Continuous Duty Torquemeter Integration

Quick Design Guide

Torquemeters LIMITED

70 YEARS *of designing, delivering and driving performance*

torquemeters.com

Continuous Duty Torquemeter Integration Quick Design Guide

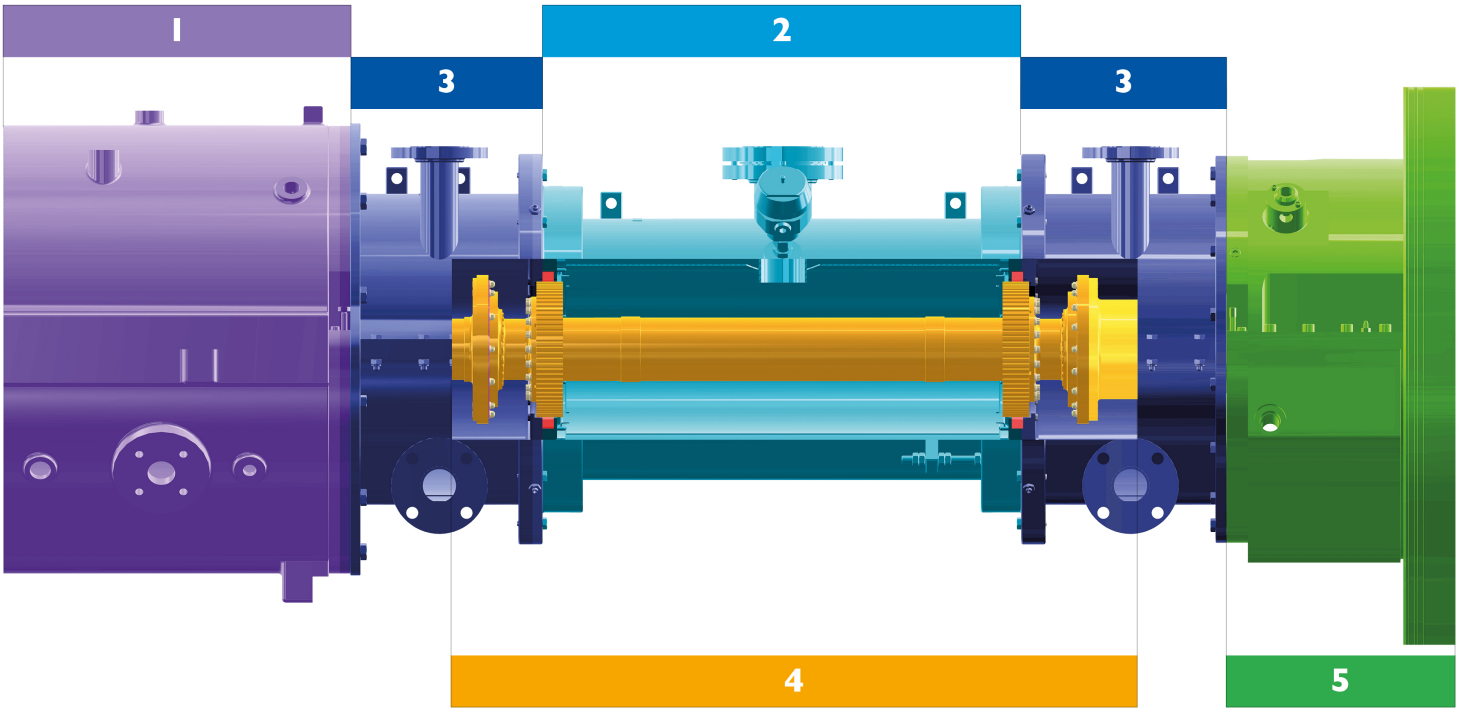
Benefits of Continuous Duty Torque Monitoring

- Reduction of setup time & optimisation of driven/driving machines during commissioning.
- Real time analysis of torsional performance and torsional vibration profile throughout the drivetrain.
- Predictive maintenance – monitoring extends service intervals resulting in fewer machine washes, outage/interventions and lower downtime.
- Extreme accuracy compared with calculated values provides for early warning of performance degradation & potential component failure issues.
- Performance optimization supporting efficient operation throughout equipment life.
- SIL 2 option is a primary safety protocol enabling overall system protection for compressor overload.
- Overall economic savings can be of the order of c.$2m* over the lifetime of the equipment.

*Estimation based on 2018 fuel prices

Torquemeter Selection - Key Design Considerations

- Coupling design is critical to ensure that the shaft is optimised to allow enough twist to enable high-accuracy phase shift torque measurement and to confirm the positioning of the signal teeth in relation to the torquemeter coils, highlighted in red ■ in the diagram below.
- Early definition of interfaces for driven/driving machines ensures that stress & mass overhang limits are established and designed for.
- Similarly, confirmation of the thermal growth of the driven/driving machines to inform the coupling and split-case guard designs.
- Consideration of cooling and venting arrangements to ensure that the design is optimised for heat transferred from the connected machines & generated by the windage of the coupling.
- Site hazardous area certification requirements to select appropriate protection.
- Distance to control room helps with signal processor siting and selection.
- Routing of piping to vents & cabling to torquemeter.



1 Driving Machine: Gas Turbine, Steam Turbine, e-Motor or Gearbox

Duty Rating
150kW to 100MW

Speed Range
500-18,000rpm

Standard Designs for Gas Turbines:
- Baker Hughes Frame 5, 6, 7, LM2500, LM6000, PGT25, LT12, LT16
- Siemens SGT700, SGT750, SGT600, SGT400, SGT300
- Solar Mars, Titan, Centaur, Taurus

Steam Turbine OEM's Supplied
- MHI
- MAN
- Thermodyn (Baker Hughes)
- Elliott Ebara
- Siemens (Dresser Rand)

e-Motor Drives

Process Applications
- Steam crackers
- Pipeline compressor stations
- PTA plants
- Charge gas
- Blended hydrogen
- Carbon capture
- Gas storage
- LNG Plants

2 Torquemeter

Rating - Direct Calibration
190,580Nm

Rating - Direct Calibration, Weights and Hydraulics
240,000Nm

Product Capability
- Phaseshift torque measurement
- Real-time torsional vibration measurement
- Power accuracy better than 1% at normal torque
- Will operate maintenance free for 25 years+
- Certified for Zone 1, Class 1 Div 1, hazardous area use
- Independent of coupling type
- Independent of coupling manufacturer
- Air/forced-air or oil cooling
- Air filters can be used
- Operating temperature up to 130°C
- Suitable for harsh, dirty environments
- Established design (1st install in 1974)
- Can be retro-fitted (with coupling modification)
- On-site calibration check

3 Split Casing / Adaptor Ring

Provides
- Support for torquemeter stator section
- Location for air inlets/drains as appropriate
- Reduced sparking aluminium/ brass liner options
- Articulation point for thermal growth/misalignment

4 Coupling Spacer

All Leading Brands Supported
- Ameridrives (Altra Gp)
- Bibby (Altra Gp)
- Eagle
- John Crane
- Kopflex
- Renk
- Rexnord
- Siemens
- Wuxi Trumy

Coupling Features
- Pair of toothed wheels
- Disc pack, diaphragm, or gear coupling compatible
- Discrete toothed wheels, or combined with assembly flange

5 Driven Machine: Compressor, Pump or Gearbox

Duty Rating
150kW to 100MW

Speed Range
500-18,000rpm

Compressor/Pump OEM's Supplied
- Baker Hughes
- Elliott Ebara
- MAN
- Siemens (Dresser Rand)
- Sulzer
- Sundyne
- Voith

Process Applications
- Pipeline compressor stations
- PTA plants
- Charge gas
- Blended hydrogen
- Carbon capture
- Gas injection
- LNG refrigeration
- Gas storage

Torquemeters LIMITED
70 YEARS of designing, delivering and driving performance

torquemeters.com