ADVANCED ENERGY MANAGEMENT UTILISING TOU-BASED CONTROL STRATEGY

An Application Note

General

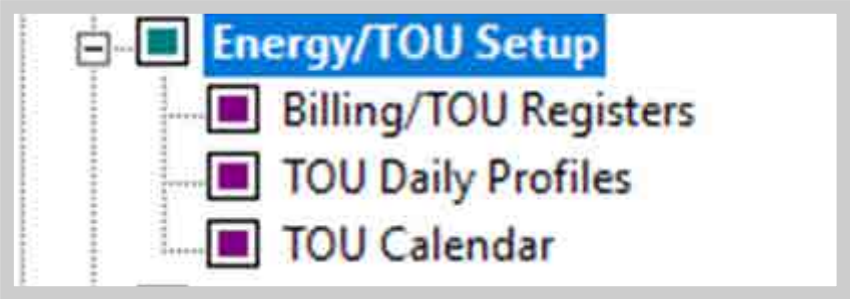
In the dynamic landscape of diverse energy sources and tariffs, SATEC introduces innovative control solutions for Battery Energy Storage Systems (BESS), Generators, and Electric Vehicles (EVs), utilising the Time Of Use (TOU) functionality embedded in all SATEC meters, thus eliminating the need for additional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

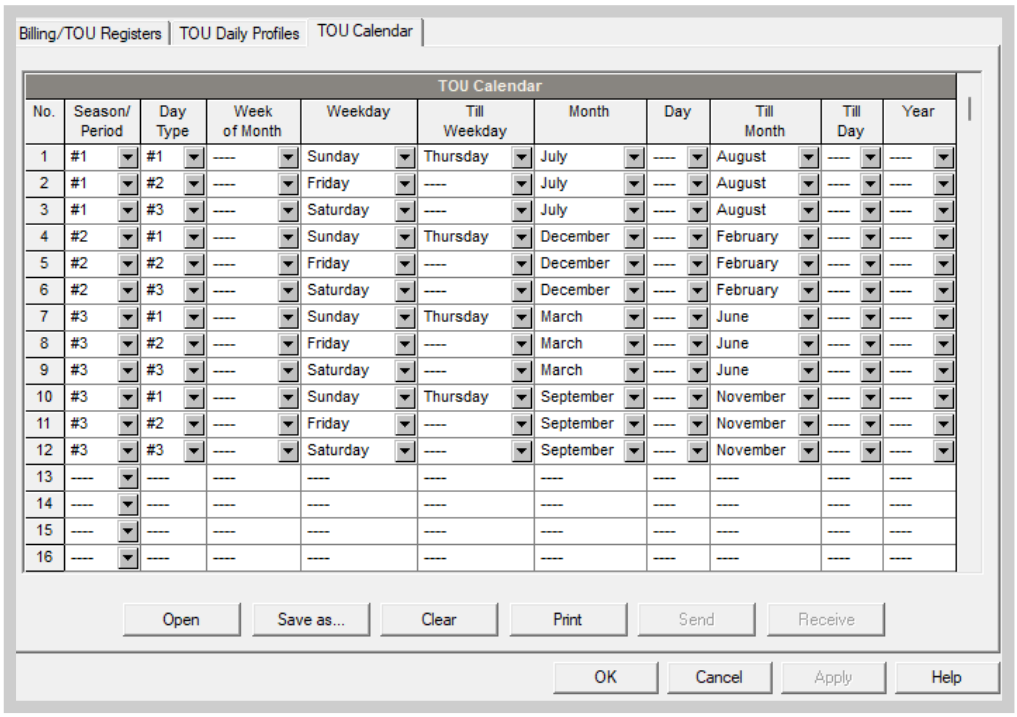
SATEC devices and TOU

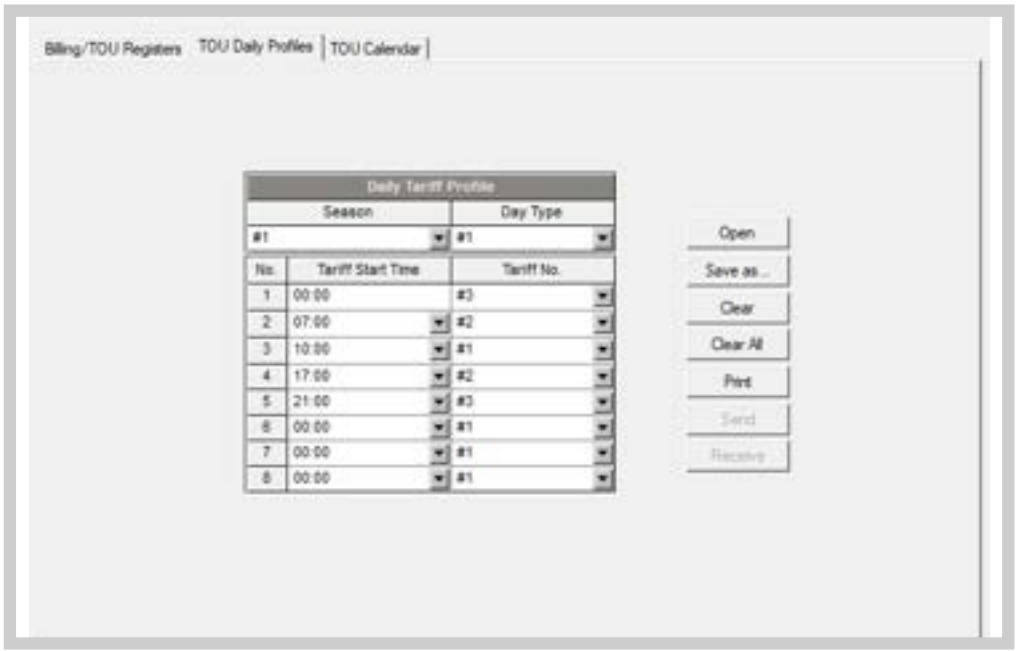
SATEC devices support up to 8 TOU Profiles, 16 Registers groups, and a maximum of 32 calendar/ season settings.

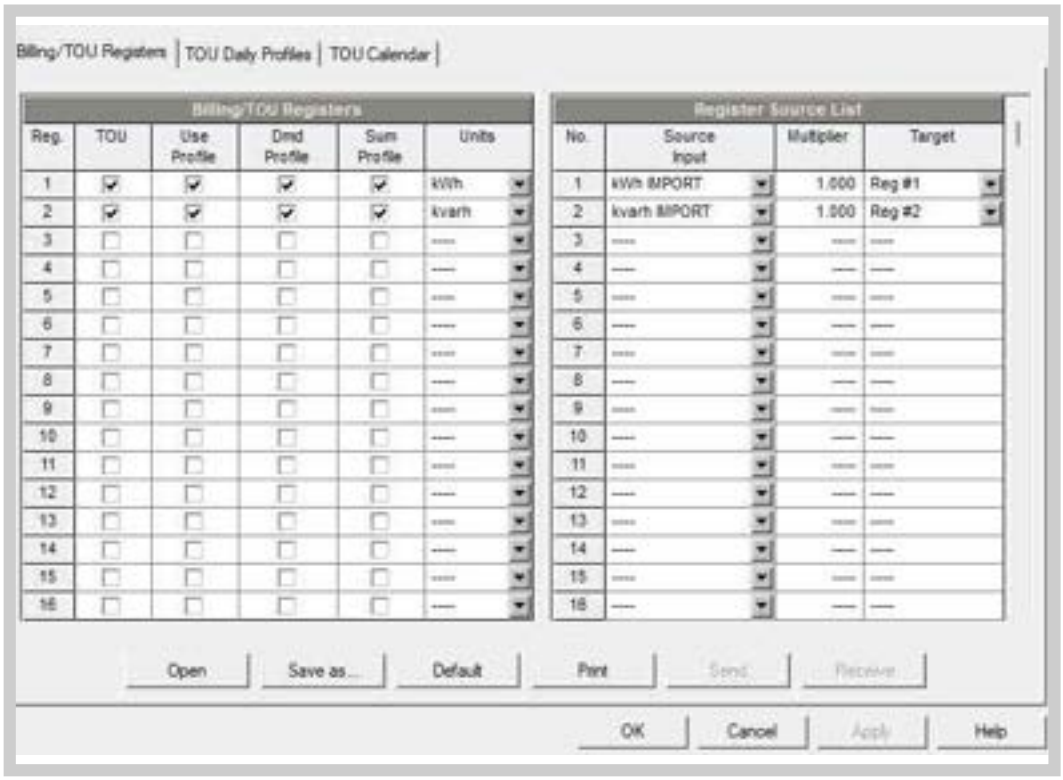


Configuring TOU via PAS Software:

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.

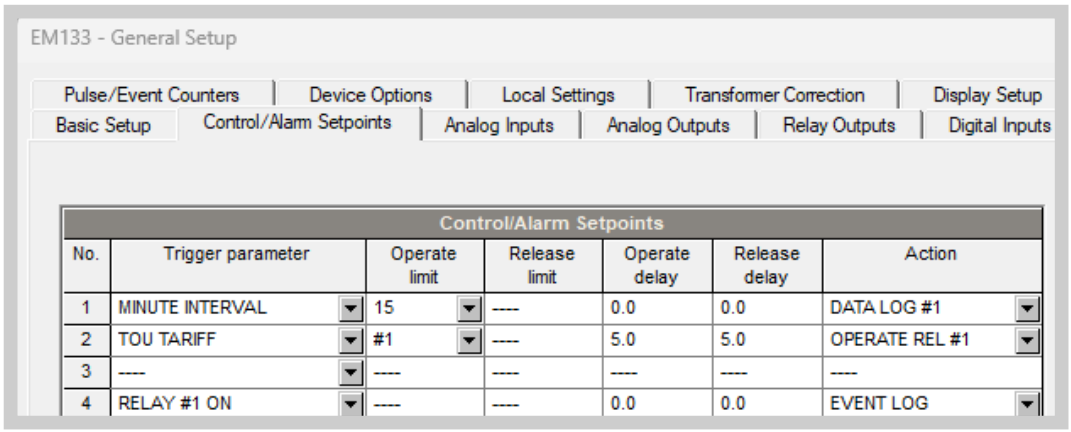
Using the configured TOU profiles, the user may set triggers for various operations within the capabilities of the specific device model.

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

Supported Devices

EM133-XM

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

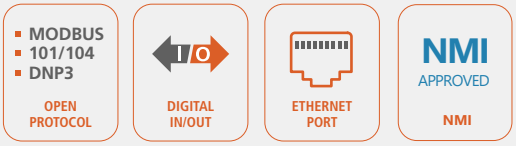


Control/Alarm Setpoints

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

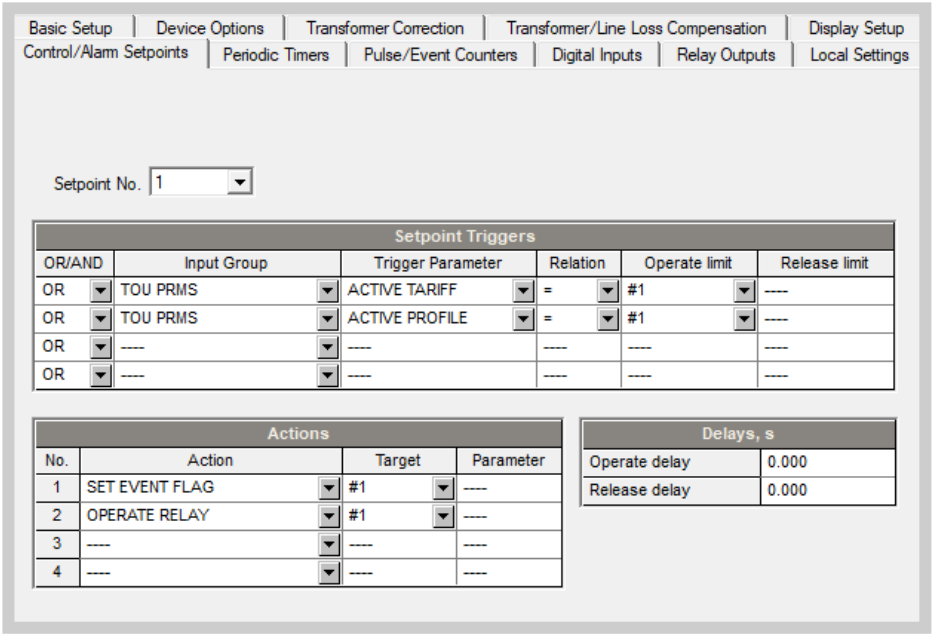
SATEC EM133-XM is an energy meter, ideal for a wide range of applications such as revenue metering, industrial power monitoring and for interfacing with SCADA in utility substations.

- Accuracy: Class 0.5S per AS/IEC 62053-22
- NMI Approved
- Digital & Analogue I/O options
- Broad-range frequency measurement: 25-400 Hz



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 Analyser that can simultaneously host several applications, including Phasor Measurement Unit functionality.

- Power Quality Analyser (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

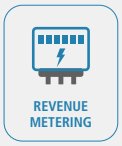
The **PRO** series combines metering, control and Class A Power Quality analysis, providing a solution for substation automation and energy management, bundling multiple capabilities in one device.

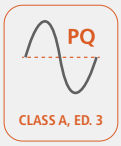
- AC/DC metering
- Power Quality Analyser (Class A):
- IEC 61850
- Dual port Ethernet

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

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





Possible Applications | BESS and Generators

Tariff Optimisation – BESS/Generators

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

EV | Charging Optimisation

Utilise 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

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