

POWER-GATE™ Solid-State Devices

OR'ing (non-programmable)

Specification Sheet

Generation 3.0



Made in U.S.A

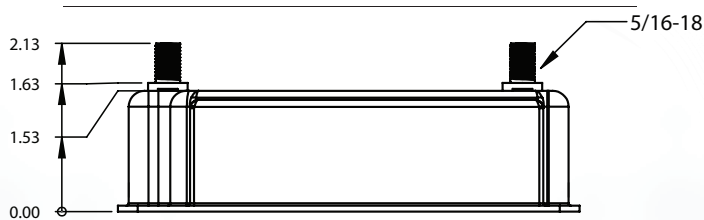


ABSOLUTE MAXIMUM RATINGS⁽¹⁾

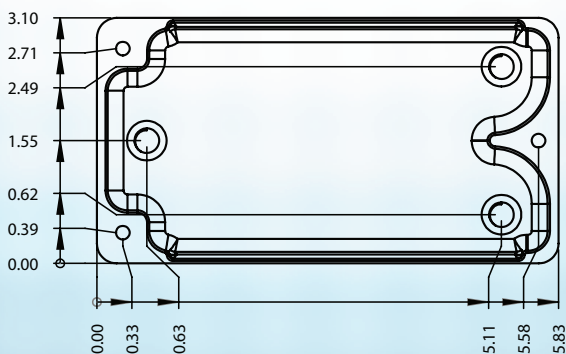
All devices, all voltages referenced to device ground, unless otherwise specified.

| Symbol | Parameter | Min. | Max. | Units |
|--------------------------------|---|---------------------|-------------------|-------|
| V_{Ax} | Anode Voltages, Model ORxxxA | -0.3 ⁽²⁾ | 21 ⁽³⁾ | Vdc |
| | Anode Voltages, Model ORxxxB | -0.3 ⁽²⁾ | 39 ⁽⁴⁾ | |
| V_K | Cathode Voltage (anode voltages at min), Model ORxxxA | -0.6 ⁽²⁾ | 21 ⁽³⁾ | Vdc |
| | Cathode Voltage (anode voltages at min), Model ORxxxB | -0.6 ⁽²⁾ | 39 ⁽⁴⁾ | |
| $V_{R, \text{gndfloat}}^{(5)}$ | Reverse Voltage (ground floating), Model ORxxxA | - | 21 | Vdc |
| | Reverse Voltage (ground floating), Model ORxxxB | - | 39 | |
| $I_{F, \text{gndfloat}}^{(5)}$ | Forward Current (ground floating), OR050x | - | 5 | A |
| | Forward Current (ground floating), OR100x | - | 10 | |
| | Forward Current (ground floating), OR150x | - | 15 | |
| | Forward Current (ground floating), OR200x | - | 20 | |
| | Forward Current (ground floating), OR250x | - | 25 | |
| | Forward Current (ground floating), OR300x | - | 30 | |
| T_A | Ambient Temperature | -45 | +110 | °C |

MECHANICAL SPECIFICATIONS



INCHES



ADDITIONAL INFORMATION

Electronic assembly inserted into ABS encapsulation shell then backfilled with black, flame retardent, filled epoxy specifically developed for the potting of electronic modules.

Three integrated mounting flanges pre-drilled to .182"

Mounting posts, 5/16-18 x .50" with provided brass washers and nylon insert 5/16-18 nuts. Mounting torque not to exceed 75 inch-pounds or 8.5 newton-meters.

RECOMMENDED OPERATING CONDITIONS

All devices, all voltages referenced to device ground, ratings per rectifier, unless otherwise specified.

| Symbol | Parameter | Min. | Max. | Units |
|----------------|---|------|------|-------|
| V _A | Anode Voltages, Model ORxxxA | 7.5 | 18 | Vdc |
| | Anode Voltages, Model ORxxxB | 7.5 | 36 | |
| V _K | Cathode Voltage (anode voltages at min), Model ORxxxA | 7.5 | 18 | Vdc |
| | Cathode Voltage (anode voltages at min), Model ORxxxB | 7.5 | 36 | |
| T _A | Ambient Temperature | -40 | +105 | °C |

ELECTRICAL SPECIFICATIONS

All devices, all voltages referenced to ground, all LED's enabled, ratings per rectifier,

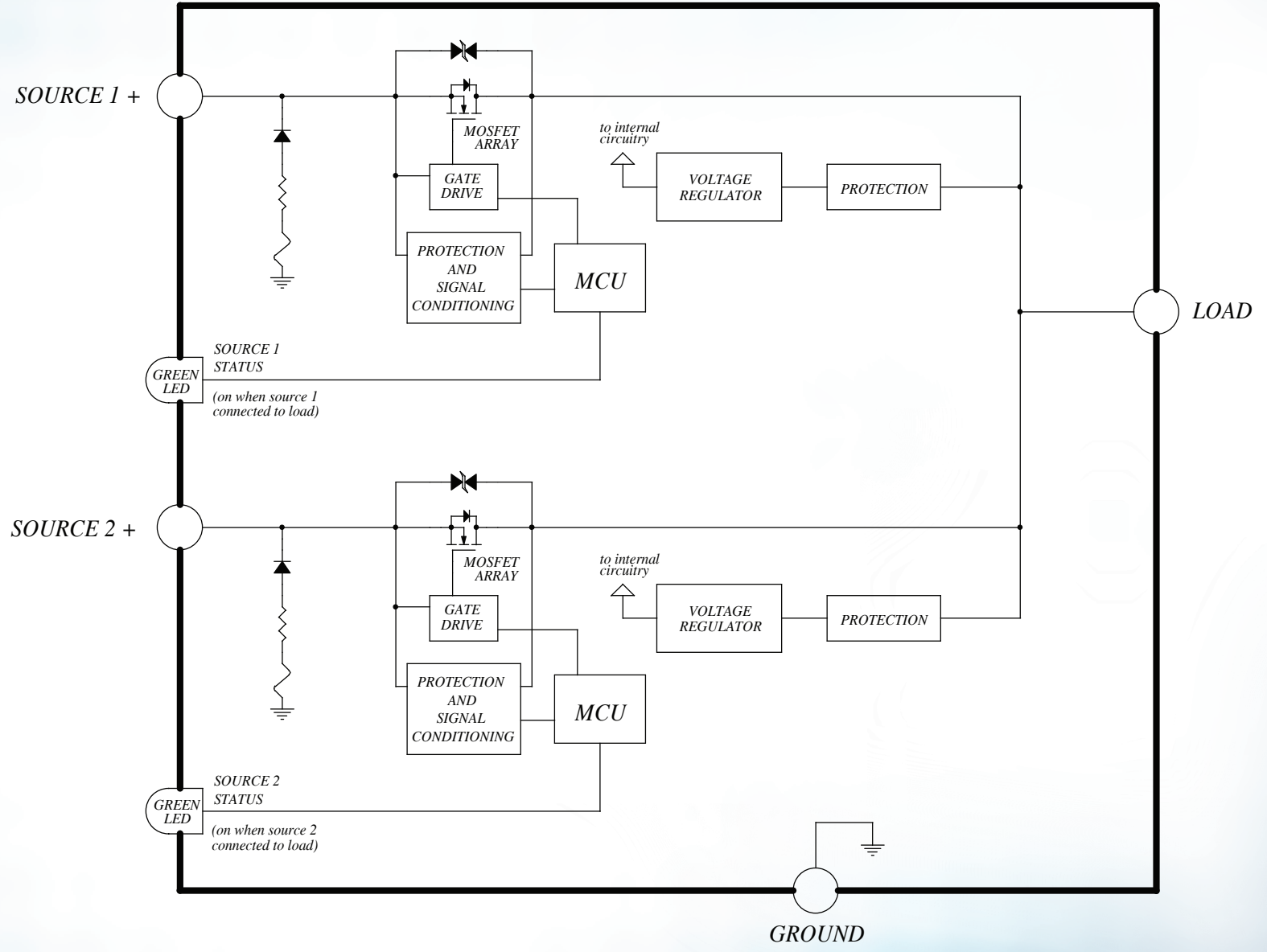
T_A = +25 ±3 °C, 7.5 Vdc ≤ V_A (ORxxxA) ≤ 18 Vdc, 7.5 Vdc ≤ V_A (ORxxxB) ≤ 36 Vdc.

| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|------------------------|------------------------------------|------|------|------------------------|-------|--|
| I _{F,MAX} | Maximum Forward Continuous Current | - | - | 50 | A | Model OR050x, -40 °C ≤ T _A ≤ +105 °C |
| | | - | - | 100 | | Model OR100x, -40 °C ≤ T _A ≤ +105 °C |
| | | - | - | 150 | | Model OR150x, -40 °C ≤ T _A ≤ +105 °C |
| | | - | - | 200 | | Model OR200x, -40 °C ≤ T _A ≤ +105 °C |
| | | - | - | 250 | | Model OR250x, -40 °C ≤ T _A ≤ +105 °C |
| | | - | - | 300 | | Model OR300x, -40 °C ≤ T _A ≤ +105 °C |
| I _{SURGE,MAX} | Maximum Forward Surge Current | - | - | 5 x I _{F,MAX} | A | Pulse width = 2 s, -40 °C ≤ T _A ≤ +105 °C |
| V _F | Forward Voltage Drop | - | 32 | 37 | mV | OR050x, Forward Current = I _{F,MAX} |
| | | - | 33 | 38 | | OR100x, Forward Current = I _{F,MAX} |
| | | - | 34 | 39 | | OR150x, Forward Current = I _{F,MAX} |
| | | - | 35 | 40 | | OR200x, Forward Current = I _{F,MAX} |
| | | - | 40 | 45 | | OR250x, Forward Current = I _{F,MAX} |
| | | - | 48 | 56 | | OR300x, Forward Current = I _{F,MAX} |
| I _S | Operating Current ⁽⁷⁾ | 0.77 | - | - | mA | V _K = 7.5 V, V _{Ax} = 0 V |
| | | - | 0.84 | - | | V _K = 12 V, V _{Ax} = 0 V |
| | | - | - | 0.95 | | V _K = 18 V, V _{Ax} = 0 V |
| | | - | 1.01 | - | | Model ORxxxB, V _K = 24 V, V _{Ax} = 0 V |
| | | - | - | 1.25 | | Model ORxxxB, V _K = 36 V, V _{Ax} = 0 V |
| | | 22.5 | - | - | | V _{Ax} = 7.5 V |
| | | - | 22.9 | - | | V _{Ax} = 12 V |
| | | - | - | 23.5 | | V _{Ax} = 18 V |
| | | - | 23.7 | - | | Model ORxxxB, V _{Ax} = 24 V |
| | | - | - | 24.4 | | Model ORxxxB, V _{Ax} = 36 V |
| I _R | Reverse Leakage Current | - | - | 10 | μA | ORxxxA, V _K = 7.5 V, V _{Ax} = 0 V |
| | | - | - | 30 | | ORxxxA, V _K = 12 V, V _{Ax} = 0 V |
| | | - | - | 140 | | ORxxxA, V _K = 18 V, V _{Ax} = 0 V |
| | | - | - | 7 | | ORxxxB, V _K = 7.5 V, V _{Ax} = 0 V |
| | | - | - | 15 | | ORxxxB, V _K = 12 V, V _{Ax} = 0 V |
| | | - | - | 30 | | ORxxxB, V _K = 18 V, V _{Ax} = 0 V |
| | | - | - | 75 | | ORxxxB, V _K = 24 V, V _{Ax} = 0 V |
| | | - | - | 1.2 | | mA |

See Notes on page 3.....

- 1) Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. Exposure to any absolute maximum rating condition for extended periods may affect device reliability and longevity.
- 2) Larger negative voltages will blow internal fuse. If fuse blows, as long as V_A is not more negative than -21/-39 V for model ORxxxA/ORxxxB, respectively, and is less than $V_{K'}$, no damage to device will occur. Call manufacturer to replace blown fuse.
- 3) Transient-protected to 40 V. Additional external protection may be required in some applications.
- 4) Transient-protected to 60 V. Additional external protection may be required in some applications.
- 5) Using the rectifier with the device ground disconnected is not recommended. Exceeding any of these ratings will cause excessive heat buildup, leading to MOSFET failure.
- 6) Transient-protected to -60 V. Additional external protection may be required in some applications.
- 7) I_S sourced from cathode (anode), when $V_A < V_K$ ($V_A > V_K$).

BLOCK DIAGRAM



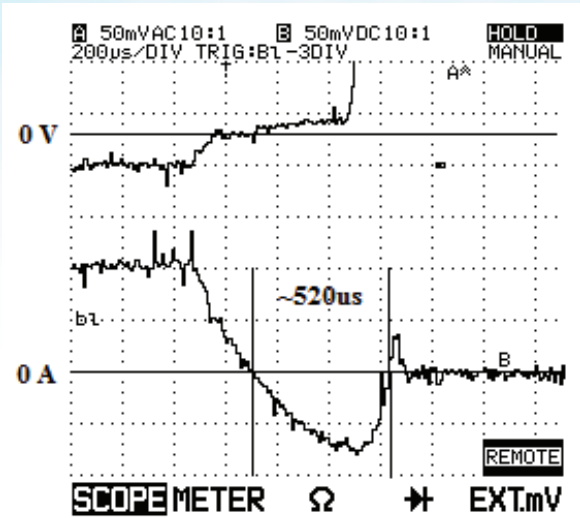


Figure 1: Reverse Current Shutdown Performance
 Top Trace: $V_K - V_{Ax}$
 Bottom Trace: I_F (50 A/div)

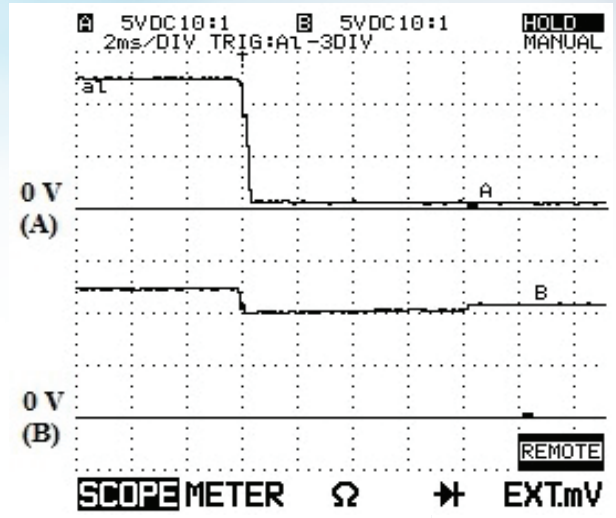


Figure 2: Load Voltage Response to Failed Source
 Top Trace: V_{A1}
 Bottom Trace: V_K
 $V_{A1} = 12.5\text{ V}$, $V_{A2} = 11\text{ V}$, $I_F = 100\text{ A}$

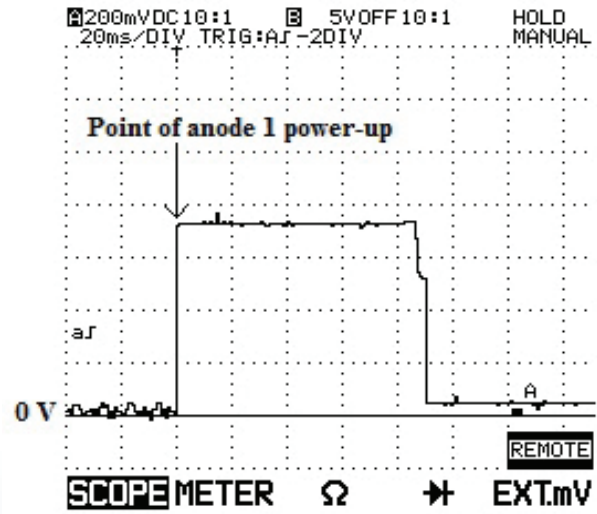


Figure 3:
 Rectifier Start-Up Forward Voltage Drop (Single Source Connected)
 Trace: $V_F (V_{A1} - V_K)$
 V_{A1} : 0 to 12.5 V, V_{A2} : Floating, $I_F = 100\text{ A}$

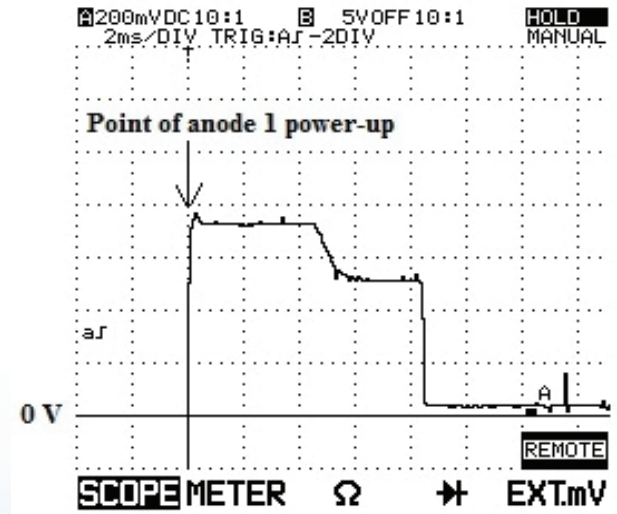
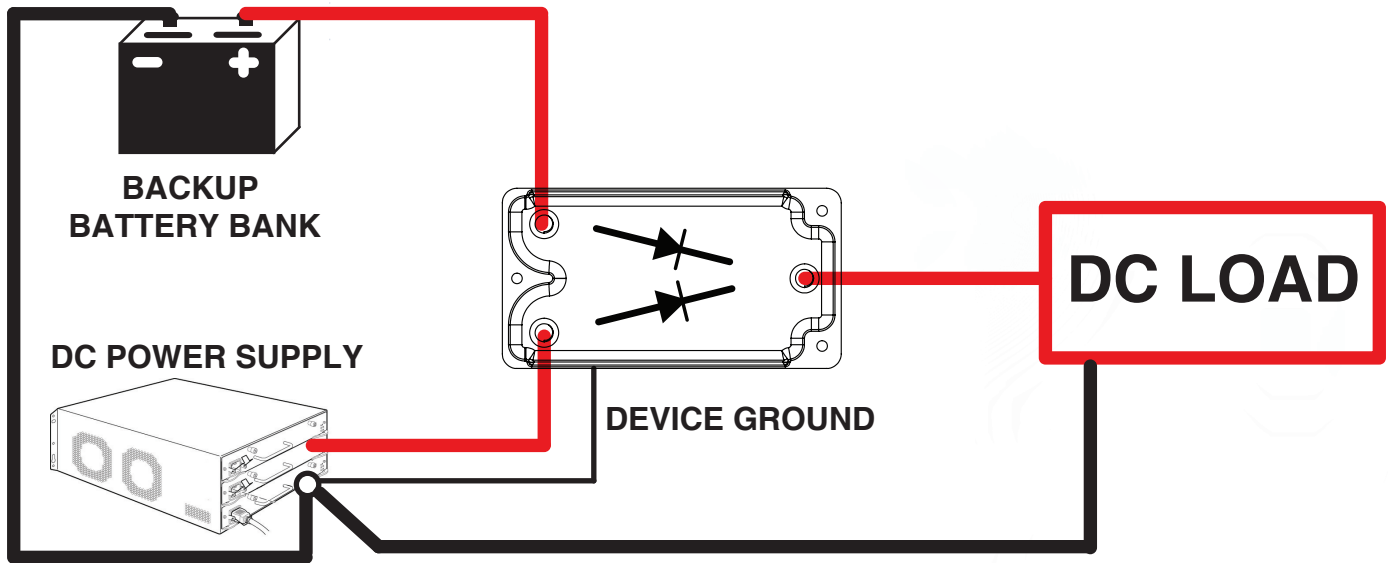


Figure 4:
 Rectifier Start-Up Forward Voltage Drop (Two Sources Connected)
 Trace: $V_F (V_{A1} - V_K)$
 V_{A1} : 0 to 12.5 V, $V_{A2} = 11\text{ V}$, $I_F = 100\text{ A}$

Diagram 1


POWER-GATE OR'ing diode (non-programmable) is designed to selectively OR one of two sources to a load. The device will automatically conduct current from the source with higher voltage (relative to device ground) to the load. When the primary source drops below the secondary source, the device will "flip," and current from the secondary will drive the load. The orientation of the internal MOSFET arrays insures there will be no disruption in power driving the load, even when transitioning from one source to another (refer to figure 2).

If source voltage levels are sufficiently close enough, dynamic voltage sag/rise of one source in response to the opposing source sag/rise can cause oscillation or rapid-switching between the sources. In this case, the "Programmable" OR'ing should be considered. Contact engineering for assistance.



REVISION HISTORY

| REV | DATE | DESCRIPTION | PAGE NUMBER (S) |
|-----|----------|----------------------|-----------------|
| 0 | 02/28/14 | Original Release | |
| 1 | 12/04/14 | Comprehensive Update | |
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|  DANGER / PELIGRO / DANGER /GEFAHR / PERICOLO / PERIGO | | | | | |
|--|--|---|--|---|---|
| <p>HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.</p> <ul style="list-style-type: none"> Disconnect all power before installing or working with this equipment. Verify all connections and replace all covers before turning on power. <p>Failure to follow these instructions will result in death or serious injury.</p> | <p>RIESGO DE DESCARGA ELECTRICA O EXPLOSION.</p> <ul style="list-style-type: none"> Desconectar todos los suministros de energia a este equipo antes de trabajar con este equipo. Verificar todas las conexiones y colocar todas las tapas antes de energizar el equipo. <p>EI incumplimiento de estas instrucciones puede provocar la muerte o lesiones serias.</p> | <p>RISQUE DE DESCARGE ELECTRIQUE OU EXPLOSION</p> <ul style="list-style-type: none"> Eteindre toutes les sources d'énergie de cet appareil avant de travailler dessus de cet appareil Vérifier tous connections, et remettre tous couverts en olace avant de mettre sous <p>De non-suivi de ces instructions provoquera la mort ou des lésions sérieuses sérieuses.</p> | <p>GEFAHR EINES ELEKTRISCHE N SCHLAGES ODER EINER EXPLOSION.</p> <ul style="list-style-type: none"> Stellen Sie jeglichen Strom ab, der dieses Gerät versorgt, bevor Sie an dem Gerät Arbeiten durchführen Vor der Inbetriebnahme alle Anschlüsse überprüfen und alle Gehäuseteile montieren. <p>Unterlassung dieser Anweisungen können zum Tode oder zu schweren Verletzungen führen.</p> | <p>RISCHIO DI SCOSSA ELETTRICA O DELL'ESPLOSIONE.</p> <ul style="list-style-type: none"> Spenga tutta l'alimentazione e che fornisce questa apparecchiatura prima del lavorare a questa apparecchiatura Verificare tutti i collegamenti e sostituire tutte le coperture prima della rotazione sull'alimentazione <p>L'omissione di seguire queste istruzioni provocherà la morte o di lesioni serie</p> | <p>RISCO DE DESCARGA ELÉTRICA OU EXPLOSAO</p> <ul style="list-style-type: none"> Desconectar o equipamento de toda a energia antes de instalar ou trabalhar com este equipamento Verificar todas as conexões e recolocar todas as tampas antes de religar o equipamento <p>O não cumprimento destas instruções pode levar à morte ou lesões sérias.</p> |