



### Typical Applications:

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

### Standard for active torque sensors

- 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

<b>Power Supply</b>	
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
<b>Sensor power supply</b>	
for torque transducer	12 V DC / 200 mA
Active input:	programmable
Input sensitivity:	from $\pm 1,25$ V to $\pm 10$ V
Input resistance:	1 M $\Omega$
Zero adjustment range:	approx. $\pm 7$ % of full scale
<b>Conversion</b>	
Pulse rise time:	10 % - 90 %: 0,25 ms
Max. measurement frequency:	3 KHz sine-wave pulse
<b>Accuracy</b>	
Tracking mode:	$\leq 0,1$ % $\pm 2$ digit
Peak mode:	$\leq 0,3$ % $\pm 2$ digit
Torque-wrench mode:	$\leq 0,3$ % $\pm 2$ 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 $100^\circ$ then $1^\circ$
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 - $45^\circ$ 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
<b>Colors</b>	
Housing:	RAL 9006 (white aluminum)
Frame:	RAL 7016 (anthracite gray)
Design strips:	RAL 3002 (carmine red)

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

<b>Option – Digital input</b>	for sensor type DRFDxx
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<b>Option – Passive input</b>	
Input sensitivity:	programmable from $\pm 0.5$ mV/V to $\pm 4$ V/V
Adjustment range:	approx. $\pm 7$ % of full scale
Sensor passive power supply	7 V DC
4-wire power supply	350 - 1000 $\Omega$

<b>Option – Angle measurement</b>	
Input signals:	2 channels 360 pulses / revolution with approx. $90^\circ$ phase shift
Resolution:	$0,25^\circ$
Counting range:	$\pm 6000^\circ$

<b>Option – Barcode scanner</b>	
Manual scanner:	80 mm
Code:	39

<b>Option – Control input and outputs</b>	
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 V ....30 V / 3 mA
Signal level OFF:	< 1,5 V

<b>Option – Voltage output</b>	
Voltage output:	$0 \pm 5$ V $R_i = < 100 \Omega$ alternative $0 \pm 10$ V $R_i = < 100 \Omega$
Short-circuit current:	10 mA

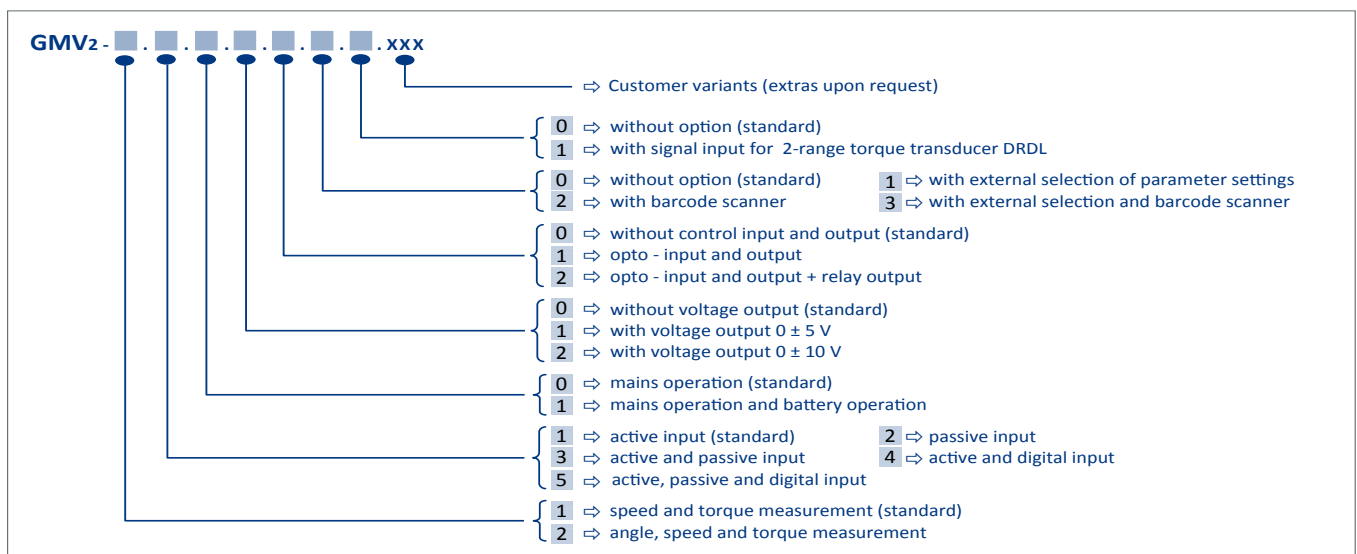
## Features

- 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<sup>®</sup> 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!**

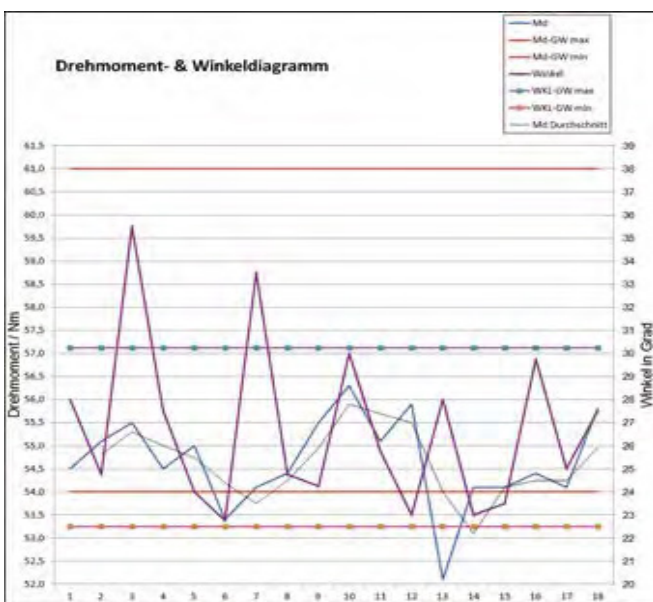
## Ordering Code System



PAR	DS	SP	Wert / Einheit	Wert GW min	Wert GW max	Winkel / Grad	WL-GW min	WL-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	27,75	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	55,0 Nm	54	61	24	22,5	30,25	14:52	26.06.17	LAGER 1	521	MOTOR 623
3	1	6	54,5 Nm	54	61	27,75	22,5	30,25	14:52	26.06.17	LAGER 1	521	MOTOR 623
3	2	1	54,1 Nm	54	61	24,75	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	14:53	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	54,8 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			
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	80,00Nm
3.Einstellwert	100,00Nm		
Kalibrierwert	Fehler	Kalibrierwert	Fehler
20,00 Nm	0,00 %	59,80 Nm	0,33 %
20,50 Nm	-2,44 %	60,10 Nm	-0,17 %
19,50 Nm	2,56 %	60,50 Nm	-0,83 %
20,30 Nm	-1,48 %	60,00 Nm	0,00 %
19,80 Nm	1,01 %	59,40 Nm	1,01 %
		101,50 Nm	-1,48 %
		101,00 Nm	-0,99 %
		100,30 Nm	-0,30 %
		101,00 Nm	-0,99 %
		99,20 Nm	0,81 %
maximaler Fehler:		2,56 %	Kalibrierung:
			ID
Bestätigung der Kalibrierung nach ISO 6789 Datum, Name, Unterschrift			

Überprüfung		vom: 26.06.17			
bis: 26.06.17					
Werkzeug / (Werkstück)					
Bezeichnung: VVK-623	Messprog. Name: MOTOR 623				
Typ: R525	Datensatz-Kennz.: LAGER 1				
Hersteller: Hudebaldner	Werknummer: 521				
Serien Nr.: 2664482	zuletzt geprüft: -----				
Inventarnummer: 3684423	Kalibrierintervall (Mon.): -----				
Einsatzort: Ufm	nächste Prüfung: -----				
Messmittel					
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.: 625736648	Serien Nr.: 625735762				
Inventarnummer: 75-5667	Inventarnummer: 75-5668				
Kalibrierung gültig bis: 31.08.18	Kalibrierung gültig bis: 31.08.19				
Par-Nr.: 3	von DS: 1	bis DS: 3			
Datensatzlänge: 6					
Anzahl Datensätze: 3	Anzahl: 18				
Drehmoment		Winkel			
Mittelwert Xwert:	54,601 Nm	28,89 Grad			
Bereich R:	4,200 Nm	12,75 Grad			
Max:	56,300 Nm	35,50 Grad			
Min:	52,100 Nm	22,75 Grad			
Standardabw. (Sy)	0,872 Nm	3,55 Grad			
Standardabw. (Sv)	2,911 Nm	10,84 Grad			
Sigma (s)	1,001 Nm	3,65 Grad			
±3 s / %	3,002 / ± 5,49%	10,35 / ± 41,02%			
Std-Drehmoment:		Std-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 > GWmin / %	2	11,11%
Anzahl < GWmin / %	2	11,11%	Anzahl < GWmin / %	0	0,00%
Cpk/Cpk	1,2	Cpk/Cpk	0,4		
Cmk/Cpk	0,2	Cmk/Cpk	0,3		
Gesamt					
Anzahl ID / %	14	77,78%			
Anzahl NIQ / %	4	22,22%			
Cpk gefordert:	1,0	Status: NIQ			



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.:	7010xxyy
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		

System requirements: up to Win 10, Office 95 - 2016