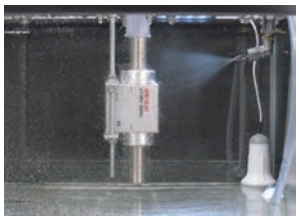
UTMV

DRIP & RUST PROOF TYPE ROTATING TORQUE METER

CE RoHS2 **Flexible cable**

Drip-proof type with high safe overload rating for use in harsh conditions



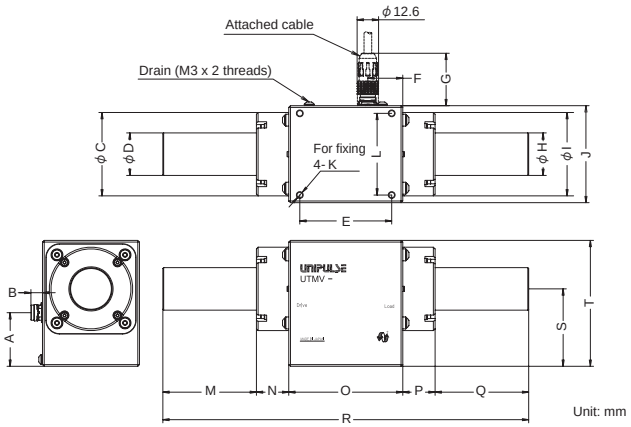
- Degree of protection: equivalent to IP65
- Made of rust-resistant stainless steel
- Labyrinth seal (standard)
  With the protection against rain and seawater, it can be used outside for wind and water turbine and so on.
- PTFE rotary seal: option (S)
  It can be used in environment with dust and/or oil mist as well.
- Key groove: option (K)

Specifications

Measurement range	±0.1 Nm		±0.5 Nm		±1 Nm		±5 Nm		±10 Nm		±50 Nm		±100 Nm		±500 Nm		±1000 Nm		±5000 Nm	
Seal structure	ST	(S)	ST	(S)	ST	(S)	ST	(S)	ST	(S)	ST	(S)	ST	(S)	ST	(S)	ST	(S)	ST	(S)
Power supply	DC 24 V±15%																			
Consumption current	100 mA or less										150 mA or less						160 mA or less			
Output range	±5 V Load resistance must be more than 2 kΩ																			
Responsivity	1 kHz																			
Rotation signal	4 pulses per 1 rotation Open collector Max. ratings 30 V, 10 mA																			
Safe overload	500% FS																			
Non-linearity	0.03% FS or less																			
Hysteresis	0.03% FS or less																			
Repeatability	0.03% FS or less																			
Operation temp. range	-10 to +50℃																			
Temp. effect on zero	0.01% FS/℃ or below																			
Temp. effect on span	0.01% FS/℃ or below																			
Max. rotation speed (rpm)	10000	2120	10000	1590	10000	1590	9000	1060	9000	1060	5700	680	4800	570	4800	380	4800	270	4000	180
Torsional spring constant (Nm/rad)	11.13		89.5		172		897		1400		6887		16.4×10^{3}		93.6×10^{3}		326×10^{3}		1418×10^{3}	
Maximum torsional angle (rad)	8.99×10^{-3} (0.515°)		5.59×10^{-3} (0.320°)		5.83×10^{-3} (0.334°)		5.58×10^{-3} (0.320°)		7.14×10^{-3} (0.409°)		7.26×10^{-3} (0.416°)		6.11×10^{-3} (0.350°)		5.34×10^{-3} (0.306°)		3.07×10^{-3} (0.176°)		3.53×10^{-3} (0.202°)	
Inertia moment (kgm^2)	1.15×10^{-6}	0.99×10^{-6}	2.19×10^{-6}	1.90×10^{-6}	2.22×10^{-6}	1.93×10^{-6}	5.60×10^{-6}	4.90×10^{-6}	5.70×10^{-6}	5.00×10^{-6}	4.21×10^{-5}	3.86×10^{-5}	9.6×10^{-5}	10.9×10^{-5}	6.2×10^{-4}	6.1×10^{-4}	3.56×10^{-3}	3.51×10^{-3}	2.38×10^{-2}	2.34×10^{-2}
Approx. weight	390 g		430 g		430 g		580 g		580 g		1.6 kg		2.1 kg		4.0 kg		11 kg		28 kg	
Attached cable	6-conductor flexible cable (2 m) Cable end: 7 wires → Cable length is switchable to 5 m (Option: UTM Ⅱ-L5)																			
Accesories	CATM51: 6-conductor flexible cable (5 m) Cable end: 7 wires CATM12: 6-conductor flexible cable (10 m) Cable end: 7 wires																			
CE marking certification	EMC directives EN61326-1, EN61326-2-3																			

(ST: Standard, (S): PTFE rotary seal option)

Dimension



Unit: mm

Model
UTMV-0.1Nm
UTMV-0.1Nm(S)
UTMV-0.5Nm
UTMV-0.5Nm(S)
UTMV-1Nm
UTMV-1Nm(S)
UTMV-5Nm
UTMV-5Nm(K)
UTMV-5Nm(S)
UTMV-5Nm(SK)
UTMV-10Nm
UTMV-10Nm(K)
UTMV-10Nm(S)
UTMV-10Nm(SK)
UTMV-50Nm
UTMV-50Nm(K)
UTMV-50Nm(S)
UTMV-50Nm(SK)

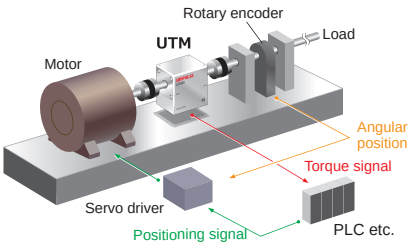
Model
UTMV-100Nm
UTMV-100Nm(K)
UTMV-100Nm(S)
UTMV-100Nm(SK)
UTMV-500Nm
UTMV-500Nm(K)
UTMV-500Nm(S)
UTMV-500Nm(SK)
UTMV-1000Nm
UTMV-1000Nm(K)
UTMV-1000Nm(S)
UTMV-1000Nm(SK)
UTMV-5000Nm
UTMV-5000Nm(K)
UTMV-5000Nm(S)
UTMV-5000Nm(SK)

Measurement range	A	B	ϕC	ϕD	E	F	G	ϕH	ϕI	J	K	L	M	N	O	P	Q	R	S	T	Key groove
0.1 Nm	25	8.3	24	5h7	45	18	32.3	5h7	24	40	M3 Depth 6	32	10	11.5	54	11.5	10	97	33	50	–
0.5 Nm	25	8.3	26	8h7	45	18	32.3	8h7	26	40	M3 Depth 6	32	15	11.5	54	11.5	15	107	33	50	–
1 Nm	25	8.3	26	8h7	45	18	32.3	8h7	26	40	M3 Depth 6	32	15	11.5	54	11.5	15	107	33	50	–
5 Nm	25	8.3	30.5	12h7	45	19.5	32.3	12h7	30.5	40	M3 Depth 6	34	20	12	57	12	20	121	35.5	55	Refer to Page 12
10 Nm	25	8.3	30.5	12h7	45	19.5	32.3	12h7	30.5	40	M3 Depth 6	34	20	12	57	12	20	121	35.5	55	
50 Nm	31.5	6.8	43.4	20h7	58	20.5	30.8	20h7	43.4	51	M3 Depth 6	43	50	18.5	70	18.5	50	207	42.5	68	
100 Nm	31.5	6.8	49	25h7	54	20.5	30.8	25h7	49	57	M4 Depth 8	48	55	19	67	19	55	215	45.5	74	
500 Nm	21.5	6.8	64.2	40h7	52	20.5	30.8	40h7	64.2	72	M4 Depth 8	64	75	20	67	20	75	257	43	79	
1000 Nm	25	5.3	86.6	60h7	66	28.5	29.3	60h7	86.6	98	M5 Depth 10	86	100	20	86	20	100	326	54	103	
5000 Nm	25	4.8	124.6	90h7	72	28.5	28.8	90h7	124.6	137	M6 Depth 12	124	145	23	97	23	145	433	72.5	141	

* Dimension of rotary seal type is same as standard type.

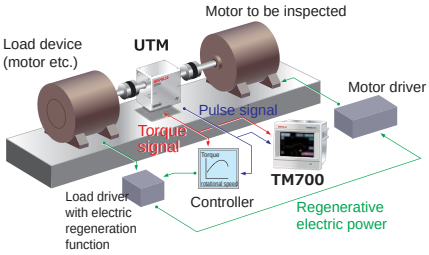
Measurement of dynamic/running torque

Servo-motor with torque output



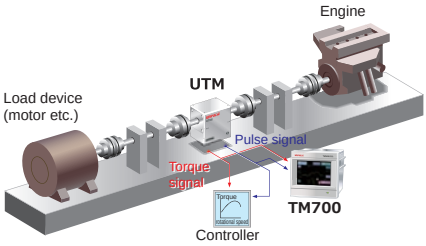
By setting UTM between the rotary encoder and motor, you can make a servo motor system with torque output. The system can be applied to various applications, such as robot hands or other systems which can detect load.

Motor test bench



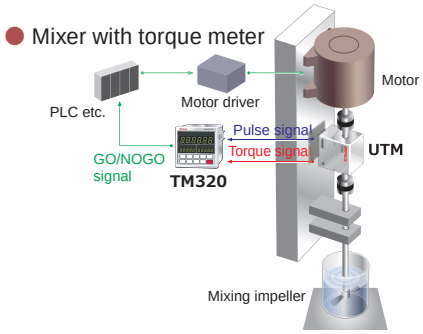
Mechanical power can be calculated from torque and rotational speed.
Also, by applying energy recovery system, the test apparatus will be eco-friendly (energy-saving).

Engine test bench



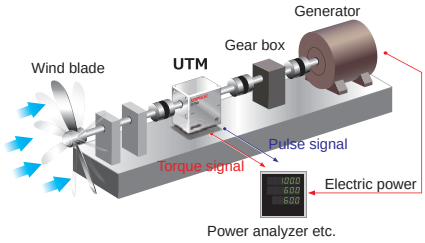
In case of torque measurement with large vibration, such as measurement of engines, please attach double disk coupling and use double bearing.

Mixer with torque meter



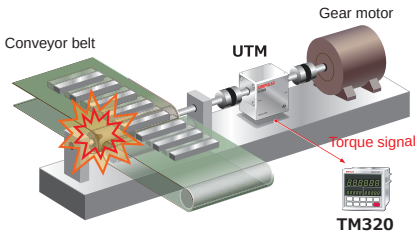
The system measures torque on the axis of mixing impellers. The change of viscosity can be detected by monitoring torque.
By using torque monitor (TM320 etc.), I/O signals can be controlled by the threshold levels.

Power generation efficiency test



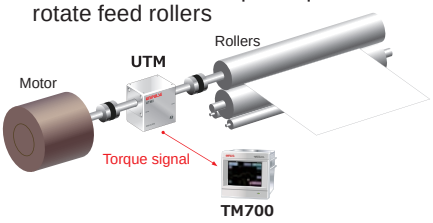
The efficiency of wind turbine generator and so on can be tested. Power can be estimated based on torque and rotational speed measured with UTM, and power generation efficiency can be calculated by comparing power and generated energy.

Fault detection of conveyor belt



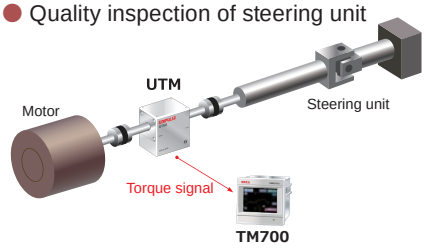
By monitoring the motor shaft torque of a conveyor belt, faults and conveyor-related hazards can be detected (e.g. materials get caught to conveyor system). Conveyor belts will be stopped immediately after faults like contamination and overturning of products are detected.

Measurement of torque required to rotate feed rollers



Torque fluctuation can be monitored while a sheet of paper or film is fed by the drive roller.
With torque measurement, quantitative management and maintenance of feed roller are possible.

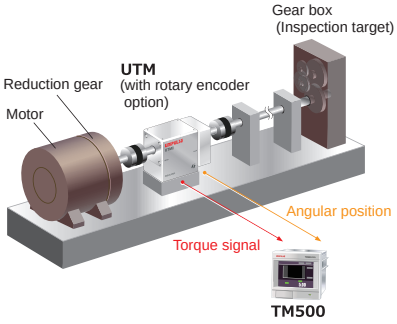
Quality inspection of steering unit



By measuring the torque required to rotate automotive parts such as steering unit, it is possible to quantize the smoothness of the rotation for standardization of the quality inspection.

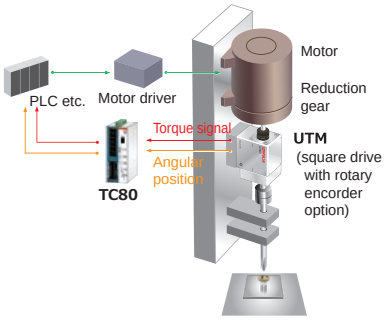
Relationship between torque and angle/displacement (distance)

Physical sensory test



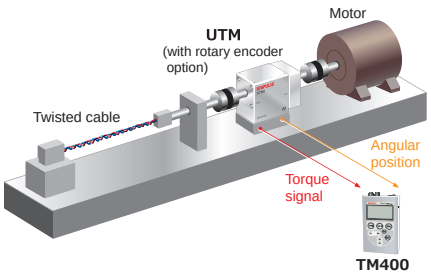
Torque corresponding to angular position can be monitored by using UTM with rotary encoder option. The system can be applied to automation of physical sensory test.

Screw driver with torque monitoring



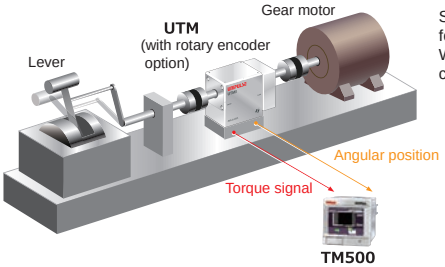
Torque can be measured in the process of tightening screws. Since the torque can be controlled during the whole process, the system can be applied to automation of process.

Torsion testing machine



Stiffness and performance of wire or cable can be tested by checking torque applied by a torsion test machine with UTM.

Sensory evaluation of lever or hinge



Smoothness of lever, hinge, and so on can be quantized for quality control purpose.
With a optional rotary encoder, torque-angle relationship can be monitored.