

2019 Catalogue

CAPCONDO

best way to energy quality

Best way to energy quality



COMPENSATION
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FILTRAGE DES
HARMONIQUES

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SURVEILLANCE



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ABOUT CAPCONDO

CAPCONDO is one of the pioneering companies of the electrical sector in Tunisia in the field of reactive energy compensation and the resolution of harmonic problems.

Since obtaining our first market, we have broadened our field and multiplied our strength and work rigor, which has allowed us to become the most rated and the most efficient company in the field of reactive energy compensation and harmonic filtering in Tunisia.

Our performances are the result of a team effort, of competent and passionate men and women.

The good atmosphere between the experienced staff with their spirit of surpassing themselves has allowed CAPCONDO to develop and rise to the top of this sector.

Our company has installed several automatic capacitor batteries and harmonic filters that have earned our customers bonuses charged by the electricity distributor as well as other benefits. The technical team of our company is active and travels to our customers to make estimates and sometimes to install the network analysis devices in case of doubt of the existence of harmonics in the power grid.

You want to minimize your expenses in terms of electrical energy cost and maintenance, we have a range of solutions and quality product with well researched prices.



INTRODUCTION

The benefit of improving the power factor $\cos \varphi$

The reactive energy called by a user on the electricity distribution network imposes for the energy supplier (STEG) more important and therefore more expensive means of production and transport. As a result, industrial consumers are billed for their reactive energy by the electricity distributor, with the aim of reducing this reactive energy consumption by favouring the customer compensation solution. The reactive energy compensation provides billing for the subscriber a bonus and an increase in the power available on the installation, a decrease in losses as well as a reduction in the online voltage drop. The main advantages of improving the power factor :

Lower electricity bills

- Increased system capacity (frees up power transformer capacity)
- Reduce the voltage drop on the power transformer and power cables
- Reducing transmission losses
- Reducing the carbon footprint

Consequence of major developments in electronics in electricity applications

The electrical energy, mainly distributed in the form of three voltages forming a three-phase sinusoidal system, makes it possible to provide the electrical power necessary for the equipment and materials of the electrotechnics.

From production to final receivers and distribution, it is necessary to maintain the sinusoidal aspect of the original voltage in order to preserve its essential qualities for the transmission of useful power to the terminal equipment.

When the voltage waveform is no longer sinusoidal, problems are encountered that affect certain equipment and lead to malfunction and heating of receivers and apparatus.

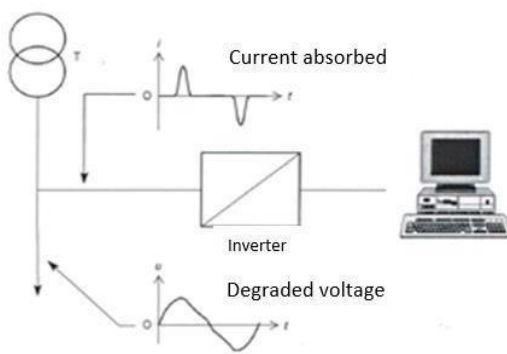
The increasing use of computer equipment and power electronics on power grids contributes to the degradation of power supply voltage.

Indeed, receivers such as asynchronous motors and transformers contribute to the distortion of the sine wave of the voltage. Power electronics, as well as computer equipment electronics, contribute essentially to the multiplication of these electrical disturbances.

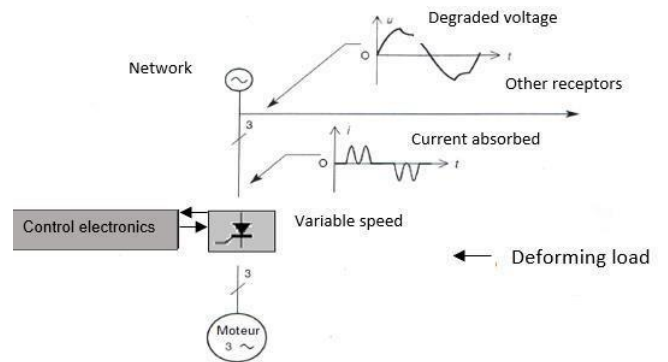
The receptors described above are referred to as deforming loads or non-linear receptors. These deforming charges will alter the appearance of sinusoidal tension. The signal obtained is composed of voltage and current harmonics which result in electrical losses or which results in power losses or malfunctions on the power grid.

Citing examples of non-linear receptors :

- Speed drives or rectifiers in the industrial field
- Switching power supplies in computers
- Voltage inverters
- LED lighting
- Televisions
- Photovoltaic panels, etc.



Voltage inverter



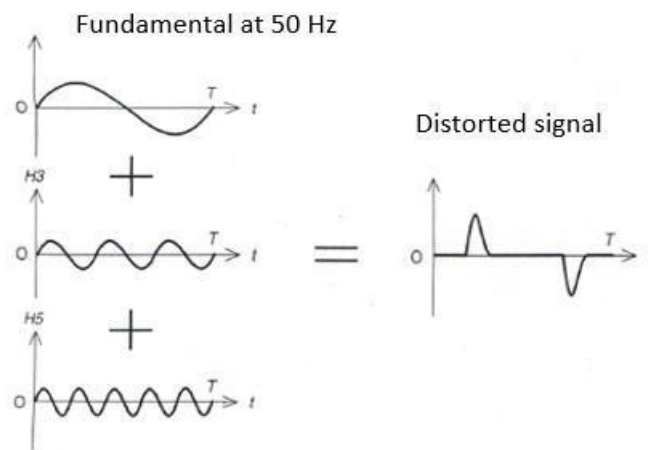
Variable speed

The distorted signals generate a variation of the original signal which is then composed of a fundamental and a number of sinusoids of different frequencies and amplitude called Harmonics. Harmonic signals are multiples of the 50 Hz fundamental frequency of the line voltage.

The created harmonic currents flow through the conductors and electrical equipment leading to :

- Increased Joule and Skin Effect losses and additional losses for high frequencies
- Power factor (PF) degradation
- Increased electricity billing

- Destruction of capacitor batteries
- The Uncommanded Disconnect
- Degradation of circuit breakers and contactors
- Reduced engine life
- Shortening the life of transformers
- Frequent malfunctions in control devices and circuits
- Damage to electronic boards



The phenomenon of harmonic pollution has already been identified for years, but today it is at the heart of the concerns of the distributor of electrical energy as well as the industrial and energy users concerned by these disturbances.

Currently, the energy distributor's concerns were centered on raising the power factor.

The inconvenience caused to the distribution network led the energy producers and distributors to take into account these new constraints, in order to find a consensus for a better quality of network.

CAPCONDO is one of the leading companies specializing in the field of reactive energy compensation and harmonic problem solving

LOW VOLTAGE COMPENSATION

Static System :

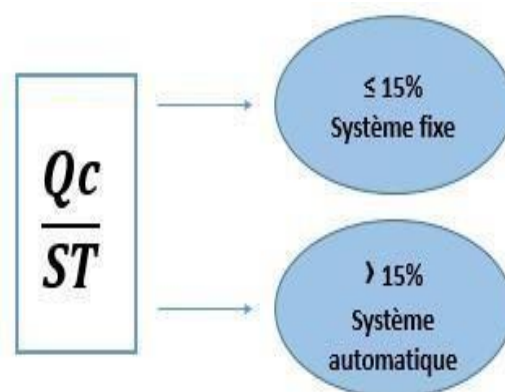
The reactive power provided by the battery is constant regardless of the variations of the power factor and the load of the receivers, and therefore of the reactive energy consumption of the installation.

The power on of these batteries can be either :

- Manual by circuit breaker or switch
- Semi-automatic remote controlled contactor

This type of battery is generally used when :

- Installation of a battery with less than 15% of the transformer power
- Constant charge electrical installation running 24/24
- Internal reactive compensation of transformers
- Individual engine compensation



Automatic system

The reactive power provided by the battery can be modulated according to the variations of the power factor and the load of the receivers and therefore the reactive energy consumption of the installation.

These batteries are composed of a parallel association of capacitor gradins (gradin = capacitor + contactor). The commissioning or decommissioning of all or part of the battery being controlled by an integrated var-metric regulator.

This type of battery is also used in the following cases :

- Installation of a battery with a power greater than 15% of the transformer power
- Variable load electrical installation
- Clearing General Tables (TGBT) or Large Start

CXT STATIC CAPACITOR BATTERIES ; GH/Sn $\leq 25\%$

General Features

- Metal housing with corrosion-resistant zinc coating coated with epoxy paint, Colour RAL 7035
- Door lock switch, designed for $1.5 \times I_n$ according to IEC 60831-1/34 (OPTIONAL)
- Flame retardant N07V-K electrical conductor in accordance with IEC 20/22-II and IEC 501027-2-1
- Metallized polypropylene self-healing three-phase capacitors with a nominal voltage of $U_N = 440V$

Technical Characteristics

Nominal operating voltage	$U_e = 400-415V$ (Other voltage is on request from 230V up to 690V)
Nominal frequency	50Hz
Maximum current overload I_n (capacitors)	1.3 * I_n (continuous) 2 * I_n (* 380s) 3 * I_n (*150s)
Discharge time of capacitors	Less than 50V in 20s
Maximum current overload I_n (battery)	1.3 * I_n
Maximum voltage overload V_n (battery)	1.1 * V_n
Isolation voltage (battery)	690 V
Temperature (capacitors)	-25/+55°C /D
Discharge device	For each battery
Mounting	Indoor
Fuses	Each battery is protected by 3 fuses (NH00 series-curve gG) with high cutting power (120kA)
Service	Continuous
Connection of capacitors	In a triangle
Testing	-Visual inspection -Good cable tightening on terminal blocks. -Isolation test, 3kV between phases and ground. -400V current test to verify power and proper operation
Standards (capacitors)	CEI 60831-1 ; CEI 60831-2 ; UL-810
Standards (battery)	CEI 60439-1 ; CEI 60439-2 ; CEI 61921 ; IEC 439-1

CXT STATIC CAPACITOR BATTERIES ; GH/Sn=25%

Technical specifications

Item Code	Power (kVAR)	Current (A)	Dimensions (cm)			Power of combinations
			L	d	H	
	To 400V					
BF10	10	14	30	23	40	1x10kVAR
BF15	15	22	30	23	40	1x15kVAR
BF20	20	29	30	23	40	1x20kVAR
BF25	25	36	30	23	40	1x25kVAR
BF30	30	43	30	23	40	1x30kVAR
BF40	40	58	50	18	55	2x20kVAR
BF50	50	72	50	18	55	2x25kVAR
BF55	55	79	50	18	55	1x25kVAR + 1x30kVAR
BF60	60	86	50	18	55	2x30kVAR
BF65	65	94	50	40	75	1x15kVAR + 2x25 kVAR
BF70	70	100	50	40	75	2x30kVAR + 1x10kVAR
BF75	75	108	50	40	75	2x30kVAR + 1x15kVAR
BF80	80	115	50	40	75	2x30kVAR + 1x20kVAR
BF85	85	122	50	40	75	2x30kVAR + 1x25kVAR
BF90	90	130	50	40	105	1x10kVAR+ 1x20kVAR+2x30kVAR
BF95	95	137	50	40	105	1x15kVAR + 1x20kVAR+2x30kVAR
BF100	100	144	50	40	105	2x20kVAR+2x30kVAR

NB : Other powers and voltages exist on order.

STATIC CAPACITOR BATTERIES WITH BLOCKING SELF $p=7\%$ ($f= 50\text{Hz}$)

General Characteristics

- Metal case with corrosion-resistant treatments based on zinc coated with epoxy paint, Colour RAL 7035
- Door lock switch, designed for 1.5* In according to IEC 60831-1 Section 34 (OPTIONAL)
- Fire retardant N07V-K cable in accordance with IEC 20/22-II and IEC 501027-2-1
- Metallized polypropylene self-healing 3-phase capacitors with a nominal voltage of UN =450V
- Three-phase blocking self with 180Hz frequency. ($p=7\%$)



NB : The image may not coincide with the available capacitor battery.

STATIC CAPACITOR BATTERIES WITH BLOCKING SELF $p=7\%$ ($f= 50\text{Hz}$)

Technical Characteristics

Nominal operating voltage	$U_e = 400-415\text{V}$ (Other voltage is on request up to 690V)50Hz
Nominal frequency	50Hz
Maximum current overload I_n (capacitors)	1.3 * I_n (continuous) 2 * I_n (* 380s) 3 * I_n (*150s)
Discharge time of capacitors	Less than 50V in 20s
Maximum current overload I_n (battery)	1.3 * I_n
Maximum voltage overload V_n (battery)	1.1 * V_n
Isolation voltage (battery)	690V
Temperature (capacitors)	-25/+55 °C /D
Temperature (battery)	-5/+40 °C
Discharge device	For each battery
Mounting	Indoors
Fuses	Each battery is protected by 3 fuses (NH00 series-curve gG) with high cutting power (120kA)
Service	Continuous
Connection of capacitors	In triangle
Testing	<ul style="list-style-type: none"> • Visual inspection • Good cable tightening on terminal blocks. • Isolation test, 3kV between phases and ground. • 400V current test to verify power and proper operation. <ul style="list-style-type: none"> • 10kVAR blocking self ($p=7\%$): 56W • Block Self 12.5kVAR ($p=7\%$): 80W • 25KVAR blocking self ($p=7\%$): 125W • 50KVAR blocking self ($p=7\%$): 221W
Losses in Joule	
Breakdown	Forced for all powers.
Standards (capacitors)	IEC 60831-1 ; IEC 60831-2 ; UL-810
Standards (battery)	IEC 60439-1 ; IEC 60439-2 ; IEC 61 921 ; IEC 439-1

STATIC CAPACITOR BATTERIES WITH BLOCKING SELF $p=7\%$ ($f= 50\text{Hz}$)

Technical Specifications

Item Code	Power (kVAR)to	Current (A)	Dimensions (cm)			Power of combinations
			L	d	H	
	400V					
BF7-10	10	14	50	40	75	1×10kVAR
BF7-15	15	22	50	40	75	1×5kVAR +1×10kVAR
BF7-20	20	29	50	40	75	2×10kVAR
BF7-25	25	36	50	40	75	1×25kVAR
BF7-30	30	43	50	40	105	1×5kVAR + 1×25kVAR
BF7-40	40	58	50	40	105	1×5kVAR +1×10kVAR+1×25kVAR
BF7-45	45	65	50	40	125	2×10kVAR+1×25kVAR
BF7-50	50	72	50	40	105	1×50kVAR
BF7-55	55	79	50	40	125	1×5kVAR +1×50kVAR
BF7-60	60	86	50	40	125	1×10kVAR +1×50kVAR
BF7-65	65	94	50	40	125	1×5kVAR +1×10kVAR+1×50kVAR
BF7-70	70	100	50	40	125	2×10kVAR +1×50kVAR
BF7-75	75	108	50	40	125	1×25kVAR +1×50kVAR
BF7-80	80	115	50	40	145	1×5kVAR +1×25kVAR +1×50kVAR
BF7-85	85	122	50	40	145	1×10kVAR +1×25kVAR +1×50kVAR
BF7-90	90	130	50	40	145	1×5kVAR +1×10kVAR +1×25kVAR +1×50kVAR
BF7-95	95	137	50	40	145	2×10kVAR +1×25kVAR +1×50kVAR
BF7-100	100	144	50	40	145	2×50kVAR

NB : Other powers and voltages exist on order.

STATIC CAPACITOR BATTERIES WITH BLOCKING SELF $p=14\%$ ($f=50\text{Hz}$)

General features

Metal case with zinc-based corrosion-resistant treatments coated with RAL 7035 color epoxy paint

- Auxiliary transformer to separate power circuit and auxiliary circuit (220V)
- Door lock switch, designed for 1.5* In according to IEC 60831-1 Section 34 (OPTIONAL)
- Fire retardant N07V-K cable in accordance with IEC 20/22-II and IEC 501027-2-1.
- Metallized polypropylene self-healing three-phase capacitors with a nominal voltage of UN =525V
- Three-phase blocking self with 135Hz resonance frequency ($p=14\%$)



NB : The image may not coincide with the available capacitor battery

STATIC CAPACITOR BATTERIES WITH BLOCKING SELF $p=14\%$ ($f=50\text{Hz}$)

Technical Characteristics

Nominal operating voltage	$U_e = 400-415\text{V}$ (Other voltage is on request up to 690V)
Nominal frequency	50Hz
Maximum current overload I_n (capacitors)	1.3 * I_n (continuous) 2 * I_n (* 380s) 3 * I_n (*150s)
Discharge time of capacitors	Less than 50V in 20s
Maximum current overload I_n (battery)	1.3 * I_n
Maximum voltage overload V_n (battery)	1.1 * V_n
Isolation voltage (battery)	690V
Temperature (capacitors)	-25/+55°C / D
Discharge device	For each battery
Mounting	Indoors
Fuses	Each battery is protected by 3 fuses (NH00 series-curve gG) with high power cut-off (120kV)
Service	Continuous
Connection of capacitors	In a triangle
Testing	Visual inspection <ul style="list-style-type: none"> • Good cable tightening on terminal blocks. • Isolation test, 3kV between phases and ground. • 400V current test to verify power and proper operation.
Losses in Joule	<ul style="list-style-type: none"> • Auto-blocage 10 kVAR ($p=14\%$): 94W • Auto-blocage 20KVAR ($p=14\%$): 168W • Auto-blocage 40KVAR ($p=14\%$): 192W
Breakdown	Forced for all powers.
Standards (capacitors)	IEC 60831-1 ; IEC 60831-2
Standards (battery)	CEI 60439-1 ; CEI 60439-2 ; CEI 61921 ; IEC 439-1

STATIC CAPACITOR BATTERIES WITH BLOCKING SELF $p=14\%$ ($f=50\text{Hz}$)

Technical Specifications

Item code	Power(kVAR) to 400V	Current (A)	Dimensions (cm)			Power of combinations
			L	d	H	
BF14-10	10	14	50	40	75	1x10kVAR
BF14-20	20	29	50	40	75	2x10kVAR
BF14-30	30	43	50	40	105	1x10kVAR + 1x20kVAR
BF14-40	40	58	50	40	105	1x40kVAR
BF14-50	50	72	50	40	125	1x10kVAR + 1x40kVAR
BF14-60	60	86	50	40	125	1x20kVAR + 1x40kVAR
BF14-70	70	100	50	40	145	1x10kVAR + 1x20kVAR + 1x40kVAR
BF14-80	80	115	50	40	145	4x20kVAR
BF14-90	90	130	60	60	160	1x10kVAR + 2x40kVAR
BF14-100	100	144	60	60	160	1x20kVAR + 2x40kVAR

NB : Other powers and voltages exist on order.

AUTOMATIC CAPACITOR BATTERIES type CM and type CXT ; GH/Sn=25%

General Features

Metal housing with corrosion-resistant zinc coating coated with epoxy paint, Colour RAL 7035

- Auxiliary transformer to separate power circuit and control circuit (230V)
- Door lock switch, designed for $1.5 \times I_n$ according to IEC 60831-1/34 (OPTIONAL)
- Contactors with damping resistors to limit current peaks when capacitors are inserted
- Flame retardant N07V-K electrical conductor in accordance with IEC 20/22-II and IEC 501027-2-1
- Typical Var-metric Power Factor Regulator
- Metallized polypropylene 1-phase or 3-phase self-healing capacitors with a nominal voltage of UN =440V



AUTOMATIC CAPACITOR BATTERIES type CM and type CXT ; GH/Sn=25%

Technical Characteristics

Nominal operating voltage	U_e = 400-415V (Other voltage is on request from 230V up to 690V)
Nominal frequency	50Hz
Maximum current overload I_n (capacitors)	1.3 * I_n (continuous) 2 * I_n (* 380s) 3 * I_n (*150s)
Discharge time of capacitors	Less than 50V in 20s
Maximum current overload I_n (battery)	1.3 * I_n
Maximum voltage overload V_n (battery)	1.1 * V_n
Isolation voltage (battery)	690V
Temperature (capacitors)	-25/+55°C /D
Temperature (battery)	-5/+40°C
Discharge device	For each battery
Mounting	Indoors Metric Var
Regulators	Current input : TI... /5Amps Voltage input : 400V (ph2-ph3) Insertion/Removal Time : 60s
Fuses	Each battery is protected by 3 fuses (NH00 series-curve gG) with high cutting power (120kA)
Service	Continuous
Connection of capacitors	Single-phase capacitors (type CM) connected in triangle or three-phase capacitors (type CXT)
Control device	Capacitive Load Contactors (AC6b) - Visual inspection - Good cable tightening on terminal blocks. - Isolation test, 3kV between phases and ground. - 400V current test to verify power and proper operation.
Testing	
Breakdown	Forced for all powers.
Standards (capacitors)	IEC 60831-1 ; IEC 60831-2 ; UL-810
Standards (battery)	IEC 60439-1 ; IEC 60439-2 ; IEC 61921 ; IEC 439-1

THREE-PHASE AUTOMATIC CAPACITOR BATTERIES

Type CM (f= 50Hz)

NETWORK HARMONIC DISTORTION Gh/Sn=25%

Technical specifications

Item code	Power (kVAR) to 400V	Current (A)	Dimensions (cm)			Power of the stands
			L	d	H	
B10	10	14	50	40	75	2x2kVAR + 1xkVAR
B15	15	22	50	40	75	3x5kVAR
B20	20	29	50	40	75	2x5kVAR + 1x1kVAR
B25	25	36	50	40	75	1x5kVAR + 1x7.5kVAR + 1x12.5kVAR
B30	30	43	50	40	75	4x7.5kVAR
B35	35	51	50	40	75	3x7.5kVAR + 1x12.5kVAR
B40	40	58	50	40	75	2x7.5kVAR + 2x12.5kVAR
B45	45	65	50	40	75	1x7.5kVAR + 3x12.5kVAR
B50	50	72	50	40	75	2x12.5kVAR + 1x25kVAR
B55	55	80	50	40	75	1x5kVAR + 2x12.5kVAR + 1x25kVAR
B60	60	87	50	40	75	1x10kVAR + 2x12.5kVAR + 1x25kVAR
B65	65	94	50	40	75	2x12.5kVAR + 1x15kVAR + 1x25kVAR
B70	70	101	50	40	75	1x7.5kVAR + 1x12.5kVAR + 2x25kVAR
B75	75	108	50	40	75	2x12.5kVAR + 2x25kVAR
B80	80	115	50	40	75	1x5kVAR + 2x12.5kVAR + 2x25kVAR
B85	85	122	50	40	105	1x10kVAR + 3x25kVAR
B90	90	130	50	40	105	2x7.5kVAR + 3x25kVAR
B95	95	137	50	40	105	1x7.5kVAR + 1x12.5kVAR + 3x25kVAR
B100	100	144	50	40	105	2x12.5kVAR + 3x25kVAR
B110	110	158	50	40	105	1x10kVAR + 2x12.5kVAR + 3x25kVAR
B120	120	172	50	40	105	1x7.5kVAR + 1x12.5kVAR + 4x25kVAR
B130	130	187	50	40	105	1x5kVAR + 2x12.5kVAR + 2x25kVAR+1 x 50kVAR
B140	140	202	50	40	105	2x7.5kVAR + 3x25kVAR + 1x50kVAR
B150	150	217	50	40	105	2x12.5kVAR + 3x25kVAR + 1x50kVAR
B160	160	231	50	40	125	1x10kVAR + 2x12.5kVAR + 5x25kVAR
B170	170	245	50	40	125	1x7.5kVAR + 1x12.5kVAR + 2x25kVAR + 2x50kVAR
B180	180	260	50	40	125	1x5kVAR + 3x25kVAR + 2x50kVAR
B190	190	267	50	40	125	2x7.5kVAR + 5x25kVAR + 1x50kVAR
B200	200	289	50	40	125	2x12.5kVAR + 5x25kVAR + 1x50kVAR
B210	210	303	50	40	125	1x10kVAR + 6x25kVAR + 1x50kVAR
B220	220	318	50	40	125	1x7.5kVAR + 1x12.5kVAR + 4x25kVAR + 2x50kVAR
B225	225	325	50	40	125	2x12.5kVAR + 4x25kVAR + 2x50kVAR
B230	230	332	50	40	125	1x5kVAR+2x12.5kVAR+2x25kVAR+3x50kVAR
B240	240	347	50	40	145	2x7.5kVAR+3x25kVAR+3x50kVAR
B250	250	361	50	40	145	2x12.5kVAR+3x25kVAR+3x50kVAR
B260	260	375	50	40	145	1x10kVAR+4x25kVAR+3x50kVAR
B270	270	379	50	40	145	1x7.5kVAR+1x12.5kVAR+3x25kVAR+2x50kVAR +1x75kVAR
B280	280	397	50	40	145	1x5kVAR+3x25kVAR+4x50kVAR
B290	290	415	50	40	145	2x7.5kVAR+3x25kVAR+1x50kVAR+2x75kVAR
B300	300	433	50	40	145	2x12.5kVAR+3x25kVAR+1x50kVAR+2x75kVAR

THREE-PHASE AUTOMATIC CAPACITOR BATTERIES

Type CXT (f= 50Hz)

NETWORK HARMONIC DISTORTION Gh/Sn=25%

Technical specifications

Item code	Power (KVAR) to 400V	Current (A)	Dimensions (cm)			Power of the stands
			L	d	H	
B310	310	447	60	60	180	1x10kVAR + 2x30kVAR + 4x60kVAR
B320	320	461	60	60	180	2x10kVAR + 2x30kVAR + 4x60kVAR
B330	330	475	60	60	180	2x15kVAR + 2x30kVAR + 4x60kVAR
B340	340	489	60	60	180	2X20kVAR + 3x60kVAR + 1x120kVAR
B350	350	503	60	60	180	2X10kVAR + 1x30kVAR + 5X60kVAR
B360	360	517	80	60	180	2X30kVAR + 3x60kVAR + 1x120kVAR
B370	370	533	80	60	180	1X10kVAR + 4x60kVAR + 1x120kVAR
B380	380	548	80	60	180	2X10kVAR + 4x60kVAR + 1x120kVAR
B390	390	563	80	60	180	1X10kVAR + 1X20 kVAR+ 6x60kVAR
B400	400	577	80	60	180	2X20kVAR+ 6x60kVAR
B410	410	591	100	60	180	1X10kVAR + 2X20 kVAR+6x60kVAR
B420	420	606	100	60	180	2X30kVAR + 4X60 kVAR+1x120kVAR
B430	430	620	100	60	180	1X10kVAR+6x60kVAR + 1x120kVAR
B440	440	635	100	60	180	2x10kVAR + 5x60kVAR + 1x120kVAR
B450	450	650	100	60	180	1x30kVAR + 7x60kVAR
B500	500	722	100	60	180	2x20kVAR + 1x40kVAR + 3x60kVAR +2x120kVAR
B550	550	749	100	60	180	1x10kVAR + 2x30kVAR + 8x60kVAR
B600	600	866	120	60	180	2x30kVAR + 9x60kVAR
B650	650	938	120	60	180	1x20kVAR + 3x30kVAR +9x60kVAR
B700	700	1009	120	60	180	2x20kVAR + 9x60kVAR + 1x120kVAR
B750	750	1081	120	60	180	1x20kVAR+1x40kVAR+1x60kVAR+1x90kVAR +3x120kVAR+1x180kVAR
B800	800	1153	160	60	180	1x20kVAR + 9x60kVAR + 2x120kVAR
B850	850	1225	160	60	180	1x10kVAR + 8x60kVAR + 3x120kVAR
B900	900	1297	160	60	180	2x30kVAR + 4x60kVAR + 5x120kVAR
B950	950	1369	160	60	180	1x20kVAR+1x30kVAR+3x60kVAR+6x120kVAR
B1000	1000	1441	200	60	180	1x40kVAR + 6x60kVAR + 5x120kVAR
B1080	1080	1556	200	60	180	2x60kVAR + 8x120kVAR
B1200	1200	1728	200	60	180	4x60kVAR + 8x120kVAR
B1260	1260	1815	240	60	180	3x60kVAR + 9x120kVAR
B1320	1320	1902	240	60	180	2x60kVAR + 10x120kVAR
B1380	1380	1989	240	60	180	1x60kVAR + 11x120kVAR

NB: Other powers and voltages exist on order.

AUTOMATIC CAPACITOR BATTERIES WITH BLOCKING SELF $p=7\%$ ($f= 50\text{Hz}$)

General Characteristics

- Metal case with corrosion-resistant treatments based on zinc coated with epoxy paint, Colour RAL 7035
- Auxiliary transformer to separate power circuit and auxiliary circuit (220V)
- Door lock switch, designed for 1.5* In according to IEC 60831-1 Section 34 (OPTIONAL)
- Contactors with damping resistors to limit current peaks when capacitors are inserted
- Fire retardant N07V-K cable in accordance with IEC 20/22-II and IEC 501027-2-1
- Var-metric power factor regulator
- Metallized polypropylene self-healing 3-phase capacitors with a nominal voltage of UN =450V
- Three-phase blocking self with 180Hz frequency. ($p=7\%$)



AUTOMATIC CAPACITOR BATTERIES WITH BLOCKING SELF $p=7\%$ ($f= 50\text{Hz}$)

Technical Characteristics

Nominal operating voltage	$U_e = 400-415\text{V}$ (Other voltage is on request up to 690V)
Nominal frequency	50Hz
Maximum current overload I_n (capacitors)	1.3 * I_n (continuos) 2 * I_n (* 380s) 3 * I_n (* 150s)
Discharge time of capacitors	Less than 50V in 20s
Maximum current overload I_n (battery)	1.3 * I_n
Maximum voltage overload V_n (battery)	1.1 * V_n
Isolation voltage (battery)	690V
Temperature (capacitors)	-25/+55°C /D
Temperature (battery)	-5/+40°C
Discharge device	For each batterie
Mounting	Indoors Metric Var
Regulators	Current input : TI... /5Amps Voltage input : 400V (ph2-ph3) Insertion/Removal Time : 60s
Fuses	Each battery is protected by 3 fuses (NH00 series-curve gG) with high cutting power (120kA)
Service	Continuos
Connection of capacitors	In a triangle
Control device	Contacteurs pour charge capacitif (AC6b) <ul style="list-style-type: none"> • Visual inspection • Good cable tightening on terminal blocks. • Isolation test, 3kV between phases and ground. • 400V current test to verify power and proper operation. • 10kVAR blocking self ($p=7\%$) : 56W • Block Self 12.5kVAR ($p=7\%$) : 80W • 25KVAR blocking self ($p=7\%$) : 125W • 50KVAR blocking self ($p=7\%$) : 221W
Testing	
Losses in Joule	
Breakdown	Forced for all powers.
Standards (capacitors)	IEC 60831-1 ; IEC 60831-2 ; UL-810
Standards (battery)	IEC 60439-1 ; IEC 60439-2 ; IEC 61921 ; IEC 439-1

AUTOMATIC CAPACITOR BATTERIES WITH BLOCKING SELF $p=7\%$ ($f= 50\text{Hz}$)

Technical specifications

Item code	Power (KVAR) to 400V	Current (A)	Dimensions (cm)			Power of the stands
			L	d	H	
BS7-20	20	29	50	40	105	2x5kVAR +1x10kVAR
BS7-25	25	36	50	40	105	1x5kVAR +2x10kVAR
BS7-30	30	43	50	40	105	2x5kVAR +2x10kVAR
BS7-35	35	51	50	40	105	1x5kVAR +3x10kVAR
BS7-40	40	58	50	40	125	2x5kVAR +3x10kVAR
BS7-45	45	65	50	40	145	1x5kVAR +4x10kVAR
BS7-50	50	72	50	40	145	1x5kVAR +2x10kVAR +1x25kVAR
BS7-55	55	80	50	40	145	3x10kVAR+1x25kVAR
BS7-60	60	87	50	40	145	1x10kVAR +2x25kVAR
BS7-65	65	94	50	40	145	1x5kVAR +1x10kVAR +2x25kVAR
BS7-70	70	101	50	40	145	2x10kVAR +2x25kVAR
BS7-75	75	108	50	40	145	1x5kVAR+ 2x10kVAR+2x25kVAR
BS7-80	80	115	60	60	180	3x10kVAR+2x25kVAR
BS7-85	85	122	60	60	180	1x10kVAR+3x25kVAR
BS7-90	90	130	60	60	180	1x5kVAR+1x10kVAR+3x25kVAR
BS7-95	95	137	80	60	180	2x10kVAR+3x25kVAR
BS7-100	100	144	80	60	180	1x5kVAR+2x10kVAR+3x25kVAR
BS7-110	110	158	80	60	180	1x10kVAR+2x25kVAR+1x50kVAR
BS7-120	120	172	80	60	180	2x10kVAR+2x25kVAR+1x50kVAR
BS7-130	130	187	80	60	180	1x5kVAR+5x25kVAR
BS7-140	140	202	80	60	180	1x5kVAR+1x10kVAR+1x25kVAR+2x50kVAR
BS7-150	150	217	80	60	180	2x25kVAR+2x50kVAR
BS7-160	160	231	80	60	180	1x10kVAR +2x25kVAR +2x50kVAR
BS7-170	170	245	80	60	180	2x10kVAR +2x25kVAR +2x50kVAR
BS7-200	200	289	80	60	180	2x25kVAR +3x50kVAR
BS7-250	250	361	80	60	180	2x25kVAR +4x50kVAR
BS7-300	300	433	100	60	180	2x25kVAR +3x50kVAR +1x100kVAR
BS7-350	350	505	120	60	180	2x25kVAR +6x50Kvar
BS7-400	400	577	120	60	180	2x25kVAR +5x50kVAR +1x100kVAR
BS7-450	450	650	160	60	180	2x25kVAR +4x50kVAR +2x100kVAR
BS7-500	500	721	160	60	180	2x25kVAR +3x50kVAR +3x100kVAR

AUTOMATIC CAPACITOR BATTERIES WITH BLOCKING SELF P=7% (f= 50Hz)

Technical specifications

Item code	Power (kVAR) to 400V	current (A)	Dimensions (cm)			Power of the stands
			L	d	H	
BS7-550	550	793	160	60	180	2x25kVAR +2x50kVAR +4x100kVAR
BS7-600	600	865	200	60	180	2x25kVAR +9x50kVAR +1x100kVAR
BS7-650	650	937	200	60	180	2X25kVAR + 8X50kVAR + 2X100kVAR
BS7-700	700	1009	200	60	180	2X25kVAR + 7X50kVAR + 3X100kVAR
BS7-750	750	1081	200	60	180	5X50kVAR + 5x100kVAR
BS7-800	800	1153	200	60	180	2X25kVAR + 5X50kVAR + 5X100kVAR
BS7-850	850	1225	300	60	180	2X25kVAR + 4X50kVAR + 6X100kVAR
BS7-900	900	1297	300	60	180	6X50kVAR + 6X100kVAR
BS7-950	950	1369	300	60	180	5X50kVAR + 7X100kVAR
BS7-1000	1000	1441	300	60	180	6X50kVAR + 7X100kVAR
BS7-1100	1100	1585	300	60	180	2X50kVAR + 10X100kVAR
BS7-1200	1200	1729	300	60	180	2X50kVAR + 5X100kVAR +4X150kVAR
BS7-1300	1300	1873	300	60	180	2X50kVAR + 6X100kVAR +4X150kVAR
BS7-1400	1400	2017	300	60	180	2X50kVAR + 4X100kVAR +6X150kVAR
BS7-1500	1500	2161	300	60	180	2X50kVAR + 2X100kVAR +8X150kVAR

NB : Other powers and voltages exist on order.



AUTOMATIC CAPACITOR BATTERIES WITH BLOCKING SELF P=14% (f= 50Hz)

General Characteristics

- Metal case with zinc-based corrosion-resistant treatments coated with RAL 7035 color epoxy paint
- Auxiliary transformer to separate power circuit and auxiliary circuit (220V)
- Door lock switch, designed for 1.5* In according to IEC 60831-1 Section 34 (OPTIONAL)
- Contactors with damping resistors to limit current peaks when capacitors are inserted.
- Fire retardant N07V-K cable in accordance with IEC 20/22-II and IEC 501027-2-1.
- Typical Var-metric Power Factor Regulator
- Metallized polypropylene self-healing 3-phase capacitors with a nominal voltage of UN=525V
- Three-phase blocking self with 135Hz resonance frequency (**p=14%**)



Note : The image may not coincide with the available capacitor battery.

AUTOMATIC CAPACITOR BATTERIES WITH BLOCKING SELF P=14% (f= 50Hz)

Technical characteristics

Nominal operating voltage	Ue= 400-415V (Other voltage is on request up to 690V)
Nominal frequency	50Hz
Maximum current overload In (capacitors)	1.3 * In (continuos) 2 * In (* 380s) 3 * In (*150s)
Discharge time of capacitors	Less than 50V in 20s
Maximum current overload In (battery)	1.3 * In
Maximum voltage overload Vn (battery)	1.1 * Vn
Isolation voltage (battery)	690V
Temperature (capacitors)	-25/+55°C / D
Temperature (battery)	-5/+40°C
Discharge device	For each batterie
Mounting	Indoors Metric Var
Regulators	Current input : TI... /5Amps Voltage input : 400V (ph2-ph3) Insertion/Removal Time : 60s
Fuses	Each battery is protected by 3 fuses (NH00 series-curve gG) with high power cut-off (120kV)
Service	Continuos
Connection of capacitors	In triangle
Control device	Contactors for capacitors (AC6b)
Testing	<ul style="list-style-type: none"> • Visual inspection • Good cable tightening on terminal blocks. • Isolation test, 3kV between phases and ground. • Current test at 400V to check power and proper operation
Losses in Joule	<ul style="list-style-type: none"> • 10kVAR blocking self (p=14%) : 94W • 20KVAR blocking self (p=14%) : 168W • 40KVAR blocking self (p=14%) : 192W
Breakdown	Forced for all powers.
Standards (capacitors)	IEC 60831-1 ; IEC 60831-2
Standards (battery)	IEC 60439-1 ; IEC 60439-2 ; IEC 61921 ; IEC 439-1

AUTOMATIC CAPACITOR BATTERIES WITH BLOCKING SELF P=14% (f= 50Hz)

Technical specifications

Item code	Power (kVAR) à 400V	Current (A)	Dimensions (cm)			Power of the stands
			L	d	H	
BS14-20	20	29	50	40	75	2x10kVAR
BS14-30	30	43	50	40	105	3x10kVAR
BS14-40	40	58	50	40	105	2x10kVAR + 1x20kVAR
BS14-50	50	72	50	40	145	1x10kVAR + 2x20kVAR
BS14-60	60	87	50	40	145	2x10kVAR + 2x20kVAR
BS14-65	65	94	50	40	145	1x5kVAR + 2x10kVAR + 2x20kVAR
BS14-70	70	101	60	60	180	1x10kVAR +3x20kVAR
BS14-75	75	108	60	60	180	1X5kVAR + 1X10kVAR + 3X20kVAR
BS14-80	80	115	60	60	180	2X10kVAR + 3x20kVAR
BS14-85	85	122	60	60	180	1X5kVAR +2X10kVAR + 3x20kVAR
BS14-90	90	130	60	60	180	1X10kVAR + 4X20kVAR
BS14-95	95	137	60	60	180	1X5kVAR + 1X10kVAR + 4X20kVAR
BS14-100	100	144	60	60	180	2x10kVAR + 2x20kVAR + 1x40kVAR
BS14-110	110	158	60	60	180	1X10kVAR + 1X20kVAR + 2X40kVAR
BS14-120	120	172	80	60	180	2X10kVAR + 1X20kVAR + 2X40kVAR
BS14-130	130	187	80	60	180	1X10kVAR + 2X20kVAR + 2X40kVAR
BS14-140	140	202	80	60	180	2X10kVAR + 2x20kVAR +2x40kVAR
BS14-150	150	217	80	60	180	1x10kVAR + 1x20kVAR + 3x40kVAR
BS14-160	160	231	100	60	180	2X10kVAR + 1X20kVAR + 3X40kVAR
BS14-170	170	245	100	60	180	1X10kVAR + 2X20kVAR + 3X40kVAR
BS14-180	180	260	120	60	180	2X10kVAR + 2X20kVAR + 3X40kVAR
BS14-200	200	289	120	60	180	2x20kVAR + 4x40kVAR

AUTOMATIC CAPACITOR BATTERIES

WITH SELF P=14% (f= 50Hz)

Technical specifications

Item code	Power (KVAR) to 400V	Current (A)	Dimensions (cm)			Power of the stands
			L	d	H	
BS14-250	250	361	140	60	180	1X10kVAR + 2X20kVAR + 5X40kVAR
BS14-300	300	433	140	60	180	1x20kVAR + 7x40kVAR
BS14-350	350	505	200	60	180	1X10kVAR +1X20kVAR +4X40kVAR+2X80kVAR
BS14-400	400	577	200	60	180	1X10kVAR + 1X40kVAR + 4X80kVAR
BS14-450	450	650	200	60	180	1X10kVAR +2X20kVAR + 2X40kVAR +4X80kVAR
BS14-500	500	721	240	60	200	1X20kVAR + 2X40kVAR+5X80kVAR
BS14-550	550	793	240	60	200	1X10kVAR+1X20kVAR + 1X40kVAR+6X80kVAR
BS14-600	600	865	300	60	200	2X20kVAR + 2X40 kVAR+6X80kVAR
BS14-650	650	937	300	60	200	1X10kVAR+2X40 kVAR+7X80kVAR
BS14-700	700	1009	300	60	200	1X40kVAR+8X80kVAR
BS14-750	750	1081	360	60	200	1X10kVAR+1X20kVAR + 2X40kVAR+8X80kVAR
BS14-800	800	1153	360	60	200	2X40kVAR + 9X80kVAR
BS14-850	850	1225	360	60	200	1X10kVAR+1X40kVAR+10X80kVAR
BS14-900	900	1297	400	60	200	1X20 kVAR+2X40 kVAR+1X80kVAR +6X120kVAR
BS14-950	950	1369	400	60	200	1X10kVAR+1x20kVAR+1x40kVAR+2x80kVAR +6x120kVAR
BS14-1000	1000	1441	400	60	200	2X40kVAR + 1X80kVAR + 7x120kVAR
BS14-1100	1100	1585	480	60	200	1x20kVAR+1x40kVAR+1x80kVAR+8x120kVA R
BS14-1200	1200	1729	480	60	200	1x40kVAR+1x80kVAR+9x120kVAR
BS14-1300	1300	1873	480	60	200	1x40kVAR+1x60kVAR+10x120kVAR
BS14-1400	1400	2017	600	60	200	1x40kVAR+1x80kVAR+4x120kVAR+5X160kV AR
BS14-1500	1500	2161	600	60	200	1x60kVAR+4x120kVAR+6X160kVAR

NB : Other powers and voltages exist on order.

THE CAPACITORS

SINGLE-PHASE CONDENSATES (CM TYPE)

Self-healing capacitor elements with low-loss metallized polypropylene dielectric.

Capacitors mounted in cylindrical aluminium housings with M12 threaded protrusion for fastening and grounding are manufactured using screw terminals of 6,3x0,8 mm

Technical characteristics

Voltage Rating	V
Frequency	50Hz
Dielectric	Polypropylene
Insulation level	3/-kV rms
Max Power Surge	1.1 U _n (8H/day)
Superintendence Max	1.3 I _n
Power tolerance	-5/+10%
Climatic range	-40/+55 °C / D
Lifespan	100000h
Connection terminal	6.3 x 0.8 mm
End	M12 :14 Nm
Standards	EC 60831, EN 60831 VDE0560-46/47



Technical specifications

Reference	Capacity (µf)	400V	Dimensions D * L (Mm)	Weight (Kg)
		Q _n (kVAR)		
CAP.CM.400.2,5	50	2.5	45 x 148	0.3
CAP.CM.400.4,17	83	4.17	60 x 148	0.5
CAP.CM.400.6,66	132.5	6.66	60 x 165	0.6

NB : Other powers and voltages exist on order.

THE CAPACITORS

THREE-PHASE CONDENSATES (CXT TYPE)

The three-phase capacitors are low-loss polypropylene dielectric self-regenerating capacitors, filled with N2 inert gas and equipped with an overpressure disconnection system that guarantees a very high level of safety.

The capacitors in cylindrical aluminium housings with M12 threaded protrusion for fastening and grounding are manufactured using screw terminals of 6,3 x 0,8 mm.

Technical characteristics

- Voltage Rating..... V
- Frequency50Hz
- Dielectric... ..Polypropylene
- Discharge resistance.....Built-in (75V/3m)
- Max Surge..... 1.1 U_n
- Superintendence Max... ..2 I_n
- Transient Overcurrent.....400 I_n
- Insulation level...../8-kV
- Power tolerance-5/+10%
- Climatic range-40 to 55°C /D
- Lifespan >110,000 hours
- FasteningM12
- Protection rating IP20, IP54 (With Hood 116 mm Ø)
- Standards..... EC 60831, EN 60831, UL810.



Technical specifications

Reference	Capacity (µf)	400V		450V		525V		Dimension sDxH (mm)	weight (kg)
		Q _n (kVAR)	I _n (A)	Q _n (kVAR)	I _n (A)	Q _n (KVAR)	I _n (A)		
CAP.CXT.400.10	3x68.6	10	14	---	---	---	---	85x245	1.1
CAP.CXT.400.15	3x98.8	15	22	---	---	---	---	100x245	2
CAP.CXT.400.20	3x137	20	29	---	---	---	---	100x245	2
CAP.CXT.400.25	3x164.4	25	36	---	---	---	---	116x245	3.2
CAP.CXT.400.30	3x197.3	30	43	---	---	---	---	136x220	3.2
CAP.CXT.450.5	3x25	---	---	5	6.4	---	---	85x175	1
CAP.CXT.450.12,5	3x62.6	---	---	12.5	16	---	---	85x245	1.3
CAP.CXT.450.30	3x150.3	---	---	30	38	---	---	136x220	2.9
CAP.CXT.525.15	3x57.7	---	---	---	---	15	16	85x245	1.2
CAP.CXT.525.30	3x115.4	---	---	---	---	30	33	116x245	3.2

NB : Other powers and voltages exist on order.

THE REGULATORS

Power factor controllers are used for the measurement and control of power factor improvement units for the reactive power compensation center. The power factor is measured by RG-T and compared with setpoint values to provide the necessary compensation.

RG-T is a microcontroller, designed to measure the reactive power requirements of an installation and give the connection and disconnection commands of the corresponding capacitor to maintain the cosine preset.



Technical characteristics

	RG-T	RG-BS
Dimensions	144*144mm	96*96mm
protection class	IP 40 front panel, IP54 Optional	
weight	0.9 Kg/pcs	0.6Kg/pcs
Measures /FUNCTIONS		
Precision	1%±1 digits (V, I, COS) ; 2%±1 digits (W, Var, VA, harmonic)	
Setting the Surge	475 VAC	0-500 VAC
current range	50mA-5.5A (other current range on request)	
Plage de mesure avec transformateur	50mA-10KA transformer primary 5...10000/5A	50mA-10KA transformation ratio 1-2000
input load	< 2VA current, < 3VA voltage	
Setting of $\text{Cos}\varphi$	0.85<cos ρ <1 Inductive	0.8<cos ρ <1 inductive/ capacitive
C/K adjustment	0.02-1.00	
Time between steps	2-1800 s a switch for on/off separately.	
Setting the discharge time		2-1800s
THD-V-Programmable Alarm		•
Programmable discharge time		•
Programmable Surge Alarm	•	•
Automatic calculation of steps		•
measure of the energy		•
Display parameters for each phase		•
Alarm contact output		•
Supply		
operating voltage	400 VAC ±10%	
operating frequency	50HZ/60HZ	
energy consumption	<10 VA	
ambient conditions		
operating temperature	-5...+55°C	
ambient humidity	85%	
CONNECTIONS		
mounting	Front panel mounting/Plug with screw terminal	
connection types	phase-phase (L1-L3), 1 current transformer on phase 1	

THE CONTACTORS

The contactors adapted to the CAP-KT capacitive current are specially designed contactors with two blocks to prevent high switching currents that can reach 180 times the nominal current. The auxiliary contact block begins to operate and ensures that switching currents remain within acceptable limits by passing them through damping resistors connected in series for a few ms (from 2 ms to 10 ms). Then the main contacts of the contactor connect.

Technical characteristics

The CAP-KT service switches enable :

- Decrease the trip call current
- Reduce reactive penalties due to failures Contactors (Compensation defect)
- Reduce capacitor failures
- Improve energy quality
- Reduce unplanned failures



Technical specifications

Item code	Power(kVAR) $\theta < 55^{\circ}\text{C}$ 400V 50/60Hz	AUXILIARY CONTACT INSTANTANEE		MAX OPERATING CYCLE PER HOUR	number of cycles
		NO	NC		
CAP-KT-12-C11	12.5	1	1	240	200.000
CAP-KT-25-C11	25.0	1	1	240	100.000
CAP-KT-33-C12	33.0	1	2	240	100.000
CAP-KT-40-C12	40.0	1	2	240	100.000
CAP-KT-60-C12	60.0	1	2	240	100.000

HARMONIC FILTERING

LINE SELF

Line Selves are installed at the input of the speed drives. They prevent voltage cuts and dampen the harmonic content of the current consumed by the inverter.

In addition, they increase the life of the electrical conductor.

The line selves are connected in series with the dimmer.

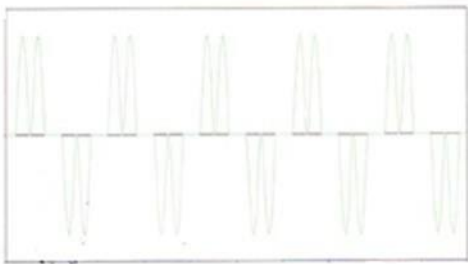
They help reduce the short-circuit current of the system, allowing more economical circuit breaker solutions.

The working voltage is up to 1000V. Connections can be terminal blocks, bars or cables depending on the power.

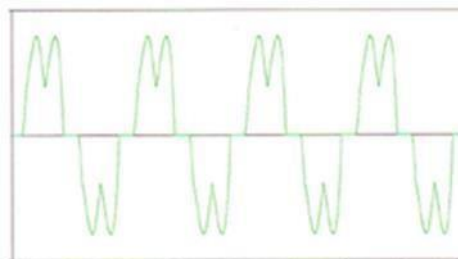


Technical characteristics

- Highly permeable iron core
- High quality copper or aluminum windings,
- High linearity
- Low losses and high efficiency
- Design capability with short circuit voltage % 4
- Vacuum-impregnated varnish for quiet operation and moisture immunity
- Sign and compatibility with EN 61558-2-20 and relevant paragraphs
- Manufactured according to ISO 9001 Quality Management System



BEFORE LINE SELF INSTALLATION



AFTER LINE SELF INSTALLATION

LINE SELF

Technical specifications

LINE SELF= 4%					
CODE PRODUCT	Current (A)	Power engine (kW)	Inductance (mH)	Loss (W)	Weight (Kg)
CAP LR 400V/5kW	10	5	2.93	47	2.1
CAP LR 400V/7.5kW	16	7.5	1.83	74	3
CAP LR 400V/11kW	24	11	1.17	77	4.7
CAP LR 400V/15kW	30	15	0.98	79	4.9
CAP LR 400V/18.5kW	37	18.5	0.81	82	6.4
CAP LR 400V/22kW	50	22	0.59	105	9
CAP LR 400V/37kW	75	37	0.385	172	11
CAP LR 400V/45kW	90	45	0.32	180	11
CAP LR 400V/55kW	110	55	0.27	188	18
CAP LR 400V/75kW	150	75	0.18	216	20
CAP LR 400V/90kW	180	90	0.163	224	31
CAP LR 400V/110kW	250	110	0.118	291	40
CAP LR 400V/132kW	300	132	0.098	325	38
CAP LR 400V/160kW	350	160	0.084	388	40
CAP LR 400V/200kW	400	200	0.074	382	48
CAP LR 400V/250kW	500	250	0.059	441	60
CAP LR 400V/315kW	700	315	0.042	482	75
CAP LR 400V/400kW	800	400	0.037	594	114
CAP LR 400V/500kW	1000	500	0.029	729	120
CAP LR 400V/600kW	1200	600	0.024	704	156

HARMONIC FILTERING

ENGINE REACTORS

Engine reactors are installed between the speed controller and the engine. They are used to attenuate the harmonic content of the voltage generated by the dimmer.

The working voltage is up to 1000V.

The connectors can be terminal blocks, bars or cables, depending on the power.

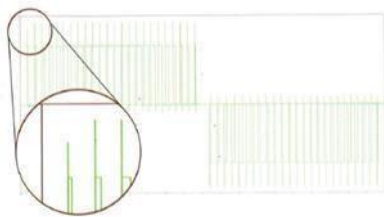
The reactors are compatible with international standards and CE marking. The reactors are also produced under the ISO9001 quality management system.

Engine reactors are classified according to their switching frequencies. They are mainly designed for a switching frequency band from 4 kHz to 12 kHz. For switching frequencies greater than 12 kHz, the engine reactor can be made to order.

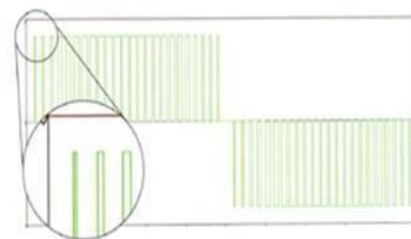


Technical characteristics

- Highly permeable iron core
- High quality copper or aluminum windings
- High linearity
- Design capability for different clock frequencies
- Low losses and high efficiency
- Vacuum-impregnated varnish for quiet operation and moisture immunity
- Sign and compatibility with EN 61558-2-20 and relevant paragraphs
- Manufactured according to ISO 9001 Quality Management System



BEFORE INSTALLATION OF ENGINE REACTOR



AFTER INSTALLATION OF ENGINE REACTOR

ENGINE REACTORS

Technical specifications

CODE PRODUCT	Power (kW)	Inductance (mH)	Losses (W)	Weight (Kg)
CAP.MR 400V/4kW	4	1.75	32	1.39
CAP.MR 400V/5kW	5	1.44	38	1.40
CAP.MR 400V/5.5kW	5.5	1.15	44	1.45
CAP.MR 400V/7.5kW	7.5	0.92	50	1.52
CAP.MR 400V/10kW	10	0.74	51	1.54
CAP.MR 400V/11kW	11	0.59	56	2.82
CAP.MR 400V/15kW	15	0.45	58	2.9
CAP.MR 400V/18.5kW	18.5	0.48	68	4.4
CAP.MR 400V/22kW	22	0.3	95	5.01
CAP.MR 400V/30kW	30	0.24	81	6.41
CAP.MR 400V/37kW	37	0.2	90	7.76
CAP.MR 400V/45kW	45	0.16	100	9.21
CAP.MR 400V/55kW	55	0.13	141	10.9
CAP.MR 400V/60kW	60	0.12	142	11
CAP.MR 400V/75kW	75	0.09	189	13.5
CAP.MR 400V/90kW	90	0.08	190	16.8
CAP.MR 400V/100kW	100	0.075	197	18.95
CAP.MR 400V/110kW	110	0.05	212	19.41
CAP.MR 400V/132kW	132	0.046	256	29.33
CAP.MR 400V/160kW	160	0.042	267	29.5
CAP.MR 400V/200kW	200	0.037	286	33.45
CAP.MR 400V/250kW	250	0.029	421	42.16
CAP.MR 400V/300kW	300	0.023	431	54.12
CAP.MR 400V/315kW	315	0.021	434	54.35
CAP.MR 400V/400kW	400	0.018	442	54.74
CAP.MR 400V/450kW	450	0.016	450	56.35
CAP.MR 400V/500kW	500	0.014	477	57.01
CAP.MR 400V/600kW	600	0.011	675	73.21

HARMONIC FILTERING

SINE FILTER

Sine filters are used to filter the high frequency component of the voltage waveform generated by PWM at the output of the inverters. They are particularly useful for applications where low current cables are installed near power cables. By filtering the high-frequency components, they prevent electromagnetic interference from causing unwanted signals in the system. In addition, a sinusoidal voltage at the terminals will increase the life of the motors.

In addition to limiting the speed of voltage growth at the motor terminals according to DIN VDE 0530 or IEC 60 034-17, longer motor cables can be used.

The engine is much quieter. The life of the engine is increased due to the reduced dielectric load of the insulation system.



Technical characteristics

- Rated operating voltage: up to 1000 V
- Switching frequency: 4kHzfs12kHz. Other switching frequencies available on request
- Thermal protection: 132°C
- Mode of operation: continuous
- Highly permeable iron core
- High quality copper or aluminum windings
- Low losses and high efficiency
- Vacuum-impregnated varnish for quiet operation and moisture immunity
- CE sign and compatibility with IEC 60076-6, EN 61558-2-20
- Manufactured according to ISO 9001 Quality Management System

SINE FILTER

Technical specifications

CODE PRODUCT	Power engine(kW)	Inductance (mH)	Capacity (uF)	Losses (W)	Weight (Kg)
CAP.SF 400V/4kW	4	12.7	2	85	4.54
CAP.SF 400V/5kW	5	10.3	2	109	5.16
CAP.SF 400V/5.5kW	5.5	8.4	3	114	5.42
CAP.SF 400V/7.5kW	7.5	6.33	3	121	8.18
CAP.SF 400V/10kW	10	5.1	5	168	10.9
CAP.SF 400V/11kW	11	4.2	5	200	11.34
CAP.SF 400V/15kW	15	3.37	8	180	14.58
CAP.SF 400V/18.5kW	18.5	2.75	8	210	17.45
CAP.SF 400V/22kW	22	2.17	10	265	21.16
CAP.SF 400V/30kW	30	1.7	10	327	23.84
CAP.SF 400V/37kW	37	1.36	18	308	33.95
CAP.SF 400V/45kW	45	1.13	18	350	40.92
CAP.SF 400V/55kW	55	0.89	25	425	43.86
CAP.SF 400V/60kW	60	0.86	25	447	44.23
CAP.SF 400V/75kW	75	0.68	35	530	56.74
CAP.SF 400V/90kW	90	0.56	35	570	69.21
CAP.SF 400V/100kW	100	0.507	50	650	69.62
CAP.SF 400V/110kW	110	0.41	50	720	94.61
CAP.SF 400V/132kW	132	0.34	75	1000	119.9
CAP.SF 400V/160kW	160	0.296	75	1030	120.1
CAP.SF 400V/200kW	200	0.253	100	1070	124.3
CAP.SF 400V/250kW	250	0.206	100	1150	166.74
CAP.SF 400V/300kW	300	0.17	125	1360	257.9
CAP.SF 400V/315kW	315	0.146	125	1340	272.8
CAP.SF 400V/400kW	400	0.127	180	1460	238.9
CAP.SF 400V/450kW	450	0.113	200	1530	331.2
CAP.SF 400V/500kW	500	0.103	200	1640	431.3
CAP.SF 400V/600kW	600	0.085	250	1900	502.9

HARMONIC FILTERING

PASSIVE HARMONIC FILTERS

Passive harmonic filters are designed to protect your system from the harmful effects of harmonics. This unit is installed at the input of the harmonic generating load (for example, speed controller, inverter, etc.) and eliminates the harmonics at the source.

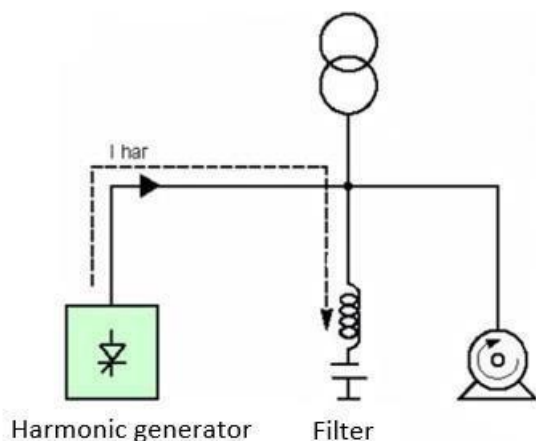


Technical characteristics

Passive harmonic filters are available in two forms : wall type and panel type. For current values below 110A, wall type units are used. For higher current values, the panel type is preferred.

The general characteristics can be listed as follows :

- Provides constant capacitive power
- High performance and reliable
- Complies with EN 61000-2-2, EN 61558-2-20, EN 60831-1, signed CE
- Dampens harmonics up to 90%
- Minimized resonance risk design
- Built-in overcurrent protection
- Turns off automatically in case of overload
- Automatically regulates panel/cabinet temperature



PASSIVE HARMONIC FILTER

Technical specifications

CODE PRODUCT	Voltage (V)	Power (kW)	Frequency (Hz)	Losses (W)	Protection rating	Weight (kg)	Dimension (mm)
CAP.PF 400V/4kW	400	4	50	125	IP21	23	206x430x219
CAP.PF 400V/5 kW	400	5	50	157	IP21	30	326x612x293
CAP.PF 400V /5.5 kW	400	5.5	50	160	IP21	31	326x612x293
CAP.PF 400V/7.5 kW	400	7.5	50	225	IP21	34	326x612x293
CAP.PF 400V/10 kW	400	10	50	230	IP21	38	326x612x293
CAP.PF 400V/11 kW	400	11	50	236	IP21	49	326x612x293
CAP.PF 400V/15 kW	400	15	50	260	IP21	55	326x612x293
CAP.PF400V/18.5 kW	400	18.5	50	340	IP21	60	326x612x293
CAP.PF 400V/22 kW	400	22	50	370	IP21	74	326x612x293
CAP.PF 400V /30 kW	400	30	50	380	IP21	97	326x612x293
CAP.PF400V /37 KW	400	37	50	497	IP21	109	514x826x315
CAP.PF 400V /45 kW	400	45	50	574	IP21	121	514x826x315
CAP.PF 400V /55 kW	400	55	50	600	IP21	126	514x826x315
CAP.PF 400V /60 kW	400	60	50	726	IP21	128	700x800x1800
CAP.PF 400V /75 kW	400	75	50	779	IP21	131	700x800x1800
CAP.PF 400V /90 kW	400	90	50	1111	IP21	145	700x800x1800
CAP.PF 400V /100 kW	400	100	50	1185	IP21	161	700x800x1800
CAP.PF 400V /110 kW	400	110	50	1260	IP21	185	700x800x1800
CAP.PF 400V /132 kW	400	132	50	1440	IP21	230	600x1000x2300
CAP.PF 400V /160 kW	400	160	50	1830	IP21	495	600x1000x2300
CAP.PF 400V /200 kW	400	200	50	1980	IP21	550	600x1000x2300

The above table is valid for 400V 50 Hz parameters.

N.B: Other technical specifications are available upon request.

HARMONIC FILTERING

ACTIVE HARMONIC FILTERS

CAPCONDO active filters save money by improving the quality of the feed, increasing the reliability and productivity of the process, and helping to meet food quality standards.

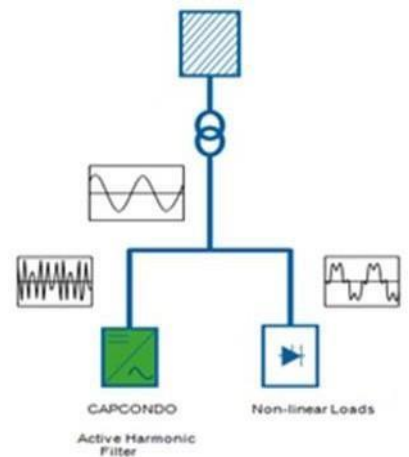
CAPCONDO active filters are designed for dynamic reactive power compensation and harmonic filtering. They provide an efficient solution for power quality applications in commercial and industrial facilities as well as in infrastructure.

CAPCONDO active filters are a combination of a state-of-the-art controller based on IGBT-Invent topology, modern 3-level, 7" touch screen user interface and modular technical design for a fast, reliable and compact easy device to be used in accordance with all standard communication protocols.

Good energy quality implies :

- Energy saving
- Increased productivity in industrial facilities
- Reliable installation operation at reduced maintenance costs
- Longer life of electrical and process equipment
- Additional capacity in existing power grid
- Compliance with IEEE 519, G5 / 4, IEC 61000 3-2, 3-4 or any other power quality standard and recommendations
- Quick return on investment

Active harmonic filters are a versatile solution, easily adaptable to provide power factor enhancement, voltage variation control, flicker reduction and load balancing capabilities.



ACTIVE HARMONIC FILTERS

INNOVATIVE FUNCTIONS FOR OPTIMAL PERFORMANCE

Fast & Efficient

- Extremely fast response time ensures effective attenuation of harmonics and other energy quality disturbances
- Reduces voltage variations caused by large, rapidly varying loads and heavy industrial loads
- Balancing loads in three-phase systems
- Factory tested, CAPCONDO active harmonic filters allow easy compliance with global energy quality standards such as IEEE-519 and G5/4

Evolutive

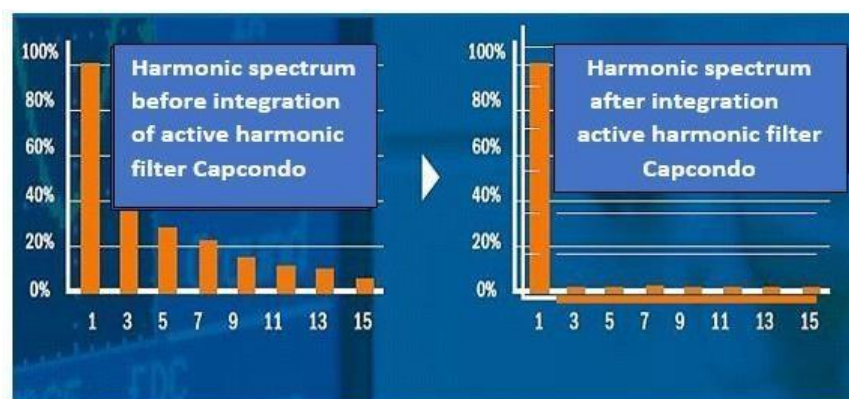
- Ability to install multiple active filters in parallel to increase power
- Reactive Power Compensation Management with Active Harmonic Filter User Interface

Flexible and simple operation

Systems consisting of multiple hybrids including active filters and conventional reactive power compensation, can be managed with a man-machine interface

Adaptable

A single device may be suitable for different operational needs. Several modes of operation allow to adapt the functionalities in order to solve the energy quality problems specific to the customers of the most economical possible.



ACTIVE HARMONIC FILTERS

Technical characteristics

	A2-35A	A2-50A	A2-100A	A2-150A	A2-200A
Nominal voltage (V)	200V..480V (automatic adaptation)				
Frequency (Hz)	50Hz or 60Hz (automatic adaptation)				
Number of entry phases	3 phases (+ neutre / 4W) + PE				
Cable entry port	Bas / Haut (Bottom/top)				
Level of protection	IP 20				
Cooling	Forced ventilation				
Control	Real-time digital control with FFT				
HMI	Touch screen 7 "(1/ installation)				
Topology / switching frequency	NPC at 3 levels / 20 kHz				
Reaction time	<25 μ s) / 1 Network cycle (Selective)				
Harmonic range	1..50 compliant with IEEE 519 and G5/4t)				
Functionality	Reactive power / harmonics / load balancing (with rated capacity)				
Nominal output current	L1... L3: (50A) 100A Neutral (4W): (150A) 300A				
Dimensions LxdxH (mm)	60 x 60 x 180			60 x 60 x 200	
Noise	60db			64db	
Operating mode	All harmonics/ All harmonics except fundamental/ Selective harmonics				
Ambient temperature	0...40°C				
Ambient humidity	max. 85%, non-condensing				
Communications	Ethernet / Modbus TCP				

Compensation Average Voltage

Capacitors Medium voltage

High voltage capacitor units for power factor filters and harmonic filters are enclosed in stainless steel containers with a porcelain capacitor socket.

Basically, there are two types :

- Single phase capacitors (One or two sockets) with internal element fuses suitable for connection to the 11kV net work supply system and above or with high power machines.
- Three-phase capacitors (three sockets) with fuses of internal elements for connection to the bus bars of the power supply system or equipment with nominal voltage preferably less than 11 kV.

Technical characteristics

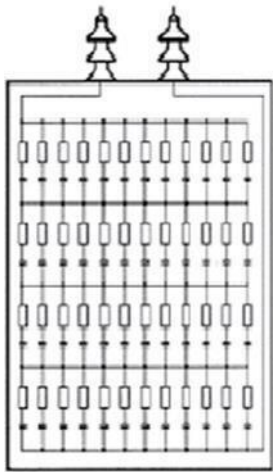
Nominal Voltage (A)	Three Phase 1 – 12kV Single phase 1—24kV
Output power (kVAR)	25-500kVAR Three-phase. 25— 600kVAR Single phase.
Frequency	50/60Hz
Standard references	IEC 60871-1 : 1997 EN 60871-1 :1997 IEC 60871-4 : 1997 EN 60871-4 :1997
Max Surge	One+10% (12 hours in 24 hours per day) One+15% (30 minutes) One+20% (5 minutes) One+30% (1 minute)
Overcurrent (as per standards)	1.3*I _n
Power tolerance	-5/+10%
Test voltage (between terminals)	4.3*DC 10s, o2.15*AC 10s
Test voltage (between terminals and container)	According to the IEC table for 10s
Limit of call current	Max 100xI _n
Dielectric loss	0.07 W/kVAR
Loss of capacitor (approx)	0.15 W/kVAR

MT OFFSET

Capacitors Medium voltage

Technical characteristics

Basic insulation level	20/60kV;28/75kV;38/95Kv 50/125kV;70/170kV
Life expectancy	>100,000 hours
Level of IP protection	IP 00, indoor and outdoor
Temperature	« C » -40°/ 50°Max
Type of cooling	Natural
Humidity	Max 95%
Mounting	Horizontal/Vertical
Arrangement of mounting	Mounting support
Internal protective device	Internal fuse
External protective device	Pressure sensor, NO + NC contact (OPTIONAL)
Container	Stainless steel
Dielectric	Polypropylene film
End plug	Porcelain
Discharge resistance	Residual voltage supplied : 75V in 10 min
Standard references	The capacitors comply with the following standards : IEC 60871-1, IEC 60871-2, IEC 593



Compensation batteries Medium voltage

MT OFFSET

Fixed batteries

There are a variety of fixed batteries with different types of cabinets/ mounting brackets and equipment included.

Product line

- 50kVAR to 4800kVAR (Other power is at customer request)
- Rated voltage ranges from 7.2kV to 36 kV.
- Three-phase capacitor batteries connected in parallel
(Internal star connection with protective fuses).
- Single-phase capacitor batteries connected in a double star.



Automatic battery

The High Voltage Automatic Power Factor Correction Batteries are suitable for installations where the charge of the power supply system fluctuates in this type of battery, the total number of kVAR is divided according to the charging conditions.

The capacitor stands are activated or deactivated via a contactor controlled by a MCX type power factor controller.

The discharge coil (voltage transformer) reduces the discharge time of the capacitors to 10 seconds (otherwise it is 10 minutes). This world allows a quick reconnection of the stands.

Product line

- Rated voltage up to 36 KV.
- From 1 MVAR to 10 MVAR.



NB : the picture of the capacitor battery above is approximate

Remote monitoring software package

The CAPCONDO remote monitoring solutions allow the measured electrical parameters to be monitored, analyzed and controlled remotely. With this method, a large number of devices can be accessed and controlled via the Internet with Ethernet and GPRS.

With the "CAP VIEW" software, the parameters of the different remote sites can be analysed and compared. This system can track changes in all electrical parameters as well as consumption at different sites and subsequently improve energy costs.

Parameters transferred via Ethernet/GPRS are instantly tracked, saved and archived.

CAP VIEW, the new generation of web-based energy monitoring systems software to improve energy consumption thus reducing costs and achieving energy efficiency targets.

CAP VIEW PRO monitors the power consumption of the installations independently of time and place and allows users to control it.

Our software is based on IoT (Internet of Things) technology by providing a SAAS (Service As A Software) solution.

This solution guarantees access to your energy data in real time and history from any machine connected to the internet, while guaranteeing the required level of security.

The SAAS solution has the following characteristics:

- Plug & Play
- No configuration required
- Quick deployment and easy maintenance
- Customizing the solution remotely
- Multiple access

Remote monitoring software package

CAP VIEW allows you to :

- Monitor the quality of the power grid at any point in a detailed way.
- Include data from third-party management systems (ERP, GMAO,) or metrics.
- Make a monthly consumption forecast and generate virtual invoices for the different structures of your facility.
- Generate an energy performance report with graphs and curves through an advanced report editor.
- Communicating energy status to users through mailing and SMS.

The infographic is a blue rectangular graphic with rounded corners. At the top left, it says 'CAP VIEW' in large white letters, with 'By CapCondo' below it. To the right is the 'CAPCONDO' logo, which consists of a stylized 'H' inside a circle followed by the word 'CAPCONDO' in blue. Below the logo is the tagline 'Your way. Knowledge. Quality.' in small text. A horizontal line separates the header from the main content. Below the line, the text 'Energy management system solution' is written in white. The main content is organized into three vertical sections, each enclosed in a white rounded rectangle. The top section is for 'CAP VIEW V.3.0 (Basic version)' and lists '+ Real-time data', '+ data history', and '+ dashboard' with a white icon of a monitor showing a line graph. The middle section is for 'CAP VIEW PLUS' and lists '+ Real-time data', '+ data history', '+ dashboard', '+ Energy management', and '+ Data export' with white icons of a line graph and a pie chart. The bottom section is for 'CAP VIEW PRO' and lists '+ Real-time data', '+ data history', '+ dashboard', '+ Energy management', '+ Data export', '+ Alerts', and '+ Ratios' with white icons of a computer monitor, a bar chart, and a clock.

Remote monitoring software package

CHARACTERISTICS

Structure of the system

The data from the communicating measurement centers is transmitted to the server via an Ethernet converter or a GPRS modem. Users access the data by connecting to the server via the Internet.

Monitor screen

It allows the electrical parameters of the devices to be tracked instantly and shows the hierarchical structures of the devices in the tree view.

Options screen

It contains user information and allows users to subscribe to the set alarms.

Reports screen

Users can receive 27 different reports from the data saved in the system. Reports can be displayed as graphs and/or tables and saved in PNG, BMP, XLS, CSV and XML formats.

Device Controls

Enable remote configuration of devices.

Configuration

Basic CAP VIEW configuration screens where Definitions including region, connection point, device, user and alarm.

Alarm

When a device setting exceeds the specified limit value, the system sends users an email and/or SMS notifications.

Correction and recording of data at other meters

With the help of a concentrator, it is possible to take remote readings of different meters such as gas, water, compressed air, etc.

Billing

You can determine the devices identified in the system as "Billing Points" and you can issue invoices within the desired periods and send these invoices to the accounting department.

Remote monitoring software package

AREAS OF APPLICATION

- Distribution / transmission sites
- Industrial sites
- Public institutions
- Universities and Schools
- Shopping Malls
- Chain stores
- Renewable energy production sites
- Radio transmitters, base stations
- Hospitals
- Banks
- Airports and Ports

SYSTEM ARCHITECTURE

The software is installed on the users' server. The data is collected by running the software on intranet or web.

The user can change the settings of his own device and also analyze the data and make reports.

Such a system architecture is composed of :

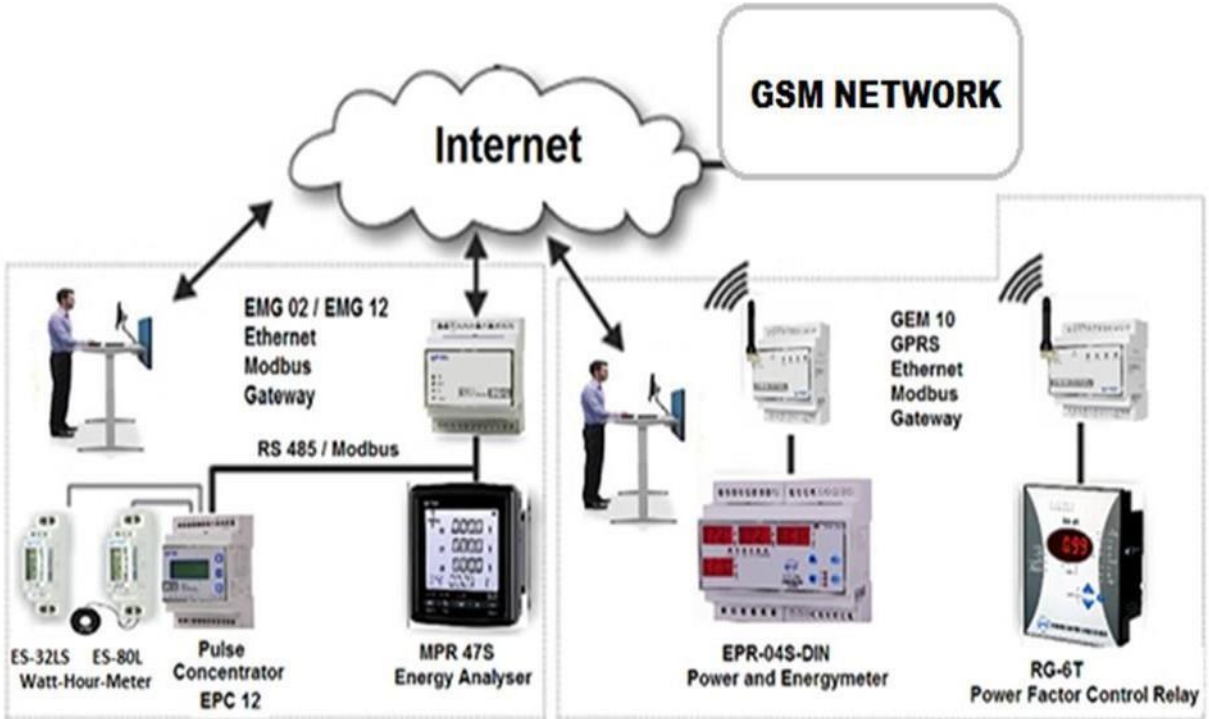
- Smart Divisional Meters,
- Communicating measuring units or network analyzers,
- Modems and data collectors that are used to transfer parameter and measurement values provided by network analyzers, measuring devices and protective control relays to energy management software that are organized and saved within a database.

This database is then used by energy management software to compile relevant and periodic statistics, reports and balance sheets necessary for decision-making and corrective actions.

Remote monitoring software package

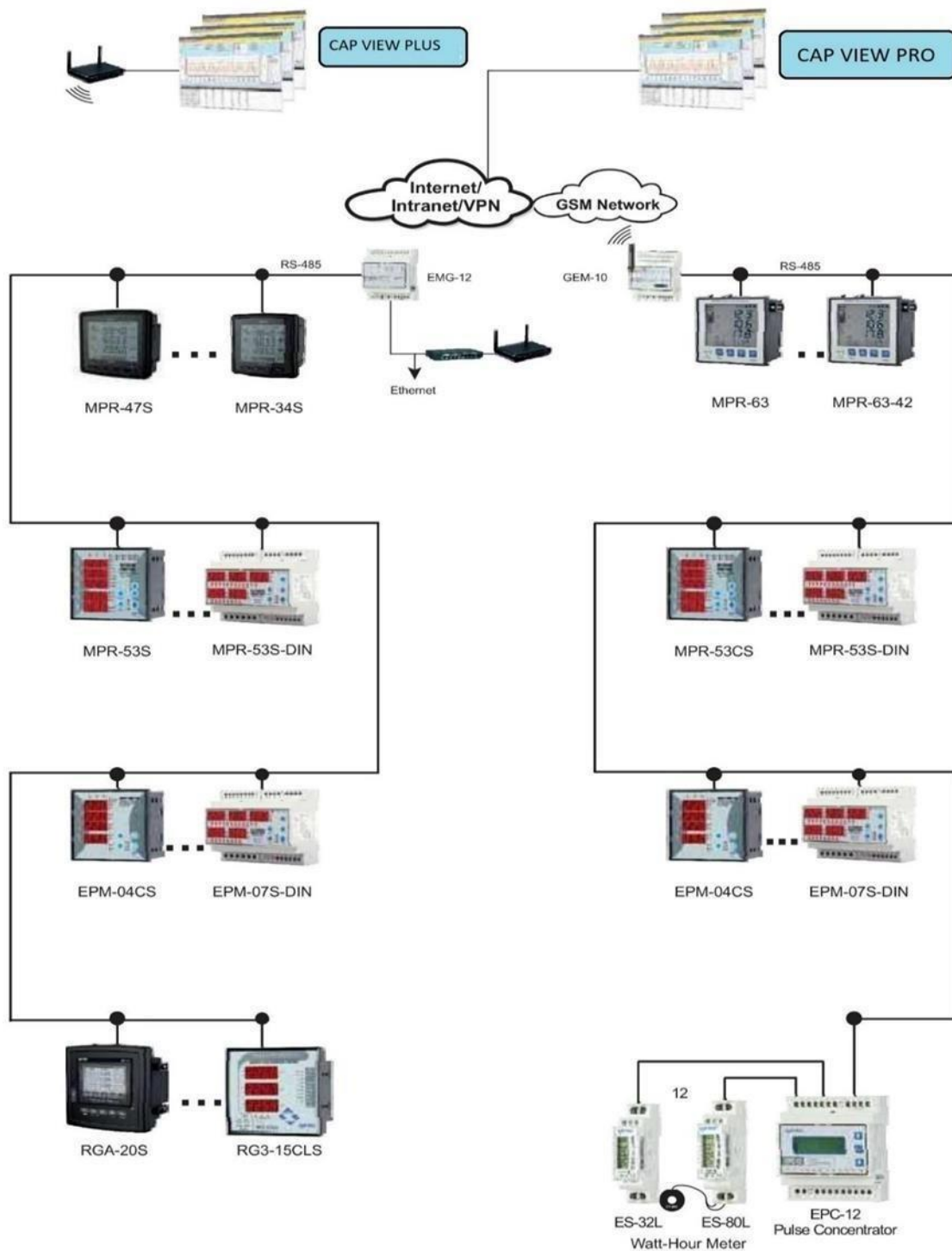
Two possible system architectures :

- Wireless Architecture: Allows information to be transmitted to the server wirelessly through GPRS modems.
- Wired Architecture: Allows information to be transmitted to the wired server (maximum wiring between devices is 500m) over the Internet or intranet.



Remote monitoring software package

SYSTEM DIAGRAM



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