Power Measurement Modules

The Power Transducer Module (PTM) and Power Synchronization and Measurement (PSM) module measure and calculate critical data for control of electrical power systems and synchronization of power grids. Both the PTM and PSM connect to user supplied current and potential transformers, which translate power grid signals to proportionate, low-level signals for measurement and analysis. The PTM module is not intended to provide a protective relay function or be used for energy billing purposes. The PSM module provides ANSI protective relay calculations and revenue grade monitoring for a complete genset, paralleling switchgear or infrastructure management solution. Both the PTM and PSM consist of a processing module that plugs into the PLC backplane, an interface module for field wiring connections, and cables to interconnect the two modules. The PTM and PSM can be used with Wye or Delta type three-phase power or with single-phase power systems.

	IC693PTM101	IC694PSM001
Product Name	Power Transducer Module Processing Module interface board (a panel mounted circuit board). This board interfaces between the Power Transducer module and the input transformers (current and potential), 1.0 meter Interface cable that connects the module to the Interface board.	Power Synchronization and Measurement Module and Interface Module (a panel mounted terminal block). The interface module translates power grid signals from external, user supplied potential and current transformers (PT's and CT's) to low voltage signals suitable for the processing module. 2.0 meter Interface cables connect the processing module to the Interface module.
Lifecycle Status	Mature	Active
Module Type	Power Transducer Modules	Power Synch and Measurement Module
Input Voltage Range	10-120 VAC (nominal)	20-600 VAC (nominal)
Power Measurement Configurations	Grids Circuits 1 0 0 up to 4	Grids Circuits 2 0 1 up to 3 0 up to 6
Current Input Range	0 to 7.5 Amps RMS (5 A RMS nominal)	0 to 7.5 Amps RMS (5 A RMS nominal)
Frequency Range	35Hz to 70Hz	40Hz to 70Hz
Output Rating	N/A	150 VAC/VDC, 1 A
Number of Outputs	0	1 (provided as redundant, isolated, solid-state contacts)
Data	Data availability • Data calculation rate: 20ms @ 50Hz, 16.67ms @ 60Hz • Data latency: 15ms @ 50Hz, 16.67ms @ 60Hz Measured Data • RMS voltage of phase A, B, and C (in Volts × 10) • RMS currents of phase A, B, C, and Neutral (in Amperes × 1000) for each grid • DC component of measured RMS voltages (in Volts × 10) • Frequency of phase A grid 1 (in Hz × 100) • Phase angle between phase A grid 1 and phase A grid 2 (in degrees × 10) Power and Energy Data • Active and reactive power reported per phase and total in Watts, Volt-Amperes-Reactive (VAR) • Active and reactive total energy consumption in Watt-Seconds and Volt-Amperes-Reactive-Seconds (updated once per second), re-settable by the user • Total power factor • Average real and reactive power consumption (sliding 15 minute window updated once per second)	Data availability • Data measurement rate: 20ms @ 50Hz, 16.67ms @ 60Hz. • Data latency: 8ms Measured Data • RMS voltage of phase A, B, and C (in Volts × 10) • RMS currents of phase A, B, C, and Neutral (in Amperes × 1000) for each grid • DC component of measured RMS voltages (in Volts × 10) • Frequency of phase A grid 1 and phase A grid 2 (in Hz × 100) • Phase angle between phase A grid 1 and phase A grid 2 (in degrees × 10) Calculated Data • Real and reactive power reported per phase and total in Watts, Volt-Amperes-Reactive (VAR) • Real and reactive total energy consumption, integrated over the past 1-second, in Kilo Watt-Hours (kWh) and Kilo Volt-Amperes-Reactive-Hours (kVARh) • Total power factor • Average real and reactive power consumption (sliding 15 minute window updated once per second)

Status and Diagnostics	• Module Heartbeat (indicates module health)
	• Utility Phase A voltage present
	• Phase polarity valid
	• Voltage measurements valid
	• Current measurements valid
		• Module Heartbeat (indicates module health)
		• Field connection OK
		• Any grid alarm (single bit indication of power grid health)
		• Grid Voltage fault
		• Grid Current fault
		• Mixed Polarity fault
		• ANSI Protection Relay Calculations
		  Grid Synchronization (ANSI 25)
		    Phase Shift OK
		    Voltage Difference OK
		    Frequency Difference OK
		    Close Relay OK
		  Under Voltage alarm (ANSI 27)
		  Reverse Power alarm (ANSI 32)
		  Negative Sequence alarm (ANSI 46)
		  Over Current alarm (ANSI 50)
		  Over Voltage alarm (ANSI 59)
		  VA Imbalance alarm (ANSI 60)
		  Under Frequency alarm (ANSI 81U)
		  Over Frequency alarm (ANSI 81O)

Internal Power Used	400 mA @ 5 VDC	190 mA @ 5 VDC