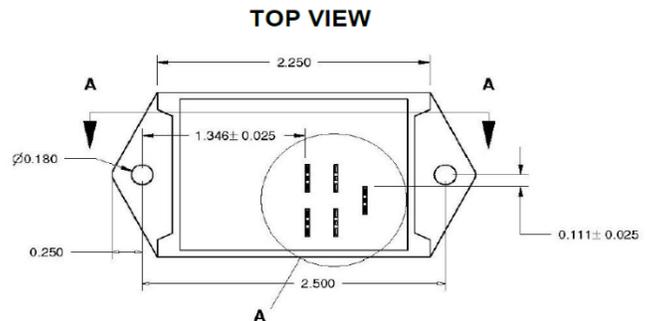
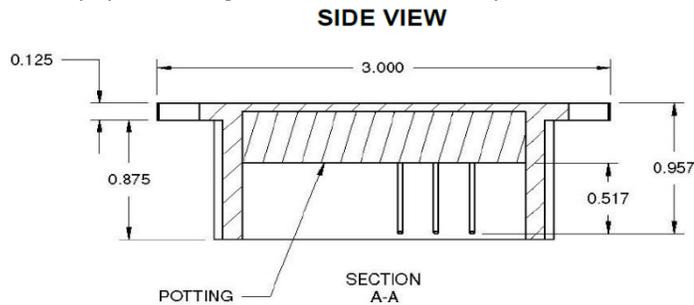


# "What you Need in a Clutch"™

## SOFT START CONTROLLER

*The patented Softstart Clutch Controller offers a simple solution to all of these issues!*

- **Mechanical Life:** The Softstart lessens forces to mechanical parts and improves the life of bolts, decks, brackets and other mechanical parts.
- **Belt Life:** Reduce wear and breakage for belts and improve the quality & reputation of the equipment.
- **Engine Stall:** The Softstart eliminates engine stalling and RPM droop by utilizing closed loop RPM monitoring while engaging the electric clutch.
- **Mechanical Jolt:** Smooth engagement means less jolt to the equipment and customers.
- **Engine Cost Savings:** The Softstart Clutch enables OEM's to reduce equipment engine size to save money.



### Gas Version, Specifications - Model 31123000

	Min	Nom	Max	Units
Operating Voltage:	8		16	Volts
Max On resistance:			0.07	Ohms
"On" Response Time:	220	250	280	ms
Soft Start Ramp Time:	900	1000	1100	ms

Tachometer Input (for closed loop versions)

Impedance:		1.5		MOhms
Input Range:	1000		4000	RPM*

\*Note: RPM Input spark pattern 1:1  
(1 Pulse per Revolution, other patterns available)

Protection: Load Dump ISO 7637-2 test pulse 5A				
Over current (13.8 VDC)	47	89	131	Amps

### Diesel/Electric Version, Specifications - Model 31128000

	Min	Nom	Max	Units
Operating Voltage:	8		16	Volts
Max On resistance:			0.07	Ohms
"On" Response Time:	220	250	280	ms
Soft Start Ramp Time:	900	1000	1100	ms

Alternator Tachometer Input (for closed loop versions)

Impedance:		100		kOhms
Trigger (VIL)			3.3	Volts
Trigger (VIH)	4.7			Volts

Frequency Range: 170 700 Hz\*

\*Note: Other frequency ranges available

Protection: Load Dump ISO 7637-2 test pulse 5A				
Over current (13.8 VDC)	47	89	131	Amps

# "What you Need in a Clutch"™

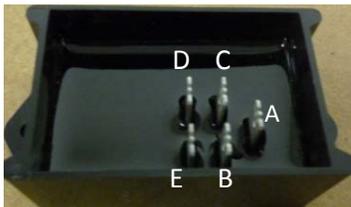
The patented softstart controller senses the exact point at which the friction surfaces contact, then rapidly reduces the current to allow the clutch to safely slip, but not release. Using engine RPM feedback, the controller adjusts the clutch current in a manner that drives the engine RPM to fit a desired profile.

## Design Features:

- Closed loop control for consistent performance throughout the entire clutch life.(For engines under 40HP)
- Precise current measurement for accurate and repeatable pull-in detection.
- Closed loop PWM current control unaffected by charging system voltage.
- One controller part number
  - Ratiometric RPM control automatically scales to RPM at time of engagement.
  - On-the-fly current calibration automatically adapts to different sized clutches.
- Default to open loop control if RPM signal is unavailable.
- Optional fixed current calibration possible for special applications
- Optional open loop available (no tachometer feedback)
- Short Circuit protected / Load dump protected

## Operating and Environment Specs:

- Operating Temperature Range: -40 to +70C
- Vibration: 20g's @ 10—80 Hz SAE J-1378
- Shock 55g's SAE J-1378 (tested and passed to 150gs, which is nearly 3 times the SAE specification)
- Humidity: 95% H SAE J-1378
- Salt Spray Test: MIL-STD-202G, Method 101E (5% NaCl @ 35C, 48 hrs)
- Dust: Unit is 100% encapsulated—dust cannot enter
- Immersion: ASAE EP455 5.6 level 2
- Ultraviolet: Q-Sun Xe-1-UV Chamber—720 Hours
- Chemical: ASAE EP455.5.8.2 chemicals brush exposure
- Thermal Shock: Controller stabilized at 70°C for 30 min. Removed from oven and immediately immersed in 0°C water mixed with UV sensitive dye for a minimum of 5 minutes—repeated for a total of 10 cycles. Controller stabilized at -40°C for 30 min. Removed from chamber and immediately immersed into 25°C water mixed with UV sensitive dye for a mini-mum of 5 min—repeated for a total of 10 cycles. No functional failures or ingress of water.

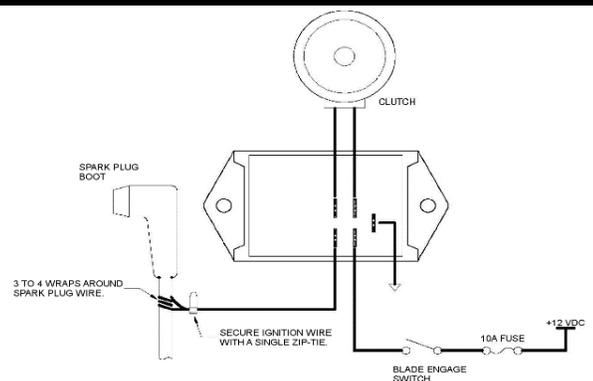


## HOOKUP: Gas, Diesel, or Electric

- A. Ground
- B. +12VDC Supply
- C. Clutch OUT +
- D. Clutch RETURN
- E. RPM Tachometer Trigger

(For closed loop; engines under 40HP)

Inductive for gas,  
Alternator for diesel, etc.



## OEM Options

- Voltage Input Options
- Open loop soft start available (no tach feedback)
- Other tach feedback (shaft rotation, controller, etc.)
- Multiple clutch engagement and tachometer profiles



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