

CALIBRATION CERTIFICATE 2023



SUSHMA
CALIBRATION

connect@sushmacalibration.com
TOLL FREE NO. 1800 270 2273

TRUE COPY

Certificate No.	SCPL/CC/2982/03/2022-2023	Calibrated On.	04-03-2023	Page 1/3
ULR No :	CC28742300000562F	Calibration Due on	03-03-2024	
Work Order	221429	Type of Parameter	TORQUE	

NAME & ADDRESS OF CUSTOMER

National Centre For Quality Calibration
4, Abhishree Corporate Park, Near Swagat Bungalows
BRTS, Iskcon - Ambli Road, Ambli,
AHMEDABAD - 380 058, Gujarat.

CUSTOMER REFERENCE

Ref No. : 200223/01
Date: 20-02-2023
Date of Receipt : 02-03-2023
Status of the item on receipt : Satisfactory

DETAILS OF UNIT UNDER CALIBRATION

Item	Make	Model	SI.No.	ID.No	Capacity	Channel	Resolution	Mode
Torque Sensor	Sushma	TS - 103 F	TS13 - 0089	NCQC-M/022	5 Nm	5 Nm	0.001 Nm	Clockwise & Counter Clockwise
Smart Display Unit	Sushma	TDU-RB-103	DU13-0032		LCD Display			

REFERENCE EQUIPMENT USED

Dead weight torque calibration system is used for calibration of Torque measuring devices. Torque is realised from mass, gravity and length traceable to SI units.
Serial No.: SC9 - T10 Range: 0.001 - 50 Nm [T10]

METROLOGICAL TRACEABILITY & METHOD USED

Traceability for Weights used in the system are established through PTB, Germany calibrated 1 kg E0 Class weight, Vide their certificate No: PTB - 11092 19 dtd. 20.09.2019 valid upto 19.09.2024
Lever Arms traceable to SICC ,vide certificate No.: SCPL/CC/CMM/05/2022-2023 dated 11-05-2022 due on 11-05-2024.
CMC of our lab for Torque calibration is 0.01% with coverage factor k=2 at 95% confidence level
Calibration Procedure: Done as per SCPL Document No: SC01-WIT-01 (based on BS 7882:2017)
Local gravity and its uncertainty has been determined by Geological survey of India.
Traceability of instruments used in monitoring temperature is established through approved accredited laboratories
Temperature : (23 ± 1) °C during the day and within ± 1°C during calibration & Relative Humidity : (50 ± 10)%



Authorised signatory

Suveer Sadanand or Manjula .G.M
(C.E.O.) (Manager- Calibration)

Note : - This Certificate refers to the values obtained at the time of calibration and under the above stated conditions. * Calibration Performed in As Received Condition*. All Calibration done in SI units and are traceable to National/International standards as required in ISO/IEC/17025. *.Certificate shall not be reproduced except in full without the written approval of Laboratory.

NCQC
Valid up to 03-03-2024
Reviewed *[Signature]*

SC01-CCT-01 v1.1 12/11/2021

Sushma Calibration and Test Labs Pvt. Ltd.,
Plot No: 18E, Block '3', 2nd Phase, "C" Main Road, Peenya Industrial Area, Bangalore-560058. INDIA. www.sushmaindustries.com

NCQC System Certificate No. 152

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CLR No : CC287423000000562F	Calibration Due 03-03-2024	
Work Order 221429	Type of Parameter TORQUE	

Temperature in °C		Output in Nm	Resolution in Nm	Applied Torque uncertainty in %, k=2		Mode	
Before	After			0.008			
22.6	22.8		0.001			Clockwise	
Applied Torque		Unchanged Position Indicated Readings		Changed Position Indicated Readings			
Sl.No.	Step in Nm	0° Series 1 Ascending	0° Series 2 Ascending	90° Series 3 Ascending	180° Series 4 Ascending	270° Series 5 Ascending	270° Series 5 Descending
1	0.0	0.000	0.000	0.000	0.000	0.000	0.000
2	0.5	0.500	0.500	0.500	0.500	0.500	0.501
3	1.0	1.000	1.000	1.001	1.001	1.000	1.001
4	1.5	1.501	1.500	1.502	1.501	1.500	1.501
5	2.0	2.001	2.000	2.002	2.001	2.002	2.004
6	2.5	2.502	2.501	2.502	2.501	2.504	2.505
7	3.0	3.002	3.001	3.004	3.002	3.004	3.006
8	3.5	3.502	3.502	3.506	3.502	3.504	3.506
9	4.0	4.003	4.002	4.007	4.003	4.005	4.007
10	4.5	4.502	4.502	4.508	4.504	4.506	4.507
11	5.0	5.002	5.002	5.009	5.004	5.007	5.007

Pre-loaded for max. Torque thrice for a period of 1 min before taking readings at first fitted position and once after each rotation before starting the series. Readings are noted after 30 seconds between each step in all the series.

Mean Value in Nm	Relative Deviation in %	Expanded relative uncertainty ± 'U' in % k = 2	U _{Interval} in % (inclusive of deviation)	Classification : The Instrument is Classified considering relative errors of repeatability, reproducibility, resolution, residual deflection, reversibility, error of indication & applied torque as per BS 7882:2017			
0.5000	0.00	0.26	0.26	Class	Range In	Nm	Expanded uncertainty in %
1.0005	0.05	0.15	0.20				
1.5010	0.07	0.13	0.20	0.05			
2.0015	0.08	0.14	0.22	0.1			
2.5023	0.09	0.10	0.19	0.2			
3.0030	0.10	0.11	0.21	0.5	5.0	0.5	0.26
3.5035	0.10	0.11	0.21	1			
4.0045	0.11	0.11	0.22	2			
4.5050	0.11	0.10	0.21	5			
5.0055	0.11	0.10	0.21				

Cal Signal : 2CFC7A

Note : Connecting Cables used, which are given by customer & Self Aligning Adaptors used are of SCPL.

Authorised signatory

Suveer Sadanand or
(C.E.O.)

Manjula G.M
(Manager- Calibration)

SC01-CCT-01 v1.1 12/11/2021

Sushma Calibration and Test Labs Pvt. Ltd.,

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ULR No : CC287423000000562F	Calibration Due 03-03-2024	
Work Order 221429	Type of Parameter TORQUE	

Temperature in °C		Output In		Resolution In	Applied Torque		Mode
Before	After	Nm		Nm	uncertainty in %, k=2		Counter Clockwise
23.0	23.2			0.001	0.008		
Applied Torque		Unchanged Position Indicated Readings		Changed Position Indicated Readings			
Sl.No.	Step In Nm	0° Series 1 Ascending	0° Series 2 Ascending	90° Series 3 Ascending	180° Series 4 Ascending	270° Series 5 Ascending	270° Series 5' Descending
1	0.0	0.000	0.000	0.000	0.000	0.000	0.000
2	0.5	-0.501	-0.500	-0.500	-0.501	-0.501	-0.503
3	1.0	-1.003	-1.004	-1.002	-1.004	-1.005	-1.008
4	1.5	-1.505	-1.507	-1.504	-1.506	-1.507	-1.511
5	2.0	-2.008	-2.009	-2.009	-2.010	-2.006	-2.008
6	2.5	-2.512	-2.514	-2.510	-2.512	-2.510	-2.512
7	3.0	-3.014	-3.015	-3.012	-3.014	-3.013	-3.016
8	3.5	-3.515	-3.516	-3.513	-3.514	-3.516	-3.520
9	4.0	-4.018	-4.018	-4.015	-4.016	-4.015	-4.020
10	4.5	-4.520	-4.522	-4.518	-4.520	-4.520	-4.524
11	5.0	-5.021	-5.022	-5.020	-5.019	-5.026	-5.026

Pre-loaded for max. Torque thrice for a period of 1 min before taking readings at first fitted position and once after each rotation before starting the series. Readings are noted after 30 seconds between each step in all the series.

Mean Value in Nm	Relative Deviation in %	Expanded relative uncertainty ± 'U' in % k = 2	U ^{interval} In % (Inclusive of deviation)	Classification : The Instrument is Classified considering relative errors of repeatability, reproducibility, resolution, residual deflection, reversibility, error of Indication & applied torque as per BS 7882:2017			
-0.5008	0.15	0.51	0.66	Class			
-1.0035	0.35	0.41	0.76				
-1.5055	0.37	0.35	0.71	0.05			
-2.0083	0.41	0.19	0.60	0.1			
-2.5110	0.44	0.15	0.59	0.2			
-3.0133	0.44	0.14	0.58	0.5			
-3.5145	0.41	0.15	0.56	1	5.0	0.5	0.51
-4.0160	0.40	0.15	0.55	2			
-4.5195	0.43	0.12	0.56	5			
-5.0215	0.43	0.10	0.53				

If the range is blank, then the UUT does not meet the classification criteria as per the above referred standard

Cal Signal : 2CFC7A

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