SSW7000

Medium Voltage Soft-Starter

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Summary

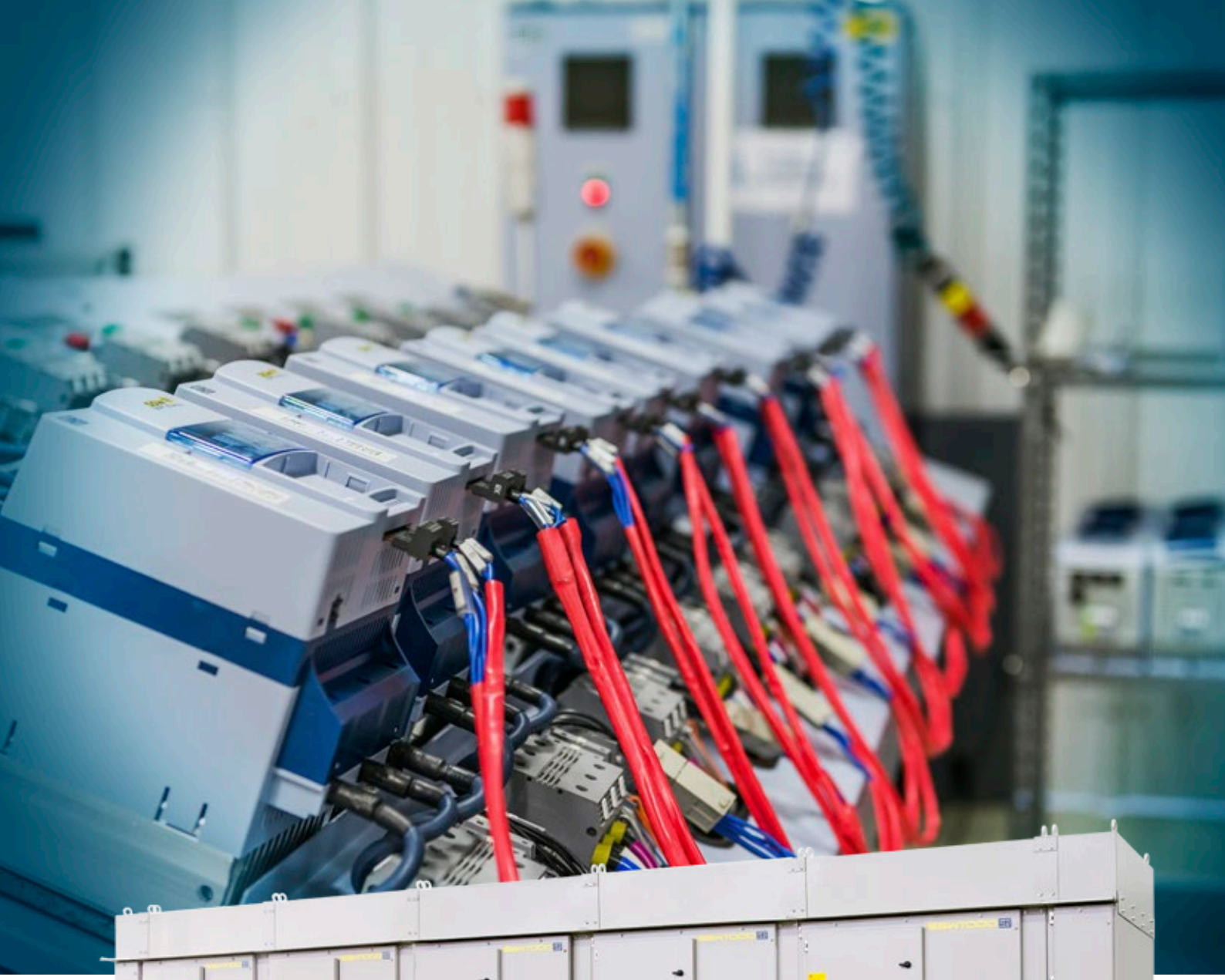
Latest technology for smooth start and motor protection

The SSW7000 uses ***latest technology*** to provide start/stop control and protection for three-phase induction and synchronous medium voltage motors. Developed to ensure ***excellent performance***, it prevents mechanical shocks from the load, protects the motor against related burnouts or current surges in the power supply and thus, offers prepackaged and engineered solutions for various applications including Marine & Mining.

The SSW7000 reduces the voltage applied to the motor at start. As a consequence, motor current and torque are reduced for a smooth start. The motor voltage control is performed with the firing angle control of the thyristors in antiparallel connection.

Main Features

- Integrated bypass
- Circuit breakers are not required because there is a line contactor
- Motor protection built-in in the standard cabinet
- Heavy duty design at 50 °C ambient temperature (above 40 °C with current derating)
- User friendly configuration and operation
- Fibre-optic firing
- Complete isolation between MV and LV compartments



Certifications

Features

- Motor Voltage: 2.3 kV to 6.9 kV
- Torque control - FTC - Flexible Torque Control, technology developed by WEG which uses the vector control and control of direct torque concepts, based on technologies developed for the vector frequency inverters CFW. The FTC is flexible to select the desired torque control according to the type of load applied to the motor (constant loads, quadratic loads, or loads with lower or higher starting torque), providing a smooth start with a linear speed ramp along the entire starting process
- Accessories can be easily and quickly installed by using the Plug & Play concept
- Protection degree: IP41 or NEMA 12
- Operating interface (HMI) with graphic LCD
- Real-time clock
- Medium voltage fuses
- Power and control insulated by fiber optics
- Main and Bypass Vaccum Contactors able to perform DOL start
- Flash memory module (accessory)
- SoftPLC function
- Licence-free software SuperDrive and WLP
- USB connection to PC
- Motor thermal protection - Pt-100 - 8 channels (optional accessory)
- 5 start modes
- Network communication boards (accessories):
  - DeviceNet, Profibus-DP, Ethernet and Modbus, RS232 or RS485
- Oriented Startup function presents minimum programming sequence to commence the operation
- Active Protection offers complete motor protection in DOL mode and eliminated the need of extra protection relays
- Ground Fault Protection – Standard
- Easy installation and suitable for Retrofits
- 40 years MTBF
- No need of back access

Plug & Play Philosophy

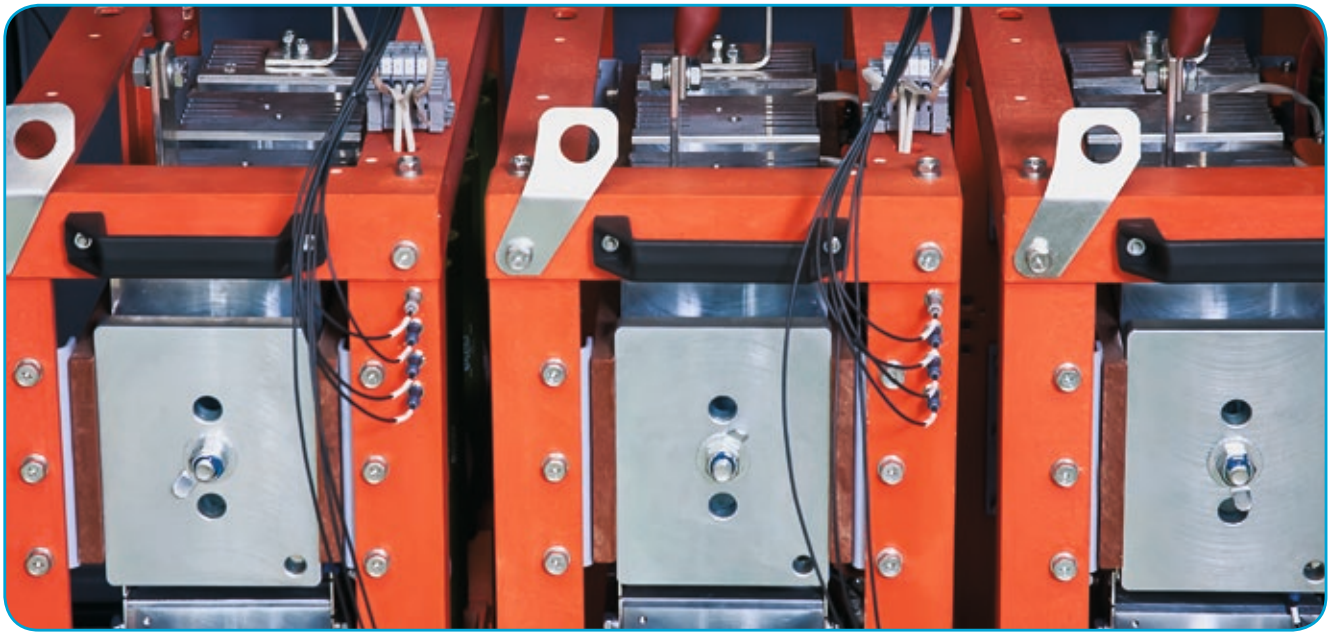
The installation of the accessories is based on the Plug & Play philosophy, that is, they are automatically configured when connected to the SSW7000, ensuring a faster and easier process.

Superdrive G2

License-free software (available at WEG website) for total control and monitoring of WEG SSW7000.

- Parameter upload and download
- Soft-Starter operation
- Soft-Starter monitoring
- On-line and off-line programming

Heavy Duty Design



- The heatsinks are sized for real heavy duty overload cycle
- The power stacks are developed in independent modules with wheels, making installation and maintenance easy

Human Machine Interface - HMI

Navigation is similar to the logic used in cell phones, with the option of sequential access to the parameters or through the groups (Menu) by means of the function access keys on the display (soft keys).

Easy to Read Display
SSW7000 has an easy to read display, offering extensive feedback and real-time information.

You can configure your own display to show the most relevant data for your application.

Remote Mount Display
SSW7000 display can be mounted on panel door reducing the need of separate meters and status indicators or mounted remotely on customer's console.

Languages
English, Portuguese, Spanish, others under request.

Event Log
SSW7000 HMI interface provides a fault history saving last 10 faults with date and time, motor current, power supply voltage in the fault and operating status.

Applications

Cement & Mining

Pumps, Fans, Exhausters, Conveyors and Mills

Sugar & Ethanol

Pumps, Fans and Exhausters

Metals

Pumps, Fans and Exhausters

Water & Waste

Pumps, Fans and Exhausters

Pulp & Paper

Pumps, Fans and Exhausters

Chemical, Petrochemical, Oil & Gas

Pumps, Fans, Exhausters, Compressors and Mixers

Customized Solutions

WEG can provide engineered solutions under request.

- Reversing motor starter (clockwise and counter-clockwise)
- Redundant protection via relay
- Medium voltage capacitors - PFC
- IP54 protection degree
- Output grounding switch
- Soft-Starter for brush/brushless synchronous motors
- Over 600 A under request

Note: for engineered solutions, please get in contact with the factory or WEG sales representative.

Advantages in Using WEG Soft-Starter

Mechanical Benefits

- Reduced mechanical stress on drive-train (gear, bearing wear and failures, belt wear, pump impeller wear, minimizes valve and pipe repair costs)
- Prolong motor life
- Provides smooth (step-less) ramping of motor speed

Electrical Benefits

- Better power quality
- Reduced stress on transformers, power line and motor rotor/stator
- Reduced voltage drop
- No need of oversized generators
- Prolong motor life
- Complete isolation between MV and LV compartments
- Optical fiber firing
- Fewer distribution problems

Cost Benefits

- Normally MV solid state Soft-Starters cost less than other reduced voltage starting methods and less than a DOL + Protection Relay
- Lower operating costs as SSW7000 helps to reduce energy consumption, for example with the reduction of inrush currents
- Providing smoother and step-less acceleration reduces load shocking to the drive train and machinery which means less investment in maintenance
- Faster pay-back when compared to other starting methods
- Extends the life time of the complete drive system, reduces maintenance time and costs
- Better price/performance ratio

Process Benefits

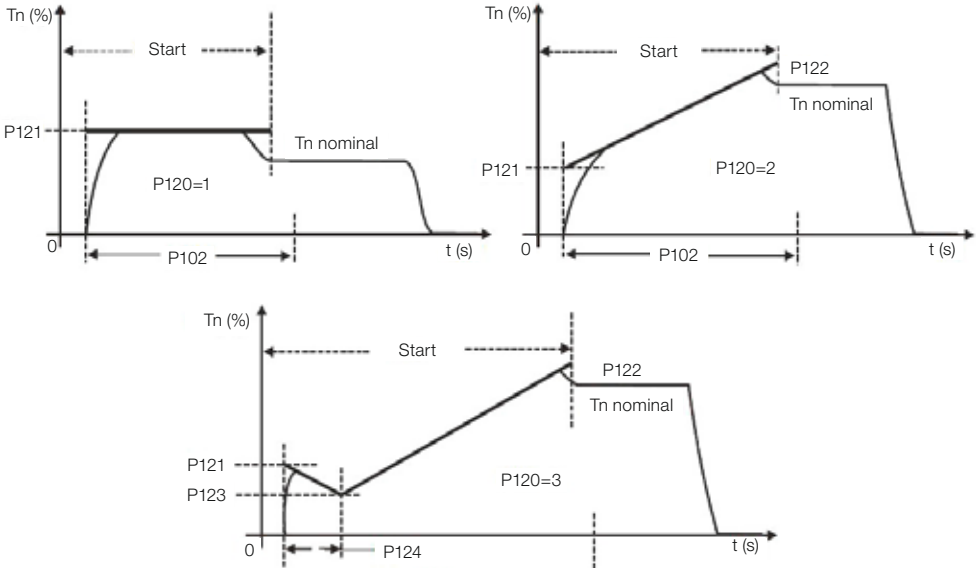
- Productivity and uptime can be greatly increased by reducing costs associated with maintenance, downtime and parts replacement.
- Prolong system life
- Provides smooth (step-less) ramping of motor speed
- Gradually stop a load (e.g. avoid water hammer in pipe lines)
- Prevents pressure surges from pumps and piping systems
- Prevents jerk and surge-free motion of conveyor belts

Starting and Stopping Modes

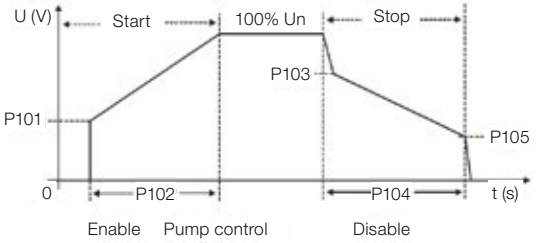
WEG SSW7000 is Supplied With the Possibility to Adjust Starting Curve to the Load Curve With Several Options

Torque Control
It allows choosing which torque profile the SSW will follow during the motor starting. WEG SSW7000 has three torque profiles available, which makes possible to start any type of load, constant or 1 point linear or 2 points and quadratic or 3 points:

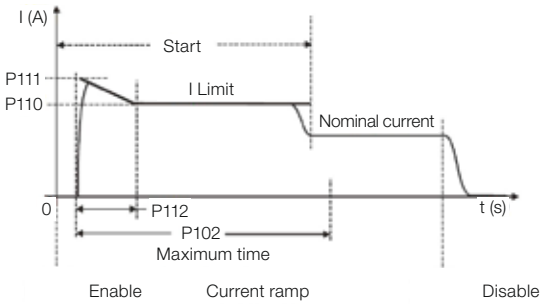
1: Constant torque
2: Linear torque
3: Quadratic torque



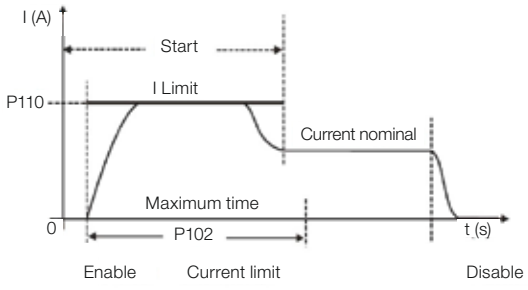
Pump Control
It limits the starting torque and the stopping speed for a smooth management in water pumps. Reduce the Water Hammer, pressure overshoots inside the hydraulic pipelines which could damage them. Set voltage is applied using voltage and current feedback measurement. Special algorithm aims to minimize pressure overshoots within piping to prevent material wear.



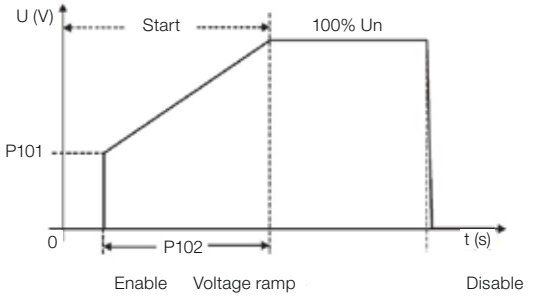
Current Ramp
Useful for application with Variable Torque. It can be used in weak power supplies to limit the current.



Current Limit
Soft-Starter will control the set current limit. When current drops below this limit the Soft-Starter will end the ramp and close the bypass.



Voltage Ramp
Used for starting loads with low starting torque and quadratic torque.



Models

Size A and B

Power supply	Product	Rated current (A)	Frame	Motor maximum power	
				HP	kW
2,300 V ac	SSW7000A 070 T2 XX 41	70	A	350	250
	SSW7000A 180 T2 XX 41	180		750	550
	SSW7000A 300 T2 XX 41	300		1,350	1,000
	SSW7000A 360 T2 XX 41	360		1,500	1,100
	SSW7000B 500 T2 XX 41	500	B	2,375	1,800
	SSW7000B 600 T2 XX 41	600		2,750	2,000
3,300 V ac	SSW7000A 070 T4 XX 41	70	A	500	400
	SSW7000A 180 T4 XX 41	180		1,300	1,000
	SSW7000A 300 T4 XX 41	300		2,200	1,700
	SSW7000A 360 T4 XX 41	360		2,700	2,058
	SSW7000B 500 T4 XX 4X	500	B	4,000	3,000
	SSW7000B 600 T4 XX 4X	600		5,000	3,750
4,160 V ac	SSW7000A 070 T4 XX 41	70	A	650	500
	SSW7000A 180 T4 XX 41	180		1,500	1,100
	SSW7000A 300 T4 XX 41	300		2,500	1,900
	SSW7000A 360 T4 XX 41	360		3,000	2,250
	SSW7000B 500 T4 XX 41	500	B	4,000	3,000
	SSW7000B 600 T4 XX 41	600		5,000	3,750
6,900 V ac	SSW7000A 070 T6 XX 41	70	A	1,100	800
	SSW7000A 180 T6 XX 41	180		2,500	1,900
	SSW7000A 300 T6 XX 41	300		3,700	2,800
	SSW7000A 360 T6 XX 41	360		4,500	3,400
	SSW7000B 500 T6 XX 41	500	B	6,250	4,700
	SSW7000B 600 T6 XX 41	600		7,500	5,600

Size N (Manufactured in USA)

Power supply	Product	Rated current (A)	Frame	Motor maximum power	
				HP	kW
2,300 V ac	SSW7000N 070 T2 XX N2	70	N	350	250
	SSW7000N 180 T2 XX N2	180		750	550
	SSW7000N 300 T2 XX N2	300		1,350	1,000
	SSW7000N 360 T2 XX N2	360		1,500	1,100
3,300 V ac	SSW7000N 070 T4 XX N2	70	N	500	400
	SSW7000N 180 T4 XX N2	180		1,300	1,000
	SSW7000N 300 T4 XX N2	300		2,200	1,700
	SSW7000N 360 T4 XX N2	360		2,700	2,058
4,160 V ac	SSW7000N 070 T4 XX N2	70	N	650	500
	SSW7000N 180 T4 XX N2	180		1,500	1,100
	SSW7000N 300 T4 XX N2	300		2,500	1,900
	SSW7000N 360 T4 XX N2	360		3,000	2,250

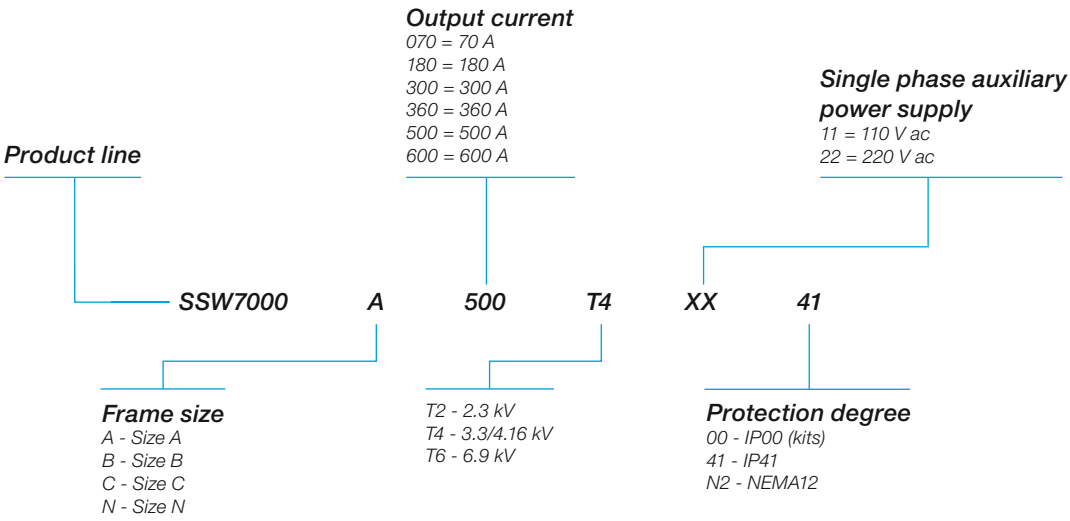
Size C

Power supply	Product	Rated current (A)	Frame	Motor maximum power	
				HP	kW
2,300 V ac	SSW7000C 125 T4 XX XX	125	C	600	450
	SSW7000C 250 T4 XX XX	250		1,300	900
	SSW7000C 360 T4 XX XX	360		1,900	1,400
4,160 V ac	SSW7000C 125 T4 XX XX	125	C	1,000	750
	SSW7000C 250 T4 XX XX	250		2,000	1,500
	SSW7000C 360 T4 XX XX	360		3,000	2,250

Sizing the Appropriate Soft-Starter

- Type of application (pump, compressor, conveyor, etc.)
- Motor rated power (HP or kW)
- Motor nominal current (A)
- Motor nominal voltage (V)
- Motor synchronous speed (rpm)
- Curve current x speed
- Curve motor torque x speed
- Curve load torque x speed
- Rotor and load inertia J=GD²/4 (Kgm²)
- Number of starts per hour and time between them
- Ambient temperature
- Altitude above sea level

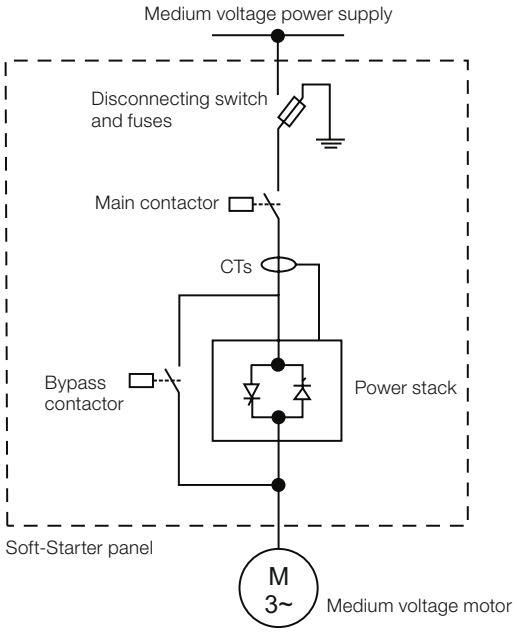
Product Code

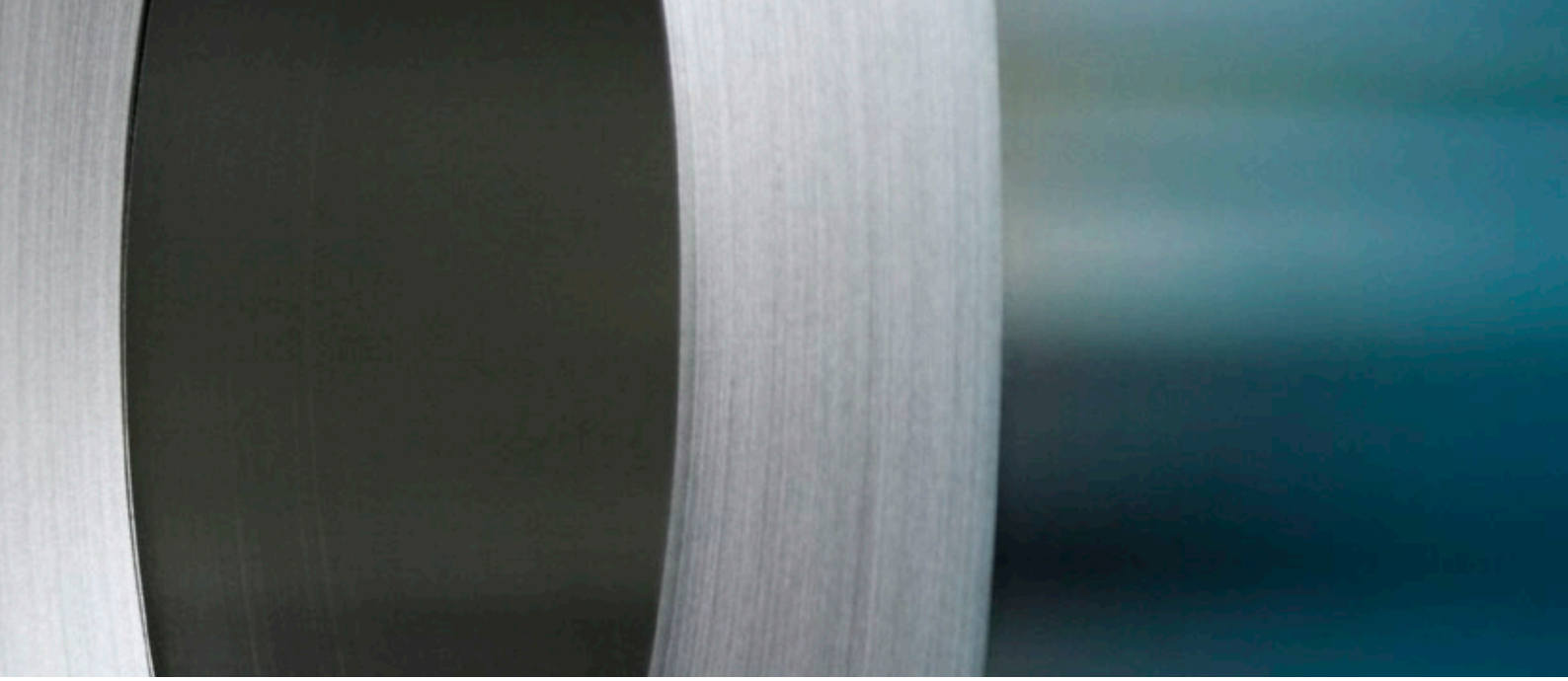


Accessories

Reference	Description	Slot
Control accessories to install in slots 1, 2 and 3		
IOE-04	Module for 8 temperature sensors Pt-100	1 and 2
RS485-01	RS485 serial communication module (Modbus)	3
RS232-01	RS232C serial communication module (Modbus)	
RS232-02	RS232C serial communication module with switch to program the microcontroller Flash memory	
Anybus-CA accessories to install in slots 4		
PROFDP-05	Profibus-DP interface module	4
DEVICENET-05	DeviceNet interface module	
ETHERNET/IP-05	Ethernet/IP interface module	
RS232-05	RS232 interface module (passive) (Modbus)	
RS485-05	RS485 interface module (passive) (Modbus)	
Flash memory module to install in slot 5 - included in standard models		
MMF-01	Flash memory module	5
Other accessories		
HMI-01	Man Machine Interface – MMI (sold separately)	-
RHMIF-01	Frame kit for MMI (protection rate IP56)	
TC FT	Ground fault CT	

Block Diagram - Standard





Dimensions

SSW7000 Complete Panel Dimensions

Frame	Width mm (in)	Height mm (in)	Depth mm (in)	Weight (without the arms) kg (lb)
A	1,200 (47)	2,365 (93)	1,007 (40)	720 (1,588)
B	1,800 (71)	2,365 (93)	1,007 (40)	1,200 (600)
C	915 (36)	2,413 (95)	762 (30)	546 (1,205)
N	1,072 (42)	2,365 (93)	845 (33)	560 (1,235)

Kits - Power Arms

Rated voltage (kV)	Width mm (in)	Height mm (in)	Depth mm (in)	Weight kg (lb)
2.3	262 (10.31)	722 (28.42)	430 (16.93)	53.0 (116.84)
4.16	262 (10.31)	722 (28.42)	546 (21.5)	68.6 (151.24)
6.9[1)]	262 (10.31)	722 (28.42)	664 (26.14)	83.3 (183.64)
4.16 - Compact	226 (9.90)	585 (23.03)	482 (19.0)	30.1 (66.35)

General Technical Characteristics

		Standard (Frame: A, B)	Compact (Frame: C, N)
Power supply	Power voltage (R/1 L1, S/3L2, T/5L3)	Models: 2,300 V ac: (-60% to +10%) or (920 to 2,530 V ac) 4,160 V ac: (-60% to +10%) or (1,664 to 4,576 V ac) 6,900 V ac: (-60% to +10%) or (2,760 to 7,590 V ac)	Models: 2,300 V ac: (-60% to +10%) or (920 to 2,530 V ac) 4,160 V ac: (-60% to +10%) or (1,664 to 4,576 V ac)
	Frequency	(50 to 60 Hz): (±10%) or (45 to 66 Hz)	
Capacity	Number of starts	5 starts in 2 hours (one start every 30 minutes), others under request	
	Starting current	450% for 30s	400% for 20s (Frame C) 450% for 30s (Frame N)
Thyristors	Medium voltage SCRs per power stack	2,300 V ac: 2 thyristors per power stack 4,160 V ac: 2 matched pairs of thyristors 6,900 V ac: 2 matched trilplets of thyristors	4,160 V ac: 2 matched pairs of thyristors
	Peak reverse voltage on the power stack	2,300 V ac: 6.5 kV 4,160 V ac: 13 kV 6,900 V ac: 19.5 kV	4,160 V ac: 13 kV
Protections	Protection by hardware	dv/dt filter Active overvoltage protection on the thyristors	
Control supply	Control voltage	As per code of the SSW7000: 110 V ac: (-15% to 10%) or (93.5 to 121 V ac) 230 V ac: (-15% to 10%) or (195.6 to 253 V ac)	
	Frequency	(50 to 60 Hz): (±10%) or (45 to 66 Hz)	
	Consumption	Continuous: 900 mA (200 W) Peak: 9.5 A (during the closing of the vacuum contactors)	
Control	Method	Voltage ramp Current limitation Pump control Torque control Current ramp	
Inputs	Digital	6 insulated digital inputs, 24 V dc, programmable functions	
	Analog	2 differential inputs insulated by differential amplifier; AI1 resolution: 12 bits, AI2 resolution: 11 bits + signal, (0 to 10) V, (0 to 20) mA or (4 to 20) mA, impedance: 400 kΩ for (0 to 10 V), 500 Q for (0 to 20 mA) or (4 to 20 mA), programmable functions	
Outputs	Digital	3 NO/NC contact relays, 240 V ac, 1 A, programmable functions	
	Analog	2 insulated outputs, (0 to 10 V) RL ± 10 kΩ (maximum load), 0 to 20 mA or 4 to 20 mA RL<500 Q, 11 bit resolution, programmable functions	
Man machine interface	Standard	9 keys: Turn/Stop, Increase, Decrease, Rotation Direction, Jog, Local/Remote, right soft key and left soft key. Graphic LCD. It enables access to/change of all parameters	
Safety	Main protections	Under and overcurrent and current unbalance Under and overvoltage and voltage unbalance Under and overtorque and active overpower phase loss Reverse phase sequence overtemperature in the power racks Motor overload Motor overtemperature (optional) External defect Ground fault by voltage or current Fault in the power racks Fault in the power contactors Faults in the control boards Communication faults of MMI and between controls Faults in the communication networks Programming errors For further details and more protections implemented, refer to the programming manual	
Protection degree	IP41 or NEMA 12	As per code	
PC connection for programming	USB connector	USB standard rev. 2.0 (basic speed) USB plug type B “device” Interconnecting cable: standard host/device shielded USB cable	
Environmental conditions	Temperature	-10 to 40 °C, up to 50 °C with derating 2%/1 °C	
	Altitude	Up to 1,000 m above sea level. For higher altitudes, contact our sales force	
	Humidity	Air relative humidity of 5% to 90% non-condensing	
Standards	NBR IEC 62271-200	High voltage controlgear and switchgear - Part 200: High voltage controlgear and switchgear in metal enclosure for voltages over 1 kV up to and including 52 kV	
	IEC 62271-1	High-voltage switchgear and controlgear - Part 1: Common specifications	
	IEC 60060-1	High-voltage test techniques. Part 1: General definitions and test requirements	
	CISPR 11	Industrial, scientific and medical (ISM) radio-frequency equipament - electromagnetic disturbance characteristics - limits and methods of measurement	
	IEC 61000-4-4	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 4: electrical fast transient/burst immunity test. Basic EMB publication	
	IEC 61000-4-18	Electromagnetic compatibility (EMC) - Part 4-18: Testing and measurement techniques - damped oscillatory wave immunity test	
	NBR IEC 60529	Protection rates for electric equipment enclosures (ip code)	
	UL 347	-	Medium voltage ac contactors, controllers and control centers
	UL 347B	-	Medium voltage motor controllers

Standard Protections

ANSI/IEEE C37.2	Function/protection feature	Standard ▭ Option ▭
19	Reduced voltage starting and bypass	▭
27	Undervoltage protection	▭
37	Undercurrent protection	▭
46	Phase-balance current protection	▭
47	Phase sequence	▭
48	Incomplete sequence	▭
50	Instantaneous overcurrent trip	▭
51	Overcurrent trip	▭
55	Power factor check	▭
59	Overvoltage	▭
81	Frequency check	▭
86	Lockout relay - electronic	▭
50N/51G	Ground fault detection instantaneous and fault-current	▭
49 & 38	Winding temperature and bearing temperature	▭

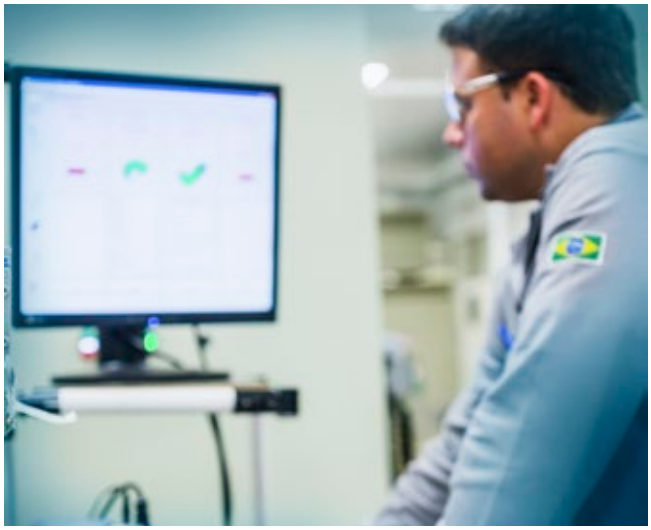
Global presence is essential, as much as understanding your needs.

Global Presence

With more than 30.000 employees worldwide, WEG is one of the largest electric motors, electronic equipments and systems manufacturers. We are constantly expanding our portfolio of products and services with expertise and market knowledge. We create integrated and customized solutions ranging from innovative products to complete after-sales service.

WEG's know-how guarantees our ***medium voltage Soft-Starter SSW7000*** is the right choice for your application and business, assuring safety, efficiency and reliability.

- ***Availability*** is to have a global support network
- ***Partnership*** is to create solutions that suits your needs
- ***Competitive edge*** is to unite technology and inovation



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For those countries where there is not a WEG own operation, find our local distributor at www.weg.net.

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