



BENSHAW
Applied Motor Controls



2025 EDITION

Benshaw Line of Products

Rapid | Rugged | Global

EMX4i SERIES PROTECTED CHASSIS SOFT STARTER



Smart does not have to mean complex ... EMX4i Series Protected Chassis Soft Starters from Benshaw are designed to make your life easier, with an intuitive display, quick setup menus and flexible connectivity functions.

Ratings from 200 - 690 V up to 1200 A

- Quick application setup for easy commissioning
- Simulation mode offers fast and easy testing - no need for line power or motor
- Automatic timers and schedulers with the addition of smart card
- Smart card technology for industry specific functionality
- Pocket Technician mobile troubleshooting app
- Power Through feature ensures minimal downtime on-site
- Emergency mode for continued operation during emergency situations
- Pluggable terminals
- USB port allows data retrieval and firmware updates without adaptor or cable

CSXi SERIES COMPACT SOFT STARTER



Benshaw CSXi Series Low Voltage Soft Starters are compact, easy-to-use soft starters with built-in motor protection. CSXi Series Low Voltage Soft Starters provide greater control for starting and stopping of three phase motors, and most models only 6.5 inches (165mm) deep, Benshaw's CSXi Series starters are easy to mount in shallow enclosures.

Ratings from 200 - 575 V up to 200 A

- Simple setup via potentiometers
- LED status indicators for soft start, soft stop, motor protection and more
- Flexible mounting options
- Easy-to-install communication interfaces
- Built-in motor protection features, including thermal overload protection and more
- Energy saving design - internal bypass function reduces operating costs.

Guaranteed ... for three full years.*

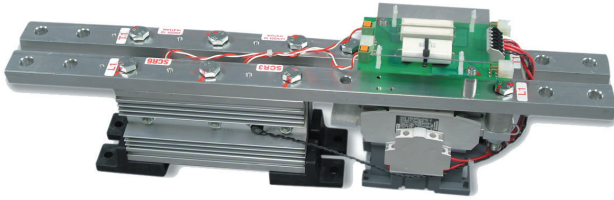
Only Benshaw has a three year guarantee.

Every Benshaw solid state starter is guaranteed for three full years. Other manufacturers limit their warranties to just one year. But at Benshaw, we believe that because we build them better, we can guarantee them longer.

**Subject to factory authorized startup.*



RB2 OPEN CHASSIS SOFT STARTER



RB2 Series Open Chassis Soft Starters combine Benshaw's high performance MX2 motor control technology with a rugged, compact and integral bypass RB series power section.

MX2 CONTROL

MX2 control technology from Benshaw provides a powerful, flexible and intelligent low voltage motor control platform. MX2-based controls offer multiple, user selectable starting modes, an increased selection of configurable digital and analog I/O, comprehensive built-in metering capabilities, unprecedented onboard protection and an easy-to-use, intuitive user interface.

Ratings from 208 - 575 V up to 838A

- Small, compact design
- Modular power stack assembly for ease of maintenance
- ModBus standard
- Multiple starting ramps for various applications
- Integrated metering system diagnostics
- Integral bypass contactors for efficient operation, eliminating the need for external fans
- Integrated motor protection
- Dual ramp capability for loaded/unloaded applications
- Power stack has multiple ratings for application flexibility

RB3 OPEN CHASSIS SOFT STARTER

Benshaw RB3 Series Open Chassis Soft Starters combine our advanced MX3 motor control technology with a rugged, compact and integral bypass RB series power section.

MX3 CONTROL

Benshaw's next generation MX3 technology propels low voltage motor control to even greater levels of performance and functionality. With its real-time clock, enhanced programming capabilities, ease-of-use and a unique, flexible architecture — Benshaw's MX3 controller delivers advanced motor control and protection with all of the rugged and dependable performance you've come to expect from the world leader in advanced controls and drives.

Ratings from 208 - 575 V up to 838A

- 8 user-configurable inputs, 2 fixed inputs for start and bypass confirm, 6 user-configurable relay outputs and 1 fixed output for bypass control
- Real-time clock
- Motor PTC input
- Zero sequence ground fault
- RTD module support
- Event log (99 events)
- Starts per hour limiter
- Back spin timer
- Time between starts limiter
- Zero speed switch input
- Power outage ride through (PORT)
- Power factor trip
- Patented CYCLO control (0–40% speed)

MX4PB SERIES PACKAGED SOFT STARTERS WITH EMX4i TECHNOLOGY



Benshaw MX4PB Packaged Soft Starters provide solid state reduced voltage starting for standard duty or heavy duty operation. Advanced protection features, integral run duty bypass and 65KAIC rating make this the ideal soft starter for nearly any application.

Ratings from 240 - 460 V up to 700 HP

- 65KAIC rated
- Combination circuit breaker
- Rotary disconnect operator
- Integral bypass contactor
- NEMA 4 or 12 enclosure
- Standard 120 V control power transformer
- Service entrance rated with circuit breaker
- Door-mounted keypad
- **Configurable options**
- Voltage (240 V/480 V)
- Duty rating (standard/heavy duty)
- HP (20 – 700 HP)
- Control options
- NEMA 3R option with heater & thermostat
- Communication interface options

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RX4E SERIES PACKAGED STARTERS WITH EMX4i TECHNOLOGY AND ATL BYPASS



Benshaw RX4E Packaged Soft Starters provide solid state reduced voltage starting for normal operation and full voltage emergency backup starting with complete electronic motor protection at the flip of a switch. The unique design of our RX4E Series soft starter is ideal for applications where downtime is extremely disruptive to production operations and cannot be tolerated.



Ratings from 200 - 575 V up to 600 HP

- 65KAIC rated
- NEMA 12, combination/circuit breaker (NEMA 3R optional)
- 450% FLA - 30 seconds rated solid state starter, UL certified and listed
- 125% FLA - continuous duty rated solid state starter, UL certified and listed
- Selector switch for selecting solid state or full voltage operation mounted inside enclosure
- Full HP rated bypass contactor with a 1.15 service factor. It is wired for normal operation and full voltage start and run operation with normally open auxiliary contact
- Separately mounted SPE Series overload relay wired for full voltage start and run operation
- 110 volt control power transformer with primary and secondary fuses
- Door-mounted start and stop push-buttons, keypad, run indicating light, local-off remote switch, fault indicating light, and overload reset
- Terminal strip mounted inside enclosure for remote start/stop connection
- Auxiliary relay with (4) Form C run contacts
- Analog I/O
- 1 Form C fault contact



RX2E / RX3E ENCLOSED SEVERE DUTY COMBINATION SOFT STARTER



The RX2E / RX3E Enclosed Combination Soft Starter is a rugged, simple to use soft starter with built-in motor protection, providing greater control in starting and stopping of three phase motors. RX2E / RX3E Series Enclosed Combination Soft Starters come standard with a circuit breaker, full voltage rated emergency bypass contactor, door mounted Start/Stop push buttons, Local/Off/Remote selector switch and door mounted keypad.

Ratings at 480 V up to 600 HP

- NEMA 12 or 3R enclosure
- Basic (RX2E) motor protection with adjustable overload settings.
- Advanced (RX3E) motor protection with adjustable overload settings.
- Real time clock with event recorder for up to 99 events (RX3E)
- Programmable using a door mounted LCD keypad or Modbus register mapping.
- Circuit breaker
- Full voltage rated emergency bypass contactor
- Door mounted Start/Stop push buttons
- Local/Off/Remote selector switch
- Door mounted keypad

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CSXi SERIES PUMP PANELS



Ratings from 230- 575 V up to 200HP

- NEMA 3R enclosure
- CSXi soft starter with internal bypass
- Circuit breaker with door operator (35 kAIC)
- Control power transformer
- Space heater with thermostat
- Start/Stop Pushbutton, HOA, Power On/Run/Fault lights

CSXi Series Pump Panels from Benshaw provide the most cost-effective way to add reliable, low voltage soft start capabilities to your system, with all components preinstalled in a NEMA 3R enclosure. Our standard panel configurations make it easy for you to add a soft starter to your system, with most of the wiring already completed for you. Pushbuttons and indicator lights are included, for the ultimate in easy installation.



GM2 SERIES GENERAL PURPOSE MICRO DRIVE



Benshaw GM2 Series is a sensorless vector, variable frequency drive. This micro-drive offers enhanced performance and reliable operation in a robust, yet compact, user-friendly design. Powerful, yet small...it is the ideal choice for cost sensitive OEM or end user requirements.

Ratings from 240 - 480 V up to 15 HP

- Display - 4 digit, 7 Segment with 4 LED Indicators
- Protected Chassis - UL Open (IP20)
- DIN Rail mounting (up to 7.5HP, 5.5kW)
- EMC Filter (480V only)
- Internal Brake IGBT
- Single Phase Input (derating required)
- Built in Potentiometer
- RJ45 Port (Modbus-RTU)
- Control - V/Hz., Sensorless Vector, Slip Compensation
- Auto Tuning
- Torque Limits
- PID Control
- Regen Avoidance
- Kinetic Energy Buffering (KEB), Ride Through

S SERIES INDUSTRIAL PURPOSE MICRO DRIVE



Benshaw S Series Variable Frequency Micro Drives provide a rugged, compact, economical chassis drive solution for low horsepower applications. Each drive in the series offers quick setup and preconfigured settings for common VFD applications, and a flexible, programmable I/O for more demanding applications or complex control strategies. Dual rated for both variable torque (120%) and constant torque (150%).

Ratings from 240 - 480 V up to 15 HP

- Standard and heavy duty rated
- V/Hz control
- Sensorless vector (induction motors)
- Sensorless vector (PMAC)
- EMC filter built in (460V only)
- Slave multiple drives off one keypad
- Modbus RTU standard
- Ethernet IP, Modbus TCP, Profibus-DP (optional)
- Peer-to-peer communications
- PLC functionality (18 steps)
- Internal brake IGBT
- IP20 enclosure standard, NEMA 1 conduit box (optional)

SW SERIES WASHDOWN AC DRIVE



Benshaw SW Series NEMA 4X Washdown Drives are heavy duty rated for applications from 0.5-30HP. Designed for high pressure washdown, all SW Series drives feature a rugged UL Type 4X (IP66) indoor rated polycarbonate enclosure that exceeds NEMA 1, 12, 4 and 4X standard. A convenient built-in power disconnect switch, 4 digit- 7 segment display an optional remote keypad make it easy to control.

Ratings from 200 - 480V up to 30 HP

- Power Disconnect Switch - Built-in
- Display - 4 digit, 7 segment with 4 LED Indicators
- Washdown rated - UL Type 4X (IP66), Indoor only
- EMC Filter (480V only)
- Internal Brake IGBT
- Single Phase Input (derating required)
- RJ45 Port (Modbus - RTU or Remote LCD)
- Modbus - RTU (via RJ45 or I/O Terminals)
- Control - V/Hz., Sensorless Vector (SVC), Slip Compensation
- Auto Tuning
- SVC (Induction and Permanent Magnet Motors)
- Torque Limits
- PID Control
- Safe Torque Off (STO)
- Fire Mode Input



H2 SERIES MULTI-PURPOSE DRIVE



Benshaw H2 Series sets the new standards for variable frequency drives. It can be used as a general purpose industrial drive with V/Hz or Vector Control (with ratings for normal or heavy duty applications from 5-800HP). This multi-purpose drive complies with industries standards including UL/cUL, CE.

Ratings from 230 - 600 V up to 800 HP

- Protected Chassis IP20
- LCD Display/Keypad
- EMC Filter (480V only, 7.5-40HP)
- Internal Brake IGBT (240V all, 480V \leq 40HP)
- Single Phase Input (derating required)
- Plenum Rated
- Quick Start Menu on Power Up
- Control - V/Hz, Sensorless Vector Control, Slip Compensation
- Auto Tuning
- Macro Selection - Pump, Fan, or Constant Torque
- Torque Limits
- PID Control
- Regen Avoidance
- Kinetic Energy Buffering (KEB), Ride Through
- Decel Brake Control



H2P SERIES PUMP/FAN DRIVE



Benshaw H2P Series sets the new standards for variable frequency drives. It includes application software designed to meet the unique requirements of the water/wastewater, irrigation and HVAC industries. Compact, yet full-featured...the H2P Series is the ideal choice for OEMs, panel builders and end users.

Ratings from 230 - 600V up to 800 HP

- PID Control with Sleep and Wake-up, Broken Pipe and Under Load Detection
- Multi Motor Control
- Lead/Lag and Alternating Control
- Pre-Fill and Soft-Fill
- Standard BACnet and Metasys-N2
- Fire Mode Input
- Start and End Ramp
- Decel Valve Ramp
- Time Event Scheduling
- Flow Compensation
- Backspin Timer
- Pump Clean Operation
- Load Tuning
- Energy Saving Operation
- Oil Pump Starter Control (compressor systems)



PACKAGED DRIVES



Benshaw is a recognized industry leader for quick shipment of built-to-order, packaged drive solutions.

Ratings from 230 - 600 V up to 800HP

- Pilot devices, control power transformers, switches, meters, relays, space heaters and more
- Circuit breaker protection
- Non-fused and fusible disconnect protection
- Flange or rotary handle mechanism
- Three contactor bypass
- Reduced voltage solid state starters bypass
- Standard designs (NEMA 1, 12, 3R) or custom enclosures
- Special enclosures — 4, 4X, air conditioned
- Motor control centers
- Line reactors 3% and 5%
- Long lead filters
- Load reactors
- Harmonic filters
- 18-pulse systems



MCP SERIES - MULTI-MOTOR CONTROL PANEL



Benshaw can deliver a customized, space saving, multi-motor package designed for your specific application and in less time than it takes to get a comparable MCC.

Ratings from 208 - 600V

- Standard designs (NEMA 1, 12, 3R) or custom enclosures
- Custom enclosure - NEMA 4, 4X, air conditioned
- Single or dual feed main circuit breaker protection
- Rotary handle mechanism - option: Flange handle
- Standard interrupt rating:
 - 65KAIC @ 208VAC
 - 35KAIC @ 460VAC
 - 25KAIC @ 575VAC
- High interrupt rating:
 - 100KAIC @ 208VAC
 - 65KAIC @ 460VAC
 - 50KAIC @ 575VAC
- Multi-starter configurations - ATL, RVSS, VFD
- Door mounted keypad (s)
- Pilot devices, control power transformer, switches, meters, relays, space heaters, and more



BMCS SERIES - BENSCHAW MOTOR CONTROL SYSTEM



Benschaw offers custom-configured motor control systems built to the UL 508A standard, tailored to fit your application needs.

Customizable to include:

- FVNR - ATL full voltage starters
- Soft starters
- Variable frequency drives
- Feeders
- Power distribution panels
- Incoming / Motor lug only
- Main breaker

Looking for a motor control solution but can't wait 40-80 weeks for a traditional MCC? Benschaw delivers in half that time!

Your alternative to traditional MCCs

Ratings from 208-600V

- UL/cUL 508A
- Up to 2000 amp circuit breaker
- Floor mounted with one or more vertical sections
- Common horizontal bus
- Fixed mount devices
- Smallest section is 13" (92.5 high design)
- Fully welded construction
- NEMA 12, 3R, 4 and 4X (indoor/outdoor)
- 42kA rated (For 65kA, consult factory)
- CSA special inspection (optional)

Available in two heights:

- 79" High
- 92.5" High



R2CB SERIES MOLDED-CASE CIRCUIT BREAKER



Standard Features:

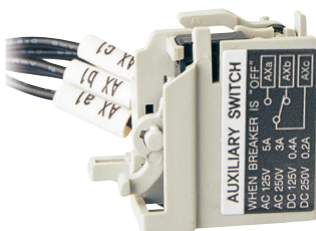
- High short-circuit interrupting ratings - 35KAIC, 65KAIC and 100KAIC @ 480V
- Fixed Thermal and Fixed Magnetic trip settings
- Mechanical Lugs (Line and Load side included)
- Mounting-Hardware (Screws included)
- Handle and cable ordered separately
- Flange and rotary operators available
- Suitable for reverse feed applications
- Compact frame
- 800-1200 Amp breakers have electronic trip

Benshaw Molded

The Benshaw R2CB Series of Molded Case Circuit Breakers are designed to provide overload and short-circuit protection for industrial electrical equipment. Available in seven different compact frame sizes, the Benshaw MCCB is a safe, reliable solution for applications from 15 to 1200 Amps.

R2CB SERIES MOLDED-CASE CIRCUIT BREAKER - ACCESSORIES

Benshaw offers a wide range of circuit breaker accessories including auxiliary switches, mechanical interlocks, shunt trips and many more products.



RC/RSC SERIES CONTACTORS



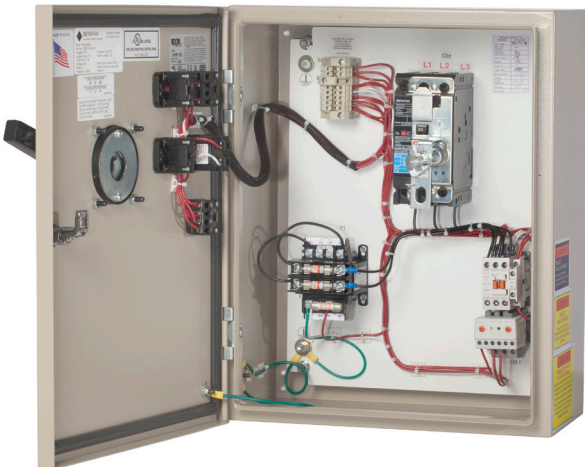
Benshaw's line of RediStart™ Contactors provides control for single-phase and three-phase motors, and for switching resistive or inductive loads up to 690 VAC. The entire line of RediStart™ contactors is built and tested to world-leading electrical and mechanical standards.

Ratings from 1-600HP (NEMA Size 00 - Size 7)

- DIN rail mountable to 150 amps
- Full product family to 800 amps
- Direct mount overload relays
- Draw out cassette coils 180 amps and above
- Integral coil surge suppression 180 amps and above
- Low coil power consumption
- Phase barriers supplied standard
- Uni-directional mounting
- Extremely long lifespan
- Compact size
- Unit identification marker
- AC or DC coil options
- Accessories & replacement parts
- NEMA or IEC ratings

PREPACKAGED FULL VOLTAGE STARTERS

NON-COMBINATION / COMBINATION / CBRCI2 SERIES / OVERLOAD PROTECTION



RCI starters are completely integrated, full voltage/non reversing starter packages. The CBRCI2 Series design is ideal for industrial duty applications. Three wires in/out enables quick installation and startup.

- NEMA 12/3R enclosure
- NEMA rated contactor and separately mounted electronic class 20 protection relay
- 480/240:120V fused control power transformer
- Door-mounted start and stop push-buttons
- Door-mounted overload reset push-button
- Red run indicator light
- (2) Auxiliary contacts
- Hand-off-auto selector switch

RMSO/SPO SERIES - BIMETALLIC OVERLOAD RELAYS



RMSO/SPO Series Overload Relays are bimetallic-style relays designed to protect AC-3 circuits (up to 150A @ 690V) and motors against overloads, phase failure, long starting times and stalling of the motor. RMSO and SPO Series overload relays can be integrally mounted to Benschaw RC and RSC contactors for thermal overload protection.

Ratings up to 800A and up to 690V

- IP20 protection (IEC 60 529)
- Trip indicator
- Reset button/selector for manual or auto reset
- Test trip device
- Available as class 10 or class 20
- Finger-safe terminals
- Overload adjustment dial cover
- 1 NO and 1 NC auxiliary contacts
- Identification labels
- Temperature compensation
- -60°C to 70°C storage temperature range
- -5°C to 55°C operating temperature range
- Differential-type phase loss protection
- Add-on accessories available
- Close couple to RC contactors

Simple, fully adjustable overload relays.



SPE - ELECTRONIC OVERLOAD RELAYS



Benshaw SPE Series Electronic Overload Relays are available in three different mounting configurations. All offer wide, adjustable current range with adjustable trip times (Class 5, 10, 20 & 30). Model SPE22-EPR can be direct mounted to RC Series Contactors. Or separately mount the SPE22-3SR type. All are DIN rail mountable and include manual reset as a standard feature.

Standard Features:

- Operation status LED indicator
- Normal operation
- Overload
- Phase imbalance
- Trip cause indication
- Overcurrent
- Phase loss
- Reverse phase
- Test/Reset push-button
- Trip time setting 0-30 sec. @ 6 x set current
- Setting range 0.1-80 amps

RMSP - MOTOR STARTER PROTECTOR



RMXP Series manual starters offer efficient motor starting functionality in a compact design. Protection functions include circuit, motor, starter and phase failure protection. They couple directly to RC Series contactors for a complete electro-mechanical combination starter.

Standard Features:

- Front-mounted auxiliary contact
- Easy mounting onto DIN rail
- Large scale for current setting
- Auxiliaries snap on without tools
- Dial cover lock device
- Test trip device for checks of the trip mechanism
- Finger-safe terminals
- Dial cover
- Handle lock device (off positions)
- Class 10 only
- Three position operator handle (ON-OFF-TRIP)
- Identification labels
- High interrupt capability
- Wide range of accessories available

PUSH BUTTONS



Benshaw's line of 30mm push buttons are durable, flexible and well-suited to a variety of applications.

Rated NEMA 4X and UL listed

- Momentary non-illuminated
- Maintained non-illuminated
- Push pull maintained non-illuminated
- Momentary illuminated
- Push pull maintained illuminated

PILOT LIGHTS



Benshaw offers a complete line of standard and push-to-test 30mm pilot lights, both at 24V or 120V.

Rated NEMA 4X and UL listed

- Standard
- Extended
- Mushroom
- Guarded
- Shrouded

SELECTOR SWITCHES



Benshaw's comprehensive line of 30mm selector switches are customizable via several handle insert color options and contact block configurations.

Rated NEMA 4X and UL listed

- 2-position, 3-position, 4-position
- Maintained return
- Spring return

POTENTIOMETERS



Benshaw offers standard 2 Watt potentiometers with prewired terminal blocks.

Ratings:

- NEMA RATING: 1, 2, 3, 3R, 12, 13, 4, 4X
- UL listed
- Fully-assembled operators come standard with one 3/16" (4.8mm) and three 1/16" (1.6mm) gaskets

CONTACT BLOCKS



Benshaw's line of 30mm contact blocks is designed to save you time and cost. These robust yet easy to install blocks enable one pilot device to operate several control circuits.

Ratings:

- 600V AC
- 250V DC
- An IP20 guard is standard on all contact blocks

MVRNX "NEXT GEN" SOFT STARTER



It'sGenius
by Benshaw

Next level NX technology takes motor control into the future delivering all the functionality and rugged, dependable performance that you've come to expect from a Benshaw product, while allowing wireless connectivity, seamless troubleshooting, advanced monitoring, and even more configurable options.

The NX controller comes standard with cyber secured Bluetooth capabilities allowing you to seamlessly and safely connect to your equipment through a phone app to shorten commissioning times and improve troubleshooting.

The PLC type architecture of the controller allows for options to be easily integrated into the system, and the upgraded HMI shows wave forms and data sampling to quickly troubleshoot any issues to get the system back up and running.

Ratings from 2300V - 4160V up to 3000HP

- Robust design for standard and heavy duty applications
- UL tested bus design option through 2000A

Key Features:

- Expandable system
- Built-in connectivity
- Easy to understand interface
- Versatile starting / stopping options
- Customizable motor protection
- Selectable motor control modes
- Commissioning / troubleshooting tools
- Cybersecurity
- Optional expansion modules

Unique Features:

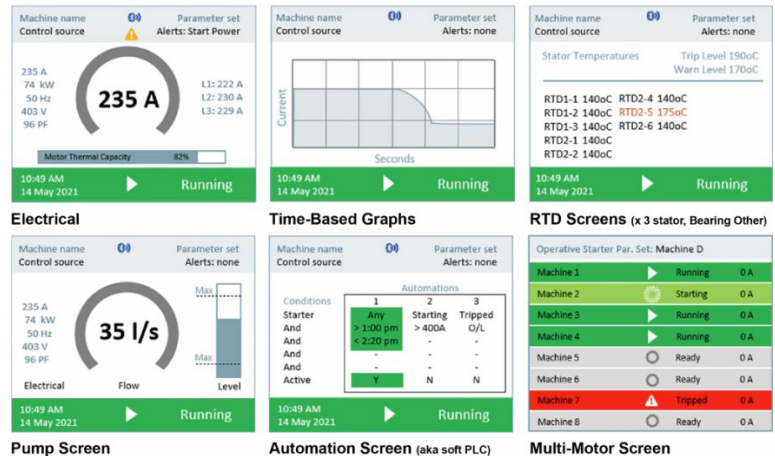
- Bluetooth interface using phone apps for iPhone or Android
- RNX controller can handle two (2) motors, each with separate parameters and overload protection
- USB port for downloading waveform capture data
- Designed to meet global standards and is RoHS compliant



"A generational change in processor speed, protection/monitoring functionality and communications capabilities."

NEXT GEN (NX) CONTROL FEATURES

Benshaw's MVRNX Series medium voltage soft start introduces a true generational change in processor speed, motor protection, monitoring and communication capabilities. An easy-to-use, door-mounted HMI operator is included. The HMI displays waveforms and data sampling . . . ideal for 'must run', critical motor applications including pumping systems, compressors, conveyors and more!

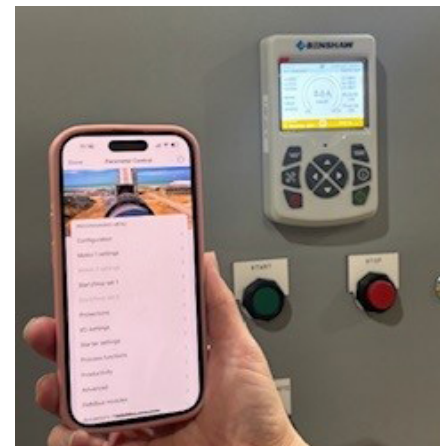


"GENIUS" START HERE APP

Full starter troubleshooting and programming capabilities from your phone – now that's genius!

Start Here is a powerful, user-friendly starter programming and troubleshooting app developed by Benshaw's engineering team for use on both iOS (App Store) and Android (Google Play) powered mobile devices. The Start Here app was developed to the latest in cybersecurity protocol, giving you peace of mind when connecting your mobile device to the starter.

The powerful Start Here app connects to the Next Generation NX controller through Bluetooth Low Energy (BLE), where you're able to update to the latest software through the cloud, update parameters, view event logs, download event and parameter data, and contact service support.



It'sGenius
by Benshaw

MVRXE SOLID STATE SOFT STARTER



Benshaw's legacy MVRXE Solid State Soft Starter is a microprocessor-controlled, reduced voltage soft starter for three phase induction motors. MVRXE Series soft starters from Benshaw are designed for severe duty applications and offer a closed-loop current ramp for smooth, stepless motor acceleration.

Ratings from 2300 - 4160V up to 3000HP

- Solid state reduced voltage starting
- Full voltage ATL emergency backup feature
- NEMA 12 or NEMA 3R enclosure
- UL 347, Class E-2 combination
- Load break disconnect switch
- Class "R" motor fuses
- Inline vacuum contactor
- Solid state power poles
- Vacuum bypass contactor
- Built-in self-test
- Digital protection and metering
- UL zero sequence ground fault
- 500% FLA for 30 seconds
- Modbus communications standard

CBMVRMX SOLUTION FOR LARGE MOTORS



Only Benshaw has the backbone to support your large motor control requirements! Our CBMVRMX Series Combination Solid State Soft Starters are purpose built to support large motors up to 16,000 HP at 6900 V and 25,000 HP at 13800 V.

Ratings 6900V up to 16,000HP and 13.8kV up to 25,000HP

For large motor soft start applications, Benshaw CBMVRMX Series Soft Starters provide a circuit breaker solution for isolation and protection. Starting from this powerful base, Benshaw's engineering team will develop a custom solution for your specific large motor application. We offer the flexibility of using existing switchgear, or we can source new switchgear from any major vendor providing a seamless transition for maintenance personnel. Customers must provide single-phase control power for controls in this configuration.

MVRMX ENGINEERED SOFT STARTERS



Benshaw's CFMVRMX Series Soft Starter is a fully integrated, programmable family of Class E2 load break/combination solid state starters. This integrated design includes control and power electronics, bypass and isolation contactors that reduce maintenance and operating costs when compared to other methods.

Ratings from 2.3 - 13.8kV up to 25,000HP

- Protects machinery from failure and excessive maintenance caused by mechanical shock during starting or stopping. The RediStart MVRMX provides smooth, stepless acceleration and controlled deceleration.
- Protects electrical systems from disruptive voltage drops and power outages caused by motor locked rotor inrush current. The RediStart MVRMX starter precisely controls the current ramp during start up.
- Protects mission-critical motors from failure or unscheduled outages caused by machine or electrical system faults. The RediStart MVRMX starter provides complete, high performance, coordinated line monitoring, motor control and protection.
- Available for wound rotor and synchronous motors.

MVDH SERIES TWO-HIGH MV SOFT STARTER



Benshaw's MVDH Two-High Solid State Starters provide separate medium and low voltage sections for each starter. Both sections include a complete starter - load break disconnect switch, Class R rated fuses, inline and bypass contactors and power stacks, to allow complete independent control of two motors.

Ratings up to 195A (per motor) through 4160V

- Two 350% - 30 seconds rated solid state starters (consult factory for heavy duty rating)
- Compact footprint - use for standalone, back-to-back and MCC/lineup applications
- Dual redundant configuration (switch-selectable emergency backup full voltage starters)
- Rugged, welded enclosure with chain drive flange handle mechanism
- Benshaw's advanced, digital MX³ control and protection
- 50 KAIC (2600 or 4800 VAC) short circuit fault rated
- 45 kV BIL
- Built-in self test features
- NEMA 1, UL 347 listed

CFMVATL MEDIUM VOLTAGE ACROSS-THE-LINE (ATL) STARTERS



Benshaw CFMVATL Medium Voltage Across-The-Line (ATL) Starters are full voltage controllers for three phase induction motors. All ATL starters from Benshaw are supplied in a free standing enclosure, with NEMA 1, NEMA 12 and NEMA 3R configurations available to suit application requirements. Our RediStart MX3 control package can be added as an option to provide a "Smart" CFMVRMXATL package.

Standard combination CFMVATL starters are supplied with a load break/fault make disconnect isolation switch, Class "R" motor current limiting fuses, vacuum motor starting contactor, and the "SPE" SureProtex electronic overload protection. The "Smart" Medium Voltage ATL package adds the RediStart MX3 control package for additional branch circuit monitoring motor protection, metering, diagnostics and communication.

Benshaw's compact, flexible, full voltage solid state starters can be customized to support reversing, multiple motor, combination and non-combination, induction, synchronous, wound rotor, mining duty (skid mounted), and other motor control requirements, and all are backed by Benshaw's full three-year warranty.

Ratings from 2300 - 15000V up to 4000HP

- 3 phase, 50/60Hz, up to 15kV metal enclosed
- Withstand ratings to 50kA
- 45kV BIL for 5KV Class equipment
- Metal enclosed NEMA 1, 12, 3R enclosures
- Load matched load break disconnect switch and fuses
- HP rated bypass contactors
- Integrated electronic motor protection
- Real-time metering and diagnostics
- Isolated 120V control section

Motor Protection Option

- Electronic or digital overload
- MX3 Series control
- Motor protection relay

Additional Features

- Thermal viewing windows
- Live line indication
- Mimic bus
- Optional incoming section
- Communication protocols, Ethernet, DeviceNet, Profibus,
- Arc flash mitigation relays
- Zero sequence ground protection
- Ground balls
- RTD protection

MVCB MEDIUM VOLTAGE SWITCHGEAR ASSEMBLIES



To ensure the safety of personnel servicing the equipment, all Benshaw medium voltage switchgear offerings include a rack-out circuit breaker design. A remote breaker control panel and arc flash sensing options are also available to further enhance personnel safety. In addition, Benshaw offers a full metal-clad switchgear solution.

MVCB switchgear assemblies are provided in a NEMA-rated enclosure configured for use as a stand-alone unit, in an equipment line-up or in a motor control center (MCC) configuration. Benshaw switchgear connects seamlessly to the rest of the Benshaw MCC for a space-saving design to feed line-ups or in jumbo starter solutions.

The Benshaw Application and Engineering Support team is available to customize switchgear designs to meet a customers' specific application needs without extended lead times.

Ratings from 2400 - 13800V up to 3000A

- Fault rating: up to 50kA
- Rack-out design
- NEMA 1, 12 and 3R indoor/outdoor
- Welded 11 gauge steel construction
- Feeder protection with CPT and PT
- Green open pilot light
- Red closed pilot light
- Amber trip pilot light
- Open push-button
- Closed push-button
- Manual racking device
- Bus rated to CB size
- Line power top entry standard
- Load power top exit

Key Advantages

- Bolts directly to Benshaw MCC line-up or starter
- CSA special inspection to SPE1000
- Available in 1200 A or 2000 A standard (3000 A option is custom)
- Feeder protection included as standard — customer to specify manufacturer
- Available up to 13.8kV
- Configurable with added options
- Rack-out design standard
- Remote breaker control panel

MVH2 - COMPACT/FULL PERFORMANCE MV VFD

Benshaw MVH2 Series Medium Voltage VFDs utilize H-Bridge multi-level and overlapping wave technology for low harmonic content and a nearly perfect sine wave output. Full-size performance ... in a compact design!

The latest in phase-locked loop technology is used to adjust drive output ... providing an ideal solution for soft starter, speed control, energy savings and intelligent control of any MV induction or synchronous motor.

- 1500HP @4160V (up to 205A)
- 50 KAIC, 60kV BIL
- NEMA 1 forced air, front access, welded enclosure
- Fully integrated, packaged VFD: load break fused disconnect and inline contactor (up to 154A rating); built in dry type transformer
- Door-mounted touch screen HMI
- IEEE 519 compliant, 24 pulse design
- V/Hz, open or closed loop, vector control
- No cable length restrictions
- Standalone or integrated into an MCC (optional)
- Synchronous Transfer up to 4 motors (optional)



M2L - HIGH-END MV VFD



Benshaw M2L Medium Voltage Variable Frequency Drives feature a unique, patented topology, with independent transformer, rectifier and inverter sections, allowing Benshaw to offer flexible packaging options to accommodate a wide range of project-specific requirements and limitations.

- Up to 12,000HP @ 7.2 kV
- Patented topology
- Flexibility of installation
- Industry-leading performance
- Enhanced reliability and efficiency
- Reduced cost of ownership
- Simplified serviceability
- Synchronous Transfer option (up to 10 motors)

BENSHAW ADDITIONAL PRODUCTS & SERVICES

- Multi-Motor Starter Panels (MCPs)
- Medium Voltage Variable Frequency Drives
- IEC Medium Voltage Soft Starters
- Mine Skid Mounted MV Controls
- Medium Voltage Load Break Switches
- Medium Voltage Junction Boxes
- MLO- Main Lug Only Sections
- DC Injection Braking
- Wound Rotor Motor Starters
- Synchronous Controllers
- Ball Mill Positioning
- Line Reactors and more...

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