Getting Started with Cyclops/Sasquatch

EXTREME TELEMATICS CORP.

Cyclops®
PLUNGER ARRIVAL SENSOR

Sasquatch®
PLUNGER VELOCITY SENSOR

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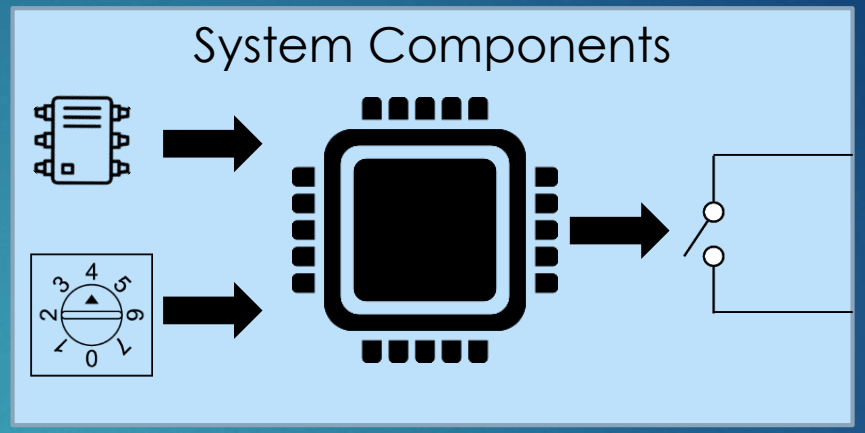
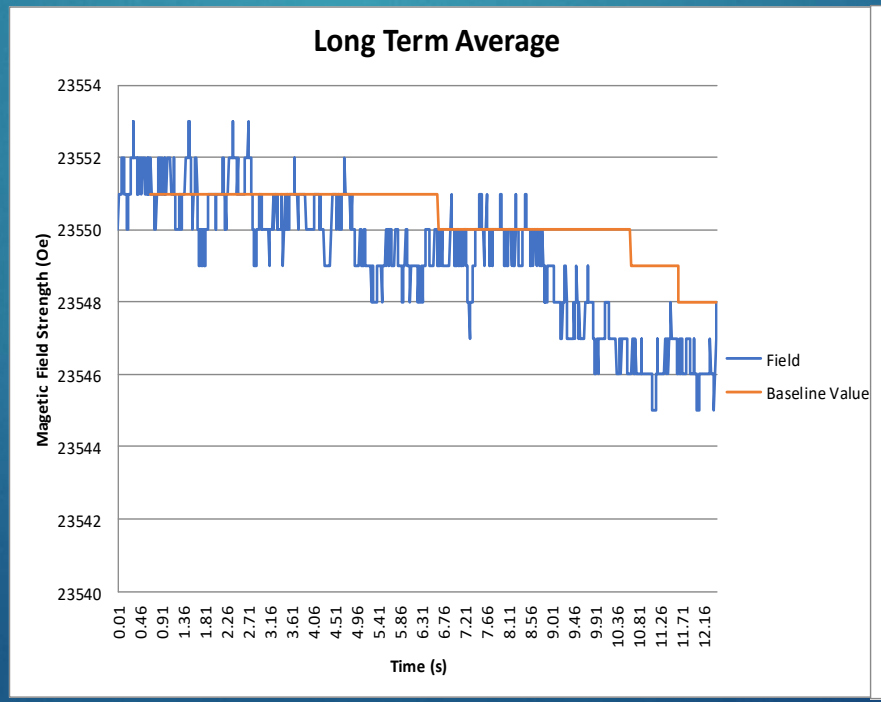
Overview

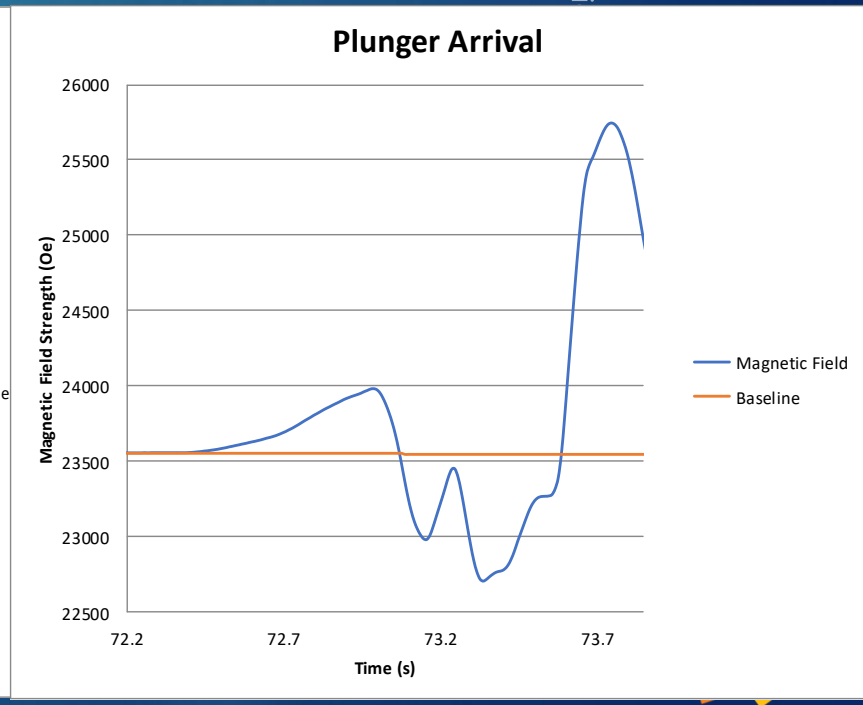
- Principle of Operation
- Adjusting Sensitivity
- Model Comparison
- Mounting
- Physical Connections
- Connecting to RTUs/PLCs
- Using Modbus with Sasquatch
- Kinetic Energy Monitoring
- Live Demo

Principle of Operation

- Main components
  - Magnetometer
  - Sensitivity Dial
  - Microprocessor
  - Digital Switch
- The basics
  - Filter out noise
  - Baseline = long term average
  - Look for deviation
  - Close switch on arrival

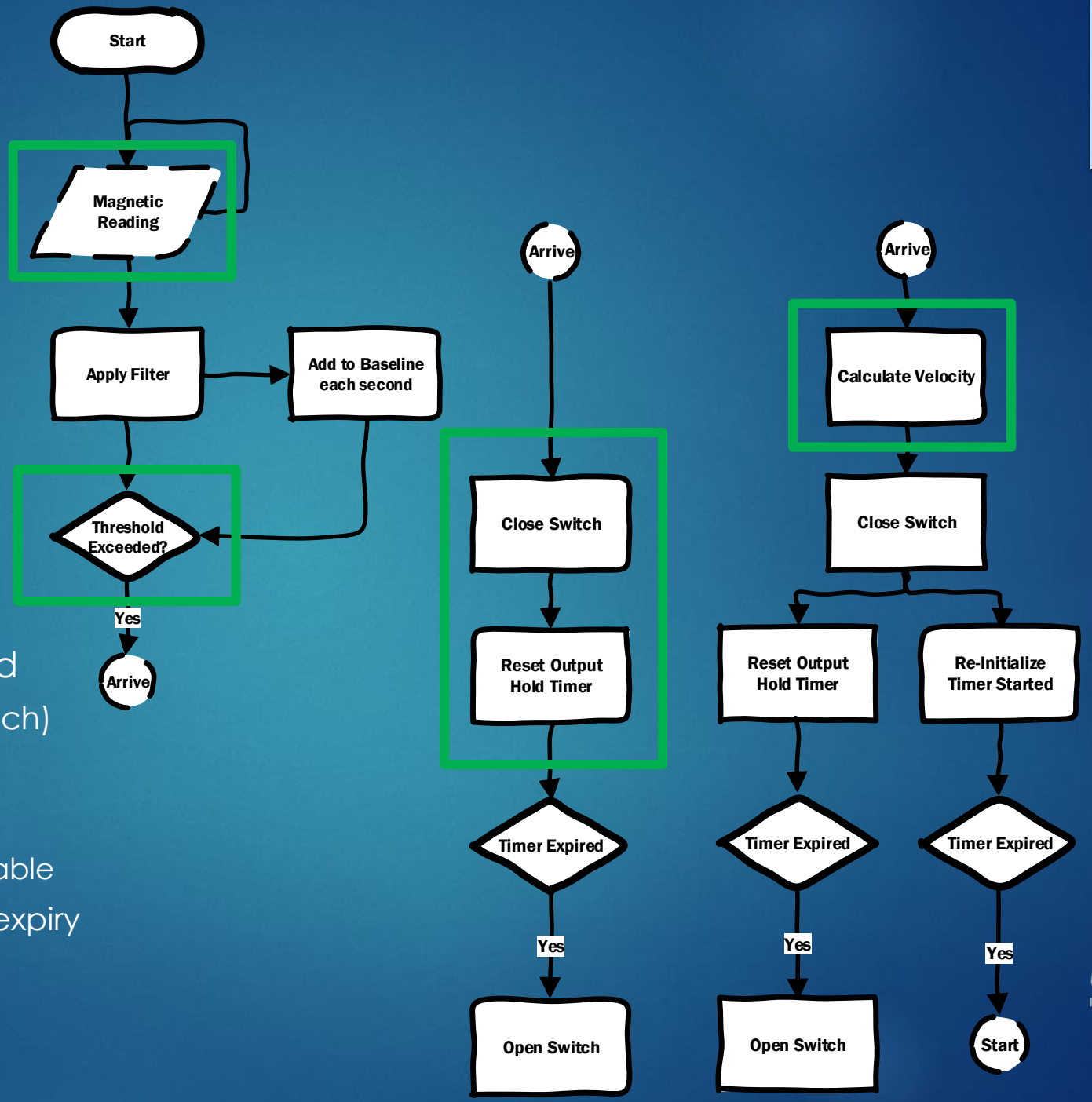






Operation

- Read samples
  - Cyclops – 10 ms
  - Sasquatch – 1 ms
- Filter noise
  - 3 samples
- Establish baseline
  - 8 x 1 sec samples
- Compare to baseline
- Arrived if Threshold Exceeded
  - Calculate Velocity (Sasquatch)
  - Set and hold switch
    - Cyclops – 5s, 30s, 60s, 90s
    - Sasquatch – 1s, Configurable
  - Open switch on Hold Timer expiry
  - Re-Initialize (Sasquatch)



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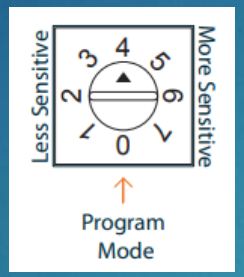
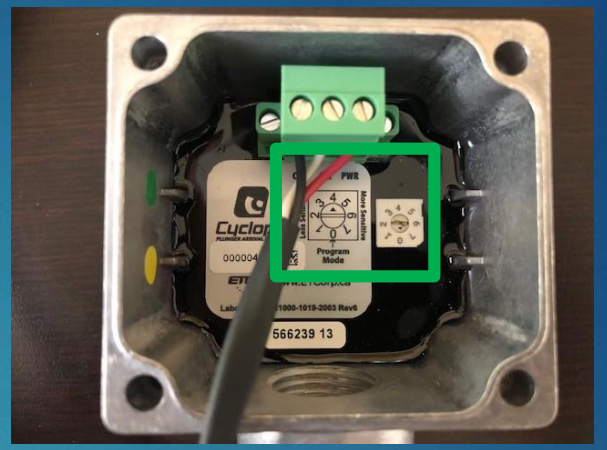
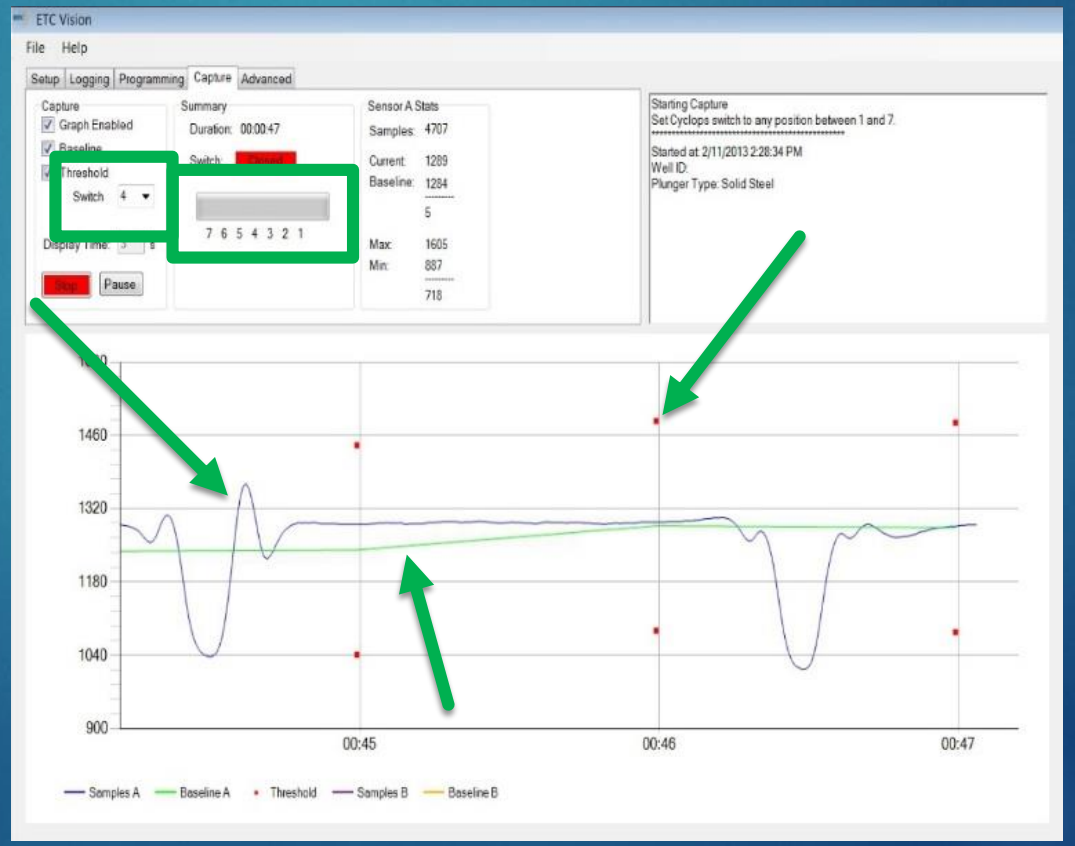
Adjusting Sensitivity

- Sensitivity Dial
  - Default is 4
  - 1 = Min Sensitivity
  - 7 = Max Sensitivity
  - 0 = Program Mode
    - Use Vision to increase
- Real Time Capture in Vision
  - Blue = Filtered Samples
  - Green = Baseline
  - Switch setting
  - Red Dots = Threshold
  - Bar for showing trip level







Model Comparison

Model	Cyclops ExP	Cyclops IS	Sasquatch
Operating Temp	-40°F to +160°F (-40°C to + 70°C)		
Operating Voltage	5V to 24V		
Current Draw	0.80 mA		8 mA
Detects	Plunger Arrival		Plunger Arrival and Velocity
Sample Frequency	10 ms		1 ms
Switch Interface	Dry Contact, Normally Open, 100 Ohm Impedance		
Comms Interface	1 wire RS-485 Debug Interface		2 wire RS-485 Modbus Slave
Certification	Class I Div 1/Zone 1 Explosion Proof	Class I, Div 1/Zone 0 Intrinsically Safe Class I, Div 2/Zone 2 Non-Incendive	

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Mounting: Cyclops

- Use provided band clamp(s) to strap sensor to lubrica
- Detects movement of ferrous metal
- Ferrous Plunger
  - At resting point of plunger
  - On Casing/Master Valve
  - Can detect plungers multiple feet away
- Non-Ferrous Plunger
  - Mount near anvil/spring
    - Detects movement of anvil as plunger is invisible
  - Can mount near trigger rod end for 2-piece
    - Less reliable

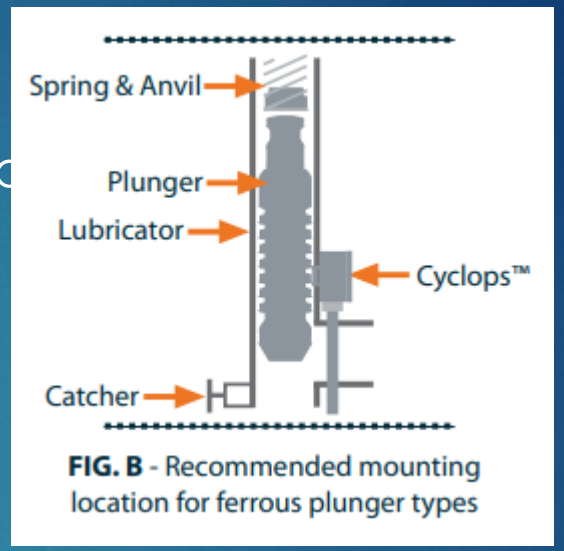

FIG. B - Recommended mounting location for ferrous plunger types

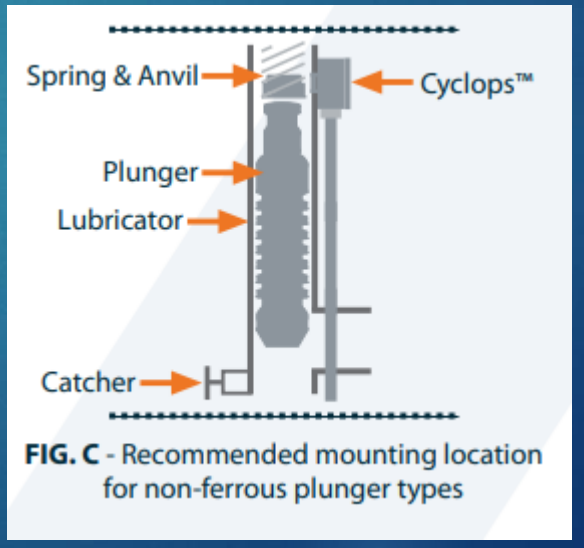

FIG. C - Recommended mounting location for non-ferrous plunger types

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Mounting: Sasquatch

- Use provided band clamps to strap sensor to lubricator
- Only works with Ferrous Plungers
  - Must see the magnetic waveform shift over time
- Plunger must travel by the sensor
  - Mount as low as possible
- Bounce back of plunger can skew results

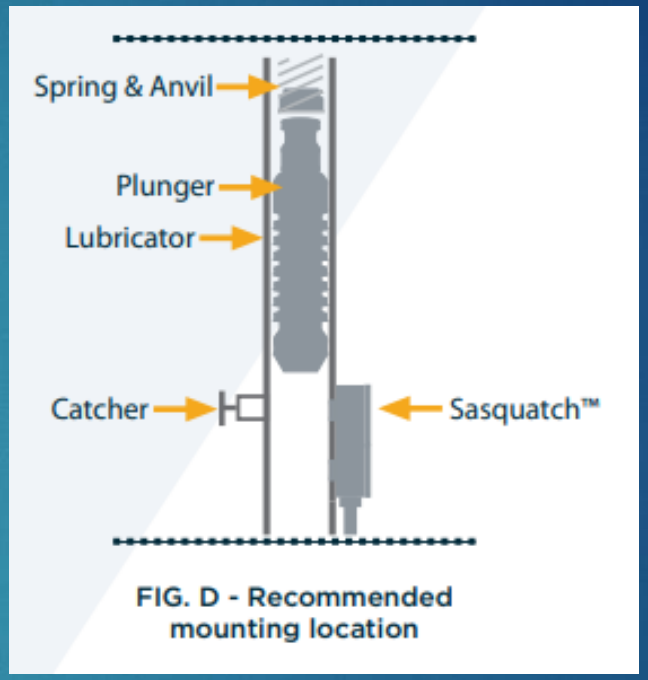

FIG. D - Recommended mounting location

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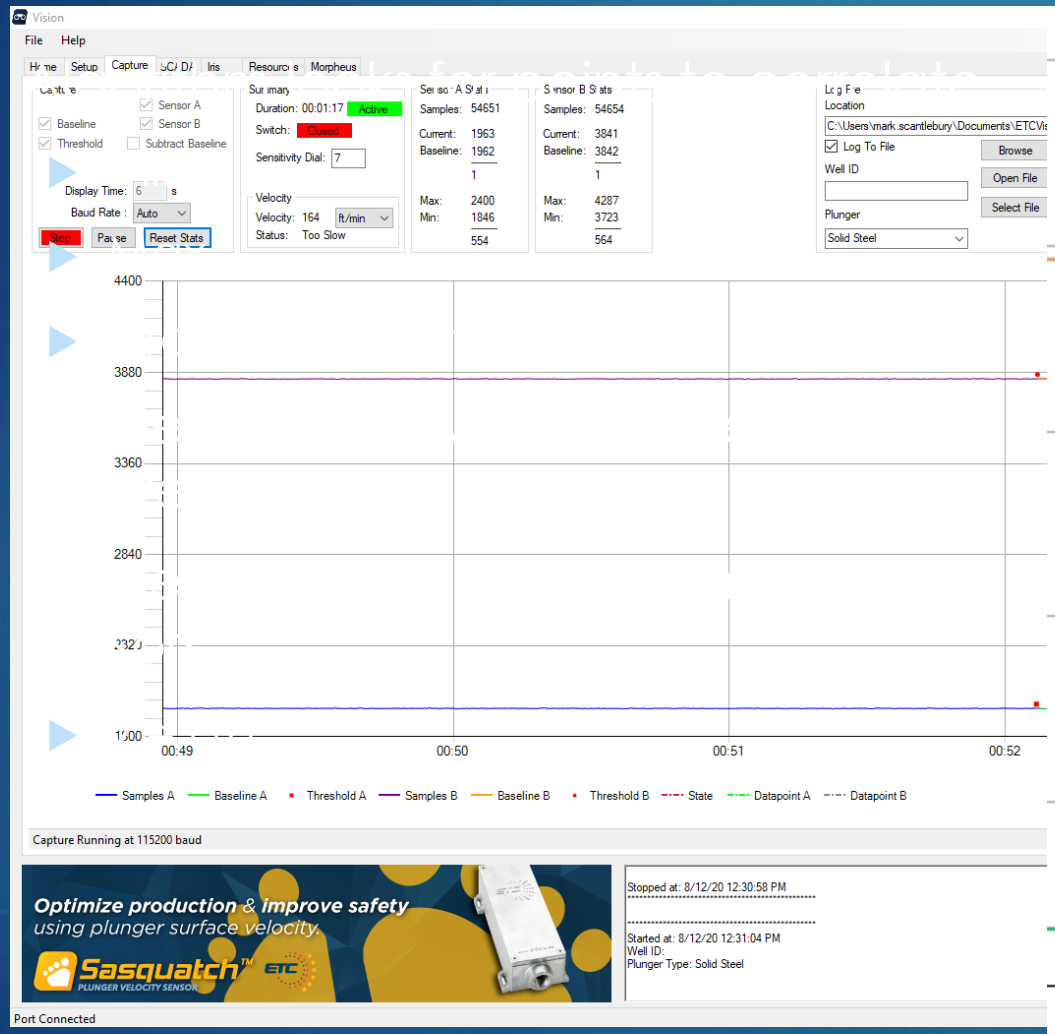
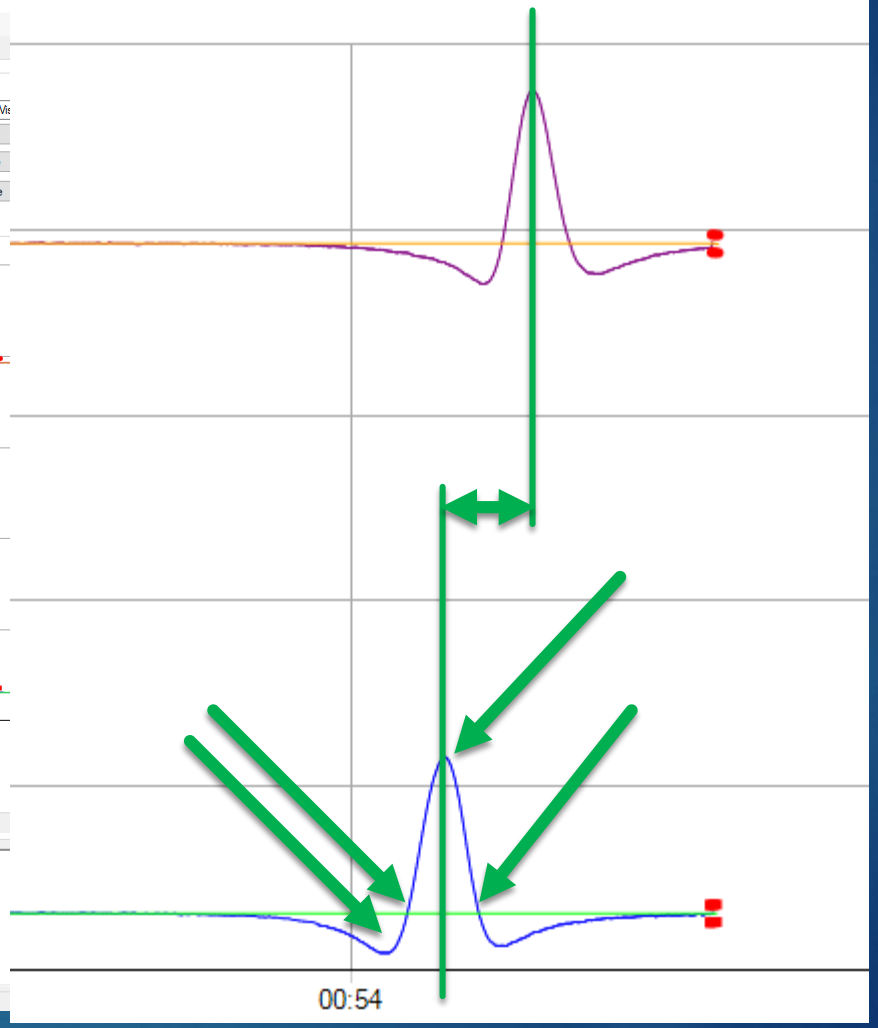
Sasquatch Capture Example





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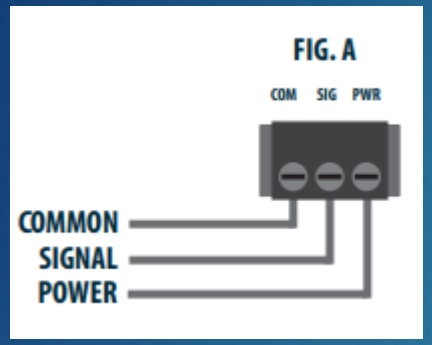
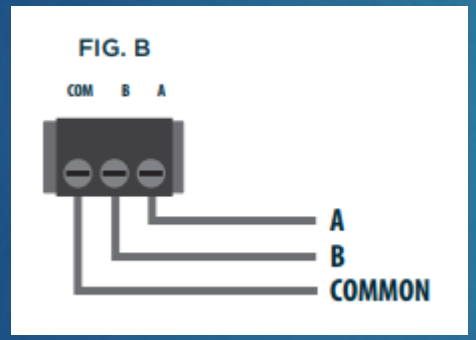
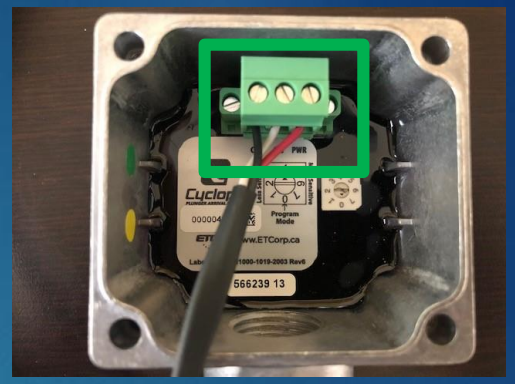
Physical Connections



- Power and Signal
  - COM - Ground
  - SIG – Dry Contact Output
  - PWR – Supply Voltage

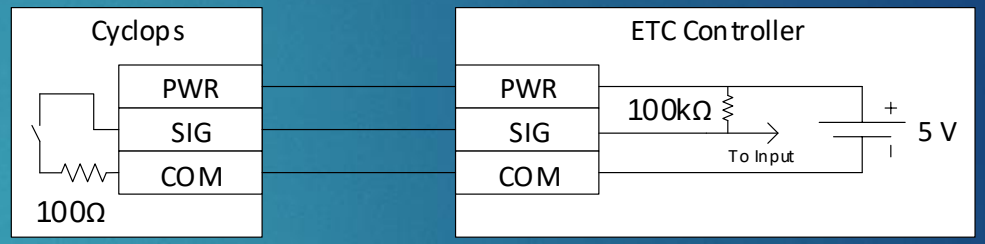


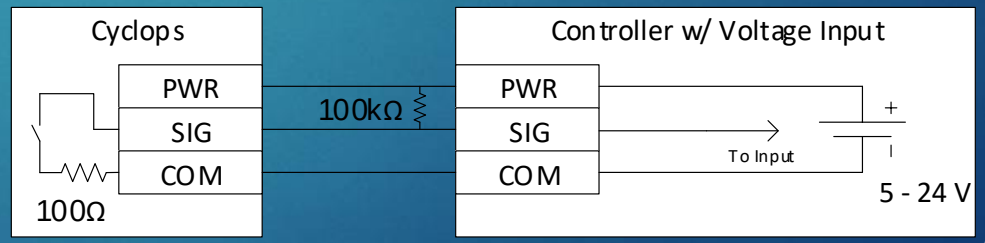
- COM 1 (Sasquatch Only)
  - COM – Ground
  - A/B – 2 Wire RS-485



Connecting to RTUs/PLCs with Voltage Input

- Dry Contact Input
  - ALiEn2 and other Plunger Controllers
  - Internal Pull Up Resistor in Controller
  - Normally Open Switch
  - Arrival connects SIG to COM
- Voltage Input
  - Typical of RTUs and PLCs
  - Needs to see High or Low Voltage
  - Open switch = Undefined
  - Use pull up to power





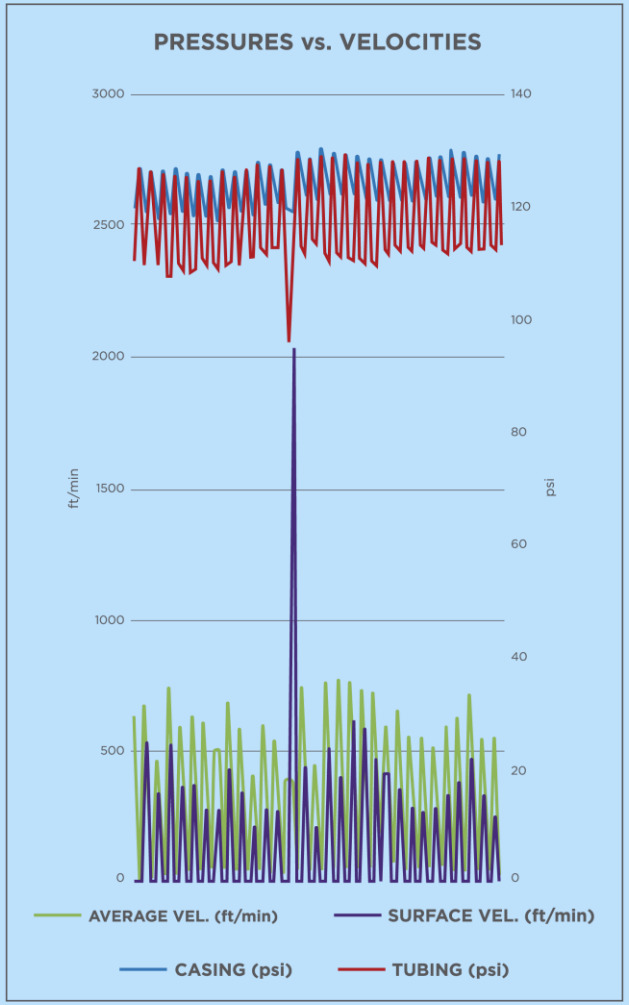
Using Modbus with Sasquatch

- COM Port
  - RS-485
  - Default is 9600 8N1
- Sensitivity Dial
  - 0 = Program Mode, Commands and Firmware from Vision
  - 1 – 7 = Operational Mode, Modbus Slave
- Key Registers
  - Date and Time (4:0002 – 4:0007)
  - Arrival Log (FIFO)
    - Arrival Time (3:0102 – 3:0107)
    - Velocity (3:0822)
    - Confidence Code (3:0942)
    - Kinetic Energy (3:1062) – Requires Plunger Mass

Code	Description
1 - 8	Number of data points used to calculate velocity
20	Velocity Under Range
21	Velocity Over Range
22	Waveform Sync Failure
23	False Arrival

Kinetic Energy (KE)

- Should be at SCADA system level
  - Implemented in Sasquatch
- Program in Plunger Mass
- KE Calculated on each arrival
  - KE = ½ mv^2
- Alarms
  - Single Dangerous Hit
  - Consecutive Hard Hits
  - Cumulative Long Term



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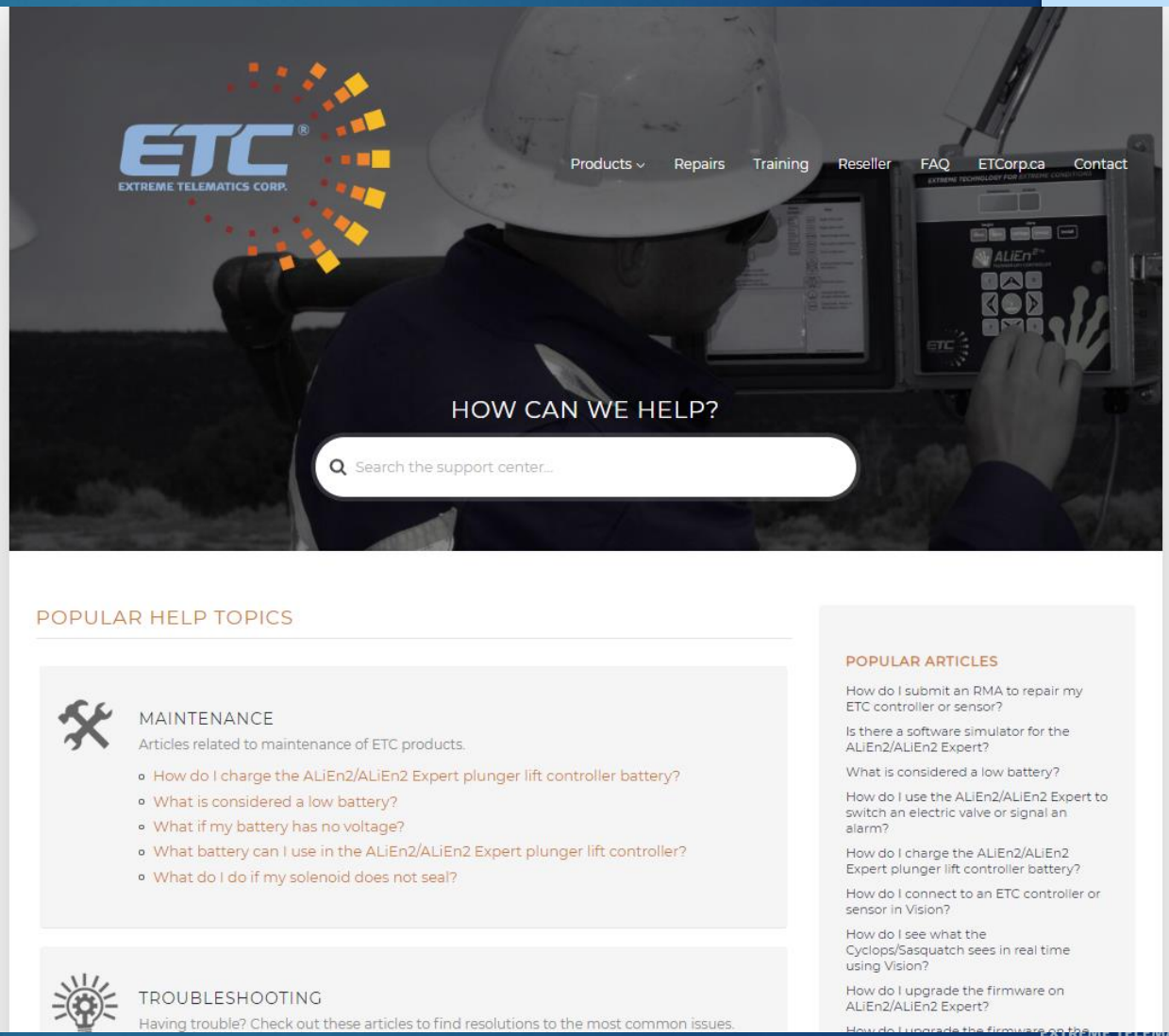
Support Center

- Go To Support Center
- Ask a question
- Access Training Programs
- Product Resources
  - Documentation
  - Tools
  - Accessories
  - Replacement Parts
- Submit an RMA
- Submit a Ticket



About ETC

Since 2001, ETC has specialized in low power, wide temperature range, hazardous locations approved electronics for the oilfield.

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60,000 Sensors

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  - Honesty and Integrity
  - Value Creation
  - Innovation
  - Collaboration
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