

ELECTRICITY METERING



PMAC 211AC Multi-Channel Energy Meter

Application

- Sub Metering in Commercial Building
- Branch Circuit Monitoring
- Utility Application

Feature

- Suit for 3 phase 4 wires with connection mode
- Used for 4x3 phase AC measuring, 12x1 phase AC measuring
- Max. measure current up to 600A
- 33.3mA & 100mA rated current input (Optional)
- LCD display U, I, P, Q, S, PF, F, kWh, kvarh
- Over & Under limit alarm, up to 500 alarm records
- LED light indicates alarm & communication status
- Standard 35mm DIN Rail Mount

Main Function



Real-time Measurement

Voltage, Current, Active power, Reactive power, Apparent power, Power Factor, Frequency, Active Energy, Reactive Energy



Over & Under Limit Alarm & Record Function

Over voltage, Under voltage, Over current



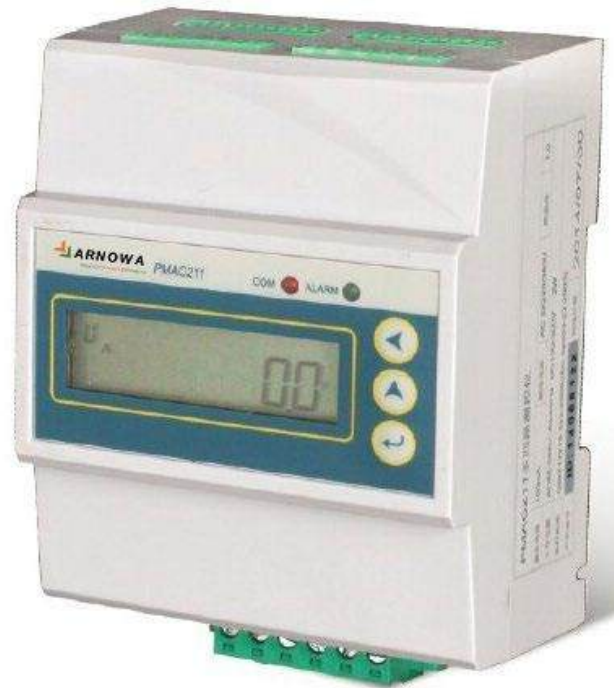
Data Logging Every 15 Minutes

Total active energy, total active power, current



Communication

1 RS485 port, MODBUS-RTU protocol



Technical Specification

Connection Mode	3 phase 4 wires
Rated Current Input	10mA & 33.3 mA (optional)
Rated voltage Input	3*220/380V, 45Hz~65Hz
Power Supply	AC 85~265V, DC 100~300V
Power Loss	≤2W
Communication	RS485 serial, support MODBUS-RTU Baud rate: 4800, 9600 bps Address: 1~247
IP Index	IP52 (front panel), IP20 (whole device)
Dimension (L*W*H)	94*75*62mm
Environment	Operating temperature: -10°C~+55°C Storage temperature: -40 °C~+70°C Humidity: 5%~95% non-condensing

Standard (EMC)	
Electrostatic discharge immunity test	IEC 61000-4-2:
Radiated immunity test	2001 IEC 61000-4-
Electrical fast transient/burst immunity test	3: 2002 IEC 61000-4-4: 2006
Surge immunity test (1,2/50µs~8/20µs)	IEC 61000-4-5,
Radio frequency immunity	2005 IEC 61000-4-
Electromagnetic emission limits	6, 2006 CISPR22: 2006 pass

Parameter	Accuracy	Resolution	Measuring Range
Voltage	0.5%	0.1V	AC 0~300V
Current	0.5%	0.1A	AC 0~600A
Active Power	1.0%	0.1W	Each phase: 0~216k/W
Reactive Power	2.0%	0.1var	Each phase: 0~216kVar
Power Factor	1.0%	0.001	-1.000~+1.000
Frequency	0.5%	0.01Hz	45~65 Hz
Active Energy	1.0%	--	0~99.999.999.9 kWh
Reactive Energy	2.0%	--	0~99.999.999.9 kWh

Options Available

	Order Code	Description
Main Module	PMAC211	-A For 100mA Secondary
		-B For 33.3mA Secondary
CT Accessory	CT for -A (100mA secondary)	LACT-100C1 Solid Core CT: Φ12 mm, 100A/100mA, Class 0.5
		CTSA016 Solid Core CT: Φ16 mm, 100A/100mA, Class 0.5
		CTSA024 Solid Core CT: Φ24 mm, 200A/100mA, Class 0.5
		CTSB0203 Solid Core CT: 20*30 mm, 400A/100mA, Class 0.5
		CTSB0508 Solid Core CT: 50*80 mm, 600A/100mA, Class 0.5
	CT for -B (100mA secondary)	LACT-100K1 Solid Core CT: Φ16.2 mm, 100A/33.3mA, Class 0.5

PMAC 770/ 770-DR Multifunction Power Meter



➤ PMAC770: Panel Mount

➤ PMAC770-DR: 35mm DIN Rail Mount

Feature



Suit for LV/ HV voltage system

- For low voltage system, direct connect up to 690 V (L-L) AC
- For high voltage system, support connect up to 65kV



* TOU (Multi-tariff billing), historical data of 31 days and 12 months

TOU, 4 tariffs, 8 time period in 24 hours



True-RMS measuring parameter

True-RMS measuring parameters includes: U, I, P, Q, S, PF, F, kWh, kvarh, kVAh



Power quality analysis

31st Harmonic analysis, K factor, unbalance etc.



Multiple Communication

- BACnet MS/TP Protocol (RS485 port)
- MODBUS-RTU Protocol (RS485 Port)
- MODBUS-TCP/IP Protocol (Ethernet port)



64M bit Memory, Build-in Web

Real-time data inquiry by Web Save monitoring data (Time interval settable 1min, 5 min, 10min, 15min, 30min) Support FTP for download memory data



Under/ over limit alarm



DI/DO



Max./ Min. Record (U, I, P, Q*)



CO2 (carbon dioxide) calculation for kWh



High accuracy

- Active energy: according to IEC62053-22, class 0.5s
- Reactive energy: according to IEC62053-23, class 2



Demand calculation

2 kinds of demand modes: fixed block and rolling block

Basic Function		
Real time metering	Voltage	Ua, Ub, Uc, Uab, Ubc, Uca, UL-L avg, UL-N avg
	Current	Ia, Ib, Ic, In, Iavg
	Power	Pa, Pb, Pc, ΣP, Qa, Qb, Qc, ΣQ, Sa, Sb,Sc, ΣS
	Power factor	PFa, PFb, PFC, ΣPF
	Energy	kWh, kvarh, kVAh *
	CO2 (Carbon dioxide)	kWh(import/export)
	Frequency	F
	Demand & Max. demand	Dmd_I, Dmd_P, Dmd_Q, Dmd_S
	Max./ min. value	Max./ min. (U, I, P, Q*, S*)
	Multi-tariff energy *	
	Phase angle *	
Power quality analysis	Unbalance	U_unbl *, I_unbl *
	Harmonic (31st)	THDu, THDi, TOHdu, TOHdi, TEHdu, TEHdi, HRU *, RHI *
	Harmonic RMS (0-31st)	Harmonic RMS-U *, Harmonic RMS-I *, Harmonic RMS-P *
	Harmonic energy (1st -13th)	
	Voltage crest factor, current K factor, Load rate, Voltage deviation, Frequency deviation Running time record for power-on period and qualified voltage & current *	
Setpoint alarm	Over/ under limit alarm	
3DI +2 DO	3 status input + 2 relay output	
RS485	Modbus-RTU protocol	
Record function	SOE (event log), Real-time clock (yyyy-mm-dd hh:mm:ss) *	
	Voltage/ frequency deviation, Voltage unbalance record	

Parameter	Accuracy	Resolution	Measuring Range
Voltage	0.2%	0.01V	Direct: 690Vph-ph
			PT primary: 0.001kV~65kV (settable) PT secondary: 1~398V (settable)
Current	0.2%	0.001A	CT primary: 1~9,999A CT secondary: 1 A or 5A
Power	0.5%	0.1W / var / VA	each phase: 0~649.9MW/ Mvar/ MVA
			Total: 0~1949.8MW/ Mvar/ MVA
Power factor	0.5%	0.001	-1.000~+1.000
Frequency	0.01	0.01Hz	45~65 Hz
Active energy	0.5%	0.1kWh	0~99,999,999.9 kWh
Reactive energy	2.0%	0.1kvarh	0~99,999,999.9 kvarh
Apparent energy	1.0%	0.1kVAh	0~ 99,999,999.9 kVAh
THD	1.0%	0.001	0~100.0%
Individual	1.0%	0.001	0~100.0%
harmonic	Un-	1.0%	0~100.0%

balance

Technical Specification

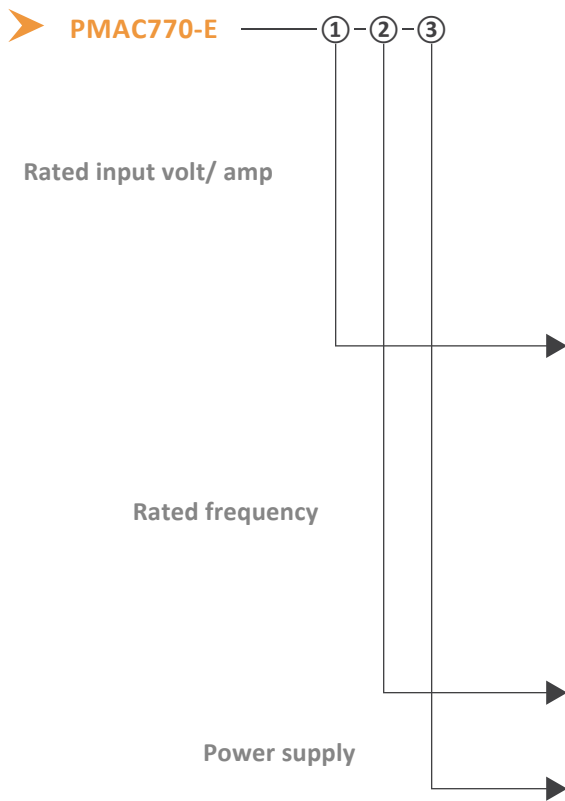
Connection mode	3-phase 3-wire, 3-phase 4-wire, 1-phase 2-wire
Metering	True RMS, 1 sec refresh time
Input	Rate current: 1A or 5A
	Rate voltage: Direct 120, 220V, 240V, 277V, 398Vph-N (optional)
	PT secondary: 1~398V (settable)
	Frequency: 50/ 60Hz
Overload	120% of rated, continuously
	Instantaneous current: 10 times/ sec
Status input	Instantaneous voltage: 2 times/ sec
Relay	Wet contact, external power supply
	Node capacity: 250VAC/5A
output Pulse output	Pulse constant: 1000~9999 programmable
	Pulse width: 60~100ms programmable
Power supply	Formula: 1 pulse = (1± pulse constant ×PT ×CT) kWh
	85 ~ 265VAC, 85 ~ 265VDC (When select P1)
Power loss	100 ~ 420VAC, 100 ~ 400VDC (When select P2)
	<5VA
IP index	IP52 (front panel) and IP30 (case)
Power frequency withstand voltage	AC 2KV/minute
Insulation resistance	≥50MΩ
Impulse withstand voltage	4kV (peak), 1.2/50uS

Communication	Modbus- RTU Protocol	RS485 serial Baud rate: 2400, 4800, 9600, 19200, 38400bps Address: 1~247
	Modbus- TCP/ IP	Ethernet communication port Support connect 10M/100M ethernet, Modbus TCP/IP, Web, FTP
	BACnet MS/TP protocol	
Dimension (L x W x H)	PMAC770: Panel: 96 x 96 x 13.5 mm Cut-out: 90 x 90 x 58.6 mm (basic) 90 x 90 x 80.1 mm (optional module) PMAC770-DR: Panel: 96 x 96 x 12 mm Cut-out: 90 x 90 x 58.6 mm (basic)	
Weight	Basic unit: approx 550gr. Optional module: 50gr.	
Environment	Main Module & and other	Operating temperature: -100C ~ +550C Storage temperature: -400C ~ +700C
	BACnet Module	Operating temperature: 00C ~ +500C Storage temperature: -50C ~ +750C Humidity: 10% ~ 95% non-condensing

Standard (EMC)

Electrostatic discharge immunity test	IEC 61000-4-2,Level 4
Radiated immunity test	IEC 61000-4-3,Level 3
Electrical fast transient/burst immunity test	IEC 61000-4-4,Level 4
Surge immunity test (1, 2/50µs~8/20µs)	IEC 61000-4-5,Level 3
Conducted emissions	EN 55022,Class B
Radiated emissions	EN 55022,Class B

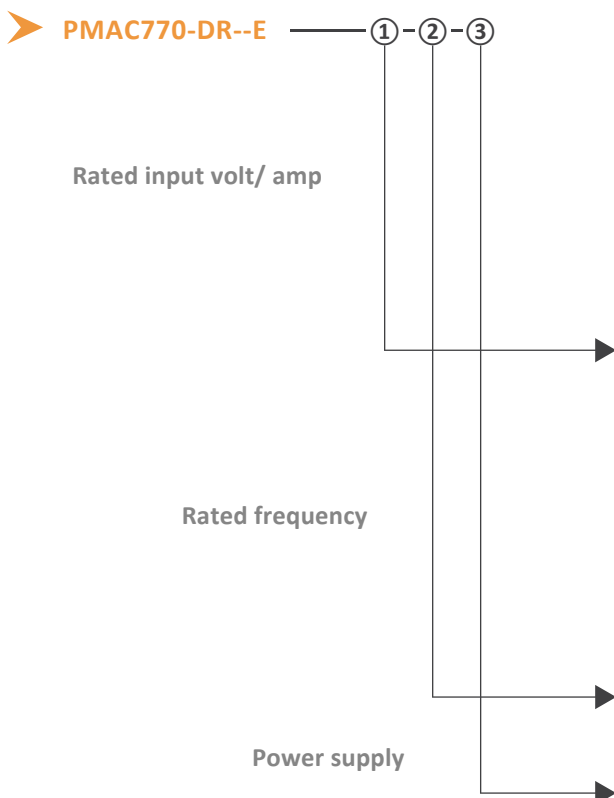
Options Available



V1	57.7/ 100V (via PT), 5A
V2	57.7/ 100V (via PT), 1A
V3	220/ 380V (direct), 5A
V4	220/ 380V (direct), 1A
V5	120/ 208V (direct), 5A
V6	240/ 415V (direct), 5A
V7	277/ 480V (direct), 5A
V8	63.5/ 110V (via PT), 5A
V9	120/ 208V (direct), 1A
V1	240/ 415V (direct), 1A
0	277/ 480V (direct), 1A
V1	63.5/ 110V (via PT), 1A
1	398/690V (direct), 5A
V1	50Hz
2	60Hz
V1	85 ~ 265Vac, or 85 ~ 265Vdc, 45-65Hz
3	100 ~ 420Vac , or 100 ~ 400Vdc, 45 ~ 60Hz

Note:

1. PMAC770 supports Max. 3 optional module
2. PMAC770 supports Max. 2 S optional module, others optional function can only be chosen once.
3. AI & AO module can only be selected once
4. 64M bit memory data can only be read by MODBUS TCP/IP
5. BA & LAN module can not be selected together



V1	57.7/ 100V (via PT), 5A
V2	57.7/ 100V (via PT), 1A
V3	220/ 380V (direct), 5A
V4	220/ 380V (direct), 1A
V5	120/ 208V (direct), 5A
V6	240/ 415V (direct), 5A
V7	277/ 480V (direct), 5A
V8	63.5/ 110V (via PT), 5A
V9	120/ 208V (direct), 1A
V1	240/ 415V (direct), 1A
0	277/ 480V (direct), 1A
V1	63.5/ 110V (via PT), 1A
1	398/690V (direct), 5A
V1	50Hz
2	60Hz
V1	85 ~ 265Vac, or 85 ~ 265Vdc, 45-65Hz
3	100 ~ 420Vac , or 100 ~ 400Vdc, 45 ~ 60Hz

SPM20AC Multi-Channel Energy Meter



Applications

- Hotel, Hospital, Dormitory
- Commercial, Building, Office
- Residential Building
- Reconstruction Project

Features

- Small Size** – Can be installed at the closest point, integrate in existing spaces-constrained installations.
- Ultra-compact Design** – Consists of control unit and current sensors (with RJ12 port, optional solid core or split core)
- Wide Measurement Range** – Max. Support 63A
- Multi Circuit** – Support 30 single phase circuit or 10 three phase circuit AC meaning
- High Accuracy** – Voltage & Current class 0.5 kWh classv1.0
- Multi Network Type** – 1 phase 2 wires, 3 phase 4 wire

Main Function



Real-time Measurement

Voltage, Current, Active power, Reactive power, Apparent power, Power Factor, Frequency



Alarm Function

Overload, Under load, Over current, Sensor fault



Energy Consumption

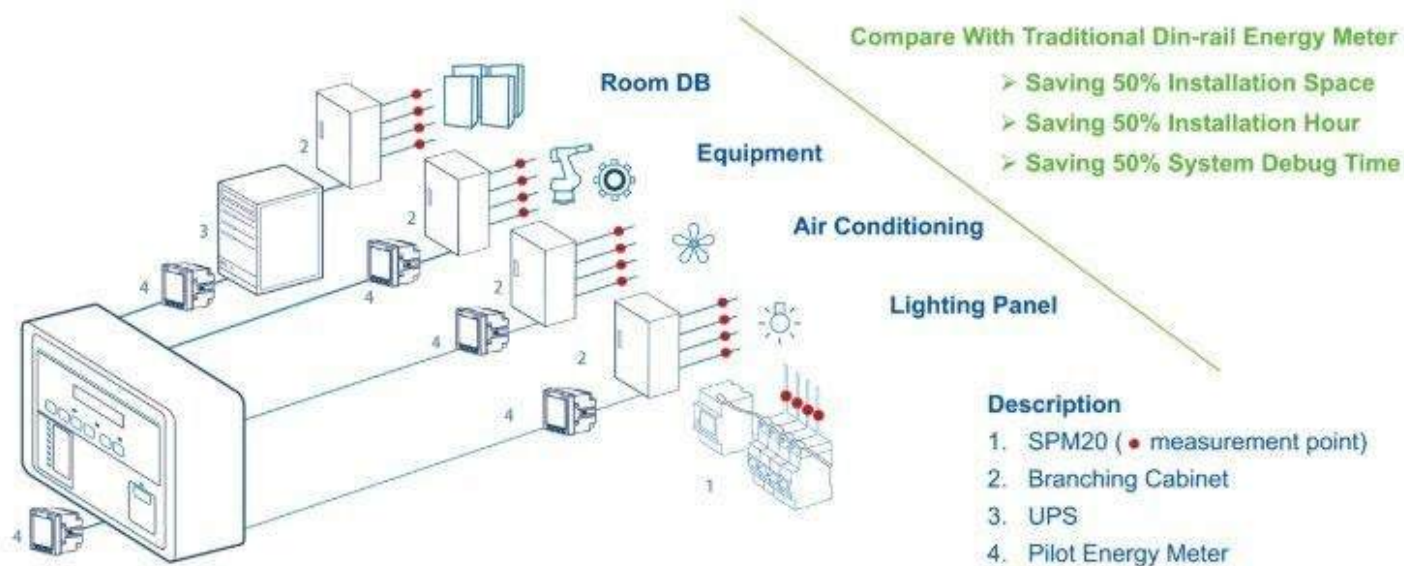
Active energy, Reactive energy



Communication

1 RS485 port, MODBUS-RTU protocol

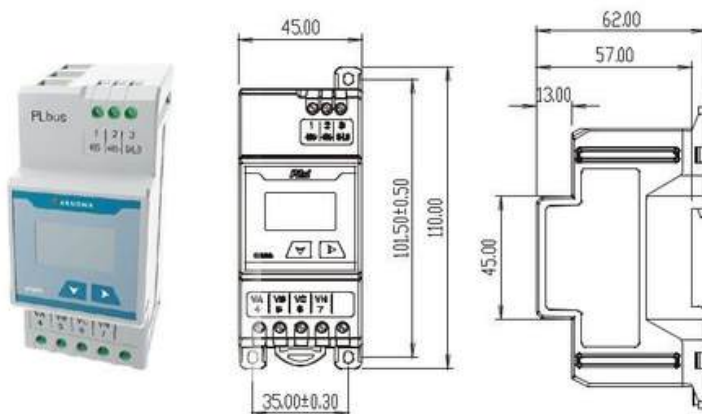
Typical Connection



SPM 20 & Accessories

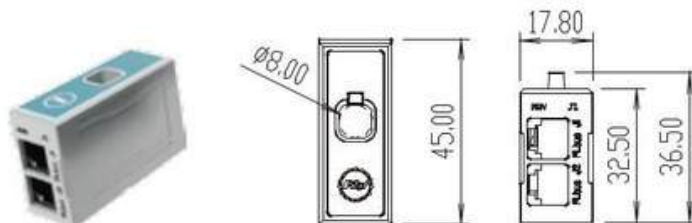
• SPM 20M Main Module

Connection	1 phase 2 wires, 3 phase 4 wires	
Mode Power	Self-supply, by a phase	
Supply	1 phase 2 wires	220V Range: 40%-150%
Voltage Input	3 phase 4 wires	3 × 220/380V
		Range: 40%-150%
Frequency	45 ~ 65 Hz	
Power Loss	Power supply circuit: ≤ 10W	
Communication	RS485 serial, support Modbus-RTU Baudrate: 4800, 9600, 19200 bps Address: 1 ~ 247	



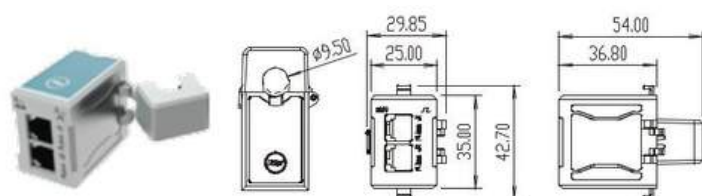
• SPM 20C Solid Core

Connection Mode	Bus connection (2 × RJ12)
Rated Current Input	Port) 5(63) A
Installation	Solid core
Open hole	Φ8 mm
Sampling Rate	28k Hz



• SPM 20-O Split Core Sensor

Connection Mode	Bus connection (2 × RJ12)
Rated Current Input	Port) 10(50) A
Installation	Solid core
Open hole	Φ9.5 mm
Sampling Rate	28k Hz



Parameter		Accuracy	Measuring Range
Voltage		0.55	40%~120%
Current	Solid Core Sensor (C)	0.5%	0-63A, 1%~120%
	Split Core Sensor (O)	1.0%	0-50A, 1%~120%
Power factor		1.0%	-1~1
Active power		1.0%	Single phase: 0~ + 14kW/var/VA Total: 0~ + 42kW/var/VA
Reactive power		2.0%	
Apparent power		2.0%	
Active energy	Solid Core Sensor (C)	1.0%	0~99,999,999.9 kWh
	Split Core Sensor (O)	2.0%	0~99,999,999.9 kWh
Reactive energy		2.0%	0~99,999,999.9 kVarh
Frequency		0.01	45~65Hz

Environment & Standard

Power frequency withstand voltage	2000V AC
Insulation resistance	≥100MΩ
Impulse withstand voltage	6kV (peak)
IP index	IP52 (front panel)

Environment	Normal operating temperature:	-20°C~+55°C
	Operating temperature:	-20°C~+50°C
	Storage temperature:	-30°C~+80°C
	Humidity:	<95% non-condensing

Standard (EMC)

Electrostatic discharge immunity test	IEC 61000-4-2, Level 4
Radiated radio-frequency electromagnetic field immunity (RFEMS)	IEC 61000-4-3, Level 4
Electrical fast transient test	IEC 61000-4-4, Level 4
Surge immunity test (1,2/50μs~8/20μs)	IEC 61000-4-5, Level 4
Conduction disturbance rejection of radio frequency field induction	IEC61000-4-6, Level 4
Electromagnetic emission limits	CISPR22: 2006, Pass
Voltage sag and short time interrupt immunity	IEC61000-4-11, Pass
Power frequency withstand voltage	IEC62052-11 2003

Options Available

Module	Order code		Description
Main Module	SPM20	-M	Suitable for 1 phase 2 wire & 3 phase 4 wire
Measure Sensor	SPM20	-C -	Solid Core Sensor: 5 (63) A, 8.0mm, Class 1.0
		O	Solid Core Sensor: 11 (50) A, 9.5mm, Class 2.0

SPM32 Multi-Function Power Meter

Feature

- Suit for Panel mount and DIN Rail Mount installation
- Suit for distribution system under 650kV (PT value settable)
- True RMS measuring parameters
- Setpoint alarm for over / under limit
- 31st Harmonic analysis, THD
- Status input & relay output function (optional) High accuracy, class 0.5 for kWh
- Small size: 72*72mm
- One RS485, support MODBUS-RTU protocol

Basic Function

SPM32 measures and display real-time parameters:

- Voltage-Ua, Ub, Uc, Uab, Ubc, Uca, UL-L avg. UL-N avg.
- Current-Ia, Ib, Ic, In, I avg.
- Current Unbalance Rate- I unbal.
- Active Power – Pa, Pb, Pc, ΣP
- Reactive Power–Qa, Qb, Qc, ΣQ
- Apparent Power– Sa, Sb, Sc, ΣS
- Power Factor –PFa, PFb, PFC, ΣPF
- Frequency –F
- Active Energy– Total kWh (import / export)
- Reactive Energy– Total kWh (import / export)
- Apparent Energy– Total kVAh
- Demand (IP) and Max. Demand Record for I,p
- 31st harmonic, THD, THDu, THDi,
- Setpoint Alarm– over voltage, under voltage, over current, under current, frequency too high, frequency too low, over load, over demand, phase loss, status input OFF

Optional Function

For SPM32 (Panel Mount)	R	2 relay outputs
	S	2 status inputs (Wet contact)



SPM32 Panel Mount



SPM32-DR: DIN Rail Mount (without display)



For SPM32-DR (DIN Rail)	S	4 status inputs (wet contact)
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Technical Specification

Connection mode	3 phase 3 wires, 3 phase 4 wires	
Metering	True RMS, 1 sec refresh time	
Input	Rated current: 5A or 1A Rated voltage: 57V~300V (ph-N), 35Hz~65Hz	
Status Input (Optional)	Rated voltage 220V, 2 channel active status input, Lower than 60V is open, higher than 178V is closed. Max, input is 300V	
Relay output (optional)	Rated contact capacity: 250VAC/5A or 30VDC/5A	
Power Supply	85~265VAC or 100~300VDC	
Power Loss	<4VA	
Power Frequency Withstand Voltage	AC 2KV/minute	
Insulation Resistance	≥100M	
Impulse Withstand Voltage	6KV	
Communication	RS485 serial, Modbus-RTU, Address: 1~247 Baudrate: 4800, 9600, 19200bps	
Dimension (L*W*D)	Panel Mount: 72*72*70 mm Din-rail Mount: 72*72*77.2 mm	
IP Index	IP52 (front panel) and IP20 (case)	
Environment	Operating temperature:- 10 °C~+55°C Limit Operating temperature: 25 +55°C Storage temperature: -40°C~+70°C Humidity: 5%~95% RH, non-condensing	
Standard (EMC)	Electrostatic discharge immunity test Radiated immunity test Electrical fast transient/burst immunity test Surge immunity test (1, 2/50μs~8/20μs) RF field immunity induced mass	IEC61000-4-2, Level 4 IEC61000-4-3, Level 4 IEC61000-4-4, Level 4 IEC61000-4-5, Level 4 IEC61000-4-6, Level 3

Measurement Parameter	Accuracy	Measuring Range
Voltage	0.2%	10V~500V (PT secondary side)
Current	0.2%	5A or 1A (5%~120% of rating) (CT secondary side)
Power factor	0.5%	-1.000~1.000
Active power	0.5%	Per phase:0~± 26MW Total: 0~± 78MW
Reactive power	1.0%	Per phase:0~± 26Mvar/VA Total: 0~± 78Mvar/VA
Apparent power	1.0%	
Active energy	0.5%	0~99,999,999.9 kWh
Reactive energy	2.0%	0~99,999,999.9 kvarh
Apparent energy	2.0%	0~99,999,999.9 kVah
Three-phase current unbalance	1.0%	0%~100%
Harmonic	Class	0%~100%

B

Options Available

SPM32	R	2 relay outputs
	S	2 status inputs (Wet contact)
	V1	5A
	V2	1A

SPM32-DR	S	4 status inputs
	V1	5A
	V2	1A

Example:

SPM32-RS-V1, it means the device provides basic measuring function, one RS485 port, 2 digital inputs, 2 relay outputs. Rated input current 5A, CT ratio and PT ratio settable.

SPM33 Multifunction Power Meter



Feature

- Economical multifunction power meter
- Suit for voltage distribution system up to 650kV
- Dual Source kWh phase trac record separately grid & generator supply
- 31st Harmonic analysis, THD
- One RS485, support MODBUS-RTU protocol
- Phase sequence adjustment
- 2 status input (standard)
- Alarm setpoint (optional)
- Bar chart display for harmonic

Basic Function

SPM33 measure and display real-time parameters:

- Voltage— $U_a, U_b, U_c, U_{ab}, U_{bc}, U_{ca}$,
- Voltage unbalance rate — $U_{L-L} \text{ unbal}, U_{L-N} \text{ unbal}$
- Current— I_a, I_b, I_c, I_n
- Current unbalance rate — $I \text{ unbal}$
- Active power — $P_a, P_b, P_c, \sum P$
- Reactive power — $Q_a, Q_b, Q_c, \sum Q$
- Apparent power— $S_a, S_b, S_c, \sum S$
- Power factor— $PF_a, PF_b, PF_c, \sum PF$
- Frequency— F
- Active energy—kWh
- Reactive energy—kvarh
- Apparent energy - kVAh
- Dual source kWh records separately grid & generator supply (Import & export kWh)
- Demand and Max. record for I, P, Q, S
- 31st harmonic, THD
- 2 DI, One RS485,

Optional Function

- 2 Relay output

Technical Specification

Connection mode	3 phase 3 wires, 3 phase 4 wires	
Metering	True RMS, 1 sec refresh time	
Input	Rated current: 5A or 1A Rated voltage: 220/380V, 35Hz~65Hz	
Overload	Current: 120% of rated, continuously Instantaneous current: 10 times/	
Overload	Low voltage system: Up to 400V(L-N) / 650V (L-L) High voltage system: Up to 650kV	
Status input voltage	2 channel active status input,less than 60V is open,more than 140V is closed,the maximum input is 300V	
Relay output (optional)	2 channels, Node capacity: 250Vac/5A	
Power frequency withstand voltage	AC 2KV/minute	
Insulation resistance	≥ 100MΩ	
Impulse withstand voltage	5kV (peak), 1.2/50uS	
Power Supply	AC 85~265V or DC 100~300V	
Power loss	<5VA	
Communication	RS485 serial, support Modbus-RTU Baudrate: 4800, 9600, 19200bps Address: 1~247	
Dimension (L x W x H)	Panel: 96 x 96 x 18 mm Cut-out: 89.5 x 89.5 x 69.8 mm (+0.5mm)	
IP index	IP54 (front panel) and IP20 (case)	
Weight	Approx. 500gr.	
Environment	Normal operating temperature: -10°C~+55°C Operating temperature: -25°C~+55°C Storage temperature: -40°C~+70°C Humidity: 5%~95% non-condensing	
Standard (EMC)	Electrostatic discharge immunity test Radiated immunity test Electrical fast transient/burst immunity test Surge immunity test (1, 2/50μs~8/20μs)	IEC 61000-4-2,Level 4 IEC 61000-4-3,Level 4 IEC 61000-4-4,Level 4 IEC 61000-4-5,Level 4

Parameter	Accuracy	Measuring Range
Voltage	0.5%	Line - line : 0 ~ 650V Line - Neutral : 0 ~ 400V
		PT primary side: up to 650KV PT secondary side: 100 - 400V (L-N) (Settable)
Current	0.5%	Each phase: 0 ~ 65,000A Zero sequence : 0 ~ 65,000A
Power factor	0.5%	-1~1
Active power	0.5%	0~ 99,999,999.9 W
Reactive power	1.0%	0~ 99,999,999.9W
Active energy	0.5% for 5A input	0~ 99,999,999.9 kWh
	1.0% for 1A input	
Reactive energy	2.0%	0~ 99,999,999.9 kVarh
Apparent energy	1.0%	0~ 99,999,999.9 kVAh
Three-phase Voltage unbalance	class B	0%~100%
Three-phase current unbalance	class B	0%~100%
THD	class B	0%~100%

Options Available



Example:

Model No. SPM33-R-V1 indicates the device provide basic function, two relay alarm output, rated input 220/380V, 5A

SPM91 Single Phase Din-Rail Energy Meter



Basic Function

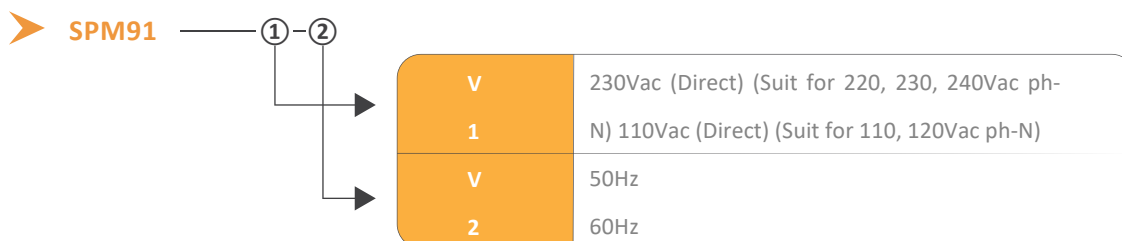
- Suit for 110V, 120V, 220V, 230V, 240V AC low voltage system
- Measure U, I, P, Q, S, PF, kWh, kvarh, LCD display U, I, P, kWh
- 6 +1 digits LCD display (999999.9 kWh)
- LED indicates pulse output
- Password protection
- One key for up/down page, one key for programming
- Small size: 100*36*65mm
- RS485 port , MODBUS-RTU or DTL645 protocol (Optional)
- 35mm DIN rail installing, standard DIN ED5002
- Standard: IEC62053-21

Technical Specification

Display	6 +1 digits LCD display (999999.9 kWh)
Accuracy	kWh kWh Class 1.0
Rated voltage	AC 220Vph-N or 120Vph-N (Optional)
	Range: 0.8Un~1.2Un
Rated(Max.)	5 (63)A
current Start	0.4%Ib
current	<2W
Power	50Hz/ 60Hz (Optional)
consumption	7mm x 7mm (16mm ²)

Pulse output	1 channels
Communication	RS485 port, MODBUS-RTU and DTL645 communication protocol
	Address: 1~247 Baud rate: 2400, 4800, 9600bps (Default)
Creeping	Anti-creeping logic design
Dimension	100*36*65mm
(L*W*H) Weight	190g
Environment	Operating temperature: -20°C ~ +55°C
	Storage temperature: -25°C ~ +70°C Humidity: 5%~95% non-condensing

Options Available



Example:

Model No. SPM91-V1-50, which indicate the device provides one RS485, one pulse output, rated input voltage 230Vac, frequency 50Hz, rated current 5(63A).

SPM93 Three Phase Din Rail Energy Meter



Basic Function

- Suit for 110V, 120V, 220V, 230V, 240V AC low voltage system
- Measure V, I, P, Q, S, PF, kWh, kvarh, Multi-tarif energy value
- 7 +1 digits LCD display (9999999.9 kWh)
- Record historical energy for latest 31 days (per 15min.), latest 12 months and latest 10 years
- KWh accuracy class 0.5s or 1.0
- Support over-voltage timing, under-voltage timing, over-current timing function
- 2 LED indicates pulse output (Settable for kWh or kvarh)
- LCD display prompt for phase sequence error
- 3 keys for programming, 35mm DIN rail installing, standard DIN ED5002
- RS485 port, MODBUS-RTU or DTL645 protocol (selectable)
- Standard: IEC62053-21/ 23

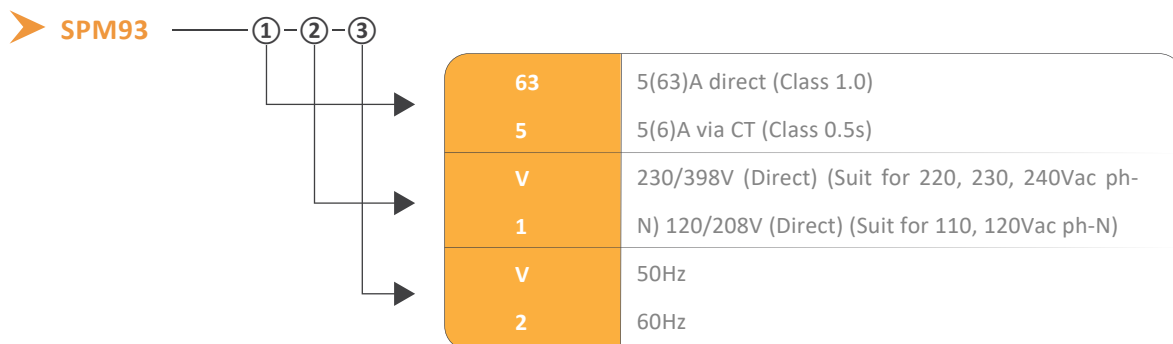
Technical Specification

Rated current	Direct: 5(63)A Or 5(6)A via CT
Rated voltage	AC 220V ph-N or 120V ph-N (Optional)
Frequency	50/60Hz (Optional)
Burdenv	<2W
Power supply	Self supply (Note: RS485 won't work, when connect 1 phase) For 220Vac (L-N), range: 176~276Vac For 120Vac (L-N), range: 96~144V
Communication	RS485 serial, Modbus-RTU and DTL645 Baud rate: 2400, 4800, 9600, 1200 (option) Address: 1~247
Environment	Operating temperature: -20°C~ +55°C Storage temperature: -40°C~ +70°C Humidity: 5%~95% non-condensing

Connection mode	3-phase 4-wire	
Pulse output	2 channels (Settable for kWh or kvarh)	
Starting Current	0.4%Ib (direct connect), 0.2%Ib (via CT)	
Power Frequency withstand voltage	4kV	
Accuracy	kWh Accuracy: Class 1 for 3×5(63)A direct kWh Accuracy: Class 0.5s for 3×5(6)A via CT	
Pulse constant	1000 imp	
Dimension	72*100*65mm	
Wire	7mm * 7mm (16mm ²)	
Diameters	Electrostatic discharge immunity test	IEC 61000-4-2,Level 4
Standard (EMC)	Radiated immunity test	IEC 61000-4-3,Level 3
	Electrical fast transient/burst immunity test	IEC 61000-4-4,Level 4
	Surge immunity test (1, 2/50μs~8/20μs)	IEC 61000-4-5,Level 4
	Conducted emission	EN55022, Class B
	Radiated emission	EN55022, Class B

Parameter		Accuracy	Resolution	Measuring Range
Display data, can also be read via MODBUS	Voltage	0.2%	0.01V	For 220Vac (L-N), range: 176~276Vac For 120Vac (L-N), range: 96~144V
	Current	0.2%	0.001A	Direct: 5(63)A Via CT: 5(6)A
	Active power	0.5%	0.1W	0~1MW
	Power factor	0.5%	0.001	-1.000~+1.000
	Frequency	0.01	0.01Hz	45~65Hz
	Active energy	Class 1 for 5(63)A	z 0.01V	0~9999999.9 kWh
		Class 0.5s for 5(6)A		
Reactive energy	Class 2	0.1kvarh	0~9999999.9 kvarh	
only can be read via MODBUS	Reactive power	1.0%	0.1Var	0~1Mvar
	Apparent power	0.5%	0.1VA	0~1MVA

Options Available



Example 1:

Model No. SPM93-63-V1-50, which indicates the device provides basic function, accuracy class 1, rated current is 5(63)A, provides TOU (Multi-tariff) function and rated voltage input is 220/380V, 50Hz.

ARNOWA Flexible Rogowski Coils CT AMK Series

Description

SPM9511-M / SPM9513-M are DIN Rail Relay Control Energy Meter can accurately and directly measure energy consumption and billing. The meters have Relay function, support to control the switch on/off remotely. It can Max. support Max. 80A direct input. With Modbus-RTU protocol and RS485 port, the meter also supports connect into 3rd party system.

Features

- Suit for 120V, 220V, 230V, 240VAC Power System
- 7+1 digits LCD display (9999999.9kWh)
- High accuracy: Class 0.5s for 5A via CT, Class 1.0 for 80A direct input
- High accuracy: Class 0.5s for 5A via CT, Class 1.0 for 80A direct input
- 3 keys for programming, 35mm DIN Rail installation, standard DIN ED5002
- 1 LED indicates pulses output, standard DIN 43864
- Support reading and inquiry data when power off
- Standard: IEC62053-21/22

Functions

- Measure - U, I, P, Q, S, PF, F, kWh, kvarh, multi-tariff energy (kWh, kvarh)
- Relay Control - for remote control circuit switch on/off
- TOU (Multi-tariff) - 4 tariffs and 8 time periods in 24 hours Historical Record - kWh, kvarh, Max. P for last 31 days (Per 15min) and last 12 months data; last 200 alarms and last 20 times power off Alarm -- temper alarm, switch on/off alarm, over-voltage alarm, under-voltage alarm, reversed connection alarm etc.
- Communication - one RS485 port, MODBUS-RTU Protocol



SPM9511-M Single Phase



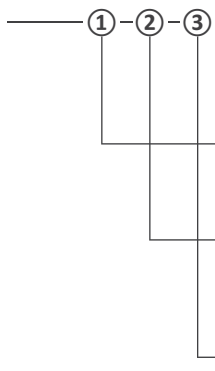
SPM9513-M Three Phase

Technical Specification

Accuracy	Class 0.5s: 5 (6) A Class 1.0: 10 (80)A	
Rated Current	SPM9511-M/SPM9513-M: Class 1.0: 10 (80)A SPM9513-M: 5 (6) A via CT	
Rated Voltage (Optional)	SPM9511-M: 120V, 220V, 240V SPM9511-M: 120/208V, 220/380V, 240/415V	
Power Supply	Self Supply (Note: for SPM9513-M, RS485 won't work if only connect 1 phase voltage) Overload: 1.2 times	
Relay Control	Support control circuit switch on/off For SPM9511-M: Build-in relay module For SPM9513-M (80A): Build-in Relay module For SPM9513-M (5A): Need to add AC contactor Need to add AC Contactor and Relay Switch	
Pulse Output	1 Channel (Settable for kWh or kvarh) constant: 1600imp/kWh/kvarh Wet contact, power supply range: 5~30VDC	
Frequency	50/60Hz	
Power Consumption	<2W/10VA each phase	
Wire Diameters	7mm*7mm (16mm ²)	
Starting Current	0.4% Ib	
Communication	RS485 port, MODBUS-RTU Baud rate: 2400、4800、9600 Address: 1~247	
Insulation	Withstand voltage: 2kV, Impulse voltage:6kV	
Historical Record	<ul style="list-style-type: none"> • kWh, kvarh, Max. P for last 31 days (Per 15min.) and last 12 months data • last 200 alarms records • last 20 times power off 	
Alarm	<ul style="list-style-type: none"> • Temper alarm • Switch on/off alarm • Over-voltage alarm • Under-voltage alarm • Reversed connection alarm 	
EMC Standard	Electrostatic discharge immunity test Radiated immunity test Electrical fast transient/burst immunity test Surge immunity test (1, 2/50μs ~ 8/20 μs) Conducted emission Radiated emission	IEC61000-4-2, Level 4 IEC61000-4-3, Level 3 IEC61000-4-4, Level 4 IEC61000-4-5, Level 4 EN55022, Class B EN55022, Class B
Environment	Operating temperature: -20°C ~ +55°C Storage temperature: -40°C ~ +70°C Humidity: 5% ~ 95% non-condensing	

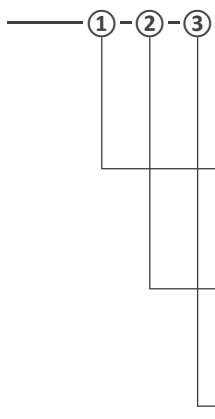
Options Available

➤ SPM9511- M (Single phase)



80	10(80)A direct
V	220V, Suit for 220, 230Vac ph-N 120V, Suit for 110, 120Vac
1	ph-N 240V
2	50Hz
V	60Hz

➤ SPM9513- M (Three phase)



80	10(80)A direct
5	5(6) for external CT
V1	220/ 380V, Suit for 220, 230Vac ph-N
V2	1120/ 208V, Suit for 110, 120Vac ph-N
V3	240/ 415V
V1	50Hz
V2	60Hz

Note:

1. SPM9511-M has build-in relay module
2. SPM9513-M 80A has build-in relay module
3. SPM9513-M 5A via CT module need to add AC contactor and relay switch to realize remote control switch

ARNOWA Hinged Core Current Transformers

ARNOWA hinged split core CTs are compact and low-cost current transformers with high accuracy. Designed with a single-click installation mechanism, the hinged CTs are ideal for quick and easy installation without disconnecting cables. The compact size is perfect for limited-space panels.

Features

- Low cost
- 4 standard sizes
- Split core design, safer, easier installation, and portable



Applications

• Measures AC current flow to electric motors, lighting, air condition equipment, etc. Compatible with HVAC temperature control, power management, building automation systems.

TECHNICAL DATASHEETS

Model	T10	T10	T10	T10
Rated Input	T10	T10	T10	T10
Rated Output	T10	T10	T10	T10
Accuracy	0.5%			
Frequency Range	50-1KHz			
Window Size	0.4 Inch			
Case Material	Black Nylon			
Rated Voltage	600 Vac, Category III			
<i>Note: Do not use 600V class CT in application with voltage greater than 600V L-L</i>				
Operating Temperature	-15°C - 60°C			
Certifications	CE approved, RoHS compliant			

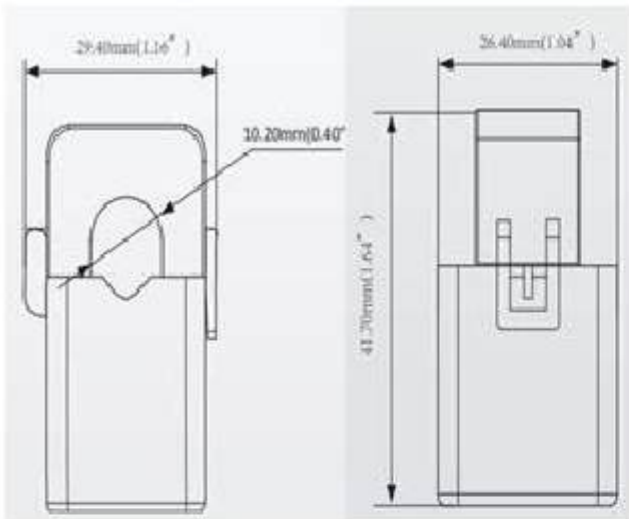
OPTIONS AVAILABLE

Rated Input

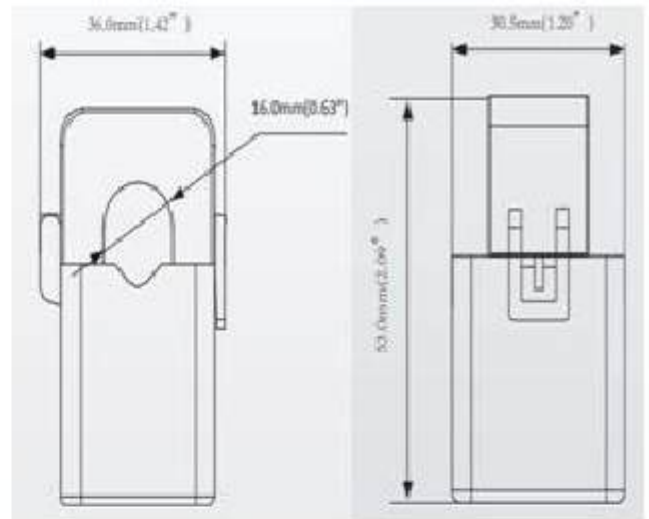
Ordering No.:	CT- T10- 333			
Ordering Example:	CT- T10- 20 333	CT- T10- 100 333	CT- T10- 200 333	CT- T10- 200 333
	5: 5A	5: 5A	100: 100A	100: 100A
	20: 20A	40: 40A	150: 150A	250: 250A
	30: 30A	100: 100A	200: 200A	400: 400A
	40: 40A	150: 150A	250: 250A	600: 600A
	50: 50A			
	60: 60A			

Dimensions

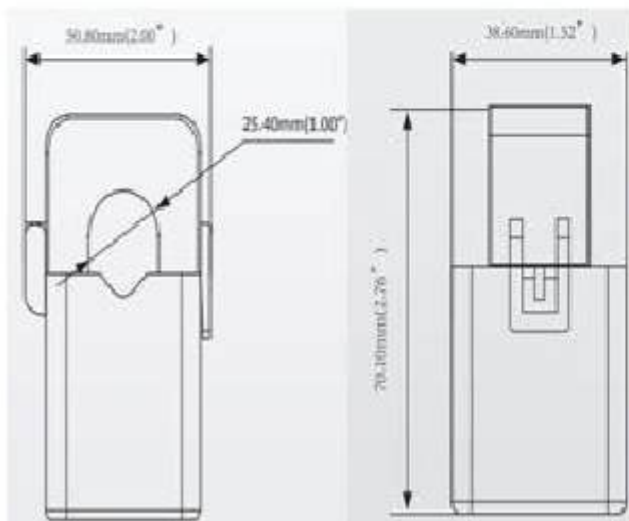
Drawings represent standard design and all dimensions are in millimeters (mm).



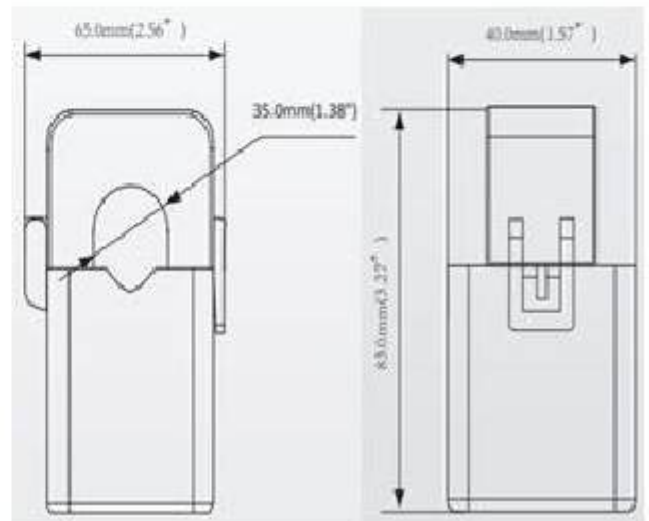
ARNOWA CT- T10



ARNOWA CT- T16



ARNOWA CT- T24



ARNOWA CT- T36

ARNOWA Split Core Current Transformers



ARNOWA CTS series of split core current transformers are designed for fast and easy installation. The split core design permits non-contact current measurements through magnetic field induction without requiring that the primary wire be taken offline and disconnected for CT installation. This method permits a safer, easy and portable current measurement. An internal precision burden resistor across the secondary winding of the CT provides a safe low voltage output and permits safe opening of the secondary

Features

- Low cost
- 4 standard sizes
- Split core design, safer, easier installation, and portable

Applications

• Measures AC current flow to electric motors, lighting, air condition equipment, etc. Compatible with HVAC temperature control, power management, building automation systems.

TECHNICAL DATASHEETS

Model	0750	1250	2000	3050
Rated Input	100/200A	300/400/600A	600/800/1000/1200/1500A	400/600/1000/1500/2000/3000/5000A
Rated Output	333mV	333mV	333mV	333mV
Accuracy	0.5%			
Frequency Range	50/60Hz			
Withstand Voltage	3000 Vac			
Case Material	Black Nylon			
Rated Voltage	600 Vac, Category III			
<i>Note: Do not use 600V class CT in application with voltage greater than 600V L-L</i>				
Operating Temperature	-15°C - 60°C			
Certifications	CE approved, RoHS compliant			
Leads	8'(2.5m), twisted pair, 22AWG			

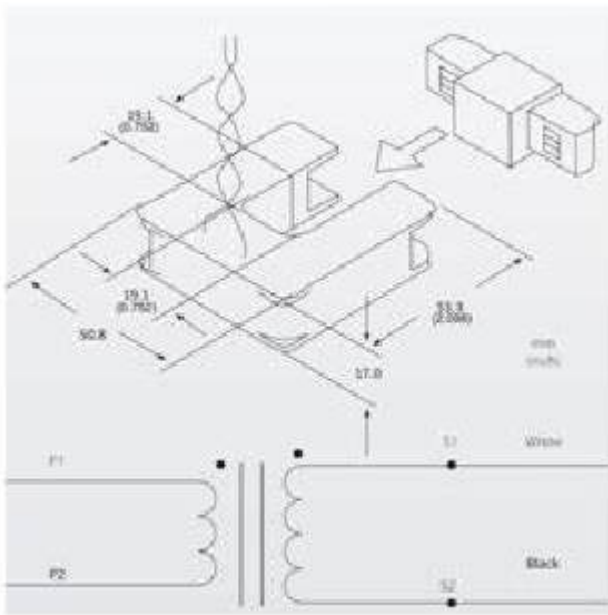
OPTIONS AVAILABLE

Rated Input

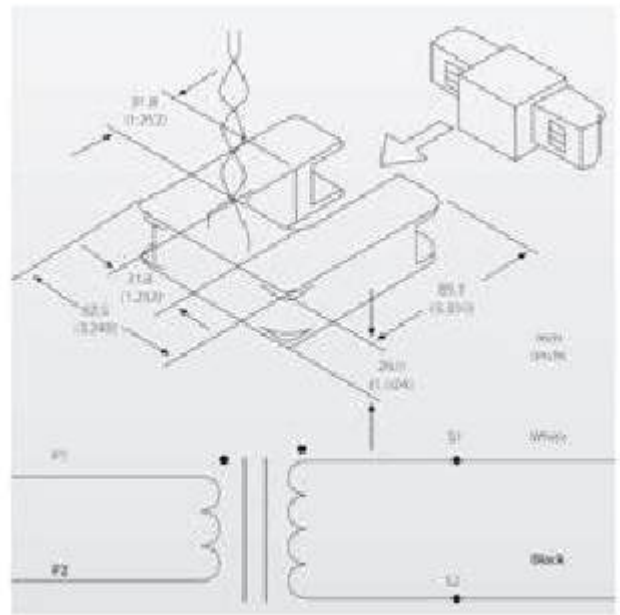
Ordering No.:	CT-0750 333			
Ordering Example:	CT-0750- 200 333	CT-1250- 300 333	CT-2000- 1000 333	CT-3050- 2000 333
	100: 100A	300: 300A	600: 600A	2000: 2000A
	200:200A	400:400A	1200:1200A	3000: 3000A
			1500: 1500A	5000: 5000A

Dimensions

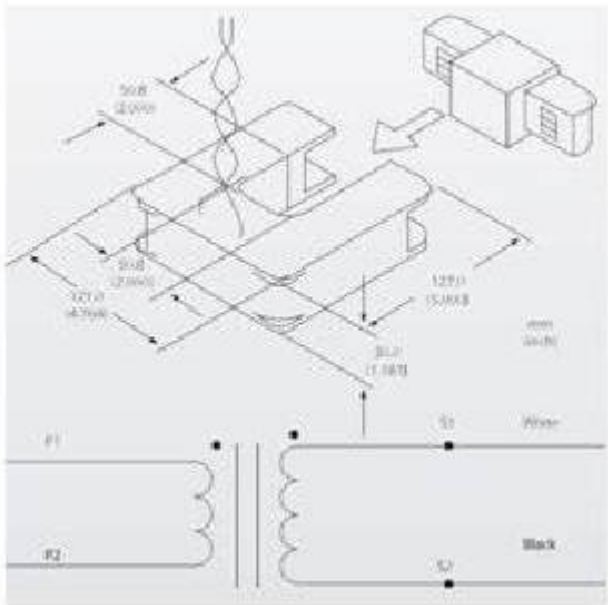
Drawings represent standard design and all dimensions are in millimeters (mm).



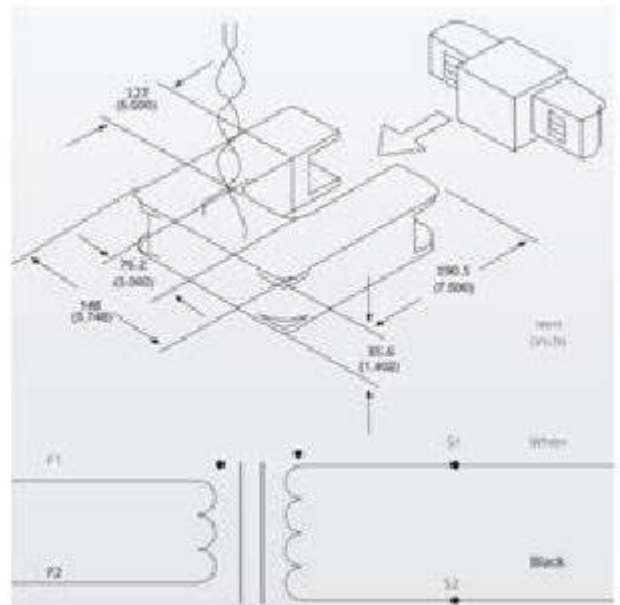
ARNOWA Split Core CT- 0750



ARNOWA Split Core CT- 1250



ARNOWA Split Core CT- 2000



ARNOWA Split Core CT- 3050

ARNOWA Flexible Rogowski Coils CT AMK Series

Rogowski Integrator Kit

ARNOWA AMK Series can be combined with any model and size of RCZ RCN or RCY Rogowski coils. The available values are: 0-1A AC, 333mV 3phase/1phase, 4-20mA, 0-5V, 0-10V AC/DC. On request the input value can be customized according to the application.

AMK Rogowski coil kit is a very flexible system, suitable for high power load analysis, impulsive current monitoring, DC ripple measurement, etc. Due to its specific features, flexible Rogowski coil is an extremely comfortable solution for current measurement and can be used in a number of cases where traditional current transducer is not the adequate solution.



AMK Series Models

Model No.	Order Code	Output
AMK-xxxA	AMK-5A	Three Channel 5A Output Kit
	AMK-333mV-1P	Single Channel 333mV Output Kit
AMK-xxxmV	AMK-333mV-3P	Three Channel 333mV Output Kit
	AMK-mA-1P	Single Channel 4-20mA or 0-20mA output Kit
AMK-xxxA	AMK-mA-3P	Three Channel 4-20mA or 0-20mA output Kit
	AMK-5V	Single/Three Channel 0-5V kit AC/DC
	AMK-10V	Single/Three Channel 0-10V Kit AC/DC
	AMK-1A-3P	Three Channel 1A Output Kit
	AMK-1A-1P	Single Channel 1A Output Kit

Note:

The Rogowski Integrator Kit comes with a choice of optional current transformer sizes.

Flexible Rogowski Coils CT RNC Series

Ø8mm Flexible Rogowski coil

ARNOWA Flex Series is a flexible current transducer based on Rogowski principle, particularly suitable for measurement in combination with portable devices. NRC coils are available in different sizes and can be supplied according to customer's design; therefore they can be used in all those applications, in which traditional transducers are not fitting due to its size and/or weight. Due to its specific features, flexible Rogowski coil is an extremely comfortable solution for current measurement and can be used in a number of cases where traditional current transducer is not the adequate solution.

NRC coil is provided with a shield against the influence of external magnetic fields, therefore it grants a stable measurement from low currents to hundreds of kA. The Rogowski coils must be connected to an electronic integrator for 90° phase shift compensation and frequency equalization. Our DIN-RAIL and panel meters can interface Rogowski coils directly without the need of the external integrators. This is an advantage because there are no external boxes or any power supply with consequent ease of use. The particular features of the Rogowski coils combined with the extremely flexible input programming of our portable meters, allow to carry out measurement by all applications.

Features

- High linearity from 1A to 100kA
- Wide dynamic range
- Very useful with large size or awkward shaped conductors or in places with limited access
- No danger from open-circuited secondary
- Not damaged by large overloads
- Non-intrusive, no power drawn from the main
- Measurement uniformity at any position of the conductor inside the coil
- Excellent degree of rejection to the external current conductor

Advantage

- Calibrated to 0.5%
- 8mm section easy to install
- Lower zero drift down to 0.1mV

Applications

- Measuring devices, lab instrumentation
- Power monitoring & control systems
- DC ripple measurement
- Harmonics and transients monitoring
- Power meter, Power analyzer sensor



CE RoHS

Transducer

Coil length	from 30 to 300 cm
Coil diameter	8 ±0.2 mm
Fastening	bayonet holder
Material	thermoplastic UL94-V0

Environmental conditions

Operating temperature:	from -30°C to +80°C
Storage temperature:	from -40°C to +80°C
Protection degree:	IP67
Safety Standards:	EN61010-1, EN61010-031, EN61010-2-031, EN61010-2-032

Electrical Characteristics

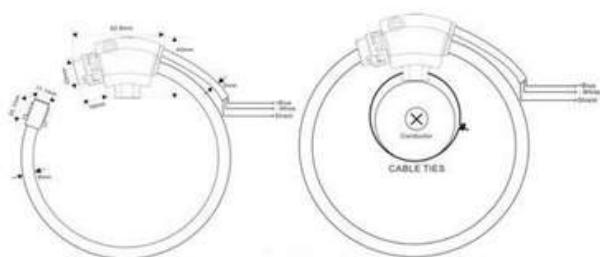
Output level (RMS)	85mV/1 kA,100mV/kA@50Hz Calibrated
Coil resistance:	from 300 to 2000 Ω
Positioning error:	better than ±1% of reading
Working voltage:	1000 VRMS CAT III 600 VRMS CAT IV pollution degree 2
Test voltage:	7400 VRMS / 1 min
Connection cable	2 x 0.15 mm + shield
Type: Length:	on request

Standard Model	RCN16	RCN24	RCN36	RCN47
Input Range	5A-50000A	5A-50000A	5A-50000A	5A-50000A
Typical Input	1000A, 2500A, 5000A, 10000A, 50000A	1000A, 2500A, 5000A, 10000A, 50000A	1000A, 2500A, 5000A, 10000A, 50000A	1000A, 2500A, 5000A, 10000A, 50000A
Output Standard	85mV/kA@50Hz /100mV/kA@50Hz Calibrated			
Output Option	Output specified for RCN Input			
Window Diameter Size (in)	4.17	7.01	10.67	14.53
Window Diameter Size (mm)	106	178	271	369
Length (in)	15.75	23.62	35.43	47.24
Length (mm)	400	600	900	1200
Accuracy	0.50%	0.50%	0.50%	0.50%
Standard/Certifications	CE	CE	CE	CE
Weight	90g	180g	270g	453g

Options available only on request, to be indicated together with the selected order code from the list above:

- Different output value: 50mV/1kA@50Hz or 85mV/1kA@50Hz
- Other coil length than those listed above, up to 300cm
- Other cable length longer than standard (3m), up to 15m
- Calibrated for customer device (input impedance value of device to be specified)
- FRB connector
- Different coil colour (MOQ required)

Dimensions



Cross section: approx. 8mm

Coil length: from 25cm to 300cm (up to 500cm for special applications)

About Arnowa

Arnowa is an Australian-born Smart technology innovator. We excel in the design and implementation of IoT and Artificial Intelligence based solutions to simplify processes, spark business efficiency and promote sustainability. Our ecosystems acquire your undiscovered data in real-time and apply our diagnostic and predictive analytics. It's how we enable informed planning and management to produce true value, regardless of industry and size. Businesses who partner with Arnowa proprietary ecosystems are Smarter, more efficient and more effective.

We are proud to have created Australia's first Multi-protocol Edge-computing Device (MED). The MED integrates with existing infrastructure to wirelessly connect the unconnected. It is a one-of-a-kind product with unparalleled flexibility and agility. The MED's applications are wide-ranging and encompass areas that traditional technologies simply cannot address.

We combine the power of IoT, Big-Data and Artificial Intelligence with Carbon - our highly customisable data visualisation, control, and analytics platform. Backed by Arnowa's Real Intelligence, our clients implement efficiency opportunities with surgical precision and continually improve their operations. That's how we redefine the concept of successful and sustainable management.

Are your processes lean and automated enough? Can you predict your facility's performance and address issues before they occur? Do you want insight for better management and decision-making? Arnowa technologies uncover the true value of your data and provide these answers.

Operate like you never have before with Arnowa's ecosystem. It is the end-to-end solution to navigate your business's Industry 4.0 revolution.

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 IoT Alliance Australia


 AUSTRALIAN MADE


 PREFERRED SUPPLIER

