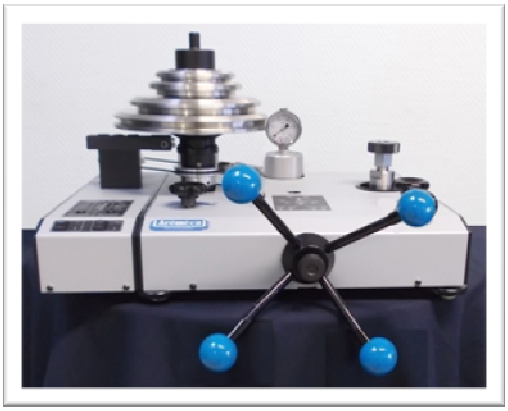
Operating Instructions

(English)

Dead weight tester with AIR

Models : BA2



Models : BA2 + option OP0004

Concerns the models :

- ✓ *model : BA2-1VB*
- ✓ *model : BA2-1B*
- ✓ *model : BA2-10B*

Zone Industrielle Sud, Rue Marc Séguin - 41100 Vendôme
Tel : +33 (0)2 54 80 79 30 Fax : +33 (0)2 54 80 79 31
E-mail : aremeca@wanadoo.fr - site : www.aremeca-instrumentation.com

Your Model : .....

Serial number : .....

Made the : .....

to contact Sales Manager : d.regal@aremeca.fr

TABLE des MATIERES

Read the instructions before handling and retain this information for future use

Dead weight tester models BA2 describes in this manual are designed and manufactured by AREMECA (France).

Our products follow manufacturing procedures and controls in line with our Quality System ISO9001 version 2015 and in accordance with the standards in force.

This manual commissioning informs the user about the functioning of the instrument and the safety limits for work peacefully.

This manual is an integral part of the device. It must be kept close to the workstation and accessible at any time by the user.

AREMECA reserves the right to alter the content or form of this manual at any time and without notice. And to make technical amendments to change the product.

Responsibility AREMECA is not liable for any damage caused by :
- not in accordance with intended usage,
- non compliance with instructions for use,
- use of the instrument by unqualified untrained operator ,
- a transformation / modification of the device carried by the user.

The operator must have read and understand prior to operating mode and use the device to start handling.

For more information

AREMECA - Instrumentation
Zone Industrielle Sud
Rue Marc Seguin
41100 VENDOME

- web site : www.aremeca-instrumentation.com
- Contact : E-mail : aremeca@wanadoo.fr / Phone : +33 (0)2 54 80 79 30 / Fax : +33 (0)2 54 80 79 31

to Contact Sales Manager : d.regal@aremeca.fr / Phone : +33 (0)2 54 80 27 60

a) Device

Device Identification

indicates the model of dead weight
ex : BA2-10B

indicates the serial number of dead weight

indicates the date of commissioning of the unit

Intended use of the device

Before switching on the device, ensure that the technical characteristics (measuring range, precision, fluid etc...) correspond to your needs

> For example : the maximum pressure defined for this compressor must not be exceeded

The pressure compensator is designed and manufactured for use as described in this document

In this case of misuse or mishandling, outside the technical specifications contained in this manual. The instrument must be immediately isolated, identified as inoperative and must be checked by our service department.

Precautions storage and transport

It's necessary to take care of the unit during storage or transportation. It must be protected from moisture, shock, extreme temperatures and shouldn't be removed or changed

> On our catalog, we have a suitcase, adapted to transport your device. (Ref.OP0002)

If the dead weight is moved to a new environment (warmer, colder, etc..). Observe the phase of "quarantine" and wait until the device temperature stabilizes at room temperature before handling.

b) User

User qualifications

> Improper use of the device can cause significant bodily injury and properly

Qualified operator, due to : it's product training, knowledge in the field of metrology and experiences in field of pressure and knowledge on standards and guidelines, is able to perform the operations describes in this manual. He will be able to detect potential dangers.

AREMECA offers on demand, an installations / commissioning of the instrument performance.

Personal protective equipment (PPE)

The personal protective equipment must be defined in the security register of the user company and made available to the operator. These devices are used to protect the operator from potential risks that impede their safety and health at work.

a) Protecting fluid

> Wear eye protection : protects the eyes against splashes and projections of the fluid.

> wear gloves : protect the skin against irritation, allergies.

AREMECA provides for oil dead weight, a bottle of colorless mineral oil. Safety data sheet of used oils are available on request.

b) Heavy lifting

> wear safety shoes : protects against crushing during drop weight.

Ergonomics and workstation management are necessary to facilitate the work of the operator and avoid musculoskeletal disorders

a) Unpacking the unit

Upon receipt of the equipment, check the status and content of your package. All of the following elements must be present in the package :

- 1 compressor
- 1 set of weights
- 1 piston/cylinder
- 1 bottle of 0.5 liters of oil for the models BA2-10B
- 1 capstan consists of 4 delivered arms removed
- 2 connectors G1/2 (supplied as standard unless otherwise specified)
- 1 manual

Check that there isn't damage or breakages during transport. If there are missing items, please immediately notify AREMECA or your local distributor for what is missing.

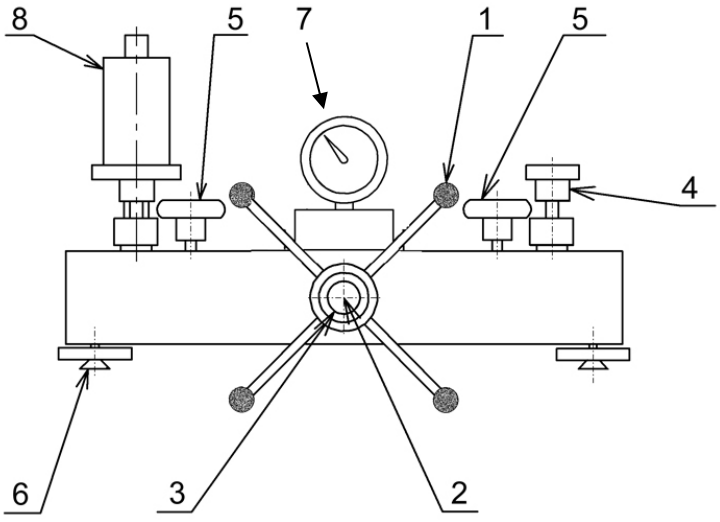
b) Installation

Preferably, install your unit in a stable and controlled environment.

You will get better performance if :
> the temperature and humidity of the room are stable,
> the workstation is clean and dry, protected from drafts, noise, vibration, and without passing

Component Identification

1 : capstan
2 : axis of rotation
3 : clamping knob
4 : connectors
5 : valves
6 : sidesteps
7 : gauge
8 : set piston / cylindre



Models BA2-1B and BA2-10B

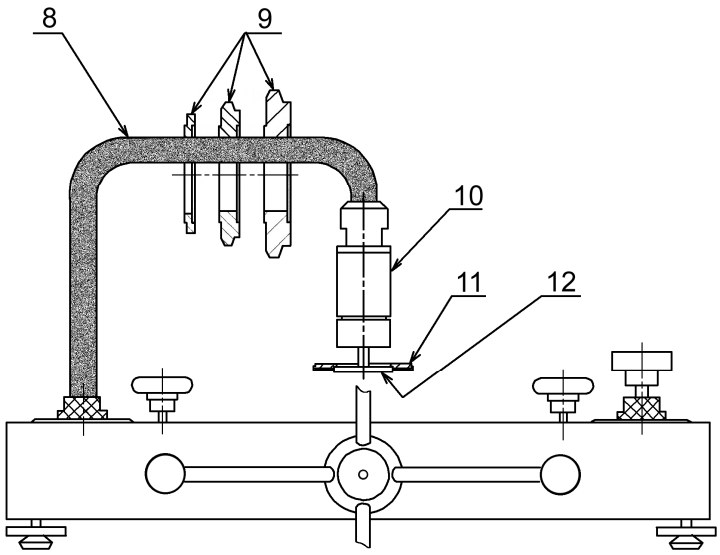
8 : vacuum adapter

9 : set of weight

10 : kit dead weight 1 bar

11 : mass slotted increment mini

12 : weight carrier plate



Model BA2-1VB

Installation / Assembly

- Install pressure generator on a established stable an rigid about 0,90 m tall.

- Adjust the stability of the generator through sidesteps **6**.

- Insert the capstan **1** on the axis of rotation **2**, the screw tightening knob **3** to the axis of rotation.

- Remove the yellow caps protections pressure connections.

- Make sure the O-rings are positioned in their throats.

- Install the piston / cylinder **8** on the connector left. See picture for model BA2-1VB

- Set up the adapter nut **4** on the right connector pressure. Make sure that the o-rings are well positionned.

> Dirty or polluted gauges must be cleaned before mounting the pressure generator to prevent contamination on the hydraulic circuit. Don't clean the tank with alcohol

Option : cleaning bench (Ref.OP0062)

The installation of a separator is recommended for calibration of instruments that were used on corrosive, so that traces of its products don't cause etching on the circuit of the pressure dead weight and in particular on the piston/cylinder assembly.

Options : separator (Ref.OP0023)

- Connect the pressure source on the outlet 1/4 gas cylindrical located behind the generator.

Note on source pressure **:** Use a clean gas, no aggressive and no-toxic dry such as nitrogen U. Provide a single regulator output pressure source.

c) Test run after installing

a) Perform a calibration test instrument with a "test" known correct (see chapter procedure) to verify and validate the operational statues of the dead weight.

b) Lower the pressure by turning the capstan in the opposite direction of the needle clockwise and remove the instrument "test". If necessary use the key to initiate the unscrewing of the swivel.

c) The device is now ready for use.

a) General information on calibration

A dead weight is a device that generates pressure from two main data :

- the force generated by adding the masses.
- the effective section of the dead weight.

These two values may vary depending on environmental conditions, atmospheric pressure, gravitational acceleration, temperature, humidity.

To generate pressures in precision values ≥ ± 1.10^{-3}, it's necessary to verify that the local environmental conditions are close to environmental conditions to which the balance was calibrated :

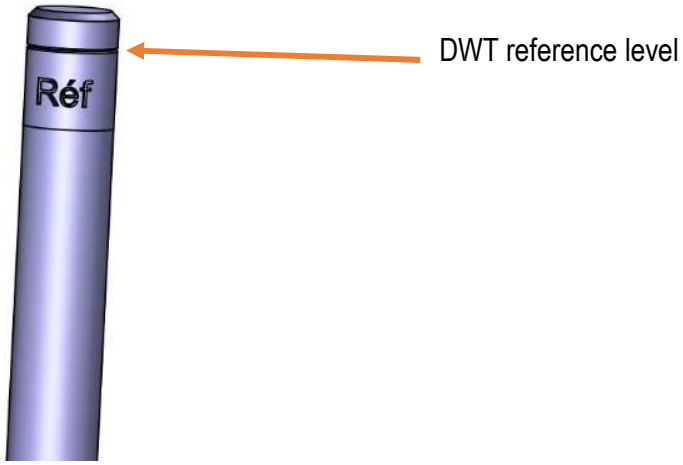
- Gravitational acceleration = 9,80665 m/s²
- Temperature = 20°C
- Standard atmospheric pressure = 1013,25 Hpa
- Ambient humidity = 50%

In the following cases, apply the essential correction formula pressures generated by the dead weight :

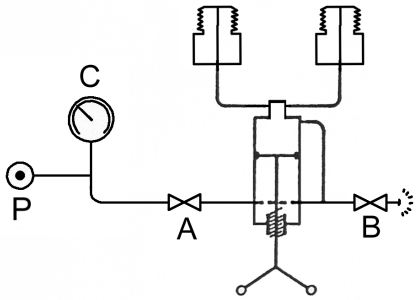
- dead weight subject to very remote local conditions using standard conditions of it
- dead weight which you want to generate pressures in values clarification less than ± 1.10^{-3}

Cf.: Table density of air as a function of pressure and temperature - See also certificate of accuracy issued with the device.

NOTE : The DWT's reference pressure is indicated by the gauge present on the compressor (see diagram below).



Pneumatic diagram



1 - Pressure mounted

> *Observe the maximum operating pressures of the pressure generator*

Maximum operating pressure : BA2-1B →1 bar and BA2-10B →10 bar

This device is not compatible with oxygen equipment

a) Put the device who should be calibrated on the right connector.

b) Turn the capstan **1** anticlockwise until it reaches the stop end position.

c) Close the valves **A** and **B**.

d) . The dead weight being equipped with fine adjustment valves, they should simply be closed but **not locked** (risk of damage to valves).

e) When the calibration bench is supplied with pressure (positive or negative), checked by the gauge **C** that it is within a close range of the pressure desired calibration.

f) Load all piezometric with the masses to obtain the desired pressure, don't forget to take into account the weight of the piston and countervailing weight.

> *precautions must be taken when handling the weights :*
> *- each weight should be handled individually.*
> - when loading on dead weight, load weight gently without hitting all piezometric.

g) Put the rotating weight (by hand 0,5 tr/s for BA2 - with motorization if option).

h) Open the valve **A** slowly (the dead weight charge gas).

i) when approaching the desired pressure, close the valve **A**
Note : If the pressure is exceeded open valve **B** to purge excess air.

j) Rotating the capstan **1** in the direction of clockwise until the piston begins to float inside the yellow area located at the base of the carrier weights.

The measuring point can now be realized.

To do the following measurement

a) To reduce the pressure, turn the capstan **1** anticlockwise .

b) then go back to step e) of the preceding paragraph "1 - Pressure mounted"

2 - To reduce and relieve pressure at the end of measuring cycle

a) Turn the capstan **1** anticlockwise until it reaches the stop end position of the capstan. Then put the dead weight at atmospheric pressure by slowly opening the valve **B** to purge the system.

b) Then disassemble your product.

Note : Before any measurement, it's recommended to ope rate the dead weight only in closed circuit, by elevating and lowering the piston to a pressure equal to about half of its measuring range. If the dead weight is not moving, clean the piston.

a) Certificate

A certificate is delivered with the dead weight. The dead weight served to calibrate your device are controlled periodically with organizations COFRAC or DAkkS.

b) Calibration COFRAC or DAkkS

A calibration certificate type COFRAC or DAkkS can be realized in option.
> It's recommended to repeat the calibration of the instrument at regular intervals of 2 to 5 year (or 1000 hours of use).

ex : a dead weight who working on several site and transported many times require a calibration to nearest interval. Ditto for a dead weight with a large uncertainty.

The user should define his requirements and establish periodicities cleaning, calibration, certification of device.

We can do this service.

a) Cleaning

The generator cleaning and checking fluid levels are the only periodic maintenance required. No additional maintenance should be necessary if all instructions are followed.

We recommend a complete overhaul of the unite every 2 years. This operation can only be performed by the manufacturer. If necessary, send us your device for maintenance. A complete assessment of your device will be made and an estimate of rehabilitation will be sent.

Instructions reminders :

- Only use oil supplied with the device. Guarantees performance and operation are performed with the use of these oils.

> Wear eye protection : protects the eyes against splashes and projections of the fluid.

- Don't remove the protective cover.

b) Maintenance

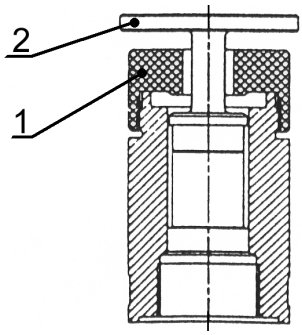
IMPORTANT : Before any operation on the exchanger, check that **the dead weight is at atmospheric pressure**. To do this, open the valve **B**.

> Clean the piston for models BA2-1B and BA2-1VB

a) Unscrew the nut **1**

b) Remove all plate carries weight and piston **2**

c) Clean the piston with a chamois and degrease possibility with a little oil .



CAUTION : Don't touch the plunger directly with the fingers, risk of oxidation

d) Go carefully all door weight and piston

e) Tighten the nut **1**

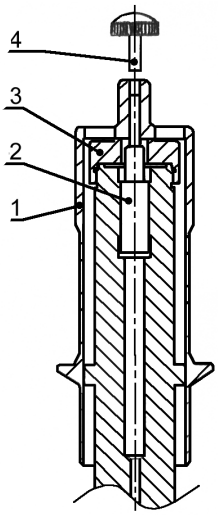
> Clean the piston for models BA2-10B

a) Separate the bell **1** of the set axis / piston **2** with the supplied screw **4**

b) Unscrew the nut **3**

c) Remove the axis / piston **2**

d) Clean the piston with a chamois and degrease possibility with a little oil



CAUTION : Don't touch the plunger directly with the fingers, risk of oxidation.

e) Remove carefully the set piézo **2**, the nut **3** and the bell **1**

> The piezometric

It's designed for extremely narrow limits of accuracy. It's forbidden to disassemble it. This set represents a significant part of the value of the dead weight, handle with care and strive to keep clean. In case of damage, return the complete package for replacement or repair.

The serial number of piezo is on the certificate of accuracy and is indicated on the body of the whole. Remind this number and the serial number of the dead weight in all correspondence relating to this piece.

For dead weight, wipe the o-rings under the piezometric and adapter rotating connector. A small leak at the piezometric is normal.

> Valves

Generator and dead weight are equipped with instrumentation valves, it's imperative to observe the following guidelines :
- Maximum torque applicable abutment valve open = 0,3 Nm
- Maximum torque applicable abutment valve closed = 4 Nm.

When the abutment valve open is reached, turn the wheel valve 1/4 turn clockwise.

> Weights

Each of the weight provides with the dead weight is identified by a number engraved.

Keep the weight in a storage case and keep them clean. They can be regularly cleaning using a non abrasive method.

> Option : suitcase transport and layouts workstation (Ref.consult us !)

c) Inspection

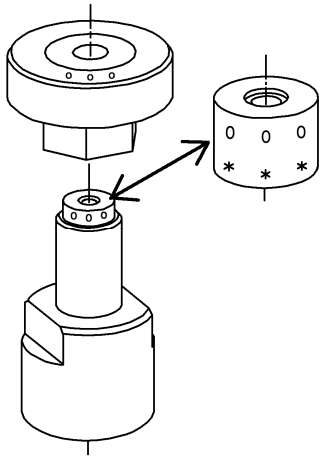
It's recommend to a service of your device every 2 years. The average response time is 2 weeks. Cleaning generator, replacement o-rings, testing pressure rise and stability are made.

d) Connection

The device is equipped with a specific connector for less than 1250 bar pressure. It is necessary to orient the ring according to the type of connector correctly.

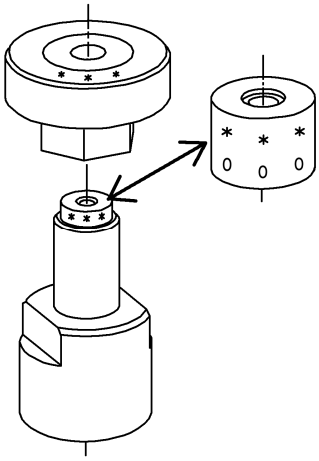
Thread M10x100, G1/8, 1/8 BSP-TR, 1/8 NPT

For these connectors guide ring, mark : **000** visible.
The connector must be tightened by hand.



Thread M12x150, M16x150, M18x150, M20x150, G1/4, G3/8, G1/2,1/4 BSP-TR, 3/8 BSP-TR, 1/2 BSP-TR, 1/4 NPT, 3/8 NPT, 1/2 NPT

For these connectors guide ring, mark : *** * *** visible.
The connector must be tightened by hand



> Available as an option :
Suitcase with 4 connectors type G (Ref.OP0171)
Suitcase with 4 connectors type NPT (Ref.OP0172)
Suitcase with 4 connectors type BSPTR (Ref.OP0173)
Suitcase with 5 connectors type M (Ref.OP0174)
Suitcase with 17 connectors (Ref.OP0037)
standard o-ring (Ref.OP0038CEO)
special o-ring (Ref.OP0038J)

> OPTIONS

Oils
OP0013 : 1 liter Oil H15 (BA2-10B)
Connectors
OP0174 : Suitcase with 5 connectors metrics - M10x100 ; M12x150 ; M16x150 ; M18x150 ; M20x150
OP0171 : Suitcase with 4 connectors gas cylindrics - G1/8 ; G1/4 ; G3/8 ; G1/2
OP0172 : Suitcase with 4 connectors NPT - 1/8NPT ; 1/4NPT ; 3/8NPT ; 1/2NPT
OP0173 : Suitcase with 4 connectors BSPTR - 1/8BSPTR ; 1/4BSPTR ; 3/8BSPTR ; 1/2BSPTR
OP0037 : Suitcase with 17 connectors - all connectors

Kit cleaning
OP0062 : Cleaning bench for manometers

Transport
OP0101: metal boxes for 8 weights
OP009? : Suitcase for transport of set of weight + workstation
OP0002 : Suitcase for dead weight or comparator

Protection of the workstation
OP0192 : transparent protective cover for dead weight without motorization
OP0193 : transparent protective cover for dead weight with motorization

Notes