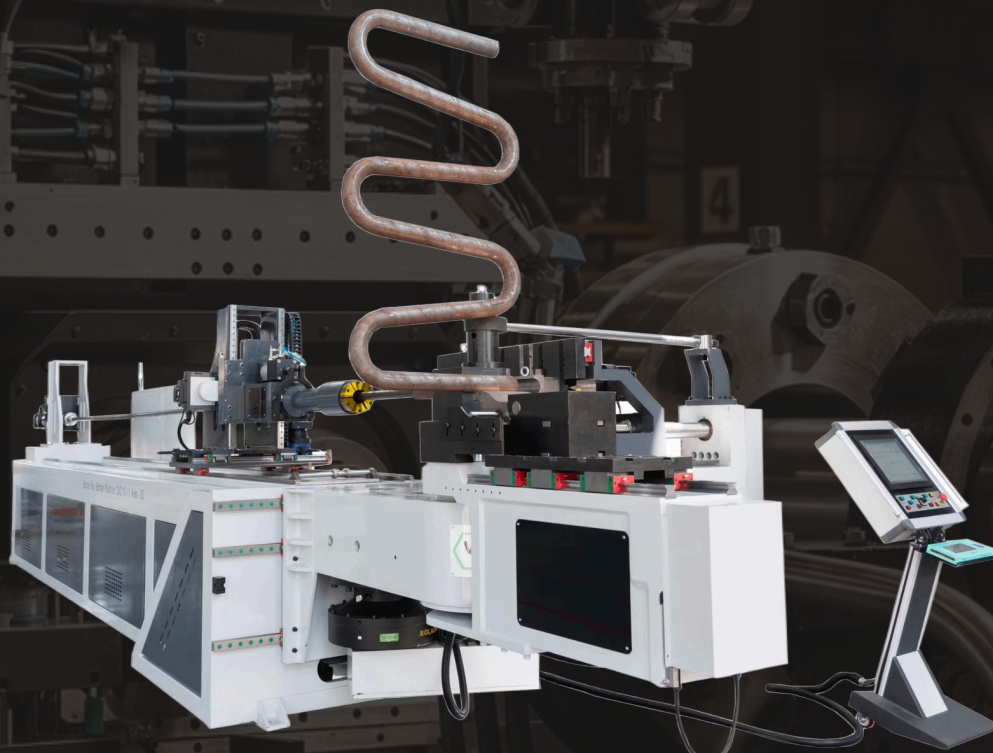




QuakeLogic QL-TubeMaster Pro X CNC Electric Mandrel Bender

High-precision, fully electric CNC tube bending engineered for aerospace, defense, and high-reliability manufacturing environments.



Fully Electric CNC

No hydraulic reservoir required

FANUC Controllers

Industrial-grade drive systems

$\pm 0.003"$ Accuracy

Precision bending tolerance

CSA Compliant

C22.1:21 electrical standards

Variable Radius

CW & CCW bending capability

Defense Ready

Aerospace applications

Precision Bending Without Compromise



QL-TubeMaster Pro X

delivers repeatable, high-accuracy tube bending using a fully electric, servo-driven architecture designed for demanding production and maintenance environments. This advanced system eliminates the complexity and maintenance burden of hydraulic systems while providing superior precision and control for critical aerospace and defense applications.



Versatility & Precision

Engineered for versatility, the system accommodates complex bending requirements across multiple materials and tube geometries. The servo-driven architecture ensures smooth, vibration-free operation that maintains tight tolerances throughout extended production runs. Whether processing aluminum, titanium, or stainless steel tubing, the QL-TubeMaster Pro X maintains consistent performance and accuracy across all operations.



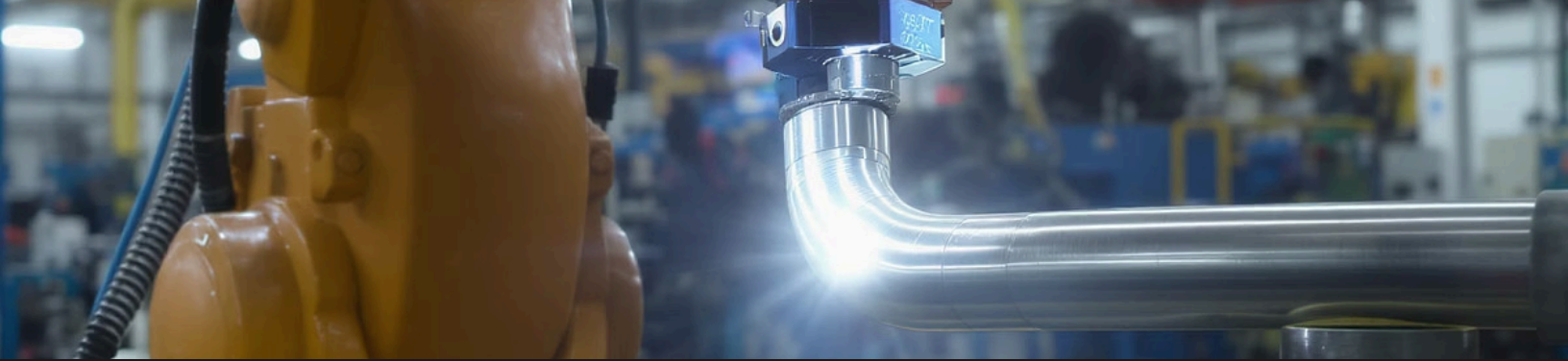
Advanced Motion Control

The system's advanced motion control enables sophisticated multi-plane bending programs with reliable repeatability. Operators can confidently execute complex bend sequences knowing that each tube will meet stringent dimensional requirements. This consistency reduces scrap rates and ensures compliance with aerospace quality standards.

Core Capabilities

- Clockwise & counterclockwise bending
- Variable radius bending
- 180° maximum bend angle
- Minimum capacity: 1.00" OD x 0.083" wall
- Aluminum, titanium, and stainless steel support
- Multi-bend program accuracy





Industrial CNC Control with FANUC Architecture

Built around **FANUC drive controllers**, the QL-TubeMaster Pro X provides reliable motion control, smooth interpolation, and long-term serviceability. FANUC's proven industrial control platform delivers the precision and reliability required for aerospace and defense manufacturing, with a global support network ensuring minimal downtime and maximum operational readiness.

The integrated CNC programming software simplifies program creation and editing, allowing operators to quickly develop complex bending sequences. The system's extensive program storage capacity accommodates production flexibility, storing over 1,000 unique bending programs for rapid changeover between different tube configurations. This capability is essential for maintenance facilities and job shops handling diverse tube bending requirements.

Precision servo control manages all critical motion axes including bending, feeding, rotation, and mandrel positioning. This coordinated control ensures optimal tooling engagement throughout the bend cycle, preventing defects such as wrinkling, flattening, or wall thinning. The result is consistently high-quality bent tubes that meet stringent aerospace specifications.

1

Program Creation

Intuitive CNC software interface

2

Motion Control

FANUC servo coordination

3

Program Storage

1,000+ bend sequences

4

Execution

Repeatable precision bending

Designed for Tight Tolerances

Engineered for precision-critical applications, the QL-TubeMaster Pro X meets stringent accuracy requirements for aerospace and defense tube fabrication. The system's **±0.003 inch bending accuracy** ensures compliance with tight dimensional tolerances required for hydraulic lines, fuel systems, and structural tubing in aircraft and military vehicles.

Repeatable bend placement and radius control are achieved through advanced servo positioning and feedback systems. Unlike hydraulic benders that may experience variation due to fluid temperature and pressure changes, the fully electric architecture maintains consistent performance regardless of ambient conditions or production duration. This stability is critical for high-reliability applications where every tube must meet identical specifications.

The system's vibration-free operation eliminates a common source of dimensional variation in tube bending. Smooth, controlled motion throughout the bend cycle prevents springback inconsistencies and ensures predictable results. Complex, multi-plane bends maintain accuracy across all bend angles and radii, enabling the production of intricate tube assemblies with confidence.

±0.003

Bending Accuracy

Inch tolerance specification

180°

Maximum Bend

Full semicircle capability

1.00

Minimum OD

Inch tube diameter

0.083

Minimum Wall

Inch wall thickness



Complete Tooling. Integrated Safety.

The system is delivered as a **complete, ready-to-run solution**, including all mandatory tooling and safety systems required for immediate production deployment. This turnkey approach eliminates the complexity of sourcing compatible tooling and ensures optimal performance from day one.

Tooling Package

Every QL-TubeMaster Pro X includes a comprehensive die and mandrel tooling package specifically configured for the customer's tube OD and wall thickness requirements. The tooling is precision-manufactured to maintain the system's tight tolerances and prevent common bending defects.

- Complete die set (bend, clamp, pressure)
- Mandrel assembly with balls and links
- Wiper die and collet system
- Automatic mandrel lubrication system
- Tool change fixtures and storage



Safety Systems

Integrated safety features protect operators and ensure compliance with North American workplace safety standards. The multi-layer safety architecture prevents accidents while minimizing production interruptions.

- Keyence area scanner perimeter protection
- Emergency stop on operator panel
- Lockout/Tagout (LOTO) compatible design
- Tool-change safety interlocks
- Light curtains and safety gates
- Audible and visual warning indicators



Built for North American Facilities

The QL-TubeMaster Pro X is configured for seamless integration into North American industrial and defense facilities. Every electrical and mechanical specification is designed to match standard facility infrastructure, eliminating costly modifications and accelerating deployment timelines.

Electrical Configuration

Standard 208V / 3-Phase / 60Hz power input with maximum 30A draw ensures compatibility with existing facility electrical systems. The system includes a minimum 10-foot attached power cable with appropriate industrial connectors for quick installation.

Full compliance with **CSA C22.1:21** electrical standards guarantees safe operation and facilitates facility safety audits. All electrical components are UL-listed or equivalent, meeting the requirements of insurance providers and regulatory authorities.

Installation & Commissioning

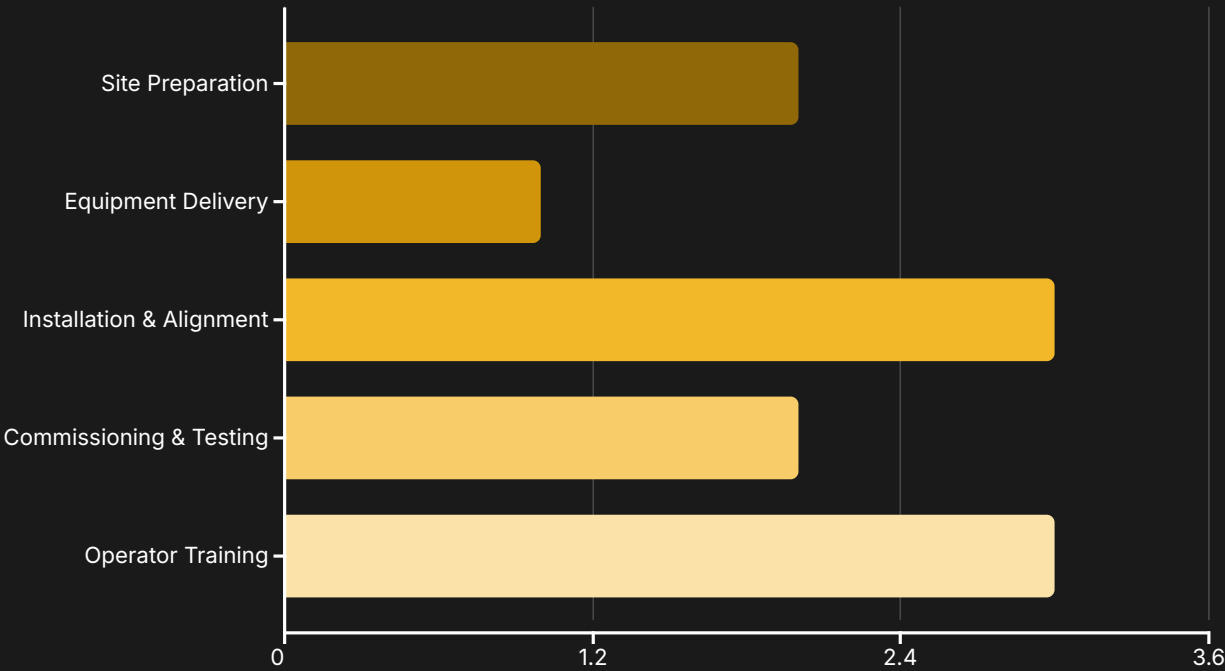
Turnkey delivery includes complete installation, alignment, and commissioning by factory-trained technicians. The system arrives fully assembled and tested, minimizing installation time and ensuring proper setup for optimal performance.

On-site operator training covers all aspects of machine operation, programming, basic maintenance, and troubleshooting. Training is conducted in both English and French, with comprehensive documentation provided in both languages to support ongoing operations.

Documentation & Support

Complete technical documentation includes operator manuals, maintenance procedures, electrical schematics, and spare parts lists. All documentation is provided in English and French, ensuring accessibility for Canadian and US facilities.

Remote technical support capabilities enable rapid troubleshooting via phone, video conference, and remote diagnostics. This minimizes downtime and ensures expert assistance is always available when needed.



Backed by QuakeLogic Inc.

QuakeLogic provides full lifecycle support to ensure long-term reliability and operational readiness. Our comprehensive warranty and support programs protect your investment and minimize total cost of ownership throughout the equipment's service life.

Warranty Coverage

Every QL-TubeMaster Pro X includes a minimum **24-month comprehensive warranty** covering all parts and labor. This extensive warranty period reflects our confidence in the system's reliability and construction quality.

- Full parts and labor coverage
- No-cost emergency service calls
- Replacement parts shipped within 24 hours
- Warranty extensions available
- Preventive maintenance visits included

Long-Term Support

Beyond warranty coverage, QuakeLogic maintains a comprehensive support infrastructure to ensure decades of reliable operation and minimize lifecycle costs.

- Remote technical support (phone, video, diagnostics)
- Firmware and control software updates
- Long-term spare parts availability
- Tooling replacement and upgrades
- Periodic calibration services
- Application engineering consultation

Target Applications



Aerospace Maintenance

Aircraft hydraulic lines, fuel systems, and environmental control tubing for commercial and military aviation maintenance facilities.



Defense Manufacturing

Government and military facilities requiring high-reliability tube fabrication for vehicles, vessels, and weapon systems.



Precision Fabrication

High-reliability manufacturing operations demanding consistent quality and traceability for critical tube components.

Advancing Tube Bending Precision with QuakeLogic Excellence

Empowering aerospace, defense, and high-reliability manufacturing environments with uncompromising accuracy, safety, and operational control, the **QuakeLogic QL-TubeMaster Pro X CNC Electric Mandrel Bender** sets a new benchmark for modern tube bending performance.

Connect with QuakeLogic: Your Partner in Precision CNC Engineering and Advanced Manufacturing Systems

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For strategic collaborations, enterprise-level instrumentation solutions, and comprehensive technical inquiries.

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