



# NUT VERIFICATION SYSTEM **WALKTHROUGH**

## **Nut Verification System Walkthrough Presentation**

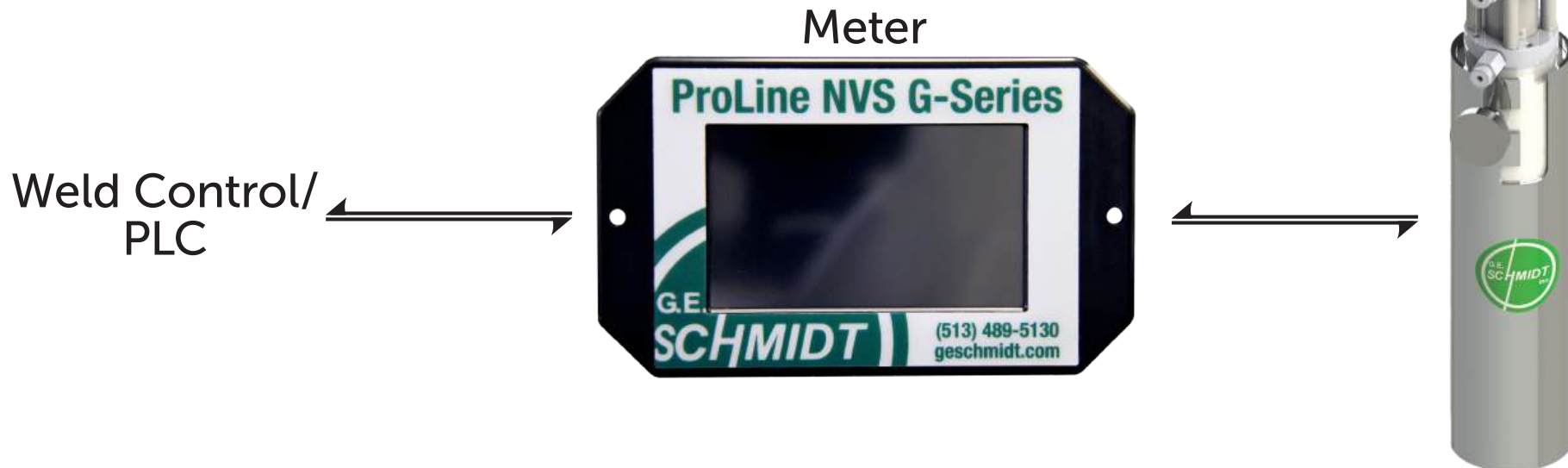
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# NVS Basics



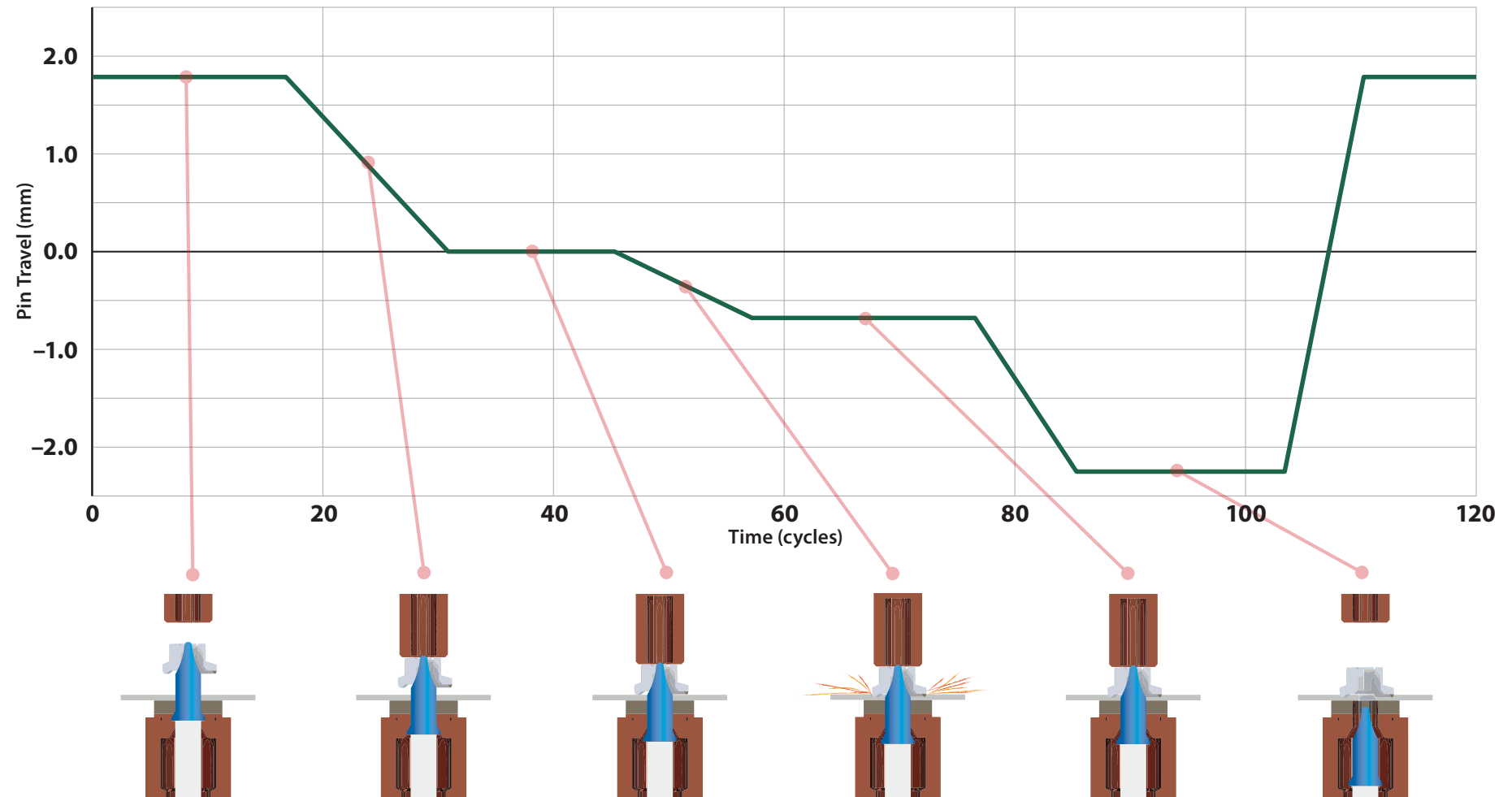
The Nut Verification System (NVS) is an **inline quality control system** for projection welding applications. By monitoring the height of the guide pin in the lower barrel, the NVS catches many common issues, including missing or upside-down nuts and bolts.

- 4 Relays, or "Limits," close when the sensor measures certain pin positions, giving the weld control or PLC permission to advance



# Weld pin travel diagram

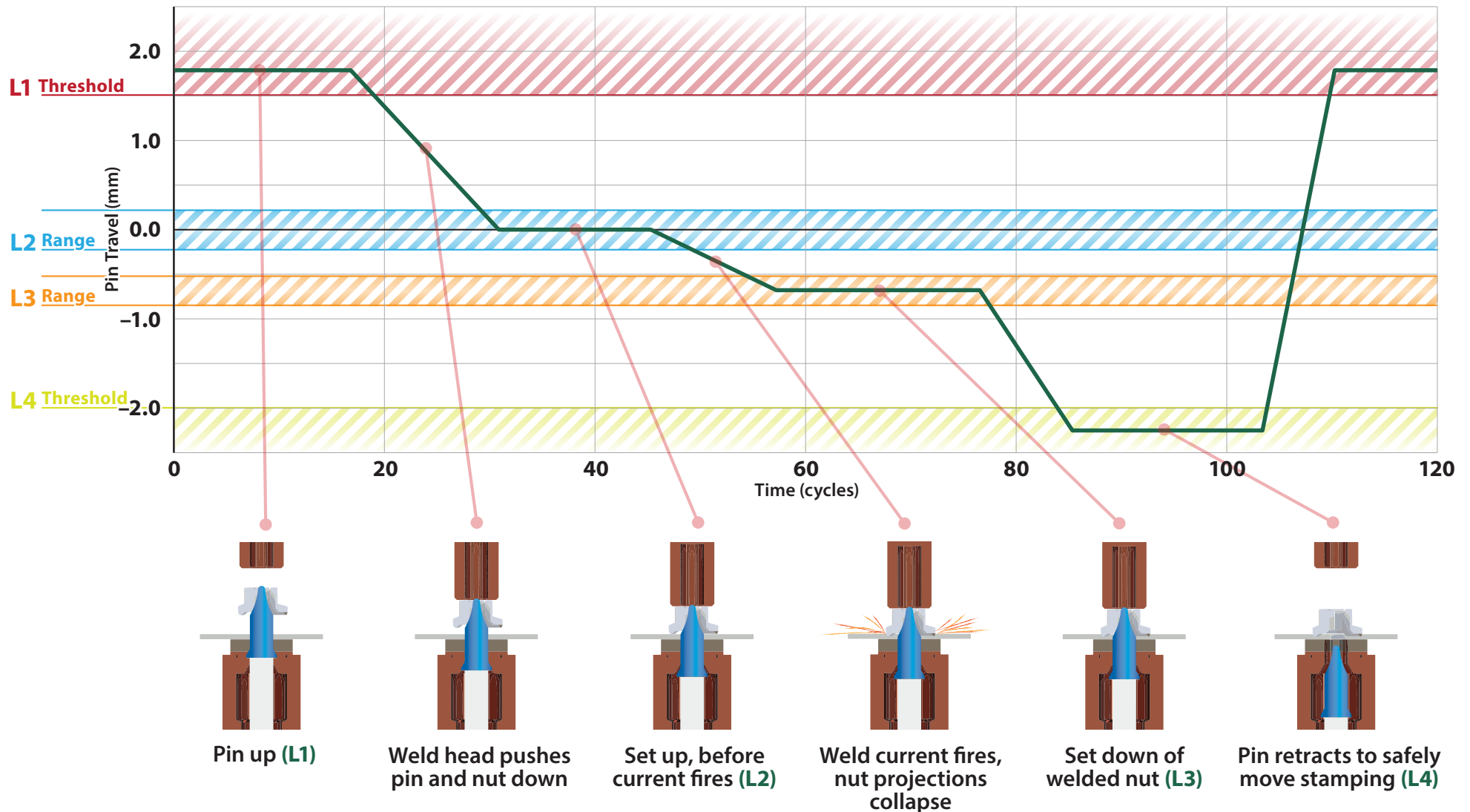
## Projection Welding Pin Travel vs. Time



# NVS Limit diagram



## Projection Welding Pin Travel vs. Time

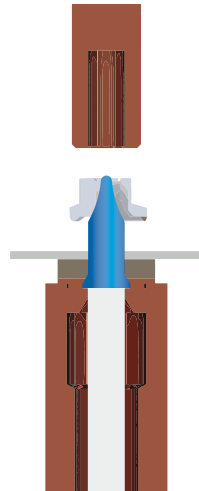


# Limit 1 (L1) reading



## "Pin Up" Condition

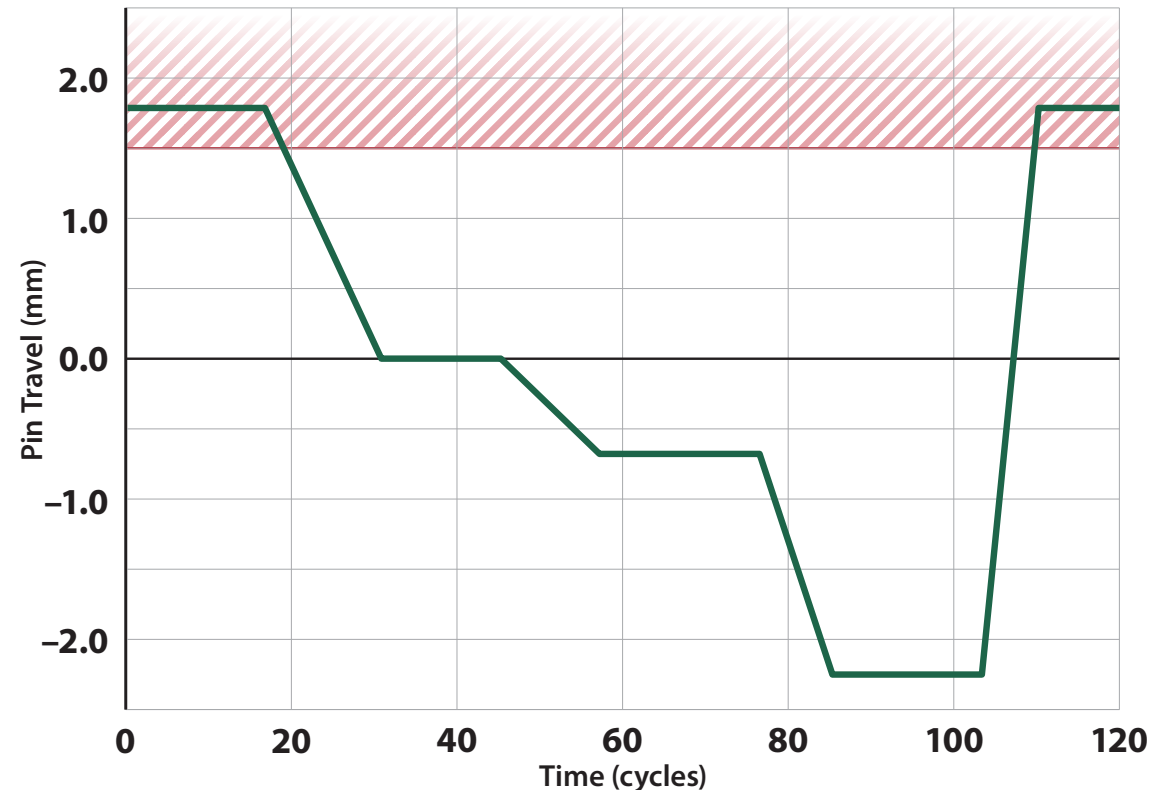
- Pin height with head raised
- Measurement above the L1 threshold signals good condition ready for feed



### Errors Caught

- Missing, partial or irregular hole in stamping
- Stamping misalignment
- Loss of pneumatic pressure to lower barrel
- Excess weld slag buildup

## Projection Welding Pin Travel vs. Time



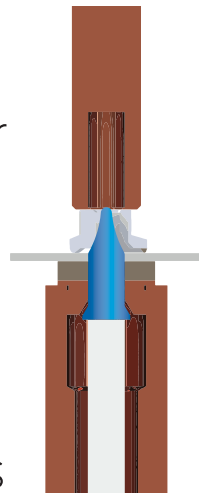
**"Good" Reading:** *Permission to feed nut or bolt*

# Limit 2 (L2) reading



## “Set Up” Condition

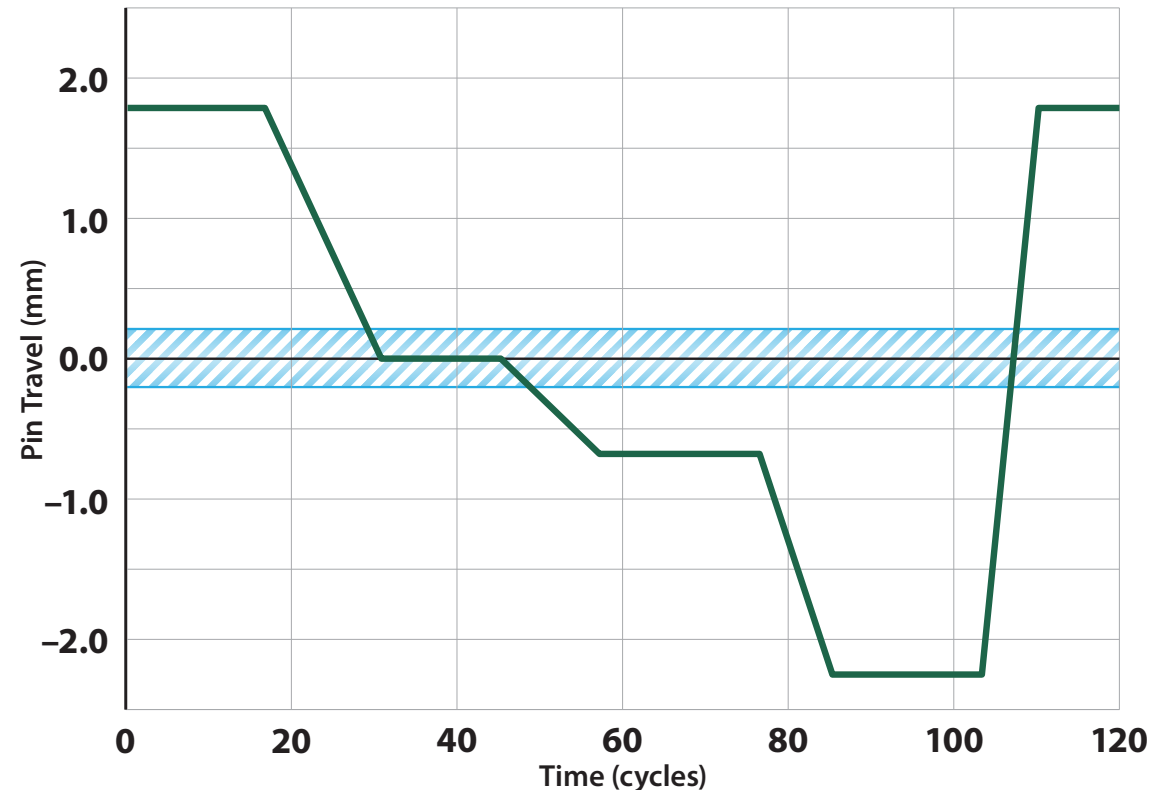
- Pin height with head lowered, before weld current fired
- “Zero” measure; other limits measured relative to L2
- Adjustable range allows for acceptable variance in stampings and projections



### Errors Caught

- Upside-down nuts
- Missing (and mis-fed) nuts
- Wrong size nuts
- Thread irregularities
- High variance in stampings or nuts
- Worn pins and caps

## Projection Welding Pin Travel vs. Time



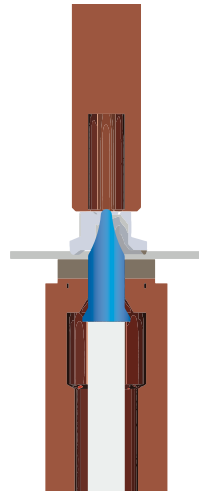
**“Good” Reading:** *Permission to weld*

# Limit 3 (L3) reading



## “Set Down” Condition

- Measures pin height after current fires
- Range allows for acceptable variance in projection set-down\*
- L3 range is dynamic, relative to the L2 measure of each stamping and nut

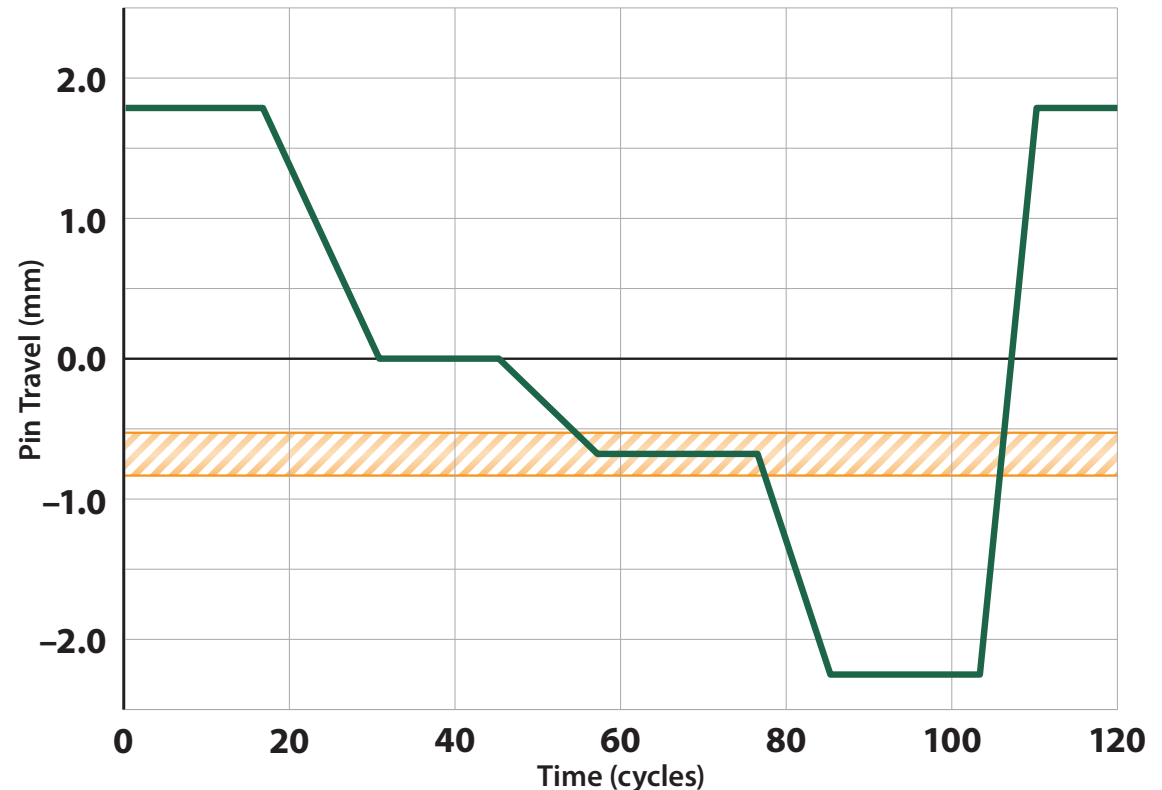


\* Range determined by quality tests such as push-out or torque tests

### Errors Caught

- Cold welds
- Too much or too little projection collapse
- Projections damaged during weld cycle

## Projection Welding Pin Travel vs. Time



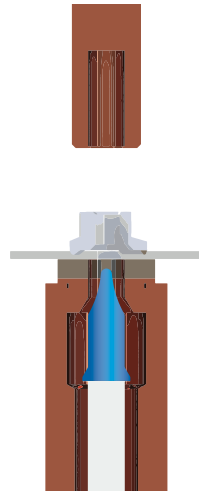
**“Good” Reading:** Weld within spec;  
permission for head to raise  
(in systems with head lock)

# Limit 4 (L4) reading



## “Pin Retract” Condition

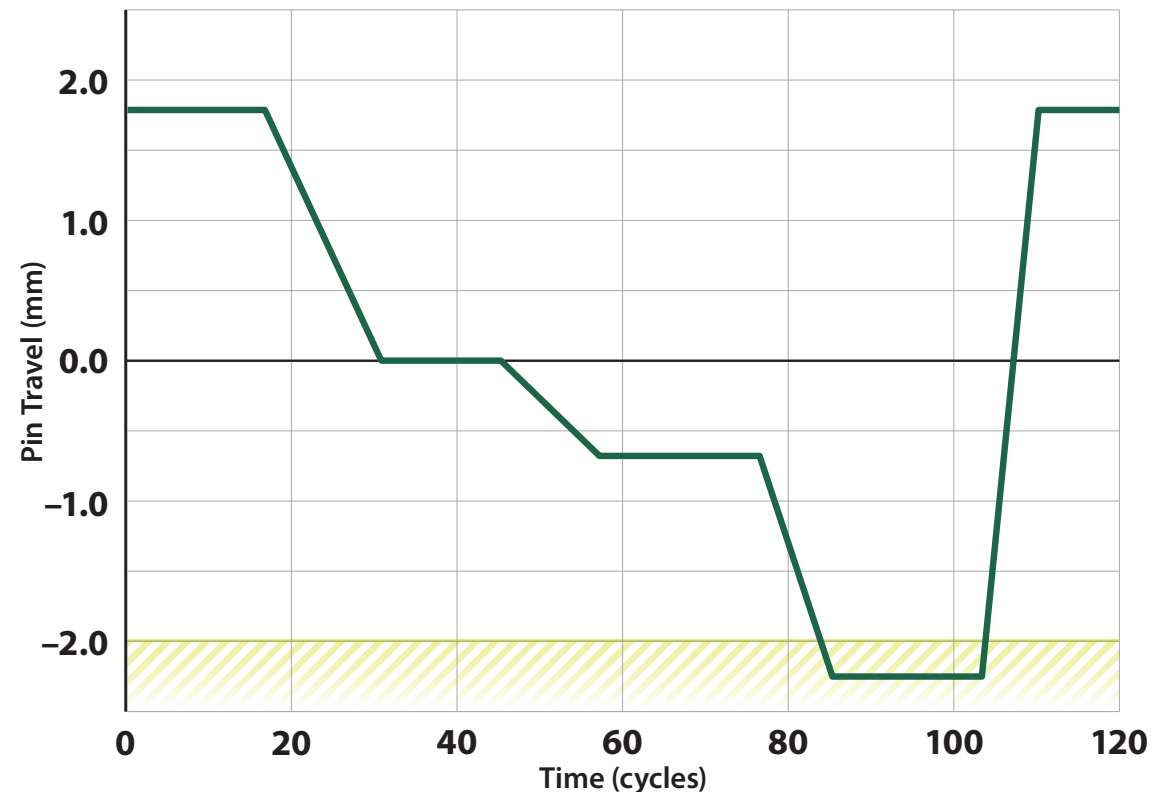
- Threshold that allows weld control or PLC to confirm pin retracted into lower barrel
- Retraction protects pin during stamping movements



### Errors Caught

- Pin not retracted before stamping movement
- Loss of pneumatic pressure to lower barrel

## Projection Welding Pin Travel vs. Time



**“Good” Reading:** *Permission to move stamping*