

ASAB Advanced Soft Starter

Range

23 Models

23A ~ 1600 A

7.5 ~ 800 kW



2 Voltage Range

200 ~ 440 VAC

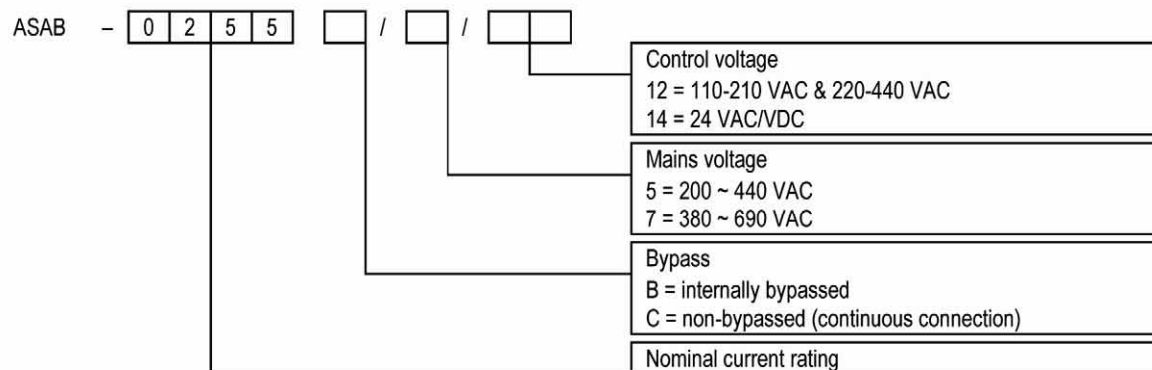
380 ~ 690 VAC

Protection

IP20 ASAB-0023B ~ ASAB-0105B

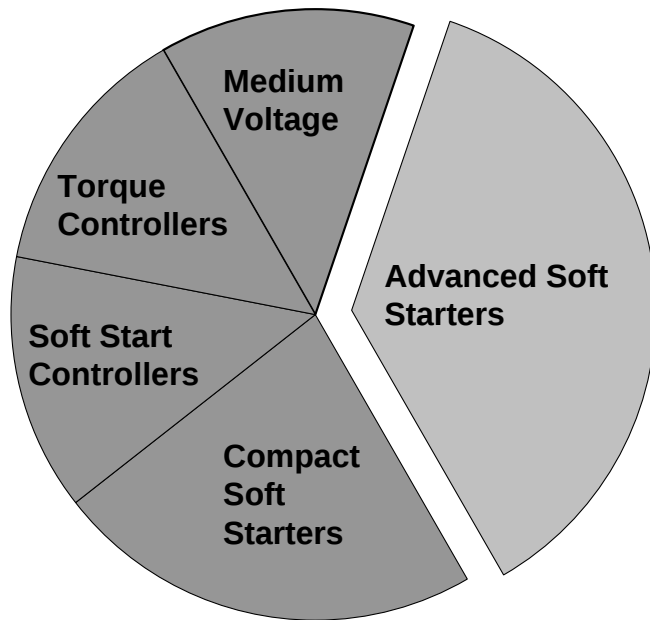
IP00 ASAB-0145B ~ ASAB-1600C





Power Range	
Bypassed	Non-bypassed
23A	-
43A	-
50A	-
53A	-
76A	-
97A	-
100A	-
105A	-
145A	-
170A	-
200A	-
220A	-
-	255A
2010	360A
2010	380A
2010	430A
2010	620A
2010	650A
2010	790A
2010	930A
-	1200A
-	1410A
-	1600A





Market Segment

Advanced soft starters.

Objective

A new product that redefines the Advanced soft starter market segment.

- create distance from existing competitor products.
- create distance compact soft starters.



Key Drivers



Advanced
Soft Starters

Feature rich motor starting solution
– *improving the way you work*

Features / Benefits

Compact
Soft Starters

Comprehensive soft start, protection and
interface features in an economic package
– *making soft start attractive and affordable*

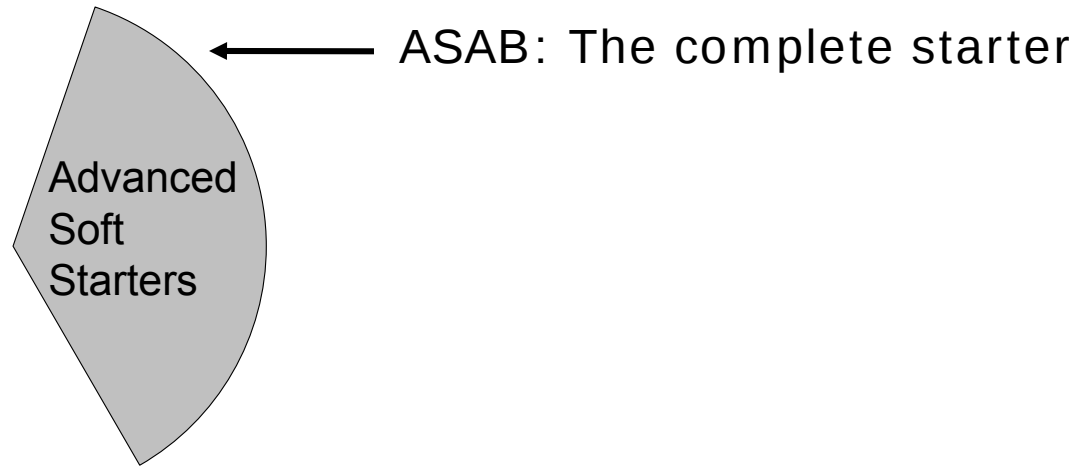
80/20
Value for money(\$)

Soft Start
Controllers

Soft start only
– *soft start at a budget price*

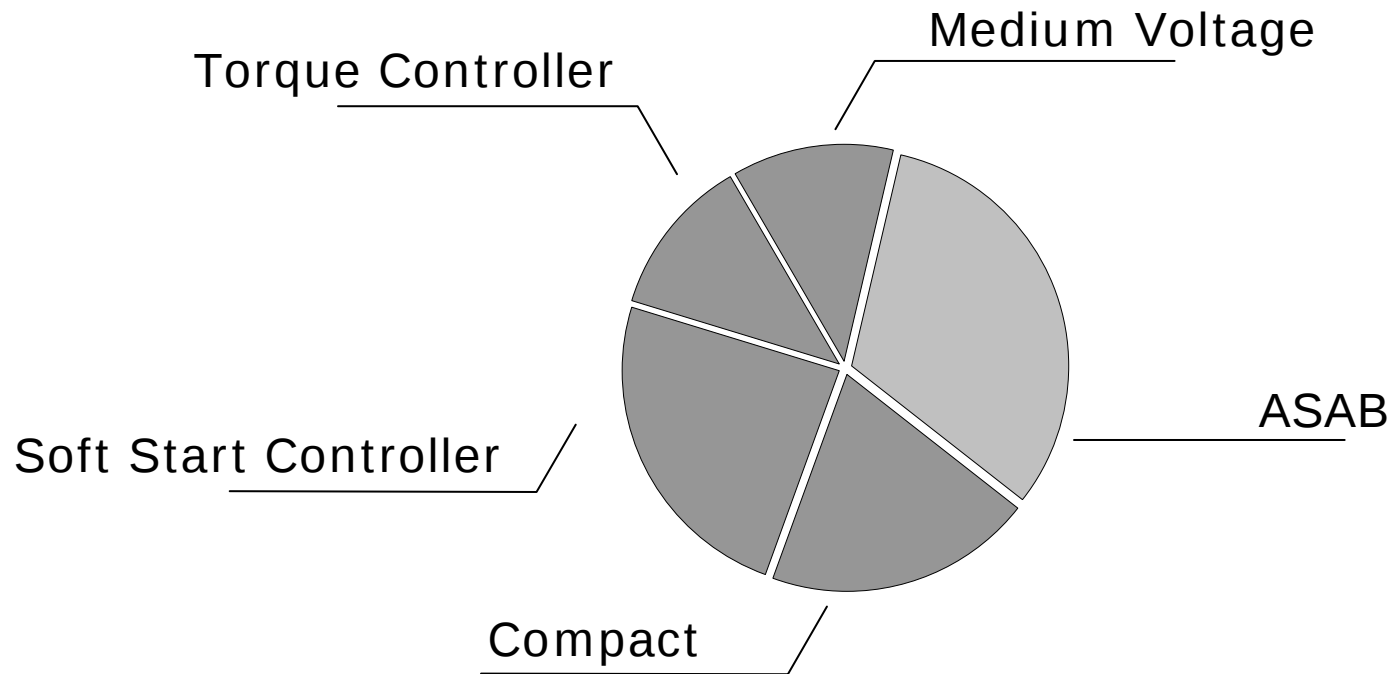
Low Cost





ASAB

- Sets a new standard in the Advanced starter market.
- Keeps this valuable market segment from becoming a commodity.
- Provides a tool that allows you to deliver solutions



- Adaptive Acceleration Control is the leading edge soft start technology.
- Bypassed up to 220 A as standard.
- Inside Delta (6-wire) connection for the whole range.
- Adjustable bus bars 360C – 1600C.
- Comprehensive and customizable motor protection.
- Emergency run.
- Shorted SCR Action.
- DC Braking – Contactorless.



23 Models

- 23A ~ 1600 A (in-line)
- (≤ 2400 A inside delta)
- 7.5kW ~ 800kW @ 400V

Voltage Range

- 200 ~ 440 VAC
- 380 ~ 690 VAC



7.5 to 800kW - 5 Frame Sizes

ASAB-0023A ~ ASAB-0105A



ASAB-0145A ~ ASAB-0220A



ASAB-0255A



ASAB-0360A ~ ASAB-0930A



ASAB-1200A ~ ASAB-1600A



4 Control Voltages

- 24 VAC
- 24 VDC
- 110 ~ 210 VAC
- 220 ~ 440 VAC



Protection

- 23B to 105B: IP20
- 145B to 1600C: IP00



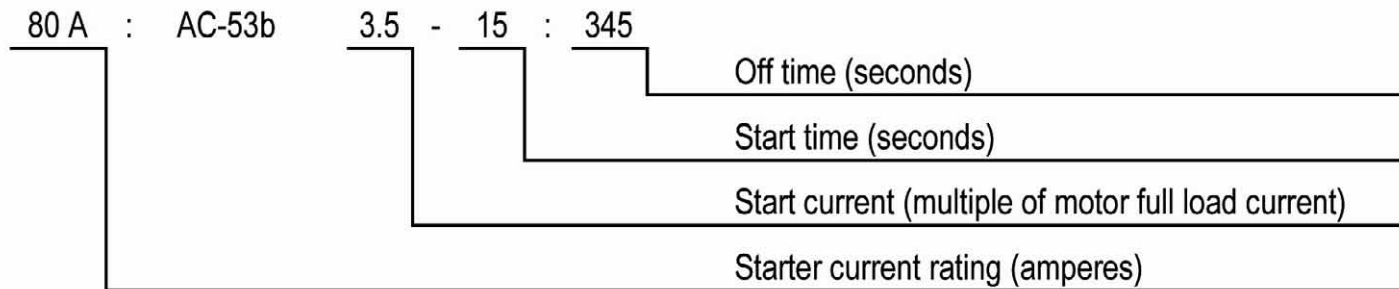
Approvals

- UL/ C-UL: UL 508
 - 23B to 105B: IP20 & NEMA1, UL Indoor Type 1
 - 145B to 1600C: IP00, UL Indoor Open Type
- CE: IEC 60947-4-2
- RoHS: Compliant with EU Directive 2002/95/EC
- C Tick
- Lloyd's Register approval (ASAB-0023B to ASAB-0220B only)



- Available for models ASAB-0145B ~ ASAB-0220A
- Provide IP20 protection against accidental contact





- **Starter Current Rating:** The full load current rating of the soft starter given the parameters detailed in the remaining sections of the utilisation code.
- **Start Current:** The maximum available start current.
- **Start Time:** The maximum allowable start time.
- **Off Time:** The minimum allowable time between the end of one start and the beginning of the next start.



- Internally Bypassed as standard up to 110kW
- 132 ~ 500kW Internally bypassed under development

Power Range	
Bypassed	Non-bypassed
23A	-
43A	-
50A	-
53A	-
76A	-
97A	-
100A	-
105A	-
145A	-
170A	-
200A	-
220A	-
-	255A
2010	360A
2010	380A
2010	430A
2010	620A
2010	650A
2010	790A
2010	930A
-	1200A
-	1410A
-	1600A



Optional plug-in communication modules:

- DeviceNet
- Modbus
- Profibus
- USB module



WinStart

- Selects the right starter for the application
- Distributor software – not for end users

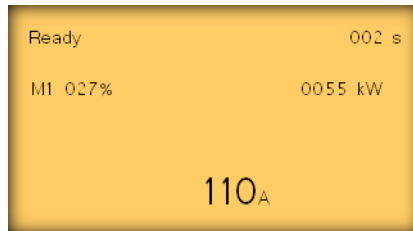
WinMaster

- ASAB soft starters can be controlled and monitored, but not programmed, using WinMaster PC Software.

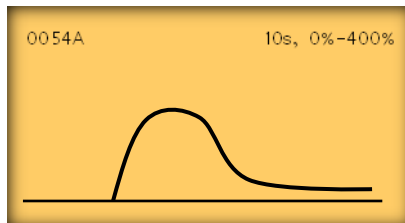
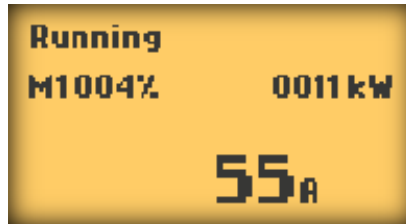


- Improved keypad (Graphical display & events log)
- Display graphical LCD
- 4 line Text – real language feedback messages
- Real time graphs of motor operating performance
- Menus – standard , extended & quick set
- 99 Events Log and Trip Log recording Last 8 Trips





- The keypad provides a wide range of performance information about the soft starter.
- The top half of the screen shows the real-time information on the starter status, motor temperature and motor power.



- Programmable monitoring screen.
- Starter State – Starting, Running, stopped or tripped.
- Motor Current , Motor pf, Mains frequency, Motor kW , Motor HP, kWh , Hours run, Analog input, Mains voltage (optional card), Motor KVA, % Rated kW, and Motor Parameter set.
- 8 Languages – German, English, Italian, French, Spanish, Brazilian Portugese, Russian and Chinese.



Adaptive Acceleration Control (AAC) is a new soft start control type that allows the selection of different acceleration and deceleration profiles according to application needs.



Soft starters offer a variety of methods for the control of motor starting and stopping. Each type of the control uses a different primary control parameter.

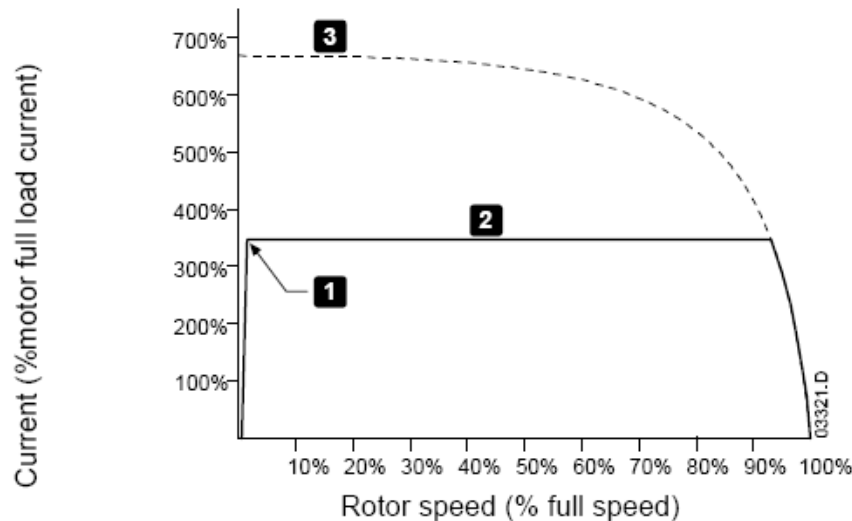
Soft Start Type	Parameter Controlled	Performance Parameters Influenced
Timed Voltage Ramp	Voltage	Start Current, Start Torque, Acceleration
Constant Current	Current	Start Torque, Acceleration
Torque Control	Torque	Start Current, Acceleration
Adaptive Control	Acceleration	Start Current, Start Torque



New



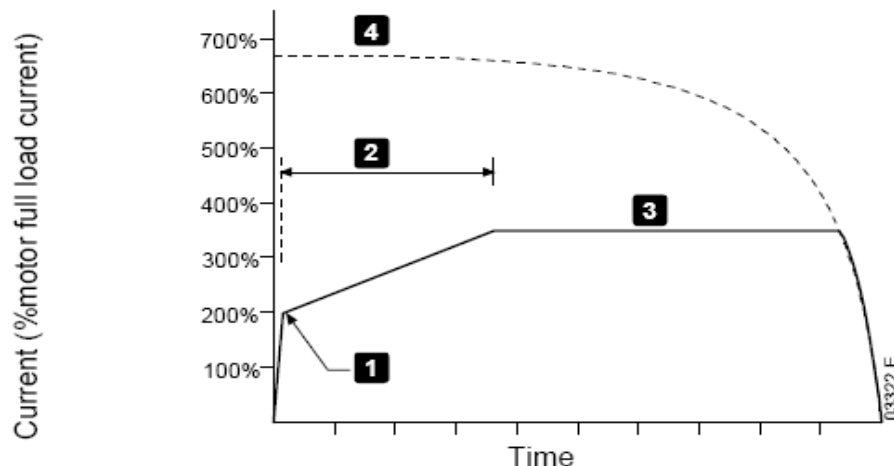
- Constant current is the traditional form of soft starting, which raises the current from zero to a specified level and keeps the current stable at that level until the motor has accelerated.
- Constant current starting is ideal for applications where the start current must be kept below a particular level.



- 1 Initial current (parameter 2C)
- 2 Current limit (parameter 2B)
- 3 Full voltage current



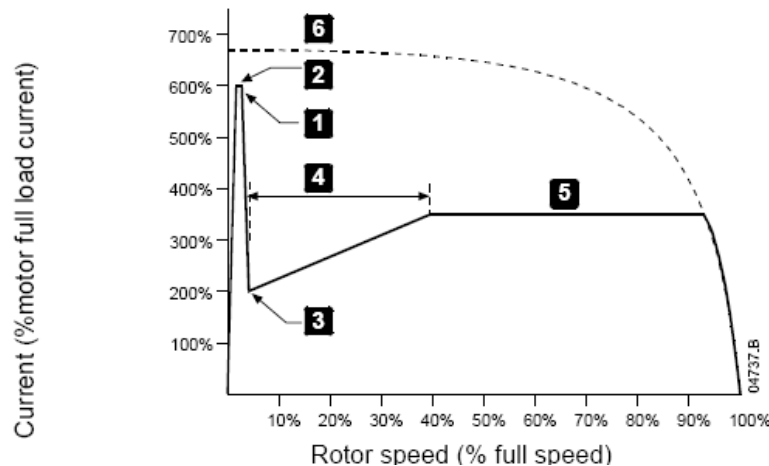
- Current ramp soft starting raises the current from a specified starting level (1) to a maximum limit (3), over an extended period of time (2).
- Current ramp starting can be useful for applications where:
 - the load can vary between starts
 - the load breaks away easily, but starting time needs to be extended
 - the electricity supply is limited



- 1 Initial current (parameter 2C)
- 2 Start ramp time (parameter 2D)
- 3 Current limit (parameter 2B)
- 4 Full voltage current



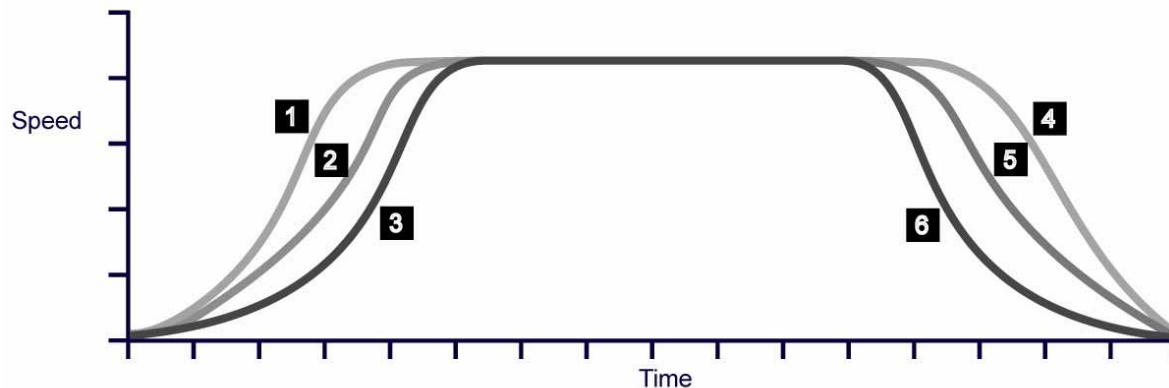
- Kickstart provides a short boost of extra torque at the beginning of a start, and can be used in conjunction with current ramp or constant current starting.
- Kickstart can be useful to help start loads that require high breakaway torque but then accelerate easily (for example flywheel loads such as presses).



- 1 Kickstart level (parameter 2E)
- 2 Kickstart time (parameter 2F)
- 3 Initial current (parameter 2C)
- 4 Start ramp time (parameter 2D)
- 5 Current limit (parameter 2B)
- 6 Full voltage current



Adaptive Acceleration Control is a new intelligent motor control technique. In an Adaptive Acceleration Control soft start, the ASAB soft starter adjusts the current in order to start the motor within a specified time and using a selected acceleration profile.



Key:

1	Early Acceleration	4	Late Deceleration
2	Constant Acceleration	5	Constant Deceleration
3	Late Acceleration	6	Early Deceleration



- Adaptive Acceleration Control is based on two algorithms, one for measuring (learning) the motor characteristics and one for controlling the motor.
- During each start it makes two speed estimates, zero speed at LR and maximum speed at the point when the motor is operating at maximum efficiency.
- During subsequent start and stop operations, measuring the motor characteristics and using this value to determine the speed between the two known end points provides an estimate of motor speed.



- The control algorithm creates a time based speed profile which can create curves from a mathematical function.
- During each start and stop operation the control algorithm compares the speed estimate with the speed ramp profile. If the speed estimate is too low it increases the power to the motor and decreases the power when it is too high.
- This allows for control of the three accelerating and three decelerating profiles.
- If the motor does not start and stop smoothly to fine tune adjust the adaptive control gain.



Which Type Of Soft Start?

The best type of soft start depends on the installation requirements.

Typically soft starters are used to:

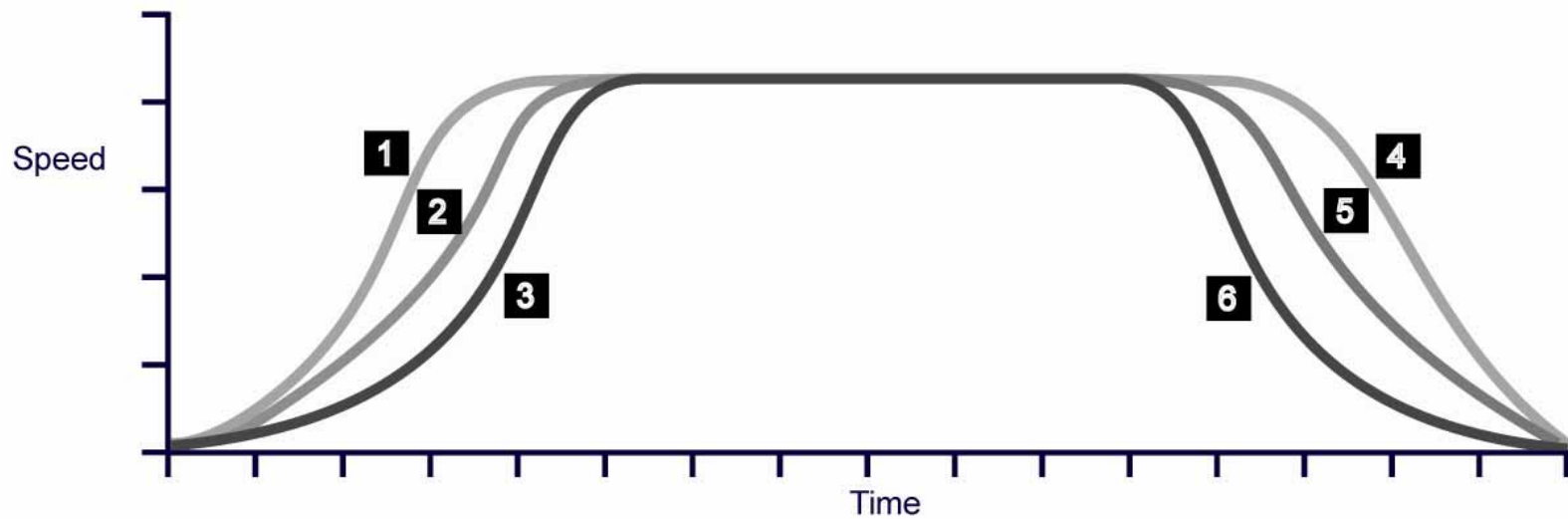
- limit motor start current
- to control load acceleration and/or deceleration.

Best results are obtained by selecting the soft start type that directly controls the parameter of interest.

To Control	Use
Motor Start Current	Constant Current
Motor/Load Acceleration or Deceleration	Adaptive Acceleration Control

The ASAB soft starter offers both Constant Current & Adaptive Acceleration Control.





Key:

- | | |
|--------------------------------|--------------------------------|
| 1 Early Acceleration | 4 Late Deceleration |
| 2 Constant Acceleration | 5 Constant Deceleration |
| 3 Late Acceleration | 6 Early Deceleration |

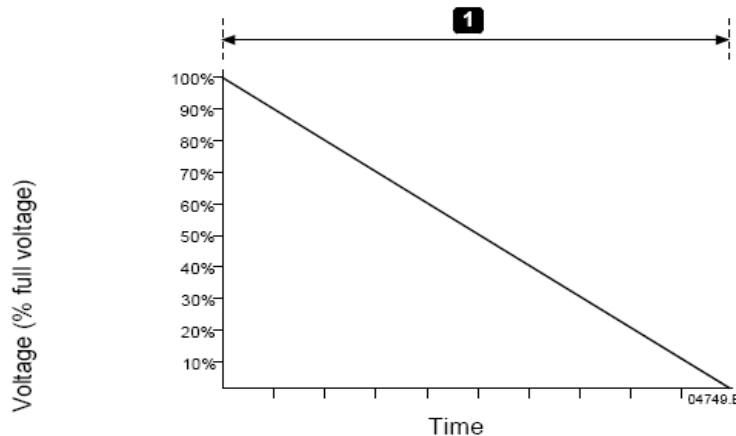


Stop Method	Performance Result
Coast To Stop	Natural load run down
TVR Soft Stop	Extended run down time
Adaptive Acceleration Control	Extended run down time according to selected deceleration profile
Brake	Reduced run down time

Soft starters are often used in pumping applications to eliminate the damaging effects of fluid hammer. Adaptive Acceleration Control should be the preferred stop method for these applications.



- Timed voltage ramp reduces the voltage to the motor gradually over a defined time. The load may continue to run after the stop ramp is complete.
- Timed voltage ramp stopping can be useful for applications where the stop time needs to be extended, or to avoid transients on generator set supplies.



1 Stop time
(parameter 2I)



- In an Adaptive Acceleration Control soft stop, the ASAB soft starter controls the current in order to stop the motor within a specified time and using a selected deceleration profile.
- Adaptive Acceleration Control can be useful in extending the stopping time of low inertia loads.



Examples:

- Late acceleration on conveyors for a gentle start without belt flap or chain couplings on milliscreens or belt couplings on fans.
- Early acceleration on submersible pumps where you need to be above minimum speed quickly.
- Constant acceleration and deceleration where they need linear response without need for tacho feedback.



Why AAC?

Select an acceleration profile to suit the application.

Gradual and shock free acceleration can benefit all motor applications, but many situations need a more precise control over acceleration and/or deceleration.



Pumps



Bandsaws



Conveyors



Why AAC?

Select a deceleration profile to suit the application.

The hydraulic characteristics of pumping systems varies considerably. The deceleration profile required for ideal stopping must match application requirements.



High Head



Low Head, High Flow



Open System

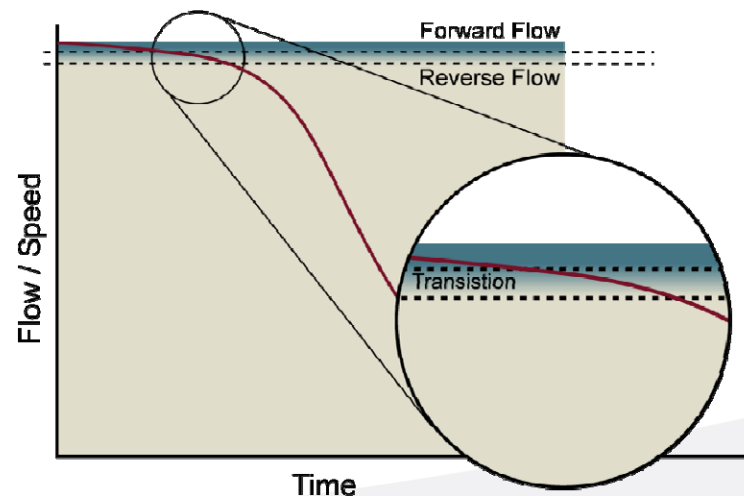




Application Characteristics - High back pressure can mean that even a small variation in speed sees water flow switch rapidly from forward to reverse.

Problem - Rapid change in flow direction results in significant reverse flow, causing the non-return valve to slam shut and setting up damaging shock waves.

Ideal Solution - Very slow control of motor deceleration at the flow/no flow transition followed by rapid deceleration.





- **Application Characteristics** - Low head, high flow rate.
- **Problem** - On stopping of the pump, fluid momentum creates a low pressure state behind the pump. The non-return valve is slammed shut and shock waves are set up as this low pressure state is equalised.
- **Ideal Solution** - Long, uniform deceleration allowing fluid momentum to naturally dissipate.





- **Application Characteristics** - A pump lifts water from a lake to a channel via a pipe system with no non-return valve.
- **Problem** - On stopping water drains back through the pump causing it to spin in reverse.
- **Ideal Solution** - Quick deceleration to point that stops water being pumped but still keeps the pump rotating in a forward direction while water remaining in the pipe work drains back through the pump.



Adaptive Acceleration Control is ideal for pump stopping because it allows selection of multiple deceleration profiles.



High Head

Late
Deceleration



Low Head, High Flow

Constant
Deceleration



Open System

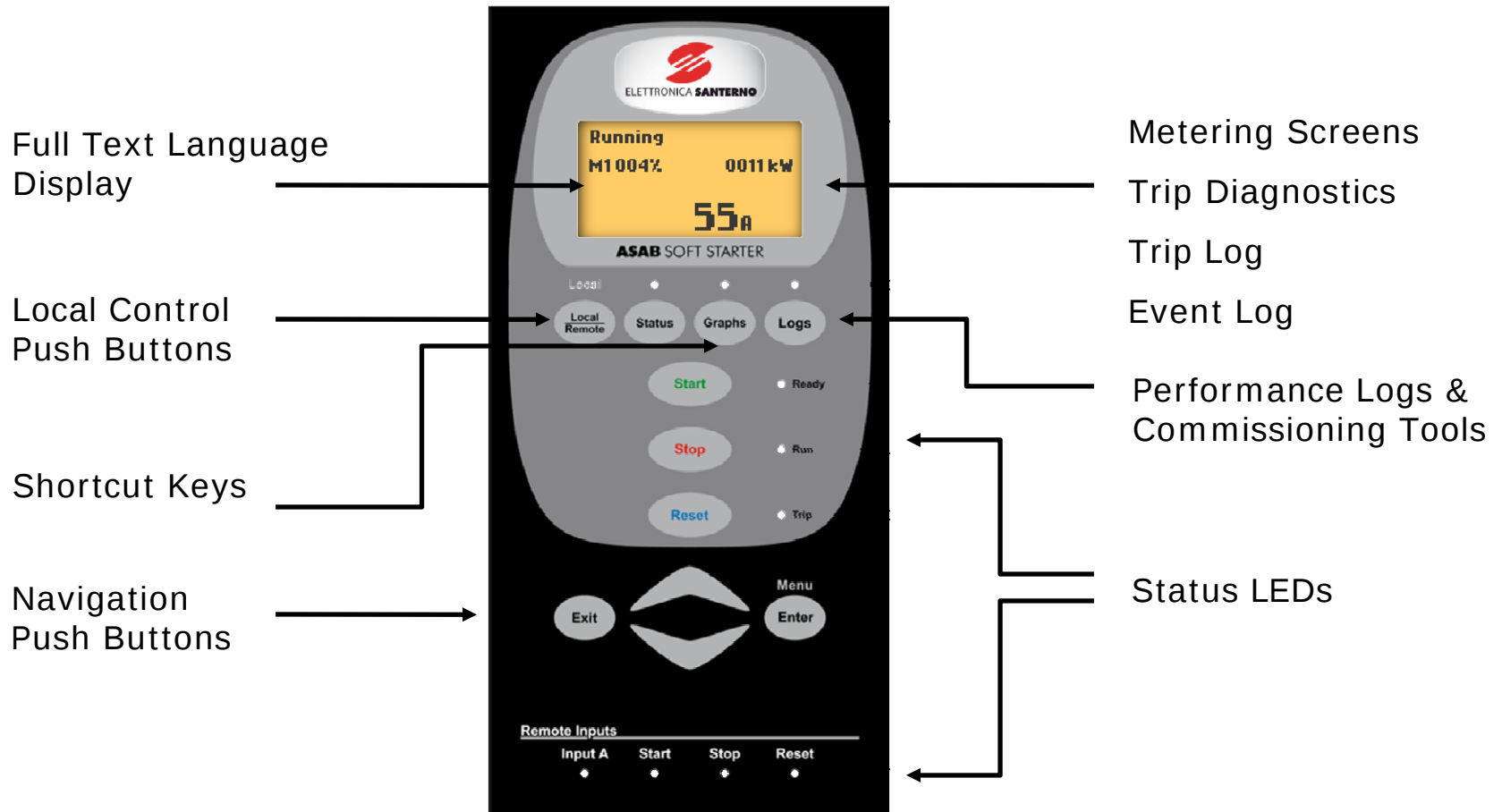
Early
Deceleration



- Controls acceleration/deceleration – is largely unaffected by changes in load.
- Provides choice of starting and stopping profiles – performance can be matched to load requirements
- Ideal for pumping stopping: the varying needs of pump applications means no single deceleration profile is ideal for all situations.



An Interface That Thinks Like You



- Standard Menu
- Extended Menu
- Quick Set

Quick Setup	
- Pump, centrifugal - Pump, submersible - Fan, damped - Fan, undamped - Compressor, screw - Compressor, reciprocating - Conveyor - Crusher, rotary - Crusher, jaw	

Pump, centrifugal	
Parameter	Suggested Value
1-A Motor FLC	Model dependent
2-A Start Mode	Adaptive Control
2-J Adaptive Start Profile	Early Acceleration
2-D Start Ramp Time	5 seconds
2-B Current Limit	350%
2-H Stop Mode	Adaptive Control
2-K Adaptive Stop Profile	Late Deceleration
2-I Stop Time	15 seconds



Compact Physical Design

ASAB soft starters are amongst the smallest in their class, allowing saving installation costs by minimising panel space requirements.

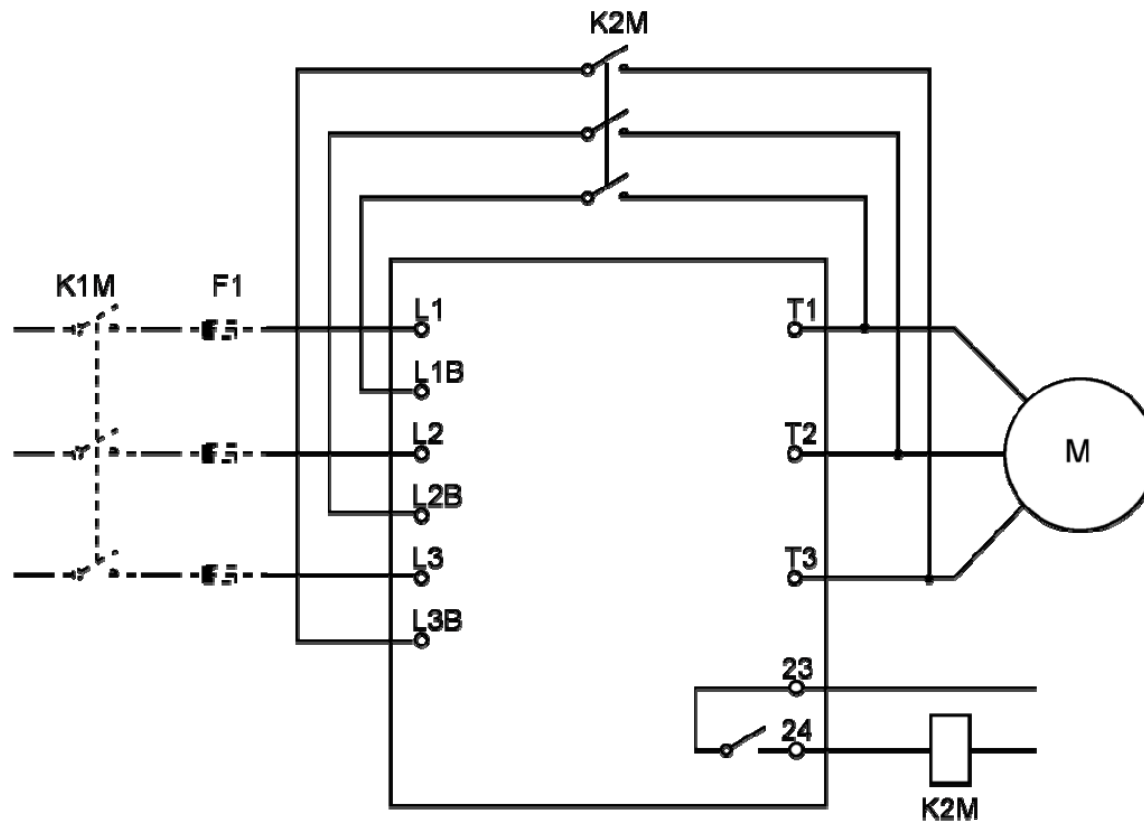


When installing soft starters within switchboards or standalone enclosures allowance must be made for dissipation of heat generated while the motor is running. This can require use of cooling fans or bypass contactors – but not with the ASAB soft starter.

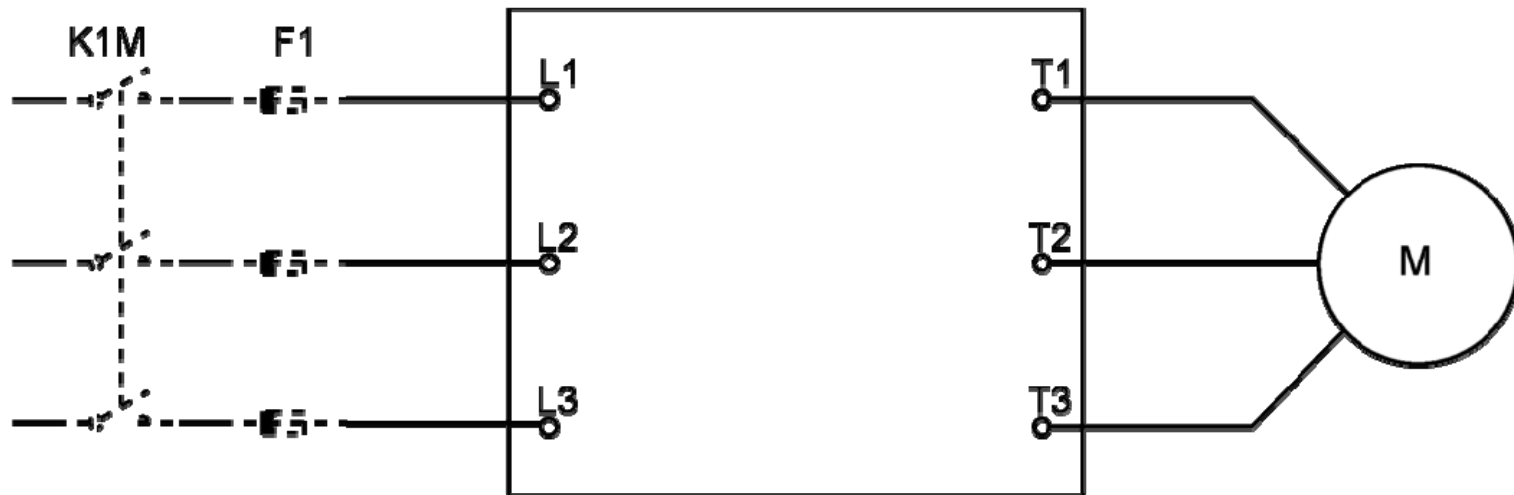
Built-in bypass means ASAB soft starters dissipate very little heat when running and eliminate the costly requirement for external fans or bypass contactors.



Power Connection: Bypassed



Power Connection: Non Bypassed



Cabling or bus-bar work for higher power installations can be costly and require significant panel space.

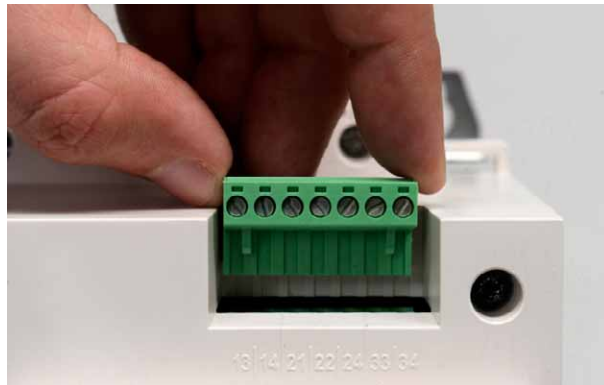
ASAB soft starters $\geq 360A$ reduce cable costs and panel space requirements because they allow for top or bottom connection of both input and output cabling.



Neat and tidy control wiring is easy with top and bottom cable entry.



Clearly labeled, pluggable terminals make control wiring a delight.

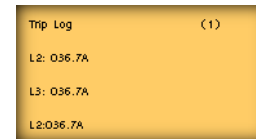
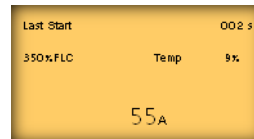
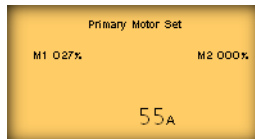
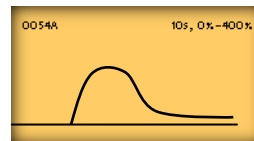
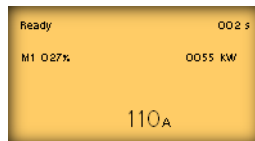


- A real language interface with selectable language, Quick Setup function and intuitive Standard Menu make the ASAB soft starter incredibly easy to use.
- The Advanced Menu offers specialised functions. Easy to use, these turn the ASAB soft starter from simply a great soft starter into a powerful motor management system.

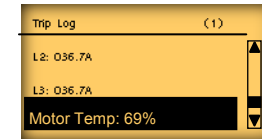
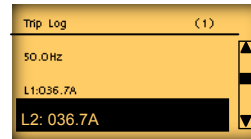
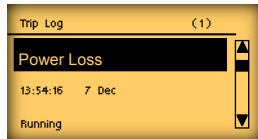


ASAB soft starters deliver extensive monitoring information to support process improvement and maintenance. Feedback is available on-screen or via serial, analog and relay outputs.

Programmable Screen



Time-stamped Trip and Event logs with full details of operating conditions.

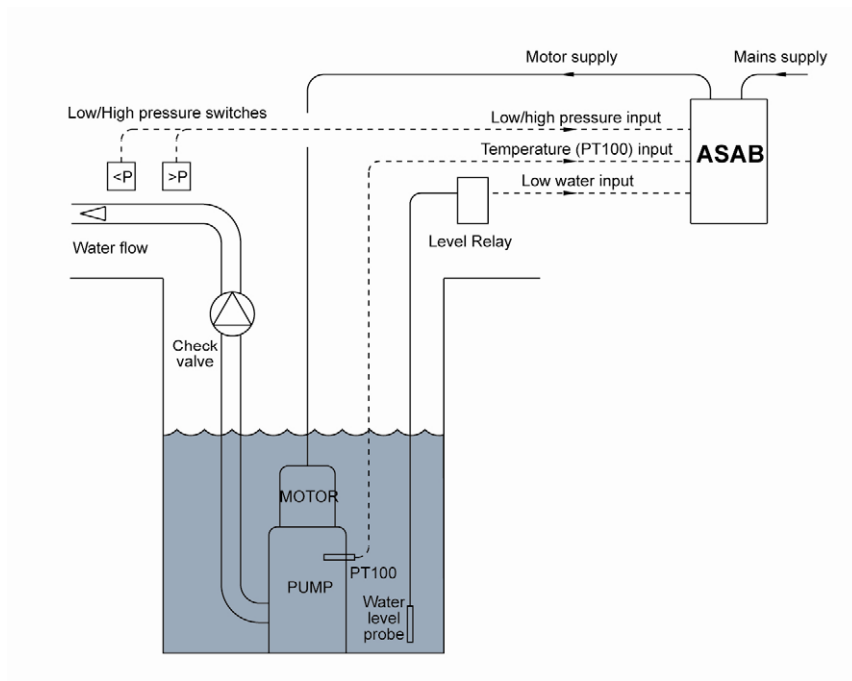


Counters record the starter's operating history:

- Hours run, kWh, number of starts
- User-resettable (password required), plus lifetime



ASAB Pump Control



Flow, pressure transducers or level probes can all be directly connected to the ASAB soft starter.

This simplifies control circuits and reduces installed cost as well as making installation, maintenance and operation simple and straight forward.



Operation of remote installations such as irrigation pumps can be automatically controlled using the ASAB soft starter's operation timer doing away with the need for external control circuits.



Braking Of High Inertia Loads

DC brake is used to electrically brake high inertia load's. The brake cycle produces a motor brake torque which approximates the parameter set motor torque.

Increase productivity of machines such as band-saws and chippers by reducing the time needed to replace saw bands or cutting heads.

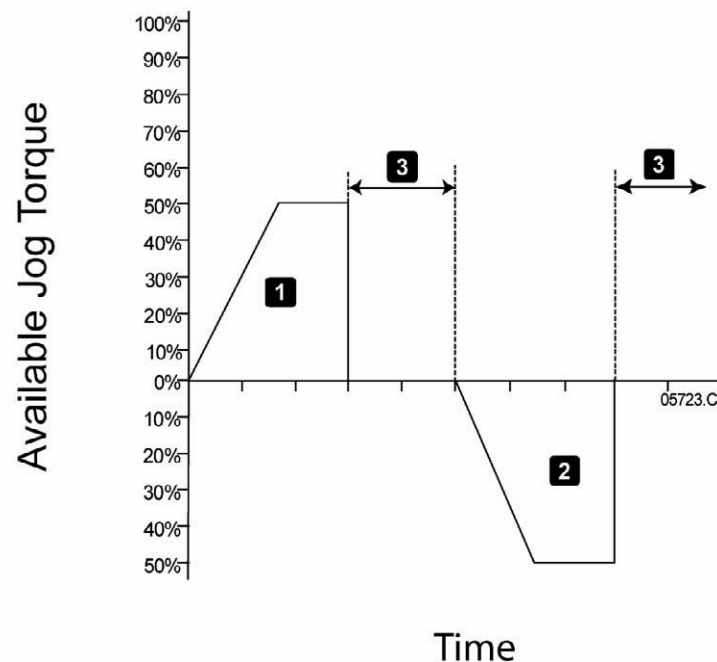
The ASAB soft starter pulses the DC over all three phases and does not require an external contactor.



The ASAB soft starter can be programmed for two separate start scenarios. Typical application of this capability includes:

- A single ASAB soft starter to control duty-standby pumps.
- Different start performance for varying load conditions.
- Soft braking.





- 1** Jog Forward
- 2** Jog Reverse
- 3** Normal Operation

The ASAB soft starter's jog function allows the operator to run the motor at part speed in either the forward or reverse direction.

Approx 11%.

Max torque is approx 60% of motor FLT in forward and 45% FLT in reverse.

This is ideal for machine positioning of loads such as mixers or hopper bins ready for unloading.





Uninterrupted operation of unmanned installations such as irrigators, flood pumps, remote pump stations is aided by the the ASAB soft starter's Auto-Reset function.

Auto Reset

- 9-A Auto-Reset Action
- 9-B Maximum Resets
- 9-C Reset Delay Groups A&B
- 9-D Reset Delay Group C

5-A Auto-Reset Action

Group	Trips
A	Current Imbalance
	Phase Loss
	Power Loss
	Mains Frequency
B	Undercurrent
	Instantaneous
	Overcurrent
C	Input A Trip
	Motor Overload
	Motor Thermistor
	Starter Overtemperature



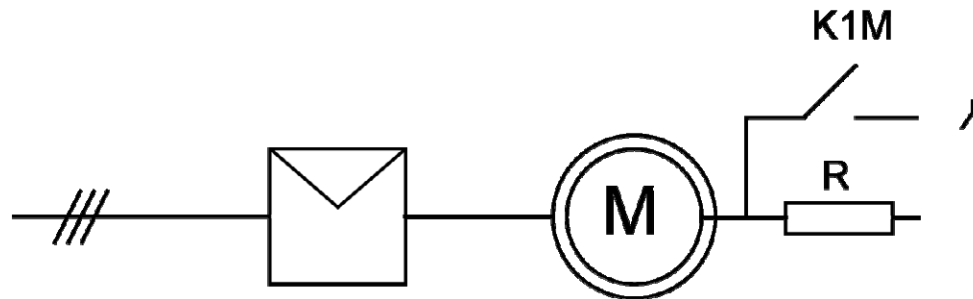
In the case of fire, equipment such as ventilations fans in high rise buildings can be required to run at all costs.

Activation of the ASAB's Emergency Run mode initiates a start and deactivates all protections systems, enabling the motor to run as long as possible despite the deteriorating environment.



Replacement of slip ring starters requires careful analysis to ensure sufficient start torque will be available in the new configuration.

Once the suitability of a conversion has been verified, the specialised slip ring control functions of the Versistart make it ideal solution.



Slip-ring motor control normally requires use of last stage resistors



Not only does ASAB soft starter provide great starting and stopping, it is also a premium motor protection system.

Motor overload protection is an important consideration for all applications. The ASAB soft starter excels in this area providing a protection levels previously only available from dedicated and expensive high-end motor protection relays.

The ASAB soft starter's second order thermal model allows motors to be used to their full potential without fear of damage from overloading.



The motor thermal model has two compartments

Motor body

Large thermal capacity, affects long term thermal behaviour



Motor windings

Low thermal capacity, affects short term thermal behaviour

The model includes the following considerations:

- Motor current
- Iron losses
- Winding resistance losses
- Motor body & winding thermal capacity
- Cooling during run
- Cooling at standstill



SCR Shorted Action is a new and unique feature that keeps your plant running even if the one phase of the ASAB soft starter is damaged.

In the event that a damaged SCR is detected in one phase the ASAB soft starter offers the option to continue operation using two phase control. This ensures continued operation while long term repair of the damage is initiated.



Each ASAB soft starter protection system is fully adjustable to site specific requirements.

- Adjustable protection levels
- Adjustable protection delays
- Selectable protection actions

By default each protection system will trip the ASAB soft starter. However, to accommodate special circumstances, the action taken by a ASAB soft starter protection system can also be set to Warn & Log or Log Only.



Protection

- Programmable input trip
- Individual phase loss trips
- Individual shorted SCR trips
- Internal bypass relay overload
- Internal bypass relay fail

24 VDC Output 200mA. This provides an in-built power supply via the serial port for the remote operator, removing the cost of a separate supply.

