

# Revalco<sup>®</sup>

Made in Italy

measuring instruments

NEWS 2009



Kazakhstan



**UL**<sup>®</sup>  
E240753

Underwriters  
Laboratories Inc.<sup>®</sup>  
USA



# INDEX

## BATTERY CHARGER

2E12 (2Amp 12Vdc) .....	1
5SE12 (5Amp 12Vdc) / 5SE24 (5Amp 24Vdc) .....	2
12PRO24 (12Amp 24Vdc) .....	3

## EQUIPMENTS FOR RAIL-WAY AND NAVAL USE

VOLTMETERS .....	4
MILLIVOLTMETERS .....	4
MILLIAMMETERS .....	5

# BATTERY CHARGER

## RAL2E12 (2A - 12VDC)

This automatic battery charger is composed by a power transformer and an electronic control module. The transformer is provided by a safety mark, so it grants a high level of insulation and confidence as well as a galvanic separation from supply also in presence of electrical discharge or high energy disturbances. The technology with which it is manufactured permits to minimize the thermic dissipation and to absorb few energy working without load. The electronic module controls the battery voltage and, considering its status, activates the charge threshold. On rest, the maintenance threshold permits to the battery to deliver the necessary current to recharge it with the same quantity consumed by the load. The battery charger limits its current to the maximum possible (2A) and start to recharge the battery.

This equipment is an industrial article for general applications use.

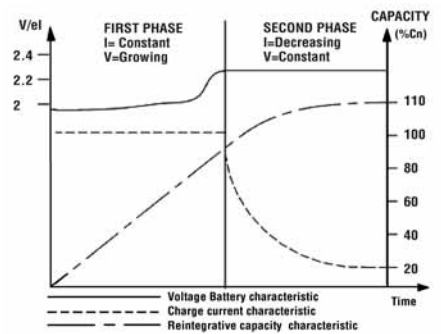
- **POWER SUPPLY** 230VAC  $\pm$  10%
- **BURDEN** 20VA (magnetic core with low heat production)
- **SAFETY** safety transformer, galvanic separation
- **PROTECTIONS** safety transformer
- **CHARGE CURRENT** 2A max
- **VOLTAGE CHARGE** 15VDC max
- **MAINTENANCE VOLTAGE** 13,2VDC (automatic charge)
- **STANDARDS:** Safety CEI EN 61010-1 CAT II; Class CEI EN 60688; Emc: immunity CEI EN 61000-6-2 (ex EN 50082-2), Emissions CEI EN 61000-6-4 (ex EN 50081-2)

Equipment suitable to charge the batteries conform to the EN50342-1 standard

- **DIMENSIONS / WEIGHT kg** 90x75 h65 mm /
- **MOUNTING POSITION:** Revalco suggests to fix the equipment to the wall (metallic) in vertical position (like the photograph) with the scope to increase the heat dissipation capacity. On the contrary the thermic protection will limits the device performance (automatic reduction of charge current)

### - CONTROL PANEL

- on front:
  - green LED shows when the battery charge is powered (negative connected with the battery)
  - red LED shows when the battery is in charge ( led lights-on for few periods informs about the maintenance status of charge
- on side:
  - trimmer for adjustment of end charge voltage



**CHARGE PROFILE**  
IU (DIN 41773 standards)

# BATTERY CHARGER

RAL5SE12 (5A - 12VDC) - 5SE24 (5A - 24VDC)

This automatic battery charger is composed by a power transformer and an electronic control module. The transformer is provided by a safety mark, so it grants an high level of insulation and confidence as well as a galvanic separation from supply also in presence of electrical discharge or high energy disturbances. The technology with which it is manufactured permits to minimize the thermic dissipation and to absorb few energy working without load. The electronic module controls the battery voltage and, considering it's status, activates the charge threshold. On rest, the maintenance threshold permits to the battery to deliver the necessary current to recharge it with the same quantity consumed by the load. The battery charger limits its current to the maximum possible (5A) and start to recharge the battery. The deep load limit can be activated from external acting on the proper input after the removal of little bridge (open contact = deep charge). These equipments are industrial articles for general applications.

- **POWER SUPPLY** 230 - 400VAC +/- 10%
- **BURDEN** 80VA (magnetic core with low heat production)
- **SAFETY** safety transformer, galvanic separation
- **PROTECTIONS** safety transformer, high temperature, short circuit (+/- battery)
- **CHARGE CURRENT** 5A continuously
- **VOLTAGE CHARGE RANGE** 32VDC max
- **MAINTENANCE VOLTAGE** 26,4VDC/13,2VDC (automatic charge)
- **RAPID VOLTAGE CHARGE** 27VDC/13,5VDC (deep charge)

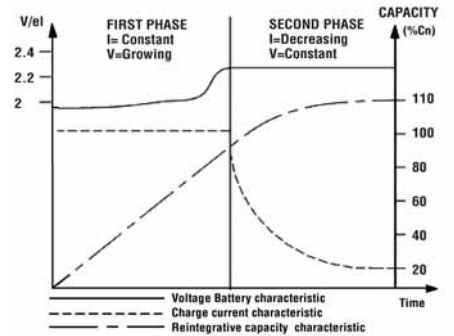
- **STANDARDS:**  
 safety CEI EN 61010-1 CAT II; Class CEI EN 60688; Emc: immunity CEI EN 61000-6-2 (ex EN 50082-2), Emissions CEI EN 61000-6-4 (ex EN 50081-2). Equipments suitable to charge the batteries conform to the EN50342-1 standard.

- **BATTERY:** Before to use the battery for the first time, make a cycle of complete charge. Battery (if correctly installed) can be reach the maximum declared capacity also after 15 charge/discharge cycles (during the normal use) being in any case conforms to the "**BCI Specifications**". For other informations on the behaviour of system battery charger / battery see: SAE J240, SAE J537, SAE J541, SAE J930, SAE J539, SAE J1495, SAE J2185, BCI recommended procedure.

- **DIMENSIONS / WEIGHT kg** 135x85 h160 mm /

- **CONTROL PANEL:**

- on front:
- green LED shows when the battery charge is powered (negative connected to the battery)
  - red LED shows when the battery is in charge ( led switches-on for few periods informs about the maintenance status of charge
  - removing the little bridge (under the drawing) it is possible to command the deep charge of battery
  - trimmer for adjustment of load current limit (from 0,5A to 5A)
  - trimmer for adjustment of end charge voltage



**CHARGE PROFILE**  
 IU (DIN 41773 standards)

# BATTERY CHARGER

12PRO24 (12A - 24VDC)

This automatic battery charger is composed by a power transformer and an electronic control module. The transformer is provided by a safety mark, so it grants an high level of insulation and confidence as well as a galvanic separation from supply also in presence of electrical discharge or high energy disturbances. The technology with which it is manufactured permits to minimize the thermic dissipation and to absorb few energy working without load. The electronic module controls the battery voltage and, considering it's status, activates 2 charge thresholds. On rest, the maintenance threshold permits to the battery to deliver the necessary current to recharge it with the same quantity consumed by the load. In case of high delivery from battery (motor start) the battery charger activates the deep charge. The battery charger limits its current to the maximum possible (12A) and start to recharge the battery. The limit to which the recharge will end is higher than the maintenance charge; at the end the battery charge stops its self waiting for the passage to the maintenance limit (lowering of battery voltage). Deep charge limit can be activated from external also acting on the proper input. An additional control starts automatically in presence of rapid discharge. Deep charge is inserted and maintained also in presence of its attainment and for a period selected by the operator in order to grant the optimal recharge status. A remote signal of empty battery is available which intervene when the battery charge supply voltage failed or after a selectable period of low voltage battery condition. This is a professional equipment for applications on which safety and confidence are necessary. Useful for not garrisoned installations where the preservation status of batteries is fundamental



- **POWER SUPPLY** 230 - 400VAC +/- 10%
- **BURDEN** 750VA (M6 magnetic core with low heat production and no load absorption)
- **SAFETY** safety transformer, galvanic separation
- **PROTECTIONS** safety transformer, high temperature, short circuit (+/- battery)
- **CHARGE CURRENT** 12A continuously (delivered also in condition of short circuit to terminals +/-)
- **VOLTAGE CHARGE RANGE** 32VDC max
- **MAINTENANCE VOLTAGE** 26,4VCC (automatic charge)
- **RAPID VOLTAGE CHARGE** 27VCC (deep charge)
- **ACTUAL DISCHARGE VOLTAGE** 22VDC (discharging battery)
- **DAMAGE BATTERY ALARM** discharge battery condition up to the end of the selected time
- **DAMAGE REMOTE SIGNAL** potential free relay 8A (positive safety relè)
- **CHARGE RESTORE** selectable time of deep charge permanency after discharge battery condition

- **STANDARDS:**

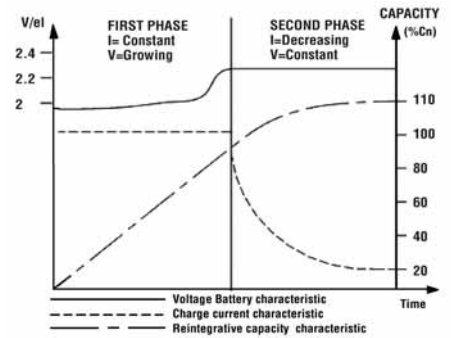
safety CEI EN 61010-1 CAT II; Class CEI EN 60688; Emc: immunity CEI EN 61000-6-2 (ex EN 50082-2), Emissions CEI EN 61000-6-4 (ex EN 50081-2).

Equipments suitable to charge the batteries conform to the EN50342-1 standard

- **BATTERY:** Before to use the battery for the first time, make a cycle of complete charge. Battery (if correctly installed) can be reach the maximum declared capacity also after 15 charge/discharge cycles (during the normal use) being in any case conforms to the "BCI Specifications". For other informations on the behaviour of system battery charger / battery see: SAE J240, SAE J537, SAE J541, SAE J930, SAE J539, SAE J1495, SAE J2185, BCI recommended procedure.

- **DIMENSIONS / WEIGHT kg** 250x192 h150 mm /

- **CONTROL PANEL:** on front
  - Alarm relay
  - Led battery charger ON
  - Led automatic charge
  - Led external high speed charge
  - Led internal high speed charge
  - Led current limit
  - Led battery low voltage
  - Led good condition battery
  - trimmer for keep time
  - trimmer for alarm delay



**CHARGE PROFILE**

IU or IUoU (keep time use)  
(DIN 41773 standards)

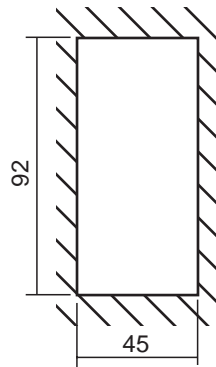
# EQUIPMENTS FOR RAIL-WAY AND NAVAL USE

## DIMENSIONS

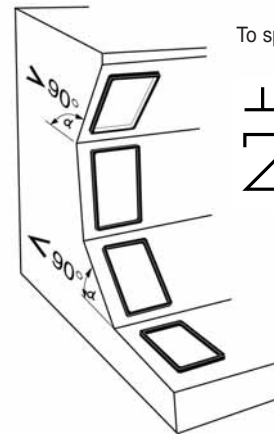


Weight: 0,45 kg

## CUT OUT



## MOUNTING POSITION



To specify when ordering:

- = vertical
- = horizontal
- = 20°...45°...60° degree

## VOLTMETERS

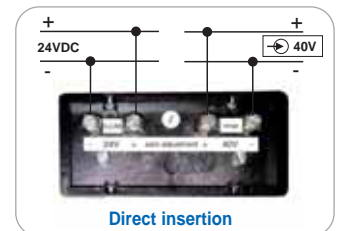
### MOVING COIL INSTRUMENTS FOR DIRECT CURRENT



#### ERCR96X48 V0-20Z5

- INSULATION CLASS
- POLLUTION DEGREE
- EXECUTION
- HOUSING
- VIBRATION RESISTANCE
- SHOCK RESISTANCE
- INTERNAL ILLUMINATION
- PROTECTION DEGREE
- ACCURACY CLASS
- OVERLOAD
- TERMINALS
- ZERO ADJUSTER
- INPUT
- READING END SCALE VALUE
- TEMPERATURE
- RELATIVE HUMIDITY

II - 150V CAT III (double insulation)  
2 (CEI EN 61010-1 standard)  
tropicalized, vibration resistant and antireflex glass  
metallic  
up to 5g, frequency 5...80Hz applied on 3 axes  
max 30g applied on 3 axes  
by white LED, 24VDC, absorbed current 47mA;  
LED duration 70.000 hours  
IP55 on front, IP00 on terminals (CEI EN 60529 standard)  
1,5 (CEI EN 60051-1; 60051-2; 60051-9; CEI EN 60688 standards)  
1,2 times (20%) the nominal current continuously,  
up to 2 times the nominal current for less than 5 seconds (CEI EN 61010-1 standard)  
M3 screws - cable with metal fork 3 mm  
on the back of the instruments  
40VDC  
vertical from 0 to 40V  
black scale plate; divisions, number, words and symbols white colour  
red sector from 0 to 20V and from 30 to 40V  
orange pointer  
working: 20°C +/- 10°C respecting the accuracy class (IEC par. 8.7.1 standard)  
from -25°C to +70°C without guarantee of accuracy class  
storage: from -40°C to +80°C  
85% max, without condensation at 35°C for max 60 days/year  
with medium annual value not higher than 65% (DIN 40040 standard)



## MILLIVOLTMETERS

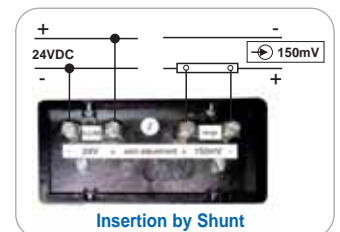
### MOVING COIL INSTRUMENTS FOR DIRECT CURRENT



#### ERCR96X48 V0-20Z6

- INSULATION CLASS
- POLLUTION DEGREE
- EXECUTION
- HOUSING
- VIBRATION RESISTANCE
- SHOCK RESISTANCE
- INTERNAL ILLUMINATION
- PROTECTION DEGREE
- ACCURACY CLASS
- OVERLOAD
- TERMINALS
- ZERO ADJUSTER
- INPUT
- READING END SCALE VALUE
- TEMPERATURE
- RELATIVE HUMIDITY

II - 150V CAT III (double insulation)  
2 (CEI EN 61010-1 standard)  
tropicalized, vibration resistant and antireflex glass  
metallic  
up to 5g, frequency 5...80Hz applied on 3 axes  
max 30g applied on 3 axes  
by white LED, 24VDC, absorbed current 47mA;  
LED duration 70.000 hours  
IP55 on front, IP00 on terminals (CEI EN 60529 standard)  
1,5 (CEI EN 60051-1; 60051-2; 60051-9; CEI EN 60688 standards)  
1,2 times (20%) the nominal current continuously,  
up to 2 times the nominal current for less than 5 seconds (CEI EN 61010-1 standard)  
M3 screws - cable with metal fork 3 mm  
on the back of the instruments  
150-0-150mVDC  
vertical -300...0...+300A  
black scale plate; divisions, number, words and symbols white colour  
red sector from -300 to -200A and from 200 to 300A  
orange pointer  
working: 20°C +/- 10°C respecting the accuracy class (IEC par. 8.7.1 standard)  
from -25°C to +70°C without guarantee of accuracy class  
storage: from -40°C to +80°C  
85% max, without condensation at 35°C for max 60 days/year  
with medium annual value not higher than 65% (DIN 40040 standard)



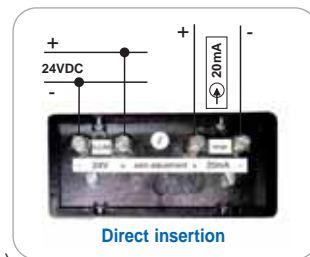
# MILLIAMMETERS

## MOVING COIL INSTRUMENTS FOR DIRECT CURRENT



### ERCR96X48 V0-20Z1

- INSULATION CLASS II - 150V CAT III (double insulation)
- POLLUTION DEGREE 2 (CEI EN 61010-1 standard)
- EXECUTION tropicalized, vibration resistant and antireflex glass
- HOUSING metallic
- VIBRATION RESISTANCE up to 5g, frequency 5...80Hz applied on 3 axes
- SHOCK RESISTANCE max 30g applied on 3 axes
- INTERNAL ILLUMINATION by white LED, 24VDC, absorbed current 47mA; LED duration 70.000 hours
- PROTECTION DEGREE IP55 on front, IP00 on terminals (CEI EN 60529 standard)
- ACCURACY CLASS 1,5 (CEI EN 60051-1; 60051-2; 60051-9; CEI EN 60688 standards)
- OVERLOAD 1,2 times (20%) the nominal current continuously, up to 2 times the nominal current for less than 5 seconds (CEI EN 61010-1 standard)
- TERMINALS M3 screws - cable with metal fork 3 mm
- ZERO ADJUSTER on the back of the instruments
- INPUT 20mADC
- READING END SCALE VALUE vertical from 0 to 1,5kA  
black scale plate; divisions, number, words and symbols white colour  
red sector from 1 to 1,5kA  
orange pointer
- TEMPERATURE working: 20°C +/- 10°C respecting the accuracy class (IEC par. 8.7.1 standard)  
from -25°C to +70°C without guarantee of accuracy class  
storage: from -40°C to +80°C
- RELATIVE HUMIDITY 85% max, without condensation at 35°C for max 60 days/year  
with medium annual value not higher than 65% (DIN 40040 standard)



### ERCR96X48 V0-20Z2

- INPUT 20mADC
- READING END SCALE VALUE vertical from 0 to 120°C  
black scale plate; divisions, number, words and symbols white colour  
red sector from 65 to 120°C  
orange pointer



### ERCR96X48 V0-20Z3

- INPUT 20mADC
- READING END SCALE VALUE vertical from 0 to 120°C  
black scale plate; divisions, number, words and symbols white colour  
red sector from 0 to 45°C and from 100 to 120°C  
orange pointer



### ERCR96X48 V0-20Z4

- INPUT 20mADC
- READING END SCALE VALUE vertical from 0 to 2000 Giri/1' (round per minute)  
black scale plate; divisions, number, words and symbols white colour  
red sector from 1800 to 2000 Giri/1' (round per minute)  
orange pointer

## NOTE

Different executions concerning dimensions, end scale values, input values, colours and mounting position can be manufactured under request.



April 30, 2009

**Prüfbericht / Test report**

Auftraggeber **REVALCO S.r.l.**  
 Applicant  
 Geräteart **Moving Coil Indicator**  
 Type of equipment  
 Typenbezeichnung **ERC96X48 V0**  
 Type designation  
 Prüfbericht Nummer **70183-00157-1 (Edition 2)**  
 Test report no.  
 Prüfgrundlage **EN 50155:2001 + A1:2002 + Corrigendum:2003**  
 Test standards  
**EN 50121-3-2:2006**

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**Summary**

Die Prüfungen wurden nach folgenden Vorschriften durchgeführt:  
 Tests were performed according to:  
**EN 50155:2001 + A1:2002 + Corrigendum:2003**  
**EN 50121-3-2:2006**

Durchgeführte Prüfung Test performed	Grenzwerte Limits		Prüfergebnis Test result			
	Abstand Margin	Überschritten by Exceeded by	Erfüllt Passed	Nicht erfüllt Not Passed	Nicht zutreffend Not applicable	Kriterium Criterion
Störspannung / Disturbance voltage			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Gestrahle Störgrößen / Radiated disturbance			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Oberschwingungen / Harmonics			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Spannungsschwankungen / Flicker			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Entladung statischer Elektrizität / Electrostatic discharge			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B
Elektromagnetische HF-Felder / RF-electromagnetic fields			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A
Schnelle Transiente / Electrical fast transients			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B
Stoßspannungen / Surges			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	B
Induzierte leitungsgeführte Störgrößen / Induced conducted disturbances			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A
Magnetfelder mit energietechnischer Frequenz / Power magnetic fields			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	A
Spannungseinbrüche und -unterbrechungen / Voltage dips and interruptions			<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	B/C

**Bemerkungen / Remarks:**

Die Prüfergebnisse beziehen sich ausschließlich auf das zur Prüfung vorgestellte Prüfmuster. Ohne schriftliche Genehmigung des Prüflabors darf der Prüfbericht auszugswise nicht vervielfältigt werden. The test results relate only to the individual item which has been tested. Without the written approval of the test laboratory this report may not be reproduced in extracts.

Datum / Date	Geprüft von / Tested by	Freigegeben durch / Checked by	Prüfergebnis / Test Result
30.04.2009	 Karl Roidt Responsible for testing	 Johann Roidt Laboratory manager	<input checked="" type="checkbox"/> Erfüllt / Passed <input type="checkbox"/> Nicht erfüllt / Not passed



April 30, 2009

**Prüfbericht / Test report**

Auftraggeber **REVALCO S.r.l.**  
 Applicant  
 Geräteart **Moving Coil Indicator**  
 Type of equipment  
 Typenbezeichnung **ERC96X48 V0**  
 Type designation  
 Prüfbericht Nummer **70183-00157-4 (Edition 2)**  
 Test report no.  
 Prüfgrundlage **DIN EN 50155; VDE 0115-200:2004-01**  
 Test standards  
**DIN EN 61373; VDE 0115-106:1999-11**

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**Summary**

Die Prüfungen wurden nach folgenden Vorschriften durchgeführt:  
 Tests were performed according to:  
**DIN EN 50155; VDE 0115-200:2004-01 (teilweise / partly)**  
**DIN EN 61373; VDE 0115-106:1999-11 (teilweise / partly)**

Durchgeführte Prüfung Prüfung durchgeführt	Betriebsart Betriebsart		Prüfergebnis Prüfergebnis			
	Betrieb Operating	Transport/ Lagerung Transport/ Storage	Erfüllt Passed	Nicht erfüllt Not Passed	Nicht zutreffend Not applicable	Kriterium Criterion
Kälte / Cold	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Trockene Wärme / Dry Heat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Feuchte Wärme, zyklisch / Damp Heat, cyclic	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Breitbandrauschen / Broadband Random	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Shock / Shock	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**Bemerkungen / Remarks:**

Die Prüfergebnisse beziehen sich ausschließlich auf das zur Prüfung vorgestellte Prüfmuster. Ohne schriftliche Genehmigung des Prüflabors darf der Prüfbericht auszugswise nicht vervielfältigt werden. The test results relate only to the individual item which has been tested. Without the written approval of the test laboratory this report may not be reproduced in extracts.

Datum / Date	Geprüft von / Tested by	Freigegeben durch / Checked by	Prüfergebnis / Prüfergebnis
30.04.2009	 Reinhold Markl Responsible for testing	 Johann Roidt Laboratory manager	<input checked="" type="checkbox"/> Erfüllt / Passed <input type="checkbox"/> Nicht erfüllt / Not passed





**Revalco®**

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