



Load Banks

Load Banks

Test Benches

Battery Discharge Testers



Hardware Reference

Document 1101031 - Edition October 2016

Content

1	General presentation.....	3
2	Main features.....	3
3	Standard Series.....	4
3.1	6 kW Hand transportable battery discharge testers.....	5
3.1.1	DVIMSeries.....	6
3.1.2	DMIM Series.....	7
3.1.3	DNIM series.....	8
3.2	12 kW Hand transportable battery discharge testers.....	9
3.2.1	DVTM Series.....	10
3.2.2	DMTM Series.....	11
3.2.3	DNTM Series.....	12
3.3	DXVA Series.....	12
3.4	DXLA Series.....	13
3.5	DCLA Series.....	15
4	Example of special designs.....	15

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1 Introduction

This documentation aims at showing the evolutions in the last years of the load banks we propose. The products shown in the former bench documentation can always be produced, but we enhanced our product range by numerous models from the small hand-transportable products to the sophisticated custom products, with improvements under every aspect : mechanical structure for an easy maintenance, water-cooling if required, electronic control while using PLC's types according to our customer choice,

The documentation presents our standard products as well as some of our custom designs in order to show the various solutions we can offer : Our expérience shown us that, in many cases, realizing a load bank taking into account the specific needs brings more benefits in all aspects than using a standard product.

2 General presentation

◆ Different types of load banks and benches

Load banks are constructed of switched loads, used for electrically loading electric equipments in order generally to test them. When the loads are fixed loads, they are considered as simple resistor assemblies, in open frame constructions or in resistor enclosures ; examples of such assemblies are given in the documentation of the different types of resistors (wirewound resistors, edgewound resistors and woven resistors).

Benches are used in various applications ; among them :

- the **battery discharge testers** are used for testing batteries by discharging them in a specified mode : given resistive load, fixed discharge current, ...
- **load banks for laboratory and teaching equipment** are used for providing electrical loads for the test of electrical devices and systems,
- **load banks for aerospace** are more specifically designed for the test of aerospace generators and equipments : they are designed for DC voltages of 28 V or for 3-phase 400 Hz to 1000 Hz AC voltages,
- the other **load banks** are generally used for testing DC or AC generators : power supplies, UPS, welding power sources, etc. They can as well be used for generating the electrical conditions for testing a specific electrical equipment : electromechanical relay, breaker, They become in this case a production or troubleshooting **test bench** or part of it.

◆ Load value selection

Depending on the type of the load bank, the load value selection can be made in different ways :

- **manual selection** : by using different terminals for connecting the source or by toggle or rotary switches
- **remote selection** : by sending signals via a parallel or serial link from a PC, an external electronic controller or a remote control panel (RS232, industrial bus : profibus, etc)
- **electronic control** : by a command given to the built-in electronic controller.

The unit can in this case operate a specific regulation (current, power) according to preset values or laws ; it can measure and record voltage and current values as well as other useful values (temperature, ...) and has communication ports for interfacing other controllers, printers, etc.

Commands and parameters are given to the controller via a local or remote control panel with keyboard and display, or via a serial link.

The data recorded by the unit can be stored on a PC via a serial link by using the **Coudial** (under Windows) interface software for analyzing them with other software tools.

These features can be used for designing a complete **test bench** for laboratory, production or troubleshooting.

◆ Reliability – Lifetime

The way we design and size our load banks, specially for what concerns the power, current and voltage aspects, as well as the choice of the components and the selected alloys for the resistance wire, allow to reach a high level of reliability and a long lifetime proven by the number and the age of the load banks always in use at our customers.

◆ Standard models and custom designs

We supply load banks for use with DC or AC generators, single and 3-phase, up to 1000 Hz.

We can supply our **standard model** as well as **adaptations** of these models or of models already produced ; we can also supply **custom designs** using our proven technologies and components for meeting your specific needs.

You will find in this document a presentation of our standard series and models and some examples of custom designs. These examples have been selected for showing our broad experience in the design of "tailor-made" load banks.

We will be happy to help you choosing the best solution, from both technical and cost points of view, which will fulfill your needs / requirements : please consult us.

3 Standard load banks

Coudoint propose 8 standard load banks series :

- 3 series (9 models) of 6 kW hand-transportable load banks : **DVIM, DMIM, DNIM**
- 3 series (6 models) of 12 kW hand-transportable load banks : **DVTM, DMTM, DNTM**
- a series (3 models) of 16 kW automatic hand-transportable load banks : **DXVA**
- a series (3 models) of 45 kW automatic load banks : **DXLA**
- a series (3 models) of 150 kW automatic load banks : **DCLA**

These standard load banks may be fitted for matching specific needs on request.

3.1 6 kW hand-transportable battery discharge testers

Coudoint propose three 6 kW hand-transportable battery discharge testers :

- the **DVIM Series** use woven resistors and forced-air cooling (1 fan). The woven resistors allow a weight reduction and bring a good resistance to mechanical shocks to the product. Forced-air cooling allows a compact housing and a limited temperature rise of the housing during the test.
- the **DMIM Series** use wirewound resistors and forced-air cooling (1 fan). Forced-air cooling allows a compact housing and a limited temperature rise of the housing during the test. Wire-wound resistors bring an economical advantage to the product compared to the DVIM Series.
- the **DNIM Series** use wirewound resistors and are forced-air cooled. These two features bring an economical advantage to the product compared to the DVIM and DMIM Series. Forced-air cooling brings a noise reduction as well, but the heat which is dissipated implies a higher temperature rise of the housing and require more precaution when using the product.

In each series, 3 standard models are proposed for 12, 28 and 48 volts :

	12 volts	28 volts	48 volts
DVIM Series	DVIM-12 (12V / 250 Amps)	DVIM-28 (28V / 200 Amps)	DVIM-48 (48V / 120 Amps)
DMIM Series	DMIM-12 (12V / 250 Amps)	DMIM-28 (28V / 200 Amps)	DMIM-48 (48V / 120 Amps)
DNIM Series	DNIM-12 (12V / 225 Amps)	DNIM-28 (28V / 200 Amps)	DNIM-48 (48V / 110 Amps)

These models are described in the series forms in the following pages.

Some optional features are proposed , and we can propose other adaptations or specific realizations depending on your needs : send us the features you wish and we will send you a price and lead-time proposal.

3.1.1 DVIM Series

Load banks of the DVIM series are :

- with **manual load step selection**
- **hand transportable** (~ 13 kg, small size)
- dissipating a **power up to 6 kW**
- **forced-air cooled** (built-in fan)

Standard models are :

- DVIM-12 : 12 V / 250 A max.
- DVIM-28 : 28 V / 200 A max.
- DVIM-48 : 48 V / 120 A max.

❖ Mechanical features

- overall dimensions (W)313 x (D)508 x (H)356 mm
- aluminum lightweight case - ingress protection IP20
- weight : approximately 13 kg depending on the model
- one carrying handle
- forced-air cooling (built-in fan)
- maximum noise level approximately 54 dB(A)

❖ Temperature range

- ambient temperature - 30°C to + 40°C

❖ Electrical features

- resistive load constructed of Coudpoint **woven resistances** in **low temperature coefficient alloy**
- load step switches, rotary type
- cooling fans and audible alarm powered by the test load itself

❖ Safety features

- reverse-voltage detection (audible alarm)
- cooling air flow failure detection (audible alarm)

❖ Variants

- labels in French [F] or in English [E]

❖ Options

- special marking (other language, etc) [I]
- painted steel case [P]
- emergency stop [U]
- analogue Voltmeter and analogue Ammeter [D]
- 2 test sockets on front panel for current measurement by an external voltmeter (1mV for 1,5A) [A]
- connecting cables (except for DVIM-48) [C]
- only DVIM-48 : connecting cables fitted with 300 Amps spring-clips [S]



Standard DVIM housing

❖ Specific features by model

- Model **DVIM-12** :
 - 9V / 185 Amps up to 14 V / 290 Amps
 - 5 load step rotary switches
 - 1 Amp steps (under 12 V)
 - 2-pin power connector (cable connector provided)
- Model **DVIM-28** :
 - 24 V / 170 Amps up to 28 V / 200 Amps
 - 4 load step rotary switches
 - 1 Amp steps (under 28 V)
 - 2-pin power connector (cable connector provided)
- Model **DVIM-48** :
 - 39 V / 95 Amps up to 53 V / 130 Amps
 - 3 load step rotary switches
 - 1 Amp steps (under 48 V)
 - connection by 2 x 25 mm² / 3,5 m (supplied) cables
 - power connections by M8 cable lugs
 - built-in cable stowage box

3.1.2 DMIM Series

Load banks in the DVIM series:

- have **manual load step selection**
- are **hand transportable** (~ 14 kg, small size)
- dissipate **up to 6 kW**
- are **forced-air cooled** (built-in fan)

Standard models are :

- DMIM-12 : 12 V / 250 Amps max.
- DMIM-28 : 28 V / 200 Amps max.
- DMIM-48 : 48 V / 120 Amps max.



For illustration purpose only

Standard DVIM housing
with Voltmeter and Ammeter (option)

⚡ Mechanical features

- overall dimensions (W)313 x (D)508 x (H)356 mm
- lightweight aluminum case - ingress protection IP20
- weight : approximately 14 kg depending on the model
- one carrying handle
- forced-air cooling (built-in fan)
- maximum noise level approximately 54 dB(A)

⚡ Temperature range

- ambient temperature - 30°C to + 40°C

⚡ Electrical features

- resistive load constructed of **Coudoint resistors with low temperature coefficient resistance wire on ceramic insulators**
- load step switches, rotary type
- cooling fans and audible alarm powered by the test load itself

⚡ Safety features

- reverse-voltage detection (audible alarm)
- cooling air-flow failure detection (audible alarm)

⚡ Variants

- labels in French [F] or in English [E]

⚡ Standard options

- special marking (other language, etc.) [I]
- painted steel case [P]
- analogue Voltmeter and analogue Ammeter [D]
- 2 test sockets on front panel for current measurement by an external voltmeter (1mV for 1.5A) [A]
- connecting cables (except for DMIM-48) [C]
- only DMIM-48 : connecting cables fitted with 300 Amps spring-clips [S]

⚡ Specific features by model

- Model **DMIM-12** :
 - 9V/185 Amps up to 14 V/290 Amps
 - 5 load step rotary switches
 - 1-Amp steps (under 12 V)
 - 2-pin power connector (cable connector provided)
- Model **DMIM-28** :
 - 24 V / 170 Amps up to 28 V / 200 Amps
 - 4 load step rotary switches
 - 1-Amp steps (under 28 V)
 - 2-pin power connector (cable connector provided)
- Model **DMIM-48** :
 - 39 V / 95 Amps up to 53 V / 130 Amps
 - 3 load step rotary switches
 - 1-Amp steps (under 48 V)
 - connection by 2 x 25 mm² / 3.5 m (supplied) cables
 - power connections by M8 cable lugs
 - built-in cable storage box

3.1.3 DNIM Series

Load banks in the DNIM series:

- have **manual load step selection**
- are **hand transportable** (~ 14 kg)
- dissipate **up to 6 kW**
- natural-air cooling

Standard models are :

- DNIM-12 : 12 V / 250 Amps max.
- DNIM-28 : 28 V / 200 Amps max.
- DNIM-48 : 48 V / 110 Amps max.

⚡ Mechanical features

- overall dimensions (W)304 x (D)623 x (H)320 mm
- Aluminum and plated-zinc steel case - ingress protection IP20
- weight : approximately 14 kg depending on the model
- One carrying handles
- natural-air cooling

⚡ Temperature range

- ambient temperature - 30°C to + 50°C

⚡ Electrical features

- **resistive load constructed of Coudoint resistors with low temperature coefficient resistance wire on ceramic insulators**
- load step switches, rotary typ

⚡ Safety features

- No reverse voltage damages
- Precaution must be taken against the heating of the housing during the use

⚡ Standard options

- special marking (other language, etc.) [L]
- painted steel case (front and back side) [P]
- connecting cables (except for DNIM-48) [C]
- connecting cables fitted with 300 Amps spring-clips [S]

For illustration purpose only



Standard DNIM housing

⚡ Specific features by model

- Model **DNIM-12** :
 - 9 V / 185 Amps à 14 V / 290 Amps
 - 2 load step rotary switches
 - 25-Amps steps (under 12 V)
 - power connections by M8 cable lugs
- Model **DNIM-28** :
 - 24 V / 170 Amps à 28 V / 200 Amps
 - 2 load step rotary switches
 - 20-Amps steps (under 28 V)
 - power connections by M8 cable lugs
- Model **DNIM-48** :
 - 39 V / 90 Amps à 53 V / 120 Amps
 - 2 load step rotary switches
 - 10-Amps steps (under 48 V)
 - connection by 2 x 25 mm² / 3.5 m (supplied) cables
 - power connections by M8 cable lugs
 - built-in cable storage box

3.2 Hand-transportable 12 kW battery discharge testers

Coudoint propose three 12 kW hand-transportable battery discharge testers Series :

- ❖ the **DVTM Series** use woven resistors and forced-air cooling (2 fans). The woven resistors allow a weight reduction and bring a good resistance to mechanical shocks to the product. Forced-air cooling allows a compact housing and a limited temperature rise of the housing during the test.
- ❖ the **DMTM Series** use wirewound resistors and forced-air cooling (2 fans). Forced-air cooling allows a compact housing and a limited temperature rise of the housing during the test. Wire-wound resistors bring an economical advantage to the product compared to the DVIM Series.
- ❖ the **DNTM Series** use wirewound resistors and are forced-air cooled. These two features bring an economical advantage to the product compared to the DVIM and DMIM Series. Forced-air cooling brings a noise reduction as well, but the heat which is dissipated implies a higher temperature rise of the housing and require more precaution when using the product.

In each series, 2 standard models are proposed for 48 and 128 volts :

	48 volts	128 volts
DVTM Series	DVTM-48 (48V / 250 A)	DVTM-128 (128V / 100 A)
DMTM Series	DMTM-48 (48V / 250 A)	DMTM-128 (128V / 100 A)
DNTM Series	DNTM-48 (48V / 225 A)	DNTM-128 (128V / 80 A)

These models are described in the Series forms in the following pages.

Some optional features are proposed , and we can propose other adaptations or specific realizations depending on your needs : send us the features you wish and we will send you a price and lead-time proposal.

3.2.1 DVTM Series

Load banks of the DVTM series are :

- with **manual load step selection**
- **hand carried portables** (~ 28 kg)
- dissipating a **power up to 12 kW**
- **forced-air cooled** (built-in fans)

One standard model :

- DVTM-48 : 48 V / 250 Amps max.
- DVTM-128 : 128 V / 100 Amps max.

❖ Mechanical features

- overall dimensions (W)403 x (D)500 x (H)753 mm
- aluminum lightweight case - ingress protection IP20
- weight : approximately 28 kg
- one carrying handle
- 2 cooling fans
- maximum noise level approximately 54 dB(A)

❖ Temperature range

- ambient temperature - 10°C to + 40°C

❖ Electrical features

- resistive load constructed of Coudoint **woven resistances** in **low temperature coefficient alloy**
- 2 test sockets on the front panel for current measurement by an external voltmeter (1mV for 1,5A)
- 2 x 25 mm²/ 3,5 m connecting cables are provided
- cooling fans and audible alarm powered from an external source

❖ Safety features

- reverse-voltage detection (audible alarm)
- cooling air flow failure detection (audible alarm)

❖ Variants

- labels in French [F] or in English [E]

For illustration purpose only



Standard DVTM housing

❖ Specific features by model

- Model **DVTM-48** :
 - 39 V / 200 Amps up to 53 V / 275 Amps
 - 5 load step rotary switches
 - 1 Amp steps (under 48 V)
- Model **DVTM-128** :
 - 120 V / 93 Amps up to 135 V / 105 Amps
 - 4 load step rotary switches
 - 1 Amp steps (under 128 V)

❖ Connections

- power connections by ØM8 screw terminals
- auxiliary supply requirements 230 V_{AC} 1 phase, 50 Hz (I_{AUX} ≈ 0,8 A) by C14 plug with cable (2 m) supplied

❖ Options

- special marking (other language, ...) [I]
- painted steel case [P]
- 115 V 60 Hz 1-phase auxiliary supply [A]
- emergency stop [U]
- analogue Voltmeter and Ammeter [D]
- connecting cables [C]

3.2.2 DMTM Series

Load banks in the DMTM series:

- have **manual load step selection**
- are **hand transportable** (~ 30 kg, small size)
- dissipate **up to 12 kW**
- are **forced-air cooled** (built-in fan)

Standard models are :

- DMTM-48 : 48 V / 250 Amps max.
- DMTM-128 : 128 V / 100 Amps max.

❖ Mechanical features

- overall dimensions (W)317 x (D)495 x (H)543 mm
- lightweight aluminum case - ingress protection IP20
- weight : approximately 30 kg depending on the model
- one carrying handle
- forced-air cooling (built-in fan)
- maximum noise level approximately 54 dB(A)

❖ Temperature range

- ambient temperature - 10°C to + 40°C

❖ Electrical features

- resistive load constructed of **Coudoint resistors with low temperature coefficient resistance wire on ceramic insulators**
- load step switches, rotary type
- 2 test sockets on front panel for current measurement by an external voltmeter
- cooling fans and audible alarm powered by the test load itself

❖ Safety features

- reverse-voltage detection (audible alarm)
- cooling air-flow failure detection (audible alarm)

❖ Variants

- labels in French [F] or in English [E]



Standard DMTM housing

❖ Specific features by model

- Model **DMTM-48** :
 - 39 V / 200 Amps up to 53 V / 275 Amps
 - 5 load step rotary switches
 - 1-Amp steps (under 48 V)
 - on test sockets : 1 mV for 2.5 Amps
- Model **DMTM-128** :
 - 120 V / 93 Amps up to 135 V / 105 Amps
 - 4 load step rotary switches
 - 1-Amp steps (under 128 V)
 - on test sockets : 1 mV for 1 Amp

❖ Connections

- power connections by M8 cable lugs
- auxiliary supply requirements 230 V_{AC} single phase, 50 Hz ($I_{AUX} \approx 0.8$ A) with C14 socket – 2 m. line cord with plug provided

❖ Standard options

- special marking (other language, etc.) [I]
- painted steel case [P]
- 115 V 60 Hz 1-phase auxiliary supply [A]
- analogue Voltmeter and Ammeter [D]
- connecting cables [C]

3.2.3 DNTM Series

Load banks in the DNTM series:

- have **manual load step selection**
- are **hand transportable** (~ 30 to 34 kg)
- dissipate **up to 12 kW**
- natural-air cooling

Standard models are :

- DNTM-48 : 48 V / 225 Amps max.
- DNTM-128 : 128 V / 80 Amps max.

❖ Mechanical features

- overall dimensions (W)352 x (D)849 x (H)353 mm
- aluminum and plated-zinc steel case - ingress protection IP20
- weight : approximately 30-34 kg depending on the model
- two carrying handles and 4 rubber feet
- natural-air cooling

❖ Temperature range

- ambient temperature - 10°C to + 50°C

❖ Electrical features

- resistive load constructed of **Coudoint resistors with low temperature coefficient resistance wire on ceramic insulators**
- load step switches, rotary type

❖ Connections

- power connections by M8 cable lugs

For illustration purpose only



Standard DNTM housing

❖ Specific features by model

- Model **DNTM-48** :
 - 39 V / 173 Amps up to 53 V / 238 Amps
 - 15-Amp steps (under 48 V)
 - weight : approximately 30 kg
- Model **DNTM-128** :
 - 120 V / 74 Amps up to 135 V / 84 Amps
 - 10-Amp steps (under 128 V)
 - weight : approximately 34 kg

❖ Standard options

- special marking (other language, etc.) [L]
- painted steel case [P]
- connecting cables [C]
- connecting cables fitted with 300 Amps spring-clips [S]

3.3 DXVA Series

Load banks of the DXVA series are :

- **electronically controlled**
- **portables** (~ 35 kg)
- dissipating a **power up to 16 kW**
- **forced-air cooled** (built-in fans)

Standard models are :

- DXVA-48 : 9 to 26 V / 100 Amps max.
26 to 53 V / 300 Amps max.
- DXVA-128 : 9 to 136 V / 75 Amps max.
- DXVA-240 : 96 to 240 V / 60 Amps max.

◆ Electrical features

- loads constructed of Coudoint resistors with low temperature coefficient resistance wire on ceramic insulators
- electronic power switches
- built-in digital controller
- control panel keyboard and display
- simultaneous display of voltage, current, power and elapse time values
- automatic load voltage detection
- automatic load regulation to maintain current, voltage or power at preset value, or to limit the duration time.
- several units can be paralleled

◆ Mechanical features

- overall dimensions (W)403 x (D)500 x (H)753 mm
- aluminum case - ingress protection IP20
- weight : approximately 35 kg
- 2 braked omnidirectional casters & 2 fixed casters, 3 carrying handles
- 3 built-in cooling fans powered from an external source
- maximum noise level approximately 54 dB(A)

◆ Temperature range

- ambient temperature - 10°C to + 40°C

◆ Safety features

- master ON/OFF switch
- reverse-voltage protection
- over-voltage protection
- load removed in case of cooling air flow failure
- fuse protection of auxiliary source lines

◆ Variants

- labels in French [F] or in English [E]



For illustration purpose only

Standard DXVA housing

◆ Specific features by model

- Model **DXVA-48** :
 - 9 to 26 V / 0 to 100 Amps
 - 26 to 53 V / 0 to 300 Amps
 - steps of 0,1 Amp
 - 3 Ø M12 power screw terminals
- Model **DXVA-128**
 - 9 to 136 V / 0 to 75 Amps
 - steps of 0,1 Amp
 - 3 Ø M6 power screw terminals
- Model **DXVA-250**
 - 96 to 240 V / 0 to 60 Amps
 - steps of 0,1 Amp
 - 3 Ø M6 power screw terminals

◆ Connections

- power connection : see for each model
- auxiliary supply requirements 230 V_{AC} single phase, 50 Hz (I_{AUX} ≈ 0,8 A) by C14 plug with cable (2 m) supplied

◆ Options

- RS232 output and **COUDIAL** data capture software on PC/Windows [S]
- Remote control panel [T]
- special marking (other language, etc) [I]
- painted steel case [P]
- 115 V 60 Hz 1-phase auxiliary supply [A]
- emergency stop [U]
- connecting cables [C]

3.4 DXLA Series

Load banks of the DXLA series are :

- **electronically controlled**
- **portable**, with a compact footprint
- dissipating a **power up to 45 kW**
- **forced-air cooled**

Standard models are :

- DXLA-60 : 40 to 60 V / 750 A max.
- DXLA-96 : 12 to 96 V / 300 A max.
- DXLA-240 : 12 to 240 V / 200 A max.

◆ Load control

- loads constructed of Coudoint resistors with low temperature coefficient resistance wire on ceramic insulators
- electronic power switches
- built-in digital controller
- control panel with keyboard and display
- simultaneous display of voltage, current, power and elapse time values
- automatic load voltage detection
- automatic load regulation to maintain current, voltage or power at preset value, or to limit the duration time.
- several units can be paralleled

◆ Mechanical features

- overall dimensions (W)552 x (D)552 x (H)1406 mm
- portable aluminum enclosure
- 2 braked omnidirectional casters & 2 fixed casters, 2 carrying handles
- air-forced cooling : built-in blower powered from an external source
- weight : approximately 200 kg, ingress protection IP20
- maximum noise level approximately 66 dB(A)

◆ Temperature range

- ambient temperature - 10°C to + 40°C

◆ Connections

- power connections : see for each model
- auxiliary supply requirements 230 V_{AC} single phase, 50 Hz (I_{AUX} ≈ 0,8 A) with 2 meter line cord provided

◆ Safety features

- master ON/OFF switch
- reverse-voltage protection
- over-voltage protection
- load removed in case of cooling air flow failure
- fuse protection of auxiliary source lines

◆ Variants

- labels in French [F] or in English [E]



For illustration purpose only

*Standard DXLA housing
(here with remote control panel)*

◆ Specific features by model

- Model **DXLA-60**
 - 40 to 60 V / 0 to 750 Amps - 0,1 Amp steps
 - 3 Ø M12 screw power terminals
- Model **DXLA-96**
 - 24 to 96 V / 0 to 300 Amps - 0,1 Amp steps
 - 3 Ø M12 screw power terminals
- Model **DXLA-240**
 - 24 to 96 V / 0 to 150 Amps - 0,1 Amp steps
 - 96 à 240 V / 0 à 75 A par pas de 0,1 A
 - 3 Ø M8 screw power terminals

◆ Options

- RS232 output and **COUDIAL** data capture software on PC/Windows [S]
- remote control panel [T]
- special marking (other language, etc) [I]
- painted steel panels [P]
- 460 V 60 Hz 3-phase auxiliary supply [A]
- emergency stop [U]
- connecting cables [C]
- top-mounted lifting eyes [L]

3.5 DCLA series

Load banks of the DCLA series are :

- **electronically controlled**
- **portable**
- dissipating a **power up to 150 kW**
- **forced-air cooled**

Standard models are :

- DCLA-230 : 24 to 240 V / 250 A max.
- DCLA-240 : 24 to 240 V / 450 A max.

Other needs : please consult us

◆ Load control

- loads constructed of Coudoint resistors with low temperature coefficient resistance wire on ceramic insulators
- electronic power switches
- built-in digital controller
- control panel with 4 push buttons and 24 digits display
- simultaneous display of voltage, current, power and elapse time values
- automatic load voltage detection
- automatic load regulation to maintain current, voltage or power at the preset value, or to limit the discharge time.
- several units can be paralleled

◆ Mechanical features

- portable aluminum housing
- air-forced cooling : built-in fan powered from an external source
- overall dimensions (W)802 x (D)965 x (H)1977 mm
- 2 braked castor wheels & 2 fixed wheels, 2 carrying handles
- weight : approximately 300 kg, ingress protection IP20
- maximum noise level approximately 86 dB(A)

◆ Temperature range

- ambient temperature - 10°C to + 40°C

◆ Connections

- power connections by 3 M12 terminal blocks
- auxiliary supply requirements 230 V_{AC} 3-phase, 50 Hz 2 kW (I_{AUX} ≈ 5 Amps) – 2 m. line cord provided

◆ Safety features

- master ON/OFF switch
- reverse-voltage protection
- over-voltage protection
- load removed in case of cooling air flow failure
- fuse protection of auxiliary source lines

◆ Variants

- labels in French [F] or in English [E]



For illustration purpose only

Standard DCLA housing

◆ Specific features by model

- Model **DCLA-230**
 - 24 to 128 V / 0 to 250 Amps by 0,1 Amp steps
 - 128 to 240 V / 0 to 125 Amps by 0,1 Amp steps
- Model **DCLA-240**
 - 30 to 35 V / 0 to 90 Amps by 0,1 Amp steps
 - 39 to 60 V / 0 to 160 Amps by 0,1 Amp steps
 - 100 to 155 V / 0 to 270 Amps by 0,1 Amp steps
 - 186 to 260 V / 0 to 450 Amps by 0,1 Amp steps

◆ Options

- RS232 output and **COUDIAL** data capture software on PC/Windows [S]
- remote control panel [T]
- special marking (other language, etc) [I]
- painted steel panels [P]
- 460 V 60 Hz 3-phase auxiliary supply [A]
- emergency stop [U]
- top-mounted lifting eyes [L]
- connecting cables [C]
- cable stowage box [B]

4 Some custom designs

We manufacture many load banks fulfilling specific needs. Our experience shown us that, in many cases, realizing a load bank taking into account the specific need brings more benefits in all aspects than using a standard product.

The following pages show some of our realizations ; they have been chosen for showing the diversity of our solutions :

- 4.1 20 kVAR **Capacitive load bank** under 230-400 V_{AC} 3-phase 50Hz [ET1614]
- 4.2 Set of 6 open-frame **RLC loads** for tests of conformity to electrical norms [ET1635 et ET1636]
- 4.3 **Set of fourteen 28 V_{DC} load banks** with **Siemens PLC's** and **Profibus** communication [ET1668]
- 4.4 **PLC controlled** resistive load bank 63 / 500 Amps **with integrated autotransformer** [ET1738]
- 4.5 **Inductive load bank** 50,5 kVAR / 230-400V_{AC} / 3-phases 400Hz [ET1758]
- 4.6 **Resistive & inductive load bank** 24 kW 3 kVAR 115 V_{AC} 400-800 Hz with Unitronics PLC [ET1757]
- 4.7 **Water-cooled** resistive & inductive load bank 350 V_{AC} 10-2000 Hz [ET1761]
- 4.8 Resistive **load bank on trailer** 115 V_{AC} 3-phase 400 Hz & 28 V_{DC} for **outdoor use** [ET1834]
- 4.9 **High voltage** resistive load bank 50 kV 32 kW [ET1861]
- 4.10 1700 A 15 V_{DC} Load bank with **specific housing** [ET1768]
- 4.11 Load bank 250 V_{DC} 420 Amps 105 kW **adapted from a standard model** [ET1529]
- 4.12 **Remote driven** load bank 511 A 14,3 kW [ET1513]
- 4.13 **Compact load bank** 270 V_{CC} 8 x 27 A 7 kW in intermittent duty [ET1416]
- 4.14 **Welding power** load bank 25 V_{DC} / 400 Amps 10 kW [ET1485]
- 4.15 **Test bench** 24 V_{AC} 650 Amps 3-phase 15,6 kW x 3 [ET1524]
- 4.16 **Electronically regulated** resistive load bank 26 - 30 V_{DC} 200 A [ET1596A]
- 4.17 **Remote controlled** load bank 1000 A / 28,5 V_{DC} [ET1740]
- 4.18 45 kW resistive and **15 kVAR inductive** load bank [ET1741]
- 4.19 20 kW resistive **USB controlled** load bank 120 à 600 VAC [ET1691]

4.1 20 kVAR Capacitive load bank

- voltage : 400Vac delta-connected 50Hz or 230Vac star-connected 50Hz
- 6 steps : 1kVAR / 2kVAR x 2 / 5kVAR x 3
- 1 light indicator per step
- fuse protection for each step
- manual selection by rotary switches of each step
- star or delta selection by switch
- natural air-cooling
- power and ground connections by M6 terminal blocks
- dimensions : W412 x D820 x H597 mm
- weight : 40 kg
- ingress protection IP20



Model ET1614

4.2 Resistive, capacitive and inductive load bank for tests of conformity to electrical norms

- set of 6 open-frame modules
- voltage from 242 to 419V_{AC}
- adjustable current from 1 to 50 Amps
- adjustable power factor from 0,3 to 0,95
- 19 series connected air-coils with intermediary tap
- 18 series connected resistors with intermediary tap
- 13 capacitors
- adjustment by copper bars on M6 terminals blocks
- inductive open frame :
 - dimensions W750 x D1605 x H1645 mm
- resistive / capacitive modules :
 - dimensions W500 x D1605 x H1645 mm
- ingress protection IP20



Models ET1635 et ET1636

4.3 Set of 28 V_{DC} resistive load banks with Siemens PLC and Profibus communication - for each :

- 80 independant electrical loads
- 6 steps per load : 0,5 Amp x 2 / 1 Amp / 2 Amps x 2 (480 steps in total)
- each step is controlled by an electromagnetic relay
- Siemens PLC ET200S CPU type
- ethernet communication between PLC's
- PROFIBUS protocol
- remote control only : global supervision
- air forced cooling
- direct access to all relays for replacement through a door with lock
- power connections by power blocks 4 mm²
- voltage of each circuit available on SubD 37 pin connectors
- light column for default signalisation
- dimensions W802 x D1235 x H 1951 mm
- weight 210 kg
- ingress protection IP20
- set of 14 load banks of same dimensions but with differents voltages, intensity and power levels.

*Model ET1668***4.4 PLC controlled resistive load bank 63Amps / 500Amps intermittent with integrated autotransformer**

- adjustable voltage generated in the range 195 to 264 V_{AC}
- voltage variation by integrated autotransformer
- adjustable permanent resistive load from 2,5 Amps to 63 Amps
- adjustable temporary resistive load from 20 Amps to 500 Amps
- Unitronics V130 PLC with display and numeric keyboard
- real time display of the voltage, current, order, duty cycle
- natural air cooling (very low acoustic noise)
- ground and power connections by copper bars
- dimensions W802 x D910 x H1670 mm
- weight 230kg
- ingress protection IP20

*Model ET1738***4.5 Inductive load bank : 50,5 kVAR 230-400V_{AC} 3-phases 400Hz**

- 3 electrically independant loads
- 8 steps per load : 0,5 kVAR / 1 k VAR / 2 kVAR x 2 / 10 kVAR x 2 / 20 kVAR
- coupling with M6 screw terminals
- steps controlled by contactors
- wired remote control
- natural air cooling
- Power and ground connections by M6 screw terminals
- dimensions W802 x D1152 x H940 mm
- weight 220kg
- ingress protection IP20

*Model ET1758*

4.6 Resistive & inductive load bank 24 kW 3 kVAR 115 V_{AC} 400-800 Hz with Unitronics PLC

- 1 resistive load with 12 steps : 5 kW x 2 / 3 kW x 2 / 1,2 kW x 2 / 0,6 kW x 2 / 0,3 kW x 2 / 0,15 kW x 2
- 3 independant resistive loads with 26 steps each :
 - 13 résistives : 0,125 W / 0,25 W / 0,5 W / 1 W / 2 W / 4 W / 8 W / 16 W / 32 W / 64 W / 128 W / 256 W et 512 W
 - 13 inductives : 0,125 VAR / 0,25 VAR / 0,5 VAR / 1 VAR / 2 VAR / 4 VAR / 8 VAR / 16 VAR / 32 VAR / 64 VAR / 128 VAR / 256 VAR et 512 VAR.
- each step is controlled by a relay or a contactor
- Unitronics V130 PLC with display & numeric keyboard included
- remote control by MODBUS TCP protocol
- coupling one-phase/bi-phases and three-phases by contactors
- state of each contactors given on 25 pins SubD connectors
- natural air-cooled
- dimensions W803 x D1135 x H1155 mm
- weight 180 kg
- ingress protection IP20

*Model ET1757***4.7 Water-cooled resistive & inductive load bank 350 V_{AC} 10-2000 Hz**

- 3-phase circuits 0,8 ohm / 60 μ H / 100 Amps per phase
- water cooled
- circuit switching by contactors
- fuse protection
- water connection on quick-connect type RMI12
- power connections on screw terminals M6
- dimensions : W803 x D1135 x H1155 mm
- weight 180kg
- load bank equipped with 4 eyebolts
- ingress protection IP21

*Model ET1761***4.8 Resistive load bank on trailer 115 V_{AC} 3-phase 400 Hz & 28V_{DC} for outdoor use**

- 2 independant electrical loads
- 1500 Amps under 28V_{DC} in 10 steps (minimum step : 10Amps)
- 38 kW under 115V_{AC} 3-phase 400 Hz in 8 steps (min. : 115W per phase)
- aeronautical standard connectors
- step controlled by rotary switches
- horizontal forced-air cooling
- integrated on a industrial trailer
- dimensions W2520 x D1160 x H1400 mm
- weight 540 kg
- ingress protection IP23

*Model ET1834*

4.9 High voltage resistive load bank 50kV 32 kW

- 32 kW resistive load bank
- maximum voltage 50kV
- resistors coupling by quick connectors
- connections on high-voltage insulators
- voltage measurement by ROSS probe
- forced air cooling
- safety contact on the door
- electric lock on the door
- framework with insulation panel, aluminium and plexiglass
- dimensions : W893 x D1387 x H2054 mm
- weight 315 kg
- eyebolts and wheels
- ingress protection IP20

*Model ET1861***4.10 1700 A 15 V_{DC} Load bank with specific housing**

- resistive load bank with 16 electrical loads
- each load can sink from 0,4 to 108 Amps
- easy access for maintenance : a door with a lock gives access for a direct replacement of any relay
- 128 channels driven through industrial connectors
- available space provided for customer use
- 4 wheels
- dimensions W1100 x D1180 x H1950 mm
- weight 230 kg
- ingress protection IP20

*Model ET1768*

4.11 Load bank 250 V_{DC} / 420 Amps ; 105 kW with remote control panel, adapted from a standard model

- adaptation of the DCLA-240 standard model
- programmable discharge current up to :
 - 180 Amps from 20 to 48 V, 280 Amps from 48 to 63 V,
 - 200 Amps from 125 to 135 V, 420 Amps from 230 to 250 V
- forced-air cooling (bottom intake, top exhaust) by a built-in blower powered from an external 380 V 3-phase source
- built-in digital controller with display/keyboard local control panel
- remote control panel with 20 meters long cable, with :
 - discharge current adjustment potentiometer
 - emergency stop button
- load removed in case of over-current failure
- power connections by copper bar terminals with bolts and nuts
- 4 x Ø4 mm test sockets for voltage and current measurement by using an external multimeter
- cable stowage box (cables provided)
- side-mounted fixing eyes
- portable housing with 2 fixed wheels and 2 omnidirectional braked wheels
- dimensions : P500 x L935 x H1938 mm
- weight 300 kg
- ingress protection IP 20



Model ET1529

4.12 Remote driven load bank 511 A ; 14,3 kW

- 9 load steps rated as follows : 1, 2, 4, 8, 16, 32, 64, 128, 256 Amps under the nominal operating voltage
- nominal operating voltage 28 V_{CC}
- maximum current 511 Amps
- natural air cooling
- electronic power switches
- load step selection by 9 parallel signals from an external controller
- galvanic insulation provided between load circuit and control signals
- power connections by copper bar terminals with bolts and nuts
- 2 carrying handles, 2 fixed castors and 2 omnidirectional braked castors
- dimensions : L653 x P842 x H782 mm
- weight 65 kg
- ingress protection IP20



Model ET1513

4.13 Compact load bank 270 V_{DC} 8 x 27 A 7 kW in intermittent duty

- 8 circuits of 80 Ω, each circuit fitted with a serial diode
- sized for pour 3 types of cyclic duties
- maximum current 27 Amps per section
- resistive load constructed of woven resistors
- cooling fan powered from external 28 V_{DC} source
- low speed fan detection
- power connections by M6 terminal blocks
- dimensions : W264 x D500 x H200 mm

*Model ET1416***4.14 Welding power load bank 25 V_{DC} / 400 Amps ; 10 kW**

- designed for the test of welding power sources
- capacity of withstanding the harsh waveforms generated by the welding power sources
- range of operating voltage 18 to 40 V_{DC}
- selectable load ohmic value from 0,062 Ω up to 0,6 Ω by 6 rotary switches
- air-forced cooling by 2 fans powered from the test load
- power connections by unipolar plugs
- hand transportable, with 3 carrying handles
- dimensions : W353 x D441 x H647 mm
- weight 22 kg , ingress protection IP 20

*Model ET1485*

**4.15 Test bench 24 V_{AC} 650 Amps single phase ; 15,6 kW
[test of electric products in single or 3-phase]**

- built-in transformer with a capacity to generate a test current from 1 to 650 Amps under 24 V_{AC} 50 Hz single phase with a resolution of ± 1 Amp up to 100 Amps, and ± 1 % above
- powered from an external 230 V_{AC} 50 Hz 1-phase source
- forced-air cooling by a built-in blower powered from external 230 V_{AC} 50 Hz single phase supply
- electronic control by a built-in micro-controller unit
- remote control panel, provided with 8-meter cable, with display and keyboard, 2 light indicators and emergency stop button
- continuous display of voltage and current values on the control panel
- input power connections by M8 terminal blocks
- output power connections to the tested product by copper bar terminals with bolts and nuts
- portable with 2 fixed wheels and 2 omnidirectional braked wheels
- dimensions : W552 x D692 x H1606 mm
- weight 190 kg , ingress protection IP 20

*Model ET1524***Test bench 24 V_{AC} 650 Amps 3-phase ; 15,6 kW x 3**

- by a "master-slave" coupling of 3 single phase benches

*3-phase test bench with 3 x ET1524 models in "master – slave" configuration*

**4.16 Electronically regulated resistive load bank 26 - 30 V_{DC}
200 A**

- resistive load bank for a consumption of 1 to 200 Amps under a voltage between 26 to 30 V_{DC}
- electronic controller maintaining a steady current
- real time display of voltage, current and power
- auxiliary circuit powered by the source (no need for a 230 V_{AC} supply)
- compact product W450 x D700 x H760 mm
- weight 43 kg
- 4 wheels

*Model ET1596A***4.17 Remote controlled load bank 1000 Amps / 28,5 V_{DC}**

- twelve 50 Amps buses and one 400 Amps bus
- forced air cooling
- individual control of each step by either :
 - switches on the front panel
 - or 19" remote control rack
- easy access for maintenance : a door with a lock gives access for a direct replacement of any relay
- busbar connection conforming to NEMA standard
- dimensions W1220 x D800 x H1950 mm
- weight 240kg
- auxiliary supply 120 V_{AC} 60Hz

*Model ET 1740*

4.18 45 kW resistive and 15 kVAR inductive load bank

- three-phase 400 Hz 115-200 V_{AC}
- 9 resistive steps : 0,16 kW / 0,16 kW / 0,16 kW / 0,67 kW / 0,67 kW / 1,67 kW / 1,67 kW / 3,3 kW / 6,67 kW
- 7 inductive steps : 0,16 kVAR / 0,16 kVAR / 0,16 kVAR / 0,67 kVAR / 0,67 kVAR / 1,67 kVAR / 1,67 kVAR
- forced air cooling
- individual control of each step by either :
 - switches on the front panel
 - or 19" remote control rack
- easy access for maintenance : a door with a lock gives access for a direct replacement of any relay
- busbar connection conforming to NEMA standard
- dimensions W1220 x D800 x H1950 mm
- weight 260 kg
- auxiliary supply 120 V_{AC} 60 Hz



Model ET1741

4.19 20 kW resistive USB controlled load bank 120 à 600 V_{AC}

- 16 controlled resistive loads
- 17 steps from 0,5 to 16384 Ohms
- loads activated by contactors
- contactors controlled by an USB interface board
- USB interface can be driven by Labview, VB, VC, VEE & DELPHI
- dimensions W800 x D1120 x H1355 mm
- weight 200 kg
- ingress protection IP20
- 4 wheels



Model ET1691

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