability: UL 94-V0
- Mounting: DIN Rail mounting
- Wire Range: 6-14 AWG
- Operation Temperature: -40°C to +150°C
- UL Listed File: E486822
- TUV File: R 50394043

DIMENSIONS: mm



ADLER Elektrotechnik Leipzig GmbH
Zschochersche Str. 91
D-04229 Leipzig - GERMANY

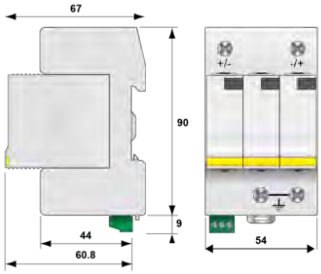
TEL: +49 (0)341 94698772
FAX: +49 (0)341 94698771

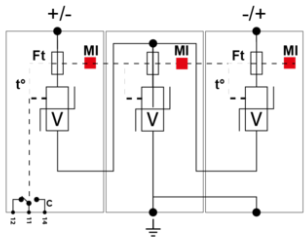
Email: info@adlerelectric.com,
info@adlerelektro.de
Website: www.adlerelectric.com

SURGE ARRESTOR

DS50PVS-1500/51

- MOV Technology
- UL1449 Type 4CA
- 40kA Surge Current Rating
- Visual fault indicator and remote contacts
- 10-Year warranty





V: High-energy varistor
Ft: Thermal fuse
t°: Thermal disconnection system
MI: Disconnection indicator C: Remote signal contact

Electrical Characteristics		
Total Maximum discharge current max. total withstand @ 8 /20 µs	Imax Total	60 kA
Protection mode(s)		Common/Differential mode
Protection level +/PE (-/PE)@ In (8/20µs)	Up	5.3 kV
Maximum Discharge CurrentImax (8/20)	kA	40.0000
POWER SPD TYPE		UL1449 5th Ed. TYPE 4CA
VOLTS	(V)	1500
AC/DC/DC PV/RF		DC PV & DC
PHASE	(PH)	-
AMPS	(A)	n/a
AMBIENT MIN	(C)	-35
AMBIENT MAX	(C)	+85
MODES		DC+-G or DC--G
MLV DC	(V)	5120/5220/5220
MCOV	(V)	1500/1500/1500
IN15 impulses 8/20µs	(kA)	10
SCCR	(kA)	n/a
IMAX8/20µs	(kA)	40
Mechanical Characteristics		
Weight		0.334 kg
TECHNOLOGY		MOV
NETWORK CONFIGURATION		3 poles, 2W+G
CONNECTION METHOD		Screw Terminal (8-12AWG)
MOUNTING		DIN RAIL
MATERIAL		Thermoplastic UL94-V0
NEMA RATING (IP RATING)		NEMA 2 (IP20)
FAIL-SAFE BEHAVIOR		Disconnection via fuse-link
REAL-TIME DIAGNOSTICS		Visual indicator and remote contacts
DIMENSIONS		See diagram (mm)
Standards		
Certification		UL / EAC / TUV
UL STANDARD		UL1449 5th Edition
UL FILE NUMBER		E326289
Part number		
480571		

ENCLOSURE

J

Expanded J HPL

The Largest J Series Yet!!

Now available from Stahlin Non-Metallic Enclosures:

- J Series 30x24 with hinged lockable pull latch (HPL)
- J Series 24x30 with hinged lockable pull latch (HPL)

The Stahlin J Series product line was designed as an industrial enclosure for harsh, aggressive environments.

Originally developed as an electrical junction box for the oil refining and petrochem industries, the J series has evolved into a versatile industrial enclosure line. It's now available in 18 sizes with varied applications for use from high-end electronics to extreme corrosive applications both indoors and out; currently servicing all industrial applications.

With over six decades of proven performance the rugged design combined with tough, durable materials, for extreme reliability in tough environments are key attributes of this series.

Now, with two new sizes in our most popular configuration – hinged lockable pull latch (HPL) – the Stahlin J Series is bigger, better, and offers you more space for maximum protection at a competitive price and available when you need it!

Expanded "J" Series HPL Featured Benefits

- *More available space for reliable enclosure protection*
- *UL Listed 4X and IP66*
- *Chemically resistant fiberglass reinforced composite formulation for long product life cycle*
- *Non-corrosive*
- *UV resistance featuring patented SolarGuard®, the best available protection against UV degradation*
- *Resistance to extreme temperatures*
- *Flame retardant UL94-5V*
- *Channel captured gasket assures seal integrity*
- *Light weight for ease of handling and cost reduction*
- *Industrially tough, but easily modified*
- *New T-Slot design for easy installation of a swing panel, dead front, or din rail mounting*

- *Overhang cover on smooth sided base*
- *Full 180°+ door opening*
- *Mounting foot gussets for structural integrity and robustness*
- *Slotted mounting hole ensures flexibility in mounting and easy changeability with other commercial options*
- *Off the shelf hardware for convenience in installation*
- *Field replaceable stainless steel latches*
- *Full length stainless steel piano hinge*
- *Rugged design provides industry leading weight loads*

MADE IN THE USA

COMPLIES WITH BUY AMERICA ACT

www.stahlin.com

J

Expanded J HPL

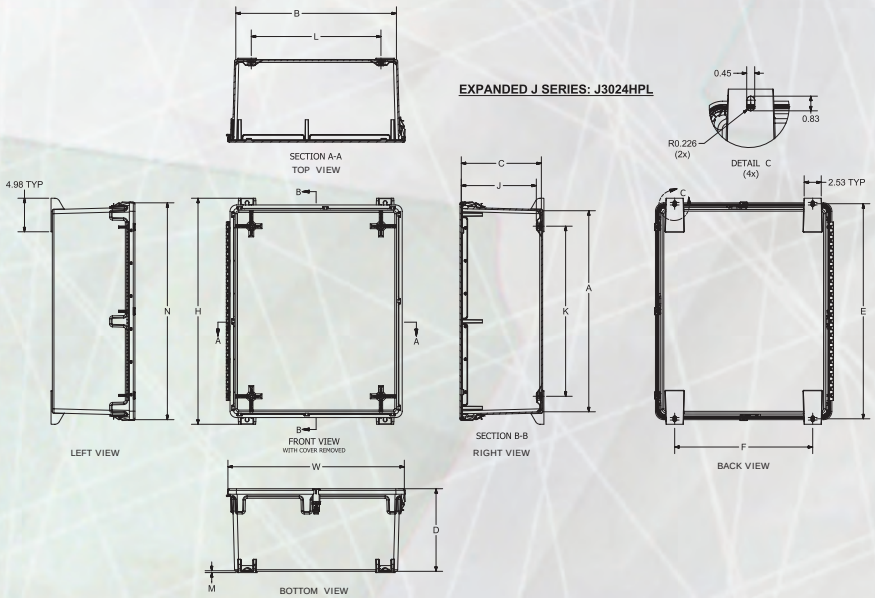
Stahlin's 30" Expanded J HPL Offerings

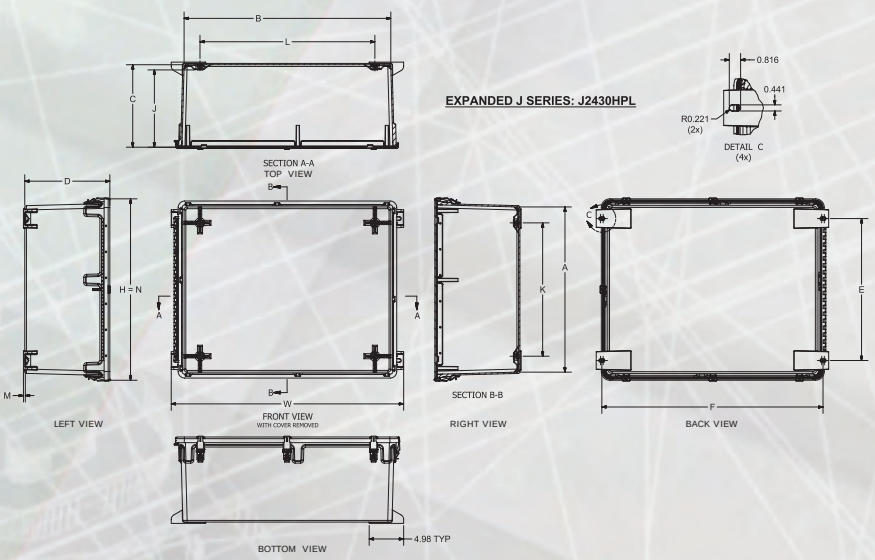
Industry Standards

- UL Listed for NEMA 250 and CSA C22.2
- Type 1, 3, 3R, 4, 4X, 12, 13
- IEC60529 IP66
- Temperature Range (-76°F to +274°F) (-60°C to +134°C)
- Flammability Rating UL94-5V
- Self-Extinguishing, Non-Halogenated, Non-Flame Propagating
- NFPA No. 101 Flame Spread Class A (1)

T-Slot for enclosure panel management

Non-penetrating stainless steel latches





Expanded J Series Enclosures Technical Drawing and Dimensional Information

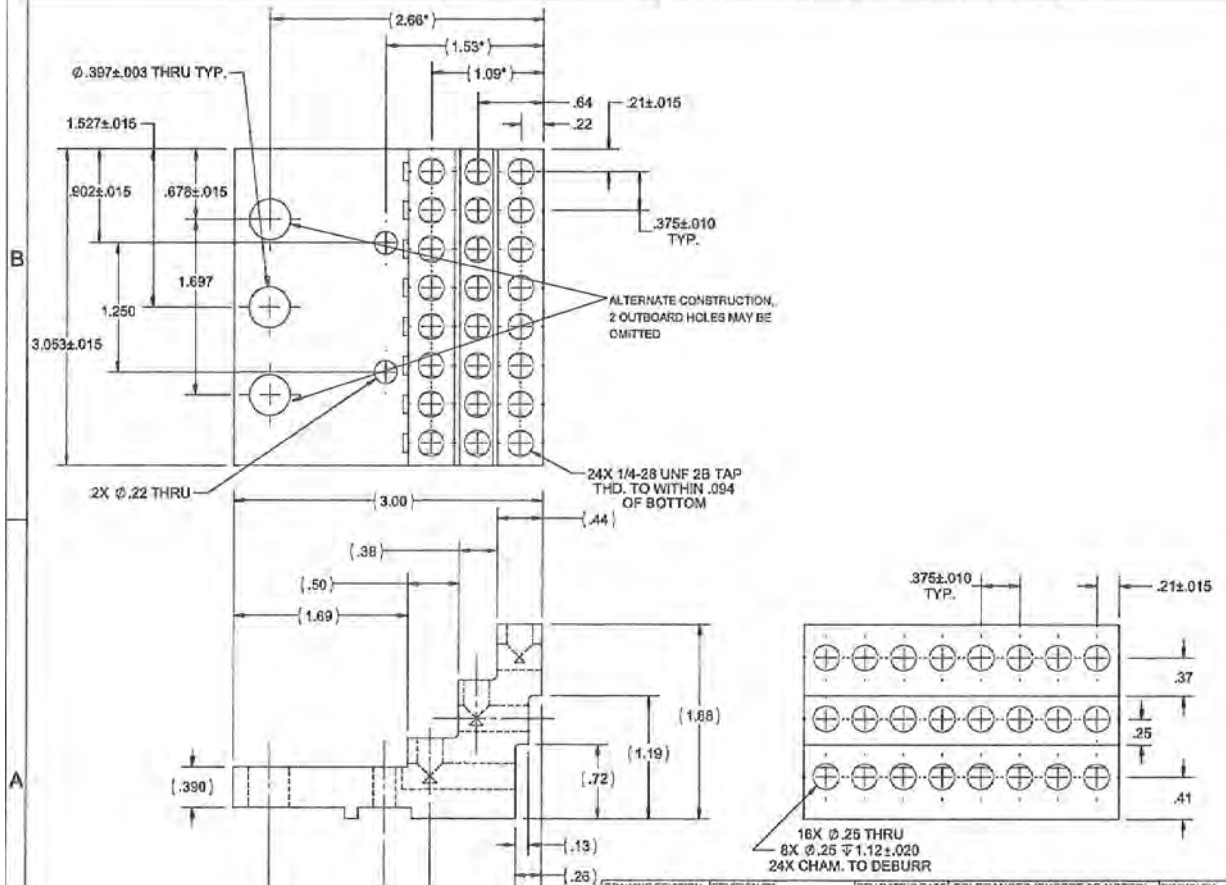
SIZE ID NUMBER	OVERALL H x W x D	INSIDE A x B x C	MOUNTING E x F	J	K	L	M	N	MOUNTING SLOT SIZE	SHIPPING WEIGHT	PANEL NUMBER
J3024HPL	33.56 x 26.18 x 12.26	29.85 x 23.85 x 11.89	31.93 x 20.49	11.06	25.25	19.25	0.28	32.19	0.83 x 0.45	46 lbs.	BPJ3024**
J2430HPL	26.18 x 33.56 x 12.26	23.85 x 29.85 x 11.89	20.49 x 31.93	11.06	19.25	25.25	0.28	26.18	0.45 x 0.83	46 lbs.	BPJ3024**

** denotes panel material
AL = aluminum
CS = carbon steel

For more details, contact:

Stahlin Non-Metallic Enclosures
500 Maple Street
Belding, MI 48809

Phone: 616-794-0700
Fax: 616-794-3378
CSR@RobroyEnclosures.com
www.stahlin.com



NOTES:

1. MAKE FROM EXTRUSION
   9725135 6061-T6 ALUMINUM
2. FINISH- .0001 BRIGHT TIN OVER
   CU FLASH
3. INSTALL SCREWS
   P/N 9837502 24) 9701652 (IH)
   P/N 9837501 24) 9701602 (SL)
4. MARKING: 5 DIGIT PART NO. *
   MARATHON LOGO
   (OPTIONAL) 6-14 CU9
5. WIRE RANGE / TEMP RATING
   6-14 CU9 (90°C)
   WIRE TYPE / CLASS
   #6-14 Cu STR. B,C,G,H,I
   #10-14 Cu SOLID
6. ADDITIONAL COMBINATIONS,
   PER TERMINAL:
   (2) #10 CU STR. B,C,G,H,I
   (2-4) #12-14 CU STR. B,C,G,H,I
   (1) #4 Cu B,C- 75A MAX. PER CONDUCTOR
7. TORQUE: #4-14; 35 IN. LB.
8. MAY BE EQUIPPED WITH 1) LINE
   SIDE STUD FOR CONNECTING
   PREPARED CONDUCTORS
9. XX* INDICATES DIM. HOLE LOCATION
   CONTOLLED FROM SURFACE "A"

* 98375 MAY BE RE-STRUCK WHERE
FORMERLY MARKED 98345

- DC INPUT LUG

DRAWING REVISION	REVISION BY	REV DATE/© DATE
F	R. SCHECKELHOFF	4/10/19
ECO	APPROVED BY	DATE
ECO DESCRIPTION: UPDATED TB AND MADE EXTRUSION LARGER		

TOLERANCES (EXCEPT AS NOTED):

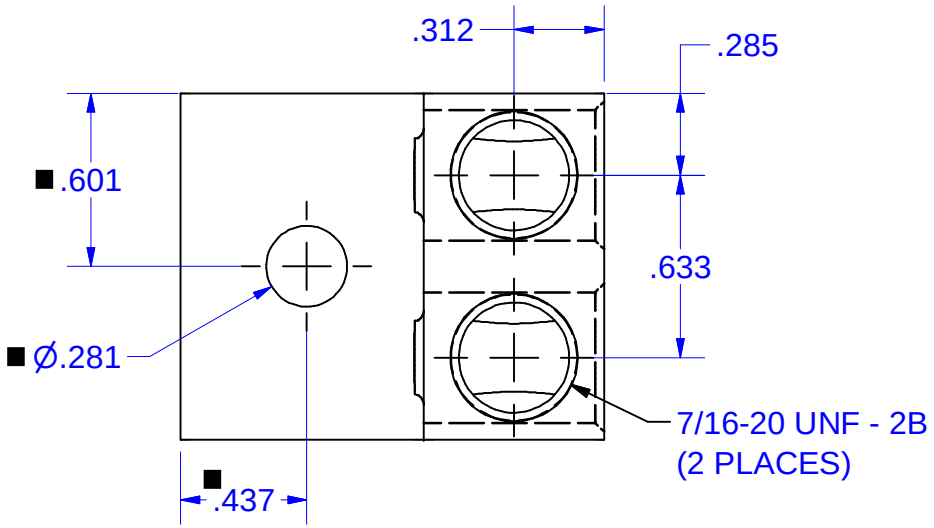
DEC.	INCH	mm	ANGLE
.X	±0.1	[±3]	±1° 30'
.XX	±0.01	[±0.3]	
.XXX	±0.005	[±0.13]	
.XXXX	±0.0005	[±0.013]	

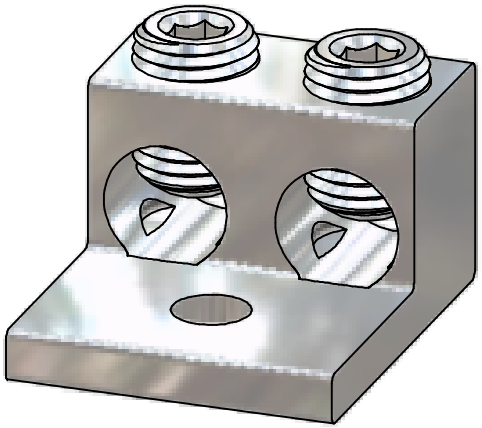
REMOVE BURRS & BREAK SHARP EDGES: .003/.015 [.08/.38] X 45 °
CORNER FILLETS: R.02 [.5]
MACHINED SURFACES: 200/ 5.1/ INCH / mm
mm DIMENSIONS IN [BRACKETS] ARE FOR REFERENCE ONLY

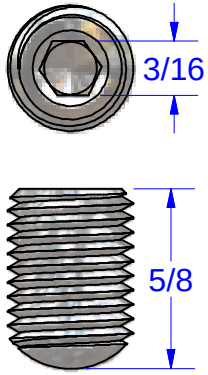
DRAWN BY	T. MINNICK
DATE	04/02/13
APPROVED BY	
DATE	
REFERENCE	
THIRD ANGLE PROJECTION	

Regal Beloit America, Inc.

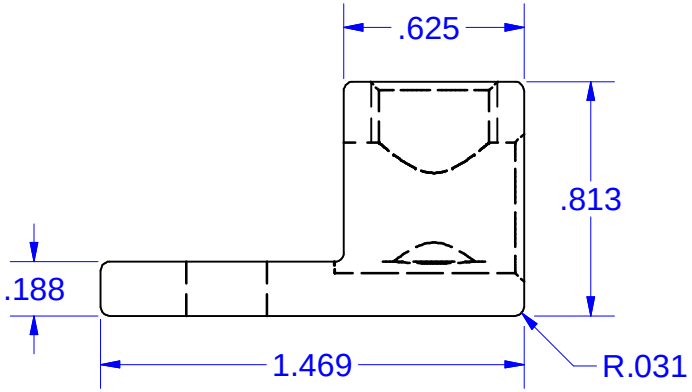
DESCRIPTION	CONNECTOR
	CONN AL 1).397 24)4
MATERIAL	PROCESS/FINISH
SIZE: B	DRAWING NUMBER: 983750X
	SHEET: 1 OF 1

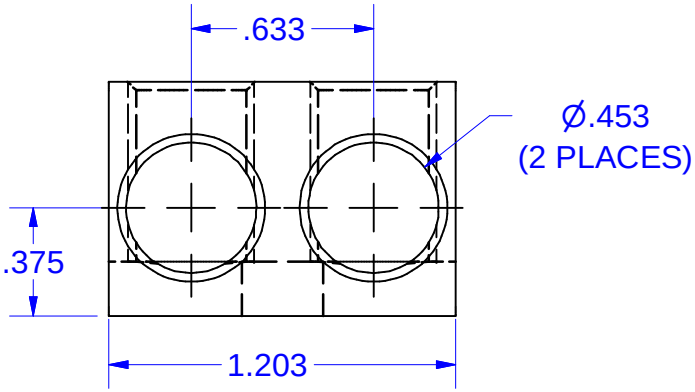






SCREW#11703
(ALUMINUM
TIN PLATED)





MARKING
2S2/0
IHI
2/0-14
CU9AL
CSA LOGO
UL LOGO

Cat. No. 2S2/0 Style No. 3
■ Drill, Enlarge, or Modify Mounting Holes
1)Increase hole(s) dia. to 7/16 bolt.
2)Move location of mounting hole(s)
3)If buying blank lug, put custom hole(s) in.

FLEX WIRE 1/0-14 AWG

IHI UL/CSA Installation Guide to Drill or Enlarge Mounting Holes:
https://lugsdirect.com/PDF Documents/IHI-MTG-HOLE-FIELD-MODS-UL&CSA-CERTIFICATIONS.pdf

FOR FURTHER INFORMATION ON THE PROPER USE OF THIS PRODUCT IN SPECIFIC APPLICATIONS SEE
http://www.ihiconnectors.com/GuideToFlexFlexibleFineStrandedWireCableMechanicalLugsFAQ.html

http://www.ihiconnectors.com/Technical-Data-Installation.htm

GENERAL TOLERANCES
±.015 (±0,038)

INTERNATIONAL HYDRAULICS, INC.

TITLE:
2S2/0-HEX
CONNECTOR

MATERIAL:	SIZE:	DRAWN BY:	DWG NO.:	REV:
6061-T6 (1075)		TDS	2S2/0-HEX (SALES)	

FINISH:	DATE:	
TIN PLATE EMS	12/9/08	IHI CONNECTORS

GROUND LUG

VENT PLUG

NO O-RING REQUIRED!

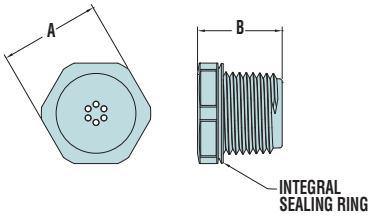
HEYClean™ Liquid Tight Threaded Vent Plugs

With Integral Sealing Ring and Liquid Tight Filter

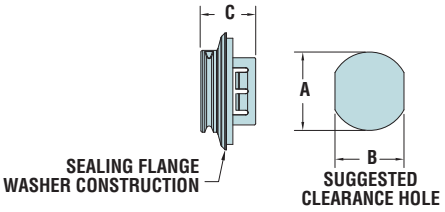
- Integral sealing ring ensures a **superior seal** at mounting hole location, every time; **IP 65, 67 and 68 Rated**.
- Allow the passage of air for pressure equalization, yet prevent moisture intrusion, remain liquid tight.
- UL Rated for Type NEMA 3R, 4, and 4X applications.
- Filter membrane is both hydrophobic and oleophobic and prevents moisture and particulate contamination in electronic enclosures.
- Pressure compensating seal prevents buildup of pressure inside of electronic enclosures due to environmental temperature cycling.
- Quick and easy installation into Threaded (LTTVP) and Clearance (LTSV) holes.
- Membrane seal is ultrasonically welded to nylon body.
- Lower cost option over metal or steel plugs.
- Approximate Head Thickness: .21" (5,3 mm). Thickness may vary.
- Hex shaped head for wrench installation (LTTVP only).
- Electrically non-conductive Nylon 6/6.
- Quick and easy **Snap-in** installation into Clearance Holes.
- All sizes and types feature 6 (six) vent holes.
- **Snap-In** plugs for panel and housing applications.
- Lower cost option over brass or steel plugs.
- Snap into a range of panel thicknesses up to .125" (3,2 mm) with no tools (LTSV only).

THREAD Type/Size	PART NO. Black	PART NO. Gray	DESCRIPTION	PART DIMENSIONS A Wrenching Flats in.	A mm.	B Overall Length in.	B mm.	CALCULATED FLOW VOLUME LPM @ 13.5 psi
NPT								
NPT 1/4	**3544VB**	**3544V**	LTTVP NPT 1/4	.63	16,0	.66	16,8	0.341
NPT 3/8	**3545VB**	**3545V**	LTTVP NPT 3/8	.83	21,0	.69	17,5	0.341
NPT 1/2	**3546VB**	**3546V**	LTTVP NPT 1/2	.98	24,9	.81	20,6	0.668
NPT 3/4	**3547VB***	**3547V***	LTTVP NPT 3/4	1.29	32,8	.86	21,8	0.668
PG - For PG Thread specifications, see page 3-49								
Pg 7	**3574VB**	**3574V**	LTTVP Pg 7	.63	16,0	.53	13,5	0.341
Pg 9	**3575VB**	**3575V**	LTTVP Pg 9	.83	21,0			0.341
Pg 13.5	**3576VB**	**3576V**	LTTVP Pg 13.5	.98	24,9	.62	15,8	0.668
Pg 21	**3401VB**	**3401V**	LTTVP Pg 21	1.29	32,8	.76	19,3	0.668
Metric								
M12	**3582VB**	**3582V**	LTTVP M12	.63	16,0	.53	13,5	0.341
M16	**3583VB**	**3583V**	LTTVP M16	.83	21,0			0.341
M20	**3584VB**	**3584V**	LTTVP M20	.98	24,9	.62	15,8	0.668

Standard color Black. Consult Heyco for other colors.
*IP 65 rated.



Threaded Vent Plug



Snap-In Vent Plug

HEYClean™ Liquid Tight Snap-In Vent Plugs

With Integral Sealing Flange/Washer and Liquid Tight Filter
Mounting Hole Diameter Range: .500˝ (12,7 mm) to 1.125˝ (28,6 mm)

A Mounting Hole Dia* in.	A mm.	PART NO. Black	DESCRIPTION	PART DIMENSIONS B To Prevent Rotation in.	B mm.	C Max. O.A. Length in.	C mm.	CALCULATED FLOW VOLUME LPM @ 13.5 psi
.500	12,7	**3481VB**	LTSV 500	.45	11,4	.600	15,2	0.301
.875	22,2	**3486VB**	LTSV 875	.77	19,6	.620	15,7	0.301
1.125	28,6	**3488VB**	LTSV 1125	1.00	25,4	.660	16,8	0.524

Standard color black. Consult Heyco for other colors.
* Consult Heyco for additional sizes.

Quick Specs

Material	Nylon 6/6 bodies with an Acrylic Copolymer Filter
Certifications	Recognized under the Component Program of Underwriters' Laboratories, File E330194 to both Canadian and U.S. Requirements
Flammability Rating	94V-2
Temperature Range	-40°F (-40°C) to 221°F (105°C)
IP Rating	IP 65/67/68

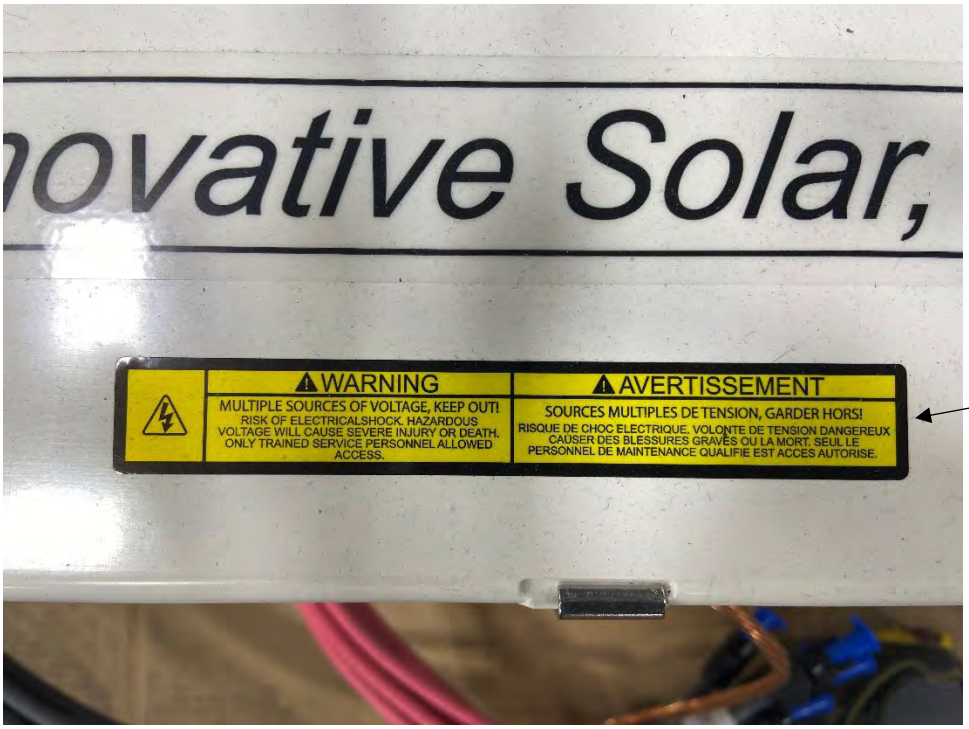
1-800-526-4182 • 732-286-1800 (NJ) • FAX: 732-244-8843 • www.heyco.com

STANDARD LABELS—DC COMBINERS

OPTIONAL LABELS

1216-00_A

0210-00_D



0210-00_D

STANDARD LABELS—DC COMBINERS

PROJECT SPECIFIC NAMEPLATE

INCLUDES MODEL NO., SERIAL NO., UNIT SPECIFIC RATINGS

EXAMPLE ONLY