SATEC PM180 compatibility with IEC 61557-12:2007

Voltage, current, power, PF, frequency	PM 180 compatibility to IEC 61557-12	Notes
Phase voltage, Linear Voltage	Class 0.2	@45Hz…750Hz, Crest factor **1.5**, (fundamental + harm) 20%...120%Vn. Both RT and 1-sec AVG
Phase current	Class 1	@45Hz…750Hz, Crest factor **2**, (fundamental + harm) 10%...200%In Both RT and 1-sec AVG
Active power (phase)	Class 0.5	1-sec AVG
Active power (total)	Class 0.5	1-sec AVG
Reactive power Q_V (total) vector	Class 2	Q_V, Q_p (AVG and RT): Class 0,5S under conditions as per IEC 62053-22, cosϕ≤0.9. Calc. mode S(P,Q). Class 0,2S for AVG Q_V, Q_p available on special order.
Reactive power (phase) Q_p	Class 2	
Apparent power (total) S_v, vector	Class 0.5	cosϕ≥0.5 & I_{max} 10A
Apparent power (phase) S_p	Class 0.5	cosϕ≥0.5 & I_{max} 10A
Power factor PF_V (total), vector, based on total vector apparent power	Class 10 (Relative error <1%)	I=10%In to 200%In; Cosϕ 0.5ind. to 0.8cap.; Real Time & 1-sec AVG measurements
Frequency	Class 0.02	
Neutral current I_N (measured with I_4)	Class 1	@45Hz…750Hz, Crest factor **2**, (fundamental + harm) I_N,I_{Nc}=0.5...10A
Neutral current I_{Nc} (calculated from phase currents)	Class 1	

Energy and Demands	PM 180 compatibility to IEC 61557-12	Notes
Active energy (phase)	Class 0.2	
Active energy (total)	Class 0.2	
Reactive energy (phase)	Class 2	Class 0,2S under conditions as per IEC 62053-22, cosϕ≤0.9
Reactive energy (total) vector	Class 2	
Apparent Energy (total) E_{apV}, vector	Better than class 0.5	@cosϕ≥0.5 & Imax 10A
Apparent Energy (phase)	Better than class 0.5	
Demands	**kW, kvar, kVA, Volt, Amps**	
MAX Demands	**kW, kvar, kVA, Volt, Amps**	

Additional parameters	PM 180 compatibility to IEC 61557-12	Notes
3-phase averaged quantities	**PF, L-N Volt, L-L Volt, Phase Amper**	Averaged, MIN & MAX quantities have an accuracy class equal to this from the corresponding measurement used to calculate these values.
Minimum quantities	**Volt (L-N, L-L), A, A neutral; Phase: kW, kvar, kVA; Total: kW, kvar, kVA; Hz, PF, THD, TDD, K-Factor.**	
Maximum quantities	**Volt (L-N, L-L), A, A neutral; Phase: kW, kvar, kVA; Total: kW, kvar, kVA; Hz, PF, THD, TDD, K-Factor, unbalances.**	

Power Quality analysis	PM 180 compatibility to IEC 61557-12	Notes
Short term flicker P_{st}	Class 5	Pst=0.4...2.0
Long term flicker P_{lt}	Class 5	Plt=0.4...2.0
Voltage dips $U_{p\text{-}g\ dip}$ (line to line)	Class 0.2	Fixed reference voltage. Duration ≥1.5 cycles (≈30ms). Uresid≥10%Unom. Uswell≤120%Unom.
Voltage dips $U_{p\ dip}$ (line to neutral)	Class 0.2	
Voltage swells $U_{p\text{-}g\ swl}$ (line to line)	Class 0.2	
Voltage swells $U_{p\ swl}$ (line to neutral)	Class 0.2	
Voltage transient $U_{pg\ tr}$ (line to line)	**Yes**	**SATEC calculation method**
Voltage transient $U_{p\ tr}$ (line to neutral)	**Yes**	
Voltage interruption (line to line) $U_{pg\ int}$	Class 0.2	Duration ≥1.5 cycles (≈30ms)
Voltage interruption (line to neutral) $U_{p\ int}$	Class 0.2	Duration ≥1.5 cycles (≈30ms)
Voltage unbalance U_{nb}	Class 0.2	range 0...10%
Voltage harmonics (phase-to-phase) $U_{pg\ h}$	Class 1 (harm.#2-#27) Class 2 (harm#28-#63) @ fundamental 45-55Hz	
Voltage harmonics (phase-to-neutral) $U_{p\ h}$	Class 1 (harm.#2-#27) Class 2 (harm#28-#63) @ fundamental 45-55Hz	
Current harmonics (phase) $U_{p\ h}$	Class 1 (harm. #2-63) @ fundamental 45-55Hz Complies accuracy requirements as for not-declared class 0.2 for harmonics #2-#29 @ fundamental 45-55Hz	For this parameter, in 61557-12 there is no better class than class 1
Voltage THD	Class 2 Accuracy of THD is better than 0,6 % THD, typical 0,3% THD	THD<20%, harm. #2-#63.
Current THD	Class 5 For THD≤100%, accuracy of THD is better than 1,5 % THD	THD<200%, harm. #2-#63.

Start-up conditions	PM 180 compatibility to IEC 61557-12	Notes
Default start-up time till the measurements are available via communication	≤ 35 s	The start-up time declared by manufacturer

Marking, operation/installation instructions	PM 180 compatibility to IEC 61557-12	Notes
Compatibility	Yes	IEC 61557-12 clause 5

Environmental conditions	PM 180	61557-12, temp. class K70
Temperature performance class, according to IEC 61557-12	K70	
Rated operating temperatures	-30°C…+70°C	-25°C…+70°C
Limit range for storage and shipping	-40°C…+85°C	-40°C…+85°C
Relative humidity with specified uncertainty	0 to 95%RH, non condensing	0 to 75%RH
Limit range of operation for 30 days/year		0 to 90%RH
Limit range for storage/shipping		0 to 90%RH
Altitude, standard conditions	0 to 2000m	0 to 2000m