PUMP CONTROL & POWER FACTOR CORRECTION

Introduction:

We are in the era where we have to conserve energy as well as our Natural resources. Day by day our Natural resources are diminishing with a very rapid rate, water is one of the utmost important Natural resource among them. Due to the development and concretization the land area required for rain water infiltration reduced drastically and results in the decrease of the ground water level.

We have developed a cloud based complete solution to reduce the wastage of water and to save the electric energy by improving the power factor by introducing the required value capacitor bank into the pump's motor input. This system installed at the water pump site and continuously communicate with the central controlling computer and reports all the parameter like:

- Voltage / Current Consumption.
- Power Factor.
- ON/OFF Status.
- Next Scheduled Operation Time.
- Alerts (Like Break Down, Dry Run, Power failure etc.)

One can also monitor or can take all the data records either from the web page or can take last 3 to 6 Months data records through the USB interface provided on the device at the site.

Automation of Pumps with power factor correction:

Features:

1. Automatic star delta control with contactors (for above 7.5kW pumps).
2. Maintain the power factor between 0.90 to 0.98
3. Auto Introduce the capacitor bank.
4. Inbuilt Timer with three time setting/ Slots (Pump needs to operate at different times daily).
5. Display unit should display following:
    (a). Current Power Factor.
    (b). Online Current each phase.
    (c). Online Voltage each phases.
    (d). ON & OFF time of all three available slots
    (e). Power consumed by pump (in kWh) – Daily and in data logging.
6. Overhead water level sensing.

Timing Control:
Pump should be operative in three slots: viz.

1.   Mourning time adjustable: from 04:00 A.M. to 10:00 A.M. any timing could be selectable. Duration for pumping, adjustable from 00 minutes to 5 hours.

2.   Afternoon time adjustable: from 12:00 A.M. to 4:00 P.M. any timing could be selectable. Duration for pumping, adjustable, from 00 minutes to 5 hours.

3.   Evening time adjustable: from 05:00 P.M. to 11:00 A.M. any timing could be selectable. Duration for pumping, adjustable, from 00 minutes to 5 hours.

Electrical Safeties:

1. Protection from high voltage i.e. > 270V, restarts when the voltage drops to 250V.
2. Protection from low voltage i.e. < 190V, restarts when the voltage increases to 200V.
3. Single phase prevention.
4. Phase sequence Alert. i.e. RYB
5. Over load condition.
6. Dry run, the condition when pump is running without lifting water. RPM will go high and current will be reduced.
7. Current Leakage in pump the condition when the current flows from neutral to earth.
8. Maintaining the power factor between 0.90 to 0.98

Protections:

1. Under & Over Voltage.

2. Overload Protection

3. Phase unbalance & Phase sequence.

4. Short Circuit Protection

5. Neutral Leakage detection ELCB

Communication:

1. Data Logging (Power consumed and alerts for past 6 months).

2. USB Port for data transfer.

Remote Control (Optional): **1.** Multiple Pumps control.   **2.** Communication over SMS/ Static IPs (Optional),   **3.** Current Pump status (ON/OFF),   **4.** Current Power Factor Status.   **5** Break Down Alert,   **6.** Alert, if pump is not operating on set schedule timings.   **7.** Forced ON/OFF of pump, if required.

Comparison Between Synergic & Other Pump Control Systems

S.No.	Parameters	Synergic Systems	Others
1.	Automatic star delta control with contactors (for above 7.5kW pumps).	√	X
2.	Maintain the power factor between 4v0.90 to 0.98	√	X
3.	Auto Introduce the capacitor bank.	√	X
4.	Inbuilt Timer with three time setting/ Slots (Pump needs to operate at different times daily).	√	X
5.	Water Flow Rate Measurement	√	X
6.	Monitor and Control Chlorine Level	**Optional**	**Optional**
7. 0	Monitor PH in the water	**Optional**	**Optional**
8.	**Displayed Parameters:**		
	a) Current Power Factor.	√	√
	b) Online Current each phase.	√	√
	c) Online Voltage each phases.	√	√
	d) ON & OFF time of all three available slots	√	X
	e) Power consumed by pump (in kWh) – Daily and in data logging.	√	√
9.	Overhead water level sensing.	√	X
10.	**Electrical Safeties:**		
	a) Protection from high voltage i.e. > 270V, restarts when the voltage drops to 250V.	√	X
	b) Protection from low voltage i.e. < 190V, restarts when the voltage increases to 200V	√	X
	c) Single phase prevention	√	X
	d) Phase sequence Alert. i.e. RYB	√	X
	e) Over load condition	√	X
	f) Dry run, the condition when pump is running without lifting water. RPM will go high and current will be reduced	√	X
	g) Current Leakage in pump the condition when the current flows from neutral to earth	√	X
11.	**Protections:**		
	a) Under & Over Voltage.	√	Alert Only
	b) Overload Protection.	√	Alert Only
	c) Phase unbalance & Phase sequence.	√	Alert Only
	d) Short Circuit Protection	√	X
	e) Neutral Leakage detection ELCB	√	X
12.	**Communication:**		
	a) Data Logging (Power consumed and alerts for past 6 months).	√	√
	b) USB Port for data transfer.(On Site)	√	X
13.	**Remote Control (Optional):**		
	a) Multiple Pumps control.	√	√
	b) Communication over SMS/ Static IPs (Optional)	√	√

c) Current Pump status (ON/OFF)	√	√
d) Current Power Factor Status.	√	√
e) Break Down Alert	√	√
f) Alert, if pump is not operating on set schedule timings.	√	X
g) Forced ON/OFF of pump, if required.	√	√

Price:

Description: Automation of pumps with star delta start-up and power factor correction. Data logging and protection from electrical hazards. Along with data communication on server.

Each Pump control system cost, with minimum 10 pumps:

Approx. cost per pump : Rs, 85,000/- + GST on basic price.