

PMCS Maintenance, Repair & Operation (MRO) Savings

Power Management Control Systems (PMCS)

Maintenance-Free High-Speed Computers



30 watts
burden

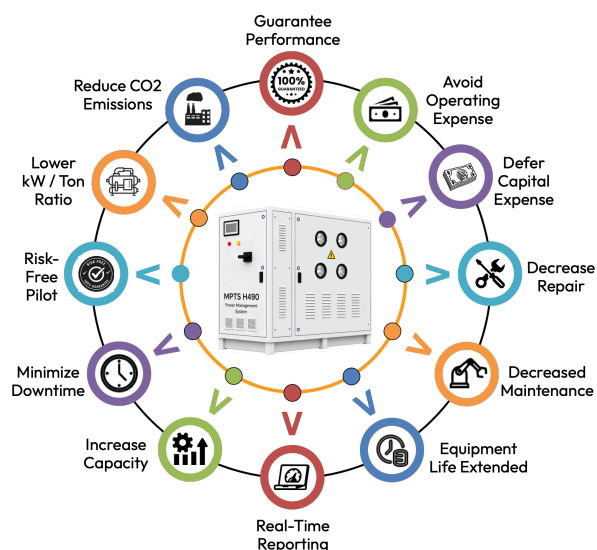
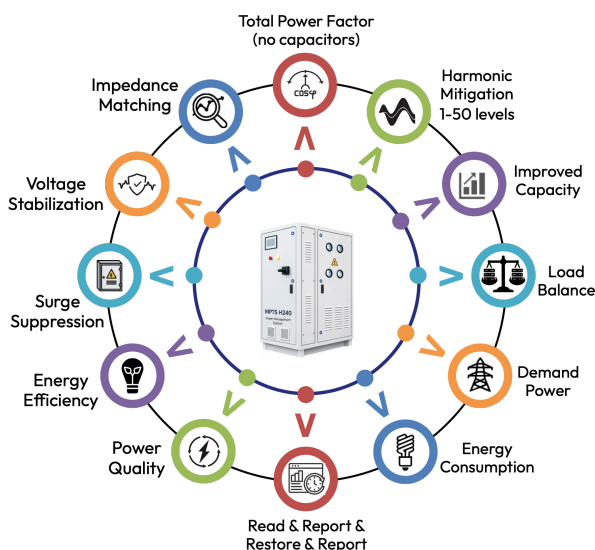


100 watts
burden

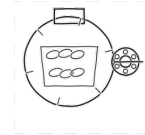


200 watts
burden

Multi-function integration. Guaranteed performance

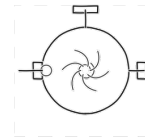


1. Motors



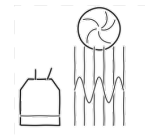
- Extends motor operating life.
- Reduces excessive motor current.
- Reduces motor winding temperatures.
- Reduces motor vibration, noise, and mechanical stress.
- Reduces motor rewinding, repair, and replacement costs.
- Reduces bearing damage associated with poor power quality.
- Reduces voltage and current imbalance across all three phases.
- Reduces emergency motor failures and expedited replacement costs.
- Limits insulation deterioration caused by heat, harmonics, and electrical stress.

2. Pumps and process equipment



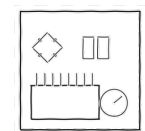
- Reduces overheating of pump motors.
- Reduces unplanned process interruptions.
- Reduces premature component replacement.
- Improves electrical conditions supplying pumps.
- Extends pump and process-equipment service life.
- Reduces seal, bearing, coupling, and impeller stress associated with unstable motor operation.

3. Refrigeration and glycol systems



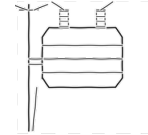
- Reduces compressor motor overheating.
- Reduces emergency refrigeration repairs.
- Reduces nuisance trips and compressor restarts.
- Helps defer major refrigeration-system replacement.
- Reduces electrical stress on refrigeration compressors.
- Helps avoid product losses caused by cooling interruptions.
- Reduces contactor, starter, relay, and protective-device failures.
- Improves voltage stability during compressor starting and load changes.
- Extends compressor, condenser-fan, evaporator-fan, and glycol-pump life.

4. Variable-Frequency Drives and electronic controls



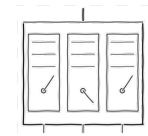
- Extends electronic-component service life.
- Reduces incoming voltage fluctuations affecting VFDs.
- Reduces replacement-board and specialist troubleshooting costs.
- Reduces harmonic distortion within the electrical distribution system.
- Reduces VFD overheating, nuisance faults, and premature component failure.
- Improves the operating environment for PLCs, sensors, instrumentation, and communication equipment.
- Reduces stress on rectifiers, DC-link capacitors, power modules, and control boards.

5. Transformers



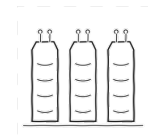
- Extends transformer operating life.
- Reduces cooling and ventilation requirements.
- Helps defer transformer upgrades or replacement.
- Reduces the risk of catastrophic transformer failure.
- Reduces transformer heating and insulation deterioration.
- Reduces reactive and harmonic current passing through transformers.
- Releases usable transformer capacity by reducing unnecessary kVA loading.

6. Switchgear and electrical distribution



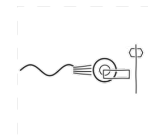
- Reduces nuisance breaker trips.
- Reduces contact deterioration and thermal cycling.
- Helps defer electrical-service and switchgear upgrades.
- Releases capacity in feeders, panels, MCCs, and busbars.
- Reduces overheating at terminals, joints, lugs, and connections.
- Reduces infrared hot-spot findings and corrective maintenance.
- Extends breaker, contactors, fuses, relays, and distribution equipment life.
- Reduces current flowing through cables, busbars, breakers, and switchgear.

7. Power-factor equipment



- Reduces harmonic-resonance exposure.
- Reduces capacitor switching and contactor wear.
- Reduces capacitor overheating and premature failure.
- Reduces the risk of overcorrection under changing loads.
- Reduces dependence on conventional fixed capacitor banks.
- Reduces inspection, replacement, and maintenance requirements for conventional power-factor-correction equipment.

8. Cables and connections



- Reduces insulation deterioration.
- Extends cable and connector life.
- Reduces unnecessary RMS current.
- Reduces cable and conductor heating.
- Helps avoid feeder and conductor upgrades.
- Reduces thermal expansion and contraction at connections.
- Reduces loose, oxidized, or damaged electrical terminations.

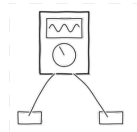
9. Packaging and production equipment

- Reduces rejected packaging and production rework.
- Improves production-line availability and throughput.
- Reduces unexpected machine stops and electronic faults.
- Reduces cleaning and restart labor following interruptions.
- Reduces motor, drive, sensor, and control-component failures.



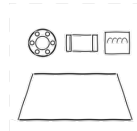
10. Maintenance labor

- Reduces emergency callouts and overtime.
- Reduces diagnostic and troubleshooting hours.
- Reduces after-hours and weekend service costs.
- Reduces dependence on specialist electrical contractors.
- Allows maintenance teams to focus on planned, higher-value work.
- Reduces repetitive repairs caused by unresolved electrical problems.
- Reduces preventive-maintenance workload on overstressed equipment.



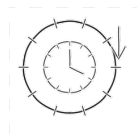
11. Spare parts and inventory

- Improves spare-parts forecasting.
- Reduces emergency spare-parts purchases.
- Reduces inventory carrying costs and obsolete parts.
- Reduces expedited shipping and premium supplier charges.
- Reduces the quantity of critical spares that must be held onsite.
- Reduces consumption of motors, bearings, seals, contactors, relays, fuses, capacitors, and control boards.



12. Downtime and production losses

- Reduces packaging-line stoppages.
- Reduces refrigeration-related product exposure.
- Reduces labor lost while equipment is unavailable.
- Protects production schedules and customer deliveries.
- Reduces interrupted and incomplete production batches.
- Avoids lost revenue caused by unavailable production capacity.
- Reduces unplanned electrical and electro-mechanical downtime.
- Reduces cleaning, sanitation, and restart requirements after outages.

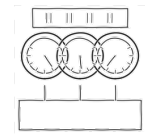


13. Capital-expenditure avoidance



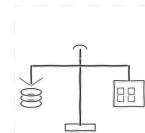
- Helps defer transformer replacement.
- Helps defer larger electrical-service installations.
- Helps avoid unnecessary cable, breaker, and panel upgrades.
- Extends the useful life of motors, compressors, pumps, and VFDs.
- Releases capacity in transformers, feeders, MCCs, and switchgear.
- Converts premature replacement CAPEX into planned lifecycle investment.
- Supports production expansion without automatically increasing electrical infrastructure.

14. Monitoring and operational control



- Supports condition-based and predictive maintenance.
- Verifies whether repairs corrected the underlying problem.
- Identifies developing electrical problems before failure occurs.
- Establishes normal operating baselines for brewery equipment.
- Provides evidence for warranty, supplier, and utility discussions.
- Measures performance before and after PMCS implementation.
- Provides continuous visibility into voltage, current, kW, kVA, kVAR, power factor (PF), and harmonic (THDi and THDv) conditions.

15. Principal MRO financial categories



PMCS savings should be quantified under:

1. Equipment-life extension
2. Maintenance labor avoided
3. Replacement parts avoided
4. Production downtime avoided
5. Emergency repair costs avoided
6. Spare-parts inventory reduction
7. Product loss and rework avoided
8. Contractor and specialist costs avoided
9. Overtime and expedited freight avoided
10. Electrical-capacity and replacement CAPEX deferred

The strongest business case combines direct utility savings with verified reductions in maintenance costs, equipment failures, downtime, product loss, and planned capital expenditure (CAPEX).