




Specifications - Force and Torque Indicators

	 Model M71 Professional	 Model M51 Advanced	 Model M31 Basic
Accuracy (% of full scale)	±0.1 + sensor		±0.2% + sensor
Sensor password protection	Yes		No
Sampling rate	14,000 Hz	7,000 Hz	2,000 Hz
Resolution	1/2,000 or 1/1,000, depending on sensor		1/1,000
Outputs	USB, RS-232, Mitutoyo, Analog		USB
RS-232	Configurable up to 230,400 baud	Configurable up to 115,200 baud	No
USB	Configurable up to 230,400 baud	Configurable up to 115,200 baud	
Mitutoyo (Digimatic)	Serial BCD suitable for all Mitutoyo SPC-compatible devices		No
Analog	±1 VDC, ±2% FS, + for compression / CW, - for tension / CCW		No
General purpose I/O	Three open drain outputs, one input		No
Set point	Three open drain lines		No
MESUR® Lite software included	Yes		
Data output functionality	Automatic output or by pressing DATA button, or requesting from a PC or other device		By pressing DATA button, or requesting from a PC or other device (currently displayed reading only)
ASCII command set for external control	Full command set		"?" only (request current reading)
Communication with MESUR® gauge and MESUR® Lite software	Full communication		Send single reading from gauge only, cannot request from software
Communication with ESM301 test stand and Series DC test stand controllers	Full communication, including PC control		No
Data memory	5,000 readings, with output	1,000 readings, with output	No
Data memory deletion	Individual data points, or clear all		N/A
Statistics calculations and output to PC	Max, min, mean, std. dev., number of readings, with output		No
Break detection	Yes*		No
1st / 2nd peak detection	Yes*		No
Programmable footswitch command string	Yes*		No
Averaging mode	Yes*	Yes	No
External trigger mode	Yes**	Yes	No
Analog load bar graph shown on display	Yes		
Set points (for pass/fail indication)	Yes, with high/low indicators		
Keypad password protection	Yes, for calibration and keys		No
Peak readings always displayed	Yes		
Programmable audible tones	Yes		
Calibration procedure	Configurable number of data points (up to 10 in each direction)		
Overload outputs	Dedicated pins for tension and compression		No
No. of units of measurement	5		3
Battery life (with backlight on/off)	Up to 7 hours of continuous use / Up to 24 hours of continuous use		
Weight	0.7 lb [0.3 kg]		
Included items	Carrying case, universal voltage AC adapter, battery, quick-start guide, USB cable, and certificate of conformance. Download free MESUR® Lite or MESUR® Gauge demo period at mark-10.com/software .		

* With configurable automatic data output, data storage, and zero function upon event completion. Can also stop travel of certain motorized test stands.

** Can stop travel of certain motorized test stands upon event completion.



Ordering Information - Force Sensors

Model No.	Capacity x Resolution - with Model 7I & 5I indicators						Capacity x Resolution - with Model 3I indicator				Accuracy* (±% FS)	Safe Overload	
	lbF	ozF	gF	kgF	N	kN	lbF	kgF	N	kN			
R01**	MR01-50	50 x 0.02	800 x 0.5	25000 x 10	25 x 0.01	250 x 0.1	-	50 x 0.05	25 x 0.02	250 x 0.2	-	0.15%	150%
	MR01-100	100 x 0.05	1600 x 1	50000 x 20	50 x 0.02	500 x 0.2	-	100 x 0.1	50 x 0.05	500 x 0.5	-		
	MR01-200	200 x 0.1	3200 x 2	-	100 x 0.05	1000 x 0.5	1 x 0.0005	200 x 0.2	100 x 0.1	1000 x 1	-		
	MR01-300	300 x 0.2	4800 x 5	-	150 x 0.1	1500 x 1	1.5 x 0.001	300 x 0.5	150 x 0.2	1500 x 2	-		
	MR01-500	500 x 0.2	8000 x 5	-	250 x 0.1	2500 x 1	2.5 x 0.001	500 x 0.5	250 x 0.2	2500 x 2	-		
	MR01-1000	1000 x 0.5	16000 x 10	-	500 x 0.2	5000 x 2	5 x 0.002	1000 x 1	500 x 0.5	5000 x 5	-		
	MR01-1500	1500 x 1	24000 x 20	-	750 x 0.5	7500 x 5	7.5 x 0.005	1500 x 2	750 x 1	7500 x 10	-		
	MR01-2000	2000 x 1	32000 x 20	-	1000 x 0.5	10000 x 5	10 x 0.005	2000 x 2	1000 x 1	10000 x 10	-		
	MR01-5000	5000 x 2	-	-	2500 x 1	25000 x 10	25 x 0.01	5000 x 5	2500 x 2	-	25 x 0.02		
	MR01-10000	10000 x 5	-	-	5000 x 2	50000 x 25	50 x 0.02	10000 x 10	5000 x 5	-	50 x 0.05		
R02	MR02-100	100 x 0.05	1600 x 1	50000 x 20	50 x 0.02	500 x 0.2	-	100 x 0.1	50 x 0.05	500 x 0.5	-	0.5%	150%
	MR02-200	200 x 0.1	3200 x 2	-	100 x 0.05	1000 x 0.5	1 x 0.0005	200 x 0.2	100 x 0.1	1000 x 1	-		
	MR02-500	500 x 0.2	8000 x 5	-	250 x 0.1	2500 x 1	2.5 x 0.001	500 x 0.5	250 x 0.2	2500 x 2	-		
	MR02-1000	1000 x 0.5	16000 x 10	-	500 x 0.2	5000 x 2	5 x 0.002	1000 x 1	500 x 0.5	5000 x 5	-		
	MR02-2000	2000 x 1	32000 x 20	-	1000 x 0.5	10000 x 5	10 x 0.005	2000 x 2	1000 x 1	10000 x 10	-		
	MR02-5000	5000 x 2	-	-	2500 x 1	25000 x 10	25 x 0.01	5000 x 5	2500 x 2	-	25 x 0.02		
	MR02-10000	10000 x 5	-	-	5000 x 2	50000 x 25	50 x 0.02	10000 x 10	5000 x 5	-	50 x 0.05		
R03**	MR03-025	0.25 x 0.0001	4 x 0.002	100 x 0.05	-	1 x 0.0005	1000 x 0.5 mN	0.25 x 0.0002	100 x 0.1 gF	1 x 0.001	-	0.15%	200%
	MR03-05	0.5 x 0.0002	8 x 0.005	250 x 0.1	-	2.5 x 0.001	2500 x 1 mN	0.5 x 0.0005	250 x 0.2 gF	2.5 x 0.002	-		
	MR03-2	2 x 0.001	32 x 0.02	1000 x 0.5	1 x 0.0005	10 x 0.005	-	2 x 0.002	1 x 0.001	10 x 0.01	-		
	MR03-5	5 x 0.002	80 x 0.05	2500 x 1	2.5 x 0.001	25 x 0.01	-	5 x 0.005	2.5 x 0.002	25 x 0.02	-		
	MR03-10	10 x 0.005	160 x 0.1	5000 x 2	5 x 0.002	50 x 0.02	-	10 x 0.01	5 x 0.005	50 x 0.05	-		150%
	MR03-20	20 x 0.01	320 x 0.2	10000 x 5	10 x 0.005	100 x 0.05	-	20 x 0.02	10 x 0.01	100 x 0.1	-		
	MR03-50	50 x 0.02	800 x 0.5	25000 x 10	25 x 0.01	250 x 0.1	-	50 x 0.05	25 x 0.02	250 x 0.2	-		
	MR03-100	100 x 0.05	1600 x 1	50000 x 20	50 x 0.02	500 x 0.2	-	100 x 0.1	50 x 0.05	500 x 0.5	-		
R04	MR04-025	0.25 x 0.0001	4 x 0.002	100 x 0.05	-	1 x 0.0005	1000 x 0.5 mN	0.25 x 0.0002	100 x 0.1 gF	1 x 0.001	-	0.2%	200%
	MR04-05	0.5 x 0.0002	8 x 0.005	250 x 0.1	-	2.5 x 0.001	2500 x 1 mN	0.5 x 0.0005	250 x 0.2 gF	2.5 x 0.002	-		
	MR04-2	2 x 0.001	32 x 0.02	1000 x 0.5	1 x 0.0005	10 x 0.005	-	2 x 0.002	1 x 0.001	10 x 0.01	-		
	MR04-5	5 x 0.002	80 x 0.05	1000 x 0.5	2.5 x 0.001	25 x 0.01	-	5 x 0.005	2.5 x 0.002	25 x 0.02	-		
	MR04-10	10 x 0.005	160 x 0.1	5000 x 2	5 x 0.002	50 x 0.02	-	10 x 0.01	5 x 0.005	50 x 0.05	-		
	MR04-20	20 x 0.01	320 x 0.2	10000 x 5	10 x 0.005	100 x 0.05	-	20 x 0.02	10 x 0.01	100 x 0.1	-		
	MR04-50	50 x 0.02	800 x 0.5	25000 x 10	25 x 0.01	250 x 0.1	-	50 x 0.05	25 x 0.02	250 x 0.2	-		
	MR04-100	100 x 0.05	1600 x 1	50000 x 20	50 x 0.02	500 x 0.2	-	100 x 0.1	50 x 0.05	500 x 0.5	-		
R05	MR05-500	500 x 0.2	8000 x 5	-	250 x 0.1	2500 x 1	2.5 x 0.001	500 x 0.5	250 x 0.2	2500 x 2	-	0.15%	150%
R06	MR06-200	200 x 0.1	3200 x 2	-	100 x 0.05	1000 x 0.5	1 x 0.0005	200 x 0.2	100 x 0.1	1000 x 1	-	0.5%	150%

All sensors include a Plug & Test® connector for interfacing directly with an M7I, M5I or M3I indicator. NIST-traceable certificate of calibration with data is also included.

* Accuracy refers to the sensor only. Total accuracy includes the indicator's accuracy (±0.1% or ±0.2%). For example, the total accuracy of the MR50-50 sensor with M5I indicator equals ±0.35% + ±0.1% = ±0.45% FS.

** Add suffix "-1" for shortened cable, for use on ESM303(H), ESM750, and ESM1500 test stands. Ex: MR01-1000-1. Test stand mounting hardware is included.

Ordering Information - Torque Sensors

Model No.	Capacity x Resolution with Model M7I & M5I indicators								Capacity x Resolution with Model M3I indicator				Accuracy * (±% FS)	Safe Overload	
	ozFin	lbFin	lbFft	gFcm	kgFmm	Nmm	Ncm	Nm	ozFin	lbFin	kgFmm	Ncm			
R50	MR50-10Z	10 x 0.005	-	-	700 x 0.5	7 x 0.005	70 x 0.05	7 x 0.005	-	10 x 0.01	-	7 x 0.005	7 x 0.005	0.35%	300%
	MR50-20Z	20 x 0.01	-	-	1400 x 1	14 x 0.01	140 x 0.1	14 x 0.01	-	20 x 0.02	-	14 x 0.01	14 x 0.01		
	MR50-50Z	50 x 0.02	-	-	3600 x 2	36 x 0.02	350 x 0.2	35 x 0.02	-	50 x 0.05	-	36 x 0.05	35 x 0.05		
	MR50-12	192 x 0.1	12 x 0.005	1 x 0.0005	-	-	-	135 x 0.1	1.35 x 0.001	192 x 0.2	12 x 0.01	-	135 x 0.1		150%
	MR50-50	800 x 0.5	50 x 0.02	4 x 0.002	-	-	-	570 x 0.5	5.7 x 0.005	800 x 1	50 x 0.05	-	570 x 0.5		
	MR50-100	1600 x 1	100 x 0.05	8 x 0.005	-	-	-	1150 x 1	11.5 x 0.01	1600 x 2	100 x 0.1	-	1150 x 1		
R51	MR51-10Z	10 x 0.005	-	-	700 x 0.5	7 x 0.005	70 x 0.05	7 x 0.005	-	10 x 0.01	-	7 x 0.005	7 x 0.005	0.15%	300%
	MR51-20Z	20 x 0.01	-	-	1400 x 1	14 x 0.01	140 x 0.1	14 x 0.01	-	20 x 0.02	-	14 x 0.01	14 x 0.01		
	MR51-50Z	50 x 0.02	-	-	3600 x 2	36 x 0.02	350 x 0.2	35 x 0.02	-	50 x 0.05	-	36 x 0.05	35 x 0.05		
	MR51-12	192 x 0.1	12 x 0.005	1 x 0.0005	-	-	-	135 x 0.1	1.35 x 0.001	192 x 0.2	12 x 0.01	-	135 x 0.1		150%
	MR51-50	800 x 0.5	50 x 0.02	4 x 0.002	-	-	-	570 x 0.5	5.7 x 0.005	800 x 1	50 x 0.05	-	570 x 0.5		
	MR51-100	1600 x 1	100 x 0.05	8 x 0.005	-	-	-	1150 x 1	11.5 x 0.01	1600 x 2	100 x 0.1	-	1150 x 1		
R52	MR52-10Z	10 x 0.005	-	-	700 x 0.5	7 x 0.005	70 x 0.05	7 x 0.005	-	10 x 0.01	-	7 x 0.005	7 x 0.005	0.35%	300%
	MR52-20Z	20 x 0.01	-	-	1400 x 1	14 x 0.01	140 x 0.1	14 x 0.01	-	20 x 0.02	-	14 x 0.01	14 x 0.01		
	MR52-50Z	50 x 0.02	-	-	3600 x 2	36 x 0.02	350 x 0.2	35 x 0.02	-	50 x 0.05	-	36 x 0.05	35 x 0.05		
	MR52-12	192 x 0.1	12 x 0.005	1 x 0.0005	-	-	-	135 x 0.1	1.35 x 0.001	192 x 0.2	12 x 0.01	-	135 x 0.1		150%
	MR52-50	800 x 0.5	50 x 0.02	4 x 0.002	-	-	-	570 x 0.5	5.7 x 0.005	800 x 1	50 x 0.05	-	570 x 0.5		
	MR52-100	1600 x 1	100 x 0.05	8 x 0.005	-	-	-	1150 x 1	11.5 x 0.01	1600 x 2	100 x 0.1	-	1150 x 1		
R55	MR55-20	320 x 0.5	20 x 0.02	1.5 x 0.002	-	-	-	220 x 0.2	2 x 0.002	320 x 0.5	20 x 0.02	-	220 x 0.2	0.6%	150%
	MR55-50	800 x 1	50 x 0.05	4 x 0.005	-	-	-	570 x 0.5	5.7 x 0.005	800 x 1	50 x 0.05	-	570 x 0.5		
	MR55-100	1600 x 2	100 x 0.1	8 x 0.01	-	-	-	1150 x 1	11.5 x 0.01	1600 x 2	100 x 0.1	-	1150 x 1		
	MR55-200	-	200 x 0.2	16 x 0.02	-	2300 x 2	-	2200 x 2	22 x 0.02	-	200 x 0.2	2300 x 2	2200 x 2		
	MR55-400	-	400 x 0.5	32 x 0.05	-	4600 x 5	-	4500 x 5	45 x 0.05	-	400 x 0.5	4600 x 5	4500 x 5		
	MR55-1000	-	1000 x 1	80 x 0.1	-	11500 x 10	-	11000 x 10	110 x 0.1	-	1000 x 1	11500 x 10	11000 x 10		
	MR55-5000	-	5000 x 5	400 x 0.5	-	55 x 0.05 kgFm	-	55000 x 50	550 x 0.5	-	5000 x 5	55 x 0.05 kgFm	550 x 0.5 Nm		

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* Accuracy refers to the sensor only. Total accuracy includes the indicator's accuracy (±0.1% or ±0.2%).
Ex: the total accuracy of the MR50-50 sensor with M5I indicator equals ±0.35% + ±0.1% = ±0.45% FS.

** Add suffix "-1" for shortened cable, for use on ESM303(H), ESM750, and ESM1500 test stands.
Ex: MR01-1000-1. Test stand mousing hardware is included.