Benshaw MX4PB Soft Starters: Comprehensive Product Overview

Overview

Soft starters are electronic motor controllers that gradually ramp up motor voltage, reducing the inrush current and mechanical shock of starting large motors. The **Benshaw MX4PB series** is a packaged soft starter solution designed to provide solid-state reduced-voltage motor starting for a wide range of industrial applications. Each MX4PB unit integrates an advanced **EMX4i digital soft starter** with all necessary components (breaker, contactor, enclosure, etc.) in one assembly. According to Benshaw, the MX4PB offers **standard-duty and heavy-duty operating modes**, advanced motor protection features, an integral run-duty bypass contactor, and a high short-circuit rating of 65 kAIC – making it a reliable soft start solution for nearly any application (Benshaw MX4PB product page). The MX4PB's EMX4i controller provides precise digital control for smooth starting and stopping, plus built-in motor protection, metering, diagnostics, and communication capabilities right out of the box (all as standard features).

Key Features and Capabilities

The Benshaw MX4PB series comes as a **"combination" soft starter** package, meaning it includes both the soft starter device and an integrated means of motor isolation/protection. This design simplifies installation and ensures that all components are matched for performance and safety. Notable standard features and components of the MX4PB packaged soft starters include:

- **Integrated Circuit Breaker (Service Entrance Rated):** Each MX4PB unit has a built-in molded-case circuit breaker for disconnect and short-circuit protection, complete with a door-mounted rotary disconnect handle. This allows the soft starter panel to be used as a **service entrance** controller, providing a local disconnect and high fault interruption capacity (rated **65 kAIC**) for compliance with safety codes (Benshaw MX4PB features). The high fault rating (65 kA interrupting) means the assembly can withstand very high short-circuit currents, enhancing safety and meeting **UL**/cUL listing requirements for industrial control panels.

- **NEMA 4/12 Enclosure (Outdoor/Indoor Rated):** The soft starter and all components are housed in a rugged **NEMA 4/12 enclosure**, which is **dust-tight, water-tight**, and suitable for harsh industrial environments. This enclosure rating allows use indoors or outdoors (NEMA 4 is weatherproof; NEMA 12 is for indoor dust/oil tight applications). For outdoor installations in direct exposure, a NEMA 3R configuration is available as an option. The robust enclosure protects the electronics from contaminants and enables the MX4PB to be used in demanding locations (mining, aggregate facilities, pulp and paper mills, etc.) without additional panel fabrication.

- **Built-in Bypass Contactor:** A **run-duty bypass contactor** is pre-installed and wired internally. The bypass contactor is used to shunt the main thyristors (SCRs) of the soft starter once the motor is up

to speed. By bypassing the SCR power devices during run, the starter improves efficiency (reducing heat losses) and extends the life of the soft starter. Bypass contactors also allow the soft starter to cool between starts and provide an across-the-line run path for the motor during steady-state operation. This feature is integral to the MX4PB design and helps achieve a compact, efficient package.

- **Control Power Transformer:** Each unit includes a **120 V control power transformer (CPT)** to supply the control circuit. This step-down transformer provides the standard 120 VAC control voltage from the line, so that the soft starter's internal electronics, contactor coils, and any pilot devices are powered appropriately. Having a built-in CPT means the installer does not need to provide a separate control power source – it's ready to use with standard control voltage out of the box.

- **Door-Mounted Interface and Controls:** For convenient operation and monitoring, the MX4PB panels feature multiple door-mounted operator devices. A **keypad with LCD display** is mounted on the enclosure door, allowing programming and monitoring of the soft starter without opening the panel. The keypad is the interface to the EMX4i controller, providing access to settings, status readings, and diagnostics. Additionally, **pushbuttons and indicator lights** are typically provided: a Start button, Stop button, reset, **Local/Remote selector switch**, running status indicator, and fault indicator light are mounted on the door (Benshaw soft starter panel features). These door-mounted controls enable easy local operation and quick indication of the starter's status (running, fault trip, etc.) while maintaining the enclosure's NEMA integrity.

- **Advanced EMX4i Soft Starter Unit:** At the heart of each MX4PB package is Benshaw's **EMX4i programmable soft starter** (developed in collaboration with AuCom). The EMX4i is a modern, microprocessor-based soft starter chassis that provides the core motor starting and protection functionality. It offers both **standard duty** and **heavy duty** ratings to match different application needs (explained in detail below). The EMX4i uses heavy-duty SCRs (silicon-controlled rectifiers) on all three phases to control voltage to the motor during startup and stopping, enabling a smooth acceleration and deceleration. With one of the smallest footprints in its class, the EMX4i soft starter is compact yet packed with features for intelligent motor control. It is also highly efficient – when the internal bypass is engaged during run, the system efficiency is around 99.5%, with no significant harmonics introduced (since the SCRs are not continuously conducting once at full speed).

- **Immediate Availability in Range of Ratings:** Benshaw stocks MX4PB soft starters for **same-day or next-day shipment** in many common sizes. Standard configurations cover motors from **20 HP up to 700 HP** (at 460 V) in the packaged design, which corresponds to approximately 40–828 A full load currents. Units are available for **480 V AC** systems (most common) as well as **240 V AC** systems, simply by selecting the appropriate voltage code. The wide horsepower range means the MX4PB series can accommodate applications from small pumps and fans to large compressors and rock crushers. Enclosure sizes and internal components are scaled according to the motor rating – for example, smaller units (below ~75 HP) come in a compact 24×20×12″ enclosure, while the largest 700 HP models use a 79×32×24″ enclosure to house the larger starter and breaker components. Having pre-engineered, in-stock models across this range allows users to get a solution quickly without the lead time of a custom design.

- **Flexible Configuration Options:** Benshaw offers **configuration flexibility** to tailor the MX4PB to specific applications. Users can select **standard duty (SD)** or **heavy duty (HD)** versions depending

on their load requirements. They can also choose to include or omit the main circuit breaker (for example, a “non-combination” version without a breaker is available as MX4PB-NC models, which have a slightly lower short-circuit rating when used with proper fusing). Additional factory options such as a **space heater with thermostat** (to prevent condensation inside the enclosure in cold or humid environments), a **remote keypad kit** (for mounting the controller interface remotely or on the machine), various **communication interface modules** (for fieldbus connectivity), and **finger guard kits** (to cover power terminals for extra IP20 touch safety) can be added as needed. Benshaw’s modification service will integrate the selected options into a stock unit and still ship quickly, giving a semi-custom solution with minimal delay. This modular approach (“configure-to-order”) means the MX4PB can fit a wide range of application needs while retaining the benefits of a standard product line.

All these features make the MX4PB a **turnkey motor starter solution** – installers get a ready-to-go panel with the soft start controller, bypass, disconnect, control power, and user interface all in one. This saves engineering time and ensures compatibility of components. It also simplifies field wiring: users typically just need to bring in the line feed, connect the motor leads, and wire any external control or communication cables to the terminal strip. Everything else is pre-wired and tested by Benshaw.

Heavy Duty vs. Standard Duty Performance

One of the key choices in the MX4PB series is between **Standard Duty (SD)** and **Heavy Duty (HD)** versions. These designations refer to the soft starter’s output current and motor starting capacity for different load types or starting conditions. Both versions use the same EMX4i controller hardware, but they are configured/rated for different levels of starting current and motor load inertia:

- **Standard Duty (Normal Duty):** In standard-duty configuration, the soft starter is rated to deliver up to **350% of motor full-load current (FLA) for 30 seconds** during startup, and typically supports around 2–3 starts per hour (with cool-down between starts) under normal load conditions. The service factor for standard duty is 1.15, meaning the starter can handle slight overloads but is optimized for applications with lighter starting torque requirements or infrequent starts. **Standard duty MX4PB models** are ideal for centrifugal pumps, fans, and other machinery with relatively soft start characteristics or lower inertia. For example, a standard duty unit might be chosen when the motor starts unloaded or with a small load and does not require extremely high starting torque. These models carry the “SD” suffix in the part number (e.g. *MX4PB-SD-400-4-4-HB* for a 400 HP, 480 V, standard-duty unit) and correspond to a motor overload class of roughly **Class 10–20** (trip time) by default.

- **Heavy Duty:** In heavy-duty configuration, the MX4PB soft starter can handle up to **450% of motor FLA for 30 seconds**, with a higher thermal capacity and often up to 4 starts per hour capability in many cases. The heavy-duty models have a service factor of 1.25, indicating they are designed for tougher starts (higher torque loads or more frequent start/stop cycles). **Heavy duty MX4PB units** are recommended for high-inertia loads or applications that demand high starting torque – such as loaded conveyors, crushers, positive displacement pumps, or compressors – where the motor may draw very high current initially and take longer to accelerate. These units (identified by “HD” in the model, e.g. *MX4PB-HD-200-4-4-HB*) are built with slightly larger capacity (often the next size up in the soft starter rating) to withstand the additional heating from heavier starts. The heavy-duty rating ensures the soft starter can start the motor without tripping even under demanding conditions, by

allowing a higher current limit and longer ramp if needed. In practice, a heavy-duty 200 HP starter, for instance, uses a larger SCR power stack than a standard-duty 200 HP unit, providing extra thermal margin.

It's important to choose the appropriate duty rating to match the motor application. **Standard duty** models suffice for the majority of applications that have easy to moderate starting requirements (and they can be slightly more economical), whereas **heavy duty** models provide assurance for hard-starting loads or high frequency of starting. Both types in the MX4PB line include an **integral bypass contactor** and carry the same 65 kA short-circuit rating and UL listings – the difference lies in their motor starting horsepower and current ratings. For example, at 480 V the largest standard-duty model is rated up to **700 HP (approx. 828 A)**, while the largest heavy-duty model is also around **700 HP** but that corresponds to the maximum 1200 A frame used at a heavier duty cycle (Benshaw MX4PB catalog data). In essence, heavy-duty versions sacrifice some horsepower capacity (or use a bigger unit) in exchange for higher allowable starting currents. Benshaw's documentation clearly specifies the **HP, max current, and enclosure size** for each variant so users can select appropriately.

Thermal Protection and Starts-Per-Hour: The EMX4i controller inside MX4PB monitors the motor's thermal model and the SCR temperature to prevent overheating. Even heavy-duty soft starters have limits on how frequently the motor can be started. Typically, if an application demands extremely frequent starts or plug-stopping, a soft starter might need to be oversized or a variable frequency drive (VFD) considered. For most use cases, however, the MX4PB heavy-duty units can comfortably handle the duty – e.g. **4 evenly spaced starts per hour at 450% current for 30s each** is within the heavy-duty spec. Standard duty units might allow around 2–3 starts/hour at 350% for 30s. These guidelines align with industry standards for solid-state starters. Exceeding these would cause the soft starter's protective algorithms to trip on **Excess Start Time** or **Overload**, which are among the built-in protections (discussed next).

Advanced Control and Protection Features (EMX4i Technology)

A standout aspect of the MX4PB series is its use of the **EMX4i intelligent motor controller**, which brings a host of advanced control functions and protective features. This next-generation soft starter platform was designed to not only start and stop motors smoothly, but also to protect the motor and provide rich data/communication capabilities for modern automation systems. **Below are some of the key control and protection features offered by the EMX4i soft starter (as integrated in the MX4PB package):**

- **Multiple Start/Stop Profiles:** The EMX4i supports **three selectable starting modes** and **two stopping modes** to accommodate different application needs. For starting, operators can choose a **voltage ramp start** (gradually increasing voltage from a user-set initial value to full voltage over an adjustable time), a **current limit start** (holding the start current to a programmed maximum level to prevent excess inrush), or a specialized **kick-start** mode which briefly applies a higher voltage at startup to break away heavy static friction before ramping normally. These options allow tuning of the soft start to achieve the right balance of torque and acceleration time for the load. For stopping, the EMX4i offers a standard **soft stop (voltage ramp-down)** which can be used on pumps or conveyors to decelerate the load smoothly and avoid sudden stops (helping prevent issues like water hammer in pumping systems), as well as a **coast or immediate stop** (simply turning off output and letting the motor free-fall to a stop). In addition, a **soft braking** feature is available: the EMX4i can inject DC braking current at the end of a stop ramp ("soft brake") to bring the motor to a faster halt than coasting, useful for applications that need quicker stopping without a full VFD. The flexibility of

these start/stop profiles means the MX4PB can be fine-tuned for gentle handling of the load, reducing mechanical stresses. For example, a conveyor system might use current limit start to avoid belt jerk, and a pump might use soft stop to eliminate pressure surges.

- **Comprehensive Motor Protection:** Protecting the motor (and the starter itself) is critical in heavy industrial use, and the MX4PB's controller is equipped with **an array of electronic protective functions**. It provides customizable protection settings for **motor overload (thermal model)**, which tracks the energy dissipated in the motor and trips if it exceeds safe levels (overload classes can be adjusted, with default typically Class 10 or 20). It also includes **excess start time** (stall protection) – if a motor fails to reach full speed in the programmed ramp time (for instance due to a jam or excessive load), the starter will trip to prevent overheating. **Phase loss and phase imbalance** protections guard against input power issues (e.g. loss of one phase or a severe voltage imbalance that could damage the motor). The EMX4i also monitors for **undercurrent** (which can detect conditions like a pump running dry) and **overcurrent** (running over the expected load). An **optional ground fault protection** feature is available: with an add-on sensor, the starter can detect ground leakage currents and trip to protect against insulation failure or wiring faults. Additionally, the soft starter will trip on **SCR faults** (such as an SCR shorted or open) and can display diagnostic codes for easy troubleshooting. All trip events are recorded in an **event log** with time stamps, so maintenance personnel can review why a shutdown occurred. Together, these protections make the MX4PB not just a starter but a full-fledged **motor protection relay**, often eliminating the need for separate overload relays or phase monitors. The goal is to safeguard the motor and system from electrical faults or misuse, thereby minimizing damage and downtime. (Notably, the MX4PB's built-in protections are focused on the motor and starter – branch-circuit short-circuit protection still must be provided by fuses/breaker which in this package is handled by the integral circuit breaker).

- **Advanced Interface and Diagnostics:** The EMX4i controller's user interface brings modern conveniences to soft starter operation. The door-mounted **graphical LCD display** provides plain language readouts and menus (no cryptic codes to interpret). It supports multiple languages (eight languages including English, Spanish, French, German, Chinese, etc.) for global usability. The interface can display real-time graphs of motor performance (for example, it can show a graph of current vs. time during startup) which helps in tuning and troubleshooting starts. Users navigate through a **Main Menu and a Quick Setup** menu – the Quick Setup allows fast commissioning by stepping through fundamental settings (like motor full load current, start/stop mode, ramp time, etc.) without needing to wade through every parameter. For more detailed configuration, the full menu gives access to all features. The EMX4i also includes **onboard metering** of electrical parameters (voltage, current, power factor, etc.) and can display values like current, voltage, and even calculated motor thermal capacity used. In case of a fault, a **text fault message** is shown (e.g. "Motor Overload Trip") along with a code, making it easy to understand what triggered a trip. This is a big improvement over older starters that only gave a trip LED or code number. To assist further with diagnostics, the EMX4i's display can generate a **QR code** that links to detailed information – by scanning the QR code with a smartphone, one can get quick access to troubleshooting tips or documentation for that specific fault condition. All these features reduce the time needed to commission the starter and to diagnose problems, thereby improving uptime.

- **Data Logging and Connectivity:** Modern industrial users often want to integrate motor controllers into a broader control system or IIoT monitoring system. The MX4PB's controller supports this via event logs and optional communication modules. It maintains a log of up to **384 events**, including

starts, stops, faults, and parameter changes, which can be invaluable for analyzing how the motor is operated over time or investigating the sequence of events leading to a trip. For connectivity, the EMX4i has a built-in **USB port** on the front – this allows users to download or upload configuration files (for example, cloning settings to multiple starters), update firmware, or extract diagnostic data using a PC. The USB connection together with PC software can also enable an offline programming or simulation mode, where the user can simulate the soft starter's behavior with the configured settings without actually running a motor (useful for training or testing logic). In terms of fieldbus communications, the MX4PB can be equipped with **communication interface options** to tie into plant automation networks. Benshaw offers modules (or versions of EMX4i) that support protocols such as **Modbus RTU** (serial), **Modbus TCP/IP**, **Profibus DP**, **Profinet**, **EtherNet/IP**, and others – enabling the soft starter to be monitored and controlled by a PLC or SCADA system. This is comparable to the capabilities of top-tier soft starters from other manufacturers (for example, ABB's PSTX series includes built-in Modbus and optional adapters for EtherNet/IP, ProfiNet, etc. to communicate with industrial networks (ABB PSTX softstarter communication)). With a communication module, data like motor current, status, and fault alarms from the MX4PB can be read remotely, and commands like start/stop or parameter adjustments can be written from a central control system. This level of integration is increasingly important for Industry 4.0 and preventive maintenance strategies.

- **Special Functions (Emergency Run, Scheduling, etc.):** The EMX4i introduces some advanced functionalities beyond basic starting/stopping. One notable feature is **Emergency Run (Fire Mode)**, which can be activated to force the motor to run under emergency conditions **ignoring most trip conditions**. This is useful, for example, in **fire pump** applications or other emergency systems where the motor must continue to run no matter what (even at the risk of damage) to satisfy a safety function. In Emergency Run mode, the soft starter will not trip on overload or other faults and will attempt to keep the motor running as long as possible – this is intended only for true emergency situations (using it will typically **void the warranty** due to the potential for damage, as noted in the manual). Another feature is a built-in **Real-Time Clock with scheduling**: the MX4PB can be programmed for **daily on/off scheduling**, meaning it can automatically start or stop the motor at certain times of day without an external control system. This could be useful for routine operations (for example, a fan that should run only during business hours). The controller can maintain the schedule and even account for things like weekends or holidays if configured. Additionally, the EMX4i has a **Simulation Mode** (mentioned as a built-in simulator) which allows testing the control logic and sequencing without applying power to the motor – essentially it can simulate a start/stop cycle for training or verification. These features show that the MX4PB's controller is not just a basic soft starter but a **smart motor control device**. It incorporates conveniences that traditionally would require separate controllers or custom logic. For instance, older systems might need an external timer or PLC to schedule motor starts, or a special fire mode relay logic – but the EMX4i has these features natively, simplifying the system design.

Overall, the **advanced feature set of the EMX4i** (as used in MX4PB) brings the soft starter on par with modern drives in terms of intelligence. It provides **improved motor control** (smooth acceleration, deceleration, braking options), **enhanced protection** (preventing damage to motor and system), and **extensive diagnostics/communications** (facilitating integration into plant systems and quick troubleshooting). This can significantly reduce downtime and maintenance costs for end users. In many cases, using a soft starter like the MX4PB can prolong the life of mechanical components and the motor itself, thanks to the reduced stress and the continuous monitoring for unhealthy conditions.

Real-World Benefits and Applications

Implementing the Benshaw MX4PB soft starter yields concrete benefits in industrial settings. By addressing the harsh electrical and mechanical stresses of motor startup, the MX4PB helps **solve common problems** such as voltage sags, breaker trips, mechanical wear, and equipment damage. Here are some real-world advantages and application examples:

- **Reduced Mechanical Stress:** One of the primary reasons to use a soft starter is to **minimize the mechanical shock** on equipment when a motor begins turning. Across industries, motors drive pumps, fans, conveyors, compressors, and many other machines. If started across-the-line (DOL), the sudden application of full torque can snap belts, shear keys, damage gearboxes, or slam hydraulic systems. In contrast, the MX4PB soft starter ramps the motor gently to speed, **preventing the sudden jerk**. For example, in a manufacturing facility, a large conveyor motor starting DOL might create a sharp jolt through the belt and pulley system; using the MX4PB, the torque is controlled so the conveyor starts smoothly, greatly reducing belt strain and extending its life. In pumping systems, soft starters avoid pressure spikes (water hammer) by starting and stopping pumps gradually. A technical study comparing direct-on-line to soft starter operation found that the soft starter achieved a more controlled and faster stabilization of motor speed, **halving the transient shock duration** (e.g., a DOL start took 0.4 seconds of high-torque transient, whereas a soft-start ramp only took 0.2 seconds to reach steady state) – demonstrating significantly gentler mechanical behavior (Jackson et al., *J. Eng. Research & Reports*, 2024). Over time, this reduction in mechanical stress translates to **fewer breakdowns and lower maintenance costs** on driven machinery. Bearings, couplings, and shafts all experience less wear. As noted in an industrial automation blog, easing the motor into operation with a soft starter effectively **prevents mechanical shock**, leading to extended equipment lifespan and more reliable production lines (Pamensky Automation Blog – Soft Starters). In short, the MX4PB helps "cushion" the entire system during startup, which is when the vast majority of mechanical stress occurs.

- **Lower Electrical Stress and Peak Current Reduction:** From an electrical perspective, the MX4PB dramatically cuts the **starting current** drawn by the motor. A typical three-phase induction motor can draw 6–7 times its full-load current when started across the line. This inrush not only causes voltage dips in the plant power system (which can lead to lights flickering or sensitive equipment tripping), but it also places great stress on upstream components like transformers, circuit breakers, and generators. By using the soft starter's current limit function, the MX4PB can restrict the inrush to, say, 300%–400% of full load current instead of 600%+. This reduction has multiple benefits: it avoids nuisance trips of feeders, **reduces voltage sag** (helping maintain power quality for other loads), and can lower peak demand charges from the utility. In fact, soft starters are often part of an energy management strategy – by curtailing the highest current peaks, they help facilities **reduce peak energy demand** and avoid penalties (IEA Efficiency in Industry). While soft starters do not provide energy savings during run (unlike variable speed drives), they prevent the wasteful surge current at startup and thereby can slightly reduce heating losses and improve the electrical distribution efficiency during those periods. Additionally, limiting inrush current is crucial when using backup power systems; for example, if a facility runs on a generator, the soft starter ensures the motor can start without overwhelming the generator. The MX4PB's ability to ramp up voltage gradually can be the difference between a successful motor start or a generator stalling out under a sudden load. Overall, the soft starter makes the electrical startup **smoother and safer for the grid**, eliminating many power quality issues associated with large motor starts.

- **Improved Process Control:** The MX4PB's soft starting and soft stopping capabilities also mean better control over the industrial process. Certain processes cannot tolerate abrupt starts or stops – for instance, in a material handling system, suddenly stopping a conveyor can cause products to topple or can create dangerous tension in the line. With a soft stop, the conveyor decelerates in a controlled fashion. Similarly, in a large fan or blower, a soft starter can eliminate the sudden torque reversal that happens when a fan coasts down through airflow (which can sometimes cause a "kick-back"). By adjusting the deceleration time, the MX4PB allows the operator to fine-tune how the machine comes to rest. Another example is in sawmills or rock crushers – using the **soft brake (DC injection)** feature, the MX4PB can bring heavy rotating equipment to a stop more quickly than coasting, which improves safety and cycle times without requiring a full variable speed drive system. Furthermore, because the EMX4i provides features like **jog (slow-speed control)** or start/stop scheduling, users gain additional flexibility in operation. They can inch a conveyor for maintenance alignment using the jog function, or automatically start a ventilation fan at a set time every day using the scheduler. These aspects contribute to **higher productivity and convenience** in operations. In essence, the MX4PB doesn't just protect equipment – it also provides tools to optimize how the equipment is used.

- **Multiple Application Areas:** The Benshaw MX4PB soft starters find use in virtually every sector where medium to large AC motors are employed. They are a great fit for **pumps and compressors** (in municipal water plants, oil & gas pumping stations, HVAC chillers, etc.), **fans and blowers** (industrial HVAC systems, dust collection, cooling towers), **conveyors and material handling** (mining conveyors, package handling systems, baggage handling in airports), **mixers and mills** (cement kilns, ball mills, industrial mixers), **agitation equipment**, and more. Because the MX4PB is available in NEMA 4/12 enclosures and even configurable for NEMA 3R outdoor, it can be installed near outdoor pumps or rooftop fans without extra shelter. In the **mining and aggregate industry**, for example, these soft starters are used to reduce equipment strain when starting heavy rock crushers or long conveyor belts full of material. In **water/wastewater facilities**, soft starters like the MX4PB are commonly applied on high-power pumps to prevent water hammer and to avoid pressure shocks to piping. The **oil and gas industry** often employs soft starters on large compressors or pump jacks to ease them into operation and reduce electrical load spikes at remote sites. Although the MX4PB is a low-voltage starter (up to 600 V class), multiple units can be used in a motor control center to handle a variety of loads in a plant. Its advanced protections (like undercurrent for dry-run) are particularly valued in pumping applications to automatically shut down a pump if it runs out of fluid. Overall, the flexibility and robustness of the MX4PB series make it suitable for **almost any fixed-speed motor application** that can benefit from controlled starting. It bridges the gap between full-voltage starters (simple but hard on the system) and variable frequency drives (fully flexible but more expensive for fixed-speed needs) – giving users a cost-effective way to protect their motors and machinery.

- **Real Customer Example:** *(Hypothetical scenario)* A manufacturing plant had recurring issues with a 250 HP air compressor motor that was started DOL – the startup current was causing voltage drop in the facility and occasionally tripping other devices. The mechanical couplings in the compressor were also wearing out frequently due to the torque spikes. The plant retrofitted a **Benshaw MX4PB soft starter (300 HP heavy-duty model)** in place of the across-the-line starter. After this upgrade, the compressor's inrush current was limited to about 300% of FLA (versus nearly 600% before). The lights no longer flicker on startup, and there have been no breaker trips from inrush. The gentler ramp has nearly eliminated sudden torque stress on the coupling – in the year following installation,

no coupling replacements were needed, whereas previously they were replaced every few months. Additionally, the MX4PB's built-in motor protection tripped the compressor off once for an **overtemperature condition**, alerting operators to a cooling problem before the motor failed. In this case, the soft starter not only solved the immediate power quality issue but also provided a safeguard that improved maintenance outcomes. This example reflects how users can achieve **tangible improvements in reliability and energy management** by deploying a modern soft starter like the Benshaw MX4PB.

Reliability and Support Advantages

Beyond the technical capabilities, Benshaw offers some practical benefits that help customers implement the MX4PB with confidence:

- **Quality and Warranty:** Benshaw is known for robust build quality in its motor control products, and the MX4PB is no exception. The combination starters are **UL listed** and **cUL listed** for safety, built and tested to applicable standards (UL 508A for industrial control panels, etc.). The use of a high-interrupting-capacity breaker and a coordinated bypass/contactors means the assembly can withstand fault conditions without catastrophic failure, providing peace of mind in critical installations. Benshaw backs the MX4PB series with an **exclusive** three-year warranty**** on the solid-state starter system, which is significantly longer than the industry norm (many competitors only offer 12 or 18 months by default). This 3-year warranty reflects the company's confidence in the reliability of their design – as Benshaw notes, they can guarantee it longer *"because we build them better"*** (Benshaw 3-year guarantee). Such an extended warranty is a strong selling point, especially in heavy industrial use where downtime is costly; it underscores that the MX4PB is engineered for durability and long service life.

- **Vendor Support and Stock Availability:** Precision Electric (and Benshaw's distribution network) keeps popular MX4PB models **in stock for immediate delivery**, meaning customers can often get a soft starter panel the same day or within a few days. This is a major advantage when a critical motor needs a replacement starter or when facing tight project deadlines. Instead of waiting weeks for a custom-built soft starter panel, the MX4PB standard units can be deployed quickly. Benshaw also provides comprehensive documentation – including user manuals, quick start guides, connection schematics, and even training resources – to ensure installers and end-users can get the unit up and running with minimal hassle. Additionally, Benshaw's technical support team is available to assist with startup or troubleshooting if needed (either via phone or on-site through partners), although the MX4PB is designed to be user-friendly. The **three-year warranty** is conditional on a **factory-authorized startup** (to ensure the unit is installed and commissioned correctly), which means either Benshaw or a certified technician will verify the setup. This startup service not only validates the warranty but also gives users an expert check on their application, providing any needed advice on parameter settings or system integration. The end result is that customers can trust both the product and the **after-sale support**, reducing the risk in adopting the technology.

- **Industry Recognition and Compatibility:** Soft starter technology like that in the MX4PB has become widely accepted and even expected in modern motor control solutions. Major manufacturers such as **ABB, Eaton, Schneider Electric, Rockwell/Allen-Bradley, Hitachi, and others** all offer soft starters in their portfolios, confirming that the approach is an industry standard for motor control. Benshaw's MX4PB series stands alongside these, offering comparable (or

superior) features in a convenient package. For instance, ABB's high-end PSTX soft starters similarly include features like built-in bypass, motor protection, and fieldbus communications – indicating that Benshaw is delivering a product at the cutting edge of soft starter design. What gives Benshaw an edge is its focus on **packaged solutions** and responsiveness: the MX4PB's combination of robust hardware and the flexible EMX4i controller, plus the quick availability and warranty, makes it a compelling choice. It's also **compatible with industry standards** – the control terminals can tie into standard 3-wire or 4-wire control circuits, and with communication modules it can slot into existing PLC networks. This means upgrading to an MX4PB in place of an old starter is relatively straightforward. Many OEMs and system integrators are specifying soft starters like the MX4PB in new designs to prolong equipment life and meet electrical codes that often require reduced-voltage starting for large motors (to mitigate voltage drop on utility systems). In retrofit scenarios, adding an MX4PB can resolve long-standing issues (as illustrated in the example above). Essentially, the MX4PB is **part of the modern best practices** in motor control – providing an energy-efficient, equipment-friendly start method that aligns with both engineering standards and operational goals.

Conclusion

The **Benshaw MX4PB Series Packaged Soft Starters** offer a comprehensive and well-engineered solution for controlling large AC motors. By combining the latest in soft start controller technology (the EMX4i intelligent controller) with a fully assembled package (including breaker, bypass, enclosure, and interface), Benshaw delivers significant value to end users and integrators. The MX4PB series addresses the key challenges of motor startup – curbing inrush currents, reducing mechanical stresses, and protecting the motor and system – all while adding modern conveniences like digital configuration, communication integration, and advanced diagnostics. Technical specifications from Benshaw confirm that these starters can cover motors up to 700 HP at 480 V in both standard and heavy duty versions, with heavy-duty models capable of driving high-torque loads through 450% current ramps. Real-world usage of soft starters has proven their ability to extend equipment life and improve reliability, and the MX4PB exemplifies this with its rich feature set and proven design.

In a competitive landscape of motor control solutions, the MX4PB stands out as a **balanced approach** – more cost-effective than a full variable frequency drive when speed control isn't required, but far more gentle and intelligent than an abrupt across-the-line starter. It effectively helps customers **solve problems** like electrical surges, mechanical wear, and process instabilities associated with motor starting. Additionally, Benshaw's attention to customer support (stock availability, documentation, and warranty) means adopting the MX4PB is a low-risk proposition backed by expertise. Whether it's a pump station avoiding water hammer or a manufacturing line aiming to minimize downtime, the Benshaw MX4PB provides the features and robustness to meet the need. By choosing this soft starter solution, facilities can expect **smoother operations, longer equipment lifespan, and improved energy management**. The MX4PB series thus represents an advanced yet practical product that can boost the performance of industrial systems and protect the investments in heavy machinery.

References

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