

TEAMmaster™

MEDIUM VOLTAGE SOLID STATE STARTERS



The **TEAMmaster**™ Advantage

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

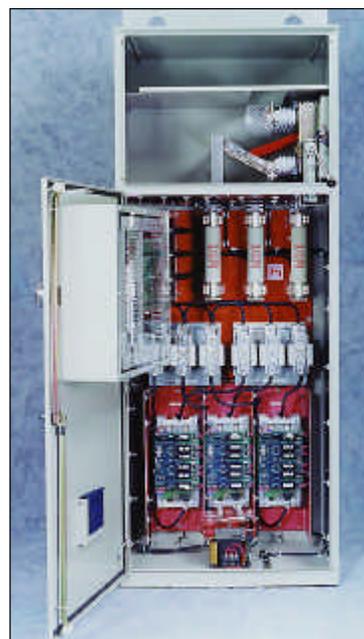


high levels of torque. This torque at the motor's shaft can result in a substantial shock to the driven equipment. The result may be belts slipping or breaking, couplings disengaging, and gears or other components failing completely.

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.

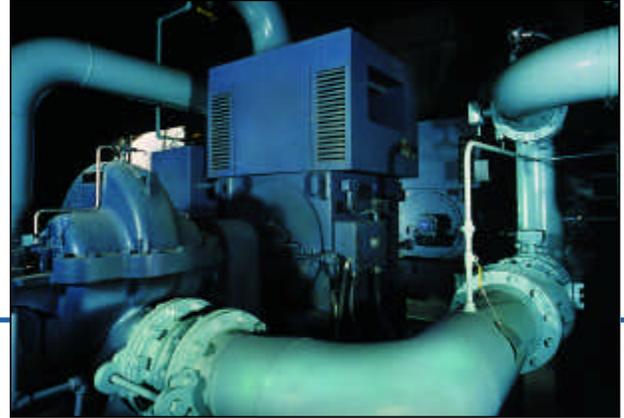
TEAMmaster medium voltage soft starters provide several advantages including:

- 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

MOTOR TYPE	Solid State Reduced Voltage	Across the Line	Reversing	Programmable Electronic Braking	Stand Alone Synchronous Excitation Package
INDUCTION	✓	✓	✓	✓	–
SYNCHRONOUS	✓	✓	✓	✓	✓
2 SPEED 1-WINDING	✓	✓	✓	✓	–
2 SPEED 2-WINDING	✓	✓	✓	✓	–
WOUND ROTOR	✓	✓	✓	✓	–

TEAMmaster Specifications and Ratings

KV	MAX. HP	✓	✓	✓	✓	✓	✓	✓	✓	✓	OPTIONAL	OPTIONAL	400	60	✓	✓
5	8,000	✓	✓	✓	✓	✓	✓	✓	✓	✓	OPTIONAL	OPTIONAL	400	60	✓	✓
7.2	10,000	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓	✓	600	75	✓	✓
15	20,000	✓	*	*	N/A	✓	✓	✓	✓	N/A	✓	✓	SIZED TO SYSTEM	95	✓	✓

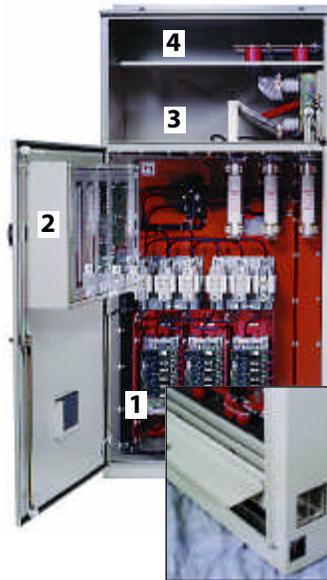
* Vacuum breaker.

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

TYPICAL HORSEPOWER @ 2300V	FLA	2300 VOLT STANDARD unit: inch			STANDARD W/DISCONNECT unit: inch		
		H	W	D	H	W	D
150	36	92	36	32	92	36	32
500	120	92	36	32	92	36	32
750	180	92	36	32	92	36	32
1250	300	92	36	32	92	36	32
1500	360	92	36	32	92	45	32
1750	420	92	45	32	92	45	32
2250	540	92	60	32	92	126	32
2750	660	92	60	32	92	126	32

TYPICAL HORSEPOWER @ 4160V	FLA	4160 VOLT STANDARD unit: inch			STANDARD W/DISCONNECT unit: inch		
		H	W	D	H	W	D
300	40	92	36	32	92	36	32
1000	133	92	36	32	92	36	32
1500	200	92	36	32	92	36	32
2500	333	92	36	32	92	36	32
3000	400	92	36	32	92	45	32
3500	467	92	45	32	92	90	32
4500	600	92	60	32	92	126	32
5000	666	92	60	32	92	126	32
5500	734	92	60	32	92	126	32
6000	800	CF	CF	CF	CF	CF	CF
>6000	CF	CF	CF	CF	CF	CF	CF

CF = Consult Factory.

Consult Factory to obtain product dimensions for ratings above 4160V.

TEAMmaster Programmable Controller

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 of 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

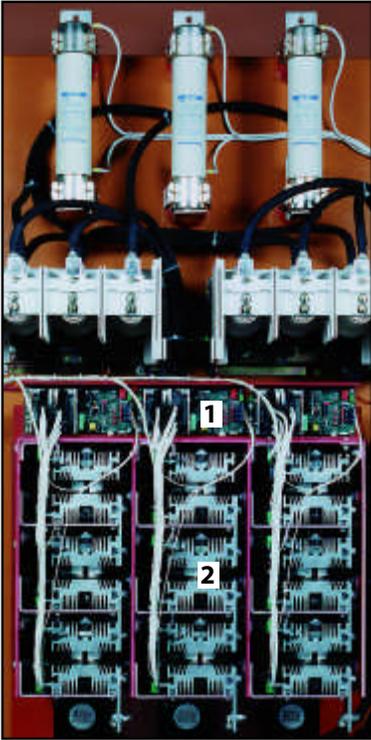
Embedded Digital Metering and Monitoring

- 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

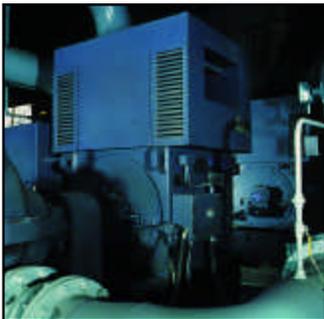
2. Draw-out integral plenum power stacks provide maximum reliability. **TEAMmaster** starters are provided with a unique draw-out/integral plenum power stack design, which completely isolates phase to phase and interphase power electronic devices. This design also provides a positive flow plenum insuring 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

D I S T R I B U T E D B Y :

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