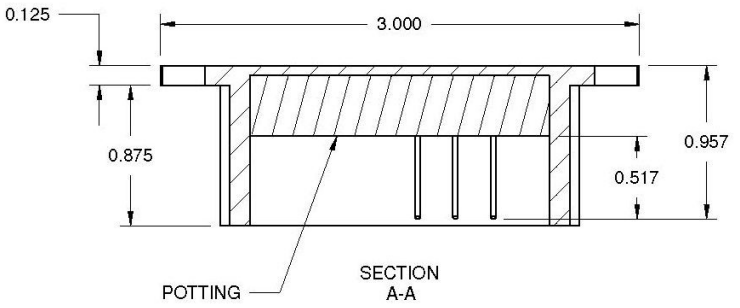
"What you need in a clutch"®

SOFTSTART CONTROLLER

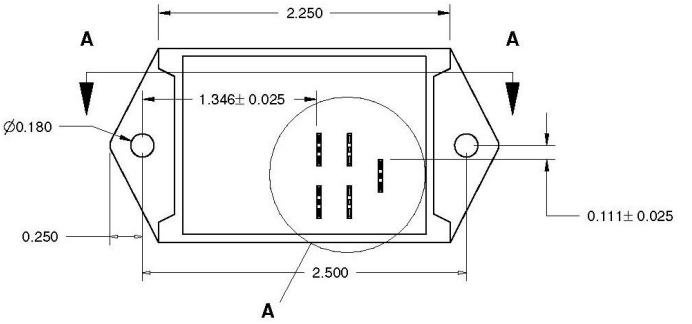
The patented Softstart Clutch Controller offers a simple solution to all of these issues!

- **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.

SIDE VIEW



TOP VIEW



Gas Version, Absolute Maximum Ratings - Model 3112300000

	Min	Nom	Max	Units
Operating Voltage	8		16	Volts
Max On resistance:			0.05	Ohms
"On" Response Time:	220	250	280	mS
Soft Start Ramp Time:	900	1000	1100	mS

Tachometer Input (for closed loop versions)

	Min	Nom	Max	Units
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

	Min	Nom	Max	Units
Over current (13.8 VDC)	47	89	131	Amps

Diesel & Electric Version, Absolute Maximum Ratings - Model 3112800000

	Min	Nom	Max	Units
Operating Voltage	8		16	Volts
Max On resistance:			0.05	Ohms
"On" Response Time:	220	250	280	mS
Soft Start Ramp Time:	900	1000	1100	mS

Alternator Tachometer Input (for closed loop versions)

	Min	Nom	Max	Units
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

	Min	Nom	Max	Units
Over current (13.8 VDC)	47	89	131	Amps

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"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 a level that allows the clutch to safely slip, but not release. Using engine RPM feedback, the patented controller adjusts the clutch current in a manner that drives the engine RPM to a fit a desired profile.

Design Features:

- Closed loop control for consistent performance throughout the entire clutch life.
- 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

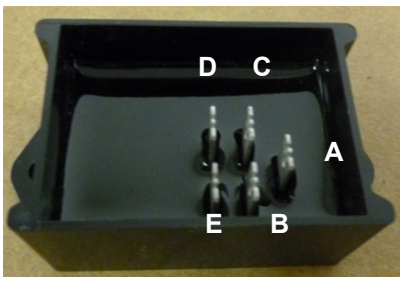
Operating and Environment Specs:

- 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

Immerse controller in tap water at temperature of 18C +/- 5C to a component top surface depth of 460mm. Orient in each of 3 orthogonal planes for 5 min in each plane. Upon removal, immediately subject to a cold soak of 019C for 30 min. Return to dry atmosphere of 25C for 60 min. No impaired function, no water entry

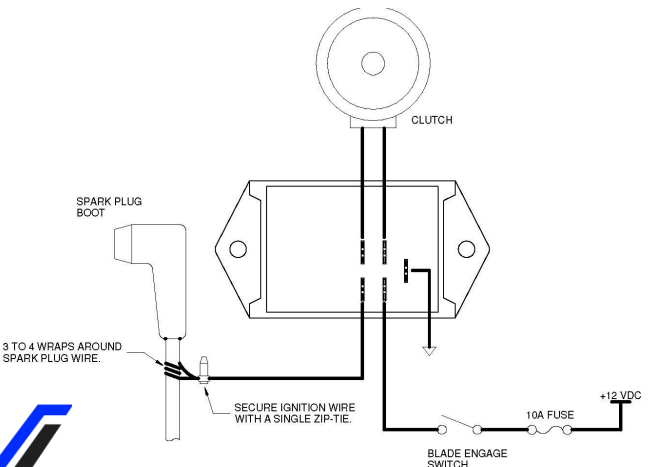
Ultraviolet: Q-Sun Xe-1-UV Chamber—720 Hours

- Thermal Shock: Controller stabilized at 70C for 30 min. Removed from oven and immediately immersed in 0C water mixed with UV sensitive dye for a minimum of 5 minutes—repeated for a total of 10 cycles. Controller stabilized at –40C for 30 min. Removed from chamber and immediately immersed into 25C water mixed with UV sensitive dye for a minimum of 5 min—repeated for a total of 10 cycles. No functional failures or ingress of water.
- Chemical: ASAE EP455.5.8.2 chemicals brush exposure
- Chemical test: Apply with a brush over the normally exposed surface area. Repeat once per day for three days. Check for impaired function or detrimental corrosion during the test and at the end of a 100 hour min interval following exposure to test condition. No defect from wiping the surface with the following chemicals at room temperature: engine oil, transmission fluid, gasoline.



HOOKUP: Gas Powered, Diesel or Electric Versions PIN OUT

A Ground
B +12VDC Supply
C Clutch OUT +
D Clutch RETURN
E RPM Tachometer trigger (for closed loop versions). Inductive for gas equipment, alternator output for diesel, other pickup options available



OEM Options

- Other tachometer feedback (rotating shaft, controller interface, etc.)
- Open loop soft start version with no tachometer feedback
- Voltage input options
- Multiple clutch engagement and tachometer profiles

OGURA INDUSTRIAL CORP.

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