ULTRA-PRECISION DIFFERENTIAL FRICTION ANALYZER

(PULSE TECHNIQUE) MPFA-Series

Introduction: MPFA series of precision differential friction analyzer(static/dynamic) up are available in more than ten different models virtually offering tribological measurement solutions for fabiric,polymer,metal, ceramic ,srubber, Printed cartons ,Flexible packaging, Printing, Rubber, Paper, coating, composite, leather etc in Cartesian/radian co-ordinate system with facility to measure peak friction/average friction at different radial velocity/pressure simulated under different thermal conditions. It can effectively measures static/dynamic friction sample 9.0000 to 9999.9100.0 mili Newton.sec/rad under varied temperature, humidity conditions. These friction analyzer meters are offered. On account of above, these friction analyzer meters are first choice for paper, polymers, cosmetic, foam, leather, PVC, wood, cotton, insulator material, laminates, filters, civil structure, soil, fins, food items etc medical diagnostic, agro, biomedical, petrochemical, automobile, organic/inorganic chemical, milk plant, sugar, textiles, beverages, water management/treatment, academic and defense. These friction analyzers are available for various functions namely……

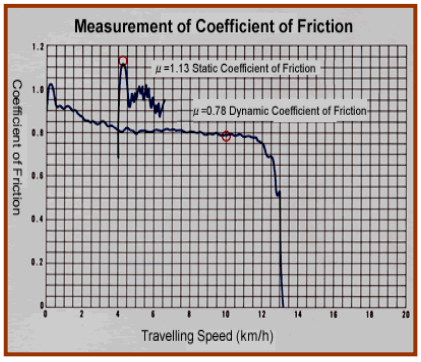
1. **Low Pressure/low R.P.M. 2. High Pressure/Low R.P.M. 3. Low Pressure/High R.P.M. 4. 4. High Pressure/High R.P.M.**

OperatingPrinciple: Sample under examination is place on rotary disc and clamped. Sensing finger coupled to torque sensor (strain gauge/electromagnetic type) measures the friction force between sensing finger and sample. Such result may be conducted at different speed. Ration of Friction force to dead weight is C.O.F. Such set-up cans static/dynamic friction at different r.p.m./pressure...

$\mu = F_f/W_t$ -- where μ = static/dynamic friction value F_f=Friction force, W_t: weight of sample

Portable friction analyzer

Heavy Duty Tribo-analyzer



ELECTRICAL/MECHANICAL Specifications OF Low pressure/low R.P.M. Friction Analyzer:

MODEL	Pressure Psi	Angular Velocity R.P.M./option	Ave-Friction/Peak Friction range p.u.	Accuracy / Repeatability	Burdon	Accuracy Restricted to Resolution level	Resolution Quantified/ optional	interface
MPFA-00011	0.01-0.100	0.0001.0-001.0	**0.0001- 99.9999**	99.9/100	**< 100 micro-N.m**	**99.99999%**	**1/2/5**	**RS-232**
MPFA-00011	0.01-1.000	0.0001.0-001.0	**0.0001- 99.9999**	99.9/100	**< 100 micro-N.m**	**99.99999%**	**1/2/5**	**RS-232**
MPFA-00021	0.01-2.000	0.0001.0-001.0	**0.0001- 99.9999**	99.9/100	**< 100 micro N.m**	**99.99999%**	**1/2/5**	**RS-232**
MPFA-00041	0.01-4.000	0.0001.0-001.0	**0.0001- 99.9999**	99.9/100	**< 100 micro N.m**	**99.99999%**	**1/2/5**	**RS-232**
MPFA-00071	0.01-7.000	0.0001.0-001.0	**0.0001- 99.9999**	99.9/100	**< 100 micro N.m**	**99.99999%**	**1/2/5**	**RS-232**
MPFA-00101	0.01-10.00	0.0001.0-001.0	**0.0001- 99.9999**	99.9/100	**< 100 micro N.m**	**99.99999%**	**1/2/5**	**RS-232**
MPFA-00201	0.01-20.00	0.0001.0-001.0	**0.0001- 99.9999**	99.9/100	**< 100 micro N.m**	**99.99999%**	**1/2/5**	**RS-232**
MPFA-00501	0.01-50.00	0.0001.0-001.0	**0.0001- 99.9999**	99.9/100	**< 100 micro N.m**	**99.99999%**	**1/2/5**	**RS-232**
MPFA-00801	0.01-80.00	0.0001.0-001.0	**0.0001- 99.9999**	99.9/100	**< 100 micro N.m**	**99.99999%**	**1/2/5**	**RS-232**
MPFA-0991	0.01-99.00	0.0001.0-001.0	**0.0001- 99.9999**	99.9/100	**< 100 micro N.m**	**99.99999%**	**1/2/5**	**RS-232**

MPFA-00071

MPFA-00501

friction tips

MOTORON SEMICONDUCTORS CORPORATION
11, Shri gar colony, Shakti gar extension, DELHI-110052. Tel: 011-23655454/23648181
motoron@hotmail.com

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(PULSE TECHNIQUE)

Electrical/Mechanical Specification of low pressure /high R.P.M... Friction Analyzer: MPFA-Series

MODEL	Pressure Psi	Angular Velocity R.P.M./option	Ave-Friction/Peak Friction range p.u.	Accuracy / Repeatability	Burdon	Accuracy Restricted to Resolution level	Resolution Quantified/ optional	interface
MPFA-00012	0.01-0.100	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro-N.m	99.99999%	1/2/5	RS-232
MPFA-00022	0.01-1.000	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00042	0.01-2.000	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00072	0.01-4.000	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00102	0.01-7.000	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00202	0.01-10.00	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00502	0.01-20.00	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-01002	0.01-50.00	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-02002	0.01-80.00	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232

Electrical/Mechanical Specification of High Pressure/low R.P.M. Friction Analyzer: MPFA-Series

MODEL	Pressure Psi	Angular Velocity R.P.M./option	Ave-Friction/Peak Friction range p.u.	Accuracy / Repeatability	Burdon	Accuracy Restricted to Resolution level	Resolution Quantified/ optional	interface
MPFA-00013	001.0-100.0	0.0001.0-001.0	0.0001- 99.9999	99.9/100	< 100 micro-N.m	99.99999%	1/2/5	RS-232
MPFA-00023	001.0-200.0	0.0001.0-001.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00043	001.0-400.0	0.0001.0-001.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00053	001.0-500.0	0.0001.0-001.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00063	001.0-600.0	0.0001.0-001.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00083	001.0-800.0	0.0001.0-001.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00093	001.0-0900.0	0.0001.0-001.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00103	001.0-1000	0.0001.0-001.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00203	001.0-2000	0.0001.0-001.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232

ELECTRICAL/MECHANICAL Specifications OF High Pressure/High R.P.M. Friction analyzer PFA-Series

MODEL	Pressure Psi	Angular Velocity R.P.M./option	Ave-Friction/Peak Friction range p.u.	Accuracy / Repeatability	Burdon	Accuracy Restricted to Resolution level	Resolution Quantified/ optional	interface
MPFA-00013	001.0-100.0	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro-N.m	99.99999%	1/2/5	RS-232
MPFA-00023	001.0-200.0	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00043	001.0-400.0	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00053	001.0-500.0	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00063	001.0-600.0	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00083	001.0-800.0	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00093	001.0-0900.0	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00103	001.0-1000	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232
MPFA-00203	001.0-2000	0.10.0-01000.0	0.0001- 99.9999	99.9/100	< 100 micro N.m	99.99999%	1/2/5	RS-232

Company may offer tailor made solution to the requirement.

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(PULSE TECHNIQUE)

MPFA-Series

General electrical/mechanical specifications of Friction analyzer:

Operating voltage: 220 volt A.C. (50-20,000 Hz)/ 12 N.m D.C.
Measurement range (full scale): as above in different model.
Sample size: 0.1-100 micro diameters in different ranges of pressure/flow
Friction range: Range: 0.0001 – 99.999 p.u.
Pressure range: 0.00 to 1000.0 psi
Differential Pressure: upto 100 psi
R.P.M. range: 0.01 TO 1000 R.P.M.
Operation humidity: 10-100%
Operation temperature: -10 °C to +60 °C
Sample size: DIAMETER: 1"/2"/3"/4"/5"/6" or option
Response time: 1000 sample/sec
Pressure drop Burden: less than 100 micro1.9999 Pa x sec / c.m or better
Accuracy for R.P.M./Pressure: 0.5/1.0/2.0 % reading
Repeatability pressure/R.P.M.: 100 of reading
Resolution pressure/R.P.M.: 1/5 count and may be altered based on time behaviour of sigl
Linearity adjustment: upto 100 count
Input imedence: ultra low (<1000 count),
Filtering: low pass (adjustable)
Offset: variable upto 10,000 count (manual/auto)
CMMR: >80 db at 50-60 Hz
Isolation: > 100 giga ohm
Connector: BNC-9 pinx2 and BNC-25 pinx2
Size: 5X8X8 inches/rack mounted or portable
Interface: RS-232
Option: ADDITIOL SOFTWARE to plot T/Rh/Friction analyzer, fabric thickness.
Or other inferential parameter.
Company may dedicate instruments to meet specific requirement. /
NOTES: The numeral after product code indicates the friction analyzer to be measured

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motoron@hotmail.com

ELECTROMAGNETIC TORQUE SENSOR & CONTROLLERS

MRRA-Series

Introduction:

MHDM series of magnetic torque sensor are available in more than 20 different models (0.0001 to 1000.0N.m.), virtually offering solutions to any torque measurement application like applications in captive power plant, paper, machine-tools, plastic/yarn, milk/brewery plant, petrochemical industry, organic/inorganic chemical, rubber, medicine, sugar, textiles, heavy electrical/mechanical industries, research and development organizations and many defense applications. Special sensor design ensures light weight, least frictionless motion and efficient operation. Updated design topology and material ensures better controllability and efficiency. Company offers tailor made solution to / requirement.

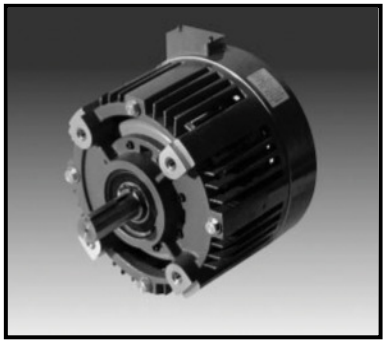
Operating Principle:

These torque/force sensors Operating works on Fleming principle of electromagnetic force, where a current (I) carrying conductor of length (L) experience force (F) when placed in a magnetic field (B). This force is balanced by incremental weight under measurement using sensitive feedback controlled D.S.P. system and is converted into equivalent signal. These measurement systems are immune to any climatically, mechanical, tribological, rheological, chemical constraints and displays very consistently with high level of accuracy.

F= I x B x L, where I=current, B= magnetic field, L= conductor length, k1 = spring factors

MRRA-01015

MRRA-003010



MRRA-001515

Electrical Specifications of Torque sensor:

Rotary Actuator

Model	Power Watts	Torque n.m. x10-2	rpm x100 (max)	Angular Stoke degree	Tc Mili sec	Vexc/ lexc D.C.
MREMT-000130	001.0	0.031	300	**120o**	<2.0	24/0.5
MREMT-000230	002.0	0.062	300	**120**	<2.0	24/0.6
MREMT-000325	003.0	0.114	250	**120**	<2.0	24/0.8
MREMT-000520	005.0	0.238	200	**120**	<2.0	32/0.5
MREMT-001015	010.0	0.636	150	**120**	<2.0	32/0.6
MREMT-001515	015.0	95.52	150	**120**	<2.0	36/0.5
MREMT-002015	020.0	01.27	150	**120**	<2.0	36/0.8
MREMT-002510	025.0	01.59	100	120	<2.0	36/0.8
MREMT-003010	030.0	01.91	100	**120**	<2.0	48/0.5
MREMT-004010	040.0	02.54	100	**120**	<2.0	48/0.6
MREMT-005010	050.0	03.17	100	**120**	<2.0	48/0.8

Rotary Actuator

Model	Power Watts	Torque n.m. x10-2	rpm X100 max	Linear stroke m.m.	Tc mili.sec	Vexc/ lexc D.C.
MLEMT-007510	075.0	04.77	100	**20.0**	**< 10**	**110/0.2**
MLEMT-010010	100.0	06.35	100	**22.0**	**<10**	**110/0.4**
MLEMT-012010	120.0	07.62	100	**25.0**	**<10**	**110/0.6**
MLEMT-015010	150.0	09.52	100	**30.0**	**<10**	**110/0.8**
MLEMT-020010	200.0	12.70	100	**35.0**	**<10**	**110/1.0**
MLEMT-050010	500.0	39.68	080	**40.0**	**<10**	**110/1.2**
MLEMT-075008	750.0	59.53	080	**42.0**	**<10**	**110/1.4**
MLEMT-100008	1000.0	79.37	080	**45.0**	**<10**	**110/1.6**
MLEMT-200006	2000.0	211.6	060	**50.0**	**<10**	**110/1.8**
MLEMT-500006	5000.0	52.91	060	**60.0**	**<10**	**110/2.0**
MLEMT-999905	10000.0	105.8	050	**70.**	**<10**	**110/2.2**

General electrical/mechanical specifications:

Operating voltage: 220 volt A.C. (50-20,000 Hz)/ 12 volts D.C.
Measurement range (full scale): as above in different model.
Torque signal: 10-6/10-3/10-01 N.m.AC/DC (optional)
Input capacitance: 10 nF
Response time: 1000 sample/sec
Burden: less than 100 micro volt/full scales current or better
Accuracy: 0.5/1.0/2.0 % reading
Repeatability: 100 of reading
Resolution: 1/5 nV & 1/5 nano amps or optional and may be altered based on time behavior of signal
Linearity adjustment: upto 100 nano volt
Input imedence: ultra low (<1000 nano volt burdon),
Filtering: low pass (adjustable)
Offset: variable upto 10,000 nano volts (manual/auto)
CMMR: >80 db at 50-60 Hz
Isolation: > 100 giga ohm
Connector: BNC-9 pinx2 and BNC-25 pinx2
Size: 5X8X8 inches/rack mounted or portable
Interface: RS-232
Option: ADDITIONAL SOFTWARE to plot V/I OR ANY DESIRED INFERENTIAL PARAMETER.
THESE SPECIFICATIONS OR PART THERE OF MAY BE MODIFIED TO MEET ANY TAILOR MADE SOLUTIONS.
NOTES: The numeral after product code indicates the (ampere meter) range and last digit corresponds to size (5x5x8, 8x8x12)
Note: First four numeral after product code MREMT, indicates watts, and last numeral indicates R.P.M.x100.

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11, Shri nagar colony, Shakti nagar extension, DELHI-110052. Tel: 011-23648181/23655454
e.mail: actuatorsonenergy@hotmail.com