# Kvar Energy Savings, Inc.

presents

## KVAR® Energy Controller (EC)

- It is a Desired & a Simple Solution for…
  *RISING ENERGY COSTS*
- Everyone wants to lower their energy bills
- The U.S. Government is mandated to cut energy costs
- All businesses, institutions and residences are looking to cut costs

# The Need for the KVAR® EC

- Climate change is a Global crisis
- Planetary distress is our new reality
- Energy efficiency is a commitment worth making
- Help meet planetary requirements and reap the financial savings
- Empower many people with work

# The Problem

- Up to 25% or more of billable electricity is unusable
- Electric AC motors use more then half of all electricity
- Electricity Costs: 1960's .019/kwh
  1970's energy crisis .044/kwh 2007 .10+ /kwh
- Most AC induction motors operates at 80% efficiency under a full load … the efficiency drops dramatically at lower loads
- NASA research proved that substantial savings could be made on the running costs of AC induction motors

# NASA TESTING

AVO

**To: DE-TPO/C. Griffin**
**From: IM-WEL/J. Weeks**

**Subject: Response to TTA-K517.(KVAR Electrical Optimization System)**

**Attached for your disposition are the results of our test on the KVAR Electrical Optimization System. Approval of test format was recieved by Gregory Taylor of KVAR energy Savings, Inc. on 11/19/96. The test was preformed at the prototype shop (building M7-581) on a 10 H.P. compressor motor on 11/22/96. Both initial and final values were recorded from a Drantz Power Monitor PP1 (NASA Tag #1382136) while connected to the distribution panel DPA-C2 (see attached diagram). The KVAR switch settings were determined by a KVAR representative. All values pertinent to motor efficiency have been recorded on the attached electric motor performance evaluation form. As shown on this form, the real power draw by this motor decreased from 5.63 kw to 5.14 kw after optimization. This corresponds to a power reduction of 8.7%.**

John Weeks

**cc:**
**IM-WEL/J. Heuser**
**IM-WEL/R. Batman**
**IM-WEL/L. Jones**
**IM-WEL/J. O'Malley**

# The Continual Dilemma

***The adequacy of North America's electricity system will decline unless changes are made soon…***

***…demand for electricity is expected to increase over the next ten years by 19 % in the U.S., but confirmed power capacity will increase by only 6 %***

*- NERC (North American Electric Reliability Council) -*

***"Over $16 billion dollars of electricity is unusable energy, but billable in the US."***

*- U.S. Dept. of Energy -*

# How are the Utility Companies & the Environment Benefited?

- Enhancement of the capacity of the existing electrical systems
- Supply power to more customers without the generation or acquisition of additional power
- Reduces capital expenditures by leveraging the existing infrastructure
- Keeps utility costs down
- Less fossil fuel being used to generate power
- Less dependency on foreign oil

# Old Method to Fine Tune Motors

Hire an Electrical Engineer (approx. $150/hr)

- They optimize each individual motor, compressor or power panel after installation to correct power factor & reduce amps
- Design the capacitors for each inductive load or panel to obtain optimized correction
- Contract with a company to manufacturer capacitors to SPEC for each motor or panel
- Hire electricians to properly install capacitors

Even at an extremely high kWh charge, it is not cost effective because of long payback time!

# The Unique Energy Savings with the KVAR® EC

- This patented diagnostic device & methodology has dramatically reduced the cost of determining how much capacitance is required for each device
- Optimizing is accomplished in minutes without costly electrical engineers, designers & manufacturers
- Capacitor units are assembled from modular components based on sizing results from a Qualified Electrician
- Installation is fast, simple and sized to the specific unit
- Power savings are immediate and average up to 25%
- Return on investment is rapid

# KVAR® EC

- Innovative, Unique & Patented*
- U.S. Manufactured
- U.S. Government certified
- NASA tested and used
- UL Listed & CSA Approved
- Cleaner & Greener / RoHS Certified
- Reduces the amount of non-productive current in your existing electrical system, resulting in a significant reduction in power consumption costs
- Thousands of installations worldwide
- 5 year warranty

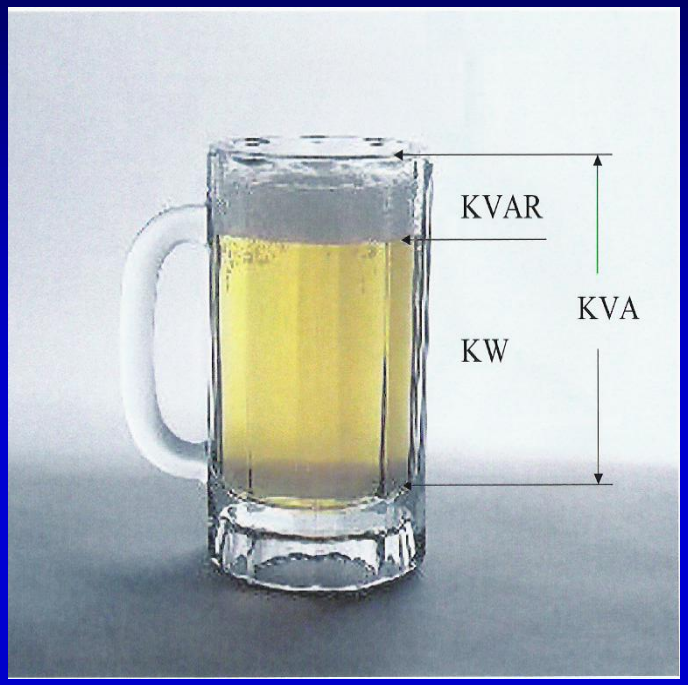
* Methodology & Apparatus

# How Does the KVAR® EC Work?

- The KVAR® EC stores the reactive power to create the electromagnetic field (EMF) around the inductive windings of a motor
- As motors operate, reactive power is “pulled” and “pushed” to and from the KVAR® EC by the motor at 60 cycles per second
- The KVAR® EC stores & releases to motors what they need to function more efficiently
- When motors start, they need power to run (*voltage* and *amperage*)
- Power needed heats up and strains the wiring and motors (*watts)*
- Electricity reclaimed and recycled by the KVAR® EC would normally be pushed back through the power distribution lines
- The KVAR® EC reclaims, stores, recycles and supplies power to inductive loads

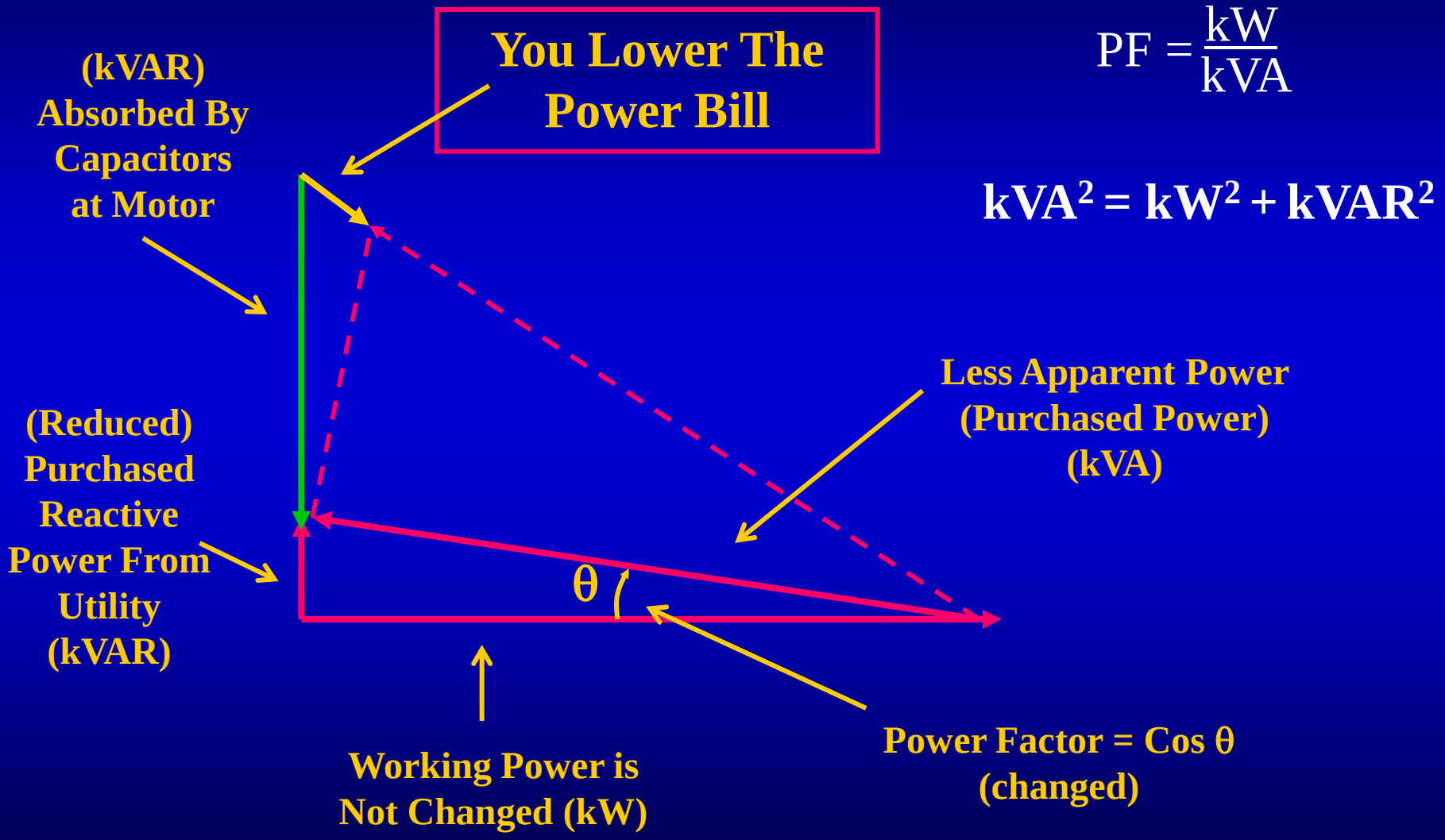
# Beer or Cream Soda Analogy: Foam vs. Liquid

- **Foam is wasteful** because it doesn't quench your thirst
- This foam is represented by kVAR (kilovolt – ampere - reactance)
- The total contents of your mug is kVA. This is the total of kW (the beer) and kVAR (the foam).
- As your kVAR (foam) approaches zero, your Power Factor approaches 100% & the amperage is reduced
- **Power Factor should always be optimized in a slightly lag position**
- Power Factor (P.F.) is the ratio of Working Power to Apparent Power P.F.= $\frac{kW}{kVA}$




**kVAR (foam) is absorbed by the KVAR® EC**

# Power Triangle




$$PF = \frac{kW}{kVA}$$

$$kVA^2 = kW^2 + kVAR^2$$

# Other Benefits

- The KVAR® EC improves the efficiency of the electrical system & the kW capacity is increased
- Maintains quality voltage levels to your system with less voltage drops especially long runs of cable
- Reduces the harmful effects from the EMF's
- Less power system losses in your distribution system
- Reduces the heat on the wires, contactors & the motors
- Less overheating and premature failure of motors and other inductive equipment
- Motors run cooler and are more efficient
- Increases the life of the motors
- Diminishes the chances of fires
- Increase starting torque
- Reduces maintenance costs

# Causes of Low Power Factor

- Inductive loads are usually the major portion of the power consumed in Commercial Buildings & Industrial Complexes - 80% or more

- Types of Inductive loads (Reactive Power)
  - Transformers
  - Motors
  - Compressors
  - wind mill generators
  - Fluorescent lighting with T-12 ballasts
  - High intensity discharge lighting (HID)

- Lightly loaded motors are wasteful and result in low power factor

- Larger loads with longer run times = more savings

# Why You Should Optimize Power Factor?

- Reducing Amperage & kW usage directly reflects to dollar savings

- Eliminate the primary power factor surcharge penalty

  + Utilities usually charge customers an additional fee (up to 25% more) when their power factor is less than 0.85 (PFC equipment)

  + Avoid this additional fee determining the capacitance needed to optimize each motor to unity by properly sizing and installing the KVAR® EC system

# Optimizing Motors to Unity

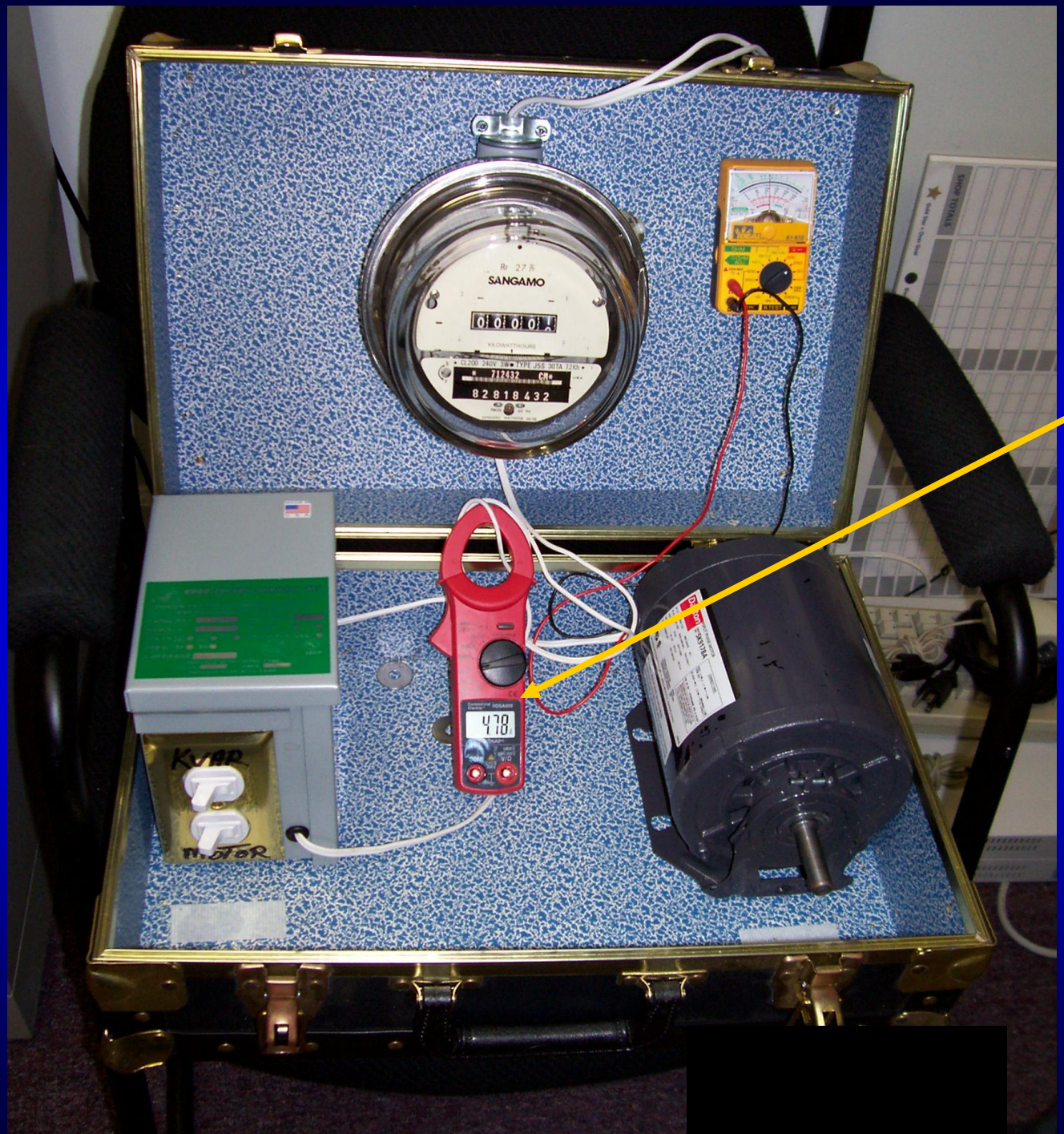
## 2 Types of Installations with the KVAR® EC

- **Panel mount – accumulation of smaller inductive loads**
  - **Single phase panel mount**
  - **Three phase panel mount**
- **Equipment mount – larger individual inductive loads**

# How long is the Payback time?

**Depends on:**

- **Age of equipment**
- **Percentage of PF optimization**
- **kW per hour charged**
- **Panel mount or equipment mount**
- **Amount of equipment and labor needed for correction**



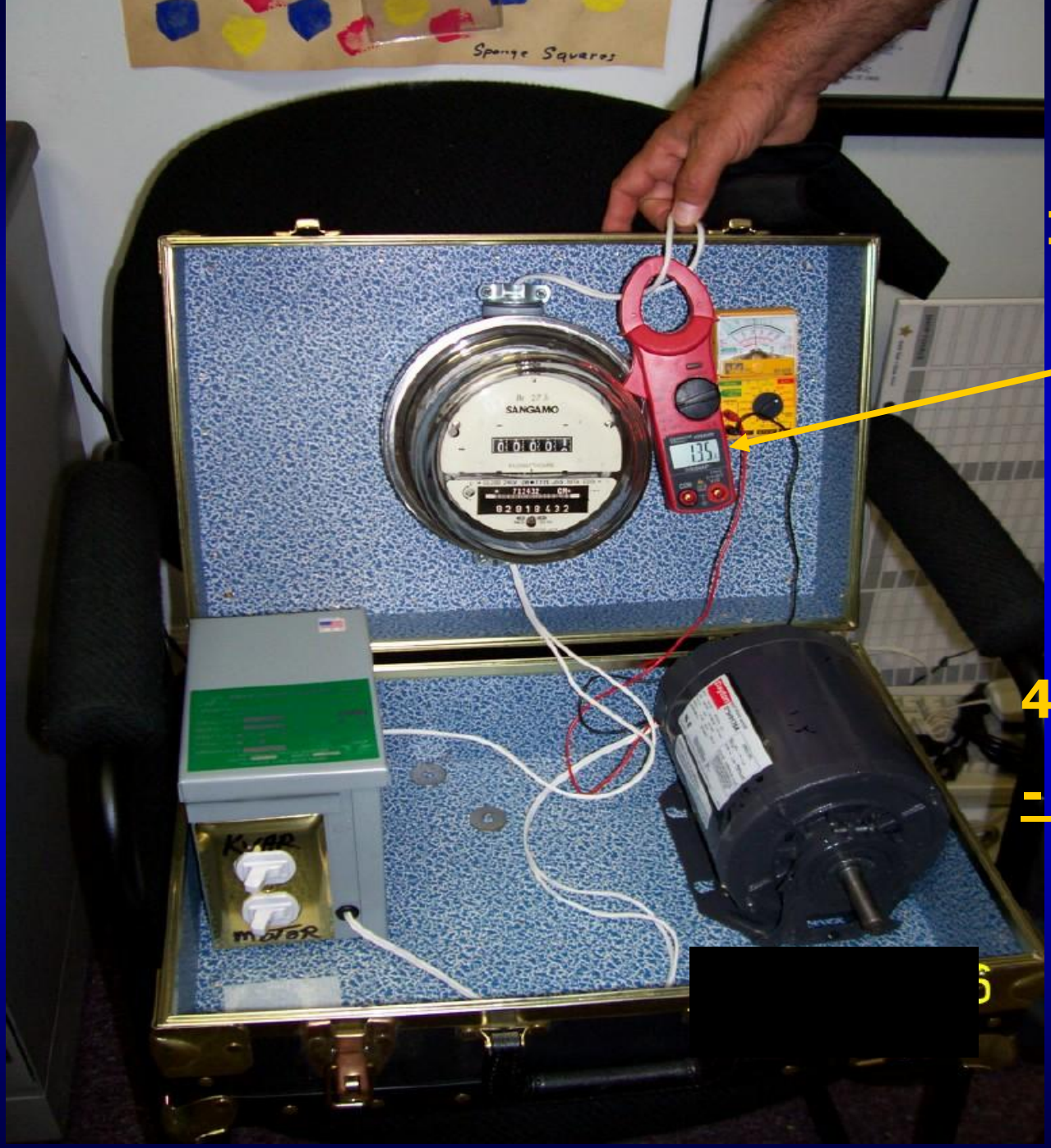

1/3 HP motor

120 volts

4.78 amps

without the

KVAR® EC




1/3 HP motor

120 volts

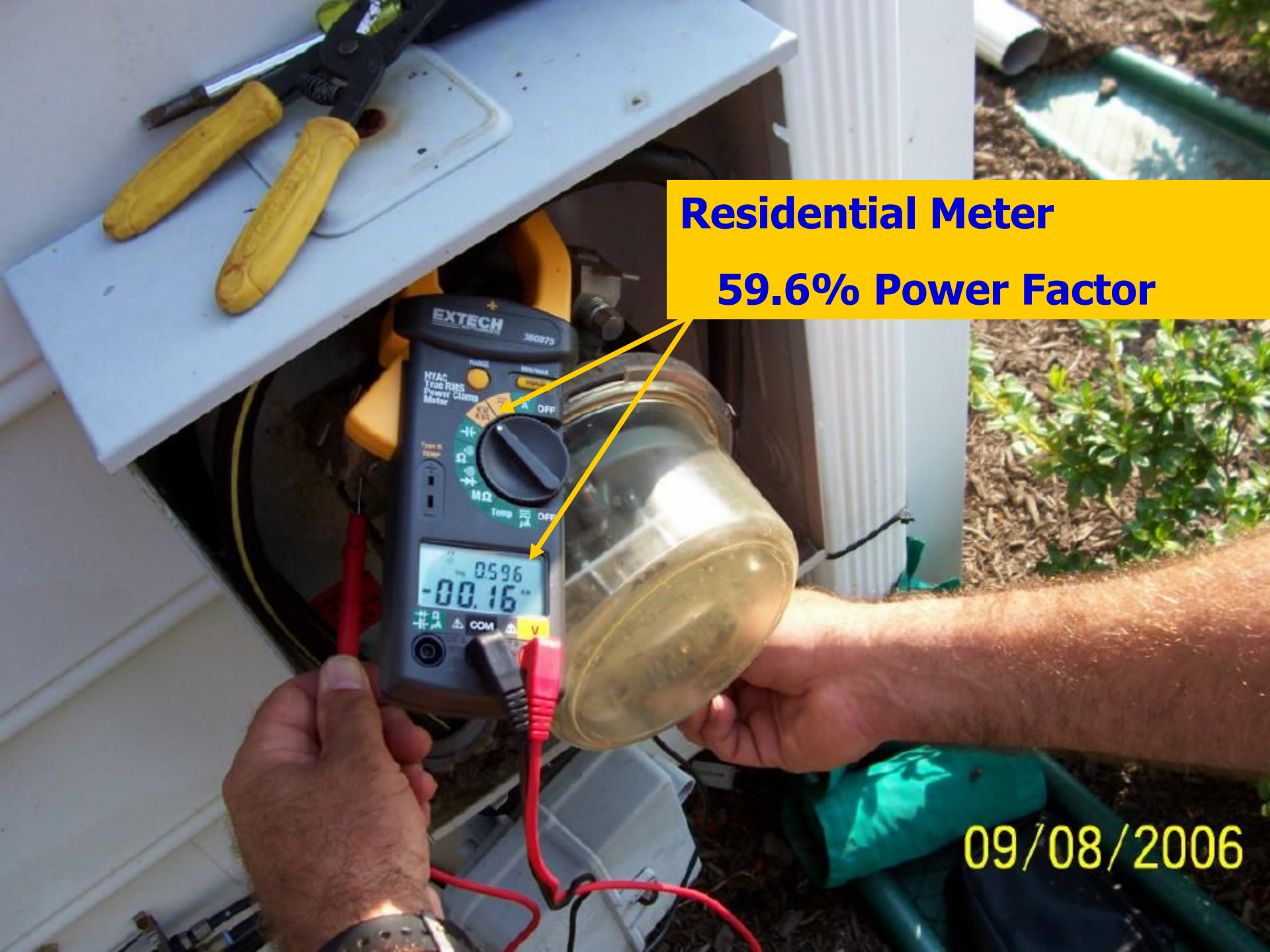
1.35 amps with the KVAR® EC

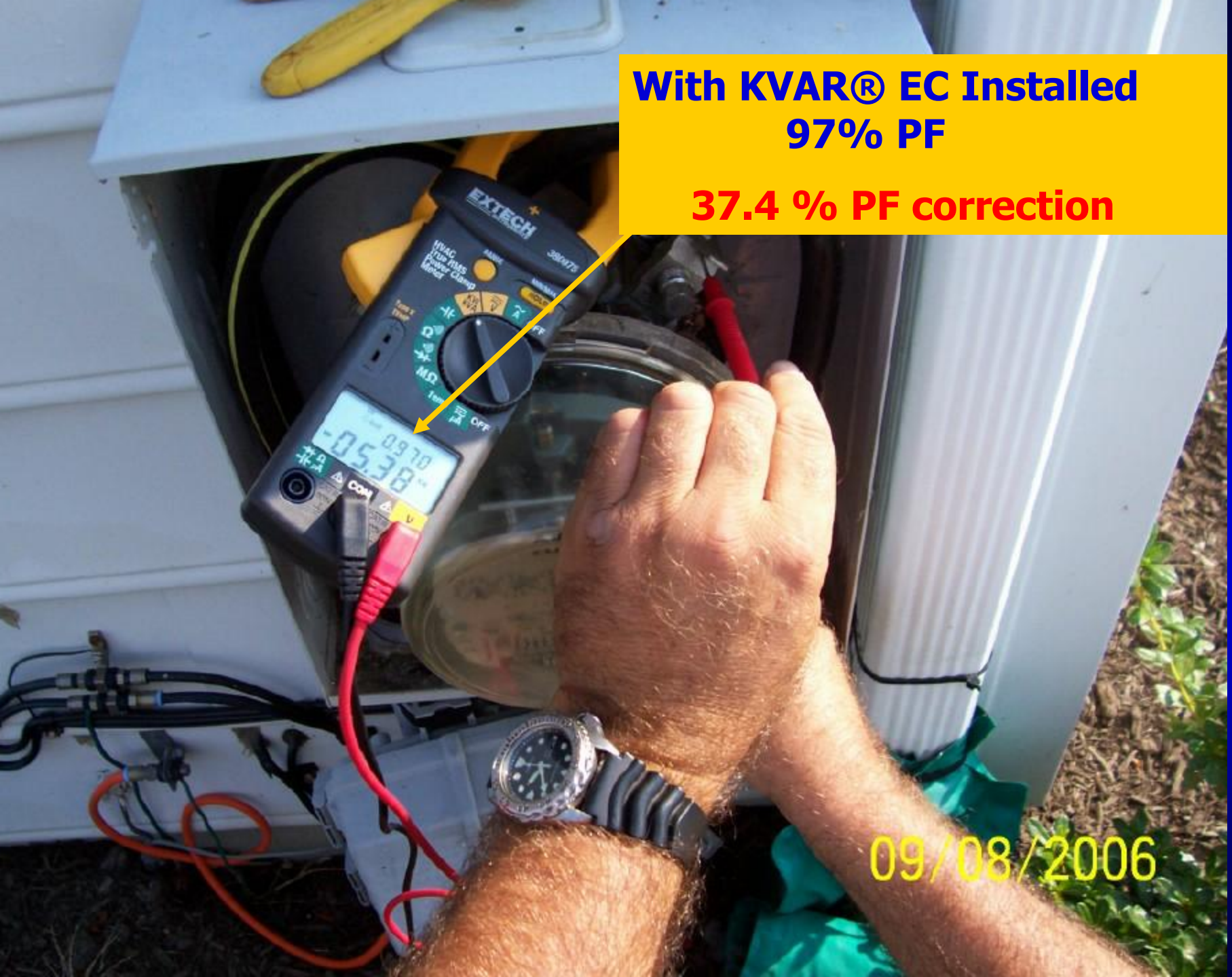
4.78 Initial amps

- 1.35 Opti amps

3.43 Amp drop

71.8 % diff.


Residential Meter
59.6% Power Factor
EXTECH
0.596
09/08/2006


With KVAR® EC Installed
97% PF
37.4 % PF correction
EXTECH
09/08/2006

Residence
KVAR® EC
PU-1200
1/31/2007 3:26

## Electric Meter Information

**Meter Number 22ST33**

| | | |
|---|---|---|
| Current Meter Reading, | Jan 29 (actual) | 015839 |
| Last Meter Reading, | Dec 28 (actual) | 014727 |
| Total KWHs Used | | 1112 |

Your Next Scheduled Meter Reading is Feb 27, 2007

## Electric Delivery Charges

Current charges for 32 days - Winter Rates in Effect - Residential Heating

For Account 2101 3369 9996, the class average annual price to compare is 10.03 cents per kWh

Delivery Charges:

| | | |
|---|---|---|
| Customer Charge | | $ 3.64 |
| Distribution Charge: First | 1000 kWh X $0.031873 | $ 31.87 |
| Last | 112 kWh X $0.012531 | $ 1.40 |
| Deferred Cost Recovery | 1112 kWh X $0.003710 | $ 4.13 |
| Environmental Surcharge | | $ 0.16 |
| Administrative Credit | 1112 kWh X $0.001390- | $ 1.55- |
| Universal Service Program | | $ 0.37 |
| MD Franchise Tax | 1112 kWh X $0.000620 | $ 0.69 |
| **Total Electric Delivery Charges** | | $ **40.71** |

Supply Charges:

| | | |
|---|---|---|
| Standard Offer Service&Transmission First | 1000 kWh X $0.097567 | $ 97.56 |
| Last | 112 kWh X $0.097567 | $ 10.93 |
| Procurement Cost Adjustment | 1112 kWh X $0.003554 | $ 3.95 |
| **Total Electric Supply Charges** | | $ **112.44** |

| | |
|---|---|
| **Total Electric Charges** | $ **153.16** |

## Your Electric Energy Comparison

Daily Averages:

| | Jan 06 | Jan 07 |
|---|---|---|
| Temp: | 40° | 40° |
| KWH: | 72.2 | 34.8 |

Monthly Usage in KWHs

delmarva power

Please See Back For Further Details

Printed On Recyclable Paper

# Residence

**Jan 06 72.2 kWh**

**Jan 07 34.8 kWh**

**Diff. 37.4 kWh**

**51.8% savings on bill**

**Same average outside temperature of 40° F**

**Not typical results**

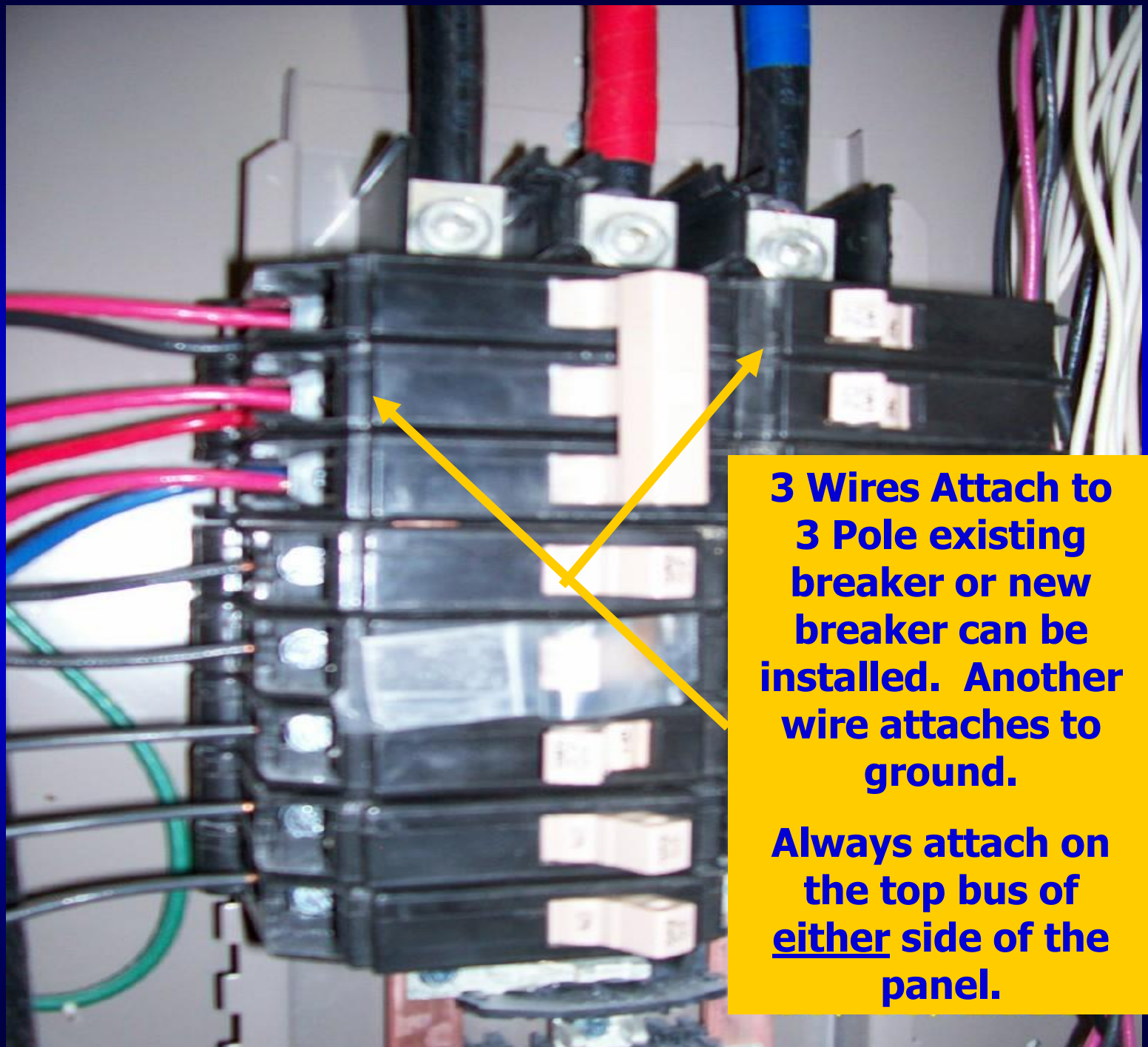
Residential or Light Commercial
Single Phase Panel Mount
STOP!
GEIGER
HOME WARRANTY
STOP
CALL
(302) 764-5000

LIGHTING
BREAKERS
APPROVED FOR
PP 1

Reach-in air cooled refrigeration cases
5 ton compressors

More Reach-in Cooler cases

3 phase panel mount was found to be most cost effective to optimize the motors with the fastest ROI
09/08/2006


3 Wires Attach to 3 Pole existing breaker or new breaker can be installed. Another wire attaches to ground.
Always attach on the top bus of either side of the panel.

The 3 Phase KVAR® EC has built in overload protection on each phase and uses a standard cartridge fuse
GALVANIZED
RAINPROOF
09/08/2006

## Your Electric Energy Comparison

Daily Averages:

| | Aug 05 | Aug 06 |
|---|---|---|
| Temp: | 80° | 79° |
| KWH: | 180.1 | 125.8 |

Monthly Usage in KWHs

Monthly Usage in KW Demand

**30.1% Reduction in Cost**

delmarva power

Please See Back For Further Details

Printed On Recyclable Paper

Delivery Charges:

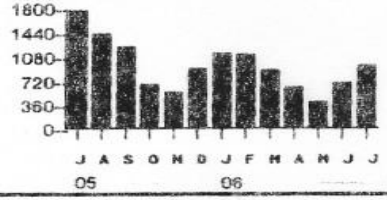
| | | | |
|---|---|---|---|
| Customer Charge | | | $ 7.00 |
| Distribution Charge: First | 500 kWh X | $0.023700 Each kWh | $ 11.85 |
| Last | 475 kWh X | $0.023705 Each kWh | $ 11.26 |
| **Total Electric Delivery Charges** | | | $ 30.11 |
| **Total Electric Charges** | | | $ 30.11 |

## Your Electric Energy Comparison

Daily Averages:

| | Jul 05 | Jul 06 |
|---|---|---|
| Temp: | 77° | 77° |
| KWH: | 52.4 | 33.8 |

Monthly Usage in KWHs




## Electric Supply Summary - Washington Gas

Billing Period:
from: Jun 26, 2006
to: Jul 25, 2006

Supplier Account
Current Charges for 29 days - Residential Service
975 KWHs Used

| | |
|---|---|
| Previous Balance Last Bill | $ 74.97 |
| Payment Jul 05, Thank You | $ 74.97- |

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Please See Back For Further Details

**35.5% Reduction in Cost**

**Total of 32.8% reduction for all 2 Strip Center Units**

# Appoquinimink School District, DE

2005/2006 Monthly Comparison by School — Appoquinimink School District, De

| | Avg Daily Temp | | Silver Lake | Meredith | K center | MHS | Redding | Brick | Townsend | Cedar | District Office | Olive |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jul-05 | 77 | Daily KW Average | 3135 | 4603 | 632 | 7455 | 2835 | 2375 | 2023 | 3102 | 666 | 2655 |
| Jul-06 | | Daily KW Average | 2223 | 2971 | 466 | 5422 | 1183 | 1137 | | | | 1260 |
| % -/+ | | | -29.091% | -35.455% | -26.266% | -27.270% | -58.272% | -52.126% | -100.000% | -100.000% | -100.000% | -52.542% |

**8 out of 10 Schools  Total = 38% savings**

**February 22, 2007**
**Middletown Transcript**
**Appoquinimink School District saves big on energy costs**

**By Shauna McVey**
Staff Reporter
shauna.mcvey@doverpost.com

**It was announced at the Feb. 11 meeting of the Appoquinimink School Board of Education that the Appoquinimink School District saved more than $100,000 in the last year in energy costs.**

**Bob Hershey, buildings and facilities supervisor, said the district saved $161,870.**

**He said the savings are due to the district's Energy Manager Andy Walton, digital heating, ventilation, air conditioning controls, the efforts of the staff inside schools and KVAR units, which operate in eight of the 10 schools.**

**The KVAR units are designed to recycle reactive power, which reduces the amount on energy that needs to be purchased from a power company.**

**The systems are automated and can be controlled through computers by Walton, who is a heating, ventilation, air conditioning specialist working with the district.**

**"That's just one portion of how we're cutting down on our kilowatt consumption," Hershey said. "I think there's still a lot of room for growth and we're looking to save a lot of money."**

**He said the district is working to get students and staff at the schools to conserve energy in other ways by turning off lights and not operating unnecessary equipment.**

**On average, schools in the district reduced their energy usage nearly 16 percent for January 2007, compared to January 2006.**

**In addition, Hershey presented Dennis Scott, chief custodian at Olive B. Loss Elementary School, with the Annual Energy Conservation Award for his efforts in cutting energy usage at OBL by 33 percent in 2006 as compared to the energy usage in 2005.**

# Refrigeration Warehouse

Relay used with KVAR® EC to save customer additional money
09/08/2006

09/08/2006

09/08/2006

Optimizing of refrigeration equipment is done LIVE

3 different sizing tools are used

US1- single phase motors

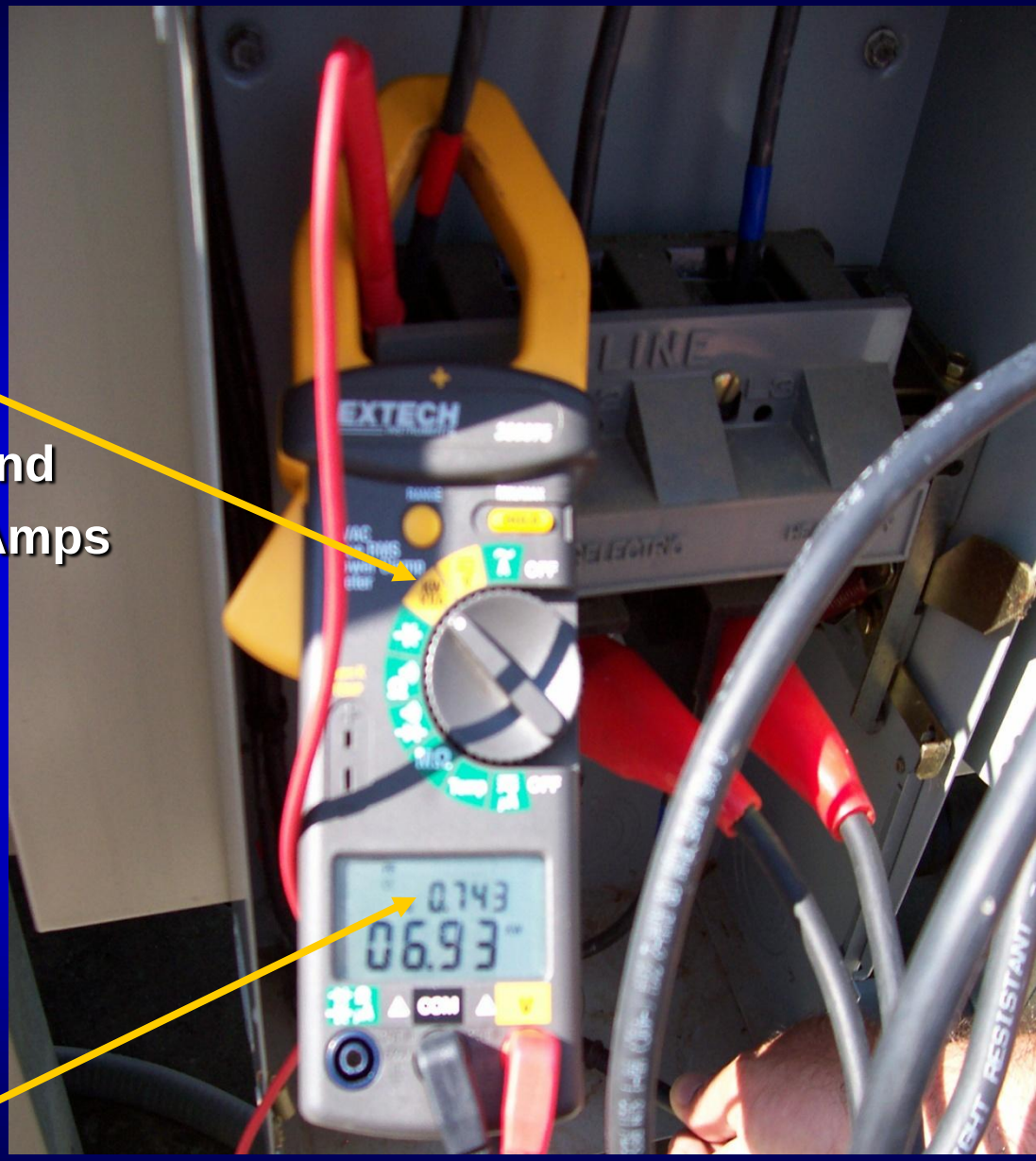
US2 - 3 phase motors up to 75 hp

US3 - 3 phase motors up to 300 hp

Additional sizers can be used together for larger motors.

# Measuring Power Factor

- Select Power Factor
- Clamp load wire
- Leads on positive and ground
- Read & record initial PF & Amps

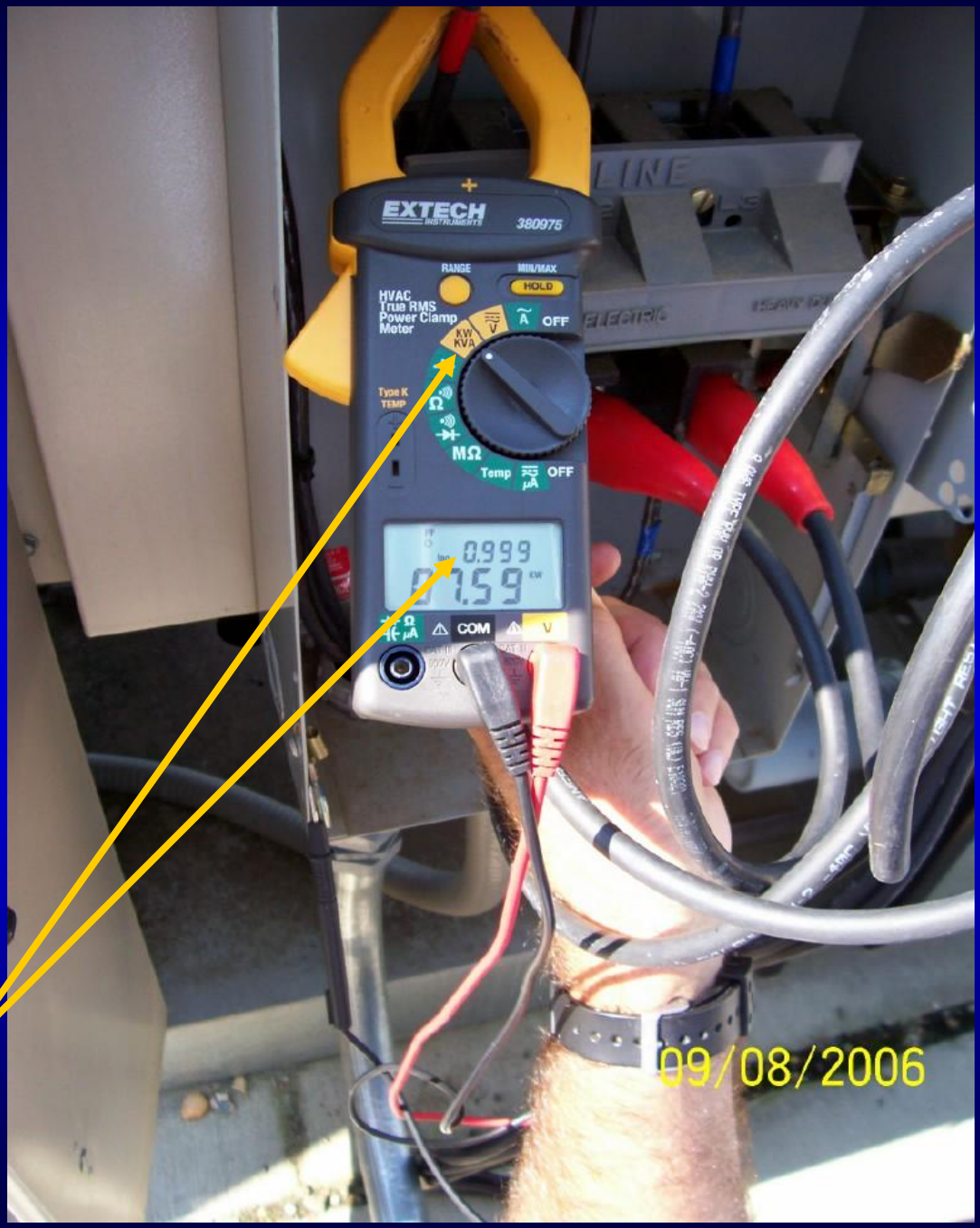



Initial PF = 74.3 %

# Sizing

- Select switches on sizer to bring power factor as close as possible to 99.9%
- Record optimized PF and Amps
- Record Unit size, switches used, lead amps, runs hours, wire length, K/O side needed & cost per kWH

**Optimized PF = 99.9%**



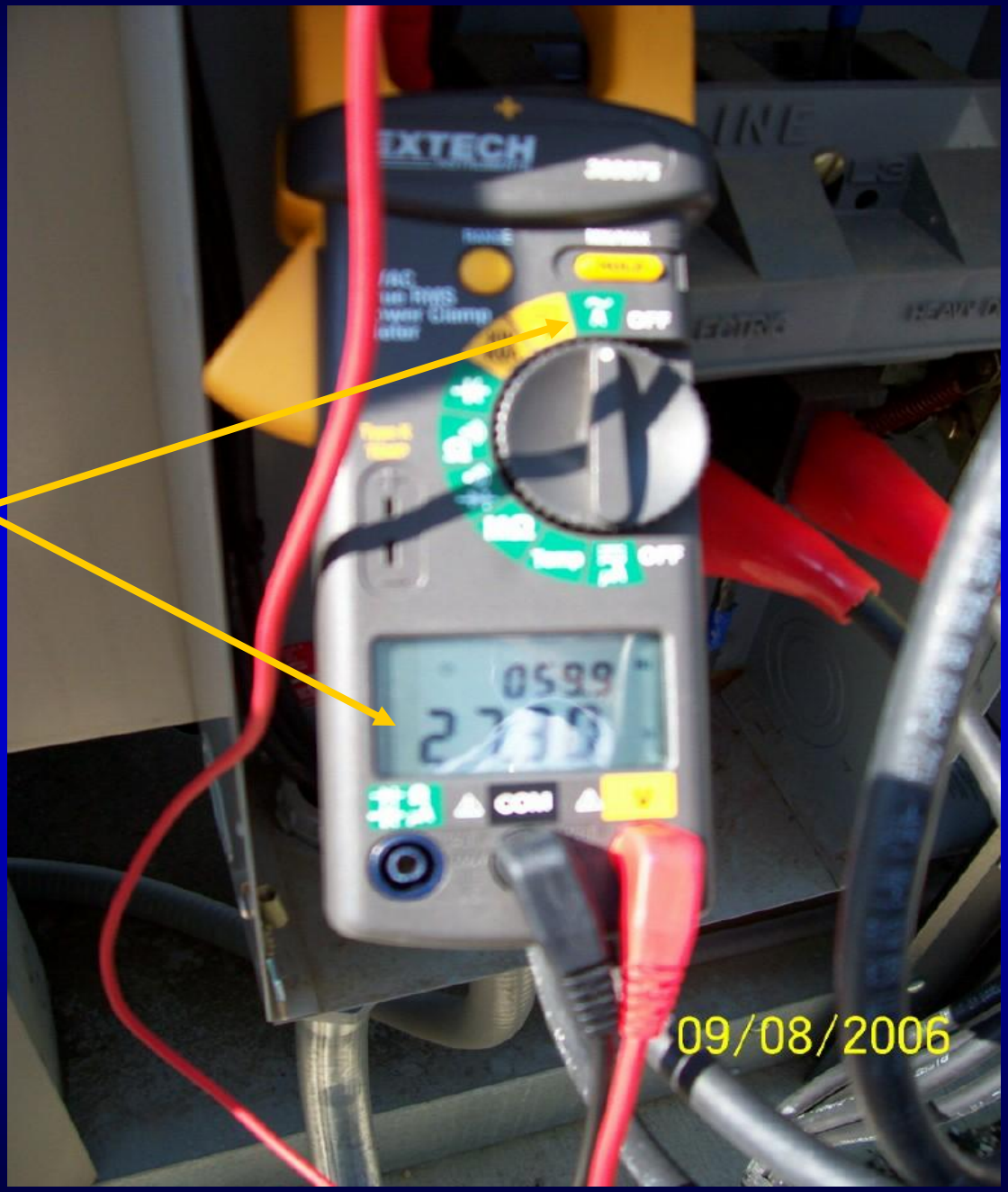
**Initial amps**

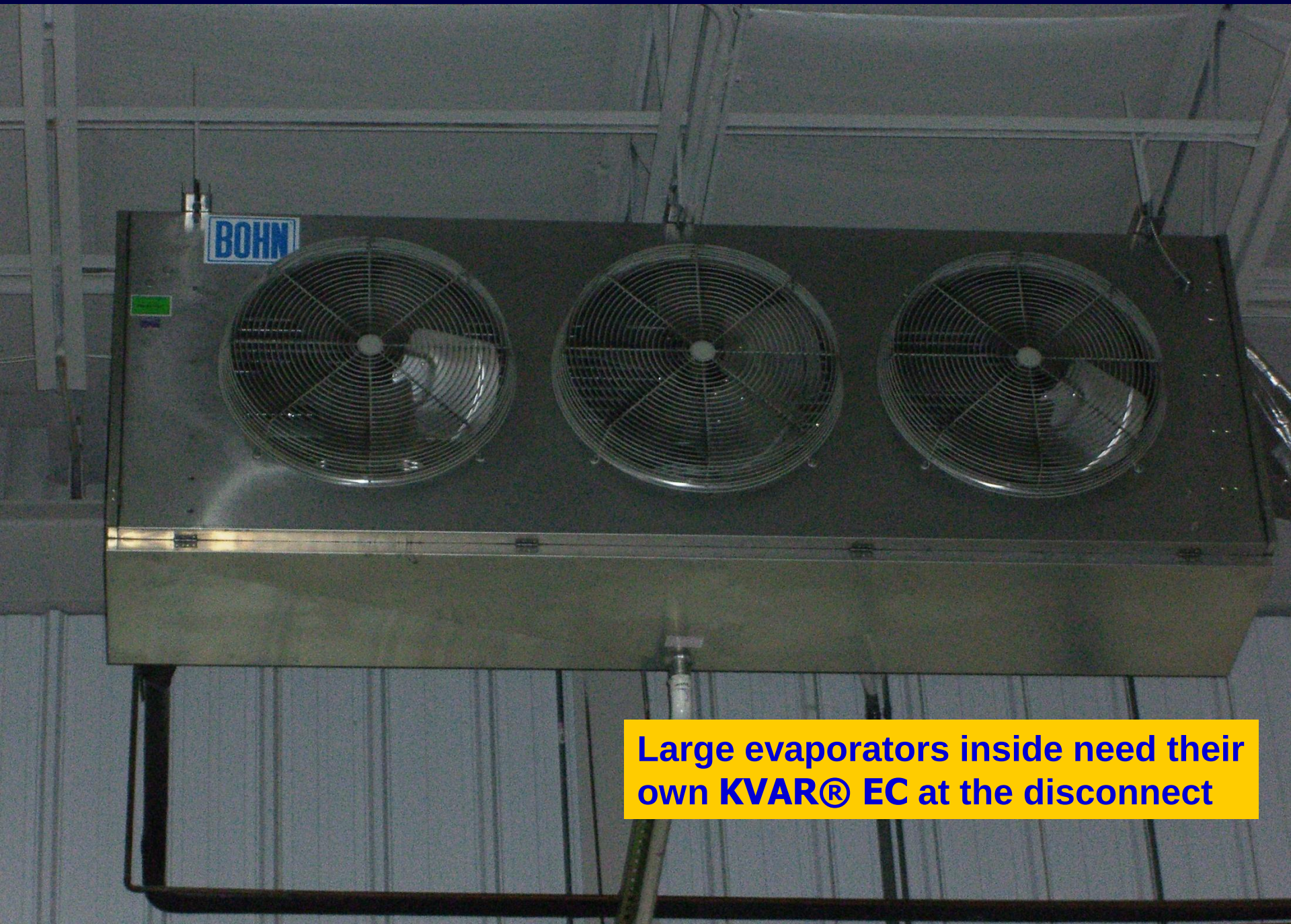
**33.85**

**Optimized amps 27.30**

**6.55 amp difference**

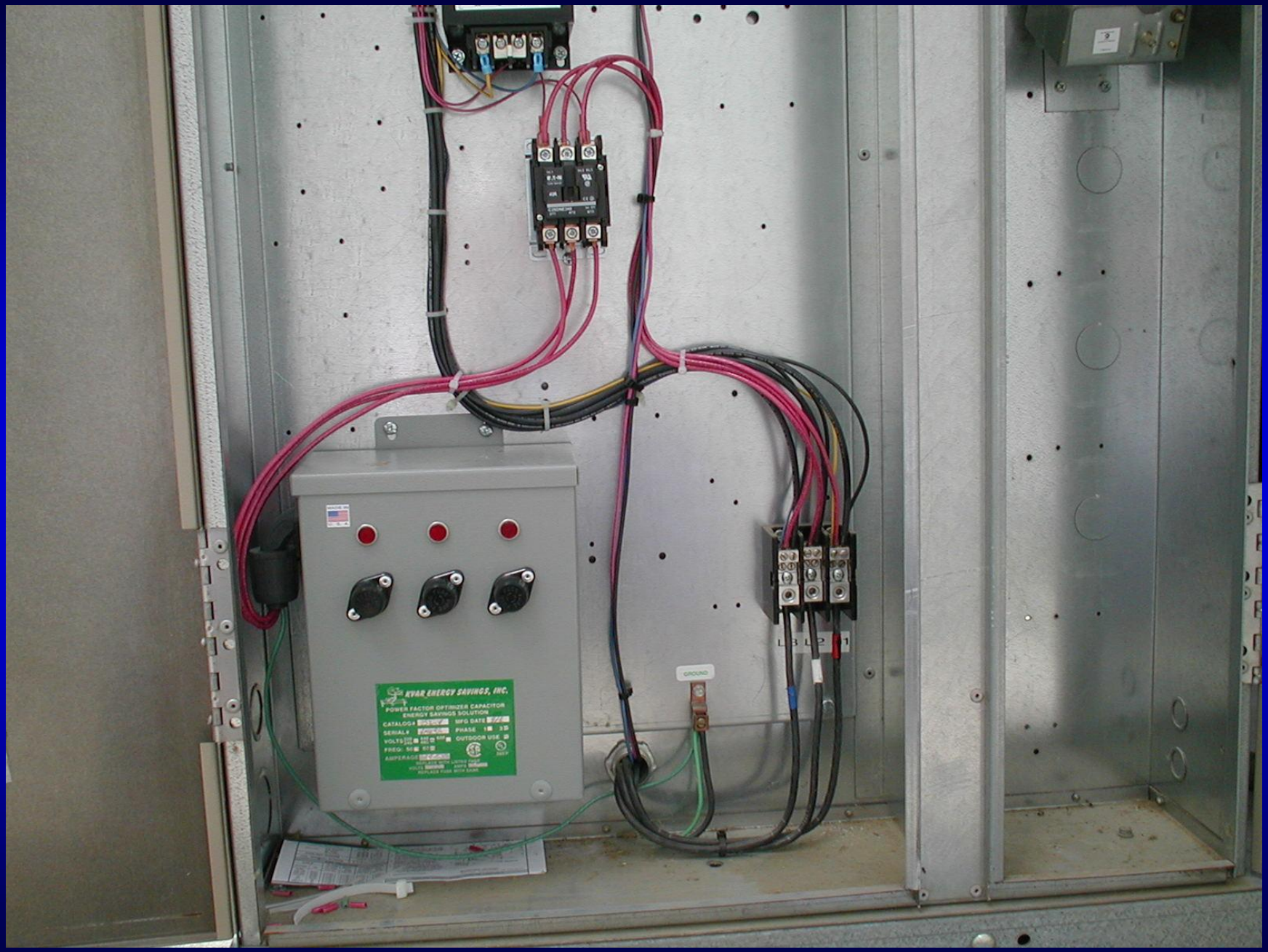
**19.35 % reduction**






**Large evaporators inside need their own KVAR® EC at the disconnect**

Budweiser
Budweiser
Budweiser


KVAR ENERGY SAVINGS, INC.
POWER FACTOR OPTIMIZER CAPACITOR
ENERGY SAVINGS SOLUTION
CATALOG#
SERIAL#
VOLTS
FREQ: 50 60
AMPERAGE
MFG DATE
PHASE 1 3
OUTDOOR USE
GROUND

RUN
PUMP DOWN STAND BY
R-22
KC-3
KVAR ENERGY SAVINGS, INC.
POWER FACTOR OPTIMIZER CAPACITOR
ENERGY SAVINGS SOLUTION
CAUTION : HAZARD OF ELECTRIC SHOCK
USE COPPER CONDUCTORS ONLY

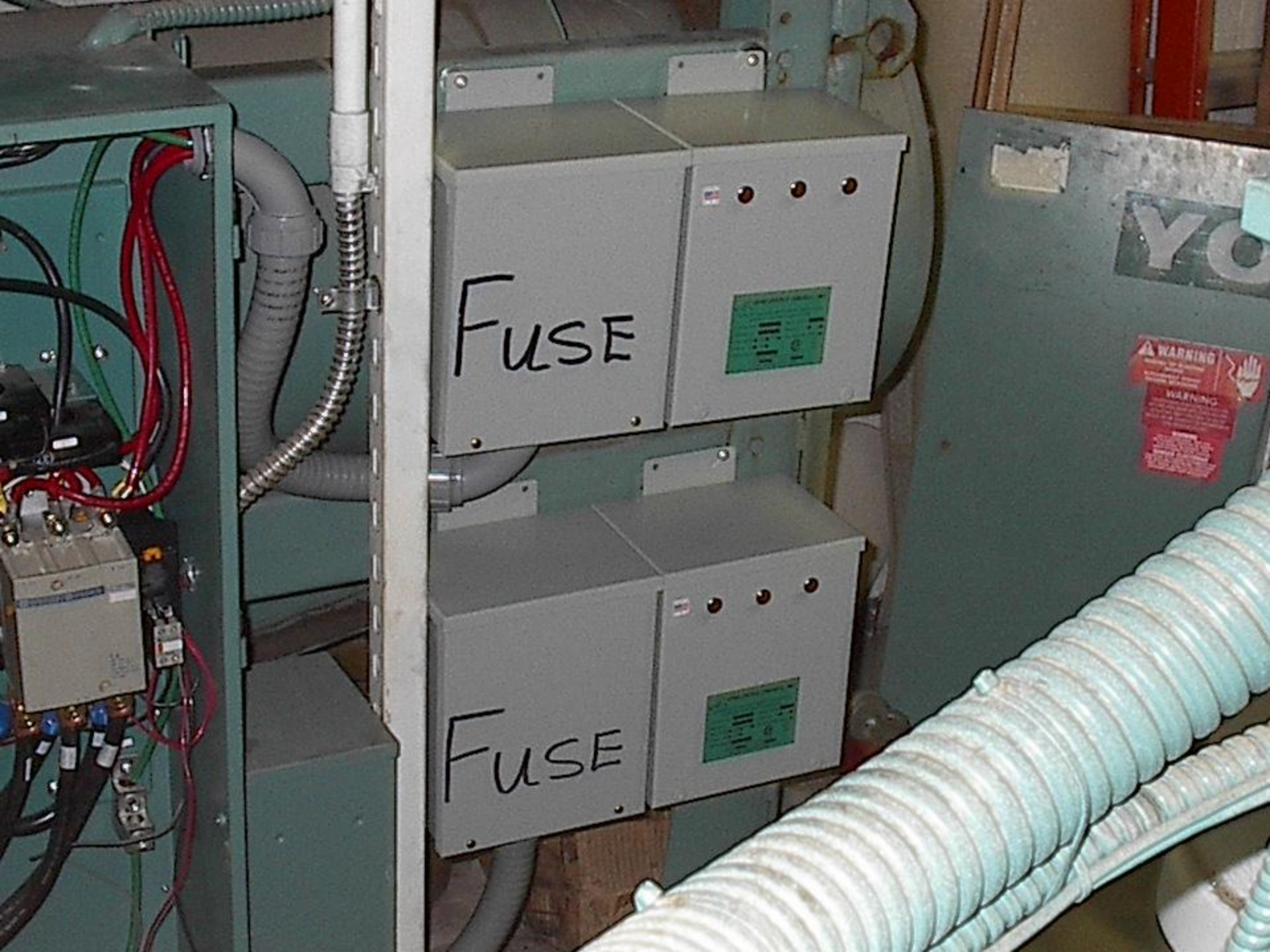
HID Lighting panel mount with more than 50 older style lights
09/08/2006

Cooling Tower

**Water Cooled Chiller**

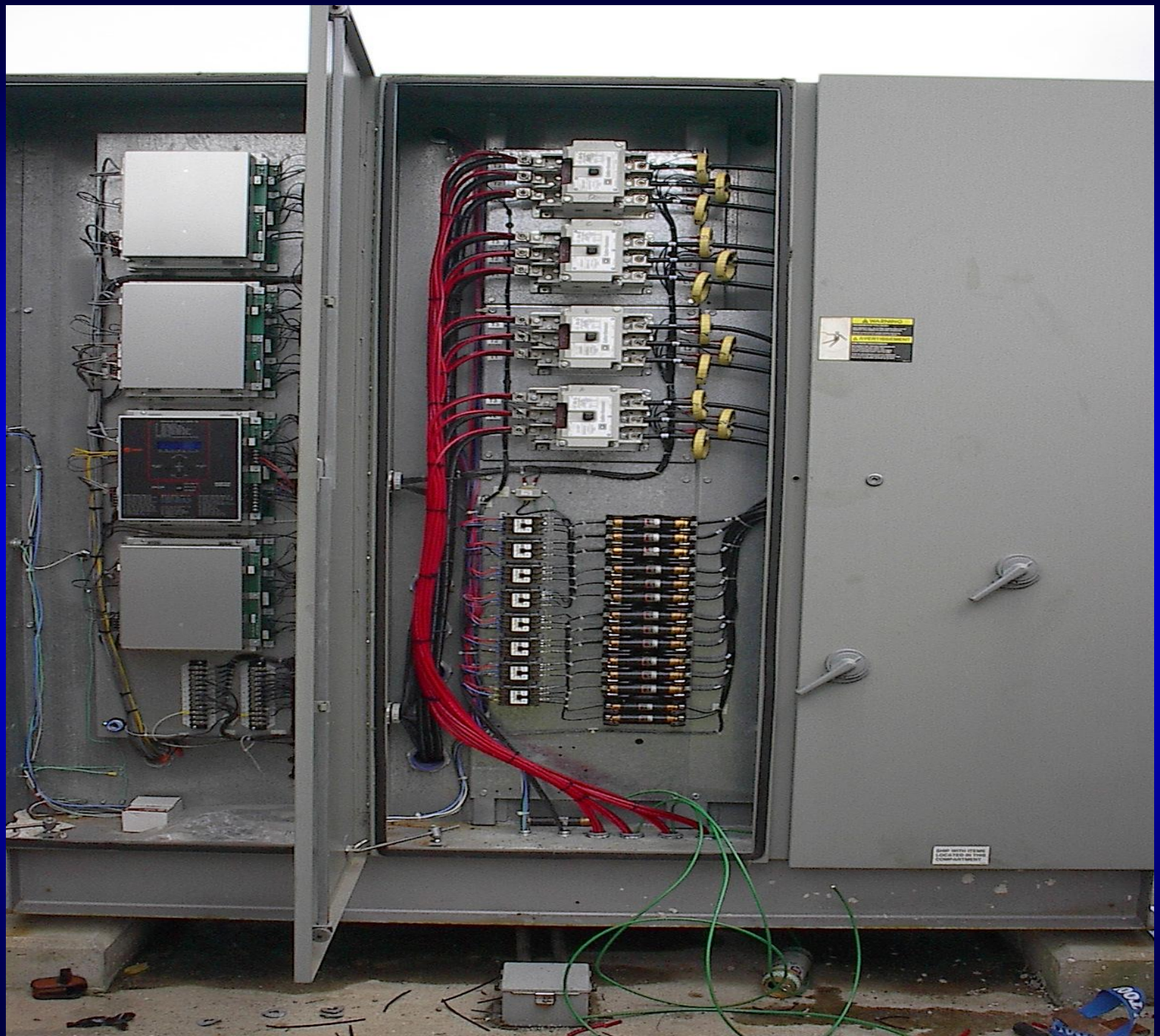
FUSE
FUSE

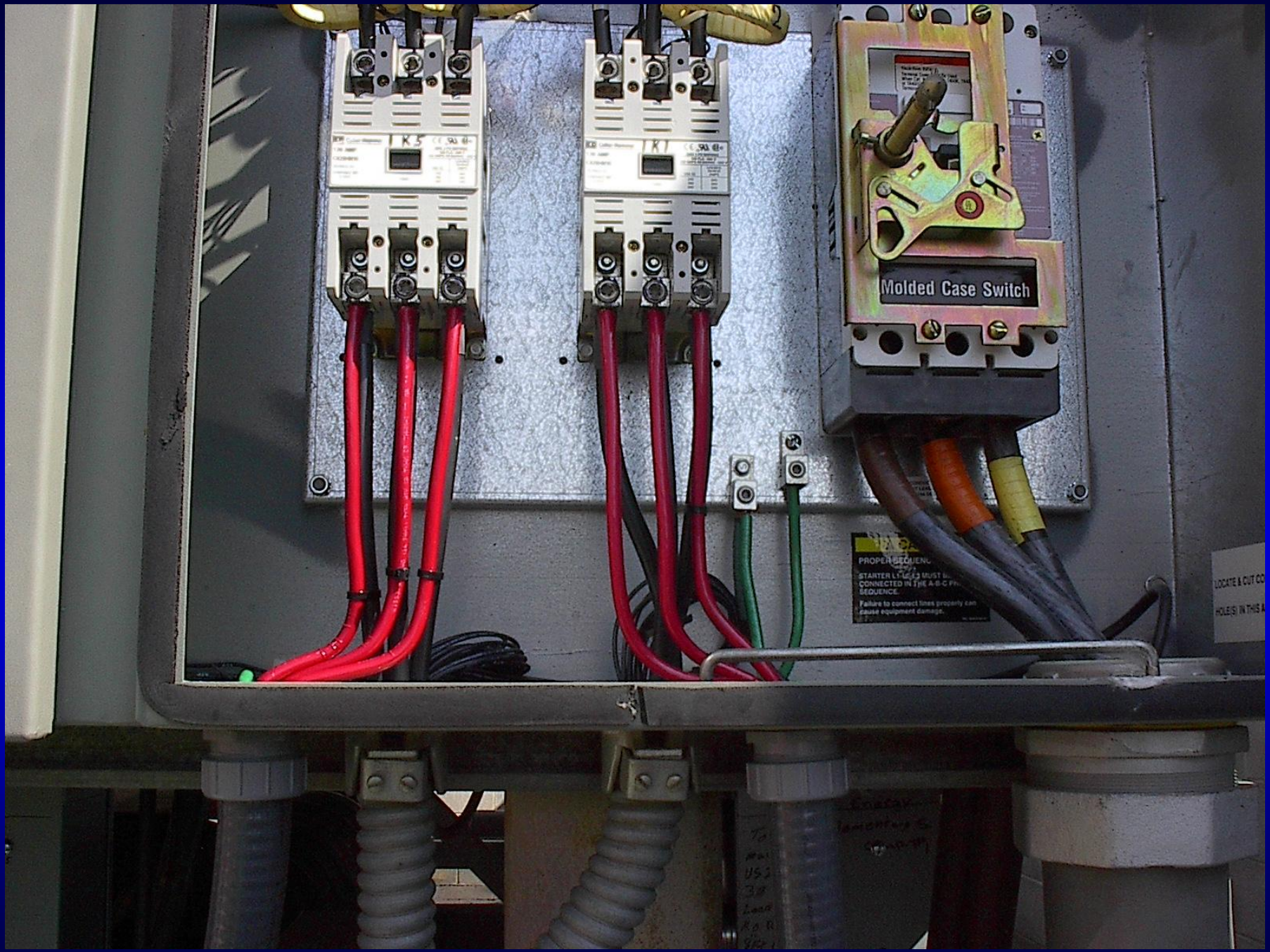
RED wiring is new
Black wiring is existing


FUSE
FUSE
WARNING

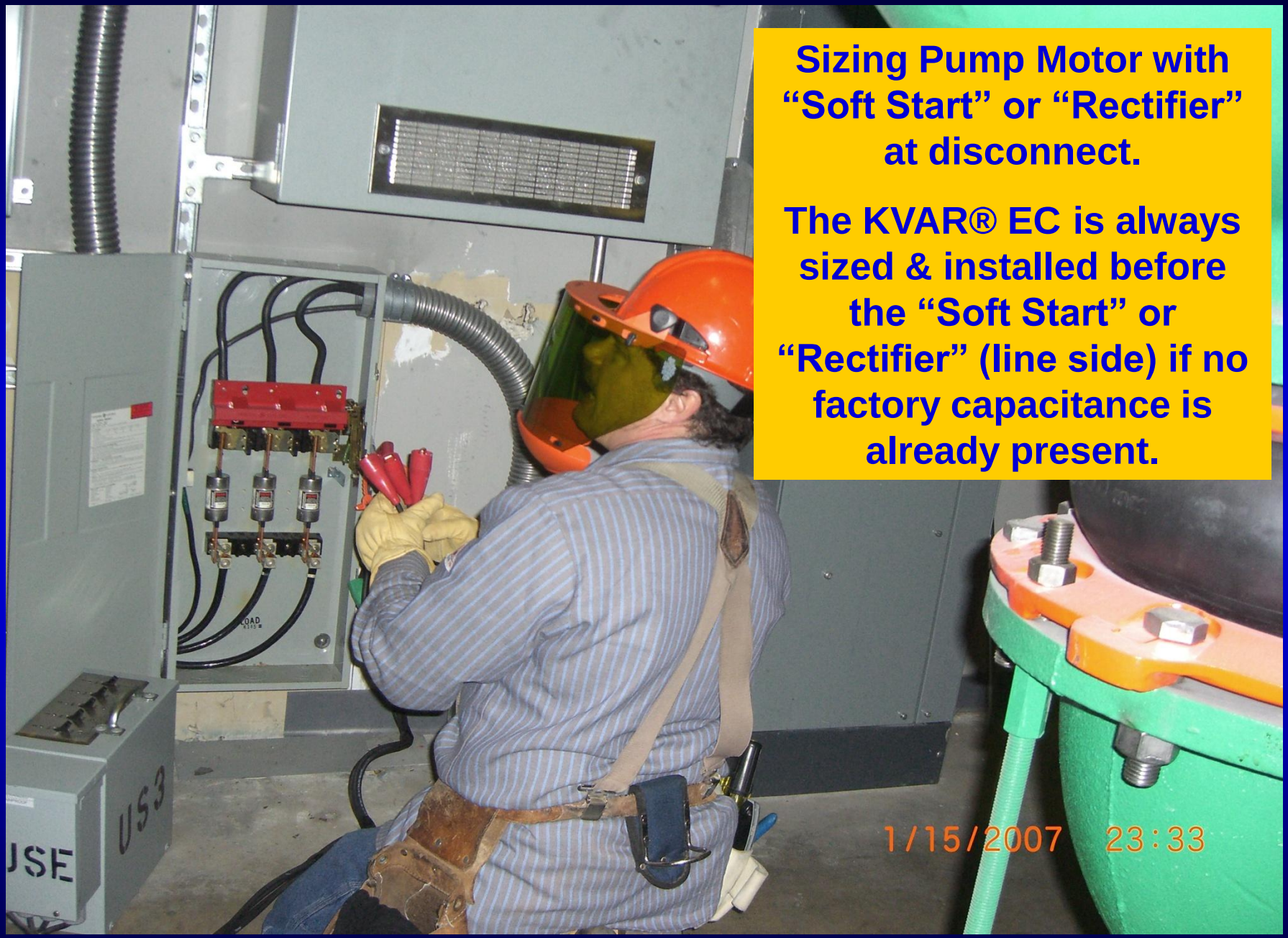
FUSE

FUSE
FUSE
FUSE
FUSE



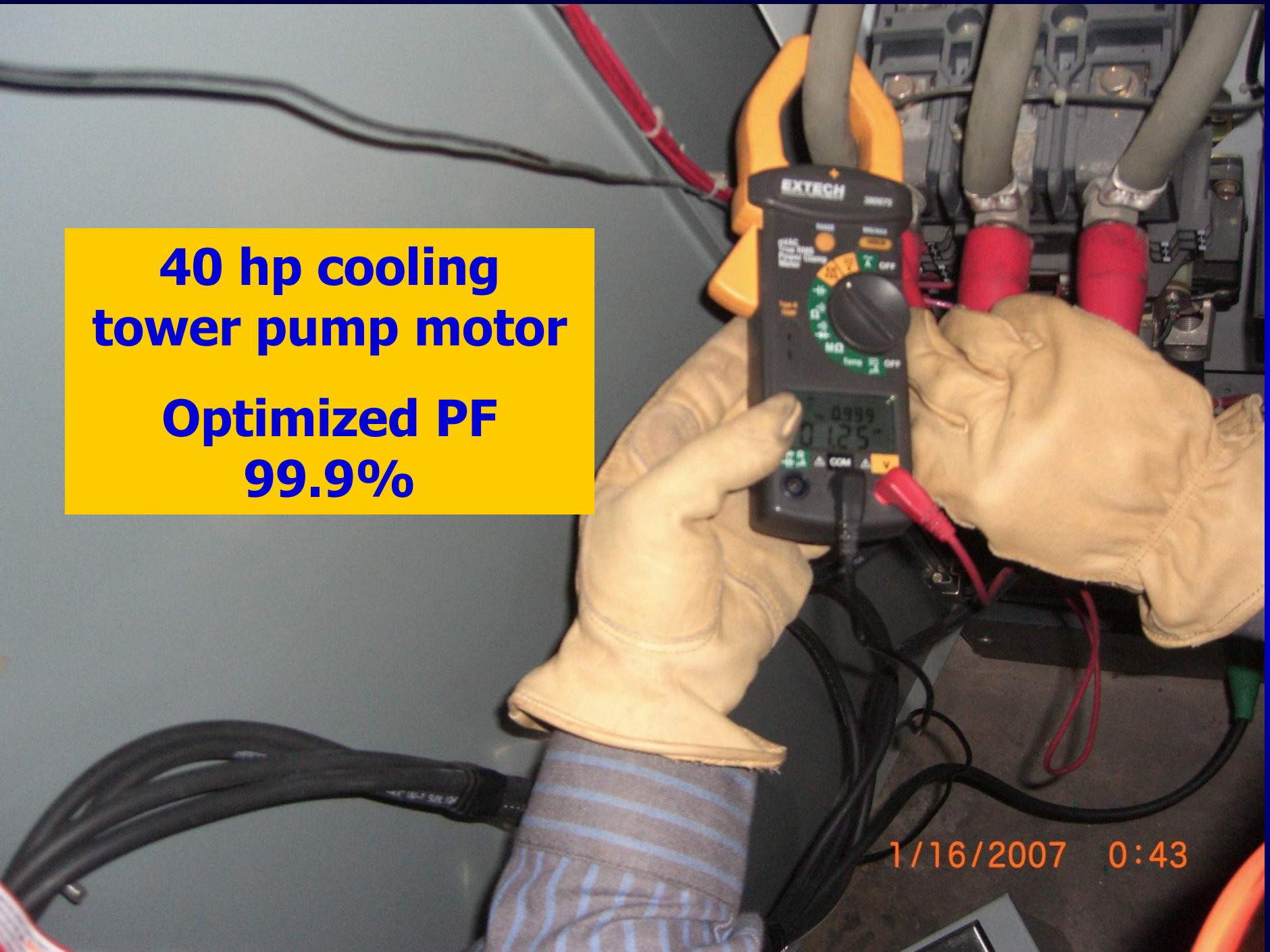

K5
K1
Molded Case Switch

FUSE
30 TON
FUSE
10/12/2007 4:09


Sizing Pump Motor with "Soft Start" or "Rectifier" at disconnect.
The KVAR® EC is always sized & installed before the "Soft Start" or "Rectifier" (line side) if no factory capacitance is already present.
1/15/2007 23:33

**40 hp cooling tower water pump motor**

**Initial PF 52%**




**40 hp cooling tower pump motor**

**Optimized PF 99.9%**

# INITIAL FIELD SURVEY SHEET

FSS-1

| | |
|---|---|
| DATE: | |
| NAME OF COMPANY: | |
| ADDRESS: | |
| CITY/ST/ZIP: | |
| PHONE # : | |
| ATTENTION: | |

SURVEYOR: _____

COMMENTS: _____

Cost per KW = _____

| # | ITEM/EQUIPMENT | PHASE | VOLTS | INITIAL AMPS | OPTIMIZED AMPS | INITIAL P.F. | OPTIMIZED P.F. | LEAD | HOURS MOTOR | US NO. | SWITCH NO. 1 | 2 | 3 | 4 | 5 | CABLE LENGTH | K/O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | |

# INITIAL FIELD SURVEY SHEET

FSS-1

| | |
|---|---|
| DATE: | |
| NAME OF COMPANY: | MCC |
| ADDRESS: | Weldin Road |
| CITY/ST/ZIP: | Wilmington, De 19803 |
| PHONE # : | |
| ATTENTION: | |

SURVEYOR:

COMMENTS: #2 Unit averages 3 hours run time per day

Cost per KW = 0.097

| # | ITEM/EQUIPMENT | PHASE | VOLTS | INITIAL AMPS | OPTIMIZED AMPS | INITIAL P.F. | OPTIMIZED P.F. | LEAD | HOURS MOTOR | US NO. | SWITCH NO. 1 | 2 | 3 | 4 | 5 | CABLE LENGTH | K/ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Air Handler | 3 | 208 | 19.9 | 14.6 | 68.0% | 99.0% | | 24 | 2 | | | x | x | | 3 | L |
| 2 | R+U #1 | 3 | 480 | 15.8 | 13.5 | 83.7% | 98.9% | | 3 | 2 | x | x | | | | 6 | F |
| 3 | AH #3 | 3 | 480 | 17.8 | 16.2 | 90.0% | 99.7% | | 24 | 2 | x | x | | | | 4 | L |
| 4 | AC #1 | 3 | 480 | 24.5 | 21.6 | 86.0% | 99.9% | | 24 | 2 | x | | x | | | 4 | L |
| 5 | HP Unit to Pool | 3 | 480 | 25.6 | 18.8 | 71.0% | 99.7% | | 24 | 2 | x | x | x | | | 3 | F |
| 6 | Pool Filter Pump | 3 | 480 | 9.7 | 5.7 | 56.0% | 96.0% | | 24 | 2 | x | x | | | | 3 | F |
| 7 | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | |

# ESTIMATED SAVINGS CALCULATIONS



| Date of Field Survey | 07/12/06 | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location #:** | **# 1** | **# 2** | **# 3** | **# 4** | **# 5** | **# 6** | **# 1 thru # 6** |
| **ITEM/EQUIPMENT:** | **Air Handler** | **R+U #1** | **AH #3** | **AC #1** | **HP Unit to Pool** | **Pool Filter Pump** | **Summary** |
| **Phase:** | 3 | 3 | 3 | 3 | 3 | 3 | |
| **Volts:** | 208 | 480 | 480 | 480 | 480 | 480 | |
| **Initial Amps:** | 19.9 | 15.8 | 17.8 | 24.5 | 25.6 | 9.7 | 113.3 |
| **Optimized Amps:** | 14.6 | 13.5 | 16.2 | 21.6 | 18.8 | 5.7 | 90.4 |
| **Initial Power Factor:** | 68.0% | 83.7% | 90.0% | 86.0% | 71.0% | 56.0% | |
| **Optimized Power Factor:** | 99.0% | 98.9% | 99.7% | 99.9% | 99.7% | 96.0% | |
| **Initial W:** | 7,160.82 | 13,120.32 | 14,781.12 | 20,344.80 | 21,258.24 | 8,054.88 | 84,720.18 |
| **Optimized W:** | 5,253.66 | 11,210.40 | 13,452.48 | 17,936.64 | 15,611.52 | 4,733.28 | 68,197.98 |
| **Reduction in Watts:** | 1,907.15 | 1,909.92 | 1,328.64 | 2,408.16 | 5,646.72 | 3,321.60 | 16,522.19 |
| **Hours of Operation/Day:** | 24.00 | 3.00 | 24.00 | 24.00 | 24.00 | 24.00 | |
| **Cost/KWH** | $0.097 | $0.097 | $0.097 | $0.097 | $0.097 | $0.097 | $0.097 |
| **Savings/Day** | $4.44 | $0.56 | $3.09 | $5.61 | $13.15 | $7.73 | $34.57 |
| **Savings/Month:** | $133.20 | $16.67 | $92.79 | $168.19 | $394.37 | $231.98 | $1,037.19 |
| **Investment Cost:** | $2,536.00 | $1,428.00 | $1,428.00 | $1,656.00 | $2,148.00 | $1,428.00 | $10,624.00 |
| **Return on Investment:** | 19.04 | 85.64 | 15.39 | 9.85 | 5.45 | 6.16 | 10.24 |
| **Percent Reduction:** | 26.63% | 14.56% | 8.99% | 11.84% | 26.56% | 41.24% | 19.50% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Location #:** | **# 7** | **# 8** | **# 9** | **# 10** | **# 11** | **# 12** | **# 7 thru # 12** |
| **ITEM/EQUIPMENT:** | | | | | | | **Summary** |
| **Phase:** | | | | | | | |
| **Volts:** | | | | | | | |
| **Initial Amps:** | | | | | | | |
| **Optimized Amps:** | | | | | | | |
| **Initial Power Factor:** | | | | | | | |
| **Optimized Power Factor:** | | | | | | | |
| **Initial W:** | | | | | | | |
| **Optimized W:** | | | | | | | |
| **Reduction in Watts:** | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! |
| **Hours of Operation/Day:** | | | | | | | |
| **Cost/KWH** | | | | | | | |
| **Savings/Day** | | | | | | | |
| **Savings/Month:** | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! |
| **Investment Cost:** | | | | | | | |
| **Return on Investment:** | | | | | | | |
| **Percent Reduction:** | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | #VALUE! | |

# QUOTATION

QUO-1

| | |
|---|---|
| DATE: | |
| NAME OF COMPANY: | |
| ADDRESS: | |
| CITY/ST/ZIP: | |
| PHONE # : | |
| ATTENTION: | |

| | | | |
|---|---|---|---|
| PRICE OF SYSTEM: | | | |
| TAXES: | % = | | |
| INSTALLATION: | | | |
| TOTALS: | | | |

| # | ITEM/EQUIPMENT | PHASE | VOLTS | INITIAL AMPS | OPTIMIZED AMPS | INITIAL P.F. | OPTIMIZED P.F. | AMPS REDUCED | RUNTIME PER MONTH | UNIT PRICE |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| 5 | | | | | | | | | | |
| 6 | | | | | | | | | | |
| 7 | | | | | | | | | | |
| 8 | | | | | | | | | | |
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| 10 | | | | | | | | | | |
| 11 | | | | | | | | | | |
| 12 | | | | | | | | | | |

# FIELD SURVEY SHEET AT INSTALLATION

FSS-2

| | |
|---|---|
| DATE: | |
| NAME OF COMPANY: | |
| ADDRESS: | |
| CITY/ST/ZIP: | |
| PHONE # : | |
| ATTENTION: | |

SURVEYOR:

COMMENTS:

Verify the comment section in field

Cost per KW =

| # | ITEM | PHASE | VOLTS | INITIAL AMPS | OPTIMIZED AMPS | INITIAL P.F. | OPTIMIZED P.F. | LEAD | DATE INST'D | US NO. | SWITCH NO. 1 | 2 | 3 | 4 | 5 | CABLE LENGTH | K/O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | |

# In conclusion…

- **You can finally reduce motor temperatures, increase longevity, enlarge distribution capacity, have better voltage regulation, eliminate surges, remove power factor surcharge penalties & SAVE MONEY!**
- **Over $16 billion dollars of electricity is unusable energy, but billable in the US.** *- U.S. Dept. of Energy -*
- **Electrical Rates are climbing everywhere**
- **Kvar Energy Savings, Inc. has patented an apparatus and methodology for determining to an exact science, the amount of capacitance that is needed to optimize inductive motors to unity creating an ideal balance for maximum savings!**
- **How much money can be saved at your facility?**

# Sizing VFD's and Soft Starts

- The KVAR® EC can cause permanent damage to Variable Frequency Drives, Variable Speed Drives or Adjustable Speed Drives.
- Motors with "Soft Starts" or "Rectifiers" must be sized and the units installed on the line side of the "Soft Starts' or "Rectifiers" otherwise permanent damage will result.
- Always ensure that all switches on the Sizing Units are in the OFF position before attempting to size any equipment or disconnect.