



Solutions for **Low Voltage Power Factor Correction**

OPTIM Range Products for LV Power Factor Correction



40 years leading power factor correction



CIRCUTOR, the energy efficiency solutions company, is once again revolutionising power factor correction through an innovative design of its capacitor banks, to guarantee the fastest, most effective and simplest assembly, installation and commissioning in the market, also ensuring the very highest performance thanks to the proven quality of its European sourced components, and the production and assembly of 100% of the capacitor banks in CIRCUTOR's installations in Spain.

We make it easy for you

The new design of the cabinets facilitates the installation, offering cable entry through the rear and/or side of the capacitor banks (depending on the model). What's more, all the capacitor banks include the *Plug&Play* system, which ensures the start-up of the units in three quick, simple steps, without the need for any programming.



CIRCUTOR Warranty

Thanks to the use of CIRCUTOR's **CLZ Heavy Duty** capacitors in capacitor banks with a patented higher power rating system, we ensure greater robustness, reliability and safety in the capacitor banks.

- USEFUL LIFE  150,000 hours
- MAXIMUM CURRENT  Up to 2.5 I_n
- TEMPERATURE RESISTANCE  From -50 to 65 °C



The first step on the path to energy efficiency

Make your capacitor bank SMART.

Knowing your energy consumption and measuring up to 150 electric parameters (max. power, harmonics, voltages, and much more). Intelligent power factor correction system and a powerful power analyzer in just one unit.

V A mA Hz kW kVA cos fi
kvar kvarL kvarC PF °C %
THD V THD A harm V harm A
M/kWh M/kvarLh M/kvarCh M/kVAh

Capacitor bank accuracy

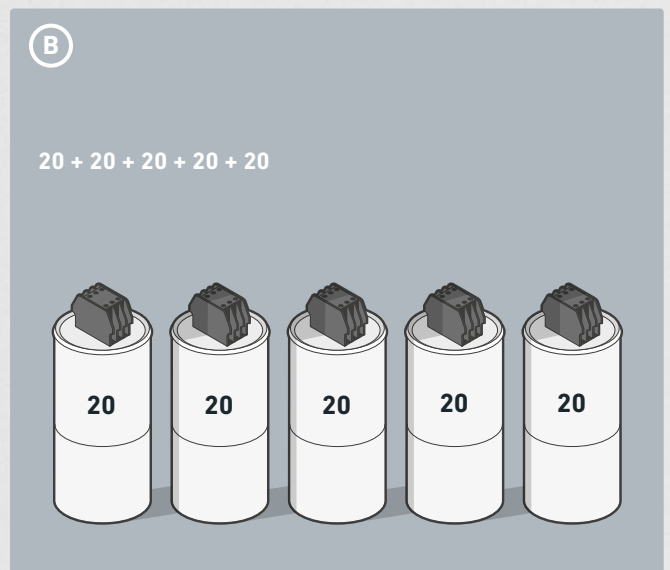
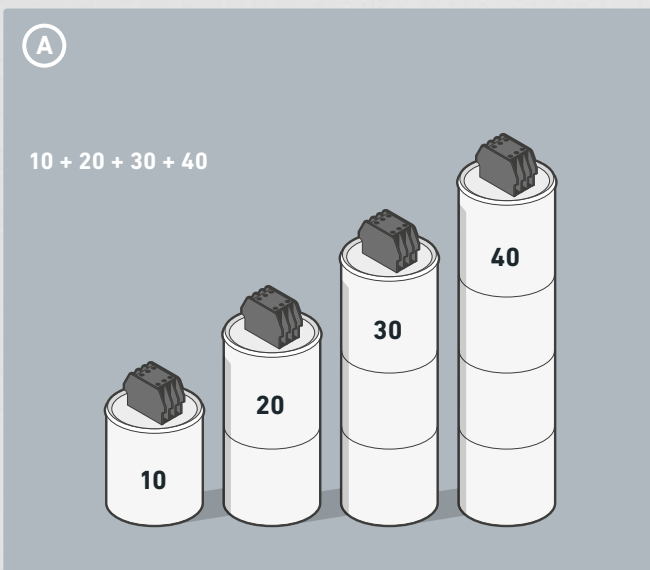


There are some popular wrong assumptions related to the capacitor bank accuracy, it is common to think that a capacitor bank with a lot of physical steps is more accurate than other with less capacitors. It is not always true. The characteristic that defines a capacitor bank accuracy is called electrical steps. The number of electrical steps are all the different combinations that the bank can connect. ↘

Electrical steps are the result of dividing the total power by the lower step.

For example, imagine two capacitor banks of 100 kvar each:

- The first one is composed by 4 capacitors (10+20+30+40)
- The second one has 5 (20+20+20+20+20).



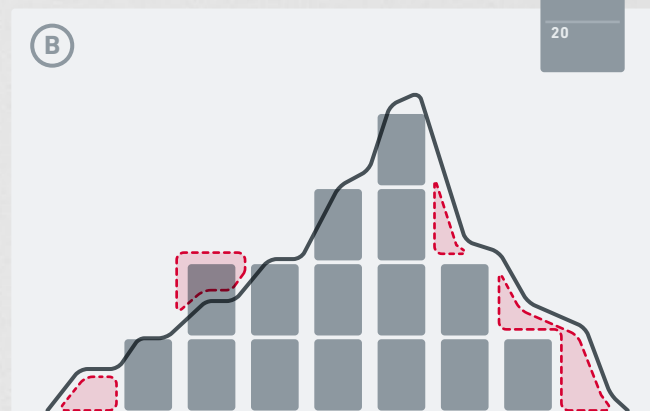
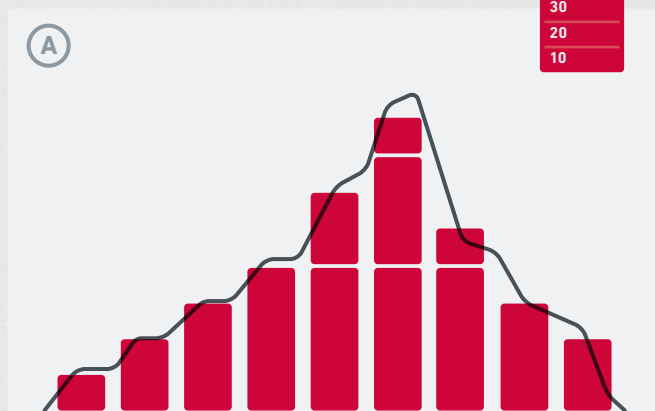
For more information about CIRCUTOR Capacitors see page 7.



In order to calculate the number of electrical steps, for the first one we will divide $100/10=10$ electrical steps. For the second one we should divide $100/20=5$ electrical steps. As you can see, the second one, despite having more capacitors, you can only combine



them in 5 different ways. (20, 40, 60, 80, 100). On the other hand, with the first bank you can have 10 different combinations (10, 20, 30, 40, 50, 60, 70, 80, 90, 100). You can compare them with two rules, the more divisions it has the more accurate you can measure.



To conclude, as we explained before, CIRCUTOR designs its capacitor banks specially thinking on the electrical steps, the bank can correctly adjust the demand curve, so you will not pay for the inductive neither capacitive power factor.

CLZ-HD

Heavy Duty Capacitors

Robust, reliable and safe

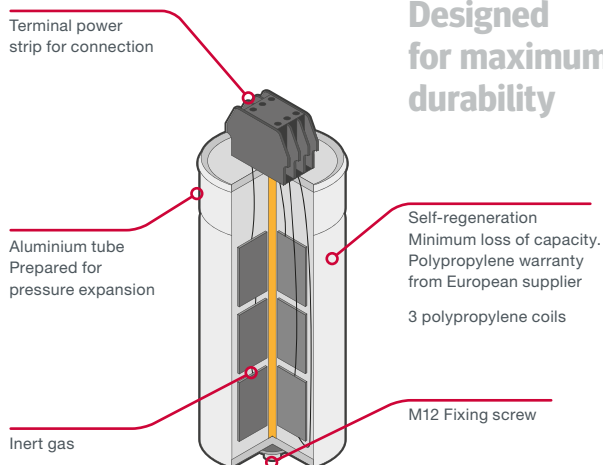
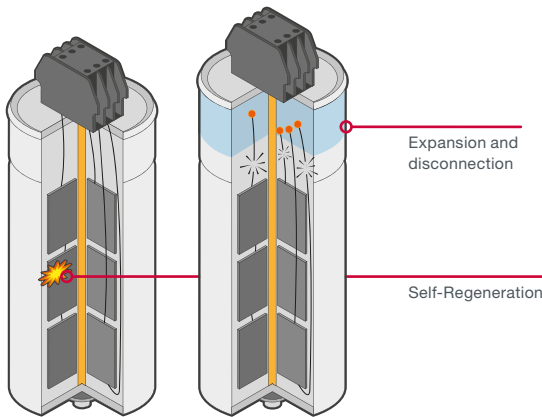
The **CLZ Heavy Duty** Capacitor series by CIRCUTOR includes a new comprehensive disconnection system that guarantees complete capacitor disconnection in the event of incidents and eliminates possible risks for the installation or collateral damage to the rest of the units.



Higher strength
Up to 65°C



Longer lifetime
150,000 h



Designed for maximum durability



HD HEAVY DUTY

MORE EFFICIENT

Cutting-Edge Technology

- I Greater current capacity:** $1.8 I_n$ permanently x, $2.5 I_n$ short time
- I Greater tolerance to inrush currents:** $400 \times I_n$
- I Longer lifetime:** 150,000 h
- I Higher temperature resistance:** -50/D, to 65°C
- I More secure and safe:** Inert gas
- I More efficient:** the lowest losses in its class, only 0.4 W/kvar
- I Faster delivery:** more than 15,000 units in stock
- I Altitude:** until 4,000 meters above sea level.

Heavy Duty Capacitors Ensure:

Greater durability

- I** Maximum quality in European propylene
- I** Dielectric thickness optimised for longer duration

Greater continuity of service

- I** Self-regeneration technology that ensures minimum loss of capacity
- I** Internal fuse technology. Ensures disconnection of the capacitor preventing dangerous situations

Guaranteed safety

- I** Overpressure safety system. To ensure the proper disconnection of the capacitor element
- I** Inert gas technology. Complete elimination of fire risks and leakages.

Computer MAX P&P

Power Factor Relay:
Top features, Accuracy and Technology

User-friendly and fully intuitive installation

Computer MAX P&P provides the “phase selection” function, that allows the user choosing the power line phase where the measuring current transformer (C.T.) has been placed in. This option eliminates the difficulty in placing the C.T. in a specific phase of the power line.



Test abilities

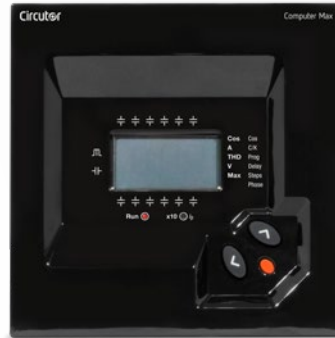
Computer MAX P&P's display shows the behavior of the current, THD/ and cos phi at the manual connection and disconnection of capacitors.

- | Correction Test
- | Harmonic Resonance Test

High accuracy regulation

Computer MAX P&P incorporates the FCP system (Fast Computerized Program), characteristic from CIRCUTOR, making a regulator with unique capabilities.

- | Reduction of switching operations, so increasing the capacitor bank life span
- | Increase of response speed, leading to higher energy savings
- | Accurate measuring method, avoiding unnecessary connections/disconnections
- | 4-quadrant compensation, assuring counteraction of reactive energy both in consuming and generating processes



Measurement of electrical parameters

Computer MAX P&P shows by display: cos phi, voltage, current, THD(I) and, besides, records in memory maximum values for voltage and current.



Voltage measurement



Current measurement



THD(I) measurement



Current maximum value



Voltage maximum value

Built-in alarms

Computer MAX P&P automatically assigns the alarm conditions to the last output relay (relay 6 or 12), provided that this is not used for switching a capacitor step.

Indication by display or through relay output of following alarm conditions:

- | Compensation failure
- | Over-compensation
- | Over-voltage
- | Over-current
- | C.T. not connected or open
- | Line current below measurable value



Computer SMART III

Integral Power Factor Relay:
Compensation, Analysis, Protection



Compensation based on real needs



Control of the electrical parameters and consumption of the installation



Easy preventive maintenance and maximum safety



Minimum investment, Maximum profits



Plug & Play
Easy to install

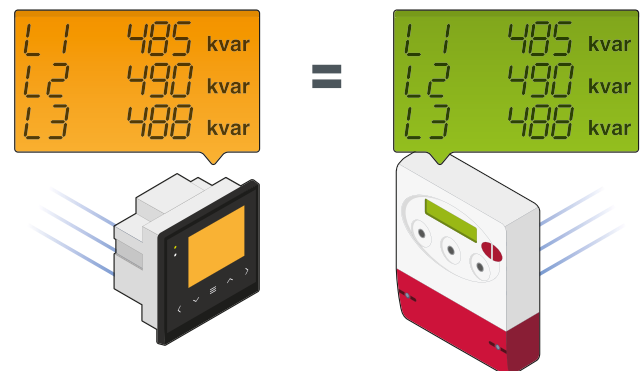
Advanced compensation

Measurement with three current transformers guarantees an analogue reading of the utilities meter. The computer SMART III is the only Power Factor Relay in the market that offers the possibility of using 3 measuring transformers in addition to the traditional method of measuring with a single current transformer, as well as providing the functions of an integral power analyzer and controlling the residual leakage currents.

2 available versions:

- ! computer SMART III: for applications with contactor switching
- ! computer SMART III Fast: for applications with static switching

Measurement equivalent to the billing energy meter

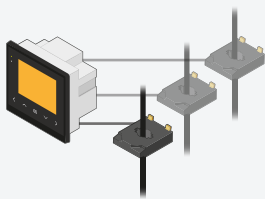


Easily and Flexibility

Connecting 1 or 3 transformers allows the following:

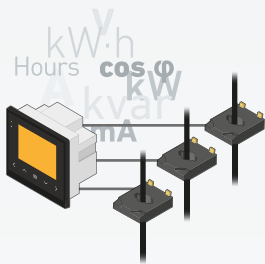
- ! **Plug & Play**
- ! Changing from 1 to 3 transformers in the following cases:
 - ! Changes in reactive energy penalties.
 - ! Changes in consumption habits.
 - ! Significant imbalances in the system.
- ! Replacement of the Power Factor Relay of any capacitor bank.

3 in 1



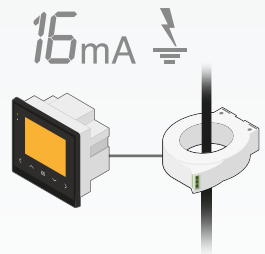
Compensation

- I Smart compensation
- I Measurement in 1 or 3 phases
- I 4 objective cos phi
- I Configurable alarms
- I Built-in communications system



Analysis

SMART III is an advanced PF relay, and it is also a powerful power analyzer that measures the consumption and electrical parameters of the installation.

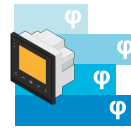
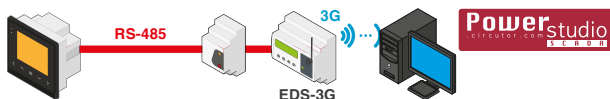


Protection

It uses CIRCUTOR's unique leakage measurement system, which facilitates the disconnection of the affected capacitor and guarantees the service continuity of the rest of the capacitor bank.

Communications

The Power Factor Relay can also be monitored remotely (via SCADA) thanks to its RS-485 Modbus communications port and two digital outputs, which also allow: Door locking, Visual or acoustic alarm, Alarm on any electrical parameter, etc.



4 objective cos phi

First Power Factor Relay in the market with a configuration of up to 4 objective cos phi with 2 digital inputs (for applications with differences in time periods or with a generating set).



Simplification of fixed compensation operations

The ON/OFF/AUTO configuration of each one of the steps of the automatic capacitor bank can be used to select a step for the fixed compensation of the power transformer, not considering the value of this step when compensating all other loads. This means that a fixed set that is independent of the automatic capacitor bank does not have to be installed.

Alarms and Supervision

17 configurable alarms for preventive maintenance.



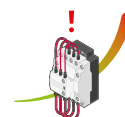
Harmonics Alarm

Indicates the risk of the presence of harmonics in the installation, programming the connection or disconnection of capacitors to eliminate resonance.



Temperature Alarm

The built-in relay and thermostats can configure the temperature alarms, avoiding the installation of external units.



Operations alarm

The alarm for the number of operations per step warns of the need to implement preventive actions.



Capacitor supervision

The [test] function checks capacitors for a quick analysis of their power. It prevents the use of external power analyzers, current sensing clamps, etc.

Automatic capacitor banks



Main features

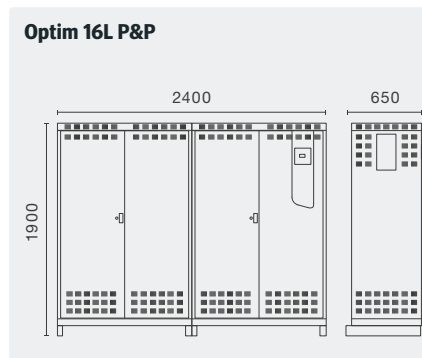
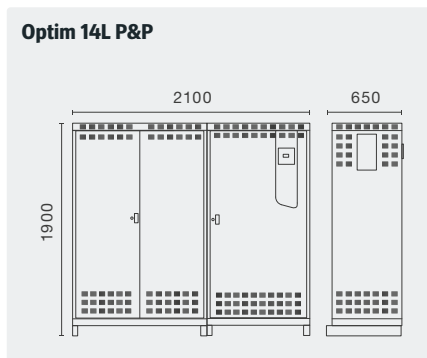
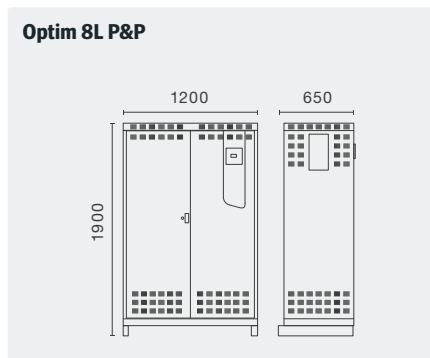
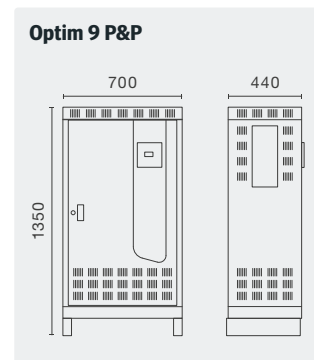
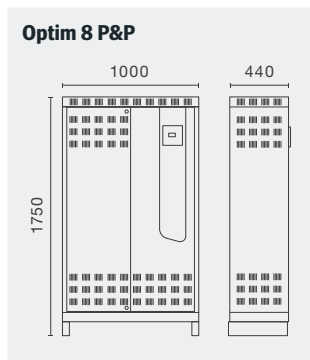
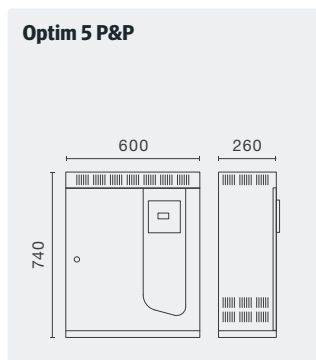
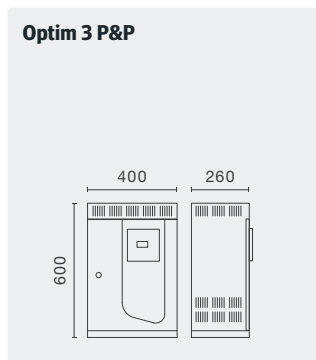
- | PF regulator: **Computer MAX 6 P&P** or **Computer MAX 12 P&P**
- | Three-phase **CLZ** series power capacitors, with cylindrical aluminum enclosure (440 V / 50 Hz)
- | Three-phase mechanical contactors for each capacitor stage
- | Terminal block for current transformer external signal connection
- | Terminal for neutral connection to get 230 V ac for auxiliary supply (**Optim 3 P&P** y **Optim 5 P&P**)
- | 2-pole MCB (Miniature Circuit Breaker) for auxiliary supply protection
- | IP 21, wall-mounted or floor standing (according to the model), mild steel enclosure
- | Entry of cables from the bottom or side of the enclosure

Additional options

- | PF Regulator: **Computer SMART 6 III** or **Computer SMART 12 III**
- | Three-phase CLZ series power capacitors, with cylindrical aluminum enclosure (440 V / 50 Hz)



Features by type	Optim 3 P&P	Optim 5 P&P	Optim 8 P&P Optim 9 P&P	Optim 8L P&P Optim 14L P&P Optim 16L P&P
General protection of the capacitor bank by a three pole MCB (Miniature Circuit Breaker)	•			
Individual protection of each capacitor stage by a three pole MCB		•		
Protection of stages by fuses with high cut-off power (HRC) NH-00 series			•	•
Terminal block for power cables connection		•	•	•
Entry of cables from the bottom or lateral of the enclosure	•	•	•	•
Autotransformer for auxiliary supply (no need of neutral signal connection)			•	•
IP 21, Floor-standing mild steel enclosure			•	•
IP 21, Wall mounted mild steel enclosure	•	•		
Additional options				
Residual current protection (by 4-pole RCCB – Residual Current Circuit Breaker)	•			
Autotransformer for auxiliary supply (no need of neutral signal connection)	•	•		
Residual current protection by electronic residual current relay + zero-current transformer (only available with 3-pole MCCB fitted with a tripping coil)		•	•	•
Polycarbonate plate for protection against accidental direct contact with life parts (with open door)		•	•	•
General 3-pole manual switch (with lever at door).		•	•	•
General 3-pole MCCB (Molded Case Circuit Breaker) with lever at door		•	•	•
IP 21, Wall mounted mild steel enclosure	•	•		



Correction Range



OPTIM P&P, automatic capacitor banks, 2.5 to 1600 kvar

Type	Code	400 V kvar	440 V kvar	Composition	Switch Aut./ Man. (A) Optional	Cable section (mm ²)	Dimensions (mm) width x height x depth	Weight (kg)
OPTIM 1, automatic capacitor bank with reactive relay. Requires one measuring transformer - MC series 250 mA (see Measuring current Transformers)								
OPTIM 1-2,5-440	[*] R3Q631EN00000	2	2.5	1 x 2,5	-/ Includo	6	215x500x166	4
OPTIM 1-5-440	[*] R3Q641EN00000	4	5	1 x 5	-/ Includo	6	215x500x166	4.5
OPTIM 1-6,25-440	[*] R3Q651EN00000	5	6.25	1 x 6,25	-/ Includo	6	215x500x166	5
OPTIM 1-10-440	[*] R3Q671EN00000	8	10	1 x 10	-/ Includo	6	215x500x166	5
OPTIM 1-12,5-440	[*] R3Q681EN00000	10	12.5	1 x 12,5	-/ Includo	6	215x500x166	5
OPTIM 1-15-440	[*] R3Q691EN00000	12.5	15	1 x 15	-/ Includo	6	215x500x166	5
OPTIM 1A-18,2-440	[*] R3Q6E1EN00000	15	18.2	1 x 18,2	-/ Includo	6	270x500x166	6
OPTIM 1A-25-440	[*] R3Q6F1EN00000	20	25	1 x 25	-/ Includo	10	270x500x166	7
OPTIM 1A-30-440	[*] R3Q6D1EN00000	25	30	1 x 30	-/ Includo	10	270x500x166	7
OPTIM 2, automatic capacitor banks with regulator without display. Requires one measuring transformer - MC series 250 mA (see Measuring current Transformers)								
OPTIM 2-7,5-440	[*] R3Q761EN00000	6.25	7.5	2,5 + 5	-/ Includo	6	362x500x166	7
OPTIM 2-10,5-440	[1] R3Q771EN00000	8.5	10.5	3 + 7,5	-/ Includo	6	362x500x166	7
OPTIM 2-12,5-440	[*] R3Q781EN00000	10	12.5	5 + 7,5	-/ Includo	6	362x500x166	7
OPTIM 2-17,5-440	[1] R3Q7E1EN00000	14	17.5	5 + 12,5	-/ Includo	6	362x500x166	7
OPTIM 2-20-440	[1] R3Q7F1EN00000	16.5	20	7,5 + 12,5	-/ Includo	6	362x500x166	7
OPTIM 2-22,5-440	[*] R3Q7G1EN00000	18.5	22.5	7,5 + 15	-/ Includo	6	362x500x166	7
OPTIM 2-25-440	[1] R3Q7H1EN00000	21	25	10 + 15	-/ Includo	10	362x500x166	8
OPTIM 2-30-440	[1] R3Q7J1EN00000	25	30	15 + 15	-/ Includo	10	362x500x166	8
OPTIM 3 P&P, automatic capacitor banks with computer Max P&P regulator								
OPTIM 3 P&P-12,5-440	[*] R3L110.	10	12.5	2,5+5+5	-/ Includo	6	400x600x260	22
OPTIM 3 P&P-17,5-440	[*] R3L120.	14	17.5	2,5+5+10	-/ Includo	6	400x600x260	23
OPTIM 3 P&P-25-440	[*] R3L130.	20	25	5+10+10	-/ Includo	10	400x600x260	23
OPTIM 3 P&P-31,25-440	[*] R3L140.	26	31.25	6,25+12,5+12,5	-/ Includo	10	400x600x260	23
OPTIM 3 P&P-37,5-440	[*] R3L150.	31.25	37.5	7,5+15+15	-/ Includo	16	400x600x260	24
OPTIM 3 P&P-43,75-440	[*] R3L160.	36	43.75	6,25+12,5+25	-/ Includo	25	400x600x260	25
OPTIM 3 P&P-52,5-440	[1] R3L170.	43	52.5	7,5+15+30	-/ Includo	25	400x600x260	27
OPTIM 3 P&P-62,5-440	[1] R3L180.	51	62.5	12,5+25+25	-/ Includo	35	400x600x260	29
OPTIM 5 P&P, automatic capacitor banks with computer Max P&P regulator								
OPTIM 5 P&P-55-440	[*] R3L210.	45	55	5+10+20+20	125/ 200	35	600x740x260	37
OPTIM 5 P&P-70-440	[*] R3L220.	58	70	10+3x20	125/ 200	50	600x740x260	38
OPTIM 5 P&P-90-440	[1] R3L230.	74	90	15+15+30+30	200/ 200	70	600x740x260	40
OPTIM 5 P&P-105-440	[*] R3L240.	87	105	15+30+30+30	200/ 200	70	600x740x260	41
OPTIM 5 P&P-135-440	[1] R3L250.	112	135	15+30+30+30+30	250/ 250	95	600x740x260	45
OPTIM 5 P&P-150-440	[1] R3L260.	124	150	30+30+30+30+30	250/ 250	120	600x740x260	46
OPTIM 9 P&P, automatic capacitor banks with computer Max P&P regulator. Built-in power supply autotransformer								
OPTIM 9 P&P-165-440	[*] R3L310.	136	165	15+5x30	400/ 400	120	700x1350x440	81
OPTIM 9 P&P-195-440	[1] R3L320.	161	195	15+6x30	400/ 400	150	700x1350x440	86
OPTIM 9 P&P-225-440	[*] R3L330.	186	225	15+7x30	400/ 400	185	700x1350x440	92
OPTIM 9 P&P-255-440	[1] R3L340.	211	255	15+8x30	630/ 630	240	700x1350x440	98
OPTIM 9 P&P-270-440	[1] R3L350.	223	270	9x30	630/ 630	240	700x1350x440	100
OPTIM 8 P&P, automatic capacitor banks with computer Max P&P regulator. Built-in power supply autotransformer								
OPTIM 8 P&P-300-440	[1] R3L410.	248	300	2x30+4x60	630/ 630	2x150	1000x1750x440	135
OPTIM 8 P&P-330-440	[1] R3L420.	273	330	30+5x60	630/ 630	2x150	1000x1750x440	140
OPTIM 8 P&P-390-440	[1] R3L430.	322	390	30+6x60	800/ 800	2x185	1000x1750x440	150
OPTIM 8 P&P-450-440	[1] R3L440.	372	450	30+7x60	800/ 800	2x240	1000x1750x440	160
OPTIM 8 P&P-480-440	[1] R3L450.	396	480	8x60	1000/ 1000	2x240	1000x1750x440	163
OPTIM 8L P&P, automatic capacitor banks with computer Max P&P regulator. Built-in power supply autotransformer								
OPTIM 8L P&P-550-440	[1] R35L10.	454	550	50+5x100	1000/ 1000	2x240	1200x1900x650	220
OPTIM 8L P&P-650-440	[1] R35L20.	537	650	50+6x100	1250/ 1600	3x150	1200x1900x650	255
OPTIM 8L P&P-750-440	[1] R35L30.	620	750	50+7x100	1600/ 1600	3x185	1200x1900x650	280
OPTIM 8L P&P-800-440	[1] R35L40.	661	800	8x100	1600/ 1600	3x185	1200x1900x650	290
OPTIM 14L P&P, automatic capacitor banks with computer Max P&P regulator. Built-in power supply autotransformer								
OPTIM 14L P&P-900-440	[2] R36L10.	743	900	2X50+8x100	1250+400/ 1600+400	3x150/185	2100x1900x650	435
OPTIM 14L P&P-950-440	[2] R36L20.	785	950	50+9x100	1600+400/ 1600+400	3x185/185	2100x1900x650	445
OPTIM 14L P&P-1050-440	[2] R36L30.	867	1050	50+10x100	1600+630/ 1600+630	3x185/240	2100x1900x650	470
OPTIM 14L P&P-1150-440	[2] R36L40.	950	1150	50+11x100	1600+1000/ 1600+1000	3x185/2x150	2100x1900x650	495
OPTIM 14L P&P-1200-440	[2] R36L50.	991	1200	12x100	1600+800/ 1600+800	3x185/2x185	2100x1900x650	505
OPTIM 14L P&P-1300-440	[2] R36L60.	1074	1300	100+6x200	1250+1250/ 1600+1600	3x185/2x240	2100x1900x650	535
OPTIM 14L P&P-1400-440	[2] R36L70.	1156	1400	100+100+6x200	1600+1250/ 1600+1600	3x185/3x120	2100x1900x650	560
OPTIM 16L P&P, automatic capacitor banks with computer Max P&P regulator. Built-in power supply autotransformer								
OPTIM 16L P&P-1500-440	[2] R37L30.	1239	1500	100+7x200	1600+1600/ 1600+1600	3x185/3x150	2400x1900x650	570
OPTIM 16L P&P-1600-440	[2] R37L40.	1322	1600	100+100+7x200	1600+1600/ 1600+1600	3x185/3x185	2400x1900x650	580

Switch and cable section for installations with $U_n=400$ V. The installation company must ensure compliance with the low voltage directive at all times, in accordance with the particularities of each installation and type of cable.

Optionals

Optim 3 P&P

Base Code		Intern Code								
R	X	X	X	X	X	0	0	X	X	X
								↑	↑	↑
								0		
Options								1		
								2		
								4		
								6		
Regulator								0		
								S		
Switch*										E

*Optim 3 P&P series includes MCB

Optionals

Optim 5 P&P, Optim 8 P&P, Optim 9 P&P

Base Code		Intern Code								
R	X	X	X	X	X	0	0	X	X	X
								↑	↑	↑
								0		
Options								1		
								2		
								3		
								4		
								5		
								6		
								7		
Regulator								0		
								S		
Switch								0		
								1		
								2		
								3		
								4		
								5		
								6		
								7		
								A		
								B		
								C		
							D			

Choose the regulator that best adapts to your needs

Max P&P

Series



Performance, accuracy and technology at the best price

- ▮ Plug & Play function
- ▮ Simple and intuitive installation and programming
- ▮ Test functions
- ▮ High-accuracy regulation
- ▮ Basic electrical parameter measurement
- ▮ Built-in alarms
- ▮ 6 or 12 steps

Smart III

Optional



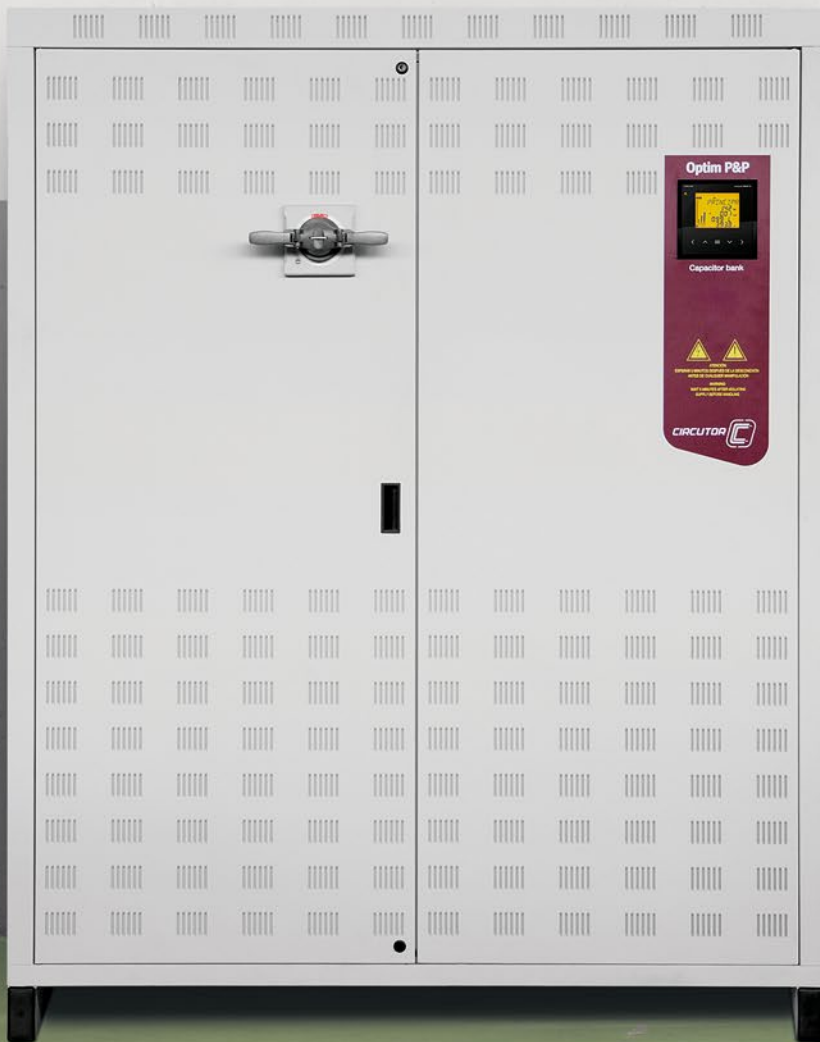
Three-phase regulator and power analyzer, all in one

- ▮ New compensation concept
- ▮ Measures the same as the company's energy meter
- ▮ Compensates over three phases
- ▮ Like a powerful power analyzer
- ▮ Easy to use
- ▮ Serial communications
- ▮ Built-in leakage control (requires external toroidal)
- ▮ Plug & Play function
- ▮ AUTO-ON-OFF function, by stage
- ▮ Safety and maintenance
- ▮ 6, 12 or 14 steps

Make your capacitor bank SMART

Multiply the advantages of your capacitor bank: possibility of measuring in one or three phases (just like the company's energy meter), complete power analyzer, leakage current protection*, integrated communications, up to 17 configurable alarms which improve preventive maintenance and **much more...**

Automatic capacitor banks with rejection filters



Main Features

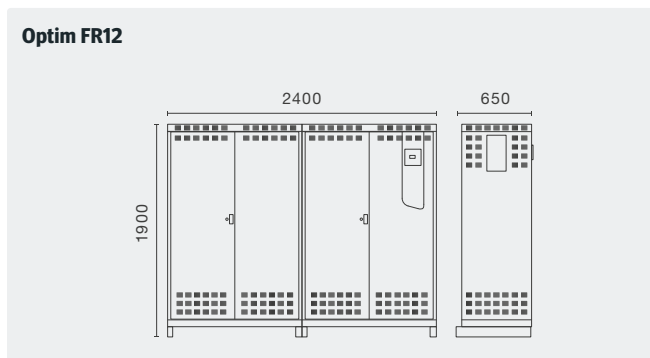
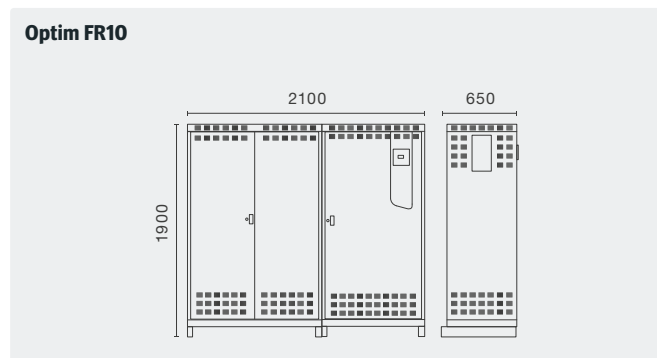
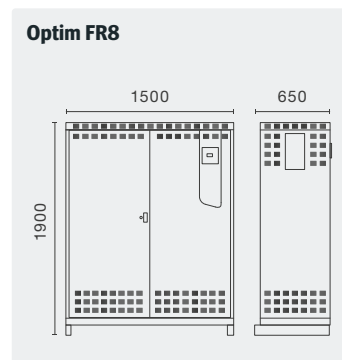
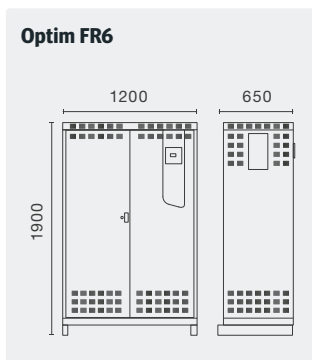
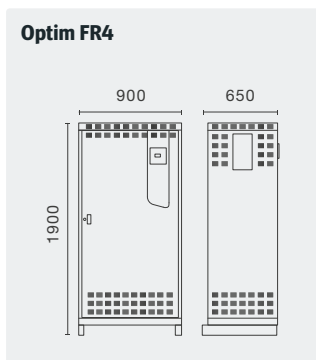
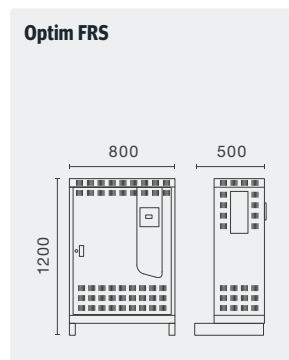
- | PF regulator: **Computer MAX 6 P&P** or **Computer MAX 12 P&P**
- | Three-phase CLZ series power capacitors, with cylindrical aluminum enclosure (440 V / 50 Hz)
- | Detuned filters tuned at 189 Hz for protection against harmonics in the network and for avoiding resonance problems with harmonics of fifth order or higher. Built-in thermostat for disconnecting the stage in the case of over temperature (+90 °C).
- | Three-phase mechanical contactors for each capacitor stage
- | Autotransformer for auxiliary supply (no need of neutral signal connection)
- | Terminal block for current transformer external signal connection
- | 2-pole MCB (Miniature Circuit Breaker) for auxiliary supply connection
- | IP 21, Floor standing, mild steel enclosure
- | Entry of cables from the bottom or lateral of the enclosure

Additional options

- | PF regulator: **Computer SMART III 6** or **Computer Smart III 12**
- | Fan+ thermostat for forced ventilation
- | Polycarbonate for protection against earth leakage contacts.
- | General manual or automatic switch
- | Earth leakage protection system (toroidal and electronic relay)



Features by type	Optim FR 5	Optim FR 4 Optim FR 6 Optim FR 8	Optim FR 10 Optim FR 12
General protection of the capacitor bank by a three pole manual switch	•		
Protection of stages by fuses with high cut-off power (HRC) NH-00 series		•	•
Terminal block for power cables connection		•	•
Entry of cables from the bottom or lateral of the enclosure	•	•	•
IP 21, Floor-standing mild steel enclosure	•	•	•
Additional options			
Autotransformer for auxiliary supply (no need of neutral signal connection)	•	•	•
Residual current protection by electronic residual current relay + zero-current transformer (only available with 3-pole MCCB fitted with a tripping coil)	•	•	•
Polycarbonate plate for protection against accidental direct contact with life parts (with open door)	•	•	•
General 3-pole manual switch (with lever at door).	•	•	•
General 3-pole MCCB (Molded Case Circuit Breaker) with lever at door	•	•	•
Fan + thermostat for forced ventilation	•	•	•



Correction Range



OPTIM FR P&P, Automatic capacitor banks with rejection filters (contactors switching)

Type	Code	400 V kvar	440 V kvar	Composition	Switch Aut./ Man. (A) Opt.	Cable section (mm ²)	Dimensions (mm) length x height x width	Peso (kg)
OPTIM FRS P&P								
OPTIM FRS-P&P-31,25-440	[2] R54R64.	26	31.25	6,25 + 2 x 12,5	-/ -	10	800x1200x500	102
OPTIM FRS-P&P-43,75-440	[2] R54R74.	36	43.75	6,25 + 12,5 + 25	-/ -	25	800x1200x500	108
OPTIM FRS-P&P-62,5-440	[2] R54R81.	52	62.5	12,5 + 2 x 25	-/ -	35	800x1200x500	115
OPTIM FRS-P&P-90-440	[2] R54R88.	74	90	2 x 15 + 2 x 30	-/ -	70	800x1200x500	133
OPTIM FRS-P&P-105-440	[2] R54R92.	87	105	15 + 3 x 30	-/ -	70	800x1200x500	138
OPTIM FRS-P&P-120-440	[2] R54R95.	99	120	4 x 30	-/ -	95	800x1200x500	143
OPTIM FR4 P&P								
OPTIM FR4-P&P-150-440	[2] R54S24.	125	150	30 + 2 x 60	400/ 400	95	900x1900x650	220
OPTIM FR4-P&P-175-440	[2] R54S25.	145	175	25 + 50 + 100	400/ 400	120	900x1900x650	225
OPTIM FR4-P&P-200-440	[2] R54S28.	165	200	50 + 50 + 100	400/ 400	150	900x1900x650	235
OPTIM FR4-P&P-250-440	[2] R54S29.	207	250	50 + 2 x 100	630/ 630	185	900x1900x650	250
OPTIM FR4-P&P-300-440	[2] R54S30.	248	300	50 + 50 + 2 x 100	630/ 630	240	900x1900x650	290
OPTIM FR4-P&P-350-440	[2] R54S32.	289	350	50 + 3 x 100	630/ 630	2x150	900x1900x650	310
OPTIM FR4-P&P-400-440	[2] R54S34.	331	400	4 x 100	800/ 800	2x150	900x1900x650	335
OPTIM FR6 P&P								
OPTIM FR6-P&P-400-440	[2] R54T25.	331	400	50 + 50 + 3 x 100	800/ 800	2x185	1200x1900x650	370
OPTIM FR6-P&P-450-440	[2] R54T30.	372	450	50 + 4 x 100	800/ 800	2x185	1200x1900x650	400
OPTIM FR6-P&P-500-440	[2] R54T35.	413	500	5 x 100	1000/ 1000	2x240	1200x1900x650	440
OPTIM FR6-P&P-550-440	[2] R54T40.	455	550	50 + 5 x 100	1000/ 1000	2x240	1200x1900x650	465
OPTIM FR6-P&P-600-440	[2] R54T45.	496	600	6 x 100	1250/ 1600	2x240	1200x1900x650	490
OPTIM FR8 P&P								
OPTIM FR8-P&P-600-440	[2] R54U36.	496	600	50 + 50 + 5 x 100	1250/ 1600	2x240	1500x1900x650	525
OPTIM FR8-P&P-650-440	[2] R54U38.	537	650	50 + 6 x 100	1250/ 1600	3x150	1500x1900x650	540
OPTIM FR8-P&P-700-440	[2] R54U40.	579	700	7 x 100	1250/ 1600	3x150	1500x1900x650	555
OPTIM FR8-P&P-750-440	[2] R54U42.	620	750	50 + 7 x 100	1600/ 1600	3x185	1500x1900x650	580
OPTIM FR8-P&P-800-440	[2] R54U44.	661	800	8 x 100	1600/ 1600	3x185	1500x1900x650	605
OPTIM FR10 P&P								
OPTIM FR10-P&P-800-440	[2] R54V25.	661	800	8 x 100	1250+400/ 1600+400	2x240/ 240	2100x1900x650	695
OPTIM FR10-P&P-850-440	[2] R54V30.	702	850	50 + 8 x 100	1000+630/ 1000+630	2x240/ 240	2100x1900x650	735
OPTIM FR10-P&P-900-440	[2] R54V35.	744	900	9 x 100	1250+630/ 1600+630	2x240/ 240	2100x1900x650	775
OPTIM FR10-P&P-950-440	[2] R54V40.	785	950	50 + 9 x 100	1000+800/ 1000+800	2x240/ 2x185	2100x1900x650	800
OPTIM FR10-P&P-1000-440	[2] R54V45.	826	1000	10 x 100	1250+800/ 1600+800	2x240/ 2x185	2100x1900x650	825
OPTIM FR12 P&P								
OPTIM FR12-P&P-1050-440	[2] R54W50.	868	1050	50 + 10 x 100	1250+800/ 1600+800	2x240/ 2x240	2400x1900x650	890
OPTIM FR12-P&P-1100-440	[2] R54W55.	909	1100	11 x 100	1250+1000/ 1600+1000	2x240/ 2x240	2400x1900x650	930
OPTIM FR12-P&P-1150-440	[2] R54W60.	950	1150	50 + 11 x 100	2x1250/ 2x1600	2x240/ 2x240	2400x1900x650	955
OPTIM FR12-P&P-1200-440	[2] R54W65.	992	1200	12 x 100	2x1250/ 2x1600	2x240/ 2x240	2400x1900x650	980

Interruptor y sección de cable para instalaciones con $U_n=400$ V. En todo caso el instalador deberá confirmar que cumpla con todo lo establecido en el reglamento de baja tensión según las particularidades de cada instalación y tipología de cable.

Optionals

Base Code				Intern Code									
R	5	P	L	X	X	0	0	X	X	X			
											↑	↑	↑
Options	Standard (*)										0		
	Fan (Thermostat ventilation)										2		
	Polycarbonate										3		
	Autotransformer + Fan (Thermostat)										4		
	Autotransformer + Polycarbonate										5		
	Polycarbonate + Fan (Thermostat)										6		
	Autotransf + Polycarbonate + Fan										7		
Regulator	Computer MAX (Series)										0		
	Computer SMART 6 III										0		
	Computer SMART 12 III										S		
Switch	Without switch										0		
	General manual switch 63 A										1		
	General manual switch 125 A										2		
	General manual switch 200 A										3		
	General manual switch 250 A										4		
	General manual switch 400 A										5		
	General manual switch 630 A										6		
	General manual switch 800 A										7		
	MCCB with lever at door 63 A										A		
	MCCB with lever at door 125 A										B		
	MCCB with lever at door 200 A										C		
	MCCB with lever at door 250 A										D		
	MCCB with lever at door 400 A										E		
	MCCB with lever at door 630 A										F		
	MCCB with lever at door 800 A										G		
	Residual current protection + MCCB 63 A										K		
	Residual current protection + MCCB 125 A										L		
	Residual current protection + MCCB 200 A										M		
	Residual current protection + MCCB 250 A										N		
	Residual current protection + MCCB 400 A										O		
Residual current protection + MCCB 630 A										P			
Residual current protection + MCCB 800 A										Q			

CIRCUTOR
Heavy Duty
Capacitors



**Robust
Reliable
& Safe**

Temperature
strength higher
65 °C short time



Longer lifetime
150,000 h



more
Efficient

Automatic capacitor banks with static contactor



Main features

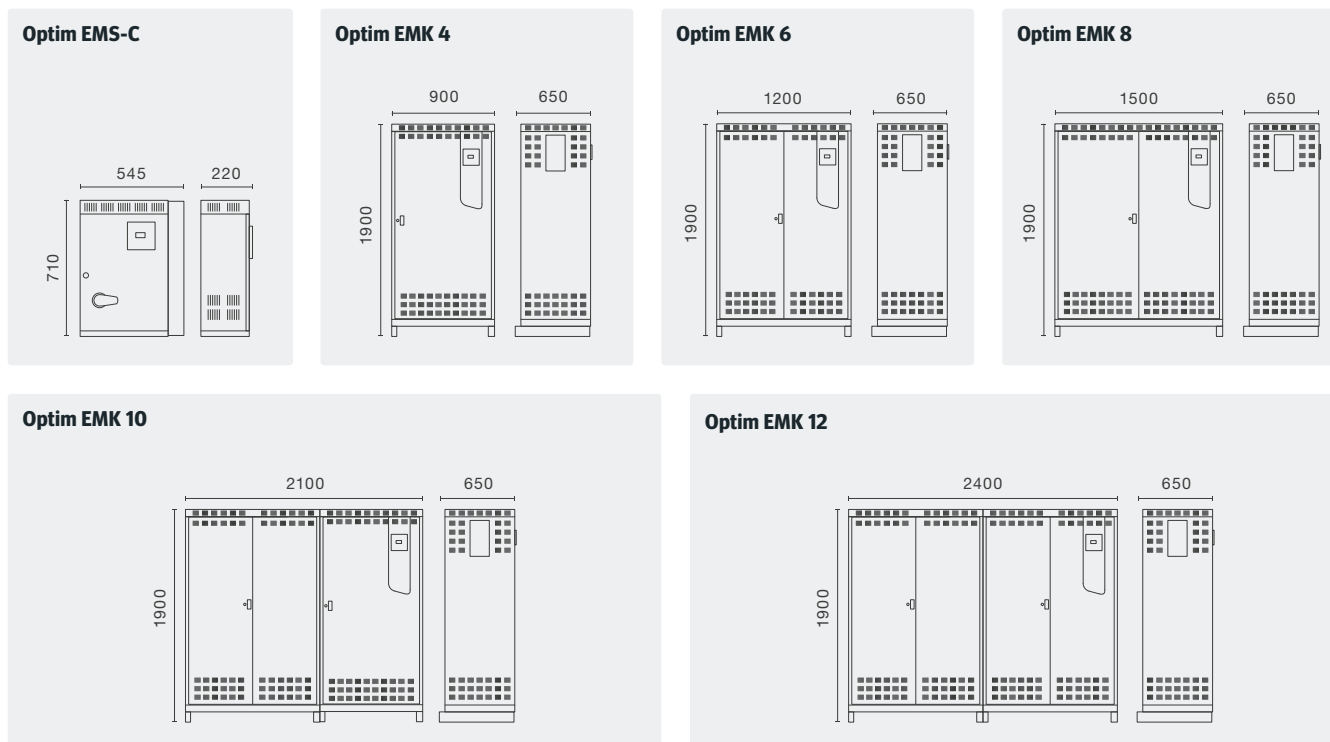
- | PF regulator: **Computer MAX-f 6** or **Computer MAX-f 12**
- | Three-phase **CLZ** series power capacitors
- | Three-phase static switching units for 3-terminal capacitors
- | Terminal block for current transformer external signal connection
- | 2-pole MCB (Miniature Circuit Breaker) for auxiliary supply connection
- | IP 21, wall-mounted or floor standing (according to the model), mild steel enclosure
- | Entry of cables from the bottom of the enclosure (**EMS-C** range) and by the sides of the cabinet (**EMK** range)

Additional options

- | PF Regulator: **Computer SMART III Fast 6** or **Computer SMART III Fast 12**
- | Fan+ thermostat for forced ventilation
- | Polycarbonate for protection against earth leakage contacts.
- | General manual or automatic switch
- | Earth leakage protection system (toroidal and electronic relay)



Features by type	Optim EMS-C	Optim EMK 4	Optim EMK 6	Optim EMK 8	Optim EMK 10	Optim EMK 12
General protection of the capacitor bank by a three pole manual switch	•					
Protection of stages by fuses with high cut-off power (HRC) NH-00 series		•	•	•	•	•
Terminal block for power cables connection		•	•	•	•	•
Entry of cables from the bottom or lateral of the enclosure	•	•	•	•	•	•
IP 21, Floor-standing mild steel enclosure	•	•	•	•	•	•
Additional options						
Autotransformer for auxiliary supply (no need of neutral signal connection)		•	•	•	•	•
Residual current protection by electronic residual current relay + zero-current transformer (only available with 3-pole MCCB fitted with a tripping coil)		•		•	•	•
Polycarbonate plate for protection against accidental direct contact with life parts (with open door)		•	•	•	•	•
General 3-pole manual switch (with lever at door).		•	•	•	•	•
General 3-pole MCCB (Molded Case Circuit Breaker) with lever at door		•	•	•	•	•
Fan + thermostat for forced ventilation		•	•	•	•	•



Correction Range



OPTIM EMS-C, Automatic capacitor banks with static contactor

Type	Code	400 V kvar	440 V kvar	Composition	Optional switch (A)	Cable section (mm ²)	Dimensions (mm) length x height x width	Weight (kg)
OPTIM EMS-C-18,75-440	[C] R4A300.	15.5	18.75	(6,25 + 12,5)	Included	1 x 6	545x710x220	29
OPTIM EMS-C-31,25-440	[C] R4A304.	26	31.25	(6,25 + 2 x 12,5)	Included	1 x 16	545x710x220	33
OPTIM EMS-C-43,75-440	[C] R4A309.	36	43.75	(6,25 + 12,5 + 25)	Included	1 x 25	545x710x220	34
OPTIM EMS-C-68,75-440	[C] R4A318.	57	68.75	(6,25 + 12,5 + 2 x 25)	Included	1 x 50	545x710x220	38
OPTIM EMS-C-82,50-440	[C] R4A321.	68	82.5	(7,5 + 15 + 2 x 30)	Included	1 x 70	545x710x220	39
OPTIM EMS-C-105-440	[C] R4A330.	87	105	(15 + 3 x 30)	Included	1 x 70	545x710x220	40
OPTIM EMS-C-120-440	[C] R4A336.	99	120	(4 x 30)	Included	1 x 95	545x710x220	41

Cable section recommended for $U_n = 400$ V installations. Anyway, the installer must confirm that it complies with all the provisions of the low voltage regulation according to the particularities of each installation and cable type, and CIRCUTOR SA is totally exempt of any breach of the relevant regulations that may result from incorrect selection of the type and section of the wiring.



OPTIM EMK, Automatic capacitor banks with static contactor

Type	Code	400 V kvar	440 V kvar	Composition	Optional switch (A)	Cable section (mm ²)	Dimensions (mm) length x height x width
OPTIM EMk4							
OPTIM EMK4-175-440	[] R46420.	175	147	25 + 50 + 100	400/ 400	400	900x1900x650
OPTIM EMK4-250-440	[] R46422.	250	207	50 + 2x100	630/ 630	630	900x1900x650
OPTIM EMK4-300-440	[] R46424.	300	248	50 + 50 + 2x100	630/ 630	630	900x1900x650
OPTIM EMK4-350-440	[] R46425.	350	289	50 + 3x100	630/ 630	630	900x1900x650
OPTIM EMK4-400-440	[] R46426.	400	331	4x100	800/ 800	800	900x1900x650
OPTIM EMk6							
OPTIM EMK6-400-440	[] R46431.	400	331	50 + 50 + 3x100	800/ 800	800	1200x1900x650
OPTIM EMK6-450-440	[] R46435.	450	372	50 + 4x100	800/ 800	800	1200x1900x650
OPTIM EMK6-550-440	[] R46437.	550	455	50 + 5x100	1000/ 1000	1000	1200x1900x650
OPTIM EMK6-600-440	[] R46438.	600	496	6x100	1250/ 1600	1250	1200x1900x650
OPTIM EMk8							
OPTIM EMK8-600-440	[] R46442.	600	496	50 + 50 + 5x100	1250/ 1600	1250	1500x1900x650
OPTIM EMK8-650-440	[] R46444.	650	537	50 + 6x100	1250/ 1600	1250	1500x1900x650
OPTIM EMK8-750-440	[] R46450.	750	620	50 + 7x100	1600/ 1600	1600	1500x1900x650
OPTIM EMK8-800-440	[] R46455.	800	661	8x100	1600/ 1600	1600	1500x1900x650
OPTIM EMk10							
OPTIM EMK10-1000-440	[] R46605.	1000	826	10x100	1600/400/ 1600/400	1600/400	2100x1900x650
OPTIM EMK10-850-440	[] R46505.	850	702	50 + 8x100	1250/250/ 1600/250	1250/250	2100x1900x650
OPTIM EMK10-950-440	[] R46604.	950	785	50 + 9x100	1250/400/ 1600/400	1250/400	2100x1900x650
OPTIM EMK12-1050-440	[] R46606.	1050	868	50 + 10x100	1250/800/ 1600/800	1250/800	2400x1900x650
OPTIM EMK12-1150-440	[] R46608.	1150	950	50 + 11x100	2x1250/ 2x1600	2x1250	2400x1900x650
OPTIM EMK12-1200-440	[] R46609.	1200	992	12x100	2x1250/ 2x1600	2x1250	2400x1900x650

Optionals

Base Code				Intern Code						
R	5	P	L	X	X	0	0	X	X	X
								↑	↑	↑
Options	Standard (*)							0		
	Fan (Thermostat ventilation)							2		
	Polycarbonate							3		
	Polycarbonate + Fan (Thermostat)							6		
Regulator	Computer Max (Series)							0		
	Computer Smart III 6f / f-12Vdc							9		
	Computer Smart III 12f / f-12Vdc							D		
Switch	Without switch							0		
	General manual switch 200 A							3		
	General manual switch 250 A							4		
	General manual switch 400 A							5		
	General manual switch 630 A							6		
	General manual switch 800 A							7		
	General manual switch 1000 A							8		
	General manual switch 1600 A							9		
	MCCB with lever at door 63 A							A		
	MCCB with lever at door 125 A							B		
	MCCB with lever at door 160 A							C		
	MCCB with lever at door 250 A							D		
	MCCB with lever at door 400 A							E		
	MCCB with lever at door 630 A							F		
	MCCB with lever at door 800 A							G		
	MCCB with lever at door 1000 A							H		
	MCCB with lever at door 1250 A							I		
	MCCB with lever at door 1600 A							J		
	Residual current protection + MCCB 63 A							K		
	Residual current protection + MCCB 125 A							L		
	Residual current protection + MCCB 160 A							M		
	Residual current protection + MCCB 250 A							N		
	Residual current protection + MCCB 400 A							O		
	Residual current protection + MCCB 630 A							P		
	Residual current protection + MCCB 800 A							Q		
	Residual current protection + MCCB 1000 A							R		
Residual current protection + MCCB 1250 A							S			
Residual current protection + MCCB 1600 A							T			

(*1) Only in **EMK** series. With communications, earth leakage current and capacitor current. Supplement not allowed for **EMS-C** series.

Automatic capacitor banks with rejection filters and static contactors



Correction Range

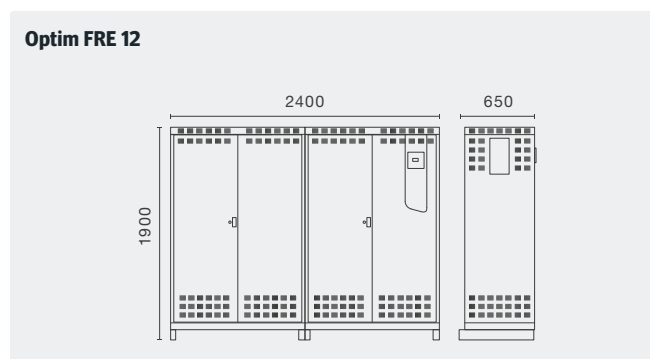
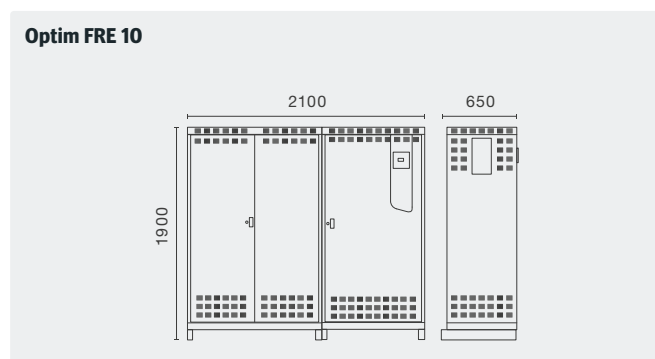
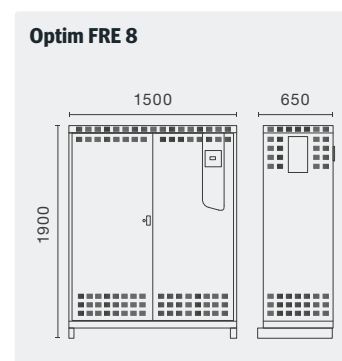
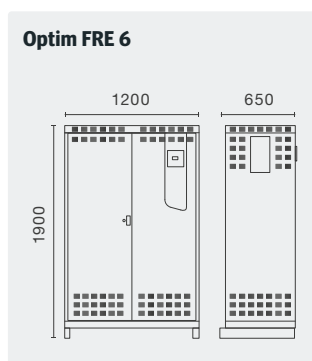
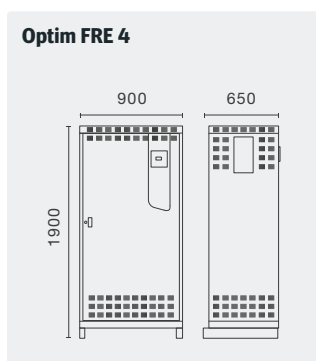
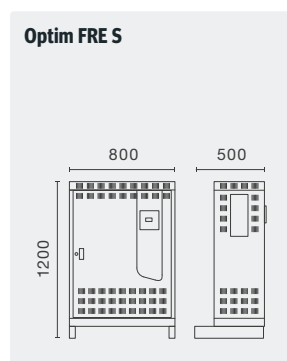
- | PF regulator: **Computer MAX-f 6** or **Computer MAX-f 12**
- | Three-phase **CLZ** series power capacitors
- | Detuned filters tuned 189 Hz for protection against harmonics in the network and for avoiding resonance problems with harmonics of fifth order or higher. Built-in thermostat for disconnecting the stage in the case of over temperature (+90°C)
- | Three-phase static switching units for 3-terminal capacitors
- | Terminal block for current transformer external signal connection
- | 2-pole MCB (Miniature Circuit Breaker) for auxiliary supply connection
- | IP 21, wall-mounted or floor standing (according to the model), mild steel enclosure
- | Entry of cables from the bottom of the enclosure

Additional options

- | PF Regulator: **Computer SMART III Fast 6** or **Computer SMART III Fast 12**
- | Fan+ thermostat for forced ventilation
- | Polycarbonate for protection against earth leakage contacts.
- | General manual or automatic switch
- | Earth leakage protection system (toroidal and electronic relay)



Features by type	Optim FRE 4		
	Optim FRE 5	Optim FRE 6 Optim FRE 8	Optim FRE 10 Optim FRE 12
General protection of the capacitor bank by a three pole manual switch	•		
Protection of stages by fuses with high cut-off power (HRC) NH-00 series		•	•
Terminal block for power cables connection		•	•
Entry of cables from the bottom or lateral of the enclosure	•	•	•
IP 21, Floor-standing mild steel enclosure	•	•	•
Additional options			
Autotransformer for auxiliary supply (no need of neutral signal connection)	•	•	•
Residual current protection by electronic residual current relay + zero-current transformer (only available with 3-pole MCCB fitted with a tripping coil)	•	•	•
Polycarbonate plate for protection against accidental direct contact with life parts (with open door)	•	•	•
General 3-pole manual switch (with lever at door).	•	•	•
General 3-pole MCCB (Molded Case Circuit Breaker) with lever at door	•	•	•
Fan + thermostat for forced ventilation	•	•	•





Correction Range

OPTIM FRE, Automatic capacitor banks with rejection filters, static contactors maneuver

Optional: allows general manual switch, $f_{resonance} = 189$ Hz

Type	Code	400 V kvar	440 V kvar	Composition	Optional switch Aut./ Man. (A)	Cable section (mm ²)	Dimensions (mm) length x height x width	Weight (kg)
FRES								
OPTIM FRES-31,25-440	[2] R64R64.	26	31.25	6,25 + 2 x 12,5	Included	10	800x1200x500	82
OPTIM FRES-43,75-440	[2] R64R74.	36	43.75	6,25 + 12,5 + 25	Included	25	800x1200x500	84
OPTIM FRES-62,5-440	[2] R64R81.	52	62.5	12,5 + 2 x 25	Included	35	800x1200x500	86
OPTIM FRES-90-440	[2] R64R88.	74	90	2 x 15 + 2 x 30	Included	70	800x1200x500	104
OPTIM FRES-105-440	[2] R64R92.	87	105	15 + 3 x 30	Included	70	800x1200x500	121
OPTIM FRES-120-440	[2] R64R95.	99	120	4 x 30	Included	95	800x1200x500	128
FRE4								
OPTIM FRE4-150-440	[2] R64E24.	125	150	30 + 2 x 60	400/ 400	95	900x1900x650	355
OPTIM FRE4-175-440	[2] R64E25.	145	175	25 + 50 + 100	400/ 400	120	900x1900x650	365
OPTIM FRE4-200-440	[2] R64E28.	165	200	50 + 50 + 100	400/ 400	150	900x1900x650	380
OPTIM FRE4-250-440	[2] R64E29.	207	250	50 + 2 x 100	630/ 630	185	900x1900x650	390
OPTIM FRE4-300-440	[2] R64E30.	248	300	50 + 50 + 2 x 100	630/ 630	240	900x1900x650	410
OPTIM FRE4-350-440	[2] R64E32.	289	350	50 + 3 x 100	630/ 630	240	900x1900x650	430
OPTIM FRE4-400-440	[2] R64E34.	331	400	4 x 100	800/ 800	240	900x1900x650	460
FRE6								
OPTIM FRE6-400-440	[2] R64J25.	331	400	50 + 50 + 3 x 100	800/ 800	2x185	1200x1900x650	550
OPTIM FRE6-450-440	[2] R64J30.	372	450	50 + 4 x 100	800/ 800	2x185	1200x1900x650	587
OPTIM FRE6-500-440	[2] R64J35.	413	500	5 x 100	1000/ 1000	2x240	1200x1900x650	621
OPTIM FRE6-550-440	[2] R64J40.	455	550	50 + 5 x 100	1000/ 1000	2x240	1200x1900x650	658
OPTIM FRE6-600-440	[2] R64J45.	496	600	6 x 100	1250/ 1600	2x240	1200x1900x650	685
FRE8								
OPTIM FRE8-600-440	[2] R64K36.	496	600	50 + 50 + 5 x 100	1250/ 1600	2x240	1500x1900x650	820
OPTIM FRE8-650-440	[2] R64K38.	537	650	50 + 6 x 100	1600/ 1600	3x150	1500x1900x650	865
OPTIM FRE8-700-440	[2] R64K40.	579	700	7 x 100	1600/ 1600	3x150	1500x1900x650	910
OPTIM FRE8-750-440	[2] R64K42.	620	750	50 + 7 x 100	1600/ 1600	3x185	1500x1900x650	955
OPTIM FRE8-800-440	[2] R64K44.	661	800	8 x 100	1600/ 1600	3x185	1500x1900x650	1000
FRE10								
OPTIM FRE10-800-440	[2] R64C25.	661	800	8 x 100	1250+400/ 1600+400	2x240 / 240	2100x1900x650	950
OPTIM FRE10-850-440	[2] R64C30.	702	850	50 + 8 x 100	1000+630/ 1000+630	2x240 / 240	2100x1900x650	987
OPTIM FRE10-900-440	[2] R64C35.	744	900	9 x 100	1250+630/ 1600+630	2x240 / 240	2100x1900x650	1024
OPTIM FRE10-950-440	[2] R64C40.	785	950	50 + 9 x 100	1000+800/ 1000+800	2x240 / 2x185	2100x1900x650	1061
OPTIM FRE10-1000-440	[2] R64C45.	826	1000	10 x 100	1250+800/ 1600+800	2x240 / 2x185	2100x1900x650	1098
OPTIM FRE12-1050-440	[2] R64L50.	868	1050	50 + 10 x 100	1250+800/ 1600+800	2x240 / 2x240	2400x1900x650	1285
OPTIM FRE12-1100-440	[2] R64L55.	909	1100	11 x 100	1250+1000/ 1600+1000	2x240 / 2x240	2400x1900x650	1322
OPTIM FRE12-1150-440	[2] R64L60.	950	1150	50 + 11 x 100	2x1250/ 2x1600	2x240 / 2x240	2400x1900x650	1359
OPTIM FRE12-1200-440	[2] R64L65.	992	1200	12 x 100	2x1250/ 2x1600	2x240 / 2x240	2400x1900x650	1389

Optionals

Base Code				Intern Code							
R	5	P	L	X	X	0	0	X	X	X	
				<div style="display: flex; justify-content: space-around; align-items: center;"> ↑ ↑ ↑ </div>							
Options	Standard (*)				0						
	Fan (Thermostat ventilation)				2						
	Polycarbonate				3						
	Polycarbonate + Fan (Thermostat)				6						
Regulator	Computer Max (Series)				0						
	Computer Smart III 6f / f-12Vdc				9						
	Computer Smart III 12f / f-12Vdc				D						
Switch	Without switch				0						
	General manual switch 200 A				3						
	General manual switch 250 A				4						
	General manual switch 400 A				5						
	General manual switch 630 A				6						
	General manual switch 800 A				7						
	General manual switch 1000 A				8						
	General manual switch 1600 A				9						
	MCCB with lever at door 63 A				A						
	MCCB with lever at door 125 A				B						
	MCCB with lever at door 160 A				C						
	MCCB with lever at door 250 A				D						
	MCCB with lever at door 400 A				E						
	MCCB with lever at door 630 A				F						
	MCCB with lever at door 800 A				G						
	MCCB with lever at door 1000 A				H						
	MCCB with lever at door 1250 A				I						
	MCCB with lever at door 1600 A				J						
	Residual current protection + MCCB 63 A				K						
	Residual current protection + MCCB 125 A				L						
	Residual current protection + MCCB 160 A				M						
	Residual current protection + MCCB 250 A				N						
	Residual current protection + MCCB 400 A				O						
	Residual current protection + MCCB 630 A				P						
	Residual current protection + MCCB 800 A				Q						
	Residual current protection + MCCB 1000 A				R						
	Residual current protection + MCCB 1250 A				S						
Residual current protection + MCCB 1600 A				T							

Choose the regulator that best adapts to your needs

Max-F Series



Performance, accuracy and technology at the best price

- ▮ Plug & Play function
- ▮ Simple and intuitive installation and programming
- ▮ Test functions
- ▮ High-accuracy regulation
- ▮ Basic electrical parameter measurement
- ▮ Built-in alarms
- ▮ 6 or 12 steps

Smart III Fast Optional



Three-phase regulator and power analyzer, all in one

- ▮ New compensation concept
- ▮ Measures the same as the company's energy meter
- ▮ Compensates over three phases
- ▮ Like a powerful power analyzer
- ▮ Easy to use
- ▮ Serial communications
- ▮ Built-in leakage control (external toroidal required)
- ▮ Plug & Play function
- ▮ AUTO-ON-OFF function, by stage
- ▮ Safety and maintenance
- ▮ 6 or 12 steps

Guarantee built from the inside



CLZ-FP-HD CLZ-FPT-HD

Tubular capacitor



Description

CLZ-HD (Heavy duty) capacitor range is composed of capacitors with a tubular casing, of the dry-type, covering a wide range of power and voltage ratings, at 50 and 60 Hz. The CLZ-HD capacitors are designed to be installed in installations with extreme working conditions. The design, manufacturing and testing processes guarantee the production of top quality and long lasting capacitors. Those CLZ-HD capacitors offer a new refrigeration technology by means of nitrogen gas*, being a refrigerating system of high benefits, inert and non flammable.

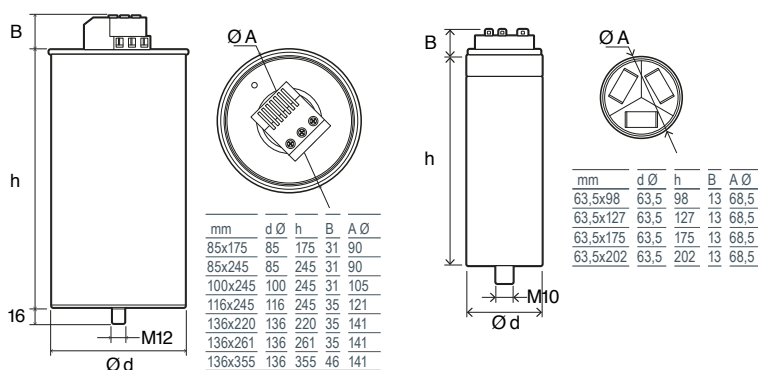
Application

Its application is based on compensation in installations with static or variable loads (capacitor banks). Especially designed to be installed in roughly environments with the most extreme conditions due to its longer life and high temperature resistance.

Technical features

Electrical features	Overcurrent	1,8 times the rated current (permanently)	
	Inrush current	400 x rated current	
	Overvoltage	10 %, 8 over 24 hours	
		15 %, up to 30 minutes over 24 hours	
		20 %, up to 5 minutes over 24 hours	
		30 %, up to 1 minute over 24 hours	
	Insulation level	3/8 kV (CLZ-FP-HD) - 3/12 kV (CLZ-FPT-HD)	
	Frequency	50 or 60 Hz	
	Tolerance	-5...+10 %	
	Discharge resistance	50 V / 1 minute (0,5 - 30 kvar)	
75 V / 3 minutes (33 - 50 kvar)			
Losses	Dielectric: < 0,2 W / kvar		
	Total: < 0,4 W / kvar		
Protections	Dielectric regeneration Expansion system		
Mechanical features	Enclosure	Aluminium	
	Power terminals	M10	
	Fixing screws	M12	
	Life time	≥ 150.000 hours	
	Protection degree	IP 20 for CLZ-FP without terminal	
		IP 54 for CLZ-FP with terminal (optional) (for diameters of 85,100 and 116 mm)	
Environmental features	Temperature (Class D)	Daily: +45 °C Annual: +35 °C Maximum: +65 °C Minimum: -50 °C	
		Humidity	95% without condensation
		Altitude	4000 m
Construction features	Type of assembly	Vertical / Horizontal	
	Ventilation	Natural or forced, depending on the cabinet design	
	Distance between capacitors	Minimum 2 cm	
	Standard	IEC 60831:2014	

Dimensions



CLZ-FP-HD

Tubular capacitor

References

$$U_n = 3 \times 230 \text{ V} / 50 \text{ Hz}$$

Type	Code	kvar 220 V	kvar 230 V	Hz	Dimensions (mm) (d x h)	Weight (kg)	Cover	Terminal
CLZ-FPT-23/1,25-HD	R2H511	1,15	1,25	50	63,5 x 127	0,44	-	F
CLZ-FPT-23/2,5-HD	R2H812	2,3	2,5	50	63,5 x 175	0,9	-	F
CLZ-FP-23/5-HD	R2H516	4,6	5	50	85 x 175	1,1	1	A
CLZ-FP-23/6,25-HD	R2H517	5,7	6,25	50	85 x 245	1,2	1	A
CLZ-FP-23/7,5-HD	R2H518	6,8	7,5	50	85 x 245	1,3	1	A
CLZ-FP-23/10-HD	R2H51B	9,15	10	50	100 x 245	2,0	7	A
CLZ-FP-23/12,5-HD	R2H51D	11,4	12,5	50	100 x 245	2,3	7	A
CLZ-FP-23/15-HD	R2H51E	13,75	15	50	116 x 245	2,4	2	B

$$U_n = 3 \times 440 \text{ V} / 50 \text{ Hz}$$

Type	Code	kvar 400 V	kvar 440 V	Hz	Dimensions (mm) (d x h)	Weight (kg)	Cover	Terminal
CLZ-FPT-44/1,25-HD	R2H541	1	1,25	50	63,5 x 98	0,34	-	F
CLZ-FPT-44/2,5-HD	R2H542	2	2,5	50	63,5 x 127	0,44	-	F
CLZ-FPT-44/3-HD	R2H543	2,5	3	50	63,5 x 127	0,44	-	F
CLZ-FPT-44/3,75-HD	R2H544	3	3,75	50	63,5 x 127	0,44	-	F
CLZ-FPT-44/5-HD	R2H546	4	5	50	63,5 x 175	0,5	-	F
CLZ-FPT-44/6,25-HD	R2H547	5	6,25	50	63,5 x 175	0,7	-	F
CLZ-FPT-44/7,5-HD	R2H848	6,25	7,5	50	63,5 x 202	0,9	-	F
CLZ-FP-44/10-HD	R2H54B	8	10	50	85 x 245	1,1	1	A
CLZ-FP-44/12,5-HD	R2H54D	10	12,5	50	85 x 245	1,2	1	A
CLZ-FP-44/15-HD	R2H54E	12,5	15	50	85 x 245	1,4	1	A
CLZ-FP-44/18,2-HD	R2H54G	15	18,2	50	100 x 245	1,9	7	A
CLZ-FP-44/20-HD	R2H54J	16	20	50	100 x 245	2,0	7	A
CLZ-FP-44/25-HD	R2H54L	20	25	50	100 x 245	2,2	7	B
CLZ-FP-44/28-HD	R2H54M	23	28	50	116 x 245	2,4	2	B
CLZ-FP-44/30-HD	R2H54N	25	30	50	116 x 245	2,5	2	B
CLZ-FP-44/40-HD	R2H54R	32	40	50	136 x 261	3,8	-	B
CLZ-FP-44/50-HD	R2H54S	40	50	50	136 x 355	5,9	-	C

$$U_n = 3 \times 460 \text{ V} / 50 \text{ Hz}$$

Type	Code	kvar 440 V	kvar 460 V	Hz	Dimensions (mm) (d x h)	Weight (kg)	Cover	Terminal
CLZ-FPT-46/6,25-HD	R2H857	5,7	6,25	50	63,5 x 202	0,7	-	F
CLZ-FP-46/12,5-HD	R2H55D	11,4	12,5	50	85 x 245	1,4	1	A
CLZ-FP-46/15-HD	R2H55E	13,7	15	50	85 x 245	1,6	1	A
CLZ-FP-46/19-HD	R2H55H	17,4	19	50	100 x 245	2,2	7	A
CLZ-FP-46/25-HD	R2H55L	22,9	25	50	116 x 245	2,5	2	B
CLZ-FP-46/30-HD	R2H55N	27,4	30	50	136 x 220	3,8	-	B
CLZ-FP-46/33,3-HD	R2H55P	30,5	33,3	50	136 x 261	3,2	-	B

All models are inert gas filled, except for 63,5 mm diameter and 136x355 mm size
Dimensions dxh is only the tube, for total size see picture dimensions
Terminal Block: maximum cross-section type A: 16 mm², type B: 25 mm², type
C: 35 mm², F: Faston 6,3x0,8 mm and maximum current 12 A

IP 54 cover for CLZ

Cover N.	Type	Code
1	TCLZ-FP85	R29911
2	TCLZ-FP116	R29917
7	TCLZ-FP100	R29918

CLZ-FP-HD

Tubular capacitor

References

 $U_n = 3 \times 480 \text{ V} / 50 \text{ Hz}$

Type	Code	kvar 460 V	kvar 480 V	Hz	Dimensions (mm) (d x h)	Weight (kg)	Cover	Terminal
CLZ-FPT-48/2,5-HD	R2H862	2,3	2,5	50	63,5 x 127	0,9	-	F
CLZ-FPT-48/5-HD	R2H866	4,6	5	50	63,5 x 175	1,1	-	F
CLZ-FPT-48/7,5-HD	R2H868	6,9	7,5	50	63,5 x 202	1,3	-	F
CLZ-FP-48/10-HD	R2H56B	9,2	10	50	85 x 245	1,1	1	A
CLZ-FP-48/12,5-HD	R2H56D	11,5	12,5	50	85 x 245	1,3	1	A
CLZ-FP-48/15-HD	R2H56E	13,8	15	50	85 x 245	1,5	1	A
CLZ-FP-48/20-HD	R2H56J	18,4	20	50	100 x 245	2,2	7	A
CLZ-FP-48/25-HD	R2H56L	23	25	50	116 x 245	2,4	2	B
CLZ-FP-48/30-HD	R2H56N	27,6	30	50	116 x 245	2,6	2	B
CLZ-FP-48/40-HD	R2H56R	36,75	40	50	136 x 261	4,5	-	B

 $U_n = 3 \times 525 \text{ V} / 50 \text{ Hz}$

Type	Code	kvar 500 V	kvar 525 V	Hz	Dimensions (mm) (d x h)	Weight (kg)	Cover	Terminal
CLZ-FPT-52/2,5-HD	R2H872	2,3	2,5	50	63,5 x 127	0,7	-	F
CLZ-FPT-52/3-HD	R2H873	2,7	3	50	63,5 x 127	0,7	-	F
CLZ-FPT-52/4-HD	R2H875	3,6	4	50	63,5 x 175	0,7	-	F
CLZ-FPT-52/5-HD	R2H876	4,5	5	50	63,5 x 175	0,8	-	F
CLZ-FPT-52/6,25-HD	R2H877	5,7	6,25	50	63,5 x 202	0,8	-	F
CLZ-FPT-52/7,5-HD	R2H878	6,8	7,5	50	63,5 x 202	0,9	-	F
CLZ-FP-52/8-HD	R2H579	7,25	8	50	85 x 175	1,1	1	A
CLZ-FP-52/10-HD	R2H57B	9,1	10	50	85 x 245	1,2	1	A
CLZ-FP-52/12,5-HD	R2H57D	11,3	12,5	50	85 x 245	1,4	1	A
CLZ-FP-52/15-HD	R2H57E	13,6	15	50	85 x 245	1,5	1	A
CLZ-FP-52/20-HD	R2H57J	18,15	20	50	100 x 245	2,3	7	A
CLZ-FP-52/25-HD	R2H57L	22,7	25	50	116 x 245	2,5	2	B
CLZ-FP-52/30-HD	R2H57N	27,2	30	50	116 x 245	3,1	2	B
CLZ-FP-52/40-HD	R2H57R	36,3	40	50	136 x 261	3,2	-	B
CLZ-FP-52/50-HD	R2H57S	45,4	50	50	136 x 355	5,9	-	C

 $U_n = 3 \times 690 \text{ V} / 50 \text{ Hz}$

Type	Code	kvar 660 V	kvar 690 V	Hz	Dimensions (mm) (d x h)	Weight (kg)	Cover	Terminal
CLZ-FPT-69/2,5-HD	R2H892	2,3	2,5	50	63,5 x 127	0,7	-	F
CLZ-FPT-69/5-HD	R2H896	4,6	5	50	63,5 x 175	0,8	-	F
CLZ-FP-69/7,5-HD	R2H598	6,9	7,5	50	85 x 175	1,1	1	A
CLZ-FP-69/10-HD	R2H59B	9,15	10	50	85 x 245	1,2	1	A
CLZ-FP-69/12,5-HD	R2H59D	11,4	12,5	50	85 x 245	1,4	1	A
CLZ-FP-69/15-HD	R2H59E	13,7	15	50	85 x 245	1,6	1	A
CLZ-FP-69/20-HD	R2H59J	18,3	20	50	100 x 245	2,4	7	A
CLZ-FP-69/25-HD	R2H59L	22,9	25	50	116 x 245	2,5	2	B
CLZ-FP-69/30-HD	R2H59N	27,5	30	50	136 x 220	3,8	-	B
CLZ-FP-69/40-HD	R2H59R	36,6	40	50	136 x 355	5,9	-	C
CLZ-FP-69/50-HD	R2H59S	45,75	50	50	136 x 355	5,9	-	C

All models are inert gas filled, except for 63,5 mm diameter and 136x355 mm size

Dimensions dxh is only the tube, for total size see picture dimensions

Terminal Block: maximum cross-section type A: 16 mm², type B: 25 mm², typeC: 35 mm², F:Faston 6,3x0,8 mm and maximum current 12 A

IP 54 cover for CLZ

Cover N.	Type	Code
1	TCLZ-FP85	R29911
2	TCLZ-FP116	R29917
7	TCLZ-FP100	R29918

CLZ-FP-HD

Tubular capacitor

References

 $U_n = 3 \times 240 \text{ V} / 60 \text{ Hz}$

Type	Code	kvar 230 V	kvar 240 V	Hz	Dimensions (mm) (d x h)	Weight (kg)	Cover	Terminal
CLZ-FPT-24/2,5-60Hz-HD	R2H622	2,3	2,5	60	63,5 x 127	0,44	-	F
CLZ-FP-24/5-60Hz-HD	R2H626	4,6	5	60	85 x 175	1,0	1	A
CLZ-FP-24/6,25-60Hz-HD	R2H627	5,75	6,25	60	85 x 175	1,1	1	A
CLZ-FP-24/7,5-60Hz-HD	R2H628	6,9	7,5	60	85 x 245	1,1	1	A
CLZ-FP-24/10-60Hz-HD	R2H62B	9,2	10	60	85 x 245	1,1	1	A
CLZ-FP-24/12,5-60Hz-HD	R2H62D	11,5	12,5	60	85 x 245	1,6	1	A
CLZ-FP-24/15-60Hz-HD	R2H62E	13,8	15	60	100 x 245	2,1	7	A

 $U_n = 3 \times 440 \text{ V} / 60 \text{ Hz}$

Type	Code	kvar 400 V	kvar 440 V	Hz	Dimensions (mm) (d x h)	Weight (kg)	Cover	Terminal
CLZ-FPT-44/1,25-60Hz-HD	R2H641	1	1,25	60	63,5 x 98	0,34	-	F
CLZ-FPT-44/2,5-60Hz-HD	R2H642	2,1	2,5	60	63,5 x 127	0,44	-	F
CLZ-FPT-44/3-60Hz-HD	R2H643	2,5	3	60	63,5 x 127	0,44	-	F
CLZ-FPT-44/3,75-60Hz-HD	R2H644	3,1	3,75	60	63,5 x 127	0,44	-	F
CLZ-FPT-44/5-60Hz-HD	R2H646	4,15	5	60	63,5 x 127	0,44	-	F
CLZ-FP-44/6,25-60Hz-HD	R2H647	5,2	6,25	60	85 x 175	0,8	1	A
CLZ-FP-44/7,5-60Hz-HD	R2H648	6,2	7,5	60	85 x 175	0,9	1	A
CLZ-FP-44/10-60Hz-HD	R2H64B	8,3	10	60	85 x 175	1,0	1	A
CLZ-FP-44/12,5-60Hz-HD	R2H64D	10,3	12,5	60	85 x 245	1,1	1	A
CLZ-FP-44/15-60Hz-HD	R2H64E	12,4	15	60	85 x 245	1,2	1	A
CLZ-FP-44/20-60Hz-HD	R2H64J	16,5	20	60	85 x 245	1,5	1	A
CLZ-FP-44/25-60Hz-HD	R2H64L	20,7	25	60	100 x 245	2,0	7	A
CLZ-FP-44/30-60Hz-HD	R2H64N	24,8	30	60	116 x 245	2,3	2	B
CLZ-FP-44/40-60Hz-HD	R2H64R	33,1	40	60	136 x 220	2,8	2	B
CLZ-FP-44/50-60Hz-HD	R2H64S	41,3	50	60	136 x 355	5,6	-	C

 $U_n = 3 \times 480 \text{ V} / 60 \text{ Hz}$

Type	Code	kvar 460 V	kvar 480 V	Hz	Dimensions (mm) (d x h)	Weight (kg)	Cover	Terminal
CLZ-FPT-48/2,5-60Hz-HD	R2H762	2,3	2,5	60	63,5 x 127	0,8	-	F
CLZ-FPT-48/5-60Hz-HD	R2H766	4,6	5	60	63,5 x 175	0,8	-	F
CLZ-FPT-48/6,25-60Hz-HD	R2H767	5,75	6,25	60	63,5 x 175	0,9	-	F
CLZ-FPT-48/7,5-60Hz-HD	R2H768	6,9	7,5	60	63,5 x 175	0,9	-	F
CLZ-FP-48/10-60Hz-HD	R2H66B	9,2	10	60	85 x 175	1,1	1	A
CLZ-FP-48/12,5-60Hz-HD	R2H66D	11,5	12,5	60	85 x 245	1,2	1	A
CLZ-FP-48/15-60Hz-HD	R2H66E	13,8	15	60	85 x 245	1,3	1	A
CLZ-FP-48/20-60Hz-HD	R2H66J	18,4	20	60	100 x 245	1,9	7	A
CLZ-FP-48/25-60Hz-HD	R2H66L	23	25	60	100 x 245	2,2	2	B
CLZ-FP-48/30-60Hz-HD	R2H66N	27,6	30	60	116 x 245	2,4	2	B
CLZ-FP-48/40-60Hz-HD	R2H66R	36,75	40	60	136 x 220	3,8	-	B
CLZ-FP-48/50-60Hz-HD	R2H66S	46	50	60	136 x 355	5,9	-	C

All models are inert gas filled, except for 63,5 mm diameter and 136x355 mm size

Dimensions dxh is only the tube, for total size see picture dimensions

Terminal Block: maximum cross-section type A: 16 mm², type B: 25 mm², typeC: 35 mm², F: Faston 6,3x0,8 mm and maximum current 12 A

IP 54 cover for CLZ

Cover N.	Type	Code	
1		TCLZ-FP85	R29911
2		TCLZ-FP116	R29917
7		TCLZ-FP100	R29918

CLZ-FP-HD

Tubular capacitor

References

 $U_n = 3 \times 525 \text{ V} / 60 \text{ Hz}$

Type	Code	kvar 480 V	kvar 525 V	Hz	Dimensions (mm) (d x h)	Weight (kg)	Cover	Terminal
CLZ-FPT-52/2,5-60Hz-HD	R2H772	2,1	2,5	60	63,5 x 127	0,8	-	F
CLZ-FPT-52/5-60Hz-HD	R2H776	4,2	5	60	63,5 x 175	0,9	-	F
CLZ-FPT-52/6,25-60Hz-HD	R2H777	5,2	6,25	60	63,5 x 175	1,1	-	F
CLZ-FPT-52/7,5-60Hz-HD	R2H778	6,25	7,5	60	63,5 x 202	1,3	-	F
CLZ-FP-52/8,5-60Hz-HD	R2H67A	7,1	8,5	60	85 x 175	1,0	1	A
CLZ-FP-52/10-60Hz-HD	R2H67B	8,4	10	60	85 x 175	1,1	1	A
CLZ-FP-52/11,5-60Hz-HD	R2H67C	9,6	11,5	60	85 x 245	1,2	1	A
CLZ-FP-52/12,5-60Hz-HD	R2H67D	10,5	12,5	60	85 x 245	1,2	1	A
CLZ-FP-52/15-60Hz-HD	R2H67E	12,5	15	60	85 x 245	1,4	1	A
CLZ-FP-52/17-60Hz-HD	R2H67I	14,2	17	60	85 x 245	1,5	1	A
CLZ-FP-52/20-60Hz-HD	R2H67J	16,7	20	60	100 x 245	2,0	7	A
CLZ-FP-52/22,5-60Hz-HD	R2H67K	18,8	22,5	60	100 x 245	2,2	7	A
CLZ-FP-52/25-60Hz-HD	R2H67L	20,9	25	60	100 x 245	2,4	7	A
CLZ-FP-52/30-60Hz-HD	R2H67N	25	30	60	116 x 245	2,5	2	B
CLZ-FP-52/34-60Hz-HD	R2H67P	28,4	34	60	116 x 245	2,6	2	B
CLZ-FP-52/40-60Hz-HD	R2H67R	33,4	40	60	136 x 261	3,8	-	B

 $U_n = 3 \times 600 \text{ V} / 60 \text{ Hz}$

Type	Code	kvar 600 V	Hz	Dimensions (mm) (d x h)	Weight (kg)	Cover	Terminal
CLZ-FPT-60/2,5-60Hz-HD	R2H782	2,5	60	63,5 x 127	0,7	-	F
CLZ-FPT-60/5-60Hz-HD	R2H786	5	60	63,5 x 175	0,8	-	F
CLZ-FPT-60/6,25-60Hz-HD	R2H787	6,25	60	63,5 x 175	0,9	-	F
CLZ-FPT-60/7,5-60Hz-HD	R2H788	7,5	60	63,5 x 175	1,0	-	F
CLZ-FP-60/10-60Hz-HD	R2H68A	10	60	85 x 175	1,1	1	A
CLZ-FP-60/12,5-60Hz-HD	R2H68B	12,5	60	85 x 245	1,2	1	A
CLZ-FP-60/15-60Hz-HD	R2H68E	15	60	85 x 245	1,3	1	A
CLZ-FP-60/17,5-60Hz-HD	R2H68I	17,5	60	85 x 245	1,4	1	A
CLZ-FP-60/20-60Hz-HD	R2H68J	20	60	100 x 245	1,9	7	A
CLZ-FP-60/21-60Hz-HD	R2H68K	21	60	100 x 245	2,0	7	A
CLZ-FP-60/25-60Hz-HD	R2H68L	25	60	100 x 245	2,2	7	A
CLZ-FP-60/30-60Hz-HD	R2H68N	30	60	116 x 245	2,4	2	B
CLZ-FP-60/34,5-60Hz-HD	R2H68P	34,5	60	116 x 245	2,6	2	B

 $U_n = 3 \times 690 \text{ V} / 60 \text{ Hz}$

Type	Code	kvar 660 V	kvar 690 V	Hz	Dimensions (mm) (d x h)	Weight (kg)	Cover	Terminal
CLZ-FPT-69/2,5-60Hz-HD	R2H792	2,3	2,5	60	63,5 x 127	0,9	-	F
CLZ-FPT-69/5-60Hz-HD	R2H796	4,6	5	60	63,5 x 175	1,0	-	F
CLZ-FPT-69/7,5-60Hz-HD	R2H798	6,9	7,5	60	63,5 x 202	1,1	-	F
CLZ-FP-69/10-60Hz-HD	R2H69B	9,15	10	60	85 x 245	1,1	1	A
CLZ-FP-69/12,5-60Hz-HD	R2H69D	11,4	12,5	60	85 x 245	1,2	1	A
CLZ-FP-69/15-60Hz-HD	R2H69E	13,7	15	60	85 x 245	1,4	1	A
CLZ-FP-69/20-60Hz-HD	R2H69J	18,3	20	60	100 x 245	2,0	7	A
CLZ-FP-69/25-60Hz-HD	R2H69L	22,9	25	60	116 x 245	2,3	2	B
CLZ-FP-69/30-60Hz-HD	R2H69N	27,5	30	60	116 x 245	2,5	2	B
CLZ-FP-69/40-60Hz-HD	R2H69R	36,6	40	60	136 x 220	3,8	-	B
CLZ-FP-69/50-60Hz-HD	R2H69S	45,75	50	60	136 x 355	5,9	-	C

All models are inert gas filled, except for 63,5 mm diameter and 136x355 mm size

Dimensions dxh is only the tube, for total size see picture dimensions

Terminal Block: maximum cross-section type A: 16 mm², type B: 25 mm², typeC: 35 mm², F: Faston 6,3x0,8 mm and maximum current 12 A

IP 54 cover for CLZ

Cover N.	Type	Code	
1	TCLZ-FP85	R29911	
2	TCLZ-FP116	R29917	
7	TCLZ-FP100	R29918	

Computer Max

plug & play

Automatic Power Factor regulator



Description

The state-of-the-art **computer Max plug & play** series of regulators has been designed to enable easy, effective regulation. In common with the entire range of computer regulators, it is based on **CIRCUTOR's** FCP system (Fast Computerized Program), which provides the regulator with unique features in the market. Other features include:

- A Plug & Play system that enables fully automatic programming of the C/K parameter and selection of the phase on which the current transformer is installed.
- Views by display: $\cos \phi$, voltage, current, THD/ and it records maximum voltage and current levels
- Includes the "phase selection" function, which allows the user to select the phase on which the current transformer is installed.
- Allows the user to view the behaviour of $\cos \phi$, I and THD/ in the event of manual connection and disconnection of capacitors.
- Indication of the following alarms by display or relay: lack of compensation, overcompensation, overvoltage, overcurrent, disconnected transformer, current below limit.

Applications

Computer Max plug & play is the perfect regulator for the compensation of balanced installations, in which ease of programming, robustness and accuracy are essential requirements. Its straightforward, intuitive programming system makes it very easy to install and maintain by the user.

Technical features

Voltage circuit	Power supply voltage	230, 400, 480 Vac (according to the type)
	Tolerance	-10%...+15%
	Consumption	4 VA (max 6) - 6 VA (max 12)
	Frequency	45...65 Hz
Measurement circuit	Measurement voltage	230, 400, 480 Vac (according to the type)
	Measurement current	Transformer I_n / 5 A +20%
Output relay	Maximum voltage	250 Vac
	Nominal current	10 A
	Electrical working life / mechanical	5×10^4 / 5×10^5
Alarm relay	Relay	Last relay (if not configured for compensation)
	Alarms	Lack of compensation, overcompensation, overvoltage, overcurrent, disconnected transformer and current below limit
Build features	Operating temperature	-20 °C...+60 °C
	Assembly	Panel
	Dimensions	144 x 144 mm
	Connection	Power strip
	Protection degree	IP 40 (front panel) / IP 30 (rear)
Features	Electrical parameter measurement	$\cos \phi$, voltage, current, THD/, maximum value of U and I
	"Phase selection" function	Selects the phase on which the current transformer was installed
	Control system	FCP / 4 quadrants
	Connection programs	1.1.1.1 / 1.2.2.2 / 1.2.4.4 / 1.1.2.2 / 1.2.4.8 / 1.1.2.4 / 1.2.2.4 / 1.2.3.3 / 1.2.3.4 / 1.2.3.6 / 1.2.4.6
	Test function	Compensation test and harmonic resonance test
	Connection delay T_c	4...999 s
	Safety delay T_s	5 · T_c
Standards	IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-11	

Computer Max

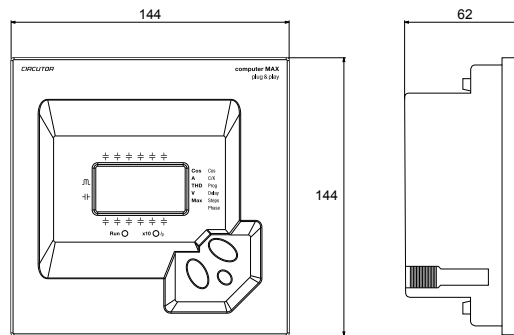
plug & play

Automatic Power Factor regulator

References

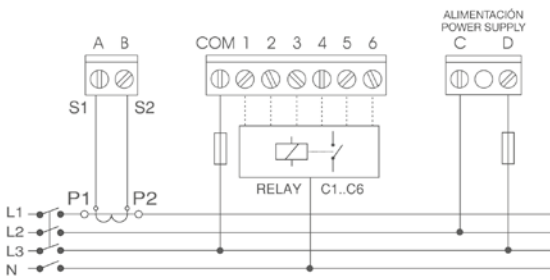
Type	Code	Power supply voltage	No. steps
Computer Max 6	R10871	400 Va.c.	6
Computer Max 12	R10872	400 Va.c.	12
Computer Max 6	R10871002	230 Va.c.	6
Computer Max 12	R10872002	230 Va.c.	12
Computer Max 6	R10871004	480 Va.c.	6
Computer Max 12	R10872004	480 Va.c.	12

Dimensions

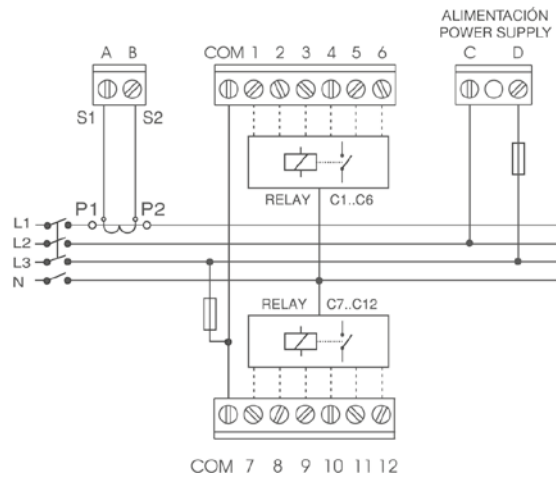


Connections

Computer Max 6



Computer Max 12



Computer SMART III



Smart Power Factor regulator

Description

Measurement with three current transformers guarantees an analogue reading of the company meter. The **Computer SMART III** reactive energy regulator is the only regulator on the market that offers the possibility of using 3 measurement transformers in addition to the conventional method of measuring with a single current transformer, as well as providing the functions of an integral power analyzer and controlling residual leakage currents.

Computer SMART III is a regulator that ensures excellent preventive maintenance by means of programming its alarms and the options for testing the capacitor status, offering maximum supervision and safety of your compensation unit.

Application

The connection of 1 or 3 transformers makes **computer SMART III** the perfect regulator in any installation, allowing the following:

- Changing from 1 to 3 transformers in the following cases:
 - Changes in reactive energy penalties
 - Changes in consumption habits
 - Significant imbalances in the system
- Replacing the regulator of any capacitor bank
- Perfect for installations with up to 4 objective $\cos \phi$, since it can adapt to any compensation need (different time periods).
- It can be used with Medium Voltage compensation units.

Technical features

Voltage circuit	Power supply voltage	100...520 Vac (SMART III 14 -> 100...400 Vac)
	Tolerance	10%
	Consumption	10...20 VA (depending on the type)
	Frequency	50...60 Hz
Measurement circuit	Measurement voltage	35...520 Vac Ph-Ph 20...300 Vac Ph-N
	Current measurement	x1 or x3 transformers .../5 A or .../1 A
Leakage current	Measurement range	$I_{Aprim} = 10 \text{ mA} \dots 1.5 \text{ A AC}$
	Current transformers	WG series
Accuracy	Voltage and Current	0.5% ± 1 digit
	Active power measurement	0.5% ± 2 digit
Temperature measurement	Configuration range	0...80 °C
Output relay	No. of relays	6, 12, 14, depending on the type
	I_{max} (operation)	1 A
	U_{max} Open contacts	1 kV
	Maximum switching power	2500 VA
Digital outputs	No. of outputs	2
	Type	NPN transistor
	U_{max} and I_{max} (operation)	24 Vdc /50 mA
Digital inputs	No. of inputs	2
Alarms	No. of alarms	17, fully configurable
Communications	Port	RS-485
	Protocol	Modbus / RTU
Environmental features	Operating temperature	-10 °C...+55 °C
	Relative humidity	5...95% without condensation
	Maximum altitude	2,000 m
Control system	PFC (Program that minimises the	number of operations)
Safety	Insulation	Category III Class II EN 61010-1
	Protection degree	IP31 IP51 Front panel
Standards	IEC 62053-23 (2003-01), IEC 61326-1 , EN 61010-1 , UL 508	

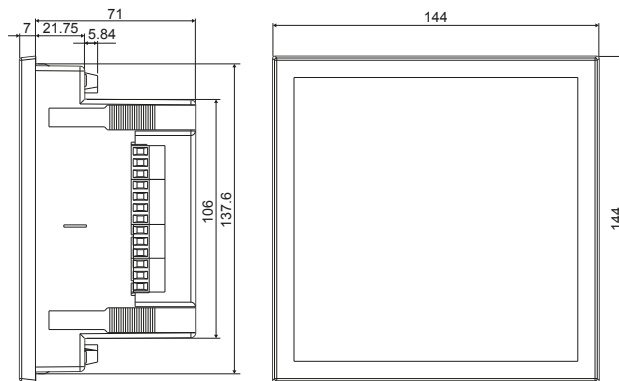
Computer SMART III

Smart Power Factor regulator

References

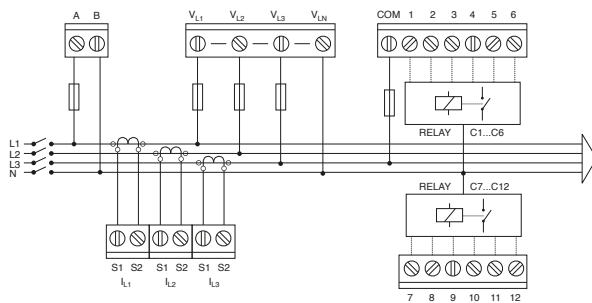
Type	Code	No. relays
Computer Smart III 6	R13851	6
Computer Smart III 12	R13862	12
Computer Smart III 14	R13864	14

Dimensions

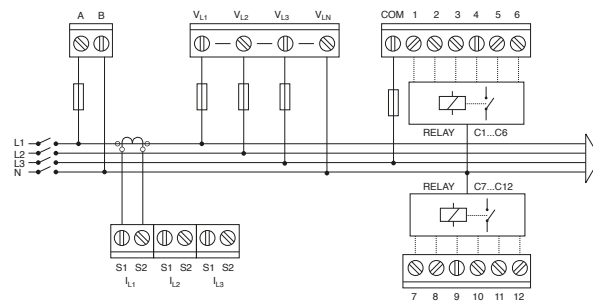


Connections

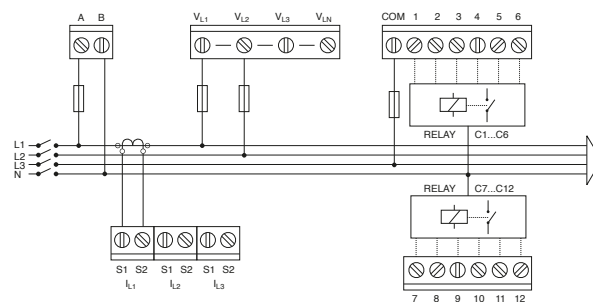
Connection of 3 phases + neutral
3 current transformers



Connection of 3 phases + neutral
1 current transformer



Connection of 2 phases +
1 current transformer



RBX / RX

Reactors



Description

CIRCUTOR has a standard range of rejection reactors $p = 7\%$, with a resonance frequency of 189 Hz for 50 Hz networks (or 227 Hz on demand for 60 Hz networks). This is the most frequent tuning value to avoid any resonance of the 5th harmonic and higher. The capacitor-reactor assembly absorbs the portion of the current of the 5th order harmonic and acts as a detuned filter for higher frequencies. In some installations, other values of $p\%$ are required, for example 5.6% (210 Hz), 6% (204 Hz), 14% (134 Hz), etc.

CIRCUTOR can build reactors on demand, which will be adapted to any power rating, $p\%$, voltage and frequency. **RX**-type low-power reactors are built with low-loss plates and are coiled with a copper conductor. The connection is made using suitable terminals. In the case of higher power ratings, **RBX** reactors are used, with a magnetic plate nucleus with multiple air gaps, which offer excellent features and a very low loss ratio. Aluminium band coils are used (or copper band on demand) and the input and output connections run through a busbar.

Both the **RX** and **RBX** reactors are impregnated with varnish in a vacuum to increase insulation, providing greater mechanical resistance and reducing noise levels.

Applications

The rejection reactors of the **RX / RBX** series have been specifically designed for use in capacitor banks in installations with a high harmonic content. The reactors must be connected in series to each capacitor to ensure adequate protection of the capacitors and to prevent resonance effects in the installation.

Technical features

Electrical features	Voltage	400 V / 480 V, on demand: up to 1000 V
	Network frequency	50 / 60 Hz
	Nominal power	Power rating I_n accordance with selection table
	Value of $p\%$	7 % (189 Hz) 5,67 % (210 / 252 Hz) 14 % (134 / 160 Hz)
	Type of conductor	Aluminum band / copper wire
	Tolerance L	$\pm 5\%$
	Linearity (5 % L)	$1,8 \times I_n$
	Isolation voltage	4 kV
	Maximum room temperature	-10 ... +45 °C
	Internal isolation	Class F (155 °C) On demand: Class H (180 °C)
Maximum overload	Permanent	$1,17 \times I_n$
	Temporary (1 min)	$2 \times I_n$
Safety	Protection thermostat	Opening @ 90 °C
	Degree of protection	IP 00
	Installation	Indoor
Standards	EN-60289, IEC 60076	

References**Reactors 400 V - 50 Hz, 7% / 189 Hz**

Type	Code	Inductance	Rated Power	CLZ model	CFB model	For contactor
RX-5-400-7%	P72110	7.66 mH	5 kvar	CLZ-FP-46/6,25-HD	CFB-46/6	CMC-7,5B
RX-6.25-400-7%	P72112	6.12 mH	6.25 kvar	CLZ-FP-52/10-HD	CFB-46/7,75	CMC-7,5B
RX-10-400-7%	P72115	3.83 mH	10 kvar	CLZ-FP-46/12,5-HD	CFB-46/12,5	CMC-12B
RX-12.5-400-7%	P72117	3.06 mH	12.5 kvar	CLZ-FP-46/15-HD	CFB-46/15	CMC-12B
RX-15-400-7%	P72120	2.55 mH	15 kvar	CLZ-FP-46/19-HD	CFB-46/19	CMC-20B
RBX-20-400-7%	P72125	1.92 mH	20 kvar	CLZ-FP-46/25-HD	CFB-46/25	CMC-20B
RBX-25-400-7%	P72130	1.53 mH	25 kvar	CLZ-FP-46/30-HD	CFB-46/30	CMC-32B
RBX-30-400-7%	P72135	1.27 mH	30 kvar	2 x CLZ-FP-46/19-HD	CFB-46/37	CMC-40B
RBX-40-400-7%	P72140	0.95 mH	40 kvar	2 x CLZ-FP-46/25-HD	CFB-46/50	CMC-75B
RBX-50-400-7%	P72145	0.76 mH	50 kvar	2 x CLZ-FP-46/30-HD	CFB-46/62	CMC-75B
RBX-60-400-7%	P72150	0.63 mH	60 kvar	3 x CLZ-FP-46/25-HD	CFB-46/74	CMC-85B
RBX-80-400-7%	P72155	0.47 mH	80 kvar	4 x CLZ-FP-46/25-HD	CFB-46/100	CMC-150B

Reactors 400 V - 50 Hz, 14% / 134 Hz

Type	Code	Inductance	Rated Power	CLZ model	CFB model	For contactor
RX-5-400-14%	P71021	16.31 mH	5 kvar	CLZ-FP-52/7,5-HD	CFB-52/7,5	CMC-7,5B
RX-10-400-14%	P71022	8.15 mH	10 kvar	CLZ-FP-52/15-HD	CFB-52/15	CMC-12B
RX-12.5-400-14%	P71023	6.52 mH	12.5 kvar	CLZ-FP-52/20-HD	CFB-52/19	CMC-12B
RX-15-400-14%	P71024	5.43 mH	15 kvar	CLZ-FP-52/25-HD	CFB-52/23	CMC-20B
RX-20-400-14%	P71025	4.07 mH	20 kvar	CLZ-FP-52/30-HD	CFB-52/30	CMC-20B
RBX-25-400-14%	P72330	3.26 mH	25 kvar	CLZ-FP-52/37,5-HD	CFB-52/38	CMC-32B
RBX-30-400-14%	P72335	2.71 mH	30 kvar	CLZ-FP-52/25-HD + CLZ-FP-52/20-HD	CFB-52/46	CMC-40B
RBX-40-400-14%	P72340	2.03 mH	40 kvar	2 x CLZ-FP-52/30-HD	CFB-52/60,5	CMC-75B
RBX-50-400-14%	P72345	1.63 mH	50 kvar	2 x CLZ-FP-52/37,5-HD	CFB-52/76	CMC-75B
RBX-60-400-14%	P72350	1.35 mH	60 kvar	3 x CLZ-FP-52/30-HD	CFB-52/91	CMC-85B

Reactors 400 V - 50 Hz, 5,67% / 210 Hz

Type	Code	Inductance	Rated Power	CLZ model	CFB model	For contactor
RX-5-440-5,67%	P72210	6.11 mH	5 kvar	CLZ-FP-46/6,25	CFB-46/6	CMC-7,5B
RX-6.25-440-5,67%	P72212	4.88 mH	6,25 kvar	CLZ-FP-52/10	CFB-46/7,75	CMC-7,5B
RX-10-440-5,67%	P72215	3.05 mH	10 kvar	CLZ-FP-46/12,5	CFB-46/12,5	CMC-12B
RX-12.5-440-5,67%	P72217	2.44 mH	12,5 kvar	CLZ-FP-46/15	CFB-46/15	CMC-12B
RX-15-440-5,67%	P72220	2.04 mH	15 kvar	CLZ-FP-46/19	CFB-46/19	CMC-20B
RBX-20-440-5,67%	P72225	1.53 mH	20 kvar	CLZ-FP-46/25	CFB-46/25	CMC-20B
RBX-25-440-5,67%	P72230	1.22 mH	25 kvar	CLZ-FP-46/30	CFB-46/30	CMC-32B
RBX-30-440-5,67%	P72235	1.02 mH	30 kvar	2 x CLZ-FP-46/19	CFB-46/37	CMC-40B
RBX-40-440-5,67%	P72240	0.76 mH	40 kvar	2 x CLZ-FP-46/25	CFB-46/50	CMC-75B
RBX-50-440-5,67%	P72245	0.61 mH	50 kvar	2 x CLZ-FP-46/30	CFB-46/62	CMC-75B
RBX-60-440-5,67%	P72250	0.51 mH	60 kvar	2 x CLZ-FP-46/25	CFB-46/74	CMC-85B
RBX-80-440-5,67%	P72255	0.38 mH	80 kvar	4 x CLZ-FP-46/25	CFB-46/100	CMC-150B

CMC-B

Capacitor contactors



Description

CMC-B series are contactors adjusted for switching single-step or multiple step capacitor banks. They have high operating times and a high electrical endurance that make the most robust and durable contactors.

Applications

They are installed in switching single-step or multiple step capacitor banks.

Technical features

Electrical features		
Operating voltage		230...690 V
Frecuency		50 / 60 Hz
Rated operational current @ 400 V		11...116 A
Coil voltage		230 V 50-60 Hz
Coil voltage tolerance		0,85...1,1 U _n
Rated impulse withstand voltage		8 kV
Frequency of switching operations (break operation: 15 s)		240/h for CMC-7,5B - CMC-12B 120/h for CMC-20B 100/h for CMC-32B to CMC-150B
Contact endurance (break operation: 15 s)		200.000 for CMC-7,5B, CMC-40B 100.000 for CMC-75B to CMC-150B
Build features	Insulation rating	690...1000 V
	Protection Degree	IP 00
Auxiliary contacts	Type	NC x2
Enviromental conditions	Working temperature	-25...+55 °C
	Relative Humidity	5...95% without condensation
	Altitude	2000 m
Standards		IEC 60947-4-1, VDE 0660

References

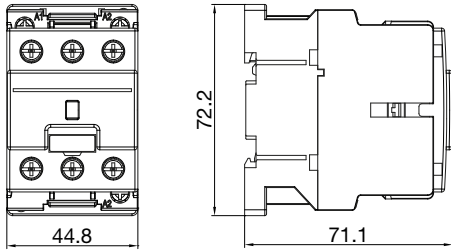
Type	Code	Maximum operation power (kvar)				Dumping resistors
		230 V	400-440-480 V	500-550 V	660-690 V	
CMC-7,5B	R281A5	4	7,5	9	11	not available
CMC-12B	R281A6	6,7	12,5	15	18	included
CMC-20B	R281A4	11	20	24	30	included
CMC-32B	R281A8	14	25	30	35	included
CMC-40B	R281A1	20	30	35	40	included
CMC-75B	R281A9	29	50	60	70	included
CMC-85B	R281A3	32	60	70	80	included
CMC-150B	R281AD	45	80	100	115	included

CMC-B

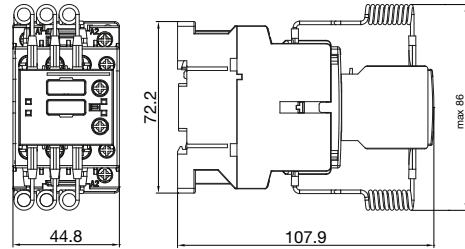
Capacitors contactors

Dimensions

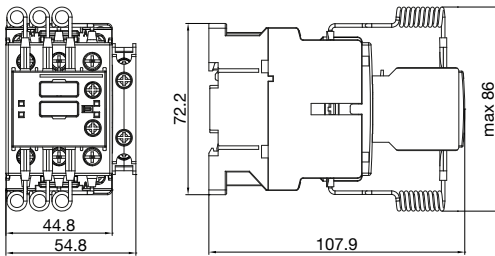
CMC-7,5B



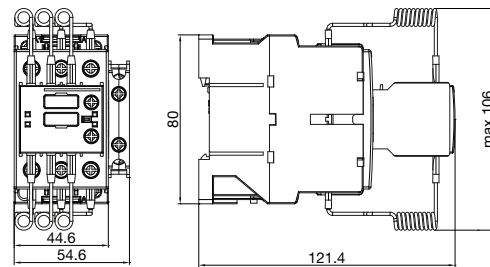
CMC-12B



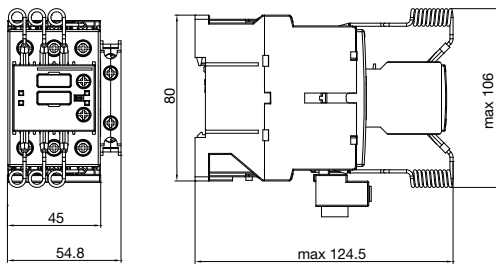
CMC-20B



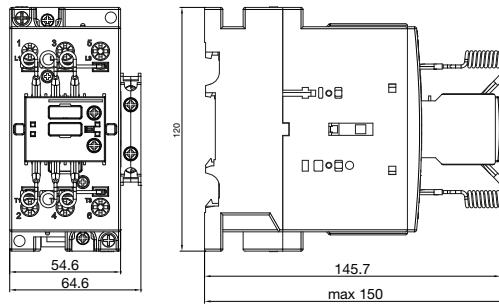
CMC-32B



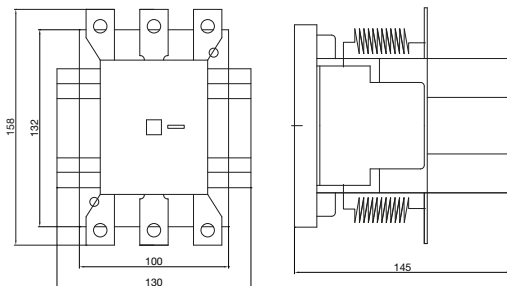
CMC-40B



CMC-75B / CMC-85B



CMC-150B



Computer Max-f

Fast power factor regulator (Static capacitor banks)



Descripción

The **computer max-f** series of regulators is within the fast regulator range, with a response time from 40 ms, adapted to real time compensation requirements.

Main Features:

- Shows by display: $\cos \phi$, voltage, current, THD(I) and, besides, records in memory maximum values for voltage and current.
- Provides the “phase selection” function, that allows the user choosing the power line phase where the measuring current transformer (CT) has been placed in allows viewing in display the variation of $\cos \phi$, line current and THD(I), when manually connecting or disconnecting capacitor steps.
- Indication by display or through output of following alarm conditions: Compensation failure, Over-compensation, Over-voltage, Over-current, C.T. not connected or open, Line current below measurable value.

Applications

The **computer Max-f** system has been designed to compensate installations that have a special load typology and require real time compensation, such as welding units, cranes, lifts and lifting equipment, smelters, hospitals, automotive industry or any other sector/unit that requires a real time compensation.

Características técnicas

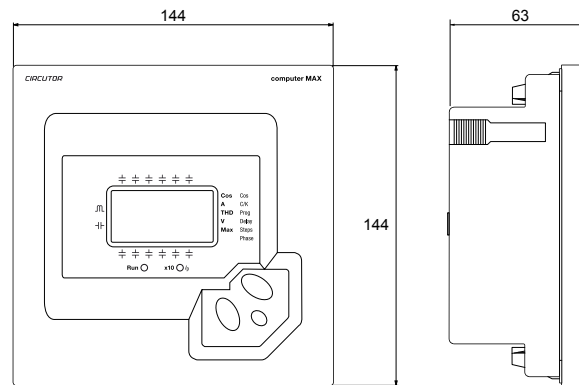
Voltage measurement circuit	Power Supply	230, 400, 480 V _{a.c.} (according to type)
	Tolerance	-10...+15 %
	Consumption	4 V-A (max 6) - 6 V-A (max 12)
	Frequency	45 ... 65 Hz
Current measurement circuit	Measuring voltage	230, 400, 480 V _{a.c.} (according to type)
	Measuring current	Transformer I_n / 5 A +20%
Outputs	Number	6 (max-f 6) - 12 (max-f 12)
	Maximum voltage	60 V _{d.c.}
	Maximum current	0,2 A
Alarm output	Alarm	Compensation failure, Over-compensation, Overvoltage, Over-current, C.T. not connected or open, Line current below measurable value
Build features	Operating temperature	-10 ... +50 °C
	Assembly	Panel
	Dimensions	144 x 144 mm
	Connection	Connection strip
	Protection Degree	IP 40 (frontal) / IP 30 (rear)
Performance	Measure electric parameters	Voltage, current, THD(I), and maximum values of U and I
	“Phase selection” function	Selection of the power line phase where the C.T. is placed
	Integrated control system	FCP / 4 quadrants
	Connection programs	1.1.1.1 / 1.2.2.2 / 1.2.4.4 / 1.1.2.2 / 1.2.4.8 / 1.1.2.4
	Test Function	$\cos \phi$ Correction Test & Harmonic Resonance Test
	Connection delay T_r	40 ms ... 2 s
	Safety delay T_s	40 ms ... 2 s
Standards	IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-11	

Computer Max-f Fast power factor regulator (Static capacitor banks)

References

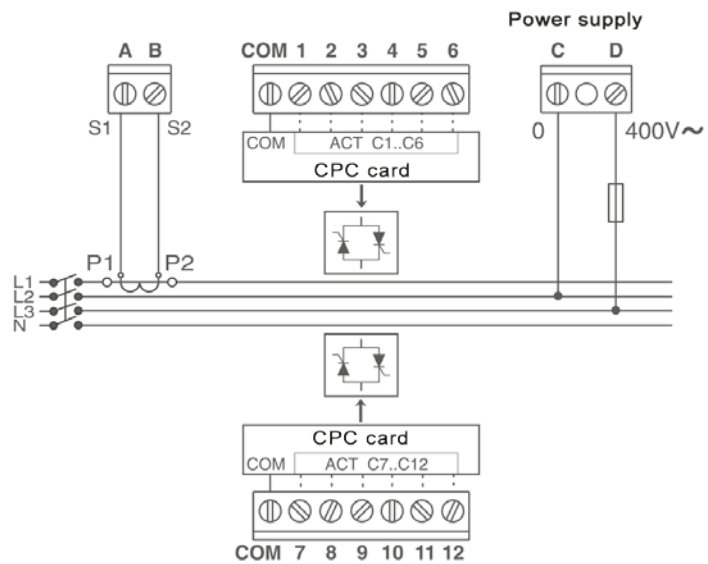
Type	Code	Power-Supply	Num. Steps
Computer Max-f 6	R10851	400 V _{c.a.}	6
Computer Max-f 12	R10862	400 V _{c.a.}	12

Dimensions



Connections

Computer Max-f



Computer SMART III fast



Smart Power Factor regulator for static capacitor banks

Description

Measurement with three current transformers guarantees an analogue reading of the company meter. The **Computer SMART III Fast** reactive energy regulator is the only regulator on the market that offers the possibility of using 3 measurement transformers in addition to the conventional method of measuring with a single current transformer, as well as providing the functions of an integral power analyzer and controlling residual leakage currents.

Computer SMART III Fast is a regulator that ensures excellent preventive maintenance by means of programming its alarms and the options for testing the capacitor status, offering maximum supervision and safety of your compensation unit.

Application

Computer Smart III fast it's the ideal solution to compensate installations with a variation of quick load, between 40 ms and 4 seconds, and/or large unbalances between phases, such as welding units, cranes, lifts and lifting units, smelters, hospitals, automotive industry or any other sector or unit that requires an efficient compensation of the power factor. The connection of 1 or 3 transformers makes **computer SMART III Fast** the perfect regulator in any installation, allowing the following:

- Changing from 1 to 3 transformers in the following cases:
 - Single-phase fast changing equipment
 - Example: Single-phase welding
- Replacing the regulator of any capacitor bank
- Perfect for installations with up to 4 objective $\cos \phi$, since it can adapt to any compensation need (different time periods).

Technical features

Voltage circuit	Power supply voltage	100...520 Vac
	Tolerance	10%
	Consumption	8...15 VA (depending on the type)
	Frequency	50...60 Hz
Measurement circuit	Measurement voltage	35...520 Vac Ph-Ph 20...300 Vac Ph-N
	Current measurement	x1 or x3 transformers .../5 A or .../1 A
Leakage current	Measurement range	$I_{\text{dprim}} = 10 \text{ mA} \dots 1.5 \text{ A AC}$
	Current transformers	WGS series
Accuracy	Voltage and Current	0.5% ± 1 digit
	Active power measurement	0.5% ± 2 digit
Temperature measurement	Measurement range	0...80 °C
Output relay	No. of relays	2
	I_{max} (operation)	1 A
	U_{max} Open contacts	1 kV
	Maximum switching power	2500 VA
Digital outputs	No. of outputs	6
	Type	OPTO-MOSFET
	U_{max} and I_{max} (operation)	24 Vdc/ 0,15 A
Digital outputs	No. of outputs	2
	Type	NPN transistor
	U_{max} and I_{max} (operation)	24 Vdc /50 mA
Digital inputs	No. of inputs	2
Alarms	No. of alarms	17, fully configurable
Communications	Port	RS-485
	Protocol	Modbus / RTU
Environmental features	Operating temperature	-10 °C...+55 °C
	Relative humidity	5...95% without condensation
	Maximum altitude	2,000 m
Control system	PFC (Program that minimises the number of operations)	
Safety	Insulation	Category III Class II EN 61010-1
	Protection degree	IP31
		IP51 Front panel
Standards	UNE EN 61010:2010, UNE-EN 61000:2007, UNE-EN 61000-6-2:2005, UNE-EN 61000-6-4:2005	

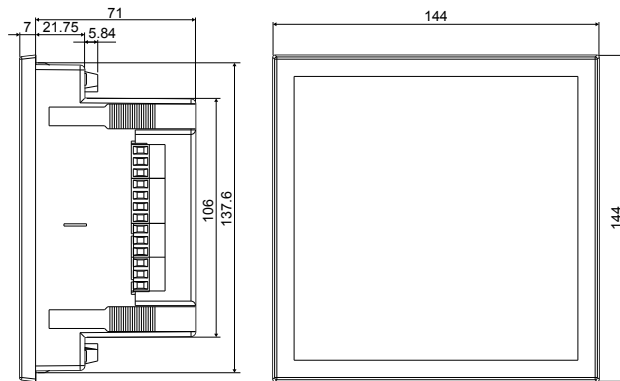
Computer SMART III fast

Smart Power Factor regulator for static capacitor banks

References

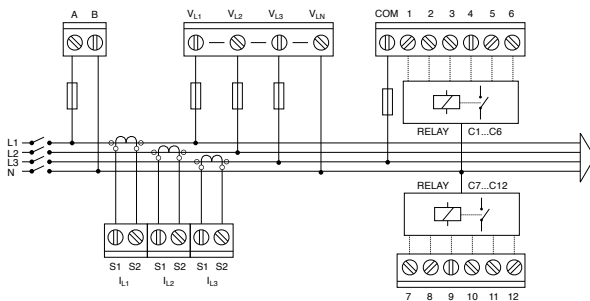
Type	Code	No. Relays
Computer Smart III Fast 6	R13951	6
Computer Smart III Fast 12	R13962	12

Dimensions

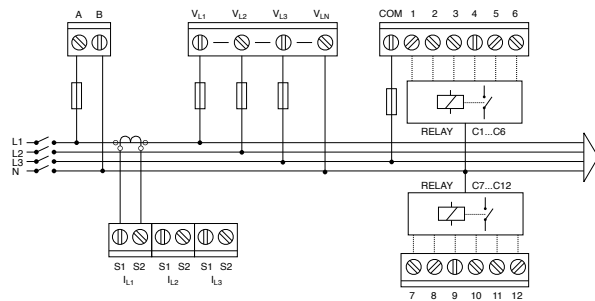


Connections

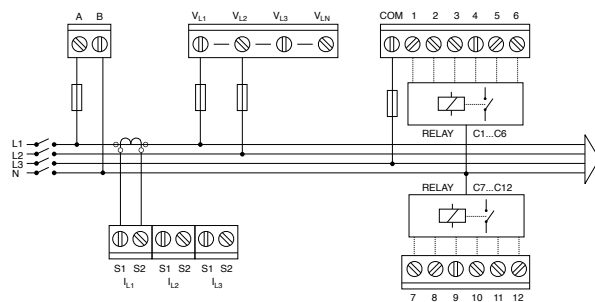
Connection of 3 phases + neutral
3 current transformers



Connection of 3 phases + neutral
1 current transformer

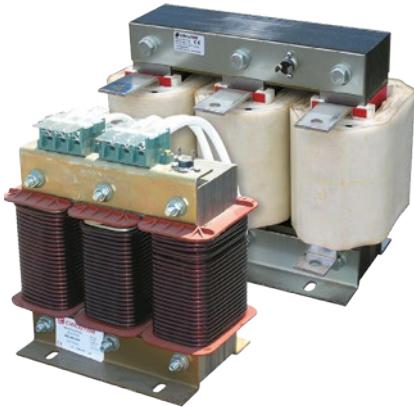


Connection of 2 phases +
1 current transformer



RE / RBE

Three-phase reactors for static capacitor banks



Description

CIRCUTOR has standardised the reactors of the **RE / RBE** series for their use in static capacitor banks. The best operation of the unit requires the reactors to be connected within the triangle made up of the capacitor-reactor group. At the same power rating, the **RE / RBE** reactors have a nominal current value that is 1.73 times lower and an inductance value that is 3 times higher than that in an **R / RB** reactor.

There is a standard range of 400 V rejection reactors with $p = 7\%$, with a resonance frequency of 189 Hz for 50 Hz networks (or 227 Hz on demand for 60 Hz networks). In addition, reactors can be manufactured on demand for static capacitor banks adapted to any value of the power rating, $p\%$, voltage and frequency.

RE-type low-power reactors are built with low-loss plates and are coiled with copper wire. The connection is made using suitable terminals. In the case of higher power ratings, **RBE** reactors are used, with a magnetic plate nucleus and multiple air gaps, which offer excellent features and a low loss ratio. The coils are made with an aluminium band (or copper band, on demand). The input and output connections run through a busbar. Both **RE** and **RBE** type reactors are impregnated with a varnish in a vacuum to increase insulation and reduce noise levels.

Application

The rejection reactors of the **RE / RBE** series have been specifically designed for use in static capacitor banks in installations with a high harmonic content. The reactors must be connected in series with each capacitor for adequate protection of the capacitors and the static operations module, and to avoid resonance effects in the installation.

Technical features

Features	Voltage	400 V On demand: up to 1,000 V
	Mains frequency	50 Hz On demand: 60 Hz
	Power	According to the table Other values on demand
	Value of $p\%$	7% (189 Hz) Other values on demand
	Type of conductor	RE: copper wire RBE: aluminium band
	Tolerance L	$\pm 5\%$
	Linearity (5% L)	$1.8 I_n$
	Insulation voltage	4 kV
	Maximum room temperature	-10 °C...+45 °C
	Internal insulation	Class F (155 °C) On demand: Class H (180 °C)
Maximum overload	Permanent	$1.17 I_n$
	Temporary (1 min)	$2 I_n$
Safety	Protection thermostat	Opening at 90 °C
	Protection degree	IP 00
	Installation	Interior
Standards	UNE-EN60289, IEC 60076	

RE / RBE

Three-phase reactors for static capacitor banks

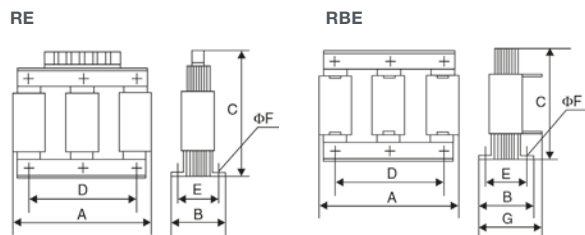
References

RE/ RBE series reactors III at 400 Vac, 50 Hz, $p = 7\%$ (189 Hz)

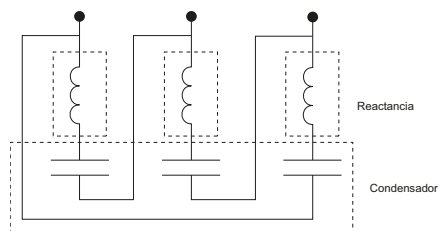
Type	Code	For capacitor	kvar	I_n (A)	L (mH)	Losses (W)	Weight (kg)
RE-5-400 / 6-460	P70210	CF 46 / 6-6B	5	5	23,67	25	6
RE-10-400 / 12,5-460	P70215	CF 46 / 12,5-6B	10	9	11,27	50	8
RE-15-400 / 19-460	P70220	CF 46 / 19-6B	15	13	7,50	57	9,5
RE-20-400 / 25-460	P70225	CF 46 / 25-6B	20	17	5,68	76	11,5
RE-25-400 / 30-460	P70230	CF 46 / 30-6B	25	21	4,68	90	17
RE-30-400 / 37-460	P70235	CF 46 / 37-6B	30	26	3,84	120	20,5
RE-40-400 / 50-460	P70240	CF 46 / 50-6B	40	35	2,84	145	25,5
RBE-50-400 / 62-460	P70245	CF 46 / 62-6B	50	42	2,29	185	29
RBE-60-400 / 74-460	P70250	CF 46 / 74-6B	60	51	1,89	205	30
RBE-80-400 / 100-460	P70255	CF 46 / 100-6B	80	68	1,42	235	41

Dimensions

Type	a	b	c	d	e	f	g
RE-5-400	155	92	165	75	75	7	-
RE-10-400	180	102	190	90	75	7	-
RE-15-400	180	112	190	90	85	7	-
RE-20-400	180	122	190	90	95	7	-
RE-25-400	240	122	250	130	90	9	-
RE-30-400	240	132	250	130	100	9	-
RE-40-400	240	147	250	130	115	9	-
RBE-50-400	310	154	233	160	120	9	185
RBE-60-400	310	154	234	160	120	9	185
RBE-80-400	338	165	280	160	130	11	195



Connections



EMB-2PH

Static switching module for three phase capacitors



Description

EMB-2PH static switching modules series are the building blocks for the construction of static capacitor banks for Power Factor Correction.

These capacitor banks use thyristors instead of the classic contactors for the connection of each capacitor stage and they are ideal in installations with fast and large load fluctuations (load changes from tenths of seconds up to 8 or 10 seconds).

Application

EMB-2PH static switching modules have been designed to connect and disconnect capacitors in some milliseconds. They can be used to build capacitors with some stages, or for the individual compensation of a load that must be compensated instantly and which is not able to be disconnected such as welding machines, cranes, lifts, etc.

Technical features

Electrical features	Standard voltages	Up to 3 x 440 Va.c. without detuned filters Up to 3 x 415 Va.c. with detuned filters
	Frequency	50/60 Hz
	External activation signal	12 Vd.c. (Terminals A+,B-)
	Nominal switched power	Described on selection table
	Overload capacity	1,5 I_n during 1 min
Protections	Fuses	Not included. External protection against overload and short-circuit are required
	Fan	1 x 230 Va.c. auxiliary voltage (on terminals A1,A2)
	du / dt	RC protection at 1000 V/ μ s
	Thermostat	90 °C
	di / dt	100 A/ μ s (L=12 μ H, not included, it must be installed series with the capacitor)
Environmental features	Maximum ambient temperature	45 °C
	Maximum temperature of the dissipator	90 °C
Construction features	Protection degree	IP 00
	Weight	From 5,1 kg to 5,4 kg
Standards	IEC 61439	

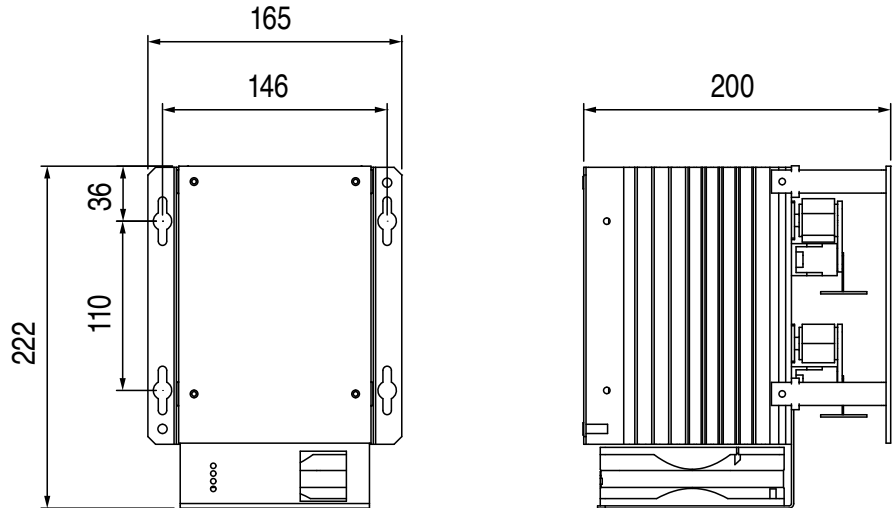
References

Type	Code	kvar 230 V	kvar 400 V	Weight (kg)	Dimensions L x H x W (mm)
EMB-2PH-25-400	R41321	12,5	25	5,1	165 x 222 x 200
EMB-2PH-50-400	R41323	27,5	50	5,2	165 x 222 x 200
EMB-2PH-80-400	R41325	45	80	5,4	165 x 222 x 200
Maximum operation voltage: 3 x 440 Va.c. (415 Va.c. with detuned reactors)					
Accessories					
Cover EMB-2PH	R41329	Polycarbonate cover for EMB-2PH series			

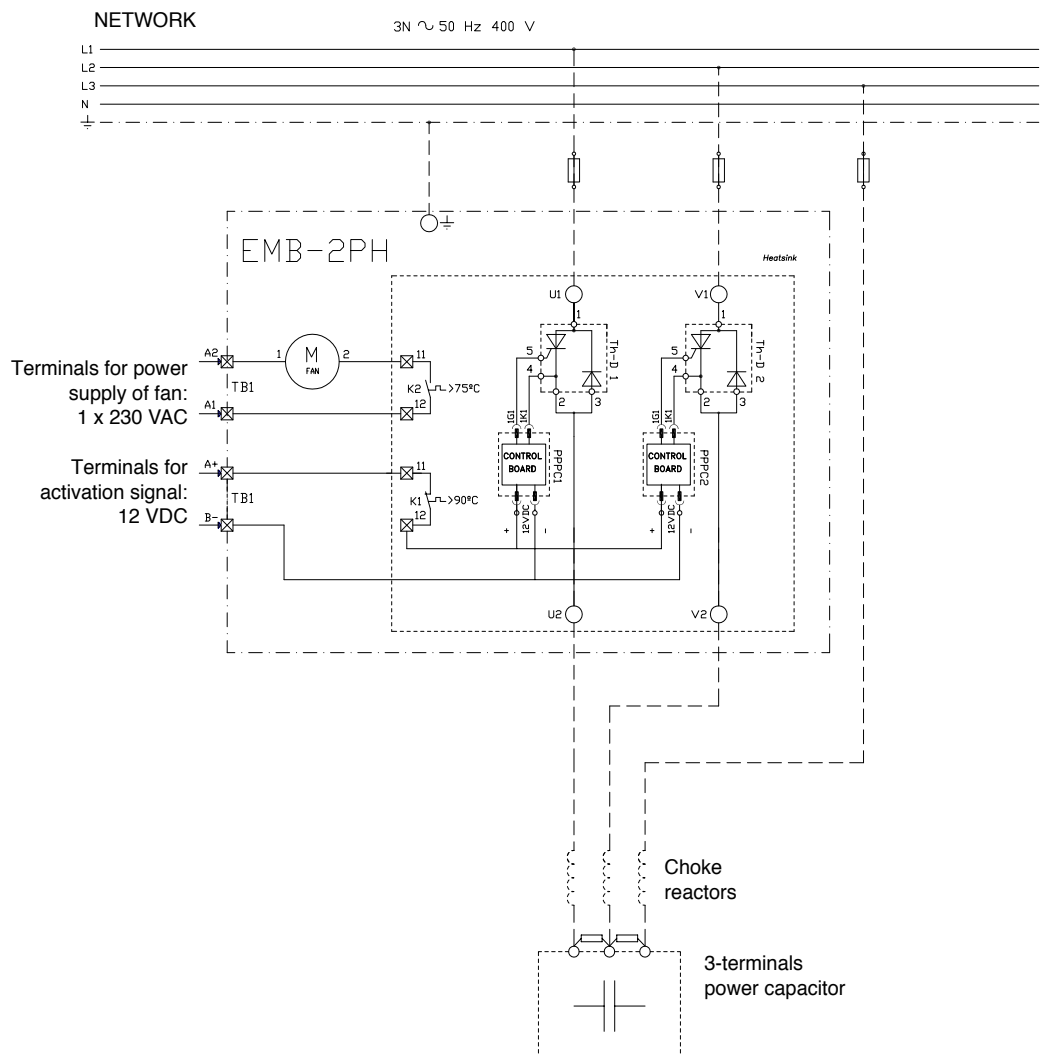
EMB-2PH

Static switching module for three phase capacitors

Dimensions



Connections



Solutions for **Low Voltage Power Factor Correction**

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