

ServoWeld™ with Integral Force Sensor

ServoWeld actuator with optional force sensor integrates a piezo-crystal force sensor inside the actuator and carries an amplifier converting force measurements into a voltage output.

Actuator force can be measured in real-time during the welding process.

The design is ideal for adaptive welding of materials with low resistance; i.e. aluminum welding

ENDURANCE TECHNOLOGY™
A Tolomatic Design Principle

FORCE SENSOR AMPLIFIER OUTPUT

- Scaled output 0-10 V up to 18 kN (4,047 lbf)
- Force measurement available via 8-pin connector. Optional 5-pin connector is also available
- Option to split scaled force output signal to both robot and weld controller

TOLOMATIC PLANETARY ROLLER SCREW

- Roller screws provide the highest thrust and life ratings available
- 5mm • 10mm



WATER COOLING

- Increases measurement accuracy
- Allows increased duty cycle and increased jobs/hour

THRUST TUBE

- Steel thrust tube supports extremely high force capabilities
- Hardened surface treatment provides excellent corrosion resistance and is very resistant to adherence of weld slag, water and other potential contaminants

UNIVERSAL MOUNTING

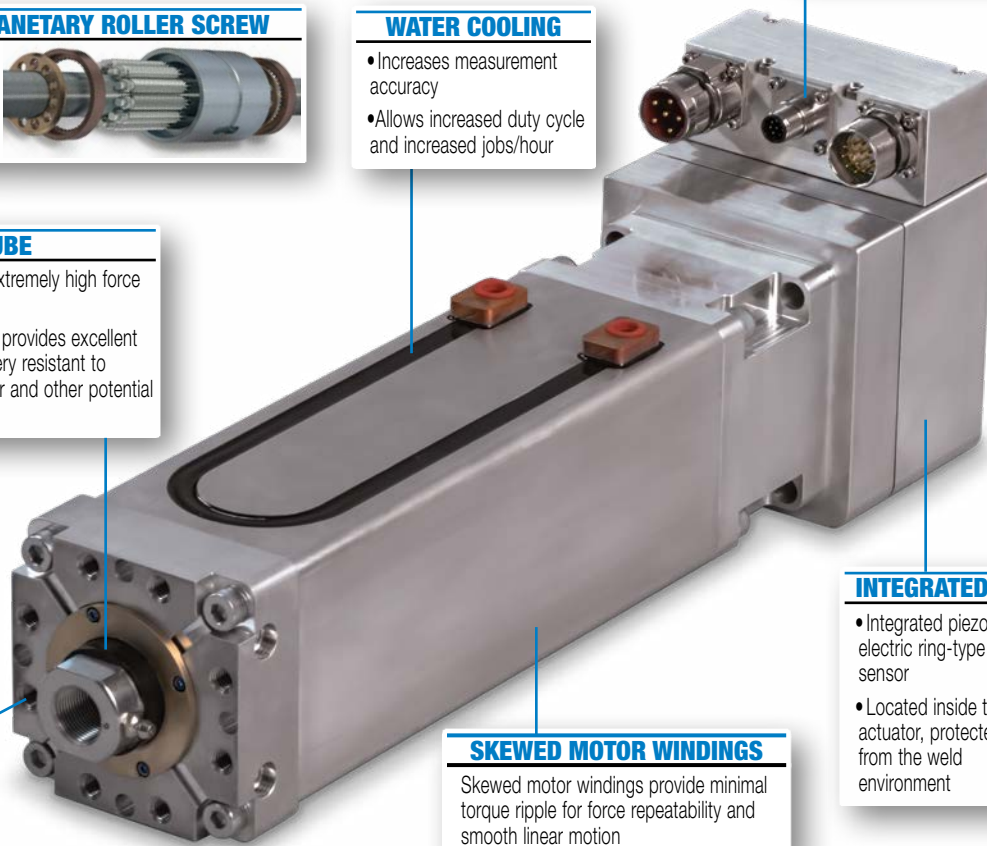
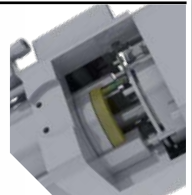
Tapped holes in front face allow for mounting in any orientation... 0°, 90°, 180° or 270°

SKEWED MOTOR WINDINGS

Skewed motor windings provide minimal torque ripple for force repeatability and smooth linear motion

INTEGRATED FORCE FEEDBACK

- Integrated piezo-electric ring-type sensor
- Located inside the actuator, protected from the weld environment



Patent Pending

Warranty	12 months
Roller Screw	RN05 & RN10
Motor	3-stack & 4-stack

REPEATABILITY
Force repeatability of ±3% for entire life of actuator

PEAK FORCE
18.0 kN (4,047 lbf)

IP65
IP65 rating protects actuator from ingress of water, weld slag and other debris (static)

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ADVANTAGES OF THE SERVOWELD-IFS (INTEGRAL FORCE SENSOR)

- Force calibration good for life of the actuator – no recalibration of piezo necessary
- Sensor and wiring protected in actuator housing away from weld electrodes
- Reliable force measurements
- Excellent force repeatability due to optimized motor architecture
- Ideal for:
 - Challenging welding applications of multiple sheets with different thicknesses
 - If forging (force stepping) is used during welding process
 - Welding of metals with low resistance; i.e. aluminum
 - Adaptive Welding



OVERVIEW

- Sensor type: Piezo-electric ring-type sensor
- Contained in hermetically-sealed ring housing, integrally mounted in actuator housing
- Scaled output 0 to 10 Volt up to 18 kN (4,047 lbf)
 - Typical scaling for C Guns: 0 to 10V = 12 kN (2,698 lbf)
 - Typical scaling for X Guns: 0 to 10V = 18 kN (4,047 lbf)
- Force measurement available via 8-pin connector. Optional 5-pin connector also available.
- Option to split force output to be sent to both robot and weld timer as scaled output.
- With Water cooling for best measurement results.

ServoWeld™ with Integral Force Sensor

SERVOWELD FORCE FEEDBACK WIRING OPTIONS

Standard 8 Pin Connector

Can be combined with any Robot type

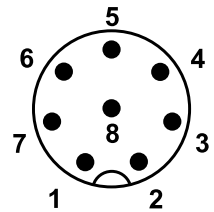
Force Feedback Code:	B2
Loadcell Type:	Piezo
Loadcell Supply Voltage (Nominal):	24V DC

Force Feedback Connector:	
Style:	M12 panel mount
Manufacturer:	Phoenix Contact

Manufacturer P/N	1441561
Clocking:	Key between pins "1" and "2"

Force Feedback Connector Pinout

Pin	Signal
1	0V GND Sensor
2	Range
3	Reset / Operate Sensor
4	NC
5	0-10V Signal Out Sensor
6	I ² C Clock
7	I ² C Data
8	24V DC Sensor



Optional 5 Pin Connector

Can be combined with any Robot type

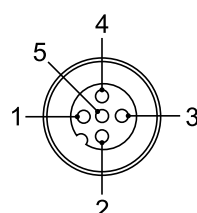
Loadcell Type:	Piezo
Loadcell Supply Voltage (Nominal):	24V DC

Force Feedback Connector:	
Style:	M12 panel mount
Manufacturer:	Turck

Manufacturer P/N	FS4.5
Clocking:	Key between pins "1" and "2"

Force Feedback Connector Pinout

Pin	Signal
1	24V DC Sensor
2	0V GND Sensor
3	0-10V Signal Out Sensor
4	Reset / Operate Sensor
5	NC



ServoWeld[™] with Integral Force Sensor

FORCE SENSOR TECHNICAL DATA

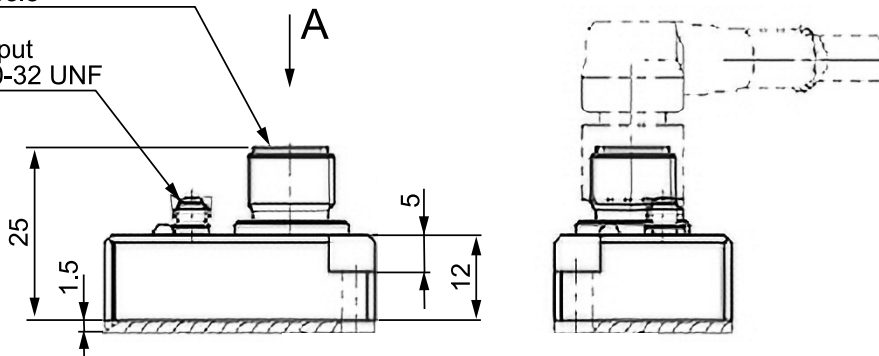
• Calibrated measuring range:	0 to 26 kN
• Sensitivity:	≈ -1.6 pC/N
• Linearity:	< +/- 2% Full Scale Output
• Temperature range:	- 40 to 120 °C
• Insulation resistance:	≥ 1013 Ω
• Plug connection:	KIAG 10-32 neg. 1 pole
• Degree of protection (with connected cable)	EN60529 IP65
• Weight:	0.15 kg

AMPLIFIER CONNECTOR PIN-OUT

- Available in 8-pin M12 male connector standard
- Available in 5-pin connector as an option

Output
Locking plug M12x1
8pole

Input
10-32 UNF



MADE IN U.S.A.

Tolomatic[™]
EXCELLENCE IN MOTION

COMPANY WITH
QUALITY SYSTEM
CERTIFIED BY DNV
= ISO 9001 =
Certified site: Hamel, MN

USA - Headquarters

Tolomatic Inc.
3800 County Road 116
Hamel, MN 55340, USA
Phone: (763) 478-8000
Toll-Free: **1-800-328-2174**
sales@tolomatic.com
www.tolomatic.com

MEXICO

Centro de Servicio
Parque Tecnológico Innovación
Int. 23, Lateral Estatal 431,
Santiago de Querétaro,
El Marqués, México, C.P. 76246
Phone: +1 (763) 478-8000
help@tolomatic.com

EUROPE

Tolomatic Europe GmbH
Elisabethenstr. 20
65428 Rüsselsheim
Germany
Phone: +49 6142 17604-0
help@tolomatic.eu
www.tolomatic.com/de-de

CHINA

**Tolomatic Automation Products
(Suzhou) Co. Ltd.**
No. 60 Chuangye Street, Building 2
Huqiu District, SND Suzhou
Jiangsu 215011 - P.R. China
Phone: +86 (512) 6750-8506
Tolomatic_China@tolomatic.com

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