![weldon SOLUTIONS]

Worm Screw Automated Grinding Line

Customer:	Commercial Steering System Manufacturer
Application:	Worm Screw Finish Grinding Workcell
System Suppliers:	• *Flexlink* powered loop conveyor and pallets
	• *Control Gaging* (2) OD grind in-process gages and (1) ID grind post-process gage station
	• (2) *Weldon* MIDAS CBN OD plunge grinders, (1) 324A and (1) 320A, each with a *FANUC* 32i-B CNC control
	• *SBS* automatic wheel balancing system on OD grinders
	• *Weldon* PHOENIX ID grinder with dual *GMN* high frequency grinding spindles, with a *FANUC* 32i-B CNC control
	• *Dittel* acoustic emissions monitoring system
	• (3) *FANUC* LRMate 200iD /7L 6-Axis machine tending robots with *Schunk* grippers
	• *Oberlin* central coolant system with *Hyfra* coolant (oil) chiller
	• *Noil* mist collectors with *FireTrace* fire suppression systems
	• *SuperAbrasives Inc.* Maximizer OD grinding wheels and diamond dressing rolls
	• *GII Solutions* OD electric dressing spindle
	• *Universal* CBN ID grinding wheels, diamond dressing roll, and electric dressing spindle
	• *Koolant Koolers* dual ID spindle and dual linear motor chiller
	• *Forkhardt* diaphragm chuck for ID grind
Process:	Operator loads raw parts onto conveyor pallets.
	Parts are conveyed through a poke yoke station to confirm correct part configuration.
	Parts are conveyed through a center blowoff station to remove debris from the part centers.

	Operation #1	Part is presented to *Cognex* camera to read barcode for data tracking.
		Part is placed in *IDG Systems* eddy current station to verify hardness.
		Part is placed in MIDAS for CBN plunge grinding of outside diameter and thrust face.
		Gage data is sent to cell controller.
	Operation #2	Part is presented to camera to read barcode for data tracking
		Part is placed in MIDAS for CBN plunge grinding of outside diameter, thrust face, and ball track.
		Gage data is sent to cell controller.
	Operation #3	Part is presented to camera to read barcode for data tracking
		Part is placed in PHOENIX for ID grinding of bore.
		Part is placed in a post process bore gaging station. Gage data is sent to cell controller.
	Parts are conveyed through a blowoff station to remove excess (*Fuchs*) oil.	
	Operator unloads finished parts manually and allows pallets to move along to loading area.	
	All operation stations are tended by *FANUC* LRMate 6-axis robots.	
Attributes:	Diameter Tolerances	+/- .0005"
	Lateral Tolerances	+/- .0015"
	Surface Finish	16 Ra (max)
	SPC	1.33 Cpk
	Cycle Time	1 part complete every 60 seconds
Notable:	*Weldon Solutions* turnkey of machines, tooling, process, machine tending robots, safety guarding, conveyor system, post-process gaging, and master cell controller with Ethernet communication to each machine and station for data tracking throughout the entire cell.	