

Soft-starters and DC Injection



Solbrake DC Injection Brake 10-820A



kW	DC Brake Part Number	Dimensions (mm)			Weight Kg
		W	H	D	
400V					
5.5	Solbrake 10-400-0-S	90	75	105	0.5
7.5	Solbrake 17-400-0-S	65	190	114	1.2
15	Solbrake 31-400-0-S	65	190	114	1.2
30	Solbrake 58-400-0-S	65	190	114	1.2
55	Solbrake 105-400-0-S	154	280	160	5.1
110	Solbrake 210-400-0-S	154	280	160	5.6
160	Solbrake 310-400-0-S	224	384	222	12.0
200	Solbrake 390-400-0-S	224	384	222	12.0
250	Solbrake 460-400-0-S	TBA	TBA	TBA	TBA
450	Solbrake 820-400-0-S	TBA	TBA	TBA	TBA

Advantages at a glance

The Solbrake provides fast, smooth and frictionless stopping of a three phase induction motor, by injecting controlled DC current to the motor windings, after the mains contactor has opened.

- Preventing mechanical wear
- Reducing stopping time of high inertia loads
- Adjustable braking time
- Auto stop - DC Injection stops when motor stops
- DIN Rail mounting (Standard 10A, option 17-58A)
- Easy installation & operation

Standard Ratings

- Voltages: 230,400,460 & 600
(105-390A are available up to 690V)



Settings

- Braking Torque - Determines the DC current level injected to the motor windings
- Two operation modes
 - Auto Mode: DC Injection stops automatically when motor stops.
 - Manual Mode: DC Injection stops after the pre-adjusted braking time. This mode can be used to "hold" the load at stand still.

Displays (LEDs)

- Mains voltage connected
- Braking Contactor Closed
- DC Injection On

Applications

- Circular and band (flywheel) saws
- Machine tools
- Fast stopping of high inertia loads
- Safety brakes (as long as mains supply remains on)

Solstart Miniature Soft Starter 8-58A, with a built-in bypass



kW	Solstart Part Number	Dimensions (mm)			Weight Kg
		W	H	D	
400V					
4	Solstart 8-400-0-S	45	75	110	0.42
7.5	Solstart 17-400-0-S	90	75	105	0.55
11	Solstart 22-400-0-S	90	75	105	0.65
15	Solstart 31-400-0-S	65	190	114	1.3
22	Solstart 44-400-0-S	65	190	114	1.3
30	Solstart 58-400-0-S	65	190	114	1.3

Advantages at a glance

- Soft start and Soft stop
- Built-in bypass
- Start / Stop by voltage free contact
- End of Acceleration contact, one-N.O (31-58 only)
- Compact, small foot print
- Plastic case 8-22A, Aluminium case for 31-58
- DIN Rail mounting (standard 8-22A, option 31-58)
- Cost effective

Option

- Single phase motor soft starters

Standard ratings

- Voltages: 230,400,440,460 & 600V
- 50 and 60 Hz



Starter Protection

- SCR protection by Metal Oxide Varistors

Displays (LEDs)

- On - mains voltage connected
- Ramp - voltage is ramping up / down
- Run - motor is running

Applications

- Light duty motors in commercial applications
- Small conveyors (post office, supermarkets, etc.)
- Electrically driven gates
- Machine tools
- Appliances

Solstart Plus Analogue Soft Starter 31-170A



RVS-DX Digital Soft Starter 8-1100A with a built-in bypass



kW	Solstart Plus Part Number	Dimensions (mm)			Weight Kg
		W	H	D	
400V					
15	Solstart Plus 31-400-2-0-S	65	190	114	1.4
22	Solstart Plus 44-400-2-0-S	65	190	114	1.4
30	Solstart Plus 58-400-2-0-S	120	265	121	3.5
37	Solstart Plus 72-400-2-0-S	120	265	121	3.5
45	Solstart Plus 85-400-2-0-S	120	265	121	3.5
55	Solstart Plus 105-400-2-0-S	120	265	121	3.5
75	Solstart Plus 145-400-2-0-S	129	275	182	6.5
90	Solstart Plus 170-400-2-0-S	129	275	182	6.5

kW	RVS-DX Part Number	Dimensions (mm)			Weight Kg
		W	H	D	
400V					
4	RVS-DX 8-400-115-0-S	120	232	122	3.1
7.5	RVS-DX 17-400-115-0-S	120	232	122	3.1
15	RVS-DX 31-400-115-0-S	120	232	122	3.1
22	RVS-DX 44-400-115-0-S	120	232	122	3.1
30	RVS-DX 58-400-115-0-S	129	275	182	5.2
37	RVS-DX 72-400-115-0-S	129	275	182	5.2
45	RVS-DX 85-400-115-0-S	129	380	182	8.5
55	RVS-DX 105-400-115-0-S	129	380	182	8.5
75	RVS-DX 145-400-115-0-S	172	380	192	11.7
90	RVS-DX 170-400-115-0-S	172	380	192	11.7
110	RVS-DX 210-400-115-0-S	380	455	295	31
160	RVS-DX 310-400-115-0-S	380	455	295	31
200	RVS-DX 390-400-115-0-S	350	550	310	55
250	RVS-DX 460-400-115-0-S	460	600	319	65
315	RVS-DX 580-400-115-0-S	460	643	319	75
355	RVS-DX 650-400-115-0-S	460	643	318	80
450	RVS-DX 820-400-115-0-S	460	643	318	90
550	RVS-DX 950-400-115-0-S	560	833	334	100
630	RVS-DX 1100-400-115-0-S	560	833	334	100

Advantages at a glance

The Solstart Plus is a compact, easy to operate soft starter, designed for use with standard three phase squirrel cage motors in commercial applications. Solstart Plus advantages include;

- Two phase control
- Soft start & soft stop
- Current Limit
- Motor Protection
- Built-in Bypass
- End of Acceleration Relay (on sizes 58-170A)
- Fault Relay
- Compact, light weight, small footprint
- Aluminium case

Standard Ratings

- Voltages: 208,400,480 & 600V
- Control Voltage: 110-230V
- 50 and 60 Hz

Displays (LEDs)

- On - Mains Voltage Connected
- Ramp Up / Down
- Run
- Overload
- Phase Loss
- Over Temp

Applications

- Over Temperature Applications
- Pumps, Fans, Compressors
- Conveyors & Monorail Systems
- Machine Tools

Advantages at a glance

- Small Footprint
- Complete Line 8-1100A 220-600V
- Third generation microprocessor based design circuitry
- Normal Duty, fully rated design including built in bypass
- Superior starting and stopping characteristics
- Comprehensive Motor Protection Package

Displays

- LCD - Two lines of 16 characters
- Multilingual: English, Spanish, German & French
- Four LEDs: On, Ramp Up/Down & Fault
- Statistical Data
- Full description parameter settings

Starting & Stopping

- Soft start & soft stop
- Current Limit
- Torque and Current Control
- Pulse start
- Slow speed forward and reverse
- Dual Adjustment
- Pulse start
- Unique Pump Control Software

Motor & starter protection

- Too many starts
- Long start time
- Shear-pin
- Electronic Overload
- Under Current
- Phase loss & Sequence
- Under, Over & No voltage
- Load loss
- Shorted SCR
- Starter over-temperature
- External Fault
- SCR Protection with MOV's

Standard Voltages

- Voltages: 230,400,440,460 & 600V

RVS-DN

Digital Soft Starter 8-3000A



Heavy duty, full featured digital soft starter, incorporating superior start-stop characteristics to provide solutions for the most demanding applications. Comprehensive motor protection package guarantees long term reliability, while the robust design ensures excellent performance in harsh environments. Incorporating Pump Control Program and Slow-Speed with Electronic Reversing. Including various marine and industrial standards. Ideal for severe and heavy duty marine and offshore applications.



Advantages at a glance

- Complete line 8-3000A, 220-1100V
- Heavy duty, fully rated design
- Robust construction
- Superior starting and stopping
- Comprehensive Motor Protection
- User friendly
- Line or Inside Delta connection
- Ambient temperature: 50°C
- Options
 - Motor Insulation Tester
 - RS-485 Modbus, Profibus, TCP
 - Thermistor in / Analogue out
 - Tachometer input

Starting & stopping

- Soft start and soft stop
- Current Limit
- Unique Pump Control software
- Torque and Current Control
- Dual Adjustments
- Slow speed with reversing
- Pulse start
- Linear Acceleration (option)
- Energy Save for improved PF

Standard Ratings

- Voltages: 230,400,500,600,690 & 1100V

kW	RVS-DN Part Number	Dimensions (mm)			Weight Kg
		W	H	D	
400V					
4	RVS-DN-8-400-115-115-9-S	153	310	170	4.5
7.5	RVS-DN-17-400-115-115-9-S	153	310	170	4.5
15	RVS-DN-31-400-115-115-9-S	153	310	217	6.8
22	RVS-DN-44-400-115-115-9-S	153	310	217	7.5
30	RVS-DN-58-400-115-115-9-S	153	310	217	7.5
37	RVS-DN-72-400-115-115-9-S	153	310	217	7.5
45	RVS-DN-85-400-115-115-9-S	274	370	279	15
55	RVS-DN-105-400-115-115-9-S	274	370	279	15
75	RVS-DN-145-400-115-115-9-S	274	370	279	15
90	RVS-DN-170-400-115-115-9-S	274	370	279	15
110	RVS-DN-210-400-115-115-9-S	380	455	292	31
160	RVS-DN-310-400-115-115-9-S	380	455	292	31
200	RVS-DN-390-400-115-115-9-S	380	455	292	31
250	RVS-DN-460-400-115-115-9-S	470	640	301	65
315	RVS-DN-580-400-115-115-9-S	470	640	301	65
355	RVS-DN-650-400-115-115-9-S	470	640	301	65
450	RVS-DN-820-400-115-115-9-S	623	660	290	65
525	RVS-DN-950-400-115-115-9-S	623	660	290	65
630	RVS-DN-1100-400-115-115-9-S	723	1100	370	170
800	RVS-DN-1400-400-115-115-9-S	723	1100	370	170
950	RVS-DN-1800-400-115-115-9-S	723	1100	370	170
1250	RVS-DN-2150-400-115-115-9-S	750	1300	392	235
1350	RVS-DN-2400-400-115-115-9-S	900	1300	410	350
1750	RVS-DN-2700-400-115-115-9-S	900	1300	410	350
1850	RVS-DN-3000-400-115-115-9-S	900	1300	410	350



* Type test

Motor & Starter Protection

- Too many starts
- Long start time (Stall)
- Shear-pin (Start+Run+Jam)
- Electronic overload with selectable curves
- Under Current with adjustable delays
- Phase Loss & Phase Sequence
- Under, Over, & No voltage
- Load loss (motor not connected)
- Shorted SCR
- Starter over-temperature

Display LCD & LEDs

- Selectable languages: English, German, French & Spanish.
- Two display modes for basic & advanced applications
- Friendly operation with default parameters
- Eight LEDs for quick operational status
- Statistical Data including:
 - Total run time
 - Total number of trips
 - Total number of starts
 - Last start current
 - Last start time
 - Last trip
 - Current at trip

Applications

- Pumps (Water utilities, Industry)
- Compressors
- Conveyors & monorails
- Mixers & Agitators
- Fans & Centrifuges
- Hydraulic pumps
- Starting from weak Mains supply
- Marine (Thrusters, pumps, fans, refrigeration, compressors, etc..)

Marine & Offshore

- Complete Line 8-3000A, 220-1100V
- Heavy duty, fully rated design
- Robust construction
- Generator ready - auto frequency tracking, sustains variations of 45-65Hz while starting
- User friendly operation
- Unique protection for corrosive environments

Options

- RS-485 Communication (see details below)
- Analogue Output (see details below)
- Thermistor Input (see details below)
- Motor Insulation Test (see details below)
- Preparation for Bypass - to maintain protection when bypass is closed
- Special Anti-Corrosive Treatment - special coating for harsh environments
- Illuminated LCD
- Special Tacho Feedback Circuitry

Communication (option)

- MODBUS RTU - enables Setting, Control & Supervision.
- PROFIBUS DP - enabling Control & Supervision
- TCP/IP - MODBUS/TCP via standard RJ 45 Computer Network Connector

Analogue card (option)

- Incorporates two functions
- Thermistor input, PTC or NTC
- Analogue output, related to motor's current, programmable as 0-10VDC, 4-20mA, 0-20mA or inverse

Motor Insulation Tester (option)

A unique feature for submersible pumps, motors installed in harsh environments, etc. The system measures motor insulation when the motor is not running.

Two programmable levels are available:

- Alarm level, adjustable 0.2-5 MΩ
- Start Disable level, adjustable 0.2-5 MΩ, preventing starting when insulation is below acceptable levels.

Auxiliary Relays

Programmable relays, one-C.O 8A,220VAC

- Immediate with adjustable On and Off delays.
- End of Acceleration, with adjustable On delay
- Fault, programmable as Fault or Fault-fail-safe operation
- Low Motor Insulation Alarm Output

MV-DS

Medium Voltage Digital Soft Starter 2.3 / 11kV

The Softstart MV-DS digital soft-starter

Designed for the controlled starting - and stopping - of large medium voltage motors up to 6.6kV with 11kV models in development.

Such motors generate huge torques and draw enormous currents when started direct-on-line and auto-transformer starting is expensive, bulky and provides only a moderate solution.

Controlled starting by precise digital voltage control offers the smoothest starting torque solution, maintaining the line current below current limit levels. This not only protects the whole drive installation but also protects the driven machinery from excessive torque surges that can cause substantial damage and expensive plant downtime.

Custom built to your needs

The MV-DS is designed to host a wide variety of options, enabling it to be customised to the client's precise needs. Slip-ring motors can be accommodated by incorporating a rotor shorting resistor package, bi-directional motor control is available and power factor correction is offered, along with 110V or 230V control. Cable entry can be accommodated from the bottom, the top or rear and internal and external cable boxes can be incorporated in the design.

Power when you need it

The MV-DS is a heavy-duty fully-rated design, allowing a start capacity of up to 400% FLC for 30secs at a rated temperature of 50°C without derating. Designed for arduous environments, a comprehensive motor protection package is included and a motor insulation test facility is offered as an option. Variations in the supply voltage are catered for by a 45-65Hz tracking capability and the construction is designed for corrosive environments. Tacho feedback enables uneven torque loads, such as these encountered on long conveyors, to be smoothly controlled, protecting the plant as a whole.

Simple Control and Monitoring

For precise and simplified control and monitoring, the MV-DS is digitally controlled via a powerful industrial PC, mounted on the cabinet door. The full color 8.4" (12.1" optional) display enables the engineer to commission the starter quickly and simply and thereafter to see exactly what is happening with the plant. Ethernet and Modbus control facilitates full remote monitoring and control in a wide variety of languages.



System Voltage (Vac)	Output Current (Amps)	Motor Power (kW)*	Dimensions(mm)			Stack Weight (kg)	Total Weight (kg)**
			L	D	H		
2300	60	200	1520	760	2025	90	360
2300	110	360	1520	760	2025	90	360
2300	200	660	1520	760	2025	90	360
2300	320	1060	1520	760	2025	130	400
2300	400	1330	1520	760	2025	160	430
2300	600	2000	1520	760	2025	200	470
2300	720	2400	1710	760	2025	350	690
3300	60	280	1520	760	2025	140	410
3300	110	520	1520	760	2025	140	410
3300	200	950	1520	760	2025	140	410
3300	320	1530	1520	760	2025	140	410
3300	400	1910	1520	760	2025	200	470
3300	600	2850	1520	760	2025	250	520
3300	720	3440	1710	760	2025	400	740
4160	60	360	1520	760	2025	140	410
4160	110	660	1520	760	2025	140	410
4160	200	1200	1520	760	2025	140	410
4160	320	1930	1520	760	2025	150	420
4160	400	2410	1520	760	2025	180	450
4160	600	3610	1520	760	2025	195	465
4160	720	4330	1710	760	2025	450	790
6600	70	670	1710	760	2025	250	570
6600	140	1340	1710	760	2025	250	570
6600	250	2390	1710	760	2025	250	570
6600	300	2870	1710	760	2025	300	620
6600	400	3820	1710	760	2025	300	620
6600	500	4780	1710	760	2025	300	620
6600	700	6740	2090	950	2025	450	790

* kW sizes are for indication only.

** Total weights are estimated and may vary depending upon components used.

The UK's first 2.3 / 11kV high power soft-starter

Standards	
ISO 0991 : 2008	Quality Standard
IEC 60470 : 2000	Vacuum Contactors
IEC 60228 : Class 5	High Voltage Cables
UCI 895, BSS 6195 Type 5	High Voltage Cable Dielectric Strength
IEC 60332-2 IEEE 383	High Voltage Cable Fire Propagation
EN 62271 : 2004	Part 200 High Voltage Switchgear and Control Gear
IEC 60694 : 1996	Common Specification for High Voltage Switchgear
IEC 60270 :2000	High Voltage Test Techniques
IEC 60071 : 1996	Insulation Coordination
EN 50178 :1998	Electronic Equipment for use in power installation
IEC 60664 : 2007	Insulated coordination within low voltage systems
IEC 61238 : 2003	Cable Lugs (High Voltage)
2006/95/EC	Low Voltage Directive
	CE Certificate of Incorporation
IEC 61000-6-2	Electromagnetic Compatibility - Immunity
IEC 61000-6-3	Electromagnetic Compatibility - Emission
	Type test certification



Additional Products



(MCB) (RCCB)

Hyundai Miniature Series



Hyundai Molded Case Circuit Breaker



Hyundai Vacuum Contactor



Hyundai Vacuum Circuit Breaker



Hyundai Air Circuit Breaker



Hyundai Contactor & Overload Relay



Digital Temperature Protection Relay



Digital Motor Insulation Protection Relay



Digital Motor Protection & Control Relay

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