

Smooth-Move[®] 1

SINGLE-SPEED A.C. SOFT-START MOTOR CONTROL

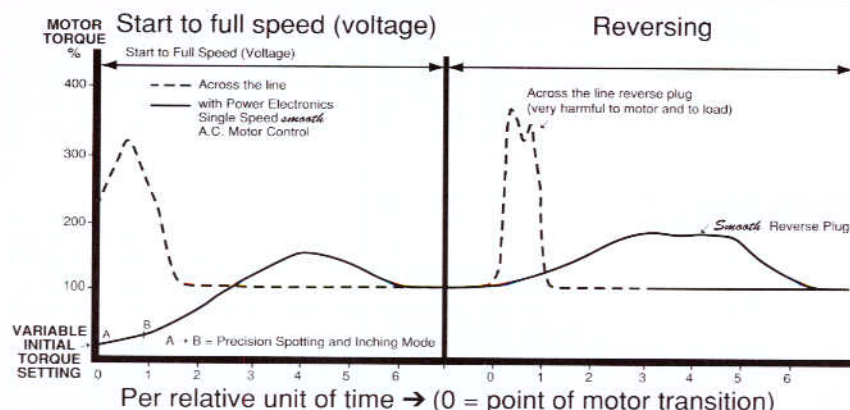
Features

- U.L., C-UL (Canada) approved
- Take the "kick" out of 3-phase motor starting
- Softly phase controls voltage to the motor
- **Automatic UNIVERSAL VAC selection!**
- 200,208,240,385,415,440,480 vac in one unit!
- 200 through 575 vac is also available!
- Sizes up to 10 full load amps (8A= 5hp 460vac)
- Phase loss protection on input
- Size of a small contactor
- TIME and TORQUE settings for motor softness
- Arc-elimination on contactor make & break—extends contactor life up to the mechanical limit!
- Easy to install and run
- Use with reversing and non-reversing systems
- Saves \$\$\$ on machinery life and productivity

SMOOTH SOFT-STARTING MOTOR CONTROL

Modernize with electronic smooth starting, reversing, jogging with more precise spotting and inching. Reduces or eliminates breakage and wear on drive trains, gearing, belts, etc. These controls increase the life, reliability, productivity and safety of new or existing 3-phase motorized equipment such as: **Conveyors, Overhead Crane Bridge/Trolleys, Monorails, Textile Machines, Turntables, Bottling Equipment, Palletizers, Overhead Doors etc.**

Torque vs. Time graph for 1-speed a.c. motor (typical)



Pictured - SM5A1S - 208 thru 480 vac - 5FLA - smooth control for one or multiple a.c. 3-phase motors up to the rated FLA. 4" x 3-3/4" x 3-3/8" less than 1 lb. UNIVERSAL VAC INPUT allows for easy stocking and wiring!

The starting TORQUE of the motor can be adjusted along with the length of TIME to reach full motor torque (see graph of comparison of a.c. induction motors with and without **Smooth-Move[®] 1**). With these two adjustments it is possible to softly control the starting characteristics of the motor. Instead of a harsh instantaneous inrush current, the control will gently adjust the motor up to full line voltage. Similar to a household light dimmer switch except that **Smooth-Move[®]** controls all three phases automatically. Simple adjustment of the initial starting voltage (TORQUE) and time to reach full motor torque (TIME) settings is all that is necessary.

Smooth-Move[®] replaces resistor ballasts, timers, fluid couplings, inductors and other electrical and mechanical systems used to "cushion start" 3-phase a.c. induction motors. Can be used with single or multiple motors up to the total full load amperage rating. Smooth reversing is accomplished with a reversing contactor.

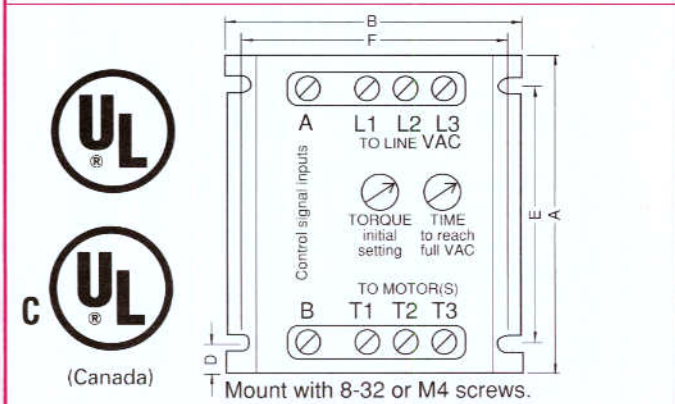
ARC-ELIMINATION™

Another reason why Power Electronics controls are known as the highest reliability in the industry is the ARC-ELIMINATION™ feature. This feature eliminates the destructive arcing on the make & break of power contactors. Doing this increases the life of contactors up to their mechanical limit. IEC style contactors can now replace the more expensive NEMA style in many applications. Additionally, the control will have very high reliability in tough applications.



Smooth-Move[®] 1

SINGLE SPEED - SOFT-START CONTROL



The above diagram shows "S" size layout with location of screw terminals. "L" size control will have both 3-phase input and output terminals across the top with the A-B signal inputs at the bottom.

Fig. 1 Typical 1-speed reversing system

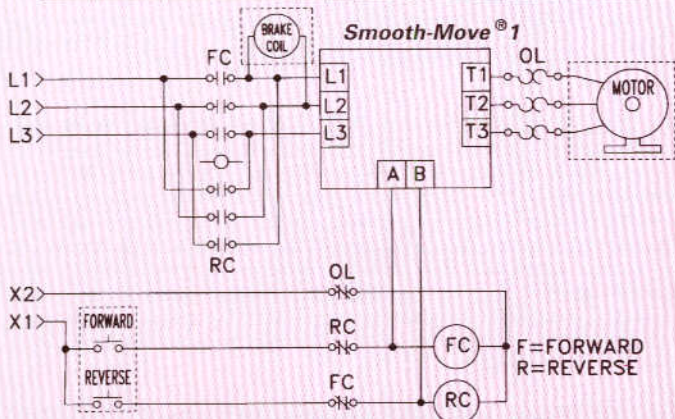


Fig. 1 The above diagram shows a typical reversing soft-starting system. Overload may be placed before the control. The "brake" is shown for applications having a motor brake. Also shown are electrical interlocks for the contactor.

Dimensions and weight							
SIZE	A	B	E	F	D	Depth	Wt.
S	4.0"	3-3/4"	3-1/4"	3-3/8"	3/8"	3-3/8"	1 lb.
(cm)	10.16	9.53	8.25	8.57	0.95	8.57	.45 kg
L	5.0"	5.0"	4.0"	4-3/4"	1/2"	3-5/8"	2 lb.
(cm)	12.7	12.7	10.16	12.06	1.27	9.21	.90 kg

Technical Specifications:

Input Voltage Variation: S or L suffix units have Universal Self-adjusting 208vac -10% through 480vac +10% 3-phase input. S57 or L57 suffix units are 208vac -10% through 575vac +10%. Control self adjusts for voltage. 60Hz standard, 50Hz available.

Control Signal VAC: 115vac/vdc is standard +/-20%. Other vac/vdc are available - note when ordering - no operation will occur without proper signal voltage from contactor coils.

Operating Temperature: 14° to 131° F (-10° to 55° C). Avoid or shield against radiant heat source. Do not block heatsink fins for proper air flow. For high duty cycles and high ambients size up - (see BT-Series for up to 150hp).

Approvals: U.L. Listed - Industrial Control Equipment 1L14, File E134267 C-U.L. approval for all Canadian Provinces. Motor overload protection should be used.

Motor types - Use with single-speed a.c. induction motors.

Fig. 2 Typical 1-speed non-reversing system

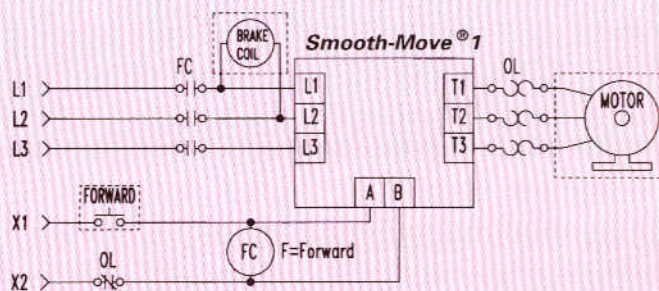


Fig. 2 The above diagram shows a typical non-reversing soft-starting control system. Overload may be placed before the control. The "brake" is shown for applications having a motor brake.

Models & FLA's 208-480vac

Smooth Move [®] New Model #	Full Load Amps	575 vac	480 vac	230 vac	200 vac	Closest ^{*3} Past model cross reference
SM4A1S	4	-	2	1	1	AC246TD AC138TD
SM5A1S	5	-	3	1.5	1+	BT346-1D BT338-1D
SM8A1L	8	-	5	2.5	2	BT546-1D BT538-1D
SM10A1L ^{*3}	10 ^{*3}	-	6	3	2+	

Models & FLA's 208-575vac

Smooth Move [®] New Model #	Full Load Amps	575 vac	480 vac	230 vac	200 vac	Closest ^{*3} Past model cross reference
SM4A1L57	4	3	2	1	1	AC257TD
SM5A1L57	5	3+	3	1.5	1+	BT357-1D
SM8A1L57	8	5	5	2.5	2	BT557-1D
SM10A1L57 ^{*3}	10 ^{*3}	7.5	6	3	2+	

SPECIFICATION FOR BIDS:

Reduced Torque Control Soft-Start device for 1-speed a.c. motors is required such as Power Electronics **Smooth-Move[®] 1**. It should have an integral phenolic enclosure surrounding all electrical printed circuit boards with an electrically isolated heatsink. Connections should consist of 3-phase inputs and outputs. Phase loss shutdown function after control signal is removed is necessary. Included should be 2 terminals for sensing off of the contactor coils Forward and Reverse control signal voltages. Includes two potentiometer controls for Time and Torque setting. Elimination of arcing on the power contactors is also a requirement to give high reliability on the contacts and of the control.

Notes for model table:

^{*1} National Electric Code is only a statistical average for Design "B" motors and commonly is incorrect FLA - always verify nameplate amps. ^{*2} For field replacements with NEW **Smooth-Move[®]** check motor nameplate FLA's. ^{*3} SM10A controls are for intermittent type duty only, such as overhead cranes.

MODEL NUMBERS: control input signal voltages other than the standard 115vac/vdc must be noted when placing an order. Example: 24vac/vdc would have a "-24" suffix.

Smooth-Move[®] 2

TWO SPEED "TRANSITIONAL" A.C. MOTOR SOFT-START CONTROL

Exceptional Two-Speed Motor Control Features:

- **U.L., C-UL (Canada) approved**
- Takes the "kick" out of 3-phase a.c. two-speed motors & *smooths* out high to low speed "jerk".
- **Automatic UNIVERSAL VAC selection!**
- 200, 208, 240, 385, 415, 440, 480 vac in one unit!
- 200 through 575 vac version also available
- Sizes up to 8 Full Load amps (8A= 5hp 480vac)
- Phase loss protection on re-start on input
- Size of a small contactor
- TIME, TORQUE and TRANSITION TORQUE BETWEEN SPEEDS adjustments for super motor softness
- Arc-elimination[™] on contactor make & break on the Forward-Reverse and High-Low contactors
- Easy upgrade for new or existing equipment
- Saves \$\$\$ on equipment life and productivity

SMOOTH TWO-SPEED MOTOR CONTROL

Obtain smooth-soft starting, smooth reversing, smooth high to low speed, smooth low to high speed, smooth transition from forward high speed to reverse low speed with **NO TIMERS!** Use **standard** 3-phase **two-speed** a.c. induction motors! Eliminate gear damage, broken belts, load swinging and increase productivity and life of the equipment. Easy quick improvement for *new or existing 2-speed equipment!*

Electronic replacement for resistor ballasts, timers, fluid couplings, inductors and other electrical and mechanical systems used to "cushion start" 3-phase two-speed a.c. induction motors.



Pictured - SM8A2L - 208 thru 480 vac - 8FLA - for one or more two-speed a.c. motors up to rated FLA. Small size - 5" x 5" x 3-5/8" less than 2 lb. UNIVERSAL VAC INPUT allows for easy stocking and wiring!

Smooth-Move[®] 2 will even smooth out the previously rough transition between speeds! Upgrade new or old two-speed a.c. motorized equipment. Can be used with single or multiple motors up to the total full load amperage rating. Smooth reversing is accomplished with a reversing contactor.

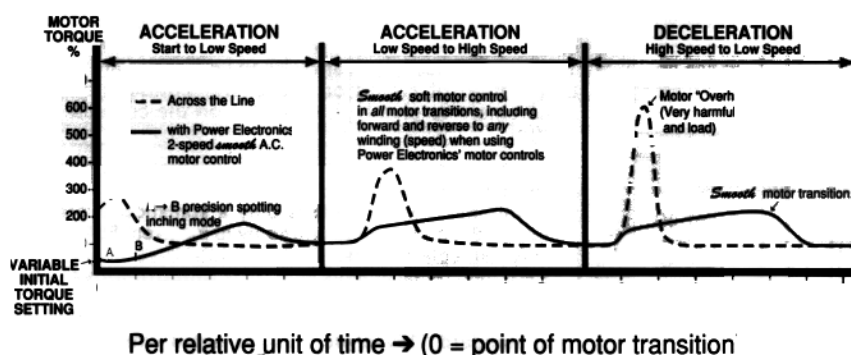
SIMPLE ADJUSTMENTS

Simple adjustments allow setting of motor starting torque (ACCEL), transitional torque control between the two speeds (DECEL) and a time ramp setting to reach the full motor torque/voltage (TIME). A unique *patented* system "senses" motor transitions, via the contactor coil control signals. Two-speed 2-winding motors or 2-speed consequent pole motors will operate smoothly in all transitions and speeds. Easy upgrade to new or older two-speed a.c. motorized equipment.

ARC-ELIMINATION[™]

Arc-Elimination[™] is the **exclusive** Power Electronics high reliability soft-start feature. Eliminates the arcing, due to the motor, on the make & break of power contactors (high/low & forward/reverse). Increases the life of contactor contacts up to their mechanical limit. IEC style contactors can now replace expensive NEMA contactors in many applications. **ONLY AVAILABLE FROM POWER ELECTRONICS!**

Torque vs. Time graph for 2-speed a.c. motors (typical)



SMOOTH TWO-SPEED MOTORS

Completely smooth movement is attained in ALL motor speed or direction transitions - electronically! Even the decelerating from high to low speed is smooth! This has been the main concern of previous 2-speed a.c. motor systems. **Only** Power Electronics controls "sense" the speed and direction control signals allowing smooth and soft-switching between speeds and directions without motor "jerk". Timers are completely unnecessary!

INDUSTRIAL POWER & CONTROL INC.

SAF-T-BAR[®] Insulated Electrification Systems

P.O. Box 1712, Guelph, Ontario N1H 6Z9
(519) 822-2020 - Fax (519) 822-2140

Smooth-Move® 2

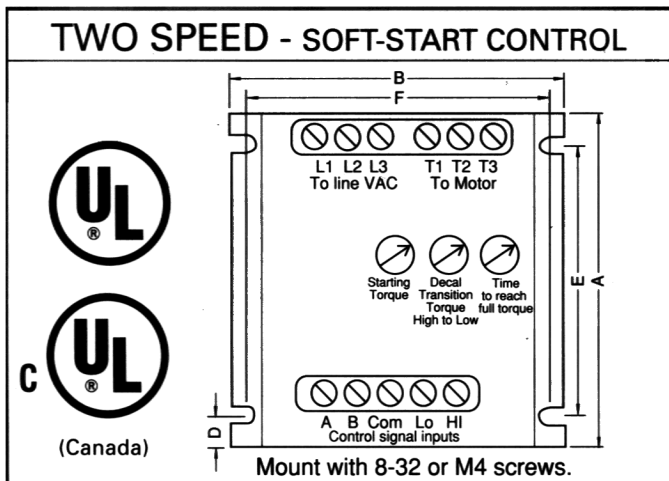


Fig. 1 Two-speed reversing with 4-pole contactor

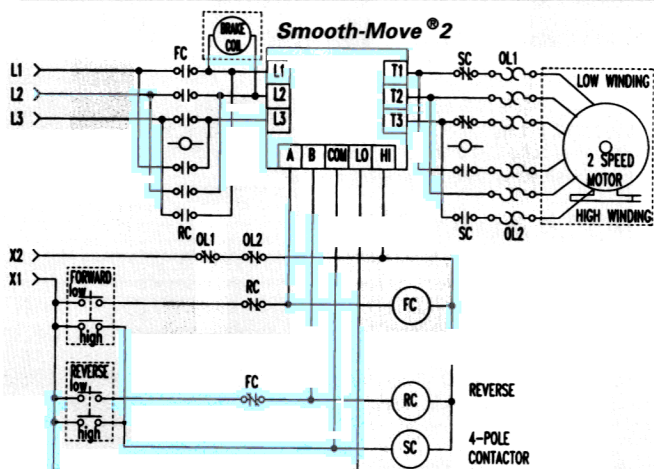


Fig. 1 The diagram at left shows a two-speed soft-starting reversing system using a 4-pole contactor for the two-speed switching. The "brake" is shown for applications having a motor brake. Electrical interlocks for the contactor are shown.

Dimensions and weight

SIZE	A	B	E	F	D	Depth	Wt.
L	5.0"	5.0"	4.0"	4-3/4"		3-5/8"	2 lb.
	12.7	12.7	10.16	12.06	1.27	9.21	.90 kg

Technical Specifications:

Input Voltage Variation: Universal VAC input is self-adjusting 208vac -10% through 480vac +10%. L57 suffix units are 208vac -10% through 575vac +10%. Controls will internally adjust for voltages between the specified ratings. 60Hz standard, 50Hz available.

Control Signal VAC: 115vac/vdc is standard +/-20%. Other vac/vdc are available - note when ordering - no operation will occur without proper signal voltage from contactor coils.

Operating Temperature: 14° to 131° F (-10° to 55° C). Avoid or shield against radiant heat source. Do not block heatsink fins for proper air flow. For high duty cycles and high ambients size up - (see BT-Series for up to 150hp).

Approvals: U.L. Listed - Industrial Control Equipment 1L14, File E134267 C-U.L. approval for all Canadian Provinces. Motor overload protection should be used.

Motor types - Use with 2-winding two-speed a.c. induction motors (see example drawings). Can also be used with 1-winding two-speed motors (consequent pole), call factory.

Fig. 2 Two-speed reversing overhead bridge crane

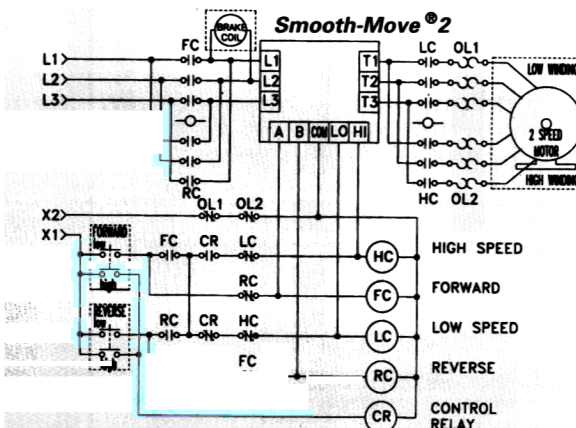


Fig. 2 The above diagram shows a typical reversing soft-starting system for a horizontal motion control. The "brake" is shown for applications having a motor brake. Also shown are electrical interlocks for the contactor.

Models & FLA's 208-480vac

Smooth Move® New Model #	Full Load Amps	575 vac	480 vac	230 vac	200 vac	Closest *2 Past model cross reference
SM4A2L	4	-	2	1	1	BT146-2D BT138-2D
SM5A2L	5	-	3	1.5	1+	BT346-2D BT338-2D
SM8A2L	8	-	5	2.5	2	BT546-2D BT538-2D

Models & FLA's 208-575vac

SM4A2L57	4	3	2	1	1	BT257-2D
SM5A2L57	5	3+	3	1.5	1+	BT357-2D
SM8A2L57	8	5	5	2.5	2	BT557-2D

SPECIFICATION FOR BIDS:

Reduced Torque Control Soft-Start device for 2-speed a.c. motors with "transitional" deceleration control is required such as Power Electronics **Smooth-Move® 2**. It should have an integral phenolic enclosure surrounding all electrical printed circuit boards, and have an electrically isolated heatsink. Connections should consist of 3-phase inputs and outputs. Phase loss shutdown function after control signal is removed is necessary. Included should be 5 terminals for sensing off of the contactor coils Forward, Reverse, High, Low and Common control signal voltages. Three potentiometer controls for Time, Torque and Decel rate from High to Low speed are necessary. Elimination of arcing on the power contactors is also a requirement to give high reliability on the contacts and the control.

Notes for model table:

*1 National Electric Code is only a statistical average for Design "B" motors and commonly is incorrect FLA - always verify nameplate amps.

*2 For field replacements with NEW **Smooth-Move®** check motor nameplate FLA's.

MODEL NUMBERS: control input signal voltages other than the standard 115vac/vdc must be noted when placing an order. Example: 24vac/vdc would have a "-24" suffix.