



CEEAMA E-NEWS

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Electrical Consultants' Newsletter

March 2020

Dear readers,

Greetings from CEEAMA E-NEWS Committee!

Since our last E-NEWS, a lot of things have happened at both Domestic and International level.

While all of us were trying to figure out as to how much we are benefited by the Budget 2020, the national capital was rocked by ugly riots which has greatly disturbed the harmony among the people. As if that was not enough the global threat of CONVID-19 has knocked the doors of India, pressing the warning signals. May be this is the negative side of Globalisation, where a contagious disease can travel across the globe in no time. As they say "prevention is better than cure", we all must follow good hygiene practices and help in avoiding the spread of this deadly disease.

Coming back to more relevant issues of Electrical Engineer's Fraternity, I am still trying to understand what good this budget 2020 has in store for Electrical Industry, which concerns all of us.

On a serious note, I am of the opinion that the importance of Electrical Consultants, though appreciated by Authorities is not recognised by any Government Body that deals with approval of Building Plans as well as issue of Occupancy Certificates. I sincerely feel that this needs to be changed at the earliest and urge all of you to come forward in large numbers and give your valuable suggestions about how it can be implemented in a time bound manner.

We are getting encouraging response to the Readers' Forum which we started last month. However, the number of technical articles are far less taking in to consideration the wealth of technical expertise and experience we have in this group. I urge you to keep sending your articles to make our E-NEWS more valuable.

Editor Committee

Article : Going beyond EMS with Plantconnect

Reader's Forum

In response to our appeal to send answer to the practical questions raised by reader's in last month's E-News, we are happy to inform that we have received several answers and scrutinized by our technical team. The appropriate answer to the practical questions is provided here below for reader's benefit.

Question-1

My Question is "When is the use of "control transformer" for control circuit recommended?"

Answer: Control transformer is recommended for followings;

- a) To reduce voltage and provide galvanic isolation to isolate control circuit from mains,
- b) To reduce fault level of control circuit (& thus use miniature devices),
- c) To provide a high degree of secondary voltage stability (regulation) during a brief period of overload condition (also referred to as "inrush current")
- d) To prevent tripping of power circuit due to fault in control circuit.

Question-2

"We have a pump set fed from a MCC which is far away. Sometimes when the local stop button is pressed the motor does not stop. We have checked and changed the push button station and cable, but to no avail. The problem persists. Kindly enlighten us on the reason and give us a solution.

Answer: Normally pump set away from MCC (longer control cable) will always face problem of low voltage across contactor coil. The problem become more severe when power contactor is connected in series with local push button. Under such circumstances Motor won't start from push button station and need to connect push button station in series with low burden relay instead of connecting push button station in series with Power contactor. However as per your email, you were able start Motor but not able to stop so this may be due to long length cable capacitance or incorrect stop push button or hold on contact (NO contact) of contactor is usually connected across Start PB but if is connected across series of start and stop PB contact then Stop PB will not able to de-energize contactor coil and then Motor will not stop.

We have received following questions in this month (Cut of date for publication of question is 8th of every month)

- 1) Please explain the purpose of round table conference and what action CEEAMA takes to resolve issue taken up in Round table conference (I am especially interested in KVA billing RC).
- 2) We have few motor in our plant with Electronic motor controller, please guide us in recommending what type of protection to be provided.
- 3) Tin plating of conductor for MV and LV XPLE cable is always required or it is required for specific application. Whether plain aluminum or copper conductor can be used in saline atmosphere plant?

What do you think is the answer to above? Request all readers to write to us your likely answer.

We will provide answers to above practical technical questions in the next month's E-News. Keep reading & send us more and more challenging questions.

We would like to hear from you on followings by writing to us at admin@ceeama.org

- 1) Feedback on this issue.
- 2) Suggestions for new topics you would want to be discussed in E-News
- 3) Your own article to be published in E-News.



Rise in demand and cost of energy has led many organizations to find smart ways of saving energy. Energy Monitoring System (EMS) is the obvious solution which helps to contribute in reduction of costs and meeting energy demand at the same time. But currently integration of data acquired from EMS and drawing insights is a big challenge. Internet of Things (IoT) platform helps in leveraging acquired data from EMS and managing energy consumption in buildings and industrial sectors with AR & VR tools. This paper presents use of IoT platform for going beyond EMS.

Presently EMS is primarily collection of data available from the Smart Tri Vector energy meters, their storage, tabulation, processing, analytics and presentation. It many times neglects other forms of energy like steam, water, pressure, level and solid, liquid & gaseous fuel consumption. It necessarily requires manual intelligence to interpret and take corrective actions. Despite of investing in instrumentation and EMS system, the real value is not created due to lack of understanding and thus is not seen as a useful tool for management of energy. So it becomes just a mere tool of data collection and historian MIS reporting.

Energy Monitoring System gives real time data of selected assets and leaves the user with following key challenges to address:



Industry has seen revolution from Industry 1.0 to Industry 4.0. We have also seen change in the way monitoring and analysis of energy parameters is done right from Operational to Executive to Strategic and now to Tactical stage.

An IoT platform helps in making a paradigm shift from energy monitoring to energy management. When we talk about energy management in real perspective, it has many dimensions like planning, budgeting, allotting and controlling. Techniques like AI, ML algorithms, big data with built in tariff logic, helps in creating the real value in terms of reduction in kWh and energy costs.

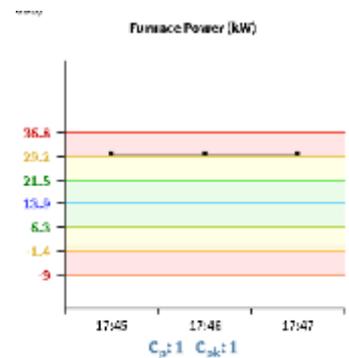
With PLCs & relays we can control the usage through machine level energy allotment which can be further linked with OEE of machines. This OEE can be further refined through continuous improvement.

An IoT platform helps in getting accurate and real time data from all legacy and proprietary systems. Hence it helps in addressing every section of energy consumption and generation as applicable and hence to draw actionable insights from the data.



An IoT platform e.g. PlantConnect gets real time data from sensors, HMIs, controllers etc. connected to assets. PlantConnect helps energy management system become multi-dimensional and achieve following:

- Collection of energy and production data on aggregate platform
- To evolve consumption pattern, Identification of Energy Wastages & Low Efficiency
- Allotment of energy to various assets and control
- Monitor Utility Supply and Consumer Power Quality (IEEE 519 standard)
- Achieve savings & avoid wastages (PF, kVA). Avoid penalties and achieve incentives.
- Improve asset life and provide predictive breakdown insights
- Maintain & Improve Assets and Work Force Management
- Decision Support System e.g. replacement of asset
- Achieve desired Energy Goals
- Reduction in operational overheads
- Achieve target of Energy Performance Index (EPI)
- Achieve target of Power Usage Effectiveness (PUE)
- Evolve KPI and benchmark against best industry values (kWh / MT, kWh / Unit)



Using advanced AI, ML algorithms it is possible to continuously commission & optimize energy critical utilities like Centrifugal Chillers/Pumps/Air Compressors etc. which has energy saving potential to the tune of about 20%.

Every machine/asset in the factory can thus be considered as a Profit Centre. By allotting specific energy quota against its production, maintenance costs, down time, OEE, operator cost, operator behaviour and its impact on productivity and energy consumption can be controlled effectively.

In addition to OEE of machines, on load transformer efficiency, plant utilization/usage, equipment efficiencies/utilization can be monitored on real time basis. More realistic industry standards for Utility energy guzzlers like Boilers, Chillers, Compressors, Pumps etc. can be evolved.

Savings from non-renewable energy means saving of Carbon. This carbon saved leads to acquiring carbon credits. This reduction in the GHGs saves the Earth from climate change effects. The EMS data helps in mandatory audits like M&V audits, PAT audits for designated consumers by the Ministry of Power, Govt. of India.

Energy Management System which can be integrated to SAP/ERP for acquisition of production or other data like fuel consumption etc. will be a realistic system delivering the real values. Users will use and depend on it reliably to make their systems more effective & efficient and thus save energy, costs and operate in the most optimal level.

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CIRCULAR NO-06

Sub: Revised Guidelines regarding Metering in respect of HT/EHV/Open Access consumers.

Ref:- Hon. MERC order in case no. 276 to 280, 306, 307, 313 & 319 of 2019

As per present metering policy adopted vide Commercial Circular no. 291 dated 29/06/2017 and Testing circular no. 8378 dated 16/04/2018 the guidelines were issued regarding Metering in r/o HT/EHV/Open Access & Generator consumers. However, it is observed that still there is some ambiguity regarding metering specifications in r/o HT/EHV/Open Access consumers and Generators.

In this regard the revised guidelines are hereby issued regarding Metering Specifications in r/o HT/EHV/Open Access consumers/Generators; the same shall be followed scrupulously henceforth-

A) The standard metering specifications shall be as per the chart shown below—

| Particulars | | Approved Specification | | |
|---|---|--|-------|-----------------------------|
| | | Ratio | Class | Burden VA |
| HT Consumers having CD below 1000 KVA with Metering Cubicle | CT | Commensurate with Contract Demand, Single Core, Single ratio(.../5A) | 0.5 S | 10 |
| | PT | ...KV/√3/110/√3 | 0.5 | 50 |
| | HT TOD Meter | (-/5A), 11KV/√3/110/√3 | 0.5S | - |
| HT Consumers having CD 1000 KVA & above with Metering Cubicle for Main and identical additional Check metering. | CT | Commensurate with Contract Demand, Single Core, Single ratio(.../5A) | 0.2 S | 10 |
| | PT | ...KV/√3/110/√3 | 0.2 | 50 |
| | HT TOD Meter | (-/5A), 11KV/√3/110/√3 | 0.2S | - |
| EHV Consumers with outdoor type CT-PT for Main and identical additional Check metering. | CT | Commensurate with Contract Demand, Single Core, Single ratio(.../1A) | 0.2 S | 15 |
| | PT | ...KV/√3/110/√3 | 0.2 | 50 |
| | HT TOD Meter | (-/1A), 11KV/√3/110/√3 | 0.2S | - |
| Open Access Consumers with compact cubicle upto 33KV & above 33KV -with outdoor type CT-PT, for Main and identical additional Check Metering | CT | Commensurate with Contract Demand, Single Core, Single ratio(.../5A) for HV & (.../1A) for EHV | 0.2 S | 10*(Cubicle) 15(Outdoor) |
| | PT | ...KV/√3/110/√3 | 0.2 | 50 |
| | ABT, 4 quadrant, Import-Export type Meter | (-/5A)for HV & (-/1A) for EHV, 11KV/√3/110/√3 | 0.2S | |
| Generation Projects (CPP/IPP/CO-gen/Solar etc) (With Outdoor type CT PT /Metering Cubicle) for Main and identical additional Check metering # | CT | Commensurate with Contract Demand, Single Core, Single ratio(.../5A) for HV & (.../1A) for EHV | 0.2 S | 10*(Cubicle) 15(Outdoor) |
| | PT | ...KV/√3/110/√3 | 0.2 | 50 |
| | ABT, 4 quadrant, Import-Export type Meter | (-/5A)for HV & (-/1A) for EHV, 11KV/√3/110/√3 | 0.2S | |

* If existing CTs in case of Open Access/MSEDCL HT consumers are of 15VA burden then the same shall be allowed to utilize as it is and also in case of future load enhancement/Reduction and need not be replaced. In case of EHV Open Access consumers VA burden of CT shall be 15VA; existing 10VA CTs(if any) need not to be replaced.

In case of outdoor type installation, it is Consumer/Generator's choice to install oil cooled or dry type CT/PT of MSEDCL approved specifications/vendors.

• **Express Feeder Consumer Substation End Metering:-** CEA (Installation and Operations of meters) Regulations 2006 stipulates that accuracy class of meters in distribution system shall not be inferior to 0.5S class. Therefore, if class of accuracy of meter provided by MSETCL/MSEDCL is not inferior to 0.5S then Meter of feeder at substation provided by MSETCL/MSEDCL shall be used for Energy audit, in case of express feeder consumers.

• **Metering Room:-** Metering room shall be constructed with minimum 15'x12' size with proper ventilation and lighting arrangement for HT cubicle/Meter. One plug point and fan shall be provided in metering room to facilitate routine testing work.

In case of SEM installation for RE generators (windmill/Solar) weatherproof portable cabins having minimum size of 12' x10' with wooden interior, proper ventilation alongwith Light and fan arrangement shall be accepted as per Generators request(if any) at their own risk and cost. However concerned SE TQA shall verify the design & material Quality and approve the same before utilization in order to have uniformity.

• **Isolation Before Metering:-** As per this office amended circular ref. No. CE/Testing/AB Switch/32510 dated 26/11/2019, isolation arrangement (AB Switch/Isolator/RMU) before Metering shall be invariably provided to all HT consumers & all Generators before release of connections.

All other conditions of Commercial Circular 291 dated 29/06/2017, Testing Circular no. 8378 dated 16/04/2018 shall remain applicable.

This circular shall come in force with effect from the date of issuance. This circular is available on MSEDCL website i.e. www.mahadiscom.in . So hard copy of the same shall not be issued.


(Dr. Manish Wath)
Chief Engineer (Testing)