

## Torque Watch® Gauge Series 366

### User Instructions

Item No.: 1103700    Rev. B

*Waters*



Series 366

The Series 366 Torque Watch® Gauges are small lightweight instruments designed for measurement of very low values of static torque typically encountered in miniature rotating mechanical systems.

The Series 366 Torque Watches utilize a calibrated helical spring, shaft, and pointer assembly mounted in jeweled bearings to minimize friction.

The 366 series covers a wide range of small torque values. See Table 1 for range, and accuracy.

Torque Range & Accuracy*		
Model	Torque Range	Accuracy
366-0	0.06 - 0.6 oz. in.	± 5%
366-1	0.03 - 0.3 oz. in.	± 5%
366-2	0.01 - 0.10 oz. in.	± 10%
366-3	0.003 - 0.03 oz. in.	± 10%
366-OM	6 - 42 gm cm	± 5%
366-1M	3 - 21 gm cm	± 5%
366-2M	1 - 7.5 gm cm	± 10%
366-3M	0.2 - 2.0 gm cm	± 10%
366-OSI	0.4 - 4.0 N-M	± 5%
366-1SI	0.2 - 2.0 N-M	± 5%
366-2SI	0.7 - 0.7 N-M	± 10%
366-3SI	0.02 - 0.2 N-M	± 10%

*\*Accuracy % Full Scale Value  
Table 1.*

The Series 366 Torque Watch is bidirectional, permitting clockwise or counterclockwise operation over the entire torque range. An internal rotation stop prevents damage from over-torque up to 3 times normal range.

A square drive shaft protrudes from the bottom of the unit to permit coupling to a test piece through one of three miniature adapter chucks furnished with the Series 366 Torque Watch. The adaptor chucks can accommodate shaft diameters from 0.010 to 0.218 in. (0.25 to 5.54 mm).

### ***Chuck Preparation***

*Determine the shaft diameter of the test piece and select appropriate chuck.*

*Refer to Table 2 below:*

Shaft Diameter		
Chuck	Minimum	Maximum
366-A	.010" (.25 mm)	.030" (.76 mm)
366-B	.300" (.76 mm)	.094" (2.39 mm)
366-C	.094" (2.39 mm)	.218" (5.54 mm)

Using appropriate size drill, preferably mounted in a small lathe, drill out the end of the chuck nearest the set screw to a depth of 0.187 in. (4.75 mm).

*Note: Make certain the set screw is removed or backed out of the chuck before drilling the hole.*

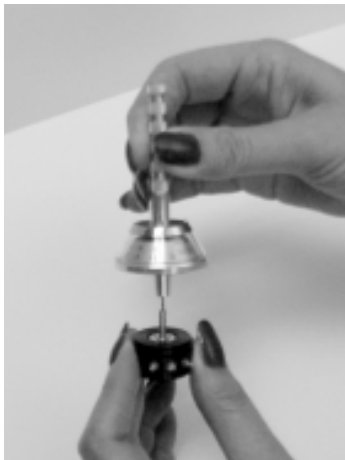
It is advisable to have a slight chamfer at the edge of the drilled hole to permit easy insertion of the test piece shaft into the chuck.

## **Operation**

1. Place the chuck on the shaft of the test piece. Tighten the set screw with hex wrench provided.
2. Switch the toggle on the Torque Watch to red (clock-

wise) or black (counterclockwise) to set direction of rotation.

3. To minimize test piece shaft friction caused by radial loads, mount or hold the test piece so its shaft is vertical.
4. Insert, but do not “bottom”, the Torque Watch drive shaft in mating plate on chuck and turn the knurled shaft on the Torque Watch. When shaft of test piece moves, read torque value on the Torque Watch scale. See Figure 1.



*Figure 1.*

## Notes

- *When possible, operate the 366 in a vertical position, shaft down, to minimize errors caused by bearing friction.*
- *Do not bottom the Torque Watch drive shaft into the chuck. Permit the shaft to “float” in the chuck to avoid loading the bearings.*
- *Do not lubricate the Torque Watch jewel bearings.*
- *Additional chuck adapters are available from the factory.*

## UNITS CONVERSION

	Multiply	By	To Obtain
English To English	Ounce Inches	$6.25 \times 10^{-2}$	Pound Inches
	Ounce Inches	$5.21 \times 10^{-3}$	Pound Feet
	Pound Inches	16	Ounce Inches
	Pound Feet	192	Ounce Inches
English To Metric	Ounce Inches	72	Gram Centimeters
	Pound Inches	1152	Gram Centimeters
	Ounce Inches	720	Gram Millimeters
	Pound Inches	11520	Gram Millimeters
Metric To Metric	Gram Centimeters	10	Gram Millimeters
	Gram Millimeters	0.1	Gram Centimeters
	Gram Centimeter	$10^{-3}$	Kg-cm
	Kg Centimeter	$10^3$	gm-cm
Metric To English	Gram Centimeters	$1.389 \times 10^{-2}$	Ounce Inches
	Gram Centimeters	$8.681 \times 10^{-4}$	Pound Inches
	Gram Millimeters	$1.389 \times 10^{-3}$	Ounce Inches
	Gram Millimeters	$8.681 \times 10^{-5}$	Pound Inches
System International	Ounce Inches	$7.06 \times 10^{-3}$	Newton-Meters
	Gram Centimeters	$9.81 \times 10^{-5}$	Newton-Meters
	Newton-Meters	141.6	Ounce Inches
	Newton-Meters	10197	Gram Centimeters

#### **WARRANTY/REMEDY**

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