

UTMIII ROTATING TORQUE METER



New series with 5kHz high-speed response & noise resistance digital output!

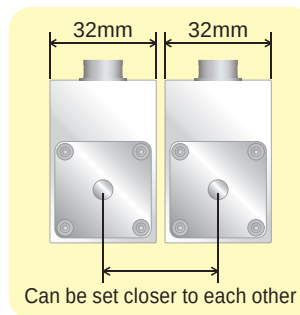
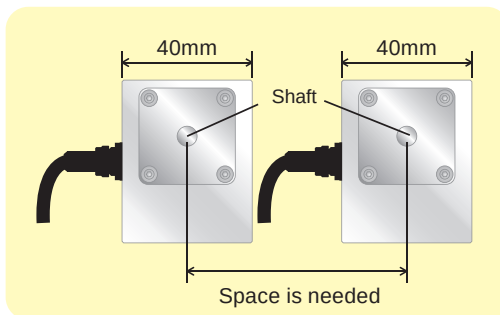
- 13 different capacities ranging from 0.05Nm to 500Nm.
- Analog bandwidth 5kHz with high-speed sampling rate of 20kHz.
- Safe overload of 500%
- Power supply DC24V
- Rated torque at $\pm 10V$
- Digital zero function via external signal
- Digital output via RS-485
- Equipped with pulse output for rotation detection (4 pulses per 1 rotation)

More compact for side-by-side measurement

Added zero correction function with external signal

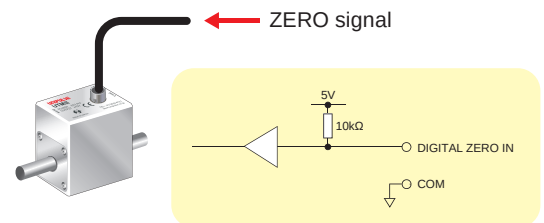
UTMII

UTMIII



* Dimensions above are for 0.05 to 2Nm capacity type.
(Achieved to miniaturize all capacity type)

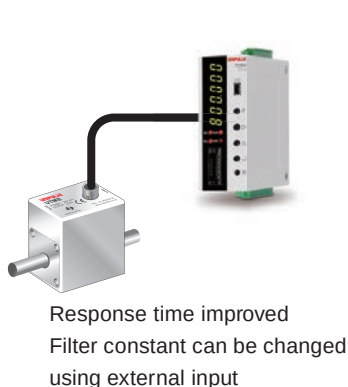
Slimmed down body and repositioned connector allow shafts to be setup closer from each other.



Reading deviation occurred during installation can be corrected with external signal.

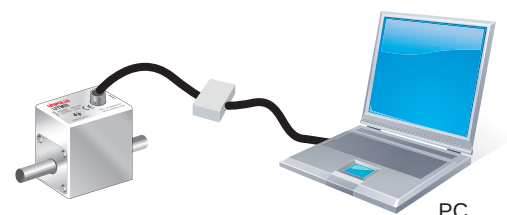
Frequency bandwidth of 5kHz, variable filter

Digital output via RS-485



Cutoff frequency 5kHz

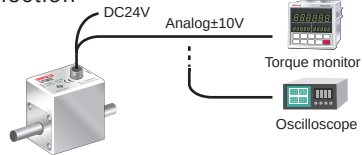
Cutoff frequency 100Hz



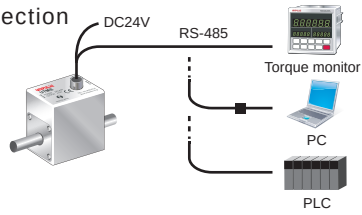
Enable to retrieve the digital signal to PC.

Connection example

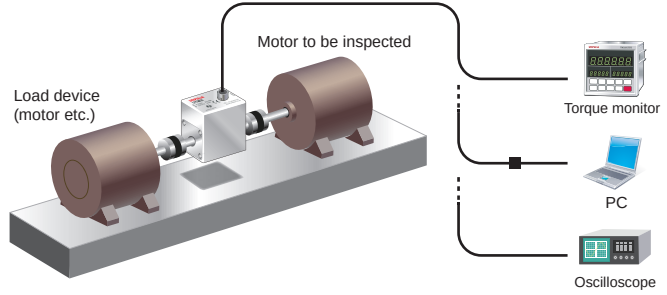
Analog connection



Digital connection



Motor test bench

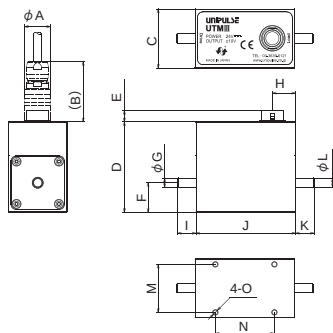


Mechanical power can be calculated from torque and rotation speed of UTM III

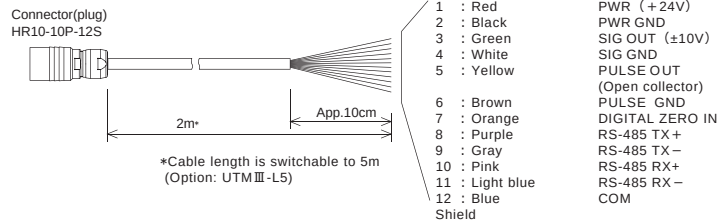
Specifications

Measurement range	±0.05Nm	±0.1Nm	±0.2Nm	±0.5Nm	±1Nm	±2Nm	±5Nm	±10Nm	±20Nm	±50Nm	±100Nm	±200Nm	±500Nm	
Power supply	DC24V ±15%													
Consumption current	100mA or less									150mA or less				
Output range	±10V DC Load resistance must be more than 5kΩ													
Resolution	5kl z													
Rotation signal	4 pulses per 1 rotation Open collector or Max ratings 30V, 10mA													
Digital filter	1Hz to 1kl z (Depending on settings) PASS 5kl z													
Safe overload	500% FS													
Non-linearity	0.03% FS													
Hysteresis	0.03% FS													
Repeatability	0.03% FS													
Operation temperature range	-10 to +50°C													
Temp. effect on zero	0.01%FS/°C													
Temp. effect on span	0.01%FS/°C													
Max rotation speed rpm	25000									20000		15000	12000	10000
Torsional spring constant Nm/rad	5.67	11.57	26.10	93.1	188	414	691	1851	5386	8428	17.3×10 ³	41.7×10 ³	117×10 ³	
Maximum torsional angle rad	8.81×10 ⁻³ (0.505°)	8.64×10 ⁻³ (0.495°)	7.66×10 ⁻³ (0.439°)	5.37×10 ⁻³ (0.308°)	5.32×10 ⁻³ (0.305°)	4.83×10 ⁻³ (0.277°)	7.24×10 ⁻³ (0.415°)	5.40×10 ⁻³ (0.310°)	3.71×10 ⁻³ (0.213°)	5.93×10 ⁻³ (0.340°)	5.78×10 ⁻³ (0.331°)	4.79×10 ⁻³ (0.275°)	4.28×10 ⁻³ (0.246°)	
Inertia moment kg·m ²	8.48×10 ⁻⁷	8.58×10 ⁻⁷	8.7×10 ⁻⁷	1.46×10 ⁻⁶	1.49×10 ⁻⁶	1.39×10 ⁻⁶	3.56×10 ⁻⁶	3.66×10 ⁻⁶	2.59×10 ⁻⁵	2.66×10 ⁻⁵	6.59×10 ⁻⁵	1.40×10 ⁻⁴	4.70×10 ⁻⁴	
Cable size W×H×D mm	54×49×32						57×54×37		70×63×47		67×63.5×56	67×68×61	67×78×71	
Total length mm	74			84			97		150	170	177	187	217	
Shaft diameter mm	φ 5			φ 8			φ 12		φ 20		φ 25	φ 30	φ 40	
Weight	App.140g			App.160g			App. 250g		App. 670g		App. 1.05kg	App. 1.44kg	App. 2.55kg	
Supplied cable	12 conductor or 13 conductor cable 2m End treatment 13 leads (Cable length is switchable to 5m (Option: UTM III -L5))													
Optionally available cable	CATM351 : 12 conductor or 13 conductor cable 5m End treatment 13 leads CATM312 : 12 conductor or 13 conductor cable 10m End treatment 13 leads													
Option	Key groove						○	○	○	○	○	○	○	
	Rotary encoder	○	○	○	○	○	○	○	○	○	○	○	○	
	Key groove & Rotary encoder						○	○	○	○	○	○	○	
	Centering location	○	○	○	○	○	○	○	○	○	○	○	○	
Key groove & Centering location									○	○	○	○	○	
CE marking certification	EMC directives EN61326-1, EMC directives EN61326-2-3													

External dimension



Supplied cable



2:PWR GND, 4:SIG GND & 6:PULSE GND are separate isolated ground.
2:PWR GND & 12:COM are connected internally.

Torque monitor for UTM III

TM320

Torque, rotation speed and power are displayed simultaneously.



TM380

Torque, rotation speed and angle are displayed simultaneously.



TC80

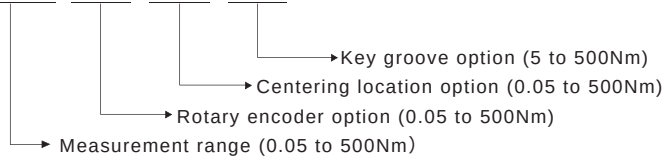
Space-saving and is best for built-in.



Measurement range	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
0.05															
0.1															
0.2															
0.5															
1															
2															
5	14	31.5			6.1	18.5	12h7	13.5	20	57	20	12h7	30		M3 depth5
10			37	54											
20			47	63		24	20h7	23	40	70	40	20h7	40	40	M3 depth6
50															
100			56	63.5		28	25h7		55	55	25h7	46	38		M4 depth8
200			61	68		30	30h7	18.5	60	67	30h7	50	30		
500			71	78		35	40h7		75	75	40h7	63			

Structure of product code

UTM III -0.05Nm (R) (C) (K)



* You can add both rotary encoder and key groove options for 5Nm to 500Nm capacity type.
Model numbers are UTM III - ○Nm(RK) respectively.

* You can add both centering location and key groove options for 20Nm to 500Nm capacity type.
Model numbers are UTM III - ○Nm(CK) respectively.

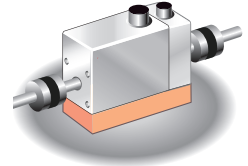
(R) Rotary encoder option : 0.05 to 500Nm



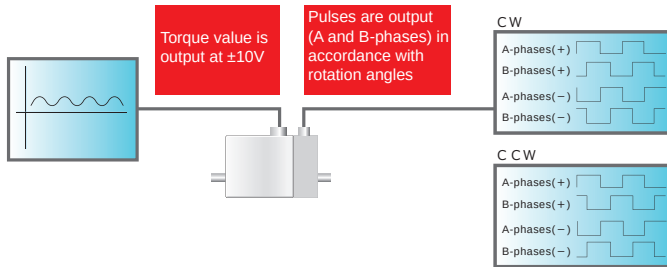
- Optical encoder
- Ideal for detecting torque versus angle

● Mounting instruction

Fix the main unit to prevent it from moving in rotational direction.

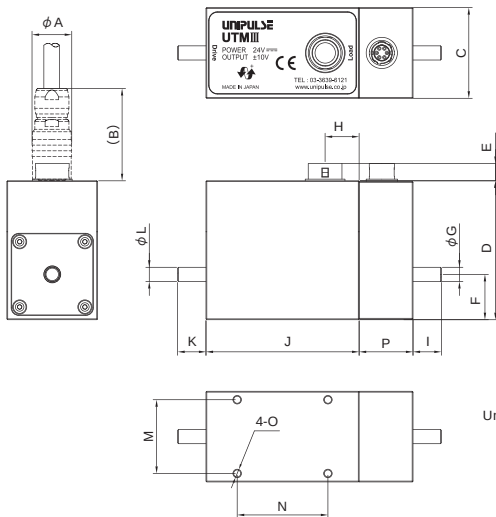


- Torque signal (analog $\pm$ 10V) and rotation angle signals (A and B phase line driver outputs) are outputted.



■ UTM III -0.05Nm (R) to 500Nm (R)

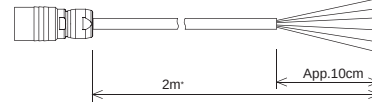
Measurement range	Pulses per rev.	Max. rotation speed rpm	Torsional spring constant Nm/rad	Maximum torsional angle rad	Inertia moment kgm ²	Approx. weight g
0.05	3600	5000	5.55	9.01×10^{-3} (0.516°)	1.39×10^{-6}	190
0.1			11.08	9.02×10^{-3} (0.517°)	1.40×10^{-6}	
0.2			23.73	8.43×10^{-3} (0.483°)	1.41×10^{-6}	
0.5			88.32	5.66×10^{-3} (0.324°)	1.90×10^{-6}	
1			169.41	5.90×10^{-3} (0.338°)	1.93×10^{-6}	210
2			333.57	6.00×10^{-3} (0.344°)	1.83×10^{-6}	
5			831	6.02×10^{-3} (0.345°)	4.18×10^{-6}	
10			1492	6.70×10^{-3} (0.384°)	4.28×10^{-6}	
20			4390	4.56×10^{-3} (0.261°)	2.85×10^{-5}	780
50			7578	6.60×10^{-3} (0.378°)	2.92×10^{-5}	
100	2500	2500	15.9×10^3	6.28×10^{-3} (0.36°)	7.49×10^{-5}	1.22k
200			37.6×10^3	5.32×10^{-3} (0.305°)	1.55×10^{-4}	1.65k
500			106×10^3	4.71×10^{-3} (0.27°)	5.1×10^{-4}	2.85k



Measurement range	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
0.05																
0.1																
0.2																
0.5																
1																
2																
5																
10																
20																
50																
100																
200																
500																

■ Supplied cable

Connector(plug)
HR10-7P-6S



- 1 : Red PWR (+5 to +24V)
- 2 : Black PWR GND
- 3 : Green Line driver output B-phase (+)
- 4 : White Line driver output B-phase (-)
- 5 : Yellow Line driver output A-phase (+)
- 6 : Brown Line driver output A-phase (-)
- 7 : Shield

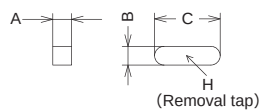
*Cable length is switchable to 5m
(Option: UTM III -R5)

(K) Key groove option : 5 to 500Nm

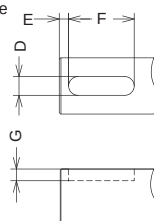
■ UTM III -5Nm (K) to 500Nm (K)



- Key (Included in (K) option)



- Key groove



Measurement range	A	B	C	D	E	F	G	H
5	$4^{+0}_{-0.03}$	$4h9^{+0.03}_{-0.042}$	$14^{+0}_{-0.18}$	$4^{-0.012}_{-0.042}$	2	$14^{+0.3}_{+0.1}$	$2.5^{+0.1}_{-0}$	—
10								
20								
50								
100								
200								
500								

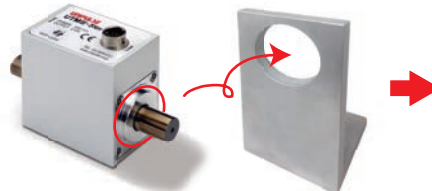
Unit : mm

Centering location type suitable for mounting

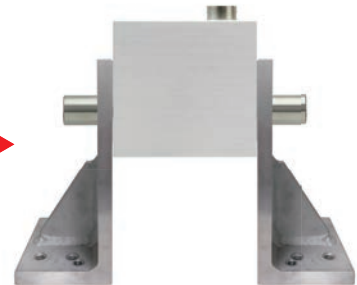


CE RoHS2

- Wants center point of axis as reference for installation
- Wants to stop vibration & fix main unit
- Other reasons that require to fix main unit
- Installation example



Insert the extended part.

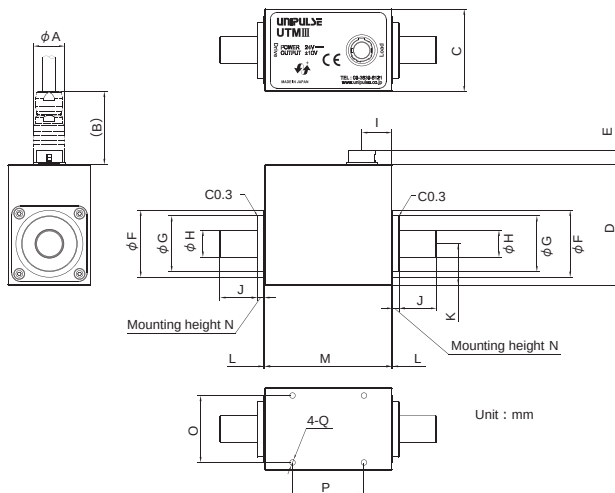


Can be mounted with excellent centering effect.

* For this setup use double disc couplings on both sides.

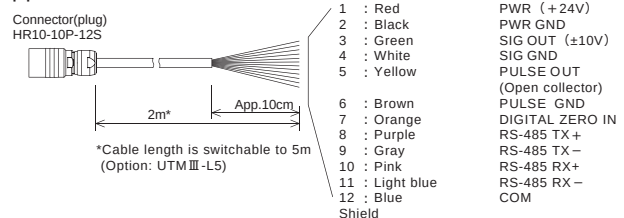
* If main unit starts to rotate, install stopper while avoiding excessive force on the main unit.

■ UTMIII-0.05Nm (C) to 500Nm (C)



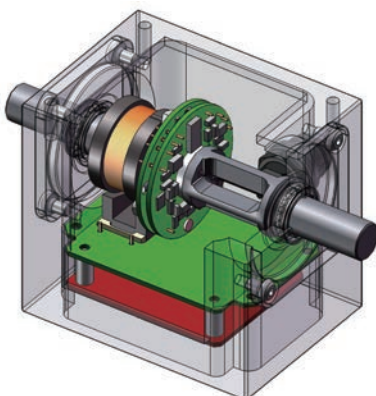
Measurement range	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	Weight
0.05																		App.150g
0.1								5h7		6.8		16	0.2	54		26		App.170g
0.2								8h7		11.8						32	M3 depth5	App.170g
0.5																		App.260g
1																		App.260g
2																		App.260g
5																		App.260g
10																		App.260g
20																		App.260g
50																		App.260g
100																		App.260g
200																		App.260g
500																		App.260g

■ Supplied cable



2:PWR GND, 4:SIG GND & 6:PULSE GND are separate isolated ground.
2:PWR GND & 12:COM are connected internally.

Mechanism of UTM series



UTM adopts strain gauges for detecting torsional strain, which is converted into an electric signal by a strain amplifier fixed on the rotating shaft. Electric power for the rotary electronics is supplied continuously through a wireless power system originally developed by UNIPULSE. The detected torque signal is converted into a digital signal, and it is transmitted to the main-frame electronics via a light signal. The rotating shaft is suspended with only two small bearings, resulting in very low rotational friction.

