



BENSHAW®
ADVANCED CONTROLS & DRIVES

A member of UNICO Technologies Group



Integrated Control Solutions

Benshaw.

A World Leader in Custom Solutions for Electric Motor Control.



High-quality, low-cost control solutions backed by unparalleled engineering, service and support.

Since its founding in 1983, Benshaw has grown to become a leader in custom motor and machine controls. Benshaw maintains its leadership position by listening carefully to partners and responding with products, services and capabilities specifically designed to address their needs:

- Regional production facilities with economy-of-scale benefits and global sourcing capabilities
- Custom engineering and control integration expertise
- Prototyping and testing to meet all major regulatory compliance standards
- ISO-certified quality and automated efficiency across all products and services
- World-class 24/7/365 after-market training, service and support
- Global reach through Regal Beloit

Responsiveness

Benshaw's state-of-the-art manufacturing facilities combine the convenience of regional proximity with the cost advantages of a single, large-scale operation and an extensive global supply chain.

All of Benshaw's manufacturing operations and information systems are linked for instantaneous transfer of engineering data and work order specifications.

Single-source responsibility

From engineering and panel prototyping to enclosure and wire harness fabrication, machining and assembly, Benshaw offers the convenience and cost advantages of single-source responsibility across a full range of electro-mechanical starters, solid-state controls and drives.

Benshaw is widely recognized as an innovator in the machine control industry. We approach complex control applications with unrivaled engineering and design experience, and work closely with partners toward an optimal control solution.

Standards compliance

Benshaw provides design and testing services to ensure UL, CSA, CE or CCC compliance and can acquire all of the necessary machine and motor control listings and certifications.

Global sourcing

Benshaw's centralized materials management staff sources all raw materials and electrical components on a global basis, working to find the best possible value for our customers.

ISO certification

Benshaw invests heavily in state-of-the-art production and process control technologies to achieve the highest possible quality at the lowest possible cost.

All operations are ISO certified, and all components, enclosures, parts and materials are inspected, tracked and kitted per ISO 9001 protocols to ensure timely processing of orders.

Automation efficiencies

Benshaw's proprietary workflow automation system streamlines the entire production process, eliminating a number of manual functions from order entry, scheduling, engineering and materials requisition to assembly, billing and payment.

The result? Increased operational efficiency, reduced opportunities for error, shorter lead times and lower panel costs than typically experienced through a local panel shop, component manufacturer or third-party integrator.

After-sale service and support programs

Benshaw's dedicated, knowledgeable technicians are available to answer questions and provide support before, during and after the sale.

Repairs, spares, field engineering, retrofits and training—whenever and wherever needed—are all part of our commitment.

Single-Source Responsibility

From design integration to detailed engineering—prototyping to production—Benshaw is your one-stop source for custom motor control solutions.

Benshaw provides turnkey custom solutions—from concept to final assembly—with all the convenience and accountability you would expect from a single-source solution. In fact, Benshaw is uniquely qualified to help you accomplish your motor and machine control objectives.

Integration expertise

When a standard product doesn't fit your requirements, Benshaw's integration and design teams can help tailor a solution that does, no matter how complex or demanding the application.

Value engineering

With 100,000+ control units installed, hundreds of custom panels designed and extensive engineering experience, Benshaw brings more to the table than a list of control components or basic assembly capabilities. Whatever your control needs, Benshaw's experienced engineering team can help you find a cost-effective solution.



Single-Source Responsibility

Benshaw's structured motor/machine control development process.



HMI design

Benshaw works closely with its partners to combine advanced motor and machine control technologies with the latest communications capabilities—delivering optimum performance and an optimized human machine interface.

Control customization

Benshaw supports all major control network protocols and offers more than 250 control hardware modifications and accessories—including pilot devices, PLCs, control power transformers and switches, meters, relays, space heaters and protective devices.

Plug-and-play wiring solutions

Investments in the very latest automated wire cutting, marking, crimping and harness fabrication systems have resulted in reduced cycle times, superior wire harness quality, spot-on consistency and plug-and-play simplicity for control panel installations.

Assemble-to-order and repetitive manufacturing capabilities

Benshaw manufactures control systems on a repetitive or assembled-to-order basis, as required. All panels are produced in accordance with a machine manufacturer's master schedule, with Benshaw meticulously managing every aspect of the control system workflow and supply chain to support the master schedule.



International Standards Compliance

Benshaw offers a full range of rugged, reliable, internationally compliant motor and machine control solutions.

Full-voltage controls and wye-delta starters

Benshaw offers a full line of contactors, overload relays, full-voltage and wye-delta starters. All units are UL® listed, IEC or NEMA rated.

Benshaw contactors have the highest mechanical ratings in the industry and are designed with user-friendly features such as universal coils and extra auxiliary contacts. Modular accessories include mechanical interlocks, terminal covers, mechanical latches, auxiliary contacts and AC/DC coils.

Variable frequency drives

Benshaw offers a complete family of variable frequency drives from 1HP to 2,000HP. Drives are rugged and easy to use, featuring intuitive, menu-driven programming and robust power sections to meet any application.

Low-voltage solid-state starters

Benshaw is widely recognized as a world leader in solid-state starter technology. Benshaw's solid-state starters combine a rugged, reliable power section with the most advanced motor control functionality in the industry.

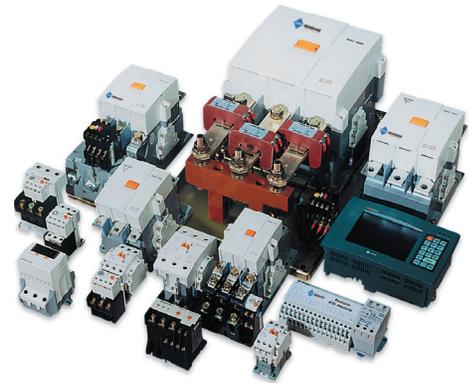
Medium-voltage controls

Benshaw designed and manufactured the first production medium-voltage solid-state starter in 1988 and today has over 3,000 units installed worldwide.

As a global leader in 2,300V to 15kV solid-state control, Benshaw has pioneered every major innovation in medium-voltage power electronics.

Benshaw's medium-voltage starters are fully programmable, UL® listed through 5kV Class and NEMA Class E2 compliant. These integrated control units include power and control electronics, bypass and isolation contactors, fiber optic firing and a fusible load break switch to reduce maintenance and operating costs compared to other starting methods.

Benshaw's medium-voltage drives are fully programmable, modular-multilevel, scalable with a multiple-use technology platform, and up to 10,000HP with 7.2kV Class systems.



Benshaw offers the industry's only modular-multilevel MV drive.

Integrated Control Solutions



Systems solutions are a central focus of our business, and a competitive value for our customers.

Benshaw's success in the marketplace is a direct result of our willingness as a company to think "beyond the box." We've made systems solutions a central focus of our business, and we make learning your business a top priority.

Every enclosure we design is carefully crafted to meet your dimensional requirements, prototyped and tested for fit and compliance with relevant safety standards, fabricated to exacting tolerances and finished to your paint specification.

By focusing on the bigger picture, we gain a better understanding of your process, your control requirements and your market objectives.

Intelligent motor controls

Benshaw offers a full range of intelligent, programmable, low- and medium-voltage starters and drives—from fractional to 30,000HP—to meet a variety of motor control needs.

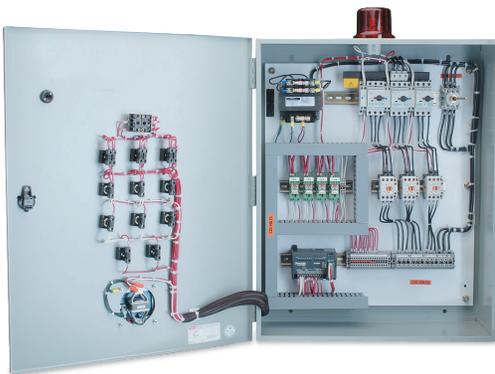
We then apply that knowledge toward the development and production of complete, cost-effective, fully integrated control solutions.

Customized enclosures

Benshaw takes great pride in our ability to design and deliver custom control enclosures that truly complement the form and function of your machine.

Motor control products include full-voltage starters, solid-state reduced-voltage starters and variable frequency drives. Reversing, two-speed, DC braking, wye-delta, synchronous and wound rotor control are supported.

NEMA 1, 3R, 4 and 12 enclosures in unit-mount, console-mount, free-standing and wall-mount configurations are available to suit your needs.



Integrated machine logic

Benshaw can supply standard or PC-based programmable logic controllers, and will custom design hardware or software to meet process requirements.

Networking capabilities, remote monitoring and custom-designed human machine interface packages are also available.

Integrated control sensors

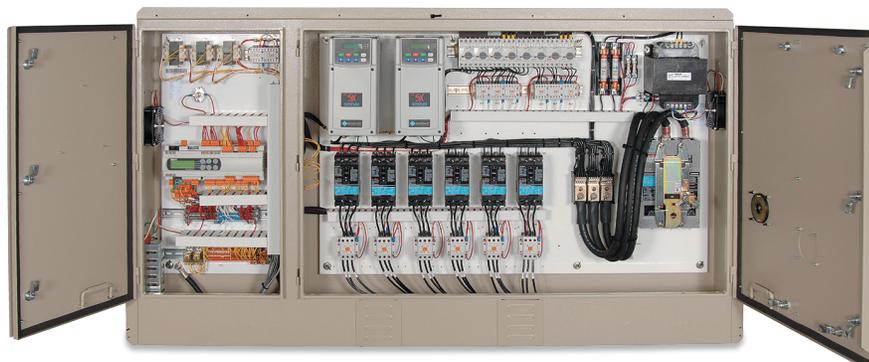
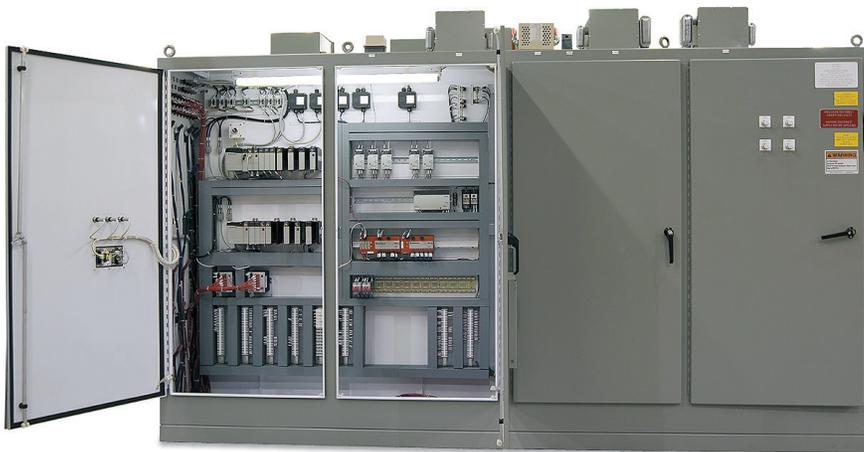
Benshaw can integrate any number of sensors, transducers, relays, switches, meters and protective devices, as required, to precisely monitor and respond to all critical process, machine or environmental variables.

Integrated power packages

Benshaw can also incorporate all of the power distribution components needed for your machine in one simple, plug-and-play package.

Turnkey power distribution packages typically include all internal and external motor control wiring harnesses, power wiring harnesses, motor/machine sensor connections and, if needed, a fully integrated power factor correction unit.

All power systems are factory tested at Benshaw with custom-built machine simulators and wire-pull testers to guarantee reliable performance.



Global Supply



Global sourcing ensures the availability of a stable supply of high-quality, low-cost raw materials and components at all times.

One of Benshaw's greatest strengths is the ability to source raw materials and off-the-shelf electrical components—in quantity—from supply chain partners in North America, China, Taiwan, India, Korea and Europe.

Selective sourcing

Benshaw's materials management staff continuously monitors key supply markets to identify new sourcing opportunities. Due diligence is performed on a regular basis with current and prospective vendors to verify quality claims and identify value opportunities.

Economies of scale

Benshaw works closely with selected supply chain partners to forecast volumes, negotiate prices and establish buffer stock requirements, thereby ensuring relative price stability and a stable flow of material to meet production demands.

By coordinating purchases for all manufacturing operations through its centralized materials management system, Benshaw achieves substantial economies of scale.



Benshaw's global supply chain and coordinated purchasing achieves substantial economies of scale.

Real-Time Quality Assurance

Benshaw's commitment to real-time quality assurance and operational excellence delivers the shortest lead time in the motor control industry.

Accuracy, repeatability and on-time performance are critical factors for customers—and top priorities at Benshaw.

Benshaw's commitment to panel quality is evident in every one of the company's state-of-the-art production facilities. It's evident in Benshaw's implementation of an advanced, industry-leading workflow automation system, and it's evident in the company's ISO 9001 certification for quality assurance systems, production controls and business processes.

Benshaw's abilities for rapid innovation, operational efficiency and high-volume, high-quality production—on demand—are demonstrated on a daily basis.

ISO 9001 certified with industry-leading accuracy and repeatability.

Real-time quality assurance

Benshaw's NEMA 1, 12, and 4 UL® listed enclosures are fabricated and configured using the latest mechanical and plasma cutting technologies. Heatsinks, busbars and other metal parts are machined on numerically and computer-controlled equipment to help ensure accuracy, repeatability and compliance with customer requirements.

Power stack modules are machined, finished, assembled and validated in-house to specified tolerances. Power devices are assembled and verified to the appropriate heatsink prior to electrical assembly and testing.

Benshaw's assembly teams perform a preliminary quality assurance inspection before delivery is made to functional test cells. Starter and drive assemblies undergo a variety of testing procedures, including motor operation testing,

Intelligent engineering

Benshaw's abilities for rapid innovation and assembly are grounded in the company's extensive engineering expertise and its focus on designing for "manufacturability."

With the right panel design, reliability and cost-effectiveness are assured, and quality becomes a matter of execution.

Integrated information system

To facilitate that execution, Benshaw has built an extensive, fully integrated, highly automated information system.

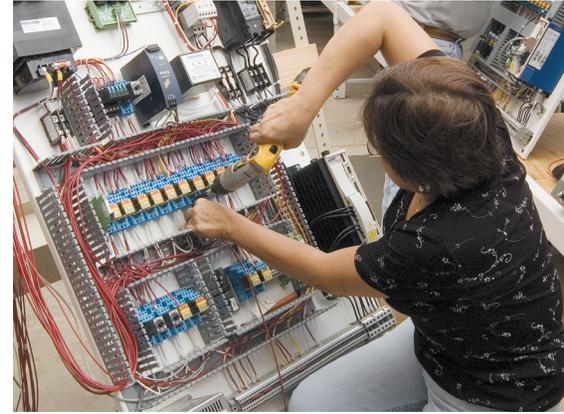
Engineering drawings, materials requisitions, work orders, change orders, master schedule commitments, contact information, delivery details—every piece of information required to fill an order accurately and on time—is available to any employee, in any plant, at any time.

control circuit testing, wire-pull testing, electrical performance checks, mechanical alignment inspection, torque measurement and user interface/pilot device functionality.

All test processes meet or exceed ISO 9001 requirements, and all test results are documented and archived for quality verification.

After assembly, Benshaw's Quality Assurance Department inspects each control unit for compliance with design documents and sales order descriptions.

Full QA inspections include a review of functional tests, an overall workmanship assessment, cosmetic assessments and a technical review of each configured product. QA inspection reports are archived prior to shipment.



Employee training

To maintain quality standards and drive home the need for operational efficiency, Benshaw invests a great deal of time and effort in training its employees on all systems and procedures put in place to support them.

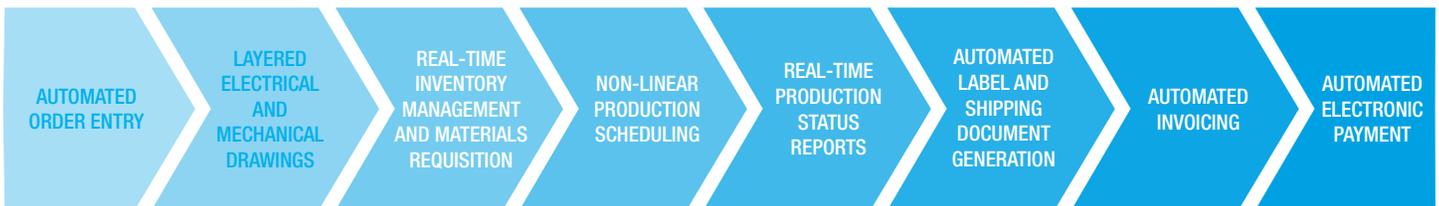
Advanced Workflow Automation

PREDATOR™

Benshaw's proprietary PREDATOR™ workflow automation system streamlines the entire production process, eliminating many manual functions. This creates numerous operational efficiencies that benefit not only Benshaw but also our customers, including significantly shorter lead times and lower panel costs than typically found with a local panel shop, component manufacturer or third-party integrator.

Pre-engineered, real-time, engineering database.

- Product structuring and part numbering system
- Object Library of global supply chain components
- Sub-Assembly Library of UL® listed functional modules
- 3D SolidWorks® packaging and mechanical design
- AutoCAD®-based multilayer master drawings
- Customer/application-specific packaged design



Automated, turnkey order release.

- Automated order entry
- Automated real-time scheduling
- Automated manufacturing order generation
- Automated engineering drawing generation
- Automated bill of materials generation
- Pre-engineered wiring harnesses
- Pre-engineered test parameters
- Electronic invoicing
- Electronic payment

Sequential Workflow



PREDATOR™ Workflow



- Order Entry
- Engineering
- Purchasing
- Material Control
- Manufacturing
- QA/Testing

Regional Manufacturing Facilities

Benshaw's regional manufacturing facilities combine the convenience of a local panel source with the economy and efficiency of a large global organization.

Benshaw's network of manufacturing facilities is linked via centralized engineering and order management systems. The benefits to industrial customers include faster delivery times, reduced shipping costs and local technical support.

Benshaw's unique distributed manufacturing system assigns primary production responsibilities to a Benshaw plant in close proximity to a industrial customer's facility, while ensuring critical data and production redundancies are available elsewhere in the system to mitigate the likelihood of a delivery disruption due to an equipment failure or catastrophic natural disaster.



**Industrial Customers Benefits —
Faster delivery times, reduced shipping
costs and local technical support.**

Advanced Controls and Drives

Full Voltage Controls

Variable Frequency Drives

Low Voltage Solid State Starters

Medium Voltage Drives

Medium Voltage Controls

Medium Voltage Switchgear

Unico Technologies Group

Power and Precision in Motion

Taking care of our customers' power needs has been our single focus for 88 years. Our two leading brands bring innovative control and electrical solutions to solve your challenges. Through thousands of systems in a broad array of applications, we've learned what it takes to make your system live up to its potential.

At a glance: With facilities in 12 countries, we combine the convenience of local service with the economies-of-scale and efficiency of a large global organization.

Innovative solutions via technology:

We bring you mission-critical motor control and protection products, designed and built with expertise and precision to maximize your output and minimize downtime.

Engaged and knowledgeable: We like to think of ourselves as "Application Smart," which always includes critical dependencies such as standards, compliance and regulatory issues.



Visit us online at unicotg.com, or contact:

UNICO Technologies Group

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24/7 Tech Support

Phone: 800.203.2416



24/7 Technical Support

- 24/7 hotline support from Pittsburgh (USA) and Listowel (Canada)
- Overnight parts shipment
- 24-hour service dispatch
- Coordination of all service capabilities — repair, spare parts, field engineering, retrofit and training

Repairs

- Trained, experienced, field personnel
- Equipped with the latest diagnostic and test equipment
- Start-up commissioning, field repairs, field analysis/data collection and preventative maintenance

Benshaw Product Line

- Solid state starters fractional to 30,000 HP at 15 kV
- LV AC drives to 700 HP
- MV AC drives to 35,000 HP
- Electromechanical controls to 800 A

Benshaw Express

- 24/7 online inventory and order system for authorized Benshaw distributors
- 24/7 shipment
- Air or truck delivery

Visit us online at benshaw.com and benshawexpress.com, or contact:

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