Comparator Balances

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Vacuum Technology

Robotic Solutions

Automated and Manual Operation

Solutions up to 5,400 kg

Innovative Solutions

For Lifetime Accuracy

METTLER TOLEDO

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Comparator Applications
High Performance for Every Weighing Task

In addition to traditional mass calibration, manual mass comparators can be used for everyday weighing applications in the same way as a standard balance. However, manual mass comparators are particularly suited to applications which have a low net sample weight combined with a heavy tare vessel or where exceptional repeatability is required. In such situations, a comparator balance eliminates the need to have two balances to meet the accuracy and capacity requirements of the application.

- Highest weighing performance with minimized corner load and eccentricity errors
- Efficient touchscreen operation with easy access to personal weighing methods
- Seamless processes with easy connectivity and data transfer

Mass Calibration

METTLER TOLEDO is the trusted partner for National Metrology Institutes, research center and countless calibration laboratories. Our mass comparators are one of the world's most accurate instruments for mass calibration.

One-Balance Formulation

With high capacity and high readability, mass comparator balances make it possible to use just one balance for many formulation applications. Small quantities can be weighed accurately into larger containers.

Heavy Tare, Small Sample

With a wide weighing range and low net sample weight, comparator balances excel in applications in which the tare and sample weights differ substantially. E.g. gas filling, determining non-volatile residue, and many more.

Flow Meter Calibration

Gravimetric calibration of a mass flow meter of any capacity.

Formulation

Formulations of any scale with demands for increased "safe weighing range" or smallest process uncertainties.

Specialty Gas Filling

Manufacturing of reference and specialty gas compositions.

Abrasion

Abrasion analysis of movable mechanical parts, determining mechanical stress or lubricant performance.

Volume / Density Determination

Analysis of density and volume of solid artefacts by the Archimedes principle.

Weight Calibration

Calibration of OIML and ASTM weights, ensuring the traceability of weights and balances.

Mass Determination

Determine the mass of artefacts for legal or scientific metrology.

Semiconductor Coating

Differential weighing to determine the amount of applied coating on semiconductors.

Filter Weighing

When extremely small differences in weight must be determined, our ultra-micro-comparators are the perfect solution. With a readability of 0.1 µg, they are perfect for weighing the very small quantities of particulate matter on filters.

Abrasion Weighing

With very high readability, our comparators are perfect for determining the level of abrasion on parts such as cog wheels, gear boxes, and levers among others.

Conserve Precious Materials

XPR comparators offer the lowest minimum weight values in their class enabling you to use the smallest quantities possible of your most valuable materials.

Vacuum Weighing Technology
For Best Conditions and Results

National Metrology Institutes achieve the lowest measurement uncertainty by measuring under vacuum or in constant pressure. The M_one and M_10 mass comparators establish such conditions for determining mass, including artefacts such as cylindrical weights and silicon spheres. Artefacts are maintained in a contamination-free environment, under vacuum or in inert gas, throughout the measurement process.

The M_one is a key worldwide reference instrument for the calibration and determination of mass at the highest accuracy, and also has a vital role in scientific work related to the redefinition of the kilogram.

M_10

M_one

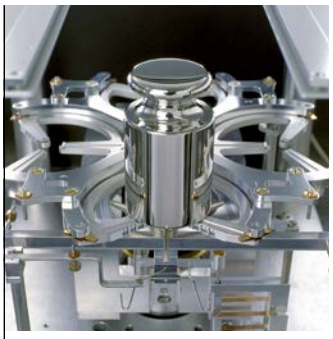
Model	**Max. Load**	**Readability**	**Weighing Ranges** (See theory on page 28 for further explanation)				
			RS*	E1	E2	F1	F2
M_one	1,001.5 g	0.1 µg	100 g–1 kg	100 g–1 kg	100 g–1 kg	100 g–1 kg	100 g–1 kg
M_10	10,011 g	1 µg	1 kg–10 kg	1 kg–10 kg	1 kg–10 kg	1 kg–10 kg	1 kg–10 kg

RS* = Reference Standard (⅓ uncertainty contribution of the E1 tolerance limit)

Measure 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, and density artefacts can be placed directly on the turntable for automated weighing.

Direct Easy Access
Thanks to ergonomic design, you have a clear view and easy access via the quick-loading door to place items directly on the 6-place turntable.

Vacuum Transfer
The Artefact Storage and Transport Vessel (ASTV) enables the transportation of artefacts to the M_one under a controlled atmosphere, preventing contamination from air, or other external sources.



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

Automated Comparators
For Unrivaled Accuracy

Achieve the ultimate in accuracy with AX automated weighing systems. With automated weight handlers and separate electronics, AX systems deliver extraordinary resolution and incomparable repeatability for mass determination of OIML E1 and Reference Mass Standards (RS). Windows® based software controls the 4-position weight handlers in a fully automated procedure, reducing handling effort and eliminating the risk of human error from the weighing process.

With up to 0.1 µg resolution and mass determination of weight pieces up to 64 kg, AX weighing systems meet highest accuracy requirements.

AX1007CP

AX106H, AX107H,
AX1006, AX10005

AX16004, AX32004, AX64004

Model	**Max. Load**	**Readability**	**Weighing Ranges** (See theory on page 28 for further explanation)				
			RS*	E1	E2	F1	F2
AX107H	111 g	0.1 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	10 g–100 g	10 g–100 g	10 g–100 g	10 g–100 g	10 g–100 g
AX1007CP	1,001.5 g	0.1 µg	100 g–1 kg	100 g–1 kg	100 g–1 kg	100 g–1 kg	100 g–1 kg
AX1006	1,011 g	1 µg	50 g–1 kg	50 g–1 kg	50 g–1 kg	50 g–1 kg	50 g–1 kg
AX10005	10,011 g	10 µg	1 kg–10 kg	1 kg–10 kg	1 kg–10 kg	1 kg–10 kg	1 kg–10 kg
AX16004	16,260 g	0.1 mg	5 kg–10 kg	2 kg–10 kg	1 kg–10 kg	1 kg–10 kg	1 kg–10 kg
AX32004	32,260 g	0.1 mg	5 kg–20 kg	2 kg–20 kg	1 kg–20 kg	1 kg–20 kg	1 kg–20 kg
AX64004	64,260 g	0.1 mg	5 kg–50 kg	5 kg–50 kg	1 kg–50 kg	1 kg–50 kg	1 kg–50 kg

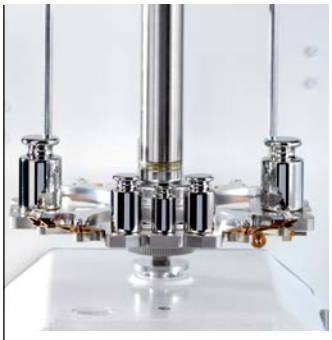
RS* = Reference Standard (⅕ uncertainty contribution of the E1 tolerance limit)

Unrivaled Accuracy

Thanks to METTLER TOLEDO's weighing and manufacturing expertise, AX automated comparators are being continuously developed to ensure you get peak measurement performance and reliability.

Continuous Weighing Ranges

The clever, continuous range technology of the 16, 32 and 64 kg mass comparators enable readability of 0.1 mg up to an impressive 64 kg. This provides an ideal solution for measuring non- metric weights, pressure discs for force measurements, gas-capsules or small bottles.



Direct Weight Dissemination

With the automated AX line, efficiency is increased by placing several weights on the turntable at each weighing position, enabling the calibration of decades from 1 kg – 64 kg by dissemination.

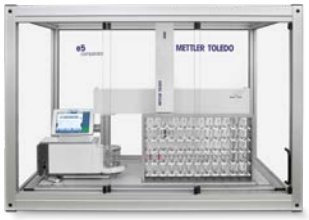
Secure Operation

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.

Robotic Mass Calibration
Increase Accuracy and Productivity

The flexible and efficient e_Line and a_Line robotic systems can be combined according to your specific requirements to create a flawless and high-throughput weight calibration process, suitable for one-to-one calibrations, or for weight disseminations from 0.05 mg up to 20 kg. The systems offer 24-hour operation capability by deploying magazines with up to 100 weight positions, maximizing time efficiency and productivity.

The Efficiency Pack software option, in conjunction with an environmental monitoring station, automatically processes all mass calibration results and compensates for the influences of air buoyancy.



e5/e100

a10XL/a107/a1006XL

AX32004-M10

Model	**Max. Load**	**Readability**	**Weighing Ranges** (See theory on page 28 for further explanation)				
			RS*	E1	E2	F1	F2
e5	6.1 g	0.1 µg	1 mg–5 g	1 mg–5 g	1 mg–5 g	1 mg–5 g	1 mg–5 g
e100	111 g	1 µg	1 g–100 g	1 g–100 g	1 g–100 g	1 g–100 g	1 g–100 g
a10XL	10.1 g	0.1 µg	1 mg–10 g	50 µg–10 g	50 µg–10 g	50 µg–10 g	50 µg–10 g
a107	111 g	0.1 µg	1 g–100 g	1 g–100 g	1 g–100 g	1 g–100 g	1 g–100 g
a1006XL	1,011 g	1 µg	10 g–1 kg	10 g–1 kg	10 g–1 kg	10 g–1 kg	10 g–1 kg
AX32004-M10	21,260 g	0.1 mg	5 kg–20 kg	2 kg–20 kg	1 kg–20 kg	1 kg–20 kg	1 kg–20 kg

RS* = Reference Standard (1/5 uncertainty contribution of the E1 tolerance limit)

Reduce Errors
Automated weight handling prevents errors caused by the mix-up of weights or eccentrical loading. Thanks to software control, reports are generated automatically, thus eliminating transcription errors.

Increase Throughput
Increase efficiency by combining up to 3 robotic systems that can carry up to 100 weights per magazine and calibrate weights from 50 µg to 20 kg simultaneously.

Simplified Dissemination
By combining automation with innovative weighing technologies, seamless traceability is delivered for decades from 0.05 µg up to 1 kg with the smallest achieveable uncertainties.

Save Time – Reduce Cost
Investing in automation enables labor-intensive processes to be completed much faster and with consistent quality. Technicians gain additional time to focus on other valuable tasks.

AX Manual Comparators
Highest Accuracy up to 12 kg

The AX comparator range enables you to achieve the highest level of accuracy in manual mass calibration up to 12 kg. Continuous weighing range technology provides a wide weighing range for calibrating standard or customized weights and artefacts. With state-of-the-art mechanics, a hanging weighing pan, full metal housing and separate electronics, AX comparators offer world-class performance.

AX106 and AX206

AX1005 and AX2005

AX1004

AX12004

Model	**Max. Load**	**Readability**	**Weighing Ranges** (See theory on page 28 for further explanation)				
			E1	E2	F1	F2	M1
AX106	111 g	1 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	5 g–200 g	100 mg–200 g	1 mg–200 g	1 mg–200 g	1 mg–200 g
AX1005	1,109 g	0.01 mg	200 g–1 kg	20 g–1 kg	1 g–1 kg	100 mg–1 kg	1 mg–1 kg
AX1004	1,109 g	0.1 mg	1 kg	500 g–1 kg	100 g–1 kg	10 g–1 kg	200 mg–1 kg
AX2005	2,109 g	0.01 mg	500 g–2 kg	100 g–2 kg	10 g–2 kg	1 g–2 kg	20 mg–2 kg
AX12004	12,111 g	0.1 mg	2 kg–10 kg	1 kg–10 kg	500 g–10 kg	500 g–10 kg	500 g–10 kg

Hanging Pan

Influences from eccentricity are efficiently eliminated. The large surface enables easy weight placement for dissemination.

Faster Results

The motorized integrated draft shield reduces environmental influences, improving stabilization and overall performance. Measurements are fast and efficient, and results are more reliable.

2-Position Manual Turntable

The unique weight-exchanging design of the AX12004 enables higher loads to be handled easily and safely. Environmental influences are minimized, providing efficient and accurate mass determination.

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 processes.

XPR Manual Comparators
Best Performance up to 64 kg

XPR full-range mass comparators offer convenient full weighing ranges coupled with short processing times to fulfill the highest demands for routine mass determination. The high performance MonoBloc™ weighing cell delivers up to 23 million points of resolution for highly precise results. The LevelMatic™ and hanging weighing pans eliminate eccentricity influences, guaranteeing outstanding performance.

In addition, thanks to MC Link software, your results are automatically documented securely.

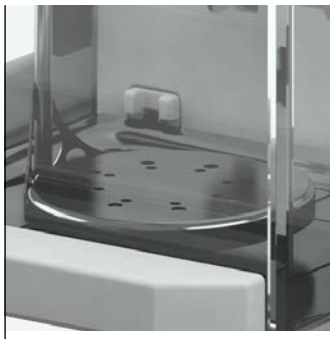
XPR6U

XPR26C and XPR56C

XPR2004SC and XPR5003SC

XPR26003LC and XPR64003LD5C

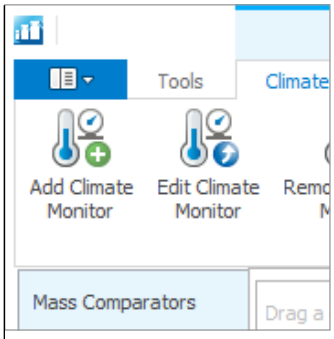
Model	**Max. Load**	**Readability**	**Weighing Ranges** (See theory on page 28 for further explanation)				
			E1	E2	F1	F2	M1
XPR6U	6.1 g	0.1 µg	1 mg – 5 g	1 mg – 5 g	1 mg – 5 g	1 mg – 5 g	1 mg – 5 g
XPR26C	22 g	1 µg	100 mg – 20 g	1 mg – 20 g	1 mg – 20 g	1 mg – 20 g	1 mg – 20 g
XPR56C	52 g	1 µg	100 mg – 50 g	1 mg – 50 g	1 mg – 50 g	1 mg – 50 g	1 mg – 50 g
XPR206CDR	220 g/81 g	10 µg/5 µg	100 g – 200 g	2 g – 200 g	50 mg – 200 g	1 mg – 200 g	1 mg – 200 g
XPE505C	520 g	10 µg	200 g – 500g	10 g – 500 g	500 mg – 500 g	10 mg – 500 g	1 mg – 500 g
XPR2004SC	2,300 g	0.1 mg	2 kg	500 g – 2 kg	200 g – 2 kg	20 g – 2 kg	500 mg – 2 kg
XPR2003SC	2,300 g	1 mg	–	–	1 kg – 2 kg	500 g – 2 kg	200 g – 2 kg
XPR5003SC	5,100 g	1 mg	–	5 kg	1 kg – 5 kg	500 g – 5 kg	200 g – 5 kg
XPR10003SC	10,100 g	1 mg	10 kg	5 kg – 10 kg	1 kg – 10 kg	500 g – 10 kg	200 g – 10 kg
XPR26003LC	26.1 kg	1 mg	20 kg	10 kg – 20 kg	2 kg – 20 kg	1 kg – 20 kg	500 g – 20 kg
XPR32003LD5C	32.1 kg	5 mg	–	–	20 kg	5 kg – 20 kg	2 kg – 20 kg
XPR64003LD5C	64.1 kg	5 mg	–	20 kg – 50 kg	5 kg – 50 kg	2 kg – 50 kg	1 kg – 50 kg
XPR64002LC	64.1 kg	10 mg	–	–	50 kg	10 kg – 50 kg	5 kg – 50 kg
XPR64002LC-T	64.1 kg	10 mg	–	–	50 kg	10 kg – 50 kg	5 kg – 50 kg



Unrivaled Accuracy
The innovative LevelMatic™ and hanging weighing pans eliminate corner load effects increasing the accuracy of your weighing results.

One-Click Certificate
The MC Link software automatically stores all your weight calibration data in a secure database. Calibration certificates can be issued with one click at the end of the weighing process.

Secure Data Transfer
The integrated USB and Ethernet interfaces make it easy to connect to a PC or network. Data transfer to the MC Link mass calibration software is secure, fast and error-free.



Effortless Compliance
Sophisticated monitoring of metrological relevant parameters within MC Link helps you ensure your results meet regulatory requirements.

XPE-KC Manual Comparators
The Ultimate Solution for up to 5 tons

XPE-KC comparators conquer the challenges of demanding high-load applications that requiring highest precision, such as filling gas cylinders, calibrating flow-meters, weighing high-speed train wheels and calibrating masses of up to 5 tons. In addition to full weighing ranges, all platforms have an integrated centering aid for easier and more precise placement of artifacts. The high-grade steel construction provides long-lasting everyday precision and reduces magnetic influences.

Furthermore, touchscreen operation makes operating these comparators as easy as any other METTLER TOLEDO balance.

XPE155KSC

XPE604KMC and XPE1003KMC

XPE2003KLC and XPE6002KLC

Model	**Max. Load**	**Readability**	**Weighing Ranges** (See theory on page 28 for further explanation)			
			F1	F2	M1	M2
XPE155KSC/LM1000*	150 kg	0.05 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	200 kg–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*	1,100 kg	0.5 g	–	500 kg–1,000 kg	200 kg–1,000 kg	50 kg–1,000 kg
XPE1003KMC				1,000 kg	500 kg–1,000 kg	100 kg–1,000 kg
XPE2003KLC/LM5000*	2,500 kg	1 g	–	–	1,000 kg–2,000 kg	200 kg–2,000 kg
XPE2003KLC				–	1,000 kg–2,000 kg	500 kg–2,000 kg
XPE6002KLC/LM5000*	5,400 kg	10 g	–	–	–	5,000 kg

* Optional accessory

Unrivaled Performance
Accomplish demanding calibrations and mass determination at peak accuracy. 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 LevelMatic mechanism eliminates corner load effects, significantly increasing the accuracy of your weighing results.

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

Volume and Density Determination
To Eliminate Significant Influences

OIML states that the volume or density of test weights must be known. This is required for E1 and E2 weights above 330 m elevation, and F1 weights above 800 m. Without this data, the air buoyancy correction will be incorrect, leading to calibration errors and potential non-compliance with regulations.

METTLER TOLEDO's VMS systems offer easy and reliable determination of volume of masses up to 20 kg. Their modular design integrates XPR comparators, enabling the calibration of both mass and density.

VC1005X

VMS2

VMS20

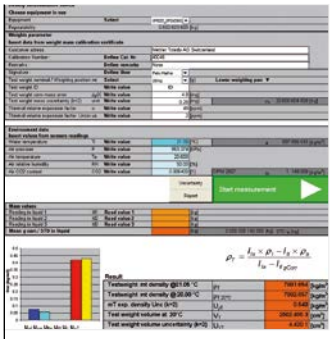
Model	**Max. Load**	**Density Uncertainty (k = 2)**	**Volume Uncertainty (k = 2)**	**Weighing Ranges**				
				RS*	E1	E2	F1	F2
VC1005X	1 kg	1.2 kg/m³	0.00015 cm³	1 g–1 kg	1 g–1 kg	1 g–1 kg	1 g–1 kg	1 g–1 kg
VMS2	2 kg	25–400 kg/m³	0.0063–0.781 cm³	–	–	1 g–2 kg	1 g–2 kg	1 g–2 kg
VMS20	20 kg	1–5 kg/m³	0.0781–0.3125 cm³	–	1 kg–20 kg	1 kg–20 kg	1 kg–20 kg	1 kg–20 kg

RS* = Reference Standard (⅕ uncertainty contribution of the E1 tolerance limit)

Unrivaled 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.

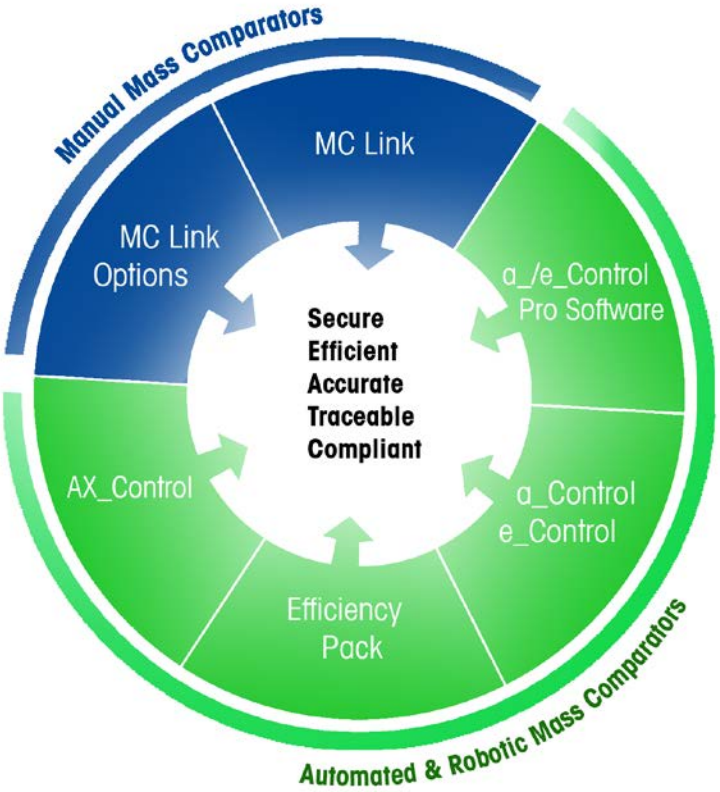
Air Bubble Removal
VMS systems include an advanced water jet to remove residual air bubbles, significantly improving the calibration result.



Straightforward Results
The supplied software simplifies the density determination process and enables you to quickly and easily generate highly detailed reports.

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 the risk of 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 and accurate workflows, secure results, and assured full traceability at all times.



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

Connectivity
With up to eight different interfaces, you have the flexibility to connect your comparator to any state-of-the-art solution as well as your network. USB, WLAN, Bluetooth and other options available.

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.

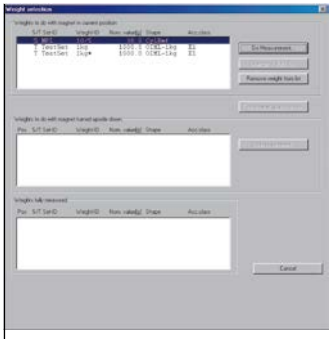
MC Link
The intuitive software solution for weight calibration guarantees efficient workflows, accurate and secure results, full traceability, and regulatory compliance at all times.

Professional Certificates
Calibration certificates at a keystroke: process information, references, environmental details, and results can be easily transferred into a certificate for a professional sign-off.

Specially Designed Accessories
For Enhanced Usability

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 prerequisite to ensure the quality of reference and test standards. The S50-K Susceptometer accurately measures susceptibility and permanent magnetization of weights up to 50 kg in one measurement.



Guided Workflow
The user-guided Susceptometer software calculates magnetic properties of artefacts according to OIML R111.

Complete Traceability
METTLER TOLEDO gauge blocks, which are easily recalibrated, and susceptibility references, can be used in combination with accurately measured magnets to ensure traceability to international standards.

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

Climate Stations
Compensating for air buoyancy impacts, the Klimet A30 and ClimaLog30 record air temperature, humidity and pressure enabling determination of air density for air 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.

LevelMatic
Eccentricity influences are eliminated accurately and efficiently. The large weighing pan surface enables easy weight placement.

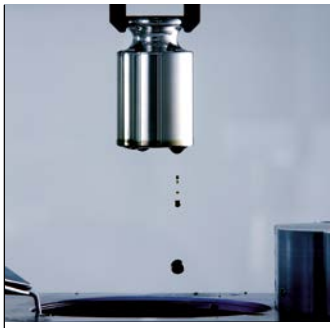
Expertly Crafted Test Weights
Your Cornerstone for Reliable Results

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 Metrology 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 0.05 mm 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

Comparator Services
For 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 suiting your specific needs. Our factory-trained and authorized service technicians help guarantee:

- Continuous highest accuracy
- Maximum equipment uptime
- Regulatory compliance through accredited qualification
- Audit-proof and fully traceable electronic certificates

Installation
Professional installation ensures your comparator is optimized to better suit your applications and performs according to the manufacturer's specifications. On-site operator training and an installation certificate are included.

Preventive Maintenance
Preventive maintenance realigns your comparator to manufacturing specifications to consistently achieve accurate results and avoid unexpected downtime. Save money and choose the maintenance plan (Care Package) best suiting your needs.

Qualification and Certification
Qualifying your manual mass comparator during installation or preventive maintenance with the mass comparator certificate proves that all relevant (or required) parameter meet manufacturer's specification. Therefore the continuous instrument verification by ISO 17025 is met.

Service	**Installation** Available for: • Automatic Mass Comparator • Robotic Mass Comparator • Vacuum Mass Comparator • Manual Mass Comparator	**Care Packages** Available for: • Automatic Mass Comparator • Robotic Mass Comparator • Vacuum Mass Comparator • Manual Mass Comparator	**Mass Comparator Certificate** Available for: • Manual Mass Comparator

Support and Repair
Our technical support staff is available 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.

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

Education and Training
Individually customizable to meet your needs, our classroom and hands-on training (on-site) courses ensure your whole comparator team is proficient and confident. Ideal for metrologists, lab managers, supervisory and operations personnel.

- User Training
- Technical Seminars
- Metrology Know-how

Relocation
Certified 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

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 to or less than ⅓ 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

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

The uncertainty of the weighing 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 ⅑ 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 should be measured. According to OIML, this applies to E1 and E2 weights above 330 m elevation and F1 weights above 800 m.

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.

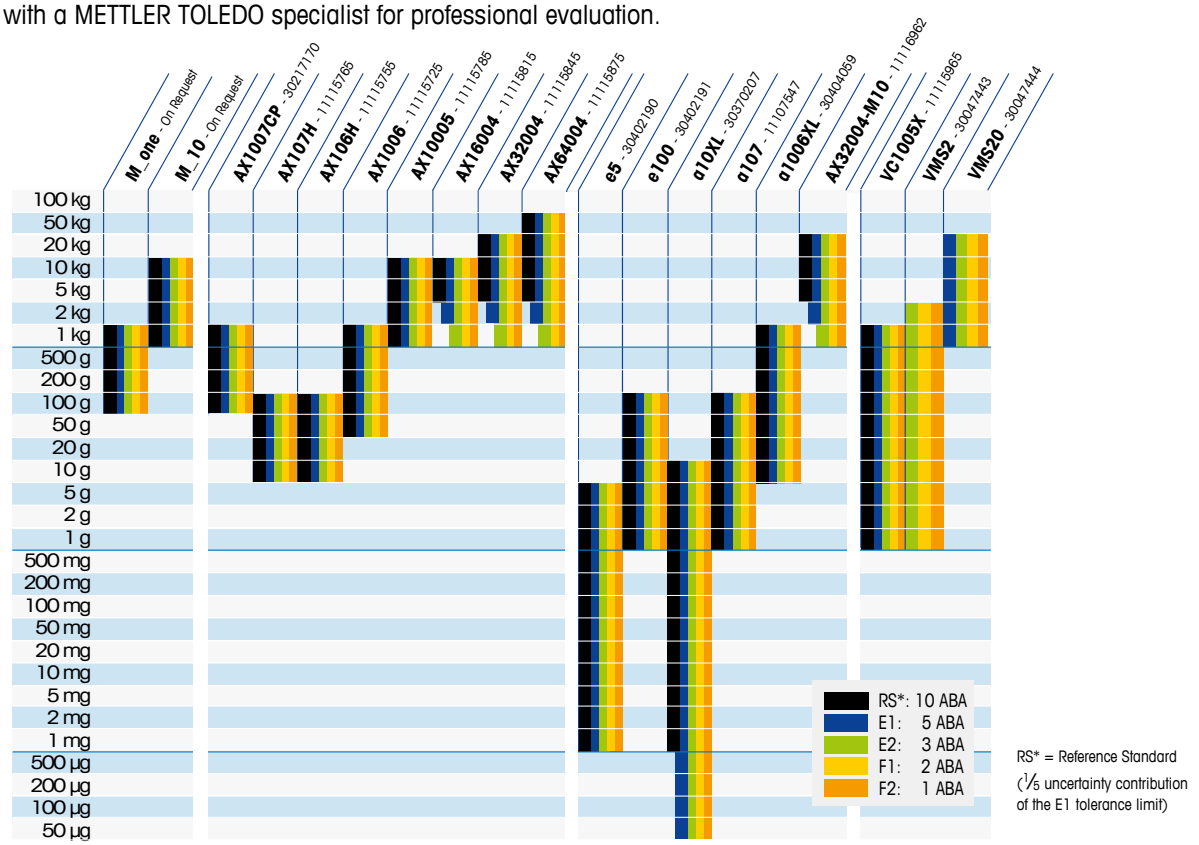
Tolerance Limits

The maximum permissible errors on verification for conventional masses are:

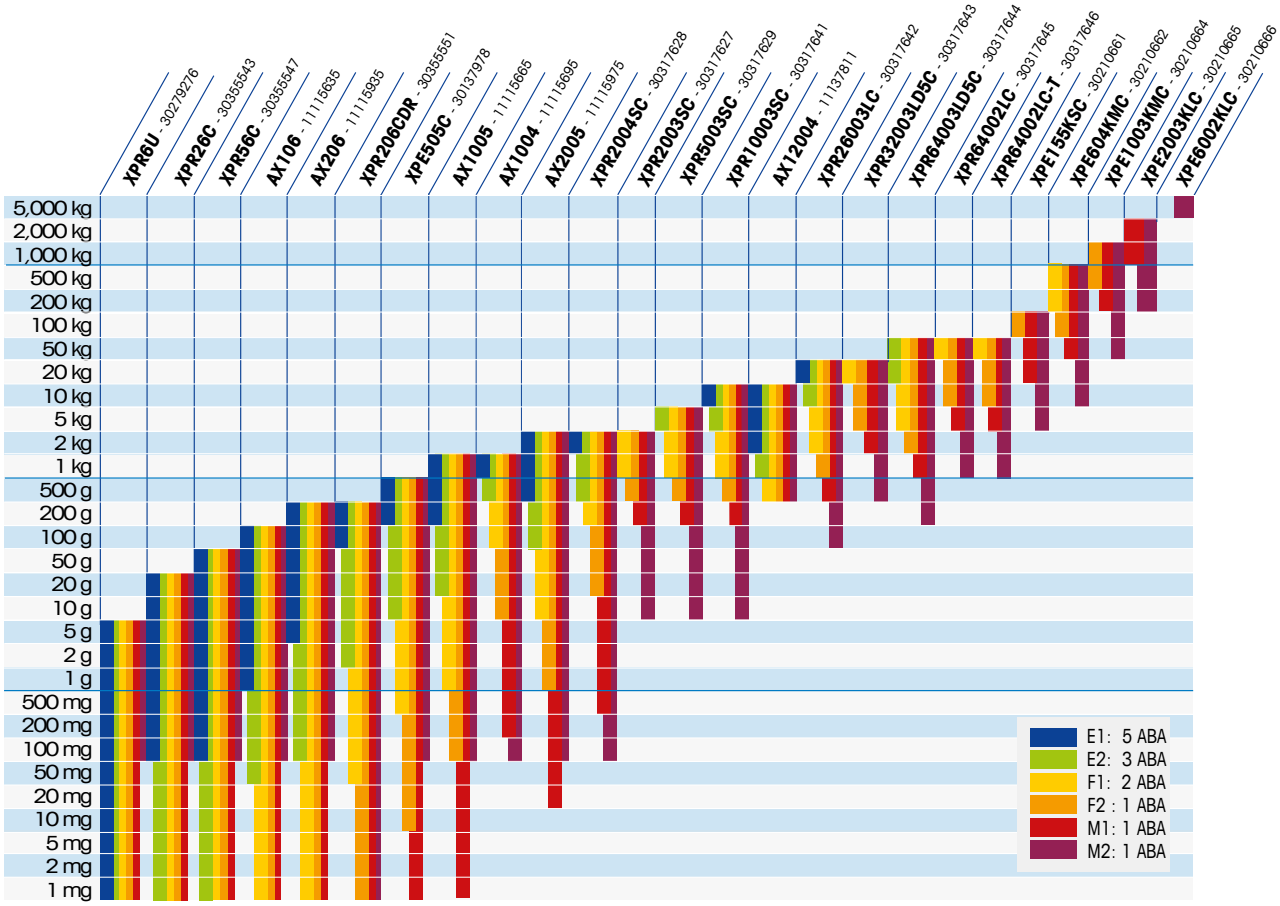
Weight	E1 ± mg	E2 ± mg	F1 ± mg	F2 ± mg	M1 ± mg	M2 ± mg	M3 ± mg
1 mg	0.003	0.006	0.02	0.06	0.2		
2 mg	0.003	0.006	0.02	0.06	0.2		
5 mg	0.003	0.006	0.02	0.06	0.2		
10 mg	0.003	0.008	0.025	0.08	0.5		
20 mg	0.003	0.01	0.03	0.1	0.3		
50 mg	0.004	0.012	0.04	0.12	0.4		
100 mg	0.005	0.016	0.05	0.16	0.5	1.6	
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	1,000
5 kg	2.5	8	25	80	250	800	2,500
10 kg	5	16	50	160	500	1,600	5,000
20 kg	10	30	100	300	1,000	3,000	10,000
50 kg	25	80	250	800	2,500	8,000	25,000
100 kg		160	500	1,600	5,000	16,000	50,000
200 kg		300	1,000	3,000	10,000	30,000	100,000
500 kg		800	2,500	8,000	25,000	80,000	250,000
1,000 kg		1,600	5,000	16,000	50,000	160,000	500,000
2,000 kg			10,000	30,000	100,000	300,000	1,000,000
5,000 kg			25,000	8,0000	250,000	800,000	2,500,000

Comparator Application Ranges

The illustrations below show the calculated weighing ranges for OIML weights according 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 should consult with a METTLER TOLEDO specialist for professional evaluation.



Vacuum, Robotic, Automated and Volume Comparators



Manual Comparators





Comparator	M_one	M_10	AX1007CP	AX107H	AX106H
Material No.	On request	On request	30217170	11115765	11115755
OIML Calibration Range RS* ■	100 g–1 kg	1 kg–10 kg	100 g–1 kg	10 g–100 g	10 g–100 g
OIML Calibration Range E1 ■	100 g–1 kg	1 kg–10 kg	100 g–1 kg	10 g–100 g	10 g–100 g
OIML Calibration Range E2 ■	100 g–1 kg	1 kg–10 kg	100 g–1 kg	10 g–100 g	10 g–100 g
OIML Calibration Range F1 ■	100 g–1 kg	1 kg–10 kg	100 g–1 kg	10 g–100 g	10 g–100 g
OIML Calibration Range F2 ■	100 g–1 kg	1 kg–10 kg	100 g–1 kg	10 g–100 g	10 g–100 g
Maximum load	1,001.5 g	10,011 g	1,001.5 g	111 g	111 g
Readability	0.1 µg	1 µg	0.1 µg	0.1 µg	1 µg
Repeatability (5×ABA)	0.5 µg (1 kg)	8 µg (10 kg)	0.5 µg (1 kg)	0.8 µg (100 g)	1.5 µg (100 g)
Repeatability typical ABA	0.3 µg	4 µg	0.4 µg	0.6 µg	1.2 µg
Electrical weighing range	0–1.5 g	0–11 g	0–1.5 g	0–11 g	0–11 g
Dial weights	External	External	500, 200, 200, 100 g	50, 30, 10, 10 g	50, 30, 10, 10 g
Linearity (electrical weighing range)	2 µg	8 µg	2 µg	8 µg	8 µg
Eccentric load deviation (at test load)	0.0 ng (1 g)	0.0 ng (10 g)	0.0 µg (1 g)	0.0 ng (10 g)	0.0 µg (10 g)
Settling time	30 s	30 s	30 s	30 s	10 s
Adjustment built-in	Motorized	Motorized	Motorized	Motorized	Motorized
Adjustment with external weight	1 g	10 g	1 g	10 g	10 g
Standard Equipment					
Turntable	6 positions	4 positions	4 positions	4 positions	4 positions
Round bell chamber	Vacuum	Vacuum	Constant pressure	–	–
Draft shield	–	–	–	Motorized	Motorized
Self centering pan	Integrated	Integrated	Integrated	Integrated	Integrated
Weighing pan	Hanging pan	Hanging pan	Hanging pan	Hanging pan	Hanging pan
SmartScreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
SmartSens	Standard	Standard	Standard	Standard	Standard
Separate display	Standard	Standard	Standard	Standard	Standard
Windows® PC with control software	Standard	Standard	Standard	Standard	Standard
Rack for control & display unit	Optional	Optional	Optional	–	–
Admissible Ambient Conditions					
Temperature (°C)	17–27	17–27	17–27	17–27	17–27
Max. temperature change (°C/12 h)	0.1	0.1	0.5	0.5	0.5
Relative humidity (%)	45–60	45–60	45–60	45–60	45–60
Dimensions					
Comparator (W×D×H, mm)	Varies upon configuration.	684×884×930	252×340×573	346×514×432	346×514×432
Comparator weight (kg)		350	25	23	23
Control unit for weight handler (W×D×H, mm)	202×197×92	202×197×92	226×370×155	226×370×155	226×370×155
Weight diameter (D, mm)	Cylindrical: 22–90 Spherical: 40–100	Cylindrical: 18–105 Spherical: 18–110	18–80	8–30	8–30
Weight height (H, mm)	100	195	90	70	70

RS* = Reference (1/5 uncertainty contribution of the E1 tolerance limit)





Comparator	**AX1006**	**AX10005**	**AX16004**	**AX32004**	**AX64004**
Material No.	11115725	11115785	11115815	11115845	11115875
OIML Calibration Range RS* ■	50 g–1 kg	1 kg–10 kg	5 kg–10 kg	5 kg–20 kg	5 kg–50 kg
OIML Calibration Range E1 ■	50 g–1 kg	1 kg–10 kg	2 kg–10 kg	2 kg–20 kg	5 kg–50 kg
OIML Calibration Range E2 ■	50 g–1 kg	1 kg–10 kg	1 kg–10 kg	1 kg–20 kg	1 kg–50 kg
OIML Calibration Range F1 ■	50 g–1 kg	1 kg–10 kg	1 kg–10 kg	1 kg–20 kg	1 kg–50 kg
OIML Calibration Range F2 ■	50 g–1 kg	1 kg–10 kg	1 kg–10 kg	1 kg–20 kg	1 kg–50 kg
Maximum load	1,011 g	10,011 g	16,260 g	32,260 g	64,260 g
Readability	1 µg	10 µg	0.1 mg	0.1 mg	0.1 mg
Repeatability (5 × ABA)	2 µg (1 kg)	20 µg (10 kg)	0.2 mg (10 kg)	0.2 mg (20 kg)	0.4 mg (50 kg)
Repeatability typical ABA	1.5 µg	15 µg	0.1 mg	0.1 mg	0.2 mg
Electrical weighing range	0–11 g	0–11 g	0–260 g	0–260 g	0–260 g
Dial weights	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
Linearity (electrical weighing range)	8 µg	0.05 mg	0.5 mg	0.5 mg	0.5 mg
Eccentric load deviation (at test load)	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)
Settling time	10 s	15 s	25 s	25 s	25 s
Adjustment built-in	Motorized	Motorized	Motorized	Motorized	Motorized
Adjustment with external weight	10 g	10 g	200 g	200 g	200 g
Standard Equipment					
Weight handler	4 positions	4 positions	4 positions	4 positions	4 positions
Draft shield	Motorized	Standard	Glass bells	Glass bells	Glass bells
Self centering pan	Integrated	Integrated	Integrated	Integrated	Integrated
Weighing pan	Hanging pan	Hanging pan	LevelMatic	LevelMatic	LevelMatic
SmartScreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
SmartSens	Standard	Standard	Standard	Standard	Standard
Separate display	Standard	Standard	Standard	Standard	Standard
Windows® PC with control software	Standard	Standard	Standard	Standard	Standard
Rack for control & display unit	–	–	Standard	Standard	Standard
Admissible Ambient Conditions					
Temperature (°C)	17–27	17–27	17–27	17–27	17–27
Max. temperature change (°C/12 h)	0.5	0.5	0.5	0.5	0.5
Relative humidity (%)	45–60	45–60	45–60	45–60	45–60
Dimensions					
Comparator (W × D × H, mm)	346 × 514 × 432	315 × 720 × 850	1,200 × 1,200 × 1,500	1,200 × 1,200 × 1,500	1,200 × 1,200 × 1,500
Comparator weight (kg)	25	85	230	260	290
Control unit for weight handler (W × D × H, mm)	226 × 370 × 155	226 × 370 × 155	226 × 370 × 155	226 × 370 × 155	226 × 370 × 155
Weight diameter (D, mm)	12–60	16–110	40–340	40–340	40–340
Weight height (H, mm)	95	200	350	350	350

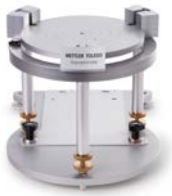
RS* = Reference (⅕ uncertainty contribution of the E1 tolerance limit)

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 adversely affect on the specifications.

Comparator	e5	e100	a10XL	a107	a1006XL	AX32004-M10
Material No.	30402190	30402191	30370207	11107547	30404059	On request
OIML Calibration Range RS* ■	1 mg–5 g	1 g–100 g	1 mg–10 g	1 g–100 g	10 g–1 kg	5 kg–20 kg
OIML Calibration Range E1 ■	1 mg–5 g	1 g–100 g	0.05 µg–10 g	1 g–100 g	10 g–1 kg	2 kg–20 kg
OIML Calibration Range E2 ■	1 mg–5 g	1 g–100 g	0.05 µg–10 g	1 g–100 g	10 g–1 kg	1 kg–20 kg
OIML Calibration Range F1 ■	1 mg–5 g	1 g–100 g	0.05 µg–10 g	1 g–100 g	10 g–1 kg	1 kg–20 kg
OIML Calibration Range F2 ■	1 mg–5 g	1 g–100 g	0.05 µg–10 g	1 g–100 g	10 g–1 kg	1 kg–20 kg
Maximum load	6.1 g	111 g	10.1 g	111 g	1,011 g	21,260 g
Readability	0.1 µg	1 µg	0.1 µg	0.1 µg	1 µg	0.1 mg
Repeatability (5×ABA)	0–1 g: 0.15 µg >1–2 g: 0.25 µg >2–6 g: 0.4 µg	1.6 µg	0–1 g: 0.15 µg >1–2 g: 0.25 µg >2–6 g: 0.4 µg >6–10 g: 0.6 µg	1 µg	10–100 g: 3 µg >100–500 g: 4.5 µg >500–1,000 g: 8 µg	0.2 mg
Repeatability typical ABA	0–1 g: 0.08 µg >1–2 g: 0.12 µg >2–6 g: 0.25 µg	1.3 µg	0–1 g: 0.08 µg >1–2 g: 0.12 µg >2–6 g: 0.25 µg >6–10 g: 0.4 µg	0.9 µg	10–100 g: 2 µg >100–500 g: 3.5 µg >500–1,000 g: 5 µg	0.1 mg
Electrical weighing range	0–6.1 g	0–11 g	0–10.1 g	0–11 g	0–11 g	0–260 g
Dial weights	–	50, 30, 10, 10 g	–	50, 30, 10, 10 g	500, 300, 200, 100, 50, 30, 10, 10 g	0.25, 0.25, 0.25, 0.25, 0.5, 0.5, 2, 2, 2, 4, 4 kg
Linearity (electrical weighing range)	2 µg	8 µg	2 µg	8 µg	8 µg	0.5 mg
Eccentric load deviation (at test load)	0.0 ng (5 g)	0.0 µg (10 g)	0.0 ng (5 g)	0.0 µg (10 g)	0.0 µg (100 g)	0.0 mg (260 g)
Settling time	20 s	20 s	20 s	30 s	30 s	20 s
Adjustment built-in	Motorized	Motorized	Motorized	Motorized	Motorized	Motorized
Adjustment with external weight	5 g	10 g	10 g	10 g	10 g	200 g
Standard Equipment						
Weight handler	3-axis robot	3-axis robot	3-axis robot	3-axis robot	3-axis robot	3-axis robot
Weight magazine	60 positions	27 positions	100 positions	30 positions	21 positions	10 positions
Draft shield	Motorized	Motorized	Motorized	Motorized	Motorized	Standard
Weighing pan	Fork/Hook-shaped	Fork-shaped	Fork/Hook-shaped	Fork-shaped	Fork-shaped	LevelMatic
SmartScreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
SmartSens	Standard	Standard	Standard	Standard	Standard	Standard
Separate display	Standard	Standard	Standard	Standard	Standard	Standard
Windows® PC with control software	Standard	Standard	Standard	Standard	Standard	Standard
Rack for control & display unit	–	–	–	–	–	Standard
Admissible Ambient Conditions						
Temperature (°C)	17–27	17–27	17–27	17–27	17–27	17–27
Max. temperature change (°C/12 h)	0.5	0.5	0.5	0.5	0.5	0.5
Relative humidity (%)	45–60	45–60	45–60	45–60	45–60	45–60
Dimensions						
Comparator (W×D×H, mm)	1,080×700×760	1,280×900×760	1,672×897×1,870	1,430×890×1,730	1,672×897×1,870	2,700×1,400×2,158
Comparator weight (kg)	50	60	290	290	290	480
Weight diameter (D, mm)	Cylindrical: 4–14 Wire: 5.5–18 Sheet: 4–14	6–26	Cylindrical: 4–14 Wire: 5.5–18 Sheet: 4–14	6–26	10–60	Cylindrical: 48–200 Block: 23×200
Weight height (H, mm)	Cylindrical: 16 Wire: 6	50	Cylindrical: 16 Wire: 6	50	85	235

RS* = Reference (⅕ uncertainty contribution of the E1 tolerance limit)



	VC1005X	VMS2	VMS20	Susceptometer S50-K
Material No.	11115965	30047443	30047444	11116880
OIML Calibration Range RS* ■	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	XPR2004SC	XPR26003LC	XPR6U
Weight handler	Turntable, 4 positions	Manual, 1 position	Manual, 2 positions	–
Readability	10 µg	0.1 mg	1 mg	0.1 µg
Electrical range	109 g	2,300 g	26.1 kg	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	–	–	–	≤0.1 Am²
Distance platform/center of magnet Zo	–	–	–	18.8–60.0
Magnetizing field strengh (max.)	–	–	–	2,000, 800 A/m
Res. magnetization for 1 digit µT (E1)	–	–	–	≥0.001/0.01
Res. susceptibility x for 1 digit (E1)	–	–	–	≥0.000,001/0.000,01
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 XPR comparator	With XPR comparator	With XPR comparator
Precision thermometer	Standard	Standard	Standard	–
Fluid	Standard	–	–	–
Susceptometer hardware bridge	–	–	–	Standard
Low permeability/susceptibility reference	–	–	–	Required option
Susceptometer 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 Hhumidity (%)	40–70	40–70	40–70	40–70
Dimensions				
Equipment (W×D×H, mm)	810×760×1,500	380×810×890	765×1,000×1,840	270×425×160
Equipment net weight (kg)	94	44	215	5

RS* = Reference (⅕ uncertainty contribution of the E1 tolerance limit)

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Comparator	XPR6U	XPR26C	XPR56C	AX106	AX206
Material No.	30279276	30355543	30355547	11115635	11115935
OIML Calibration Range E1	0.05 mg–5 g	100 mg–20 g	100 mg–50 g	1 g–100 g	5 g–200 g
OIML Calibration Range E2	0.05 mg–5 g	0.05 mg–20 g	0.05 mg–50 g	50 mg–100 g	100 mg–200 g
OIML Calibration Range F1	0.05 mg–5 g	0.05 mg–20 g	0.05 mg–50 g	1 mg–100 g	1 mg–200 g
OIML Calibration Range F2	0.05 mg–5 g	0.05 mg–20 g	0.05 mg–50 g	1 mg–100 g	1 mg–200 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
OIML Calibration Range M2	100 mg–5 g	100 mg–20 g	100 mg–50 g	100 mg–100 g	100 mg–200 g
Maximum load	6.1 g	22 g	52 g	111 g	211 g
Readability	0.1 µg	1 µg	1 µg	1 µg	1 µg
Repeatability absolute	0.4 µg	2 µg	6 µg	–	–
Repeatability Nominal Load (5×ABA)	0.4 µg (5 g)	2 µg (20 g)	6 µg (50 g)	3 µg (100 g)	4 µg (200 g)
Repeatability Low Load (5×ABA)	0.25 µg (0.2 g)	0.7 µg (1 g)	1.5 µg (2 g)	3 µg (5 g)	4 µg (10 g)
Repeatability typical ABA	0.27 µg (5 g)	0.6 µg (1 g)	0.6 µg (2 g)	2 µg (100 g)	2.5 µg (200 g)
Electrical weighing range	0–6.1 g	0–22 g	0–52 g	0–11 g	0–11 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
Eccentric load deviation	0.0 mg (hook pan)	0.00 mg (20 g)	0.00 mg (50 g)	0.0 µg (10 g)	0.0 µg (10 g)
Settling time	<15 s	3.5 s	3.5 s	5 s	5 s
Adjustment built-in	ProFACT	ProFACT	ProFACT	ProFACT	ProFACT
Adjustment with external weight	1–6 g	5–20 g	10–50 g	10 g	10 g
Standard Equipment					
Mass calibration software	MC Link	MC Link	MC Link	MC Link	MC Link
Draft shield	Motorized	Motorized	Motorized	Motorized	Motorized
Self centering pan	Hook pan	Hanging pan	Hanging pan	Hanging pan	Hanging pan
Below the balance weighing	Ready	Ready	Ready	Included	Included
Weighing pan	Round pan & hook	Hanging & grid pan	Hanging & grid pan	Hanging/top load	Hanging/top load
Touchscreen terminal	7" Color touchscreen & SmartView	7" Color touchscreen	7" Color touchscreen	Touchscreen	Touchscreen
SmartSens/LevelControl	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
USB-Host/USB/LAN/RS232	1/3/1/–	1/3/1/–	1/3/1/–	–/–/–/1	–/–/–/1
Admissible Ambient Conditions					
Temperature (°C)	10–30	10–30	10–30	10–30	10–30
Max. temperature change (°C/12 h)	0.5	0.5	0.5	0.5	0.5
Relative humidity (%)	40–70	40–70	40–70	40–70	40–70
Dimensions					
Comparator (W×D×H, mm)	128×287×113	195×485×292	195×485×292	241×353×291	241×353×291
Comparator weight (kg)	7.5	10.1	10.1	13.5	13.5
Weighing pan (mm)	∅ 14 Hook/16	∅ 35/40×40	∅ 35/40×40	∅ 60 (45)	∅ 60 (45)
Object diameter (D, mm)	0–9/13	0–35	0–35	0–45	0–45
Object height (H, mm)	0–26/50	0–70 (235)	0–70 (235)	0–85 (120)	0–85 (120)

Comparator	XPR206CDR	XPE505C	AX1005	AX1004	AX2005
Material No.	30355551	30137978	11115665	11115695	11115975
OIML Calibration Range E1	100 g–200 g	200 g–500 g	200 g–1 kg	1 kg	500 g–2 kg
OIML Calibration Range E2	2 g–200 g	10 g–500 g	20 g–1 kg	500 g–1 kg	100 g–2 kg
OIML Calibration Range F1	50 mg–200 g	500 mg–500 g	1 g–1 kg	100 g–1 kg	10 g–2 kg
OIML Calibration Range F2	1 mg–200 g	10 mg–500 g	100 mg–1 kg	10 g–1 kg	1 g–2 kg
OIML Calibration Range M1	1 mg–200 g	1 mg–500 g	1 mg–1 kg	200 mg–1 kg	20 mg–2 kg
OIML Calibration Range M2	100 mg–200 g	100 mg–500 g	100 mg–1 kg	100 mg–1 kg	100 mg–2 kg
Maximum load	220 g	520 g	1,109 g	1,109 g	2,109 g
Readability	0.005 mg; 0.01 mg	0.01 mg	0.01 mg	0.1 mg	0.01 mg
Repeatability absolute	0.03 mg	0.06 mg	–	–	–
Repeatability Nominal Load (5×ABA)	0.03 mg (200 g)	0.035 mg (500 g)	0.02 mg (1 kg)	0.07 mg (1 kg)	0.04 mg (2 kg)
Repeatability Low Load (5×ABA)	0.01 mg (10 g)	0.01 mg (20 g)	0.02 mg (50 g)	0.07 mg (1 kg)	0.04 mg (100 g)
Repeatability typical ABA	0.012 mg (200 g)	0.008 mg + 4×10^{-8} • Rgr	0.015 mg (1 kg)	0.05 mg (1 kg)	0.025 mg (2 kg)
Electrical weighing range	0–220 g	0–520 g	0–109 g	0–109 g	0–109 g
Dial weights	–	–	500, 300, 100, 100 g	500, 300, 100, 100 g	500, 300, 100, 100 g
Linearity (electrical weighing range)	0.032 mg	0.2 mg	0.12 mg	0.15 mg	0.12 mg
Eccentric load deviation	0.06 mg (100 g)	0.2 mg (500 g)	0.0 µg (100 g)	0.0 µg (100 g)	0.0 µg (100 g)
Settling time	5 s	5 s	5 s	5 s	5 s
Adjustment built-in	ProFACT	ProFACT	ProFACT	ProFACT	ProFACT
Adjustment with external weight	100–200 g	100 –500 g	100 g	100 g	100 g
Standard Equipment					
Mass calibration software	MC Link	MC Link	MC Link	MC Link	MC Link
Draft shield	Motorized	Motorized	Motorized	Motorized	Motorized
Self centering pan	–	–	Hanging pan	Hanging pan	Hanging pan
Below the balance weighing	Ready	Ready	Included	Included	Included
Weighing pan	Grid pan	Grid pan	Hanging/top load	Hanging/top load	Hanging/top load
Touchscreen terminal	7" Color touchscreen	Color touchscreen	Touchscreen	Touchscreen	Touchscreen
SmartSens/LevelControl	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
USB-Host/USB/LAN/RS232	1/3/1/–	–/–/–/1	–/–/–/1	–/–/–/1	–/–/–/1
Admissible Ambient Conditions					
Temperature (°C)	10–30	10–30	10–30	10–30	10–30
Max. temperature change (°C/12 h)	0.5	0.5	0.5	0.5	0.5
Relative humidity (%)	40–70	40–70	40–70	40–70	40–70
Dimensions					
Comparator (W×D×H, mm)	195×485×292	263×482×322	241×353×291	241×353×291	241×353×291
Comparator weight (kg)	9.4	10.0	13.5	13.5	13.5
Weighing pan (mm)	78×73	78×73	∅ 100	∅ 100	∅ 100
Object diameter (D, mm)	0–73	0–73	0–80	0–80	0–80
Object height (H, mm)	0–235	0–235	0–135	0–135	0–135

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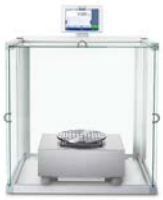
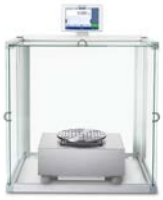
Comparator	XPR2004SC	XPR2003SC	XPR5003SC	XPR10003SC	AX12004
Material No.	30317628	30137627	30317629	30317641	11137811
OIML Calibration Range E1	2 kg	–	–	10 kg	2 kg–10 kg
OIML Calibration Range E2	500 g–2 kg	–	5 kg	5 kg–10 kg	1 kg–10 kg
OIML Calibration Range F1	200 g–2 kg	1 kg–2 kg	1 kg–5 kg	1 kg–10 kg	500 g–10 kg
OIML Calibration Range F2	20 g–2 kg	500 g–2 kg	500 g–5 kg	500 g–10 kg	500 g–10 kg
OIML Calibration Range M1	500 mg–2 kg	200 g–2 kg	200 g–5 kg	200 g–10 kg	500 g–10 kg
OIML Calibration Range M2	100 mg–2 kg	10 g–2 kg	10 g–5 kg	10 g–10 kg	500 g–10 kg
Maximum load	2,300 g	2,300 g	5,100 g	10,100 g	12,111 g
Readability	0.1 mg	1 mg	1 mg	1 mg	0.1 mg
Repeatability absolute	0.6 mg (2 kg)	1 mg (2 kg)	2 mg (5 kg)	3.5 mg (10 kg)	–
Repeatability Nominal Load (5×ABA)	0.25 mg (2 kg)	0.8 mg (2 kg)	0.8 mg (5 kg)	1.5 mg (10 kg)	0.25 mg (10 kg)
Repeatability Low Load (5×ABA)	0.1 mg (100 g)	0.6 mg (100 g)	0.7 mg (200 g)	1.2 mg (500 g)	0.25 mg (1 kg)
Repeatability typical 5×ABA (at test load)	0.15 mg (2 kg)	0.5 mg (2 kg)	0.5 mg (5 kg)	0.8 mg (10 kg)	0.15 mg (10 kg)
Electrical weighing range	0–2,300 g	0–2,300 g	0–5,100 g	0–10,100 g	0–111 g
Dial weights	–	–	–	–	5, 3, 2, 1, 1 kg
Linearity (electrical weighing range)	0.5 mg	0.7 mg	1.8 mg	3.2 mg	0.6 mg
Eccentric load deviation	Eliminated through LevelMatic	2.6 mg (1 kg)	Eliminated through LevelMatic	Eliminated through LevelMatic	0.0 mg
Settling time	3.5 s	3.5 s	3.5 s	3.5 s	10 s
Adjustment built-in	ProFACT	ProFACT	ProFACT	ProFACT	Built in 100 g E2
Adjustment with external weight	1–2 kg	1–2 kg	1–5 kg	2–10 kg	100 g
Standard Equipment					
Mass calibration software	MC Link	MC Link	MC Link	MC Link	MC Link
Draft shield	Standard	Standard	Standard	Standard	Standard
Self centering pan	LevelMatic	Optional	LevelMatic	LevelMatic	Hanging pan
Below the balance weighing	Included	Included	Included	Included	–
Weighing pan	LevelMatic/square/ SmartPan	Square/ SmartPan	LevelMatic/square/ SmartPan	LevelMatic/square/ SmartPan	Hanging with 10 kg weight handler
Touchscreen terminal	7" capacitive Color	7" capacitive color	7" capacitive color	7" capacitive color	Touchscreen
SmartSens/LevelControl	–/Yes	–/Yes	–/Yes	–/Yes	–/Yes
USB-Host/USB/LAN/RS232	1/3/1/–	1/3/1/–	1/3/1/–	1/3/1/–	–/–/–/1
Admissible Ambient Conditions					
Temperature (°C)	10–30	10–30	10–30	10–30	10–30
Max. temperature change (°C/12 h)	0.5	0.5	0.5	0.5	0.5
Relative humidity (%)	40–70	40–70	40–70	40–70	40–70
Dimensions					
Comparator (W×D×H, mm)	214×260×368	214×260×368	214×260×368	385×478×614	837×614×952
Comparator weight (kg)	8.3	8.3	8.3	17.2	62.5
Weighing pan (mm)	∅ 130	127×127	∅ 130	∅ 130	∅ 220
Object diameter (D, mm)	0–130	0–125	0–130	0–130	34–220
Object height (H, mm)	0–228	0–248	0–228	0–335	0–230





Comparator	XPR26003LC	XPE32003LD5C	XPR64003LD5C	XPR64002LC	XPR64002LC-T
Material No.	30317642	30317643	30317644	30317645	30317646
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	20 kg	5 kg – 50 kg	50 kg	50 kg
OIML Calibration Range F2	1 kg – 20 kg	5 kg – 20 kg	2 kg – 50 kg	10 kg – 50 kg	10 kg – 50 kg
OIML Calibration Range M1	500 g – 20 kg	2 kg – 20 kg	1 kg – 50 kg	5 kg – 50 kg	5 kg – 50 kg
OIML Calibration Range M2	100 g – 20 kg	500 g – 20 kg	200 g – 50 kg	1 kg – 50 kg	1 kg – 50 kg
Maximum load	26.1 kg	32.1 kg	64.1 kg	64.1 kg	64.1 kg
Readability	1 mg	5 mg	5 mg	10 mg	10 mg
Repeatability absolute	6 mg	15 mg	15 mg	35 mg	35 mg
Repeatability Nominal Load (5 × ABA)	2.5 mg (20 kg)	8 mg (20 kg)	8 mg (50 kg)	25 mg (50 kg)	25 mg (50 kg)
Repeatability Low Load (5 × ABA)	2 mg (1 kg)	5 mg (2 kg)	4 mg (2 kg)	10 mg (5 kg)	10 mg (5 kg)
Repeatability typical 5 × ABA (at test load)	2 mg (20 kg)	5 mg (20 kg)	7 mg (50 kg)	20 mg (50 kg)	20 mg (50 kg)
Electrical weighing range	0 – 26,100 g	0 – 32,100 g	0 – 64,100 g	0 – 64,100 g	0 – 64,100 g
Linearity (electrical weighing range)	11 mg	18 mg	28 mg	28 mg	50 mg
Eccentric load deviation (at test load)	Eliminated through LevelMatic	0.25 g (10 kg)	Eliminated through LevelMatic	0.4 g (25 kg)	0.5 g (25 kg)
Settling time	8 – 12 s	8 – 12 s	8 – 12 s	8 – 12 s	8 – 12 s
Adjustment built-in	ProFACT	ProFACT	ProFACT	ProFACT	ProFACT
Adjustment with external weight	5 – 25 kg	5 – 30 kg	10 – 60 kg	10 – 60 kg	10 – 60 kg
Standard Equipment					
Mass calibration software	MC Link	MC Link	MC Link	MC Link	MC Link
Draft shield	Standard	Optional	Standard	Optional	–
Self centering pan	LevelMatic	–	LevelMatic	–	–
Below the balance weighing	Ready	Ready	Ready	Ready	–
Weighing pan	LevelMatic	Square	LevelMatic	Square	Round
Touchscreen terminal	7" capacitive color	7" capacitive color	7" capacitive color	7" capacitive color	7" capacitive color
SmartSens / LevelControl	– / Yes	– / Yes	– / Yes	– / Yes	– / Yes
USB-Host / USB / LAN / RS232	1 / 3 / 1 / –	1 / 3 / 1 / –	1 / 3 / 1 / –	1 / 3 / 1 / –	1 / 3 / 1 / –
Admissible Ambient Conditions					
Temperature (°C)	10 – 30	10 – 30	10 – 30	10 – 30	10 – 30
Max. temperature change (°C/12 h)	0.5	0.5	0.5	0.5	0.5
Relative humidity (%)	40 – 70	40 – 70	40 – 70	40 – 70	40 – 70
Dimensions					
Comparator (W × D × H, mm)	360 × 280 × 185	360 × 280 × 130	360 × 280 × 185	360 × 280 × 130	845 × 445 × 295
Comparator weight (kg)	15.7	10.7	15.7	10.7	22
Weighing pan (mm)	∅ 220	360 × 280	∅ 220	360 × 280	∅ 220
Object diameter (D, mm)	0 – 220	0 – 280	0 – 220	0 – 280	0 – 220
Object height (H, mm)	0 – 395	–	0 – 395	–	–

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Comparator	XPE155KSC XS155KSX Ex	XPE604KMC XS604KMX Ex	XPE1003KMC XS1003KMX Ex	XPE2003KLC XS2003KLX Ex	XPE6002KLC XS6002KLX Ex
Part No.	30210661 22026938	30210662 22026939	30210664 22026941	30210665 22026942	30210666 22026943
OIML Calibration Range E1	–	–	–	–	–
OIML Calibration Range E2	–	–	–	–	–
OIML Calibration Range F1	–	200 kg – 500 kg/ – kg	–	–	–
OIML Calibration Range F2	50 kg – 100 kg 100 kg*	100 kg – 500 kg 500 kg*	500 kg – 1,000 kg 1,000 kg*	–	–
OIML Calibration Range M1	20 kg – 100 kg 50 kg – 100 kg*	50 kg – 500 kg 200 kg – 500 kg*	200 kg – 1,000 kg 500 kg – 1,000 kg*	1,000 kg – 2,000 kg 1,000 kg – 2,000 kg*	–
OIML Calibration Range M2	5 kg – 100 kg 10 kg – 100 kg*	10 kg – 500 kg 50 kg – 500 kg*	50 kg – 1,000 kg 100 kg – 1,000 kg*	200 kg – 2,000 kg 500 kg – 2,000 kg*	5,000 kg
Maximum load	150 kg	600 kg	1,100 kg	2,500 kg	5,400 kg
Readability	0.05 g	0.1 g	0.5 g	1 g	10 g
Repeatability absolute	0.15 g	0.3 g	2 g	10 g	100 g
Repeatability Nominal Load (5 × ABA)	0.12 g (100 kg)	0.23 g (500 kg)	1.5 g (1,000 kg)	7 g (2,000 kg)	70 g (5,000 kg)
Repeatability Low Load (5 × ABA)	0.09 g (5 kg)	0.15 g (20 kg)	1 g (50 kg)	4 g (100 kg)	50 g (500 kg)
Repeatability typical 5 × ABA (at test load)	0.07 g + 3.2×10^{-07} •Rgr	0.11 g + 1.5×10^{-07} •Rgr	0.6 g + 4.2×10^{-07} •Rgr	3 g + 1.3×10^{-06} •Rgr	40 g + 4.2×10^{-06} •Rgr
Electrical weighing range	0 – 150 kg	0 – 600 kg	0 – 1,100 kg	0 – 2,500 kg	0 – 5,400 kg
Linearity (electrical weighing range)	2 g	10 g	20 g	100 g	300 g
Eccentric load deviation (at test load)	5 g (50 kg)*	40 g (200 kg)*	40 g (200 kg)*	120 g (1,000 kg)*	240 g (2,000 kg)*
Settling time	5 s	5 s	5 s	5 s	5 s
Adjustment built-in	ProFACT	ProFACT	ProFACT	ProFACT	ProFACT
Adjustment with external weight	50 kg – 150 kg	200 kg – 600 kg	200 kg – 1,000 kg	500 kg – 2,500 kg	1,000 kg – 5,000 kg
Standard Equipment					
Mass calibration software	MC Link	MC Link	MC Link	MC Link	MC Link
Draft shield	Optional, 11116556	Optional, 11116557	Optional, 11116557	Optional, 11116558	Optional, 11116558
LevelMatic	Optional, 22001940	Optional, 22001940	Optional, 11116554	Optional, 11116554	Optional, 11116554
Weighing pan	Square	Square	Square	Square	Square
Touchscreen terminal	Standard	Standard	Standard	Standard	Standard
SmartSens / LevelControl	– / –	– / –	– / –	– / –	– / –
USB-Host / USB / LAN / RS232	– / – / – / 1	– / – / – / 1	– / – / – / 1	– / – / – / 1	– / – / – / 1
Admissible Ambient Conditions					
Temperature (°C)	10 – 30	10 – 30	10 – 30	10 – 30	10 – 30
Max. temperature change (°C / 12 h)	1	1	1	1	1
Relative humidity (%)	40 – 70	40 – 70	40 – 70	40 – 70	40 – 70
Dimensions					
Comparator (W × D × H, mm)	800 × 600 × 130	1,000 × 800 × 115	1,000 × 800 × 115	1,500 × 1,252 × 182	1,500 × 1,252 × 182
Comparator weight (kg)	40	91	91	353	353
Weighing pan (mm)	800 × 600	1,000 × 800	1,000 × 800	1,500 × 1,250	1,500 × 1,250
Object diameter (D, mm)	0 – 600	0 – 800	0 – 800	0 – 1,250	0 – 1,250

* Without LevelMatic

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Climate Stations	ClimaLog30	DataLog30	Klimet A30
	30078423 (Certified)	30078424 (Certified)	222011 (Certified) 222012 (Non-certified)
Application Range			
E1	0–330 m	0–330 m	0–2,000 m
E2**	0–800 m	0–800 m	0–2,000 m
F1–M3**	0–2,000 m	0–2,000 m	0–2,000 m
Temperature			
Resolution (°C)	0.1	0.1	0.001
Range (°C)	–20 to 50	–20 to 50	15 to 25
Accuracy (°C)	±0.3	±0.3	±0.05
Relative Humidity			
Resolution (%)	0.5	0.5	0.01
Range (%)	10–95	10–95	10–80
Accuracy (%)	±2	±2	±0.15
Pressure			
Resolution (hPa)	0.1	0.1	0.001
Range (hPa)	300–1,300	300–1,300	600–1,060
Accuracy (hPa)	±0.5	±0.5	±0.04
Included Accessories	Air pressure sensor		Air pressure sensor
	Relative humidity sensor		Dew point mirror system
	Air temperature sensor		Air temperature sensor
	USB and LAN interface		4 temperature sensor inputs
	SmartGraph 3 software including: • Graphical and numerical representation of measured values • Export-ready data in *.csv format • Data-recording mode		Data logging software including: • Air density calculation CIPM 81/91 • Serial communication • Direct data transfer to specific METTLER TOLEDO software
	DKD calibration certificate		Available as certified/non-certified system
Optional Accessories	DataLog30 for 2 additional external temperature sensors (cable length 1.5 m)		Pressure tight Klimet A30V system available for special applications as vacuum (e.g. M_one)
			CO_2 content sensor (calibrated)
			Temperature sensor (cable length 2.5 m or 5.0 m)

** Without weight density determination

Special Weight Sets
For determination of the first weight decade 1 kg to 10 kg, the weight set for AX10005 is comprising 1×5 kg, 2×2 kg and 1×1 kg cylindrical weights.

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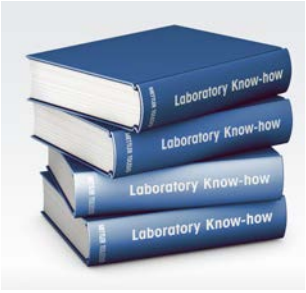

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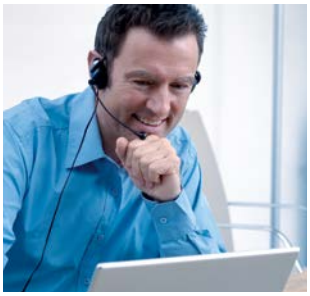

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