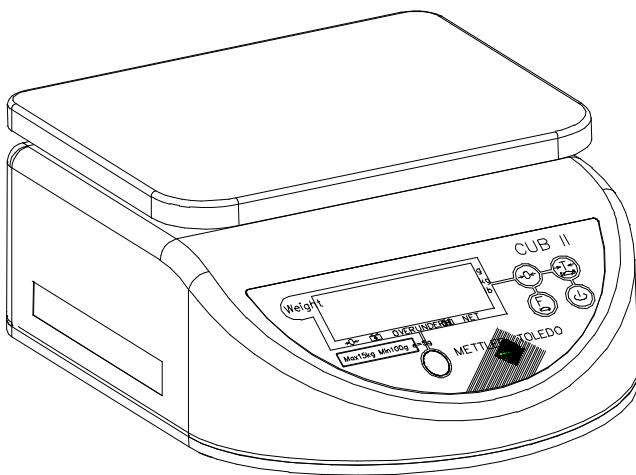


Cub-II

Weight Only Scale

Service Manual



METTLER TOLEDO

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1 Introduction

Thank you for purchasing the Cub II weigh only scale, designed for various weighing applications.

1.1 Cub II Overview

The Mettler Toledo model Cub II is a stand-alone weigh only scale designed to meet the needs of a worldwide market. According to working environment, 3 versions are available including RW10, RW11 and RW12.

1.1.1 Reliability

The Cub II was developed, produced, and tested in a Mettler Toledo facility that has been audited and registered according to international ISO 9001 quality standards and ISO 14000 environment control program.

1.1.2 Standard Features

Not all features are available in all models.

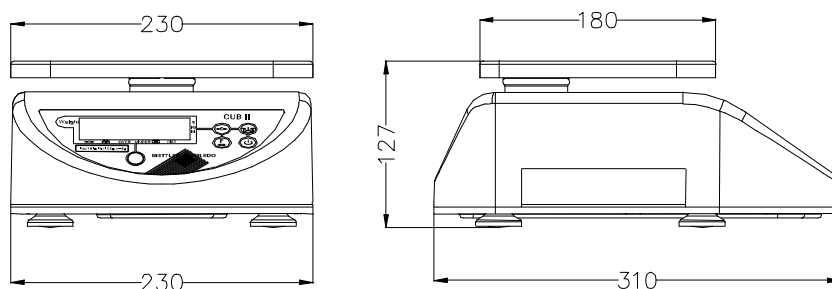
- + Capacity: 600g x 0.2g; 1.5x0.5g; 3x0.001kg; 6x0.002kg; 15 x 0.005kg
1.5x0.0005lb; 3x0.001lb; 6x0.002lb; 15x0.005lb; 30x0.01lb
 - + Average updating speed: up to 0.8 seconds
 - + Accuracy: 3000 approved*, 6000/7500 maximum displayed
 - + Platter: stainless steel: 180X230mm, x?x (600g only)
 - + Display: LCD: 19 mm high, optional backlight is available, 6 digits.
LED: 14 mm high, red, 6 digits.
 - + Different display updating style: normal updating or holding display.
 - + Keyboard: 4 touch keys with a tactile and tone feedback upon key closure.
 - + Power supply: External 9VDC/500mA power supply.
6V/5Ah lead-acid rechargeable battery.
6 1# D-cells (LCD version only).
- Clever battery capacity indication gives you more convenience of use of battery (LCD version only).
- + Enclosure: Plastic or SS top and plastic bottom covers, SS spiders (top/lower).
 - + Basic functions: zero; tare; on/off, over and under.
 - + IP 65
 - + Sealing: The following 3-level sealing will be available for some models. Battery is in a sealed and separated housing.
 - First level rubber ring sealing is between up cover and base and spider and up cover;
 - The second rubber ring sealing is for both main PCB and back PCB, the two housing for two PCB are also be separated
 - The third glue sealing is for main PCB.

* 600g is not approved.

1.1.3 Option

Big SS platter sized 200X290mm

1.1.4 Physical Dimensions



1.1.5 Power

Power supply

Introduction

- + External 9VDC/500mA power supply.
- + 6V/5Ah lead-acid rechargeable battery.
- + 6 1# D-cells (LCD version only).

Notice: non-rechargeable battery can not be used in the scale with charging function.

The Work time is battery capacity/ working current.

Please use these calculated data as an indication, data will vary, depending on supplier, environment, age, way of usage, etc.

1.1.6 Load Cell

The capacity of the analog load cell versus the capacity of the scale is as follows:

Capacity of the scale	600g	1.5kg/3lb	3kg/6lb	6kg/15lb	15kg/30lb	30kg/60lb
Capacity of the load cell	1kg	3.5kg	6.5kg	15kg	30kg	40kg
Resistance of the load cell	1000 ohm	350 ohm	350 ohm	350 ohm	350 ohm	350 ohm

1.1.7 Temperature and Humidity

Working temperature range: from -10 to +40 °C (+14 to +114F) at following humidity:

- + RW10: dry, 10 to 85% humidity, non-condensing.
- + RW11: IP 65, 10 to 85% humidity, non-condensing.
- + RW12: damp.

Storage temperature range: from -25 to +50°C at 10 to 85% humidity, non-condensing.

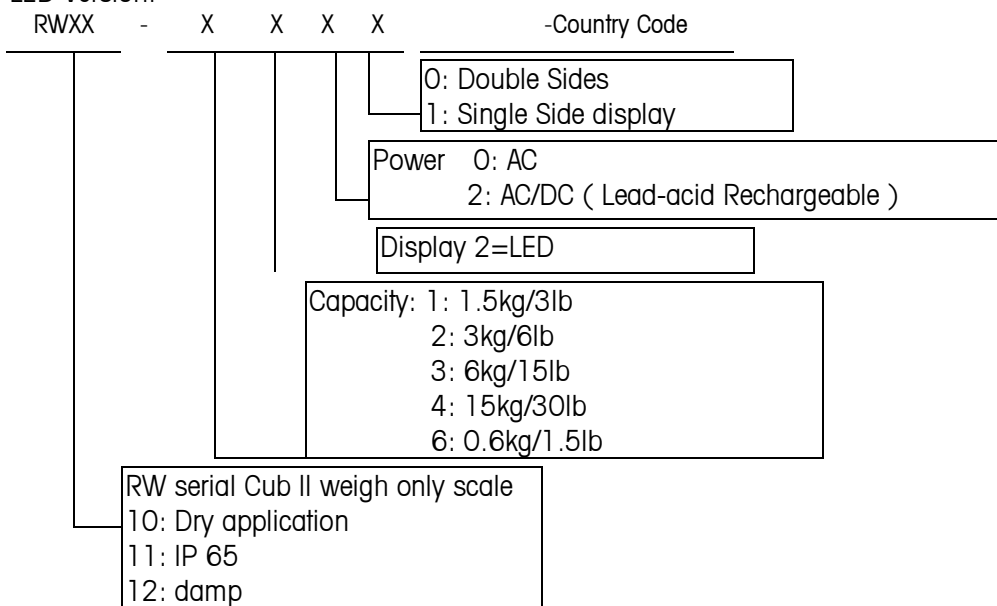
1.1.8 Weights and Measures Approval

- UL60950: The approval number is:xxxxxxx
- OIML 3000e: The approval number is: xxxxxx
- Factory Audit OIML (first step) by the Eichdirektion Stuttgart

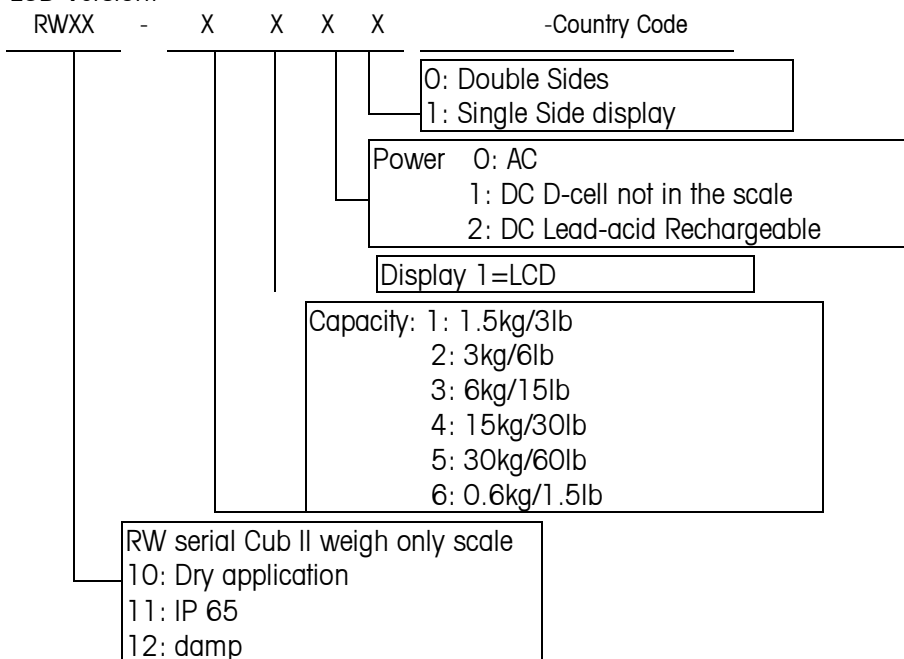
For most EU countries the Cub II will be factory stamped.

1.2 Model Configuration

LED Version:



LCD Version:



Notice: to Stainless steel version, the model will be RWXX-XXXXS-XXX. The difference between SS version and plastic version (RWxx-xxxx-xxx) is just the one part, up cover, one is plastic, and the other is SS.

2 Installation

2.1 Precautions

This chapter gives detailed instructions and important information to install the Cub II scale successfully.

2.2 Environment

Before you install the scale, identify the best location for the equipment. The proper environment enhances its operation and longevity. Keep in mind the following factors, which might have a negative influence on the scale's operation:

+ Vibration

Vibration diminishes the scale's ability to measure accurately. Electrical machinery such as conveyors and drill presses can cause inaccurate and non-repeatable readings. The scale may also read inaccurately if it is not leveled properly.

+ +Air current

Moving air can cause the scale to read an additional force (add. weight) and have the same effect as vibration.

+ +Friction

A scale cannot measure accurately if an object is rubbing or pressing against the plate.

2.3 Unpacking and inspection

Please inspect the package as it is delivered by the carrier. If the shipping container is damaged, check for internal damage and file a freight claim with the carrier if necessary. If the container is undamaged, open the box, remove the scale and place it on a solid, flat surface. Please keep the packing material and shipping insert in case you need to return the scale to METTLER TOLEDO. The Cub II is a precision instrument and may be permanently damaged if not shipped in factory approved packaging.

Package contents for all Cub II units include:

Package contents for all Cub II units include:

+ Cub II scale + platter+ AC-DC power adapter + operation manual

2.4 Setup

Open the box and pull up the scale, including the packing material. Remove the packing material from each side of the scale.

Set the unit on a sturdy, level surface. Level the scale by turning the adjustable feet on the bottom of the unit. When the bubble indicator is in the centre of the circle, Cub II is leveled correctly.

Bubble indicator:

Good



Wrong




All four feet must touch the surface to make sure that Cub II does not rock.

Put the platter on top of Cub II.


If no battery is in the scale, unpack the power adapter and plug it into the bottom of the scale. Plug the line cord into a properly grounded AC power outlet.

2.5 Power up sequence and Turn Off the Scale

Press the power key  turn on the Cub II. It goes through a series of self-tests when it is turned on. The scale performs a diagnostic test on its ROM and RAM, and proceeds to normal operating mode. The power-up sequence is as follows:

- Light all segments of the display characters. This verifies operation of all segments.
- Display the software part number, revision number, GEO value and battery type one by one.
- Capture zero and be ready for normal operation.

Note: Before switching on the Cub II scale, always make sure there is nothing on the platter.

Press the power key  until "OFF" is shown to turn off the scale.

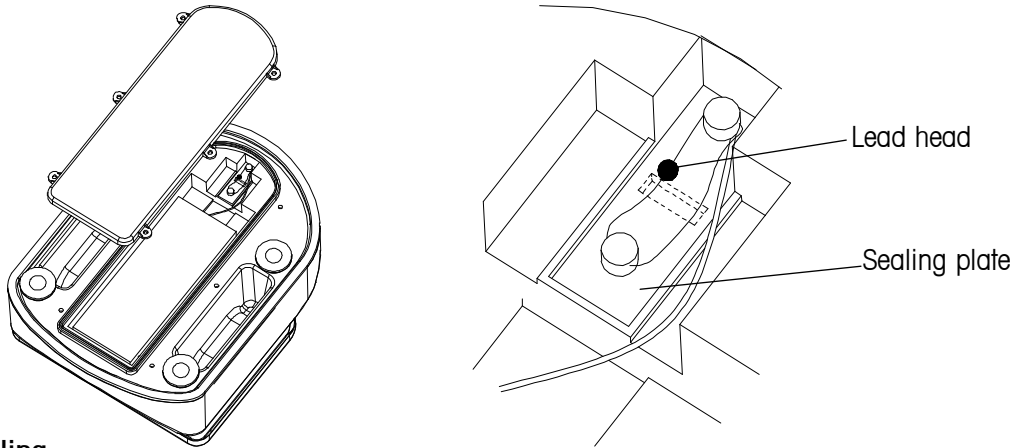
2.6 Sealing

After installation is complete, most legal-for-trade applications require sealing the enclosure so settings cannot be changed.

There are two kinds of sealing, one is lead wire sealing, the other is sticker sealing

2.6.1 The lead wire sealing

- Install special through-hole sealing screw.
- Tighten these two screws and run a wire seal through the holes in the heads of the screws.
- Apply the seal.

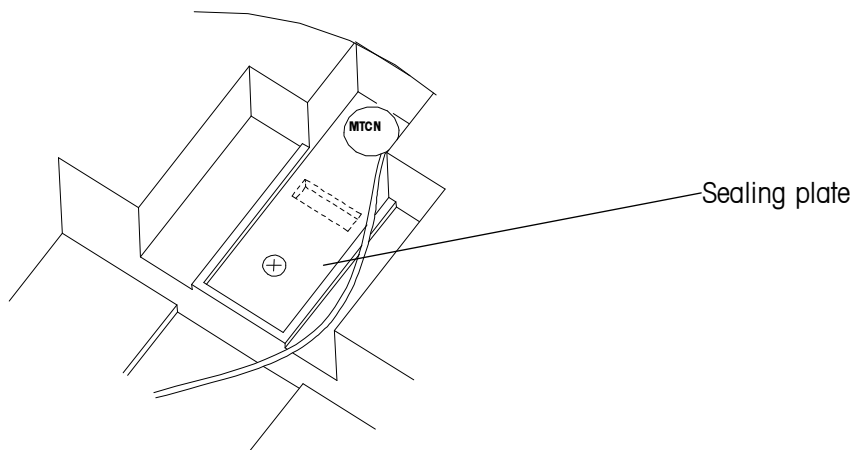


2.6.2 Sticker Sealing

Security Sticker Ø 15mm material Vinyl white 3690 E UL, colour red, type black.



The position for the sealing and stamping stickers is shown below.



3 Set up and Calibration

This chapter discusses basic features of program blocks and the specific parameters and how to configure each program block. There are two ways (Service Mode & Master Mode) to access the program steps and calibration. In master mode, some softswitches are programmable, and in service mode, all softswitches and calibration are programmable. The following section "Set up Softswitch and Default Table" lists softswitch default values in two modes.

Service setup mode

Open battery holder cover, and remove the calibration plate, push the switch on the main PCB rightward with a thin rod through the calibration hole. The display will show "S1 ON", it means the scale has accessed to setup mode. At this time, you may push the switch back. In this case, after setting finish, it is not needed to push the switch again.

Service setup mode:

Press and hold [>0<] until "S1 OFF" is displayed to access master mode when turn on the scale.

3.1 Function of the key

In Set up mode, the functions of the keys are as follows:

Key	Name	Function
[>0<]	Accept key	Finish setting
[>T<]	Toggle key	Chose parameter
[F]	Back key	Step backwards to last step
[on/off]	Finish key	Confirm choice and step forwards to next step

3.2 Set up Softswitch and Default Table

Step	Description	Available parameter	Default	Available in master mode
Def	Initiate default	No: don't initiate the default Yes: Initiate the default	no	No
S1	Automatically turn off the scale	On: Enable this function off: disable this function	off	yes
S2	Sleeping function	On: Enable this function off: disable this function	on	yes
S3	Beep range	0: no beep 1: beep when weight is between over and under value 2: beep when weigh is out of range of over and under	0	yes
S4	Filter strenghtn	0: light 1: normal 2: strong 3: very strong	0	yes
S5	Weight unit	g/kg/lb	g	yes
S6	LED brightness	0: normal, the work currence is ? ? mA 1: dimmer than "0", the work current is ? ? mA 2: dimmer than "1", the work current is ? ? mA 3: dimmer than "2", the work current is ? ? mA	0	yes
S7	Display type	On: rapidly update Off: hold display	on	No
S8	Resolution	On: 6000/7500 (available) Off: 3000 (approved)	off	No
S9	Enable access to S8 in master mode	On: Enable Off: Disable	off	No
S10	Expanded display	On: Expanded display (30000/60000/75000) Off: Normal display	off	No

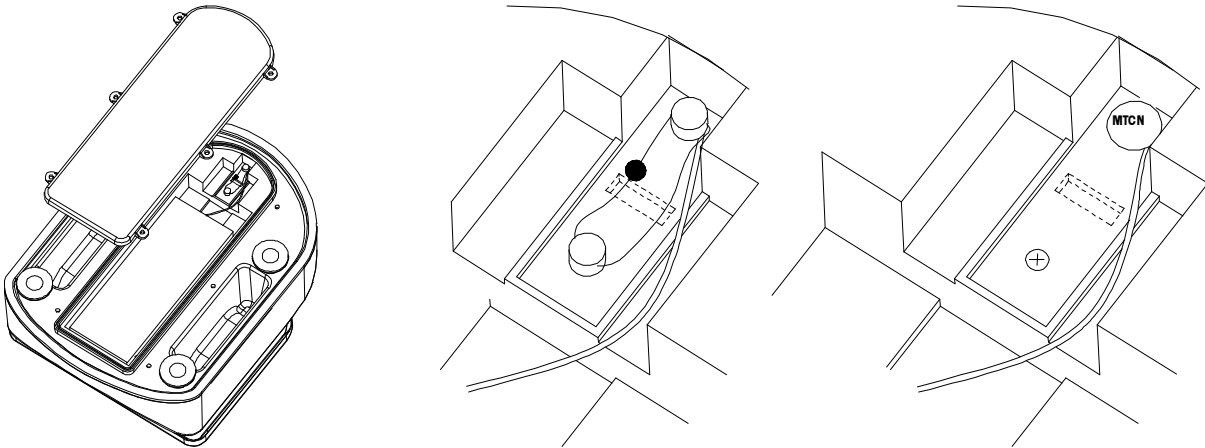
Set up and Calibration

Bat	Battery type	Bat D: D-cell Bat CH: Rechargeable battery	Bat CH:	No
GEO	GEO	0~31	12	No
Cal	Calibrate	YES: Calibrate scale NO: Don't calibrate scale	no	No

3.3 Calibration

3.3.1 Calibration switch & sealing stickers

Bottom view of Cub II



3.3.2 Calibrate scale and exit setting mode

Step	Operation	Display	Description
		[CAL YES]	
1	Press [ON/OFF]	[kg]	Calibration weight unit
	Press [>T<]	[lb]	Chose suitable parameter
2	Press [ON/OFF]	[600]	Capacity of the scale**
	Press [>T<]	[1500]	Chose suitable parameter
3	Press [ON/OFF]	[-----]	Capture zero, make sure the platter is empty before press [>0<]
4		[5]	The scale count down from 5 to 0, if the scale isn't stable, it will count again until find stable zero.
5	Press [ON/OFF]	[400]	Put the weight of 400g (2/3 of the full capacity) on the platter
	Press [>T<]	[600]	Chose the suitable weight of 600g (full capacity)***
3	Press [ON/OFF]	[5]	Capture span. The scale count down from 5 to 0, if the scale isn't stable, it will count again until find stable zero.
1	Press [ON/OFF]	[save]	Save calibration and all setting changes
	Press [>T<]	[abort]	Abort calibration and all setting changes
2	Press [ON/OFF]	[done]	Finish calibration
	Push the calibration switch back	[0.000]	Weigh display mode

* the lines highlighted by grey are for reference of parameter choice.

** The available capacities are as follows:

Capacity of the scale	600g	1.5kg	3kg	6kg	15kg	30kg
Display	600	1500	3000	6000	15000	30000

Capacity of the scale	1.5lb	3lb	6lb	15lb	30lb	60lb
Display	1500	3000	6000	15000	30000	60000

** The capacity of the scale versus the required added weight

Capacity of the scale	600g	1.5kg	3kg	6kg	15kg	30kg
Full capacity	600	1500	3000	6000	15000	30000
2/3 of the capacity	400	1000	2000	4000	10000	20000

Capacity of the scale	1.5lb	3lb	6lb	15lb	30lb	60lb
Full capacity	1500	3000	6000	15000	30000	60000
2/3 of the capacity	1000	2000	4000	10000	20000	40000

3.4 Specifications by Country for GEO value and weight unit

Country	GEO	Weight Unit
RUSSIA	23	K Γ
BELGIUM; NETHERLAND; Poland; England	21	kg
Ukraine		K Γ
GERMANY; Czechia	20	Kg
FRANCE; HUNGARY; Slovakia	19	kg
AUSTRIA; CROATIA; Slovenia; SWITZERLAND	18	kg
Kazachstan		K Γ
ITALY	17	kg
PORTUGAL; SPAIN	15	kg
USA	12	lb
Other		kg

4 Operating Instructions

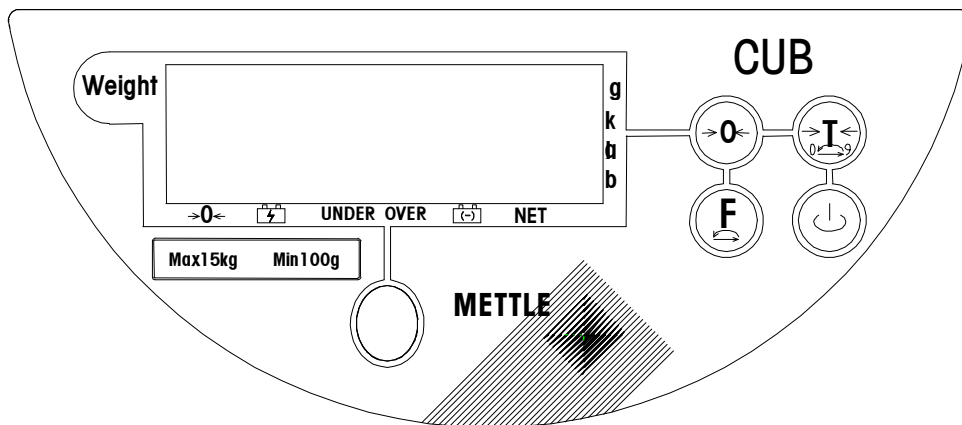
This chapter provides information that an operator will need to become familiar with the scale and to perform its functions.

4.1 Display Area & Keypad

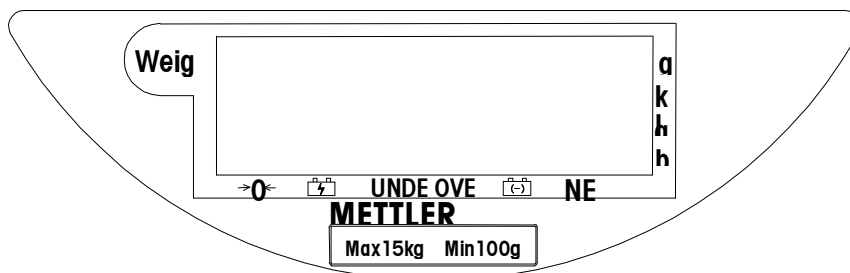
The CUB II price computing model has four overlay depending different version. These are pictured below:
EU Version

4.1.1 Overlay

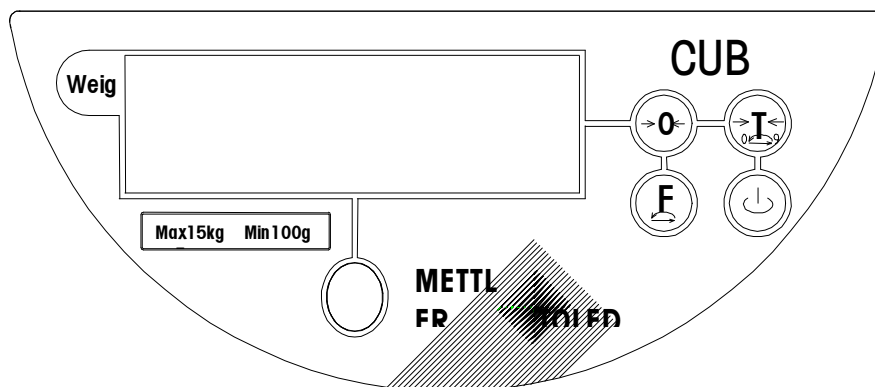
LED version:
Operator side:



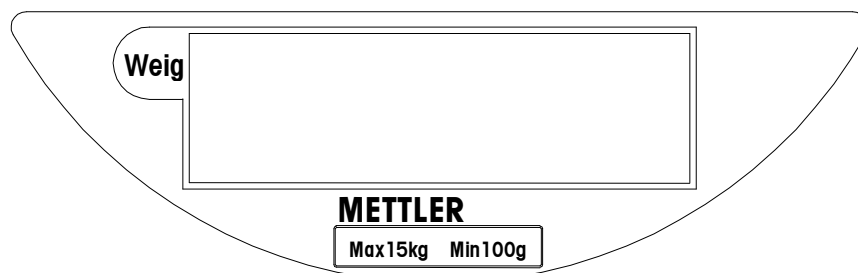
Customer side:



LCD version
Operator side:



Customer side:



4.2 Keys

Key	Name	Function
	Zero Key	To return the scale to gross zero if drifting occurs
	Tare Key	To tare the scale
	Function Key	To enter over/under setting mode
	Power key	To turn on or turn off the scale

4.3 Cursors

Cursor	Description
>0<	To be lit when weight is gross 0
LED version	To be lit when power is AC or battery is fully charged
	To be lit when power is battery, it blinks to indicate the voltage of battery is lower than the required
LCD version	To be lit when power is AC or battery is fully charged blinking means the voltage is being charged more than > V
	To be lit when voltage is less than ?V blinking means the voltage is being charged more than > V
	To be lit when voltage is less than ?V blinking means the voltage is being charged more than > V
	In charging mode: blinking means the voltage is being charged more than > V In discharging mode: To be lit when voltage is less than ?V, Begin blinking when the power of the battery is less than the requirement. The scale will be turned off automatically when voltage is less than the critical voltage point.
Net	To be lit when tare is existed
under	To be lit when weight is less than the under value
over	To be lit when weight is more than the over value

Notice: Some model has back display. Please check with dealer if the model you purchase has back display.

5 Operations

5.1 Straight weighing

Place the item to be weighed on the platter.

Remove the item from the platter, display will return to 0.

5.2 Re-zero function

There are two ways to re-zero the scale:

1. Power-up Zero
2. Push button Zero

5.2.1 Power-up Zero



The scale will automatically capture zero when it is turned on. The power-up zero capture range is +/-10% of the scale capacity. When the scale is turned on with a weight on the platter of more than +/-10% of the capacity, the scale will not capture zero (the weight display will show "----") and the scale will not be ready for use. After removing the weight the scale will capture "zero".

5.2.2 Pushbutton Zero

The ZERO key re-zeros the scale over a range of +/-2% of the scale capacity. To use this function, the scale must be in the gross weighing mode (NET cursor must be off) and in a no motion condition. When the weight on the platter is more than +/-2% of the scale capacity the depression of the zero key will not be accepted.

5.3 Tare Function

The Tare key subtracts the weight of the wrapping material.

- 1) Place the empty container or wrapping material on the platter, e.g. 50g.
- 2) Press  key, it show net weight 0g, meanwhile net weight cursor light.
- 3) Place the item to be weighed in the container or on the wrapping material and then onto the platter.
- 4) Remove the weighed item, as well as the container or wrapping material from the platter, the displays will show all the negative net weight of the container, e.g. -50g.
- 5) Press  key to return the scale back to gross weighing mode.

5.4 Power Save and automatically turning off scale

Power saving feature is used to save battery power. These functions can be enabled or disabled through setting.

When using the battery and the scale is idle for 2 minutes, both the price and total price displays will turn off, the weight display will only display one decimal on the right and the battery in use cursor is lit. This indicates that the scale is in the power saving cycle. When weight is placed on the platter or a key is pressed, the scale will wake up automatically.

If there is still no key operation and weight change 15 minutes after power saving status occurred, the scale will be turned off automatically.

5.5 Backlight

Press key [Zero] until to hear 2 continuous beep to turn on the backlight. Using the same way or just turning off the scale turn off backlight.

The backlight will be turn off temporarily if there is no weight change or no key touching for 15 seconds, while in this case, if weight changes or any key is pressed, backlight will be turned on automatically.

This function is only available in LCD with backlight version.

6 Over/Under

6.1 Setting mode

Press [F] key to access to setting mode. The display will show default 0.000 (the digits on the both sides of decimal point vary with the capacity and its resolution E.g.: 0.000 (3kg scale)) or exiting value.

Notice: All value will be zero after resolution or weight unit is changes.

Cursor over will light when setting over values, and the under will light when setting under value.

6.2 Key Function

In over and under setting mode, the functions of the keys will be as follows:

key	Description
[>0<]	End setting mode and return the scale to weighing mode.
[T]	Chose value in a circle from 0 to 9.
[F]	Chose digit in a circle from left to right.
[On/off]	Confirm the choice and step forward to next step in a circle of over and under value.

6.3 Set over and under value

In setting mode, if the cursor over is lit, the over value can be set. Press key [F] some times to chose digit you want, the chosen digit will blink, then press key [T] to change to value of this digit to what you want, use the same way to set all digits and get the right over value, finally press [>0<] to confirm the over value and step forwards to under value setting. The way to set under value is same as over value. When setting is finish, press [on/off] key to return the scale to the weighing mode.

For example: 3kg scale, the over value is 505g, under value is 500g:

The procedures	display show	Lit cursor
1) Press [F] to access to setting mode	[0.000]	over
2) Press [F]	[0.000]	over
3) Press [T] 5 times	[0.500]	over
4) Press [F] twice	[0.500]	over
5) Press [T] 5 times	[0.505]	over
6) Press [ON/OFF] to set under value	[0.000]	under
7) Press [F]	[0.000]	under
8) Press [T] 5 times	[0.500]	under
9) Press [on/off] to set over value	[0.505]	over
10) Press [>0<] to be back to weighing mode	[0.000]	

The digit in grey shadow mean this digit is blinking.

6.4 Operation

When over and under value exists, beep will be available as a sound indication, the possible mode will be as follows:

Weight	S3 is 0	S3 is 1	S3 is 2	Lit cursor
> over value	No beep	No beep	beep	over
< under value	No beep	No beep	beep	Under
<= over value and >=under value	No beep	beep	No beep	Over and under
Over value=under value =0*	No beep	No beep	No beep	

*When both over and under values are 0, over and under indication function is disable.

7 Batteries

+ Battery type

To rechargeable version, Cub II can use one 5V/5Ah lead-acid rechargeable battery.

To D-cell version, Cub II can use 6 1# d-cells. Always make sure that all six batteries have the same capacity.

Please contact your authorized dealer for more information.

+ Installation

Before you install the batteries, make sure that the external power supply is disconnected. Turn the scale upside down and lay the scale carefully on the platter. Open the battery cover by unscrewing, and then install the batteries as shown on the battery holder or the label on the battery holder cover. Close the cover by screwing all screws

+ Battery indication

Please see the detail inset in section 4.3. ay.

+ Charging (automatically)

The automatic charging will only start when the AC is provided until it is fully charged.

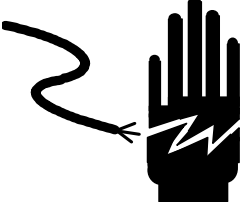

Note

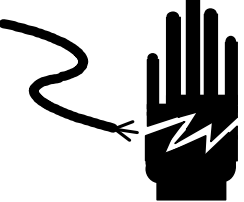

The total operation time of the scale on fully charged batteries depends on the basic capacity (mAh) of the batteries.

The capacity of the NIHM batteries will reduce over the years and therefore also the total operation time of the scale.

This is not an error of the scale, but it is normal behavior of the NIHM batteries.

8 Service and Maintenance

	 WARNING
	<p>ONLY PERMIT QUALIFIED PERSONNEL TO SERVICE THIS EQUIPMENT. EXERCISE CARE WHEN MAKING CHECKS, TESTS AND ADJUSTMENTS THAT MUST BE MADE WITH POWER ON. FAILING TO OBSERVE THESE PRECAUTIONS CAN RESULT IN BODILY HARM.</p>

	 WARNING
	<p>DISCONNECT ALL POWER TO THIS UNIT BEFORE SERVICING OR CLEANING.</p>

This chapter provides information on servicing and maintaining the Cub II scale including:

- + Cleaning and regular maintenance
- + Troubleshooting

8.1 Cleaning and Regular Maintenance

You may wipe the display area and weighing platter with a clean, soft cloth that has been dampened with a mild glass cleaner. Do not use any types of industrial solvents. These may damage the display and platter finish.

Regular maintenance inspections by a qualified service technician are also recommended.

8.2 Troubleshooting

Error Codes and Action

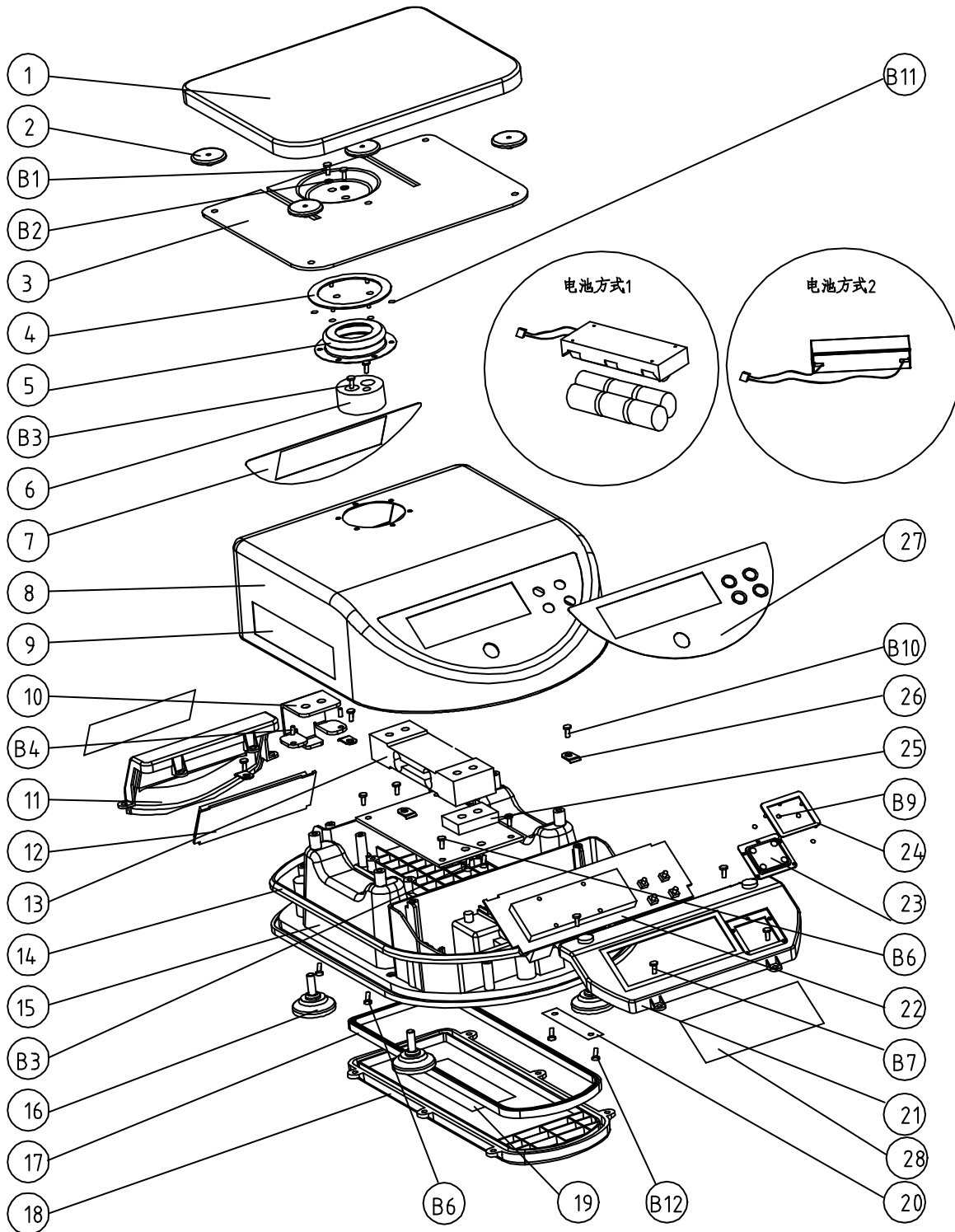
The following table lists Cub II's error messages, descriptions, and corrective actions.

E11	RAM error	Call METTLER TOLEDO service
E16	ROM error	
E18	EEPROM error	
nnnnnn in weight display	Over capacity	Remove weight from Platter
uuuuuu in weight display	Under zero	Add something Turn off and then turn on the scale

9 Parts and Accessories

Please refer to the following diagram and chart when ordering parts for the Cub II scale.

9.1 Explosion diagram



9.2 Part List - Cub II LCD Version

B12	118549	Sealing screw M4X8	2	
B11	134428	Nut GB6170 M3-S.S	6	
B10	152668	Self-driving screw ST 3.5X8.5	4	
B9	102618	Nut GB6170 M2-Zn.D	5	
B7	132545	Self-driving screw GB845 ST4X15	8	
B6	115097	Screw GB818 M4X8-S.S	14	
B4	124073	Screw M4X12-S.S	2	
B3	132389	Screw GB70 M6X12-S.S	4	
B2	102663	Grower washer GB93 6	2	
B1	132627	Screw GB70 M6X20-S.S	2	
28	152498	Transparent CUB-II	2	
27	152309	Overlay, customer CUB-II	1	
26	149397	Maintaining washer plate, main PCB TIGER-II	4	
	155273	Pillar washer, down side of load cell 1.5Kg CUB-II	1	1.5Kg
25	152298	Pillar washer, down side of load cell CUB-II	1	3Kg 6Kg 15kg
24	152303	Packing ring, key CUB-II	1	
23	152307	Sealing rubber ring, key CUB-II	1	
	155789	Subassembly, main PCB LCD CUB-II	1	LCD
22	151404	Subassembly, main PCB LED CUB-II	1	LED
21	152294	Cover, housing of main PCB CUB-II	1	
20	156481	Cover, calibration CUB-II	1	
19	134997	Sponge mat RN00	1	
18	152293	Cover, battery holder CUB-II	1	
17	152499	Rubber sealing ring, battery holder CUB-II	1	
16	155540	Foot CUB-II	4	
15	152291	Base CUB-II	1	
14	152304	Rubber sealing ring CUB-II	1	
13	xxxxxx	Load-cell	1	
	155795	PCB Subassembly, back display LCD CUB-II	1	LCD
12	151405	PCB Subassembly, back display LED CUB-II	1	LED
11	152295	Cover, housing of back display CUB-II	1	
10	153673	Plate, stop loading CUB-II	1	
9	119043	Data plate	1	
8	152292	Up cover CUB-II	1	
7	152310	Overlay, customer display CUB-II	1	
6	152299	Transferring pillar washer CUB-II	1	
5	152308	Thin rubber ring CUB-II	1	
4	152301	Packing washer, for thin rubber ring CUB-II	1	
3	152300	Up spider CUB-II	1	
2	152296	Rubber mat, platter CUB-II	5	
1	152302	Platter CUB-II	1	
ID	P/N	Description	Quantity	Remark

