Medium Voltage Solid State Starters
Advanced motor control, protection and monitoring in a reliable, field proven soft starter
The power of performance in an unpredictable world the Centris Starter protects both your motor and your load.

- Motor and starter protection is taken to a new level by combining a high-end motor protection relay with a heavy duty solid state starter.
- Flexible control features and selectable ramping profiles to match any application—no need to compromise performance.
- High level circuit isolation via fibre optics (standard on all units) for safety and power quality immunity.
- Sealed NEMA 12/IP55 enclosures are standard equipment, not an expensive option.

Soft start & protect any AC motor
The Centris Starter is designed to start AC motors in any fixed speed application. It provides maximum protection with “True Thermal Modelling,” while allowing smooth, stepless control of acceleration and deceleration. The Centris Starter guarantees power control and protection for your most important assets.

Heavy-duty attitude
Highest rated power devices for maximum current carrying capacity. Rated at 500% for 60 seconds, the Centris Starter will never be the limiting factor in your application. Powerful sustained gate pulse ensures reliable SCR firing without reactors (unlike inferior pulse train designs that require a reactor to prevent SCR and motor damage).

Experience where it counts
With over 500,000 low voltage and medium voltage soft starters in operation, Fairford Electronics has the application expertise you need. No other soft starter manufacturer takes this product more seriously or has as much experience applying solid state starters. The Centris Starter is the pinnacle of product development and is recognized by users and OEMS around the world as the best Medium Voltage Soft Starter on the market today.

Expect peak performance from your critical medium voltage equipment when your motors are protected and controlled by Fairford Electronics Centris Soft Starters.
Features and Benefits

1. Advanced motor protection relay and ramp features programmable via the keypad or a laptop computer.
2. Fibre optically isolated low voltage compartment with up to 110kV BIL rating for safety and reliability.
3. Built-in 120V control power transformer*; voltage and current metering.
4. Load-break / fault-make rated disconnect switch with door safety interlocking.*
5. Visible grounding bar for safe operation.
6. Coordinated motor fuses with blown fuse indicators.
7. Line isolation vacuum contactor.*
8. Fully rated bypass contactor for increased thermal capacity and optional across-the-line starting.
9. Heavy duty SCR stack assemblies with ring transformer isolation for reliable SCR gate fixing.
10. RTD Option accepts up to 12 RTD inputs.
11. Zero sequence ground fault protection option.
13. NEMA 12/IP55 gasketed enclosure (NEMA 3R optional).

*“Soft Start Only” model available for retrofit applications. Does not include disconnect switch, line isolation contactor or CPT. Customer supplied line start panel required.
All the features of a motor protection relay without the added cost

- True Thermal Modelling monitors the motor for excessive thermal conditions due to starting, running and even ambient conditions.
- Retentive Thermal Memory for continuous overload protection even after a complete power loss. When power is restored, the Centris Starter remembers the last thermal condition of the motor, observes the off time via a real-time clock and adjusts the thermal model accordingly.
- Non-Volatile Memory stores the thermal memory without the need for batteries.
- True Time Thermal Tracking adjusts the thermal model for different cooling rates based on motor temperature, running state or power loss.
- Dynamic Reset Response is only allowed after the motor has sufficient thermal capacity for a successful restart.
- Thermal Model Biasing adjusts for heating effects of phase current imbalance or optional RTD inputs.

Flexible Setup

Choose the level of overload protection.

- Programmable Trip Classes selectable from IEC/NEMA Classes 5 - 30.
- Dual Mode Protection separate trip curves for start and run modes (example: Class 20 for start, Class 10 for run).
- Warning Levels can be programmed and assigned to one of six built-in output relays.
- Custom Trip Curve programmable based on the motor manufacturer’s data or it can use a “Learned Overload Curve” that reflects normal running condition with a programmable trip bandwidth.
- Remote or Automatic Overload Reset can be activated for unattended operation.

Every facility has equipment critical to its operation and productivity. This equipment is often controlled by medium voltage AC motors.

The Centris Soft Starter provides the highest standard of motor control and unsurpassed protection for these critical motor applications.
The Centris Soft Starter provides the system protection features found in expensive “stand-alone” Motor Protection Relays, without costly add-on cards or discreet devices.

- Over Current /Electronic Shear Pin trip and alarm safeguards your motor and equipment. Protects against jammed loads, sand in pumps, detects worn out blades, etc.
- Under Current /Load trip and alarm sensing detects an underloaded motor due to shaft/belt breakage or loss of prime in pumping systems.
- Dual Mode Short Circuit Trip (exclusive “toe-in-the-water” circuit) pre-checks the motor to prevent starting into a shorted load. In the Run mode, it becomes an “electronic fuse” tripping faster than most fuses and circuit breakers.
- Phase Rotation, Phase Loss and Current Imbalance Protection
- Under Voltage, Over Voltage and Line Frequency trips and alarms protect against power problems from the utility or generator.

Ground Fault Option
Zero Sequence ground fault protection can be provided to protect equipment from damage due to faulty grounded conductors or motor windings. Separate High (fast) and Low (slower) trip points and alarm levels are available to help prevent nuisance trips. The ground fault protection CT uses a fibre optic connection for safety isolation.

### ANSI / IEE System/Protection Features

<table>
<thead>
<tr>
<th>ANSI / IEE</th>
<th>System/Protection Features</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Reduced voltage soft starts</td>
<td>✔</td>
</tr>
<tr>
<td>27</td>
<td>Under voltage</td>
<td>✔</td>
</tr>
<tr>
<td>37</td>
<td>Undercurrent</td>
<td>✔</td>
</tr>
<tr>
<td>46</td>
<td>Current imbalance</td>
<td>✔</td>
</tr>
<tr>
<td>47</td>
<td>Phase rotation</td>
<td>✔</td>
</tr>
<tr>
<td>48</td>
<td>Locked rotor / incomplete sequence</td>
<td>✔</td>
</tr>
<tr>
<td>49</td>
<td>Electronic motor overload</td>
<td>✔</td>
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<tr>
<td>50</td>
<td>Instantaneous electronic over current trip</td>
<td>✔</td>
</tr>
<tr>
<td>51</td>
<td>Over current</td>
<td>✔</td>
</tr>
<tr>
<td>55</td>
<td>Power factor trip</td>
<td>✔</td>
</tr>
<tr>
<td>59</td>
<td>Over voltage protection</td>
<td>✔</td>
</tr>
<tr>
<td>66</td>
<td>Starts per hour and time between starts</td>
<td>✔</td>
</tr>
<tr>
<td>81</td>
<td>Frequency variance</td>
<td>✔</td>
</tr>
<tr>
<td>86</td>
<td>Lockout / start inhibit</td>
<td>✔</td>
</tr>
<tr>
<td>50N/51G/N</td>
<td>Ground fault detection, instantaneous and current</td>
<td>Optional</td>
</tr>
<tr>
<td>49/38</td>
<td>Stator and bearing RTD protection</td>
<td>Optional</td>
</tr>
<tr>
<td>14</td>
<td>Speed switch and tachometer trip</td>
<td>Optional</td>
</tr>
</tbody>
</table>

**Ground Fault Option**

Zero Sequence ground fault protection can be provided to protect equipment from damage due to faulty grounded conductors or motor windings. Separate High (fast) and Low (slower) trip points and alarm levels are available to help prevent nuisance trips. The ground fault protection CT uses a fibre optic connection for safety isolation.

**RTD Input Option for Precise Thermal Management**

Thermally biased, programmable RTD inputs can be multiple types and can be individually named. Each RTD can be assigned to an output relay with different values for alarm or trip. Temperatures are recorded to the fault history and can be used to activate warning or trip relays based on setpoints.

12 RTD inputs can be configured in software to match the RTD material used and can be monitored at the keypad or remotely.

**Real-time Clock Features**

- Coast Down/Back Spin Lockout (programmable up to 60 minutes) prevents a start attempt when the motor/load is backspinning when the motor is turned off.
- Elapsed Time Metering indicates run time for scheduled maintenance or trouble shooting help.
- Time Between Starts Lockout eliminates motor and equipment damage caused by repeated start commands.
- Time and Date Stamping of faults for precise recording of what happened when.
- Starts-per-Hour Lockout/Short Cycle Timer allows you to program the maximum number of starts per hour and provides a programmed “wait time” (0 - 60 minutes) between start attempt.
Choose the acceleration ramp that is best for your application with the flexibility of microprocessor based ramp control.

**Pumps, Fans, Blowers & Conveyors**
- Closed Loop Torque (CLT™) using PID algorithms is ideal for deep well pumps or systems where the load conditions change from one start to the next.
- Linear Speed Ramping can be achieved by adding a tachometer feedback signal from the motor.

**Compressors & Chillers**
- Voltage Ramp with Current Limit for applications that need the smoothness of voltage ramping while maintaining the ability to start in limited power environments.
- For maximum motor power where the available power supply is severely limited, a Current Limit/Current Step start can be used.

**Process Machinery**
- The Jog function can be used in initial machine setup. Apply just enough voltage/torque to rotate the motor shaft without accelerating to full speed.
- Dual ramps are built-in, allowing for different load conditions and ramping requirement.

**Generator Powered & Mobile Equipment**
- Protect the integrity of your process even when power conditions are less than perfect.
- Reliable SCR firing even during frequency drift that may occur with portable equipment or backup generators.
- No need for reactors, regardless of motor lead length or system capacity.
**Custom acceleration Curves**
Can be programmed to match your pump and hydraulic conditions. Select up to eight time and torque points for smooth acceleration of your pump without surges or undue motor thermal stress. Three selectable custom curves can be programmed to accommodate changing load/pump conditions or for different processes.

**Pump-Flex™ Deceleration Control**
Is a standard feature of the Centris start and a key reason for choosing Fairford Electronics solid state soft starters over other more traditional methods of motor control.

**Experience the difference - Pump-Flex™ Deceleration**
A gradual reduction in the output torque of your pump motor is provided when a stop signal is initiated. When the motor output reaches a point where the check valve can be safely and gently closed, the Pump-Flex™ circuit automatically turns itself off. No need for external timers or auxiliary controls.

**Maximize performance**
Since no two pumps or pump applications are exactly the same, the flexible settings of Pump-Flex™ deceleration control allow you to tailor the output to precisely match your application requirements.

**Eliminate the damaging effects of “Water Hammer”**
When traditional electro-mechanical motor controls are used, motor torque is immediately lost when the power is turned off. The fluid that is flowing through the system, and the kinetic energy associated with it, immediately reverses direction. To prevent the reverse flow, a check valve typically is slammed shut, trapping the kinetic energy in the piping system. This creates a shockwave often referred to as “Water Hammer.”

**Minimize maintenance costs & downtime**
By gradually reducing motor torque using Pump-Flex™ deceleration control, this potentially destructive pump output pressure is allowed to slowly dissipate in the system during the stopping process. Check valves close gently and other fluid system components including pipes, valves, flanges, couplings and hangers are no longer subjected to the shock and destructive potential of water hammer.

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**Customised Line-Ups**

The standard Class E-2 Centris Starter design can be packaged as a “building- wide solution”. Medium voltage MCC line-ups or stand-alone starters customised to meet your application needs.

- Main disconnects
- Main-tie-mains
- Incoming line sections
- Transformer feeders
- Across-the-line starters
- VFD bypass isolation
- Coordinated key interlock
- Multiple motors on one starter
- PFC capacitor control
- Reversing or 2-speed motors
- SCADA communications
- Cone valve logic control
- Conveyor controls
- PLC Logic
## Medium Voltage Control Centres

Typical 5kV MCC options:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incoming/pull sections</td>
<td>18”, 24” or 36” wide</td>
</tr>
<tr>
<td>Busbars</td>
<td>800A, 1200A, or 2000A</td>
</tr>
<tr>
<td></td>
<td>Tin plated copper</td>
</tr>
<tr>
<td></td>
<td>Braced for 78kA fault withstand</td>
</tr>
<tr>
<td>Safety key interlocks</td>
<td></td>
</tr>
<tr>
<td>Main fused disconnects</td>
<td>400A, 600A or 1200A</td>
</tr>
<tr>
<td>Auxiliary across-the-line starters - Emergency</td>
<td></td>
</tr>
<tr>
<td>Control sections</td>
<td>24” or 36” wide</td>
</tr>
<tr>
<td>Feeder switches</td>
<td>400A, 600A or 1200A</td>
</tr>
<tr>
<td>Protection relays and other accessories</td>
<td></td>
</tr>
<tr>
<td>Low voltage transformers</td>
<td></td>
</tr>
<tr>
<td>AC drive bypass isolation</td>
<td></td>
</tr>
<tr>
<td>PLC logic control</td>
<td></td>
</tr>
<tr>
<td>Power factor correction capacitor controls</td>
<td></td>
</tr>
<tr>
<td>Custom packaging with draw-out switch gear</td>
<td></td>
</tr>
</tbody>
</table>

Contact factory for 7kV and 15kV application requirements.

## Speciality Motor Applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronous Exciter</td>
<td>The Centris Starter can be integrated with synchronous exciters in both brush and brushless packages.</td>
</tr>
<tr>
<td>Wound Rotor</td>
<td>Apply the exact rotor resistance needed for your application, while soft starting the stator with the Centris Starter.</td>
</tr>
<tr>
<td>Reversing or 2 speed</td>
<td>Controls can be built-in, or the Centris Starter can be retrofitted behind existing 2 speed controllers.</td>
</tr>
<tr>
<td>Inching /Spotting Control</td>
<td>For low speed load positioning to line up access ports, test blade positions, etc.</td>
</tr>
<tr>
<td>Multiple Motor</td>
<td>Control and protect multiple motors from one soft start</td>
</tr>
</tbody>
</table>

4160V, 1000A Soft Starter with Synchronous Controller for 10,000 HP gas compressor.

4160V, multi-motor Soft Starter designed to simultaneously start (3) 600HP conveyor motors.
Specifically designed for ease of integration into automated systems, the Centris Starter offers communications and flexible I/O as standard.

**Flexible I/O**
- 120Vac control power input accepts long control circuit runs without the need for interposing relays
- 8 programmable relay outputs for control flexibility without the need for external auxiliary relays or add-on cards
- 2 programmable analog outputs (0 - 10Vdc or 4 - 20mA)

**Communication Ready**
- Built-in comm ports
  - RS-232 for one on one communications with a PC
  - RS-485 for multi-drop communications with Modbus RTU protocol as standard

**Centris MLink Commissioning Software**
The Centris MLink Windows® based software offers users the ability to program, startup and trouble-shoot the Centris Starter via the built-in RS485 connection. The Centris MLink reduces startup time and allows for commissioning data to be backed up and e-mailed directly from the software. Other features include:

- Parameter editing and commissioning
- E-mail and Export commissioning data directly from the software
- Parameter compare functions
- Parameter settings export to popular file format (PDF, XLS, RTF, etc...)
- Application Setup Wizard
- Visual Programming, point and click on visual terminal strip
- Monitor Panel with 4 programmable signals
- Trend-recorder with 6 programmable channels, storage, triggering and playback mode
- Status and Diagnostics Panel for quick drive status and fault history overview
- Communication connection for serial and USB
- Comprehensive help and product user manual
- Multi-drop network support for trend-recorder, monitor and diagnostics panel
- Demo modes for all interactive functions
- Automatic Software Updates

**Communication Options**
- Remote Monitoring

Available communication options for the Centris Starter include DeviceNet, Profibus, Ethernet (Modbus/TCP-IP) and several others. The Centris Starter can also be used in combination with the VirtualSCADA® VS1 remote monitoring device allowing for monitoring the Centris Starter via a standard web-browser or for use with the VirtualSCADA® VS2 for communication over Ethernet.
Technical Highlights

**Type of Load**
3-phase medium voltage AC induction or synchronous motors

**AC Supply Voltage**
2300, 3300, 4160, 6000/7200V, 11-15kV
VAC +10% to -15%, 50/60 Hz line voltages

**HP Ratings**
- Up to 10,000 HP @ 7.2kV (1500 Amps)
- Up to 20,000 HP @ 15kV (800 Amps)
Contact Fairford Electronics for higher rating requirements

**Overload Rating**
AC53b 600-30-60m

**Power Circuits**
Series strings of SCR power modules (1, 2 or 3 matched pairs of SCRs per phase depending on voltage rating)

**SCR Peak Inverse Voltage**

<table>
<thead>
<tr>
<th>Line Voltage</th>
<th>PIV Rating</th>
<th>Line Voltage</th>
<th>PIV Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>2300</td>
<td>6500</td>
<td>6500</td>
<td>19500</td>
</tr>
<tr>
<td>3300</td>
<td>9000</td>
<td>6900-7200</td>
<td>26000</td>
</tr>
<tr>
<td>4160</td>
<td>13000</td>
<td>11000</td>
<td>27000</td>
</tr>
<tr>
<td>6000</td>
<td>18000</td>
<td>13-15kV</td>
<td>39500</td>
</tr>
</tbody>
</table>

**BIL Rating**
2300V - 7200V 60kV 11000 - 15000V (110kV)

**Transient Voltage Protection**
dv/dt circuits (1 per SCR pair)

**Vacuum Bypass Contactor**
Standard on all models, line start rated

**Ambient Operating Conditions**
0 - 50°C (82° F to 122° F) (Optional -20° to 50° C with heaters)
5 - 95% relative humidity
0 - 3300 ft (1000m above sea level without derating)

**Digital Control Unit (DCU)**
Programmable keypad/operator with 2 lines x 20 character backlit LCD display. Status/Alarm LEDs (indicate: Power, Run, Alarm, Trip, Aux 1 - 8)

**Auxiliary Contacts**
Multiple Form C contacts rated 5A @ 250VAC max.
6 fully programmable relays (including fail-safe operation)
5 dedicated relays (fault, at-speed, etc.)

**Programmable Features**
Motor FLA, service factor, insulation class
- Dual Ramp Adjustments - Two independent settings for:
  - Initial Torque 0 - 100% of nominal torque, voltage or current
  - Current Limit 200 - 600% of motor FLA
  - Acceleration Time 1 - 120 seconds
- Power Ramp Function
  - Three Custom Curves Via plotted torque/time axis points
  - Pump-Flex™ Deceleration 1 - 60 seconds with begin & end torque adj
  - Kick Start 0.1 - 2.0 seconds (10 - 100% voltage)
  - Tach Feedback (option) Closed loop speed ramp

**Motor and Starter Protection**
Electronic Overload
Phase Loss
Phase Imbalance
Phase Reversal
Short Circuit Detection
Over / Under Current
Over / Under Voltage
Shorted SCR / Shunt Trip
Starter Over-Temp
Coast Down Lockout
Starts per Hour Lockout
Time between starts
RTD Input (Option)
Ground Fault (Option)

**Statistical Data**
Elapsed run time, last start time, average starting current, stores history of up to 60 events (data includes date & time, phase & ground fault current). Also displays time-to-trip, remaining inhibit time and starts/hour values

**Metering (Voltage & Current)**
Percent of FLA, phase currents, kVAR, kVA, kW, power factor, demand, avg. start current, remaining thermal register, thermal capacity to start, measured capacity to start, time since last start, line frequency, phase order, RTD values (optional).

**Enclosure**
NEMA 12 with 3R optional (not for direct sun applications), top and bottom entrance plates, 11 gauge steel, ASA #61 gray powder coated paint.

**Communications**
RS485 with Modbus RTU protocol or RS232 with windows interface.
<table>
<thead>
<tr>
<th>Volts</th>
<th>Max. Amps</th>
<th>Nominal Max. HP</th>
<th>KW</th>
<th>Model</th>
<th>H</th>
<th>W</th>
<th>O</th>
<th>Model</th>
<th>H</th>
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<tbody>
<tr>
<td>2300</td>
<td>200</td>
<td>800</td>
<td>500</td>
<td>CEN-23200-E-SWG</td>
<td>92</td>
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<td>30</td>
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<td>1000</td>
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<tr>
<td>11 -15KV</td>
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<td>5700</td>
<td>CEN-130300-E-SWG</td>
<td>Contact factory</td>
<td>Contact factory</td>
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</tr>
<tr>
<td></td>
<td>600</td>
<td>15000</td>
<td>11000</td>
<td>CEN-130600-E-SWG</td>
<td>Contact factory</td>
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<td>Contact factory</td>
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</tr>
</tbody>
</table>
For more information on how the Centris from Fairford Electronics can reduce your running costs and lower maintenance bills contact your local distributor.

www.fairford.com/centris