

# ***POWER FACTOR CORRECTION***

Better electrical utilisation and efficiency can be achieved with the use of Power Factor Improvement Systems, specifically:

- Reduction of electricity costs
- Reduction of load
- Reduced losses
- Increased machinery performance
- Decreased contribution to the greenhouse effect

### POWER FACTOR CONTROL RELAY

- Digital display showing PF, Current, Harmonic Voltage etc.
- Microprocessor controller to provide accurate PF control without overcompensation
- Cyclic operation to prolong life of contactors and capacitors
- Protection against harmonic overcurrent
- Counter for switching operation
- Remote monitoring display and control on a PC via a RS485 communication (optional)

### CABINETS

#### DESIGN

- Flexible design in modular construction
- Compact to save valuable switchroom space

#### ENCLOSURE:

- Free standing cabinets constructed from 2mm thick mild steel
- Zinc plated sheet metal for additional rust protection
- Powder coated in electrical orange (or optional colours of your choice)
- Cabinet doors with lift off hinges and a three point locking mechanism
- Cable entry through either the top or bottom with aluminium gland plates

#### CABINET COOLING:

- Large volume, low velocity fan
- Efficient motor with low noise
- Thermostatic fan control

## CAPACITORS

### FEATURES

- Cylindrical aluminium casing
- Metallised polypropylene foil
- PCB free impregnate
- Self healing
- Overcurrent cut-off for extra protection
- Continuous current rating, up to 175% of rated current
- Low capacitor losses, < 0.5 W/kVAR (including discharge resistors)
- Temperature rating of -10°C to +60°C; this allows the capacitor to cope with most severe conditions
- Long life expectancy
- Maintenance free terminals

### MODULE

- Compact modular design for easy installation and maintenance
- Segregation between capacitors and reactors
- Rating up to 100kVAR without reactors or up to 50kVAR with reactors

### QUALITY CONTROL

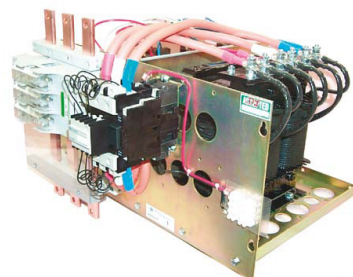
- Continuous commitment to supply quality products
- Manufactured to AS/NZ 9001:1994

### CAPACITOR CONTACTOR

- Specially designed for capacitor switching (AS3000-1991-4.16.2)
- Includes an inrush current limiting device
- Reduces stress on capacitors and switchgear
- Reduced switching surges and voltage spikes during capacitor switching

### SAFETY

- Components are shrouded





# STANDARD EQUIPMENT SPECIFICATIONS

## PROTECTION CLASS INDOOR IP 31

- Indoor dusty areas IP 51
- Outdoor IP 54

## CAPACITORS

- Temperature class: -10°C to +60°C
- Voltage rating: 440V and 480V (525V for systems with harmonic blocking reactors).
- Complies with Australian (AS 1013-1971) and International (IEC831 part 1 & 2) standards

## MAIN PROTECTION

- Fuse isolators or circuit breakers for systems up to 300kVAr
- Circuit breakers for systems rated above 300kVAr

## BUSBAR SYSTEM

- Fault level up to 70kA

## CABLE ENTRY

- Top or bottom entry

TOTAL RATING	TYPE	MAX. DIMENSIONS			SHIPPING
(kVAr)		Width (mm)	Depth (mm)	Height (mm)	Weight (kg)
50	LSW50-415	600	680	1450	144
75	LSW575-415	600	680	1450	150
100	LSW100-415	600	680	1450	155
125	LSW125-415	600	680	1450	166
150	LSW150-415	600	680	1450	177
200	LSW200-415	600	680	1450	199
250	LSF250-415	600	680	2150	254
300	LSF300-415	600	680	2150	265
350	LSF350-415	600	680	2150	298
400	LSF400-415	600	680	2150	309
500	LSF300-415 + LSF200S-415	1200	680	2150	519
800	LSF400-415 + LSF400S-415	1200	680	2150	618
1000	LSF400-415 + 3xLSF400S-415	2400	680	2150	927



## HARMONICS

Advances in technology have increased the amount of harmonics created by electrical systems. The increasing use of transistors, thyristors and non-linear devices such as variable speed drives, computers, electric power supplies, low energy lighting etc. are largely responsible. They effect the supply system due to their ability to draw a large reactive non-sinusoidal current. Reactive current is composed of a series of sinusoidal currents consisting of the fundamental and harmonic currents. The injection of harmonic current into a supply system will result in the superimposition of harmonic voltages, consequently distorting the systems voltage. This can lead to disturbances of the supply system and may cause failure of capacitor banks and other equipment i.e. computers, power supplies, motors etc. Additionally, an amplification of current and voltage will occur if the resonance frequency is close or equal to one of the harmonic frequencies within the system.

## DESIGN

- Similar in design to the Automatic Power Factor Systems except:
- Capacitors have a higher voltage rating
- Each capacitor step has a harmonic blocking reactor

Automatic Power Factor Improvement Systems with Blocking Reactors are based on our modular design with ratings of 25 and 50 kVAr (1 step) per module or 100kVAr (2 steps) for total segregation between reactors and capacitors.

The presence of harmonics in power systems can result in the following problems:

- The newly installed capacitor banks may be damaged
- Resonance between the capacitor bank and the reactive impedance of the supply
- An increase in the harmonic voltage and current after installation of capacitor banks

To prevent these conditions Harmonic Blocking Reactors are installed in series with the capacitors.

TOTAL RATING	TYPE	MAX. DIMENSIONS			SHIPPING
(kVAr)		Width (mm)	Depth (mm)	Height (mm)	Weight (kg)
50	LSW50-415BR	600	680	1450	144
75	LSW75-415BR	600	680	1450	150
100	LSW100-415BR	600	680	1450	155
150	LSW150-415BR	600	680	1450	177
200	LSW200-415BR	600	680	1450	199
250	LDF250-415BR	600	680	2150	254
300	LDF300-415BR	600	680	2150	265
350	LDF350-415BR	600	680	2150	298
400	LDF400-415BR	600D	680	2150	309
500	LTF300-415BR	1200	680	2150	519
800	LDF400-415BR + LDF400S-415BR	1200	680	2150	618
1000	LDF400-415BR + 3xLDF400S-415BR	2400	680	2150	927



## HARMONIC BLOCKING

### REACTOR SPECIFICATIONS

- Three phase low loss harmonic blocking reactor for each capacitor step
- Losses at rated current < 100W per 50 kVAr reactor
- 189 Hz tuning frequency



## SAVING ON YOUR ELECTRICITY BILL

Features and benefits of Automatic Power Factor Improvement Systems

Features	Benefits
Reliability	Design incorporates the latest leading edge technologies developed by Frako-Germany and Captech to provide long and trouble free life
Design	Modular construction for easy change and system expansion
Enclosure with zinc plating and powder coating	Provide excellent rust protection
Capacitors	Long life expectancy High ambient temperature rating of 60°C Up to 175% continuous current rating Maintenance free terminals
Special capacitor contactor with "early make" contacts	Reduction of capacitor inrush current Reduced stress on electrical equipment Reduced voltage spikes during capacitor switching
Harmonic blocking reactors	Manufactured by Captech and designed and tested to Australian Standards
Large fans	Excellent cooling with thermostatic control Low noise level
Power factor controller with microprocessor and harmonic indication/protection, optional computer interface	Excellent cooling with thermostatic control Low noise level
Busbar system with high fault level	Up to 70 kA
Safety	Components are shrouded
Quality control to AS/NZ ISO 9001/1994	Ensures high quality of manufactured product including traceability



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