



PRODUCT CATALOG

Sharda Electronics & Co.

An ISO 9001:2015 Certified Company





Sharda Electronics & Co.

Manufacturer of : L.T., H.T. & Special Capacitors



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LT / LV Automatic Real Time Power Factor Controller (RTAPFC)



SHARDA Low Voltage Automatic Real Time Power Factor Controller Capacitor Panel achieves & maintains very closure to unity Power Factor & Harmonics level within limit. With advance technology of Thyristor or contactor used switching devices, Inrush current limiting reactor or harmonics filter reactor.

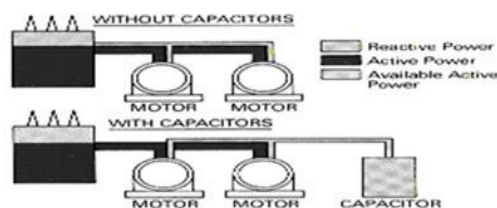
For optimum utilization of available power, the reactive power consumption should be reduced or nullified i.e. power factor should be unity, hence, most of the Power Distribution companies have policy to penalize the industrial and commercial consumers for not maintaining power factor in Leading as well as in Lagging.

However, due to reactive power drawn by capacitive or inductive load in the consumer premises the power factor is either lagging or leading, thus to maintain it within limit i.e. for compensating or supplying required KVAR, the capacitors (in case of lagging PF) or reactors (in case of leading PF) are connected across the system.

For stable load the fixed KVAR compensation is required, while for variable load the KVAR requirement also changes as per the load duration cycle, thus in such case the Automatic Power Factor Control Panel is installed.

THE ROLE OF AUTOMATIC POWER FACTOR CONTROLLER CAPACITOR PANEL

Low power factor is a problem that can be solved by adding power factor correction APFC capacitor Panel in a system. Correction capacitors work as reactive current generators "providing" needed reactive power (kVAR) into the power supply. By supplying their own source of reactive power, the industrial user frees the utility from having to supply it, therefore, the total amount of apparent power supplied by the utility will be less.



CONCEPT OF APFC CAPACITOR PANEL

Automatic Power factor correction capacitor panels are rated in electrical units called "VARs". One VAR is equivalent to one volt-ampere of reactive power. VARs, then, are units of measurement for indicating just how much reactive power the capacitor will supply. As reactive power is usually measured in the thousands of VARs, the letter "k" (abbreviation for kilo", meaning thousands) precedes the VAR creating the more familiar "kVAR" term. The capacitor kVAR rating, then, shows how much reactive power the capacitor will supply. Each unit of the capacitor's kVAR will decrease the inductive reactive power demand (magnetizing demand) by the same amount.

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Table to find the factor from existing power factor to desired power factor

	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99
0.4	1.807	1.836	1.865	1.896	1.928	1.963	2.000	0.97	2.041	1.910
0.42	1.676	1.705	1.735	1.766	1.798	1.832	1.749	1.790	1.680	1.577
0.44	1.557	1.585	1.615	1.646	1.678	1.712	1.639	1.481	1.392	1.308
0.46	1.446	1.475	1.504	1.535	1.567	1.602	1.536	1.229	1.154	1.083
0.48	1.343	1.372	1.402	1.432	1.465	1.499	1.440	1.015	0.950	0.888
0.5	1.248	1.276	1.306	1.337	1.369	1.403	1.351	0.828	0.770	0.713
0.52	1.158	1.187	1.217	1.247	1.280	1.314	1.267	0.658	0.631	0.605
0.54	1.074	1.103	1.133	1.163	1.196	1.230	1.188	0.552	0.499	0.447
0.56	0.995	1.024	1.053	1.084	1.116	1.151	1.113	0.395	0.369	0.343
0.58	0.920	0.949	0.979	1.009	1.042	1.076	1.042	0.316	0.289	0.262
0.6	0.849	0.878	0.907	0.938	0.970	1.005	0.974	0.234	0.253	0.175
0.62	0.781	0.810	0.839	0.870	0.903	0.937	0.909	0.145	0.112	0.078
0.64	0.716	0.745	0.775	0.805	0.838	0.872	0.847	0.98	2.088	1.958
0.66	0.654	0.683	0.712	0.743	0.775	0.810	0.787	1.838	1.727	1.625
0.68	0.594	0.623	0.652	0.683	0.715	0.750	0.729	1.529	1.440	1.356
0.7	0.536	0.565	0.594	0.625	0.657	0.692	0.672	1.276	1.201	1.130
0.72	0.480	0.508	0.538	0.569	0.601	0.635	0.617	1.062	0.998	0.935
0.74	0.425	0.453	0.483	0.514	0.546	0.580	0.590	0.875	0.817	0.761
0.75	0.380	0.426	0.456	0.487	0.519	0.553	0.706	0.679	0.652	0.706
0.76	0.371	0.400	0.429	0.460	0.492	0.526	0.563	0.699	0.547	0.495
0.78	0.318	0.347	0.376	0.407	0.439	0.474	0.511	0.443	0.417	0.390
0.8	0.266	0.294	0.324	0.355	0.387	0.421	0.458	0.364	0.337	0.309
0.82	0.214	0.242	0.272	0.303	0.335	0.369	0.406	0.281	0.313	0.223
0.84	0.162	0.190	0.220	0.251	0.283	0.317	0.354	0.192	0.160	0.126
0.85	0.135	0.164	0.194	0.225	0.257	0.291	0.328	0.99	2.149	2.018
0.86	0.109	0.138	0.167	0.198	0.230	0.265	0.302	1.898	1.788	1.685
0.87	0.082	0.111	0.141	0.172	0.204	0.238	0.275	1.590	1.500	1.416
0.88	0.055	0.084	0.114	0.145	0.177	0.211	0.248	1.337	1.262	1.191
0.89	0.028	0.057	0.086	0.117	0.149	0.184	0.221	1.123	1.058	0.996
0.9		0.029	0.058	0.089	0.121	0.156	0.193	0.936	0.878	0.821
0.91		0.030	0.060	0.093	0.127	0.164	0.205	0.766	0.739	0.713
0.92				0.031	0.063	0.097	0.134	0.660	0.608	0.556
0.93					0.032	0.067	0.104	0.503	0.477	0.451
0.94						0.034	0.071	0.424	0.397	0.370
0.95							0.037	0.342	0.313	0.284

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CAUSES OF LOW POWER FACTOR

- Most of the A.C. motors are of induction type which have low lagging power factor. These motors work at a power factor is extremely small.
- Arc lamp, electric discharge lamps and industrial heating furnaces operate at low lagging power factor.
- The load on the power system is varying ; being high during morning & evening & low at other times. During low load supply voltage increases also magnitude of current increases. This results in the decrease of power factor.

DISADVANTAGES OF LOW POWER FACTOR

The Power Factor plays an important role in A.C. Circuit since power consumed depends upon this factor.

$$P = VL \times IL \times \cos(\Phi) \text{ (For Single Phase)}$$

$$IL = P / VL \cos(\Phi)$$

$$P = 1.73 \times VL \times IL \times \cos(\Phi) \text{ (For Three Phase)}$$

$$IL = P / 1.73 \times VL \times \cos(\Phi)$$

It is clear from above that for fixed power & voltage the load current is inversely proportional to the power factor. Lower the power factor, higher the load current & vice-versa.

The larger current due to poor power factor result in the following Disadvantages:

- The KVA rating of equipment is larger. The electric machinery's are rated in *kVA. $kVA = kW / \cos(\Phi)$
 - The conductor size. To transmit or fixed amount of power at constant voltage, the conductor will have to more current at low power factor.
 - Larger copper losses. The large current at low power factor causes more (I^2R) losses in all element of the supply.
 - Poor voltage regulation.
 - Reduce hunting capacity of system.

The above discussion indicates that the low power factor is an objective feature in the supply system.

APPLICATION

- 40% saving in electricity bill.
- Supply quality improves.
- Saving in losses of transformer rating.
- Avoid nuisance tripping for sensitive load in event of harmonics effect.

FEATURES of RTAPFC PANEL

- Electricity saving.
- Increase loading capacity of generator.
- Reduction in kVA demand.
- As kVA is directly proportional to current so substantially saving in I^2R losses, eddy current & hysteresis losses.
- Losses of cables and transformer is reduced.
- Improves performance of electrical apparatus.
- Time delay avoids impulse operation.
- Automatic dynamic switching.
- No inrush current, Voltage surges, Voltage spike, Harmonics generated at time of switching of capacitor.
- Switchgears are used in panel which compliance all international standards.
- Panels are protected by IP4XX.
- Anti-corrosive & UV protected powder coated panel
- Compact design.
- Cooling is maintained by exhaust fan & thermostat.
- Efficient after sale service.

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PRODUCT RANGE

Rated kVAR : **100 kVAR to 2000 kVAR**

Rated Voltage : **400 volt to 690 volt**

Mode of switching : **Contactor / Thyristor**

** Note: We provides **ARTPFC Panel** as per system / customer requirement.
The design criteria is depends on the load Power Factor & total connected load.

BILL OF MATERIAL

Sr. No.	Description
01	APP type LV / LT Ultra Heavy duty Capacitor (specially design for Harmonics Filter)
02	Switching Inrush Current limiting Reactor / Harmonics Filter Series Reactor
03	Indication Lamp
04	Incomer MCCB / ACB
05	Current transformer for Load current sensing
06	MCB for metering
07	MCCB for each capacitor step for manual operation
08	Control Unit (Thyristor / Contactor)
09	Neutral Link
10	Microprocessor based APFC Relay
11	Exhaust Fan Industrial type
12	Switch Mode Power Supply
13	Thermal Sensor.
14	Fabrication 14/16 gauge front operated
15	Non corrosive Powder coating after seven tank process.
16	Hinges, Lock with panel Key, Eye Bolts
17	Aluminum Bus Bar EC grade with HSS sleeves
18	Power & Control cable for all outgoing feeder
19	Printed ferrules for Power Control Cables
20	SMC support for bus bar, Gasket, Epoxy Insulator
21	Misc. Material like end screw, lugs, PVC channel, Spiral connection, G.I. Plated hardware etc.

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ORDER FORM

(Kindly furnish following details to enable us to submit techno-commercial offer).

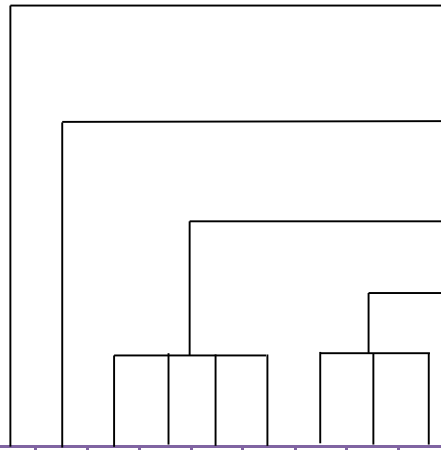
Customer's Name & Address:

Contact Person & Designation:

Tel. Nos.: Email ID:

Sr. No	Particulars	Unit	Required
1	Main Transformer / Alternator rating	kVA	
2	Present Contract Demand	kVA	
3	Present Maximum demand	kVA	
4	Total Continues Fixed load	kW	
5	Total variable load	kW	
6	Rated voltage	Volt	
7	Total capacitor connected in system (if any)	kVAR	
8	Existing Power Factor (average of last 3 month)	As per electric company bill Or attach electric bill	
9	Desired Power Factor	0.96 / 0.97 / 0.98 / 0.99 / Unity	
10	Quotation required (Product Code)	Please refer below ordering information	

Ordering Information for APFC



Capacitor type
1. APP Heavy duty capacitor
2. MPP Normal duty capacitor
Installation of panel
1. Indoor type
2. Outdoor type
Capacitor Rating (kVAR)
0100 kVAR to 2000 kVAR
Voltage Rating (Volts)
400 Volt to 690 volt

Product Code

L	T	A	P	F	C	*	*	*	*	*	*	*	*	*
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For example if APFC panel is 120 kVAr 525 volt then,

L	T	A	P	F	C	1	1	0	1	2	0	5	2	5
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For More details on products and services

Please communicate our Techno-commercial executive (+91-9503435575) or visit us at www.shardacapacitor.com

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