GDI Softstart Contoller for Electric Clutches

For Gas, Diesel, or Electric powered equipment; remove damaging jolt during clutch engagement; tachometer closed loop feedback (inductive or alternator input)

GDi GLOBAL DIGITAL INSTRUMENTS

Problems solved by the Softstart Contoller:

- Bolt Shear
- Broken Belts
- Link Breakage
- Belt Screech
- RPM Droop
- Engine Stall
- Operator Jolt
- Mechanical Slam

GDI's patented Softstart Clutch Controller offers a simple solution to all of these issues!

Enhance the perception of value among users by making clutch engagement smooth and predictable.

- **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 OEMs to reduce equipment engine size to save money.
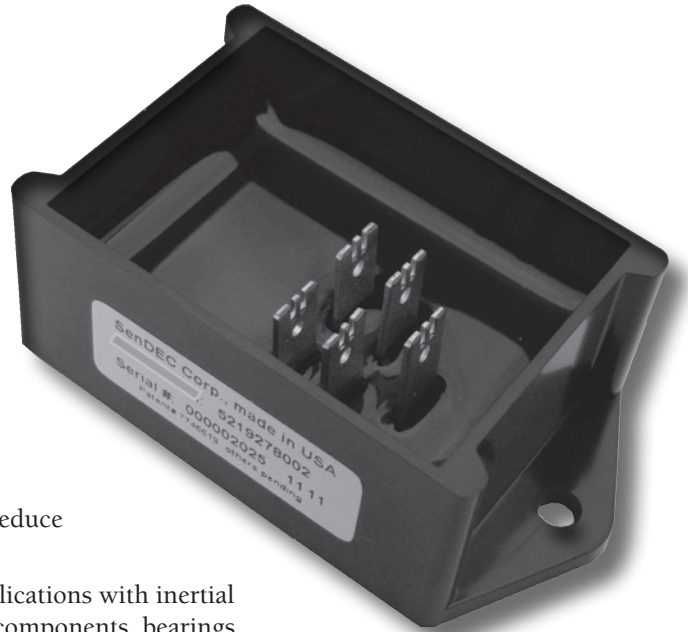
Electromagnetic clutches inherently engage abruptly. For many applications with inertial loads, high stresses are produced, potentially shortening the life of components, bearings, mechanical mounts etc. The advantages of electromagnetic clutches are such that the stress problem has traditionally been tolerated by adding cost, either by over designing components, increasing engine size, or simply accepting a higher failure rate.

The patented GDI 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 fit a desired profile.

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

Models:
Model SS808-8I for Gas Powered equipment; Model SS808-8D for Diesel, Electric, or other powered equipment
** Other OEM options below

Operating and Environment Specs:
Environmental:
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% NaCI @ 35C, 48 hrs)
*Dust: Unit is 100% encapsulated - dust can not enter
* Immersion: ASAE EP455 5.6 level 2
Immerse controller in tap water at a 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: GDI's Q-Sun Xe-1- UV Chamber - 720 Hours

*Thermal Shock: Controller stabilized at 70°C for 30 minutes. Removed from oven and immediately immersed into 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 minutes. Removed from chamber and immediately immersed into 25°C water mixed with UV sensitive dye for a minimum of 5 minutes - 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

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Gas Version, Absolute Maximum Ratings

	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

|	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
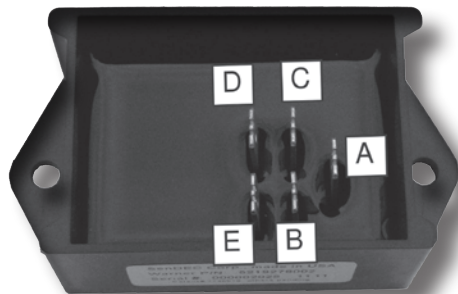
HOOKUP: Gas Powered, Diesel or Electric Versions PIN OUT
A Ground
B +12VDC Supply
C Clutch OUT+
D Clutch RETURN
E RPM Tachometer trigger (for closed loop versions). Inductive for Gas equipment, Alternator Output for Diesel, Other pickup options available

U.S. Patent # 8,320,096 and 7,746,619

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

Note: Specifications are preliminary and are subject to change without prior notification.