POWER-GATE™ Solid-State Devices
Bi-Directional DC Relay
Specification Sheet
Generation 4.0

Made in U.S.A

ABSOLUTE MAXIMUM RATINGS(1)

All devices ("x" = don't care), all amperages DC, all voltages DC and referenced to relay ground, unless otherwise specified.

Symbol	Parameter	Min.	Max.	Units
V_{Tx}	Terminals 1 and 2 Voltage, Model RBx40A-xxx	-0.3(2)	19(3)	V
	Terminals 1 and 2 Voltage, Model RBx40B-xxx	-0.3(2)	37(4)	
T_A	Ambient Temperature	-45	110	°C
$V_{TRIG,M}$	Main Trigger Voltage(5)	-37(6)	37(4)	V
$V_{TRIG,O}$	Override Trigger Voltage(7)	-37(6)	37(4)	V
I_{LED}	Remote LED Current	-	30	mA
$V_{LED(OFF)}$	Remote LED Voltage (LED Off)	-50	50	V

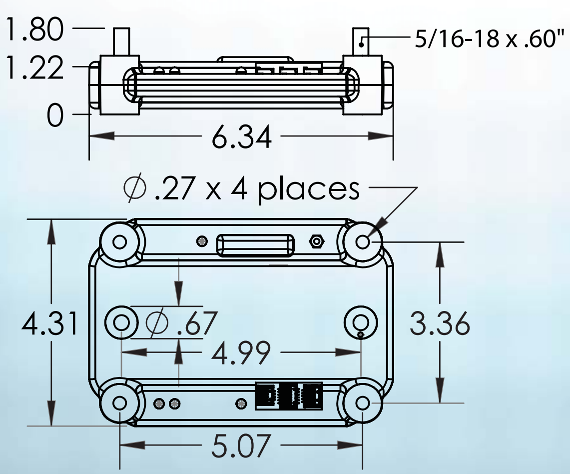
RECOMMENDED OPERATING CONDITIONS

All devices ("x" = don't care), all amperages DC, all voltages DC and referenced to relay ground, unless otherwise specified.

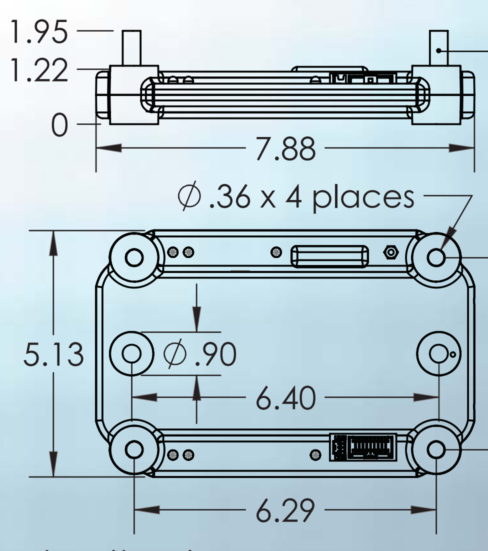
Symbol	Parameter	Min.	Max.	Units
V_{Tx}	Terminals 1 and 2 Voltage, Model RBx40A-xxx	4.8	18	V
	Terminals 1 and 2 Voltage, Model RBx40B-xxx	4.8	36	
T_A	Ambient Temperature	-40	105	°C
$V_{TRIG,M}$	Main Trigger Voltage(5)	0	36	V
$V_{TRIG,O}$	Override Trigger Voltage(7)	0	36	V

MECHANICAL QUICK SPECIFICATIONS

SMALL PACKAGE



MEDIUM PACKAGE



- ABS enclosure
- Dielectric tough-gel encapsulation
- Brass conductive posts
- Four integrated reinforced mounting points
- 6-32 ground connection
- User replaceable fuse
- LED indicator lights

Perfect Switch, LLC
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ELECTRICAL SPECIFICATIONS

All devices ("x" = don't care), all amperages DC, all voltages DC and referenced to device ground, T_A = +25 ± 3 °C, 4.8 V ≤ V_{T1} (RBx40A-xxx) ≤ 18 V, 4.8 V ≤ V_{T1} (RBx40B-xxx) ≤ 36 V, terminal 2 floating, all LEDs enabled, non-isolated active-low main trigger, non-isolated active-high override trigger, unless otherwise specified.

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_{L,CONT(MAX)}$	Maximum Continuous Load Current	-	-	50	A	Models RBS40x-050, -40 °C ≤ T_A ≤ 105 °C
		-	-	100		Models RBS40x-100 and RBM40x-100, -40 °C ≤ T_A ≤ 105 °C
		-	-	150		Models RBS40x-150 and RBM40x-150, -40 °C ≤ T_A ≤ 105 °C
		-	-	200		Models RBS40A-200, RBM40A-200, and RBM40B-200, -40 °C ≤ T_A ≤ 105 °C
		-	-	250		Models RBM40x-250, -40 °C ≤ T_A ≤ 105 °C
		-	-	300		Models RBM40x-300 and RBL40x-300, -40 °C ≤ T_A ≤ 105 °C
		-	-	400		Models RBL40x-400, -40 °C ≤ T_A ≤ 105 °C
		-	-	500		Models RBL40x-500, -40 °C ≤ T_A ≤ 105 °C
		-	-	600		Models RBS40x-600, -40 °C ≤ T_A ≤ 105 °C
$I_{L,INT(MAX)}$	Maximum Load Interrupt Current	-	-	-	-	See "Maximum Interrupting Current" section (coming soon)
$V_{IO,DROP}$	Input-to-Output Voltage Drop[8]	-	22	30	mV	Model RBS40A-050, Load Current = $I_{L,CONT(MAX)}$
		-	30	43		Model RBS40A-050, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	35	53		Model RBS40A-100, Load Current = $I_{L,CONT(MAX)}$
		-	48	70		Model RBS40A-100, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	25	37		Model RBM40A-100, Load Current = $I_{L,CONT(MAX)}$
		-	33	49		Model RBM40A-100, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	45	66		Model RBS40A-150, Load Current = $I_{L,CONT(MAX)}$
		-	61	88		Model RBS40A-150, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	27	40		Model RBM40A-150, Load Current = $I_{L,CONT(MAX)}$
		-	36	53		Model RBM40A-150, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	51	75		Model RBS40A-200, Load Current = $I_{L,CONT(MAX)}$
		-	71	100		Model RBS40A-200, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	28	41		Model RBM40A-200, Load Current = $I_{L,CONT(MAX)}$
		-	38	54		Model RBM40A-200, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	29	42		Model RBM40A-250, Load Current = $I_{L,CONT(MAX)}$
		-	40	56		Model RBM40A-250, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	34	49		Model RBM40A-300, Load Current = $I_{L,CONT(MAX)}$
		-	45	64		Model RBM40A-300, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	27	40		Model RBL40A-300, Load Current = $I_{L,CONT(MAX)}$
		-	37	53		Model RBL40A-300, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	29	42		Model RBL40A-400, Load Current = $I_{L,CONT(MAX)}$
		-	40	55		Model RBL40A-400, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	35	50		Model RBL40A-500, Load Current = $I_{L,CONT(MAX)}$
		-	48	66		Model RBL40A-500, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	40	57		Model RBL40A-600, Load Current = $I_{L,CONT(MAX)}$
		-	55	75		Model RBL40A-600, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	29	41		Model RBS40B-050, Load Current = $I_{L,CONT(MAX)}$
		-	44	63		Model RBS40B-050, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	49	69		Model RBS40B-100, Load Current = $I_{L,CONT(MAX)}$
		-	75	105		Model RBS40B-100, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	27	38		Model RBM40B-100, Load Current = $I_{L,CONT(MAX)}$
		-	40	58		Model RBM40B-100, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	64	90		Model RBS40B-150, Load Current = $I_{L,CONT(MAX)}$
		-	97	136		Model RBS40B-150, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	32	45		Model RBM40B-150, Load Current = $I_{L,CONT(MAX)}$
		-	48	68		Model RBM40B-150, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	41	57		Model RBM40B-200, Load Current = $I_{L,CONT(MAX)}$
		-	60	86		Model RBM40B-200, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	48	67		Model RBM40B-250, Load Current = $I_{L,CONT(MAX)}$
		-	71	101		Model RBM40B-250, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	55	77		Model RBM40B-300, Load Current = $I_{L,CONT(MAX)}$
		-	81	115		Model RBM40B-300, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	36	50		Model RBL40B-300, Load Current = $I_{L,CONT(MAX)}$
		-	54	75		Model RBL40B-300, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	47	65		Model RBL40B-400, Load Current = $I_{L,CONT(MAX)}$
		-	70	97		Model RBL40B-400, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	55	77		Model RBL40B-500, Load Current = $I_{L,CONT(MAX)}$
		-	84	115		Model RBL40B-500, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C
		-	65	90		Model RBL40B-600, Load Current = $I_{L,CONT(MAX)}$
		-	98	135		Model RBL40B-600, Load Current = $I_{L,CONT(MAX)}$, T_A = +105 °C

ELECTRICAL SPECIFICATIONS

All devices ("x" = don't care), all amperages DC, all voltages DC and referenced to device ground, T_A = +25 ± 3 °C, 4.8 V ≤ V_{T1} (RBx40A-xxx) ≤ 18 V, 4.8 V ≤ V_{T1} (RBx40B-xxx) ≤ 36 V, terminal 2 floating, all LEDs enabled, non-isolated active-low main trigger, non-isolated active-high override trigger, unless otherwise specified.

$I_{S,OPEN}$	Operating Current, Relay Triggered Open	17.1	18.1	19.1	mA	$V_{TRIG,M}$ = 0 V[5], OVERRIDETRIG+[7] floating
$I_{S,CLOSED}$	Operating Current, Relay Triggered Closed	20.1	22.1	24.1	mA	$V_{TRIG,M}$ = V_{T1}[5], OVERRIDETRIG+[7] floating
$I_{S,LP}$	Low Power Sleep Mode Operating Current[9]	-	-	2.4	mA	Models RBx40A-xxx
		-	-	2.5		Models RBx40B-xxx
I_{LEAK}	Relay Open Output Leakage Current: Normal Operation (Low Power Sleep Mode[9])	-	5 (4)	210 (210)	µA	Model RBS40A-050, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	7 (5)	25 (25)		Model RBS40A-100, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	11 (3)	35 (25)		Model RBM40A-100, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	10 (9)	215 (215)		Model RBS40A-150, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	17 (6)	220 (220)		Model RBM40A-150, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	16 (14)	730 (725)		Model RBS40A-200, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	22 (10)	740 (730)		Model RBM40A-200, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	33 (19)	1300 (1300)		Model RBM40A-250, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	36 (22)	1600 (1600)		Model RBM40A-300, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	44 (27)	1600 (1600)		Model RBL40A-300, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	24 (3)	845 (835)		Model RBL40A-400, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	23 (4)	2800 (2800)		Model RBL40A-500, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	110 (95)	9200 (9200)		Model RBL40A-600, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 12 V, Maximum value: V_{T1} = 18 V
		-	8 (2)	20 (15)		Model RBS40B-050, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 24 V, Maximum value: V_{T1} = 36 V
		-	9 (2)	20 (15)		Model RBS40B-100, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 24 V, Maximum value: V_{T1} = 36 V
		-	18 (4)	30 (20)		Model RBM40B-100, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 24 V, Maximum value: V_{T1} = 36 V
		-	9 (2)	20 (15)		Model RBS40B-150, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 24 V, Maximum value: V_{T1} = 36 V
		-	18 (4)	20 (15)		Model RBM40B-150, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 24 V, Maximum value: V_{T1} = 36 V
			20 (5)	30 (20)		Model RBM40B-200, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 24 V, Maximum value: V_{T1} = 36 V
			22 (6)	50 (30)		Model RBM40B-250, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 24 V, Maximum value: V_{T1} = 36 V
			25 (7)	100 (85)		Model RBM40B-300, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 24 V, Maximum value: V_{T1} = 36 V
			25 (5)	100 (85)		Model RBL40B-300, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 24 V, Maximum value: V_{T1} = 36 V
			51 (30)	1700 (1700)		Model RBL40B-400, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 24 V, Maximum value: V_{T1} = 36 V
			26 (4)	75 (55)		Model RBL40B-500, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 24 V, Maximum value: V_{T1} = 36 V
		-	27 (6)	10100 (10000)		Model RBL40B-600, Terminal 2 shorted to relay ground, Typical value: V_{T1} = 24 V, Maximum value: V_{T1} = 36 V
$V_{TRIG,H}$	Trigger High Threshold Voltage[10]	-	0.92	1.23	V	
$V_{TRIG,L}$	Trigger Low Threshold Voltage[12]	0.55	0.86	-	V	
$V_{TRIG,HYS}$	Trigger Hysteresis Voltage[12]	20	-	95	mV	
$I_{TRIG,AH}$	Active-high Trigger Current[13]	-	34	-	µA	$V_{TRIG,x}$ = 3.3 V[5,7]
		-	173	-		$V_{TRIG,x}$ = 12 V[5,7]
		-	293	-		$V_{TRIG,x}$ = 18 V[5,7]
		-	413	-		$V_{TRIG,x}$ = 24 V[5,7]
		-	653	-		$V_{TRIG,x}$ = 36 V[5,7]
$I_{TRIG,AL}$	Active-low Trigger Leakage Current[13]	-	34	-	µA	$V_{TRIG,x}$ = 0 V[5,7]
$V_{TRIG,ALOCV}$	Active-low Trigger Open Circuit Voltage[13]	-	3.3[14]	-	V	
f_{SW}	Relay Switching Frequency[15]	-	-	1	Hz	
$t_{TRIG,HOLD}$	Trigger Hold Time[13,16]	45	-	-	ms	
I_{OI1}	Over-current Threshold - Level 1[17]		2 x $I_{L,CONT(MAX)}$		A	
t_{OI1}	Over-current Shutdown Delay - Level 1	-	60	-	s	
I_{OI2}	Over-current Threshold - Level 2[17]	-	3 x $I_{L,CONT(MAX)}$	-	A	
t_{OI2}	Over-current Shutdown Delay - Level 2	-	1	-	s	
I_{OI3}	Over-current Threshold - Level 3[17]	-	3.25 x $I_{L,CONT(MAX)}$	-	A	
t_{OI3}	Over-current Shutdown Delay - Level 3	-	500	-	ms	
I_{OI4}	Over-current Threshold - Level 4[17]	-	3.5 x $I_{L,CONT(MAX)}$	-	A	
t_{OI4}	Over-current Shutdown Delay - Level 4	-	200	-	ms	
I_{OI5}	Over-current Threshold - Level 5[17]	-	3.75 x $I_{L,CONT(MAX)}$	-	A	
t_{OI5}	Over-current Shutdown Delay - Level 5	-	20	-	ms	
$t_{OI,D}$	Over-current Detection Delay[18]	-	-	15	ms	
I_{SC}	Short-circuit Threshold[17]	-	4 x $I_{L,CONT(MAX)}$	-	A	
t_{SC}	Short-circuit Shutdown Delay	-	-	4	ms	
$\Delta I_{OI/SC}$	Over-current/Short-circuit Threshold Tolerance[19]	-10	-	10	%	
$t_{OI/SC,LOCK}$	Over-current/Short-circuit Lockout Period[20]	-	10	-	s	

ELECTRICAL SPECIFICATIONS

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-	Over-current Fault LED Blinks - Level 1[21]	-	1	-	-	
-	Over-current Fault LED Blinks - Level 2[21]	-	2	-	-	
-	Over-current Fault LED Blinks - Level 3[21]	-	3	-	-	
-	Over-current Fault LED Blinks - Level 4[21]	-	4	-	-	
-	Over-current Fault LED Blinks - Level 5[21]	-	5	-	-	
-	Short-circuit Fault LED Blinks[21]	-	6	-	-	
T_{OFF}	Internal Over-temperature Shutdown	-	135	-	°C	
T_{RESET}	Internal Over-temperature Reset	-	130	-	°C	
-	Over-temperature Fault LED Blink Frequency[22]	-	3.8	-	Hz	
$\Delta V_{UV/OV}$	Under- and Over-voltage Threshold Tolerance[23]	-1	±0.5	1	%	
$t_{UV/OV,Dmin}$	Under- and Over-voltage Minimum Shutdown Delay	-	-	4	ms	
Δt	Timing Tolerance[24]	-2	±1	2	%	
$V_{Tx,PWRDWN}$	Terminal Voltage Power-down Threshold	-	3.8	-	V	
$V_{Tx,WARNON}$	Terminal Voltage Warning On Threshold[25]	-	4.7	-	V	
$V_{Tx,WARNOFF}$	Terminal Voltage Warning Off Threshold[25]	-	4.8	-	V	
$t_{D,CLOSE}$	Turn-on (Relay Open-to-Close) Delay[26]	-	-	2	ms	
$t_{D,OPEN}$	Turn-off (Relay Close-to-Open) Delay[27]	-	-	3	ms	
t_{RISE}	Output Voltage Rise Time[28]	1.2	-	7.5	µs	Models RBx40A-xxx: V_{T1} = 12 V, R_L = 120 Ω[29]; Models RBx40B-xxx: V_{T1} = 24 V, R_L = 240 Ω[29]
t_{FALL}	Output Voltage Fall Time[30]	-	11	-	µs	Model RBS40A-050, V_{T1} = 12 V, R_L = 120 Ω[29]
		-	12	-		Model RBS40A-100, V_{T1} = 12 V, R_L = 120 Ω[29]
		-	14	-		Model RBM40A-100, V_{T1} = 12 V, R_L = 120 Ω[29]
		-	13	-		Model RBS40A-150, V_{T1} = 12 V, R_L = 120 Ω[29]
		-	17	-		Model RBM40A-150, V_{T1} = 12 V, R_L = 120 Ω[29]
		-	14	-		Model RBS40A-200, V_{T1} = 12 V, R_L = 120 Ω[29]
		-	22	-		Model RBM40A-200, V_{T1} = 12 V, R_L = 120 Ω[29]
		-	26	-		Model RBM40A-250, V_{T1} = 12 V, R_L = 120 Ω[29]
		-	28	-		Model RBM40A-300, V_{T1} = 12 V, R_L = 120 Ω[29]
			25			Model RBL40A-300, V_{T1} = 12 V, R_L = 120 Ω[29]
		-	28	-		Model RBL40A-400, V_{T1} = 12 V, R_L = 120 Ω[29]
		-	29	-		Model RBL40A-500, V_{T1} = 12 V, R_L = 120 Ω[29]
		-	31	-		Model RBL40A-600, V_{T1} = 12 V, R_L = 120 Ω[29]
		-	9	-		Model RBS40B-050, V_{T1} = 24 V, R_L = 240 Ω[29]
		-	10	-		Model RBS40B-100, V_{T1} = 24 V, R_L = 240 Ω[29]
		-	27	-		Model RBM40B-100, V_{T1} = 24 V, R_L = 240 Ω[29]
		-	11	-		Model RBS40B-150, V_{T1} = 24 V, R_L = 240 Ω[29]
		-	30	-		Model RBM40B-150, V_{T1} = 24 V, R_L = 240 Ω[29]
		-	32	-		Model RBM40B-200, V_{T1} = 24 V, R_L = 240 Ω[29]
		-	34	-		Model RBM40B-250, V_{T1} = 24 V, R_L = 240 Ω[29]
		-	36	-		Model RBM40B-300, V_{T1} = 24 V, R_L = 240 Ω[29]
		-	28	-		Model RBL40B-300, V_{T1} = 24 V, R_L = 240 Ω[29]
		-	30	-		Model RBL40B-400, V_{T1} = 24 V, R_L = 240 Ω[29]
		-	31	-		Model RBL40B-500, V_{T1} = 24 V, R_L = 240 Ω[29]
		-	32	-		Model RBL40B-600, V_{T1} = 24 V, R_L = 240 Ω[29]
t_{CC}	Cold Crank Tolerance Time[31]	-	-	7	ms	Applied V_{T1} step = 12 to 3 V
$t_{D,PWRUP}$	Power-up Delay[32]	-	650	-	ms	Models RBx40A-xxx: Applied V_{T1} step = 0 to 12 V; Models RBx40B-xxx: Applied V_{T1} step = 0 to 24 V
t_{WD}	Low Power Sleep Mode Watchdog Time[33]	-	33	-	s	
$I_{SLEEPTRIP}$	Sleep Inhibit/Wake-up Trip Current (relative to $I_{LCONT(MAX)}$)[34]	-	1	4	%	Models RBx40A-xxx
		-	1	3	%	Models RBx40B-xxx

NOTES

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 lifetime.
2. Larger negative voltages will blow fuse and may cause MOSFET failure due to current through body diodes. Refer to application sheet AS0705 for more information.
3. Transient-protected to 40 V. Additional external protection may be required in some applications; see application sheet AS0705.
4. Transient-protected to 60 V. Additional external protection may be required in some applications; see application sheet AS0705.
5. Non-isolated trigger: $V_{TRIG,M}$ equals difference between MAINTRIG+ and relay ground (MAINTRIG- is internally connected to relay ground through 330 Ω resistor and is generally not required); Isolated trigger: $V_{TRIG,M}$ equals difference between MAINTRIG+ and MAINTRIG-
6. Transient protected to -60 V. Additional external protection may be required in some applications; see application sheet AS0705.
7. Non-isolated trigger: $V_{TRIG,O}$ equals difference between OVERRIDETRIG+ and OVERRIDETRIG- (OVERRIDETRIG- is internally connected to relay ground through 330 Ω resistor and is not required, but is often used to simply connection to mechanical trigger switch); Isolated trigger: $V_{TRIG,O}$ equals difference between OVERRIDETRIG+ and OVERRIDETRIG-
8. Voltage drop tested under pulsed conditions with pulse length ≤ 2 s.
9. Low power sleep mode is a non-standard feature. Refer to application sheet AS0705 for more information.
10. $V_{TRIG,H}$ is the threshold to activate/deactivate both the main and override triggers for active-high/active-low configurations, respectively.
11. $V_{TRIG,L}$ is the threshold to deactivate/activate both the main and override triggers for active-high/active-low configurations, respectively.
12. $V_{TRIG,HYS} = V_{TRIG,H} - V_{TRIG,L}$
13. Applies to both main and override triggers.
14. 100 kΩ (typical) between MAINTRIG+/OVERRIDETRIG+ and internal 3.3 V.
15. Relay switching frequency is limited internally by software. Trigger frequencies in excess of 1 Hz will not cause faster switching.
16. Trigger hold time is defined as the length of time that a trigger voltage must be held above/below $V_{TRIG,H}$/$V_{TRIG,L}$,respectively, in order to yield a valid trigger state change.
17. Over-current and short-circuit thresholds are specifically designed for MOSFET array protection and cannot be changed by customer request. If other current-related shutdowns are desired, refer to available circuit-break thresholds described in application sheet AS0705.
18. Over-current detection delay is defined as the length of time between when an over-current threshold level is first exceeded and when the delay timer begins.
19. Over-current/short-circuit threshold tolerance applies equally to all levels (e.g. if level 1 over-current threshold has a -5% error, then over-current levels 2, 3, 4, and 5, and the short-circuit threshold, will all have the same -5% error).
20. If the relay opens due to an over-current or short-circuit event, relay reset is inhibited for the lockout period. If the relay opens due to a circuit-break event, and the circuit-break threshold is greater than $I_{L,CONT(MAX)}$, relay reset by trigger toggle is also inhibited for the lockout period.
21. Typical blink on- and off-time is 262 ms. Typical delay between blinking sequences is 2 seconds. See application sheet AS0705 for more information.
22. Over-temperature blinking pattern has equal on- and off-time.
23. Under- and over-voltage shutdown features non-standard. Call manufacturer for more information.
24. Applies to over-current, short-circuit, circuit-break, under-voltage, and over-voltage shutdowns.
25. If the relay is closed when the source voltage falls below $V_{Tx,WARNON,}$ it will stay closed, but the over-current and short-circuit features will revert to a single level. If the relay is open when the source voltage falls below $V_{Tx,WARNON,}$ closing of relay will be inhibited until the source voltage rises above $V_{Tx,WARNOFF.}$
26. Turn-on delay is defined as the length of time between when a valid trigger state change is detected (refer to note 16) and when the output voltage reaches 10 % of its final value.
27. Turn-off delay is defined as the length of time between when a valid trigger state change is detected (refer to note 16) and when the output voltage reaches 90 % of its final value.
28. Output voltage rise time is defined as the length of time the output voltage takes to go from 10 to 90 % of its final value.
29. R_L is the load resistance between the relay output and ground.
30. Output voltage fall time is defined as the length of time the output voltage takes to go from 90 to 10 % of its final value.
31. Cold crank tolerance time is defined as the length of time the relay will remain closed while the source voltage is below the power-down threshold.
32. Power-up delay is defined as the length of time between when the source voltage rises above the warning off theshold ($V_{Tx,WARNOFF}$) and when the relay is enabled for normal operation.
33. Low power sleep mode watchdog time is defined as the length of time the relay is in its lowest-power state, between wakeup check intervals. Refer to application sheet AS0705 for more information.
34. Sleep inhibit/wake-up trip current is defined at the amount of current flowing through the MOSFET array (in either direction) that will cause the sleep timer to be restarted (or stated another way, the current through the MOSFET array must be less than the sleep inhibit/wake-up trip current for the sleep timer to run). This same amount of current will wake-up the device from sleep mode when the relay momentarily wakes up to check the requested current draw through the MOSFET array.

TYPICAL PERFORMANCE

Any inductance ("L") noted is the value seen between terminals 1 and 2.

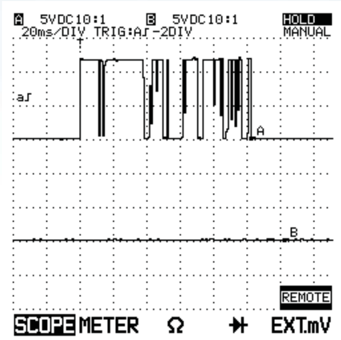


Figure TP1: Trigger Noise Immunity (Relay Open)
Top Trace: Trigger Voltage
Bottom Trace: Relay Output Voltage

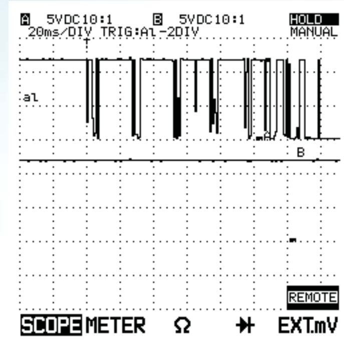


Figure TP2: Trigger Noise Immunity (Relay Closed)
Top Trace: Trigger Voltage
Bottom Trace: Relay Output Voltage

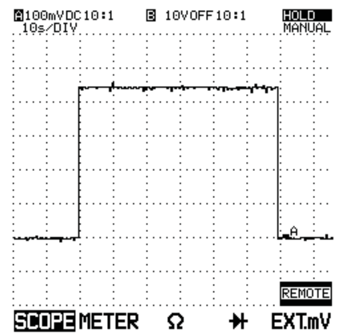


Figure TP3: Level 1 Over-Current Shutdown Example (RBS40B-200)
Trace: Load Current (100 A/div)

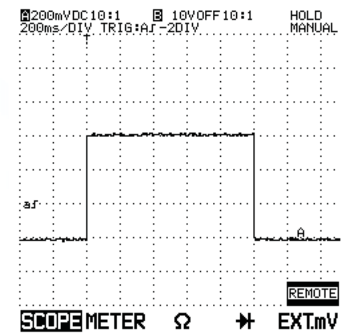


Figure TP4: Level 2 Over-Current Shutdown Example (RBM40B-200)
Trace: Load Current (200 A/div)

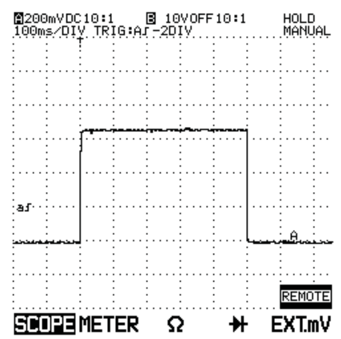


Figure TP5: Level 3 Over-Current Shutdown Example (RBM40B-200)
Trace: Load Current (100 A/div)

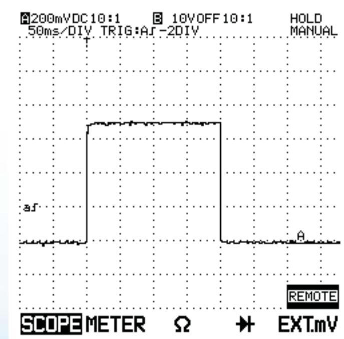


Figure TP6: Level 4 Over-Current Shutdown Example (RBM40B-200)
Trace: Load Current (100 A/div)

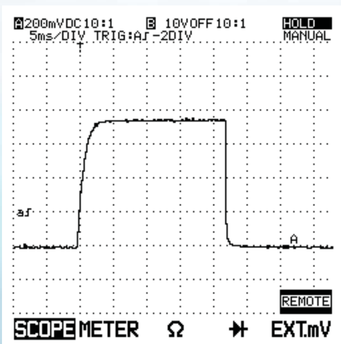


Figure TP7: Level 5 Over-Current Shutdown Example (RBM40B-200)
Trace: Load Current (200 A/div)

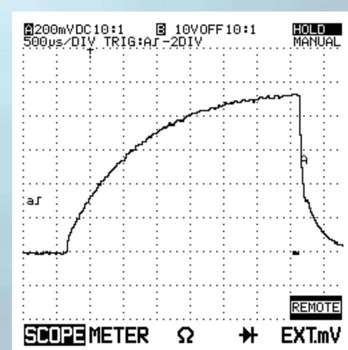


Figure TP8: Short Circuit Shutdown Example 1
Condition Present Before Turn-On (RBM40B-200, L ≈ 16 μH)
Trace: Load Current (200 A/div)

TYPICAL PERFORMANCE

Any inductance ("L") noted is the value seen between terminals 1 and 2.

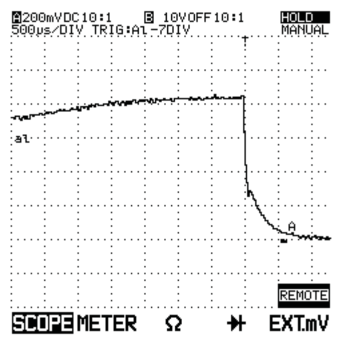


Figure TP9: Short Circuit Shutdown Example 2
Condition Appears After Turn-On Complete (RBM40B-200, L ≈ 16 µH)
Trace: Load Current (200 A/div)

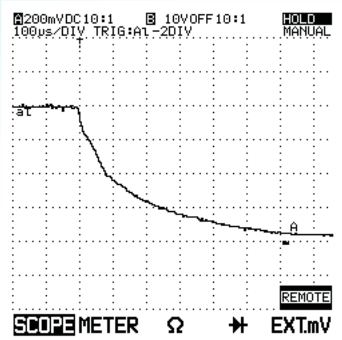


Figure TP10: Short Circuit Shutdown Example 3
Current Decay (RBM40B-200, L ≈ 16 µH)
Trace: Load Current (200 A/div)

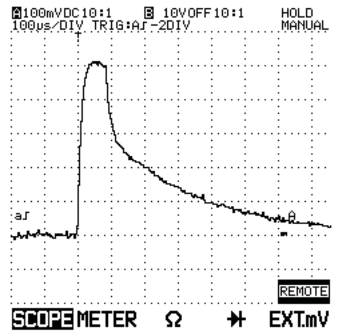


Figure TP11: Short Circuit Shutdown Example 4
Ground Wire Current (RBM40B-200, L ≈ 16 µH,
Ground Wire: 18 AWG, 4 ft.)
Trace: Ground Wire Current (100 A/div)

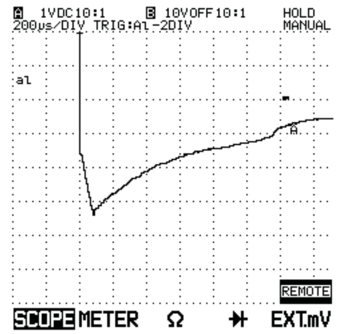


Figure TP12: Short Circuit Shutdown Example 5
Negative Output Voltage Spike (RBM40B-200, L ≈ 16 µH,
Ground Wire: 18 AWG, 4 ft.)
Trace: Relay Output Voltage (Measured Between Relay Load and Ground Terminals)

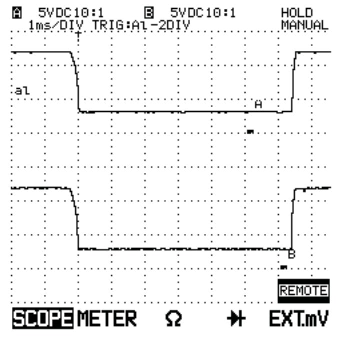
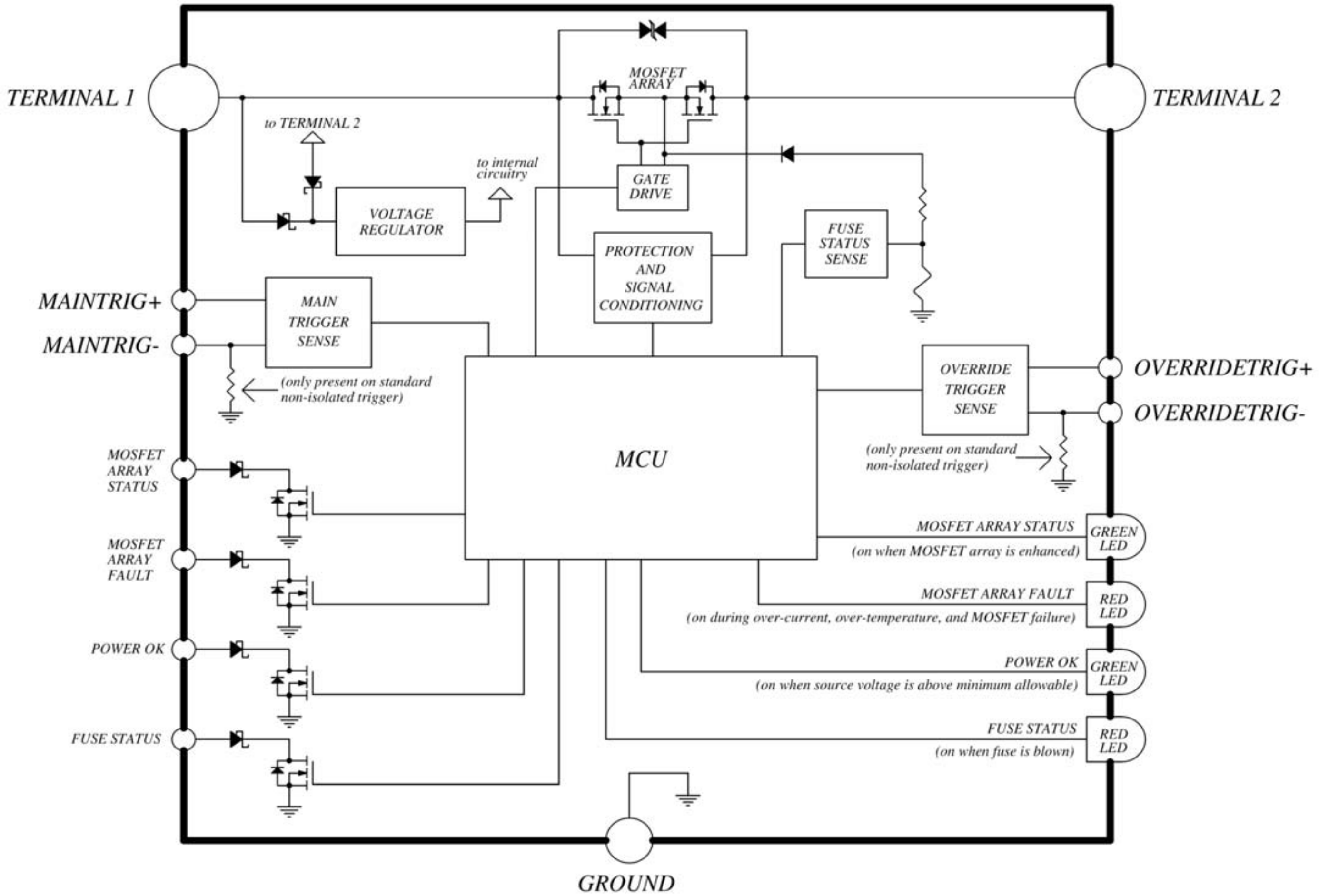


Figure TP13: Cold-Crank Performance
Top Trace: Relay Source Voltage
Bottom Trace: Relay Output Voltage

FUNCTIONAL BLOCK DIAGRAM



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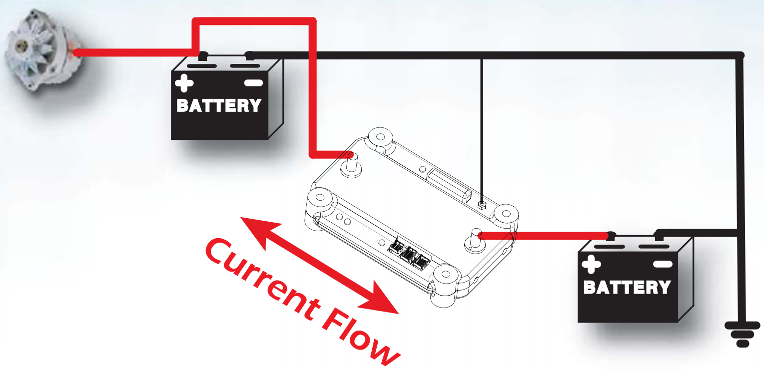
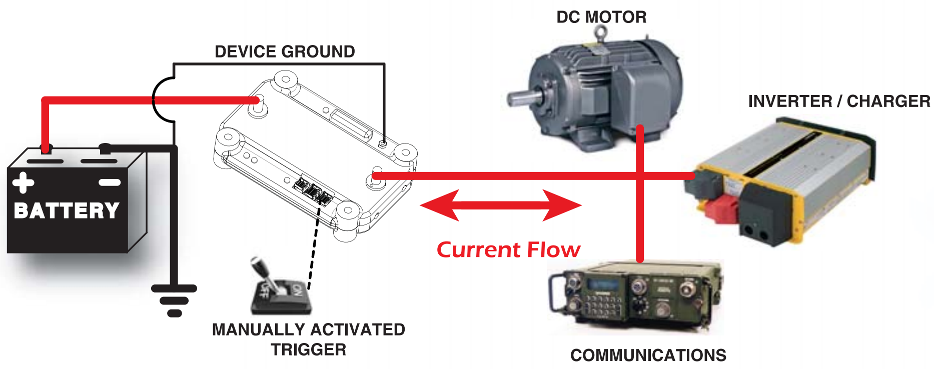
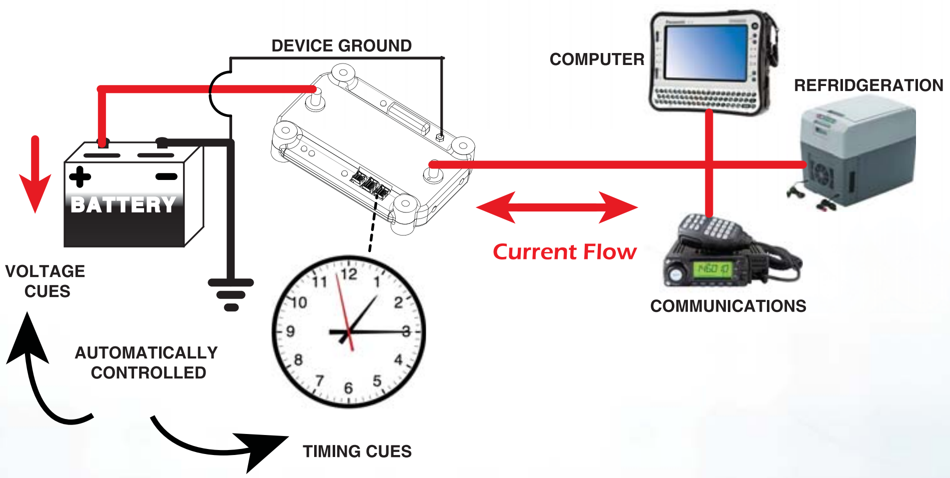
SAMPLE APPLICATIONS



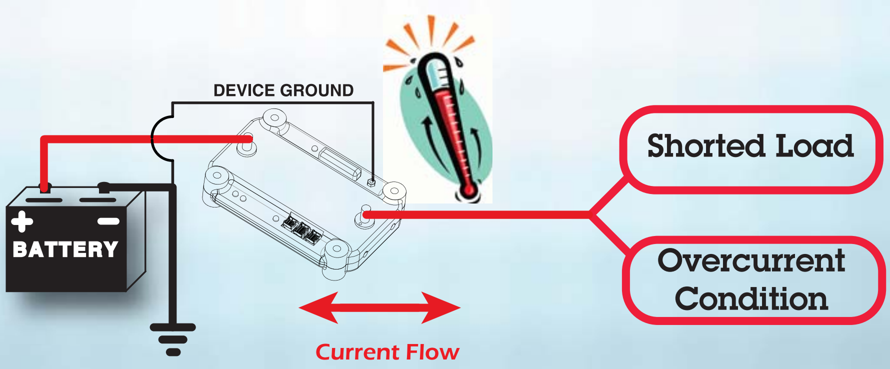
A Bi-directional relay must be used when voltage sources are present on both sides of the device in order to fully open the electrical circuit and insure no MOSFET damage occurs.



POWER-GATE Bi-directional relay can be manually activated or ignition-switched to power or de-power all high and low current accessories including motors, inverters, communications equipment, lighting, refrigerators/freezers, and sensitive computer equipment.



POWER-GATE Bi-directional relay can be programmed to automatically respond to low-voltage or high voltage battery conditions, and various timing cues making the device highly customizable. The ability to handle both high and low current in a single, easy-to-install module makes POWER-GATE a compelling choice when programmed to behave as a low voltage disconnect and preserve battery health.



POWER-GATE Bi-directional relay can be programmed to respond as a precision circuit breaker. If the device senses a shorted load or an overcurrent condition, the device will "open" and de-power the output.

The device will also respond to over temperature conditions by sensing strategically placed sensors within the sealed module.

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NOTES

REVISION HISTORY

REV	DATE	DESCRIPTION	PAGE NUMBER (S)
0	6/25/18	Original Release	

⚠ DANGER / PELIGRO / DANGER /GEFAHR / PERICOLO / PERIGO

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.

- Disconnect all power before installing or working with this equipment.
- Verify all connections and replace all covers before turning on power.

Failure to follow these instructions will result in death or serious injury.

RIESGO DE DESCARGA ELECTRICA O EXPLOSION.

- 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 energizer el equipo.

El incumplimiento de estas instrucciones puede provocar la muerte o lesiones serias.

RISQUE DE DESCHARGE ELECTRIQUE OU EXPLOSION

- 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

De non-suivi de ces instructions provoquera la mort ou des lésions sérieuses sérieuses.

GEFAHR EINES ELEKTRISCHE N SCHLAGES ODER EINER EXPLOSION.

- 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.

Unterlassung dieser Anweisungen können zum Tode oder zu schweren Verletzungen führen.

RISCHIO DI SCOSSA ELETTRICA O DELL'ESPLOSI ONE.

- Spenga tutta l'alimentazion e che fornisce questa apparecchiatu ra prima del lavorare a questa apparecchiatu ra
- Verificare tutti i collegamenti e sostituire tutte le coperture prima della rotazione sull'alimentazi one

L'omissione di seguire queste istruz ioni provocherà la morte o di lesioni serie

RISCO DE DESCARGA ELÉTTRICA OU EXPLOSÃO.

- Desconectar o equipamento de toda á energia antes de instalar ou trabalhar com este equipamen to
- Verificar todas as conexões e recolocar todas as tampas antes de religar o equipamento

O não cumprimento destas instruções pode levar á morte ou lesões sérias.

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