

Datasheet

Multipurpose Torque Meter

GMV2

for general stationary or mobile use

Typical Applications:

- Tool testing
- Production supervising
- Documentation compliant with DIN EN ISO 9001
- Quality Assurance
- Test bench evaluation



Standard for active torque sensors

- Measurement of torque, speed and power
- Measurement modes: tracking, peak (clockwise/ counterclockwise), torque wrench test
- Menu-driven operation and adjustment
- Storage for 1000 measurements
- 50 programmable parameter sets
- Power supply 110-240 V
- RS 232C port, max. 19200 baud
- Software 'GMV2-PC-Trans'
- EMC-proof housing
- Multilingual

The GMV2 is a microprocessor-based measurement and control unit for various torque-based applications. Measurement values for torque, speed and power (and optional angle) that are scanned with appropriate torque sensors in screwing applications and in test benches in labs can be displayed, their compliance with pre-set limits evaluated, and stored. The device is operated in simple steps via a self-explanatory menu. Using a torque transducer with integrated recognition chip, the sensor data will be transmitted automatically into the parameter set by connecting the transducer to GMV2.

Options

- Angle measurement
- External control of storing, deleting and printing
- External selection of parameter sets
- Screwdriver control
- Passive input for sensors 0.5–4 mV/V
- Digital input for DRFD sensors
- Analog output for torque signal
- Battery operation for 8 hours

Access to the device settings can be restricted by using passwords in three levels.

Measurement data will be stored in the device in combination with date and time and they can be printed out on an external printer or exported for further processing.

Option: a pulsed tool can be operated about a floating output.

Option: integrated power unit for operating a power screwdriver 230 V max. 16 A.

Technical Specifications

Power Supply	
Mains voltage::	100 V - 240 V / 50 Hz - 60 Hz via IEC (power) connector
Operating mode:	simultaneous mains and charging mode with bat- tery option
Sensor power supply	
for torque transducer	12 V DC / 200 mA
Active input:	programmable
Input sensitivity:	from $\pm 1,25$ V to ± 10 V
Input resistance:	1 M Ω
Zero adjustment range:	approx. ± 7 % of full scale
Conversion	
Pulse rise time:	10 % - 90 %: 0,25 ms
Max. measurement frequen- cy:	3 KHz sine-wave pulse
Accuracy	
Tracking mode:	$\leq 0,1$ % ± 2 digit
Peak mode:	$\leq 0,3$ % ± 2 digit
Torque-wrench mode:	$\leq 0,3$ % ± 2 digit
Speed	
at $n \leq 10000$ min-1:	$\leq \pm 2$ digit
at $n \leq 20000$ min-1:	$\leq \pm 3$ digit
Angle of rotation:	$\pm 0,25^\circ$ to 100° then 1°
Zero error:	$\leq 0,05$ %
Storage:	50 measurement programs 1000 measurement values
Display:	Graphics-LCD with 240 x 64 pixels
Data output:	RS 232 serial port 9 pin connector (DEE) 1200 – 19200 baud
Ambient temperature:	0 - 45° C
Humidity:	< 75 %
Protection:	IP 40 as per DIN 40050
Dimensions: (without handle)	257 x 118 x 266 mm (W x H x D)
Weight:	approx. 3.8 kg with battery approx. 5 kg
Colors	
Housing:	RAL 9006 (white aluminum)
Frame:	RAL 7016 (anthracite gray)
Design strips:	RAL 3002 (carmine red)

Option – Battery operation

Supply voltage:	battery 2 x 6 V / 4 Ah
Operating time for continuous operation:	approx. 8 h (with sensor)

Option – Digital input for sensor type DRFDxx

Option – Passive input

Input sensitivity:	programmable from ± 0.5 mV/V to ± 4 V/V
Adjustment range:	approx. ± 7 % of full scale
Sensor passive power supply	7 V DC
4-wire power supply	350 - 1000 Ω

Option – Angle measurement

Input signals:	2 channels 360 pulses / revolution with approx. 90° phase shift
Resolution:	$0,25^\circ$
Counting range:	$\pm 6000^\circ$

Option – Barcode scanner

Manual scanner:	80 mm
Code:	39

Option – Control input and outputs

2 relay outputs:	IO / NIO
U max :	25 V AC / 30 V DC
I max:	1 A
Switching delay:	$\leq 1,6$ ms
2 optocoupler outputs:	shutdown / spare
U max :	30 V DC
I max :	300 mA
Saturation voltage:	< 2 V (100 mA) < 1,5 V (50 mA) < 1 V (2 mA)
Switching delay::	$\leq 0,2$ ms
Shutdown response time:	$\leq 0,5$ ms
2 optocoupler inputs	Store / print / delete
Signal level ON:	4 V30 V / 3 mA
Signal level OFF:	< 1,5 V

Option – Voltage output

Voltage output:	0 ± 5 V $R_i = < 100 \Omega$
alternative	0 ± 10 V $R_i = < 100 \Omega$
Short-circuit current:	10 mA

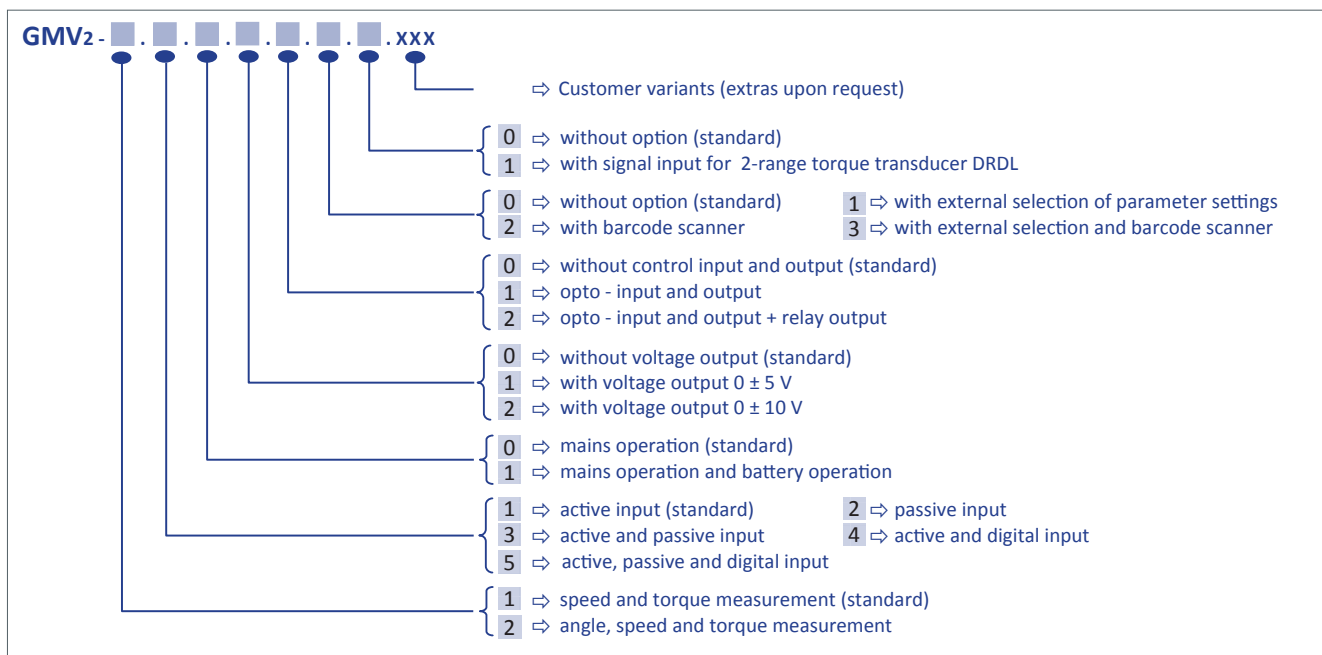
Features

- Measurement of torque, speed and power
- Tracking mode with adjustable filter for torque and speed power measurement from 1 mW up to 20,000 kW continuous measurement output or periodic storage of values
- Peak mode in clockwise or counter-clockwise direction with
 - display status of peak measurement
 - adjustable correction factor for pulsed tools
 - adjustable moving average for torque
 - averaging surveillance function
- Torque-wrench measurement with display of peak value at yielding point
- 50 programmable measurement programs
- Storage for 1000 measurement values
- Adjustable erasing time and start-up suppression times
- RS232C port up to 19200 baud
- EMC-proof housing
- Mains operation 110 to 240 V / 50 - 60 Hz
- Data transfer to MS-Excel[®] with data-transfer software GMV2-PC-Trans
Serial cable supplied with device
- Automatic scanning of transducer data and checking the parameter set for transducers with integrated chip
- Self-explanatory menu structure in many languages
- Protection of settings by passwords in three levels

Options

- Angle measurement
- Battery operation for 8 hours, integral battery charger and power supply
- Passive input for sensors
- Digital input for sensors
- Controlling electric screw drivers with separate power unit (ETH-Accessories `LTE2`)
- Signal input for dual-range torque transducer (ETH-Sensor Type DRDL)
- External control of storing, erasing and printing
- Analog output for torque signal
- External selection of parameter sets
- Input with barcode scanner
- **Special options on request!**

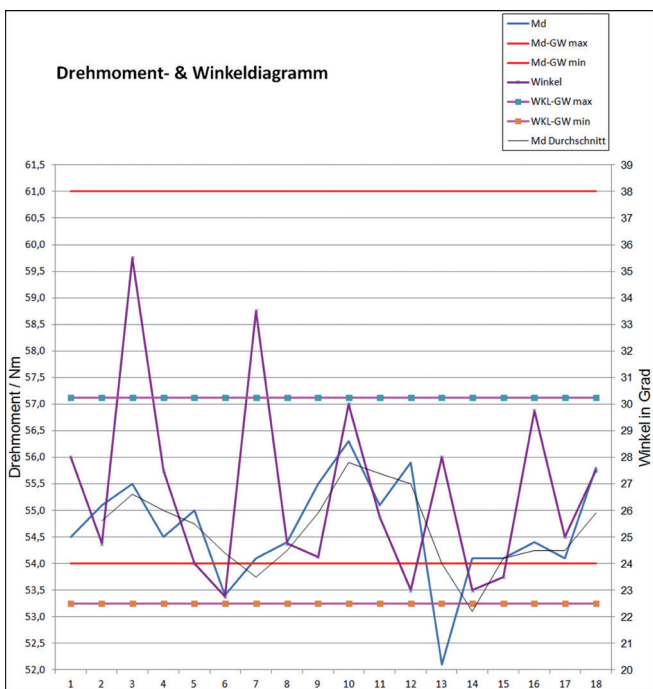
Ordering Code



PAR	DS	SP	Wert / Einheit	Wert GW min	Wert GW max	Winkel / Grad	Wi.-GW min	Wi.-GW max	Uhrzeit	Datum	DS-Kennz.	Werker-Nr.	PAR-Bezeichnung
3	1	1	54,5 Nm	54	61	28	22,5	30,25	14:52	26.06.17	LAGER 1	521	MOTOR 623
3	1	2	55,1 Nm	54	61	24,75	22,5	30,25	14:52	26.06.17	LAGER 1	521	MOTOR 623
3	1	3	55,5 Nm	54	61	35,5	22,5	30,25	14:52	26.06.17	LAGER 1	521	MOTOR 623
3	1	4	54,5 Nm	54	61	27,5	22,5	30,25	14:52	26.06.17	LAGER 1	521	MOTOR 623
3	1	5	55 Nm	54	61	24	22,5	30,25	14:53	26.06.17	LAGER 1	521	MOTOR 623
3	1	6	53,4 Nm	54	61	22,75	22,5	30,25	14:53	26.06.17	LAGER 1	521	MOTOR 623
3	2	1	54,1 Nm	54	61	33,5	22,5	30,25	14:53	26.06.17	LAGER 2	521	MOTOR 623
3	2	2	54,4 Nm	54	61	24,75	22,5	30,25	14:53	26.06.17	LAGER 2	521	MOTOR 623
3	2	3	55,5 Nm	54	61	24,25	22,5	30,25	14:54	26.06.17	LAGER 2	521	MOTOR 623
3	2	4	56,3 Nm	54	61	30	22,5	30,25	14:54	26.06.17	LAGER 2	521	MOTOR 623
3	2	5	55,1 Nm	54	61	25,75	22,5	30,25	14:54	26.06.17	LAGER 2	521	MOTOR 623
3	2	6	55,9 Nm	54	61	23	22,5	30,25	14:54	26.06.17	LAGER 2	521	MOTOR 623
3	3	1	52,1 Nm	54	61	28	22,5	30,25	14:55	26.06.17	LAGER 3	521	MOTOR 623
3	3	2	54,1 Nm	54	61	23	22,5	30,25	14:55	26.06.17	LAGER 3	521	MOTOR 623
3	3	3	54,1 Nm	54	61	23,5	22,5	30,25	14:55	26.06.17	LAGER 3	521	MOTOR 623
3	3	4	54,4 Nm	54	61	29,75	22,5	30,25	14:55	26.06.17	LAGER 3	521	MOTOR 623
3	3	5	54,1 Nm	54	61	25	22,5	30,25	14:55	26.06.17	LAGER 3	521	MOTOR 623
3	3	6	55,8 Nm	54	61	27,5	22,5	30,25	14:56	26.06.17	LAGER 3	521	MOTOR 623

Prüfbedingungen					
Temperatur		22,5 °C	Rel. Luftfeuchte 10 (<= 90%)		
Sensor		Messgerät			
Hersteller:	ETH	Hersteller:	ETH		
Typ	DRT x	Typ	GMV2 (aktiv)		
Serien Nr.:	654321	Serien Nr.:	543210		
nächste Prüfung	11. Jun. 2018	nächste Prüfung	11. Jun. 2018		
Messunsicherheit mit ErweiterungsfaktorK=			< ±1%		
Drehmomentwerkzeug					
Hersteller:	XY	Typ	2		
Artikelbezeichnung:	MD-Schlüssel	Klasse:	A		
Serien Nr.:	123456	max. Drehmoment:	100,0		
Inventarnummer:	123456	Einheit:	Nm		
zulässige Toleranz:	<= ±4%	Skaleneinteilung:	≤ 5%		
Prüfablauf					
Vorbereitung:	-GMV2: Knickschlüsselmessung -5° mit max. Drehmoment auslösen				
Prüfung:	1.) 5 x <= 20,00 Nm 2.) 5 x ca. 60,00 Nm 3.) 5 x 100,00 Nm				
Ergebnisse					
1.Einstellwert	20,00Nm	2.Einstellwert	60,00Nm	3.Einstellwert	100,00Nm
Kalibrierwert	Fehler	Kalibrierwert	Fehler	Kalibrierwert	Fehler
20,00 Nm	0,00 %	59,80 Nm	0,33 %	101,50 Nm	-1,48 %
20,50 Nm	-2,44 %	60,10 Nm	-0,17 %	101,00 Nm	-0,99 %
19,50 Nm	2,56 %	60,50 Nm	-0,83 %	100,30 Nm	-0,30 %
20,30 Nm	-1,48 %	60,00 Nm	0,00 %	101,00 Nm	-0,99 %
19,80 Nm	1,01 %	59,40 Nm	1,01 %	99,20 Nm	0,81 %
maximaler Fehler:			2,56 %	Kalibrierung:	IO
Bestätigung der Kalibrierung nach ISO 6789				Datum, Name, Unterschrift	

Überprüfung			
			vom: 26.06.17 bis: 26.06.17
Werkzeug / (Werkstück)			
Bezeichnung: VK-623	Messprog. Name: MOTOR 623		
Typ: RS25	Datensatz-Kennz.: LAGER 1		
Hersteller: Hudelemaier	Werknummer: 521		
Serien Nr.: 2564482	zuletzt geprüft: -----		
Inventarnummer: 3684423	Kalibrierintervall (Mon.): -----		
Einsatzort: Ulm	nächste Prüfung: -----		
Messmittel			
Sensor		Messgerät:	
Bezeichnung: Drehmomentsensor 1/2"	Bezeichnung: GMV2		
Typ: DRFN-100-w	Typ: GMV2-2.1.1.0.000		
Hersteller: ETH	Hersteller: ETH		
Toleranz: 0,15%	Toleranz: 0,30%		
Serien Nr.: 625735845	Serien Nr.: 625735762		
Inventarnummer: 75-5567	Inventarnummer: 75-5568		
Kalibrierung gültig bis: 01.08.18	Kalibrierung gültig bis: 31.08.19		
Par.-Nr.: 3	von DS: 1	bis DS: 3	Datensatzlänge: 6
Anzahl Datensätze: 3		Anzahl n: 18	
Drehmoment		Winkel	
Mittelwert Xquer:	54 661 Nm	Mittelwert Xquer:	26 69 Grad
Bereich R:	4 200 Nm	Bereich R:	12 75 Grad
Max:	56 300 Nm	Max:	35 50 Grad
Min:	52 100 Nm	Min:	22 75 Grad
Standardabw. (σ):	0 972 Nm	Standardabw. (σ):	3 55 Grad
±3 σ:	2 917 Nm	±3 σ:	10 64 Grad
Sigma (s):	1 001 Nm	Sigma (s):	3 65 Grad
±3 s / %:	3 002 / ± 5,49%	±3 s / %:	10 95 / ± 41,02%
Soll-Drehmoment:		Soll-Winkel:	
Grenzwert max:	61 000 Nm	Grenzwert max:	30 25 Grad
Grenzwert min:	54 000 Nm	Grenzwert min:	22 50 Grad
Anzahl > GWmax / %:	0 0,00%	Anzahl > GWmax / %:	2 11,11%
Anzahl < GWmin / %:	2 11,11%	Anzahl < GWmin / %:	0 0,00%
Cm/Cp:	1,2	Cm/Cpk:	0,4
Cmk/Cpk:	0,2	Cmk/Cpk:	0,3
Gesamt			
Anzahl IO / %:	14 77,78%	Cpk gefordert:	1,0
Anzahl NIO / %:	4 22,22%	Status:	NIO



Prüfprotokoll Drehmomentschlüssel			
Sensor			
Fabrikat:	ETH	Serien Nr.:	7010xxxx
Typ:	DRT x	Inventarnummer:	0815
Geprüft Datum:	11. Jun. 17	Toleranz:	≤ 0,15 %
Prüfintervall:	1 Jahr	nächste Prüfung:	11. Jun. 18
Messgerät			
Fabrikat:	ETH	Serien Nr.:	7010xxxy
Typ:	GMV2 (aktiv)	Inventarnummer:	0816
Geprüft Datum:	24. Jan. 17	Toleranz:	≤ 0,3 % ± 2 Digit
Prüfintervall:	1 Jahr	nächste Prüfung:	24. Jan. 18
Drehmomentschlüssel			
Hersteller:	Hauruck		
Artikelbezeichnung:	Drehmomentschlüssel		
Serien Nr.:	4711		
Inventarnummer:	123456		
Drehmomentbereich:	20 - 100 Nm		
Skaleneinteilung:	5 Nm		
Toleranz:	3%		
Messwerte		Ergebnisse	
	75,00	Mittelwert:	75,04
1. Prüfung	75,20	Abweichung:	0,05%
2. Prüfung	75,80	+/- 3 Sigma:	1,55
3. Prüfung	74,80		
4. Prüfung	74,40		
5. Prüfung	75,00		