

# CALIBRATION CERTIFICATE 2023



**SUSHMA**  
CALIBRATION

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

Certificate No.	SCPL/CC/2995/03/2022-2023	Calibrated On.	04-03-2023	Page 1/3
ULR No :	CC287423000000575F	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	Sl.No.	ID.No	Capacity	Channel	Resolution	Mode
Torque Sensor	Sushma	TS - 103 F	TS13 - 0092	NCQC-M/022	500 Nm	500 Nm	0.1 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 - 022A [023-1LA & 023-2LA]

Range: 10 - 3000 Nm

### 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

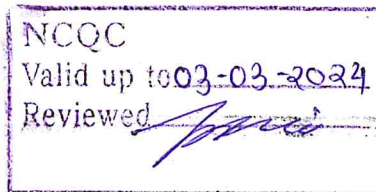
Calibration Procedure:

Done as per SCPL Document No: SC01-WIT-04 (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  
(C.E.O.)

or

Manjula .G.M  
( 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 System Certificate No. 152/3

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

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ULR No : CC287423000000575F	Calibration Due 03-03-2024	
Work Order 221429	Type of Parameter TORQUE	

Calibration results for				Torque Sensor with Smart Display Unit			
Temperature in °C Before   After		Output in Nm		Resolution in Nm	Applied Torque uncertainty in %, k=2		Mode
23.0   23.1				0.1	0.003		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	0.0	0.0	0.0	0.0	0.0
2	50	50.0	50.0	49.9	49.9	49.9	49.8
3	100	99.9	100.0	99.9	99.9	99.9	99.8
4	150	149.9	149.9	149.9	149.9	149.8	149.7
5	200	199.9	199.9	199.8	199.9	199.8	199.7
6	250	249.9	249.8	249.8	249.8	249.8	249.7
7	300	299.8	299.8	299.8	299.8	299.7	299.7
8	350	349.8	349.8	349.7	349.7	349.7	349.6
9	400	399.8	399.7	399.7	399.7	399.7	399.6
10	450	449.7	449.7	449.7	449.7	449.7	449.6
11	500	499.7	499.7	499.7	499.7	499.6	499.6

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 <sub>interval</sub> 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
49.93	-0.15	0.29	0.44	Class
99.90	-0.10	0.16	0.26	
149.88	-0.08	0.10	0.18	0.05
199.85	-0.07	0.07	0.15	
249.83	-0.07	0.06	0.13	0.1
299.78	-0.07	0.03	0.11	
349.73	-0.08	0.04	0.12	0.2
399.73	-0.07	0.04	0.11	
449.70	-0.07	0.03	0.10	0.5
499.68	-0.07	0.02	0.08	
Cal Signal : 442792				Class
				Range in Nm
				From To
				Expanded uncertainty in %
				500 50 0.29
				1
				2
				5

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

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

Authorised signatory

Suveer Sadanand  
(C.E.O.)

Manjula .G.M  
( Manager- Calibration)

# CALIBRATION CERTIFICATE 2023



CC-2874

**TRUE COPY**



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ULR No : CC287423000000575F	Calibration Due 03-03-2024	
Work Order 221429	Type of Parameter TORQUE	

Temperature in °C		Output in Nm	Torque Sensor		with Smart Display		Unit
Before	After		Resolution in Nm	Applied Torque uncertainty in %, k=2			Mode
22.8	23.0		0.1	0.003			Counter 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	0.0	0.0	0.0	0.0	0.0
2	50	-50.0	-50.0	-50.0	-50.1	-50.1	-50.0
3	100	-100.0	-100.0	-100.0	-100.1	-100.1	-100.0
4	150	-150.0	-150.0	-150.1	-150.0	-150.1	-150.0
5	200	-200.0	-199.9	-200.1	-200.0	-200.0	-200.0
6	250	-249.9	-249.9	-250.1	-250.0	-250.0	-250.0
7	300	-299.9	-299.9	-300.1	-300.0	-300.0	-300.0
8	350	-349.9	-349.9	-350.1	-349.9	-350.0	-350.0
9	400	-399.8	-399.8	-400.1	-399.9	-400.0	-400.0
10	450	-449.8	-449.8	-450.1	-449.9	-450.0	-450.0
11	500	-499.8	-499.8	-500.1	-499.9	-499.9	-499.9

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 <sub>interval</sub> 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			
-50.05	0.10	0.29	0.39	Class 0.05			
-100.05	0.05	0.15	0.20				
-150.05	0.03	0.10	0.13				
-200.03	0.01	0.08	0.09				
-250.00	0.00	0.06	0.06				
-300.00	0.00	0.05	0.05	0.2			
-349.98	-0.01	0.04	0.05	0.5	500	50	0.29
-399.95	-0.01	0.06	0.07	1			
-449.95	-0.01	0.05	0.06	2			
-499.93	-0.01	0.04	0.06	5			

Cal Signal : 442792

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

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

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