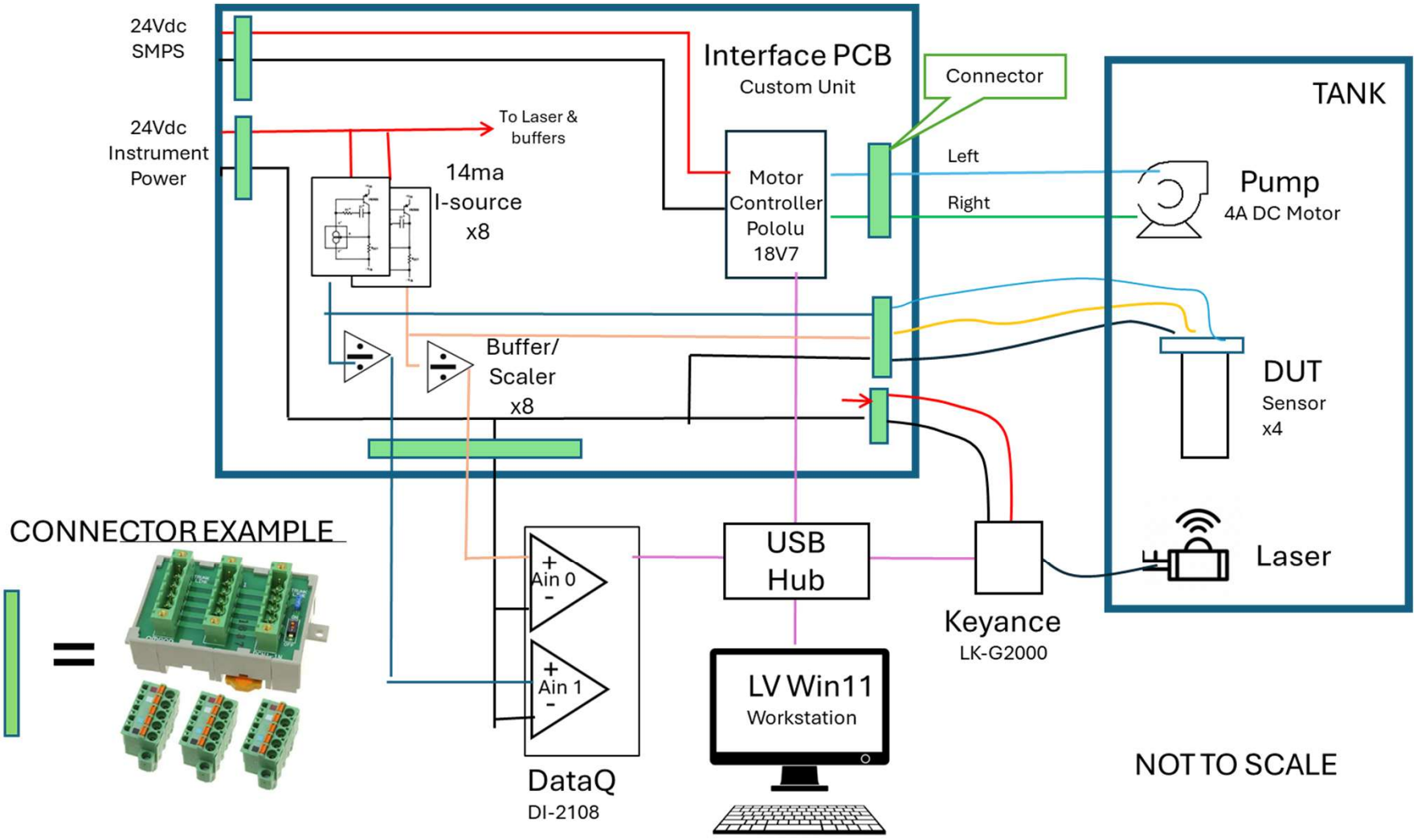
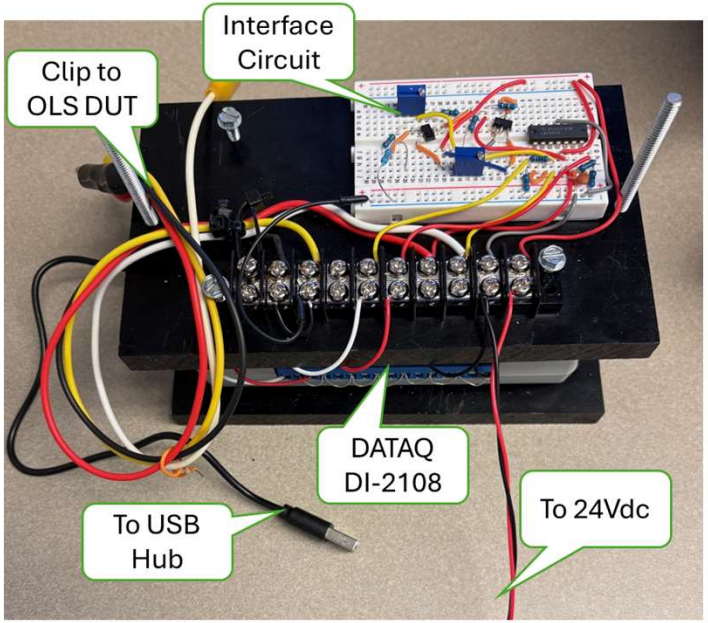
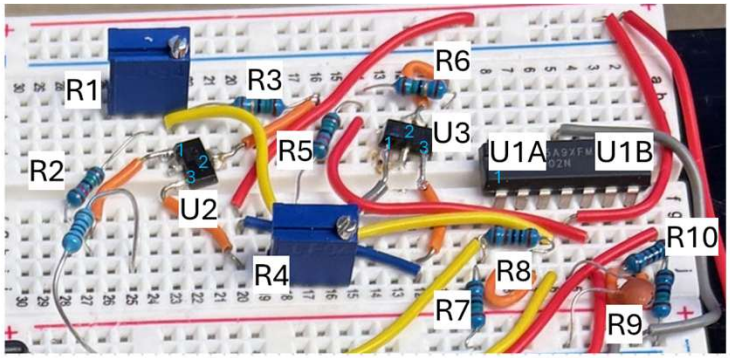
Hardware and Interface PCB block diagram



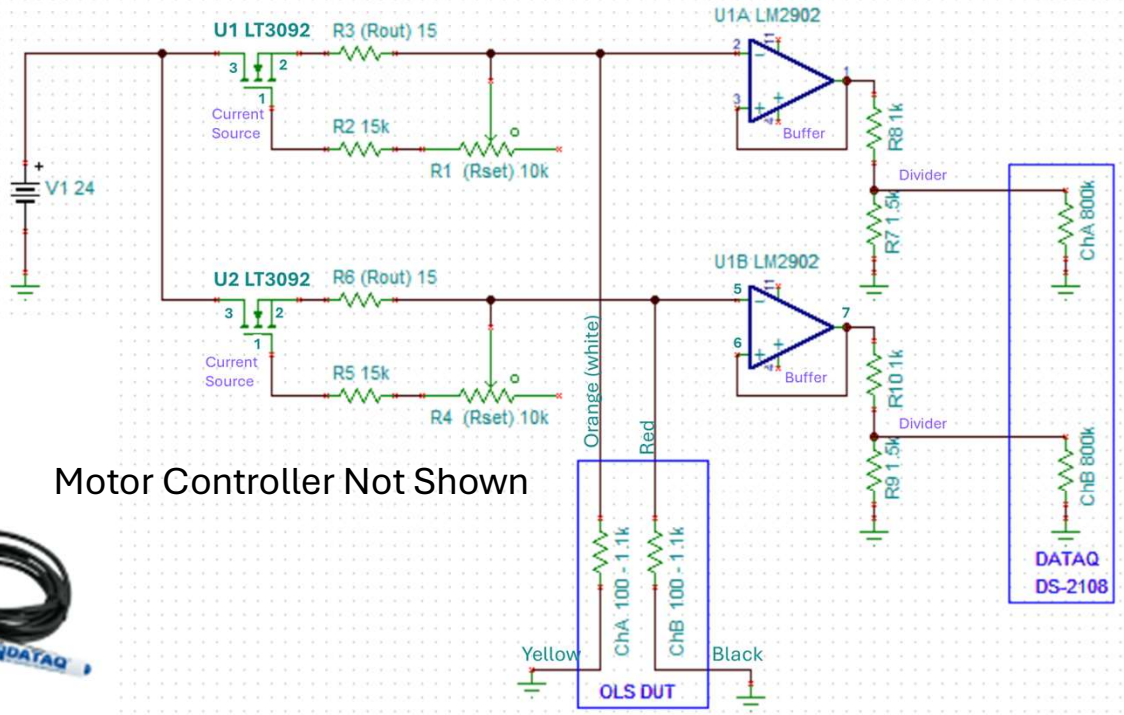
HW and Interface PCB Prototype Schematic and Assy Diagrams





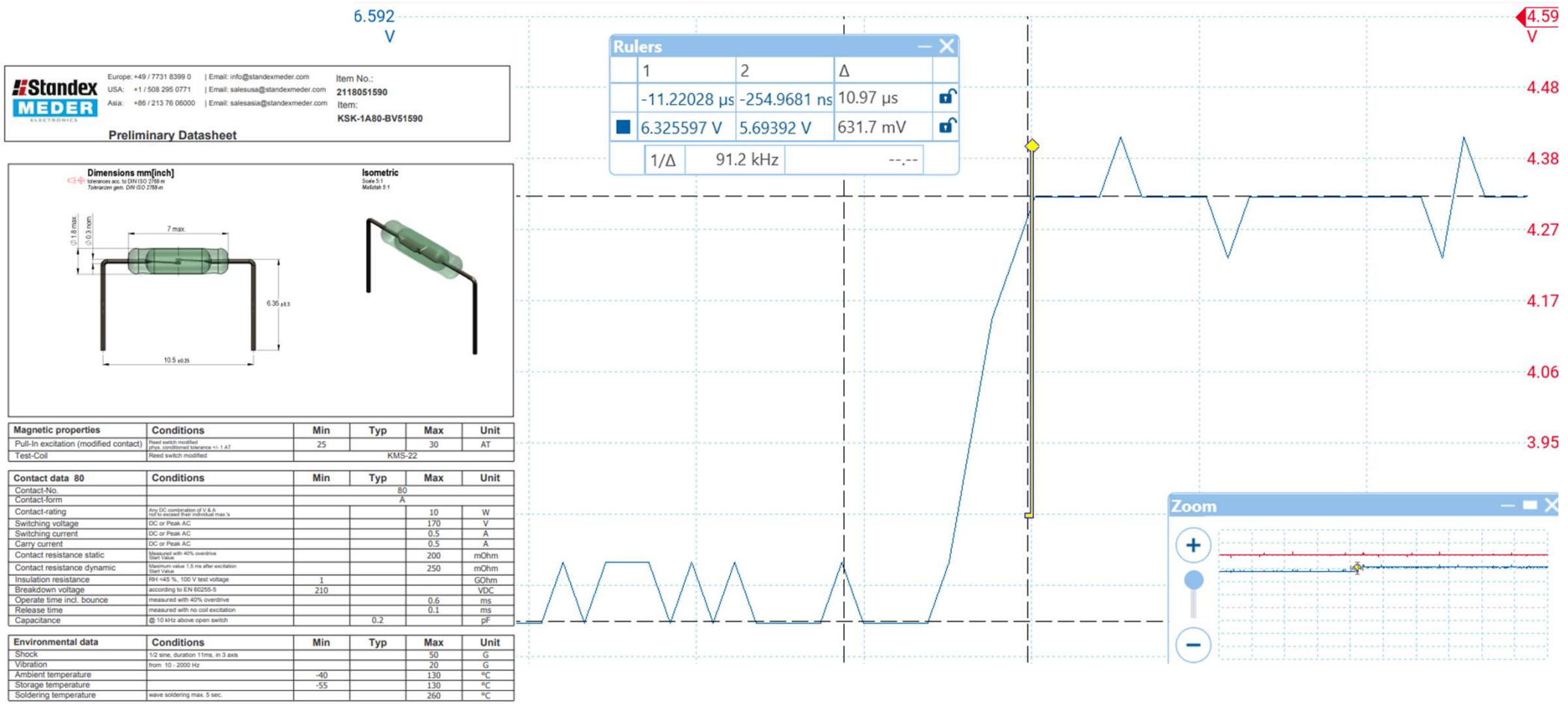
DI-2108-P

- Bipolar and unipolar: 2.5 to 10V
- **High common mode range** 220V. Perfect for 4-20mA signals
- 8 analog channels, 7 digital
- 160,000 samples per second
- Records to PC or USB drive
- Expandable to 128 analog inputs
- DC Accuracy +/-5mV @10V



Motor Controller Not Shown

Reed Switch, open->close step response



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Item No.: 2118051590
Item: KSK-1A80-BV51590

Preliminary Datasheet

Dimensions mm[inch]

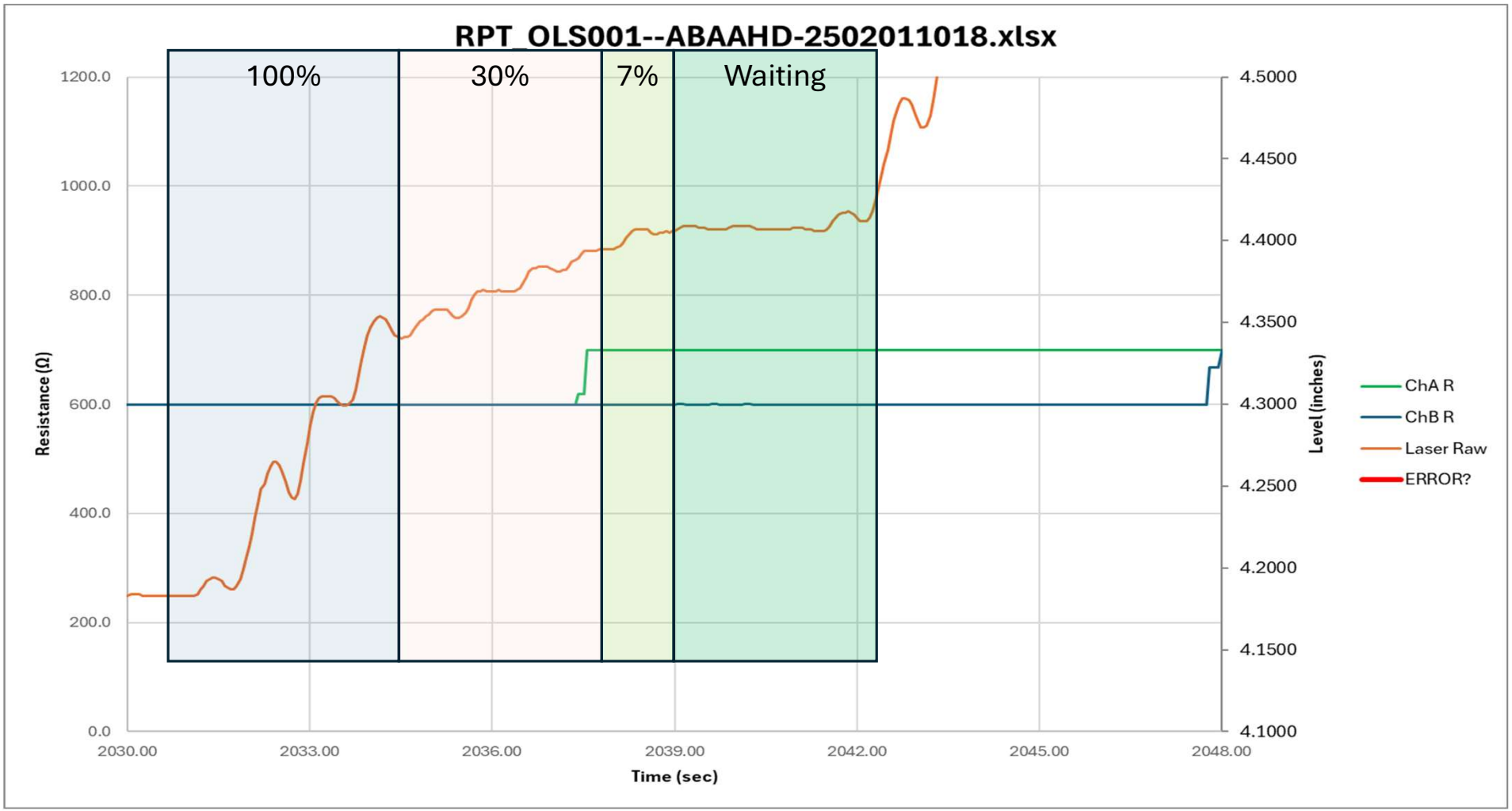
Isometric

Magnetic properties	Conditions	Min	Typ	Max	Unit
Pull-In excitation (modified contact)	Reed switch modified phys. conditioned tolerance +/- 1 AT	25		30	AT
Test-Coil	Reed switch modified		KMS-22		

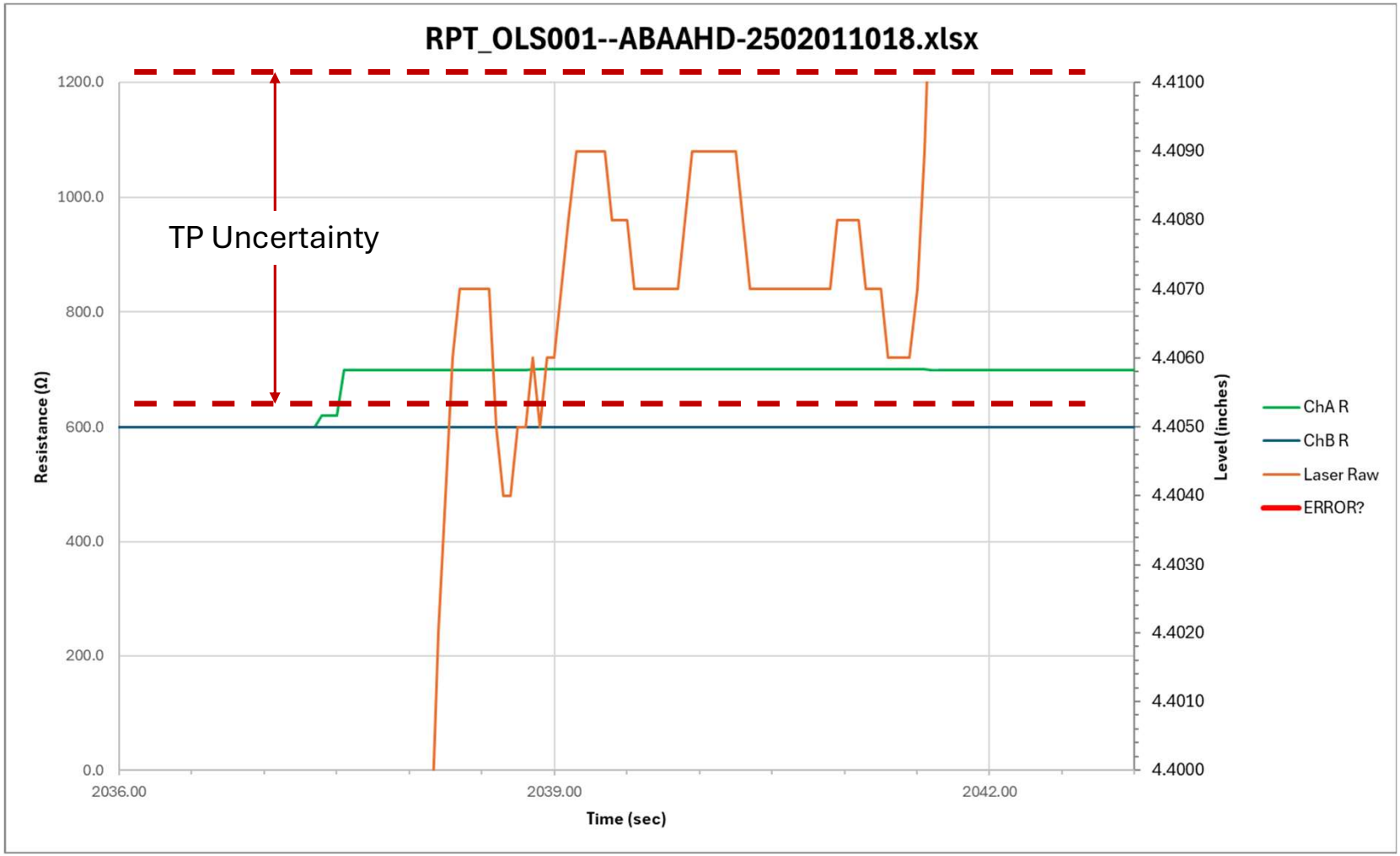
Contact data 80	Conditions	Min	Typ	Max	Unit
Contact-No.			80		
Contact-form			A		
Contact-rating	Any DC combination of V & A not to exceed their individual max.'s			10	W
Switching voltage	DC or Peak AC			170	V
Switching current	DC or Peak AC			0.5	A
Carry current	DC or Peak AC			0.5	A
Contact resistance static	Measured with 40% overdrive Start Value			200	mOhm
Contact resistance dynamic	Maximum value 1,5 ms after excitation Start Value			250	mOhm
Insulation resistance	RH <45 %, 100 V test voltage	1			GOhm
Breakdown voltage	according to EN 60255-5	210			VDC
Operate time incl. bounce	measured with 40% overdrive			0.6	ms
Release time	measured with no coil excitation			0.1	ms
Capacitance	@ 10 kHz above open switch		0.2		pF

Environmental data	Conditions	Min	Typ	Max	Unit
Shock	1/2 sine, duration 11ms, in 3 axis			50	G
Vibration	from 10 - 2000 Hz			20	G
Ambient temperature		-40		130	°C
Storage temperature		-55		130	°C
Soldering temperature	wave soldering max. 5 sec.			260	°C

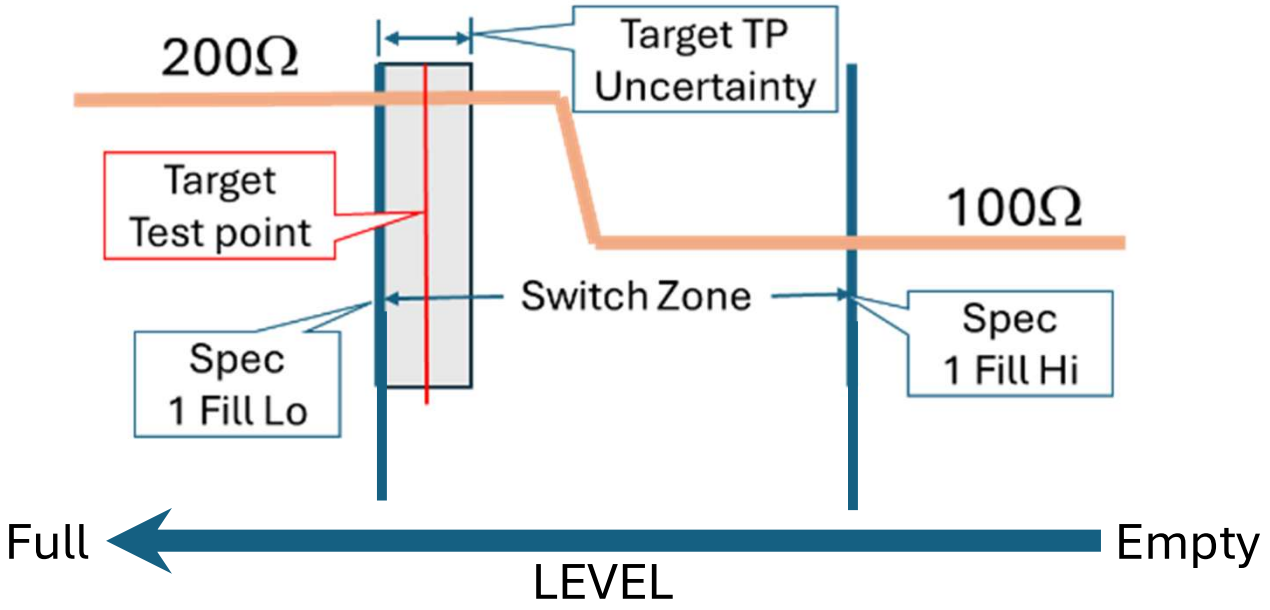
Tank Level step response to 3-speed servo motor control



Tank Level step response to 3-speed servo motor control
Zoomed into 3sec wait period



Where to measure resistance to determine “has switched” PASS/FAIL



The Target Test Point Level (TP) will be set to ½ the level measurement uncertainty after 3 second settling time, prior to the specified upper bound of the Switch Zone.

To be defined

REQUIREMENT: The Target Test Point uncertainty shall not exceed ???”.

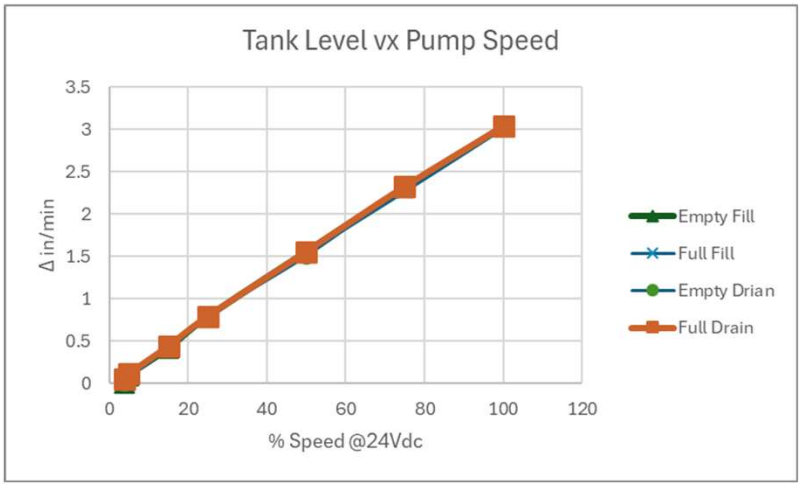
Tank Level Response at various motor speeds

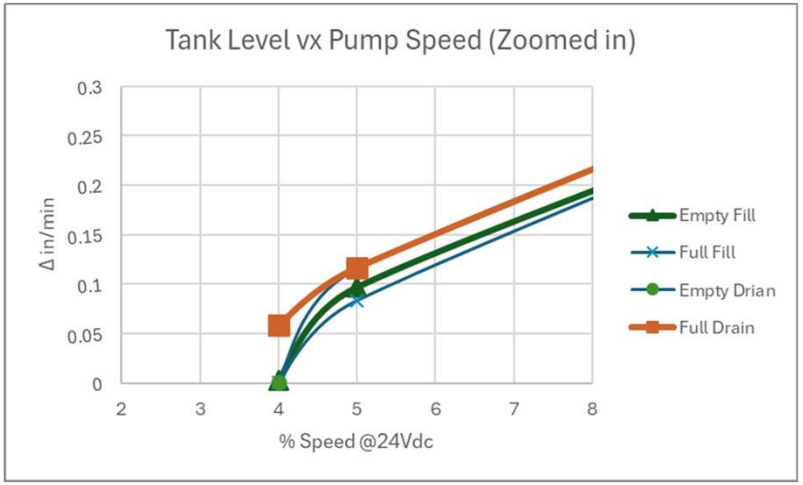
Using the Pololu MC18V7 PWM motor controller with Vs set to 24Vdc, The Δ Level was measure for 30 seconds at various percent of max speed (100% duty cycle) for both FILL and DRAIN at near EMPTY and near FULL.

The response has a minor shift at each case but is basically linear down to about 5% resulting in fill rate of about 0.1”/min where the control becomes unstable by 4% as shown in the ‘Zoomed In Plot.

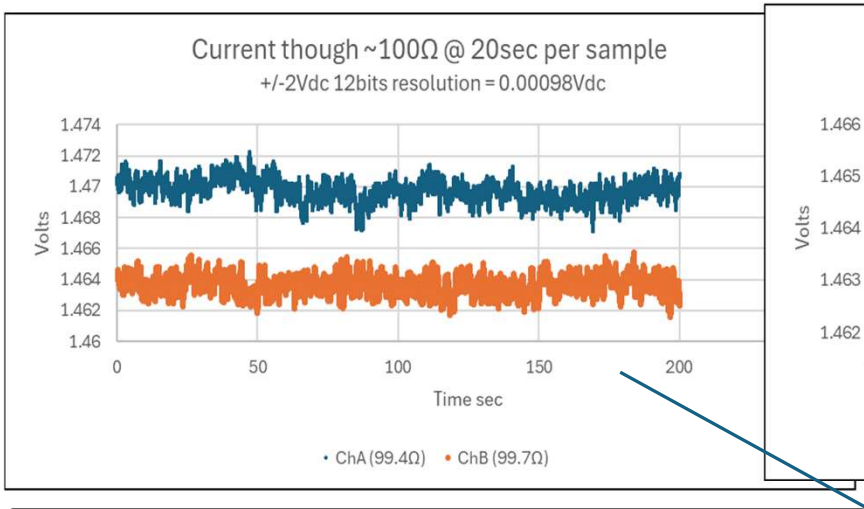
<u>Without doing an extensive fluid analysis, this response is assumed to be adequate for the MLOI application.</u>

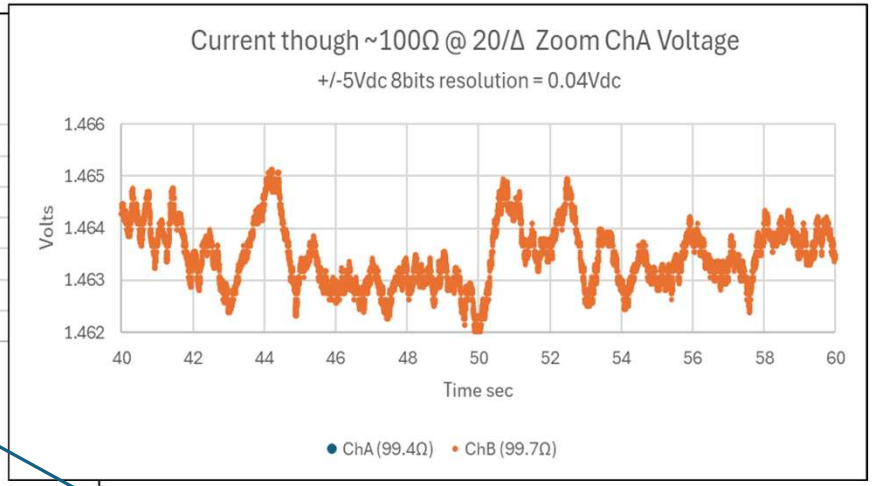
Data from mloi:\PM_Folder_3 Develop\Design Calculations.xlsx sheet Tank. 3/4/2025 R. Ales





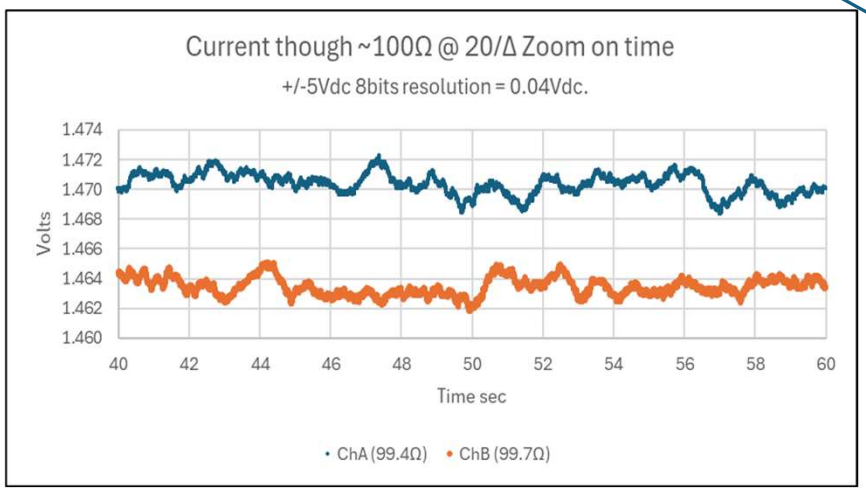
Breadboard LT3092 Current Source Drift over 15 hours



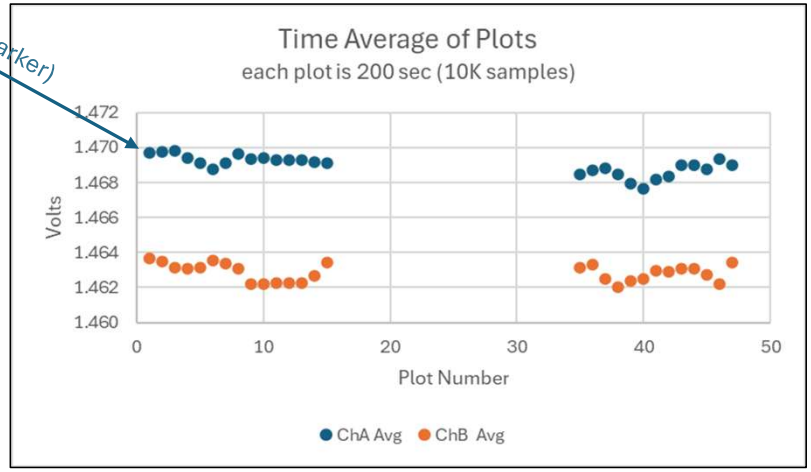


(Volts)	ChA	Ch B
AVG	1.470	1.464
StDev	0.00071	0.00060
Min	1.467	1.462
Max	1.472	1.466
Range	-0.00513	-0.00415

Rref	99.4	99.7
Iavg (ma)	14.786	14.6806
Irange (µa)	-51.6	-41.6



One Plot (marker)

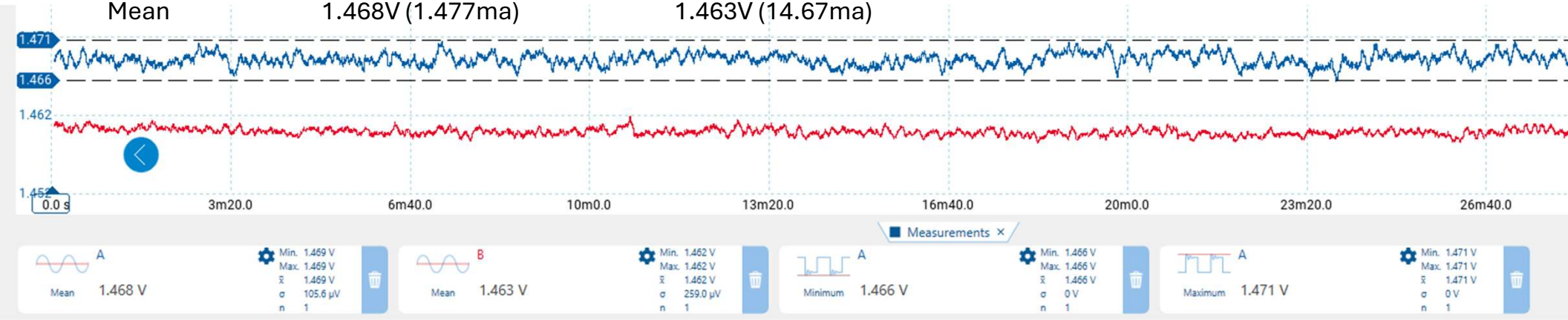


Current source stability over 15 hrs, Start and End trace,
2000 seconds each trace

Time 0 -26min
Mean

ChA Blue,
1.468V (1.477ma)

ChB Red
1.463V (14.67ma)



Time 14h26min – 15hrs
Mean

ChA Blue,
1.469V (14.78ma)

ChB Red
1.462V (14.66ma)