

GENERIC STANDARDS

Stand-alone merging unit (SAMU)	IEC61869-13	Conventional Instrument Transformers
Measuring relays and protection equipment Electromagnetic compatibility requirements	IEC60255-26	
Product safety requirements for protection relays and measuring equipment	IEC60255-27	

POWER SUPPLY DC

Operating nominal input voltage	24VDC, 48VDC, 110VDC, 125VDC	48VDC and 110VDC type registered (KEMA) 24V partial noncompliance with IEC61000-4-29
Power consumption	Maximally 7W	
Connector	3 pin: positive, negative and Functional Earth	
Insulation	Hazardous Live Voltage	

POWER SUPPLY AC: Using an external power supply adapter with a low voltage DC output (15V...24V)

CURRENT INPUTS

Nominal Input Current	1A / 5A	
Dynamic input Range	Measuring: 12,5mA .. 250A Quality Measurement: 12,5mA .. 10A	
Nominal Frequency	50Hz, 60Hz	
Accuracy	Measuring: Class 1 (WB0) Protection: Class 6TPM Quality Metering: Class 0,2 (WB1)	
Frequency response	Protection Measurement: 650/780Hz - Quality Metering: 3kHz	
Burden	0,1VA	
Overvoltage Factor (KSCC)	50 for 5A 250 for 1A	
Secondary loop time constant	T.B.D (contact Grid to Great)	
AC current thermal withstand	20A continuous 250A for maximally 2,5sec 500A for maximally 1sec	
Insulation Class	Hazardous Live Voltage	

COMMUNICATION PORTS

Interface	Dual SFP ports with 100BASE-FX and 1000BASE-X capability	HSR: only 1000BASE-X
Protocol	IEC61850-9-2 with IEC61869-9 profile variant support	F4000S1I4U4 (WB0) F4800S2IxUy (WB0) F14400S6IxUy (WB0) F14400S6IxUy (WB1)
Redundancy	Redundant Ethernet networks (IEC62439-3)	PRP supported - HSR expected in 2025
Insulation	Extra Low Voltage	

SIGNAL PROCESSING

ADC resolution	Simultaneously sampling Delta/Sigma	24 bit resolution
Output Sample rate	F4000S1IxU0 (50Hz) F4800S2IxU0 (50Hz) F4800S2IxU0 (60Hz) F14400S6IxU0 (50Hz) F14400S6IxU0 (60Hz)	80S/Cycle 96S/cycle 80S/Cycle 288S/cycle 240S/cycle
Rated delay time	0µSec	IEC 61869-1:2023
Maximum processing delay time	<1mSec	IEC 61869-9:2016
Bandwidth	Protection Measurement: 650/780Hz (WB0) - Quality Metering: 3kHz (WB1)	

SYNCHRONIZATION

Time synchronization	Ethernet based Precision time protocol (PTP) with multiple profiles	IEC61850-9-3 (extended power profile) C37.238:2011 (power profile) C37.238.2017 (power utility profile)
Time Accuracy	<1µSec	Depends on the master clock
Drift when not Locked	T.B.D	
Hold over time	>25Sec	
Redundancy	Supports Multiple Grand Masters (selected by PTP best master clock algorithm)	

LOCAL CONFIGURATION PORT

Interface	USB-C
Functionality	Device maintenance and configuration using ICT Suite software application
Insulation	Extra Low Voltage

CLIMATIC

Cold Operational	IEC60068-2-1:2007	-40°C, 16hrs
Dry Heat Operational	IEC60068-2-2:2007	70°C, 16hrs
Cold Storage	IEC60068-2-1:2007	-40°C, 96hrs
Dry Heat Storage	IEC60068-2-2:2007	70°C, 96hrs
Change of temperature	IEC60068-2-14:2014	-10°C to 55°C, 3 hours, 2 cycle
Damp Heat Steady Test	IEC60068-2-78:2012	+55°C ±2°C -93% ±3% RH -10 days
Cyclic temperature with humidity test	IEC60068-2-30:2005	-40°C ± 3 °C -97% -2% +3% RH +70°C ±2°C -93% ±3% RH 6 cycles of 24 hours (12h + 12h) cycles

SEISMIC

Vibration response & Endurance	IEC60255-21-1:1988	Class 2
Shock Response and Bump	IEC60255-21-2:1988	Class 1
Single axis sweep	IEC60255-21-3:1993	Class 2

PRODUCT SAFETY

Overvoltage category	IEC60255-27:2013	OVC3
Pollution degree	IEC60255-27:2013	PD2
Impulse Voltage	IEC60255-27:2013	5kV
Dielectric voltage	IEC60255-27:2013	2500VRMS/50Hz/1min
Insulation resistance	IEC60255-27:2013	>100MΩ @500VDC
Protective bonding resistance	IEC60255-27:2013	100mΩ
Inflammability	UL94	V0/V2
Ingress Protection	IEC60529	IP3X

EMC IMMUNITY

Electrical Static Discharge	IEC 61000-4-2:2008	6kV contact / 8kV air
Radiated, radio-frequency, electromagnetic field immunity	IEC 61000-4-3:2020	80-1000MHz: 10 V/mtr - 1000-2700MHz: 3V/mtr 1400MHz - 3000MHz - 10V/mtr
Electric Fast Transient (EFT)	IEC 61000-4-4:2014	4kV (5kHz and 100kHz repetition rate)
Surge Immunity	IEC 61000-4-5:2014	Line-Line: 4kV Line-Earth: 2kV
Conducted, radio-frequency, electromagnetic field immunity	IEC 61000-4-6:2013	150kHz - 80MHz: 10V
Power frequency magnetic field	IEC 61000-4-8:2009	100A/m continuous - level 5
Pulse magnetic field immunity	IEC61000-4-9:2016	1000A/m (sec) - level 5
Damped Oscillatory magnetic field immunity	IEC61000-4-10:2016	100A/m
Testing and measurement techniques - Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz	IEC61000-4-16:2015	DC, 50Hz, 60Hz: 30V continuous, DC, 50Hz, 60Hz: 300 V for 1sec 15Hz to 150Hz: 30V to 3V (-20 dB/dec) 150Hz to 1500Hz: 3V 1,5kHz to 15Hz: 3V to 30V (+20 dB/dec) 15kHz to 150kHz: 30V

DC ripple	IEC61000-4-17:2002	15% of rated DC value, 100Hz/120Hz
1 MHz/100 kHz Slow Damped oscillatory wave	IEC61000-4-18:2019	Line-Line: 1kV Line-Earth: 2,5kV
Reversal of DC power supply	IEC61000-4-27:2013	Continuous
Gradual Startup Shut-down ramp	IEC61869-13m Clause 7.2.5.2.1302	60s Power off: 5min. Start-up ramp: 60s, perf Cat C
Slow voltage variation test	IEC 61000-4-29:2000	From +20 % to -20 %, perf Cat A
DC voltage dips on Power Port	IEC61000-4-29:2000	50mSec (100% interruption) 200mSec (40% residual), perf Cat C 500mSec (70% residual), perf Cat C 5Sec, perf Cat C

EMC EMISSION

Radiated emission (below 1GHz)	CISPR 11:2015+AMD1:2016+AMD2:2019	Class A
Radiated emission(Above 1GHz)	CISPR32:2015: Amd 1:2019	Class A
Conducted emission	CISPR32:2015	Class A (<1GHz)

DRAWINGS

