

규격서

품명 및 규격 (Description)	단위	수량
전달오차 검증 측정용 토크센서 및 전용 인디케이터	SET	1

◇ 특징 및 사용자 요구조건

- 본 물품은 전달오차 검증 측정용 센서로 실험을 위하여 속도/회전속도 측정이 가능하고 비접촉식 센서로 구성되어야 함
- 또한, 전용 앰프를 통해 측정 및 출력이 되어야함
- 공급자는 공급자는 명시된 규격과 동일하거나 동등 이상의 제품을 납품하여야 하며, 동등 이상의 규격(품질)을 증빙하는 제조사 공식 문서를 제출할 것.(공급자 납품 확인증명서 제출)
(제조사 정품 납품, 재생품 등 납품 불가)
- 국내 정식 수입원을 통한 제품 납품할 것
(워런티 및 기타 정식 서비스 지원가능할 것)
- 납기는 계약 후 2개월 이내이며, 다음의 상세규격 조건을 만족할 것
- 납품 후 1년간 제조사의 Warranty(무상수리)를 보증할 것

1. General Features

- 10,000N·m Torque-meter
- Torque/RPM indicator

2. 공급범위 품목에 대한 사양

2.1 Torque-meter

- Torque flange type Measuring range : 10kN·m
- Degree of protection acc. to EN 60529: IP54
- Accuracy class 0.05%
- Standard rotational speed to 10,000rpm
- Contactless measurement signal transmission
- no bearings;
- Plug connection;
- Frequency and $\pm 10V$ output signal
- Component : Complete
- Adjustment : Metric (N·m)
- Electrical configuration: 60kHz \pm 30kHz and $\pm 10V$, DC vers.

- rotational speed meas. System : mag. rot. speed sys. 1024 imp.
- Customized modification : None
- Effect of temperature per 10 K in the nominal (rated) temperature range on the output
 - signal, related to the actual value of signal span
 - Frequency output < $\pm 0.05\%$
 - Voltage output < $\pm 0.2\%$
- Non-Linearity including hysteresis, relative to the nominal (rated) sensitivity
 - Frequency output < $\pm 0.05\%$
 - Voltage output < $\pm 0.05\%$
- Output Signal (Frequency & Voltage) 동시 출력 가능.
- CAN 통신 출력 가능

2.2 Indicator

- Frequency measuring module for incremental transducers
- frequency transducers
- frequency measurement up to 1000 kHz
- 2 peak value stores
- 4 limit switches
- 4 remote inputs and 4 remote outputs, analogue output
- Accuracy class 0.05;
- alphanumeric LCD display
- keypad with 3 keys
- CAN-communication interface
- module for support rail mounting
- to DIN EN 50022, degree of protection IP20
- supply voltage 18 - 30 V DC
- 토크 전용 Shunt signal 입력, 전기적 신호로 이상 유무 점검 가능 (Shunt to calibrate)
- Output Signal (Analogue & CAN) 동시 출력 가능

3. 공급 범위

3.1 공급 품목

- Torque-meter
- Torque/RPM 전용 Indicator
- 토크 미터 성능 검사서

3.2 기타 계약자 공급 품목

계약자 공급 품목에는 상기 기자재와 용역 외에 다음 사항이 포함되어야 한다.

- 토크 센서 설치(장착) 및 현장 기술 지원 포함
- 전용 인디게이터를 통한 Shunt signal 확인.
(토크센서 전기적 신호를 통한 이상 유무 검증)
- 공급 기자재의 현장 운송 및 반입, 상·하차 포함
- 토크센서 방문을 통한 1년 무상 점검 진행 포함
- 운전 및 유지보수에 필요한 공구
- 시운전에 필요한 소모품
- 시운전 지도를 위한 기술자 파견

3.3 기술 일반 사항

안전성에 대한 요구조건

- 비상시 사고의 파급을 예방하고 안전이 확보되도록 보호 장치와 안전장치가 구비 되어야 하며, 적절한 설치 방법과 비상조치 계획이 제시되어야 한다.

◇ 상세 규격

1) Torque-Meter 사양

Accuracy class		0.05
Torque measuring system		
Nominal (rated) torque M _{nom}	kN m	10
Nominal (rated) rotational speed		
standard speed (option M)	U/min	10000
Non-linearity including hysteresis, related to the nominal (rated) sensitivity		
Frequency output		
For a max. torque in the range:	%	< ±0.01
between 0% of M _{nom} and 20% of M _{nom}	%	< ±0.02
> 20% of M _{nom} and 60% of M _{nom}	%	< ±0.03
> 60% of M _{nom} and 100% of M _{nom}		
Voltage output		
For a max. torque in the range:	%	< ±0.01
between 0% of M _{nom} and 20% of M _{nom}	%	< ±0.02
> 20% of M _{nom} and 60% of M _{nom}	%	< ±0.03
> 60% of M _{nom} and 100% of M _{nom}		
Relative standard deviation of the repeatability, per DIN 1319, related to the variation of the output signal		
Frequency output	%	< ± 0.03
Voltage output	%	< ± 0.03
Temperature effect per 10 K in the nominal (rated) temperature range on the output signal, related to the actual value of the signal span		
Frequency output	%	±0.05
Voltage output	%	±0.2
Temperature effect per 10 K in the nominal (rated) temperature range on the zero signal, related to the nominal (rated) sensitivity		
Frequency output	%	±0.05
Voltage output	%	±0.1
Nominal (rated) sensitivity (span between torque = zero and nominal (rated) torque)		
Frequency output 10 kHz / 60 kHz / 240 kHz	kHz V	5/30/120
Voltage output		10
Sensitivity tolerance (deviation of the actual output quantity at M_{nom} from the nominal (rated) sensitivity)		
Frequency output	%	±0.1
Voltage output	%	±0.1
Output signal at torque = zero		
Frequency output	kHz	10/60/240
Voltage output	V	0
Nominal (rated) output signal		
Frequency output		
with positive nominal (rated) torque	kHz	90
with negative nominal (rated) torque	kHz	30
Voltage output		
with positive nominal (rated) torque	V	10
with negative nominal (rated) torque	V	-10
Load resistance		
Frequency output	kΩ	2
Voltage output	kΩ	10
Long-term drift over 48 h at reference temperature		
Frequency output	%	< ± 0.03
Voltage output	%	< ± 0.03
Measurement frequency range, -3 dB	kHz	3
Group delay	s	<220
Residual ripple		
Voltage output	mV	<40
Shunt signal		
Shunt signal		approx. 50% of M _{nom}
Tolerance of the shunt signal, related to M _{nom}	%	< ± 0.05
Nominal (rated) trigger voltage	V	5
Trigger voltage limit	V	36
Shunt signal ON	V	min. >2.5
Shunt signal OFF	V	max. < 0.7

2) Indicator 사양

Accuracy class		0.05
Supply voltage	VDC	24; potential separation from measuring system (typ. 500 VDC)
Permitted supply voltage range	VDC	18...30
Power consumption, max.	W	9
Amplifier		
Input		Differ. inputs for symmetrical and asymmetrical freq. signals
Cable length	m	70
Input level (Levels of up to 30 V are permitted and are internally limited to ± 5 V)		
Each line to measurement earth	V	$-5 \dots +5$
Signal amplitude	V _{pp}	>1
Hysteresis, switch over threshold selectable in steps	V	0.25
Trigger level	V	± 5 (adjustable in steps of 250 mV)
Input impedance (input level -5 V... $+5$ V) (The input impedance for level 5 V is approx. 3 k Ω)	k Ω	>100
Input filter		Glitch filter, disconnectable
Detection of direction of rotation		via additional T90 or phase-shifted frequency signal
Frequency quadrupling		connectable
Input range		
Frequency measurement	kHz	0.0001...1
	kHz	0.001...10
	kHz	0.02...20
	kHz	0.01...100
	kHz	0.1...1000
Pulse counting	pul.	0...999999
		0... 5×10^6
		0... 1×10^9 (Kilo-Pulses)
Resolution (for frequency measurement)	%	0.01 of measurement value
Maximum pulse rate	pul./s	1 000 000
Linearity deviation	%	0.01
Low-pass filter	Hz	disconnectable and adjustable in steps of 0.05 to 500 Hz (Bessel and Butterworth filter characteristics)
Sampling rate with filter deactivated	1/s	4800
Calibration accuracy	%	0.01
Long-term drift over 48 hours		
30 minutes after switching on	%	< 0.01
Effect of change in operating voltage in the specified range (in relation to full scale)		
on sensitivity	%	0.01
Effect of 10 K change in ambient temperature		
on sensitivity	%	0.01