SIGNOTRON

## Energy Saving by Active Harmonic Filtration

## RTPFC for Leading & Lagging PF

## Phase Balancing & Neutral Current Compensation


## Remote PQ monitoring Through SCADA


QUALPOWER

## QUALPOWER

Most of the Industrial loads consist of induction machines which draws magnetizing current to produce magnetic field and hence work at low Pf, which is even lower (0.2-0.3) at light loads. Other inductive machines such as transformers, generators, AC lamps & non-linear loads like diode rectifiers, electric furnaces work at low Pf too. Non-linear loads also cause non-sinusoidal current wave-forms which inject high percentage of harmonics to the system that causes loss of energy and may damage other sensitive equipments.

Poor Power Factor and/or harmonics are severely penalised by Utility Boards. Installations of QUALPOWER improves power factor & mitigate current harmonics, which considerably reduces the electricity bill. It provides a very attractive ROI and improved Power Quality.

## POWER OPTIMIZATION

- Provides steady state reactive and dynamic compensation for fast changing loads like welding, ARC furnace etc.
- Ensures a steady Power Factor of almost unity for all types of loads (leading & lagging) and eliminates penalty imposed by Power utilities for low power factor
- Ensures maximum rebate benefit offered by power utility boards which can be up to 9%* of the total cost of energy.
- Eliminates harmonics up to the 33rd order and saves substantial electrical energy
- Restricts Input current THD<5%
- Mitigates voltage fluctuation & light flickers
- Ensures Load balancing between phases
- Ensures longer service life for equipments due to improved Power Quality

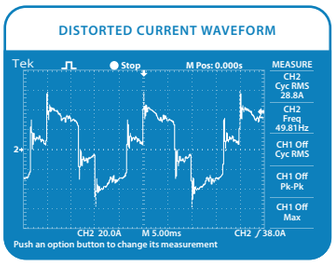
| Features | Qualpower | Automatic PF Correction Systems | Benefits |
|---|---|---|---|
| Power Factor Improvement | Real-time PF correction is possible with faster response time of <300µs | Dynamic APFC is available with TSM. Response time upto 0.5 - 1.0 Sec | QUALPOWER can fully compensate PF of very fast changing loads like ARC furnace, weilding machines, drives, etc |
| | IGBT based solid state converter with no risk of Harmonic Resonance | Amplifies current harmonics due to parallel resonance | QUALPOWER eleminates nuisance tripping and production down time |
| | Compensating current is independent of input voltage variation | Compensating current is proportional to the square of the ratio between oparating voltage & rated voltage | Ensures steady current compensation |
| | Stepless compensation of reactive current as per system requirement | Step wise compensation to achieve target PF | Precise compensation is easily achieveable with QUALPOWER |
| | Phase-wise VAR compensation | Not possible using 3 - phase capacitor | For unbalanced load, optimum phase wise VAR compensation achieveable with QUALPOWER that effectively reduces KVAH |
| | Can inject both Inductive and Capacitive currents for PF Correction. | Only capacitive compensation is possible | QUALPOWER Protects from leading PF |
| Harmonic Mitigation | Injects harmonic current (equal in magnitude and opposite in phase) to mittigate current harmonics. | Cannot reduce harmonic current genarated by the load | Saves energy consumption by reducing core losses |
| Phase Balancing | Possible | Not possible | Reduction of Neutral current by QUALPOWER |
| Life Expectancy | > 25 Years | < 5 Years | Value for money |
| Maintenance | Negligible | Periodic maintenance is required to sustain the performance | High reliability and improves system efficiency |

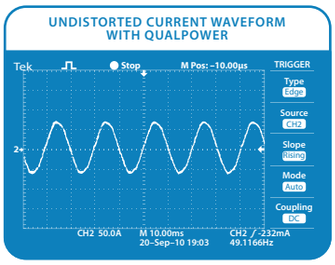
* Depends on applicable Electricity Tariff and load conditions.

## BENEFITS

### REDUCTION OF HARMONICS

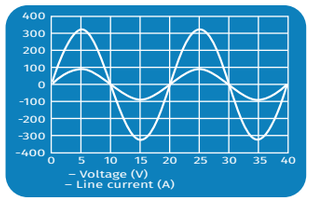
Non-linear loads generate harmonic currents. The harmonics current overloads the network and voltage distortions. Distorted voltage may cause malfunctions in sensitive devices and other process control equipment.



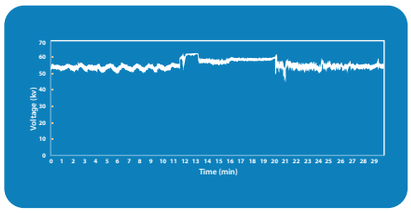

## NEAR UNITY POWER FACTOR

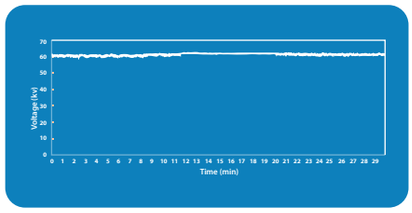
Qualpower ensures almost unity power factor for all types of load (lagging and leading) which not only avoids penalty for low power factor but also ensures maximum rebate benefit for near unity power factor as offered by respective power utility boards.



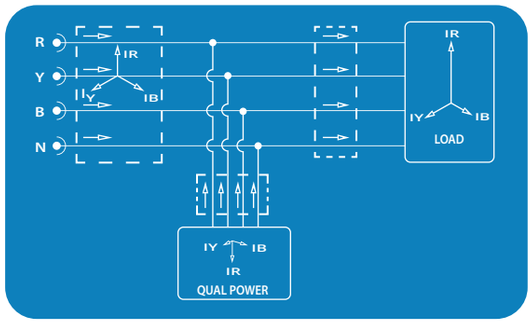

## FLICKER REDUCTION

Rapidly varying reactive power causes voltage fluctuations at the point of common coupling. The human eye perceives this frequency of voltage fluctuations as flickering lights. Qualpower reduces the flicker.




## LOAD BALANCING BY COMPENSATION OF UNBALANCE CURRENT




## APPLICATIONS

- All kind of bulk power consumers with heavy motor loads
- Industries with electrical welding system, induction furnaces, Arc furnaces and variable speed drives
- Plastic Industries (Extruders, injection moulders)
- Offices, hospital, Shopping Malls (Harmonic cancellation)
- Any other industries having non-linear loads like Diode rectifiers/chargers, SMPS, Servers, Drives etc. and inductive and capacitive load

# GENERAL TECHNICAL SPECIFICATIONS

| | QUALPOWER - 415V | | QUALPOWER - 600V |
|---|---|---|---|
| System Input / No of Phase | 3phase 3wire; 3phase 4wire | | 3phase 3wire; |
| Rate Of Harmonic Reduction | upto 99% | | |
| Phase Compensation Current | 140A, 415V | 280A , 415V | 280A, 600V |
| Neutral Current compensation / Phase Balance | Possible | | |
| Input Voltage (Min / Max) | 3P3W device 360V….460V | | 3P3W device 500V -700V |
| | 3P4W device 360V….460V | | |
| Inverter Technology | Two level NPC topology, IGBT | | |
| Frequency | 50Hz | | |
| Reaction Time | 63µs (immediate load change reaction) | | |
| Steady state response time | < 300µs (steady state response to full steady state compensation) | | |
| Switching frequency | 8kHz | | |
| Harmonic Compensation | Up to 33th Order (Other design on request) | | |
| Power Factor Correction | Full scale Inductive and Capacitive current compensation | | |
| Current Transformer | Primary current range as per system requirement. Secondary current 5A, class 0.5 | | |
| Over Current (peak value for 10ms) | 225A | 450A | 450A |
| Efficiency | 98% | | |
| Cabinet Mounting | Floor | | |
| Weight including Cabinet | 300kgs | 500 kgs | 700 kgs |
| Dimensions including Cabinet (L x D x H) | 1000 x 500 x 1450 | 1400 x 700 x 1850 | 1750 x 700 x 1850 |
| Cooling | Forced Air Cooling | | |
| Interface | Modbus TCP/IP | | |
| Ambient Temperature | -10 to +45 ºC | | |
| Protection Class | IP-42 (IP54 floor mounted panel is optionally available on request) | | |
| Humidity | 95% Non-condencing | | |
| Self-protection | Yes: Against OC/SC / EF / OT / OV / UV / VS | | |
| Noise level | <65 dB (depending on model and load conditions) | | |
| Standards / Recommendations specifying limits for harmonics in networks or units | IEEE - 519, 2014 | | |
| Design Standards | Design of QUALPOWER is tailor made to specific project requirements. | | |

| Features | Descriptions | Capacity | | Rated Voltage | Dimension in mm (± 10 %) | | | Weight (including cabinet) |
|---|---|---|---|---|---|---|---|---|
| | | kVAr | Amps | Volts | Length | Depth | Height | kgs (apprx) |
| QP-050-33-V4 | QUALPOWER 3P3W | 50 | 69.56 | 415 | 900 | 500 | 1250 | 200 |
| QP-100-33-V4 | QUALPOWER 3P3W | 100 | 139.12 | 415 | 1000 | 500 | 1450 | 250 |
| QP-150-33-V4 | QUALPOWER 3P3W | 150 | 208.69 | 415 | 1100 | 600 | 1550 | 300 |
| QP-200-33-V4 | QUALPOWER 3P3W | 200 | 278.25 | 415 | 1400 | 700 | 1850 | 500 |
| QP-200-34-V4 | QUALPOWER 3P4W | 200 | 278.25 | 415 | 1400 | 700 | 1850 | 700 |
| QP-150-33-V6 | QUALPOWER 3P3W | 150 | 144.34 | 300 | 1750 | 700 | 1850 | 700 |
| QP-300-33-V6 | QUALPOWER 3P3W | 300 | 288.68 | 600 | 1750 | 700 | 1850 | 700 |
| The design of QUALPOWER is tailor made to specific project requirement. | | | | | | | | |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