

OF-C2T Optical Fast Calculation Torque Tool

PRESENTATION

Agile and comprehensive solution to acquire and calculate dynamic torque based on shift angle measurement technique.

Torque determination between 2 points of shaft with known mechanical characteristics.

Computation using an advanced "proprietary algorithm".

Combination of one Electronic Calculation Unit and two high dynamic Optical Sensors and probes.

Stand-alone tool working with contactless sensors for quick installation in rough environments.



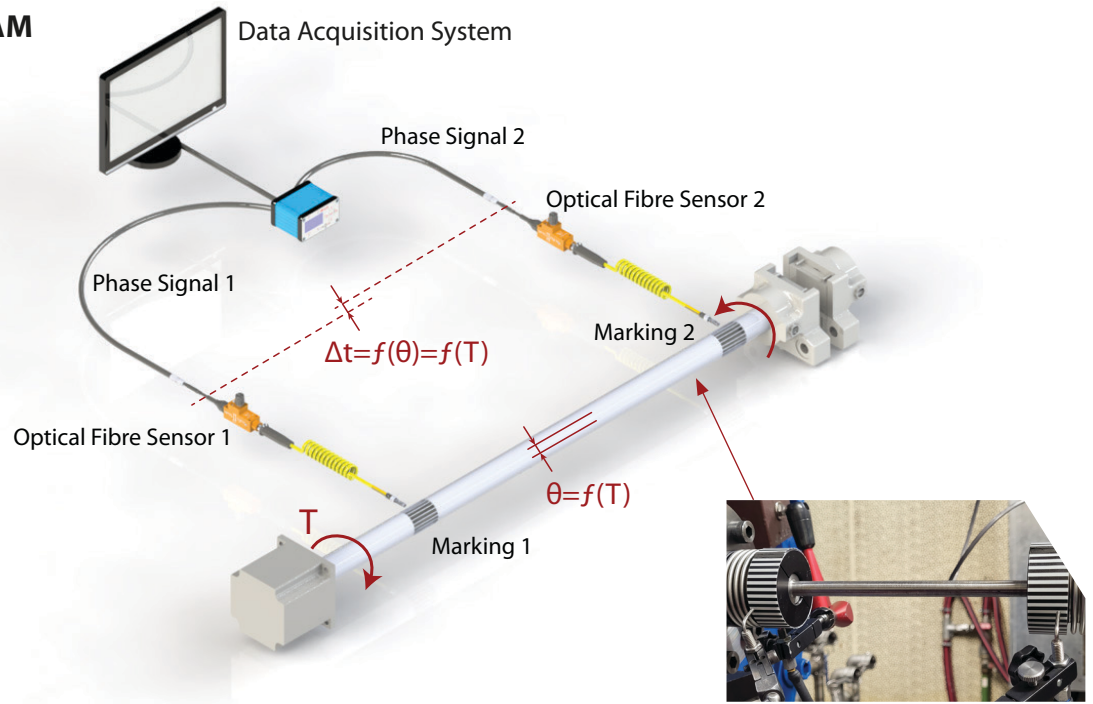
FEATURES

- Non-Intrusive solution - Contactless**
 Based on Optical fibre detection on periodical elements (teeth, lasered marks, zebra tape).
 Acquisition of torsion angle is made without any contact with rotating shaft.
- Easy installation and Secured operation, time saving:**
 Measure the twist angle between two optical sensors on each side of the coupling (or shaft), eliminates the need for any dismantling.
 No complex installation process required thanks to the use of marks applied on the shaft, ensuring an easy installation and eliminating the risk of metallic piece ejections.
- EMC immunity**
 Using optical fibre probe (naturally immune to EMC) allows extracting the electronics away from the EMC environment.
 Signal (pulses) is not disturbed by interferences.
- High precision:**
 Can implement and detect a lot of marks (black and white) on small diameter shaft. Using very fast and accurate high-speed sensors and wide variety of optical fibre probes.
- Large speed span:**
 Measurement is achievable at low speed on large rotors and theoretically at speeds above 200,000 revolutions per minute with the same angular accuracy.
- Large torque range:**
 Allowing measurement of a wide torque range by carefully selecting the distance of the marks along the shaft.

SPECIFICATIONS

- Torque range:**
 0.2 to 15,000 Nm
- Speed range:**
 Up to 100,000 rpm
- Resolution:**
 0.01 °
- Communication protocol:**
 Analogue, CAN, Ethernet
- Dimensions**
 72 x 46 x 81.3 mm

SCHEMATIC DIAGRAM



PRINCIPLE

Use of phase shift technique, which is directly related to the measurement of the torsional twist of the shaft.

Using a set of two optical fibre sensors and periodical marks (laser engraving or zebra tapes) installed at each end of the shaft. This allows optical measurement of the instantaneous angles.

The marks must integrate a missing tooth (pulse) to determine the 0° angle reference.

OF-C2T analyser acquires both pulse signals and determines instantaneous phase shift.

Then using proprietary algorithm taking into account mechanical data of the shaft – diameter, length of the shaft and also its Young modulus (elasticity) or torsional stiffness – calculation is performed in real time to obtain dynamic torque result.

RANGE AND OPTIONS

Configurations	OF-C2T-S (Standard)	OF-C2T-F (Fast)	OF-C2T-E (Embedded)
Pack Including	• Calculation Unit • 2 optical Sensors + 2 probes (5 meters) HM6x20 Ending	• Calculation Unit • 2 optical Fast Sensors + 2 probes (5 meters) HM6x20 Ending	• Calculation Unit • 2 optical Embedded Sensors + 2 probes (5 meters) HM8x20 Ending
Sensor Switching Frequency	260 KHz	700 KHz	300 KHz
Digital Signal Processor (DSP) Sampling Rate	30 MHz		
Resolution	Phase: 0.003% FS *		
Detection distance (from probe head to target)	Up to 10mm	Up to 10mm	Up to 20mm
Power supply	9 to 30 V		
Display	OLED monochrome		
Outputs	Analogue / Digital	Analogue / Digital	Analogue / Digital
Communication	By wire with SMA to BNC CAN-BUS 2.0 A & B Ethernet	By wire with SMA to BNC CAN-BUS 2.0 A & B Ethernet	By wire with SMA to BNC CAN-BUS 2.0 A & B Ethernet
Environment	Calculation Unit: IP44 Optical sensors: -10 to +70°C Optical probes: up to 200°C	Calculation Unit: IP44 Optical sensors: -10 to +70°C Optical probes: up to 200°C	Calculation Unit: IP44 Optical sensors: -10 to +70°C Optical probes: up to 120°C
Available data (@ 1KHz)	Speed, Phase, Torque (N.m) Overall Level, H1 + Hx (x from 2 to 8)		

* Measured in laboratory with Frequency Generator

Available Accessories: Zebra tapes (for speed < 10 000 rpm) / CAN to ETH PtP