MOTORTRONICS™
Solid State AC Motor Control

Low Voltage Soft Starter

S.A.F.E. Series | VMX

Safer Access For Electricians

Motor Starting System 208 - 575VAC, up to 1000HP*

Totally safe main enclosure, no voltage with breaker off

- LED Voltage Detection System
- Line Surge Protection
- Low Voltage Box with 120 Vac Limited Energy
- Side Breaker Box with Interlocking Flange Handle
- UL and IEC Rated UL508 and IEC UL60947
- Direct On-Line Starting Contactor
- Redundant True Thermal Motor Overload Protection
- Works in North America and Europe
- Modbus RTU Standard
- Touch Screen (Standard)

NEMA 4 / IP67 ENCLOSURE WITH OUTDOOR 3R KIT

***For 1000HP Contact factory**

Motortronics Motor Controls Made Easy

VMX S.A.F.E. Plus Series

The New Standard of Safety for Electricians

The VMX S.A.F.E. Plus Series is the ultimate product in the market today for Low Voltage Control which allows a Service Engineer / Electrician to do the job safely with minimum PPE (Personal Protection Equipment).

S.A.F.E. VOLTAGE COMPARTMENTS

The S.A.F.E control has a low-voltage compartment which has limited energy 120 Vac signals available. All the control logic is in the isolated low-voltage compartment along with a three phase 120 Vac test point for the primary voltage sensing and measuring. All keypads, meters, lights, relays and control logic are available in the low-voltage compartment. No need to open the line-voltage compartment to check control logic and status.

The 65 kA breaker at 480 Vac and surge device are located inside the line-voltage compartment for safety. S.A.F.E. has an LED live voltage indicator connected to the output of the main breaker. The visual voltage indication would indicate the breaker is open and no voltage is present before entering the line voltage compartment.

The service engineer or electrician can safely enter the low-voltage compartment knowing that no voltage is present and limited PPE is required, due to the voltage indication on the front door. An in-line isolation contactor is standard on all S.A.F.E. units so when the motor is off no voltage will be present on the motor leads. Safe for anyone working on the motor, equipment or soft starter control enclosure. Visual live line indication ensures the safety for all Service engineers and Electricians during lockout / tag out procedures.

S.A.F.E. PROTECTION FEATURES

All S.A.F.E. units come with flanged mount lockable breaker which interlocks with both the line voltage compartment and separate circuit breaker section (on larger units). The VMX S.A.F.E. Plus Series also comes with redundant motor protection. Should the customer need a little extra torque and want to start the motor across the line the contactor and a full digital redundant motor protective relay (Rx Series) is provided to protect the motor while performing an across the line start without the Soft Starter. The VMX Soft Start utilizes true thermal modeling to ensure optimal motor protection and performance. When safety, long life and reliability is key and only the best will do --- choose -- S.A.F.E. Series the ultimate protection for Engineers / Electricians and Equipment.

VMX S.A.F.E. Plus Features

1. **In-Line Contactor**
   No dangerous output voltage when off

2. **SSRV Heavy Duty**
   Ansi 500% rated for 60 seconds / 600 % for 30 seconds

3. **Heavy duty Direct On Line Rated**
   In-line and bypass Contactors

4. **Digital Metering**
   In both soft start and across-the-line modes
   Advanced digital metering with Smart Panel

5. **Advanced Dual Redundant Motor Protection**
   True thermal modeling

6. **Circuit Breaker 65 kAIC at 480 VAC**
   Service entrance rated

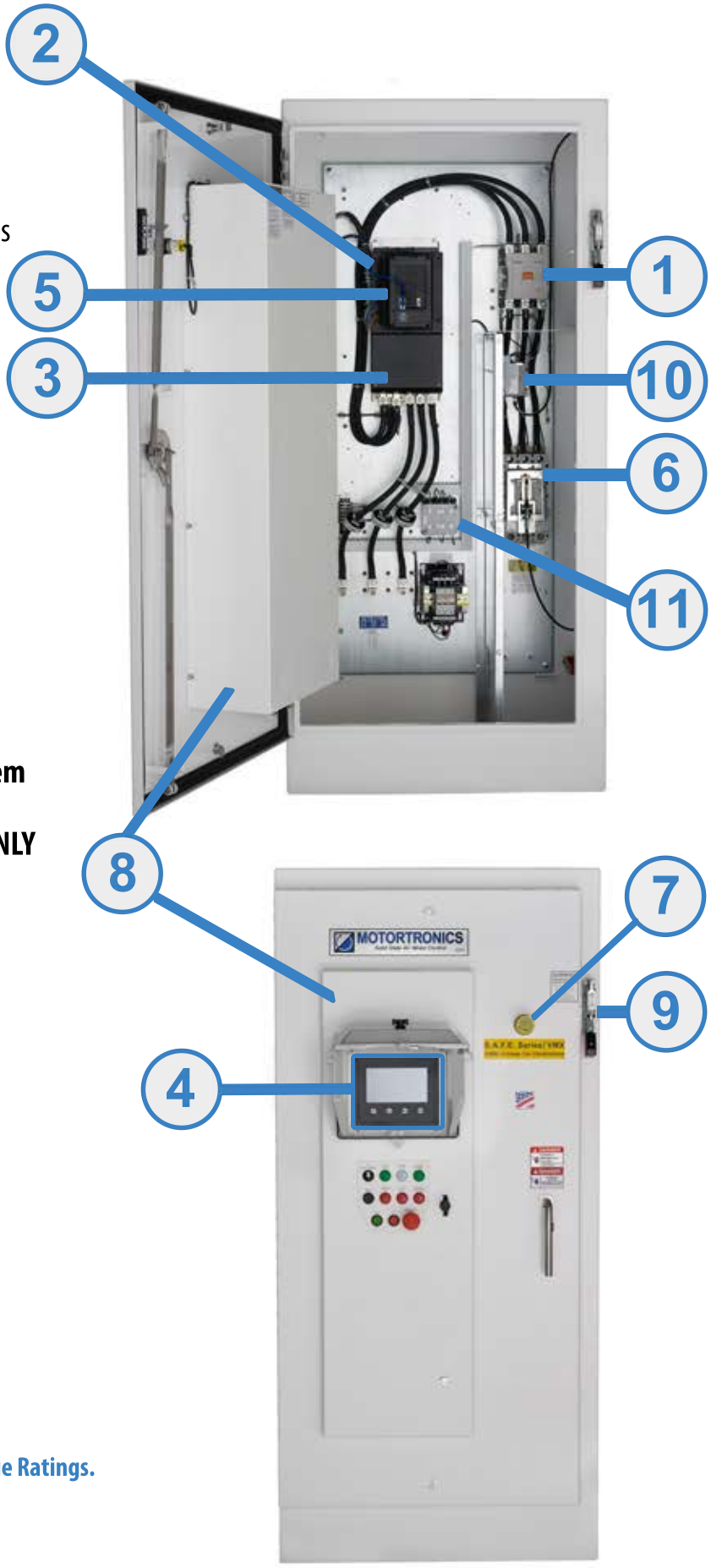
7. **Live Line Indication LED Voltage Detection System**

8. **Low Voltage Box with 120 Vac Limited Energy ONLY**
   Three Phase 120 Vac test point from metering grade Voltage Transformer

9. **Interlocked Flanged Circuit Breaker Handle**
   Door is locked while breaker is on

10. **Surge Device**

11. **Open Delta Potential Transformer**
    3 Phase 120 Vac for low voltage box



* Contact Factory to confirm SCCR/Isc Ratings and other voltage Ratings.

Advanced Motor Protection Features

Overload Protection Method
Real-time Motor Thermal Modeling uses current sensors and microprocessor to continuously calculate motor temperature.

Retentive Thermal Memory
Remembers the thermal condition of the motor even if control power is lost. Thermal Register is adjusted for Off-Time when power is resumed.

Dual Overload Curve Settings for RV Start
Start Curve can be set to Class 5-30
Run Curve can be set to Class 5-30
Automatic Full Speed detection and change over

Learned Dynamic Reset
Overload Trip will not reset unless motor has regained enough thermal capacity based on learned motor starting profiles.

Programmable Service Factor
Service Factor setting automatically adjusts other settings to compensate.
Adjustment Range: 1.0-1.15 SF

Current Imbalance Protection
Provides monitoring of phase-to-phase current levels and trips if imbalance exceeds setting.
Setting: Off or 1-30% FLA w/1-20 sec. delay

Phase Loss/Sequence Protection
Trips on any phase under 20% of FLA.
Sequence selectable A-B-C, C-A-B or Off

Over-Current Trip
Electronic Shear-Pin / Shock Relay
Setting: Off or 50-300% FLA w/1-20 sec. delay

Under-Current Trip
Load-Loss /Loss of Prime protection
Setting: Off or 10-90% FLA w/1-60 sec. delay

Over Voltage Trip
Any phase voltage over trip level
Off or 1-10% of set voltage, w/1-20 sec. delay

Under Voltage Trip on Startup
Off, or 1-30% of set voltage
1-180 second startup time

Under Voltage Trip at Full Speed
Off, or 1-30% of set voltage
1-20 second trip delay

Load Monitor (True Motor Power)
Under or Over kW trip or alarm
Off, or 20-100% motor kW, w/1-20 sec. delay

Power Factor Monitor
Leading or Lagging PF, trip or alarm
Off, or 0.01-1.00, lead or Lag w/1-20 sec. delay

Frequency Monitor
Over or Under programmed frequency
Trip Setting: Off, or 1-10Hz, w/1-20 sec. delay

Equipment Ground Fault Protection
Electronic Residual current protection method, no additional CTs needed
Setting: Off, 5-90% of CT w/1-60 sec. delay

Short Circuit / Shorted Load
Peak Current quick trip (electronic fuse)
Trip level: Off or 800-1400% FLA,
with .1-.5 sec. delay

Restart Delay Timer
Programmable delay for restarting after a power failure for use in multiple installations.
Setting: 0-999 sec.

Starts-per-Hour Lockout
Programmable maximum starts-per-hour to prevent exceeding motor limits.
Setting: Off or 0-10 start / Hr

Minimum Time Between Starts
Used with or without Start-per-Hour protection to prevent short cycling of motor
Setting: Off or 1-60 minutes between starts

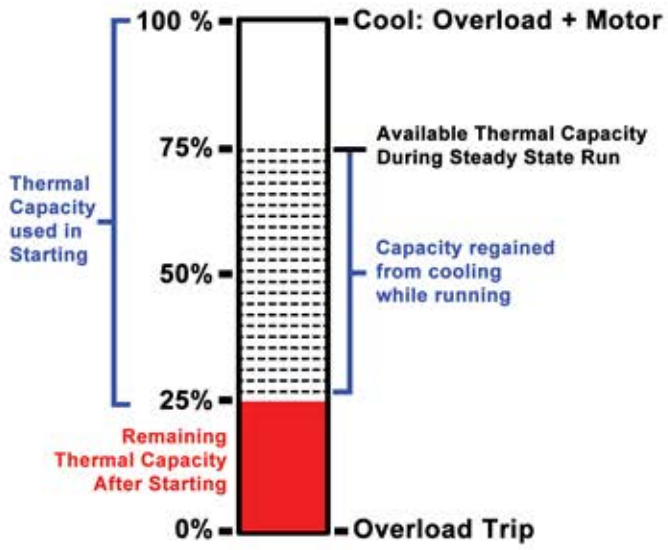
Coast-Down Timer
Back Spin or Anti-windmilling protection
Prevents Restart after Stop Command
Time Setting: Off or 1-60 min.

AVAILABLE OPTIONAL FEATURES

- Motorized Remote Control Breaker
- Hand Rails for Marine Applications
- Electric Motor Heater for Damp Environments = No Strip Heaters to Fail - "MWH"
- Cabinet Heaters
- Sun Shield (NEMA 4/12/3R/1)
- Ground Fault - Zero Sequence Current Transformer
- Dual Motor Option with Motor Protection
- GFI Safety Receptacle Plug in Low Voltage Compartment
- NEMA 4X Stainless Steel Enclosure
- Low Voltage LED Lighting for Low Voltage Enclosure

Advanced Motor Protection

- **Real-Time Thermal Modeling**
  Continuously calculates motor operating temperature
- **Dynamic Reset Capacity**
  Knows when the motor is cool enough for a successful start
- **Separate Start & Run Overload Protection**
  For closely matched overload protection during start and run
- **Pre-start Shorted Load Protection**
  Checks for motor lead or winding damage before starting
- **Over Current Trip**
  Acts as an Electronic Shear Pin
- **Under Current Trip**
  Acts as a Load Loss Trip (broken belt / dry pump monitor)
- **Phase Loss**
  Instantaneous tripping
- **Current Imbalance Trip**
  Adjustable level and time delay
- **Minimum Time Between Starts Lockout**
  Helps reduce utility demand charges
- **Coast Down Lockout**
  Inhibits Start attempts that could harm equipment
- **Starts per hour Lockout**
  Matches motor protection to motor or utility limits
- **Restart Delay**
  Allows for staggered starting of motors
- **Equipment Ground Fault**
  Residual Current type
- **Manual / Automatic Overload Reset**
  Match overload protection type to the application
- **Shorted SCR Lockout**
  Self Diagnostic



Advanced Metering and Control with Msmart Touch Screen (Standard)

Single Universal Smart HMI Panel for all Motortronics devices with support for 8 languages

VMX S.A.F.E. Plus Series

VMX S.A.F.E. Plus Available Models

Ratings

Nominal Motor Rating

Model Number	Max Amps (1)	208V HP	240V HP	480V HP	575V HP	Enclosure Size	Circuit Breaker
VMX-SAFE-PLUS-96-CB-X	96	30	30	75	75	2 ½	150A CB
VMX-SAFE-PLUS-125-CB-X	130	40	50	100	75	2 ½	250A CB
VMX-SAFE-PLUS-156-CB-X	180	60	60	150	150	2 ½	250A CB
VMX-SAFE-PLUS-220-CB-X	192	60	75	150	150	2 ½	400A CB
VMX-SAFE-PLUS-230-CB-X	250	75	100	200	250	2 ½	400A CB
VMX-SAFE-PLUS-248-CB-X	312	100	125	250	300	2 ½	400A CB
VMX-SAFE-PLUS-400-CB-X	361	125	150	300	300	2 ½	400A CB
VMX-SAFE-PLUS-480-CB-X	480	150	200	400	500	2 ½	600A CB
VMX-SAFE-PLUS-600-CB-X	590	200	200	500	600	2 ½	800A CB
VMX-SAFE-PLUS-690-CB-X	722	250	300	500	600	2 ½	1200A CB
VMX-SAFE-PLUS-800-CB-X	750	-	300	600	600	2 ½	1200A CB
VMX-SAFE-PLUS-960-CB-X	960	300	400	800	900	3	1200A CB

*** Contact factory for SCCR/Isc ratings**

NOTES: 1 – Always confirm Motor FLA is less than Max AMP
2 – For 1000HP Contact Factory

X = Line Voltage (50/60Hz)

1 = 208V, 2 = 240V, 3 = 380V, 4 = 480V, 5 = 575V, 6 = 415V

Frame Size	Dimensions
2 ½	72" x 48.5" x 24"
3	90" x 60" x 24"

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