

US 11,352,998 B2

Fully Adjustable Open and Close Voltages
Supports All Battery Chemistry Combinations

Supports Multiple Engine Installations with
Dual Start/Engine Isolation Inputs

Start Assist Option for Auto or Manual
Connection with Start / Aux Batteries

Optional Priority Charging Delays Closure Until
Charging Battery is More Charged

Optional Aux Battery Priority Shares Start
Battery Energy, Maintains Starting Ability

Optional Low Voltage Lockout Protects From
Connecting Into Shorted Cell Battery



Eliminates Dead Start Batteries by sharing charging on either of two batteries and isolating batteries when no charge sources are present.



Simple & Robust Installation: Integrated sealed plug eliminates corrosion, includes Deutsch/Amphenol DTM connector harness



Additional Low Amp Output can be used to report device status remotely.



Bullet-proof Construction: Sealed unit, high temperature materials allow mounting anywhere. Integrated thermal overload shutdown protection.



Ultra Low Off-State Current: Compare to typical ACRs (7-10 mA) vs 7610 ACR @ 1.3 mA



Adjustable On and Off Voltage Settings allow sharing start battery energy for auxiliary battery while ensuring engine starting ability; or charging start battery before sharing with auxiliary



Dual Start/Engine Isolation input option for protecting sensitive electronics or isolating multiple charging sources to optimize overall system performance.



Start Assist input option to ensure maximum cranking amps available.



4 Year Industry Leading Warranty

Dip Switch Setting Options & Features

*** DISCONNECT BATTERY FROM POWER DISTRIBUTION SYSTEM BEFORE INSTALLING PRODUCT TO PREVENT ELECTRICAL SHOCK OR PRODUCT DAMAGE**

8 OFF	1	4 STATUS +	3 PER SWB +
ON	2 Force OFF +	1 GROUND	

Voltage Settings			
3 2 1	6 5 4 ON OFF	13.6	12.8
Under-Volt Lock-Out		13.5	12.7
9.5 Vdc		13.4	12.6
OFF		13.3	12.5
PIN #3		13.2	12.4
Function		13.1	12.3
Force ON		13.0	12.2
Force OFF		12.9	12.1
Factory Default			
3 2 1	6 5 4 ON OFF	27.2	25.6
		27.0	25.4
		26.8	25.2
		26.6	25.0
		26.4	24.8
		26.2	24.6
		26.0	24.4
		25.8	24.2

DS1-DS3: Determines 30 sec OFF Trigger Voltage, 10 sec OFF Trigger Voltage is 0.4 (0.8) Vdc lower. Once below this voltage, time delay to OFF is counting. If voltage is greater than this setting, time delay is re-set to 0. Setting below 12.7 (25.4) Vdc allows accy loads partial use of start battery energy, while ensuring sufficient starting ability.

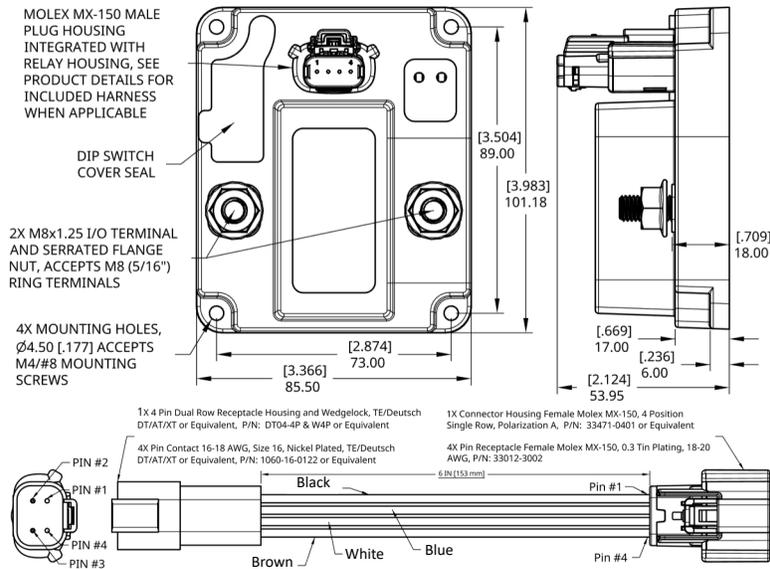
DS4-DS6: Determines 120 sec ON Trigger Voltage, 30 sec ON Voltage is 0.6 (1.2) Vdc higher. Once above this voltage, time delay to turning the relay ON is counting until ON event. If voltage is less than this setting, time delay is re-set to 0.

DS7: Under-voltage Lock-Out Enable. If DS7=ON, ACR will NOT close if either terminal < UV Lockout Voltage to prevent an extremely high inrush current from damaging the ACR

DS8: Determines Pin #3 Response Function. DS8=ON triggers CLOSE if Pin #3 > 8.0 Vdc. (Start Assist) DS8=OFF triggers OPEN if Pin #3 > 8.0 Vdc. (Isolate)

** Voltages in () represent 24V version settings

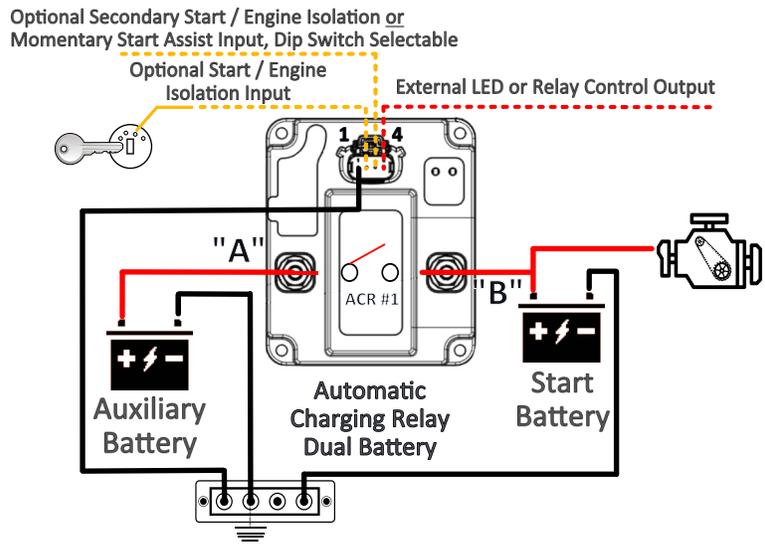
Dimensions



Methods of Operation

- ACR turns ON after 30 (or 120) seconds if:**
- 1) If UV Lock = OFF: V-sense A or V-sense B > "ON Voltage", or
 - 2) If UV Lock = ON: V-sense A and V-sense B > V-Lock and V-sense A or V-sense B > "ON Voltage"
- ACR turns OFF after 30 (or 10) seconds if:**
- 1) V-sense A or B < "OFF Voltage" per DS1-DS3
- Force OFF (Start / Engine Isolation) Opens ACR Immediately if:**
- 1) If (DS8 = OFF and Pin #3 > 8.0 Vdc) OR (Pin #2 > 8.0 Vdc)
 - 2) 3 min lock-out after enabling before AUTO on/off enabled.
 - 3) Isolation can be connected to engine 'starting' signal or 'running' signal. Use 'start' to isolate Aux loads from cranking event. Use 'running' for multiple engine/charge sources if continuous isolation is desired.
- Force ON (Start Assist) Closes ACR Immediately if:**
- 1) If DS8 = ON and Pin #3 > 8.0 Vdc, * ACR returns to normal operation after 10 sec delay and Pin #3 voltage removed. ** Overrides Engine Isolation if both are applied simultaneously.
- ACR Opens in < 5 sec if Voltage > 17.0 Vdc**

System Diagram



Status LED Indicator Functions

	Bicolor LED	Red Solid / Green Flash	Relay Off, Pending Voltage Based On
		Red Flash / Green Solid	Relay On, Pending Voltage Based Off
		Single Red Flash / No Green	Under-Volt Lockout or Start Isolation Engaged
		Single Green Flash	Start Assist Applied
		No LED	Unit OFF/Open, voltage below turn ON threshold
		Red Rapid Flash	High Current / Temperature OFF/Open

Specifications

Nominal Voltage (Vdc)	12	24
Input Voltage Range (Vdc)	8.0-18.0	16.0-36.0
Continuous Current (Amps)	160	
120 sec Close Voltage Range (Vdc)	12.9-13.6	25.8-27.2
30 sec Close Voltage Range (Vdc)	13.5-14.2	27.0-28.4
30 sec Open Voltage Range (Vdc)	12.1-12.8	24.2-25.6
10 sec Open Voltage Range (Vdc)	11.7-12.4	23.4-24.8
Over Voltage Protection (Vdc) (5 sec)	17.0	34.0
Under-Voltage Lockout (Vdc) (if ON)	9.5	19.0
Operating Current (Amps)	0.340	0.170
Max 5 Min Current (Amps)	240	
Operating Current (mA) Standby / Open	1.3	
Cable Size to Meet Ratings	1/0 AWG	
Maximum Cable Size	2/0 AWG	
Hardware Material	Stainless Steel Self-Locking	
Terminal Stud Torque	80 in-lbs	
Aux Output Pin #4 Max Drive Current	400 milli-Amps	
Min Source Current (Pin #2 & #3 Inputs)	10 micro-Amps	
IP Rating (IEC 60529)	IP65	
Operational Temperature	-40 to 105 C	
Storage Temperature	-50 to 125 C	

Part Numbers

Part Numbers	Resell Pack	Bulk Pack
12V ACR, 160A w/Deutsch Harness	7610	7610B
24V ACR, 160A w/Deutsch Harness	7610-24	7610-24B

* Contact us about custom product configurations



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