

# SOFT STARTERS

For Marine, Offshore,  
Oil & Gas applications

HRVS-DN & RVS-DN, 8 - 3000A, 220 - 15000V



Soft-Starting AC motors is what we do best.

**SOLCON**

# HRVS-DN Medium Voltage Digital Soft Starter

60 - 2700A, 1500 - 15000V

The HRVS-DN is a third generation, Medium Voltage, digital soft starter, designed for use with standard asynchronous and synchronous motors. This highly sophisticated soft starter ensures smooth, step-less acceleration and deceleration, eliminating current and mechanical shocks on motor and load. The HRVS-DN may be supplied as chassis type or a complete system including Line and/or Bypass Contactors. Addible options are Load Break Switch, Fuses, Motor Protection Relay, etc



## Advantages at a Glance

- Heavy duty design at 50°C ambient temperature
- Reduced inrush current and mechanical shock
- Third generation microprocessor circuitry
- Soft, stepless acceleration & deceleration
- Unique starting & stopping characteristics
- Sophisticated motor protection package
- User friendly, easy setting and operation
- IP32-standard, higher protection by special order
- Synchronous motor starting, utilizing unique module
- Innovative low voltage test mode - full testing with a small L.V motor using standard built in features
- Advanced Electronic Potential Transformer utilizing Patent Pending "wireless" voltage measurement system
- Unique, Patent Pending fiber-optic firing system providing complete isolation between MV and LV compartments.
- Unique fault indication to the individual thyristor level
- Each starter is tested for Partial Discharge (Korona) improving safety and ensuring long term reliability
- Power factor capacitors can be connected directly to the upstream contactor (omitting the need for capacitor contactor)
- Two optional methods of delivery: Chassis type for self assembly or Complete system
- RS485 Communication with MODBUS, PROFIBUS or MODBUS/TCP protocols (others - upon request)
- Wide 45-65Hz Auto-tracking frequency range combining special software with unique hardware arrangement (designed for Marine, Offshore and Generators operating under continuous frequency variation)

## Motor & Starter Protection

- Too many starts & start inhibit time
- Long start time (Stall protection)
- Electronic overload with selectable curves
- Electronic shear-pin
- Undercurrent
- Unbalanced current
- Ground fault current
- Phase loss
- Phase sequence and under/over frequency
- Undervoltage
- Overvoltage
- External faults (2 separate inputs)
- Shorted SCR & Wrong Connection
- Starter over temperature
- Power on without start signal
- Open Bypass contactor

## Interactive LCD Display

- Six languages can be selected: English, French, German & Spanish (Chinese and Russian - optional)
- User friendly keypad allows accurate setting
- LEDs - For easy operational status

## Starting & Stopping

- Soft start and soft stop
- Current limit
- Pump Control characteristics
- Torque and Current Control for optimized Starting & Stopping process
- Dual Adjust - 2 start/stop characteristics for varying loads and two speed motors
- Pulse start (kick start)
- Tacho/encoder feedback (option)

## Control Circuitry

- Multi-function programmable I/Os
- Opto-isolated control inputs
- Three Change Over output relays, 8A/250VAC
  - "Immediate" - upon Start
  - "End of Acceleration"
  - "Fault" programmable as Trip or Trip-Fail safe
- Analogue output 0/4-20mA, 0-10VDC
- Tacho incremental encoder feedback

## Applications - Marine & Offshore

- Pumps (LNG, LPG, Pressure Injection)
- Water, ballast and Fi-Fi (Fire Fighting) pumps
- Refrigeration chillers & compressors
- Hydraulic pumps & power packs
- Thrusters
- Main Propulsion motors
- Unique protection for corrosive environments
- Generator ready - auto frequency tracking, sustains variations of 45-65Hz while starting

## Standards

- Marine & Offshore  
Lloyds, GL, ABS, BV, DNV, RINA  
Subject to individual case approval



- CE & Gost-R



The company reserves the right to make changes or improvements without prior notice.  
Inner Picture (Fluminense FPSO) - Courtesy Jurong Shipyard



# RVS-DN Low Voltage Digital Soft Starter

8 - 3000A, 220 - 1000V

The RVS-DN soft starter incorporates thyristors (SCR's) to start the motor by supplying a slowly increasing voltage, providing a soft start and smooth stepless acceleration while drawing the minimum current.

## Advantages at a Glance

- Complete product line 8-3000A, 220-1000V
- Heavy duty fully rated design (50°C)
- Robust construction (Harsh Environment)
- Soft, smooth, stepless acceleration and deceleration
- Second generation microprocessor circuitry
- Superior starting & stopping characteristics
- Comprehensive motor protection package
- User friendly
- Energy save - Power factor control
- Five languages LCD: English, French, German & Spanish (Russian - optional)
- Unique optional features - Motor Insulation Tester
  - RS-485 communication
  - Analogue output
  - Thermistor input

## Applications

- Pumps (LNG, LPG, Pressure Injection)
- Thrusters
- Water and Ballast Pumps
- Anchor Motors
- Main Propulsion
- Fans and Blowers
- Air Conditioning Chillers
- Weak Generator systems
- Refrigeration Compressors
- Fi-Fi (Fire Fighting) pumps
- Hydraulic Powerpacks (Crane, Hoist)
- Screw, Piston and Turbo Compressors

## Starting & Stopping

- Soft start and soft stop
- Current limiting
- Pump control program
- Current Control Curve
- Torque Control
- Dual adjustment - two start/stop characteristics
- Slow speed with electronic reversing
- Pulse start
- Linear acceleration (tacho feedback)



## Motor & Starter Protection

- Too many starts & Start inhibit time
- Long start time (Stall protection)
- Shear-pin (Jam) with adjustable delay
- Electronic overload with selectable curves
- Under current
- Phase loss
- Phase sequence and Under/Over frequency
- Under/Overtoltage
- Load loss (motor not connected)
- External fault
- Shorted SCR
- Starter over temperature protection
- Motor insulation test (option)
- Motor thermistor (option)
- When using "Preparation for Bypass" all protection remains active



## MPS-3000

### Motor Protection & Control Relay



The MPS 3000 is the ideal protection for high voltage and large low voltage motors in applications requiring comprehensive protection with advanced warning. Especially in the process, chemical marine and offshore industries. Monitoring three phase currents, voltages and up to 10 temperature inputs, it provides a most complete motor protection package. Thermal capacity and overload calculation methods are incorporated as well as bias input into the Overload curve from current imbalance (positive/negative sequence) and temperature sensors, ensuring accurate modeling of the motor condition.

## MPR-6/3

### Motor Protection Relay Available with Directional Ground Fault



The MPR-6 monitors three phase currents, ground current, motor temperature (three RTDs/Thermistors) and creates an accurate "Thermal Model" of the motor to protect it from abnormal conditions due to power supply, motor and cabling faults, as well as operator malfunction.

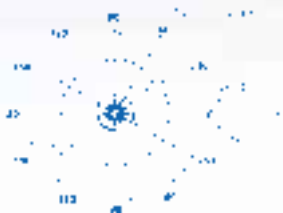
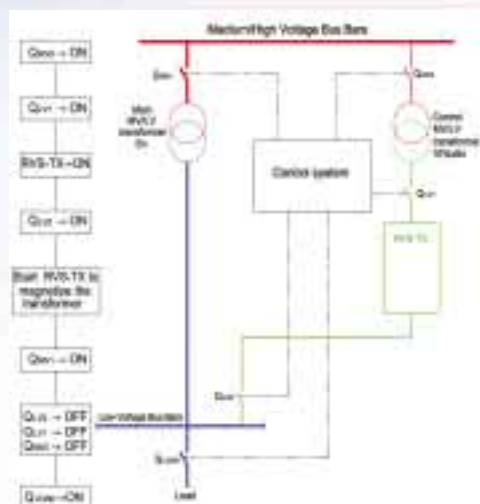
- Advanced microprocessor based circuitry
- True RMS measurement at a sampling rate of 0.5mSec
- Display of motor's operating data, fault and statistical data
- Early warning "Time to Trip" indication
- Programmable inputs and output
- RS-485 communication for remote programming, monitoring and supervision
- Compact design and simple installation

## RVS-TX

### Digital Transformer Soft Starter 8-3000A, 220-1000V



Eliminating the magnetizing inrush current of transformers in either low or medium voltage. The RVS-TX incorporates automatic operation with RS-485 communication and forms a reduced size fully featured digitally controlled transformer starter.



# Additional Products

Additional catalogues available from Solcon's product range

## RVS-AX / RVS-DX

Analogue & Digital soft-starter



## SOLSTART

Miniature soft-starter  
(Solstart-1P for single motors)



## SOLBRAKE

DC Injection brake



## SOLSTART PLUS

Analogue Soft Starter 17-170A,  
with a built-in bypass



## TPS

Thyristor Power Controller (Heaters)  
Zero Crossing or Phase Control



## MPC-6

Motor Protection, Control &  
Supervision Relay



## TPR-6

Digital Temperature  
Protection Relay



## MIP-6

Motor Insulation Protection Relay



## DPM 10

Digital Power Meter



## PFC 10

Reactive Power Factor Controller



## IPNP-RMU

Remote Monitoring/Supervision Unit  
Cellular, Internet, Satellite



## DGC 2000

Digital Generator Control  
& Protection



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