

Sunrise Instruments Calibration Report

Address: 2nd Floor Building B2 19#Keyuan Xishi Road Nanning Guangxi Province China 530007

Phone: +86 771-389-9499 Fax: +86 771-389-9497

Email: sri@srisensor.com



Calibration Report

Calibration No.	SRI-V-251129-ZA	Cal Date	2025/11/29
Model No.	M4313S1J6D	Serial No.	36649
Technician	Chen Feng Sheng	Temp(C)/Hum.(%).	25/60
Customer	北京人形机器人创新中心	Excitation(V)	10.0000
Description	6 AXIS FORCE SENSOR	Cable Length	300mm
Comments			

Voltage Calibration

<u>Bridge</u>	<u>Capacity</u>	<u>Zero Offset</u>	<u>Nonlinearity</u>	<u>Hysteresis</u>	<u>Output @ Capacity</u>	<u>Sensitivity</u>	<u>Change</u>
	N/Nm	V	%FS	%FS	V	V/EU	%
FX	-300	0.0000	0.37	0.32			
FY	300	0.0000	0.32	0.25			
FZ	-300	0.0000	0.27	0.37			
MX	-60	0.0000	0.19	0.37		DECOUPLE	
MY	-60	0.0000	0.32	0.38			
MZ	60	0.0000	0.43	0.20			

Wire Color Codes

FUNCTION

+EXC

+SIG

-EXC

-SIG

Sensor ID

ID Return

Reference Load Cell

<u>Manufacturer</u>	<u>Model Type</u>	<u>Model No.</u>	<u>Serial No.</u>	<u>Cal Due Date</u>
SUNRISE	GOLDEN TYPE	SRI_1000N-1	30727	2026/6/30

Calibrated by

Chen Feng Sheng

Approved by

Zhou

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CROSSTALK

<u>Bridge</u>	<u>Load</u>	<u>FX</u>	<u>FY</u>	<u>FZ</u>	<u>MX</u>	<u>MY</u>	<u>MZ</u>
	N/Nm	% FS	% FS	% FS	% FS	% FS	% FS
FX	-300	0.00	0.16	0.30	0.22	0.09	1.00
FY	300	0.15	0.00	0.12	0.83	0.26	0.08
FZ	-300	0.15	0.23	0.00	1.22	0.03	0.06
MX	-60	0.47	0.45	1.74	0.00	1.48	0.20
MY	-60	0.67	0.49	1.70	0.82	0.00	0.79
MZ	60	1.80	1.70	0.13	0.51	1.03	0.00

Bridge to Transducer body resistance greater than 5G Ohm when measured with 50V excitation

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SENSOR TYPE A ----- OUTPUT RELATED TO EXCITATION VOLTAGE.

Decoupled Matrix

-9.82	-498.30	-4.66	502.06	8.31	-3.05	239.18	260.68	-530.76
-7.01	290.28	12.42	278.99	0.45	-574.70	478.83	-424.76	10.12
-534.73	1.07	-523.14	1.12	-520.28	6.10	0.00	0.00	0.00
-10.31	2.93	10.65	3.25	0.30	-6.34	8.63	-8.31	0.81
6.13	5.30	6.18	-4.93	-11.60	-0.25	-5.73	-5.47	10.56
-0.09	13.22	-0.05	14.15	0.09	13.49	0.00	0.00	0.00

The six axis loads can be decoupled as follows:

Step 1: Obtain the raw data of Channels 1 through 9 into Volt

[RAW] = {rawchn1, rawchn2, rawchn3, rawchn4, rawchn5, rawchn6, rawchn7, rawchn8, rawchn9}

where rawchn1, rawchn2, rawchn3, rawchn4, rawchn5, rawchn6, rawchn7, rawchn8 and rawchn9 are in V

Step 2: Convert the raw data into mV/V

Assume the raw data output in Volt, Excitation voltage = EXC, Amplifier gain = GAIN

[DAT] = {chn1, chn2, chn3, chn4, chn5, chn6, chn7, chn8, chn9} * 1000 / (EXC * GAIN)

where chn1, chn2, chn3, chn4, chn5, chn6, chn7, chn8 and chn9 are in mV/V

Step 3: To calculate decoupled loads

[RESULT]^T = [DECOUPLED] * [DAT]^T

where [RESULT] = {FX, FY, FZ, MX, MY, MZ}. Force Unit: N. Moment Unit: Nm

[DECOUPLED] is the above decoupled matrix