





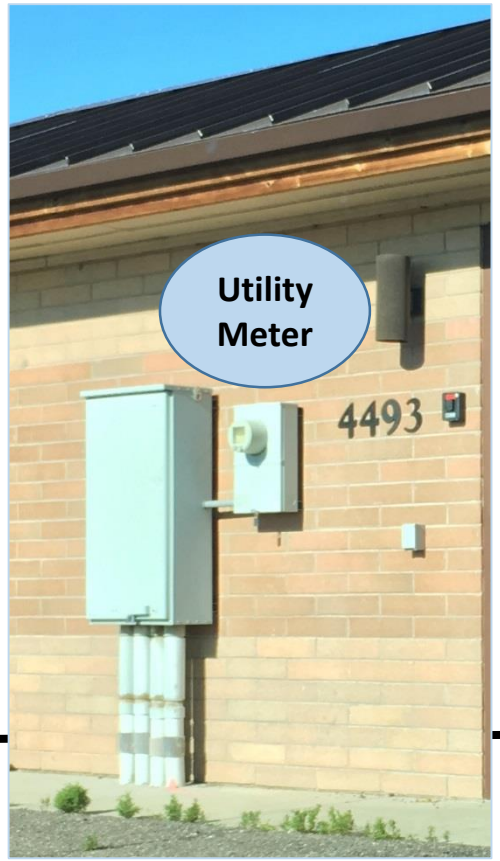
Power quality improvement and energy efficiency at Pumping Station




4493
PUMP STATION
SA-10 / SL-10
EAST CHERRY CREEK
VALLEY WATER AND
SANITATION DISTRICT
303-693-3800

240A/480V/3Ph – Power Quality Improvement Device







600 Amps

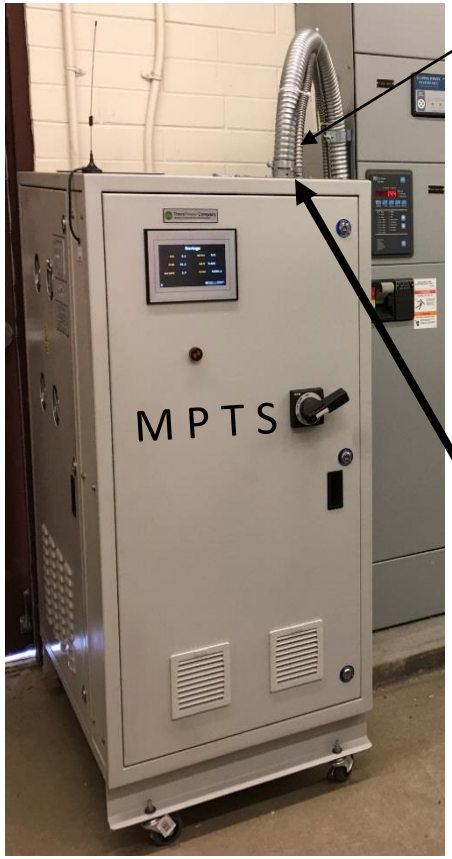
Utility Transformer

480 V/3Ph/60 Hz

Loads

- 250 HP Motor with VFD
- Heaters
- Transformer 480V/208V
  - HVAC unit
  - Lighting
  - Receptacles

240A/480V/3Ph – Power Quality Improvement Device



MPTS installed in August 2017

600 Amps

Utility Meter

Mains Disconnect

CTs

CT Primary Amps = Max recorded Amps x 1.5

CT output 5 Amps
To MPTS CT connection box

Main Electrical Panel

Breaker or
Fused Disconnect
Max value 400A
To MPTS

Top Panel
Entry into MPTS

VFD and Motor

Transformer

Receptacles

Lighting

HVAC

MPTS – Pre-Installation and Post Installation Data

MPTS Performance Verification Summary

- Pre - Installation Data is without MPTS
- Post - Installation Data is with MPTS

Summary	Pre-Install	Post Install	Improvement	UOM
Voltage	493V/285V	494V/286V	Same	Voltage
Motor Load Current	216 Amps	216 Amps	Same load	Amperes
VFD Load	195 Amps	195 Amps	Same Load	Amperes
Load on the Utility Meter	195 Amps	165 Amps	30	Amperes
KVA Demand Kilowatts	167	141	25	Kilowatts
KVAr Reactive Power Kilowatts	80 to 120	less than 20	>60	Kilowatts
Power Factor	0.79 to 0.85	> 92	14	points





MPTS – Pre-Installation and Post Installation Data

- Pre - Installation Data is without MPTS
- Post - Installation Data is with MPTS

MPTS Performance Verification Summary

Summary

Item	Voltage	Motor Load Current	VFD Load	Load on the Utility Meter	KVA Demand Kilowatts	KVAr Reactive Power Kilowatts	Power Factor
Pumphouse Values without MPTS	493V/285V	216 Amps	195 Amps	195 Amps	167	80 to 120	0.79 to 0.85
Pumphouse Values with MPTS	494V/286V	216 Amps	195 Amps	165 Amps	141	less than 20	> 92





Without MPTS

System Voltage

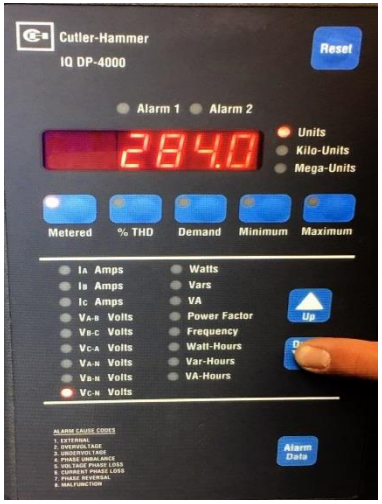




With MPTS

System Voltage





Without MPTS

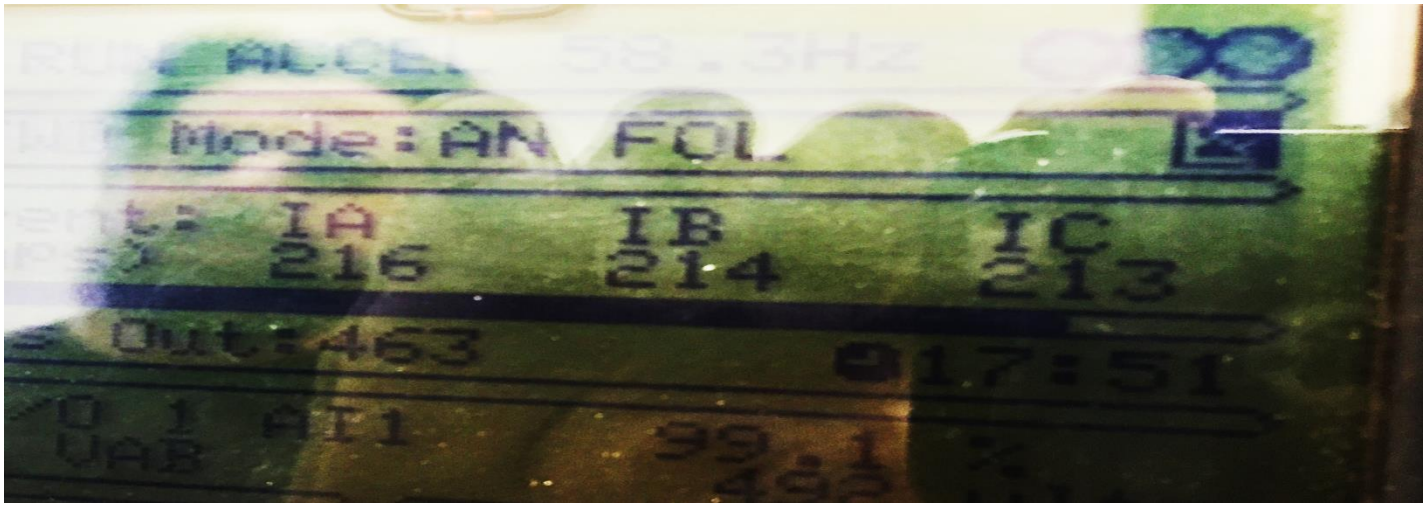
With MPTS

VFD Current – Load in Amps on the Utility Transformer





Motor Current – Load in Amps



Without MPTS

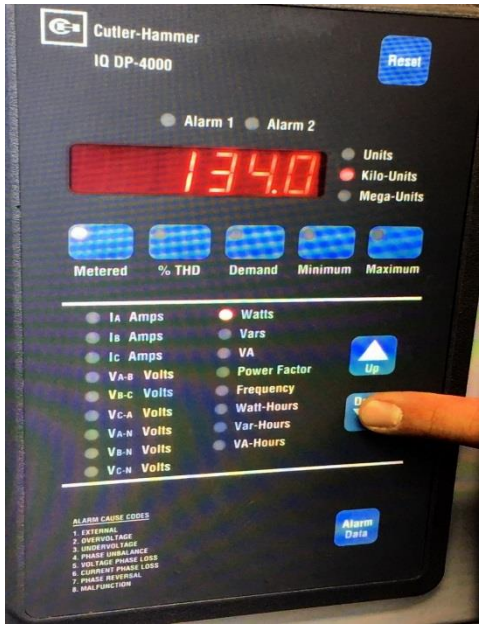
With MPTS

Power Factor – Electrical Efficiency





KW – Net Power – required to run the pump motor

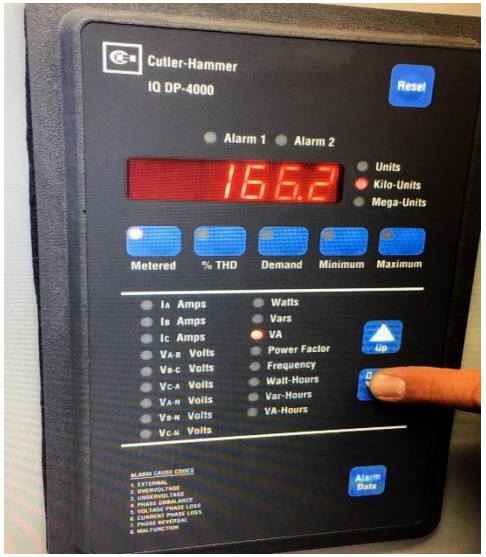




Without MPTS

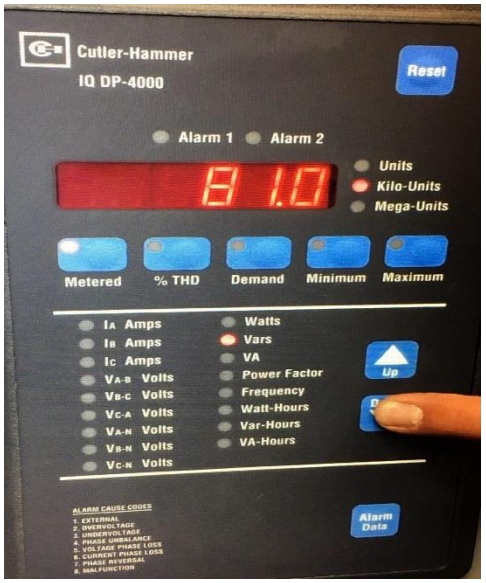
With MPTS

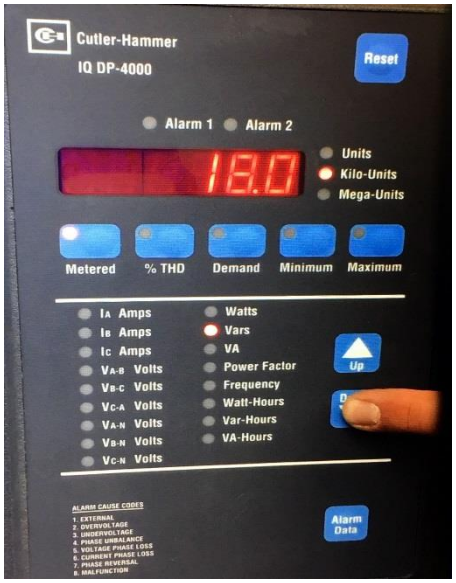
KVA – Electrical Demand from the Grid





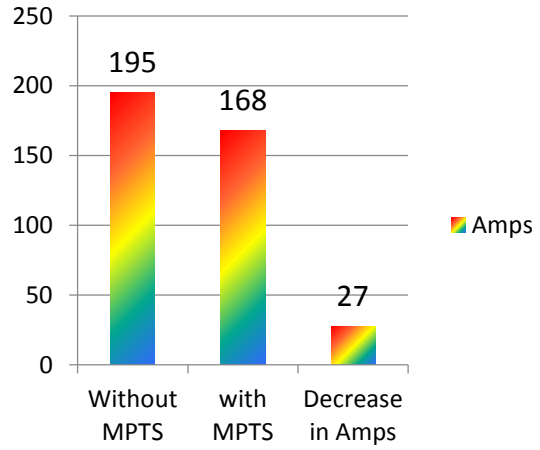
KVAr – Reactive Power



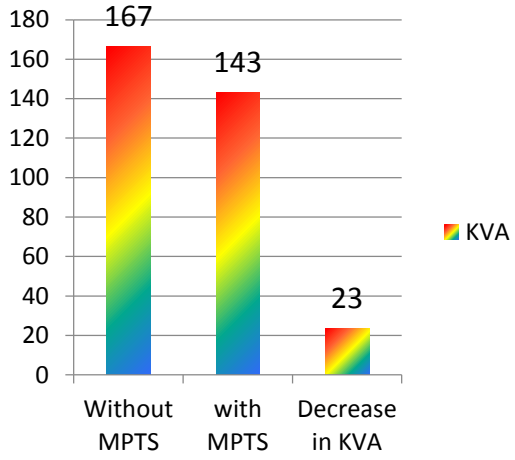


Power quality improvement and energy efficiency

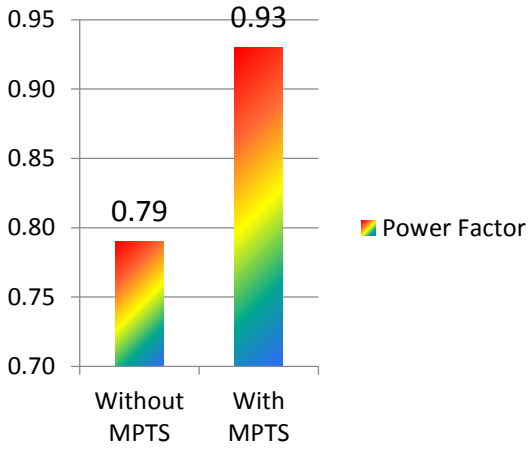
Amps



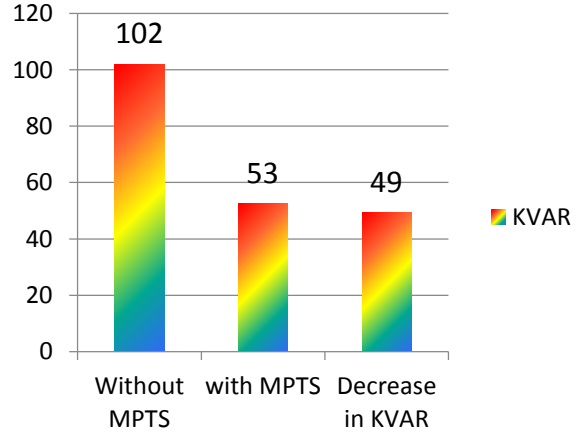
KVA - Demand



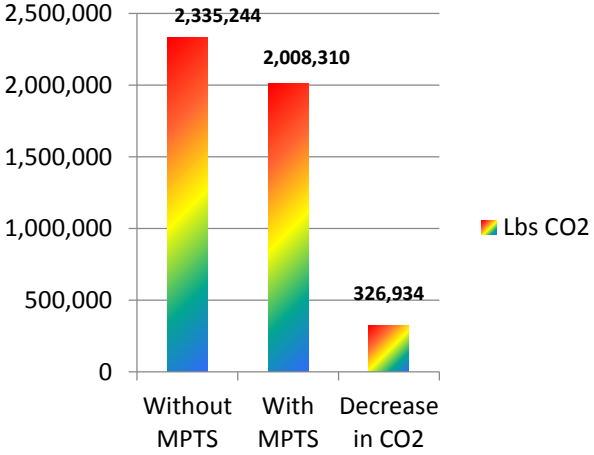
Power Factor



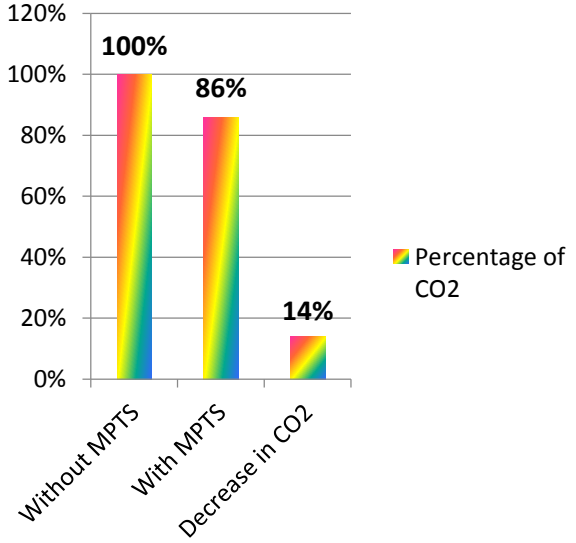
KVAR-Reactive Power



CO2 – Carbon Emission



Percentage of CO2



Power quality improvement and energy efficiency

Improvements in Power Quality Metrics

Item	Existing values without MPTS	Values with MPTS	Changes in Values with MPTS	
Volts	493	493	Same Voltage	0
Load Amps	195	168	Decrease in Line Amps	27
Load PF	0.79	0.93	PF improvement on load side	0.14
Load KVA	167	143	Decrease in Line KVA	23
Load KVAr	102	53	Decrease in KVAr	49
CO2 before MPTS in Pounds(LBS)	2,335,244	2,008,310	Decrease in CO2	326,934
CO2 Percentage	100%	86%	Percent decrease in Carbon Emissions	14%

Power quality improvement and energy efficiency



MPTS, maximum power transfer solutions, are next generation power quality products that **decrease the Electrical Demand, Total Electrical Power requirement or Generation(KVA) and the Carbon foot print without** replacing/retrofitting inefficient electrical and mechanical equipment.

It makes the electrical networks more efficient

Features of MPTS

- Decrease the Max current in your network
- Decrease in KVA electrical Demand
- Decrease in peak KW and electrical consumption
- Decrease in KVAR- reactive power
- Decrease in harmonics
  - THD that is damaging your electrical, electronic, computer, lighting and mechanical equipment.
- Provide stable power to the connected loads
- Increase safety and reliability of the electrical network
  - Avoids overload conditions and hot spots in panels and equipment -a function of decrease in I^2R losses, KVAr, and harmonics

Benefits of MPTS

- **Decrease** Current and KVA significantly
- Maintains stability of voltage for connected equipment
- Protects investment in expensive electrical and mechanical equipment
- **Reduce** service, repair, replacement, and maintenance costs
- **Reduce** total cost of operating mechanical and electrical equipment
- **Save** money on utility bills based on tariffs and billing practices

Minimum Values Demand Reduction Kilowatts of Power reduced	Coal Burned in Coal Power Plants in Pounds	Gallons of gasoline consumed by America	Tree seedlings that have to be grown for 10 years
MPTS – 100/480V/3P 10 KVA	39,106 Pounds 	4097 Gallons 	933 Seedlings 
MPTS – 225/480V/3P 20 KVA	78,213 Pounds	8,194 Gallons	1,867 Seedlings
MPTS – 450/480V/3P 40 KVA	156,426 Pounds	16,388 Gallons	3,734 Seedlings
MPTS – 600/480V/3P 60 KVA	234,639 Pounds	24,582 Gallons	5,601 Seedlings

MPTS decreases demand for power generation resulting CO2 reduction

Minimum amounts of Power Generation and Carbon Emission Reduction with MPTS