

# Digital Force and Torque Gauges



AFG



BFG



CFG

# Market Sectors

Aerospace/Defence  
Automotive  
Aviation  
Cosmetics  
Domestic Appliances  
Electronics  
Ergonomics/Occupational Therapy  
Food Processing  
General Engineering  
Medical  
Metal Fabrications  
Military/Defence  
Packaging  
Pharmaceuticals  
Rubber & Plastics  
Telecommunications  
Textiles  
Toy & Nursery Products

## Typical Applications

Adhesive Bonds  
Closure Torque Testing  
Connector Insertion & Withdrawal  
Crimp Joint Testing  
Medical Devices  
Operation Forces of Pedals & Levers  
Packaging - Crush & Peel Testing  
Release Torque of Screws/Fasteners  
Resistance Torque of Machinery Rollers  
Shear Torque on Rivets  
Spring Testing  
Steering Wheel Torque  
Tension & Compression Testing  
Torque Wrench Calibration

Mecmesin reserves the right to alter equipment specifications without prior notice.



Top-load test



Textile test



Peel test

# Contents

Mecmesin force gauges are specifically designed to measure forces in tension and compression with optimum precision and performance.

Used in quality control, production and R & D departments, industrial companies throughout the world have come to rely on this top quality range of instruments to solve their force measurement problems.

This brochure covers the family of digital gauges from the fully featured Advanced Force Gauge, through the Basic Force Gauge to the elementary Compact Force Gauge....as easy as ABC!

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# Mecmesin

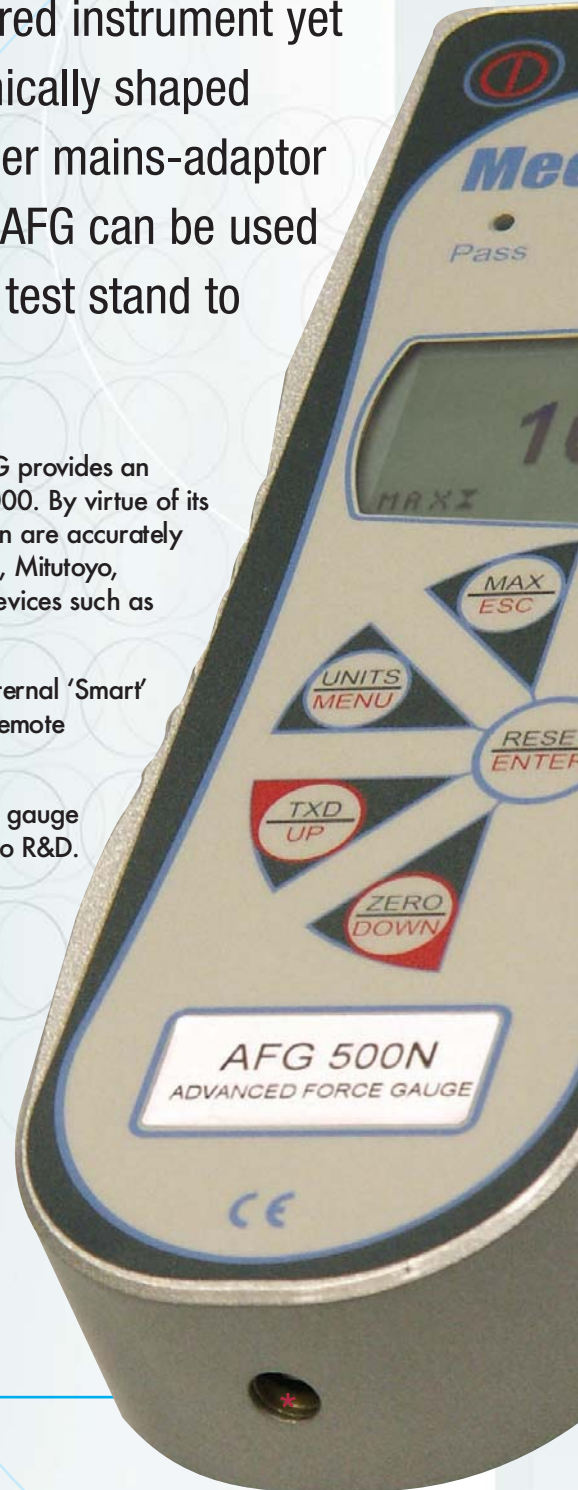
# AFG

The AFG is the most versatile and fully-featured instrument yet offered by Mecmesin. Housed in an ergonomically shaped rugged aluminium case and powered by either mains-adaptor or standard rechargeable AAA batteries. The AFG can be used hand-held or fixed to a manual or motorised test stand to enable testing under controlled conditions.

Comprising 10 different models ranging from 2.5N up to 2500N, the AFG provides an impressive accuracy of  $\pm 0.1\%$  of full scale with a resolution of 1 part in 5000. By virtue of its 5000Hz internal sampling rate, peak readings for tension and compression are accurately and repeatably captured. The configurable bi-directional interface (RS232, Mitutoyo, Analogue) ensures full data transfer and communication with peripheral devices such as PC's, data-loggers and Mecmesin test stands.

For added flexibility the AFG is able to recognise data from a range of external 'Smart' force and torque transducers, so you can use it as a universal display for remote applications, (see pages 5 to 9).

The dual level design of the keypad ensures that operation of this powerful gauge is kept simple, thereby making it ideal for use from shop floor production to R&D.



AFG in carry case (see page 13 for accessories included)



PET bottle top-load test, using an AFG with MultiTest 1 motorised test stand

\* loadcell stud 10/32 UNF male  
(5/16 UNC male for AFG 2500N)

# The Advanced Force Gauge



## Key features

- Tension and compression measuring
- Accuracy  $\pm 0.1\%$  of full scale
- 1st and ultimate peak capture
- Data output RS232, Mitutoyo, analogue
- Internal sampling rate 5000Hz
- External 'Smart' force & torque transducer
- Ability to invert display on gauge
- Test stand mountable
- Full unit conversion of displayed value
- Overload warning with trend bar
- On-board memory 100 readings
- Pass/Fail alarms
- External trigger (freeze reading of switch contact)
- Diagnostic check of loadcell
- Wide range of grips and fixtures

## AFG Specification Table

Model	Part No.	mN	N	kN	gf	kgf	ozf	lbf
AFG 2.5	850-412	2,500 x 0.5	2.5 x 0.0005	-	250 x 0.05	-	9 x 0.002	0.55 x 0.0001
AFG 5	850-413	5,000 x 1	5 x 0.001	-	500 x 0.1	0.5 x 0.0001	18 x 0.005	1.1 x 0.0002
AFG 10	850-414	10,000 x 2	10 x 0.002	-	1,000 x 0.2	1 x 0.0002	35 x 0.01	2.2 x 0.0005
AFG 25	850-415	25,000 x 5	25 x 0.005	-	2,500 x 0.5	2.5 x 0.0005	90 x 0.02	5.5 x 0.001
AFG 50	850-416	50,000 x 10	50 x 0.01	-	5,000 x 1	5 x 0.001	180 x 0.05	11 x 0.002
AFG 100	850-417	-	100 x 0.02	-	10,000 x 2	10 x 0.002	350 x 0.1	22 x 0.005
AFG 250	850-418	-	250 x 0.05	-	25,000 x 5	25 x 0.005	900 x 0.2	55 x 0.01
AFG 500	850-419	-	500 x 0.1	-	50,000 x 10	50 x 0.01	1,800 x 0.5	110 x 0.02
AFG 1000	850-420	-	1,000 x 0.2	1 x 0.0002	-	100 x 0.02	3,500 x 1	220 x 0.05
AFG 2500	850-421	-	2,500 x 0.5	2.5 x 0.0005	-	250 x 0.05	9,000 x 2	550 x 0.1

- Accuracy  $\pm 0.1\%$  of full scale
- Full scale deflection of loadcell typically 0.5mm
- Calibrated analogue output:  $0 \pm 4Vdc$  full scale (available on request)

# AFTI

## The Advanced Force & Torque Indicator

The AFTI display is a high-specification, rechargeable battery-powered display, (without internal loadcell) for use solely with Mecmesin's 'Smart' transducers.

The 'Smart' transducers are fully interchangeable without the need for additional calibration of either the display or the transducer. Force & torque readings are displayed in all common units of measurement, with a sampling rate of 5000Hz, ensuring highly accurate peak data capture.

The AFTI is supplied in a rugged carry case, together with a mains adaptor/charger.

'Smart' transducers can also be used with the Mecmesin AFG (Advanced Force Gauge fitted with internal loadcell), see page 2.

\* display is shown for indication purpose only. Requires "Smart" transducer to be connected (not shown)



### Key features

- Tension, compression, torque measurement
- Data output RS232, Mitutoyo, analogue
- Full unit conversion of displayed value
- Overload warning with trend bar
- On-board memory of 100 readings
- Internal sampling rate 5000Hz
- 1st and ultimate peak capture
- Pass/fail alarms
- External trigger (freeze reading of switch contact)

# 'Smart' Force & Torque Transducers

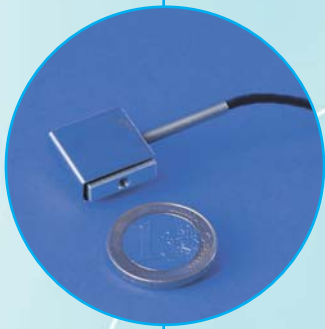
For added flexibility both the AFG and AFTI display are able to recognise data from a range of external 'Smart' force and torque transducers.

All transducers are fully interchangeable with 1.5m cable length and are supplied in cardboard transit cases, with Calibration Certificates traceable to UK National Standards. Ruggedised plastic cases are available on request (please contact our sales department for further details).

Overload protection by software warning is typically 120% of full scale for all items (without accessories), with additional mechanical overload protection being up to a minimum of 150% of full scale.

All gauges and sensors are calibrated under controlled laboratory conditions at a temperature of  $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . Resolution for all sensors is 1:5000 - e.g. a 5000N loadcell resolves to 1N.





# Tension & Compression

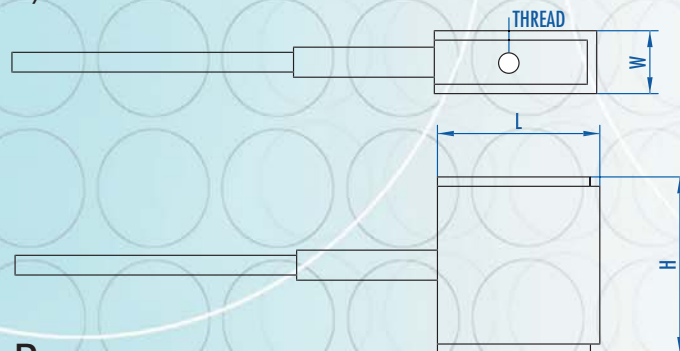
## Junior S-Beam

The junior S-Beam is suitable for tension and compression measuring. Ideal for applications where available space is limited. Dedicated fixtures can be fitted via threaded holes.



Model	Part No.	L mm	W mm	H mm	Thread
1N/100gf/3.5ozf	870 - 101	17	7	19	M3 x 0.5
2.5N/250gf/9ozf	870 - 102	17	7	19	M3 x 0.5
5N/500gf/18ozf	870 - 103	17	7	19	M3 x 0.5
10N/1kgf/2.2lbf	870 - 104	17	7	19	M3 x 0.5
25N/2.5kgf/5.5lbf	870 - 105	17	7	19	M3 x 0.5
50N/5kgf/11lbf	870 - 106	17	7	19	M3 x 0.5
100N/10kgf/22lbf	870 - 107	17	7	19	M3 x 0.5
250N/25kgf/55lbf	870 - 108	17	7	19	M3 x 0.5
500N/50kgf/110lbf	870 - 109	17	7	19	M3 x 0.5

Accuracy  $\pm 0.25\%$  of full scale



## S-Beam

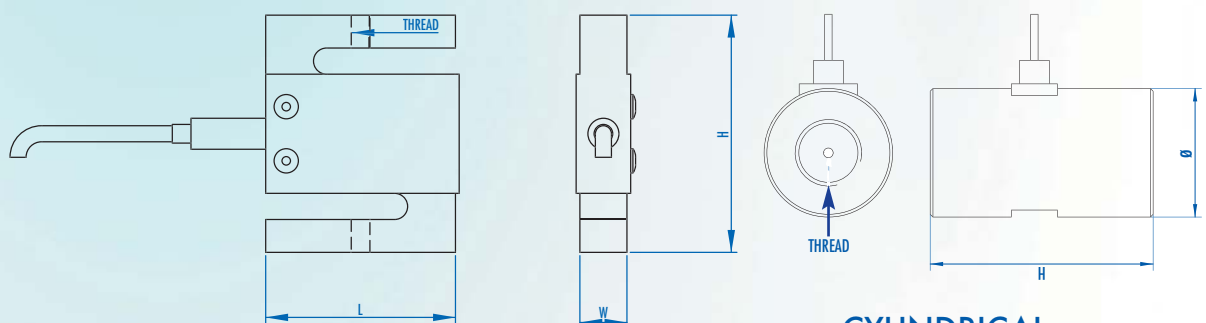
The S-Beam provides an economical solution to general force measurement applications where space is not restricted. Dedicated fixtures can be fitted via threaded holes.



Model	Part No.	L mm	W mm	H mm	Thread
100N/10kgf/22lbf	870 - 002	51	13	64	M6 x 1
200N/20kgf/44lbf	870 - 004	51	13	64	M6 x 1
500N/50kgf/110lbf	870 - 009	51	13	64	M6 x 1
1000N/100kgf/220lbf	870 - 001	51	13	64	M10 x 1.5
2500N/250kgf/550lbf	870 - 006	51	25	76	M12 x 1.75
5000N/500kgf/1100lbf	870 - 008	51	25	76	M12 x 1.75
10kN/1000kgf/2200lbf	870 - 003	51	25	76	M12 x 1.75
25kN/2500kgf/5500lbf	870 - 007	64	38	89	M16 x 2

Cylindrical	Part No.	$\phi$ mm	H mm	Thread
* 50kN/5000kgf/11000lbf	870 - 011	70	120	M36 x 3
* 100kN/10000kgf/22000lbf	870 - 010	70	120	M36 x 3

Accuracy  $\pm 0.25\%$  of full scale \* Uni-directional calibration (please specify tension or compression)



S-BEAM

CYLINDRICAL

# Load Button Cell

The Load Button Cell is a miniature sensor for compression measurement only, where available space is very limited.



## Miniature Series

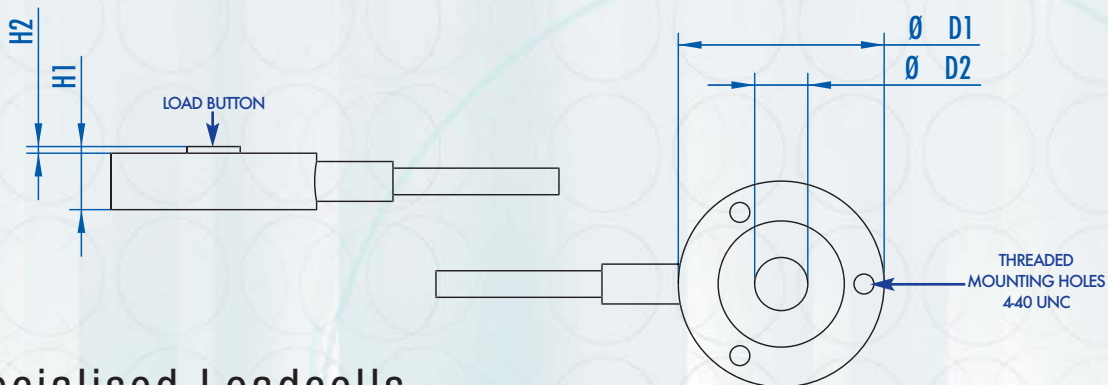
Model	Part No.	Capacity	ØD1mm	ØD2mm	H1 mm	H2 mm
L16010	878 - 008	100N/10kgf/22lbf	25	5	8	1
	878 - 009	250N/25kgf/55lbf	25	5	8	1
	878 - 010	500N/50kgf/110lbf	25	5	8	1
L16020	878 - 011	1000N/100kgf/220lbf	31	8	10	1
	878 - 012	2500N/250kgf/550lbf	31	8	10	1
	878 - 013	5000N/500kgf/1100lbf	31	8	10	1
	878 - 014	10kN/1000kgf/2200lbf	31	8	10	1
L16030	878 - 015	20kN/2000kgf/5500lbf	38	11	16	2
	878 - 016	50kN/5000kgf/11000lbf	38	11	16	2

Accuracy ±1% of full scale

## Sub-miniature Series

Model	Part No.	Capacity	ØD1mm	ØD2mm	H1 mm	H2 mm
L1630	878 - 001	50N/5kgf/11lbf	19	3	6	1
	878 - 002	100N/10kgf/22lbf	19	3	6	1
	878 - 003	250N/25kgf/55lbf	19	3	6	1
	878 - 004	500N/50kgf/110lbf	19	3	6	1
	878 - 005	1000N/100kgf/220lbf	19	3	6	1
	878 - 006	5000N/500kgf/1100lbf	19	3	6	1

Accuracy ±1% of full scale

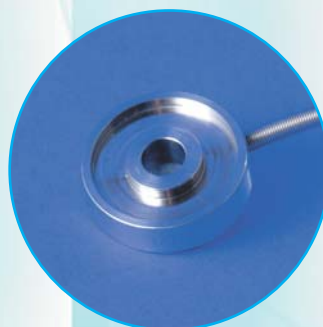


## Specialised Loadcells

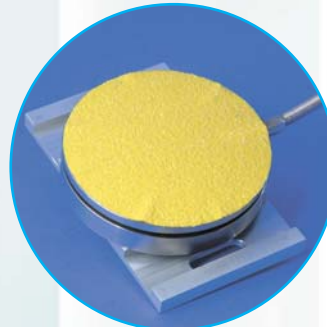
In addition to the standard range of sensors, Mecmesin also offers specialised loadcells dedicated to specific applications. A few examples are shown below. Contact our sales department for further details.



Pinch Sensor



Donut Loadcell



Pedal Force Accelerator



Hand Gripper

# Static & Rotary Torque

## Static Torque Transducer

For mounting to a bench or integrating into a complete test rig. Equipped with male square drive for easy fitting of adaptors.

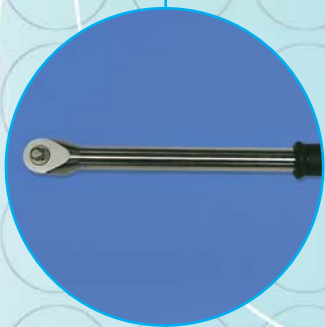


Model	Part No.	Capacity	Sq Drive Male	H mm	W mm	D mm
ST15	872 - 006	15N.m/150kgf.cm/130lbf.in	3/8"	32	80	90
ST60	872 - 008	60N.m/600kgf.cm/520lbf.in	3/8"	32	80	90
ST100	872 - 003	100N.m/1000kgf.cm/870lbf.in	1/2"	38	80	90
ST150	872 - 005	150N.m/1500kgf.cm/1300lbf.in	1/2"	38	80	90

Accuracy  $\pm 0.5\%$  of full scale

## Static Torque Wrench

For medium capacity applications where it is more practical to apply torque by a lever arm. Equipped with male square drive for easy fitting of adaptors.



Model	Part No.	Capacity	Sq Drive	L mm	H mm	Weight
TW15	873 - 003	15N.m/150kgf.cm/130lbf.in	3/8"	280	25	800g
TW60	873 - 005	60N.m/600kgf.cm/520lbf.in	3/8"	355	25	950g
TW150	873 - 006	150N.m/1500kgf.cm/1300lbf.in	1/2"	508	25	1200g

Accuracy  $\pm 0.5\%$  of full scale

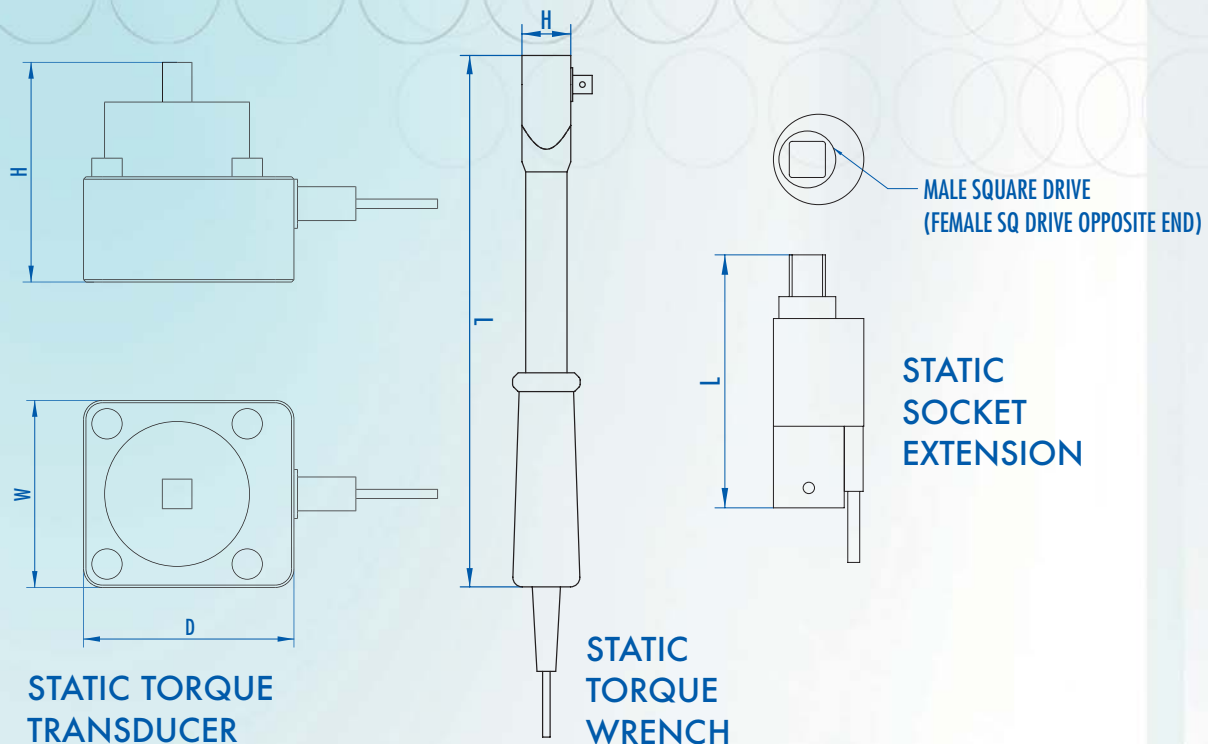
## Static Socket Extension

For low capacity applications, where space is limited. Fitted with male/female square drives for easy fitting of drivers.



Model	Part No.	Capacity	Sq Drive	L mm
SE3	871 - 201	3N.m/30kgf.cm/26lbf.in	1/4"	50.8
SE6	871 - 202	6N.m/60kgf.cm/50lbf.in	1/4"	50.8
SE10	871 - 203	10N.m/100kgf.cm/90lbf.in	1/4"	50.8

Accuracy  $\pm 0.5\%$  of full scale



# Static Torque Screwdriver

For low capacity applications. Used as hand-held devices or mounted in a bench stand (type TS only). Not suitable for applications which require multiple rotations of the sensor - use rotary torque transducers below.



Model	Part No.	Capacity	Drive	L mm	Ø mm	Weight
H1	871 - 100	10mN.m/100gf.cm/1.4ozf.in	3h7* push-fit female	115	16	130g
H5	871 - 101	50mN.m/500gf.cm/8ozf.in	3h7* push-fit female	115	16	130g
H10	871 - 102	100mN.m/1000gf.cm/15ozf.in	3h7* push-fit female	115	16	130g
H50	871 - 103	500mN.m/5kgf.cm/5lbf.in	1/4*** hex female	124	22	280g
H100	871 - 104	1N.m/10kgf.cm/9lbf.in	1/4*** hex female	124	22	280g
TS1.5	871 - 002	1.5N.m/15kgf.cm/13lbf.in	3/8" sq male/3 jaw chuck	143	43	660g
TS3	871 - 003	3N.m/30kgf.cm/26lbf.in	3/8" sq male/3 jaw chuck	143	43	660g
TS6	871 - 005	6N.m/60kgf.cm/53lbf.in	3/8" sq male/3 jaw chuck	143	43	660g
TS10	871 - 001	10N.m/100kgf.cm/90lbf.in	3/8" sq male/3 jaw chuck	143	43	660g

\*with clamping screw \*\* with hold spring Accuracy ±0.5% of full scale



# Rotary Torque Transducers

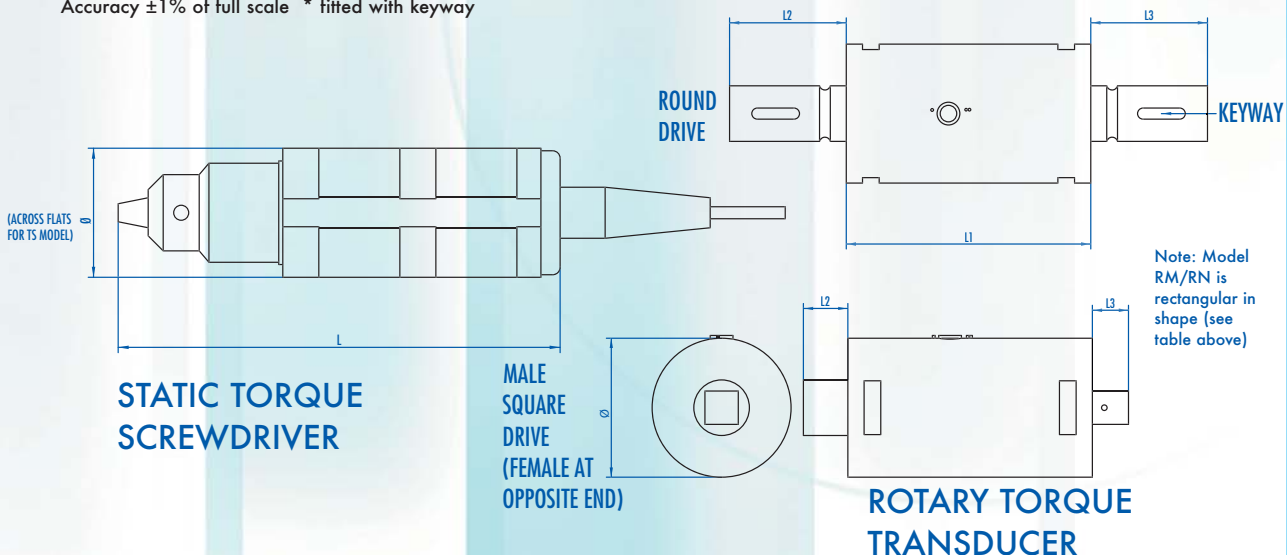
A complete range of sensors for measuring rotary torque. Suitable for applications with multiple revolutions (e.g.window-winder torque tools).



Model	Part No.	Capacity	Drive	L1 mm	L2 mm	L3 mm	H mm	W mm	Max rpm
RM 50	877 - 010	50mN.m/500gf.cm/8ozf.in	Ø 9mm round	51	19	28	46	20	5000
RM 500	877 - 011	500mN.m/5000gf.cm/5lbf.in	1/4" hex female	51	19	28	46	20	1000
RN1	877 - 012	1N.m/10kgf.cm/9lbf.in	1/4" hex female	51	19	28	46	20	1000

Model	Part No.	Capacity	Drive	L1 mm	L2 mm	L3 mm	Ø mm	Max rpm
FAST 2N.m sq	877 - 020	2N.m/20kgf.cm/18lbf.in	1/4" square	70	16	10	40	1000
FAST 2N.m rd	877 - 021	2N.m/20kgf.cm/18lbf.in	Ø 9mm round*	70	28	28	40	5000
FAST 6N.m sq	877 - 022	6N.m/60kgf.cm/53lbf.in	1/4" square	70	16	10	40	1000
FAST 6N.m rd	877 - 023	6N.m/60kgf.cm/53lbf.in	Ø 9mm round*	70	28	28	40	5000
FAST 15N.m sq	877 - 024	15N.m/150kgf.cm/133lbf.in	1/4" square	70	16	10	40	1000
FAST 15N.m rd	877 - 025	15N.m/150kgf.cm/133lbf.in	Ø 9mm round*	70	28	28	40	5000
FAST 60N.m sq	877 - 026	60N.m/600kgf.cm/530lbf.in	3/8" square*	70	24	13	50	1000
FAST 60N.m rd	877 - 027	60N.m/600kgf.cm/530lbf.in	Ø 14mm round*	70	28	28	50	5000
FAST 150N.m sq	877 - 028	150N.m/15.3kgf.m/111lbf.ft	1/2" square	70	35	19	50	1000
FAST 150N.m rd	877 - 029	150N.m/15.3kgf.m/111lbf.ft	Ø 19mm round*	70	55	55	50	5000

Accuracy ±1% of full scale \* fitted with keyway



# BFG

The BFG series of force gauges is designed for easy operation and provides outstanding force measurement performance and reliability at an affordable price.

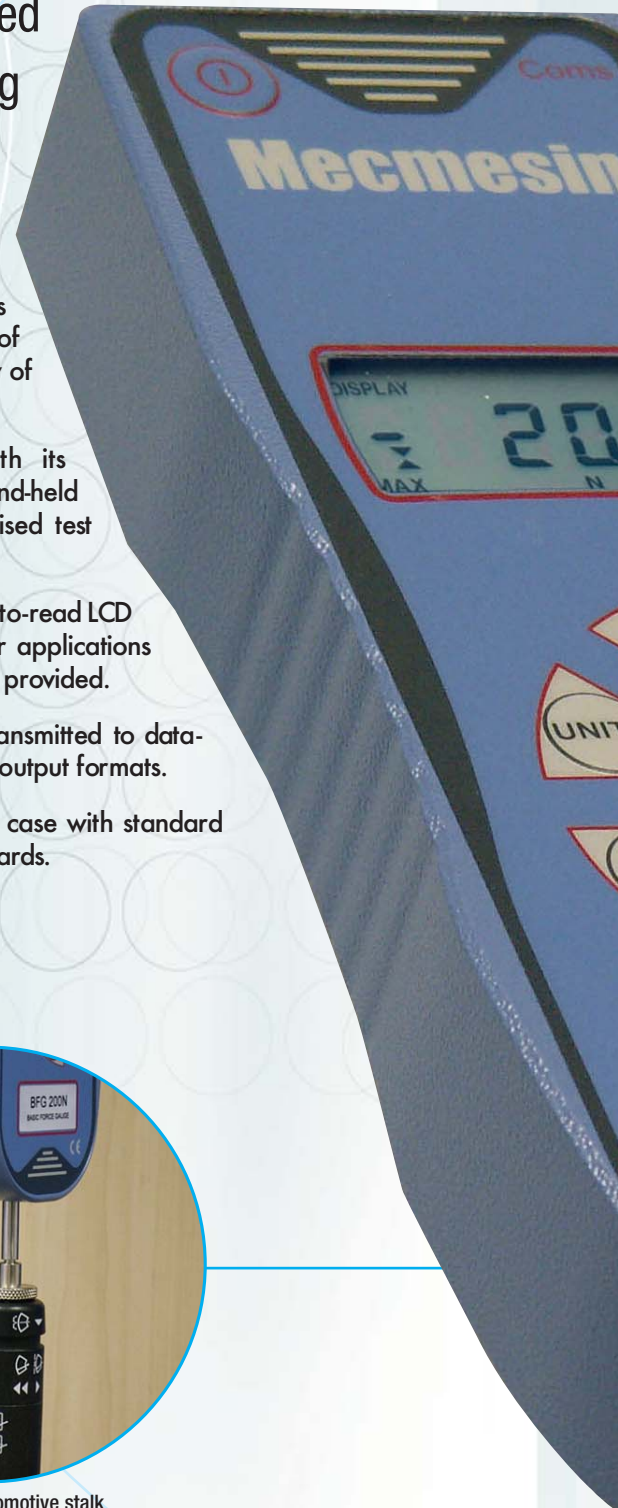
Available in 6 capacities from 10N to 2500N, the BFG features superb accuracy of  $\pm 0.25\%$  of full scale and a sampling rate of 1,000 times per second, making it ideally suited for a wide variety of tension/compression applications.

Constructed in a rigid yet lightweight aluminium housing, with its ergonomically attractive shape, the BFG can be used as a hand-held instrument, or alternatively it can be mounted to manual or motorised test stands to allow testing under more controlled conditions.

Peak readings in tension or compression can be captured on the easy-to-read LCD display with full conversion between all units of measurement. For applications requiring load to be continuously monitored, a 'live' display mode is provided.

Using the data-output connector and interface cable, results can be transmitted to data-loggers, PC's and printers in RS232, Mitutoyo digimatic and analogue output formats.

All models carry CE marking and are supplied in a robust carrying case with standard accessories and a calibration certificate traceable to UK national standards.



BFG in carry case (see page 13 for accessories included)



BFG testing automotive stalk

# The Basic Force Gauge

## BFG Specification Table

Model	Part No	mN	N	kN	gf	kgf	ozf	lbf
BFG 10	853 - 410	10,000 x 2	10 x 0.002	-	1,000 x 0.2	1 x 0.0002	35 x 0.01	2.2 x 0.0005
BFG 50	853 - 411	50,000 x 10	50 x 0.01	-	5,000 x 1	5 x 0.001	180 x 0.05	11 x 0.002
BFG 200	853 - 412	-	200 x 0.05	-	20,000 x 5	20 x 0.005	720 x 0.2	44 x 0.01
BFG 500	853 - 413	-	500 x 0.1	-	50,000 x 10	50 x 0.01	1,800 x 0.5	110 x 0.02
BFG 1000	853 - 414	-	1,000 x 0.2	1 x 0.0002	-	100 x 0.02	3,500 x 1	220 x 0.05
BFG 2500	853 - 417	-	2,500 x 0.5	2.5 x 0.0005	-	250 x 0.05	9,000 x 2	550 x 0.1

- Accuracy  $\pm 0.25\%$  of full scale
- Calibration temperature  $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$
- Operating temperature  $10^{\circ}\text{C} - 35^{\circ}\text{C}$



## Key features

- Tension and compression
- Accuracy  $\pm 0.25\%$  of full scale
- Data output RS232, Mitutoyo, analogue
- Sampling rate 1000Hz
- Full unit conversion of displayed value
- Powered by 4 nickel metal hydride rechargeable batteries
- M5 mounting holes (57mm pitch) for test stand fixing
- Wide range of gripping fixtures and accessories
- Ergonomic design for handheld use

\* loadcell stud 10/32 UNF male  
(5/16 UNC male for BFG 2500N)

# CFG The Compact Force Gauge

The CFG is a pocket-sized, light-weight force gauge designed for elementary tension and compression measurement.

Housed in a plastic case and powered by disposable AA batteries, the CFG is available in either 50N, 200N or 500N capacity. Measurements can be made in N, lbf, ozf, kgf, and gf with a resolution of 1:1000 or better. The CFG has an accuracy of  $\pm 0.5\%$  of full scale with peak force data being captured at 10Hz in both tension and compression.

The CFG provides a simple digital alternative to traditional analogue spring balances and is ideal for users with a limited budget, who only measure on an occasional basis for non-critical applications.



## Key features

- Low cost
- M6 loadcell stud thread
- Data sampling rate 10Hz
- Accuracy  $\pm 0.5\%$  of full scale
- Declaration of conformity as standard (Calibration Certificate available on request)
- Peak hold

## CFG Specification Table

Model No.	Part No.	N	kgf	lbf
CFG 50	860 - 011	50 x 0.05	5 x 0.005	11 x 0.01
CFG 200	860 - 010	200 x 0.2	20 x 0.02	44 x 0.05
CFG 500	860 - 012	500 x 0.5	50 x 0.05	110 x 0.1

• Accuracy  $\pm 0.5\%$  of full scale



CFG Testing fire extinguisher



CFG with standard accessories (see page 13 for accessories included)

# Accessories

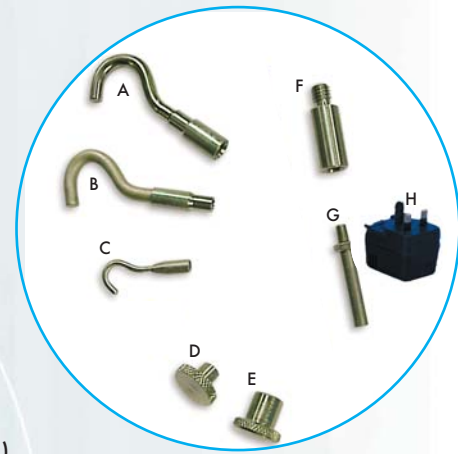
Each Mecmesin gauge comes with a set of standard accessories to help perform basic tension or compression tests.

Choose from a wide selection of standard grips and fixtures to hold your test samples. Alternatively make use of our experienced team of engineers to provide a customised grip to solve your particular problem.

A collection of accessories exclusive to Mecmesin is available. See our Accessories Catalogue for an extensive range of grips and fixtures, to enable you to complete thousands of different tests.

- A 6mm  $\varnothing$  - 5-16 UNC thread (432-122)
- B 6mm  $\varnothing$  - M6 (432-169)
- C 3.2mm  $\varnothing$  - M6 (432-171)
- D 19mm  $\varnothing$  - M6 (F) (432-005)
- E 19mm  $\varnothing$  - 5-16 UNC (F) (432-125)
- F 30mm long - 5-16 UNC (F-M) (432-008)
- G 30mm long - 10-32 UNF to M6 (F-M) (432-007)
- H Mains adaptor/charger (304-004) - 220V 2-pin round  
(304-005) - 220V 3-pin square  
(304-006) - 110V 2-pin flat

\* Part numbers shown in brackets



## Table of standard accessories delivered with each gauge:

Model	A	B	C	D	E	F	G	H
AFG 2.5, 5, 10, 25 & 50N			•	•			•	•
AFG 100, 250, 500 & 1000N		•		•			•	•
AFG 2500N	•				•	•		•
BFG 10 & 50N			•	•			•	•
BFG 200, 500 & 1000N		•		•			•	•
BFG 2500N	•				•	•		•
CFG 50N			•	•			•	
CFG 200N		•		•			•	
CFG 500N		•		•			•	

## Service Repair and Calibration

Mecmesin, the UK leading supplier of force and torque measurement equipment, believes that all customers deserve the highest level of on-going service and support. As we recognise the value of a quick and efficient service we have set up an on-site calibration service to complement our comprehensive existing in-house capability. Our qualified engineers will come to you to carry out the calibration procedure. The service is managed from our head office situated in Slinfold, West Sussex where, whichever the preferred option on or off site calibration, we guarantee a prompt and cost-effective service.

### Test Stands

To ensure repeatable testing under controlled conditions, mount your Mecmesin gauge to a motorised or manual test stand.

### Software Systems

From a simple mini-printer to full computer-controlled testing systems, Mecmesin can offer you a complete solution. Call our sales department to arrange a demonstration at your facility.



AFG mounted on MultiTest 1 stand



MultiTest-i computer-controlled testing system

# Mecmesin

## Force and Torque Test Solutions

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