

**INDUSTRIAL  
CAPABILITIES**

# Advanced Controls & Drives



**Complete family - LV products  
Complete family - MV products  
Turnkey retrofit solutions  
Benshaw Express™ webstores  
PREDATOR™ QuickShip program  
Custom engineered products  
Regional manufacturing/service centers  
24/7 technical support**



# Benshaw. World leader in **MISSION CRITICAL**



## When it absolutely has to work ...

### *Benshaw at a glance:*

- ▶ Headquartered in Pittsburgh, PA
- ▶ 500,000+ square feet of manufacturing, warehouse and service center facilities worldwide
- ▶ Global reach through distribution and OEM partners
- ▶ Fastest growing motor controls company in the world

Since its founding in 1983, Benshaw has grown to become the world leader in the design, development and manufacture of advanced industrial motor controls and drives. With more than 250,000 units installed and operating, Benshaw products now blanket the globe.

More importantly ... when the application is critical, and the environment harsh, more customers specify Benshaw than any other brand.

### **Complete family of products**

Although many in industry have come to know Benshaw through our global leadership position in solid state motor control technologies, we also manufacture a *complete line* of electro-mechanical controls and drives. Today, Benshaw is widely recognized as the world leader in mission critical control and protection.

Benshaw's ISO 9001 certified motor control manufacturing facilities produce:

- ◆ Full voltage controls
- ◆ Variable frequency drives
- ◆ Pump control panels
- ◆ Power factor correction products
- ◆ Low voltage solid state starters
- ◆ Medium voltage controls

Benshaw control products feature advanced motor control and protection functionality, an easy-to-use interface, exceptional input/output flexibility and connectivity across all major communications protocols.

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



motor control and protection ...



## It absolutely has to be from Benshaw.

### **Rugged. Reliable. Ready.**

Benshaw has extensive experience in the design, production and installation of mission critical controls for heavy duty continuous process industries ... and that experience is reflected in every product we build.

We design our products for durability, and we test them rigorously to ensure the highest degree of reliability. Parts and materials are inspected, tracked and kitted per ISO 9001 protocols to ensure timely, accurate processing of orders.

### **Worldwide engineering, integration, retrofit and modernization services**

Benshaw is widely recognized as a leading provider of innovative motor control technologies. We thrive on complex applications and work diligently to bring cost-effective engineered solutions to our customers.

Benshaw's custom engineering, integration, retrofit and modernization services are available anywhere in the world:

- ◆ Power system and motor starting studies
- ◆ Control integration
- ◆ Engineered application-specific controls
- ◆ Turnkey retrofit solutions
- ◆ Project management for large scale modernization initiatives

### **Regional support**

With production facilities, warehouses and technical service centers located all across North America and beyond, Benshaw is uniquely positioned to serve your motor control and protection needs.

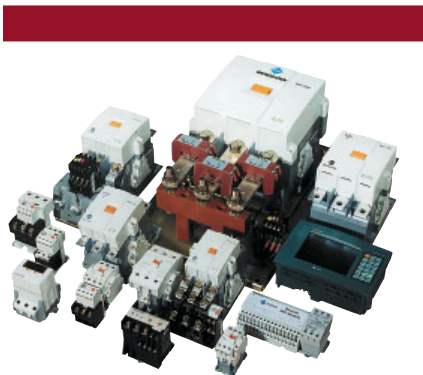
Dedicated, knowledgeable technicians are available to answer your questions before, during and after the sale.

Repairs, spare parts, field engineering, technical training services—whenever and wherever needed—are all part of our commitment.

If you value 24/7 technical support, on demand field service capability, convenient online ordering and one- or two-day ground service shipping to any destination on the continent, you'll appreciate Benshaw's regional support resources.

By focusing our efforts on the design and production of high quality motor control products and by exceeding your expectations for service and support, we hope to earn your confidence ... and your continuing business across the full range of controls and drives we manufacture.

# Benshaw offers a comprehensive line of advanced motor controls and drives ...



## Full voltage controls ...

Benshaw offers a complete line of contactors, overload relays and full voltage starters. All units are UL listed, IEC or NEMA rated, and backed by the industry's only two-year factory warranty.

Benshaw contactors have the highest mechanical and electrical operation ratings in the industry and are designed with user-friendly features such as universal coils and extra auxiliary contacts.

Contactors and overloads can be packaged for any electro-mechanical application, including full voltage, wye-delta, reversing, part winding and two speed applications.



## Variable frequency drives ...

Benshaw offers a wide range of standard and engineered variable frequency drives from 1 to 700 horsepower. Benshaw drives are rugged, reliable and easy to use, featuring intuitive menu driven programming and robust power sections to support your toughest applications.

In addition, Benshaw provides engineered solutions for any variable frequency drive application, including NEMA 12/4/3R packages, 18 pulse systems, two and three contactor bypasses, custom control logic and any modification you specify.



## Pump panels ...

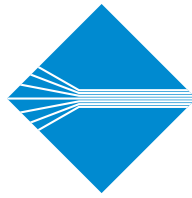
Benshaw pump panels are all UL listed and are available as NEMA HP rated. NEMA 3R enclosures makes these panels ideal for a wide range of heavy duty pumping and irrigation applications, and all are backed by Benshaw's two-year factory warranty.



## Power factor correction units ...

Benshaw's IPFusion™ power factor correction line combines presized, components in a compact, modular housing structure that mates easily to your load—both physically and electrically.

Each unit is engineered to deliver precise power factor correction, with plug-and-play convenience. Units can be manually or automatically engaged and may be remotely monitored for status.



**BENSHAW®**

**Rugged.  
Reliable.  
Ready.**



## Low voltage solid state starters ...

Benshaw is widely recognized as the world leader in solid state starter technology. Benshaw's latest generation of intelligent low voltage starters combine a rugged, reliable power section with the most advanced motor control and protection features in the industry.

- ◆ **MX<sup>2</sup>** - Single board design with integrated motor protection, communications, diagnostics, and high performance motor control.
- ◆ **MX<sup>3</sup>** - Multiple board set with integrated motor protection, communications, diagnostics, advanced motor control, real time clock and advanced motor control algorithms for the most complex applications.

Benshaw provides complete engineered low voltage packages from 1 to 3,000 horsepower, 120 to 600VAC.

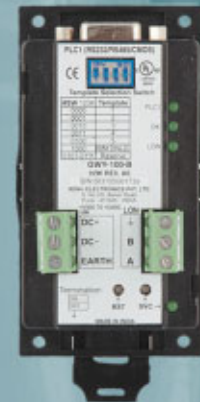


## Medium voltage controls ...

Benshaw designed and manufactured the first production medium voltage solid state starter in 1988 and today has over 4,000 units installed worldwide. As the global leader in 2300 to 15,000V solid state control, Benshaw has pioneered every major innovation in medium voltage power electronics.

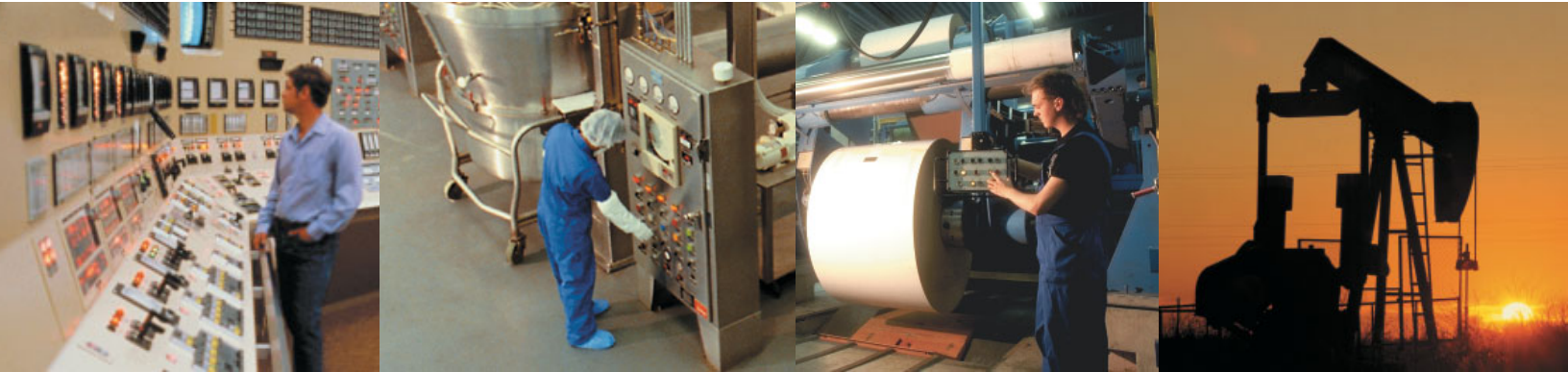
Benshaw medium voltage controls are fully integrated, programmable, NEMA Class E2, combination solid state starters. This UL listed design includes control and power electronics, bypass and isolation contactors, and a fusible load break switch to reduce maintenance and operating costs compared to other starting methods.

Benshaw engineers medium voltage starters and fully integrated control lineups from 2,300 to 15,000 volts, up to 60,000 horsepower.



*Benshaw's latest motor control technologies support a wide range of industry standard network communications protocols, including ModBus/RS485, Profibus, DeviceNet, Lon Works and web-addressable Ethernet.*

# Serving your most demanding applications ...



## Standard products ...

Benshaw offers an extensive line of cost-effective standard controls and drives ... serving a broad spectrum of industries and applications:

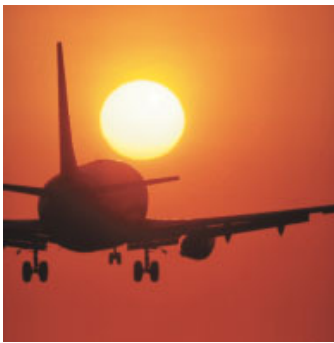
- ◆ Aggregate and mining
- ◆ Oil production
- ◆ Lumber
- ◆ Metals
- ◆ Agriculture
- ◆ Power generation
- ◆ Chemical processing
- ◆ Food production
- ◆ Paper manufacturing
- ◆ Printing and packaging
- ◆ Municipal fresh and waste water treatment
- ◆ Transportation

Benshaw's standard products are stocked in warehouses across the USA and Canada ... ready for shipment around the world on very short notice. In fact, most standard products ship same day or next day, and ordering couldn't be easier:

- ◆ In the eastern USA call or fax  
**Phone:** 412-487-8235  
**Fax:** 412-487-4201
- ◆ In the western USA call or fax  
**Phone:** 480-905-0601  
**Fax:** 480-905-0757
- ◆ In Canada, call or fax  
**Phone:** 519-291-5112  
**Fax:** 519-291-2595

**[www.BenshawExpress.com](http://www.BenshawExpress.com)**

If you prefer to order online, BenshawExpress.com provides direct digital access to our complete inventory of standard controls, drives, spares and parts—24 hours a day, seven days a week, 365 days a year.



*The Benshaw Express Direct Digital Warehouse provides 24/7/365 access to Benshaw's extensive inventory of products, parts, accessories and components ... with guaranteed same day or next day shipment available to any address in North America.*



With speed, precision and reliability ...



## Custom-engineered products ...

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

### **PREDATOR™ QuickShip**

Benshaw's unique "build-to-order" capability is supported by a pre-engineered real-time engineering database, an automated order entry system, and an extensive inventory of control components, protective relays, circuit breakers, contactors, enclosures and other devices ... all designed to ensure the quickest shipment of engineered products in the industry.

### **Control modifications**

- ◆ Over 250 modifications and accessories are available from Benshaw, including pilot devices, PLCs, control power transformers and switches, meters, relays, space heaters and protective devices.

### **Combination starters**

- ◆ Circuit breakers
- ◆ Non-fused disconnects
- ◆ Fusible disconnects

### **Bypass contactors**

- ◆ Integral or separate mount bypass contactors
- ◆ Two or three contactor drive bypass packages
- ◆ NEMA, IEC or Definite Purpose rated

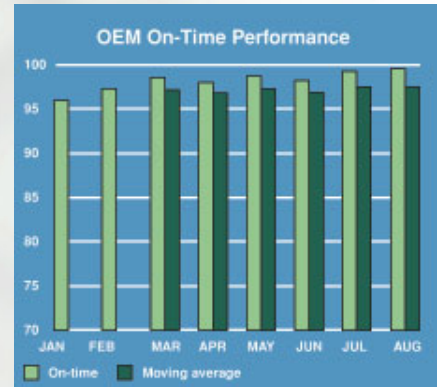
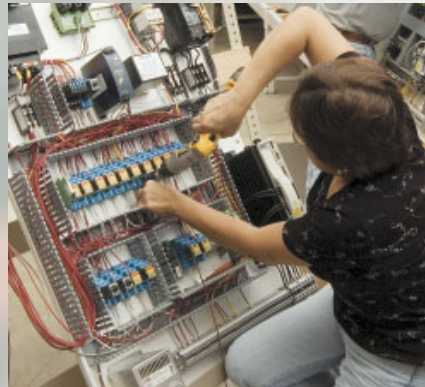
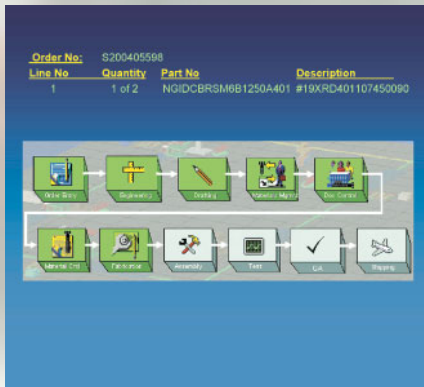
### **Enclosures**

- ◆ Standard designs - NEMA 1, 12, 4, chassis
- ◆ OEM/unit mount, custom designs as specified
- ◆ Special enclosures - 3R, 4X, 7, 9 as specified
- ◆ ABS/DNV approved for marine duty
- ◆ Motor control centers

### **Communications modules to match your network**

- ◆ ModBus RS232/485
- ◆ Profibus
- ◆ DeviceNet
- ◆ Ethernet
- ◆ Custom interfaces

# ISO 9001 certified quality ...



## 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 our customers—and top priorities at Benshaw.

Benshaw's commitment to 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.

In fact, with product cycle times that are the fastest in the motor control industry, warranty incidents running well below industry averages, and a customer retention rate of well over 98%, Benshaw's abilities for rapid innovation, operational efficiency and high-volume, high quality production—on demand—are demonstrated on a daily basis.

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, 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.

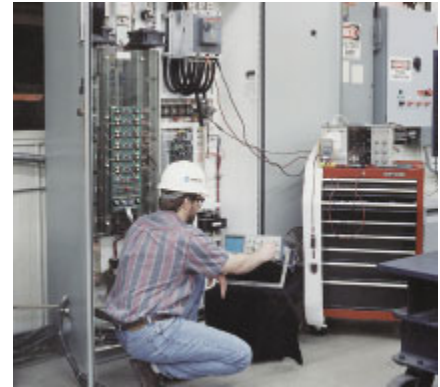
After assembly, Benshaw's Quality Assurance Department inspects each control unit for compliance to design documents and sales order descriptions.

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.





## Turnkey retrofit solutions ...



## From applications engineering, installation and commissioning services to retrofits and large scale modernization programs—Benshaw is your source for custom engineered control solutions.

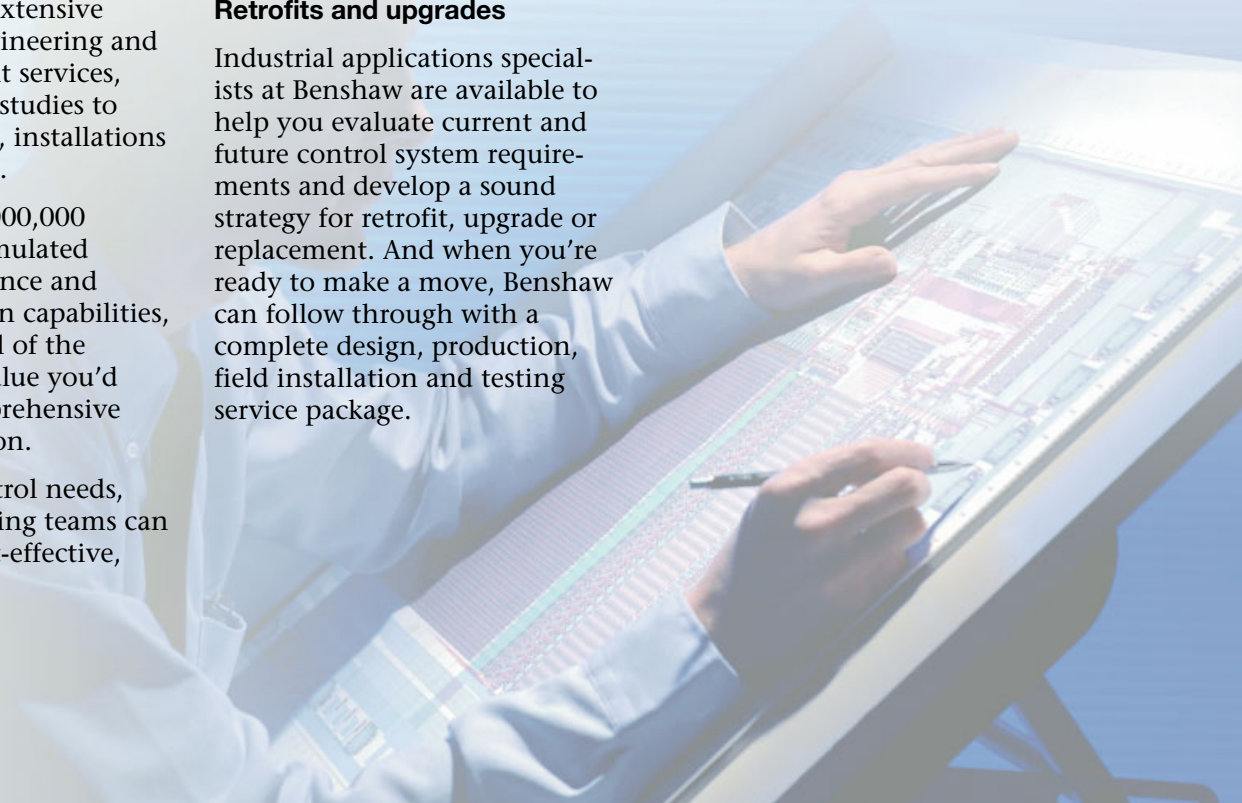
Benshaw offers an extensive array of custom engineering and project management services, from power system studies to design consultation, installations and commissioning.

With more than 1,000,000 man-hours of accumulated engineering experience and complete production capabilities, Benshaw delivers all of the convenience and value you'd expect from a comprehensive single-source solution.

Whatever your control needs, Benshaw's engineering teams can help you find a cost-effective, reliable solution.

### Retrofits and upgrades

Industrial applications specialists at Benshaw are available to help you evaluate current and future control system requirements and develop a sound strategy for retrofit, upgrade or replacement. And when you're ready to make a move, Benshaw can follow through with a complete design, production, field installation and testing service package.





With **REGIONAL** warehouses, manufacturing ...



## Regional facilities combine the convenience of local service and support with the economies-of-scale and efficiency of a large global organization.

Benshaw has developed an extensive network of regional manufacturing facilities and technical support centers across North America ... all linked via centralized engineering and order management systems.

Our regional manufacturing and service capabilities ensure rapid delivery times, reduced shipping costs and on demand field service when needed.

Repairs are made by trained, experienced personnel, using the latest diagnostic and test equipment to service printed circuit boards, power electronic control assemblies and electrical sub-assemblies.

### **Regional field engineering resources**

Benshaw can dispatch experienced field-engineering experts on short notice to help you address and solve your toughest motor control and protection challenges.

### **Regional/on-site technical training capabilities**

Benshaw's regional technical support centers regularly conduct classroom and hands-on training sessions for basic electrical maintenance, electronic maintenance and diagnostics, new product orientations and customized maintenance or operations based systems.

### **Regional warehousing for critical parts, spares and components**

Critical parts, packaged assemblies and components are stocked and ready to ship from several strategically located warehouses at a moments notice.





## ... Applications support and field services



### **Pittsburgh, PA**

Benshaw's headquarters and Operations Center in Pittsburgh, PA provides customer service, research and development, sales, support, engineering, logistics and administrative services.

The Pittsburgh Manufacturing Center contains over 100,000 square feet of warehouse, manufacturing and test space.

### **Listowel, Ontario**

Benshaw Canada serves the Canadian and international markets with product engineering, research and development, purchasing, manufacturing and testing, sales, customer service and administrative support.

### **Pueblo, CO**

The Pueblo facility is a state-of-the-art manufacturing operation and technical support center for the mountain states. This facility has achieved six sigma performance as measured by customer quality systems.

### **Rochester Hills, MI**

Ben-Tech Industrial Automation provides industrial automation and drive systems worldwide, including: integrated control panels, material handling systems, production control software, integrated drive assemblies and machine control solutions.

### **High Point, NC**

Benshaw's High Point facility is one of the leading engineered pump control design and manufacturing centers in North America. This facility builds a complete range of control products and serves as a regional distribution and technical support center for the southeast.

### **Fort Smith, AR**

Our Fort Smith facility is a high volume assembly operation for custom controls and drives. Continuous flow, kanban assembly lines are combined with Benshaw's fully integrated, automated test equipment

to achieve record levels of productivity in the industry. An expansion is planned to add a regional distribution and technical support center at this facility.

### **Scottsdale, AZ**

Benshaw's Phoenix operations center supports customers in the Western United States with customer service, sales support, and applications engineering capabilities.

### **Mobile, AL**

Benshaw Mobile supports both OEM and industrial customers in the Gulf Coast region. In addition to providing assembly, distribution and technical support capabilities, the Mobile facility has been designated as Benshaw's Center of Excellence for the Marine Industry.

## World-class after-market service and support—whenever and wherever needed...

# 7x24

Benshaw provides comprehensive support, with web-based tools and dedicated, knowledgeable staff available 7-days-a-week, 24-hours-a-day to answer your questions, dispatch a field service technician or coordinate an emergency parts request.

Repairs, spares, field engineering, retrofits and training services—whenever and wherever needed—are all part of Benshaw's commitment.



[www.BenshawExpress.com](http://www.BenshawExpress.com) offers a guaranteed two-hour emergency response on many starters and drives from warehouses around the country

- ◆ 7x24 same day shipment.
- ◆ Air or truck delivery.
- ◆ Airport pick-up or door-to-door service.



**7x24 Phone Support** from Benshaw operations centers in Pittsburgh, Listowel (Canada), Detroit and Phoenix provides:

- ◆ Technical assistance.
- ◆ Overnight parts shipment.
- ◆ Service dispatch.



**Training courses** are available in a classroom or a hands-on environment:

- ◆ Basic electrical maintenance.
- ◆ Electronic maintenance and diagnostics.
- ◆ New product orientations.
- ◆ Customized systems (maintenance- or operations-based).



**Regional/International Field Service** by a skilled technician, engineer or complete team, if needed, is available for:

- ◆ Start-up commissioning.
- ◆ Field repairs.
- ◆ Field analysis/data collection.
- ◆ Preventive maintenance.



**Repairs** are made by trained, experienced personnel, using the latest diagnostic and test equipment to service:

- ◆ Printed circuit boards.
- ◆ Power electronic control assemblies.
- ◆ Electrical sub-assemblies.

## Sales and Service

### United States

Pittsburgh, Pennsylvania  
 Indianapolis, Indiana  
 Syracuse, New York  
 Boston, Massachusetts  
 Charlotte, North Carolina  
 Birmingham, Alabama  
 Los Angeles, California  
 Detroit, Michigan  
 Chicago, Illinois  
 Phoenix, Arizona  
 Seattle, Washington  
 Denver, Colorado  
 Houston, Texas  
 Mobile, Alabama  
 Philadelphia, Pennsylvania

### Canada

Listowel, Ontario  
 Toronto, Ontario  
 Montreal, Quebec  
 Calgary, Alberta

### Brazil

### Ecuador

### Venezuela

### Columbia

### Peru

### Chile

### Argentina

### China

### Australia

### Philippines

### Korea

### Singapore

### Germany

### Mexico

### Russia

### Turkey

### Egypt

### Saudi Arabia

### United Arab Emirates

### Bahrain

### Kuwait

### BENSHAW Inc.

1659 East Sutter Road  
 Glenshaw, PA 15116  
 Phone: (412) 487-8235  
[www.benshaw.com](http://www.benshaw.com)

### BENSHAW Canada

550 Bright Street E  
 Listowel, Ontario N44 3W3  
 Phone: (519) 291-5112

### Ben-Tech Industrial Automation

2904 Bond Street  
 Rochester Hills, MI 48309  
 Phone: (248) 299-7700

### BENSHAW High Point

EPC Division  
 645 McWay Drive  
 High Point, NC 27263  
 Phone: (336) 434-4445

### BENSHAW Pueblo

Trane Division  
 1 Jetway Court  
 Pueblo, CO 81001  
 Phone: (719) 948-1405

