Wolf Eye
Robotic Laser Calibration
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What’s The Point?
- Wolf wants to use a laser distance sensor
- A laser sensor cannot be used without first being calibrated
  - **Problem:** A laser beam has no physical point to calibrate
  - **Our Solution:** Create a routine to calibrate the laser
  - Uses distance data from laser sensor to calibrate
  - Exploits geometry of rectangular plate

Tool Center Point (TCP)
- Endpoint of tool connected to robot
- Robot “knows” how the tool is mounted
- Ability to rotate arm while holding TCP position constant in space
  - Calibrate TCP within laser beam
  - Constant TCP position = constant distance data

Automated Sensing Techniques
- Accurate welding depends on sensing technologies
  - **Trade offs:** Speed, Accuracy, Cost

Keyence IL-300 Spot Sensor

Completed Objectives
- **Electrical Schematics**
  - Create AutoCAD schematic for Keyence IL-300 Sensor connections
- **Sensor Wiring**
  - Mount and wire Keyence sensor into ABB robotic system
- **Mathematical Calibration Theory**
  - Develop algorithm for calibration program
- **Learn to Program in RAPID**
  - Become fluent in the ABB program language, RAPID and use it for calibration
- **Working Calibration Routine**
  - Implement calibration algorithm in RAPID programming language
- **Optimization and Testing**
  - Improve and test calibration routine for speed and versatility
- **System Integration**
  - Package code for use in commercial systems

Project Continuation
- Use the laser sensor in tandem with a welding arm
  - Laser identification of weld joints:
    - T-Joints
    - Groove Joints
    - Corner Joints