

A Lincoln Electric Company







Project Proposal

Flowmaster Inc. West Sacramento, CA

January 10, 2018

Proposal Number: 16765-1

Submitted By: Chris Norris

January 10, 2018

Mr. Mark Rogers Flowmaster Inc. 1500 Overland Ct West Sacramento, CA 95691

SUBJECT: Proposal Number 16765-1

Dear Mr. Rogers:

Wolf Robotics, LLC is pleased to submit this proposal covering your requirement for a robotic welding system.

Wolf Robotics has been delivering advanced automation solutions to some of the toughest production challenges around since 1978. With over 8,400 installations worldwide, Wolf Robotics' expert staff designs manufacturing systems that result in faster, safer and higher-quality production. Wolf Robotics delivers not only these results, but most importantly peace-of-mind to its customers.

We hope that our proposal and the enclosed literature will answer any questions or concerns you may have. If you have any further questions after reviewing this information, please call me at (970) 219-5806.

We look forward to assisting you on this project in any way we can.

Sincerely,

Chris Norris Regional Manager

Notice to Recipients



In consideration of Wolf Robotics, LLC preparation of this proposal and disclosure of certain proprietary information, its recipient agrees to treat as confidential all Wolf Robotics, LLC proprietary information disclosed herein. Such proprietary information includes, but is not limited to, all technical requirements, specification, prints, and information relating to the description and operation of the system which is the subject of this proposal, its components, equipment, options and related services, designs, processes, techniques, documentation, pricing, installation, and safety. The recipient further acknowledges that Wolf Robotics, LLC proprietary information is unique and valuable, was developed or acquired by Wolf Robotics, LLC at substantial expense, and is the subject of efforts by Wolf Robotics, LLC to maintain the secrecy thereof. The recipient agrees not to reverse engineer, to use or to disclose this proprietary information to any person or party without the prior written consent of Wolf Robotics, LLC This agreement is effective between the recipient and Wolf Robotics, LLC regardless of whether the parties enter into a contract for sale of the goods or services that are the subject matter of this proposal.

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Overview

Equipment Summary

- IRB 1660ID-4 1.55 Six Axis Robot Package
- BullsEye TCP Calibration System
- FerrisWheel 300KG Servo Positioning System
- Lincoln Power Wave R450 Welding Package
- AutoDrive® 4R100 Wire Feeder
- Lincoln Magnum® PRO Thru-Arm Welding Torch Package
- Touch Sense
- Operator Panel
- Equipment & Robot Pallet
- Safety Package
- Product Documentation
- WolfPack® Installation Supervision



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The proposed scope of proposal is outlined in this section. Note: Pictures may not be exact representation of final deliverables

ltem	Description	
1)	IRB 1660ID-4 1.55 Six Axis Robot Package Includes: - IRB 1600ID 6 Axis Robot - IRC5 Controller - Collision Detection - Path Recovery - Multitasking - Color Touch Screen FlexPendant (10m Cable) - Cable Management Specifications: - Reach: 1550mm - Repeatability: 0.02mm - Payload Capacity: 4 kg - 480V 3Ph	
2)	 TrueMove Technology Robot maintains the same path regardless of speed or mode Maintains path after program interruptions Drastically reduces robot path teaching and verification time Prevents collisions Allows for reaches into tighter locations 	
3)	 QuickMove Technology Enables the maximum possible acceleration Optimizes cycle times 	and the me

ltem	Description
4)	 BullsEye TCP Calibration System Automated calibration of Tool Center Point (TCP) based robot tools including (but not limited to): MIG welding torch Oxy-fuel cutting torch Automatically adjust tool position and angle to ensure path repeatability Supports up to five unique tools per robot Integrated error handling Optimized update times Includes calibration check pointer for quick visual reference
5)	 FerrisWheel 300KG Servo Positioning System Includes: Two-station interchanging manipulator dual headstock/tailstock Ferris wheel type interchange axis Full coordinated motion between robot and positioner axis Specifications: 300 kg. load capacity per side, including fixture 180 kg. load difference per side 2500mm between headstock/tailstock 600 mm swing radius per side Station interchange less than 4 seconds Max load up to 350NM torque and 650NM bending moment.

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ltem	Description
6)	 Literative Literative Literative Power Wave R450 Welding Package Includes: Power Connect™ Technology (patent pending) - Automatically adjusts to input power while maintaining a constant welding output throughout the entire input voltage range Tribrid™ Power Module - Exceptional welding performance with high power factor and efficiency Built in feeder control Gas flow sensor Wire conduit from wire barrel to wire feeder Specifications: 450A output at 100% duty cycle 550A output at 40% duty cycle Process Capabilities: Pulse Pulse Pulse-on-Pulse® Rapid Arc® Rapid X™ (When paired with STT® Module) Upgradeable for additional processes to be developed in the future.
	NOTE: STT functionality not included with this item

ltem

7)

8)

9)

Description		
AutoDrive® 4R100 Wire Feeder Includes:		
 Wirefeed robot mounting bracket Best in Class Torque provides faster acceleration and reliably pulls wire through conduit Compact, lightweight package maximizes robot acceleration performance and throughput No tools are required for drive roll, wire guide or pressure arm adjustment High resolution tachometer for accurate wire feed speed control Patented MAXTRAC® heavy-duty cast aluminum wire drive system provides reliable feeding and durability Reliable, replaceable brushes to extend service life 		
 Specifications: For MIG, Pulsed, STT, Flux-cored and Metal-cored wires Solid Wire size range: 0.023"-0.045" (0.6-1.2 mm) Cored Wire size range: 0.035"-0.045" (0.9-1.2 mm) Speed range: 30-1200 in/min (1.3-20.3 m/min) 500 Amps @ 100% output capacity 		
 Lincoln Magnum® PRO Thru-Arm Welding Torch Package 550 amp (CO₂) air cooled torch 22° removable torch neck HexConnect™ Gun Bushing : Ensures better electrical conductivity through full face contact as opposed to rotating connections that have single line contact All cables and hoses 		
Touch Sense - Tactile interface - Ability to search with weld wire or gas cup - Search 1 dimension returning a vector offset - Combine searches for multi-dimension offset - Search for part present functionality		

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Item	Description
10)	Operator Panel - - Twist Release E-Stop - OK to Enter Pilot Light - Safety Reset / Op Ready - Program Start - Program Stop
11)	Equipment & Robot Pallet - Integrated cable trays with aluminum covers for cable routing and excess cable loops - Built in forklift tubes - Holds: • Robot • Robot controller • Power supply • Robot accessories
12)	Safety Package - Safety PLC - Modular safety fence - Light curtains with pre-reset / op-ready push buttons - Access gate with safety switch and gate-reset push button
13)	 Product Documentation Product Manual. This manual provides information on installation, preventive maintenance, trouble shooting and how to carry out repairs on the mechanical arm and controller Programming Reference Manual. This is a reference manual containing a detailed explanation of the programming language as well as data types, instructions and functions User's Guide. This manual will provide the user with step-by-step instructions on how to perform various tasks, such as how to move the robot manually, how to program, or how to start a program when running production Peripheral equipment manuals NOTE: all documentation will be provided in Wolf Robotics, LLC standards.

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ltem	Description
14)	 WolfPack[®] Installation Supervision Travel time for Wolf Robotics technician Travel expenses for Wolf Robotics technician NOTE: Prior to the arrival of the Wolf Robotics field service engineer, the robot system should be placed into position and securely fastened to the floor. All electrical and pneumatic connections should be installed up to the machine and work pieces should be available.

ASSUMPTIONS: (Any variation from the below assumptions limits the liability of Wolf Robotics)

- 1. Weld quality is a function of product tolerances. Variance outside the range of that qualified in any process development activity may cause degradation in weld quality. In general, gaps are not to exceed one half of the wire diameter.
- 2. No fume filtration solutions are included at this time. It is the responsibility of Flowmaster Inc. to ensure that measures are in place to reduce exposure to HAPs. If proper fume extraction does not currently exist, Wolf Robotics can supply integrated filtration solutions on request that meet the National Emission Standards for Hazardous Air Pollutants.
- 3. Items that are specifically designed towards ergonomics are explicitly stated in the respective proposal items. It is the responsibility of Flowmaster Inc. to provide the proper additional ancillary equipment that supports ergonomic operation of the proposed equipment or Wolf can provide, on request, additional equipment to support more ergonomic operation as discovered.
- 4. Flowmaster Inc. is to provide and install necessary isolation transformers if needed.
- 5. Flowmaster Inc. is to acquire proper training to program and maintain the system.
- 6. At this time, Wolf Robotics, LLC has not been made aware of any particular customer/plant specifications. Therefore, all equipment covered in this proposal will be per Wolf Robotics, LLC engineering practices and standards.

TOTAL PRICE	2,550
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DELIVERY:

Typical lead-time for this solution is 12-18 weeks depending on pre-ordered equipment.

Current estimated shipment for this system is 14-16 weeks* after acceptance of purchase order.

Shipment is FCA Wolf Robotics, LLC Incoterms 2010

PAYMENT TERMS:

60% with order, 30% prior to shipment, and 10% after installation

Respectfully submitted,

By:

Chris Norris, Wolf Robotics

*Shipment dates are based upon prompt receipt of all necessary information from Buyers. All shipment dates are approximate based on current supplier lead times and engineering capacity. Upon receipt of Buyer's purchase order and initial payment, shipment date and other terms and conditions will be confirmed through Wolf Robotics, LLC written acceptance.

This quotation is valid for 30 days, and is governed by Seller's Terms and Conditions of Sale located at http://www.wolfrobotics.com/terms-conditions/. Any reference to Buyer's request for quote incorporates only the technical information described therein. ALL TERMS AND CONDITIONS IN BUYER'S REQUEST FOR PROPOSAL/QUOTE ARE DEEMED MATERIAL ALTERATIONS AND ARE HEREBY EXPRESSLY REJECTED. Wolf Robotics is not liable for clerical errors. Wolf Robotics is not liable for clerical errors. ©Copyright 2016 Wolf Robotics A Lincoln Electric Company. All rights reserved.

OPTION PRICES ARE VALID ONLY WITH THE INITIAL PURCHASE.



Item	Description	Price
Opt.1)	 Week of Production Support Up to 40 hours on site per week Travel time for Wolf Robotics technician Travel expenses for Wolf Robotics technician 	\$8,250
Opt.2)	 Basic Training in Fort Collins for one person (4.5 day Class) Safety precautions while programming and operating Operator controls and indicators Correct positioning of the robot using pendant Type of robot motion and use of joy stick Teach Pendant menus Positioning of part using positioner Storing and retrieving programs Using the Wolf Cell Controller Recovery from safety stops and E stops NOTE: Price contingent upon a 2 person minimum per class. Training credits are valid only during the first year of warranty period at the end of which they will expire. 	\$1,990 / Person

Customer Service

Wolf Robotics, LLC equipment is backed by a complete complement of technical services provided by an experienced technical staff, trained to understand your needs and concerns.

We believe in continually educating our personnel in the welding processes, including twin wire, heavy welding, assorted sensor technologies and others. Our goal is to have our employees well versed in the many aspects of welding, cutting and other process practices as well as become certified welding inspectors. This continuous training philosophy will improve their ability to help our customers.

24/7 Technical Support

Get help day or night by calling our emergency toll-free hotline **866-WOLF-911** for parts, field service, training information, preventive maintenance, programming or production consulting.

Our technicians are experts in robotic welding and cutting, material handling and material removal with years of experience, both in the field and on the phone.

Field Service

Our nationwide service organization is comprised of personnel that perform product installation and service, preventive maintenance, productivity evaluations, retrofits and online/offline programming.

Several personnel are strategically located throughout the United States to provide quick response to your front door on a moment's notice. With our expertise we can help increase your productivity output, improve weld quality, reduce cycle times and even identify production bottlenecks.

Training

Wolf Robotics, LLC offers a number of training classes to accommodate your level of knowledge. From Basic Operator to the Advanced we can instruct your personnel to fit your required level of competence.

- Basic training is geared towards operators and teaches how to jog the robot and positioner, create weld and/or process programs, change
 weld or process data, edit programs, recover from safety stops as well as general safety precautions while programming the robot.
- Advanced training in geared towards programmers and teaches more detail about the robot operating software to create effective weld routines and efficiently program cell devices (i.e. WolfTrack, Tactile Sensing, BullsEye, error handling, torch cleaners, etc.)
- Robot Studio training teaches how to offline program parts in a virtual environment to efficiently add programs and capability to the robot without taking it out of production.

These are all 5 day classes designed to make you more productive and can be conducted at your facility or in our Fort Collins, Colorado lab environment.

Feel free to contact us about more detailed information on the classes described or on other customized service training.

Maintenance

Experience has proven that it is much more cost effective to do preventive maintenance on a regular schedule than to wait for a failure. Wolf Robotics, LLC can help keep your robotic welding system operating at peak performance.

In addition, we can offer rebuild maintenance of your old equipment whether it's electrical or mechanical components that need testing, inspecting and replacing.

Parts

Because of our status as a single-source turn-key supplier, Wolf Robotics, LLC employs a full time dedicated parts expert that can provide all replacement parts and consumables related to your robot system and its components. We can supply factory-new parts or rebuilt parts with a warranty and ship most parts to your facility the next day. We'll even make recommendations for spare parts kits to keep on-hand.

We pride ourselves in having a team of professionals that possess a unique knowledge of the robotic automation business unequalled in the industry. They are dedicated to serving our customers in the most cost effective way possible.