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PRECISION INSTRUMENTATION

Application Note

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Provide accurate electrical energy consumption at 400 Hz frequency for Airport gates

The Problem

Aircraft operate on a 400 Hz Electrical Supply for many technical reasons. 400Hz majorly helps have lighter transformer cores on the aircraft thus reducing the aircraft weight and additionally lowers the energy stored in the transformer core which are among other reasons for the using higher frequency. Traditionally, aircraft ran their APU or Auxiliary Power Units while on the ground. Running APU is very expensive and at the same time pollutes the air at the airport already overwhelmed with the jet engine exhaust. Aircraft while at the gate is now connected to a ground based 400 Hz power supply. This saves 90% of the cost of fuel otherwise incurred on running the APU. Of course, the airport provided power is cleaner in many ways and more reliable as well. There is also a need to accurately measure the amount of energy consumed by the aircraft while at the gates so the respective airlines can pay their fair share to the airport authority. We proposes the following solution to address this.

The Solution

Install smart 400 Hz Multifunction Power and Energy Meters at each gate where an aircraft is connected to the 400 Hz ground power. Now connect those meters to a central data collection and monitoring system. This will allow airport authority to accurately bill each airline on a periodic basis.

"The airport authority gains complete control over billing of each airline on a periodic basis."

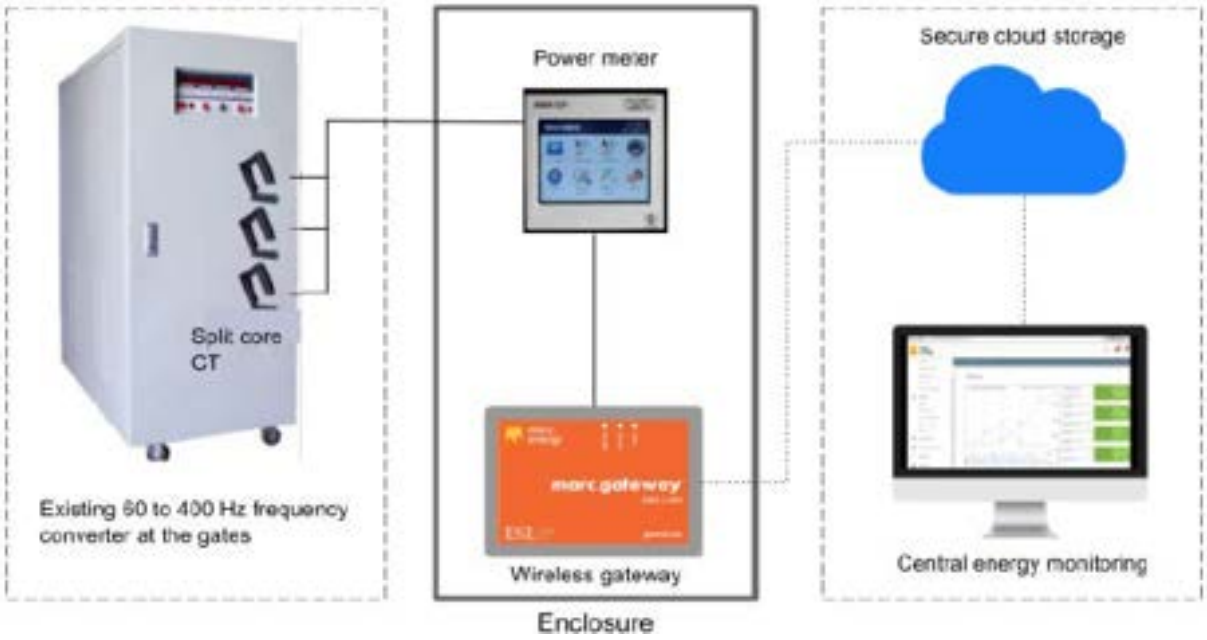
- **400 Hz power & energy meter** – A Power Meter to collect precise Power and Energy parameters at each gate. Power Meter is capable of communicating the electrical parameters to a centralized software system via Modbus TCP-IP protocol.

- **Split-core current transformers** – Each meter will be connected to the Electrical Network using easy to mount Split Core current transformers provided by us.

- **Wi-Fi gateway** – Where it is difficult to find an Ethernet port we propose to use a Wi-Fi Gateway. This Gateway will take Modbus inputs from Power Meter and transmit this information over Wi-Fi network to the central software which will record the data.

- **marc.energy** : An energy data analytics platform – At a secure central location, our energy management software will collect data 24/7 from the meters. This will help airport authority to know exactly when an aircraft came at the gate got connected and how much energy it consumed. The software will also easily sum up data for all airlines separately so that they can be billed individually.

The following equipment is proposed together with the schematic.



The Benefits

- **To the Airport authority**

-Reduce pollution and improve carbon footprint
-Accurately collect money for the energy consumed by the aircraft
-Better Electrical Load Management

- **To the Airline**

-Pay fair amount for actual electrical usage based on the fleet/size of the aircraft
-Lower maintenance – no need to run APU on a regular basis
-Better air quality and passenger comfort at the gate

"Along with the monetary savings, pollution control is an added benefit"