Panel Mounted / Three Phase / CT Operated – SMART X96-5-F/G/H/I/J

- **Multi-parameter Measurements**
- **Up to 63rd THD and IHD**
- **RS485 Modbus RTU**
- **Ethernet TCP Gateway**
- **Lora Wireless option**
- **Multi-tariffs**
- **Digital Input/Output**
- **Accuracy Class 0.5s**
- **Bar Graph for Power Indication**
- **Backlit LCD Display for Full Viewing Angles**
- **Push-in Installation and Plug-in Connection**

Smart X96-5F

Smart X96-5G

Smart X96-5H

Smart X96-5 I/J

The multifunction energy analyzer SMART X96 series is a high end new-generation intelligent panel meter, used not only in electricity transmission and power distribution systems, but also for power consumption measurements and to analyze high voltage intelligent power grids.

The unit measures and displays the characteristics of 1p2w, 3p4w and 3p3w supplies, including voltage, frequency, current, power and active and reactive energy, imported or exported, Harmonic, Power factor, Max. Demand etc. Energy is measured in terms of kWh, kVArh and kVAh. Maximum demand current can be measured over preset periods of up to 60minutes.

In order to measure energy, the unit requires voltage and current inputs in addition to the supply required to power the product. The requisite current input(s) are obtained via current transformers. The SMART X96 can be configured to work with a wide range of CTs, giving the unit a wide range of operation. Built-in interfaces provides RS485 Modbus RTU and Ethernet TCP/IP communication. Digital input and outputs are provided for external signal counting and external device control.

30 types of parameters can be set for alarm.

The unit uses plug-in terminals for easy wiring and push-in mechanism for quick installation.

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Specification table

Input Voltage	
VT Primary	100~500000V ac
UN	230 V L-N
Measured voltage with over-range and crest factor	100 to 480Vac L-L 100 to 276Vac L-N
Permanent overload	490V L-L 280V L-N
Impedance	1M Ω
Frequency range	45~66Hz

Input Current	
CT Ratings	Primary - 1~9999A Secondary - 1A / 5A
Measured current with over-range and crest factor	5mA~6A
Withstand	Continuous 8A 120A for 0.5 Seconds
Impedance	<1 mΩ
Frequency range	45~66Hz
Burden	<0.036VA at 6A

Auxilary Power Supply	
Operating range	65~480V AC / 80~660V DC
Power consumption	< 7VA/3.5W.
Frequency	45 to 65 Hz

Accuracy	
Power	IEC 61557-12 Class 0.5
Active energy	IEC 62053-22 Class 0.5S, IEC 61557-12 Class 0.5
Reactive energy	IEC62053-23 Class 2, IEC 61557-12 Class 2
Frequency	±0.1%
Current	±0.2%
Voltage	±0.2%
Power factor	±0.01%
HArmonic distortion	2

Enviromental	
Operating temperature	-25 to 55°C
Storage temperature	-40 to 70°C
Humidity rating	<95% RH at 50 °C (non-condensing)
Pollution degree	2
Altitude	2000m
Vibration	10Hz to 50Hz, IEC 60068-2-6

Digital Outputs	
Number/type	2 - electromagnetic relay
Output frequency	1 Hz maximum
Switching current	250 Vac at 3.0 Amps, 100k cycles)
Isolation	2.5 KVac for 1min

Digital Inputs	
Number	100~500000V ac
Input resistance	230 V L-N
Maximum frequency	490V L-L 280V L-N
Response time	1M Ω
ISOLATION	45~66Hz

Communications	
Interface standard and protocol	RS485 and MODBUS RTU
Communication address	1~247
Transmission mode	Half duplex
Data type	Floating point
Transmission distance	1000m Maximum
Transmission speed	2400bps~38400bp
Parity	None (default), Odd, Even
Stop bits	1 or 2
Response time	<100 mS

Enclosure	
Weight	250g
IP Degree of protection (IEC 60529)	IP51 front display
Dimensions (WxHxD)	96x96x70.3
Mounting position	Vertical
panel thickness	1~5mm
Material of meter case	Self-extinguishing UL 94 V-0
Mechanical environment	M1

Safety	
Measurement category	Per IEC61010-1 CAT III
Current inputs	Require external Current Transformer for Insulation
Over voltage category	CAT III
Dielectric withstand	As per IEC 61010-1 Double Insulated front panel display
Protective class	II

Electromagnetic Compatibilty	
Electrostatic discharge	IEC 61000-4-2
Immunity to radiated fields	IEC 61000-4-3
Immunity to fast transients	IEC 61000-4-4
Immunity to impulse waves	IEC 61000-4-5
Conducted immunity	IEC 61000-4-6
Immunity to magnetic fields	IEC 61000-4-8
Immunity to voltage dips	IEC 61000-4-11
Radiated emissions	EN55011 Class A
Conducted emissions	EN55011 Class A
Harmonics	IEC 61000-3-2

Ordering options

Features	Meter Type				
	SMART X96-5F	SMART X96-5G	SMART X96-5H	SMART X96-5I	SMART X96-5J
INSTANTANEOUS MEASUREMENTS					
Current	•	•	•	•	•
Voltage L-N	•	•	•	•	•
L-L	•	•	•	•	•
Frequency	•	•	•	•	•
Active power	•	•	•	•	•
Reactive power	•	•	•	•	•
Apparent Power	•	•	•	•	•
Power factor	•	•	•	•	•
ENERGY VALUES					
Active energy	•	•	•	•	•
Reactive energy	•	•	•	•	•
DEMAND VALUES					
Current	•	•	•	•	•
Active, Reactive. Apperent Power	•	•	•	•	•
MAXIUM DEMAND VALUES					
Maximum current	•	•	•	•	•
Maximum active power	•	•	•	•	•
Maximum reactive power	•	•	•	•	•
Maximum apparent power	•	•	•	•	•
MIN. AND MAX. VALUE					
Active power per phase and total	•	•	•	•	•
reactive power per phase and total	•	•	•	•	•
Apparent power per phase and total	•	•	•	•	•
PF per phase and total	•	•	•	•	•
Current per phase and average	•	•	•	•	•
THDI per phase	•	•	•	•	•
THDU L-L and L-N	•	•	•	•	•
Power-quality values	•	•	•	•	•
Total harmonic distortion	•	•	•	•	•
CV	63rd	63rd	63rd	63rd	63rd
Multi tariffs	*	*	*	*	*
Running hour	•	•	•	•	•
Real time clock	•	•	•	•	•

Features	Meter Type				
	SMART X96-5F	SMART X96-5G	SMART X96-5H	SMART X96-5I	SMART X96-5J
NETWORK					
Single phase 2 wire	•	•	•	•	•
Two phase 3 wire	•	•	•	•	•
Three phase 3 wire	•	•	•	•	•
Three phase 4 wire	•	•	•	•	•
Ct programmable	•	•	•	•	•
PT programmable	•	•	•	•	•
INPUTS & OUTPUTS					
Digital inputs	-	4	-	4	4
Digital outputs	-	2	-	2	2
Alarms	-	30	-	30	30
COMMUNICATIONS					
RS485	•	•	•	•	•
M-BUS	•	•	•	•	•
LORA	•	•	•	•	•
Ethernet	-	-	•	•	•
Ethernet gateway	-	-	-	-	•
ACCURACY					
Active energy	Cl. 0.5s	Cl. 0.5s	Cl. 0.5s	Cl. 0.5s	Cl. 0.5s
Reactive energy	1%	1%	1%	1%	1%
Current	0.5%	0.5%	0.5%	0.5%	0.5%
Voltage	0.5%	0.5%	0.5%	0.5%	0.5%
Power	0.5%	0.5%	0.5%	0.5%	0.5%
THD And IHD	2%	2%	2%	2%	2%
HZ	0.2%	0.2%	0.2%	0.2%	0.2%
Number of measurement points per circle	128	128	128	128	128
Auxiliary power supply	•	•	•	•	•

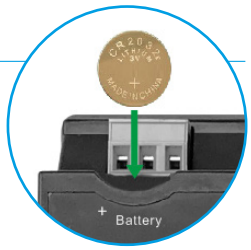
Maintenance

In normal use, little maintenance is needed. As appropriate for service conditions, isolate electrical power, inspect the unit and remove any dust or other foreign material present. Periodically check all connections for freedom from corrosion and screw tightness, particularly if vibration is present.

The front of the case should be wiped with a dry cloth only. Use minimal pressure, especially over the viewing window area. If necessary wipe the rear case with a dry cloth. If a cleaning agent is necessary, isopropyl alcohol is the only recommended agent and should be used sparingly. Water should not be used. If the rear case exterior or terminals should be contaminated accidentally with water, the unit must be thoroughly dried before further use. Should it be suspected that water might have entered the unit, factory inspection and refurbishment is recommended.

In the unlikely event of a repair being necessary, it is recommended that the unit be returned to the factory or nearest Eastron distributor.

Battery Replacement



The meter provides multi tariffs and RTC, it has a 3V DC battery as backup power supply. When the battery voltage is lower than 2.4V DC, the meter LCD will shows warning symbol . The user needs to replace the battery with a new one.

When you replace the battery, make sure the meter's voltage inputs and the auxiliary power supply must be disconnected.

Installation

The unit may be mounted in a panel of any thickness up to a maximum of 3 mm. Leave enough space behind the instrument to allow for bends in the connection cables. The unit is intended for use in a reasonably stable ambient temperature within the range -25°C to +55°C. Do not mount the unit where there is excessive vibration or in excessive direct sunlight.

Safety

The unit is designed in accordance with IEC 61010-1:2010 – Permanently connected use, Normal condition. Installation category III, pollution degree 2, basic insulation for rated voltage.

EMC Installation Requirements

Whilst this unit complies with all relevant EU EMC (electro-magnetic compatibility) regulations, any additional precautions necessary to provide proper operation of this and adjacent equipment will be installation dependent and so the following can only be general guidance:

Avoid routing wiring to this unit alongside cables and products that are, or could be, a source of interference.

The auxiliary supply to the unit should not be subject to excessive interference. In some cases, a supply line filter may be required.

To protect the product against incorrect operation or permanent damage, surge transients must be controlled. It is good EMC practice to suppress transients and surges at the source.

The unit has been designed to automatically recover from typical transients; however in extreme circumstances it may be necessary to temporarily disconnect the auxiliary supply for a period of greater than 10 seconds to restore correct operation.

Screened communication leads are recommended and may be required. These and other connecting leads may require the fitting of RF suppression components, such as ferrite absorbers, line filters etc., if RF fields cause problems.

It is good practice to install sensitive electronic instruments that are performing critical functions in EMC enclosures that protect against electrical interference causing a disturbance in function.

EMC Installation Requirements (continued)

- **During normal operation, voltages hazardous to life may be present at some of the terminals of this unit. Installation and servicing should be performed only by qualified, properly trained personnel abiding by local regulations. Ensure all supplies are de-energized before attempting connection or other procedures.**
- **Terminals should not be user accessible after installation and external installation provisions must be sufficient to prevent hazards under fault conditions.**
- **This unit is not intended to function as part of a system providing the sole means of fault protection - good engineering practice dictates that any critical function be protected by at least two independent and diverse means.**
- **The unit does not have internal fuses therefore external fuses must be used for protection and safety under fault conditions.**
- **Never open-circuit the secondary winding of an energized current transformer.**
- **This product should only be operated with CT secondary connections Earthed.**
- **If this equipment is used in a manner not specified by the manufacturer, protection provided by the equipment may be impaired.**

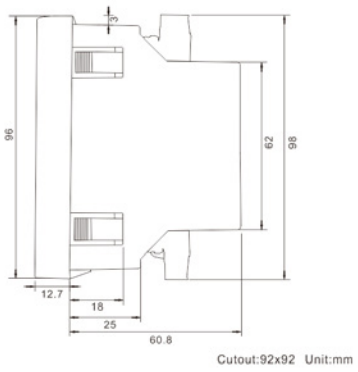
Auxiliary circuits (communication & relay outputs) are separated from metering inputs and 110-400V auxiliary circuits by at least basic insulation. Such auxiliary circuit terminals are only suitable for connection to equipment which has no user accessible live parts. The insulation for such auxiliary circuits must be rated for the highest voltage connected to the instrument and suitable for single fault condition. The connection at the remote end of such auxiliary circuits should not be accessible in normal use. Depending on application, equipment connected to auxiliary circuits may vary widely.

Dimensions

In normal use, little maintenance is needed. As appropriate for service conditions, isolate electrical power, inspect the unit and remove any dust or other foreign material present. Periodically check all connections for freedom from corrosion and screw tightness, particularly if vibration is present.

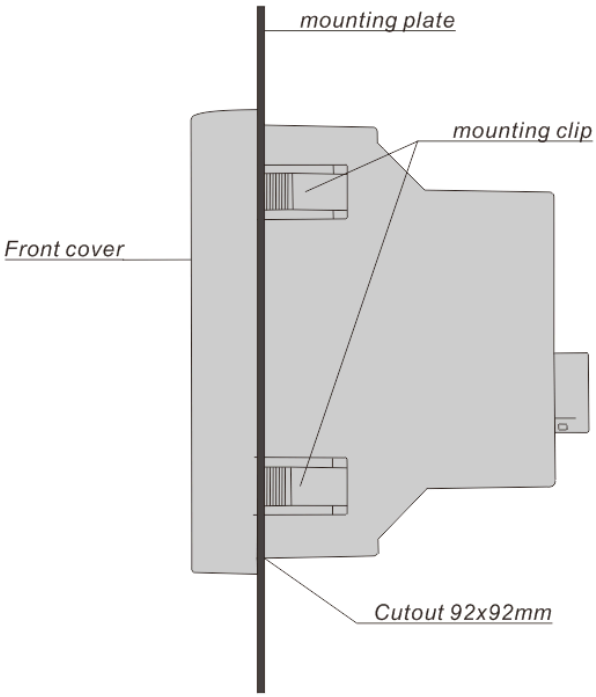
The front of the case should be wiped with a dry cloth only. Use minimal pressure, especially over the viewing window area. If necessary wipe the rear case with a dry cloth. If a cleaning agent is necessary, isopropyl alcohol is the only recommended agent and should be used sparingly. Water should not be used. If the rear case exterior or terminals should be contaminated accidentally with water, the unit must be thoroughly dried before further use. Should it be suspected that water might have entered the unit, factory inspection and refurbishment is recommended.

In the unlikely event of a repair being necessary, it is recommended that the unit be returned to the factory or nearest Eastron distributor.

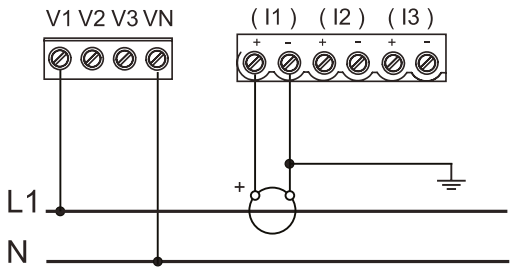


Smart
X96-5J
Rear view

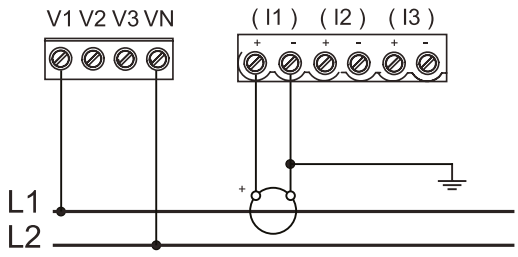
Mounting



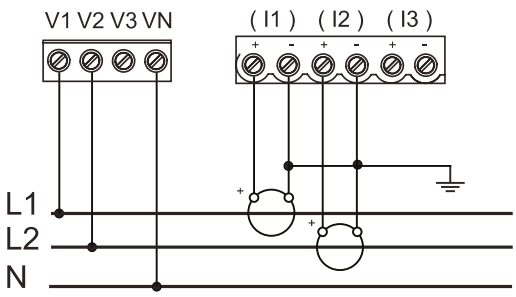
Wiring Configuration



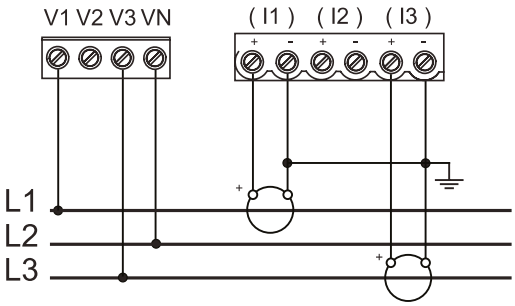
1P2W (L+N) 1CT



1P2W (L+L) 1CT

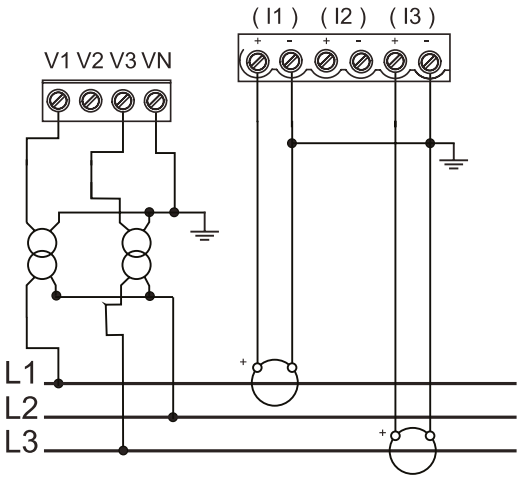


1P3W (L+L+N) 2 CTS

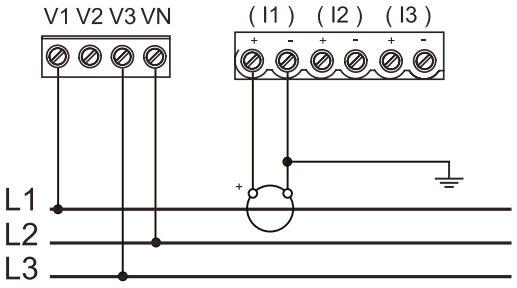


3P3W 2 CTS

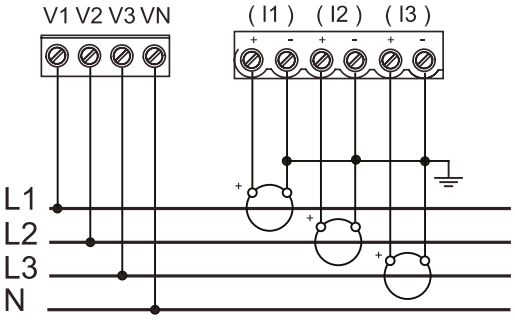
Wiring Configuration



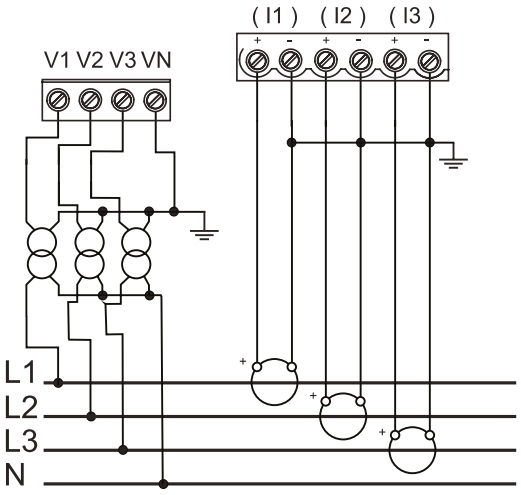
3P3W 2PT & 2CTS



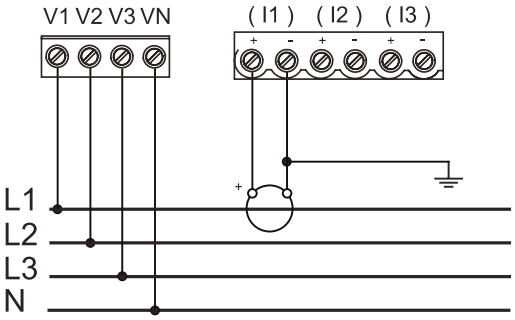
3P3W 1CT BALANCED LOAD



3P4W 3CT'S



3P3W 3PT 3CTS



3P4W 1CT BALANCED LOAD