ADVANCED ENERGY MANAGEMENT UTILIZING TOU-BASED CONTROL STRATEGY

An Application Note

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General

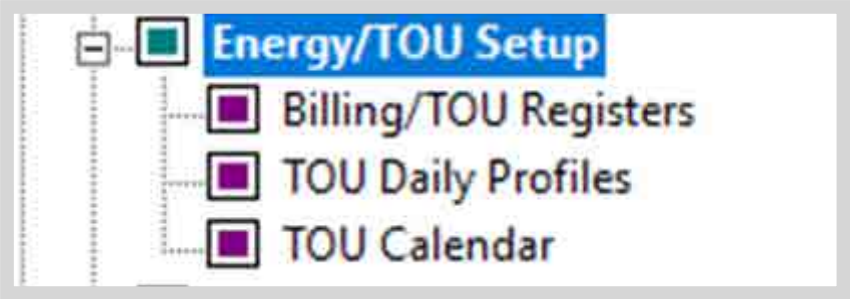
In the dynamic landscape of diverse energy sources and tariffs, SATEC introduces innovative control solutions for Battery Energy Storage Systems (BESS), Generators, and Electric Vehicles (EVs), utilizing the Time Of Use (TOU) functionality embedded in all SATEC meters, thus eliminating the need for additional Programmable Logic Controllers (PLCs).

What is TOU?

Time-of-Use (TOU) is an energy pricing strategy that differentiates rates based on It's based on day of week, time of day, and season. This approach is employed by utilities to manage peak demand by imposing varying tariffs, with increased rates during typical peak consumption periods.

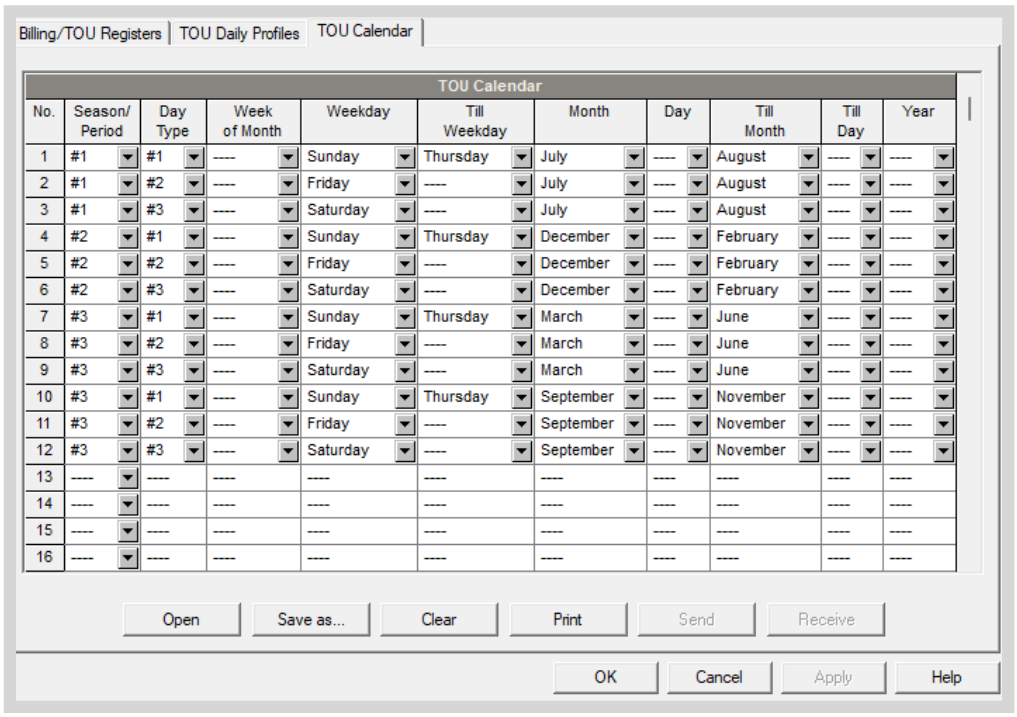
SATEC devices and TOU

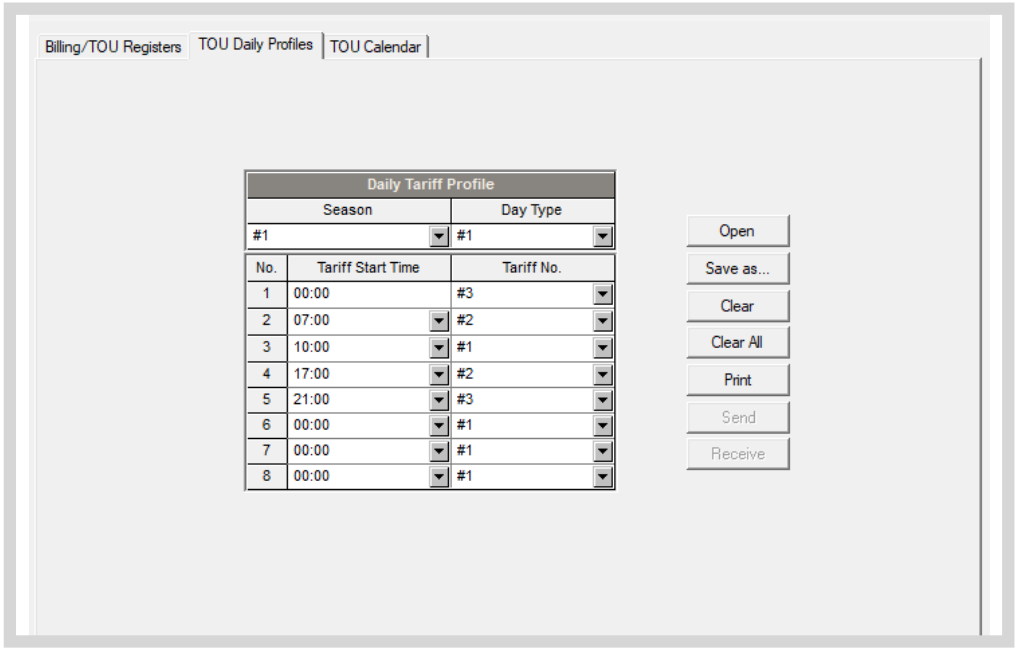
SATEC devices support up to 8 TOU Profiles, 16 Registers groups, and a maximum of 32 calendar/ season settings.

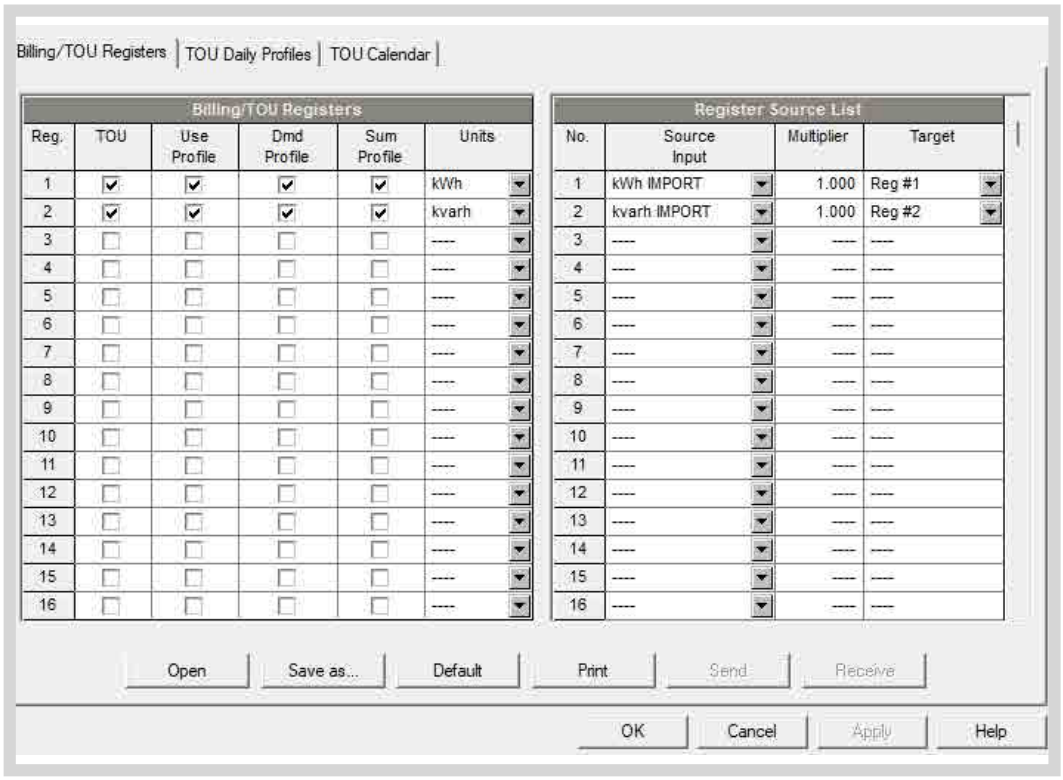


Configuring TOU via PAS Software:

The initial step involves configuring the TOU calendar and TOU Daily Profiles within the device.







After configuring TOU settings, press Send to upload the data to the device and activate the TOU profiles.

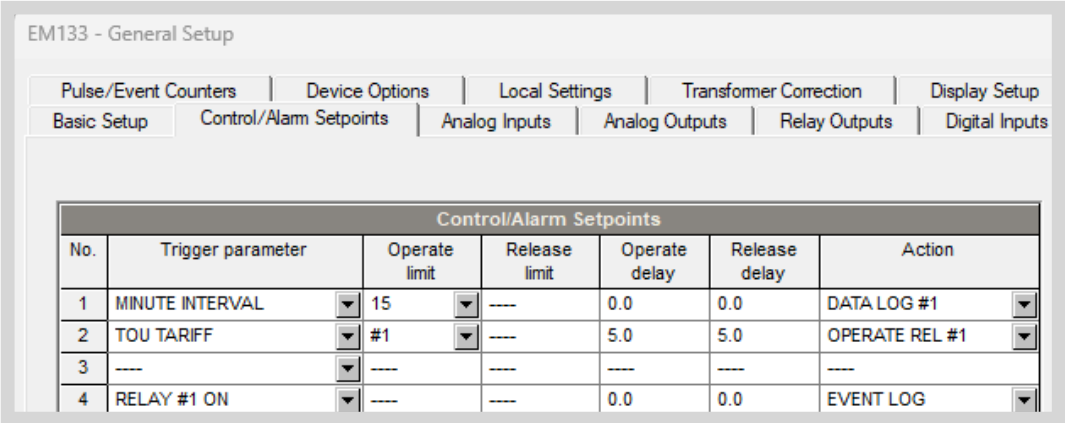
Using the configured TOU profiles, the user may set triggers for various operations within the capabilities of the specific device model.

Setting these triggers enables events, such as relay operation, or reading the setpoint flag via Modbus, providing a robust control mechanism.

Supported Devices

EM133

- Features an on-board relay, making it well-suited for TOU applications.
- Trigger can be set only for Tariff.



Control/Alarm Setpoints

No.	Trigger parameter	Operate limit	Release limit	Operate delay	Release delay	Action
1	MINUTE INTERVAL	15	----	0.0	0.0	DATA LOG #1
2	TOU TARIFF	#1	----	5.0	5.0	OPERATE REL #1
3	----	----	----	----	----	----
4	RELAY #1 ON	----	----	0.0	0.0	EVENT LOG

SATEC EM133 is an energy meter, ideal for a wide range of applications such as revenue metering, industrial power monitoring, and for interfacing with SCADA in utility substations.

- Accuracy: Class 0.5 / 0.5S per ANSI / IEC 62053-22
- MID certified
- Up to 19 Digital & Analog I/O
- Broad-range frequency measurement: 25-400 Hz

- MODBUS
- 101/104
- DNP3

OPEN PROTOCOL

DIGITAL IN/OUT

ETHERNET PORT

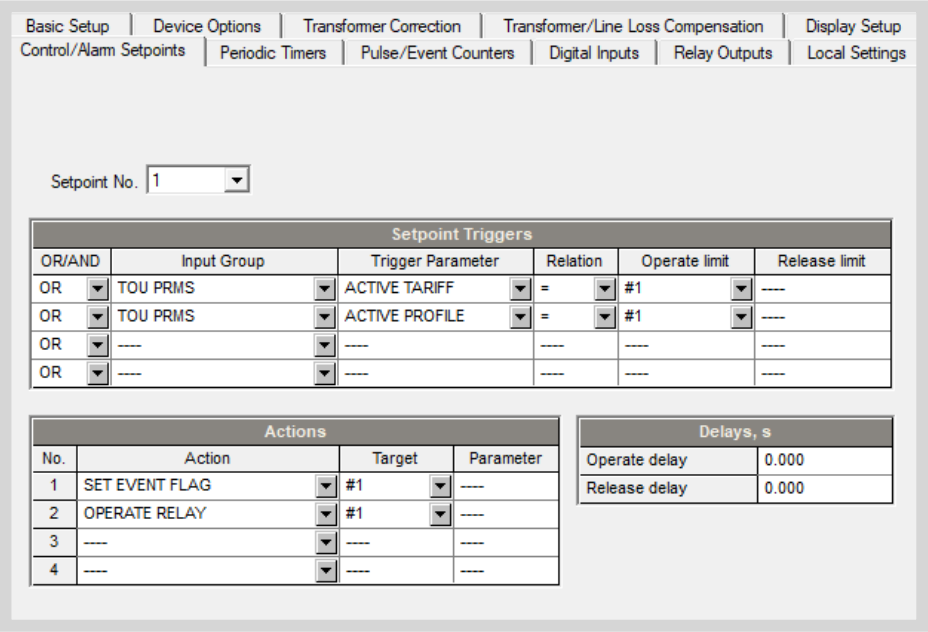
MID APPROVED

MID

For further information on this device

PM17X, PRO Series, PM180, EM720/920

These devices offer flexibility with the choice of separate or complex setpoints for TOU profiles and tariffs.



The PM180 is a high-performance Class Power Quality Analyzer that can simultaneously host several applications, including Phasor Measurement Unit functionality.

- Power Quality Analyzer (Class A)
- Up to 48 digital and analog I/O
- PMU per IEEE C37.118.1
- Disturbance Direction Detection

PQ CLASS A, ED. 3 | IEC 61850 | PMU/WAMS | FAULT RECORDER

For further information on this device

The PRO series combines metering, control and Class A Power Quality analysis, providing a solution for substation automation and energy management, bundling multiple capabilities in one device.

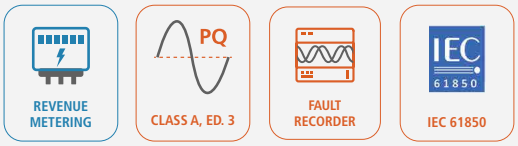
- AC/DC metering
- Power Quality Analyzer (Class A):
- IEC 61850
- Dual port Ethernet

0.2S ACCURACY CLASS | PQ CLASS A, ED. 3 | I/O DIGITAL IN/OUT | IEC 61850

For further information on this device

EM720/920: these unique devices combine highly accurate revenue grade metering with Class A power quality analysis. This includes virtual metering, based on transformer and lines losses calculation.

- Power Quality Analyzer (Class A)
- Revenue grade metering (Class 0.2S)
- Virtual Metering Point (calculated)
- Six-hour operation back-up battery (EM720)



For further information on these devices EM720 / EM920

Possible Applications | BESS and Generators

Tariff Optimization – BESS/Generators

Set triggers to optimize the operation of BESS and generators based on specific tariff structures, considering different rates during peak and off-peak hours and seasons.

EV | Charging Optimization

Utilize triggers to schedule charging of EV during off-peak TOU periods when electricity rates are lower. This helps lower charging costs for EV owners, and reduces the load on the grid during peak hours.

Employ triggers in fleet management systems to coordinate the charging schedules of multiple EVs according to most cost-effective tariffs from the utility.

Mobile Energy Storage

Configure triggers to allow bidirectional charging, turning EVs into mobile energy storage units. During high TOU rates, EVs can discharge stored energy back to the grid, or power homes and businesses.

General Incentive Programs

Utilize triggers to align EV charging, BESS or Generators with utility incentive programs that offer discounts or rewards for charging during specific TOU periods.