

Comparator Balances



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Vacuum Technology

Robotic Solutions

Automated & Manual Operation

Solutions up to 5400 kg

Innovative Solutions
For Lifetime Accuracy

METTLER TOLEDO

Continuous Innovation Accompanying Your Future

METTLER TOLEDO Comparators determine even the smallest differences in mass. They provide highest resolution and excellent repeatability – the critical factors for your comparative weighing performance. We offer several models with readabilities as fine as 0.1 µg and capacities up to 5400 kilograms.

Segments & Applications



Machinery & Electronics

Production-oriented, the XPE-SC line offers the highest accuracy for the smallest tolerances assuring top quality finished components and parts.



Petrochemicals

XPE-LC line is largely used in gas cylinder filling. Its robustness and highest resolution help reducing uncertainties to a minimum improving the quality of the gas mixes.



Calibration Laboratories

For safe and simple weight calibration ComparatorPac™ is the all-in-one solution, assuring efficient workflow and reliable results.














Bulk Chemicals

Highest yield for highest capacities, XPE-KC line helps minimizing the waste of bulk chemical components at the time of filling, drastically reducing production costs.



Index

	Vacuum Comparator	4–5
	Robotic Comparator	6–7
	Automated Comparator	8–9
	Manual Comparator	10–19
	Volume Comparator	20–21
	Software Solutions	22–23
	Accessories	24–25
	Test Weights	26–27
	Comparator Services	28–29
	Select the Right Comparator	30–31
	Technical Specifications	32–39

Best Conditions and Results With Vacuum Weighing Technology

National Metrology Institutes improve their measurement accuracy using the reference in vacuum mass determination: The METTLER TOLEDO M_one and M_10 mass comparators evaluate various artefacts, giving results up to 10 ng accuracy, whilst offering unique flexibility features.

Determine the mass of weights, artefacts and silicon spheres up to 10 kg from controlled ambient pressure down to vacuum at 10^{-6} mbar. Load the artefacts directly through the quick loading door or through the Load Lock system. The Windows® M_Control software guides you through the whole process.



M_10



M_one

Model	Max. Load	Read-ability	Repeat-ability	Weighing Ranges (See theory on page 30 for further explanation)				
				E0	E1	E2	F1	F2
M_one	1001.5 g	0.1 ug	0.5 µg	100 g–1 kg	100 g–1 kg	100 g–1 kg	100 g–1 kg	100 g–1 kg
M_10	10011 g	1 ug	8 µg	1 kg–10 kg	1 kg–10 kg	1 kg–10 kg	1 kg–10 kg	1 kg–10 kg



The M_one and M_10 Offer:



Ready for Various Artefacts

Thanks to the unique STAR shaped pan, OIML weights from 100 g up to 1 kg, silicon spheres up to 100 mm in diameter or density artefacts may be placed directly on the turntable for automated weighing.



Direct Easy Access

Weights are placed directly with a clear view on the 6-place turntable through the large quick-loading door. Ergonomic design allows direct access into the system.



Constant Conditions

The unique Load Lock system allows time-saving exchange of weights into the vacuum or pressure stabilized weighing chamber without changing measurement conditions.



Automated Centering

The Automated Gravimetric Centering (AGC) allows automated centering at all positions before determining the mass to reduce eccentricity influence to a minimum.

Accurate and Productive With a_Line Robots

With METTLER TOLEDO's flexible robotic system, several models can be used in combination to create a high speed calibration system for weights from 1 mg to 20 kg with maximum safety, accuracy and time savings. The Robotic Comparators provide extremely fast results with an outstanding performance up to nano-accuracy. Magazines with up to 100 weight positions enable efficient calibration of single weights, or in combination of up to three weights, by downward/upward calibration. The process is fully automatic, controlled by Windows® based software and allows easy evaluation of results and preparation of certificates.



a5 / a100 / a107 / a1000



a5XL / a100XL



AX32004-M10

Model	Max. Load	Read-ability	Repeatability	Weighing Ranges (See theory on page 30 for further explanation)				
				E0	E1	E2	F1	F2
a5	6.1 g	0.1 µg	0-1 g: 0.15 µg 1-2 g: 0.25 µg 2-5 g: 0.4 µg	1 mg - 5 g	1 mg - 5 g	1 mg - 5 g	1 mg - 5 g	1 mg - 5 g
a5XL	6.1 g	0.1 µg	0-1 g: 0.15 µg 1-2 g: 0.25 µg 2-5 g: 0.4 µg	1 mg - 5 g	1 mg - 5 g	1 mg - 5 g	1 mg - 5 g	1 mg - 5 g
a107	111 g	0.1 µg	1 µg	1 g - 100 g	1 g - 100 g	1 g - 100 g	1 g - 100 g	1 g - 100 g
a100	111 g	1 µg	1.6 µg	10 g - 100 g	1 g - 100 g	1 g - 100 g	1 g - 100 g	1 g - 100 g
a100XL	111 g	1 µg	1.6 µg	10 g - 100 g	1 g - 100 g	1 g - 100 g	1 g - 100 g	1 g - 100 g
a1000	1109 g	10 µg	10 µg	200 g - 1 kg	100 g - 1 kg	10 g - 1 kg	10 g - 1 kg	10 g - 1 kg
AX32004-M10	21260 g	0.1 mg	0.2 mg	5 kg - 20 kg	2 kg - 20 kg	1 kg - 20 kg	1 kg - 20 kg	1 kg - 20 kg



The Robotic a_Line Offers:



Nano-Accuracy

The separate detached weighing frame prevents vibrations from being transferred to the comparator. This allows outstanding measurement performance with a resolution of up to 110 million points.



Maximum Efficiency

Increase efficiency by combining up to 4 robotic systems covering the full range from 0.1 µg to 20 kg. Together with up to 100 positions per system, this maximizes productivity and minimizes human error.



Proven Technology

Our robots offer highly sophisticated 3-axis ball bearing technology. Ultra precise centering and smooth vibration-free handling of weights within seconds is assured year after year.



Secure Operations

The control software monitors all your jobs which can be directly imported from LIMS. Autostart several jobs in a row and calculate air buoyancy correction. Data can be exported to a database giving full traceability at a keystroke.

Unrivalled Mass Comparison

AX Automation Makes it Possible

Ultimate accuracy is achieved with AX fully automatic weighing systems. Design without compromise, automated weight handler and separate electronics result in extraordinary resolution and incomparable repeatability for weight determinations of OIML E1 and "EO" Mass Standards. The AX automated weighing systems meet highest accuracy requirements with up to 0.1 µg resolution and mass determination of weight pieces of up to 64 kg. Human error is eliminated due to fully automatic operation of the 4-place weight handlers controlled by Windows® based software. Measurement data is securely stored and handling effort reduced.



AX106H, AX107H, AX1006



AX10005



AX16004, AX32004, AX64004

Model	Max. Load	Readability	Repeatability	Weighing Ranges (See theory on page 30 for further explanation)				
				EO	E1	E2	F1	F2
AX107H	111 g	0.1 µg	0.8 µg	10 g – 100 g	10 g – 100 g	10 g – 100 g	10 g – 100 g	10 g – 100 g
AX106H	111 g	1 µg	1.5 µg	10 g – 100 g	10 g – 100 g	10 g – 100 g	10 g – 100 g	10 g – 100 g
AX1006	1001 g	1 µg	2 µg	100 g – 1 kg	100 g – 1 kg	100 g – 1 kg	100 g – 1 kg	100 g – 1 kg
AX10005	10011 g	10 µg	20 µg	1 kg – 10 kg	1 kg – 10 kg	1 kg – 10 kg	1 kg – 10 kg	1 kg – 10 kg
AX16004	16260 g	0.1 mg	0.2 mg	5 kg – 10 kg	2 kg – 10 kg	1 kg – 10 kg	1 kg – 10 kg	1 kg – 10 kg
AX32004	32260 g	0.1 mg	0.2 mg	5 kg – 20 kg	2 kg – 20 kg	1 kg – 20 kg	1 kg – 20 kg	1 kg – 20 kg
AX64004	64260 g	0.1 mg	0.4 mg	5 kg – 50 kg	5 kg – 50 kg	1 kg – 50 kg	1 kg – 50 kg	1 kg – 50 kg



Automatic Comparators Offer:



Unrivalled Accuracy

Our engineers always strive for the perfect mass comparator. By improving them over the last 30 years, the AX automated comparators are proof by offering peak measurement performance and reliability in everyday weighing routine.



Continuous Weighing Ranges

The clever continuous range technology enables use of the entire 64 kg range in 0.0001 g steps. This makes it the ideal solution for measuring non-metric weights, pressure discs for force measurements, gas-capsules or small bottles (AX10005 offers Window-Range).



Direct Weight Dissemination

With the automated AX line the efficiency is increased by placing several weights on the turntable for each weighing position. This enables you to calibrate the weight decade 1 kg - 64 kg by dissemination without the aid of disc weights. AX1006 and AX10005 offer dissemination with disc weights.



Secure Operation

The Windows® based software controls all your weighing jobs which can be imported directly from LIMS. Autostart several jobs in a row and calculate air buoyancy. Data can be exported to a database giving you full traceability at a keystroke.

Peak Performance up to 520g With XPE-C Micro Comparators

In the field of Mass Metrology, weighing to the highest degree of accuracy is required. The XPE Micro Comparators offer convenient full weighing ranges with highest precision. The brilliant mass calibration software MC Link guides the user through the calibration process and controls the mass comparator, while the operator concentrates on weight handling only. The automatically controlled draft shield doors enable a simplified and safer workflow, resulting in improved quality of results and less fatigue.



XP6U

XPE26C & XPE56C

XPE205CDR & XPE505C

Model	Max. Load	Readability	Repeatability	Weighing Ranges (See theory on page 30 for further explanation)				
				E1	E2	F1	F2	M1
XP6U	6.1 g	0.1 µg	0.35 µg	1 mg – 5 g	1 mg – 5 g	1 mg – 5 g	1 mg – 5 g	1 mg – 5 g
XPE26C	22 g	1 µg	1.5 µg	50 mg – 20 g	1 mg – 20 g	1 mg – 20 g	1 mg – 20 g	1 mg – 20 g
XPE56C	52 g	1 µg	3 µg	50 mg – 50 g	1 mg – 50 g	1 mg – 50 g	1 mg – 50 g	1 mg – 50 g
XPE205CDR	220 g	10 µg	4 µg	–	100 g – 200 g	1 g – 200 g	50 mg – 200 g	1 mg – 200 g
XPE505C	520 g	10 µg	3.5 µg	200 g – 500 g	10 g – 500 g	500 mg – 500 g	10 mg – 500 g	1 mg – 500 g



The XP-U and XPE-C Offer:



Hands-free Operation

For a faster and more secure workflow, motorized doors are controlled through SmartSens or MC Link allowing hands-free operation.



Hanging Pan

More reliability thanks to the hanging pan technology, which reduces corner load errors to a very minimum.



MC Link

The intuitive software solution for weight calibration guarantees efficient workflows, accurate and secure results assuring full traceability and regulatory compliance at all times.

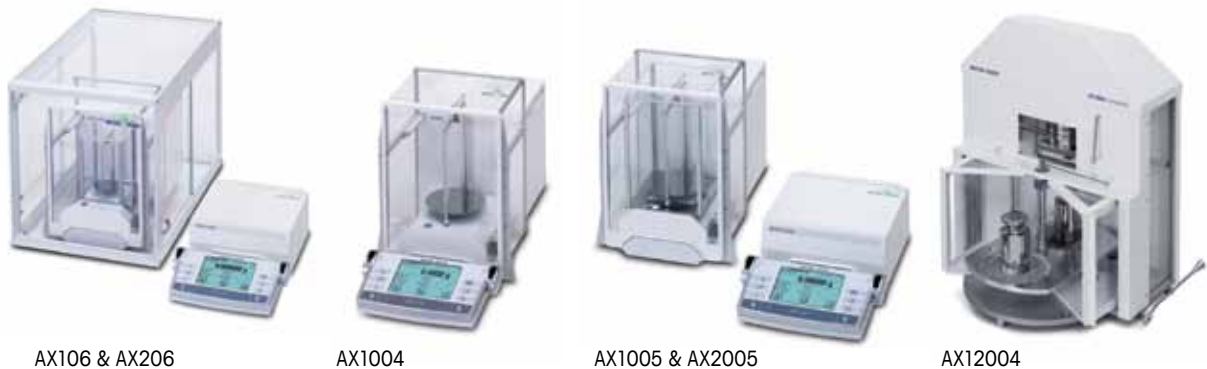


Easy Weight Handling

With the patented hook weighing pan, smallest wire weights are handled safely and easily. With its hanging weight approach, eccentricity is reduced to a minimum.

Highest Accuracy Manually Handled AX Comparators up to 12 kg

Highest performance when manually weighing is achieved with the AX comparator range. Sophisticated features such as the continuous weighing range technology allows a wide weighing range for standard or customized weights and artefacts. State-of-the-art mechanics with a hanging weighing pan, full metal housing and separate electronics, the AX comparators offer world-class performance.



Model	Max. Load	Read-ability	Repeat-ability	Weighing Ranges (See theory on page 30 for further explanation)				
				E1	E2	F1	F2	M1
AX106	111 g	1 µg	3 µg	1 g – 100 g	50 mg – 100 g	1 mg – 100 g	1 mg – 100 g	1 mg – 100 g
AX206	211 g	1 µg	4 µg	5 g – 200 g	100 mg – 200 g	1 mg – 200 g	1 mg – 200 g	1 mg – 200 g
AX1005	1109 g	0.01 mg	0.02 mg	200 g – 1 kg	20 g – 1 kg	1 g – 1 kg	100 mg – 1 kg	1 mg – 1 kg
AX1004	1109 g	0.1 mg	0.07 mg	1 kg	500 g – 1 kg	100 g – 1 kg	10 g – 1 kg	200 mg – 1 kg
AX2005	2109 g	0.01 mg	0.04 mg	500 g – 2 kg	100 g – 2 kg	10 g – 2 kg	1 g – 2 kg	20 mg – 2 kg
AX12004	12111g	0.1 mg	0.25 mg	2 kg – 10 kg	1 kg – 10 kg	500 g – 10 kg	500 g – 10 kg	500 g – 10 kg



The AX Manual Line Offers:



Hanging Pan

Eccentricity influences are eliminated accurately and efficiently. The large surface allows easy weight placement for dissemination.



Faster Results

With the motorized and integrated draft shield, environmental influences and stabilization time are reduced and measurement performance as well as efficiency increased obtaining faster and more reliable results.



2-position Manual Turntable

The unique weight exchanging design of the AX12004 allows easy and safe weight handling at lowest environmental influences allowing more efficient and accurate mass determination with higher loads.



Straightforward Results

MC Link is the all-in-one solution for weight calibration offering total flexibility and full compliance while maximizing productivity. Achieve accurate results whilst streamlining your calibration process.

For Versatile Applications up to 10 kg

The XPE-SC Comparator Line

METTLER TOLEDO XPE-SC Comparators guarantee everyday top performance and reliability with the most accurate measurement results up to 10 kg. With the MonoBloc weighing cell technology and a resolution of up to 23 million resolution points, accuracy is peak at shortest process times fulfilling the highest demands in routine mass determination. The LevelMatic weighing pan eliminates eccentricity influences guaranteeing improved performance. LevelControl automatically warns if the comparator must be leveled assuring reliable results. An ergonomic draft shield allows secure handling whilst reducing air draft influences to a minimum.



XPE2003SC

XPE2004SC,
XPE5003SC

XPE10003SC

Model	Max. Load	Readability	Repeatability	Weighing Ranges (See theory on page 30 for further explanation)				
				E1	E2	F1	F2	M1
XPE2004SC*	2300 g	0.1 mg	0.25 mg	2 kg	500 g – 2 kg	200 g – 2 kg	20 g – 2 kg	500 mg – 2 kg
XPE2003SC	2300 g	1 mg	1 mg	–	–	1 kg – 2 kg	500 g – 2 kg	200 g – 2 kg
XPE5003SC	5100 g	1 mg	0.8 mg	–	5 kg	1 kg – 5 kg	500 g – 5 kg	200 g – 5 kg
XPE10003SC	10100 g	1 mg	1 mg	10 kg	5 kg – 10 kg	1 kg – 10 kg	500 g – 10 kg	200 g – 10 kg

* Ex zone model available



The XPE-SC Line Offers:



LevelMatic

Eccentricity influences are eliminated accurately and efficiently. The large weighing pan surface allows easy weight placement for dissemination.



MC Link

The intuitive software solution for weight calibration guarantees efficient workflows, accurate and secure results assuring full traceability and regulatory compliance at all times.



Faster Results

With the integrated draft shield, environmental influences are reduced and measurement performance increased. Stabilization time is reduced to a minimum allowing fast and reliable results.



Full Connectivity

With up to 8 interface options and the built-in RS232 interface, data is exchanged securely and measurement data is ready for external data handling systems.

High Capacity Performance Using the XPE-LC Comparator Line

In the higher mass ranges handling becomes more critical. Easy handling and highest accuracy is facilitated with the built-in LevelMatic system. The MC Link software solution for mass determination, guides the user step-by-step through the process all the way to printing out of certificates for a smooth and error-free workflow. Secure and accurate results are achieved with ease. For Ex Zone applications, specific models are available as ATEX II 3G approved versions. Due to their high versatility, XPE-LC models are the best choice for mass calibration, gas filling or any other demanding high capacity and high accuracy weighing application.



XPE32003LC &
XPE64002LC



XPE26003LC &
XPE64003LC



XPE64002LC-T

Model	Max. Load	Readability	Repeatability	Weighing Ranges (See theory on page 30 for further explanation)				
				E1	E2	F1	F2	M1
XPE26003LC*	26.1 kg	1 mg	3 mg	20 kg	10 kg – 20 kg	2 kg – 20 kg	1 kg – 20 kg	500 g – 20 kg
XPE32003LC	32.1 kg	5 mg	10 mg	–	–	20 kg	5 kg – 20 kg	2 kg – 20 kg
XPE64003LC*	64.1 kg	5 mg	8 mg	–	20 kg – 50 kg	5 kg – 50 kg	2 kg – 50 kg	1 kg – 50 kg
XPE64002LC	64.1 kg	10 mg	25 mg	–	–	50 kg	10 kg – 50 kg	5 kg – 50 kg
XPE64002LC-T	64.1 kg	10 mg	30 mg	–	–	50 kg	10 kg – 50 kg	5 kg – 50 kg

* Ex zone model available



The XPE-LC Line Offers:



LevelMatic

Utmost reliability and accuracy thanks to the LevelMatic, an innovative mechanism that reduces corner load effects to the very minimum.



LevelControl

Work under leveled conditions. LevelControl alerts you when the comparator is not correctly leveled, avoiding incorrect results.



Draft Shield

For enhanced measurement stability, elimination of air draft influences leads to highest performance even in demanding environments (applies to XPE26003LC & XPE64003LC).



ATEX Approved Versions

With the ATEX II 3G c Ex ic IIC T5 approved versions, demanding mass determination can be performed in hazardous environments at peak accuracy.

The Ultimate Solution up to 5 Tons

XPE-KC Comparators for Extreme Challenges

XPE-KC comparators are made to conquer extreme challenges with highest precision, such as filling gas cylinders, calibrating flow-meters, weighing high-speed train wheels or mass pieces up to 5 tons for truck or rail scales. Besides full weighing ranges, all platforms have an integrated centering aid for an easier and more precise placement of artifacts and are constructed using high-grade steel for long lasting everyday precision and reduction of magnetic influences. Furthermore, the standard touchscreen operation makes working with these comparators as easy as with any other comparator.



XPE155KSC

XPE604KMC &
XPE1003KMCXPE2003KLC &
XPE6002KLC

Model	Max. Load	Read-ability	Repeat-ability	Weighing Ranges (See theory on page 30 for further explanation)			
				F1	F2	M1	M2
XPE155KSC & LM1000	150 kg	0.05 g	0.12 g	–	50 kg – 100 kg	20 kg – 100 kg	5 kg – 100 kg
XPE155KSC					100 kg	50 kg – 100 kg	10 kg – 100 kg
XPE604KMC & LM1000	600 kg	0.1 g	0.23 g	200 – 500 kg	100 kg – 500 kg	50 kg – 500 kg	10 kg – 500 kg
XPE604KMC				–	500 kg	200 kg – 500 kg	50 kg – 500 kg
XPE1003KMC & LM5000	1100 kg	0.5 g	1.5 g	–	500 kg – 1000 kg	200 kg – 1000 kg	50 kg – 1000 kg
XPE1003KMC					1000 kg	500 kg – 1000 kg	100 kg – 1000 kg
XPE2003KLC & LM5000	2500 kg	1 g	7 g	–	–	1000 kg – 2000 kg	200 kg – 2000 kg
XPE2003KLC					–	1000 kg – 2000 kg	500 kg – 2000 kg
XPE6002KLC & LM5000	5400 kg	10 g	70 g	–	–	–	5000 kg

All comparators available as Ex zone models



The XPE-KC Line Offers:



Unrivaled Performance

Accomplish demanding calibrations and weight determination at peak accuracy. The XPE-KC comparators offer top resolution and excellent repeatability at highest loads.



Precise Centering

With the integrated centering aid, precise placement of weights is enabled and reproducibility improved.



Utmost Reliability

The optional innovative Level-Matic mechanism eliminates corner load affects, thus significantly increasing the accuracy of your weighing results.



ATEX Approved Versions

With the ATEX II 3G c Ex ic IIC T5 approved versions, demanding mass determination can be performed in hazardous environments at peak accuracy.

Volume & Density Determination To Eliminate Significant Influences

According to OIML, the volume or density of the test weights must be known. Determination is required for E1 weights, E2 weights above 330m elevation and F1 weights above 800m. Failing to include this data will lead to incorrect air buoyancy correction resulting in errors in calibration and potential noncompliance to regulations.

METTLER TOLEDO offers easy and reliable systems up to 20 kg. The VMS systems use standard XPE comparators, which have the dual use capability for density and mass calibration in one system.



VC1005X



VMS2



VMS20

Model	Max. Load	Readability	Density Uncertainty (k=2)	Volume Uncertainty (k=2)	Weighing Ranges				
					E0	E1	E2	F1	F2
VC1005X	1 kg	0.01 mg	1.2 kg/m ³	0.00015 cm ³	1 g – 1 kg	1 g – 1 kg	1 g – 1 kg	1 g – 1 kg	1 g – 1 kg
VMS2	2 kg	0.1 mg	25...400 kg/m ³	0.0063...0.781 cm ³	–	–	1 g – 2 kg	1 g – 2 kg	1 g – 2 kg
VMS20	20 kg	1 mg	1...5 kg/m ³	0.0781...0.3125 cm ³	–	1 kg – 20 kg	1 kg – 20 kg	1 kg – 20 kg	1 kg – 20 kg



The Volume Comparators Offer:



Unrivalled Performance

The fully automatic VC1005X enables fast and accurate volume and density determination of weights from 1 g to 1 kg.



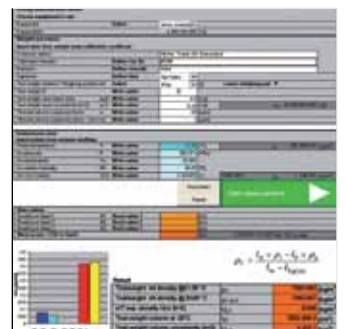
Dual Use

VMS systems are designed to support standard mass determination and buoyancy force measurement for density determination. Smooth weight handling in air and water is enabled by the weight handlers.



Air Bubble Removal

Advanced water jet system to remove the residual air bubbles is included in VMS systems.



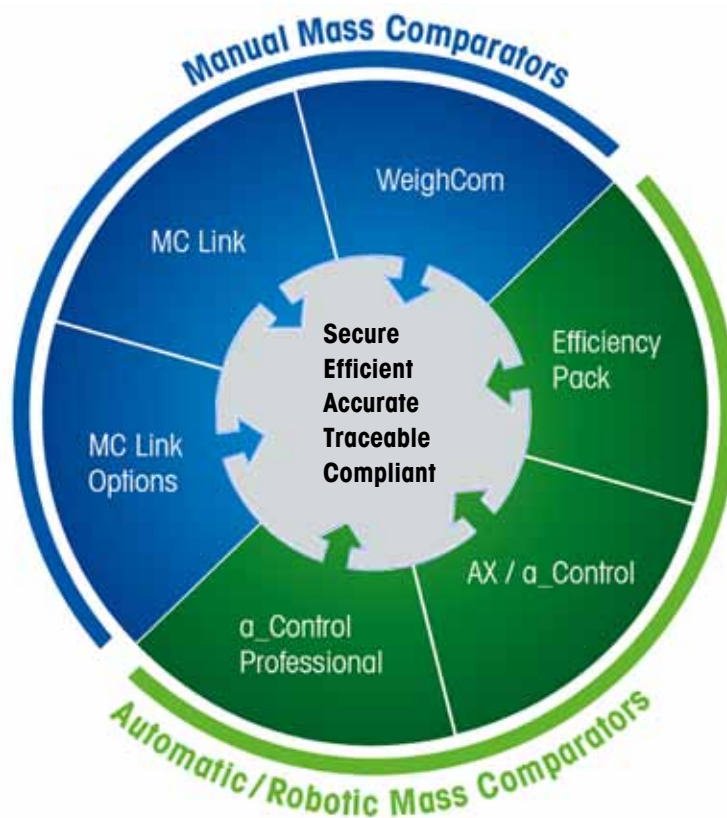
Straightforward Results

With the supplied software, the highly complex theory of density determination and generation of the most accurate and detailed reports has never been easier.

Software Solutions For Efficient Mass Determination

For flawless traceability of weights to the International Prototype of the Kilogram (IPK), it takes the most accurate mass comparator and a highly intelligent software solution to eliminate any human error.

When comparing weights with reference standards, you can rely on METTLER TOLEDO's unique expertise in the world of mass determination: Tailored software solutions for mass comparators guarantee efficient workflows and accurate with secure results, assuring full traceability at all times.



For safer and simpler weight calibration select the ideal software solution for your mass comparator line.



Our Software Solutions Offer:



Connectivity

Up to 8 different interfaces can be flexibly used to connect your comparator into your network. From wireless, Bluetooth to ethernet – state-of-the-art solutions.



Traceable Results

Using METTLER TOLEDO software, all weighing results can be sent directly to a PC or database for safe storage. All calibration data is fully traceable and available at any time for quality and accreditation purposes.



MC Link

The intuitive software solution for weight calibration guarantees efficient workflows, accurate and secure results assuring full traceability and regulatory compliance at all times.



Professional Certificates

Calibration certificates at a keystroke. All parameters, processes used, references and results, with or without calculations, can easily be transferred into a certificate for a professional sign-off.

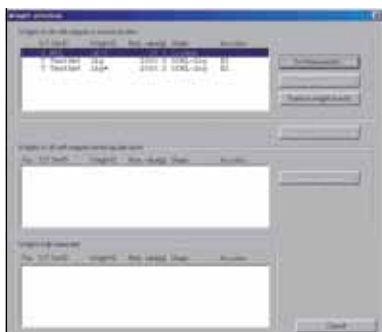
Enhanced Usability Through Specially Designed Accessories

To meet your individual requirements and improve your laboratory's overall performance METTLER TOLEDO offers a range of innovative accessories. These ergonomically-designed solutions improve your mass calibration performance while significantly increasing your process safety, accuracy and efficiency.



S50-K Susceptometer

Determination of magnetic characteristics is an important precondition to ensure the quality of reference and test standards. The S50-K Susceptometer measures susceptibility and permanent magnetization of weights up to 50 kg in one measurement accurately.



Guided Workflow

The user-guided Susceptometer software calculates magnetic properties of artifacts according to OIML R111.



Complete Traceability

Recalibratable gauge blocks and-susceptibility reference in combination with accurately-measured magnets secure the traceability to international standards.



Intelligent SmartGeo

Select OIML standard shapes or define specific weight geometries for automatic calculation of geometry correction factors.

Description	Part No.	XP6U	XPE26C / XPE56C	AX106	AX206	XPE505C / XPE205CDR	AX1005/1004 / AX2005	XPE2004SC / XPE2003SC	XPE5003SC	XPE10003SC	AX12004	XPE26003LC / XPE32003LC	XPE64003LC / XPE64002LC	XPE64002LC-T	XPE155KSC	XPE604KMC	XPE1003KMC	XPE2003KLC / XPE6002KLC	
Susceptometer																			
Hardware (S50-K)	11116880	•																	
Susceptibility Reference	11116858	•																	
Susceptibility Software	11116870	•																	
Magnet Calibration Set	11116866	•																	
Draft Shields																			
Draft Shield AX	11115915			•	•		•												
Draft Shield XP W5	11116043	•																	
Draft Shield W12	11134430		•			•		•	•										
Draft Shield XP W64	11134470										•	•							
Draft Shield XP-WKS	11116556													•					
Draft Shield XP-WKM	11116557														•	•			
Draft Shield XP-WKL	11116558																	•	
Inner Draft Shield AX1004	222159					•													
Self Centering Pan																			
LevelMatic for XPE2003SC	11131123						•												
LevelMatic 1000	22001940													•	•				
LevelMatic 5000	11116554																•	•	
Software Solutions																			
MC Link Options	Various	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Printer / Interfaces																			
P-58RUE Printer	30094674	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Bluetooth Interface	11132530	•	•	•	•	•	•	•	•	•	•	•	•	•					
Ethernet Interface	11132515	•	•	•	•	•	•	•	•	•	•	•	•	•					
Terminals																			
IND690	22011901														•	•	•	•	

More accessories for Automated and Robotic Mass Comparators available at: www.mt.com/comparators
 More solutions for Weight handling available at: www.mt.com/weights



Climate Stations

Klimet A30 and ClimaLog30 as stand-alone or online measurement stations, record air temperature, humidity and pressure to determine air density for buoyancy correction.



Straightforward Results

MC Link is the all-in-one solution for weight calibration offering total flexibility and full compliance while maximizing productivity. Achieve accurate results whilst streamlining your calibration process.



Draft Shield XP W12



LevelMatic 1000



Optional Bluetooth or ethernet interface

Our Expertise

Your Cornerstone for Reliable Results

Only the finest quality austenitic steel offers the highest resistance to corrosion over the course of a weight's lifetime. Our unique manufacturing process involves melting the steel under vacuum, traditional mechanical polishing, final stage electrolytic polishing, fully automated cleaning processes and final calibration using state-of-the-art mass comparators. The process has been perfected over years of experience to bring you accurate weights of the highest quality, with a stability that remains unmatched in the market.

Signature Line, OIML E1, E2 and F1



The Signature Line offers more than perfection. Hand selected weights with guaranteed positive tolerances and a lifetime guarantee make these weights the first choice for ambitious testing purposes.



Custom Materials

Our specially produced super austenitic stainless steel is cast under vacuum to reduce undesired trace elements, remove dissolved gases and improve oxide cleanliness. This optimizes the physical properties of the steel; e.g. density is highly reproducible.



Electrolytic Polishing

Our proprietary process eliminates microscopic protrusions on the weight's surface giving a more even finish compared to mechanical polishing methods. Thanks to the enhanced properties of the passive oxide film, long-term stability of the weight is improved.



Robotic Calibration

Substantial investment in cutting-edge robot technology, combined with decades of experience, guarantees the highest standard of weight calibration. Computer-controlled processes eliminate human error, producing consistent and reproducible results with low uncertainty values.



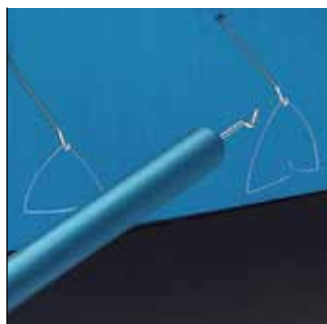
Microgram Weights For Mass Calibration

The weights, combined with their specially designed set of accessories and handling tools, offer the complete solution for customers who go beyond traditional boundaries. These weights are mainly used by national institutes for scientific research and calibrations, but they also aid general industry research in areas where equipment calibration with milligram weights is no longer sufficiently precise.



Protective Storage

Easy-to-clean aluminum boxes protect weights against electrostatic charge. To avoid unintentional mis-storage of weights, each box is laser marked with the nominal value.



Stable Weights

Precise and distinguishable shapes for each nominal weight. To ensure accuracy, an automated process is used to bend wires with diameters as small as 0.05mm into the desired shape.



Nifty Tools

Tweezers with a special hook and ceramic tips ensure proper handling. The miniature draft shield protects the weights during acclimatization and pre-weighing preparations.

► www.mt.com/weights

Maximum Productivity With Lifetime Peak Performance

Take advantage of our worldwide services to ensure you get the most out of your mass comparator. You can ensure accurate results, full traceability and worry-free operation thanks to our comprehensive service solutions which can be individually tailored to meet your specific needs. Our specially trained engineers provide you with the highest level of service so that you benefit from:

- Assured continuous accuracy
- Maximum equipment uptime
- Cost-effective service solutions

Installation



Professional installation ensures your comparator is optimized to your applications and performs according to specifications. On-site operator training and an installation certificate are included.

Maintenance



Your comparator is realigned to our manufacturing specifications to maintain quality standards. It is cleaned and any worn-out parts replaced. On-demand and regular plans are available.

Support and Repair



Our technical support staff are available by phone to assist you with operational queries. We can also visit you on-site for 1:1 consultations. Any repairs required are carried out by our trained technical specialists using only original parts.

Examples of Services

Installation of:

- Automatic Mass Comparator
- Robotic Mass Comparator
- Vacuum Mass Comparator
- Manual Mass Comparator

Maintenance of:

- Automatic Mass Comparator
- Robotic Mass Comparator
- Vacuum Mass Comparator
- Manual Mass Comparator

- Telephone Helpline
- On-site Support
- Adjustment and Repair



Education and Training



Individually customizable to meet your needs, our classroom and on-the-job training courses ensure your whole comparator team is proficient and competent. Ideal for metrologists, lab managers, supervisory and operations personnel.

- User Training
- Maintenance Instruction
- Technical Seminars
- Metrology Know-how

Relocation



Specially trained technical specialists prepare, supervise the transfer and install your comparator in a new on-site location. A relocation certificate and final system performance test are included.

- On-site Comparator Relocation
- Final System Performance Test

METTLER TOLEDO Service

Select the Right Comparator For the Calibration of Your Weights

In Mass Metrology, weights are used according to OIML or ASTM guidelines which are categorized into accuracy classes E1, E2, F1, F2, M1, M2 and M3 or class 1 to 7 respectively. When determining the mass of a weight, the maximum allowed measurement uncertainty of the whole process must be equal or less than $\frac{1}{3}$ of the maximum tolerance (mpe) of the weight under test with level of confidence $k=2$ or 95%. The main uncertainty contribution factors when calibrating weights are the following:

Uncertainty of the Weighing

$$u_w(\Delta m_c) = \frac{s(\Delta m_{ci})}{\sqrt{n}}$$

is the repeatability of the comparator with a defined number of weight comparisons per process. The more repetitions of ABA / ABBA which are performed, the impact of repeatability to the overall weighing uncertainty is reduced. METTLER TOLEDO's calculations are based on repeatabilities in ABA weighing mode.

Uncertainty of the Reference Weight

The reference weight being used should be at least one class higher than the test object, e.g. E2 standard weights should be used to calibrate weights in class F1. The uncertainty contribution of the mass standard is therefore only $\frac{1}{3}$ of the MPE of the calibrated test weight.

Uncertainty of Air Buoyancy

Correction

The density of the weights and air density have a strong influence on measurement uncertainty. To achieve smallest uncertainties, the density of weights and air shall be measured, if the contribution is significant. According to OIML this applies to E1 weights, E2 weights above 330m elevation and F1 weights above 800m.

Uncertainty of the Comparator

Smallest readability and eccentricity ensure a minimum effect on comparator uncertainty.

METTLER TOLEDO Definitions

The Weight Calibration ranges of Mass Comparators are defined to typical customer processes using OIML or ASTM standards.

- Number of repetitions according to OIML standards:
 - E1: 5 ABA,
 - E2: 3 ABA,
 - F1: 2 ABA,
 - F2 - M3: 1 ABA

Uncertainty Analysis

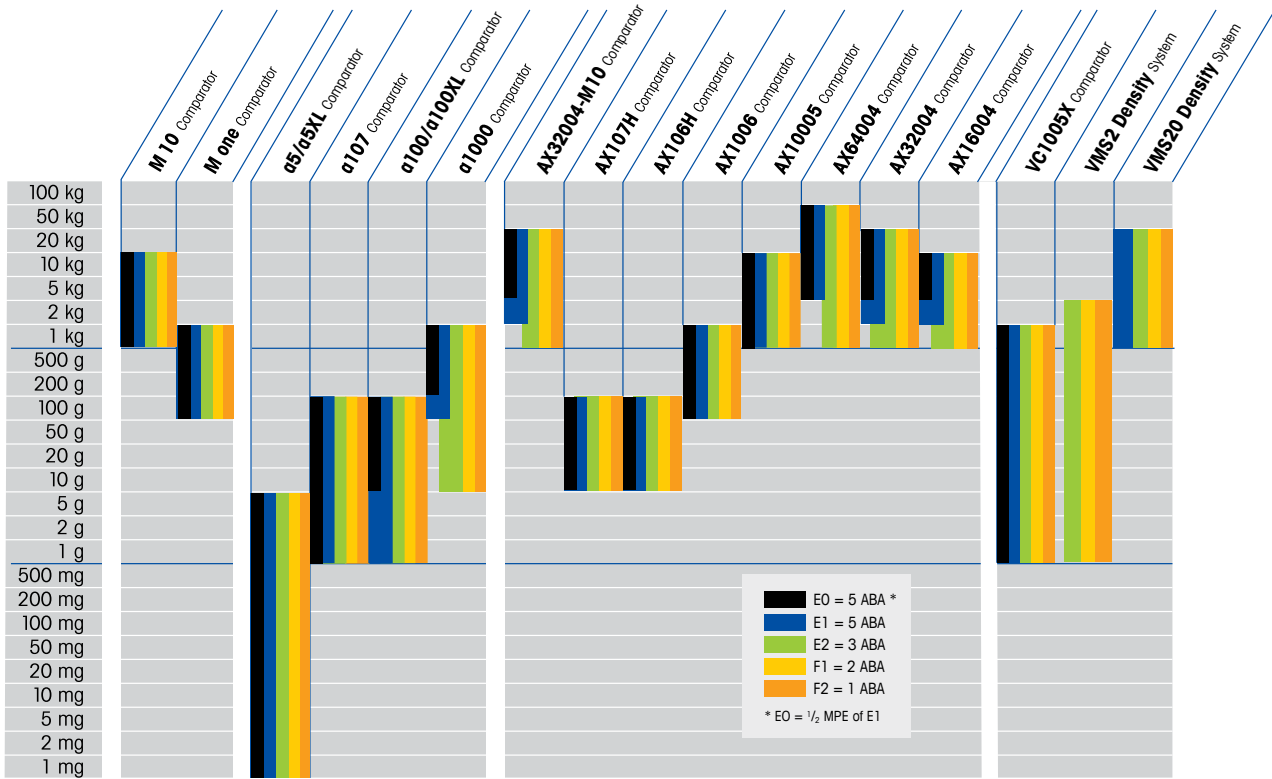
For all models, the weighing ranges are calculated for zero meter altitude based on the complete uncertainty analysis ensuring realistic weighing ranges.

Tolerance Limits – The maximum permissible errors on verification for conventional masses are:

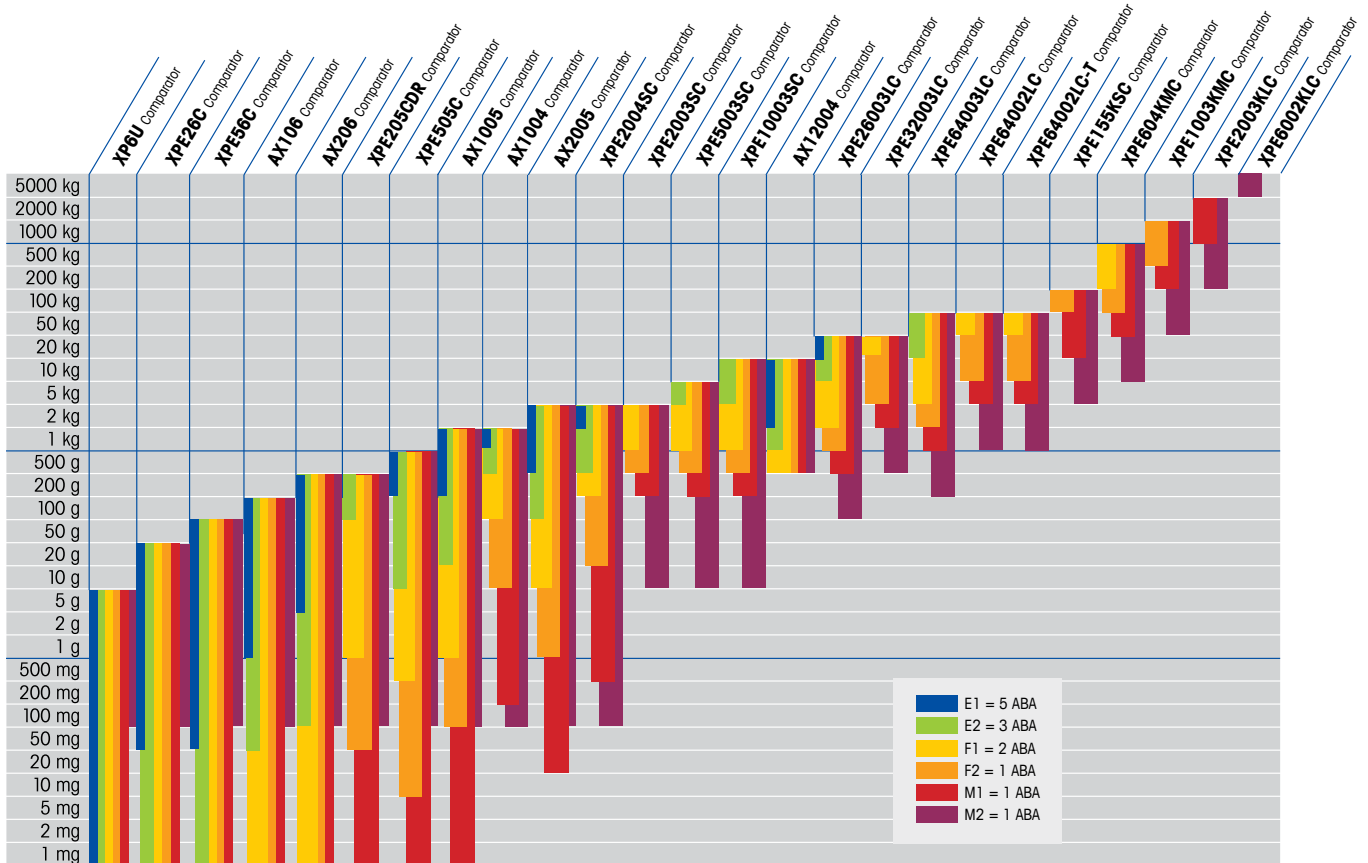
Weight	E1 ± mg	E2 ± mg	F1 ± mg	F2 ± mg	M1 ± mg	M2 ± mg	M3 ± mg
1 mg	0.003	0.006	0.02	0.06	0.2		
2 mg	0.003	0.006	0.02	0.06	0.2		
5 mg	0.003	0.006	0.02	0.06	0.2		
10 mg	0.003	0.008	0.025	0.08	0.5		
20 mg	0.003	0.01	0.03	0.1	0.3		
50 mg	0.004	0.012	0.04	0.12	0.4		
100 mg	0.005	0.016	0.05	0.16	0.5	1.6	
200 mg	0.006	0.02	0.06	0.2	0.6	2	
500 mg	0.008	0.025	0.08	0.25	0.8	2.5	
1 g	0.01	0.03	0.1	0.3	1	3	10
2 g	0.012	0.04	0.12	0.4	1.2	4	12
5 g	0.016	0.05	0.16	0.5	1.6	5	16
10 g	0.02	0.06	0.2	0.6	2	6	20
20 g	0.025	0.08	0.25	0.8	2.5	8	25
50 g	0.03	0.10	0.3	1	3	10	30
100 g	0.05	0.16	0.5	1.6	5	16	50
200 g	0.1	0.3	1	3	10	30	100
500 g	0.25	0.8	2.5	8	25	80	250
1 kg	0.5	1.6	5	16	50	160	500
2 kg	1	3	10	30	100	300	1000
5 kg	2.5	8	25	80	250	800	2500
10 kg	5	16	50	160	500	1600	5000
20 kg	10	30	100	300	1000	3000	10000
50 kg	25	80	250	800	2500	8000	25000
100 kg		160	500	1600	5000	16000	50000
200 kg		300	1000	3000	10000	30000	100000
500 kg		800	2500	8000	25000	80000	250000
1000 kg		1600	5000	16000	50000	160000	500000
2000 kg			10000	30000	100000	300000	1000000
5000 kg			25000	80000	250000	800000	2500000

Comparator Application Ranges

The illustrations below show the calculated weighing ranges for OIML weights according to OIML R111 at zero meter altitude. To select the right comparator just take the OIML Class of your test weights and the weighing ranges you wish to calibrate and look them up in the tables below. Laboratories at altitudes higher than zero meter altitude must consult a METTLER TOLEDO specialist for professional evaluation.



Vacuum, Robotic, Automated, and Volume Comparators



Manual Comparators



	M_one Comparator	M_10 Comparator	a5 Comparator a5XL	a107 Comparator	a100 Comparator a100XL	a1000 Comparator
Article No.	On request	On request	11107540 11147560	11107547	11107541 11147660	11107542
OIML Calibration Range E0	100 g - 1 kg	1 kg - 10 kg	1 mg - 5 g	1 g - 100 g	10 g - 100 g	200 g - 1 kg
OIML Calibration Range E1	100 g - 1 kg	1 kg - 10 kg	1 mg - 5 g	1 g - 100 g	1 g - 100 g	100 g - 1 kg
OIML Calibration Range E2	100 g - 1 kg	1 kg - 10 kg	1 mg - 5 g	1 g - 100 g	1 g - 100 g	10 g - 1 kg
OIML Calibration Range F1	100 g - 1 kg	1 kg - 10 kg	1 mg - 5 g	1 g - 100 g	1 g - 100 g	10 g - 1 kg
OIML Calibration Range F2	100 g - 1 kg	1 kg - 10 kg	1 mg - 5 g	1 g - 100 g	1 g - 100 g	10 g - 1 kg
Maximum load	1001.5 g	10011 g	6.1g	111 g	111 g	1109 g
Readability	0.1 µg	1 µg	0.1 µg	0.1 µg	1 µg	10 µg
Repeatability at nominal load (5x ABA, measured at)	0.5 µg	8 µg	0-1 g: 0.15 µg 1-2 g: 0.25 µg 2-5 g: 0.4 µg	1 µg	1.6 µg	10 µg
Repeatability typical ABA	0.3 µg	4 µg	0-1 g: 0.05 µg 1-2 g: 0.25 µg 2-5 g: 0.35 µg	0.9 µg	1.3 µg	5 µg
Electrical weighing range	1.5 g	11 g	0..6.1 g	0...11 g	0...11 g	0...109 g
Dial weights	External	External	-	50, 30, 10, 10 g	50, 30, 10, 10 g	500, 300, 100, 100 g
Linearity (electrical weighing range)	2 µg	±8 µg	±4 µg	±8 µg	±8 µg	±12 µg
Eccentric load deviation (at test load)	0.0 ng (1 g)	0.0 ng (10 g)	0.0 ng (5 g)	0.0 µg (10 g)	0.0 µg (10 g)	0.0 µg (100 g)
Settling time	30 s	30 s	20 s	30 s	20 s	20 s
Adjustment built-in	Motorized	Motorized	Motorized	Motorized	Motorized	Motorized
Adjustment with external weight	1 g	10 g	5 g	10 g	10 g	100 g
Standard Equipment						
Weight handler	Turntable, 4 or 6 positions	Turntable, 4 positions	3-axis robot	3-axis robot	3-axis robot	3-axis robot
Weight magazin	-	-	36 positions 100 positions	30 positions	30 positions 56 positions	18 positions
Software and controller	Windows®, standard	Windows®, standard	Windows®, standard	Windows®, standard	Windows®, standard	Windows®, standard
Vacuum chamber	Round bell jar	Round bell jar	-	-	-	-
Draft shield	-	-	Motorized	Motorized	Motorized	Motorized
Self centering pan	Integrated	Integrated	-	-	-	-
Weighing pan	Hanging pan	Hanging pan	Fork-shaped	Fork-shaped	Fork-shaped	Fork-shaped
SmartScreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
SmartSens	Standard	Standard	Standard	Standard	Standard	Standard
LevelControl	-	-	-	-	-	-
Separate display	Standard	Standard	Standard	Standard	Standard	Standard
Admissible Ambient Conditions						
Temperature (°C)	17 - 27	17 - 27	17 - 27	17 - 27	17 - 27	17 - 27
Max. temperature change (°C /12h)	0.1	0.1	0.5	0.5	0.5	0.5
Relative humidity (%)	45 - 60	45 - 60	45 - 60	45 - 60	45 - 60	45 - 60
Dimensions						
Comparator (WxDxH, mm)	4-Pl.: 274 x 409 x 620 6-Pl.: 344 x 440 x 620	315 x 720 x 850	1430 x 890 x 1730 1680 x 320 x 1855	1430 x 890 x 1730	1430 x 890 x 1730 1680 x 320 x 1855	1430 x 890 x 1730
Display unit (WxDxH, mm)	226x370x155	226 x 370 x 155	224 x 366 x 94	224 x 366 x 94	224 x 366 x 94	224 x 366 x 94
Comparator weight (kg)	300	350	290	290	290	290
Object diameter (D, mm)	Cylindrical: 22 - 90 Spherical: 40 - 100	Cylindrical: 18 - 105 Spherical: 18 - 110	Cylindrical: 4 - 14 Wire weight: 5.5 - 18 Sheet weight: 4 - 14	6 - 26	6 - 26	10 - 60
Object height (H, mm)	100	195	Cylindrical: 16 Wire weight: 6	50	50	85
Control unit for weight handler (WxDxH, mm)	202 x 197 x 92	202 x 197 x 92	-	-	-	-
Vacuum chamber (WxDxH, mm)	684 x 884 x 930	684 x 884 x 930	-	-	-	-
Rack for control & display unit	Optional	Optional	-	-	-	-



AX32004-M10 Comparator	AX107H Comparator	AX106H Comparator	AX1006 Comparator	AX10005 Comparator	AX16004 Comparator	AX32004 Comparator	AX64004 Comparator
11116962	11115765	11115755	11115725	11115785	11115815	11115845	11115875
5 kg - 20 kg	10 g - 100 g	10 g - 100 g	100 g - 1 kg	1 kg - 10 kg	5 kg - 10 kg	5 kg - 20 kg	5 kg - 50 kg
2 kg - 20 kg	10 g - 100 g	10 g - 100 g	100 g - 1 kg	1 kg - 10 kg	2 kg - 10 kg	2 kg - 20 kg	5 kg - 50 kg
1 kg - 20 kg	10 g - 100 g	10 g - 100 g	100 g - 1 kg	1 kg - 10 kg	1 kg - 10 kg	1 kg - 20 kg	1 kg - 50 kg
1 kg - 20 kg	10 g - 100 g	10 g - 100 g	100 g - 1 kg	1 kg - 10 kg	1 kg - 10 kg	1 kg - 20 kg	1 kg - 50 kg
1 kg - 20 kg	10 g - 100 g	10 g - 100 g	100 g - 1 kg	1 kg - 10 kg	1 kg - 10 kg	1 kg - 20 kg	1 kg - 50 kg
21260 g	111 g	111 g	1011 g	10011 g	16260 g	32260 g	64260 g
0.1 mg	0.1 µg	1 µg	1 µg	10 µg	0.1 mg	0.1 mg	0.1 mg
0.2 mg	0.8 µg	1.5 µg	2 µg	20 µg	0.2 mg	0.2 mg	0.4 mg
0.1 mg	0.6 µg	1.2 µg	1.5 µg	15 µg	0.1 mg	0.1 mg	0.2 mg
0...260 g	0...11 g	0...11 g	0...11 g	0...11 g	0...260 g	0...260 g	0...260 g
0.25, 0.25, 0.25, 0.25, 0.5, 0.5, 2, 2, 2, 4, 4, kg	50, 30, 10, 10 g	50, 30, 10, 10 g	500, 300, 100, 100, 50, 30, 10, 10 g	5, 3, 1 kg	0.25, 0.25, 0.25, 0.25, 0.5, 0.5, 2, 2, 2, 4, 4 kg	0.25, 0.25, 0.25, 0.25, 0.5, 0.5, 2, 2, 2, 4, 4, 8, 8 kg	0.25, 0.25, 0.25, 0.25, 0.5, 0.5, 2, 2, 2, 8, 8, 8, 8, 8, 8 kg
±0.5 mg	±8 µg	±8 µg	±8 µg	±0.05 mg	±0.5 mg	±0.5 mg	±0.5 mg
0.0 mg (260 g)	0.0 ng (10 g)	0.0 µg (10 g)	0.0 µg (10 g)	0.0 µg (10 g)	0.0 mg (260 g)	0.0 mg (260 g)	0.0 mg (260 g)
20 s	10 s	10 s	10 s	15 s	25 s	25 s	25 s
Motorized	Motorized	Motorized	Motorized	Motorized	Motorized	Motorized	Motorized
200 g	10 g	10 g	10 g	10 g	200 g	200 g	200 g
3-axis robot	Turntable, 4 positions	Turntable, 4 positions	Turntable, 4 positions	Turntable, 4 positions	Turntable, 4 positions	Turntable, 4 positions	Turntable, 4 positions
10 positions	-	-	-	-	-	-	-
Windows®, standard	Windows®, standard	Windows®, standard	Windows®, standard	Windows®, standard	Windows®, standard	Windows®, standard	Windows®, standard
-	-	-	-	-	-	-	-
Standard	Motorized	Motorized	Motorized	Standard	Standard	Standard	Standard
Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated	Integrated
LevelMatic	Hanging pan	Hanging pan	Hanging pan	Hanging pan	LevelMatic	LevelMatic	LevelMatic
Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
-	-	-	-	-	-	-	-
Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
17 - 27	17 - 27	17 - 27	17 - 27	17 - 27	17 - 27	17 - 27	17 - 27
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
45 - 60	45 - 60	45 - 60	45 - 60	45 - 60	45 - 60	45 - 60	45 - 60
2700 x 1400 x 2158	346 x 514 x 432	346 x 514 x 432	346 x 514 x 432	315 x 720 x 850	1200 x 1200 x 1500	1200 x 1200 x 1500	1200 x 1200 x 1500
224 x 366 x 94	226 x 370 x 155	226 x 370 x 155	226 x 370 x 155	226 x 370 x 155	224 x 366 x 94	224 x 366 x 94	224 x 366 x 94
480	23	23	25	85	290	290	290
Cylindrical: 48 - 200 Block weights: 234x200	8 - 30	8 - 30	12 - 60	16 - 110	40 - 340	40 - 340	40 - 340
235	70	70	95	200	350	350	350
-	226 x 370 x 155	226 x 370 x 155	226 x 370 x 155	226 x 370 x 155	-	-	-
-	-	-	-	-	-	-	-
Standard	-	-	-	-	Standard	Standard	Standard

Important

The stated specifications and technical data apply only under good ambient conditions. Disruptive factors at the place of installation such as strong drafts (especially from air conditioning equipment), excessive vibrations, physical effects of the items being weighed (e.g. magnetic fields or electrostatic charges), or ambient conditions outside the allowable tolerances, may have adverse effects on the specifications.



	XP6U Comparator	XPE26C Comparator	XPE56C Comparator	AX106 Comparator	AX206 Comparator	XPE205CDR / XPE505C Comparator
Article No.	11122400	30137966	30137970	11115635	11115935	30137974 / 30137978
OIML Calibration Range E1	1 mg - 5 g	50 mg - 20 g	50 mg - 50 g	1 g - 100 g	5 g - 200 g	- / 200 g - 500 g
OIML Calibration Range E2	1 mg - 5 g	1 mg - 20 g	1 mg - 50 g	50 mg - 100 g	100 mg - 200 g	100 g - 200 g / 10 g - 500 g
OIML Calibration Range F1	1 mg - 5 g	1 mg - 20 g	1 mg - 50 g	1 mg - 100 g	1 mg - 200 g	1 g - 200 g / 500 mg - 500 g
OIML Calibration Range F2	1 mg - 5 g	1 mg - 20 g	1 mg - 50 g	1 mg - 100 g	1 mg - 200 g	50 mg - 200 g / 10 mg - 500 g
OIML Calibration Range M1	1 mg - 5 g	1 mg - 20 g	1 mg - 50 g	1 mg - 100 g	1 mg - 200 g	1 mg - 200 g / 1 mg - 500 g
OIML Calibration Range M2	100 mg - 5 g	100 mg - 20 g	100 mg - 50 g	100 mg - 100 g	100 mg - 200 g	100 mg - 500 g / 100 mg - 500 g
Maximum load	6.1 g	22 g	52 g	111 g	211 g	220 g / 520 g
Readability	0.1 µg	1 µg	1 µg	1 µg	1 µg	0.01; 0.1 mg / 0.01 mg
Repeatability absolute	0.35 µg	1.5 µg	4.5 µg			0.06 mg
Repeatability at nominal load (5x ABA, measured at)	0.35 µg (5 g)	1.5 µg (20 g)	3 µg (50 g)	3 µg (100 g)	4 µg (200 g)	0.05 mg (200 g) / 0.035 mg (500g)
Repeatability at low load (5x ABA, measured at)	0.2 µg (0.2 g)	0.7 µg (1g)	0.7 µg (1 g)	3 µg (5 g)	4 µg (10 g)	0.015 mg (10 g)/0.01 mg (20 g)
Repeatability typical ABA	0.15µg + 1.7x10 ⁻⁰⁸ • Rgr	0.6 µg + 3x10 ⁻⁸ • Rgr	0.6 µg + 4x10 ⁻⁸ • Rgr	2 µg (100 g)	2.5 µg (200 g)	0.007 mg + 5x10 ⁻⁰⁸ • Rgr 0.08 mg + 4.x10 ⁻⁸ • Rgr
Electrical weighing range	0...6.1 g	0...22 g	0...52 g	0...11 g	0...11 g	220g / 520 g
Dial weights	-	-	-	50, 30, 10, 10 g;	50, 30, 10, 10 g; 100 g disc weight	-
Linearity (electrical weighing range)	4 µg (6 g)	±0.006 mg	±0.02 mg	±8 µg	±8 µg	±0.2 mg
Eccentric load deviation	2 µg (2 g)	0.00 mg (20 g)	0.00 mg (50 g)	0.0 µg (10 g)	0.0 µg (10 g)	0.2 mg (200 g / 500g)
Settling time	≤ 15 s	3.5 s	3.5 s	5 s	5 s	5 s
Adjustment built-in	ProFACT	ProFACT	ProFACT	ProFACT	ProFACT	ProFACT
Adjustment with external weight	1...6 g	5...20 g	10...50 g	10 g	10 g	100...500 g
Standard Equipment						
Mass calibration software	MC Link	MC Link	MC Link	MC Link	MC Link	MC Link
Draft shield	Motorized	2 x motorized	2 x motorized	Motorized	Motorized	Motorized
Self centering pan	-	Hanging pan	Hanging pan	Hanging pan	Hanging pan	-
Below the balance weighing	Standard	Standard	Standard	Standard	Standard	Standard
Weighing pan	Round pan & hook	Hanging & grid pan	Hanging & grid pan	Hanging	Hanging	Grid Pan
SmartScreen	Color touchscreen	Color touchscreen	Color touchscreen	Touchscreen	Touchscreen	Color touchscreen
SmartSens	Standard	Standard	Standard	Standard	Standard	Standard
LevelControl	-	Standard	Standard	-	-	Standard
Separate display	Standard	Standard	Standard	Standard	Standard	Standard
Admissible Ambient Conditions						
Temperature (°C)	10 - 30	10 - 30	10 - 30	10 - 30	10 - 30	10 - 30
Max. temperature change (°C / 12h)	0.5	0.5	0.5	0.5	0.5	0.5
Relative humidity (%)	40 - 70	40 - 70	40 - 70	40 - 70	40 - 70	40 - 70
Dimensions						
Comparator (WxDxH, mm)	128 x 287 x 113	263 x 482 x 322	263 x 482 x 322	241 x 353 x 291	241 x 353 x 291	263 x 482 x 322
Display unit (WxDxH, mm)	195 x 313 x 80	194 x 129 x 58	194 x 129 x 58	224 x 366 x 94	224 x 366 x 94	194 x 129 x 58
Weighing pan (mm)	∅ 14 Hook / 16	∅ 35 / 40 x 40	∅ 35 / 40 x 40	∅ 60 (45)	∅ 60 (45)	78 x 73
Comparator weight (kg)	7.5	11.5	11.5	13.5	13.5	10.0
Object diameter (D, mm)	0...9 / 13	0...35	0...35	0...45	0...45	0...73
Object height (H, mm)	0...26 / 50	0...72 (235)	0...72 (235)	0...85 (120)	0...85 (120)	235

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AX1004 / AX1005 Comparator	AX2005 Comparator	XPE2003SC Comparator	XPE2004SC Comparator XS2004SX	XPE5003SC Comparator	XPE10003SC Comparator	AX12004 Comparator
11115695 / 11115665	11115975	30138750	30138751 30004707	30138752	30138754	11137811
1 kg / 200 g - 1 kg	500 g - 2 kg	-	2 kg	-	10 kg	2 kg - 10 kg
500 g - 1 kg / 20 g - 1 kg	100 g - 2 kg	-	500 g - 2 kg	5 kg	5 kg - 10 kg	1 kg - 10 kg
100 g - 1 kg / 1 g - 1 kg	10 g - 2 kg	1 kg - 2 kg	200 g - 2 kg	1 kg - 5 kg	1 kg - 10 kg	500 g - 10 kg
10 g - 1 kg / 100 mg - 1 kg	1 g - 2 kg	500 g - 2 kg	20 g - 2 kg	500 g - 5 kg	500 g - 10 kg	500 g - 10 kg
200 mg - 1 kg / 1 mg - 1 kg	20 mg - 2 kg	200 g - 2 kg	500 mg - 2 kg	200 g - 5 kg	200 g - 10 kg	500 g - 10 kg
100 mg - 1 kg / 100 mg - 1 kg	100 mg - 2 kg	10 g - 2 kg	100 mg - 2 kg	10 g - 5 kg	10 g - 10 kg	500 g - 10 kg
1109 g	2109 g (min. 998 g)	2300 g	2300 g	5100 g	10100 g	12111 g
0.1 / 0.01 mg	0.01 mg	1 mg	0.1 mg	1 mg	1 mg	0.1 mg
		2 mg	1 mg	3.5 mg	3.5 mg	
0.07 / 0.02 mg (1kg)	0.04 mg (2kg)	1 mg (2 kg)	0.25 mg (2 kg)	0.8 mg (5 kg)	1 mg (10 kg)	0.25 mg (10 kg)
0.07 / 0.02 mg (50g)	0.04 mg (100g)	0.8 mg (100 g)	0.1 mg (100 g)	0.7 mg (200 g)	0.8 mg (500 g)	0.25 mg (1 kg)
0.05 / 0.015 mg (1kg)	0.025 mg (2kg)	0.5mg + 1x10 ⁻⁷ • Rgr	0.07mg + 5x10 ⁻⁸ • Rgr	0.55mg + 2x10 ⁻⁸ • Rgr	0.6mg + 2x10 ⁻⁸ • Rgr	0.15 mg (10 kg)
0...109 g	0...109 g	0...2300 g	0...2300 g	0...5100 g	0...10100 g	0...111 g
500, 300, 100, 100 g	500, 300, 100, 100 g	-	-	-	-	5, 3, 2, 1, 1 kg
±0.15/0.12 mg	±0.12 mg	±5 mg	±1 mg	±3 mg	±7 mg	±0.6 mg
0.0 µg (100 g)	0.0 µg (100 g)	4.0 mg (1 kg)	0.0 mg (1 kg)	0.0 mg (2 kg)	0.0 mg (5 kg)	0.0 mg (10 kg)
5 s	5 s	3.5 s	3.5 s	3.5 s	3.5 s	10 s
ProFACT	ProFACT	proFACT	proFACT	proFACT	proFACT	Built in 100g E2
100 g	100 g	1...2 kg	1...2 kg	1...5 kg	2...10 kg	100 g
MC Link	MC Link	MC Link	MC Link	MC Link	MC Link	MC Link
Motorized	Motorized	Standard	Standard	Standard	Standard	Standard
Hanging pan	Hanging pan	Optional	LevelMatic	LevelMatic	LevelMatic	Hanging pan
Standard	Standard	Standard	Standard	Standard	Standard	-
Hanging	Hanging	Square	LevelMatic	LevelMatic	LevelMatic	Hanging
Touchscreen	Touchscreen	Color touchscreen	Color touchscreen	Color touchscreen	Color touchscreen	Touchscreen
Standard	Standard	Standard	Standard	Standard	Standard	Standard
-	-	Standard	Standard	Standard	Standard	-
Standard	Standard	Standard	Standard	Standard	Standard	Standard
10 - 30	10 - 30	10 - 30	10 - 30	10 - 30	10 - 30	10 - 30
0.5	0.5	0.5	0.5	0.5	0.5	0.5
40 - 70	40 - 70	40 - 70	40 - 70	40 - 70	40 - 70	40 - 70
241 x 353 x 291	241 x 353 x 291	214 x 260 x 363	214 x 260 x 363	214 x 260 x 363	385 x 478 x 614	837 x 614 x 952
224 x 366 x 94	224 x 366 x 94	194 x 129 x 58	194 x 129 x 58	194 x 129 x 58	194 x 129 x 58	224 x 366 x 94
∅ 100	∅ 100	125x125	∅ 130	∅ 130	∅ 130	∅ 220
13.5	13.5	8.3	8.3	8.3	17.2	62.5
0...80	0...80	0...125	0...130	0...130	0...130	34...220
0...135	0...135	0...248	0...228	0...228	0...335	0...230

Important

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	XPE26003LC Comparator XS26003LX	XPE64003LC Comparator XS64003LX	XPE32003LC Comparator	XPE64002LC Comparator
Article No.	30138755 30004710	30138758 30004720	30138756	30138757
OIML Calibration Range E1	20 kg	–	–	–
OIML Calibration Range E2	10 kg - 20 kg	20 kg - 50 kg	–	–
OIML Calibration Range F1	2 kg - 20 kg	5 kg - 50 kg	20 kg	50 kg
OIML Calibration Range F2	1 kg - 20 kg	2 kg - 50 kg	5 kg - 20 kg	10 kg - 50 kg
OIML Calibration Range M1	500 g - 20 kg	1 kg - 50 kg	2 kg - 20 kg	5 kg - 50 kg
OIML Calibration Range M2	100 g - 20 kg	200 g - 50 kg	500 g - 20 kg	1 kg - 50 kg
Maximum load	26.1 kg	64.1 kg	32.1 kg	64.1 kg
Readability	1 mg	5 mg	5 mg	10 mg
Repeatability absolute	6 mg	13 mg	15 mg	35 mg
Repeatability at nominal load (5x ABA, measured at)	3 mg (25 kg)	8 mg (50 kg)	10 mg (30 kg)	25 mg (50 kg)
Repeatability at low load (5x ABA, measured at)	2 mg (1kg)	4 mg (5 kg)	5 mg (2 kg)	10 mg (5 kg)
Repeatability typical ABA	1.5mg + 5x10 ⁻⁶ •Rgr	3.5 mg + 7x10 ⁻⁶ •Rgr	4 mg + 2x10 ⁻⁷ •Rgr	8 mg + 3x10 ⁻⁷ •Rgr
Electrical weighing range	0...26100 g	0...64100 g	0...32100 g	0...64100 g
Linearity (electrical weighing range)	±25 mg	±50 mg	±40 mg	±50 mg
Eccentric load deviation (at test load)	0.0 g (10 kg)	0.0 g (25 kg)	0.25 g (10 kg)	0.4 g (25 kg)
Settling time	8 ...12 s	8 ...12 s	8 ...12 s	8 ...12 s
Adjustment built-in	proFACT	proFACT	proFACT	proFACT
Adjustment with external weight	5...25 kg	10...60 kg	5...30 kg	10...60 kg
Standard Equipment				
Mass calibration software	MC Link	MC Link	MC Link	MC Link
Draft shield	Standard	Standard	Optional	Optional
Self centering pan	Integrated	Integrated	–	–
Below the balance weighing	Standard	Standard	Standard	Standard
Weighing pan	LevelMatic	LevelMatic	Square	Square
SmartScreen	Standard	Standard	Standard	Standard
SmartSens	Standard	Standard	Standard	Standard
LevelControl	Standard	Standard	Standard	Standard
Separate display	Standard	Standard	Standard	Standard
Admissible Ambient Conditions				
Temperature (°C)	10 - 30	10 - 30	10 - 30	10 - 30
Max. temperature change (°C/12h)	0.5	0.5	0.5	0.5
Relative humidity (%)	40 - 70	40 - 70	40 - 70	40 - 70
Dimensions				
Comparator (WxDxH, mm)	360 x 280 x 185	360 x 280 x 185	360 x 280 x 130	360 x 280 x 130
Display unit (WxDxH, mm)	194 x 129 x 58	194 x 129 x 58	194 x 129 x 58	194 x 129 x 58
Weighing pan (mm)	∅ 220	∅ 220	360 x 280	360 x 280
Comparator weight (kg)	15.7	15.7	10.7	10.7
Object diameter (D, mm)	0...220	0...220	0...280	0...280
Object height (H, mm)	0...395	0...395	–	–

* Without LevelMatic



XPE64002LC-T Comparator	XPE155KSC Comparator XS155KSX	XPE604KMC Comparator XS604KMX	XPE1003KMC Comparator XS1003KMX	XPE2003KLC Comparator XS2003KLX	XPE6002KLC Comparator XS6002KLX
30138759	30210661 22026938	30210662 22026939	30210664 22026941	30210665 22026942	30210666 22026943
-	-	-	-	-	-
50 kg	-	200 - 500 kg / - kg	-	-	-
10 kg - 50 kg	50 / 100 kg - 100 kg	100 / 500 kg - 500 kg	500 / 1000 kg - 1000 kg	-	-
5 kg - 50 kg	20 / 50 kg - 100 kg	50 kg / 200 kg - 500 kg	200 / 500 kg - 1000 kg	1000 / 1000 kg - 2000 kg	-
1 kg - 50 kg	5 / 10 kg - 100 kg	10 / 50 kg - 500 kg	50 / 100 kg - 1000 kg	200 / 500 kg - 2000 kg	5000 kg
64.1 kg	150 kg	600 kg	1100 kg	2500 kg	5400 kg
10 mg	0.05 g	0.1 g	0.5 g	1 g	10 g
40 mg	0.15 g	0.3 g	2 g	10 g	100 g
30 mg (50 kg)	0.12 g (100 kg)	0.23 g (500 kg)	1.5 g (1000 kg)	7 g (2000 kg)	70 g (5000 kg)
15 mg (5 kg)	0.09 g (5 kg)	0.15 g (20 kg)	1 g (50 kg)	4 g (100 kg)	50 g (500 kg)
12 mg + 3x10 ⁻⁷ •Rgr	0.07 g + 3.2x10 ⁻⁰⁷ •Rgr	0.11 g + 1.5x10 ⁻⁰⁷ •Rgr	0.6 g + 4.2x10 ⁻⁰⁷ •Rgr	3 g + 1.3x10 ⁻⁰⁶ •Rgr	40 g + 4.2x10 ⁻⁰⁶ •Rgr
0...64100 g	0...150 kg	0...600 kg	0...1100 kg	0...2500 kg	0...5400 kg
±50 mg	2 g	10 g	20 g	100 g	300 g
0.5 g (25 kg)	5 g (50 kg)*	40 g (200 kg)*	40 g (200 kg)*	120 g (1000 kg) *	240 g (2000 kg)*
8 ...12 s	5 s	5 s	5 s	5 s	5 s
proFACT	proFACT	proFACT	proFACT	proFACT	proFACT
10...60 kg	50...150 kg	200...600 kg	200...1000 kg	500...2500 kg	1000...5000 kg
MC Link	MC Link	MC Link	MC Link	MC Link	MC Link
-	Optional	Optional	Optional	Optional	Optional
-	Optional	Optional	Optional	Optional	Optional
-	-	-	-	-	-
Round	Square	Square	Square	Square	Square
Standard	Standard	Standard	Standard	Standard	Standard
Standard	Standard	Standard	Standard	Standard	Standard
Standard	-	-	-	-	-
Integrated	Standard	Standard	Standard	Standard	Standard
10 - 30	10 - 30	10 - 30	10 - 30	10 - 30	10 - 30
0.5	1	1	1	1	1
40 - 70	40 - 70	40 - 70	40 - 70	40 - 70	40 - 70
845 x 445 x 295	800 x 600 x 130	1000 x 800 x 115	1000 x 800 x 115	1500 x 1252 x 182	1500 x 1252 x 182
194 x 129 x 58	194 x 129 x 58	194 x 129 x 58	194 x 129 x 58	194 x 129 x 58	194 x 129 x 58
∅ 220	800 x 600	1000 x 800	1000 x 800	1500 x 1250	1500 x 1250
22	40	91	91	353	353
0...220	0...600	0...800	0...800	0...1250	0...1250
-	-	-	-	-	-

* Without LevelMatic

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VC1005X

VMS2

VMS20

Susceptometer S50-K

Article No.	11115965	30047443	30047444	11116880
OIML Calibration Range E0	1 g - 1 kg	–	–	–
OIML Calibration Range E1	1 g - 1 kg	–	1 kg - 20 kg	1 g - 50 kg
OIML Calibration Range E2	1 g - 1 kg	1 g - 2 kg	1 kg - 20 kg	1 g - 50 kg
OIML Calibration Range F1	1 g - 1 kg	1 g - 2 kg	1 kg - 20 kg	1 g - 50 kg
OIML Calibration Range F2	1 g - 1 kg	1 g - 2 kg	1 kg - 20 kg	1 g - 50 kg
OIML Calibration Range M1	–	–	–	1 g - 50 kg
Recommended comparator	built-in	XPE2004SC	XPE26003LC	XP6U or XP6
Weight handler	Turntable, 4 positions	Manual, 1 position	Manual, 2 positions	–
Readability	10 µg	0.1 mg	1 mg	0.1µg or 1 µg
Electrical range	109 g	2300 g	26100 g	6.1 g
Dial weights	500, 300, 100, 100 g	–	–	–
Disc weights (support weight <100 g)	4 pieces	–	–	–
Measuring time	15 s	15 s	15 s	15 s
External adjustment	100 g	1...2 kg	10...25 kg	5 g
Object diameter (D, mm)	12...94	6...70	45...140	≤ 260
Object height (H, mm)	1...94	5...130	70...270	≤ 500
Sphere diameter (D, mm)	12...94	–	–	–
Susceptometer Specific				
Dipole moment of magnets	–	–	–	≤0.1Am ²
Distance platform / center of magnet Z ₀	–	–	–	18.8...60.0
Magnetizing field strength (max.)	–	–	–	2000, 800 A/m
Res. magnetization for 1 digit µT (E1)	–	–	–	≥ 0.001 / 0.01
Res. susceptibility x for 1 digit (E1)	–	–	–	≥ 0.000001 / 0.00001
Operation				
Comparator	Standard, built-in	Required option	Required option	Required option
Operating software – user guided	Standard	Standard, Windows® PC	Standard, Windows® PC	Required option
Controller – storage of processes	Standard, Windows® PC	Optional	Optional	Required option
SmartGeo – weight geometries database	–	–	–	With optional software
Touchscreen with SmartSens	Standard	With XPE comparator	With XPE comparator	With XPE comparator
Precision thermometer	Standard	Standard	Standard	–
Fluid	Standard	–	–	–
Suceptometer hardware bridge	–	–	–	Standard
Low permeability / susceptibility reference	–	–	–	Required option
Suceptometer magnet calibration set	–	–	–	Optional
Admissible Ambient Conditions				
Temperature (°C)	17 - 27	17 - 27	17 - 27	17 - 27
Max. temperature change (°C/12 h)	0.5	0.5	0.5	0.5
Relative Humidity (%)	40 - 70	40 - 70	40 - 70	40 - 70
Dimensions				
Equipment (W x D x H, mm)	810 x 760 x 1500	380 x 810 x 890	765 x 1000 x 1840	270 x 360 x 160
Display unit (W x D x H, mm)	224 x 366 x 94	194 x 129 x 58	194 x 129 x 58	–
Equipment net weight (kg)	94	44	215	5

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Climate Stations



Klimet A30



ClimaLog30

	Klimet A30		ClimaLog30	
Temperature				
Resolution	0.001	[°C]	0.1	[°C]
Range	15 .. 25	[°C]	-20 .. 50	[°C]
Accuracy	±0.05	[°C]	±0.3	[°C]
Relative humidity				
Resolution	0.01	[%]	±0.5	[%]
Range	20 .. 80	[%]	10 .. 95	[%]
Accuracy	±0.15	[%]	±2	[%]
Pressure				
Resolution	0.001	[hPa]	0.1	[hPa]
Range	600 .. 1060	[hPa]	300 .. 1300	[hPa]
Accuracy	±0.04	[hPa]	±0.5	[hPa]

Klimet A30 includes

- Air pressure sensor
- Dew point mirror system
- Air temperature sensor
- 4 temperature sensor inputs
- Data logging software including:
 - Air density calculation CIPM 81/91
 - Serial communication
 - Direct data link for specific METTLER TOLEDO mass comparator software
- Available as certified / non-certified system

ClimaLog30 includes

- Air pressure sensor
- Relative humidity sensor
- Air temperature sensor
- USB and LAN interface
- SmartGraph 3 software including:
 - Graphical and numerical representation of measured values
 - Export-ready data in csv format
 - Data-recording mode
- DKD calibration certificate

Optional for Klimet A30

- Pressure tight Klimet A30V system for special applications as vacuum (e.g. M_one)
- CO₂ content sensor calibrated
- Temperature sensor (cable length 2.5 m or 5.0 m)

Optional for ClimaLog30

- DataLog30 for 2 additional external temperature sensors (cable length 1.5 m)

Special Weight Sets

for AX1006 (Part No. 222404)

Nominal weight	Contents
100 g	•
200 g	••
–	

for AX10005 (Part No. 222420)

Nominal weight	Contents
1 kg	•
2 kg	••
5 kg	•

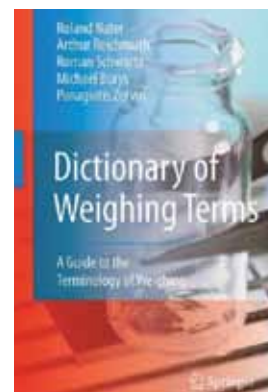


Special Weight Sets

Weight set for AX1006, for determination of the first weight decade 1 kg to 100 g, comprising 2x200 g and 1x100 g disk weights. Weight set for AX10005, for determination of the first weight decade 1 kg to 10 kg, comprising 1x5 kg, 2x2 kg and 1x1 kg cylindrical weights.

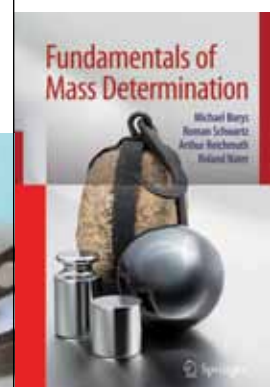
Cumulated Expertise

We are happy to make our users technical experience as well as ours available to you.



Dictionary of Weighing Terms

A Practical Guide to the Terminology of Weighing. (Part No. 11116539)



Fundamentals of Mass Determination

Compiled under the auspices of Prof. Dr. M. Kochsiek, Federal Institute of Physics and Technology PTB, Braunschweig and Berlin. (Part No. 30043868)

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