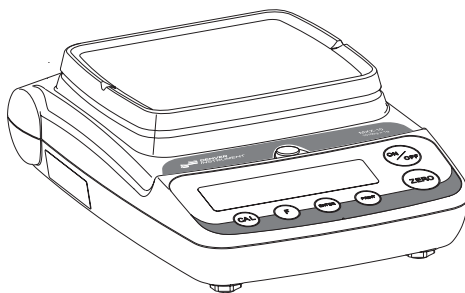
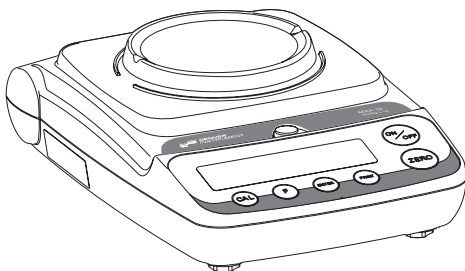


Denver MAXX

Electronic Precision Scales/Balances
Elektronische Präzisionswaagen
Balances électroniques d'analyse et de précision
Balanzas electrónicas de precisión
Operating Instructions/Betriebsanleitung/
Mode d'emploi/Manual de instrucciones



English page 3

In cases involving questions of interpretation, the German-language version shall prevail.

Deutsch Seite 20

Im Auslegungsfall ist die deutsche Sprache maßgeblich.

Français page 37

En cas de questions concernant l'interprétation, la version en langue allemande fera autorité.

Español página 54

En caso de interpretación, la versión en lengua alemana será determinante.

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Warnings and Safety Precautions

Safety Information

- To prevent damage to the equipment, please read these operating instructions carefully before using your balance/scale.



Do not use this equipment in hazardous areas.



Make sure the voltage rating printed on the power supply is identical to your local line voltage.



Use only commercially available 9V batteries (not included). If desired, you can use a rechargeable battery.

- The balance/scale is energized at all times unless you disconnect the AC adapter and, if connected, the battery.
- Protect the AC adapter from contact with liquid



Exposure to excessive electromagnetic interference can cause the readout value to change. Once the disturbance has ceased, the instrument can be used again in accordance with its intended purpose.

Installation

- It is recommended to connect only Denver accessories and options, as these are optimally designed for use with your balance/scale.
- Do not open the balance/scale housing as this will void the manufacturer's warranty.

Symbols

The following symbols are used in these instructions:

- indicates steps you must perform
- indicates steps you must perform only under certain conditions
- > describes what happens after you have performed a certain step
- indicates an item in a list



indicates a hazard

Getting Started

Equipment Supplied

- Balance/scale
- Weighing pan
- AC adapter

Additional equipment with models
MXX-612, MXX-412, MXX-212:

- Calibration weight

Additional equipment with model
MXX-123:

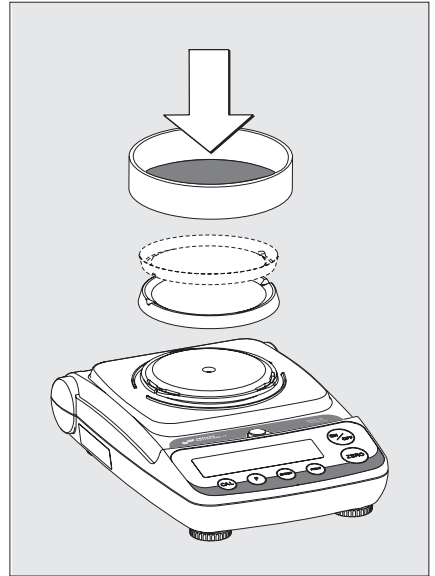
- Calibration weight
- Round glass draft ring
- Level indicator and adjustable feet

Installation

Choose a location that is not subject to the following negative influences:

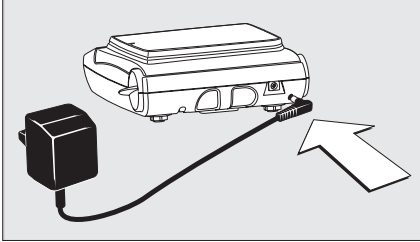
- Heat (heater or direct sunlight)
- Drafts from open windows and doors
- Extreme vibrations during weighing
- Excessive moisture

Setting Up the Balance/Scale



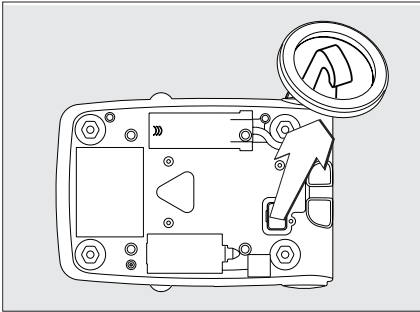
- Place the components on the balance/scale in the following order:
 - Reversible weighing pan
 - Round glass draft ring on model MXX-123

Connecting the Balance/Scale to AC Power



- ⚠ Use only the AC adapter for optimal performance and safety.
- Insert plug into the jack (located on back of balance/scale)
- Plug the AC adapter into an electrical outlet
- ⚠ LISTED power supply 11 V–21 V compliant with NEC Class 2 output.

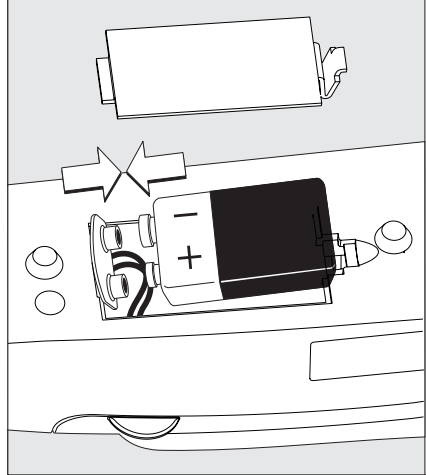
Below-Balance/Under-Scale Weighing



A port for a below-balance weighing hanger is located on the bottom of the balance/scale.

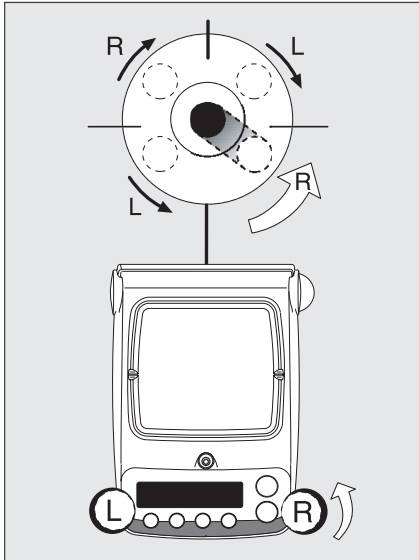
- Open the cover plate on the bottom of the balance/scale.
- Attach the sample (e.g., using a suspension wire) to the hanger.
- Install a shield for protection against drafts if necessary.

Installing the Battery (not for model MXX-123)



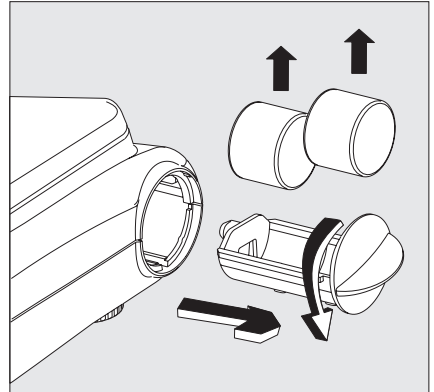
- Batteries are not included with the equipment supplied
- ⚠ Use only commercially available 9V batteries.
- ⚠ If you use a rechargeable battery, recharge it with an external battery charger.
- Lay the balance/scale on its side
- Open the battery compartment: remove the compartment cover
- Install the battery in the compartment
- Make sure the polarity is correct.
- Close the battery compartment: slide the cover into position until it snaps into place
- ⚠ Do not throw away used batteries with normal household waste. Rechargeable batteries contain toxic materials and must be disposed of in accordance with local waste disposal regulations.

Leveling the Balance/Scale (only for model MXX-123)



- Always level the balance/scale again any time after it has been moved to a different location.
 - Turn the front feet as shown in the diagram until the air bubble is centered within the circle of the level indicator.
 - Lower all feet to touch the counter-top so the balance/scale does not rock.
- > In most cases this will require several adjustment steps.

Removing Weights for Calibration/Span Adjustment (only for models MXX-612, MXX-412, MXX-212, MXX-123)



- Grasp the tab to turn and pull out the weight compartment.
- Always wear gloves or use tweezers when handling weights.
- Follow instructions on page 15 for calibration/span adjustment.

Warmup Time for Model MXX-123:
To ensure accurate results, the scale must warm up for 1 hour before operation. Only after this time will the scale have reached the required operating temperature.

Operation

Basic Weighing Function


Features

- Zeroing the balance/scale
You can zero the balance/scale within the entire weighing range, up to the maximum capacity.

Preparation

- Switch on the balance/scale: press the (ON/OFF) key
- If necessary, zero the balance/scale: press the (ZERO) key
- If necessary, change the configuration settings: see the chapter entitled "Configuration"
- If desired, reset the factory settings: see the chapter entitled "Advanced Features," menu item 9.- 1

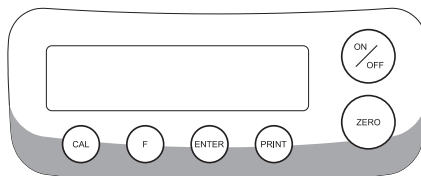
Additional functions:

- Switching off the balance/scale: press the (ON/OFF) key
- Battery operation: automatic shut-off after 2, 5 or 10 minutes; see chapter on configuration. Example: 2 minutes. If the weight readout remains unchanged and no keys are pressed for at least two minutes, the battery symbol "  " starts flashing. After another 2 seconds, the balance/scale shuts off automatically, unless a key is pressed.

Example: Determine weight of sample
Step

1. Switch on the balance/scale
Self-test runs
Display: Software version
2. Place container on the balance/scale
(in this example, 52 g)
3. Zero the balance/scale
4. Place sample in container on balance/scale (in this example, 150.2 g).

Description of the Keys



(ON/OFF) On/off key: switches the balance/scale on and off or switches it to the standby mode.

Battery operation: on;

turns backlight on; off

(ZERO) Zeros the balance/scale; press and hold 2 seconds: enters application menu

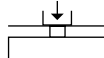
(CAL) Starts calibration/adjustment

(F) Starts an application program; scrolling in application menu, configuration menu and calibration menu

(ENTER) Confirms the selected setting; exits application, configuration & calibration menu if key is pressed and held for at least 2 seconds.

(PRINT) Generates a printout or data output

Key (or instruction)	Display
(ON/OFF)	
	r 31.01 52.0 g
(ZERO)	0.0 g
	150.2 g



Application Programs

Toggle between Weigh Units

With this application program you can toggle the display of a weight value back and forth between two weigh units (see table below).

Example: Toggle weigh unit from pounds [lb] (application) to grams [g] (basic unit)

Step	Key (or instruction)	Display
1. Select application program	(ZERO) ≥ 2 sec	
2. Select Toggling between Weigh Units	(F) repeatedly	
3. Confirm unit of application*	(ENTER)	
4. Select weigh unit; in this example: "5. Pounds" (see table below)	(F) repeatedly	
5. Confirm weigh unit (pounds)	(ENTER)	
6. Place sample on balance/scale		
7. Toggle weigh unit	(F)	

Menu code	Unit	Conversion factor	Display
1. USER**	Grams	1.000000000000	o
2. GRAMS (factory setting)	Grams	1.000000000000	g
4. CARAT	Carats	5.000000000000	o
5. POUND	Pounds	0.00220462260	lb
6. OUNCE	Ounces	0.03527396200	oz
7. TROY	Troy ounces	0.03215074700	ozt
8. HK TAI	Hong Kong taels	0.02671725000	tlk
9. SING	Singapore taels	0.02645544638	tl
10. TAI	Taiwanese taels	0.02666666000	tl
11. GRAIN	Grains	15.4323583500	GN
12. PENNY	Pennyweights	0.64301493100	dwt
15. CHINESE	Chinese taels	0.02645547175	tl
22. LB/OZ	lb/oz	0.03527396200	lb:oz
23. NEWTON	Newtons	0.00980665000	N

* Grams is chosen as 1st unit; to changes 1st unit, see Advanced Features section.

** User-defined conversion can be loaded in balance/scale with RS-232 or USB program option. Contact Denver Instrument for more information.

Counting

Purpose

With the Counting program you can determine the number of parts or pieces by weight.

Example: Determine the number of uncounted parts; calculate the sample reference quantity (in this example: 20)

Step	Key (or instruction)	Display
1. Select application program	(ZERO) \geq 2 sec	
2. Select Counting	(F) repeatedly	
3. Confirm application Symbol "✱" on the display: application is active	(ENTER)	
4. Place empty container on the balance/scale		
5. Zero the balance/scale	(ZERO)	
6. Place sample reference quantity (20) on the balance/scale		
7. Select sample reference quantity: in increments of 1 (1, 2, 3, ..., 99) or in increments of 10 (10, 20, 30, ..., 100)	(F) repeatedly (briefly) or (F) \geq 2 sec.	
8. Confirm selected sample reference quantity	(ENTER)	
9. Place uncounted parts on balance/scale		
10. Toggle display between mean piece weight, total weight, and quantity	(F) repeatedly	
11. Unload the balance/scale		
12. Start new Count application or exit application	(ENTER) \geq 2 sec	
13. Reactivate Counting (if no other application program has been selected)	(F)	
14. Repeat procedure starting from Step 5.		

Weighing in Percent

Purpose

This application program allows you to obtain weight readouts in percent which are in proportion to a reference weight.

Example: Determine an unknown percentage; store the weight on the balance/scale as the reference percentage (100%)

Step	Key (or instruction)	Display
1. Select application program	(ZERO) \geq 2 sec	
2. Select Weighing in Percent	(F) repeatedly	
3. Confirm application Symbol "*" on the display: application is active	(ENTER)	
4. Place empty container on the balance/scale		
5. Zero the balance/scale	(ZERO)	
6. Place the reference weight for 100% on the balance/scale		
7. If desired, change the number of decimal places displayed: 100.0%, 100.00% or 100% (factory setting)	(F) repeatedly	
8. Confirm selected no. of decimal places	(ENTER)	
9. Place unknown weight on the balance/scale		
10. Toggle display between weight and percentage	(F) repeatedly	
11. Unload the balance/scale		
12. Start new Weighing in Percent application or exit application	(ENTER) \geq 2 sec	
13. Reactivate Weighing in Percent (if no other application program has been selected)	(F)	
14. Repeat procedure starting from Step 5.		

Display Lock Mode

Purpose

The last stable value remains displayed for 5 seconds after removing the sample from the pan.

Example: Determine weight of oversized sample

Step	Key (or instruction)	Display
1. Select application program	(ZERO) ≥ 2 sec	
2. Select Display Lock ("HLdon")	(F) repeatedly	
3. Confirm application Symbol "▲" on the display: application is active	(ENTER)	
4. If necessary: zero the balance/scale	(ZERO)	
5. Place sample on balance/scale		
6. Start application program	(F)	
Symbol "▲" flashes on the display: when stability conditions are met		
7. Unload the balance/scale: the weight value remains displayed for a further 5 seconds; or		
8. Zero the balance/scale	(ZERO)	
9. End the Display Lock application	(ENTER) ≥ 2 sec	
10. Reactivate Display Lock (if no other application program has been selected)	(F)	
11. Repeat procedure starting from Step 5.		

Total/Formulation

Purpose

With this application program you can add successive weight values. The cumulative weight can infinitely exceed the capacity of the balance/scale.

Example: Obtaining the total/formulation

Step	Key (or instruction)	Display
1. Select application program	(ZERO) \geq 2 sec	
2. Select Total (formulation)	(F) repeatedly	
3. Confirm application Symbol "✱" on the display: application is active	(ENTER)	
4. If necessary: zero the balance/scale	(ZERO)	
5. Place sample on balance/scale (in this example, 380 g)		
6. Store value in memory. Total weight is displayed steadily; Σ symbol flashes. If interface is connected, sample weight is outputted automatically	(ENTER)	
7. Remove sample or press ZERO		
8. Place the next sample on the balance/scale (in this example, 575 g)		
9. Store value in memory. Total weight is displayed; along with the flashing Σ icon. Note: Σ symbol remains on, indicating stored value in memory until cleared (if interface is connected, sample weight is outputted automatically).	(ENTER)	
10. To view current individual weight for 2 seconds (if a printer is connected, a printout is generated)	(F)	
11. Clear Total memory (if a printer is connected, total is printed)	(F) \geq 2 sec	
12. Exit Total/Formulation	(ENTER) \geq 2 sec	
13. Reactivate Totalizing (if no other application program has been selected) (if a printer is connected, total is printed).	(F)	
14. Repeat procedure starting from Step 6.		

Specific Gravity

Purpose

Use this application program to determine the specific gravity of a sample. The calculation used is $\text{Result} = \text{Weight in air} / (\text{Weight in air} - \text{Weight in water})$. The result is displayed with one decimal place. Beaker and wire not included with balance/scale.

Example: Determine the specific gravity of a solid.

Step	Key (or instruction)	Display
1. Select application program	(ZERO) ≥ 2 sec	
2. Select Specific Gravity	(F) repeatedly	
3. Confirm application Symbol "g*" on the display: application is active	(ENTER)	
4. If necessary, zero the balance/scale	(ZERO)	
5. Start application program	(F)	
6. Confirm the display, "AIRURL"	(ENTER)	
7. Determine weight of the sample in air: place sample on the balance/scale		
8. Store weight-in-air value	(ENTER)	
9. Remove sample from balance/scale		
10. Determine weight of sample in liquid: connect wire and set up beaker		
11. Confirm the display "Water"	(ENTER)	
12. Place sample in liquid		
13. Store the weight-in-liquid value and view the result	(ENTER)	
14. Clear the display	(ZERO)	
15. Exit the Specific Gravity application	(ENTER) ≥ 2 sec	
16. Reactivate Specific Gravity (if no other application program has been selected)	(F)	
17. Repeat procedure starting from Step 5.		

Calibration/Span Adjustment

Calibration is recommended after initial installation and each time the balance/scale is moved.

Features

Calibration/adjustment can be performed only when:

- there is no load on the balance/scale,
- the scale is zeroed, and
- the internal signal is stable.

If these conditions are not met, an error message is displayed.

The weight required for calibration/span adjustment is displayed.

Standard calibration weights for selected models: to remove, see instructions on page 7.

Press (F) to select a different weight value.



To cancel the procedure: press and hold the (ENTER) key (≥ 2 sec.).

Example: Calibrate/adjust span of the balance/scale (here: model MXX-5001)

Step	Key (or instruction)	Display
1. Switch on the balance/scale	(ON/OFF)	
2. Zero the balance/scale	(ZERO)	
3. Start calibration The preset calibration weight is displayed without the weigh unit (in this example, 5000 g)	(CAL)	
4. To select a different calibration weight value	(F) repeatedly	
5. Start calibration/span adjustment	(ENTER)	
After the zero point is stored, the required calibration weight flashes on the display.		
6. Place the required calibration weight on the balance/scale		
The readout stops flashing if the weight is applied within the defined time limit and tolerance. If the weight value is accepted, the display stops flashing and the stability symbol appears on the display.		
7. Remove the calibration weight		
8. Calibration/span adjustment has been completed		

Advanced Features (Setup Menu)

Purpose: Several advanced balance operations can be changed through menu codes. Select the desired codes from the list below. Then follow the steps to change the menu codes.

Step	Key (or instruction)	Display
1. Turn balance off.	(ON/OFF)	
2. Turn the balance back on. While all segments are displayed, press ZERO key once.	ZERO	
3. Increase the number on display to desired value.	MODE	
4. Move to the 2nd number of the code.	ENTER	
5. Increase the second number on display to desired value.	MODE	
6. Move to the 3rd number of the code (when you move to the third number, the previously set menu code will appear).	ENTER	
7. Increase the third number on display to desired value.	MODE	
8. Confirm new code.	Hold down the ENTER key until "0" appears after the desired code. Press ZERO for more than 2 seconds	
9. Exit setup menu.		

Special Keyfunctions for Menu Code Operation

Key	Press briefly	Press and hold
(F)	Increase a number by one with each press	
(ENTER)	Moves to the next of three numbers of a code; hold to confirm setting	
(ZERO)	Moves to the previous number of a codes; hold to exit set-up.	

Parameter Settings (Overview)

o Factory setting

Setup menu	1 Weighing	1.1. Adapt filter	1.1.1	Very stable conditions
			1.1.2	o Stable conditions
			1.1.3	Unstable conditions
			1.1.4	Very unstable conditions
		1.2. Application filter	1.2.1	o Final readout
			1.2.2	Filling
		1.3. Stability range	1.3.1	1/4 digit
	1.3.2		1/2 digit	
	1.3.3		1 digit	
	1.3.4		o 2 digits	
	1.3.5		4 digits	
	1.5. Calib./adjust./linearization: Function of the (CAL) key	1.5.1	o Calibration/span adjustment	
		1.5.2	Linearization: for service personnel only	
		1.5.3	Key blocked	
	1.6. Auto zero	1.6.1	o On	
		1.6.2	Off	
	1.7. 1st weigh unit, or 2nd unit in Toggle Weigh Units app.	1.7.1	User-defined unit: see "Toggling between Weigh Units"	
to 1.7.23				
5. and 6.	Interface settings; see manual for interface accessory			
8. Additional functions	8.1. Block key functions (with battery use only)	8.1.1	All keys blocked except for (ON/OFF) and (ZERO)	
		8.1.2	o All keys unblocked	
	8.2. Automatic shut-off (with battery use only)	8.2.1	o After 2 minutes	
8.2.2		After 5 minutes		
8.2.3		After 10 minutes		
9. Reset menu	9.1. Factory settings	9.1.1	Restore	
		9.1.2	o Do not restore	

Error Codes

Most error codes are shown on the main display for approx. 2 seconds. The program then returns automatically to the previous mode.

Display/Problem	Cause	Solution
No segments appear on the display	No power available	Check the power supply
	The AC adapter is not plugged in Battery is drained	Plug in the AC adapter Replace battery; recharge battery using external charger
<i>oL</i>	The load exceeds the balance/scale capacity	Unload the balance/scale
<i>uL</i>	Weighing pan not in place	Place the weighing pan on the balance/scale
	Something is touching the weighing pan	Move the object that is touching the weighing pan
<i>d iSErr</i>	Display overflow: Value cannot be shown on the display	Reduce load on the balance/scale
<i>CALErr</i>	Calibration parameter not met; e.g.:	Calibrate only when zero is displayed
	– Balance/scale not zeroed	Press (ZERO) to tare the balance/scale
	– Balance/scale is loaded	Unload the balance/scale
<i>RPPErr</i>	Weight is too light or there is no sample on the balance/scale with application in use	Increase the weight on the balance/scale
<i>PrtErr</i>	Data interface for printing is blocked	Contact the Denver customer service center
<i>bALErr</i>	Balance/scale loaded or defective when power was turned on	Unload balance/scale before switching on or contact Denver customer service*
<i>SEPErr</i>	Balance/scale defective	Contact Denver customer service
Max. weighing capacity is less than indicated under “Specifications”	The balance/scale was switched on without the weighing pan in place	Place the weighing pan on the balance/scale and press (ON/OFF)
The weight readout is obviously wrong	The balance/scale was not calibrated/adjusted before weighing Balance/scale not zeroed	Calibrate/adjust the balance/scale Zero the balance/scale

If any other errors occur, contact your local Denver customer service center

* This fault will appear on the display when the unit is powered on. This occurs when the electronics are no longer within the factory set parameters. The most common cause is from objects being dropped onto the weighing pan or from the balance itself being dropped. The balance must be returned for service.

Overview

Specifications

Model		MXX-123	MXX-612	MXX-412	MXX-212
Weighing capacity	g	120	610	410	210
Readability	g	0.001	0.01	0.01	0.01
Tare range (subtractive)	g	120	610	410	210
Linearity	≤ ±g	0.003	0.03	0.03	0.03
Operating temperature range		10°C to 30°C (273°K to 303°K; 50°F to 86°F)			
Response time (average)	s	2.5	2	2	2
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels; display update: 0.1–0.8 sec. (depends on filter level selected)			
Calibration weight	g	100*	200*	200*	200*
Net weight, approx.	kg/lb	1.2/2.6	1.35/2.9	1.35/2.9	1.2/2.6
Pan size	mm/in	97/3.8 ∅	142×130/5.6×5.1		97/3.8 ∅
Power source/voltage/frequency		AC adapter, 230 V or 115 V, +15% to –20%, 48–60 Hz			
Power consumption (average)	W	1	0.75	0.75	0.75
Hours of operation w/ 9V battery:					
– Alkaline (approx.)	h	–	11	11	14
– Rechargeable, fully ch. (NiMH), avg.	h	–	2.5	2.5	4

Model		MXX-5001	MXX-2001	MXX-601	MXX-10	MXX-5
Weighing capacity	g	5000	2000	600	10000	5000
Readability	g	0.1	0.1	0.1	1	1
Tare range (subtractive)	g	5000	2000	600	10000	5000
Linearity	≤ ±g	0.2	0.2	0.2	2	2
Operating temperature range		10°C to 30°C (273°K to 303°K; 50°F to 86°F)				
Response time (average)	s	2	2	1.5	1.5	1.5
Adaptation to ambient conditions		By selection of 1 of 4 optimized filter levels; display update: 0.1–0.8 sec. (depends on filter level selected)				
Calibration weight	kg	5*	2*	0.2*	5*	5*
Net weight, approx.	kg/lb	1.1/2.4	1.1/2.4	1.25/2.8	1.1/2.4	1.1/2.4
Pan size	mm/in	142×130/5.6×5.1				
Power source/voltage/frequency		AC adapter, 230 V or 115 V, +15% to –20%, 48–60 Hz				
Power consumption (average)	W	1	1	0.75	0.75	0.75
Hours of operation w/ 9V battery:						
– Alkaline (approx.)	h	11	11	14	14	14
– Rechargeable, fully ch. (NiMH), avg.	h	2.5	2.5	4	4	4

* included with the balance

Accessories

Product

Data interface, mounting kit

- RS-232 interface with cable
- USB interface with cable

Data printer

Lock-down capability

(for anti-theft locking device)

Calibration weights

- for MXX-601 (200 g)
 - for MXX-5001 (5 kg)
 - for MXX-2001 (2 kg)
 - for MXX-10 (5 kg)
 - for MXX-5 (5 kg)
-

CE Marking

The balance/scale complies with the following EC Directives and European Standards:

Council Directive 89/336/EEC
“Electromagnetic compatibility
(EMC)”

Applicable European Standards:

Limitation of emissions:

In accordance with product standard
EN 61326-1 Class B (residential area)

Defined immunity to interference:

in accordance with product standard
EN 61326-1

(minimum test requirements,
non-continuous operation)

Important Note:

The operator shall be responsible for any modifications to Denver equipment and must check and, if necessary, correct these modifications.

On request, Denver will provide information on the minimum operating specifications (in accordance with the

Standards listed above for defined immunity to interference).

73/23/EEC “Electrical equipment designed for use within certain voltage limits”

Applicable European Standards:

EN 60950

Safety of information technology equipment including electrical business equipment

EN 61010

Safety requirements for electrical equipment for measurement, control and laboratory use
Part 1: General requirements

If you use electrical equipment in installations and under ambient conditions requiring higher safety standards, you must comply with the provisions as specified in the applicable regulations for installation in your country.

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