

Weighing Environment Analyzer AD-1691



BM-20 (sold separately)

- ✓ Daily and periodic checks of balances
- ✓ Uncertainty calculation for balance calibration
- ✓ Minimum weight calculation
- ✓ Assessment of measurement environment
- ✓ Remote balance display and control



AND ...Clearly a Better Value
A&D Company, Limited
<http://www.aandd.jp>

Do You Know What It Takes to Properly Manage Balance Quality and Performance?

How would you like to have someone from A&D – an expert on balances – sit by your side, advise you what to carry out and how, and even create reports for you to meet documentation requirements, whenever and as often as necessary? For A&D's balancesⁱ, you can essentially make all this happen with just one device: the AD-1691 Weighing Environment Analyzer!

ⁱ Please inquire regarding connectivity with other manufacturers' balances

Operation with 7-inch color touch-panel LCD

The AD-1691 makes various tasks related to balance management quick and easy for every user. All you have to do is follow the displayed, step-by-step guidance and touch the screen to enter prompted information, commands, selections, etc.

Comes with a dedicated touch pen and holder ►



1. Daily and periodic checks of balances

If you need to implement standard operating procedures (SOP) for quality and performance verifications but aren't sure where to look, these functions can assist you.

Daily balance check

Confirmation of external appearance



Confirmation of measurement environment



Confirmation of power supply



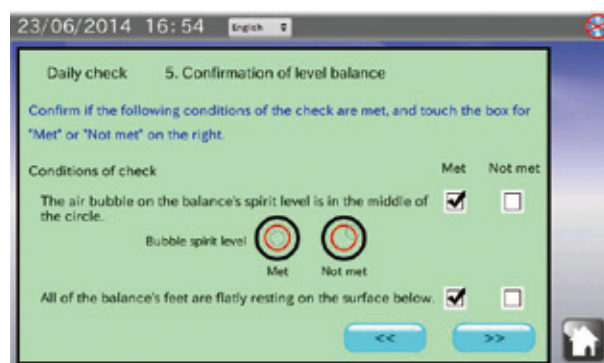
Confirmation of level balance



Measurement confirmation

For daily checks, you are simply asked to determine whether the condition is "met" or "not met" for each check itemⁱⁱ. The check items include those which A&D recommends as the most basic ones to confirm that the balance meets proper conditions for use.

Whether to check all or only some of these items will be up to you, depending on your workplace policies and requirements.

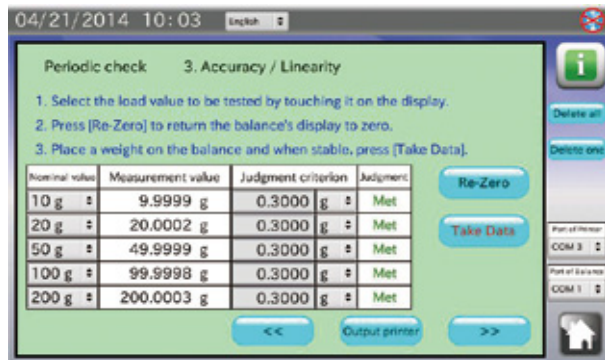


Confirmation of level balance

ⁱⁱ The AD-1691 need not be connected to the balance to perform a daily check.

Periodic balance check

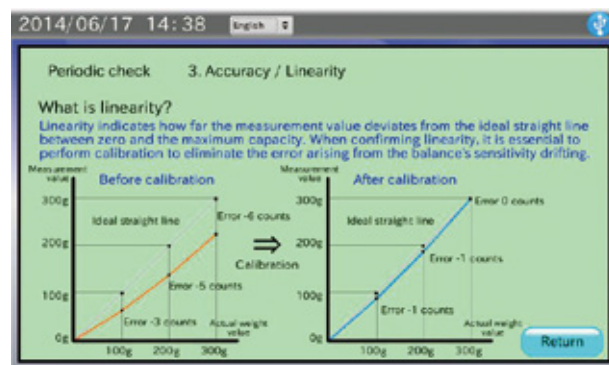
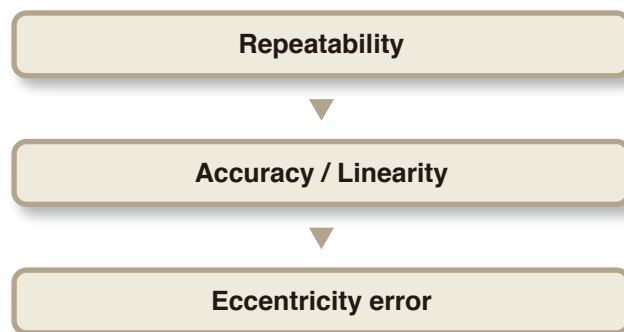
Three kinds of tests are prepared for the periodic check; namely, those for repeatability, accuracy / linearity, and eccentricity error. You can easily perform one, two, or all of them in accordance with your set specifications.



Test for linearity

► Quick glossary

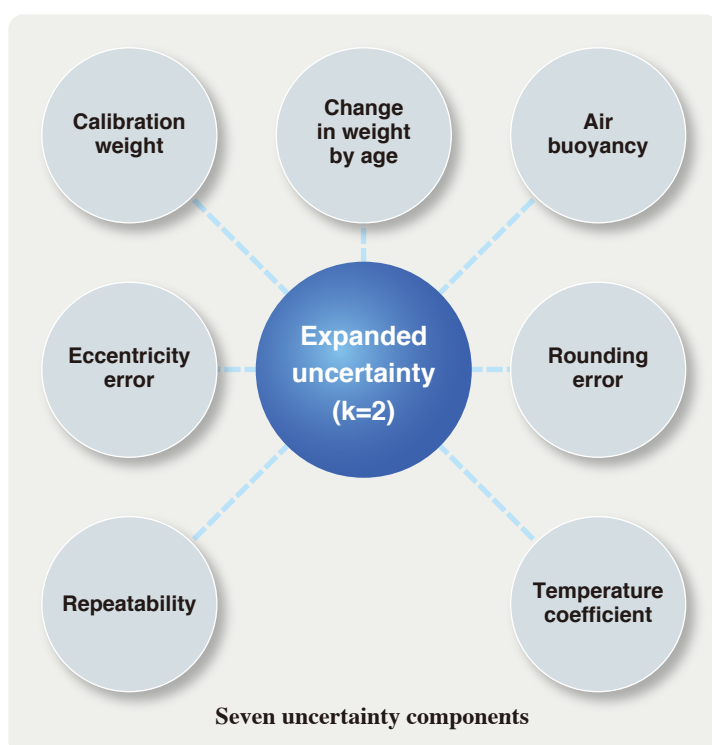
Explanation of each periodic check item can be accessed by touching the **i** button in the upper-right corner of the screen.



Explanation of linearity

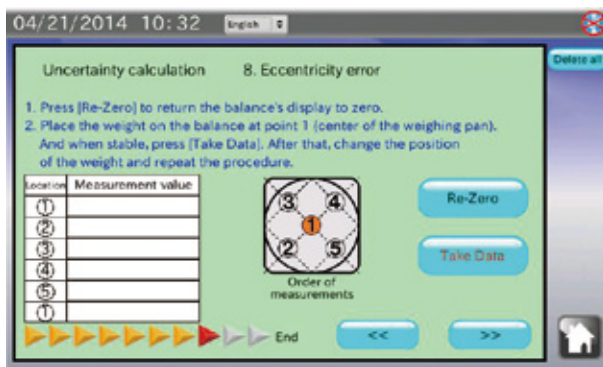
2. Uncertainty calculation for balance calibration

Regular calibration of balances is essential to ensure the reliability of your measurement data. The AD-1691 lets you warrant accuracy even when a third-party calibration service cannot be used frequently.

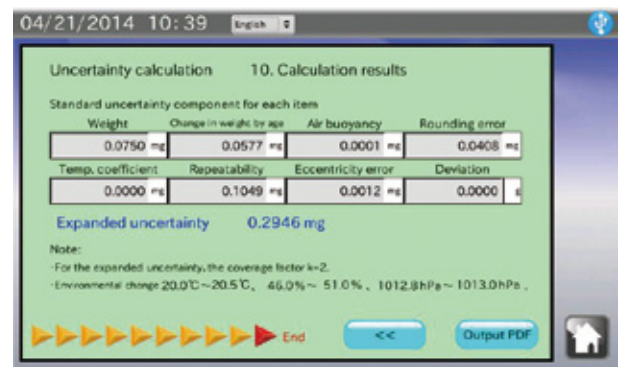


In a precise sense, a calibration report is only complete when the uncertainty of the measured value is provided. However, its estimation normally involves highly complex mathematics, not to mention knowing what uncertainty components exist.

With the AD-1691, the whole thing becomes very simple. Just enter information and perform tests as per on-screen instructions, and the AD-1691 will calculate the expanded uncertainty (coverage factor $k=2$) of your balance calibration right on the spot, based on seven uncertainty components.



Eccentricity error test



Uncertainty calculation results

Reporting results

For documentation required by ISO, GLP, GMP, etc., daily/periodic check or calibration (uncertainty calculation) results can be saved to a USB flash drive in PDF report formats. Daily/periodic check results can also be outputted to a printer.

Daily Balance Check Report

Date of check: 04/21/2014 09:35
Location of check: ABD Co., Ltd. Technical center

1. Balance
Model: BM-300 Serial No. 12345678
Capacity: 300g Min. display: 0.1mg

2. Confirmation of external appearance
The area surrounding the balance is not dirty Met
The balance and inside of weighing chamber are not dirty Met
The balance is not damaged or deformed in any places Met

3. Confirmation of measurement environment
Temperature and humidity are within an acceptable range Not met
There is no breeze or vibration No

4. Confirmation of power supply
The AC adapter is connected Met
No error messages are displayed Met
The balance is in weighing mode Met

5. Confirmation of level balance
The air bubble on the balance's spirit level is in the middle of the circle Met
All of the balance's feet are flatly resting on the surface below Met

6. Measurement confirmation
The display reads zero after performing "Re-Zero" Met
After placing a standard weight on the balance, the weight value is within an acceptable range Met
Measurement value: 50.0001 g

7. Note

Signature (Operator): Ichiro Kitamoto
Signature (Manager):

Daily check report (PDF)

Periodic Balance Check Report

Date of measurement: 04/21/2014 10:12
Location of measurement: ABD Co., Ltd. Technical center

1. Specifications of device
Model: BM-300 Serial No. 12345678
Capacity: 300g Min. display: 0.1mg

2. Environment
Temperature: Humidity: Barometric pressure:

3. Calibration
Calibration: 30001 surface

4. Repeatability/Minimum weight

No.	1	2	3	4	5	6
Weight	40.0000 g	40.0000 g	40.0000 g	50.0000 g	50.0000 g	40.0000 g
Repeatability	0.0000 g	0.0000 g	0.0000 g	0.0000 g	0.0000 g	0.0000 g
Minimum weight	40.0000 g	40.0000 g	40.0000 g	40.0000 g	40.0000 g	40.0000 g
Repeatability	0.0000 g	0.0000 g	0.0000 g	0.0000 g	0.0000 g	0.0000 g
Minimum weight	134 mg	134 mg	134 mg	134 mg	134 mg	134 mg

5. Accuracy/Linearity

Load value	10 g	20 g	50 g	100 g	200 g
Measured	9.9999 g	19.9998 g	49.9999 g	99.9999 g	199.9999 g
Adjusted	0.0000 g	0.0000 g	0.0000 g	0.0000 g	0.0000 g
Adjusted	0.0000 g	0.0000 g	0.0000 g	0.0000 g	0.0000 g
Adjusted	Met	Met	Met	Met	Met

6. Eccentricity error

Point	Measurement Value	Repeatability	Minimum weight
1	40.0000 g	0.0000 g	134 mg
2	40.0000 g	0.0000 g	134 mg
3	40.0000 g	0.0000 g	134 mg
4	40.0000 g	0.0000 g	134 mg
5	40.0000 g	0.0000 g	134 mg
6	40.0000 g	0.0000 g	134 mg

7. Notes: Weight used, etc.

Signature (Operator): Ichiro Kitamoto
Signature (Manager):

Periodic check report (PDF)

Calibration Result Report

Date: 04/21/2014 10:41
Location: ABD Co., Ltd. Technical center

1. Balance model
Model: BM-300 Serial No. 12345678
Capacity: 300g Min. display: 0.1mg

2. Weights to be used

Weight value	Repeatability	Repeatability deviation	Eccentricity deviation
50g	0.0000 mg	0.0000 mg	0.0000 mg

3. Rounding error
Rounding: 0.0000 mg

4. Temperature coefficient

Temp. coefficient	Temp. change	Repeatability
2.0 deg/C	0.5 deg	0.0000 mg

5. Repeatability

No.	1	2	3	4	5	6
Weight	50.0000 g	50.0000 g	50.0000 g	40.0000 g	50.0000 g	50.0000 g
Repeatability	0.0000 g	0.0000 g	0.0000 g	0.0000 g	0.0000 g	0.0000 g
Repeatability	0.0000 mg	0.0000 mg	0.0000 mg	0.0000 mg	0.0000 mg	0.0000 mg

6. Eccentricity error

Point	Value
1	50.0000 g
2	50.0000 g
3	50.0000 g
4	50.0000 g
5	50.0000 g
6	50.0000 g

7. Expanded uncertainty

Weight value	Repeatability	Expanded uncertainty
50g	0.0000 mg	0.0000 mg

Note: 1) For the expanded uncertainty, the coverage factor k = 2.
2) Environment change: Temp: 20.0°C ~ 20.5°C Hum: 45.0% ~ 51.0% Bar: 1012.0 hPa ~ 1013.0 hPa

Signature: Ichiro Kitamoto

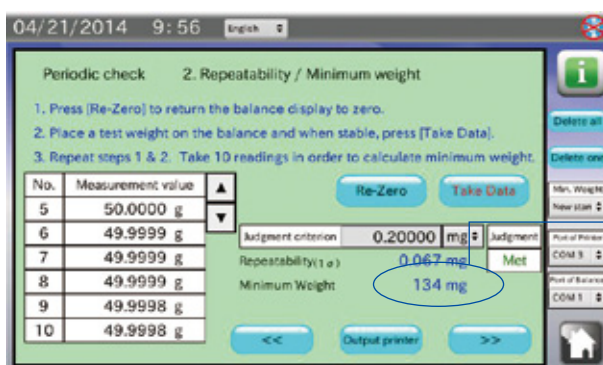
Calibration report (PDF)

3. Minimum weight calculation

To know the minimum weight, you'll have to send for the balance manufacturer or a third-party specialist and ask them to work it out, right? – Wrong!

When performing a repeatability test for a periodic check, the AD-1691 also automatically calculates the minimum weight as defined by the United States Pharmacopeia (USP) ⁱⁱⁱ.

* ⁱⁱⁱ Supports the newly-revised standard (effective since December 2013)



Repeatability test for a periodic check

Minimum weight

----PERFORMANCE TEST----

MODEL: BM-300
S/N: T1012000
ID: LAB-0001
DATE: 2012/12/20
TIME: 09:11:27

NAME WEIGHT

1	500.0003 g
2	500.0002 g
3	500.0001 g
4	500.0001 g
5	500.0001 g
6	500.0001 g
7	500.0003 g
8	500.0002 g
9	500.0002 g
10	500.0002 g

REPEATABILITY
S.D.: 0.0000 mg
MINIMUM WEIGHT: 240 mg

REMARKS

SIGNATURE

Repeatability test report

4. Assessment of measurement environment

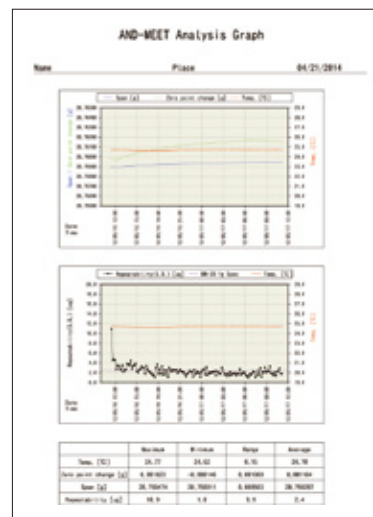
Crack the mystery of invisible environmental culprits that destabilize your measurements. This is where the product name “Weighing Environment Analyzer” comes from.

Analytical balances, microbalances among others, are highly susceptible to external disturbances like temperature changes, vibrations, drafts, etc. These disturbances are typically imperceptible to humans, leaving many users clueless about the lack of precision in their balances.

To solve this problem, A&D invented the “A&D Measurement Environment Evaluation Tool”, or AND-MEET, which helps deduce what factors in the set-up environment are affecting the stability of measurements. Once those factors are identified, it becomes possible to devise corrective measures to elicit better performance from the balance (and thereby improve the minimum weight as well).



Taking data from the BM-20 microbalance



AND-MEET report (PDF)

AND-MEET was originally available for use only by qualified specialists at A&D. The AD-1691 now allows you to conduct assessments yourself with it when using A&D’s BM series of micro analytical balances.

5. Remote balance display and control

What happens to the AD-1691 while none of the above-mentioned tasks are being carried out? Just laid aside? – Check this feature that will actually make the AD-1691 both handy and important at all hours.

The AD-1691 can be used as a separate touch-panel display for an A&D balance (with an RS-232C interface).

Use of this function is especially recommended for the BM-20/22 microbalances, as the slightest tilting or tremor caused by direct key operation could compromise their accuracy and precision (the ION key is available to control their built-in static eliminator).



Console screen

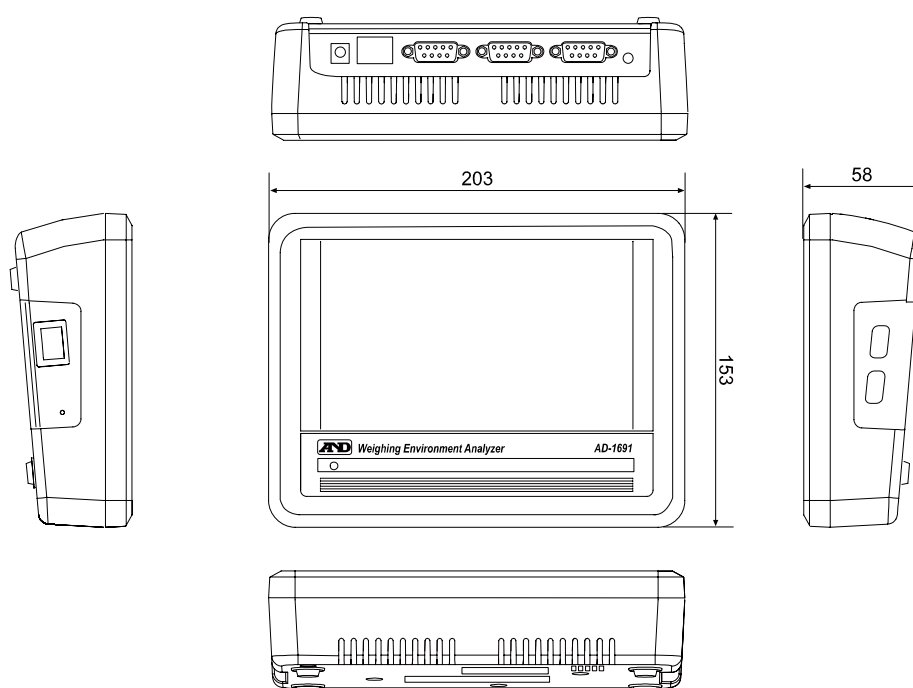
Specifications

Display	TFT color LCD with backlight (7 inches, 800 × 480 dots)
LCD backlight brightness	Adjustable to 10 levels ^{iv}
Data transmission	RS-232C × 3, USB (1.1) × 2 ^v
Operating environment	5 to 40°C (41 to 104°F), 85% RH or less (no condensation)
Power supply	AC adapter
Power consumption	Approx. 30 VA
External dimensions	203 (W) × 153 (D) × 58 (H) mm, excluding protrusions
Net weight	Approx. 1.0 kg
Standard accessories	Instruction manual, Touch pen with holder, AC adapter, three balance connection cables (D-Sub 9-9, D-Sub 9-25, D-Sub 9-DIN 7), Stand attachment

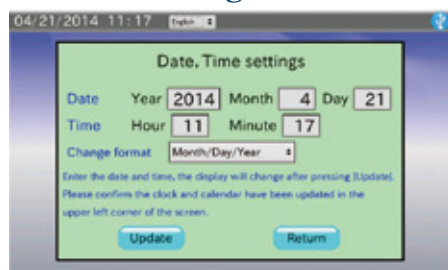
^{iv} Set to the maximum brightness by default

^v For inserting USB flash drives (the two slots cannot be used at the same time)

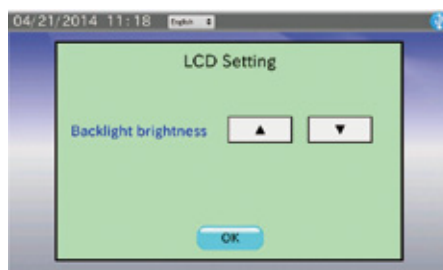
Dimensions



► Device setting screens



Date, Time settings



LCD setting



RS-232C settings



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