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Prüftechnik
Testing Technics

MAV PRÜFTECHNIK GMBH

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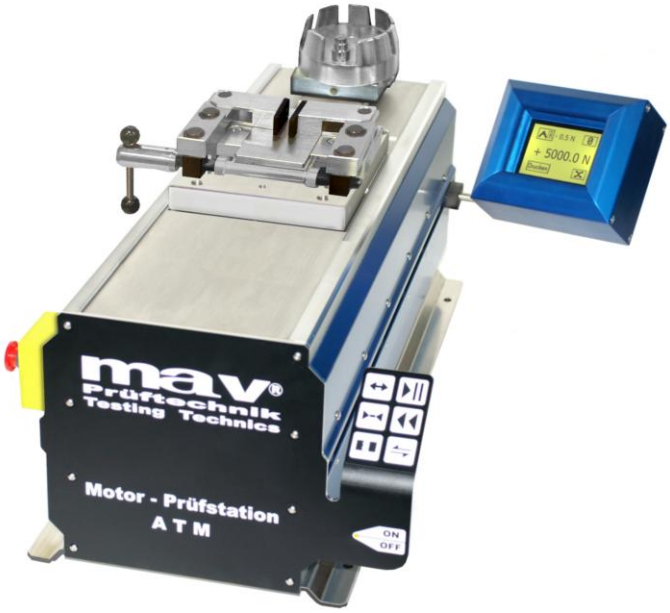
Delivery Overview



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Kraftmessgeräte - Prüfsysteme - Prüfstationen

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Overview - Manually Operated Devices

Model Type	Code	Indication Range [Newton]	Resolution [Newton]	Max. Relative Deviation ± 1 Digit
Hand Testers / Reference Systems				
KMG-Touch	5	0-50	0.005	± 0.1 % F.S.
KMG-Touch	10	0-100	0.01	± 0.1 % F.S.
KMG-Touch	20	0-200	0.02	± 0.1 % F.S.
KMG-Touch	50	0-500	0.05	± 0.1 % F.S.
KMG-Touch	100	0-1000	0.1	± 0.1 % F.S.
KMG-Touch	200	0-2000	0.2	± 0.1 % F.S.
KMG-Touch	300	0-3000	0.3	± 0.1 % F.S.
KMG-Touch	500	0-5000	0.5	± 0.1 % F.S.
KMG-Touch	1000	0-10000	1	± 0.1 % F.S.
Universal Testers				
CT	50	0-500	0.5	± 0.5 % *
Clip Gun Testers				
CGT	50	0-500	0.5	± 0.25 % *
CGT Touch	50	0-500	0.05	± 0.25 % *
Manually Operated Digital Testers				
FT	5	0-50	0.01	± 0.25 % *
FT	10	0-100	0.02	± 0.25 % *
FT	25	0-250	0.05	± 0.25 % *
FT	50	0-500	0.1	± 0.25 % *
FT	100	0-1000	0.2	± 0.25 % *
FT-Touch	5	0-50	0.005	± 0.25 % *
FT-Touch	10	0-100	0.01	± 0.25 % *
FT-Touch	25	0-250	0.02	± 0.25 % *
FT-Touch	50	0-500	0.05	± 0.25 % *
FT-Touch	100	0-1000	0.1	± 0.25 % *
FTS	5	0-50	0.01	± 0.25 % *
FTS	10	0-100	0.02	± 0.25 % *
FTS	25	0-250	0.05	± 0.25 % *
FTS	50	0-500	0.1	± 0.25 % *
FTS	100	0-1000	0.2	± 0.25 % *

* in measuring Area

Special designs and measuring areas upon request. All indications made are without engagement and non-binding. This is no assurance of characteristics in the sense of § 459 Abs.2, BGB and will not cause any liability. The right is reserved to make alterations without giving prior notice.
Warranty period: 6 months or max. 25000 tests.
Recommended maintenance interval: 24 months or max. 50000 tests.

Overview – Motorized Devices

Model Type	Code	Indication Range [Newton]	Resolution [Newton]	Max. Relative Deviation ± 1 Digit
Motorized Testers				
FTM	5	0-50	0.01	± 0.25 % *
FTM	10	0-100	0.02	± 0.25 % *
FTM	25	0-250	0.05	± 0.25 % *
FTM	50	0-500	0.1	± 0.25 % *
FTM	100	0-1000	0.2	± 0.25 % *
FTM	200	0-2000	0.5	± 0.25 % *
FTM	500	0-5000	1	± 0.25 % *
FTM	1000	0-10000	2	± 0.25 % *
Motor Test Stations				
ATM	5	0-50	0.01	± 0.25 % *
ATM	10	0-100	0.02	± 0.25 % *
ATM	25	0-250	0.05	± 0.25 % *
ATM	50	0-500	0.1	± 0.25 % *
ATM	100	0-1000	0.2	± 0.25 % *
ATM	200	0-2000	0.5	± 0.25 % *
ATM	500	0-5000	1	± 0.25 % *
ATM	1000	0-10000	2	± 0.25 % *
Motorized Testers with Touch Panel Operation				
ETM-F	5	0-50	0.005	± 0.25 % *
ETM-F	25	0-250	0.02	± 0.25 % *
ETM-F	50	0-500	0.05	± 0.25 % *
ETM-F	100	0-1000	0.1	± 0.25 % *
ETM-F	300	0-3000	0.3	± 0.25 % *
ETM-F	600	0-6000	0.6	± 0.25 % *
ETM-F	1000	0-10000	1.0	± 0.25 % *
ETM-A	5	0-50	0.005	± 0.25 % *
ETM-A	25	0-250	0.02	± 0.25 % *
ETM-A	50	0-500	0.05	± 0.25 % *
ETM-A	100	0-1000	0.1	± 0.25 % *
ETM-A	300	0-3000	0.3	± 0.25 % *
ETM-A	600	0-6000	0.6	± 0.25 % *
ETM-A	1000	0-10000	1.0	± 0.25 % *
ETM-M	5	0-50	0.005	± 0.25 % *
ETM-M	25	0-250	0.02	± 0.25 % *
ETM-M	50	0-500	0.05	± 0.25 % *
ETM-M	100	0-1000	0.1	± 0.25 % *
ETM-M	300	0-3000	0.3	± 0.25 % *
ETM-M	600	0-6000	0.6	± 0.25 % *
ETM-M	1000	0-10000	1.0	± 0.25 % *

* in measuring Area

Special designs and measuring areas upon request. All indications made are without engagement and non-binding. This is no assurance of characteristics in the sense of § 459 Abs.2, BGB and will not cause any liability. The right is reserved to make alterations without giving prior notice.
Warranty period: 6 months or max. 25000 tests.
Recommended maintenance interval: 24 months or max. 50000 tests.

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Overview - Tools

Designation	max. Load	Model
Tools		
Clamping crown, 40 mm Ø	500 N	SG 40
Clamping crown , 80 mm Ø	2,000 N	SG 80
Clamping crown , 80 mm Ø, reinforced version	3,000 N	SG 80 V
Clamping crown , 90 mm Ø, with protective cover	10,0000 N	SG 90
Turntable, 80 mm Ø, with clamp fixture "K"	500 N	DT 88K
Universal turntable with clamp fixture "2K"	1,000 N	UNI-DT-2K
Universal turntable, reinforced	2,000 N	UNI-DT-2K-V
Clamping and holding fixtures for connector parts	500 N	SL-WW
Comb tool	1,000 N	KW 1
Comb tool	1,000 N	KW 2
Tool set for roll-off force measurements	500 N	CB
Layered cone for testing cable tie, complete set	1,000 N	KBS
Holding fixtures for ferrules	500 N	ADE
Tool set for insertion / subtraction tests	500 N	KLH
Tool set for testing cable tie pistols	500 N	KBP
Ceramic tile breakage appliance	1,000 N	KPB
Miniature cable tensioner, clamping diameter max. 6 mm	500 N	MK-8/M,A
Cable tensioner, clamping diameter max. 20 mm	2,000 N	DKS-20/M,A
Quick action clamps, clamping diameter max. 6 mm	500 N	KSH-6/M,A
Quick action clamps, clamping diameter max. 8 mm	1,000 N	KSP-8/M,A
Quick action clamps, clamping diameter max. 12 mm	1,000 N	SHA-12/M,A
Quick action clamps, clamping diameter max. 16 mm	2,000 N	KSP-16/M,A
Quick action clamps, clamping diameter max. 20 mm	3,000 N	SHA-20/M,A
Quick action clamps, clamping diameter max. 40 mm	10,000 N	SHA-40/M,A
Cable tensioner, clamping diameter max. 40 mm	10,000 N	ESP
Eccentric fixture	1,000 N	DES-10/M,A
Fit strip for cable splices	5,000 N	SL-BAT
mm-perforated plate ML1 including adustable supporting frame (0,1 - 10 mm)	500 N	SPA/ML1
mm-perforated plate ML1 including adustable supporting frame (10 - 20 mm)	500 N	SPA/ML2
mm-perforated plate ML1 including adustable supporting frame (21 - 30 mm)	500 N	SPA/ML3
Short clamping fixture	500 N	KSEL - M,A
Precision clamping fixture	500 N	FSEL - M,A
Circuit board tensioning frame including shearing tools	500 N	LSS
Rope tensioning tool for wire, thread, cord etc.	500 N	VW 10
Self-clamping brackets, 25 mm wide	500 N	VW 25
Clamping jaws, 30 mm wide	500 N	VW 30
Pressure plates	500 N	VW 50
Rope tensioning tool	1,000 N	VW 70
Eccentric clamping jaws	500 N	VW 80
Long nose pliers (surgical)	500 N	FSZ/M,A
Ring testing tool	500 N	RP
Interchangeable tool for high power terminals & connectors (MAK 8 & 12)	10,000 N	WW-MAK

Additional accessories and special tools upon request
The M respectively the A within the model name indicate the tool's mounting point.
M = Measuring Point, A = Load bar

Overview - Accessories & Software

Designation	Model
Accessories for the Digital-Test Stations ETM / MPM	
RS 232 data cable for PC connection 9S-9B	
Adapter RS 232 9 pin, USB	
Special program "printout of force/displacement curve" (ETM-M + MPM only)	
Special program "repetitive force" (ETM-A + ETM-M + MPM)	
Special program "webserver" (ETM-A + ETM-M + MPM)	
Special program "PC-keyboard" (MPM only)	
Special program "dwell time 1-220 sec." (ETM-A + ETM-M + MPM)	
Display-protective foil for touchscreen, 1 sales unit= 3 pieces. (all ETMs + MPM)	
Software-Update from ETM-F to ETM-A	
Printer-paper rolls for IPN 240-24, width: 58/Ø50 mm, 1 sales unit = 1 carton including 100 rolls (MPM only)	
Ribbon cartridges HX 20, endless, black/purple 1 sales unit = 10 pieces (MPM only)	HX 20
Accessories for CT 50 - ET(S) – KMS - FT(M) – ATM - EP(M)- ETM - Devices	
Miniature tabletop printer DPN 833, including power supply unit	DPN 833
Data cable for printer connection (please name device model)	
Data cable for PC connection-software (please name device model)	
mavDataEX software, statistical recording, MS-Excel-interface	mavDataEX
mavSTAT software: statistical recording, illustration and analysis of measured values	mavSTAT
mavSTAT_light software statistical recording, MS-Excel-interface	mavSTAT_light
mav GRAPH software: Recording of force-time and force-displacement diagrams	mavGRAPH
mavCALIB Software: Calibration and adjustment of MAV test stations	mavCALIB
Electronic Force Transducers (Load Cells) SM for KMG/DKS-USB, Ready for Connection	
Force transducer 50 N	SM 50 N
Force transducer 100 N	SM 100 N
Force transducer 200 N	SM 200 N
Force transducer 500 N	SM 500 N
Force transducer 1,000 N	SM 1,000 N
Force transducer 2,000 N	SM 2,000 N
Force transducer 3,000 N	SM 3,000 N
Force transducer 5,000 N	SM 5,000 N
Force transducer 10,000 N	SM 1,.000 N
Digital calibration system with USB- sensor interface and visualizing software for SM- load cells (price without load cell)	DKS-USB
Control Devices and Adapters	
Force load device for test stations with manual levers ranging up to 1,000 N	KB 1000
Suspension blocks for load cells of devices ranging up to 1,000 N nominal load	HLT 100
Suspension blocks for ETM, FTM and ATM devices with max. 3,000 N	LB 300
Suspension blocks for ETM, FTM, ATM devices with 5/6/10 kN nominal load	LB 1000

Manually Operated Test Devices of the MAV Prüftechnik GmbH

- *Comparison of available manually operated test stations*
- *List of relevant parameters*

Feature \ Model	CT 50	FT	FTS	FT - Touch	CGT 50	CGT - Touch
Measuring system (force direction)	Mainly pull force, push force is manageable	Mainly pull force, push force is manageable	Pull & push force	Mainly pull force, push force is manageable	Pull force only	Pull force only
Indication range (0 - X N)	0 - 500 N	0 - 50/250/500/1000 N	0 - 50/250/500/1000 N	0 - 50/250/500/1000 N	0 - 500 N	0 - 50/250/500/1000 N
Resolution (in steps: nominal load/steps = resolution in N)	1.000	5.000	5.000	10.000	1.000	10.000
Internal measurement frequency (Hz)	10,000	10,000	10,000	10,000	10,000	10,000
Application range	20 - 100 % of nominal load	20 - 100 % of nominal load	20 - 100 % of nominal load	10 - 100 % of nominal load	20 - 100 % of nominal load	10 - 100 % of nominal load
Rel. deviation in measurement area	≤ ± 0.5 % of measured value ± 1 digit	≤ ± 0.25 % of measured value ± 1 digit	≤ ± 0.25 % of measured value ± 1 digit	≤ ± 0.25 % of measured value ± 1 digit	≤ ± 0.5 % of measured value ± 1 digit	≤ ± 0.25 % of measured value ± 1 digit
Operating modes	Roll- & peak mode	Roll- & peak mode	Roll- & peak mode	Roll- & peak mode	Roll- & peak mode	Roll- & peak mode
Display	LCD- dot matrix infrared sensor display, 128x64 pixels.- 5 Hz update rate	LCD- dot matrix infrared sensor display, 128x64 pixels.- 5 Hz update rate	LCD- dot matrix infrared sensor display, 128x64 pixels.- 5 Hz update rate	LCD QVGA-TFT touchscreen display 5.7“, 370x240 pixels. 60 Hz update rate	LCD- dot matrix infrared sensor display, 128x64 pixels.- 5 Hz update rate	LCD QVGA-TFT touchscreen display 5.7“, 370x240 pixels. 60 Hz update rate
Operation	Hand lever	Hand lever	Hand wheel	Hand lever	Via fixed cable tie tightening pistol.	Via fixed cable tie tightening pistol.
Automatic Zero Point correction	●	●	●	●	●	●
Tare compensation	●	●	●	●	●	●
Overload protection and indication	●	●	●	●	●	●
Measured value memory	-	10,000 values	10,000 values	4,000 values	-	4,000 values
Interface	RS232	RS232	RS232	RS232	RS232	RS232
Real time clock module	-	●	●	●	-	●
Single and listing output	Single output only	●	●	●	Single output only	●
Linear stroke	80 mm	80 mm	150 mm	80 mm	-	-
Printer	○	○	○	○	○	○

– not available * ○ optional (surcharge) * ● standard

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Motor Test Stations of the MAV Prüftechnik GmbH

- *Comparison of incoherent features*
- *List of the most important parameters*

Feature \ Model	ETM-F	ETM-A	ETM-M	FTM	ATM	MPM
Measuring system (force direction)	Pull & push force	Pull & push force	Pull & push force	Pull & push force	Pull & push force	Pull & push force
Indication range (0 - X N)	50/250/500/1,000/3,000/ 6,000/10,000	50/250/500/1,000/3,000/ 6,000/10,000	50/250/500/1,000/3,000/ 6,000/10,000	50/100/250/500/1,000/ 2,000/5,000/10,000	50/100/250/500/1,000/ 2,000/5,000/10,000	50/100/250/500/1,000/ 2,000/5,000/10,000
Resolution (in steps: nominal load/steps = resolution in N)	10,000	10,000	10,000	5,000	5,000	10,000
Application range	10 - 100 % of nominal load	10 - 100 % of nominal load	10 - 100 % of nominal load	20 - 100 % of nominal load	20 - 100 % of nominal load	10 - 100 % of nominal load
Internal measurement frequency (Hz)	10,000	10,000	10,000	10,000	10,000	10,000
Rel. deviation in measurement area	≤ ± 0.25 % of measured value ± 1 digit	≤ ± 0.25 % of measured value ± 1 digit	≤ ± 0.25 % of measured value ± 1 digit	≤ ± 0.25 % of measured value ± 1 digit	≤ ± 0.25 % of measured value ± 1 digit	≤ ± 0.25 % of measured value ± 1 digit
Operating modes	Roll- & peak mode	Roll- & peak mode	Roll- & peak mode	Roll- & peak mode	Roll- & peak mode	Roll- & peak mode
Display	LCD QVGA-TFT touchscreen display 5.7“, 370x240 pixels. 60 Hz update rate	LCD QVGA-TFT touchscreen display 5.7“, 370x240 pixels. 60 Hz update rate	LCD QVGA-TFT touchscreen display 5.7“, 370x240 pixels. 60 Hz update rate	LCD- dot matrix infrared sensor display, 128x64 pixels.- 5 Hz update rate	LCD- dot matrix infrared sensor display, 128x64 pixels.- 5 Hz update rate	Touchscreen display 5.7“, update rate 5 Hz
Operation	Via touchscreen	Via touchscreen	Via touchscreen	Manually via membrane keyboard, load bar will move as long as the respective key is actuated, will stop on release	Membrane keyboard with ON/OFF button & six keys for start/stop, fast rewind, push, pull, break stop function and cycle test	Via touchscreen of the external device control unit
Automatic Zero Point correction	•	•	•	•	•	•
Password protected test parameter setup	•	•	•	-	-	-
Tare compensation	•	•	•	•	•	•
Overload protection & indication	•	•	•	•	•	•
Set-point specification	•	•	•	•	•	•
Measured value memory	100 values	4,000 values	4,000 values	10,000 values	10,000 values	10,000 values
Interface	RS232	RS232, LAN (optional)	RS232, LAN (optional)	RS232	RS232	RS232C-, DIGIMATIC-, USB and LAN
Real time clock module	•	•	•	•	•	•
Single and listing output	•	•	•	•	•	•
Push/pull switch (* for SW-Version 1.45 and newer by keystroke)	Rewinding speed must be higher than testing speed	Rewinding speed must be higher than testing speed *	Rewinding speed must be higher than testing speed *	Keys on membrane keyboard	Keys on membrane keyboard	Key on working screen
Testing speed (mm/min)	50/75/100/800 (≤ 1.000 N) 50/75/100/400 (3.000 N) 50/75/100/250 (≥ 6.000 N)	5-800 (≤ 1.000 N) 5-400 (3.000 N) 5-250 (≥ 6.000 N)	5-800 (≤ 1.000 N) 5-400 (3.000 N) 5-250 (≥ 6.000 N)	50/100//600 (≤ 2.000 N) 50/100/300 (≥5.000 N) (modifications upon request)	≤ 2000 N: 5-600 ≥ 5000 N: 5-300	≤ 2000 N: 5-600 ≥ 5000 N: 5-300
Testing speed tolerance	0-100: ± ≤ 1% 101-400: ± ≤ 3% 401-800: ± ≤ 5%	0-100: ± ≤ 1% 101-400: ± ≤ 3% 401-800: ± ≤ 5%	0-100: ± ≤ 1% 101-400: ± ≤ 3% 401-800: ± ≤ 5%	3% max.	2% max.	2% max.

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Motor Test Stations of the MAV Prüftechnik GmbH

- *Comparison of incoherent features*
- *List of the most important parameters*

Feature \ Model	ETM-F	ETM-A	ETM-M	FTM	ATM	MPM
Linear stroke (mm)	150	150	150	150	150	150
Break stop function	-	●	●	-	●	●
Cycle test between adjustable end positions	-	● (temporary adjustable positions)	● (adjustable positions)	-	● (temporary adjustable positions)	● (adjustable positions)
Repeated test between force values	-	○	○	-	-	○
Force preset for non-destructive tests	-	●	●	-	●	●
Holding under load	-	0-220 sec	0-220 sec	-	60/120/180 sec.	0-2000 sec
Force-displacement measurement	-	-	●	-	-	●
Printer	○	○	○	○	○	Built-in printer
Safety features	Emergency stop button, anti-trap protection during rewind	Emergency stop button, anti-trap protection during rewind	Emergency stop button, anti-trap protection during rewind	*Not necessary (let go of membrane keyboard to stop)*	Emergency stop button, anti-trap protection during rewind	Emergency stop button, anti-trap protection during rewind

– not available * ○ optional (surcharge) * ● standard

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Manual Devices

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Universal Tester Model CT 50

- *Indication Range 0-500 N*
- *Tractive and Compressive Force Measurements*

General Information:

- Electronic testing device with digital display for tensile and compressive force measurements
- Easy to use and space-saving, made for the use in production and test laboratories, suitable for the tensile force measurement of ready-made supply cables with flat plugs, end sleeves and other pressed, crimped soldered, welded glued or comparably connected parts
- Compressive force measurement, for example insertion and extraction tests.
- Indication Range: 0-500N, measurement resolution of 0.5N.
- High measurement accuracy and reproducibility of measurement
- Readout and operation via resistant touchscreen with dot matrix-LCD-Display.
- Casing protected against dust.
- High measurement frequency.
- Automatic zero point alignment.
- Tare-compensation.
- Overload indicator.
- 2 operating modes:
  Peak-mode, displaying the highest measured force value of the entire measurement procedure
  Tracking-mode, displaying the current force value
- Setup menu for adjustment.
- Serial interface for measured value output.
- Loading system with parallel guided load slide; actuation via laterally mounted hand-lever, adjustable in inclination; load slide with guide rail and possible length adjustment.
- Durable, maintenance-free metal construction.
- Universal quick-change tool holders

Optional Accessories :

- Tabletop printer – Software mavDataEX, -mavSTAT light
- Data transmission cable for printer connection
- Data transmission cable for computer connection
- Other supplies from the catalogue upon request

Clamping Tools & Holding Fixtures:

Clamping cone	SG 40, SG 80
Turntable	DT 88K
Miniature cable tensioner	MK-8
Quick action clamps	KSH-6, KSP-8
Miniature grips	KSEL, FSEL
Layered cone	KBS for testing cable tie
Comb tool	KW 1, KW 2

Other tools from the catalogue.
Customized tools upon request.
Clip gun tester model CGT 50 for testing the tensioning force of cable tie pistols.

Model CT 50 with SG 40 and MK-8/A

Technical Data CT 50:

Model Designation: **CT 50**

Indication range: 0-500 N.

Measurement resolution: 0,5 N

Relative deviation in measuring area: ≤ ± 0.5 % of value ± 1 digit

Casing:

Dimensions:	Baseplate:	W×D×H ca. 130×400×125 mm;
	Controls:	W×D×H ca. 125×105×70 mm;
	Hand lever:	240 mm, adjustable inclination
Weight:	around 8 kg.	
Material:	Anodized aluminum	
Color:	Silver-grey	

Measuring System:

Supply Voltage: 12 V DC via an external power supply.

Force Transducer:
Strain gauge - load cells with integrated 12 bit AD-converter and RS485 bus. Overload protection.

Evaluation:
Operating modes: Tracking-mode and peak-mode;
Measurement frequency: 10000 Hz; Zero point correction; Tare-compensation;
Overload indicator;
Setup menu for instrument adjustment;
Individual output of measured values via serial interface.

Display:
Backlight LCD-dot matrix-display,
128x64p, 56,3x38,4 mm.
LCD update rate: 5 Hz.

Input/Handling
All inputs and actuations made via infrared-touchscreen.

Interface:

RS232C	1200 baud, 8 data bits, 1 stop bit, Parity: none; Connector: RJ45 socket (8-pin).

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Digital Tester Models FT / FTS

- *Indication Ranges 0-50 N, 0-100 N, 0-250 N, 0-500 N, 0-1000 N with hand-lever or hand-wheel*
- *Tractive and Compressive Force Measurements*

Model FT with hand-lever, Model FTS with hand-wheel

Technical Data FT / FTS:

FT Tester:

Capacity:	0- 50/100/250/500/1000 N.
	240mm hand-lever, adjustable inclination.
Dimensions:	W×D×H 130x400x125 mm.
Weight:	ca. 10 kg.
Construction:	Resistant metal construction.
Color:	silver and blue, anodized.
Capacity:	max. 1000 N.
Linear stroke:	ca. 80 mm.

Characteristics FT Tester:
Load slide, hand-lever operated for rapid test sequences, precise linear guidance.
Durable, maintenance-free metal construction.

FTS Tester:

Capacity:	0- 50/100/250/500/1000 N.
Dimensions:	W×D×H 116x520x124 mm.
Weight:	ca. 12 kg.
Color:	blue, anodized.
Capacity:	max. 1000 N, overload protection.
Linear stroke:	150 mm, precise linear guidance.

Characteristics FTS Tester:
Self-locking linear driven by hand-wheel, 1mm advance per rotation enables a steady, easy to apply workload and also holding under load.
Durable, maintenance-free metal construction.

Technical Data Measuring System FT / FTS:

- Indication ranges: 0- 50/100/250/500/1000 N.
- Measurement resolution: 4000/5000
  for exact steps: see delivery overview
- Relative derivation in measuring area: ≤ ± 0.25 % of value ± 1 digit.
- Built-in force measuring system:
- **Force Transducer:**
  Strain gauge - load cells with integrated 16 bit AD-converter and RS485 bus. Overload protection.
- **Force measuring device:**

Dimensions: W×D×H ca. 125x105x70 mm;
Supply Voltage: 12-24 V DC via an external power supply.

- **Evaluation:**

Operating modes: Tracking-mode and peak-mode;
Internal measurement frequency: 10000 Hz;
Zero point correction, Tare-compensation;
Optical and acoustical overload indicator;
Set point value with optical and acoustical alarm;
Setup menu for parameter setting and adjustment;
Memory space for 10000 measured values;
Single- and list output via serial interface;
Real-time clock for printouts with date and time;
Language for data output selectable: English, French, German

- **Display:**

LCD-dot matrix-display 128×64p, 56.3×38.4 mm.
LCD update rate: 5 Hz.
Input/Handling:
All inputs and actuations made via infrared-touchscreen.

- **Interface:**

RS232C adjustable 1200-38400 baud, 7/8 data bits, ½ stop bit, parity: none/even/odd. Connector: RJ45 socket (8-pin).

Optional Accessories:

- Tabletop printer
- Software mavDataEX, -mavSTATlight
- Data transmission cable for printer connection
- Data transmission cable for computer connection
- Other supplies from the catalogue upon request

Clamping Tools & Holding Fixtures:

Clamping cone	SG 40, SG 80
Turntable	DT 88K
Miniature cable tensioner	MK-8
Quick action clamps	KSH-6, KSP-8
Miniature grips	KSEL, FSEL
Layered cone	KBS for testing cable tie
Comb tools	KW 1, KW 2

For other tools, please see the catalogue.
Customized tools upon request.
Clip gun tester model CGT 50 for testing the tensioning force of cable tie pistols.

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Digital Tester Model FT - Touch

- *Indication Ranges 0-50 N, 0-250 N, 0-500 N, 0-1000 N with hand lever*
- *Tractive and Compressive Force Measurements*

FT - Touch with hand lever

Technical Data:

Model Designation:	**FT- Touch**
Indication Range:	0- 50//250/500/1000 N.
Resolution:	10000 increments, see overview
rel. accuracy error :	≤ ± 0,25 % F.S. ± 1 Digit

Measurement System:
Power supply: Power supply: external 24 V DC (plug-power supply);

Force Transducer:
Strain gauge -load cell with integrated 16 Bit AD-converter and configurable micro-controller system.

Evaluation:
Operating Modes: Rolling Mode and Peak Point Mode;
Internal update rate: ca. 10000 Hz; automatic zero correction;
Tare compensation up to 25 % of resp. load cell capacity;
Optical and acoustic overload indicator;
Internal memory for ca. 4000 measurements;
real-time clock with date; Setup menu for internal parameter setting and automatic adjustment in several password protected levels;
Single and listing printout via RS232 serial port.

Display:
LED backlight QVGA TFT-touchscreen-display, ca. 115×86 mm. LCD update rate: 60 Hz.

Operation:
All actuations made via touchscreen.

Serial Port:
RS232C, adjustable 1200-38400 baud, 7/8 data bits, ½ stop bits, parity: e/o/n. Connector: Sub-D socket (15 pins).

General Information:

FT Tester:

Capacity:	0- 50/100/500/1000 N. 240mm hand-lever, adjustable inclination.
Dimensions:	W × D × H: 130 x 400 x 125 mm.
Weight:	ca. 10 kg.
Construction:	Resistant metal construction.
Color:	silver and blue, anodized.
Capacity:	max. 1000 N.

.

Characteristics FT Tester:
Load slide, hand-lever operated for rapid test sequences, precise linear guidance.
Durable, maintenance-free metal construction.

Code	Indication Range [N]	Resolution [N]
5	0- 50	0.005
25	0- 250	0.025
50	0- 500	0.05
100	0- 1000	0.1

Optional Accessories:

- Tabletop printer, Software mavDataEX, -mavSTAT$_{light}$
- Data transmission cable for printer connection
- Data transmission cable for computer connection
- Other supplies from the catalogue upon request

Clamping Tools & Holding Fixtures:

Clamping cone	SG 40, SG 80
Turntable	DT 88K
Miniature cable tensioner	MK-8
Quick action clamps	KSH-6, KSP-8
Miniature grips	KSEL, FSEL
Layered cone	KBS for testing cable tie
Comb tools	KW 1, KW 2

For other tools, please see the catalogue.
Customized tools upon request.
Clip gun tester model CGT 50 for testing the tensioning force of cable tie pistols.

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Clip Gun Tester Model CGT 50

- *Indication Range 0-500 N*
- *Testing Cable Tie Application Tools*

General Information:

- Small, handy electronic testing device with digital display used to determine the tensile force of cable tie tighten pistols
- Easy to use and versatile testing device with minimum space requirements, for the use in production or test laboratory, suitable for tensile force measurements of all hand- or pneumatically operated cable tie pistols.
- Indication Range: 0-500 N, measurement resolution of 0.5 N.
- High measurement accuracy and reproducibility of measurement results.
- Readout and operation via resistant touchscreen with dot matrix-LCD-Display.
- Casing protected against dust.
- High measurement frequency (10000 Hz).
- Automatic zero point alignment.
- Tare-compensation.
- Overload indicator.
- 2 operating modes:
  - Peak-mode, displaying the highest measured force value of the entire measurement procedure.
  - Tracking-mode, displaying the current force value.
- Setup menu for adjustment.
- Serial interface for measured value output.
- The CGT 50 is only suitable for testing cable tie tighten pistols.
- Durable, maintenance-free metal construction.
- Universal quick action clamps for the fixture of different kinds of cable tie pistols and manufacturers (for example HellermannTyton, Panduit, and others)
- Different mandrel tools to clamp the cable tie are deliverable.
- Our electromotive ETM test stations are deliverable with the technical equipment for an automatic test procedure, allowing the actuating lever of the cable tie tighten pistols to be triggered with preselected speed.

Clip Gun Tester CGT 50 with KBP toolset and HellermannTyton cable tie tighten pistol MK 7

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Clip Gun Tester Model CGT 50

- *Technical Data*
- *Supplies*
- *Electromotive Models upon Request*

HellermannTyton MK 9 P with CGT 50 and

HellermannTyton MK 7 with CGT 50 and KSH 6 clamps

Optional Accessories:

- Tabletop printer – Software mavDataEX, -mavSTAT light
- Data transmission cable for printer connection
- Data transmission cable for computer connection
- Holding mandrels with customized diameters
- Different load ranges with higher precision out of the FT Series including additional software upon request.

Technical Data:

Model Designation: **CGT 50**

Indication range: 0-500 N.

Measurement resolution: 0.5 N

Relative deviation in measuring area: ≤ ± 0.25 % of value ± 1 digit

Casing:

Dimensions: Baseplate: W×D×H ca. 130×400×125 mm;
Controls: W×D×H ca. 125×105×70 mm;

Installation: Usable in longitudinal and transverse direction.

Weight: Around 6 kg.

Material: Anodized aluminum, silver-grey.

Measuring System:

Supply Voltage: 24 V DC via an external power supply.

Force Transducer:

Strain gauge load cells with integrated 16 bit AD-converter and microcontroller-system. Overload protection is enabled .

Evaluation:

Operating modes: Tracking-mode and peak-mode;
Measurement frequency: 10000 Hz;
Zero point correction;
Tare-compensation;
Overload indicator;
Setup menu for instrument adjustment;
Individual output of measured values via serial interface.

Display/Input:

Display and operation via infrared LCD backlight dot-matrix display 128x64 pixles, 56,3x38,4 mm. LCD Update Rate: 5 Hz.

Input/Handling:

All inputs and actuations made via infrared-touchscreen.

Interface:

RS232C: 1200-38400 baud, 8 data bits, 1 stop bit,
Parity: none/even/odd;
Connection: RJ socket 45/6

Implementation and Tool Fixture:

Tool fixture is solid, made of stainless steel and therefore maintenance-free. Universal quick change tool fixtures with dovetail mount on the measuring point of the tester and a load bar with a guide rail and possible length adjustment enable trouble-free tool mounting.

Deliverable Special Designs upon Request:

The inspection of the cable tie pistols can be performed by using a specially modified tool assembly including one of our motor-driven testing devices ETM-A, ETM-M, ATM or MPM. In doing so, the tensioning pistol is laid in a fixed holding tool; pressing the lever then causes the adjustable mandrel to automatically pull the pneumatic pistols trigger with preselected speed. After triggering the pistol, the machine stops and returns to the starting position. (Choose option: “Break Stop”)

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Clip Gun Tester Model CGT 50 - Touch

- *Indication Range 0-500 N*
- *Testing Cable Tie Application Tools*

General Information:

- Small, handy electronic testing device used to determine the tensile force of cable tie tighten pistols; display and operation via 5.7“ QVGA TFT-touchscreen display
- Easy to use and versatile testing device with minimum space requirements, for the use in production or test laboratory, suitable for tensile force measurements of all hand- or pneumatically operated cable tie pistols.
- Indication Range: 0-500 N, measurement resolution of 0.05 N (other ranges 50/250/1000 N upon request).
- High measurement accuracy and reproducibility of measurement results.
- Casing protected against dust.
- High measuring frequency of 10000Hz.
- Automatic zero point correction.
- Tare compensation.
- Overload indicator.
- 2 operating modes:
  - Peak-mode, displaying the highest measured force value of the entire measurement procedure.
  - Tracking-mode, displaying the current force value.
- Setup menu for adjustment.
- Serial interface for measured value output.
- The CGT 50 is only suitable for testing cable tie tighten pistols.
- Durable, maintenance-free all metal construction.
- Universal quick action clamps for the fixture of different kinds of cable tie pistols and manufacturers (for example HellermannTyton, Panduit, and others)
- Different mandrel tools for clamping the cable tie are deliverable.
- Our electromotive ETM test stations are deliverable with the technical equipment for an automatic test procedure, allowing the actuating lever of the pneumatic clip gun to be triggered with preselected speed.

Clip Gun Tester CGT 50 with KBP toolset and HellermannTyton cable tie tighten pistol MK 7

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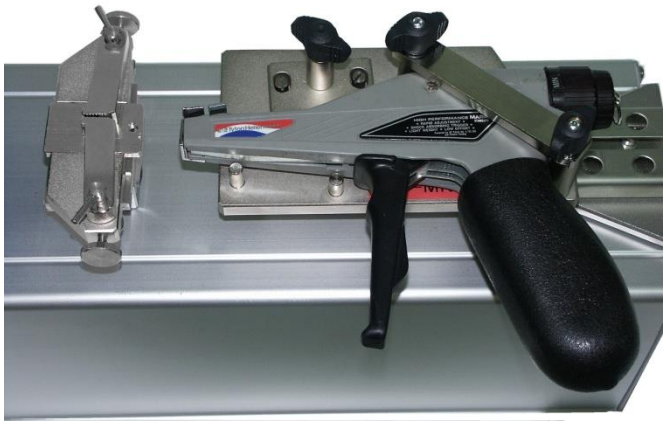
Clip Gun Tester Model CGT 50 - Touch

- *Technical Data*
- *Supplies*
- *Electromotive Models upon Request*

HellermannTyton MK 9 P with CGT 50 and KBP



HellermannTyton MK 7 with CGT 50 and quick action clamp KSH 6

Optional Accessories:

- Tabletop printer – Software mavDataEX, -mavSTAT$_{light}$
- Data transmission cable for printer connection
- Data transmission cable for computer connection
- Holding mandrels with customized diameters
- Different load ranges with higher precision out of the FT Series including additional software upon request.

Technical Data:

Model Designation:	**CGT-Touch 50**
Indication range:	0-500 N.
Measurement resolution:	0.05 N
Relative deviation in measuring area:	≤ ± 0.25 % of value ± 1 digit

Casing:

Dimensions:	Baseplate:	W×D×H ca. 130×400×125 mm;
	Controls:	W×D×H ca. 125×105×70 mm;
Installation:	Usable in longitudinal and transverse direction.	
Weight:	Around 6 kg.	
Material:	Anodized aluminum, silver-grey.	

Measuring System:

Supply
Voltage: 24 V DC via an external power supply.

Force Transducer:
Strain gauge load cells with integrated 16 bit AD-converter and RS485 bus overload protection .

Evaluation:
Operating modes: Roll mode and peak mode;
Measurement frequency: 10000 Hz;
Zero point correction; Tare-compensation; Overload indicator;
Setup menu for parameter adjustment (with optional password protection); Real-time clock and date module;
Measured value memory for 4000 values;
Single and listing output of measured values via serial interface.

Display/Input:
Display and operation via LED backlight QVGA TFT-touchscreen 5.7“, ca.115x86, LCD Update Rate: 60 Hz.

Input/Handling:
All inputs and actuations made via touchscreen.

Interface:

RS232C	1200-38400 baud, 8 data bits, 1 stop bit, Parity: none/even/odd; Connection: Sub-D socket (15-pin).

Implementation and Tool Fixture:
Tool fixture is solid, made of stainless steel and therefore maintenance-free. Universal quick change tool fixtures with dovetail mount on the measuring point of the tester and a load bar with a guide rail and possible length adjustment enable trouble-free tool mounting.

Deliverable Special Designs upon Request:

The inspection of the cable tie pistols can be performed by using a specially modified tool assembly including one of our motor-driven testing devices ETM-A, ETM-M, ATM or MPM. In doing so, the tensioning pistol is laid in a fixed holding tool; pressing the lever then causes the adjustable mandrel to automatically pull the pneumatic pistols trigger with preselected speed. After triggering the pistol, the machine stops and returns to the starting position. (Choose option: “Break Stop”)

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Motorized Devices

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Motorized Tester Models ETM-F/A/M

- *Indication range 0-50 N, 0-250 N, 0-500 N, 0-1000 N, 0-3000 N*
- *Motor driven with adjustable test speed*
- *Password protection of operational levels*

General Information:

- Re-designed model series for tensile and compressive force measurements with high measurement accuracy and a simple control concept; durable construction
- Deliverable in three different versions (see overleaf table)
- Tester with motorized drive unit for precise and dependable measurements in test laboratories, production lines and quality assurance inspections.
- Suitable for testing ready-made supply cables, plugs, components and ceramic work-pieces and also for tensile and compressive force tests in the field of material testing.
- Password protection between operating and programming levels can easily be activated. Special operational safety for the use on different continents
- Display and operation via LED backlight QVGA TFT-touchscreen-display with pictograms, ca. 115×86 mm (5.7“). LCD update rate: 60 Hz.
- New maintenance-friendlier form of the drive
- Optimized protection of linear guidance against dust.
- High internal measurement frequency and resolution to ensure the highest degree of accuracy
- Tare-compensation.
- Set-point specification with acoustical warning (can be deactivated) and a color change of the display
- 2 Operating modes:
  - Peak-mode, displaying the highest measured force value of the entire measurement procedure.
  - Tracking-mode, displaying the current force value.
- Memory space for measured values, including counter.
- Setup menu for parameter setting and adjustment; Several operational levels with password protection.
- Serial- and Ethernet interface for data output
- Optical and acoustical overload indication.
- Emergency break function when resistance is encountered during rewind
- Shielding of force transducer and AD-converter against electromagnetic radiation (mobile phone interference etc.).
- ETM Testers have a, depending on the chosen model, constant or manually adjustable testing speed, which is also displayed.
- Universal quick action clamps for tool fixture
- Interface for PC-Software mavSTAT$_{light}$, mavSTAT, mavDataEX and mavGraph (ETM-M only), mavCALIB for calibrations in combination with a KMG force gauge

Modell ETM 300 / 3,000 N with DKS 20 & SG 80V

Modell ETM 50 / 500 N with MK 8 SG 80

Model Overview ETM-F * ETM-A * ETM-M:

Code	Indication Range [N]	Resolution [N]
5	0 - 50	0.005
25	0 - 250	0.02
50	0 - 500	0.05
100	0 - 1000	0.1
300	0 - 3000	0.3

Clamping Tools & Holding Fixtures:

Clamping cones	SG 40, SG 80(V)
Turntable	UNI-DT-2K
Cable tensioner	MK-8, DKS-20
Quick action clamps	KSH-6, KSP-8, SHA-12/-20, DES-10
mm-plug gauge	ML1 for cable isolation pull-off testing
Comb tools	KW 1, KW 2
Miniature grips	FSEL, KSEL

For other tools, please see the catalogue.
Customized tools upon request.

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Motorized Testers - Models ETM 5 - ETM 300

- Technical Data
- Optional Accessories
- Differences between Software Versions F/A/M

Technical Data:

Model designation: ETM.
Indication range: 0- 50/250/500/1000/3000 N.

Test units up to 1000 N nominal load:
Capacity: 0 - 50/250/500/1000 N.
Dimensions: W × D × H ca. 200 × 655 × 192 mm.
Weight: ca. 21 kg.

Test unit with 3000 N nominal load:
Capacity: 0 - 3000 N.
Dimensions: W × D × H ca. 200 × 655 × 192 mm.
Weight: ca. 25 kg.

Color: blue RAL 5019, cover plates in light grey.
Power supply: 30 V DC, via external power supply.
Drive: Stepping motor with linear drive.

Force Transducer:
Strain gauge-load cell with integrated 16 bit AD-converter and configurable micro controller.

Evaluation:
- Different software features (see overview).
- Operating modes: roll- and peak mode.
- Internal measuring frequency ca. 10000 Hz.
- Zero point adjustment, tare-compensation.
- Optical and acoustical overload indicator.
- Set-value specification, optical and acoustical note.
- Password protected menu for parameter setting and adjustment.
- Single- and list output via serial interface;
- Real-time clock for printouts with date and time.

Display and Operation:
LED backlight QVGA TFT-touchscreen display, 5.7“, ca.115x86, 370x240 pixels, LCD Update Rate: 60 Hz. All actuations and input via touchscreen. Clear overview of respective operating mode. Operating- and programming levels with password protection.

Interface:
RS232C adjustable 1200-38400 baud, 7/8 data bits, 1/2 stop bits, parity: n/e/o. Connector Sub-D (15-pin).

Additionally for the ETM-A and ETM-M models:
- Adjustable testing speed.
- Force pre-selection: 10-100% of device nominal load.
- Break-stop function: Automatic stop and return after breakage of test specimen.
- Cycle function: load slide moves back and forth between 2 end positions.
- The ETM-M model additionally features a precision length measuring system.

Optional Accessories:

- Tabletop printer including a data cable
- Software mavDataEX, mavSTAT, mavSTAT$_{light}$, mavGraph for ETM-M, mavCALIB for calibrations with the KMG
- Control system KMG
- Machine’s firmware can be updated by operator for free
- Other supplies from the catalogue upon request

Equipment	ETM-F	ETM-A	ETM-M
Measurement and drive system	Tractive and compressive force measurements		
Indication range	0-50/250/500/1000/3000/6000 N		
Measurement resolution	10000 increments		
Relative derivation in measuring area	≤ ± 0.25% of measured value +/- 1 digit		
Coverage	10-100% of nominal load		
Operation modes	Peak and tracking mode		
Operation and display	TFT-Touch-Screen 5,7“ with LED-Backlight		
Automatic zero point correction	●	●	●
Tare-compensation	●	●	●
Set-point specification	●	●	●
Serial interface for data output	●	●	●
Ethernet interface	-	○	○
Real time clock	●	●	●
Memory space	●	●	●
Single and listing output	●	●	●
Safety components	Emergency stop button & anti-pinch function in fast reverse f		
Testing speeds for all Models up to 1000 N	50/75/100/ 800 mm/min	Einstellbar 5-800 mm/min	Einstellbar 5-800 mm/min
Testing speeds Model 3000 N	50/75/100/ 400 mm/min	Einstellbar 5-400 mm/min	Einstellbar 5-400 mm/min
Tolerance for set testing speed < 1000 N	0 - 100 mm/min ± ≤ 1 %	101 - 400 mm/min ± ≤ 3 %	401 - 800 mm/min ± ≤ 5 %
Tolerance for set testing speed 3000 N	0 - 100 mm/min ± ≤ 1 %		101 - 400 mm/min ± ≤ 3 %
Pull/push rearrangement	Reverse speed must be higher than testing speed		
Linear stroke	Max. 150 mm		
Memory (max. saved measured values)	100	4000	4000
Break-stop function	-	●	●
Cycle test	-	●	●
Force pre-selection for non-destructive testing	-	●	●
Holding under load, preset choices: destruction, back to normal (afterwards)	-	0-220sec ● ●	0-220sec ● ●
Force/displacement measurement	-	-	●
Repeat tests between two positions	-	●	●
Software holding time up to max. 2,000 sec.	-	-	○
Software repeat test force	-	-	○
Software webserver	○	○	○
Software update	to ETM-A	-	-
Firmware update	●	●	●
Tabletop printer DPN	○	○	○

– not available * ○ optional, surcharge * ● Standard

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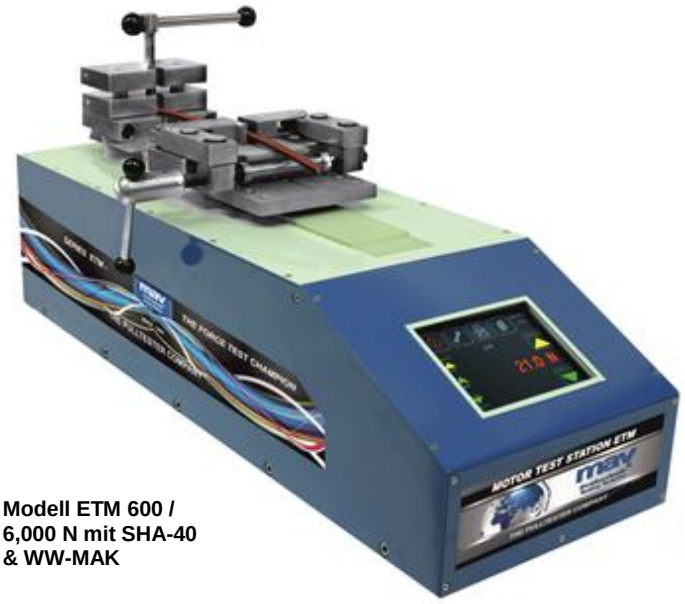
Motorized Tester Models ETM-F/A/M

- *Indication range 0-6000N, 0-10000 N*
- *Motor driven with adjustable test speed*
- *Password protection of operational levels*

General Information:

- Re-designed model series for tensile and compressive force measurements with high measurement accuracy and a simple control concept; durable construction
- Deliverable in three different versions (see overleaf table)
- Tester with motorized drive unit for precise and dependable measurements in test laboratories, production lines and quality assurance inspections.
- Suitable for testing ready-made supply cables, plugs, components and ceramic work-pieces and also for tensile and compressive force tests in the field of material testing.
- Password protection between operating and programming levels can easily be activated. Special operational safety for the use on different continents
- Display and operation via LED backlight QVGA TFT-touchscreen-display with pictograms, ca. 115×86 mm (5.7“). LCD update rate: 60 Hz.
- New maintenance-friendlier form of the drive
- Optimized protection of linear guidance against dust.
- High internal measurement frequency and resolution to ensure the highest degree of accuracy
- Tare-compensation.
- Set-point specification with acoustical warning (can be deactivated) and a color change of the display
- 2 Operating modes:
  - Peak-mode, displaying the highest measured force value of the entire measurement procedure.
  - Tracking-mode, displaying the current force value.
- Memory space for measured values, including counter.
- Setup menu for parameter setting and adjustment; Several operational levels with password protection.
- Serial- and Ethernet interface for data output
- Optical and acoustical overload indication.
- Emergency break function when resistance is encountered during rewind
- Shielding of force transducer and AD-converter against electromagnetic radiation (mobile phone interference etc.).
- ETM Testers have a, depending on the chosen model, constant or manually adjustable testing speed, which is also displayed.
- Universal quick action clamps for tool fixture
- Interface for PC-Software mavSTAT$_{light}$, mavSTAT, mavDataEX and mavGraph (ETM-M only)

Model ETM 600 / 6,000 N with SHA-40 & SG 90



Modell ETM 600 / 6,000 N mit SHA-40 & WW-MAK

Model Overview ETM-F * ETM-A * ETM-M :

Code	Indication Range [N]	Resolution [N]
600	0 - 6000	0.6
1000	0 - 10000	1.0

Clamping Tools & Holding Fixtures:

Clamping cones	SG 90
Quick action clamps	SHA-40
Interchangeable tool	WW-MAK
Power strip	SL-BAT for battery cable terminals
Undulate clamps	WS
Cable fixture	ESP

For more tools and specifications please see the catalogue.
Customized tools upon request.

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Motorized Testers - Models ETM 600 / 1000

- Technical Data
- Optional Accessories
- Differences between Software Versions F/A/M

Technical Data:

Model designation: ETM.
Indication range: 0 - 6,000/10,000 N.

Test units with 6,000 N / 10,000 N nominal load:
Capacity: 0 - 6,000/10,000 N.
Dimensions: W × D × H ca. 240 × 725 × 192 mm.
Weight: ca. 37 kg.

Color: blue RAL 5019, cover plates in light grey.
Power supply: 30 V DC, via external power supply.
Drive: Stepping motor with linear drive.

Force Transducer:
Strain gauge-load cell with integrated 16 bit AD-converter and configurable micro controller.

Evaluation:

- Different software features (see overview).
- Operating modes: roll- and peak mode.
- Internal measuring frequency ca. 10000 Hz.
- Zero point adjustment, tare-compensation.
- Optical and acoustical overload indicator.
- Set-value specification, optical and acoustical note.
- Password protected menu for parameter setting and adjustment.
- Single- and list output via serial interface;
- Real-time clock for printouts with date and time.

Display and Operation:
LED backlight QVGA TFT-touchscreen display, 5.7“, ca.115x86, 370x240 pixels, LCD Update Rate: 60 Hz. All actuations and input via touchscreen. Clear overview of respective operating mode. Operating- and programming levels with password protection.

Interface:
RS232C adjustable 1200-38400 baud, 7/8 data bits, 1/2 stop bits, parity: n/e/o. Connector Sub-D (15-pin).

Additionally for the ETM-A and ETM-M models:

- Adjustable testing speed.
- Force pre-selection: 10-100% of device nominal load.
- Break-stop function: Automatic stop and return after breakage of test specimen.
- Cycle function: load slide moves back and forth between 2 end positions.
- The ETM-M model additionally features a precision length measuring system.

Optional Accessories:

- Tabletop printer including a data cable
- Software mavDataEX, mavSTAT, mavSTAT$_{light}$, mavGraph for ETM-M, mavCALIB for calibrations with the KMG
- Control system KMG
- Machine’s firmware can be updated by operator for free
- Other supplies from the catalogue upon request

Equipment	ETM-F	ETM-A	ETM-M
Measurement and drive system	Tractive and compressive force measurements		
Indication range	6,000/10,000 N		
Measurement resolution	10,000 increments		
Relative derivation in measuring area	≤ ± 0.25% of measured value +/- 1 digit		
Coverage	10-100% of nominal load		
Operation modes	Peak and tracking mode		
Operation and display	TFT-Touch-Screen 5,7“ with LED-Backlight		
Automatic zero point correction	●	●	●
Tare-compensation	●	●	●
Set-point specification	●	●	●
Serial interface for data output	●	●	●
Ethernet interface	-	○	○
Real time clock	●	●	●
Memory space	●	●	●
Single and listing output	●	●	●
Safety components	Emergency stop button & anti-pinch function in fast reverse f		
Testing speeds for all Models 6000 N	50/75/100/ 250 mm/min	adjustable 5-250 mm/min	adjustable 5-250 mm/min
Testing speeds Model 10000 N	50/75/100/ 250 mm/min	adjustable 5-250 mm/min	adjustable 5-250 mm/min
Tolerance for set testing speed 6000N	0 - 100 mm/min ± ≤ 1 %		101 - 250 mm/min ± ≤ 3 %
Tolerance for set testing speed 10000 N	0 - 100 mm/min ± ≤ 1 %		101 - 250 mm/min ± ≤ 3 %
Pull/push rearrangement	Reverse speed must be higher than testing speed		
Linear stroke	Max. 150 mm		
Memory (max. saved measured values)	100	4,000	4,000
Break-stop function	-	●	●
Cycle test	-	●	●
Force pre-selection for non-destructive testing	-	●	●
Holding under load, preset choices: destruction, back to normal (afterwards)	-	0-220sec ● ●	0-220sec ● ●
Force/displacement measurement	-	-	●
Repeat tests between two positions	-	●	●
Software holding time up to max. 2000 sec.	-	-	○
Software repeat test force	-	-	○
Software webserver	○	○	○
Software update	to ETM-A	-	-
Firmware update	●	●	●
Tabletop printer DPN	○	○	○

– not available * ○ optional, surcharge * ● Standard

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Motorized Digital Tester Model FTM

- *Indication Ranges 0-50 N, 0-100 N, 0-250 N, 0-500 N, 0-1000 N, 0-2000 N, 0-5000 N, 0-10000 N*
- *Motor Driven with constant Testing Speed*

Basic Information:

- Digital testing device for tensile and compressive force measurements.
- Tester with motorized drive unit for precise and dependable measurements in test laboratories, production lines and quality assurance inspections.
- Suitable for testing ready-made supply cables, plugs, components and ceramic work-pieces and also for tensile and compressive force tests in the field of material testing.
- Easy to use, space-saving testing device.
- Readout and operation via resistant touchscreen with dot matrix-LCD-Display.
- Linear guidance protected against dust.
- High internal measurement frequency and high resolution, ensuring the optimal measurement
- Tare-compensation.
- Set point specification.
- 2 Operating modes:
  - Peak-mode, displaying the highest measured force value of the entire measurement procedure.
  - Tracking-mode, displaying the current force value.
- Memory space for measured values.
- Setup menu for parameter setting and adjustment.
- Serial interface for data output.
- Overload indicator.
- Overload protection of load cells: 200% to 2000% of nominal load, depending on section.
- Thermal overload protection.
- Shielding of force transducer and AD-converter against electromagnetic radiation (mobile phone interference etc.).
- Tough drive unit.
- FTM Tester with 3 constant testing speeds:
  between 5 and 600 mm/min up to 2.000 N nominal load;
  between 5 and 300 mm/min up to 5000/10000 N nominal load
- Durable and maintenance free metal construction
- Universal quick action clamps for tool fixture
- Interface for PC-Software mavSTATLight and mavDataEX.

FTM 50 with SG 80 and MK 8/A
FTM 1000 with SG 90 an SHA 40

Model Overview FTM:

Code	Indication Range [N]	Resolution [N]
5	0- 50	0.01
10	0-100	0.02
25	0-250	0.05
50	0-500	0.1
100	0-1000	0.2
200	0-2000	0.5
500	0-5000	1
1000	0-10000	2

Clamping Tools & Holding Fixtures:

Clamping cone	SG 40, SG 80, SG 90, SG 90-v
Turntable	DT 88K, UNI-DT-2K
Cable tensioner	MK-8, DKS-20
Quick action clamps	KSH-6, KSP-8, SHA-12, DES-10, SHA-20, SHA-40, SHA-40-v
mm-plug gauge	ML1 for cable isolation pull-off testing
Comb tools	KW 1, KW 2
Miniature grips	FSEL, KSEL
Power strip	SL-BAT for battery cable terminals

For other tools, please see the catalogue.
Customized tools upon request.

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Motorized Digital Tester Model FTM

- *Technical Data*
- *Accessories*

Technical Data:

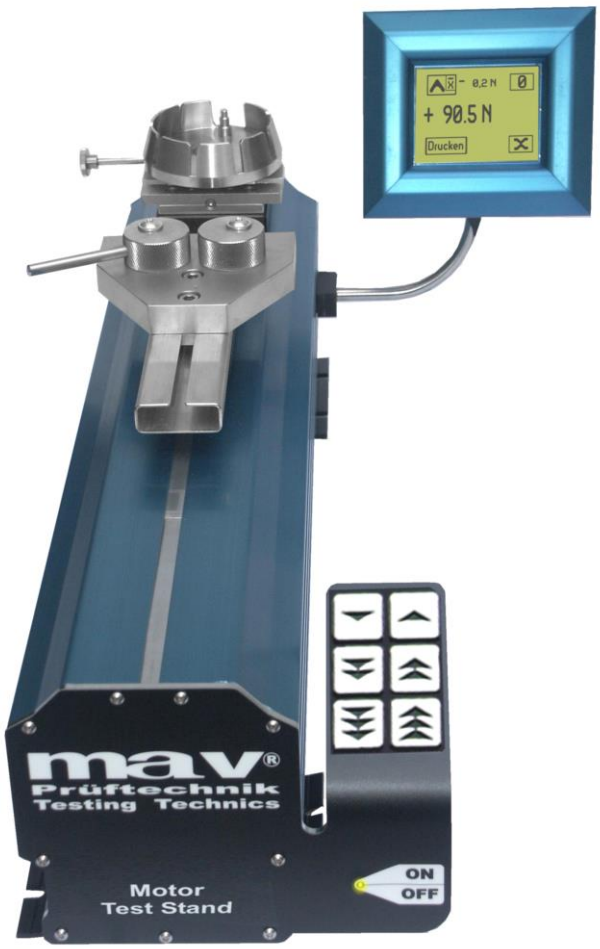
Model designation: FTM
Indication ranges: 0- 50/100/250/500/1000 N
0- 2000/5000/10000 N
Measurement resolution: 4000/5000,
for exact steps see delivery overview
Relative derivation in measuring area:
≤ ± 0.25 % of value ± 1 digit.

Test Unit FTM (up to 2000N nominal load):
Capacity: 0- 50/100/250/500/1000 N/2000N.
Dimensions: W×D×H ca. 116×520×124 mm.
Weight: ca. 12 kg.
Test Unit FTM (5000N-10000N nominal load):
Capacity: 0- 5000/10000 N
Dimensions: W×D×H ca. 176×636×190 mm.
Weight: ca. 40 kg.
Construction: Maintenance free metal construction.
Color: Blue and black, anodized.
Linear stroke: 150 mm.
Speed: 50, 100, 600 (300) mm/min.
(max. tolerance: ± 3 %).
Customized speeds upon request.
Controls: Keypad control unit with on/off switch and 6 keys for drive control, each 3 keys per direction for test speeds according to force range.
Power supply: 24/36 V DC, via an external power supply.
Operating mode: Manually; load slide drives while the drive key is actuated and stops automatically at release of the key
Drive: Step motor with linear drive.

Force Measuring System AMS:
Force Transducer:
Strain gauge- load cells type MWM 80108V with integrated 16 bit AD-converter and RS485 Bus. Overload protection up to 200%.
Force measuring device:
Dimension: W×D×H ca. 125×105×70 mm;

Analysis:
Operating modes: Tracking-mode and peak-mode;
Internal measurement frequency: 10000 Hz;
Zero point correction, Tare-compensation;
Optical and acoustical overload indicator;
Set point value with optical and acoustical alarm;
Setup menu for parameter setting and adjustment;
Memory space for 10000 measured values;
Single- and list output via serial interface;
Real-time clock for printouts with date and time;
Language for data output selectable: English, French, German.

Display:
Backlit LCD-dot matrix-display 128×64p, 56.3×38.4 mm.
LCD update rate: 5 Hz.
Input/Handling:
All inputs and actuations made via infrared-touchscreen.
Interface:
RS232C adjustable 1200-38400 Baud, 7/8 data bits, 1/2 Stop bits, parity: none/even/odd. Connector: RJ45 socket (8-pin).



FTM 100 with SG 80 and DKS 20

Optional Accessories:

- Tabletop printer
- Software mavDataEX, -mavSTATLight
- Data transmission cable for printer connection
- Data transmission cable for computer connection
- Other supplies from the catalogue upon request-
- Control system KGM
- Protection covers

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Motor Test Station Model ATM

- *Indication Ranges 0-50 N, 0-100 N, 0-250 N, 0-500 N, 0-1000 N, 0-2000 N, 0-5000 N, 0-10000 N*
- *Motor drive for specified test speeds*

General Information:

- Electronic Test Station for tension and compression tests with digital indication and DMS load cell.
- Versatile Test Station e.g. for tensile testing of crimped, pressed, glued and soldered parts as crimped terminals and connection parts of cable harnesses as well as for cable insulation pull-off testing, insertion and extraction tests of connectors, shearing tests and cable tie testing.
- Rugged all metal construction ensures durability for production floor as well as laboratory test requirements.
- Dust protection of the engine housing.
- Space saving and easy to operate units.
- Motorized drive for constant test speed.
- Adjustable test speed.
- Test load preset e. g. for non-destructive tests.
- Break Stop function with stop and automatic reversal at break of test specimen.
- Continuous cycle operation.
- Operation of drive system by keypad control unit.
- High measuring rate and high resolution provides high accuracy and captures even critical peak force readings.
- Indication and operation of the measuring system via durable infrared touch screen with dot matrix LCD-display.
- Zero correction and tare compensation.
- Overload indication and overload protection of load cells.
- Thermal overload protection.
- Revised electromagnetic shielding of load cell and AD converter system.
- High ruggedness of the drive unit.
- 3 operating modes:
  - Peak Point Mode with indication of the highest measured force value and
  - Rolling Mode with indication of current force values.
  - Hold function with timer 60/120/180 seconds, followed by selectable destructive or non- destructive testing.
- Single and listing output of measured values via the serial port.
- Real time clock for printout with date and time.
- Measured-value memory.
- Setup menu for internal parameter setup.
- Serial port for data output.
- Universal tool mounting adapters for tool assembly (quick change tool fittings).
- PC Software interface for mavStat and mavDataEx

ATM 50 with SHA-20/M and SPA/ML1 for Cable coating pull-off testing

Model Range ATM:

Code	Indication Range [N]	Resolution [N]
5	0-50	0.01
10	0-100	0.02
25	0-250	0.05
50	0-500	0.1
100	0-1000	0.2
200	0-2000	0.5
500	0-5000	1
1000	0-10000	2

ATM 100 with SG 80 and DKS-20/A

Clamping Tools and Test Fixtures:

Clamping Crowns	SG 80, SG 90, SG 90-v
Universal Turntable	UNI-DT-2K, UNI-DT-2K-v
Cable Clamps	MK-8, DKS-20
Quick Action Grippers	KSH-6, KSP-8, SHA-12, DES-10, SHA-20, SHA-40
mm-Bore Gauge	ML1 for cable insulation pull-off testing
Plug-in Plate	SL-BAT for battery cable connections
Comb Tools	KW 1, KW 2
Miniature Grips	FSEL, KSEL
Breaking Fixture	KPH for plate material

Please see our catalogue for additional tools.
Customized test fixtures available on request.

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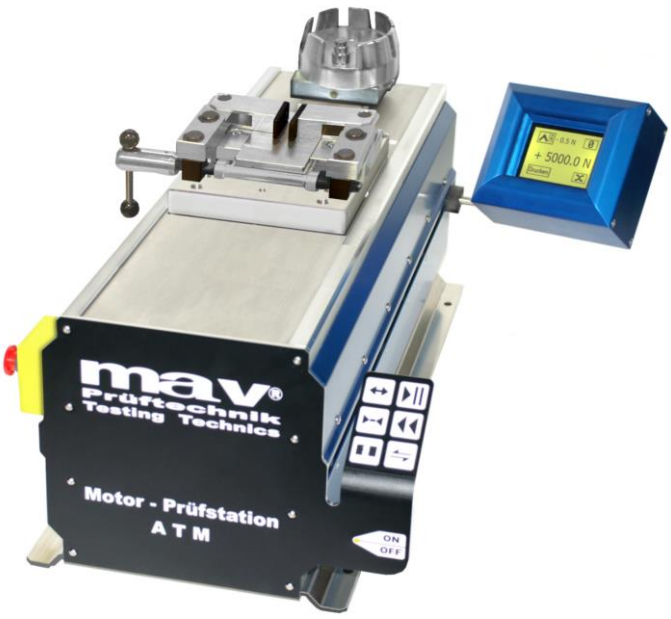
Motor Test Station Model ATM

- *Indication Ranges 0-50 N, 0-100 N, 0-250 N, 0-500 N, 0-1000 N, 0-2000 N, 0-5000 N, 0-10000 N*
- *Technical Specifications and Accessories*



ATM 500 with Clamping Crown SG 90 and Quick Action Grippers SHA-40/A

Technical Specifications:

Model Designation:	**ATM**
Indication Ranges:	0 - 50/100/250/500/1000 N 0 - 2000/5000/10000 N.
Resolution:	4000/5000 increments, see overview
Rel. accuracy error:	≤ ± 0.25% ± LSD (within the measuring range)
Drive Unit:	
Dimensions:	≤ 1000 N:WxDxH ca. 116x520x124 mm; ≥ 5000 N:WxDxH ca. 176x700x190 mm.
Weight:	≤ 1000 N: ca. 13 kg; ≥ 5000 N: ca. 40 kg.
Construction:	Maintenance-free all metal construction.
Drive:	Step motor with precision linear drive.
Linear stroke:	150 mm.
Test speed:	Adjustable, ≤ 2000 N: 5-600 mm/min. ≥ 5000 N: 5-300 mm/min. (max. tolerance: ± 2% F.S.)
Test load preset:	10-100% of tester's nominal load.
Break Stop function:	Automatic stop and reversal at break of test specimen.
Cycle function:	The load bar drives between two final positions back and forth continuously.
Operation:	Keypad control unit with On/Off-switch and 3 keys for Start/Stop, Quick Reverse, Pull, Press, Break Stop and Cycle. Test speed adjustment and set point selection via the measuring system control unit.
Power supply:	24 V DC, by external power adaptor.

Force Measuring System AMS:

Force Transducer:
DMS-load cells type MWM 80108V with integrated 16 bit AD-converter and RS485 bus. Overload protection min. 200%.

Control Unit:
Dimensions: WxDxH ca. 125x105x70 mm;

Display:
Dot matrix LCD display with LED background lighting, 128x64 pixel, 56.3x38.4 mm. LCD update rate: 5 Hz.

Input/Operation:
Operation of all displayed elements via infrared touch screen.

Evaluation:
Operating Modes: Rolling Mode and Peak Point Mode;
Internal measuring rate: 10000 Hz;
Zero point correction and tare compensation;
Overload indication;
Test load preset;
Setup Menu for adjustment and internal parameter selection;
Measured value memory for 10000 values;
Single and listing output via serial port;
Real time clock for printout with date and time.
Language for printout selectable: D, E, F.

Serial Port:
RS232C selectable 1200-38400 Baud, 7/8 data bits, 1/2 stop bits, parity: e/n/o. Connector: RJ45.

Accessories and Options:

- Mini Table Printer DPN 833
- Data Transmission Cable for printer connection
- Data Transmission Cable for PC connection
- Force Measuring System KMG for control
- Protective Covers
- For additional accessories please see our catalogue.
- Customized programs and adaptations available on request.
- PC Software mavStat, mavSTAT$_{Light}$ and mav DataEx available.

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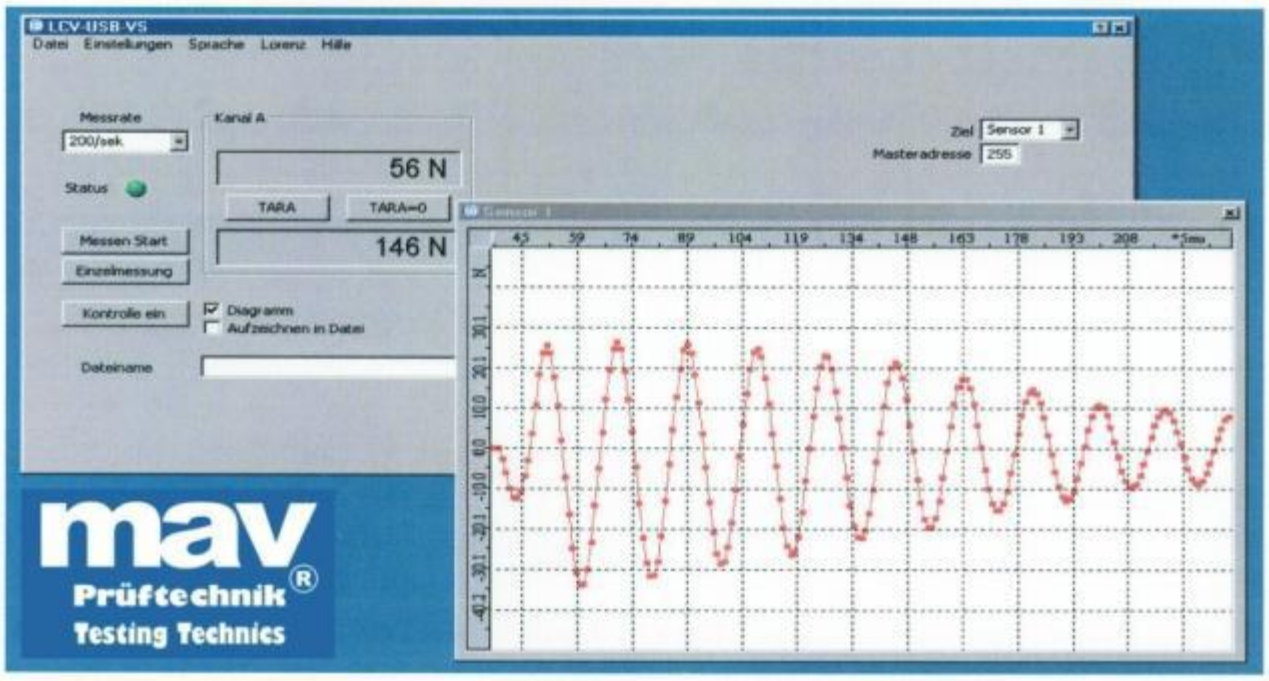
Calibration & Adjustment



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Kraftmessgeräte - Prüfsysteme - Prüfstationen

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Digital Force Measuring System Model KMG

- *For Tension and Compression Measurements*
- *For portable use or permanent installation*
- *Reference System for Calibration of our Testers*

KMG Force Gauge

Deliverable Force Transducer SM in accordance to code list

Model Range KMG:

Code	Indication Range [N]	Resolution [N]
5	0 - 50	0.005
10	0 - 100	0.01
20	0 - 200	0.02
50	0 - 500	0.05
100	0 - 1000	0.1
200	0 - 2000	0.2
300	0 – 3000	0.3
500	0 - 5000	0.5
1000	0 - 10000	1

General Information:

The Digital Force Measuring System KMG is a handy force measuring system for measurements of tension and compression forces or weights. The force measuring system consist of a force gauge KMG and a remote load cell which interfaces with the gauge electronics via a detachable cable. The small size allows both the mobile application and the stationary assembly, especially in hard to reach places. The system is characterized by high accuracy, high measurement resolution and ease of use. Despite its small size, the measurement and evaluation system also provides a variety of functions and settings:

- High measuring rate to ensure good measurement accuracy even in difficult application problems.
- Local independent battery power.
- Easy to read LCD display.
- Tare compensation.
- 2 operating modes: peak and roll mode
- Adjustable presets.
- Serial interface with adjustable parameters.
- Measured value memory.
- Setup menu for parameter selection.
- Real-time clock for printout with date and time.

The KMG is an interchangeable load cell gauge with the capability of utilizing up to 8 different capacity load cells with a single gauge body. The KMG device automatically detects when you connect a load cell and then loads the specific factory-programmed parameters.

Technical Specifications:

Model Designation: KMG

Indication Range [N]: 50/100/250/500/1000/2000/3000/ 5000/10000 N.
Resolution: 10000 increments, see overview
Rel. accuracy error ≤ ± 0.1 % F.S. ± 1 digit

KMG Unit:
Dimensions: W×D×H ca. 170×160×30 mm;
Weights: ca. 500 g;
Material/Color: anodized aluminum casing;
Load Cell: see SM description
Connection: 15-pin. SUB-D-HD15 connector
Power Cable: ca. 1 m (or specification)

Measurement System:
Power supply: external 24 V DC (plug-power supply);
Plastic adapter box for connecting of the SM force transducer including all connectors.

Evaluation:
16 bit AD-converter, configurable microcontroller,
Operating Modes: Roll mode and Peak mode;
Internal update rate: ca. 10000 Hz; automatic zero point correction; Tare compensation up to 25 % of resp. load cell capacity; Optical and acoustic overload indicator (Piezo transducer); Internal memory for about. 100 measurements; real-time clock with date; Setup menu for internal parameter setting and automatic adjustment in several password protected levels; Single and listing printout via RS232 serial port; 9-pin.

Display:
LED backlight QVGA TFT-touchscreen-display, 115×86mm.
LCD update rate: 60 Hz.

Base:
Aluminum holder for a 40° inclination of control unit.

Serial Port:
RS232C 300-76800 Baud, 7/8 data bits, 1/2 stop bits.

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Electronic Force Transducer Model SM

- *Strain Gauge Force Transducer with "S" Profile*
- *Application in all Areas of Force Measuring Techniques*
- *Suitable in Combination with Force Measuring Device KMG*

General Information:

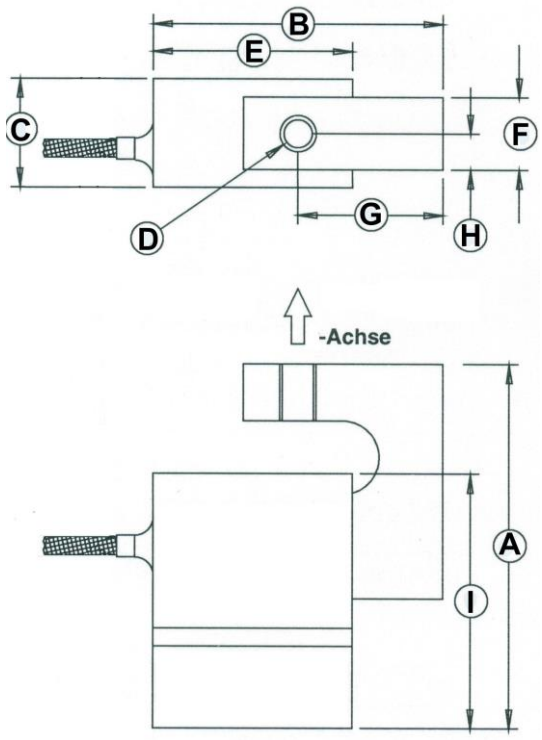
The load cells of the model series SM can be used for tension and compression measurements. They are suitable for various force measuring applications. In combination with a force gauge KMG or DKS-USB an efficient measuring system is provided.

The strain gauge load cells use standard „S" beam design with threaded holes at top and bottom to mount in either tension or compression applications. Load cells are electromechanical systems. These systems generate a rated output signal which is exact proportional to the applied load. The structure of the load cell body has a high stiffness and stability. The precise manufactured internal construction ensures that the applied forces are concentrated into defined areas. The load cells contain no movable mechanical components. The resulting deflection of the basic form is measured by strain gages which are mounted on the „S" beam. The strain gages within a load cell are connected to a Wheatstone bridge. The precise placement of the gages ensures that predominant loads are measured which are applied through the axis of the load cell whereas errors caused by side forces or bend moments are minimized. Nevertheless to achieve measurements with highest possible accuracy a fundamental requirement is that there is only one load path and that this load path must be through the load axis of the load cell. Loads not being perfectly aligned must be avoided.
During the use of load cells a suited overload protection must be installed

Load Cell Model SM

Technical Specifications:

Model Name: SM



Capacities and Dimensions:

Modell	Nominal range [N]	A [mm]	B [mm]	C [mm]	D
SM 50 N	50	63,5	51	19	M6
SM 100 N	100	63,5	51	19	M6
SM 200 N	200	63,5	51	19	M6
SM 500 N	500	63,5	51	19	M6
SM 1000 N	1000	63,5	51	19	M6
SM 2000 N	2000	76,2	51	32	M12
SM 5000 N	5000	76,2	51	32	M12
SM 10000 N	10000	76,2	51	32	M12

Specifications

Capacity [N]:	accord. to chart tabulates
Rated Output::	3 mV/V (nominal)
Bridge Resistance:	350 ± 3,5 Ω
Absolute Zero Balance%:	± 1,0 output
Supply Voltage:	15 V DC max.
Measurement Range by Nominal Load:	0,076-0,127 mm (depending on type)
Weight:	ca. 200-300 g (depending on type)
Connection Cable:	4-Conductor with shield, 1 m long
Overload Protection:	± 150 % of the nominal range
Breaking Load:	± 500 % of the nominal range
Linearity in% of Nominal Load:	± 0,03-0,06 %
Zero Signal:	± 1 % of the nominal range

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General Information regarding the calibration of test stations

General Information:

All testers are being calibrated and adjusted on site by the use of traceable measuring instruments. The test certificate, included in the delivery, provides information regarding the determined measurement accuracies. In the area of industrial and scientific measurement engineering there is no need for official calibrations by the bureau of standards. Industrial and scientific measurement parameters will be calibrated and adjusted. In Germany, only inspections are affected, which, determined by law, are subject to official calibrations. The calibration gives indication on the extent to which the measured value and the correct value correspond to each other. Hereby, it is assumed that the measuring equipment does not exceed the pre-determined limits during the process. This is assumed until the next calibration takes place. This is based on the prerequisite that the measuring equipment is treated and handled in a proper way in the meantime. We recommend inspections on a regular basis to check the proper functioning and accuracy of the testers. The intervals of those inspections depend on the tester model, the frequency of use, the operating conditions and the customer's individual requirements of measurement control. Thus, a general statement regarding the calibration cycle is not possible. The control and calibration process may take place in our works or on site, carried out by the customer.

Should the customer decide to inspect the test station on his or her own, there is the possibility of calibrating with a digital force measuring system and a corresponding load cell, serving as a force transducer. Moreover, we recommend a periodically performed inspection of the tester in our works. As part of this kind of inspection, the functionality of the device is checked, faulty or worn out parts are being replaced and the tester will be adjusted. If requested, a factory default calibration can be carried out, too.

Display Control with the KMG Force Gauge:

Load Cell 50 to 1000 N with fork heads M6	Load Cell 2000 to 10000 N with ball screws M12

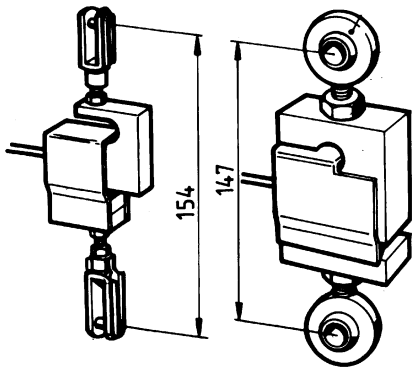
For the adjustment and calibration of MAV PRÜFTECHNIK test machines, the KMG force gauge can be equipped with load cells of the required force range from 50 to 10,000 N. In order to do this, a set of support racks is needed for the fixture of the respective load cell on the tester. Moreover for manually operated devices, the KB 1000 load adaptor is required for the application of a defined static testing load.

All basic information and technical data regarding the KMG force measuring device can be taken out of the descriptions for the KMG and SM load cell. Any desired amount of load cells with whatever range you just need can be connected to a single KMG force gauge and be operated alternately. When re-ordering a single load cell, the customer can just connect it to the KMG. The KMG will automatically detect the connected load cell, display it on the intro screen and load all related parameters. Consequently, the appropriate load cell connected to the KMG can always be selected for the required range of the tester to be calibrated.

When using the KMG as a control device, the load cell will be equipped with M6 fork heads or M12 ball screws, depending on the force range. For the fitting on the tester, appropriate HLT support racks are required. During the calibration, the displayed values of the tester and the values of the KMG force gauge are being compared.

When calibrating a motorized test station, the load is applied through the motor drive, whereas for manually operated testers, a KB 1000 load adaptor is needed to apply the static test load.

KMG Force Gauge



Load Cell 50 to 1000 N with fork heads M6	Load Cell 2000 to 10000 N with ball screws M12

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General Information regarding the calibration of test stations

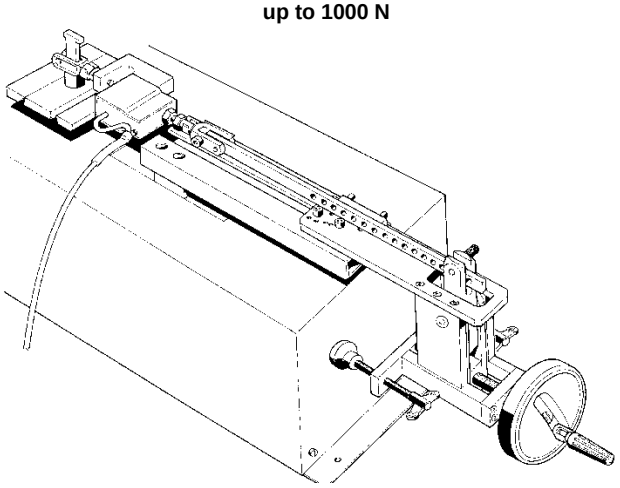
Adjustment and Calibration of Test Stations with the KMG force gauge:

For carrying out adjustments with an optimum accuracy the testers have to be loaded with their respective nominal load. Therefore it is a prerequisite that the testers can be loaded with a defined static load during the adjustment procedure. This also applies for the calibration of testers, however for a calibration not only should the nominal load be generated, but also should the accuracy be verified at predefined force steps, e.g. a verification series over the range of 10% of the nominal load.

In case of the adjustment or calibration with the KMG force measuring device, the corresponding load cell of the KMG is set up between the measuring point and the load bar of the tester respectively between the measuring point and a suitable load adaptor (e.g. KB 1000). For this, applicable support racks are used, which enables an assembly at the necessary fixing height. The measuring point of the tester is loaded via the reference load cell either by means of the tester's drive or by means of a load adaptor. During the calibration process, the operating mode of the tester must always be set to roll mode. During the calibration, the displayed values of the tester and the KMG force gauge are being compared. If deviations are determined which are outside the permissible tolerances, the tester must be readjusted. Depending on the model, for digital testers there is a model specific adjustment menu with automatic adjustment, which can be used. All information needed for this can be found in the instruction manual.

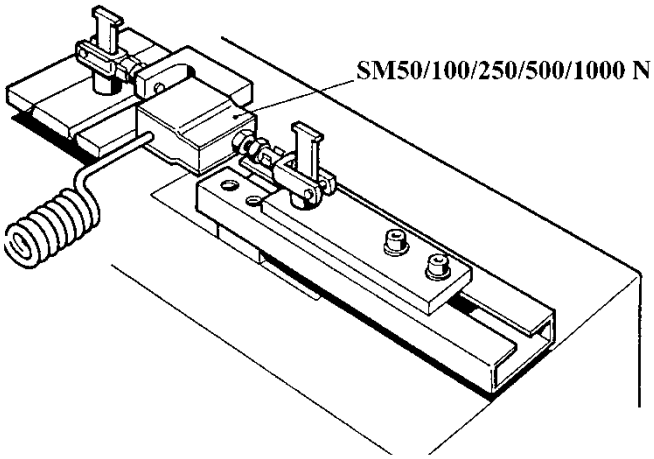
Examples for Controls with the KMG force gauge

for testers CT 50, FT,FT-Touch, ET(S), EP, EP/LV, DIP up to 1000 N



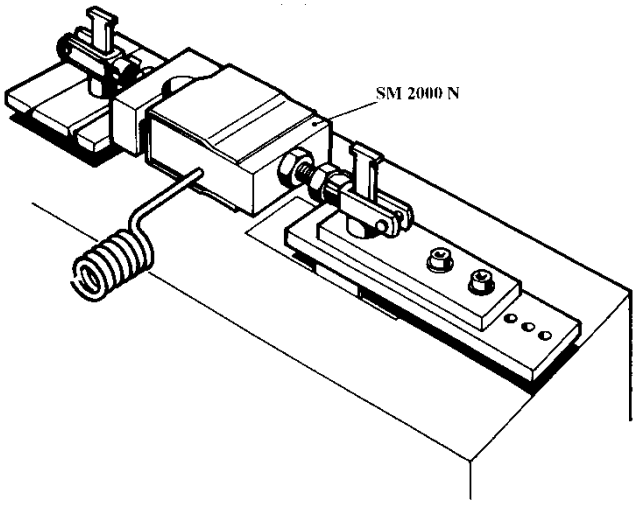
load cell with load adaptor KB 1000

for testers FTS, ETM, FTM, ATM, EPM, DIP/S, DIPM up to 1000 N



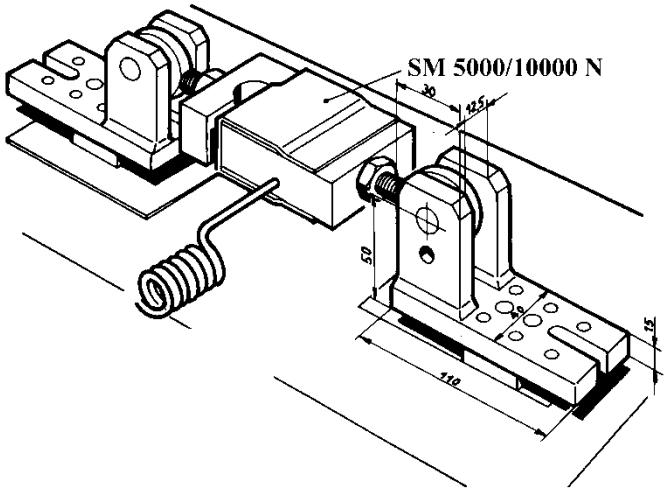
load cell with support racks HLT 100

for all motorized testers with a nominal load of 2000 / 3000 N



load cell with support racks LB 300

for motorized testers with a nominal load of 5 kN/ 6 kN / 10 kN



load cell with support racks LB 1000

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Software

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Kraftmessgeräte - Prüfsysteme - Prüfstationen

eMail: info@mav-germany.de • Internet: www.mav-germany.de

Software

- *DataEx*
- *mavGRAPH*
- *mavSTATlight and mavSTAT*

General Information:

- Easy setup and use in combination with our testing devices.
- Software: German and English language options available.
- System requirements: executable with any standard WINDOWS PC
- Data transfer via serial port.

DataEx

Software for analysis and display of measured values for Microsoft Excel ™.

- Easily transfer measured data to MS Excel™.
- Information regarding date, time, operator, sequence no. etc may be adjusted and is also transferred.
- Possibility of recording data during continuous measurement.
- Tabular output.

mavSTATLIGHT

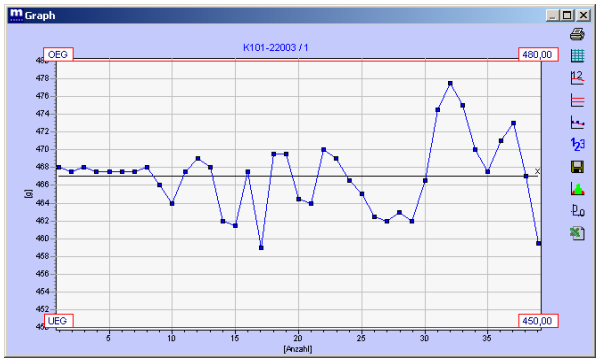
Program for statistical monitoring of measured values (single values) in conjunction with MAV-testers.

- Storage of test plans, customers, operators.
- Statistics with report view.
- Graphical measurement display and listing of individual values.
- Statistical analysis of a series of measurements (min, max, average, spread width, standard deviation, CPK).
- Transfer of the values in Excel and printout of values with sequence number, date, time, investigators.

Extendable to:

mavSTAT

- Control chart.
- Statistical analysis of all measurements (min, max, average, spread width, standard deviation, CPK).
- Up to 40 measurements in one graph.
- Partial Statistics (by date of measurement).
- Data base.
- Archiving.



mavGRAPH

Collection, presentation and analysis of the force-time measurements (or force-distance measurements) in a histogram.

- Storage of test plans, customers, operators.
- Input and display of tolerance limit.
- Graphical display of measurement results with an adapted presentation.
- Tabular measured values.
- Statistical evaluation.
- Data base.
- Archiving.
- Printout.

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Software

- *mavCALIB: Calibration and Adjustment of MAV Test Stations*
- *mavFIRMWARE: Update Program for ETM and KMG devices*

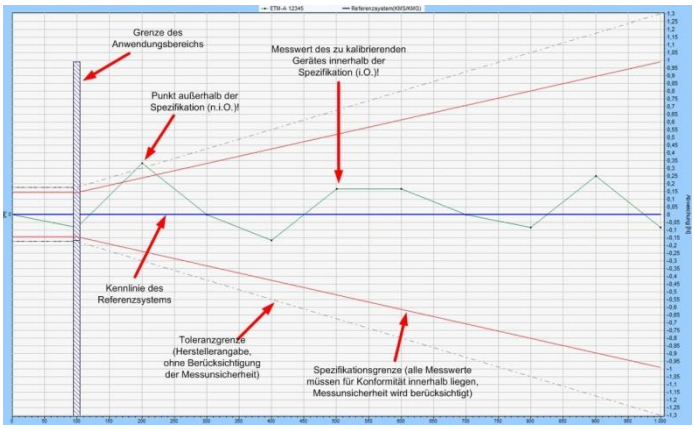
Basic Informationen:

- Easy setup and use in combination with our testing devices.
- Software: German and English language options available.
- System requirements: executable with any standard WINDOWS PC
- Data transfer via serial port.

mavCALIB:

Software for carrying out calibrations and adjustments of MAV Prüftechnik test stations.

- KMG force gauge and a load cell are required.
- CT 50. CGT. CGT-Touch, FT/FTS, FT-Touch, FTM, ATM, MPM, ETM-F/A/M, DIPM, EP, EPM test stations can be calibrated and adjusted
- Application on site.
- User-friendly interface.
- Automatic database backup.
- Input of company-specific data (operator, address etc.) within the software program.
- Adjustable test parameters (measurement uncertainty, temperature etc.).
- Supporting notes and integrated operation manual.
- Comparison of measured values of the reference system (KMG) and the test station.
- Visualized output of the measurement results and evaluation based on generated tolerance curves.
- Assessment of the conformity by the operator through drop-down selection.
- Specification limits are indicated in color and will automatically adjust to all changes made.
- Output of a test certificate at the end of the calibration process.
- Archive for the management of existing certificates.

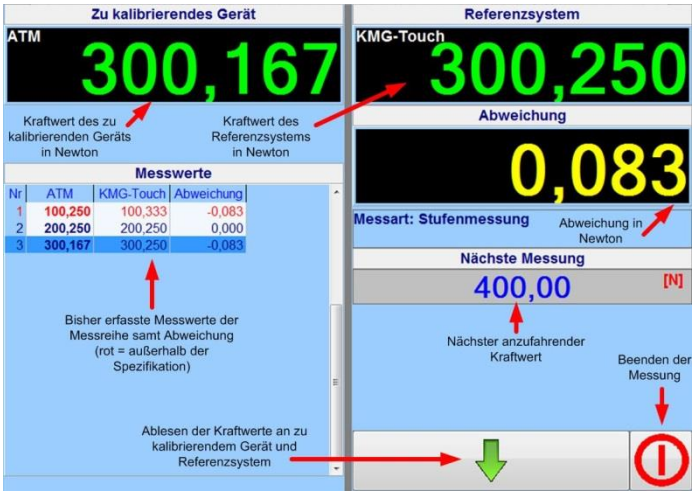


mavCALIB - Visualization of measurement results

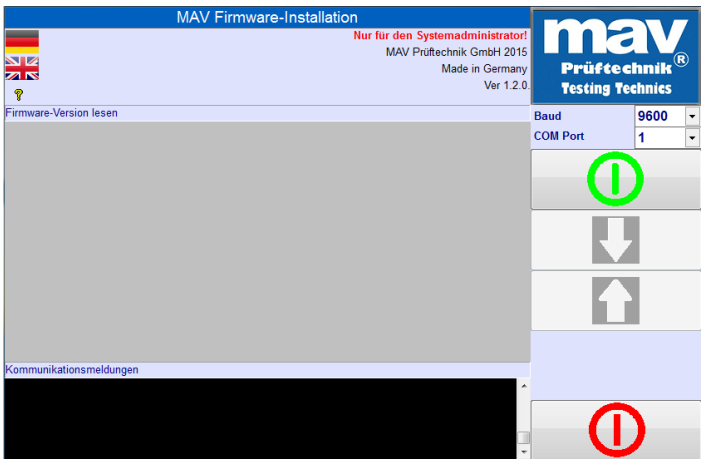
mavFIRMWARE:

Software used for updating the firmware of ETM test stations and KMG force gauges.

- The firmware update can be carried out on site by the system administrator.
- Data transfer via serial port.
- Supporting notes will lead through the updating process.



mavCALIB - Calibration interface



mavFIRMWARE communication window

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Tools

Clamping Tools and Holding Fixtures

- *Standardized Tools*
- *Description, Function, Force Range*

Clamping Crowns SG 40, SG 80 (V), SG 90

Rotatable clamping crowns for tensile strength tests of wire terminals, connectors and other end fittings.

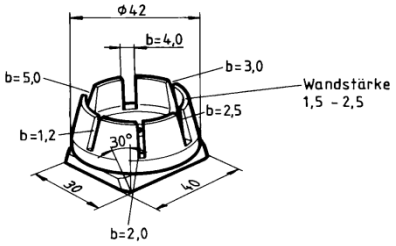
SG 40:
40 mm diameter, 6 slots from 1.2 to 5 mm width.
Suitable for all hand-lever testers up to 500 N.

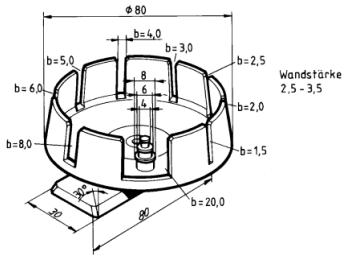
SG 80:
80 mm diameter, 8 slots from 1.5 to 8 mm width, a slot with 20 mm width and a graded pin with diameters 4, 6 and 8 mm.
Suitable for all tester models up to 2,000 N

SG 80 V:
Reinforced model SG 80-V with max. load of 3,000 N.
Suitable for all tester models up to 3,000 N.

SG 90:
90 mm diameter, 8 slots from 1.5 to 15 mm width, a slot with 25 mm width and graded pin with diameters 8, 12 and 16 mm. Additional rotating safety cover included.

Suitable for all tester models ranging from 5,000 to 10,000N.





Measuring point arrangement only!
(all SG tools)

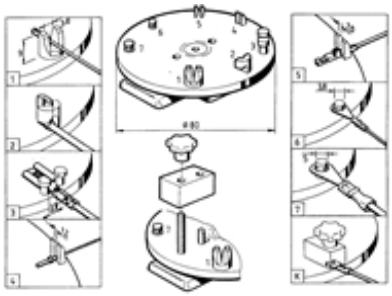
Turntable DT 88K

Turntable with 80 mm diameter and 8 different gripping and fastening fixtures for wire terminals, clips, sleeves, end splices, round plug connectors and other end fittings.

Suitable for all hand-lever testers up to 500 N.

Upon request, customized gripping stations or brackets can be assembled, designed according to customer's samples of test specimen.

Measuring point arrangement only!



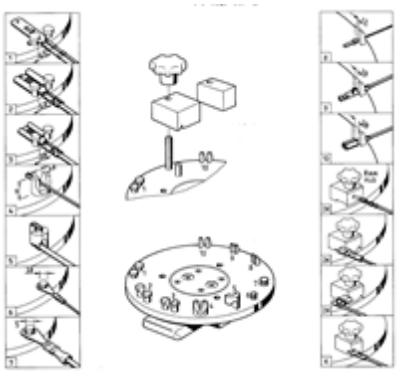
Universal Turntable UNI-DT-2K

UNI-DT-2K
Universal turntable with 100 mm diameter and 12 different gripping and fastening stations for wire terminals, clips, sleeves, end splices, round plug connectors and other end fittings.
Suitable for all tester models up to 1,000 N.

UNI-DT-2K-V
Suitable for all tester models up to 2,000 N.

Upon request, customized gripping fixtures or brackets can be assembled, designed according to customer's samples of test specimen.

Measuring point arrangement only!



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mav Prüftechnik® Testing Technics

Clamping Tools and Holding Fixtures

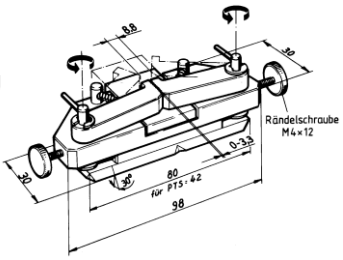
- Standardized Tools
- Description, Function, Force Range

Quick Action Clamps KSH 6

Quick action clamps with adjustable clamping range from 0 to 6 mm for fixing cable, wire, filaments, fibers and shaped parts. After release of the locking screws, the clamping diameter can be adjusted by the toggle arm's eccentric jaw mechanism. The mechanism is self-tightening and results in an increasing clamping pressure at rising test loads.

Measuring point arrangement: KSH-6/M !
Load bar arrangement: KSH-6/A !

Suitable for all testers of all model series up to 500 N.

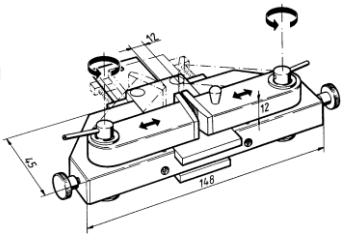


Quick Action Clamps SHA 12

Quick action clamps with adjustable clamping range from 0 to 12 mm for fixing cable, wire, filaments, fibers and shaped parts. After release of the locking screws, the clamping diameter can be adjusted by the toggle arm's eccentric jaw mechanism. The mechanism is self-tightening and results in an increasing clamping pressure at rising test loads.

Measuring point arrangement: SHA-12/M !
Load bar arrangement: SHA-12/A !

Suitable for all testers of all model series up to 1,000 N.

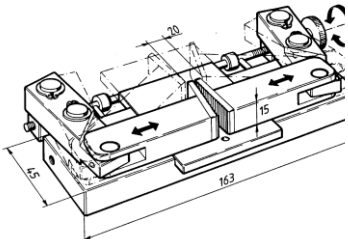


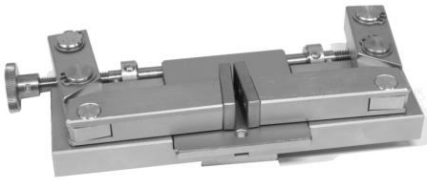
Quick Action Clamps SHA 20

Quick action clamps with adjustable clamping range from 0 to 20 mm for fixing cable wire, filaments, fibers and shaped parts. The diameter is changed by using the laterally attached adjustment screw. The mechanism is self-tightening and results in an increasing clamping pressure at rising test loads.

Measuring point arrangement: SHA-20/M !
Load bar arrangement: SHA-20/A !

Suitable for all testers of all model series
Ranging from 1,000 - 3,000 N.



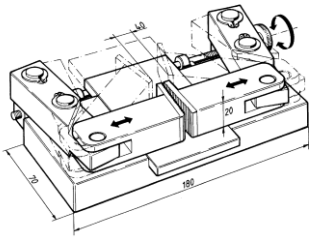


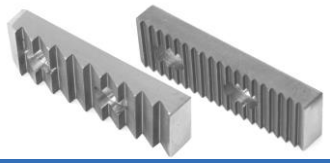
Quick Action Clamps SHA 40

Quick action clamps with adjustable clamping range from 0 to 40 mm for fixing cable wire, filaments, fibers and shaped parts. A central adjustment spindle ensures a fast diameter adjustment. The mechanism is self-tightening and results in an increasing clamping pressure at rising test loads. For cables with very thin copper conductors, clamps with a finer toothing (twice as many teeth), are deliverable, to prevent the wire from being torn apart.

Measuring point arrangement: SHA-40/M !
Load bar arrangement: SHA-40/A !

Suitable for all testers of all model series
ranging from 5,000 - 10,000 N.





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mav Prüftechnik® Testing Technics

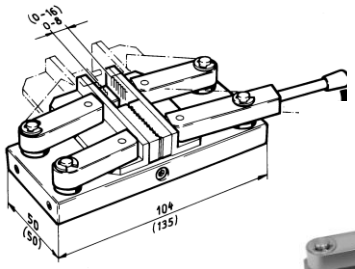
Clamping Tools and Holding Fixtures

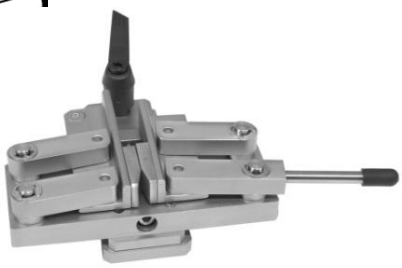
- Standardized Tools
- Description, Function, Force Range

Quick Action Clamps KSP 8 and KSP 16

Quick action grippers with parallel clamping jaw for rapid and semi-automatic testing of wire, cable, wire cable and filaments.

The clamps of the KSP-8 Grippers open up to 8 mm, the clamps of the KSP-16 open up to 16 mm and are operated by a hand lever. No diameter adjustment is necessary. Rising test loads result In an increase of the clamping pressure. The clamps are being adjusted symmetrically.





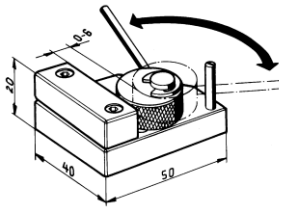
Measuring point arrangement: **KSP-8/M / KSP-16/M**
Load bar arrangement: **KSP-8/A / KSP-16/A**

KSP-8 suitable for all testers of all model series up to 1,000 N;
KSP-16 suitable for all testers of all model series up to 3,000 N.

Miniature Cable Clamp MK 8

Self-tightening cable clamp for pull-off tests of cable, wire, strip etc. Clamping range 0-8 mm.

The test specimen is inserted between the eccentric cam and the static tension block and is fixed by rotating the cam by its hand lever. Increasing the test load also increases the clamping pressure.



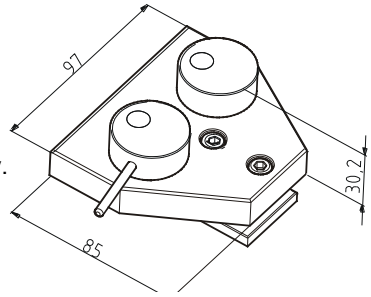
Measuring point arrangement: **MK-8/M**
Load bar arrangement: **MK-8/A**

Suitable for all testers of all model series up to 500 N.

Cable Clamp DKS 20

Self-clamping cable clamp for pull-off tests of cable, wire, strip etc. Clamping range 0-20 mm.

The test specimen is inserted between the two eccentric cams and is secured by rotating the small lever a tone cam and tightens as the tension load is applied. Increasing the test load also increases the clamping pressure. The cams are being tightened symmetrically.



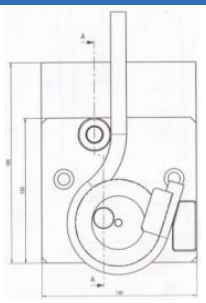
Measuring point arrangement: **DKS-20/M**
Load bar arrangement: **DKS-20/A**

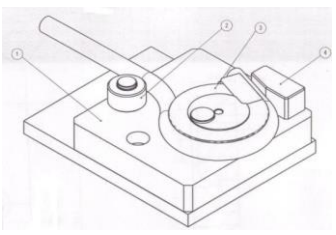
Suitable for all testers of all model series up to 3,000 N.

Cable Clamp ESP

Eccentric cable clamping tool for cable with Fine strands and/or soft cable sheath.

Diameter adjustment possible by simply shifting the clamping cam.





Load bar arrangement.

Suitable for all testers of all model series.

ranging from 5,000 to 10,000 N.

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mav Prüftechnik® Testing Technics

Clamping Tools and Holding Fixtures

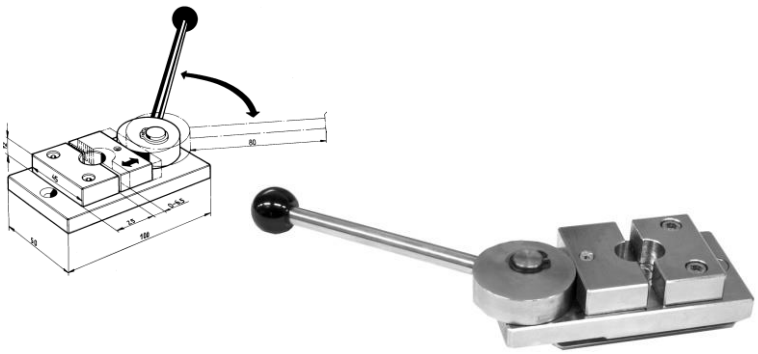
- Standardized Tools
- Description, Function, Force Range

Eccentric Grip DES-10

Eccentric grip for tensile strength test of wire, enameled wire, cable, stranded wire, etc. The specimen is inserted between the holding blocks and secured by rotating the eccentric cam. The gap dividing the two holding blocks ensures a strong fixture without causing unwanted breaking points.

Measuring point arrangement: DES-10/M
Load bar arrangement: DES-10/A

Suitable for all testers of all model series up to 1,000 N.

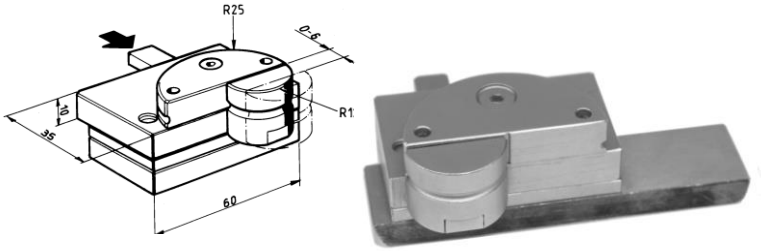


Self-tightening Cord and Wire Grip VW 70

The self-tightening grip is used for tensile tests on insulated wire, cord, stranded cable and similar materials. The test sample is wrapped around the smaller, movable semi-circular block and then looped over the larger one.

Measuring point arrangement: VW 70/M
Load bar arrangement: VW 70/A

Suitable for all testers of all model series up to 1,000 N.

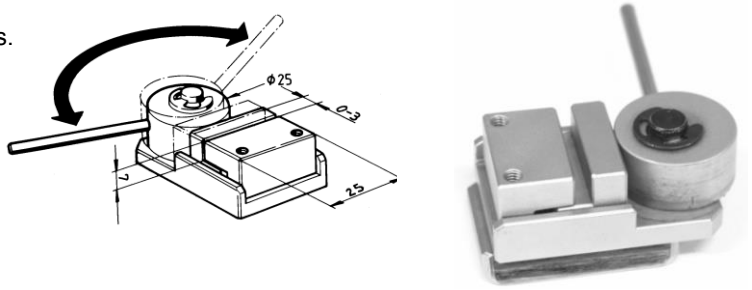


Cam-operated Smooth Face Grip VW 80

This grip is used for testing the tensile strength of wire, filaments, magnetic tape, film, foil strips and adhesive tapes. The specimen is inserted between the holding blocks and fixed by rotating the cam by its hand lever.

Measuring point arrangement: VW 80/M
Load bar arrangement: VW 80/A

Suitable for all testers of all model series up to 500 N.



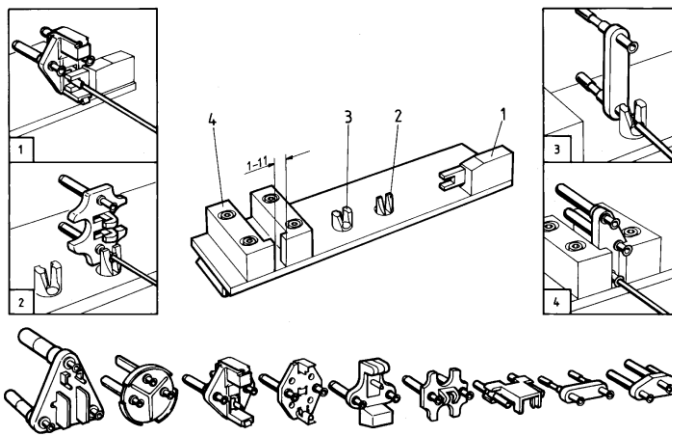
Clamping and Fixing Tool SL-WW

Clamping and fixing tool for testing of welded or crimped parts of EURO- or SCHUKO connectors

Measuring point arrangement: SL-WW-A

Suitable for all testers of all model series up to 1,000 N

Upon request, also customized gripping stations or brackets can be assembled, designed according to customer's samples of test specimen.



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Clamping Tools and Holding Fixtures

- *Standardized Tools*
- *Description, Function, Force Range*

Precision Component Grip FSEL

Narrow faced grip for very small or difficult to grab parts such as fine wire, filaments and other small componenents or in difficult to access areas.

Measurement point arrangement: FSEL/M
Load bar arrangement: FSEL/A

(different tool tip compared to KSEL)

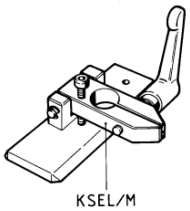
Suitable for all testers of all model series up to 500 N.

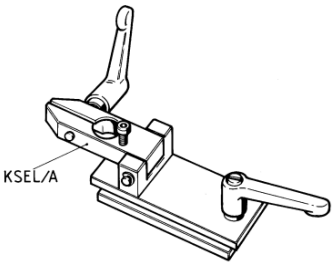
Miniature Component Grip KSEL

Narrow faced grip for small or difficult to grab parts such as fine wire, filaments and other small componenents or in difficult to access areas.

Measurement point arrangement: KSEL/M
Load bar arrangement: KSEL/A

(different tool tip compared to FSEL)



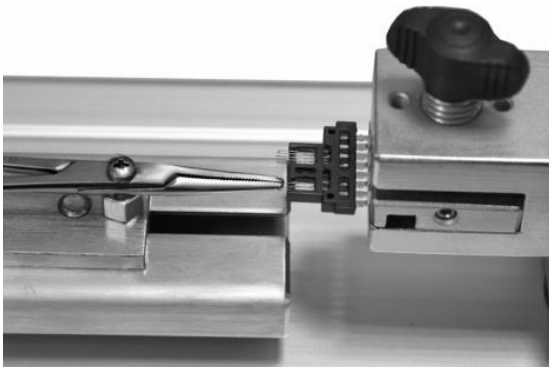


Suitable for all testers of all model series up to 500 N.

Miniature Component Grip FSZ

Narrow faced grip for very small or difficult to grab parts such as fine wire, filaments and other small componenents. Also suitable for testing in areas, which are difficult to access.

Load bar arrangement only.



Suitable for all testers of all model series up to 250 N.

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Clamping Tools and Holding Fixtures

- Standardized Tools
- Description, Function, Force Range

Ring Testing Tool RP

Divided mandrel for rubber-, plastic- or jewelry rings.
Stepped with diameters of 14 mm and 24 mm. By altering the gap width, the diameter can be adjusted. Upon request, the mandrel is also available in customer specific diameters.

Suitable for all testers of all model series up to 500 N.

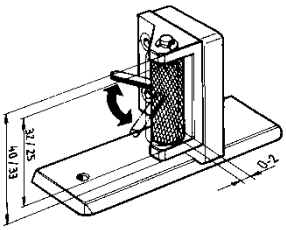
Ferrule Testing Tool ADE

Clamping tool for testing wire-end ferrules.
The clamping tool ADE features two clamps with adjustable diameter, which are capable of gripping between the end sleeve and the cable sheath. They are infinitely adjustable between 0 mm and 8 mm and therefore suitable for a variety of cable diameters.

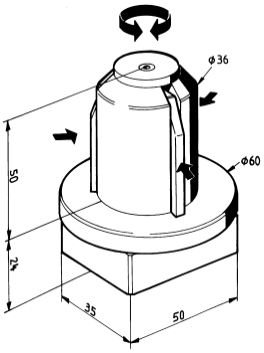
Suitable for all testers of all model series up to 500 N.

Tool Set CB for Adhesive Tape Rolls

Tool set for testing the adhesive force / roll-off force of adhesive tape rolls with a max. tape width of 25mm. The tape rolls are fixed horizontally on a bearing cone (for inside diameter of tape rollers 38.5 ± 2 mm).
The end of the tape is gripped by a vertical assembled self-tightening grip VW 25 or any other suitable gripping tool. Then, the tape can be uncoiled from its roll by the tester's drive.



VW 25 (vertical orientation)



Bearing Cone

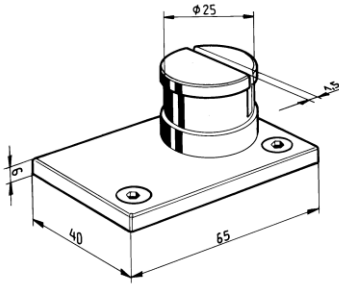
Suitable for all testers of all model series up to 500 N.

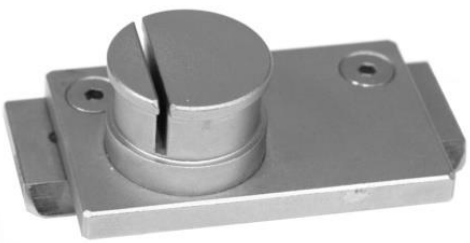
Spool Grip VW 10

Used for hard-to-hold items, such as fine wires, fibers, filaments etc.

The sample is simply threaded into the locking groove and wrapped around the spool.

Measurement point arrangement: **VW 10/M**
Load bar arrangement: **VW 10/A**





Suitable for all testers of all model series up to 500N.

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mav Prüftechnik® Testing Technics

Clamping Tools and Holding Fixtures

- Standardized Tools
- Description, Function, Force Range

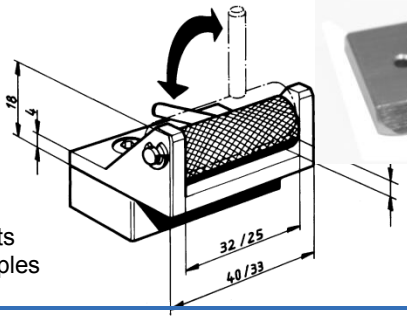
Self-Tightening Grip VW 25

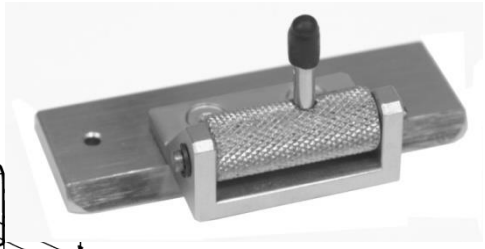
Grip for flat samples such as rubber, fabric, plastics etc.
Eccentrically mounted serrated pressure roller enables self-tightening of specimen once load is applied.

Max. gripping width: 25 mm
(standard version, other diameters upon request).

Measurement point arrangement: **VW 25/M**
Load bar arrangement: **VW 25/A**

Suitable for all testers of all model series up to 500N.
Upon request, also customized gripping stations or brackets can be assembled, designed according to customer's samples of test specimen.



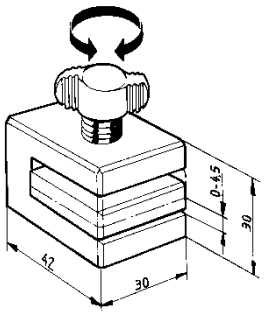


Clamping Jaws VW 30

Clamping jaws with manually tightened jaw clamps for tensile tests of flat samples such as paper, cardboard strips, foil strips, plastics, packaging, etc.

Clamping width: 30 mm (standard version)
Other versions available.

Suitable for all testers of all model series up to 500 N.

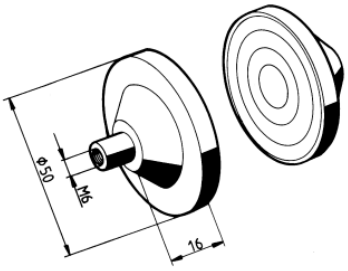


Pressure Plates VW 50

Pressure plates for testing springs, tablets, packaging, etc.

Plate diameter: 50 mm (standard version),
other versions available.

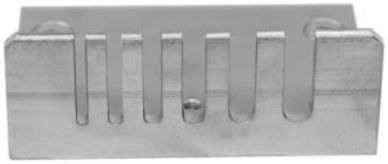
Suitable for all testers of all model series up to 500 N.



Comb Tool KW-1 & KW-2

The KW comb tools are provided with slits of different width and thus are also suitable for larger specimen such as carbon brushes. By laterally displacing the comb tool within the quick-change chucks, the required slit can be brought into testing position.

Comb tool KW 1:
Comb width: 100 mm, comb height: 30 mm,
6 slits, width: 3/4/5/6/7/8 mm, slit depth: 26 mm
Comb tool KW 2:
Comb width: 100 mm, comb height: 20 mm,
6 slits, width: 1.2/1.6/2/2.5/3/4 mm, slit depth: 26 mm



KW-1

KW-2

Suitable for all testers up to 2,000 N, greater force ranges upon request.

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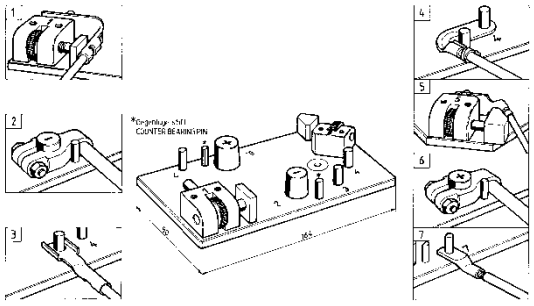
Clamping Tools and Holding Fixtures

- Standardized Tools
- Description, Function, Force Range

Plug-in Plate SL-BAT for Battery Cable Terminals

The standard version of the Plug-in Plate SL-BAT has 7 receptions for battery cable terminals according to the drawing on the right. The receptions on the SL-BAT are arranged on both sides of the plate. That means the plat can be reversed for the use of all receptions.

Customized gripping stations can be assembled, designed according to customer's test samples.

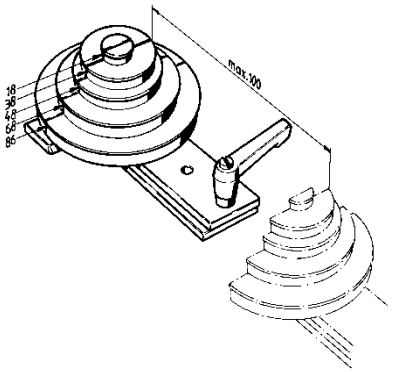


Suitable for all testers of all model series ranging from 5,000 to 10,000 N.

Step Cone KBS for Cable Tie Testing

Divided stepped cone for testing cable ties. The cable tie is looped around the step of the corresponding size. The lock should point in the direction of the slit. During the test, the two parts of the cone are dispersed by the tester.

Cone with 5 gradations: 18, 38, 48, 68, 86 mm, additionally the diameters can be adapted by the continuously adjustable length adjustment of the tester's load bar fixing.



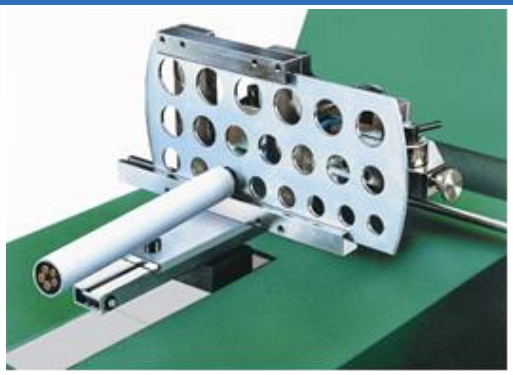
Suitable for all testers of all model series up to 1,000 N.

Cable Insulation Pull-off Testing - ML Plug Gauge

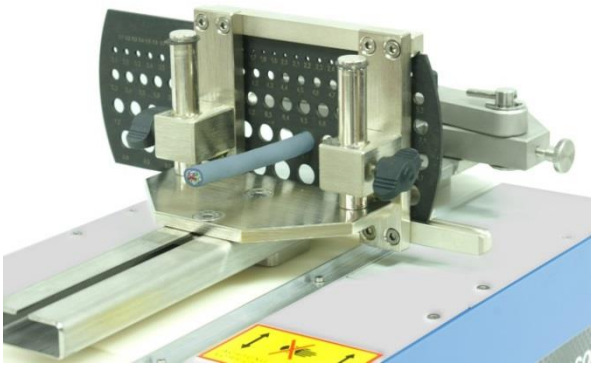
Cable insulation pull-off tests can be carried out with motor driven and hand operated testers. The tool set consists of a SPA holding frame (must be purchased seperately, suitable for all ML models) and the ML plug gauge, which will be assembled on the load bar of the tester. The plug gauge can be moved sideways within the holding frame. This enables the operator to select the right Bore diameter.

The stripped end of the tested cable is put throgh the respective hole and then clamped by the tools located on the measuring point.

Specification ML1:
Bore diameters: 0.1 to 10 mm, gradation 0.1 mm.
Specification ML2:
Bore diameters: 10 to 20 mm, gradation 0.5 mm.
Specification ML3:
Bore diameters: 21 to 30 mm, gradation 1.0 mm.



ML1 (below) ML2 (above) - SHA-12 on measuring point



Arrangement on load bar.
Suitable for all testers of all model series up to 500 N.

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Clamping Tools and Holding Fixtures

- Standardized Tools
- Description, Function, Force Range

Tool Set for Testing Cable Tie Tightening Pistols KBP

The KBP tool set is designed to determine the tightening force of cable tie pistols. The set consists of a plug-plate with 3 pins of the diameters 12, 20 and 30 mm for assembly on the measuring point of the tester and a special fixture for the cable tie pistol for assembly on the load bar of the tester.

Basically, fixtures for any chosen cable tie pistol can be manufactures. In our standard delivery program, we consistently provide fixtures for cable tie tool models HellermannTyton MK 7, MK 7HT, MK 7P, MK9, MK 9HT, MK3SP, MK3PNSP, MK 6PN as well as Panduit GS2B, GS4H, GTS, PPTS.

The cable tie pistol is not included!

The tool set is suitable for all testers up to 1,000 N. We recommend using a Clip Gun Tester CGT or CGT-Touch (as seen on the right figure).

Tool Set for Automatic Testing of Cable Tie Tightening Pistols KBP-A

The KBP-A tool set is designed for the automatic testing of the tightening force of cable tie pistols from our standard delivery program (see above KBP). The set consists of a plug-plate with 3 pins of the diameters 12,20 and 30 mm on the measuring point side and a fixture plate for the cable tie pistols. Moreover there is a moveable driver-roll on the machine's load sled, which is used for actuating the cable tie pistol's trigger.

The KBP-A tool enables a continuous testing due to the electromotive drive of the machine's load sled. The options force preset, movement path preset and testing speed preset can be chosen and adjusted.

The KBP-A tool set is only available for ETM-A and ETM-M test stations ranging up to 1,000 N.

The cable tie pistol is not included!

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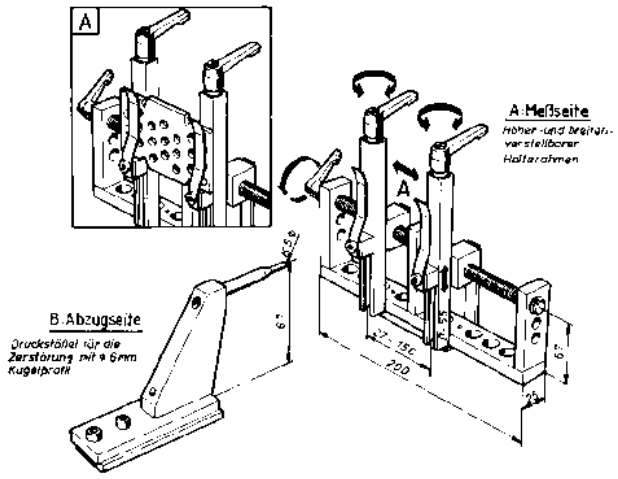
Clamping Tools and Holding Fixtures

- Standardized Tools
- Description, Function, Force Range

Plate Breaking Fixture KPB

The plate breaking fixture allows uni-directional bending and breaking tests on rigid and semi rigid materials, such as ceramic plates, plastics, etc.

The tool set consists of a pressure pestle with 6 mm diameter ball profile and a height and width adjustable holding frame for the fixture of the test specimen.



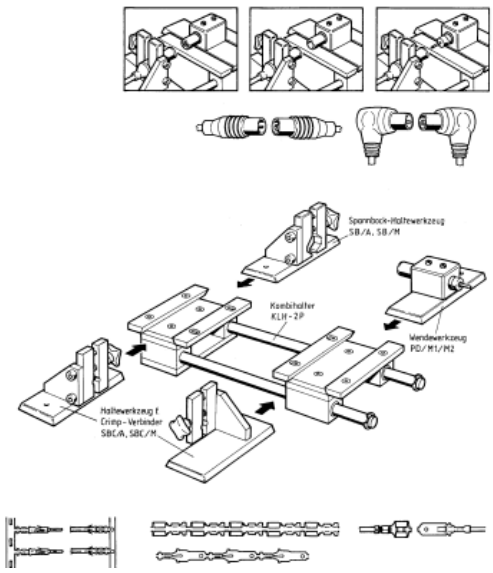
Suitable for all testers of all model series up to 1,000 N.

Insertion and Extraction Tool KLH

Tool set for insertion and extraction tests of crimped connectors, antenna plugs, etc.

The tool set KLH consists of a tool reception with parallel guidance bars and adjustable force idle facility to avoid pre-loads during change of test load direction.

On top of this tool reception, corresponding fixtures for the test samples are assembled. A fixture set for crimped standard connectors and a fixture set for antenna plugs are available as a standard. Customized fixtures can be designed, too.



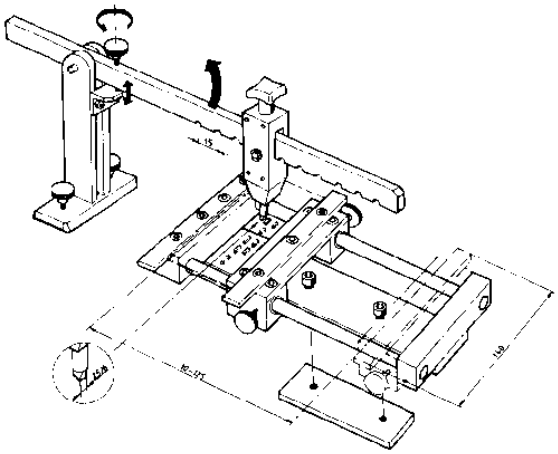
Suitable for all testers of all model series up to 500 N.

PCB Holding Frame LSS

Tool set consisting of the Holding Frame LSS and a shearing mechanism for tests of electronic components on PC boards.

The LSS holding frame features an adjustable fixing bar for PCB side lengths of ca. 10 to 125 mm and a material thickness of up to 3.5 mm.

Customized holding frames can be designed, too. The shearing mechanism has a vertical length adjustment of ca. 140 mm and is also adjustable in height. The shearing pin can be reversed and has shearing blades on both sides (2.5 and 6 mm width).



Suitable for all testers of all model series up to 500 N.

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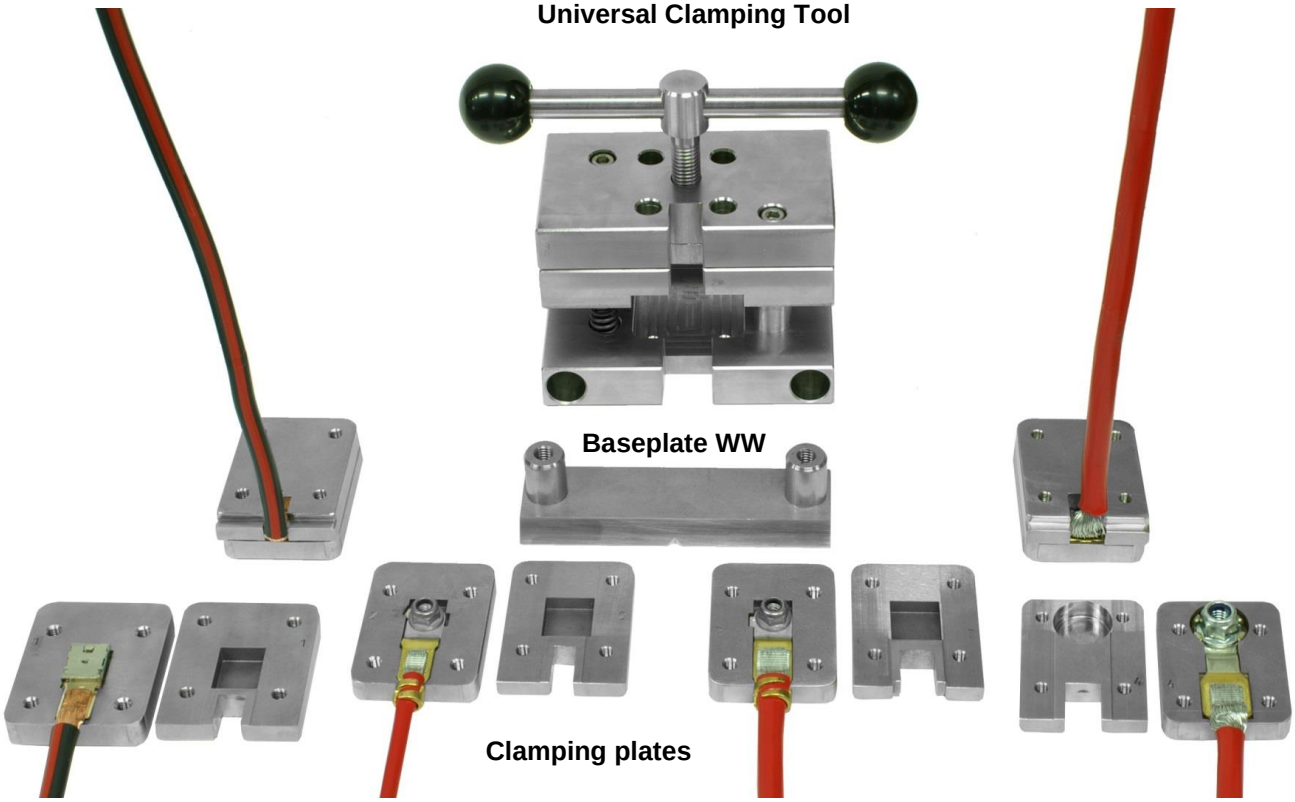
Interchangeable Tool WW-MAK: Functional Principle



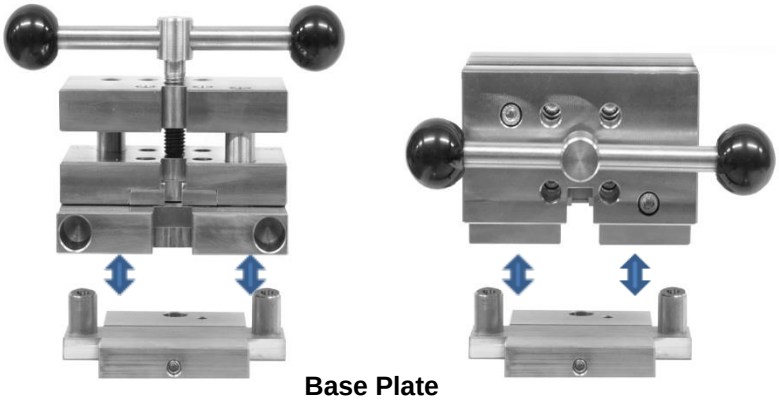
The WW-MAK is a universally usable tool for the testing of high power terminals and connectors of the MAK8 and MAK 12 production series MAK8-Crimp, MAK8 Sonic Weld and MAK12 Sonic Weld. Its construction design also allows the testing of different ultrasonic welded or crimped components due to the inter-changeable specimen fixtures.

There is the option to carry out standardized pull-off tests with the designated clamping plates as well as peeling tests in a 90° angle by simply rotating the universal clamping tool as a whole.

Positioning capabilities of the WW-MAK:

1. Pull-off test: the lever is located on the upper side
2. Peeling test: tool is rotated by 90°, the lever is located in front and faces the load side of the machine
   (in this case, the specimen has to be inserted in the specimen fixture before the whole tool is positioned on the mandrel prism-plate)

1. Pull off test



2. Peeling test

Base Plate

The testing procedure basically is as follows:

- Insertion and mounting of the chosen specimen fixture in the tool
- Insertion of the chosen specimen in the fixture and clamping through the fixture's pressure plate
- Mounting of the tool on the measuring point in the chosen position
- Tightening of the tool's contact pressure plate by actuating the handle
  Clamping the specimen on the load side and start testing as is usual (SHA20/SHA40)

Interchangeable Tool WW-MAK: Structure

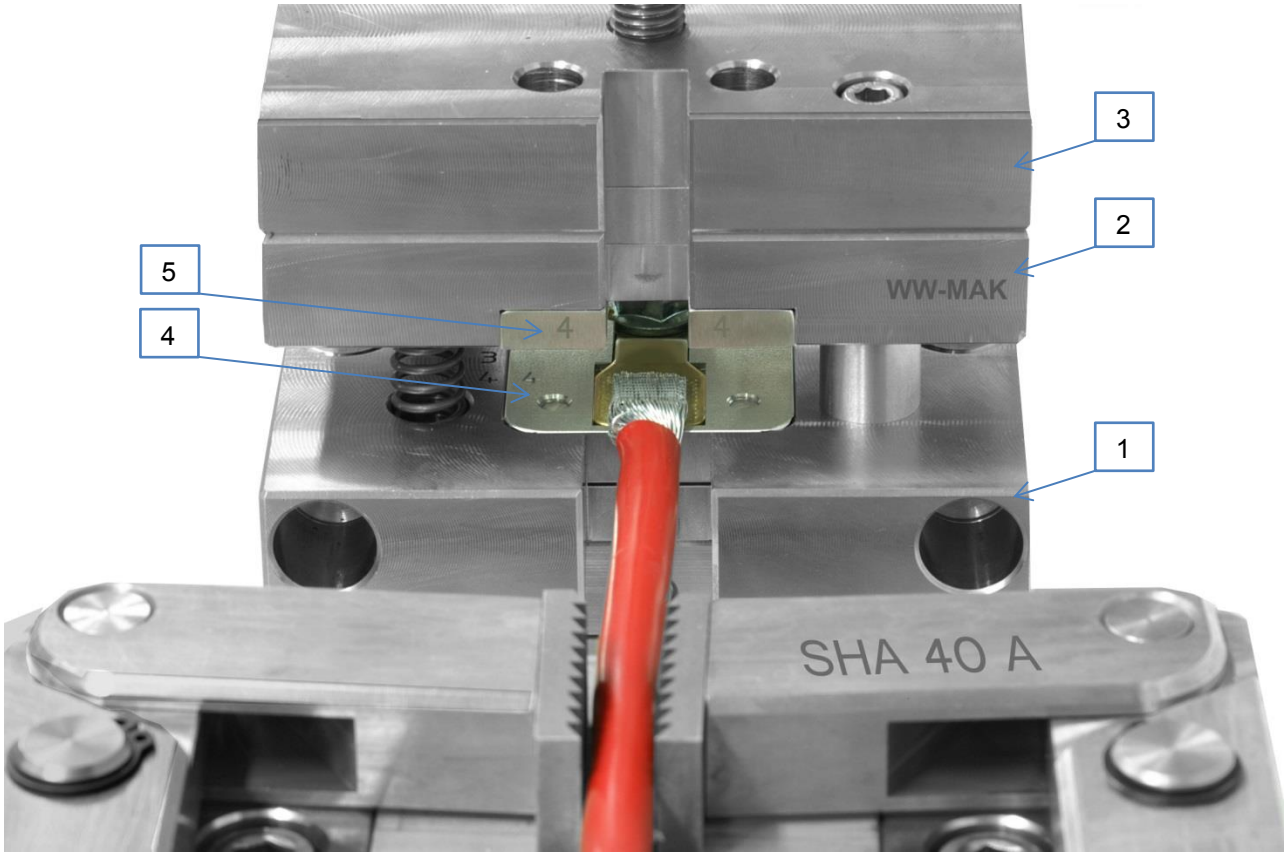
The WW-MAK tool is set up on the measuring point and due to the prism slider underneath, it is compatible with all MAV Prüftechnik devices of 5,000 N or higher force ranges.

The basic structure of the WW-MAK consists of the following components:

- tool – baseplate (1)
- tool – contact pressure plate (2)
- tool – pressure plate (3)
- specimen fixture – milled insert plate (4)
- specimen fixture – insert pressure plate (5)

Between pressure plate and contact pressure plate, there's room for the insertion of the specimen fixture, which can be exchanged quickly by simply loosening the screws above. The specimen fixture itself again consists of two plates – a baseplate (4) and a pressure plate (5) – both with finely milled recesses, so the inserted specimen can be clamped in between and will remain steady. Those clamping-plates always come in pairs and are adapted for a special specimen shape.

Additionally to the four fixtures for MAK terminal specimen existing so far, it is possible for us to manufacture customized fixtures upon request, given that we are provided with a sample specimen.

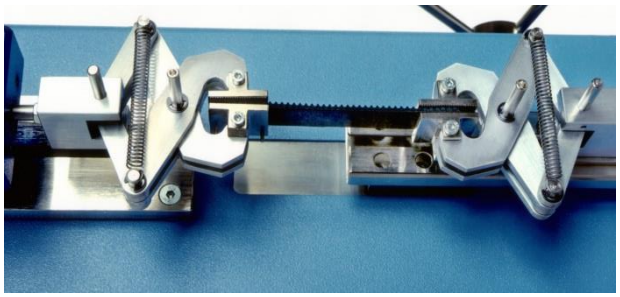


mav Prüftechnik® Testing Technics

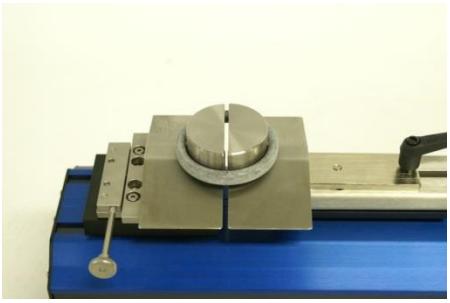
Special Tools

- Developed and Manufactured Special Purpose Tools
- Application Examples

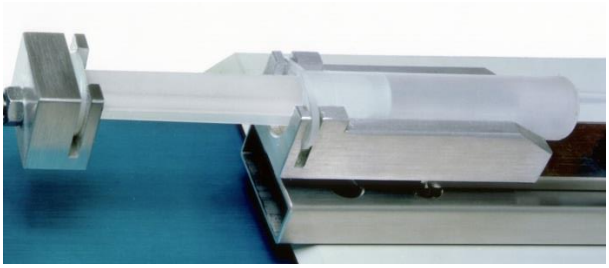
Tool for Flat Specimen



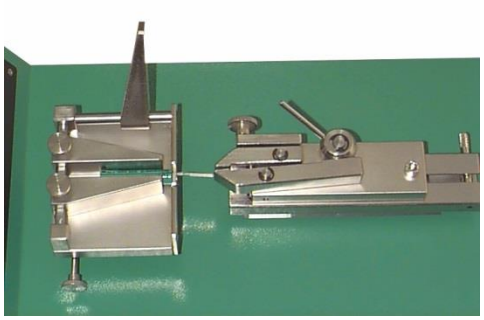
Mandrel for Testing Rings



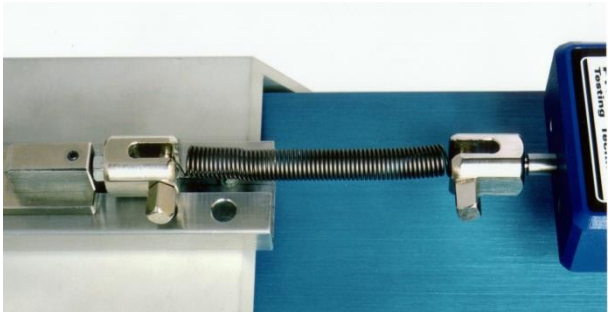
Syringes Testing Tool



Toolkit for Rechargeable Batteries

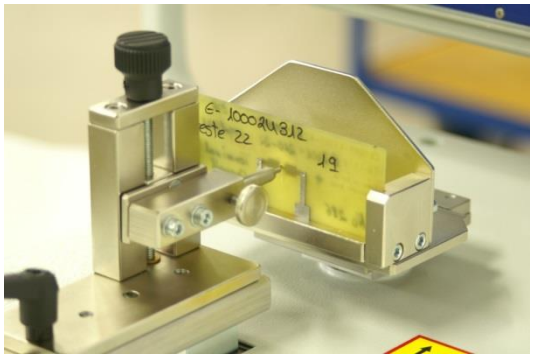


Tesing Tool for Tension Springs

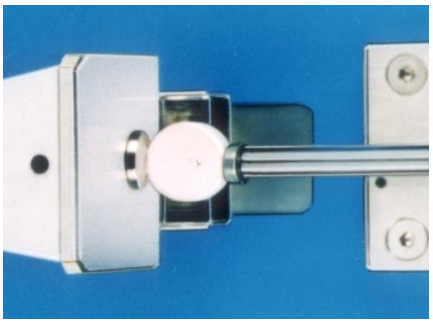


Testing Tool for Compression Springs

Circuit Board Pressure Testing Tool



Tool for Testing Medical Pills



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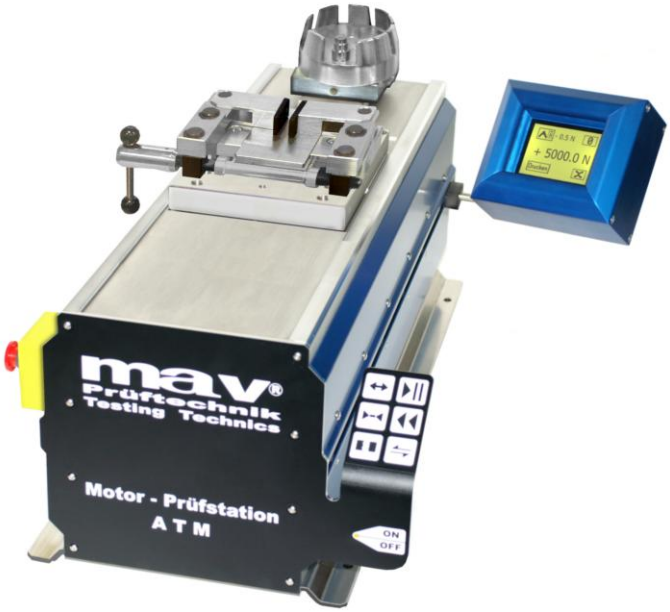
Miscellaneous



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Tools for Cable Tie Tighten Pistols

- *Guideline for Testing the Tensile Strength of Cable Ties*
- *Guideline for Testing Cable Tie Tighten Pistols*

Cable Ties: Testing cable tie tighten pistols

Tool Testing - Determination of Tensions:

The test equipment for cable tie tighten pistols (cable application tools, e.g. HerllermannTyton MK7, MK9, ML3PNSP, etc.) is used to determine the tensile forces of the tools and to guarantee the quality of the tools. The tension force can be adjusted on many of the cable tie models and should be checked in regular intervals and if necessary should also be readjusted. For testing cable tie tools, it is of supreme importance to comply with a standardized procedure and consistent test conditions. In general, the speed of cut-off, the position of the tool to the cable tie, the condition of the wearing parts in the tool and the state of the cable tie play a fundamental role in the determination of tensile forces. The recommendation of the respective manufacturer of the tools should be observed.

We point out that the herein exemplified indicated tension forces are provided as approximate values for the description if the test procedure and must only be regarded as guide values for your information. The tensile force of the cable tie tool can be adjusted with the help of the below described test apparatus, As a guideline for the tensile force e.g. the company HellermannTyton recommends to use half of the minimum tensile strength of the cable tie. The minimum tensile strength is the least force which the cable can withstand before it tears or stretches (see also leaflet “Determination of minimum tensile strength” of cable ties). The following formula can be used for guidance as to the correct tensile force of the tool:

$$\textit{Recommended tensile force} = ½ \bullet \textit{Minimum tensile strength.}$$

This tensile force can of course be adjusted up or down in line with the corresponding application. It is only a guide value and can vary from manufacturer to manufacturer.

Test set-up for determination of the tensile strength of cable tie tools

The KBP tool set is designed to determine the tensile force of cable tie hand tools. The set consists of a plug-plate with 3 pins of diameter 12, 20 and 30 mm for assembly on the measuring point of the tester and a special fixture for the cable tie pistol for assembly on the load bar of the tester.

To carry out the test, the cable tie is looped around one of the 3 pins and the strip end is guided through the cable tie head. The tie is then tightened firmly enough so that one stroke of the tool Is enough to tension and cut off. The free strip end is inserted into the open side of the cable tie tool head with the tension mechanism. The tool head must have a distance of only a few mm to the cable head. Now the manual lever of the cable tie tool is pulled one or more times to the stop. Once the pre-selected tension is reached, the free tie end is automatically cut off. The tension achieved at cut-off is determined by the tester and indicated on the display.

Instead of the 3-pin plug-in plate, also suitable quick-action clamps can be used on the measuring point. The special fixtures for the cable tie tools are designed for the corresponding tool models. Due to the manifold cable tie pistol models with different shapes and dimensions, there exists no all-purpose fixture, which is suitable for all models. Basically, fixtures for all hand operated, electric or pneumatic cable tie pistols can be manufactured. In our standard delivery program, we consistently provide fixtures for cable tie tool models HellermannTyton MK 7, MK 7HT, MK 7P, MK9, MK 9HT, MK3SP, MK3PNSP, MK 6PN as well as Panduit GS2B, GS4H, GTS, PPTS. The tool sets are available for all MAV tester models up to a nominal load of 1000 N with parallel stroke of the load bar and basic GAMA tool receptions. We recommend the use of our Clip Gun Tester Model CGT.

Tool Set KBP-MK 9 on a Clip Gun Tester CGT

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Tools for Cable Tie Tighten Pistols

- *Guideline for Testing the Tensile Strength of Cable Ties*
- *Guideline for Testing Cable Tie Tighten Pistols*

Testing Cable Ties: Determination of Minimum Tensile Strength

General Information:

The versatility of MAV testing units in combination with suitable clamping tools and fixtures provides flexible test systems for varying test applications in research, development, quality control, incoming inspection and industry. Herewith we present a special application using a small tester model CT 50 with 2 different tool sets for testing cable ties and cable tie application tools. Please gather some general information and technical data of the CT 50 Tester from our catalogue.

The clamping tools and test fixtures for determination of the minimum tensile strength of cable ties and for testing cable tie tighten pistols (cable tie tools) are available for all MAV force tester models up to a nominal load of 1000 N.

Minimum Tensile Strength of Cable Ties:

The minimum tensile strength is a critical selection criterion for cable ties. It expresses how much loading a cable tie can bear. The minimum tensile strength is the force up to which the cable tie bears up before the cable tie fail or before the material shows a plastic deformation. This minimum tensile strength is determined e.g. in accordance with the Military Specification and Standards of the USA. Test conditions being laid down precisely in MIL-S-23190E such as conditioning of the test pieces, construction of the test apparatus, application of the ties on a split test probe and test speed.

This minimum tensile strength is used to calculate the mass with which the tie can be loaded. This derives from the formula: $\boldsymbol{Force = Mass \cdot Acceleration\ due\ to\ gravity.}$ The unit for the force is [N] (1[N] = 1[kg· m/s²]).

The resulting formula is: $\boldsymbol{Mass = \frac{minimum\ tensile\ acceleration}{acceleration\ due\ to\ gravity}}$. The acceleration due to gravity is 9.81m/s². At a minimum tensile strength of 225 N: $\boldsymbol{Mass = \frac{225\ N}{9.81\ m/s^2}}$ the mass amounts to 22.9 kg.

The Test Procedure to Determine the Minimum Tensile Strength:

1. The cable tie is fixed onto a split mandrel test probe with suitable cable tie application so the cable tie head should be to the side of the split mandrel's slit.
2. For testing the cable tie, the mandrel is opened using the drive unit of the tester. When using a motorized tester, the mandrel can be opened at a defined speed.
3. The loading at which the cable tie fails or at which the material begins to show plastic deformation is determined. This force value is stated in Newton [N] (figure 3).

Test Fixture for Testing Cable Ties: Step Cone KBS

The Step Cone KBS is a split stepped mandrel for determination of the tensile strength of cable ties with different sizes. The cable tie is fixed onto a step of the mandrel with suitable diameter. Care should be taken to ensure that the cable tie head is on the side of the mandrel's slit.

The standard version of the KBS tool provides 5 graduations with diameters of 18, 38, 48, 68 and 86 mm. Additionally the diameters can be adapted by the length adjustment of the tester's load bar fixing.

Figure 1

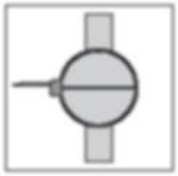


Figure 2

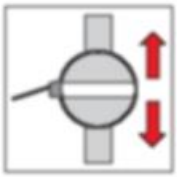
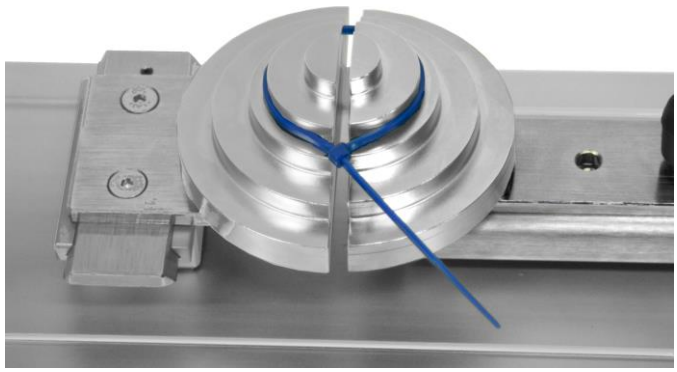


Figure 3



Tool Set KBS on a C50 Tester

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In accordance with our ISO 9001-certification, our machines are officially classified as testing devices and thus are subject to regular inspections. Therefore, in order to ensure correct functioning and a long service life of your device, we recommend the commission of maintenance inspections and calibrations on a regular basis and we also offer to carry out those calibrations for you.

As the owner and operator, you are responsible of managing and observing the calibration cycles. According to the ISO/DIS 7500-1:2014 (Tension/compression testing machines - Verification and calibration of the force-measuring system), the timeframe between inspections depends on the type of the test machine, its condition and the frequency of use. Unless otherwise stated, inspections should take place at least once every 12 months. Should a stationary test machine be moved or extensive repairs or adjustments be carried out on a machine, then an inspection and/or calibration is urgently recommended.

In order to minimize waiting times, we would kindly ask you to make an appointment with our service department.

To avoid transport damage, we recommend using the original packaging of your testing device. Corrugated cardboards are a good alternative if the original packaging not be available. When shipping goods with a weight exceeding 30 kg, please use a pallet and always remember you are sending a highly sensitive device. Please also keep in mind that you are sending an expensive and highly sensitive electronic measuring device!

All device shipments should be accompanied by documents containing name and address of your company, phone and fax numbers, name of the contact person and if applicable the ordering date. Please also note the model designation, the serial number and the year of manufacture of the sent device in the accompanying papers. This information shall be taken from the respective device's type plate. Furthermore all required services such as repair, calibration, adjustment, maintenance inspection etc. should be listed. If you are sending the devices from abroad, please indicate the approximate fair value of the device(s) as the custom value, not the buying price.

The accompanying documents should also include potential malfunction messages, defect descriptions as well as the delivery date we agreed upon. Information about calibration procedures / repairs:

- Should we detect a need of repair during the intermediate inspection of the testing device, or should the determined tolerances exceed the manufacturer specifications or the customer specifications, the customer will be informed before we carry out further services in order to make an arrangement. Should an estimate of costs not lead to a confirmation of the repair order on your part, we will charge a fixed rate of 150€ (plus VAT for domestic orders) for all services carried out hitherto.

- Should all tolerances determined during the examination be within the specified limits, however an adjustment can still improve the measurement results (no repair), than this adjustment counts as part of the calibration service. Upon request, the condition of the device before and after repair/calibration is documented, including an arrival certificate against the payment of a surcharge (50% of calibration cost).

Force Gauges Test Systems Test Stations

The **MAV PRÜFTECHNIK GmbH** offers an extensive program of test devices and test systems for force, force/distance as well as strain measurements. The versatility of the MAV testing units in combination with suitable clamping tools and test fixtures provides flexible test systems for varying test applications in research, development and industry.

Applications

AUTOMOTIVE
- ❑ Measure pull force of wire ropes and shafts.
- ❑ Measure actuation force of switches and buttons.
- ❑ Measure arm pressure of windshield wipers.
- ❑ Measure pull force of cables, connectors and contacts.

CHEMICALS & PLASTICS
- ❑ Test film bond strength.
- ❑ Tensile test of rubber, fibers and filaments.
- ❑ Test crush strength of medical pills.
- ❑ Test subcutaneous syringes
- ❑ Test peel strength of adhesives.
- ❑ Measure compression of ceramic compounds.

MACHINERY & MFG
- ❑ Rate testing of springs.
- ❑ Test pull-out of drive shafts.
- ❑ Test sprocket chain tension.

ELECTRONICS
- ❑ Test force springs and magnets used in various fields.
- ❑ Insertion and extraction test of terminals, antenna plugs, etc.
- ❑ Tensile tests of crimped terminals.
- ❑ Strain and break tests of copper, silver and steel wires.
- ❑ Test welded and soldered connections.
- ❑ Shearing tests e.g. of SMD components.
- ❑ Test cable ties.
- ❑ Material test of electronic and electrical components.

BUSINESS EQUIPMENT
- ❑ Test clutch release force.
- ❑ Measure force to perforate cards.
- ❑ Test adhesion strength of labels and stickers.

QR Code
Direct Access to our products!

Extract from our product range of standard and special tools

Force Measuring Systems
Force gauge KMS with external force sensor

Calibrations, Service and Repairs
The technicians of the MAVPRÜFTECHNIK GmbH can carry out calibrations, maintenance and repairs for all MAV test devices and test stations. Calibration certificates are traceable to the national standard of Germany.

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