

**BR04-05-06-07**

**BC05**

**BL07**



**Boîtes de Résistances, Capacités, Inductances**

**Resistance, Capacitance and Inductance Boxes**

**Widerstands-, Kapazitäts-Induktivitätsdekaden**

**Scatole Resistenze, Capacita', Induttanze**

**Cajas de resistencias, Capacidades, Inductancias**

*Measure up*



# SUMMARY

1	GENERAL INSTRUCTIONS .....	13
1.1	UNPACKING – PACKING .....	13
1.2	PRECAUTIONS AND USAGE SAFETY .....	13
1.2.1	Before any use .....	13
1.2.2	Meaning of symbols used: .....	14
1.2.3	When using the equipment .....	14
2	GENERAL PRESENTATION .....	15
2.1	RESISTANCE BOXES .....	15
2.1.1	Characteristics: .....	15
2.1.2	Recommendations for use: .....	15
2.2	CAPACITOR BOXES .....	15
2.2.1	Characteristics: .....	15
2.2.2	Recommendations for use: .....	16
2.3	INDUCTANCE BOX .....	16
2.3.1	Characteristics: .....	16
2.3.2	Recommendations for use: .....	16
3	GENERAL SPECIFICATIONS .....	16
3.1	CONSTRUCTION CHARACTERISTICS .....	16
3.2	STORAGE AND OPERATING CONDITIONS .....	17
3.2.1	Storage conditions: .....	17
3.2.2	Operating conditions: .....	17
3.3	CLEANING, MAINTENANCE, WARRANTY .....	17
3.3.1	Cleaning .....	17
3.3.2	Maintenance, metrology: .....	17
4	WARRANTY, REPAIRS .....	17
4.1	WARRANTY .....	17
4.2	REPAIRS .....	18
5	HOW TO ORDER .....	18

You have just obtained a resistance, capacity or inductance decade box, and we thank you for your trust in us.

To obtain the best service from your unit:

- read these operating instructions carefully,
- comply with the precautions for use.

## 1 GENERAL INSTRUCTIONS

If the device is used in a manner unspecified in these instructions, the protection provided by the device may be compromised.

### 1.1 UNPACKING – PACKING

All instruments are checked mechanically and electronically before shipment. All precautions are taken to be sure you receive an undamaged instrument. If there is damage, notify the carrier immediately.

### 1.2 PRECAUTIONS AND USAGE SAFETY

#### 1.2.1 Before any use

Resistance, condenser and inductance decade boxes are passive elements to be inserted into trial or development circuits to obtain the desired resistance, capacity or inductance values by a combination of decades.

These decade boxes are compliant with safety standard IEC 61010 – 1.

For your own safety and to prevent any damage to your equipment, you must follow the instructions in this manual.

This equipment can be used in category II electrical circuits not exceeding 150V relative to earth. It must be used indoors in an environment with level 2 pollution and at an altitude below 2,000m.

Definition of Installation Categories (see IEC 61010-1)

CAT I: Circuits not directly connected to network and specially protected.

Example: *protected electronic circuits.*

CAT II: Circuits connected directly to low-voltage installation.

Example: *power supply for domestic electrical appliances and portable tools.*

CAT III: Power supply circuits in the building installation.

Example: *Electrical panel, circuit breakers, fixed industrial machines or devices.*

CAT IV: Source circuits of building low-voltage installation.





Example: *Power feeders, counters and protection systems.*

For safety reasons, you must use only measuring leads, of voltage and category at least equal to those of the instrument and compliant with standard IEC 61010.

Do not use damaged equipment.

Before use, always check all the cord insulation.

### 1.2.2 Meaning of symbols used:

Symbol	Meaning	Symbol	Meaning
	WARNING, risk of DANGER! The operator must refer to this user's manual whenever this danger symbol appears.		Earth.
	The CE marking indicates conformity with European directives, in particular LVD and EMC.		The rubbish bin with a line through it indicates that, in the European Union, the product must undergo selective disposal in compliance with Directive WEEE 2002/96/EC. This equipment must not be treated as household waste.

### 1.2.3 When using the equipment

To prevent electrical discharge, injury or damage to the device, and to ensure you use the decade box without risk, follow the safety recommendations below:

- Read the operating instructions fully before using this device and observe all safety instructions.
- This device must be used indoors, up to 2,000m altitude.
- Always connect the box's earth terminal to an earth protection.
- Never exceed the protection limit values indicated in the specifications for each type of decade.
- When the decade box is inserted into a circuit, do not touch the unused cords or terminals.
- Every time, after use, disconnect the supplies for the capacity boxes and discharge the condensers.
- Avoid working alone.
- Use the device only as specified in this manual; otherwise, the protection provided by this equipment may be altered.
- Do not use this device if it appears damaged.
- Inspect the integrity of lead insulation. Replace damaged leads.
- Be careful when working with voltages higher than 70Vdc or 33Vrms and 46.7Vpp, such voltages can pose a risk of electrocution. Depending on conditions, the use of individual protection is recommended.
- **Before opening the equipment**, disconnect it from all circuits and cords.

## 2 GENERAL PRESENTATION

These decade boxes come in metal casing with a male terminal linked to the casing for earthing and female terminals for a direct connection to each decade.

### 2.1 RESISTANCE BOXES

4 modls for values 0  $\Omega$  to:

11,111k $\Omega$  in 4 decades (BR04)

111,111k $\Omega$  in 5 decades (BR05)

1,111111M $\Omega$  in 6 decades (BR06)

11,111111M $\Omega$  in 7 decades (BR07)

#### 2.1.1 Characteristics:

Residual resistance is around 0.1 $\Omega$ .

Uncertainty is  $\pm 1\%$  of the displayed value (residual resistance deducted).

Model	Decade						
	X1 $\Omega$	X10 $\Omega$	X100 $\Omega$	X1k $\Omega$	X10k $\Omega$	X100k $\Omega$	X1M $\Omega$
BR04	+	+	+	+	////	////	////
BR05	+	+	+	+	+	////	////
BR06	+	+	+	+	+	+	////
BR07	+	+	+	+	+	+	+
Uncertainty	$\pm 1\%$	$\pm 1\%$	$\pm 1\%$	$\pm 1\%$	$\pm 1\%$	$\pm 1\%$	$\pm 1\%$
I max mADC	700	200	70	20	7	1	0.1

#### 2.1.2 Recommendations for use:

Use short and strong section cables for low values.

Do not exceed the maximum intensity allowed for each decade.

The access terminals for each decade are used to produce resistant dividers.

### 2.2 CAPACITOR BOXES

1 model (BC05) for a total capacity of 11,1111 $\mu\text{F}$  in 5 decades.

#### 2.2.1 Characteristics:

Residual capacity is around 25pF.

Uncertainty is  $\pm 2\%$  of the displayed value (capacity resistance deducted).

Model	Decade				
	X100pF	X1nF	X10nF	X100nF	X1 $\mu\text{F}$
BC05	+	+	+	+	+
Uncertainty	2%	2%	2%	2%	2%

## 2.2.2 Recommendations for use:

Use short cables kept away from one another for low values.  
Do not exceed the maximum tensions: 300V direct current or 230V at 50Hz.

The access terminals for each decade are used to produce capacitive dividers.

## 2.3 INDUCTANCE BOX

1 model (BC07) for a total capacity of 11,111111H in 7 decades.

### 2.3.1 Characteristics:

Residual inductance  $L_r$  is around 0,15 $\mu$ H.

Uncertainty is given in the table below for a frequency and a superimposed direct current under 10mA (residual self-deducted)

Model	Decade						
	X1 $\mu$ H	X10 $\mu$ H	X100 $\mu$ H	X1 mH	X10 mH	X100 mH	X1 H
BL07	+	+	+	+	+	+	+
Uncertainty	5%+/- $L_r$	5%	5%	5%	5%	5%	10%
Fréquence	10 kHz					1kHz	100Hz
I max mA <sub>DC</sub>	300	200	100	100	70	50	40

### 2.3.2 Recommendations for use:

Using the twisted cables for low values can help to reduce the effects of the per unit length.

Do not exceed the maximum intensity allowed for each decade.

The access terminals for each decade are used to produce inductive dividers.

## 3 GENERAL SPECIFICATIONS

### 3.1 CONSTRUCTION CHARACTERISTICS

Models	BR04	BR05	BC05	BR06	BR07	BL07
Weight	1kg			1.4kg		
Dimensions L (mm)	310			410		
w (mm)	86			86		
h (mm)	76			76		

Protection level: IP 40 (as per EN 60529)

## **3.2 STORAGE AND OPERATING CONDITIONS**

### **3.2.1 Storage conditions:**

Temperature: -40°C to +70°C

Humidity: 20% to 96%

Altitude: < 12,000m

### **3.2.2 Operating conditions:**

Temperature: 0°C to 40°C

Humidity: 20% to 80%

Altitude: < 2,000m

Pollution level: 2

Rated voltage: 150V CAT II relative to earth

## **3.3 CLEANING, MAINTENANCE, WARRANTY**

### **3.3.1 Cleaning**

Disconnect from all sources of electricity before cleaning, maintenance or dismantling.

Clean using a soft tissue with a small amount of soap and water, then dry completely.

### **3.3.2 Maintenance, metrology:**

After a long period of storage, it may be worth turning each of the decade's switches before use.

Like all measuring or testing devices, regular metrological verification is necessary.

To have your devices checked and calibrated, please contact our Cofrac approved metrology laboratories or Manumasure centres.

# **4 WARRANTY, REPAIRS**

## **4.1 WARRANTY**

This instrument is guaranteed against any defect in materials or workmanship, in accordance with the general terms and conditions of sale.

During the guarantee period (1 year), the instrument must be repaired only by the manufacturer, who reserves the right to repair the instrument or to exchange all or part of it.

The guarantee is not applicable in the following cases:

1. misuse of the instrument or use with incompatible equipment;
2. modifications of the instrument without explicit authorisation of the manufacturer's engineering department;
3. work carried out on the instrument by a person not approved by the manufacturer;
4. adaptation for a specific application, not included in the definition of the instrument or the operating instructions;
5. impacts, falls or immersion.

## 4.2 REPAIRS

For all repairs before or after expiry of warranty, please return the device to your distributor.

## 5 HOW TO ORDER

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<b>BR04</b> .....	<b>P01197401</b>
<b>BR05</b> .....	<b>P01197402</b>
<b>BR06</b> .....	<b>P01197403</b>
<b>BR07</b> .....	<b>P01197404</b>
<b>BC04</b> .....	<b>P01197421</b>
<b>BL07</b> .....	<b>P01197451</b>

Delivered with:

- 1 user's manual in 5 languages.

### ACCESSORIES :

- Cords 25cm long with rewriter .....**P01295056**



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