Today’s global economy is in many ways driven by the AC Induction Motor. Industrial facilities worldwide depend on these motors to drive the machinery that enhances their efficiency and increases their production output.

However, many industrial operations unknowingly subject their machinery to severe stress during motor start-up. When motor operation is activated, high inrush currents flow into the motor’s windings, producing very high levels of torque. This torque at the motor’s shaft can result in a substantial shock to the driven equipment. The result may be belts slipping or breaking, couplings disengaging, and gears or other components failing completely.

Therefore, it is often a cost-effective decision to protect your machinery investment with a TEAMmaster™ medium voltage soft starter. Available only from TECO-Westinghouse Motor Company, the TEAMmaster protects your machinery by controlling motor torque. The TEAMmaster also reduces current demand and creates a more stable line voltage, which benefits facilities that have weak electrical systems.

TEAMmaster medium voltage soft starters provide several advantages including:

- Protection of machinery from failure and excessive maintenance caused by mechanical shock during starting or stopping. The TEAMmaster provides smooth, stepless acceleration and controlled deceleration.

- Control of the current ramp during start-up. The TEAMmaster protects electrical systems from disruptive voltage drops and power outages caused by motor locked rotor inrush current.

- Complete line monitoring, motor control and protection. These functions protect mission-critical motors from failure or unscheduled outages caused by machine or electrical system faults.

- Programming capabilities. The TEAMmaster includes control and power electronics, as well as bypass and isolation contactors that reduce maintenance and operating costs.

- A UL listing and a CSA approval.
The TECO–Westinghouse Integrated Protection Plan

When a TEAMmaster starter is purchased and installed with a new TECO–Westinghouse Motor Company motor, we will offer a three-year warranty on both the motor and the TEAMmaster starter.

Precision-Engineered Products

TECO–Westinghouse Motor Company can offer custom TEAMmaster starters to match your specific requirements, including:

- Specified enclosures
- Control and protective devices
- Surge and lightning protection
- Power factor correction capacitors
- Integrated machine or process controls

TEAMmaster Applications

<table>
<thead>
<tr>
<th>MOTOR TYPE</th>
<th>Solid State Reduced Voltage</th>
<th>Across the Line</th>
<th>Reversing</th>
<th>Programmable Electronic Braking</th>
<th>Stand Alone Synchronous Excitation Package</th>
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TEAMmaster Specifications and Ratings

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<th>Solid State Reduced Voltage</th>
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<th>Reversing</th>
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* Vacuum breaker.
The TEAMmaster is Rugged and Dependable

TEAMmaster enclosures are manufactured from welded heavy-gauge steel that is coated with industrial-grade paint. Lifting brackets and sidewall panels for linking adjacent units are conveniently removable.

TECO–Westinghouse Motor Company will provide the proper enclosure for your environment, with an optional incoming line top-hat or low-voltage control/RTD wireway, including:

- Chassis
- NEMA 1
- NEMA 12
- NEMA 12V
- NEMA 3R
- NEMA 4
- Marine duty

Each enclosure is divided into separate compartments:

1. The medium-voltage power section (5 KV-15 KV) is located in the main body of the enclosure. A mechanical interlock prevents entry until the power is off and the isolating switch is grounded. This section houses the medium-voltage fuses, power stacks, isolation and bypass contactors and other MV components.

2. The low-voltage control section is an isolated compartment. The control signals are fiber-optically isolated from the medium voltage signals. Low-voltage power is transformer-isolated from medium-voltage on 5 KV units and fiber-optically isolated on 7.3 KV and 15 KV units.

3. The disconnect section houses the lockable rotary operated fault make/load break disconnect switch and includes a window for disconnect verification.

4. Horizontal power bus is braced for a short circuit rating of 400 MVA on 5 KV units and matched to the electrical system requirements for 7.2 KV and 15 KV units.

5. Specified bus configurations. TEAMmaster starters will be provided with the exact bus configuration, ratings and protection you specify:

- Copper or aluminum
- 800/1200/2000 amp
- Top or center mount
- Environmentally or electrically insulated
- Custom retrofit arrangements
- Higher BIL ratings (45/60 KV standard)
- Front access copper ground bus

6. Specified control and protective devices. In addition to the array of standard features included with every TEAMmaster starter, TECO–Westinghouse Motor Company can engineer and integrate the control and protective devices you specify, including:

- Protective relays
- RTD monitors
- Third-party motor protection packages
- Pilot devices/PLCs

7. Specified surge capacitors and lightning arrestors. TECO–Westinghouse Motor Company can design, mount, and test (as an integrated unit) surge capacitors and lightning arrestors to match your electrical system and lightning protection requirements.

8. Load engineered power factor capacitors and controls. TECO–Westinghouse Motor Company can engineer and integrate the proper PF correction capacitors to match your specific motor requirements, including single or multiple units with integrated controls for:

- Start/run sequencing
- Load matching
## TEAMmaster Dimensions

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<th>FLA</th>
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CF = Consult Factory.
Consult Factory to obtain product dimensions for ratings above 4160V.
Unlike other forms of reduced-voltage starting, the TEAMmaster control and power hardware, software, and sensors are designed to perform as an integrated control system. This eliminates the uncoordinated performance problems inherent with multiple, dissimilar components.

TEAMmaster starters are equipped with a built-in, self-test (BIST) standard. This enables the user to completely test the mechanical and electrical sequencing of the starter at low voltage, prior to applying medium voltage power. The unit is easily programmable from its display keypad using simple, intuitive commands. Parameters, ranges, settings, fault messages, and metering functions are instantly shown on a two-line, 16-character, backlit display.

The entire hardware set is controlled and protected by a real-time clock and battery-backed memory.

I. TEAMmaster “modular” hardware
The following modules are configurable to match your motor control requirements:

**Standard Hardware Modules**
- Voltage divider
- Microprocessor control
- Power supply and I/O
- Display/programming

**Optional Hardware Modules**
- Expanded aux. Relays
- Communications
- Reversing and synchronization
- RTD monitor
- Predictive maintenance

II. Over 100 Selectable Functions
The TEAMmaster provides over 100 programmable, selectable functions, standard integrated control and protection software that allows the user to select from the broadest range of functions available anywhere. Features include:

**Programmable Motor Protection**
- Electronic overload
- Selectable class 5/10/15/20/25/30
- Overload warning
- Electronic shear pin
- Motor short circuit/IOC
- Zero speed switch input
- Under/over voltage protection
- Machine ground fault protection
- Single/reverse phase protection
- Undercurrent/unbalance protection

**Programmable Motor Control**
- Programmable torque or current ramp
- Programmable ramp to current limit
- Initial current limit
- Maximum current limit
- Start/ramp time
- Selectable motor service factor
- Fully programmable linear or S curve deceleration
- Auxiliary motor/feeder control
- Current limited jog
- Restart block-backspin timer

**Embedded Diagnostics and Self-Protection**
- Pre-start “Built-In Self Test” (BIST)
- System fault diagnostics and display
- Self diagnostics and display
- Date-and-time stamped fault logging
- Revolving 99 event data recorder
- Power loss fault memory retention/lockout
- Start/stop recorder
- Pass code protected

**Embedded Digital Metering and Monitoring**
- Selectable view-all keypad display
- Volts/amps/frequency
- KW/KWHR
- Elapsed time
- KVAR/power factor
- Motor thermal capacity utilization

**Communications/Supervisory Control Options**
- RS232/485
- Supervisory control and data logging
- PLC interface
- Real time clock
- Year 2000 compliant
- Remote OL/CPU reset
III. 15 KV Rated, Fiber Optically Controlled Power Stacks *

1. Fiber-optic firing control isolates low and high voltage. TEAMmaster starters have a precision fiber optic firing control system that completely isolates low and high voltage signals. This ensures electrical reliability providing:
   - Complete noise immunity
   - Control signal isolation and integrity
   - Precision firing of series SCRs

2. Draw-out integral plenum power stacks provide maximum reliability. TEAMmaster starters are provided with a unique draw-out/integral plenum power stack design, which completely isolates phase to phase and interphase power electronic devices. This design also provides a positive flow plenum insuring power module reliability:
   - Power module isolation
   - Integral positive cooling
   - Modular power-pole replacement

* Standard on 7.2 KV and 15 KV units and optional on 5 KV units.
TEAMmaster™ Starters are designed for use with medium voltage motors such as TECO–Westinghouse Motor Company’s World Series and Synchronous motors. Ask about our 3-Year Integrated Protection Plan.

WORLD SERIES MOTORS
- Rugged thru-bolt copper or copper alloy rotor bar construction and end rings
- Form wound windings with minimum of two complete VPI cycles
- Anti-friction or spherically seated Renk split sleeve bearings
- High efficiency designs reduce life-cycle costs
- Thermalastic® epoxy insulation stator insulation system
- API 541 design available
- Available up to 30,000HP

SYNCHRONOUS MOTORS
- Renk split-sleeve bearings
- Brush excitation or brushless excitation
- Thermalastic® epoxy insulation stator insulation system
- Available in high speed and slow speed designs
- Available for adjustable frequency AFAC applications
- Available up to 100,000HP