

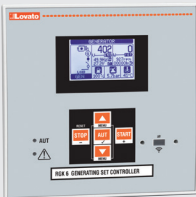
POWER QUALITY

F

Generator controllers		Lovato	F-1...2
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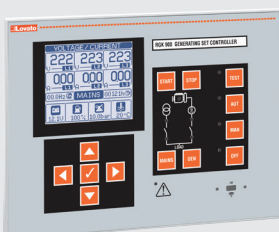
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RGK600



RGK750



RGK900

Automatic mains failure (AMF) gen-set controllers

- Engine protection
- Programmable inputs and outputs / alarm properties
- Automatic starting of generator and load switching to stand-by emergency source in case of mains failure
- Supervision in “open transition” for contactors, motorised circuit breakers and changeover switches

type	digital inputs	digital outputs	description
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RGK600 series (IP40) 144 x 144 mm panel mounting

- Universal supply: 12/24 VDC
- Display: Graphic LCD 128 x 80 pixels with backlight
- Measurement voltage: 50...576 VAC / Rated voltage: 480 VAC L-L
- Current Input: 3PH, /5A or /1A
- Single, two and three phase voltage control - L1-L2-L3-N
- IR programming port on front panel for communication with PC
- 3 analog resistance input for oil pressure, engine temperature or fuel level control
- Customisable alarm text (8 alarms)
- Non-volatile memory for event storage
- Modbus-RTU and Modbus-ASCII protocols (**RGK610**)

RGK600	4	6	AMF gen-set controller with “W” or magnetic “pickup” for engine speed reading (no CANbus)
RGK601	4	6	AMF gen-set controller with CANbus-J11939 (no “W” or magnetic “pickup”)
RGK610*	4	6	AMF gen-set controller with “W” or magnetic “pickup” for engine speed reading (no CANbus)

* 1 slot to accept plug-in expansion modules **EXP1010/1011/1012**, see page F-7

RGK700 series (IP65) 180 x 240 mm panel mounting

As above **RGK600** but with following additional features:

- Measurement voltage: 50...720 VAC / Rated voltage: 480 VAC L-L
- Rated voltage: RGK700 - 600 VAC L-L / RGK750 - 480 VAC L-L
- IR programming port on front panel for communication with PC
- PLC logic for inputs, outputs and internal status
- Expansion bus with 2 slots for **EXP...** series expansion modules (**RGK 750 only**)
- Calendar-clock (RTC) with backup reserve energy

RGK700	6	7	AMF grey gen-set controller
RGK750	6	7	AMF black gen-set controller

RGK800 series (IP65) 180 x 240 mm panel mounting

As above **RGK750** but with following additional features:

- RS485 communication (+ CANBUS)
- Neutral current measurement range: 0.050...6A or 1.2A
- 400Hz frequency support
- 1 programmable analog input
- Current leakage control
- Expandable with rear plug-in expansion (up to 3) modules (see page F-7)

RGK800	8	10	full featured AMF gen-set controller
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Paralleling controllers for mains - mains and generator - generator

- Engine protection
- Mains-generator “closed transition” synchronising
- Mains-generator load sharing with source peak demand control
- Generator paralleling supervision (island mode with load sharing)

RGK900 series (IP65) 180 x 240 mm panel mounting

As above **RGK800** but with following additional features:

- Voltage measurement range: 50-720 VAC / Rated voltage: 480 VAC L-L
- Frequency measurement range: 45...65Hz or 360...440Hz
- Display: Graphic LCD 128 x 112 pixels with backlight
- Customisable alarm text (16 alarms)
- Modbus-RTU, Modbus-ASCII and Modbus-TCP communication protocols
- 2 analog outputs for engine speed control (governor) / voltage regulator (AVR)
- Built-in buzzer, multi-level passwords, sleep function

RGK900SA	13	10	full featured stand alone gen-set controller
RGK900	13	10	mains-generator paralleling control

Control of mains, automatic transfer switching and paralleling on multiple generators controlled by **RGK900SA**

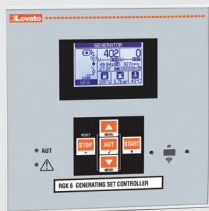
RGK900MC	13	10	Mains-ATS (Automatic Transfer Switching) controller
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RGK400SA



RGK420SA



RGK600SA

Stand alone gen-set controllers

- Generator voltage and current control
- Engine protection
- Programmable inputs and outputs
- Programmable alarm properties

type	digital inputs	digital outputs	description
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RGK400SA series (IP40) 96 x 96 mm panel mounting

- Universal supply: 12 / 24 VDC
- Display: LCD icon display
- Measurement voltage: 50 - 576 VAC
- Rated voltage: 480 VAC L-L
- Current Input: 1PH, /5A or /1A
- Engine protection: With "W" or magnetic "pickup" for engine speed reading
- 1 analog resistance input for oil pressure / engine temperature or fuel level control
- Single, two and three phase voltage control - L1-L2-L3-N
- Customisable alarm text (2 alarms)
- IR programming port on front panel for communication with PC (CX01, see page F-7)
- NFC technology for parameter setup via smartphone or tablet

RGK400SA	5+1 (E/stop)	5	stand alone gen-set controller
RGK420SA*	5+1 (E/stop)	5	stand alone gen-set controller

* Incorporates 3 position key switch (OFF, local start, remote start)

RGK400SA accessories

Expansion modules (rear plug-in)

EXP1040	additional - 2 digital / resistance inputs, 2 static outputs
EXP1041	additional - 2 thermocouple inputs, 2 static outputs
EXP8005	housing gasket to increase protection to IP65

RGK600SA series (IP40) 144 x 144 mm panel mounting

As above RGK400SA but with following additional features:

- Display: Graphic LCD 128 x 80 pixels with backlight
- Measurement voltage: 50 - 576 VAC
- Rated voltage: 480 VAC L-L
- Current Input: 3PH, /5A or /1A
- Operating temperature: -30 - +70°C
- 3 analog resistance input for oil pressure, engine temperature or fuel level control
- Customisable alarm text (8 alarms)
- No NFC technology
- Non-volatile memory for event storage
- Modbus-RTU and Modbus-ASCII protocols

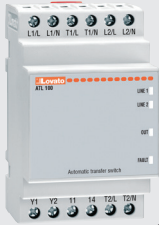
RGK600SA	4	6	stand alone gen-set controller with "W" or magnetic "pickup" for engine speed reading (no CANbus)
RGK601SA	4	6	stand alone gen-set controller with CANbus-J11939 (no "W" or magnetic "pickup")



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Automatic Transfer Switch (ATS) controllers

- Tie-breaker management
- Automatic non-priority load management
- Remote control and supervision / Event logging
- Supervision of two or three three-phase power sources
- Emergency demand supervision for stand-by generating sets
- Modbus-RTU, Modbus-ASCII and Modbus-TCP communication protocols
- IR programming port on front panel for communication with PC (*NFC on some models*)



ATL100

new



ATL500

NFC

new



ATL601

NFC



ATL900

type	digital inputs	relay outputs	description
ATL100 series (econo) IP40 (no display) 54 mm DIN mounting			
ATL100 with its modular housing is suitable for monitoring two independent power sources and to manage switching between the two sources with single phase control.			
<ul style="list-style-type: none"> • Supply voltage: 230 VAC • Rated voltage: 230 VAC L-L • 2 single phase inputs and outputs L+N • Response thresholds of min and max voltage: 80% and 120% of nominal setting • LED indication: 2 x (green) presence of both input voltages, 1 x presence of output voltage 1 x (red) indicates presence voltage out of limits on inputs 			
ATL100	2	3	single phase automatic transfer switch controller
ATL500 series (econo) IP40 (no display) 144 x 144 mm panel mounting			
ATL500 is an automatic transfer switch that allows load commutation between two different source line, a main line (LINE 1) and a stand-by or emergency secondary line (LINE 2).			
<ul style="list-style-type: none"> • Supply voltage: Self seeking power supply - 110...240 VAC LN • Measurement inputs: 3-ph+N (suitable for 1 and 2 phase lines) • Supported switching devices: Contactors and motorised changeovers • Output relay: 2 NO for contactors / 1 NC to start genset • Parameter setup: Via built-in NFC technology (smartphone or tablet) • Monitoring functions: Overvoltage, Undervoltage Phase failure Wrong phase sequence, Symmetry, Overfrequency Under frequency 			
ATL500	2	3	3-ph+N automatic transfer switch controller
ATL600 series IP40 (with LCD display) 144 x 144 mm panel mounting			
<ul style="list-style-type: none"> - AC power supply 110...240 VAC - Management of two power sources - Measurement inputs for 3-ph+N voltage values (suitable for 1 and 2 phase lines) - 128 x 80 backlit graphic LCD to view measurements, events and alarms 			
ATL600	6	7	automatic transfer switch controller for 2 sources
ATL601*	6	7	automatic transfer switch controller for 2 sources
* With 12/24DC supply			
ATL610 series			
As above ATL600 but with following additional features:			
<ul style="list-style-type: none"> - Real time clock RTC - Dual power supply (110 - 240 VAC line and 12-24 VDC battery supply) - Expandable with I/O and communication modules 			
ATL610*	6	7	automatic transfer switch controller for 2 sources
* 2 slot to accept plug-in expansion modules EXP1010/1011/1012/1013/1014 , see page F-7			
ATL800 series IP65 (with backlit graphic LCD display) 180 x 240 mm panel mounting			
As above ATL610 but with following additional features:			
<ul style="list-style-type: none"> - Management of 2 energy sources and 1 tie breaker - 6 preconfigured system layouts - Built-in NFC technology for parameter setup via smartphone or tablet - Built-in RS485 communication / Built-in programmable PLC logic - Expandable with up to 3 rear plug-in expansion modules EXP... (see page F-7) 			
ATL800	8	7	automatic transfer switch controller for 2 sources
ATL900 series IP40 180 x 240 mm panel mounting			
As above ATL800 but with following additional features:			
<ul style="list-style-type: none"> - Management of 3 energy power sources and 2 tie breakers - 4 current inputs for the three phases and neutral - 14 preconfigured system layouts - 128 x 112 backlit graphic LCD to view measurements, events and alarms 			
ATL900	12	10	automatic transfer switch controller for 3 sources



BCF...

Switching battery chargers

- Switching technology
- Automatic reset at end of alarm conditions
- Charging cycle in accordance with DIN 41773 standards

type	output voltage	output current	max. power consumption		description	dimensions (mm)		
			VA	W		(H)	(W)	(D)

BCF series Modular automatic switching battery chargers

- Alarm output relay (3A 250 VAC) AC1 duty
- Modular DIN rail mounting (*aligns with standard MCB's*) or chassis mount
- Wide auxiliary supply range 100 - 240 VAC ($\pm 10\%$) 50/60Hz
- Protection:
 - Mains input fuse (*non replaceable*)
 - Battery output fuse
 - Electronic lock in case of short circuit on battery terminals, reverse battery polarity and output overload
- LED indication of:
 - Correct output voltage
 - Reverse battery polarity

BCF025012	12V	2.5A	80	40	auto battery charger	96	90	56
BCF045012	12V	4.5A	150	70	auto battery charger	96	90	56
BCF012524	24V	1.25A	80	39	auto battery charger	96	90	56
BCF025024	24V	2.5A	150	77	auto battery charger	96	90	56

BCG series Rail mount switching battery chargers

- High efficiency
- Alarm output relay (5A 30 VDC duty)
- Wide auxiliary supply range 110 - 240 VAC ($\pm 10\%$) 50/60Hz
- DIN rail or chassis mounting (*can be mounted vertically with adaptor*)
- Boost signal controlled by external contact
- Hiccup function for battery recharging when its voltage is lower than 50% rated value
- Maximum charging current limiting trimmer 20 - 100% (*adjustable from front*)
- Protection:
 - Mains input fuse
 - Electronic lock in case of short circuit on battery terminals, reverse battery polarity and output overload
- LED indication of:
 - Power ON
 - Charging operation $I > 30\% I_c$
 - Overload or short circuit condition
 - Reverse battery polarity

BCG0612	12V	6A	230	97	auto battery charger	150	162	63
BCG1212	12V	12A	284	290	auto battery charger	150	213	63
BCG0524	24V	5A	364	158	auto battery charger	150	162	63
BCG1024	24V	10A	630	311	auto battery charger	150	213	63

Accessories for above BCG battery chargers

BCGX00 vertical side mount adaptor (*for space saving*) for **BCG0612** and **BCG0524**

BCE series Linear battery chargers

- Linear technology
- Auxiliary supply voltage: 220 - 240 VAC ($\pm 10\%$) 50/60Hz
- Charging current: 30 - 100% I_c (*adjustable*)
- Protection:
 - Mains input fuse (*except BCE2V524 and BCE0312*)
 - Battery output fuse
 - Electronic lock in case of short circuit on battery terminals, reverse Battery polarity output overload ($< 0.5 U_e$) and disconnected battery
- LED indication of:
 - Power ON
 - Charge ($I > 0.2 I_c$)
 - Alarm for protection tripping
- Alarm output: Static NPN transistor BCE2V5 and BCE03 - others relay (5A 250 VAC)

BCE0312	12V	3	117	-	auto battery charger	93	134	100
BCE0612	12V	6	222	-	auto battery charger	130	192	140
BCE1212	12V	12	400	-	auto battery charger	230	192	140
BCE2V524	24V	2.5	166	-	auto battery charger	93	134	100
BCE0524	24V	5	317	-	auto battery charger	130	192	140
BCE1024	24V	10	610	-	auto battery charger	230	192	140



BCG ...



BCE...



DCRL...



DCRG 8



DCRG 8F



EXP...

DCRL / DCRG Power Factor Controllers incorporate latest technological advanced monitoring to provide accurate measurement and control of network parameters in power factor correction applications, providing total protection of capacitors and systems.

- Configurable 1A or 5A current input
- Suitable for medium voltage systems (with VT's)
- High accuracy (TRMS) measurements with configurable alarms
- Wide voltage measurement range: 50-720VAC L-L, 50-415VAC L-N
- Expandable through clip-in expansion modules (*I/Os, Comm ports etc.*)
- Front mounted optic interface port for programming, data download, diagnostics

type	number of steps	expand to:	description	dimensions (mm)		
				(H)	(W)	(D)

DCRL controllers 3, 5 and 8 step *single phase CT connection*

DCRL series power factor controllers with advanced functionality in a dedicated ultra compact housing, combine modern front design with ease of mounting and expendability.

- Reactive power measurement per step installed
- 3, 5 or 8 steps (*expandable with expansion module*)
- Voltage and current THD with single harmonic analysis up to 15° order
- Backlit icon LCD display (*alarm codes with scrolling text*) 128 x 80 pixels

3 and 5 step controllers *1 expansion slot*

DCRL 3	3 step	6 step	panel mount power factor controller	96	96	65
DCRL 5	5 step	8 step	panel mount power factor controller	96	96	65

8 step controllers *2 expansion slots*

DCRL 8	8 step	14 step	panel mount power factor controller	144	144	44
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DCRG controllers 8 step *single and three-phase CT connection*

DCRG series power factor controllers are designed to satisfy technical characteristics of modern electrical installation requirements in all industries and working conditions, to detect critical operating conditions and offer total protection of power factor systems.

- Recording of number of connections per step
- Capacitor over-current protection on all three phases
- Voltage and current THD with single harmonic analysis up to 31° order.
- 8 steps (*expandable by up to another 8 steps with plug-in expansion modules*)
- Backlit graphic LCD display (*permits reading in bar-graph and wave form format*)
- Configurable for fast dynamic (*thyristor*) switching or a combination of static and relay
- Quick CT programming function / Automatic identification of direction of CT current flow
- Calendar-clock (RTC) with backup reserve for event logging: Alarms, setup changes, etc.
- Connection to 1/3 ph lines, 3 ph + N and co-generation systems with 4 quadrant operation
- Three current inputs permit per phase analysis of all electrical parameters in the installation

8 relay step controller *4 expansion slots*

DCRG 8	8 step	18 step	panel mount power factor controller	144	144	44
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8 thyristor static step controller (*expandable up to 24 steps with expansion modules*)

DCRG 8F	8 step	24 step	static step power factor controller	144	144	44
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Expansion modules for controllers

EXP series expansion modules add extra functionality to following panel mount products:

- DMG 600/700/800/900** - Digital milometers and power analysers
- DCRL and DCRG** - Automatic power factor controllers
- ATL 600/800/900** - Automatic transfer controllers
- RGK 400/600/750/800/900** - Generator controllers

type	inputs	outputs	description
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EXP expansion modules (*plug into rear of controller to add more functionality*)

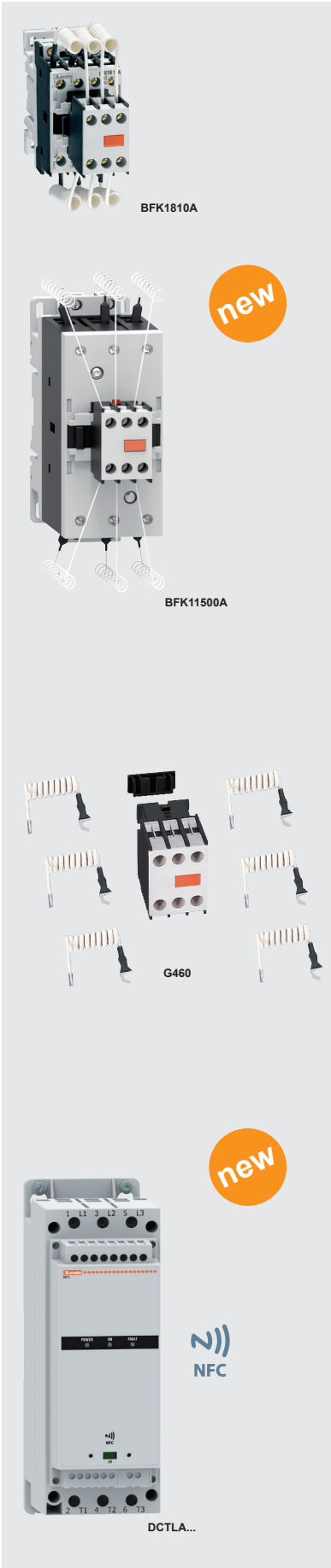
Inputs/Outputs

EXP1006	-	2 relay	to increase number of capacitor steps
EXP1007	-	3 relay	to increase number of capacitor steps
EXP1000	4 digital	-	opto-isolated digital inputs

Note: For more expansion modules options, see F-7

A - Motor control & drives

Special capacitor switching contactors are equipped with early-make limiting resistors which limit in-rush currents initially before making contact. Resistors are disconnected from the circuit when contactor closing operation is complete.

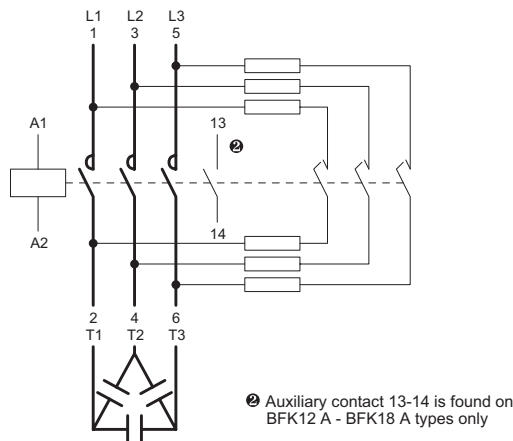


type	kvar 400V	kvar 440V	rated current	auxiliary contact	description
Capacitor switching contactors					
BFK1210A...	12.5	14	18A	1NO	capacitor switching contactor
BFK1810A...	15	17	23A	1NO	capacitor switching contactor
BFK2600A...	20	22	30A	-	capacitor switching contactor
BFK3200A...	25	27.5	36A	-	capacitor switching contactor
BFK3800A...	30	33	43A	-	capacitor switching contactor
BFK5000A...	40	45	58A	-	capacitor switching contactor
BFK8000A...	50	56	75A	-	capacitor switching contactor
BFK11500A...	75	85	115A	-	capacitor switching contactor
BFK15000A...	100	115	144A	-	capacitor switching contactor

Standard coil voltages (add to part number): **AC - 230/400/525V**

Kit to assemble BFK contactors from standard contactors

type	description	for contactor
G460	kit to assemble standard contactors for capacitor switching	BF09...38
BFX10K3	kit to assemble standard contactors for capacitor switching	BF50...80
BFX10K4	kit to assemble standard contactors for capacitor switching	BF95 ...150



Thyristor switching modules (intelligent)

DCTL series thyristor modules are ideal for dynamic correction of power factor. Zero cross switching guarantees very short switching times, reducing current peaks generated by capacitor insertion without voltage peaks on disconnection. Integrated current transformers permit complete monitoring and protection of capacitor banks.

- Suitable for dynamic (fast) power factor correction
- Prevents high in-rush currents at capacitor switching
- Operational voltage: 400 VAC (440/690V available on request)

Advanced communication functions

- NFC connectivity for programming via smart devices
- Optical port for frontal connection to a PC via USB or WiFi via **CX01** or **CX02** dongle
- Optional RS485 card (order code **EXC1042** - see page **A-12**) for connection to DCRG8F connector

type	kvar 400V	rated current	description	dimensions (mm)		
				(H)	(W)	(D)
DCTLA4000150	15	22A	thyristor switching module	218	75	17
DCTLA4000300	30	43A	thyristor switching module	218	75	172
DCTLA4000500	50	72A	thyristor switching module	226	95	182
DCTLA4001000	100	144A	thyristor switching module	301	212	216



EXP...



CX02



CX01

Expansion modules for controllers

EXP series expansion modules add extra functionality to following panel mount products:

- DMG 600/700/800/900** - Digital multimeters and power analysers
- DCRL and DCRG** - Automatic power factor controllers
- ATL 610/800/900** - Automatic transfer controllers
- RGK 400/600/750/800/900** - Generator controllers

type	inputs	outputs	description
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EXP expansion modules *(plug into rear of controller to add more functionality)*

Inputs/Outputs

EXP1006	–	2 relay	to increase number of capacitor steps
EXP1007	–	3 relay	to increase number of capacitor steps
EXP1000	4 digital	–	opto-isolated digital inputs
EXP1001	–	4 static	opto isolated to increase static steps
EXP1002	2 digital	2 static	opto-isolated digital inputs and static outputs
EXP1003	–	2 relay	outputs rated 5A 250 VAC
EXP1004	2 analog	–	opto-isolated PT100, 0/4-20mA, 0-10V, 0...±5V
EXP1005	–	2 analog	opto-isolated 0/4-20mA or 0-10V or 0...±5V
EXP1016	3ph (A)	–	+ 2 x NTC for capacitor bank protection

Communication

EXP1010	USB	–	opto-isolated USB interface
EXP1011	RS232	–	opto-isolated RS232 interface
EXP1012	RS485	–	opto-isolated RS485 interface
EXP1013	Ethernet	–	opto-isolated Ethernet with web server function
EXP1014	Profibus	–	opto-isolated Profibus-DP interface
EXP1015	GSM	–	GPRS/GSM modem without antenna

Accessories

C2	PC - DCRL/DCRG connecting cable + EXP10 11 module
C9	PC - Analog modem connecting cable
CX01	PC - controller USB dongle with connecting cable
CX02	PC - Controller Wi-Fi dongle for programming, data download, diagnostics
CX03	GSM Quad-band antenna for EXP10 15 modem (800/900/1800/1900MHz)



275.525-701400



275.186-405600



275.396-715401



275.100-10120

MKPg-275 three-phase cylindrical capacitors

MKPg-275 three-phase power capacitors, dry self-healing dielectric, gas filled (N2) protecting windings from environmental influences extending life expectancy, permitting mounting in any position.

- Capacitance tolerance: -5 - +10%
- Max. permissible current: 1.5 - 2 IN
- Impregnant (filling): Inert insulation gas (N2) completely harmless to the environment
- Mounting: M12 base mounted fixing stud (any position)
- Protection: Overpressure disconnection facility
- Standards: IEC/EN 60831, VDE 0560-46/47, CSA C22.2 - 190-M1985, UL - 810, GOST 1282-88
- Dielectric losses: <0.25 W/kvar
- Max. inrush current: 300 x IN

type	kvar at:			CN µF 3 x	description	dimensions (mm)	
	400V	440V	480V			(H)	Ø

400...440V three-phase capacitors *Supplied with discharge resistors*

- Rated Voltage: 440V, 50 Hz
- Temp category: **D** -50°C to +55°C Max. (24 hr average 45°C - annual average 35°C)
- Duty: Continuous (life expectancy > 100.000 h)
- For PFC equipment in mains with standard operating conditions

275.548-408200	12.5	15	–	82	3-ph cylindrical capacitor	245	75
275.269-416600	25	30	–	166	3-ph cylindrical capacitor	280	95
275.39B-527400*	41	50	–	274	3-ph cylindrical capacitor	295	136
275.105-10068*	discharge resistor module for 275.39B-527400 capacitor						3 x 68 kΩ

400...480V three-phase industrial capacitors

- For PFC equipment in mains with severe operating conditions or substantial voltage fluctuations.

- Rated Voltage: 480V, 50 Hz
- Temp category: **60** -50°C to +60°C Max. (24 hr average 50°C - annual average 40°C)
- Duty: Continuous (life expectancy > 150.000 h)
- Supplied with discharge resistors (except * require separate discharge module)

275.523-502800	4.2	5	6.1	33	3-ph cylindrical capacitor	196	60
275.545-504000	6.2	7.5	8.7	40	3-ph cylindrical capacitor	164	75
275.546-505800	8.3	10	12.5	58	3-ph cylindrical capacitor	230	75
275.546-506800	10.0	12.5	15.0	68	3-ph cylindrical capacitor	230	75
275.256-508300	12.5	15.0	18.0	83	3-ph cylindrical capacitor	230	85
275.266-511100	16.8	20.0	24.1	111	3-ph cylindrical capacitor	230	95
275.278-513700	20.0	25.0	30.0	137	3-ph cylindrical capacitor	245	100
275.279-516600	25.0	30.0	36.0	166	3-ph cylindrical capacitor	280	100
275.389-519900*	30.0	36.0	43.0	199	3-ph cylindrical capacitor	280	116
275.389-522100*	33.3	40.0	48.0	221	3-ph cylindrical capacitor	280	116
275.100-10120*	discharge resistor module for 275.389-519900 capacitor						3 x 120 kΩ
275.105-10100*	discharge resistor module for 275.389-522100 capacitor						3 x 100 kΩ

525V three-phase capacitors

- Rated Voltage: 400...525V, 50 Hz
- Temp category: **D** -40°C - +55°C (Max: 24 hr average 45°C - annual ave 35°C)
- Duty: Continuous (life expectancy 480V >150000 h 525V >100000 h)
- Supplied with discharge resistors (except * require separate discharge module)

	525V	480V	400V
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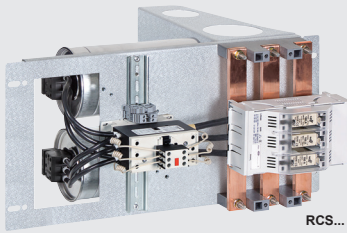
275.525-701400	3.6	3.0	2.2	14	3-ph cylindrical capacitor	164	60
275.535-601900	5	4.1	3	19	3-ph cylindrical capacitor	164	65
275.546-703800	10	8.3	6.2	38	3-ph cylindrical capacitor	230	75
275.548-605800	15	12.5	9.4	58	3-ph cylindrical capacitor	245	75
275.266-607700	20	16.7	12.5	77	3-ph cylindrical capacitor	230	95
275.269-611500	30	25.0	18.6	115	3-ph cylindrical capacitor	280	95
275.396-715401*	40	33.4	25	154	3-ph cylindrical capacitor	230	136
275.105-10100*	discharge resistor module for 40 kvar 525V capacitor						3 x 100 kΩ

690V three-phase capacitors

- Rated Voltage: 690...760V, 50 Hz
- Temperature category: **60** -40°C - +60°C (Max: 24 hr average 50°C - annual ave 40°C)
- Duty: Continuous (life expectancy > 150000 h)
- Supplied with discharge resistors (except * require separate discharge module)

	690V	760V	400
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275.185-402800*	12.5	15	–	27.6	3-ph cylindrical capacitor	164	116
275.186-405600*	25	30	–	56	3-ph cylindrical capacitor	230	116
275.39B-411100*	50	60	–	111	3-ph cylindrical capacitor	295	136
275.100-10300*	discharge resistor module for 12.5/25 kvar 690V capacitor						3 x 300 kΩ
275.105-10180*	discharge resistor module for 50 kvar 690V capacitor						3 x 180 kΩ



RCS...

RC series - Power Factor rack system

RC series power factor racks are designed for direct panel mounting onto vertical supports within floor standing electrical panels.

RC series rack design incorporates the following:

- Sheet metal mounting frame for easy panel mounting
- Electronic heavy duty "gas filled" cylindrical capacitors (*with integrated discharge resistors*)
- Special capacitor switching contactors 400 VAC coil (*230V on request*)
- Three-phase busbar mounted fuse holder with hinged fuse protection cover
- Suitably rated HRC fuses per phase of each capacitor bank
- Incorporated busbar, supports and inter-connecting busbar links

type	kvar at:			description	dimensions (mm)		
	400V	440V	480V		(H)	(W)	(D)

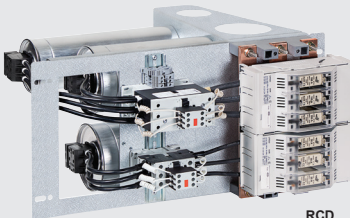
RC series - Rack system (*without harmonic reactors*)

Single step racks - 480V capacitors - fuse protection

RCS01204	12.5	14	17	single step capacitor rack	270	555	470
RCS02504	25	28	34	single step capacitor rack	270	555	470
RCS05004	50	56	67	single step capacitor rack	270	555	470

Double step - racks 480V capacitors - separate fuse protection for each bank

RCD02524	2 x 12.5	2 x 14	2 x 17	double step capacitor rack	270	555	470
RCD05024	2 x 25	2 x 28	2 x 34	double step capacitor rack	270	555	470
RCD10024	2 x 50	2 x 56	2 x 67	double step capacitor rack	270	555	470
RCD03734	12.5+25	14 + 28	17 + 34	double step capacitor rack	270	555	470
RCD07534	25 + 50	28 + 56	34 + 67	double step capacitor rack	270	555	470



RCD...

HR7 series - Racks (480V capacitors) with 7% de-tuned harmonic capacitor banks

7% - 189 Hz De-tuned reactors *for networks with 5th and 7th Harmonics*

Single step - racks 480V capacitors - separate fuse protection for each bank

HRS014074	13.5	15	18	capacitor + 7% reactor rack	310	740	538
HRS027074	27	30	36	capacitor + 7% reactor rack	310	740	538
HRS054074	54	60	72	capacitor + 7% reactor rack	310	740	538

Double step - racks 480V capacitors - separate fuse protection for each bank

HRD027274	2 x 13.5	2 x 15	2 x 18	capacitor + 7% reactor rack	310	740	538
HRD054274	2 x 27	2 x 30	2 x 36	capacitor + 7% reactor rack	310	740	538
HRD108274	2 x 54	2 x 60	2 x 72	capacitor + 7% reactor rack	310	740	538
HRD041374	13.5+27	15 + 30	18 + 36	capacitor + 7% reactor rack	310	740	538
HRD081374	27 + 54	30 + 60	36 + 72	capacitor + 7% reactor rack	310	740	538



HRD...

HR14 series - Racks (525V capacitors) with 14% de-tuned harmonic capacitor banks

14% - 134 Hz De-tuned reactors *for networks with a high levels of 3rd Harmonics*

Single step - racks 480V capacitors - separate fuse protection for each bank

HRS013144	13.5	15	18	capacitor + 14% reactor rack	310	740	538
HRS027144	27	30	36	capacitor + 14% reactor rack	310	740	538
HRS054144	54	60	72	capacitor + 14% reactor rack	310	740	538

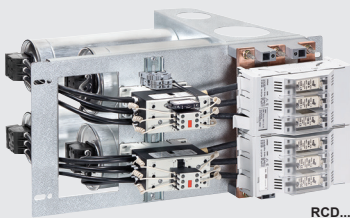
Double step - racks 480V capacitors - separate fuse protection for each bank

HRD027144	2 x 13.5	2 x 15	2 x 18	capacitor + 14% reactor rack	310	740	538
HRD054144	2 x 27	2 x 30	2 x 36	capacitor + 14% reactor rack	310	740	538
HRD040144	13.5+27	15 + 30	18 + 36	capacitor + 14% reactor rack	310	740	538

RC series - 525V Rack system (*without harmonic reactors*)

	525V	440V	400V			
--	------	------	------	--	--	--

RCS02005	20	14	11.5	single step capacitor rack	270	555	470
RCD04025	2 x 20	2 x 14	2 x 11.5	double step capacitor rack	270	555	470
RCD08025	2 x 40	2 x 28	2 x 23	double step capacitor rack	270	555	470
RCD06035	20 + 40	2 x 56	11.5 + 23	double step capacitor rack	270	555	470



RCD...



Try the EM PFC Calculator.

Visit our website

www.em.co.za/powerfactor

Power factor systems (automatic)

For applications with varying capacitor requirements. An automatic reactive controller monitors the network and only switches capacitor banks when required, avoiding potential over or under compensation in a network.

FMS series - Floor standing systems

Complete ready-to-install system comprising following:

- Suitably ventilated floor standing enclosure (*thermostatically controlled roof mounted exhaust fan*)
- Mains isolator, door interlocking (*with early make/late break auxiliary contact*)
- High end reactive control relay **DCRG 8** (*incorporating digital display of all important network parameters*)
- Reverse-flow roof mounted exhaust fan (*improved cooling and ventilation of the entire panel*)
- Bottom cable entry (*top entry available on request*)
- RC series racks heavy duty cylindrical 480V rated capacitors, fusegear and busbar "special" capacitor switching contactors incorporating limiting inductances

Able to monitor all three phase voltage and current to providing accurate indication of:

- Active, Apparent Power as well as Active, Reactive, Apparent Energy monitoring
- Current and Voltage Harmonics analysis (*up to 31st harmonic*)
- Calendar-clock with backup reserve power
- Event logging: alarms, setup changes, events etc. (*internal memory stores last 250 events*)
- Internal panel temperature monitoring
- Expandable with up to 4 expansion modules for: additional steps, Analog Inputs/Outputs, RS323, RS485, Ethernet, GPRS/GSM modem communication

type	kvar at:		steps (kvar) at 400V				Expands to (kvar)	dimensions (mm)		
	400V	440V	12.5	25	50	100		(H)	(W)	(D)

FMS series - Floor standing complete power factor systems (480V capacitors)

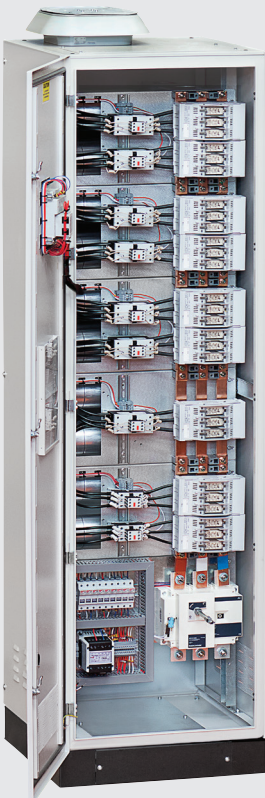
400V floor standing complete power factor systems

FMS13804	137.5	165	1	1	2	-	475	2180	600	630
FMS17504	175.0	210	-	1	3	-	475	2180	600	630
FMS21304	212.5	255	1	2	3	-	475	2180	600	630
FMS23804	237.5	285	1	1	2	1	475	2180	600	630
FMS27504	275.0	330	-	1	3	1	475	2180	600	630
FMS31304	312.5	375	1	2	1	2	475	2180	600	630
FMS33804	338.0	390	1	1	2	2	475	2180	600	630
FMS37504	375.0	450	-	1	3	2	475	2180	600	630
FMS41304	412.5	480	1	2	3	2	475	2180	600	630
FMS43804	437.5	525	1	1	2	3	475	2180	600	630
FMS47504	475.0	570	-	1	1	4	-	2180	600	630
FMS53804	537.5	645	1	1	2	4	950	2180	1200	630
FMS57504	575.0	690	-	1	3	4	950	2180	1200	630
FMS63804	637.5	765	1	1	2	5	950	2180	1200	630
FMS67504	675.0	810	-	1	1	6	950	2180	1200	630
FMS73804	738.0	870	-	1	2	6	950	2180	1200	630
FMS77504	775.0	930	-	1	1	7	950	2180	1200	630
FMS83804	838.0	990	1	1	2	7	950	2180	1200	630
FMS85004	850.0	1020	-	2	2	7	950	2180	1200	630
FMS87504	875.0	1050	-	1	3	7	950	2180	1200	630
FMS95004	950.0	1140	-	2	2	8	-	2180	1200	630

525V floor standing complete power factor systems

type	kvar at:		steps (kvar) at 525V				Expands to (kvar)	dimensions (mm)		
	525V	415V	20	40	80			(H)	(W)	(D)

FMS14005	140	88	1	1	1	-	400	2180	600	630
FMS20005	200	126	2	2	1	-	400	2180	600	630
FMS22005	220	138	1	1	2	-	400	2180	600	630
FMS28005	280	176	2	2	2	-	400	2180	600	630
FMS30005	300	188	1	1	3	-	400	2180	600	630
FMS36005	360	226	2	2	3	-	400	2180	600	630
FMS38005	380	238	1	1	4	-	400	2180	600	630
FMS46005	460	288	1	1	5	-	800	2180	1200	630
FMS52005	520	326	2	2	5	-	800	2180	1200	630
FMS54005	540	338	1	1	6	-	800	2180	1200	630
FMS62005	620	388	1	1	7	-	800	2180	1200	630
FMS68005	680	426	2	2	7	-	800	2180	1200	630
FMS70005	700	438	1	1	8	-	800	2180	1200	630
FMS78005	780	488	1	1	9	-	800	2180	1200	630
FMS80005	800	500	-	-	10	-	-	2180	1200	630



FMS...

FHS series - Floor standing power factor systems (with anti-harmonic de-tuned capacitor banks)

- For networks with THDU ≤6% and/or THDI ≤40%

Growing use of power electronic devices such as: variable speed drives, inverters, UPS systems, battery chargers, LED lighting etc. is causing increasing levels of harmonic distortion in electrical networks, often leading to problems with capacitor installations.

Installation of de-tuned (*reactor-connected*) capacitors designed to force the resonant frequency of the network below the frequency of the lowest harmonic present (*usually the 5th*), thereby ensuring no resonant circuit or amplification of harmonic currents. Such an installation also has a partial filtering effect, reducing the level of voltage distortion on the supply. De-tuned capacitors safer than non-de-tuned capacitors and future-proof for conditions of more and more deteriorating power quality in modern mains.

Complete ready-to-connect floor standing power factor system comprising:

- Suitably ventilated floor standing enclosure with roof mounted exhaust fan
- Mains isolator, door interlocking (*with early make/late break auxiliary contact*)
- HR heavy duty racks comprising: capacitors, reactors, switchgear, fusegear and busbars
- High end reactive control relay **DCRG 8** (*incorporating digital display of all important network parameters*)
Configurable to monitor three voltage and current phases and provide accurate indication of:
 - Active, Apparent power as well as Active, Reactive, Apparent Energy monitoring
 - Current and Voltage Harmonics analysis (*up to 31st harmonic*)
 - Calendar-clock with backup reserve power
 - Event logging: alarms, setup, changes, etc. (*internal memory stores last 250 events*)
 - Internal panel temperature monitoring
- Expandable with up to 4 expansion modules for:
 - additional steps, Analog I/O's, RS323, RS485, Ethernet, GPRS/GSM modem communication



DCRG 8 (Door mount)



FHS...

type	kvar at:		steps (kvar) at 400V				Expands to kvar	dimensions (mm)		
	400V	440V	13.5	27	54	108		(H)	(W)	(D)

Anti-harmonic systems incorporating 7% de-tuned capacitor banks (480V capacitors)

- **7% - 189 Hz De-tuned reactors** *for networks with 3rd and 5th Harmonics*

FHS122074	122	131	1	2	1	-	405	2280	900	600
FHS149074	149	161	1	1	2	-	405	2280	900	600
FHS176074	176	190	1	2	2	-	405	2280	900	600
FHS203074	203	219	1	1	3	-	405	2280	900	600
FHS230074	230	248	1	2	3	-	405	2280	900	600
FHS257074	257	277	1	1	2	1	405	2280	900	600
FHS297074	297	320	-	1	1	2	405	2280	900	600
FHS338074	338	364	1	2	1	2	405	2280	900	600
FHS365074	365	393	1	1	2	2	405	2280	900	600
FHS405074	405	436	-	1	1	3	-	2280	900	600
FHS446074	446	481	1	2	1	3	864	2280	1800	600
FHS473074	473	510	1	1	2	3	864	2280	1800	600
FHS513074	513	553	-	1	1	4	864	2280	1800	600
FHS554074	554	597	1	2	1	4	864	2280	1800	600
FHS621074	621	669	-	1	1	5	864	2280	1800	600
FHS675074	675	727	-	1	2	5	864	2280	1800	600
FHS729074	729	786	-	1	1	6	864	2280	1800	600
FHS770074	770	830	1	2	1	6	864	2280	1800	600
FHS837074	837	902	-	1	1	7	864	2280	1800	600
FHS864074	864	931	-	-	2	7	-	2280	1800	600

Anti-harmonic systems incorporating 14% de-tuned capacitor banks (525V capacitors)

- **14% - 134 Hz De-tuned reactors** *for networks with a high levels of 3rd Harmonics*

FHS095144	95	102	1	1	1	-	203	2280	900	600
FHS149144	149	161	1	1	2	-	203	2280	900	600
FHS203144	203	219	1	1	3	-	-	2280	900	600
FHS257144	257	277	1	1	4	-	432	2280	1800	600
FHS311144	311	335	1	1	5	-	432	2280	1800	600
FHS365144	365	393	1	1	6	-	432	2280	1800	600
FHS419144	419	452	1	1	7	-	432	2280	1800	600
FHS432144	432	466	-	-	8	-	-	2280	1800	600
FHS473144	473	510	1	1	8	-	648	2280	2700	600
FHS527144	527	568	1	1	9	-	648	2280	2700	600
FHS581144	581	626	1	1	10	-	648	2280	2700	600
FHS635144	635	684	1	1	11	-	648	2280	2700	600
FHS648144	648	698	-	-	12	-	-	2280	2700	600



WMS...



WMS...



HFRA...



EXP1011



EXP1015 + CX03

WMS series - Wall mount power factor systems (automatic) 400/440V

For applications with varying capacitor requirements. An automatic reactive controller monitors the network and only switches capacitor banks when required, avoiding potential over or under compensation in a network.

WMS series wall mount power factor systems (37 - 150 kvar - 400V)

Complete ready-to-install system comprising following

- Reverse-flow fan ventilated wall mount enclosure, bottom cable entry (*top entry on request*)
- Mains isolator, door interlocking (*with early make / late break auxiliary*)
- Heavy duty three phase capacitors (with internal discharge resistors)
- Reactive control relay **DCRL 5** (digital display of all important electrical network parameters)
- "Special" capacitor switching contactors incorporating limiting resistors
- HRC fuse protection (*per capacitor bank*)

type	kvar at:		steps (kvar) at 415V			Expands to (kvar)	dimensions (mm)		
	415V	440V	12.5	25	50		(H)	(W)	(D)

WM series - Wall mount complete power factor systems (440V capacitors)

WMS03704	37.5	45	1	1	–	87.5	700	600	300
WMS05004	50	60	2	1	–	87.5	700	600	300
WMS06204	62.5	75	1	2	–	87.5	700	600	300
WMS07504	75	90	2	2	–	87.5	700	600	300
WMS08704	87.5	105	1	3	–	–	700	600	300
WMS10004	100	120	2	1	1	150	700	900	300
WMS11204	112.5	135	1	2	1	150	700	900	300
WMS12504	125	150	2	2	1	150	700	900	300
WMS13704	137.5	165	1	1	2	150	700	900	300
WMS15004	150	180	–	2	2	–	700	900	300

De-tuned anti-harmonic reactors 400V, 50Hz

De-tuned reactors protect capacitors against harmonics, avoiding parallel resonance and amplification of harmonics flowing within the network.

- Insulation: F class insulation, 155°C
- Internal protection: Thermal cutout (125°C) incorporated (*on centre phase*)
- Reference standards: IEC/EN 60076-6, 61558-2-20

type	kvar at:		%	description	dimensions (mm)		
	400V	440V			(H)	(W)	(D)

7% - 189 Hz De-tuned reactors

for networks with 5th and 7th Harmonics

HFRA1207	12.5	15	7%	anti-harmonic reactors	215	210	120
HFRA2507	25	30	7%	anti-harmonic reactors	190	240	170
HFRA5007	50	60	7%	anti-harmonic reactors	240	300	180

14% - 134 Hz De-tuned reactors

for networks with a high levels of 3rd Harmonics

HFRA1314	13.5	16	14%	anti-harmonic reactors	280	240	150
HFRA2714	27	32	14%	anti-harmonic reactors	250	330	220
HFRA5414	54	64	14%	anti-harmonic reactors	270	340	220

Remote monitoring of FM series systems

For remote monitoring and control of all electrical network parameters including harmonics, panel internal temperature, alarms, events and all setup parameters.

Communication modules simply plug-in to the controller and are automatically configured to offer various communication protocols.

EXP1011	opto-isolated	RS232 plug-in communication	expansion module
EXP1012	opto-isolated	RS485 plug-in communication	expansion module
EXP1013	opto-isolated	ETHERNET with web server function	expansion module
EXP1014	opto-isolated	Profibus-DP plug-in communication	expansion module

Plug-in GPRS/GSM modem automatically configures to the controller when mounted and once a data-enabled SIM card is installed the controller can send alarm or event SMS's or e-mails.

EXP1015	plug-in GPRS/GSM Modem for remote monitoring	expansion module
CX03	GSM/GPRS penta-band antenna (850/900/1800/1900/2100MHz)	for above

Static Var Generator (SVG) systems

The increase of non-linear and other challenging loads in electrical grids today present unique Power Quality challenges. **SVG** (Static Var Generator) provides a cost effective, extremely fast solution to Power Quality problems, enhancing equipment operating life whilst improving overall power system capacity.

SVG is the new standard in reactive energy compensation, a highly accurate, reliable solution for today's networks characterised by significant increases in harmonics. SVG provides stable, accurate, real-time PFC (*without the drawbacks of traditional capacitor based systems*)

The **SVG** operates by detecting the load current, analysing the reactive content and then injecting the exact reverse reactive compensating current on an instantaneous real-time basis enabling perfect compensation on each phase for both inductive and capacitive loads.

Typical applications

- Data centres: For correction of leading power factor
- UPS systems: Enabling back-up generators to easily synchronise with network UPS systems
- Renewable power generation: (e.g. *photovoltaics and wind turbines*)
- Plastic industry machinery: (e.g. *extruders, injection moulders*)
- Loads with low power factor: Motors, cables, lightly loaded transformers, lighting, etc.
- Electrical welding systems
- Highly dynamic loads requiring rapid reactive power compensation, e.g: electric arc furnaces, or in big steps like cranes, sawmill machinery, etc.

Benefits include: - reduced maintenance, a considerably longer life span, compact size

- Complete Power Quality improvement solution including real-time elimination of harmonics, flicker mitigation
- Provides dynamic step-less compensation instantaneously in real-time to each phase individually
- Only injects the kVAr required in that moment with no possibility of over or under-compensation.
- Can maintain a PF of 0.99 lagging or unity (*if required*) for both inductive and capacitive loads.
- Voltage fluctuations (*flicker*) mitigation and reduction of voltage (*sag and swell*) variations
- Immune to harmonics, resonance and voltage level and is maintenance free (*with no electromechanical components*)
- Expandable by unlimited parallel installations (*unnecessary to over-dimension the capacity to cater future needs*)
- Output current is unaffected by mains voltage fluctuations providing stable support for mains voltage.

Static Var Generator (SVG) systems

- Cooling: Forced air cooling (*fan cooling*)
- Efficiency: $\geq 97\%$
- Communication: RS485 and Ethernet (RJ45) ports (*via HMI*)/RS232 (*via LCM*)

new



PQCMS503BVB00B0



PQCMA101ANB21B0

type	Kvar	description	expands: up to	dimensions (mm) (H) (W) (D)		
Static Var Generators (SVG) - Wall mount system				(3 phase 4 wire) 400V		
PQCMS503BVB00B0*	50kvar	Static Var Generators (SVG) system	–	174	440	600
PQCMA750ANA23B0	–	LCM screen controller for (SVG)	up to	7 slave devices		
PQCMA101ANB21B0	–	HMI touch screen controller for (SVG)	up to	7 slave devices		
* Touch screen or LCM controller required.						
Static Var Generators (SVG) - Floor standing system				(3 phase 4 wire) 400V		
Withdrawable type cabinet - for withdrawable type SVG modules (IP30)						
PQCS-400-50-200DC4EM	50kvar	4 module cabinet with rack	200kvar	2000	600	800
PQCS-400-50-350DC4EM	50kvar	7 module cabinet with rack	350kvar	2000	600	800
Withdrawable rack for above draw type cabinet						
PQCMS503BHB02B0	50kvar	rack module for above cabinet	–	174	440	522

Active Power Filter (APF) systems

The increase of non-linear and other challenging loads in electrical grids today present unique Power Quality challenges. **APF** (Active Power Filter) provides a cost efficient solution to Power Quality problems, eliminating resonance problems, preventing amplified harmonic current and voltage, simultaneously compensating reactive power in real-time to maintain power factor at >0.99, enhancing equipment operating life whilst improving overall power system capacity.

APF systems provide multiple compensation functionality including:

- **Harmonic compensation:** *(filtering any order from 2nd to 50th harmonic)*
- **Power Factor compensation:** *(compensating in real-time to maintain power factor at >0.99)*
- **Phase Imbalance compensation:** *(reducing the peak current demand tariff on electricity bills)*

APF is the new standard in harmonic filtering, a highly accurate, reliable solution for today's networks characterised by significant increases in harmonics, able to provide stable, accurate, real-time PFC *(without the drawbacks of traditional capacitor based systems)*

Typical applications:

Malls, shopping centres, office blocks, hospitals, printing works, processing plants, Data centres, pumping stations and all applications where harmonic generating equipment is utilised, such as variable speed drives (VSD's) rectifiers, battery charges, UPS's, Power supplies, LED lighting.

- Plastic industry machinery: *(e.g. extruders, injection moulders)*
- Loads with low power factor: Motors, cables, lightly loaded transformers, lighting, etc.

Benefits include:

- Complete power quality improvement solution including real-time elimination of harmonics, flicker mitigation
- Provides dynamic step-less compensation instantaneously in real-time to each phase individually
- Only injects the kVAR required in that moment with no possibility of over or under-compensation.
- Can maintain a PF of 0.99 lagging or unity *(if required)* for both inductive and capacitive loads.
- Voltage fluctuations *(flicker)* mitigation and reduction of voltage *(sag and swell)* variations
- Correcting phase imbalance *(reducing the peak current which reduces the peak demand tariff on electricity bills)*
- Maintenance free *(with no electromechanical components)* and a longer life span
- Expandable by unlimited parallel installations *(unnecessary to over-dimension the capacity to cater future needs)*
- Output current is unaffected by mains voltage fluctuations providing stable support for mains voltage.

Active Power Filter (APF) systems

- Harmonic compensation: 2nd to 50th harmonic
- Cooling: Forced air cooling (fan cooling)
- Efficiency: ≥97%
- Communication: RS485 and Ethernet (RJ45) ports *(via HMI)/RS232 (via LCM)*



PQCA-400-75-525DC4EM



PQCA750BHA00B0

type	amps	description	expands: up to	dimensions (mm) (H) (W) (D)
Active Power Filters (APF) - Wall mount system			(3 phase 4 wire) 400V	
PQCA500BVB00B0*	50A	Active Power Filter (APF) system	–	174 440 600
PQCA750ANA23B0	–	LCM controller for (APF)	up to	7 slave devices
PQCA101ANB21B0	–	HMI touch screen controller for (APF)	up to	7 slave devices
* Touch screen or LCM controller required.				
Active Power Filters (APF) - Floor standing system			(3 phase 4 wire) 400V	
Withdrawable type cabinet - for withdrawable type APF modules (IP30)				
PQCA-400-75-300DC4EM	75A	4 module cabinet fitted with rack	300A	2000 600 800
PQCA-400-75-525DC4EM	75A	7 module cabinet fitted with rack	525A	2000 600 800
Withdrawable rack module for above draw type cabinet				
PQCA750BHA00B0	75A	rack module for above cabinet	–	174 440 522

Passive harmonic filters

ECOsine FN 3416 series represent a very compact economical harmonic filter with a THID performance of ≤10% in conjunction with VSD's built-in DC-link choke. Ideal for non-linear three-phase equipment with 6-pulse front-end rectifier circuits.

Performance complies with EN 61000-3-12 or with IEEE-519 for I_{sc}/I_L <50. and other power standards. Schaffner ECOSine filters help to unburden the electrical infrastructure from excess loading and heat caused by current harmonics, and therefore support a better utilization of electric system capacity. Lower harmonics also reduce the risk of system resonances and potential downtime of sensitive electronic equipment.

FN 3416 filters upgrade standard motor drives to "low-harmonic drives" quickly and easily.

- Ideal for motor drives with 6-pulse rectifier front-end
- Suitable for diode and thyristor (SCR) rectifier applications

Nominal operating voltage: 3x 380 to 500 VAC ±10%
 THID current distortion: <10% @ rated power (with DC-Link choke)
 Efficiency: >98% @ nominal line voltage and power
 Conformity to: UL 508, EN 61558-2-20, CE (LVD2006/95/EC)



FN3416-45-33

type	current 400V	rated load power		power loss (W)	dimensions (mm)			kg
		400V	500V		(H)	(W)	(D)	

ECOsine passive harmonic filters

FN3416-10-44	10A	4kW	5.5kW	63	390	185	190	10
FN3416-13-44	13A	5.5kW	7.5kW	82	390	185	190	10
FN3416-16-44	16A	7.5kW	11kW	105	390	185	190	15
FN3416-24-33	24A	11kW	15kW	153	455	250	230	20
FN3416-32-33	32A	15kW	18.5kW	294	455	250	230	22
FN3416-38-33	38A	18.5kW	22kW	256	455	250	230	25
FN3416-45-33	45A	22kW	30kW	306	455	280	230	29
FN3416-60-34	60A	30kW	37kW	408	520	280	248	37
FN3416-75-34	75A	37kW	45kW	410	520	280	248	43
FN3416-90-35	90A	45kW	55kW	493	580	280	248	47
FN3416-110-35	110A	55kW	75kW	546	580	280	248	50
FN3416-150-40	150A	75kW	90kW	784	700	450	385	86
FN3416-180-40	180A	90kW	110kW	817	700	450	385	92
FN3416-210-40	210A	110kW	132kW	887	700	450	385	100
FN3416-260-99	260A	132kW	160kW	947	700	450	385	125
FN3416-320-99	320A	160kW	200kW	988	700	450	385	135

EMC/RFI - Three phase filters

Electro Magnetic Interference (EMI) unwanted high frequencies which ride on AC waveform. Many products such as variable frequency drives generate EMI, which may interrupt, obstruct, degrade or limit the effective performance of electronic equipment.

FN 3258 filters ensure compliance with Class A limits according to EN 55011 up to 50 m cable length and beyond, and contribute significantly to meet emission limits to Class B

Applications:

Three-phase variable speed motor drives, servo drives, inverters and converters
 HVAC equipment, elevators, power supplies, UPS and further three-phase applications

- Exceptional attenuation performance from 150 kHz to 30 MHz
- Excellent saturation resistance up to 50 m cable length
- Most compact and slim filter design in its class

Max. continuous operating voltage: 3x 480/277 VAC (FN 3258)
 Conformity to: UL 1283, CSA 22.2 No. 8 1986, IEC/EN 60939



FN3258-16-44

type	current at 50°C	typical drive	leakage current	power loss (W)	dimensions (mm)			kg
					(H)	(W)	(D)	

FN3258-16-44	16A	7.5kW	4.3 mA	6.1	250	45	70	0.8
FN3258-30-33	30A	15kW	4.3 mA	11.8	270	50	85	1.2
FN3258-42-33	42A	22kW	4.3 mA	15.7	310	50	85	1.4
FN3258-55-34	55A	30kW	4.3 mA	25.9	250	85	90	2
FN3258-75-34	75A	37kW	4.3 mA	32.2	270	80	135	2.7
FN3258-100-35	100A	55kW	4.3 mA	34.5	270	90	150	4.3
FN3258-130-35	130A	75kW	4.3 mA	43.1	270	90	150	4.5
FN3258-180-40	180A	90kW	4.3 mA	58.3	380	120	170	6

M - Tools



new



P01157151



P01157150



P01157151 + P01102134



P01120580

Chauvin Arnoux - PEL103 Power & Energy Loggers IP54 casing

Portable, advanced yet simple to use Power and Energy logger, designed for energy audits (ISO 50001 standard) or one-off measurements of the Power and Energy values in low-voltage electrical networks (1000 V CAT III)

PEL100 series Power and Energy loggers provide a complete solution to measuring and identifying energy consumption in any industry, they can be used handsfree, remotely without interruption to the mains power. The logger tracks even the slightest consumption in an electrical network, providing all Power and Energy measurement recording on the internal 2GB SD card, while simultaneously permitting real-time monitoring on its backlit 4 line LCD display. Recordings are time/date stamped for ease of comparing measured gains achieved before and after installation modification. Easily transfer recorded data to a PC via the free PEL data transfer software and SD card with USB adaptor (included). Designed to fit inside most electrical cabinets thanks to its magnetic base or hook for easy mounting.

Key Features of the PEL103 include:

Measurements and display of:

- RMS frequency, voltage and current measurements
- Voltage measurement ranges 10 to 1000V AC/DC +/- 0.2 % + 0.5 V
- Current measurement ranges 5 mA to 10 kA AC / 50 mA to 1,4 kA DC ±0.5 %
- VA, W and var power values
- Power Factor (PF), cos φ, tan φ and crest factor
- Total Harmonic Distortion (THD) for currents and voltages
- DC, 50 Hz, 60 Hz and 400 Hz measurements
- Phase rotation indication and MIN/MAX indication of all parameters
- VAh, Wh (source, load) and varh (4 quadrant) energy values, total energy
- Harmonics: up to the 50th order for currents and voltages (an essential feature to help identify problems)

- **Network types include:** Three phase (with or without neutral), split phase, single phase
- **Automatic recognition:** Of the type of sensor connected
- **Communication / Data transfer:** USB, Ethernet and Bluetooth / PEL transfer PC software (included)
- **Records:** Measurements and calculation results on SD card (included)
- **Acquisition rate:** 128s/period



Scan to watch video

PEL 103 Power and Energy logger (KIT) (created as a complete kit with following accessories)

- 1 x PEL103 Power and Energy Logger: Analyser with backlit LCD screen
- 3 x MA193 (200 mm) flexible current clamps: MINIFLEX MA193 flexible current sensors - 200mA to 10 kA
- 4 x Measurement leads and crocodile clips: Robust high quality test leads for frequent use/built to last
- 1 x Set of coloured rings and Inserts: For easy identification of connections and leads
- 1 x 2GB SD card (internal): SD card to USB adaptor

SD card to USB adapter, USB cable, mains cable, MultiFIX mounting system, operating manual (on CD)
PEL transfer PC software enabling data to be transferred to PC, all in a convenient canvas carrying bag.

type	model	description	dimensions (mm)		
			(H)	(W)	(D)

PEL 103 Power and Energy logger (KIT)					
P01157151	PEL103 (KIT)	portable power and energy logger/analyser	256	125	37
P01157150	PEL102 (KIT)	as above, but without LCD display screen	256	125	37

Accessories for PEL103 Power and Energy logger

P01120434B	MN 93A	compact tong clamps for PEL102/3	Ø20 mm	0.005 - 100A	
P01120323B	C193	compact tong clamps for PEL102/3	Ø52 mm	1 - 1000A	
P01120580*	MA193-250	Ampflex 250 mm flexible current sensor	Ø70 mm	200mA - 10kA	
P01120526B	A193-450	Ampflex 450 mm flexible current sensor	Ø140 mm	100mA - 10kA	
P01101959	CA833X-F	for reading from 5A secondary CT's		5A adaptor	
P01102134	self-power	mains adaptor for self powering PEL from supply		mains adaptor	
P01295174*	mains lead	mains power cable - (2P EUR)			
P01295476*	test leads	spare measurement leads (3m) with crocodile clips		KIT (black)	
P01102080*	set	ID rings and inserts (for ends of leads and sensors)		diff. colours	

P01298078* bag no.23 canvas carrying bag for PEL analyser and access

* Items supplied with standard PEL KIT.

Data processing software power quality & installation supervision

Automatically recognizes the instrument connected to the PC and opens the corresponding menu, providing direct access to the configuration and saved data. Includes many predefined report templates for quick generation in compliance with applicable standards. Users can create personalised models to fit their requirements and add comments directly.

- Configuration of all the functions of instruments connected to a PC or via Bluetooth
- Recovery of the recorded measurement data and backup of measurement files
- Opening of saved files / processing and creation of reports (EN50160)
- Export into an Excel spreadsheet or PDF format / Database management

P01102095 DataView powerful configuration/transfer/measurement data processing software

