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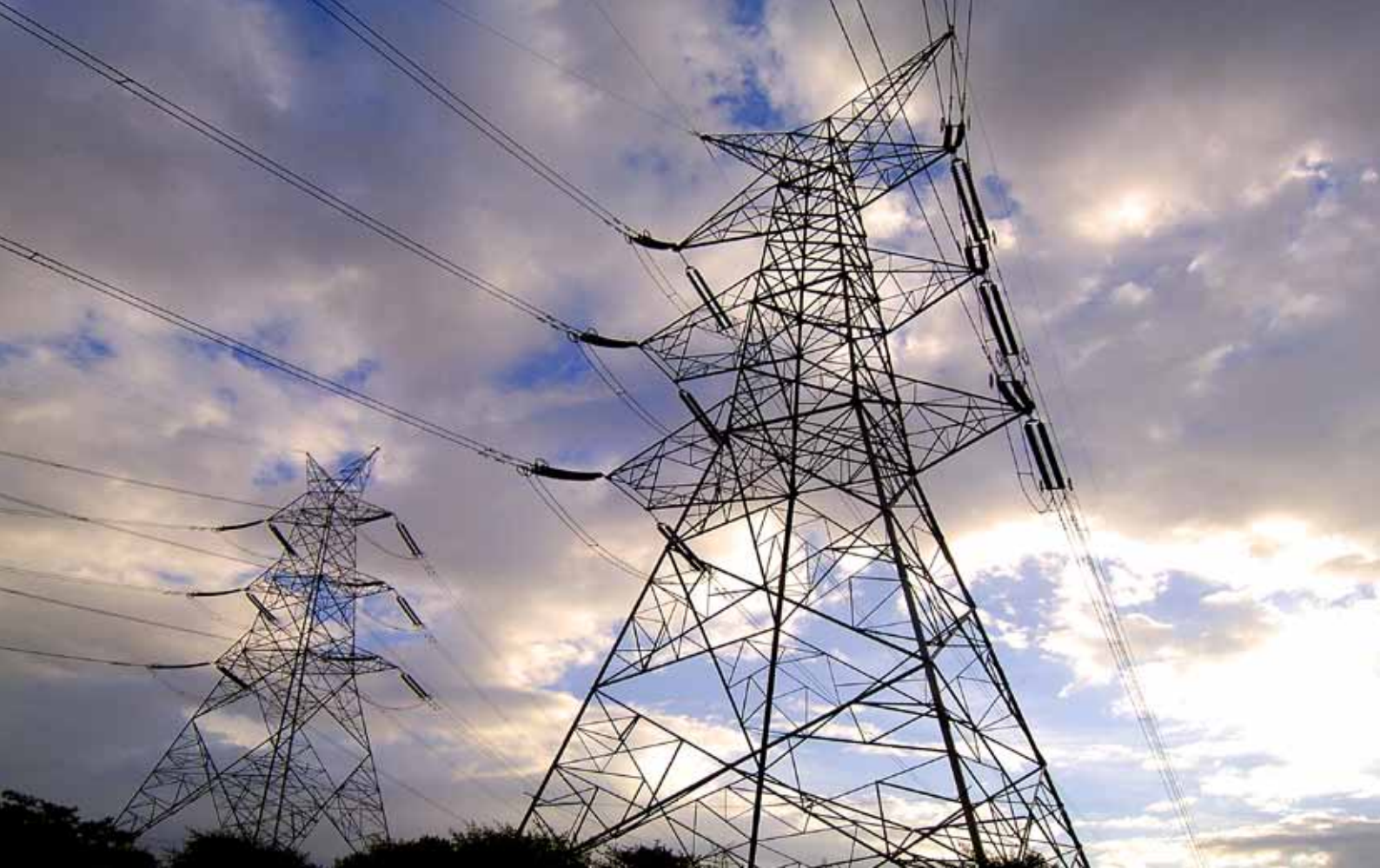
Smart. Easy. Reliable.

Automatic Power Factor Controller Relay
7UG05 for optimized power need.

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7UG05 Automatic power factor correction relay

- Controls the required Power factor
- Manage capacitor bank switching
- Monitors power quality
- Communication capable



Smart. Easy. Reliable.

The increasing demand of electrical power and the awareness of the necessity of energy saving is growing these days. Also the awareness of improvement and enhancing power quality by means of improvement of power factor is catching up, as there is different incentive schemes rolled out by the governments in these directions.

In power distribution, low- and medium-voltage networks, Power factor correction focuses on the power flow ($\cos \varnothing$) and the optimization of voltage stability by generating reactive power – to improve voltage quality and reliability at distribution level Reactive Power Compensation or Power Factor Correction is the simplest way of improving efficiency of the electrical energy and generating savings by energy conservation.

Electrical devices, e.g motors, need active power and reactive power. Active power is converted into mechanical power or heat losses, reactive power is needed to maintain the magnetic fields of the devices. Vector addition of active power P & reactive power Q gives the apparent power S. This means, that generators, transformers, power lines, switchgear, etc. must be sized for greater power ratings than the load which draws active power. If the lagging power factor is corrected, for example by installing a capacitor at the load, this totally or partially eliminates the reactive power draw at the power supply

Apparent power

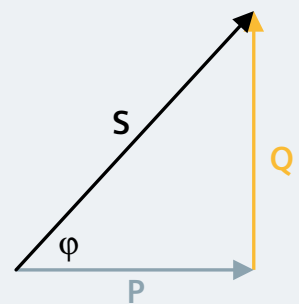
$$S^2 = P^2 + Q^2$$

Active power

$$P = S \cos \varphi$$

Reactive power

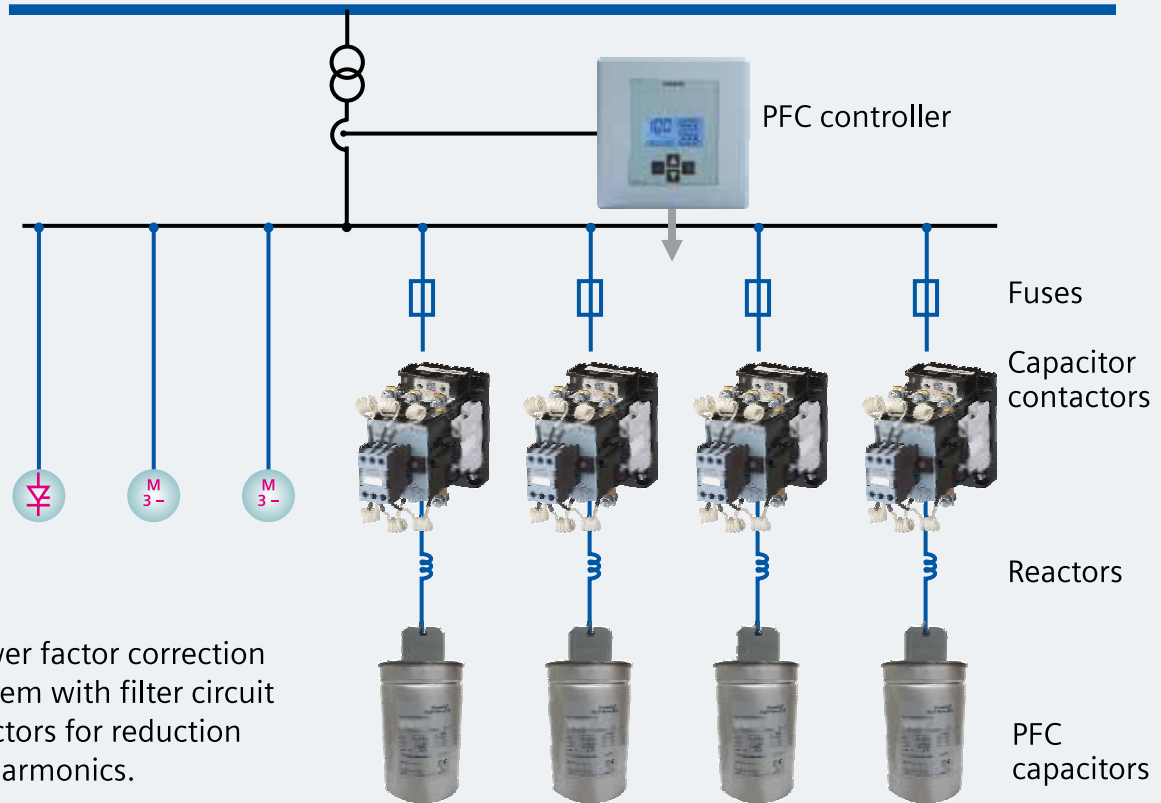
$$Q = S \sin \varphi$$



With the systematic use of power factor correction,

- Energy losses in the electrical transmission and distribution networks can be significantly reduced, with a corresponding reduction in the CO2 emissions involved in generating that lost energy;
- Energy transmission and distribution networks can be used more efficiently
- Reliability of planning for future energy networks can be increased.

Typical power factor correction circuit diagram



Benefits of power factor correction

- Fast return on investment through lower power costs
- Power factor correction reduces the reactive power in a system.
- Power consumption and thus power costs drop in proportion.
- Improved voltage quality, reduced voltage drops
- Optimum cable design – Cable cross-sections can be reduced with improvement of power factor (less current)



The Range

7UG0572-1GT21



- Intelligent 12 stage relay controls
- Confirms to IEC 60947-5-1, carry **CE** and **RoHS Compliant**
- 4 digit 7 segment LED display
- Universal control supply – optimizing the no of variants
- Automatic / Linear / rotational switching of banks
- Power factor settable-0.8 lag -- 0.8 Lead
- Selectable 1A /5A current input

7UG0572-1GT20



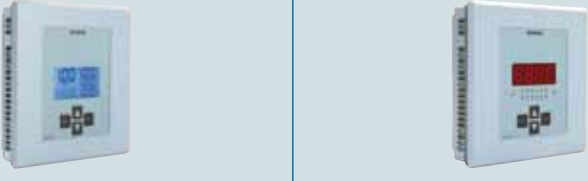
- Intelligent 12 stage relay controls
- Confirms to IEC 60947-5-1, carry **CE** and **RoHS Compliant**
- Dual colour Backlight LCD display
- Universal control supply – optimizing the no of variants
- Automatic / Linear / rotational switching of banks
- Power factor settable-0.8 lag – 0.8 Lead
- Selectable 1A /5A current input
- Measurement and display of key parameters viz: Voltage, Current, Power factor, THDI etc
- RS485 Communication MODBUS RTU Protocol

7UG0571-1FT20



- Intelligent 08 stage relay controls
- Confirms to IEC 60947-5-1, carry **CE** and **RoHS Compliant**
- Dual colour Backlight LCD display
- Universal control supply – optimizing the no of variants
- Automatic / Linear / rotational switching of banks
- Power factor settable-0.8 lag -- 0.8 Lead
- Selectable 1A /5A current input
- Measurement and display of key parameters viz: Voltage, Current, Power factor, THDI etc
- RS485 Communication MODBUS RTU Protocol

APFC relay: Technical data

Make		
Type	7UG0571-1FT20 (8 step) / 7UG0572-1GT20 (12 step)	7UG0572-1GT21
STEPS	8 Step & 12 Step	12 Step
Display	LCD with dual color backlight 3 line 4 digit & Programable Scrolling (Auto / Manual / Default) to show electrical parameters	4 digit 7 segment LED (No display scrolling, only PF is displayed)
INPUT		
Rated operational voltage [Ue]	415V	
Rated Insulation Voltage [Ui]	600V	
Rated Impulse Withstand Voltage [Uimp]	6kV	
Overvoltage category	III	
Control supply AC	90 to 250 VAC	
Power consumption	15VA	
Frequency HZ	50/60Hz	
Mains		
L-N AC	30 to 250 VAC	
L-L AC	50 to 440 VAC	
Current AC	5A AC	
Frequency HZ	50/60Hz	
Digital input	Yes	NA
Wiring input	3P 4W / 3P 3W / 2P 2W / 1P 2W	
Environment condition		
Temperature (operating)	0°C to +60°C	
Temperature (storage)	-20°C to +60°C	
Humidity	0 % to 95 %, without moisture condensation	
Pollution Degree	PCB: 2 Product: 3	
IP Protection	IP20	
Accuracy		
Voltage	± 0.5% of full range	NA
Current	± 0.5% of full range	NA
Power factor	± 0.01	
Frequency	± 0.1% of full range	NA
Power (KW, KVA, KVAR)	± 1% of full range	NA
Energy (KWh, KVAh, KVARh)	± 1% of full range	NA
Resolution		
Energy (kWh)	0.01k, 0.1k, 1k, 0.01M, 0.1M, 1M	NA
Power factor	For average PF: 0.01 For phase PF: 0.001	0.001
Voltage, current & power	Auto	NA
Measurement parameters		
Power factor	√	√
True RMS voltage	√	x
Current	√	x
Frequency	√	x
Power (KW, KVA, KVAR)	√	x
Energy (KWh, KVARh)	√	x
Temperature	√	x

Setting		
Power factor (settable)	0.8 lag --- 0.8 Lead	
Reconnection time (sec)	Reconnection time is same as discharge time	
Step switching time (sec)	1 - 999 (Default is 5 sec)	
Discharge time (sec)	1 - 9999 (Default is 180 sec)	
No voltage release	Instantaneous** (Voltage failure) 90 sec (Voltage restoration)	
Control sensitivity	55 -- 100%	
Switching	Automatic / Linear / rotational	
Control	Automatic / Manual	
CT (programable)	Pri: 1A / 5A upto 9999A Sec: 1A/ 5A	
CT Burden	20 mohms	
PT (programable)	Pri: 100 V - 500KV Sec: 100 V - 500V	NA
Alarm Indication		
% THDI	20 -100% / OFF	NA
Over Voltage AC	(L-N) 50 - 277V (L-L) 85 - 480V	
Under Voltage AC	(L-N) 50 - 240V (L-L) 85 - 415V	
No Voltage	ON / OFF	
Over compensate	ON / OFF	
Under compensate	ON / OFF	
CT Polarity error	ON / OFF	
Step error	20 -- 80% or OFF	
Over Temperature	0--100°C, ON /OFF	NA
Current absent indication	NA	CURR
Fan setting	ON/OFF	NA
Test mode Facility	YES	
Display		
% THDI	20 - 100%	NA for LED variant
Harmonics Resolutions	Upto 31st Harmonics	NA for LED variant
Active Power	4 digit	NA for LED variant
Reactive Power	4 digit	NA for LED variant
Apparent Power	4 digit	NA for LED variant
Voltage	100V - 500kV	NA for LED variant
Current	1 - 9999A	NA for LED variant
Temperature	0 - 100°C	NA for LED variant
Frequency	45 - 65 Hz	NA for LED variant
Power factor	-1.00 to 1.00	
Mechanical		
Mounting	Panel	
Dimension(WxHxD)	144 X 144 X 50 MM	
Net weight	635gms (Final packing with accessories)	610gms (Final packing with accessories)
Termination for Control supply, Measuring circuit, output relays		
Conductor cross section (solid) sq.mm.	1x (0.75 to 2.5) 2x 0.5 to 2x 1.5	1 x (0.75 to 2.5) 2x 0.5 to 2x 1.5
Conductor cross section (stranded with end sleeve) sq.mm.	1 x (0.5 to 2.5) 2x (0.5 to 1.5)	1 x (0.5 to 2.5) 2x (0.5 to 1.5)
Tightening torque	0.5 Nm	
Termination for RS485, T1, T2		
Conductor cross section (solid / stranded)	1x 0.5	1x 0.5
Tightening torque	0.4 Nm	0.4 Nm
Output		
Relay Contacts	NO, one common point max fuse 6A	
Ie (AC12 @ 250VAC)	5A* @ 250VAC	
Ie (AC15 @ 250VAC)	1A @ 250VAC	
Password protection	YES	
Communication	RS 485 & Modbus-RTU communication	NA
Standards	IEC 60947-5-1	
Markings	CE & RoHS	

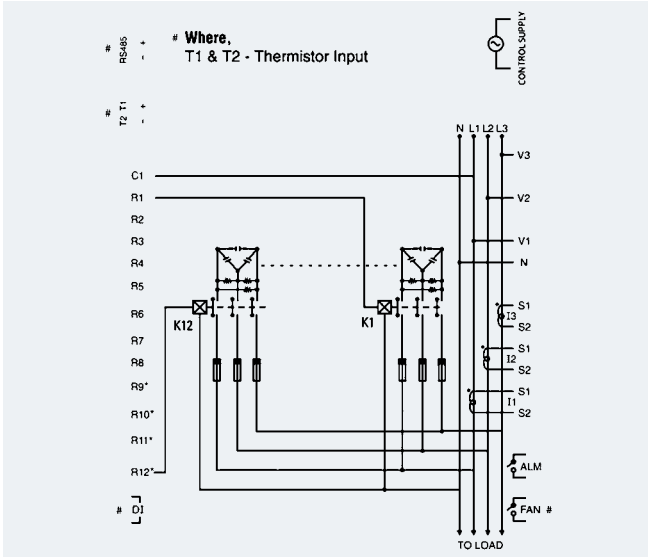
* 5A rating is for each relay contact. If multiple relays are getting switched simultaneously, relay rating will be derated to 1.2A @ 250V

** Response time is 3-5 sec

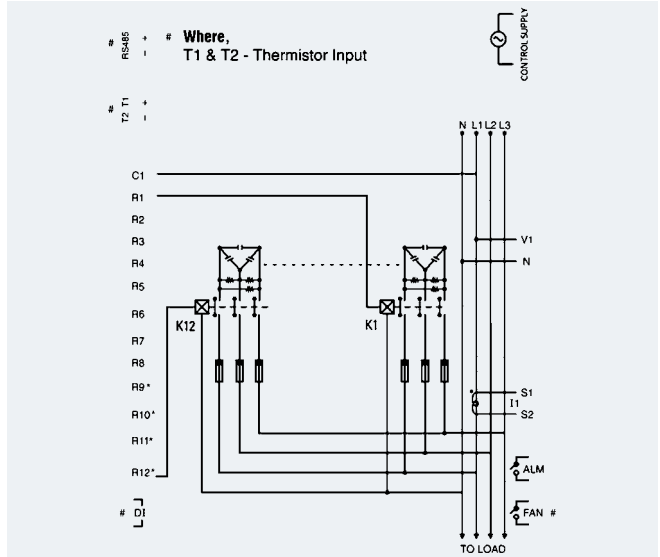
Dimensions and wiring diagram

Wiring Diagram

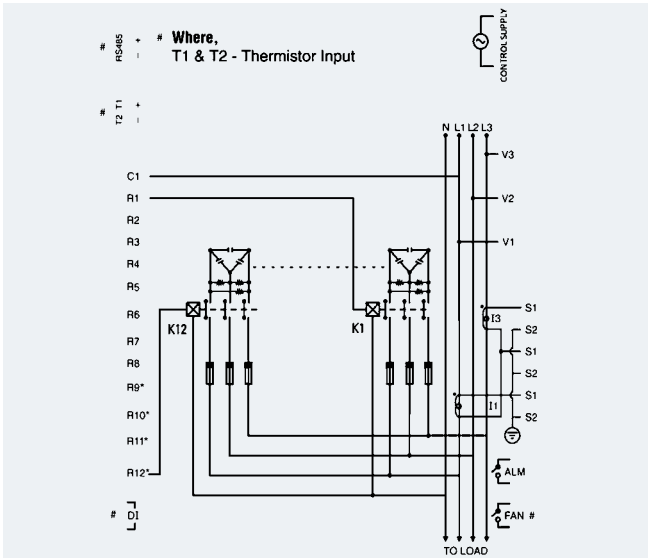
3 Phase - 4 Wire



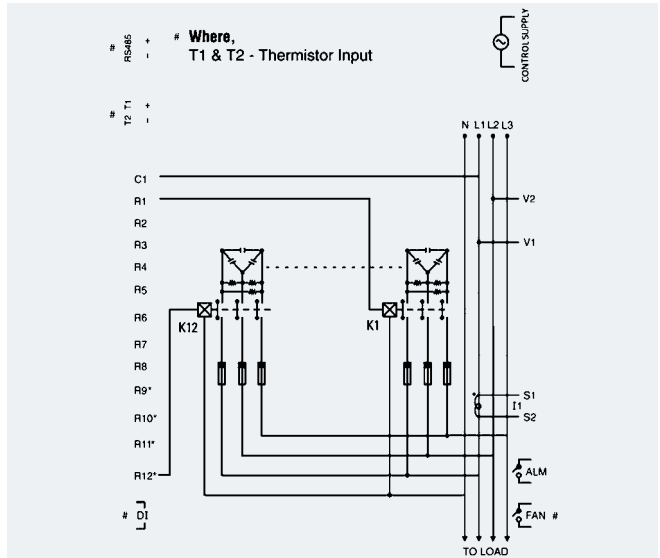
1 Phase - 2 Wire



3 Phase - 3 Wire



2 Phase - 2 Wire



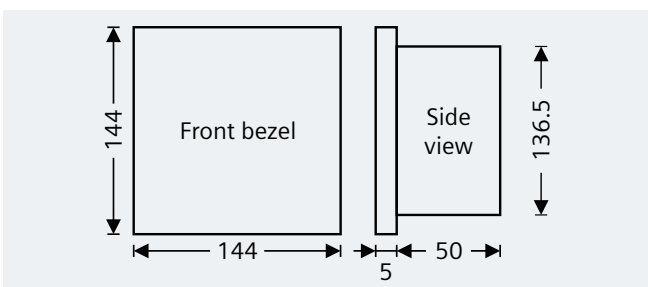
Note:

- For N/W selection 2P2W voltage (V_{LL}) applied between V1 & V2 and connect CT for I1 (Do not use V3, N, I2 & I3 terminal)
- For N/W selection 1P2W voltage (V_{LN}) applied between V1 & N and connect CT for I1 (Do not use V2, V3, I2 & I3 terminal)

Only available in 7UG0571-1FT20 & 7UG0572-1GT20 variants * Not applicable for 7UG0571-1FT20

Dimensional Drawing (mm)

Outline Dimension (in mm)



Panel Cutout (in mm)

