



Control and Instrumentation

Catalogue and Price List



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ภัทรเมธกิจ
P.M.K CORPORATION LTD.

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PMK Corporation has had a long standing relationship for several decades distributing Crompton Instrument products. The Crompton Instruments brand offers a diverse product range to cover all of your control and instrumentation needs. With quality and reliability you can trust.

NEW PRODUCTS



Integra 1222 DMS

see page 16



DRS Energy Meters

see page 20



254 - XZZ TRANSDUCER

see page 35

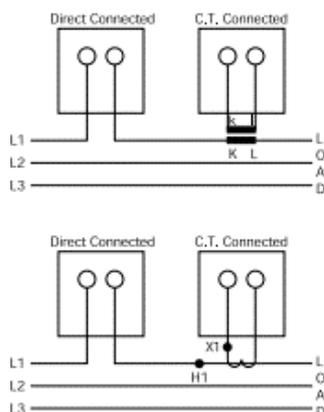


MODULE PROTECTOR RELAYS

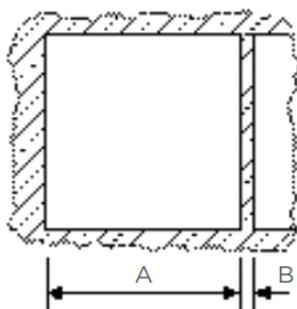
see page 46



Connections



Panel cut - out



Bezel	A	B
48 x 48	45 x 45	4
72 x 72	68 x 68	4
96 x 96	92 x 92	4
144 x 144	138 x 138	4

Approvals

BS EN60051

DIN43701

Lloyds approved : 03/00056

UL no. E203000

Moving Iron AC Ammeters

Designed to measure AC current and indicate true RMS values with substantial independency of system waveform. Scales are calibrated down to 20%, and can have overload scales x2, x3, x5, x6 of nominal current for motor start. Ammeters can be supplied for use in either direct connection or -/1A or -/5A current transformer systems. Meters can be used to measure DC at a reduced accuracy.

Specifications

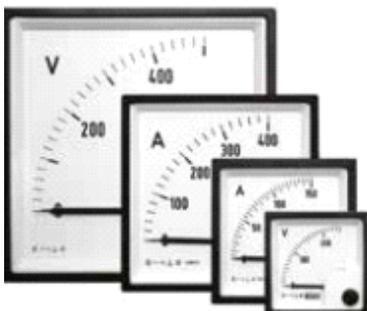
Accuracy :	Class 1.5% (of full scale)
Frequency :	50 or 60Hz (400Hz on request)
Burden at 50Hz :	0.5VA
Ratings :	0.5 - 100A AC direct connected (Accept E242 & E246 40A ≤ only) Current transformer -/1A or -/5A Maximum system voltage 600V Low load/high middle, maximum 10A
Overload :	x1.2 continuous, x10 for 5 seconds

Part Numbers & Prices

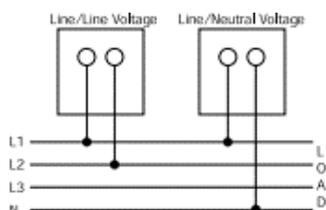
Bezel size (mm)	Part Number	Scale length (mm)	Price (Baht)
48	E242-75A	42	4,800
48	E242-752	42	4,800
48	E242-753	42	4,800
48	E242-755	42	4,800
48	E242-756	42	4,800
72	E243-02A	65	1,700
72	E243-022A	65	1,500
72	E243-023A	65	1,700
72	E243-025A	65	1,700
72	E243-026A	65	1,700
96	E244-02A	94	1,700
96	E244-022A	94	1,400
96	E244-023A	94	1,700
96	E244-025A	94	1,700
96	E244-026A	94	1,700
144	E246-02A	145	11,600
144	E246-022A	145	11,600
144	E246-023A	145	11,600
144	E246-025A	145	11,600
144	E246-026A	145	11,600

Analogue Instruments

Features and Benefits



Connections



Approvals

BS EN60051

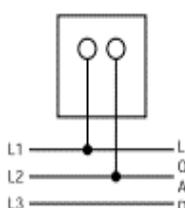
DIN43701

Lloyds approved : 03/00056

UL no. E203000



Connections



Approvals

BS EN60051

DIN43701

Lloyds approved : 03/00057

UL no. E203000

Moving Iron AC Voltmeters

Designed to measure AC voltage and indicate true RMS values with substantial independency of system waveform. Scales are calibrated down to 20%. Voltmeters can be supplied for direct connection use, alternatively they can be scaled for use with the voltage transformers.

Specifications

Accuracy :	Class 1.5% (of full scale)
Frequency :	50 or 60Hz (400Hz on request)
Burden at 50Hz :	Up to 4.5VA maximum
Ratings :	Maximum system voltage 600V AC
Overload :	x1.2 continuous, x2 for 5 seconds
Range :	6-600V

Part Numbers & Prices

Bezel size (mm)	Part Number	Scale length (mm)	Price (Baht)
48	E242-75V	42	5,000
72	E243-02V	65	1,900
96	E244-02V	94	1,500
144	E246-02V	145	11,600

Frequency Meters

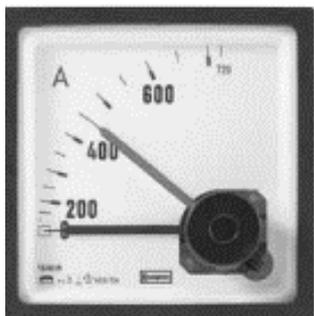
Frequency meters use an integral electronic converter and a moving coil indicator. These easy to read meters have accuracy class 0.5%.

Specifications

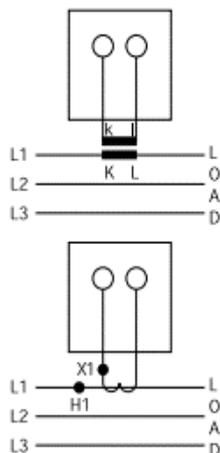
Accuracy :	Class 0.5 (0.5% of range)
Ratings :	100-125V AC 200-250V AC 380-440V AC* 500V AC*
*Use E242-89A and 252-SHL in place of E242-41S for voltages over 380V. Models available for use with VT's.	
Frequency:	45/55Hz, 55/65Hz, 45/65Hz, 380/440Hz

Part Numbers & Prices

Bezel size (mm)	Part Number	Scale length (mm)	Price (Baht)
48	E242-41S	42	7,900
72	E243-41S	65	7,600
96	E244-41S	94	7,600



Connections



Approvals

BS EN60051
DIN43701
UL no. E203000



Approvals

BS EN60051
DIN43701
UL no. E203000

Maximum Demand Indicator

MDI meters monitor the most economic use of cable switchgear and transformers. The bimetal element indicates the mean RMS current over 8, 15 or 20 minutes, a red slave pointer shows the maximum reached, with reset knob. Scales are calibrated to 120% of CT nominal current.

Specifications

Accuracy:	Class 3% (of full scale)
Input:	5A for use with separate CT
Burden at 50Hz:	MDI 2.5VA, CT 2VA
Overload Withstand:	Std: 5 x FL for 5 secs, 10 x FL for 1 sec
Frequency:	50/60 Hz

Part Numbers & Prices

Bezel size mm	Part number/Description	Scale length mm	Price (Baht)
	8 minute time lag		
72	E243-16B	65	8,900
96	E244-16B	94	8,900
	15 minute time lag		
72	E243-16A	65	8,900
96	E244-16A	94	8,900
	20 minute time lag		
72	E243-16J	65	8,900
96	E244-16J	94	8,900

Combined AC Ammeter and Maximum Demand Indicator

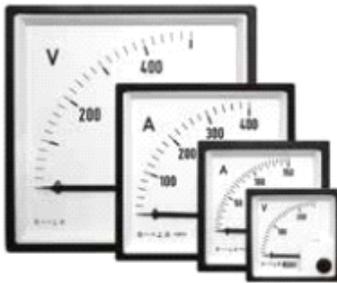
Where space is an issue the combined MDI makes it possible to measure both instantaneous and maximum demand current with just one product.

Specifications

Accuracy:	MDI:CL3% (of full scale) Ammeter:CL1.5%(of full scale)
Input:	/5A for use with separate CT

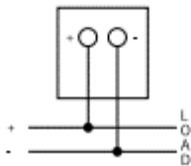
Part Numbers & Prices

Bezel size mm	Part number/Description	Scale length mm	Price (Baht)
	8 minute time lag		
96	E244-16Q	94	11,400
	15 minute time lag		
72	E243-16C	65	11,400
96	E244-16C	94	11,400
	20 minute time lag		
96	E244-16H	94	11,400

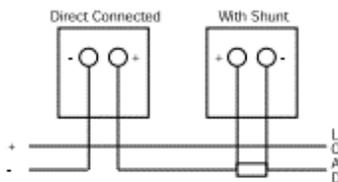


Connections

DC Voltmeter



DC Ammeter



Approvals

BS EN60051

DIN43701

Lloyds approved : 03/00055

UL no. E203000

Moving Coil DC Ammeters & Voltmeters

Moving coil meters are suitable for all DC systems. The linear scale is calibrated down to zero and accuracy maintained down to 10%. High currents are measured with separate shunts scaled indicators. Suppressed & Offset zero available.☐

Specifications

Accuracy :	Class 1.5% (of full scale)
Ammeter range:	100 μ A-25A E243 & E244 up to 100A (E242 \leq 40A) 4/20mA suppressed zero
Voltmeter range:	50mV-600V 1/5V suppressed zero 50, 60, 75, 100 and 150mV for shunts
Impedance	
Ammeters:	75mV internal shunt above 60mV
Voltmeter:	1000 Ω /V above 1V

Part Numbers & Prices

Ammeters

Bezel size (mm)	Part number/Description	Scale length (mm)	Price (Baht)
	Side Zero		
48	E242-89A	42	5,800
72	E243-01A	65	5,300
96	E244-01A	94	5,300
144	E246-01A	145	11,600
	Suppressed zero		
48	E242-89R	42	11,600
72	E243-01R	65	8,400
96	E244-01R	94	8,400
144	E246-01R	145	15,400

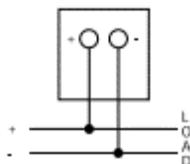
Voltmeters

Bezel size (mm)	Part number/Description	Scale length (mm)	Price (Baht)
	Side Zero		
48	E242-89V	42	5,800
72	E243-01V	65	5,300
96	E244-01V	94	5,300
144	E246-01V	145	11,600
	Suppressed zero		
48	E242-89S	42	11,600
72	E243-01S	65	8,400
96	E244-01S	94	8,400
144	E246-01S	145	15,400

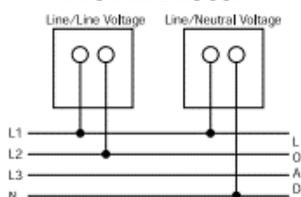


Connections

AC Voltmeter



AC Ammeter



Approvals

BS EN60051

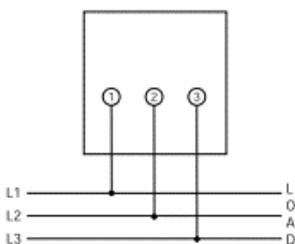
DIN43701

Lloyds approved : 03/00055

UL no. E203000



Connections



Moving Coil Rectified AC Ammeters & Voltmeters

For high frequency or linear full scale AC measurements, these instruments measure average values of sinusoidal waveforms and are scaled in RMS values. The high quality silicon bridge rectifier gives a linear scale down to zero.

Specifications

Accuracy :	Class 1.5% (of full scale)
Ammeter range:	250 μ A-1A Over 1A via CT's
Voltmeter range:	15V-600V (Direct connected) Models available for use with VT's
Frequency :	50/60Hz (Single frequencies 25-3kHz on request)

Part Numbers & Prices

Ammeters

Bezel size (mm)	Part Number	Scale length (mm)	Price (Baht)
48	E242-89B	42	8,400
72	E243-01B	65	8,000
96	E244-01B	94	8,000
144	E246-01B	145	35,000

Voltmeters

Bezel size (mm)	Part Number	Scale length (mm)	Price (Baht)
48	E242-89W	42	8,400
72	E243-01W	65	8,000
96	E244-01W	94	8,000
144	E246-01W	145	35,000

Phase Sequence Indicator

Electronic phase sequence indicators ensure correct phase rotation and the presence of all 3-phase supplies.

Specifications

Voltage :	151/300V, 301/500V, 100/150V(244 only)
Frequency :	50/60Hz
Burden :	2.5VA/phase

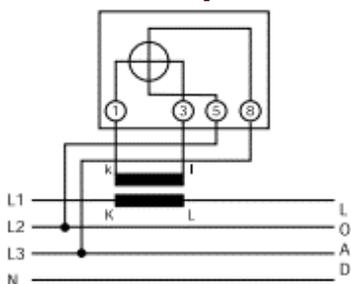
Part Numbers & Prices

Bezel size (mm)	Part Number	Price (Baht)
72	243-12P	16,000
96	244-12P	16,000



Connections

3-Phase, 3/4-Wire Balanced Systems.



Approvals

DIN IEC 61544
DIN 43802
DIN 43807
DIN 40050
IEC 51/DIN



Approvals

DIN IEC 61544
DIN 43802
DIN 43807
DIN 40050
IEC 51/DIN

Electronic Phase Angle Meter

Phase angle meters indicate the phase displacement between current and voltage. They are used in applications where the phase angle must be monitored. For example with tariffs having penalties or to optimise generator power delivery.☐

Specifications

Accuracy :	Class 1.5% (of range)
Ratings:	Current:1A or 5A CT's Voltage:110V, 240V, 380V and 400V for VT's
Burden at 50Hz :	Current: 1VA Voltage: 3VA per phase
Frequency :	50Hz or 60Hz
Current range:	20-120%

Part Numbers & Prices

Bezel size (mm)	Part Number	Scale length (mm)	Price (Baht)
72	E243-42A	65	18,000
96	E244-42A	94	18,000

Dual AC Ammeter and Voltmeters

The two instruments in one case can be used for the independent measurement of two parameters or the comparison of two inputs. i.e. When matching AC generator with mains when connecting in parallel.

Specifications

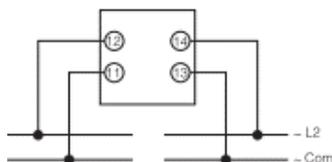
Accuracy :	Class 1.5% (of full scale)
Ratings:	Current: 1A, 1.2A, 5A, 6A, 10A Voltage:120V, 150V, 300V, 500V and 600V
Impedance:	Current: 75mV internal shunt Voltage: 900 Ω/V
Frequency :	50/60Hz

Part Numbers & Prices

Bezel size (mm)	Part Number ☐	Scale length (mm)	Price (Baht)
96	E244-80F (AC Amps)	41	20,000
96	E244-80L (AC Volts)	41	20,000



Connections

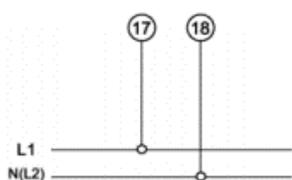


Approvals

DIN IEC 61544
DIN 43802
DIN 43807
DIN 40050
IEC 51/DIN



Connections



Approvals

DIN IEC 61544
DIN 43802
DIN 43807
DIN 40050
IEC 51/DIN

Dual Frequency Meter

Two instruments in one case can be used to measure a wide range of frequencies. These dual instruments save both panel space and assembly time. The E244-41D is an ideal component in synchronising applications.

Specifications

Accuracy:	Class 0.5 (0.5% of range)
Ratings:	100-125VAC, 200-250VAC, 380-440VAC 500VAC
Frequency:	45/55Hz, 55/65Hz, 45/65Hz 360/440Hz
Burden:	4VA Maximum

Part Numbers & Prices

Bezel size (mm)	Part number	Scale length (mm)	Price (Baht)
96	E244-41D	41	20,000

Long Scale Moving Coil Frequency Meter

Frequency meters use an integral electronic converter and a moving coil indicator. These easy to read meters have accuracy class 0.5.

Specifications

Accuracy:	Class 0.5 (0.5% of range)
Ratings:	100-125V AC 200-250V AC 380-440V AC
Frequency:	45/55Hz, 55/65Hz, 45/65Hz, 380/440Hz

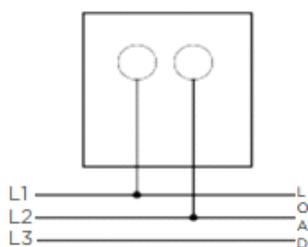
Part Numbers & Prices

Bezel size (mm)	Part number	Scale length (mm)	Price (Baht)
96	E244-41L	135	22,000

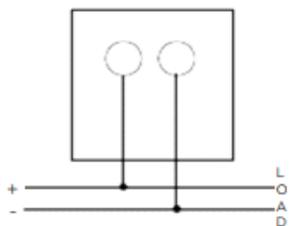


Connections

Elapsed Time/Hours Run Meters AC



Elapsed Time/Hours Run Meters DC



Elapsed Time Meters (Hours Run)

Elapsed time meters (ETM) or hours-run meters monitor "ON/RUN" time of plant and equipment, allowing the user to effectively control production efficiently, cost estimation and service period monitoring for preventable maintenance. Time is measured in increments of 0.01h up to 99999.9 hours after which the meter automatically resets to zero. Meters are non-resettable before this time to prevent accidental resetting.

Specifications

AC	
Display:	99999.9
Voltage:	100-125VAC, 200-250VAC, 380-440VAC
Frequency:	50 or 60Hz
Operating temperature:	-25°C to +80°C
IP protection:	IP52
Burden:	1VA (100-125VAC), 2VA (200-250V) 3.5VA (380-440VAC)
DC	
Display:	99999.9
Voltage:	6-30VDC, 10-80VDC (M243 & M244 only) 12-36VDC, 36-80VDC (M242 only) 110VDC
Operating temperature:	-20°C to +70°C
IP protection:	IP52
Burden:	0.5VA (12-36VDC), 1VA (10-80VDC), 1.5VA (110VDC), 0.5VA (6-30VDC), 1VA (36-80VDC)

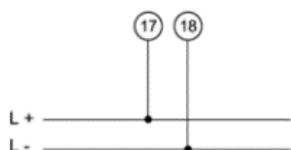
Part Numbers & Prices

Bezel size (mm)	Part Number/Description	Price (Baht)
50Hz AC		
48	M242-155	4,000
72	M243-155	6,000
96	M244-155	6,000
60Hz AC		
48	M242-156	7,000
72	M243-156	7,000
96	M244-156	7,000
DC INPUT		
48	M242-157	7,000
72	M243-157	7,000
96	M244-157	7,000

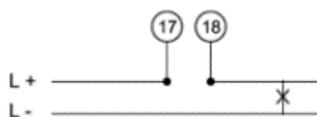


Connections

AC Voltage



AC Current



Approvals

DIN IEC 61554

DIN 43802

IEC 529, IEC 1010

DIN 40050

Long Scale Moving Coil Rectified AC Ammeters & Voltmeters

For high frequency or linear full scale AC measurements, these instruments measure average values of sinusoidal waveforms and are scaled in RMS values. The high quality silicon bridge rectifier gives a linear scale down to zero.

Specifications

Accuracy:	Class 1.5% (of full scale)
Ratings:	Current: 1A, 1.2A, 5A, 6A and 10A Voltage: 60V, 100V, 120V, 125V, 140V 150V, 250V, 300V, 400V, 500V and 600V
Impedance:	Current: 75mV internal shunt Voltage: 900 Ω /V
Frequency:	50/60Hz

Part Numbers & Prices

Ammeters

Bezel size (mm)	Part Number	Scale length (mm)	Price (Baht)
72	E243-05B	113	18,000
96	E244-05B	155	18,000

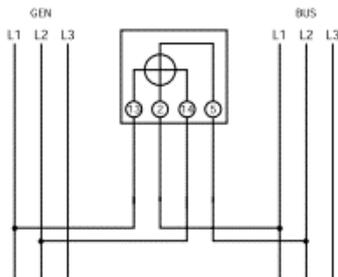
Voltmeters

Bezel size (mm)	Part Number	Scale length (mm)	Price (Baht)
72	E243-05W	113	19,000
96	E244-05W	155	19,000

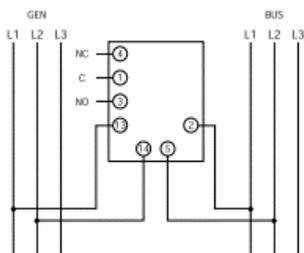


Connections

360° LED Synchroscope



360° LED Synchroscope and Synchro Check Relay



For 244-14 L/H models, the generator voltage is compared to the nominal input (bus) voltage specified at time of ordering. For the 244-14 G/H models, the generator voltage is compared the measured bus voltage.

Approvals

IEC1010-1 (300V AC RMS installation degree2)
Vibration to Lloyds shipping

360° LED Synchroscope and Synchro Check Relay

Where manual paralleling of two AC systems is desired, the frequency of both systems can be monitored by an LED synchroscope. The systems are synchronised when the green LED is lit in the 12 o'clock position. The instrument is rated for continuous operation and connection. For the semi-automatic paralleling of two AC systems, the voltage, phase displacement and the frequency of both systems can be monitored by this LED synchroscope and synchro check relay. Controls for voltage, phase angle, and time delay are provided. The systems are synchronised when the green triangular LEDs are lit together.

Specifications

Ratings Voltage:	63.5, 110, 120, 220, 230, 240, 380, 400, 415, 440, 480V 110/120V (115V nom) 220/240V (230V nom) 380/480V (430V nom) volts AC or via VT
Frequency:	40/65Hz
Burden at 50Hz:	4VA (for 1-Ph or 3-Ph systems)
*Phase difference:	+0-20° +2%
*Voltage difference:	+0-20% ±2% models G and H 0-10%
*Time delay:	0-2.5 seconds +10%
*Accuracy:	Synchronisation at T.D.C. is +1
* Only for 360° LED synchroscope and synchro check relay.	

Part Numbers & Prices

Bezel size (mm)	Part number/Description	Voltage inputs	Price (Baht)
96	360° LED Synchroscope	63.5, 110, 120, 220, 230, 240, 380, 400, 415, 440, 480V	45,000
	244-14A		
96	360° LED Synchroscope + Check Relay	63.5, 110, 120, 220, 230, 240, 380, 400, 415, 440, 480V	40,000
	244-14L		
96	244-14G	110/120, 220/240, 380/480V	40,000
96	360° LED Synchroscope + Check Relay+Dead Bus	63.5, 110, 120, 220, 230, 240, 380, 400, 415, 440, 480V	45,000
	244-14D		
96	244-14H	110/120, 220/240, 380/480V	45,000



Approvals

DIN IEC 61554

DIN 43802

IEC 529, IEC 1010

IEC 51/DIN EN

DIN 40050

Wattmeters and Varmeters

Self contained Wattmeters and Varmeters are able to measure active and reactive power in both balanced and un-balanced, systems. Ideal for clear precise analogue indication of power. For use in power generation & distribution & industrial control.

Specifications

Accuracy:	Class 1.5% (of full scale)
Ratings:	Current: 1A-5A CT's Voltage: 63.5V-480V
Measuring ranges:	Voltage: 85-115% Current: 20-120%
Overload:	120% rated Voltage & current continuous
Maximum input:	600V
Frequency:	50/60Hz (45-65Hz max)
Power Factor:	Unity power assumed range 0.5/1/0.5
Bezel size:	96 x 96mm

Short-Scale Wattmeters		Scale Length 95(mm)
Part No.	Product Description	Price (Baht)
E244-210	1-Ph	30,000
E244-211	3-Ph, 3-W, balanced load	30,000
E244-213	3-Ph, 3-W, unbalanced load	30,000
E244-214	3-Ph, 4-W, unbalanced load	20,000

Short-Scale Varmeters		Scale Length 95(mm)
Part No.	Product Description	Price (Baht)
E244-310	1-Ph	30,000
E244-311	3-Ph, 3-W, balanced load	30,000
E244-313	3-Ph, 3-W, unbalanced load	30,000
E244-314	3-Ph, 4-W, unbalanced load	30,000

Long-Scale Wattmeters		Scale Length 150(mm)
Part No.	Product Description	Price (Baht)
E244-215	1-Ph	40,000
E244-216	3-Ph, 3-W, balanced load	40,000
E244-218	3-Ph, 3-W, unbalanced load	40,000
E244-219	3-Ph, 4-W, unbalanced load	40,000

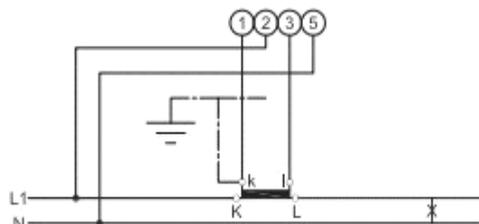
Long-Scale Varmeters		Scale Length 150(mm)
Part No.	Product Description	Price (Baht)
E244-315	1-Ph	40,000
E244-316	3-Ph, 3-W, balanced load	40,000
E244-318	3-Ph, 3-W, unbalanced load	40,000
E244-319	3-Ph, 4-W, unbalanced load	40,000

Active Power

Reactive Power

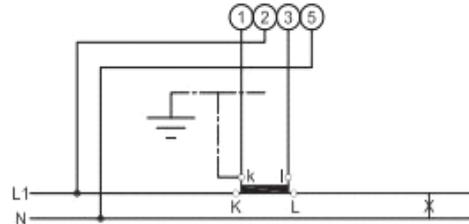
E244-210 & E244-215

Single-phase
(one element)



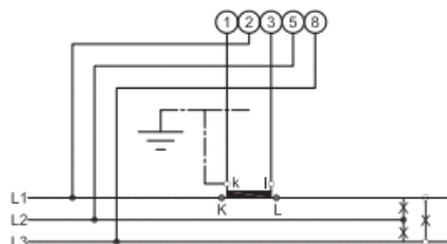
E244-310 & E244-315

Single-phase
(one element)



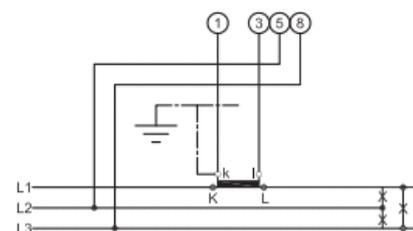
E244-211 & E244-216

Three-phase, three-wire
AC supply with balanced load
(One element)



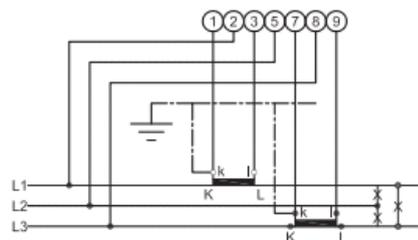
E244-311 & E244-316

Three-phase, three-wire
AC supply with balanced load
(One element)



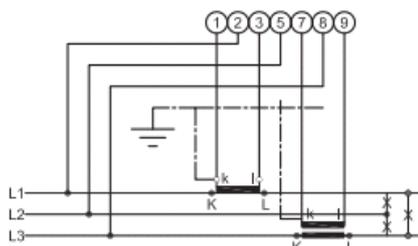
E244-213 & E244-218

Three-phase, three-wire
AC supply with unbalanced load
(Two element)



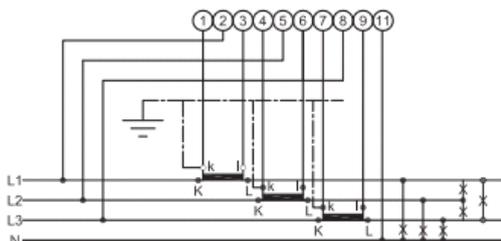
E244-313 & E244-318

Three-phase, three-wire
AC supply with unbalanced load
(Two element)



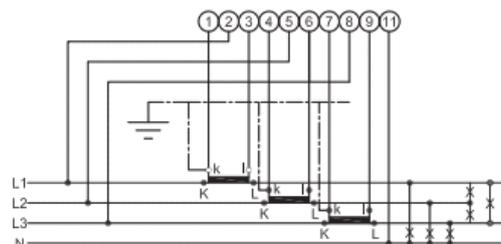
E244-214 & E244-219

Three-phase, four-wire
AC supply with unbalanced load
(Three element)



E244-314 & E244-319

Three-phase, four-wire
AC supply with unbalanced load
(Three element)





Displayed Parameters

- Voltage per phase L-N, L-L
- Current per phase and max demand
- Power Factor-per phase and system
- Total harmonic distortion voltage and current per phase
- Neutral current
- Frequency system
- Phase sequence
- Active power (P) per phase, total and max demand
- Reactive power (Q) per phase, total and max demand
- Apparent power (S) per phase, total and max demand
- Energy-Active and Reactive importing and total
- Energy-Active and Reactive exporting and total

Approvals

IEC BS EN 61010-1:2010
 BS EN 61326-1:2013
 IEC62053-21 Class 1
 IEC 62053-24 Class 1

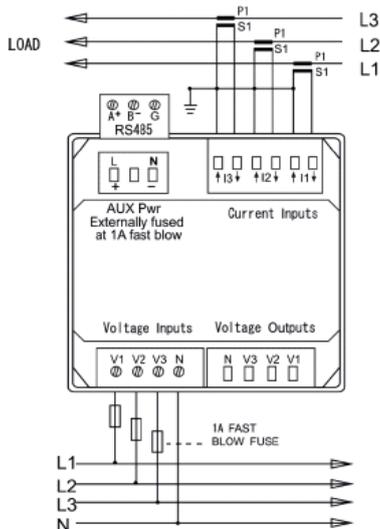
Integra 1222 Digital Metering System.

The Integra 1222 digital metering system provides a cost effective solution for the measurement and display of all electrical parameters including total harmonic distortion (THD) and individual, up to the 63rd harmonic. High definition screen with back light for low visibility and direct sunlight, plus energy saving dim feature. Case has panel clips for easy installation.

Specifications

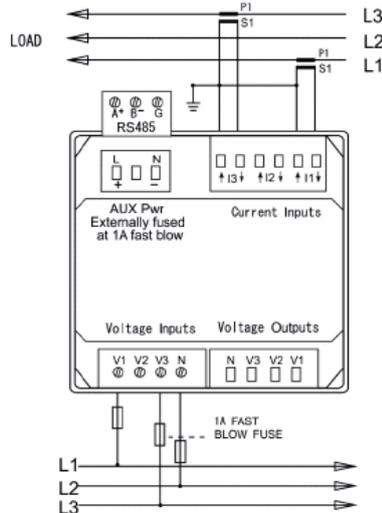
Accuracy:	0.5% of range
Input ratings:	57.7-276V AC L-N (100-480V L-L) 576V L-L max 1A or 5A AC programmable
Measuring Ranges	
Voltage range:	5-120% of nominal
Current range:	5-120% of nominal
Power Factor:	4 quadrant
Power (W, VAR, VA):	5-144% of nominal (bi-directional)
Energy:	8 digit display
Frequency:	44-66Hz
THD:	0-40% up to the 63 rd harmonic
Voltage overload:	120% of nominal continuous 2 x nominal voltage for 1 second
Current overload:	120% of nominal continuous 20 x nominal for 1 second
Burden:	Voltage : < 0.2VA per phase Current : < 0.1 VA
Auxiliary supply:	65-275V AC 50/60Hz ± 10% 80-380V DC ± 20%
Auxiliary burden:	<2W 10VA
Auxiliary frequency:	45-66Hz
Programmable Ranges	
CT primary current:	Max 9999A **
VT primary voltage:	Max 500kV **
VT secondary voltage:	Nominal input voltage** maximum
VT & CT ratios are limited so the combined can not exceed 360 MW at 120% of relevant input.	
Output:	RS485 RTU comms IEEE 754 F/P Baud rate: 4800, 9600, 19200, 38400 2 wire half duplex
Protection rating:	Front IP54 Rear IP30
Operating temperature:	-25 to +55°C
Relative humidity:	0 to 95% non-condensing

3 Phase 4 Wire Unbalanced Load



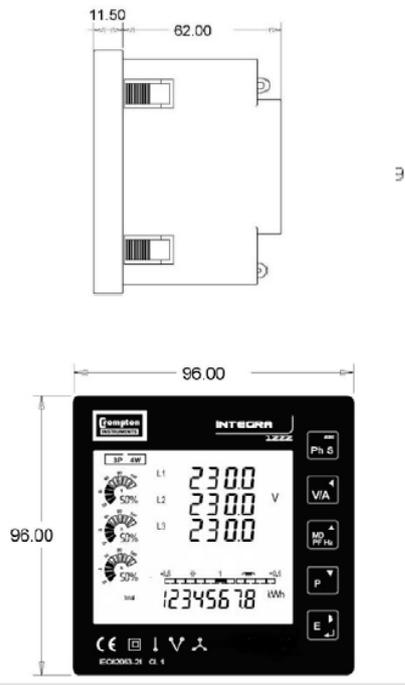
The maximum number of products that can connect is a single chain is 20 products.

3 Phase 3 Wire Unbalanced Load

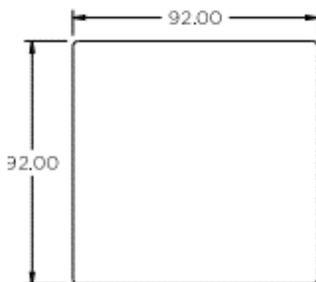


Please note for 3P3W configuration L2 is connected through the neutral and not V2.

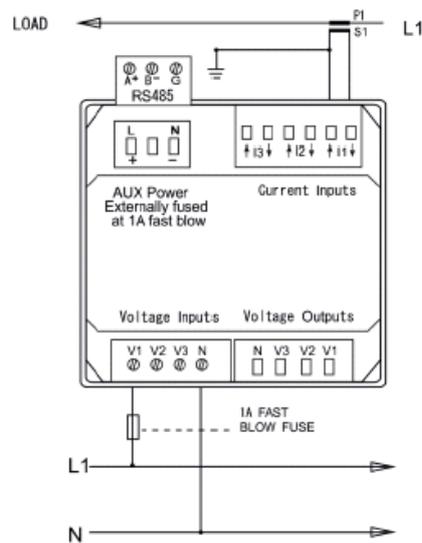
Dimensions



Panel Cut Out



Single Phase 2 Wire Load



Part Number	Product Description	Price (Baht)
INT-1222-M-01	100/480V L-L, 5A, 65/275VAC Aux + Modbus	18,000



Measurement and Display

Up to 35 electrical and power quality parameters can be configured and display.

1. System (avg) volts & current
System (total) kW
2. System volts (avg) THD%
System current (avg) THD%
3. Volts (L1-N) & (L2-N) & (L3-N)
(4 wire only)
Volts (L1-L2) & (L2-L3) & (L3-L1)
(3 wire only)
4. THD% Volts (L1-N) & (L2-N)
& (L3-N)
(4 wire only)
THD% Volts (L1-L2) & (L2-L3)
& (L3-L1)
(3 wire only)
5. Volts (L1-L2) & (L2-L3) & (L3-L1)
(4 wire only)
6. Amps (L1), Amps (L2), Amps(L3)
7. THD% Amps (L1), Amps (L2),
Amps(L3)
8. Neutral current **(4 wire only)**
Frequency
Power Factor (overall)
9. kVAR, kVA, kW
10. kWhr import (7 digits)
11. kVARhr import (7 digits)
12. kWhr export (7 digits)
13. kVARhr export (7 digits)
14. kW demand, current demand
15. Maximum kW demand,
Maximum current demand
16. Hours run

Approvals

IEC 61010-1 (BSEN 61010-2001)

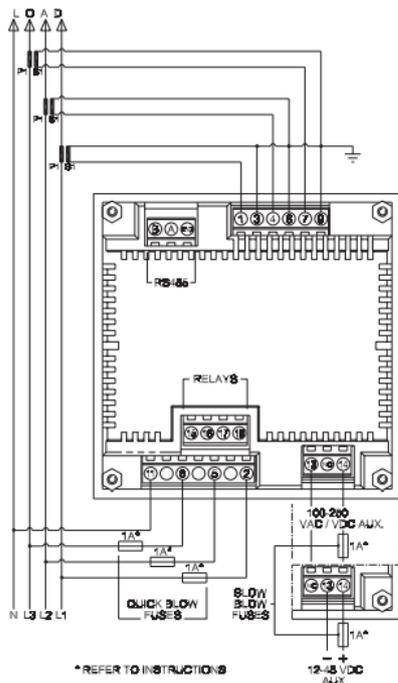
Integra 1630 Digital Metering System.

Integra 1630 digital metering system provides high accuracy 0.2% measurement, display and communication of all major parameters including total harmonic distortion (THD) up to the 31st harmonic. The range includes single-phase, three-phase three-wire and three-phase four-wire capability, selectable at the point of installation.

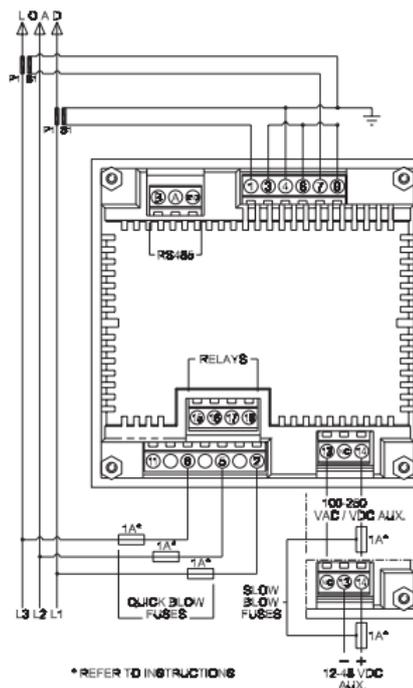
Specifications

Accuracy:	0.2% (0.3% for energy) of range
Input ratings:	57.7-277V L-N, 100-480V L-L 5A or 1A version available
Measuring Ranges	
Voltage range:	80-120% of nom (functional 5-120%)
Current range:	5-120% of nominal
Power Factor:	0.8 cap -1-0.8 Ind (functional 4 quadrant 0-1 Lag/Lead)
THD:	Up to the 31 st harmonic
Voltage overload:	120% of nominal continuous 2 x nominal for 1 sec at 10 sec intervals
Frequency:	45-66Hz
Current overload:	120% of nominal continuous 20 x nominal for 1 sec at 5 sec intervals
Input burden:	Voltage: <0.2VA, Current: <0.6VA
Auxiliary supply:	Standard: 100-250V AC/DC, 6VA (Max Limit 85-287V AC 85-312V DC) Optional: 12-48V DC, 6VA (Max limit 10.2V DC to 60V DC)
Auxiliary frequency:	45-66Hz
Programmable Ranges	
CT primary current:	Max 9999A **
VT primary voltage:	Max 400kV **
VT secondary voltage:	Nominal input voltage** maximum
VT & CT ratios are limited so the combined can not exceed 360 MW at 120% of relevant input.	
Pulse rate divisor:	1, 10, 100, 1000
RS485 baud rate:	4800, 9600, 19200, 38400
Output modules:	Pulsed O/P's (SSR) 50mA @ 250V Max RS485 RTU comms IEEE 754 F/P BACnet I/P (Ethernet) & MSTP Modbus 485 RTU (TCP) (Ethernet) Profibus DP
Enclosure:	Din 96 panel mount. IP54
Operating temperature:	-20 to +60°C

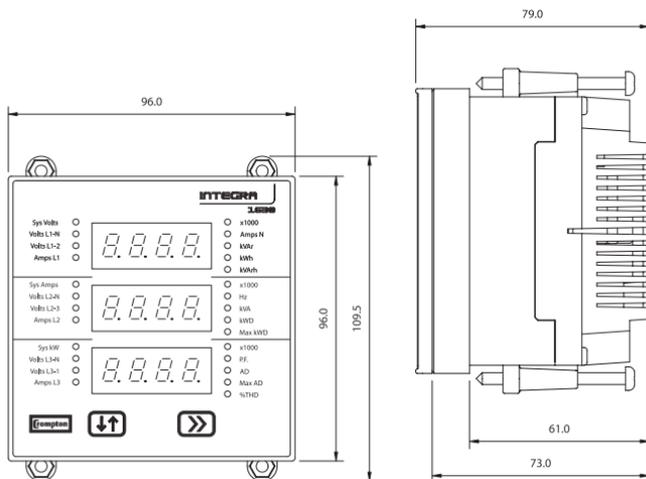
3 Phase 4 Wire Unbalanced Load



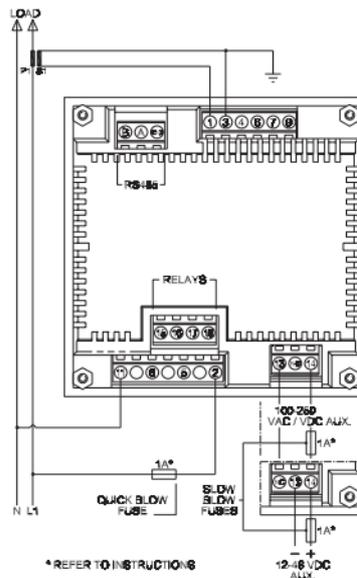
3 Phase 3 Wire Unbalanced Load



Dimensions



Single Phase 2 Wire Load



Panel Cut Out = 92mm x 92mm

Part Number	Product Description	Price (Baht)
INT-1630-M-5-M-010	241/480V L-L, 5A, 100/250V Aux + Modbus	40,000
INT-1630-M-5-M-110	241/480V L-L, 5A, 100/250V Aux + Modbus + 1 Pulse	42,000
INT-1630-M-5-M-210	241/480V L-L, 5A, 100/250V Aux + Modbus + 2 Pulse	44,000
INT-1630-M-5-M-090	241/480V L-L, 5A, 100/250V Aux + BACnet MSTP	48,000
INT-1630-M-5-M-070	241/480V L-L, 5A, 100/250V Aux + Modbus TCP IP	56,000
INT-1630-M-5-M-080	241/480V L-L, 5A, 100/250V Aux + BACnet IP	56,000
INT-1630-M-5-M-050	241/480V L-L, 5A, 100/250V Aux + Profibus DP	60,000
INT-1630-*1-*1-***	1 Amp Option additional to standard product	Add 3,000
INT-1630-L-*1-*1-***	100/240V L-L Option additional to standard product	Add 3,000

**DRS-100-3P****DRS-100-1P****DRS-45-1P-MOD-01 & DRS-45-1P-PLS-01**

DRS Energy Meters

The DRS energy meter range offers an accurate cost effective solution for measurement and display of importing and exporting energy parameters for single phase and three phase networks. With it's easy programming, mounting and user-friendly navigation for customers who requires reliable energy measurement. Din-rail mounted with back light, pulsed output and Modbus 485 supplied as standard on most models. MID certified, class B (kWh) to EC2004/22/EC.

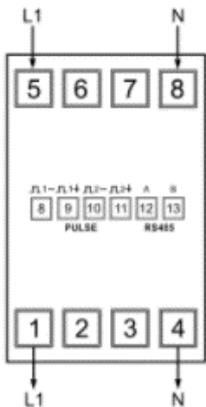
General Specifications

Accuracy:	0.5% (1.0% for energy & power) of range
Input ratings:	63.5-276V AC L-N (173-500V L-L) 600V L-L max 45A model:0.25-5 (45A) 100A model:0.5-10 (100A)
Measuring ranges	
Voltage range:	100V L/L (min) to 600V L/L (max)
Current range:	5-120% of nominal
Power Factor:	4 quadrant
Power (W, VAR, VA):	5-144% of nominal (bi-directional)
Energy:	7 digit up to 999999.9 kWh, kVARh
Frequency:	44-66Hz ±2%
Input waveform:	Sinusodal (distortion factor < 0.05)
Voltage overload:	120% of nominal continuous 2 x nominal voltage for 1 second
Current overload:	120% of nominal continuous 20 x nominal for (300 milliseconds)
Burden:	Voltage: < 0.2VA per phase Current: < 0.5 VA
Auxiliary supply:	Self-Powered Burden: <2W 10VA
Output:	RS485 RTU Comms IEEE 754 F/P Baud rate: 2400, 4800, 9600, 19200, 38400 2 wire half duplex 2x pulsed o/ps, 1st is fixed @1000 imp/kWh 2nd output is user programmable Opto-coupled, volt free contacts Pulse rate: 0.01, 0.1, 1, 10, 100 kWh/kVAh Contact rating: 2.27mA@27VDC (5-27VDC)
Enclosure:	Din-rail to Din 43880 IP51
Operating temperature:	-25 to +55°C
Storage temperature:	-40 to +70°C
Relative humidity:	0 to 95% non-condensing
Approvals:	Please see page 23 for product approvals

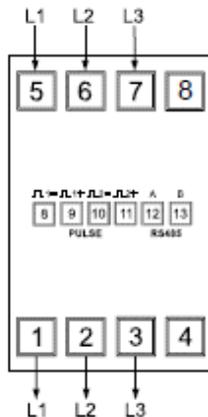
Direct connected 100A Energy Meter 3 Phase DRS-100-3P

Part Number	Product Description	Price (Baht)
DRS-100-3P-MOD-01	173/500V L-L, 3-Ph 100A direct I/P+Modbus+2x Pulse	TBA

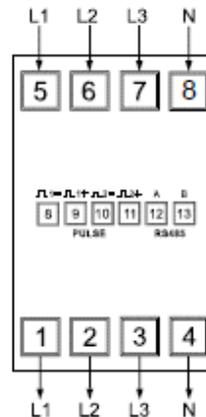
Connections



Single Phase

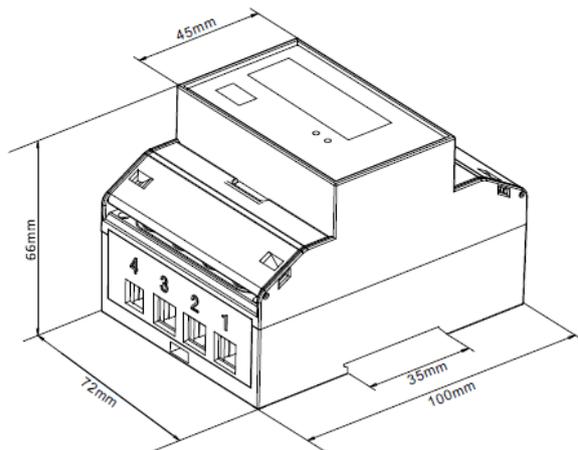


Three Phase Three Wire



Three Phase Four Wire

Dimensions



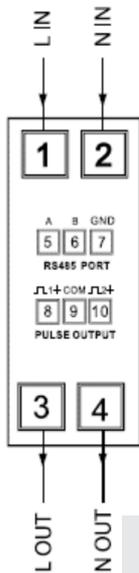
User Display Screens

Phase to neutral voltages	Frequency and Power Factor (total)	Instantaneous Active Power in kW	Imported Active Energy in kWh	Total Active Energy in kWh
Current on each phase	Power Factor of each phase	Instantaneous Reactive Power in kVAr	Exported Active Energy in kWh	Total Reactive Energy in kVArh
Phase to neutral voltage THD%	Maximum Power Demand	Instantaneous Volt-Amps in KVA	Imported Reactive Energy in kVArh	
Current THD% for each phase	Maximum Current Demand	Total kW, kVArh, kVA	Exported Reactive Energy in kVArh	

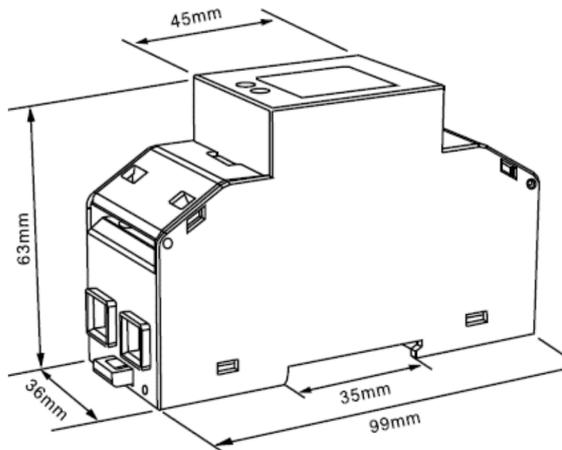
Direct Connected 100A Energy Meter Single Phase DRS-100-1P

Part Number	Product Description	Price (Baht)
DRS-100-1P-MOD-01	63.5/276V L-N, 1-Ph 100A direct I/P+Modbus+2x Pulse	TBA

Connections



Dimensions



User Display Screens

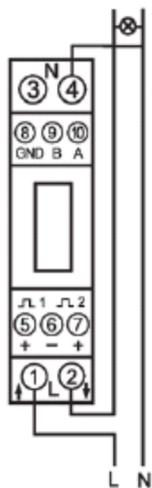
Instantaneous Active (w)	Pulse Constant	Modbus Baud Rate	Power Factor	Voltage Input (v)
Power Factor	Modbus Address (0001-241)	Hours Run (Σn)	Frequency (Hz)	Current Input (A)

Total Active Energy (Σ kWh)	Total Reactive Energy (Σ kVArh)
Imported Active Energy (kWh)	Imported Reactive Energy (kVArh)
Exported Active Energy (kWh)	Exported Reactive Energy (kVArh)
Partial Active Energy (Σr kWh)	Partial Active Energy (Σr kVArh)
Total Reactive Energy (Σ kVArh)	Total Maximum Demand (W)

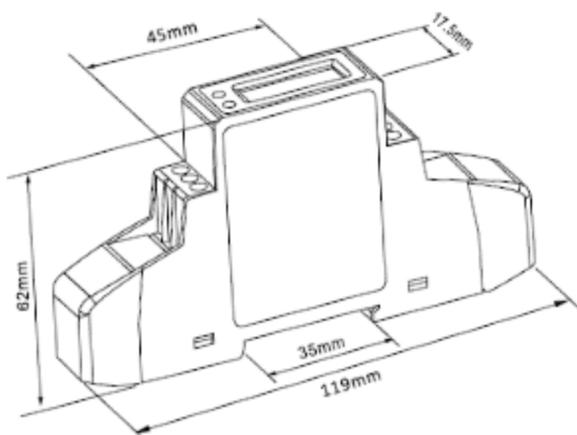
Direct Connected 45A Energy Meter Single Phase DRS-45-1P-MOD

Part Number	Product Description	Price (Baht)
DRS-45-1P-MOD-01	63.5/276V L-N, 1-Ph 45A direct I/P+Modbus+2x Pulse	TBA

Connections



Dimensions

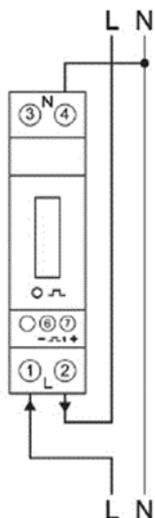
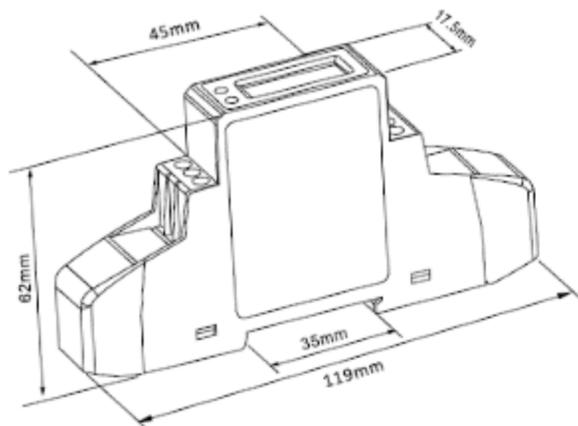
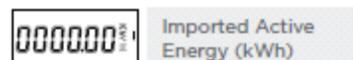


User Display Screens

Total Active Energy (Σ kWh)
Imported Active Energy (kWh)
Exported Active Energy (kWh)
Voltage Input (V)
Current Input (A)
Instantaneous Active (W)
Frequency (Hz)
Power Factor (PF)

Direct Connected 45A Energy Meter Single Phase DRS-45-1P-PLS

Part Number	Product Description	Price (Baht)
DRS-45-1P-PLS-01	63.5/276V L-N, 1-Ph 45A direct I/P+1 x Pulse	TBA

Connections**Dimensions****User Display Screen**

Please note this product only has 1 x pulsed output which is preset to 1000 imp/kWh.

DRS Range Product Approvals

MID Certified
Class B (kWh) to EC 2004/22/EC
IEC 50470-1
IEC 50470-3
IEC 62053-24
IEC 62053-21
IEC 62052-11
IEC 61010-01
IEC 60068-2-6



Other Features

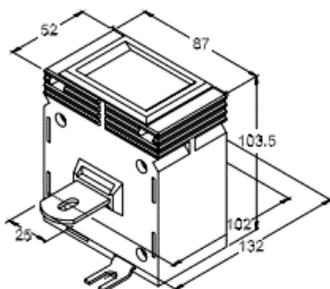
- Integral terminal cover.
- Combined M4 posi/slot screw terminal.
- Sealable terminal cover.
- Wide range of apertures and case sizes available.
- Long lifetime.

Applications

- Switchgear
- Distribution systems
- Generator sets
- Control panels



Dimensions



AS Series Current Transformers

The AS series of moulded case current transformers offers a wide range of current ratings, apertures and case sizes to suit every application. The range benefits include ratio ratings from 10A to 5000A, accuracy up to class 0.5. The range is available in both 5A and 1A versions, with an integral terminal cover for safety and multiple mounting options. For 1A version please contact PMK sales office for price & availability.

Specifications

System voltage:	720V maximum
Secondary current :	5A or 1A (contact PMK sales)
Test voltage:	3kV for 1 minute
System frequency:	50/60Hz
Short circuit thermal current(Ith) :	60 x rated primary current for 1 second
Overload withstand:	1.2 x rated primary current
Dynamic current (Idyn):	2.5 x Ith
Operating temperature:	- 20 to +50°C
Accuracy:	0.5% (3% for ≤30A)
Thermal class:	class B (130°C) for winding core
Enclosure:	Flame retardent grade classified UL 94V-0
Mounting hardware:	Plug-in metal feet for wall or base mounting busbar and din rail mounting(included)
Compliant with:	IEC/EN 60044-1
Rated security coefficient:	Fs<5

AS0 Range

Case Size: 87mm wide x 52mm deep x 103.5mm high
3.4" wide x 2" deep x 4.1" high

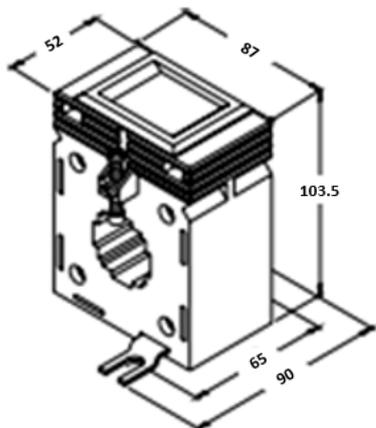
Stud Size: M8

Weight: 0.5kg

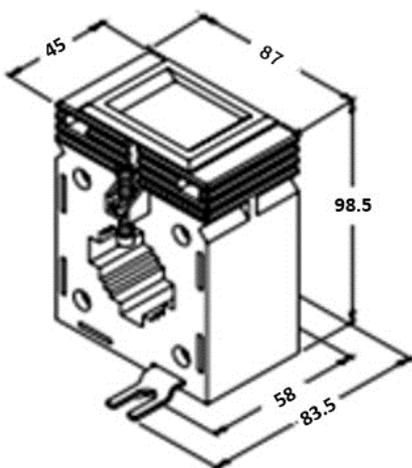
Part Number	Ratio	Burden(VA)	Class	Price (Baht)
AS0-5/5A	5/5A	5	0.5	TBA
AS0-10/5A	10/5A	5	0.5	TBA
AS0-15/5A	15/5A	5	0.5	TBA
AS0-20/5A	20/5A	5	0.5	TBA
AS0-30/5A	30/5A	5	0.5	2,200



Dimensions



Dimensions



AS1A Range

Case Size: 87mm wide x 52mm deep x 103.5mm high

3.4" wide x 2" deep x 4.1" high

Aperture: 31.5 x 11mm, 26 x 21.5mm and 28mm diameter

1.2" x 0.4", 1" x 0.8" and 1.1" diameter

Weight: 0.5kg

Part Number	Ratio	Burden(VA)	Class	Price (Baht)
AS1A-30/5A	30/5A	3	3	1,600
AS1A-50/5A	50/5A	2.5	0.5	1,600
AS1A-60/5A	60/5A	2.5	0.5	1,600
AS1A-75/5A	75/5A	3.8	0.5	TBA
AS1A-80/5A	80/5A	4.0	0.5	TBA
AS1A-100/5A	100/5A	3.8	0.5	TBA
AS1A-150/5A	150/5A	3.75	0.5	TBA
AS1A-200/5A	200/5A	3.8	0.5	TBA
AS1A-250/5A	250/5A	5.0	0.5	TBA
AS1A-300/5A	300/5A	5.0	0.5	TBA

AS1B Range

Case Size: 87mm wide x 45mm deep x 98.5mm high

3.4" wide x 1.8" deep x 3.9" high

Aperture: 31.5 x 11mm, 26 x 21.5mm and 28mm diameter

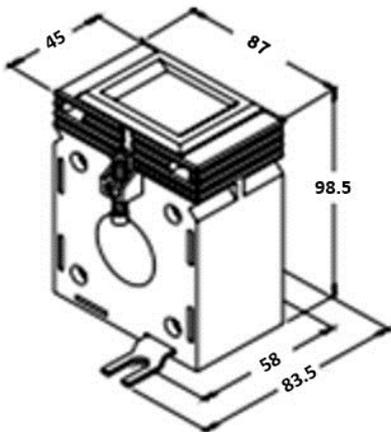
1.2" x 0.4", 1" x 0.8" and 1.1" diameter

Weight: 0.65kg

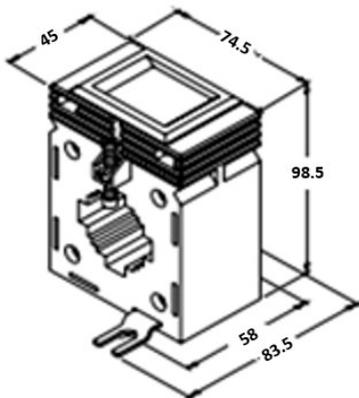
Part Number	Ratio	Burden(VA)	Class	Price (Baht)
AS1B-60/5A	60/5A	1.5	0.5	TBA
AS1B-75/5A	75/5A	2.5	0.5	TBA
AS1B-80/5A	80/5A	3	0.5	TBA
AS1B-100/5A	100/5A	3.75	0.5	1,500
AS1B-150/5A	150/5A	3.75	0.5	1,550
AS1B-200/5A	200/5A	3.75	0.5	1,600
AS1B-250/5A	250/5A	5.0	0.5	1,600
AS1B-300/5A	300/5A	5.0	0.5	1,650



Dimensions



Dimensions



AS1C Range

Case Size: 87mm wide x 45mm deep x 98.5mm high

3.4" wide x 1.8" deep x 3.9" high

Aperture: 30mm diameter

1.2" diameter

Weight: 0.65kg

Part Number	Ratio	Burden(VA)	Class	Price (Baht)
AS1C-50/5A	50/5A	1.5	0.5	TBA
AS1C-60/5A	60/5A	1.5	0.5	TBA
AS1C-75/5A	75/5A	3	0.5	TBA
AS1C-80/5A	80/5A	2.5	0.5	TBA
AS1C-100/5A	100/5A	3.75	0.5	TBA
AS1C-150/5A	150/5A	3.75	0.5	TBA
AS1C-200/5A	200/5A	3	0.5	TBA
AS1C-250/5A	250/5A	5.0	0.5	TBA
AS1C-300/5A	300/5A	5.0	0.5	TBA

AS2 Range

Case Size: 74.5mm wide x 45mm deep x 98.5mm high

2.9" wide x 1.8" deep x 3.9" high

Aperture: 41.5 x 11mm, 31.5 x 21mm, 26.5 x 26.5mm and 33mm diameter

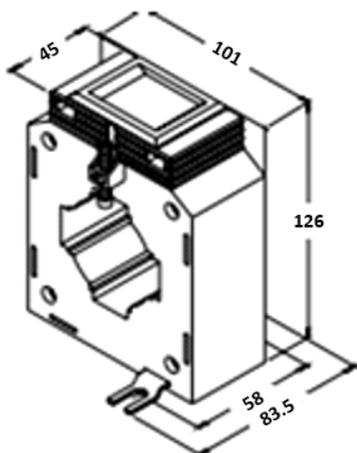
1.6" x 0.4", 1.2" x 0.8", 1" x 1" and 1.3" diameter

Weight: 0.65kg

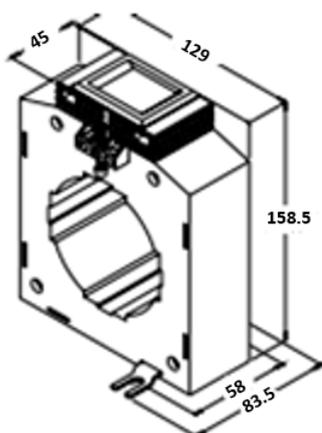
Part Number	Ratio	Burden(VA)	Class	Price (Baht)
AS2-100/5A	100/5A	2.5	0.5	TBA
AS2-150/5A	150/5A	5	0.5	TBA
AS2-200/5A	200/5A	5	0.5	TBA
AS2-250/5A	250/5A	5	0.5	TBA
AS2-300/5A	300/5A	5	0.5	TBA
AS2-400/5A	400/5A	5	0.5	1,700
AS2-500/5A	500/5A	5	0.5	1,700



Dimensions



Dimensions



AS3 Range

Case Size: 101mm wide x 45mm deep x 126mm high

3.9" wide x 1.8" deep x 4.9" high

Aperture: 61.5 x 21mm, 52 x 25mm and 52mm diameter

2.4" x 0.8", 2" x 0.9" and 2" diameter

Weight: 0.65kg

Part Number	Ratio	Burden(VA)	Class	Price (Baht)
AS3-200/5A	200/5A	3.8	0.5	TBA
AS3-250/5A	250/5A	5	0.5	TBA
AS3-300/5A	300/5A	5	0.5	TBA
AS3-400/5A	400/5A	5	0.5	TBA
AS3-500/5A	500/5A	5	0.5	TBA
AS3-600/5A	600/5A	10	0.5	2,000
AS3-750/5A	750/5A	10	0.5	TBA
AS3-800/5A	800/5A	10	0.5	2,200
AS3-1000/5A	1000/5A	10	0.5	TBA

AS4 Range

Case Size: 129mm wide x 45mm deep x 158.5mm high

5.1" wide x 1.8" deep x 6.2" high

Aperture: 86 x 11mm, 82.5 x 32mm and 82mm diameter

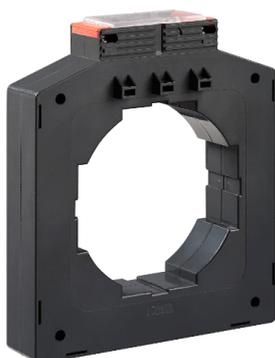
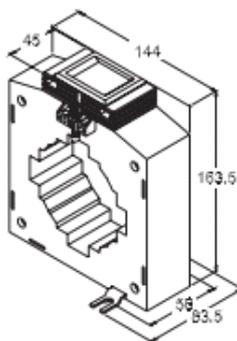
3.4" x 0.4", 3.2" x 1.3" and 3.2" diameter

Weight: 1kg

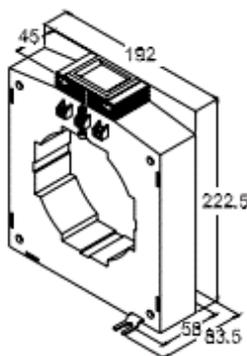
Part Number	Ratio	Burden(VA)	Class	Price (Baht)
AS4-750/5A	750/5A	10	1	TBA
AS4-800/5A	800/5A	10	1	TBA
AS4-1000/5A	1000/5A	10	1	TBA
AS4-1200/5A	1200/5A	10	1	TBA
AS4-1500/5A	1500/5A	10	1	TBA



Dimensions



Dimensions



AS5 Range

Case Size: 144mm wide x 45mm deep x 163.5mm high

5.7" wide x 1.8" deep x 6.4" high

Aperture: 101 x 22mm, 81 x 45mm and 85.5mm diameter

4" x 0.9", 3.2" x 1.8" and 3.4" diameter

Weight: 1kg

Part Number	Ratio	Burden(VA)	Class	Price (Baht)
AS5-800/5A	800/5A	10	0.5	TBA
AS5-1000/5A	1000/5A	10	0.5	2,300
AS5-1200/5A	1200/5A	10	0.5	2,650
AS5-1500/5A	1500/5A	10	0.5	2,900
AS5-1600/5A	1600/5A	10	0.5	2,900
AS5-2000/5A	2000/5A	15	0.5	TBA
AS5-2500/5A	2500/5A	15	0.5	TBA

AS6 Range

Case Size: 192mm wide x 45mm deep x 222mm high

7.6" wide x 1.8" deep x 8.8" high

Aperture: 130.5 x 11mm, 126 x 58mm and 126.5mm diameter

5.1" x 0.4", 4.9" x 2.3" and 5.0" diameter

Weight: 1.2kg

Part Number	Ratio	Burden(VA)	Class	Price (Baht)
AS6-1500/5A	1500/5A	10	0.5	TBA
AS6-1600/5A	1600/5A	10	0.5	TBA
AS6-2000/5A	2000/5A	15	0.5	3,250
AS6-2500/5A	2500/5A	15	0.5	3,500
AS6-3000/5A	3000/5A	15	0.5	4,000
AS6-4000/5A	4000/5A	20	0.5	4,800
AS6-5000/5A	5000/5A	20	0.5	5,500



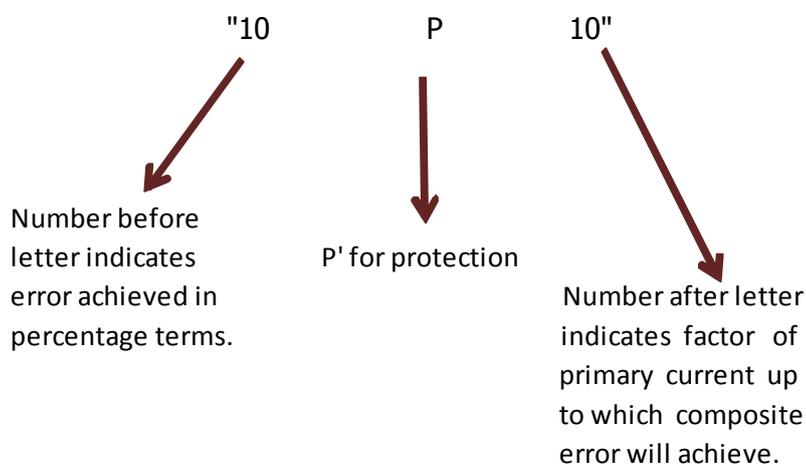
PR Series Protection CT Range

IEC60044-1/BS EN60044-1 commonly define protection current transformers in terms of composite error at an accuracy limit factor. In simple terms this means how accurate the current transformer will remain when the primary current flowing is many times higher than in normal conditions i.e. In a fault situation.

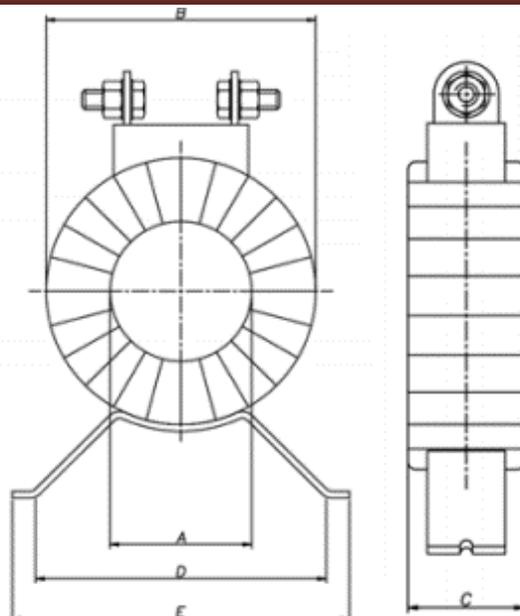
General Specifications

Accuracy:	5P10 and 10P10
System voltage:	720V maximum
Test voltage:	3kV for 1 minute
System frequency:	50/60Hz
Complies with:	IEC60044-1/BS EN60044-1
Operating temperature:	- 20 to +70°C
Secondary current: 5A (1A contact PMK sales for availability)	
Insulation class:	BSEN60085 class Y

The classification of protection current transformers follows the following simple formula



In addition the classification of protection current transformers indicates accuracy class: 5P-current transformer will have a ratio error of 1% and a phase error not exceeding 60 minutes. 10P-current transformer will have a ratio error of 3% (no level of phase error specified)



**1A current transformers
dimensions may vary by
up to 10%**

Part Number	Burden (VA)	Ratio Range	A	B	C	D	Price (Baht)
PR-35-100/5A-2.5 (10P10)	2.5	100/5A	35	98	60	100	TBA
PR-35-100/5A-5 (10P10)	5	100/5A	35	98	90	100	TBA
PR-35-120/5A-2.5 (10P10)	2.5	120/5A	35	98	55	100	TBA
PR-35-120/5A-5 (10P10)	5	120/5A	35	98	85	100	TBA
PR-35-150/5A-2.5 (5P10 & 10P10)	2.5	150/5A	35	98	50	100	TBA
PR-35-150/5A-5 (5P10 & 10P10)	5	150/5A	35	98	70	100	TBA
PR-35-200/5A-2.5 (5P10 & 10P10)	2.5	200/5A	35	98	40	100	TBA
PR-35-200/5A-5 (5P10 & 10P10)	5	200/5A	35	98	60	100	TBA
PR-35-250/5A-2.5 (5P10 & 10P10)	2.5	250/5A	35	98	35	100	TBA
PR-35-250/5A-5 (5P10 & 10P10)	5	250/5A	35	98	55	100	TBA
PR-55-300/5A-5 (5P10 & 10P10)	5	300/5A	55	98	75	100	TBA
PR-55-300/5A-15 (5P10 & 10P10)	15	300/5A	55	125	90	100	TBA
PR-55-400/5A-5 (5P10 & 10P10)	5	400/5A	55	98	60	100	TBA
PR-55-400/5A-15 (5P10 & 10P10)	15	400/5A	55	125	65	100	TBA
PR-55-500/5A-5 (5P10 & 10P10)	5	500/5A	55	98	55	100	TBA
PR-55-500/5A-15 (5P10 & 10P10)	15	500/5A	55	125	60	100	TBA
PR-55-600/5A-5 (5P10 & 10P10)	5	600/5A	55	98	50	100	TBA
PR-55-600/5A-15 (5P10 & 10P10)	15	600/5A	55	125	55	100	TBA
PR-65-800/5A-5 (5P10 & 10P10)	5	800/5A	65	110	40	100	TBA
PR-65-800/5A-15 (5P10 & 10P10)	15	800/5A	65	110	80	100	TBA
PR-80-1000/5A-15 (5P10 & 10P10)	15	1000/5A	80	125	70	100	TBA
PR-80-1200/5A-15 (5P10 & 10P10)	15	1200/5A	80	125	65	100	TBA
PR-90-1500/5A-15 (5P10 & 10P10)	15	1500/5A	90	140	55	100	TBA
PR-90-1600/5A-15 (5P10 & 10P10)	15	1600/5A	90	140	55	100	TBA
PR-100-2000/5A-15(5P10 & 10P10)	15	2000/5A	100	155	55	100	TBA
PR-110-2500/5A-15(5P10 & 10P10)	15	2500/5A	110	165	45	100	TBA
PR-120-3000/5A-15(5P10 & 10P10)	15	3000/5A	120	180	45	100	TBA



Features

- A wide range of ratings available.
- Accuracy up to class 0.5%.
- Protection types also available.
- Long product life.

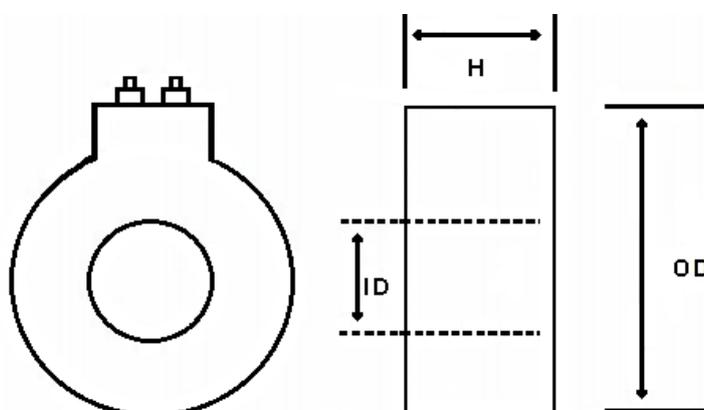
EMR & EPR Series Measuring & Protection CT Range Resin Cast Type

Designed to be used in harsh environmental conditions. These resin cast CT's are constructed from high grade silicon alloy cores insulated and protected by a polypropylene covering on which the secondary winding is toroid alloy. Multi layers of polyester and PVC are then applied to provide a tough moisture resist coating.

General Specifications

Accuracy:	Up to class 0.5%
System voltage:	720V maximum
Test voltage:	2.5kV for 1 minute
System frequency:	50/60Hz
Overload withstand:	1.2 x rated primary current
Short circuit thermal current(Ith):	60 x rated primary current for 1 second
Dynamic current (Idyn):	2.55 x Ith
Complies with:	IEC60044-1/BS EN60044-1 BS 7626/93-IEC 44-1 BS 7276
Operating temperature:	- 40 to +70°C
Saturation coefficient:	<6
Secondary current:	5A (1A contact PMK sales for availability)
Insulation class:	BSEN60085 class Y
Humidity:	Up to 95% (non-condensing)
Mounting hardware:	Foot mounted

Dimensions



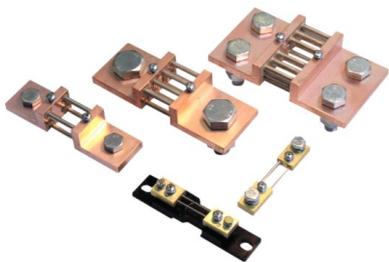
Epoxy Measuring Current Transformer

Part Number	Burden(VA) / Class		Ratio Range	ID	OD	H	Price (Baht)
	CL1	CL 0.5					
EMR-20-60/5A	2.5	-	60/5A	20	80	40	TBA
EMR-34-100/5A	2.5	-	100/5A	34	80	40	TBA
EMR-34-150/5A	2.5	-	150/5A	34	80	40	TBA
EMR-42-200/5A	5	-	200/5A	42	90	30	TBA
EMR-42-250/5A	5	-	250/5A	42	90	30	TBA
EMR-42-300/5A	7.5	-	300/5A	42	90	30	TBA
EMR-65-400/5A	7.5	-	400/5A	65	110	30	TBA
EMR-65-500/5A	10	-	500/5A	65	110	30	TBA
EMR-65-600/5A	15	-	600/5A	65	110	30	TBA
EMR-75-800/5A	15	-	800/5A	75	120	30	TBA
EMR-85-1000/5A	15	-	1000/5A	85	150	30	TBA
EMR-85-1200/5A	15	-	1200/5A	85	150	40	TBA
EMR-110-1500/5A	-	20	1500/5A	110	150	40	TBA
EMR-110-1600/5A	-	20	1600/5A	110	175	40	TBA
EMR-110-2000/5A	-	20	2000/5A	110	175	40	TBA
EMR-130-2500/5A	-	30	2500/5A	130	190	40	TBA
EMR-130-3000/5A	-	30	3000/5A	130	190	40	TBA
EMR-200-4000/5A	-	40	4000/5A	200	312	40	TBA

Epoxy Protection Current Transformer

Part Number	Class	Burden(VA)	Ratio Range	ID	OD	H	Price (Baht)
EPR-150-100/5A	5P10	5VA	100/5A	34	150	95	TBA
EPR-150-150/5A	5P10	5VA	150/5A	34	130	75	TBA
EPR-135-200/5A	5P10	5VA	200/5A	45	135	50	TBA
EPR-135-250/5A	5P10	5VA	250/5A	45	135	50	TBA
EPR-135-300/5A	5P10	7.5VA	300/5A	45	135	50	TBA
EPR-140-400/5A	5P10	7.5VA	400/5A	65	140	50	TBA
EPR-140-500/5A	5P10	10VA	500/5A	65	140	50	TBA
EPR-140-600/5A	5P10	15VA	600/5A	65	140	50	TBA
EPR-145-800/5A	5P10	15VA	800/5A	75	145	50	TBA
EPR-160-1000/5A	5P10	15VA	1000/5A	85	160	70	TBA
EPR-160-1200/5A	5P10	15VA	1200/5A	85	160	70	TBA
EPR-180-1600/5A	5P10	15VA	1600/5A	110	180	50	TBA
EPR-180-2000/5A	5P10	15VA	2000/5A	110	180	50	TBA
EPR-180-2250/5A	5P10	15VA	2250/5A	110	180	50	TBA
EPR-200-2500/5A	5P10	15VA	2500/5A	130	200	50	TBA
EPR-200-3000/5A	5P10	15VA	3000/5A	130	200	50	TBA

Protection class 5P20 available on request contact PMK sales team.



Installation

For maximum heat dissipation mount shunts in the horizontal plane. Ample ventilation should be provided. Busbars should be adequately rated, clean and level, with a thin coat of silicone grease applied to the contact surface area. Shunts are supplied to contact surface area. Shunts are supplied with bolts, nuts and washer, these must be tightened fully.

ST shunts comply to Din 43 703 for dimensions and IEC51(BS89) EN60051 for performance.

DC Shunts

A range of direct current shunts which provides an accurate millivolt signal, exactly proportional to the system current. They can be used to drive ammeter indicators, overload protection and control devices. These shunts enable the measurement of D.C. current in ranges from 10A to 1000A with various options.

General Specifications

Accuracy:	0.5% of Range
Test voltage:	3kV for 1 minute
Temperature coefficient:	0.1%/10°K
Overload withstand:	1.2 x rated current
5 second withstand:	10A-250A = 10 x rated current 250A-2000A = 5 x rated current. 2000A-10000A = 2 x rated current
Operating temperature:	-25° C to +55 °C
Rating:	10A to 10000A
Outputs:	50mV* , 60mV, 75mV* , 100mV* , 150mV*

Product Codes & Prices

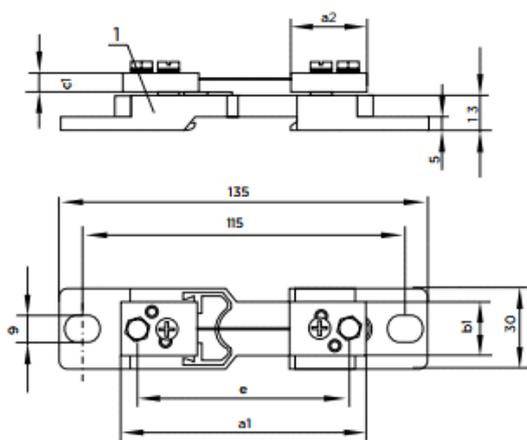
Part Number	Description	Diag	Price (Baht)
ST1-10/60mV	I/P 10A - O/P 60mV	A	4,200
ST1-20/60mV	I/P 20A - O/P 60mV	A	4,200
ST1-25/60mV	I/P 25A - O/P 60mV	A	4,200
ST1-30/60mV	I/P 30A - O/P 60mV	A	4,200
ST1-40/60mV	I/P 40A - O/P 60mV	A	5,000
ST1-50/60mV	I/P 50A - O/P 60mV	A	5,000
ST1-60/60mV	I/P 60A - O/P 60mV	A	5,000
ST1-80/60mV	I/P 80A - O/P 60mV	A	5,000
ST1-100/60mV	I/P 100A - O/P 60mV	A	5,000
ST1-125/60mV	I/P 125A - O/P 60mV	A	5,400
ST1-150/60mV	I/P 150A - O/P 60mV	A	5,400
ST2-200/60mV	I/P 200A - O/P 60mV	B	5,600
ST2-250/60mV	I/P 250A - O/P 60mV	B	5,600
ST2-400/60mV	I/P 400A - O/P 60mV	B	5,800
ST2-600/60mV	I/P 600A - O/P 60mV	B	5,800
ST2-1000/60mV	I/P 1000A - O/P 60mV	B	9,300
ST2-1500/60mV	I/P 1500A - O/P 60mV	B	14,000
ST2-2000/60mV	I/P 2000A - O/P 60mV	B	17,500
ST2-2500/60mV	I/P 2500A - O/P 60mV	B	18,000
ST3-4000/60mV	I/P 4000A - O/P 60mV	C	57,000
ST3-5000/60mV	I/P 5000A - O/P 60mV	C	77,500
ST3-6000/60mV	I/P 6000A - O/P 60mV	C	79,000
ST3-8000/60mV	I/P 8000A - O/P 60mV	C	149,000
ST3-10000/60mV	I/P 10000A - O/P 60mV	C	150,000

For 50, 75, 100 & 150mV outputs please contact PMK sales.

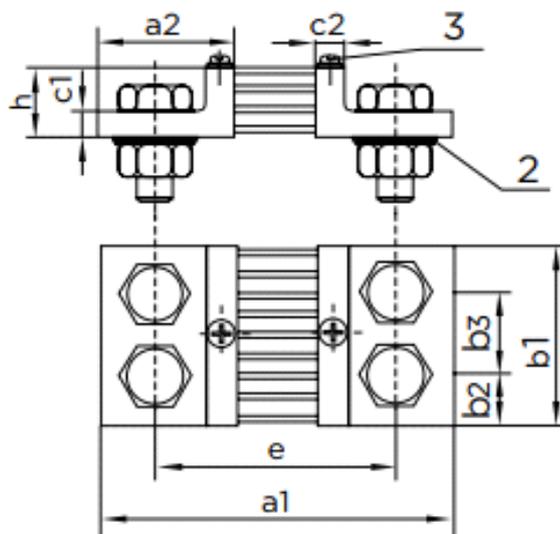
DC Shunts

Connections & Dimensions

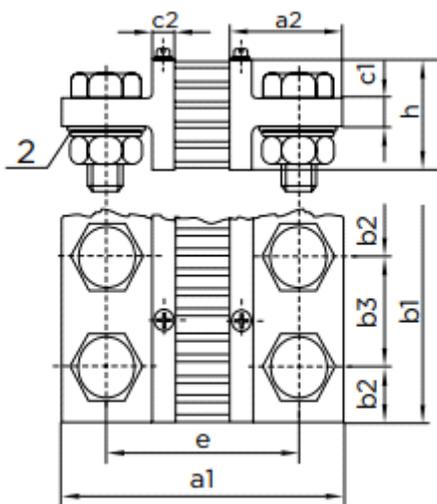
ST1 10A to 200A (A)



ST2 200A to 2500A (B)



ST3 4000A - 10000A (C)



- 1 - Insulation base.
- 2 - Spring washer.
- 3 - Screw with cruciform cavity.

Range	a1	a2	b2	b1	b3	c1	e	c2	h
10A-30A (ST1)	90	28	-	20	-	8	78	-	-
40A-200A (ST1)	100	33	-	20	-	8	80	-	-
200A-250A (ST2)	145	55	15	30	-	10	105	10	30
400A-600A (ST2)	145	55	20	40	-	10	105	10	30
1000A (ST2)	165	65	30	60	-	10	115	10	30
1500A (ST2)	165	65	21	90	48	10	115	10	30
2000A-2500A (ST2)	165	65	30	120	60	10	115	10	30
4000A (ST3)	165	65	30	120	60	15	115	10	60
5000A-6000A (ST3)	175	70	25	154	52	25	125	15	130
8000A-10000A (ST3)	185	75	25	206	52	30	135	20	170

Warning - Shunts are uninsulated and protection against accidental contact may be necessary in order to comply with health and safety regulations.



Input Parameters

- **Voltage per phase L-N, L-L**
VL1, VL2, VL3, VL12, VL23, VL31
- **Average voltage L-N, L-L**
AVG V12 V23 V31,
AVG V1N V2N V3N
- **Voltage difference L-N, L-L**
DELTA VN, DELTA V
- **Current per phase & average**
IL1, IL2, IL3, IN, AVG I1 I2 I3
- **Current difference - DELTA I**
- **Current maximum demand**
I1 MAX, I2 MAX, I3 MAX
- **Average current per phase**
I1 AVG, I2 AVG, I3 AVG
- **Power per phase plus total P.**
P1, P2, P3, (P)
- **Power average & maximum**
PAVG, PMAX
- **Vars per phase plus total Q.**
Q1, Q2, Q3, (Q)
- **VA per phase plus total S.**
S1, S2, S3, (S)
- **Power Factor per phase**
PF1, PF2, PF3
- **Power Factor average + total**
PF AVG, (PF)
- **Phase angle per phase + total**
ANGLE L1, ANGLE L2, ANGLE L3
SYS ANGLE
- **Frequency - FREQ**
- **THD per phase volts & amps**
THDV1, THDV2, THDV3
THDI1, THDI2, THDI3
- **Power Factor displacement**
COSPHI 1, COSPHI 2, COSPHI 3

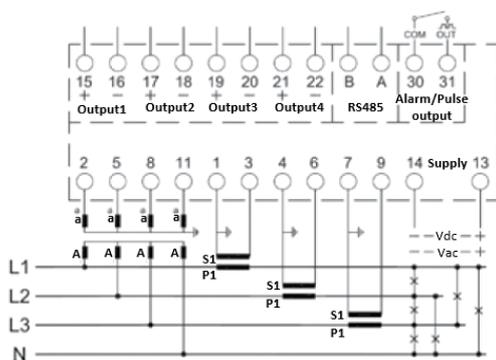
254 -XZZ Paladin Advantage Universal Programmable Transducer

The 254-XZZ transducer, is a programmable transducer which provides measurement isolation and conversion of all main electrical parameters into a standard DC output signal. The transducer can measure single and three phase 3 or 4 wire in both balanced and unbalanced configurations. With a class accuracy of 0.2% the transducer also comes with RS-485 RTU and pulse/alarm fitted as standard.

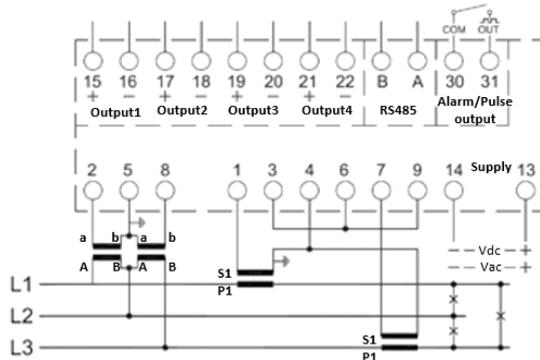
Specifications

Accuracy:	0.2% of range
Input ratings:	57.7V-277V AC L-N(100-480V L-L)480V max 1A or 5A AC RMS programmable
Measuring Ranges	
Voltage range:	5-120% of nominal
Current range:	5-120% of nominal
Power (W,VA,VAR):	50-120% of nominal (bi-directional)
Frequency:	45-65 Hz
THD:	Up to the 31 st harmonic
Voltage overload:	1.2 x of nominal continuous 2 x nominal for 300 ms
Current overload:	2 x of nominal continuous 20 x nominal for 300ms
Burden:	Voltage input: <0.5VA per phase Current input: <0.5VA per phase
Auxiliary supply:	80-260V AC/DC 45/65Hz \pm 10% 6VA or 20-60V AC/DC 45/65Hz \pm 10% 6VA
Outputs:	RS485 RTU Comms 2 wire half duplex. baud rate: 9600, 19200, 38400 4 x Analogue outputs: -1/0/+1 mA -5/0/+5 mA, -10/0/+10 mA, -20/0/+20mA 4 - 20 mA, -1/0/+1 V, -10/0/+10 V - All programmable. pulsed/Alarm O/P-user defined (SSR) 100mA @ 250V max.
Software:	Configuration software included
Enclosure style:	DIN-rail mounting. Case UL 94-V0
Operating temperature:	-10 to +55°C
Storage temperature:	-30 to +70°C
Relative humidity:	0 to 90% non-condensing
Protection:	IP 23
Dimensions:	100 x 70 x (WxH) 118mm (max depth)

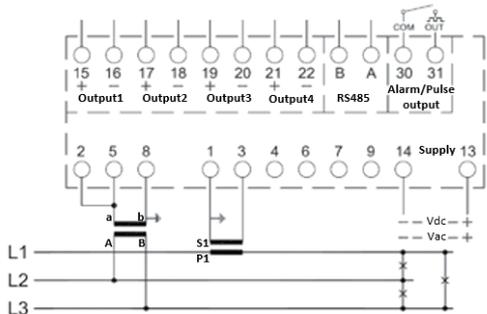
3 Phase 4 Wire Unbalanced Load



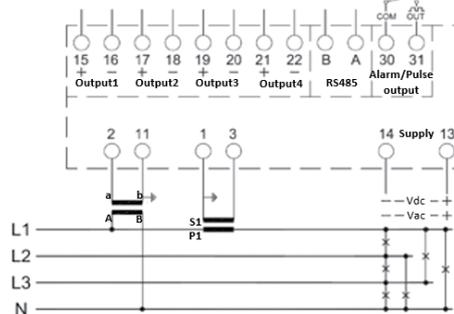
3 Phase 3 Wire Unbalanced Load



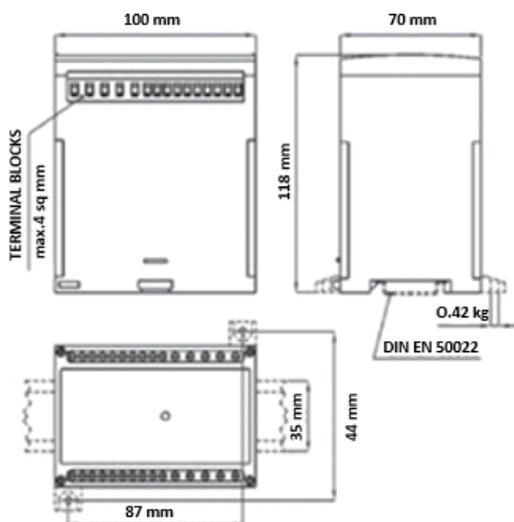
3 Phase 3 Wire Load



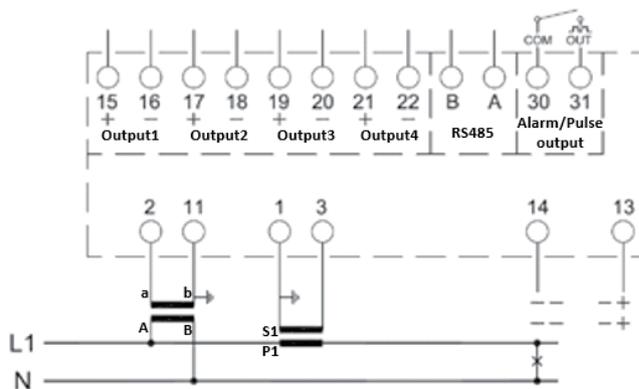
3 Phase 4 Wire Load



Dimensions



Single Phase 2 Wire Load



Approvals

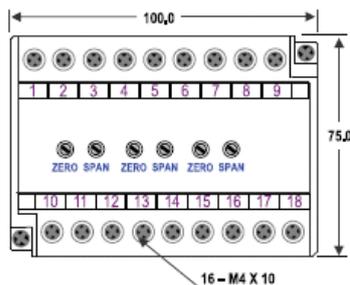
IEC 61326, IEC 61010-1, IEC 62053-21, EN60688

Part Number	Product Description	Price (Baht)
254-XZZ-M-04	80-260V AC/DC 45/65Hz, four analogue outputs	70,000
254-XZZ-M-02	80-260V AC/DC 45/65Hz, two analogue outputs	62,000
254-XZZ-L-04	20-60V AC/DC 45/65Hz, four analogue outputs	70,000
254-XZZ-L-02	20-60V AC/DC 45/65Hz, two analogue outputs	62,000

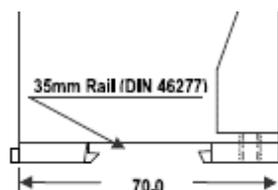
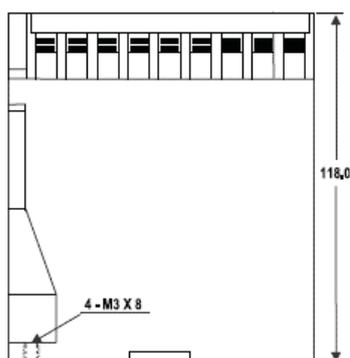
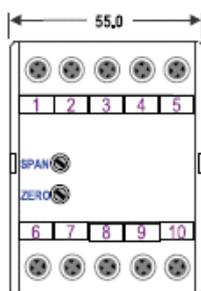


Dimensions

254 Series



252 Series



S series Transducer Class 0.2 AC Current, AC Voltage & Frequency

An extensive range of class 0.2 transducers providing measurement, isolation and conversion of electrical parameters into industry standard DC output signals. The range offers protection against high voltage, overload and resistance to vibration in harsh electrical environments. Transducers offer multiple analogue outputs in a single housing and individual measurements of most electrical parameters. For voltage and current both true RMS and average sensing versions are available.

General Specifications

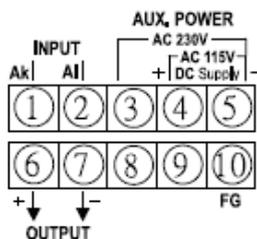
Accuracy:	0.2% of range
Waveform effect (RMS type only):	$\pm 0.2\%$ of range at 30% distortion
Voltage overload:	1.5 x nominal continuous 2 x nominal for 10 seconds 4 x nominal for 2 seconds
Current overload:	3 x nominal continuous 20 x nominal for 1 second 50 x nominal for 1 second
Burden:	1 phase $\leq 2.5\text{VA}$, 3 phase $\leq 6.5\text{VA}$ Frequency version $\leq 2.5\text{VA}$
Auxiliary supply:	AC: 115, 230, 380, 416V $\pm 15\%$ 50/60Hz DC: 24, 48, 110, 220V $\pm 10\%$
Output range:	0-1V into 50 Ω load minimum 0-5V into 250 Ω load minimum 0-10V into 500 Ω load minimum 1-5V into 500 Ω load minimum 2-10V into 500 Ω load minimum 0-1mA into 0-15k Ω load 0-5mA into 0-3k Ω load 0-10mA into 0-1.5k Ω load 0-20mA into 0-750 Ω load 4-20mA into 0-750 Ω load
Please specify required output range when ordering.	
Span adjustment:	$\leq \pm 5\%$ of range
Zero adjustment:	$\leq \pm 5\%$ of range
Response time:	$\leq 250\text{ms}$
Operating temperature:	0-60 °C Enclosure: IP 20
Relative humidity:	20 to 90% RH non-condensing
Approvals:	IEC 414, IEC 688:1992, ANSI C37.90a IEC 255-4, BS 5458

Transducers

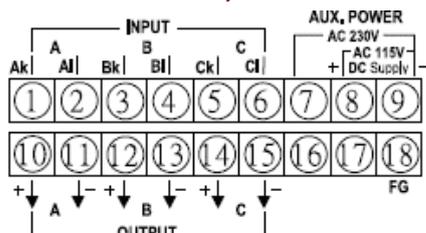
Features and Benefits

Connections

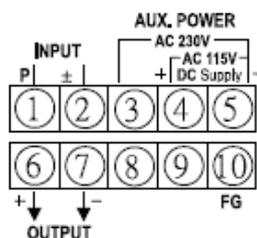
252-SAL & 252-SAR, 1-Ph



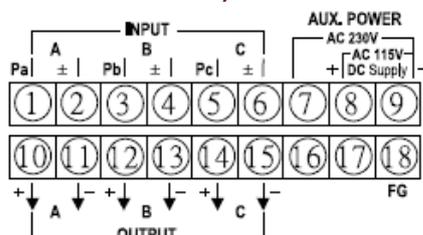
254-SAL & 252-SAR, 3-Ph



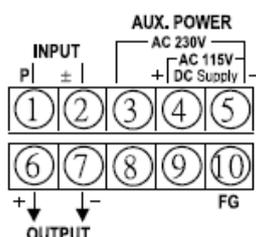
252-SVL & 252-SVR, 1-Ph



254-SVL & 254-SVR, 3-Ph



252-SHL, 1-ph



AC Current Transducer

Select Input Current:	5 Amp version	1 Amp version
Select Output(s):	0/1mA, 0/5mA, 0/10mA, 0/20mA, 4/20mA 0/1V, 0/5V, 0/10V DC	
Select Frequency:	50Hz	60Hz
Auxiliary Supply:	AC: 115, 230, 380, 416V +/--15% 50/60Hz DC: 24, 48, 110, 120, 220V +/-- 10% *	

Please select from the above table the configuration required.

Part No.	Product Description	Price (Baht)
252-SAL	Average sensing current, single phase	9,000
252-SAR	True RMS current, single phase	15,000
254-SAL	Average sensing current, three phase	22,000
254-SAR	True RMS current, three phase	30,000
*Option	DC auxiliary	Add 3,500

AC Voltage Transducer

Select Input Voltage:	150V	300V	500V
Select Output(s):	0/1mA, 0/5mA, 0/10mA, 0/20mA, 4/20mA 0/1V, 0/5V, 0/10V DC		
Select Frequency:	50Hz	60Hz	
Auxiliary Supply:	AC: 115, 230, 380, 416V +/--15% 50/60Hz DC: 24, 48, 110, 120, 220V +/-- 10% *		

Please select from the above table the configuration required.

Part No.	Product Description	Price (Baht)
252-SVL	Average sensing voltage, single phase	9,000
252-SVR	True RMS voltage, single phase	15,000
254-SVL	Average sensing voltage, three phase	22,000
254-SVR	True RMS voltage, three phase	30,000
*Option	DC auxiliary	Add 3,500

AC Frequency Transducer

Select Input Voltage:	110V	220V	380V	416V
Select Output:	0/1mA, 0/5mA, 0/10mA, 0/20mA, 4/20mA 0/1V, 0/5V, 0/10V DC			
Select Frequency:	45/55Hz	55/65Hz	45/65Hz	
Auxiliary Supply:	AC: 115, 230, 380, 416V +/--15% 50/60Hz DC: 24, 48, 110, 120, 220V +/-- 10% *			

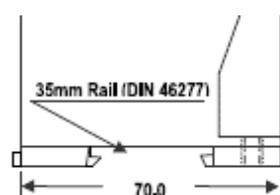
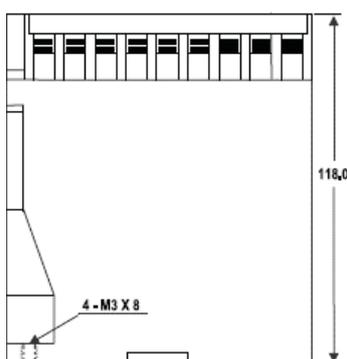
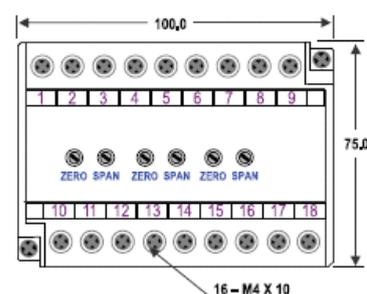
Please select from the above table the configuration required.

Part No.	Product Description	Price (Baht)
252-SHL	Frequency sensing, single phase	19,500
*Option	DC auxiliary	Add 3,500



Dimensions

254 Series



S Series Transducer Class 0.2 AC Watts, AC Vars, Power Factor, Kilowatt Hour

An extensive range of class 0.2 transducers providing measurement, isolation and conversion of electrical parameters into industry standard DC output signals. The range offers protection against high voltage, overload and resistance to vibrate in harsh electrical environments. Transducers offer multiple analogue outputs in a single housing and individual measurements of most electrical parameters. Including Power and Energy parameters.

General Specifications

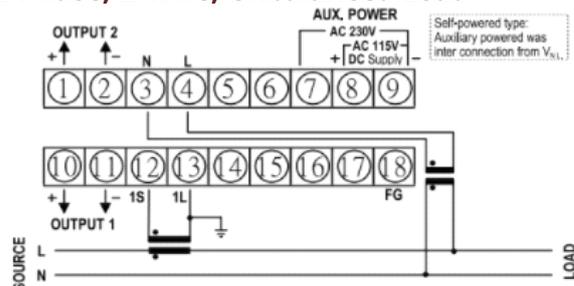
Accuracy:	0.2% of range
Waveform effect (RMS type only):	$\pm 0.2\%$ of full scale at 30% distortion
Voltage overload:	1.5 x nominal continuous 2 x nominal for 10 seconds 4 x nominal for 2 seconds
Current overload:	3 x nominal continuous 20 x nominal for 1 second 50 x nominal for 1 second
Burden:	Single phase version $\leq 2.5\text{VA}$ Three phase version $\leq 6.5\text{VA}$ Frequency version $\leq 2.5\text{VA}$
Auxiliary supply:	AC: 115, 230, 380, 416V $\pm 15\%$ 50/60Hz DC: 24, 48, 110, 220V $\pm 10\%$
Output range:	0-5V & 0-1V into 50 Ω load minimum 1-5V & 1-3-5V & 0-5V & 0-2.5-5V into 250 Ω load minimum 0-10V & 0-5-10V into 500 Ω load minimum -1-0-1V into 75 Ω load minimum -5-0-5V into 375 Ω load minimum -10-0-10V into 750 Ω load minimum 0-1mA & 0-0.5-1mA into 0-15k Ω load 0-5mA & into 0-3k Ω load 0-10mA & 0-5-10mA into 0-1.5k Ω load 4-20mA & 4-12-20mA & 0-20mA & 0-10-20mA into 0-750 Ω load -1-0-1mA into load 0-11k Ω load -5-0-5mA into load 0-2.2k Ω load -10-0-10mA into load 0-1.1k Ω load -20-0-20mA into load 0-550 Ω load

AC Watt Transducer

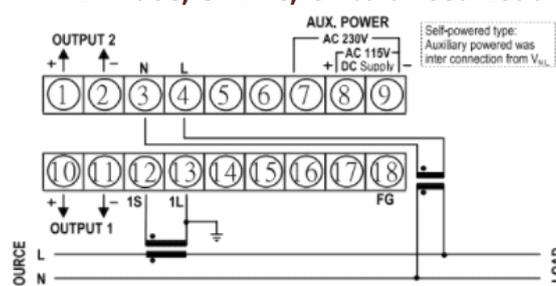
Select Input Current:	5 Amp version	1 Amp version
Select Input Voltage:	110V, 120V, 208V, 220V, 380V & 416V	
Select Output:	0/1mA, 0/5mA, 0/10mA, 0/20mA, 4/20mA, 0/0.5/1mA, 0/5/10mA, 4/12/20mA, -1/0/1mA, -5/0/5mA, -10/0/10mA, -20/0/20mA, -5/0/5V, 0/1V 0/5V, 0/10V, 1/5V, 0/0.5/1V, 0/2.5/5V, 0/3/5V, 1/3/5V, -1/0/1V, -10/0/10V	
Select Frequency:	50Hz	60Hz
Auxiliary Supply:	AC:115, 230, 380, 416V +/-15% 50/60Hz DC: 24, 48, 110, 120, 220V +/- 10%*	

Please select from the above table the configuration required.

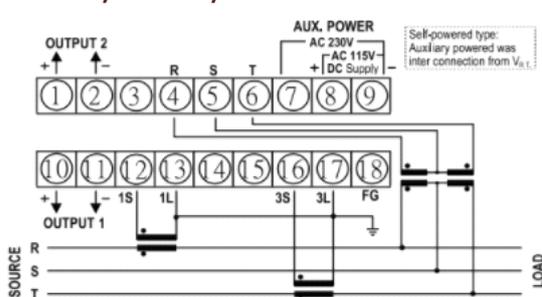
1 Phase, 2 Wire, Unbalanced Load



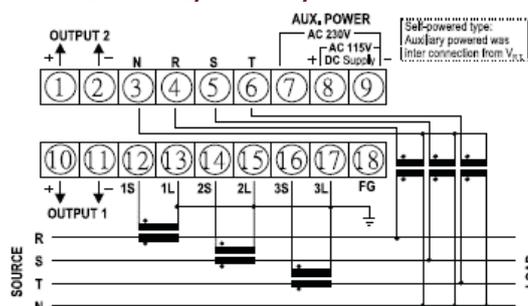
1 Phase, 3 Wire, Unbalanced Load



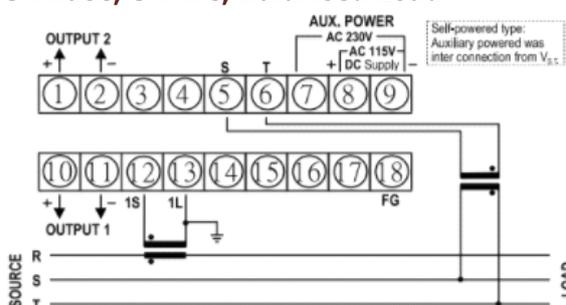
3 Phase, 3 Wire, Unbalanced Load



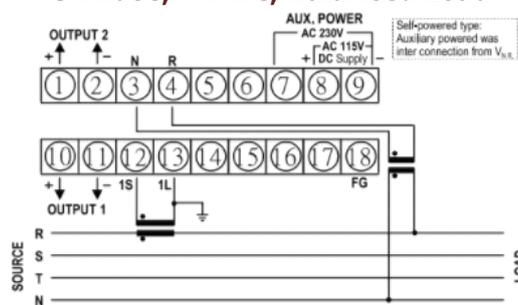
3 Phase, 4 Wire, Unbalanced Load



3 Phase, 3 Wire, Balanced Load



3 Phase, 4 Wire, Balanced Load



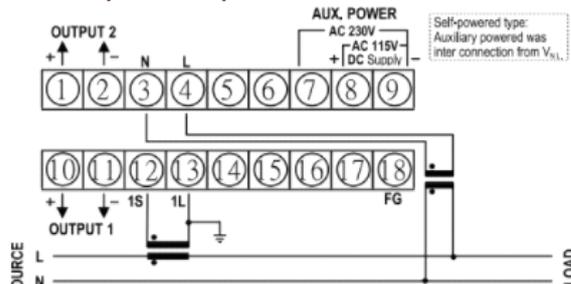
Part Number	Product Description	Price (Baht)
254-SWK	1-Ph, 2-W, Unbalanced Load, AC Watts	22,000
254-SWF	1-Ph, 3-W, Unbalanced Load, AC Watts	TBA
254-SWM	3-Ph, 3-W, Unbalanced Load, AC Watts	26,500
254-SWW	3-Ph, 4-W, Unbalanced Load, AC Watts	26,500
254-SWL	3-Ph, 3-W, balanced Load, AC Watts	24,000
254-SWH	3-Ph, 4-W, balanced Load, AC Watts	24,000
Option*	DC Auxiliary	Add 3,500

AC VAR Transducer

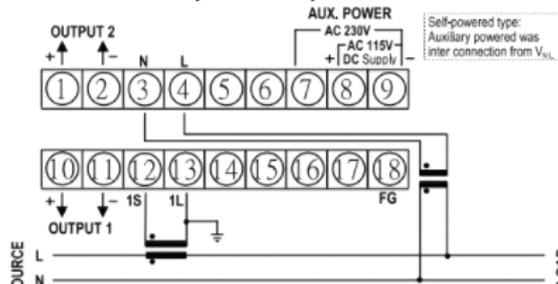
Select Input Current:	5 Amp version	1 Amp version
Select Input Voltage:	110V, 120V, 208V, 220V, 380V & 416V	
Select Output:	0/1mA, 0/5mA, 0/10mA, 0/20mA, 4/20mA, 0/0.5/1mA, 0/5/10mA, 4/12/20mA, -1/0/1mA, -5/0/5mA, -10/0/10mA, -20/0/20mA, -5/0/5V, 0/1V 0/5V, 0/10V, 1/5V, 0/0.5/1V, 0/2.5/5V, 0/3/5V, 1/3/5V, -1/0/1V, -10/0/10V	
Select Frequency:	50Hz	60Hz
Auxiliary Supply:	AC:115, 230, 380, 416V +/-15% 50/60Hz DC: 24, 48, 110, 120, 220V +/- 10%*	

Please select from the above table the configuration required.

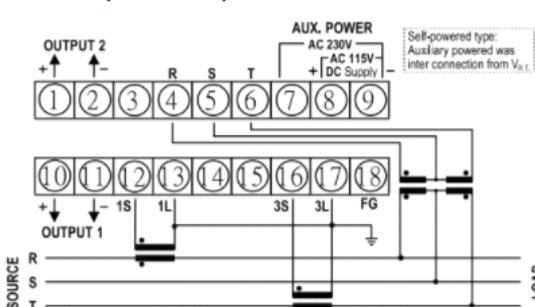
1 Phase, 2 Wire, Unbalanced Load



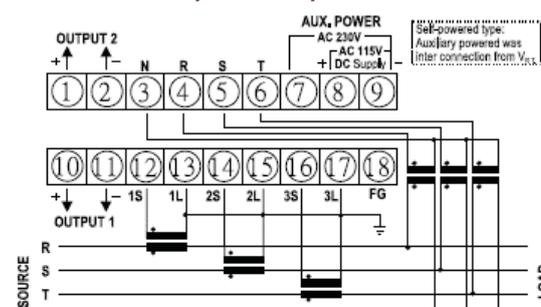
1 Phase, 3 Wire, Unbalanced Load



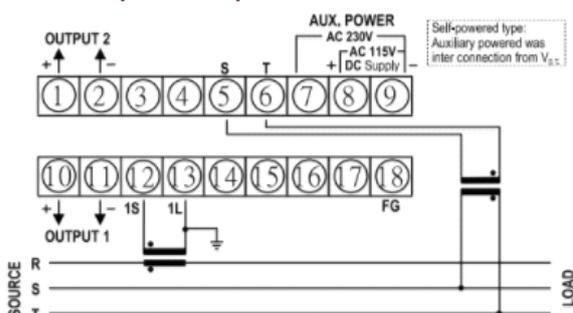
3 Phase, 3 Wire, Unbalanced Load



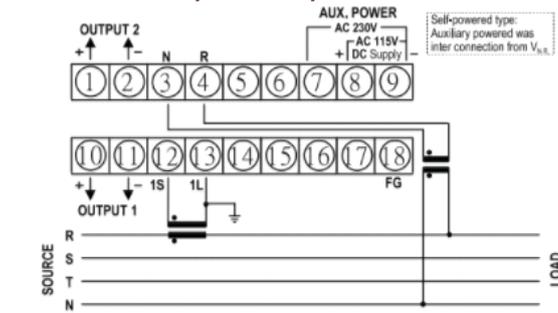
3 Phase, 4 Wire, Unbalanced Load



3 Phase, 3 Wire, Balanced Load



3 Phase, 4 Wire, Balanced Load



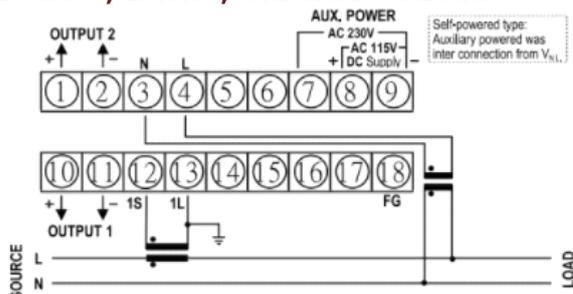
Part Number	Product Description	Price (Baht)
254-SXK	1-Ph, 2-W, Unbalanced Load, AC VARs	22,000
254-SXF	1-Ph, 3-W, Unbalanced Load, AC VARs	TBA
254-SXM	3-Ph, 3-W, Unbalanced Load, AC VARs	26,500
254-SXW	3-Ph, 4-W, Unbalanced Load, AC VARs	26,500
254-SXL	3-Ph, 3-W, balanced Load, AC VARs	24,000
254-SXH	3-Ph, 4-W, balanced Load, AC VARs	24,000
Option*	DC Auxiliary	Add 3,500

Combined AC Watt & VAR Transducer

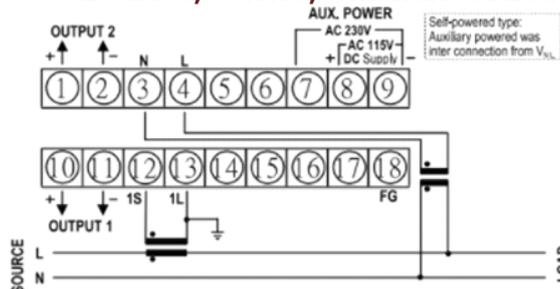
Select Input Current:	5 Amp version	1 Amp version
Select Input Voltage:	110V, 120V, 208V, 220V, 380V & 416V	
Select Outputs:	0/1mA, 0/5mA, 0/10mA, 0/20mA, 4/20mA, 0/0.5/1mA, 0/5/10mA, 4/12/20mA, -1/0/1mA, -5/0/5mA, -10/0/10mA, -20/0/20mA, -5/0/5V, 0/1V 0/5V, 0/10V, 1/5V, 0/0.5/1V, 0/2.5/5V, 0/3/5V, 1/3/5V, -1/0/1V, -10/0/10V	
Select Frequency:	50Hz	60Hz
Auxiliary Supply:	AC: 115, 230, 380, 416V +/- 15% 50/60Hz DC: 24, 48, 110, 120, 220V +/- 10%*	

Please select from the above table the configuration required.

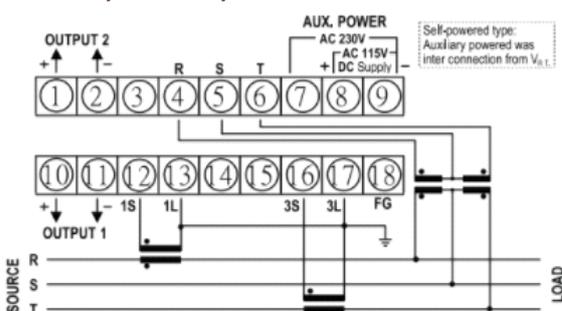
1 Phase, 2 Wire, Unbalanced Load



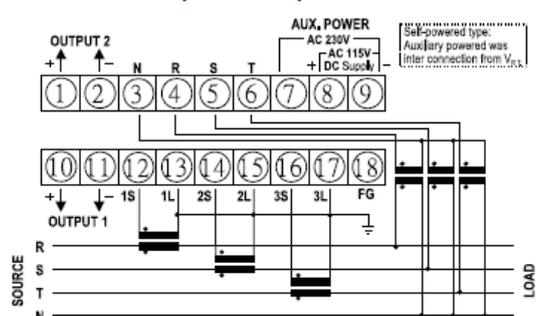
1 Phase, 3 Wire, Unbalanced Load



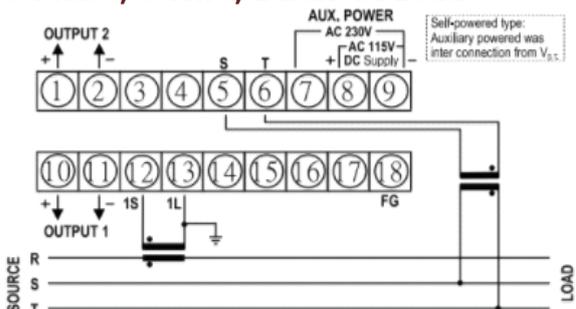
3 Phase, 3 Wire, Unbalanced Load



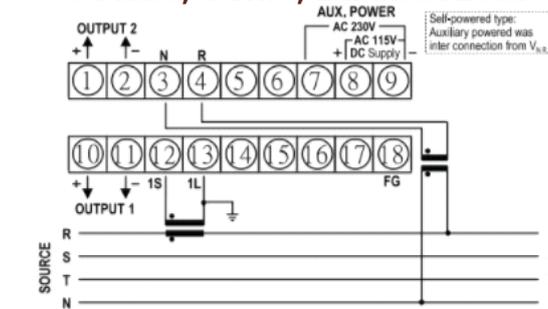
3 Phase, 4 Wire, Unbalanced Load



3 Phase, 3 Wire, Balanced Load



3 Phase, 4 Wire, Balanced Load



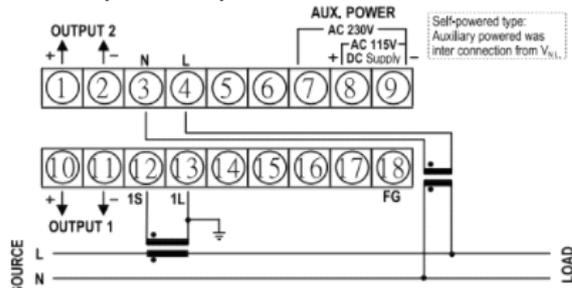
Part Number	Product Description	Price (Baht)
254-SDK	1-Ph,2-W, Unbalanced Load, AC Watt & VARs	33,000
254-SDF	1-Ph,3-W, Unbalanced Load, AC Watt & VARs	TBA
254-SDM	3-Ph,3-W, Unbalanced Load, AC Watt & VARs	38,500
254-SDW	3-Ph,4-W, Unbalanced Load, AC Watt & VARs	38,500
254-SDL	3-Ph,3-W, Balanced Load, AC Watt & VARs	36,000
254-SDH	3-Ph,4-W, Balanced Load, AC Watt & VARs	38,500
Option*	DC Auxiliary	Add 3,500

Power Factor Transducer

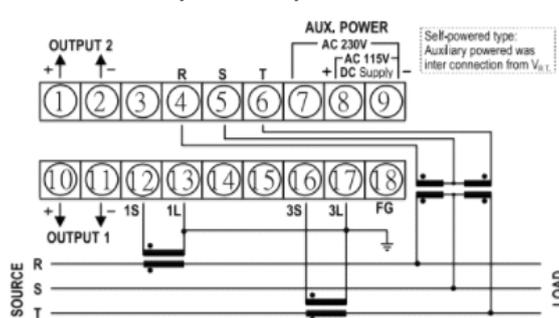
Select Input Current:	5 Amp version	1 Amp version
Select Input Voltage:	110V, 120V, 208V, 220V, 380V & 416V	
Select Outputs:	0/1mA, 0/5mA, 0/10mA, 0/20mA, 4/20mA, 0/5/10V - 1 /0/ 1mA, -5/0/5mA, -10/0/10mA, -20/0/20mA, -5/0/5V, 0/1V 0/5V, 0/10V, 1/5V, 0/0.5/1V, 0/2.5/5V, 1/3/5V, -1/0/1V, -10/0/10V	
Select Frequency:	50Hz	60Hz
Auxiliary Supply:	AC:115, 230, 380, 416V +/-15% 50/60Hz DC: 24, 48, 110, 120, 220V +/- 10%*	

Please select from the above table the configuration required.

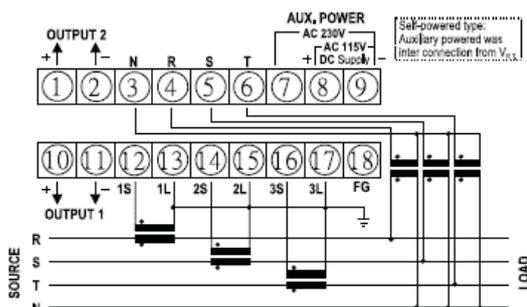
1 Phase, 2 Wire, Unbalanced Load



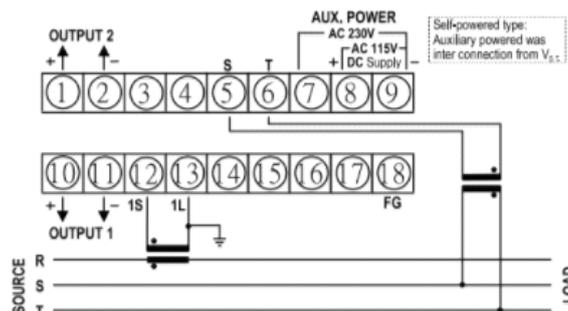
3 Phase, 3 Wire, Unbalanced Load



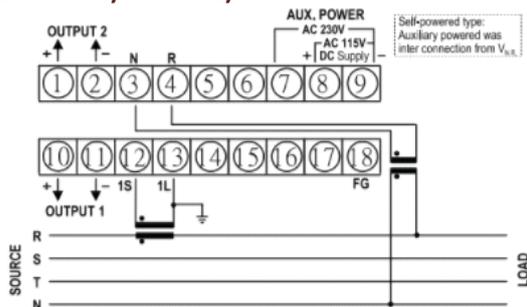
3 Phase, 4 Wire, Unbalanced Load



3 Phase, 3 Wire, Balanced Load



3 Phase, 4 Wire, Balanced Load



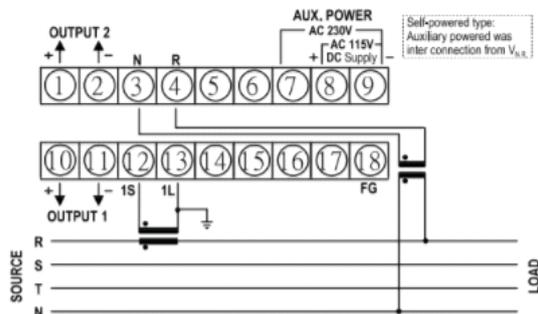
Part Number	Product Description	Price (Baht)
254-SFK	1-Ph,2-W, Unbalanced Load, AC Power Factor	26,500
254-SFM	3-Ph,3-W, Unbalanced Load, AC Power Factor	32,500
254-SFW	3-Ph,4-W, Unbalanced Load, AC Power Factor	32,500
254-SFL	3-Ph,3-W, Balanced Load, AC Power Factor	30,000
254-SFH	3-Ph,4-W, Balanced Load, AC Power Factor	30,000
Option*	DC Auxiliary	Add 3,500

AC Watt/Var/Hr Transducer

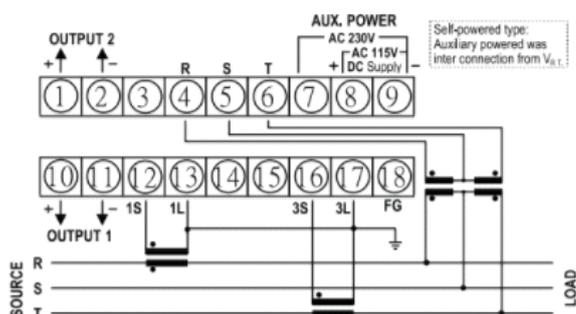
Select Input Current:	5 Amp version	1 Amp version
Select Input Voltage:	110V, 120V, 208V, 220V, 380V & 416V	
Select Outputs:	0/1mA, 0/5mA, 0/10mA, 0/20mA, 4/20mA, 0/5/10V -1/0/1mA, -5/0/5mA, -10/0/10mA, -20/0/20mA, -5/0/5V, 0/1V 0/5V, 0/10V, 1/5V, 0/0.5/1V, 0/2.5/5V, 1/3/5V, -1/0/1V, -10/0/10V	
Select Frequency:	50Hz	60Hz
Auxiliary Supply:	AC: 115, 230, 380, 416V +/-15% 50/60Hz DC: 24, 48, 110,120,220V +/- 10%*	
Pulsed Output:	1 Pulse=1kWhr(kVARhr), 10 Pulse=1kWhr(kVARhr), 100 Pulse=1kWhr(kVARhr) 1000 Pulse=1kWhr(kVARhr), 10000 Pulse=1kWhr(kVARhr)	

Please select from the above table the configuration required.

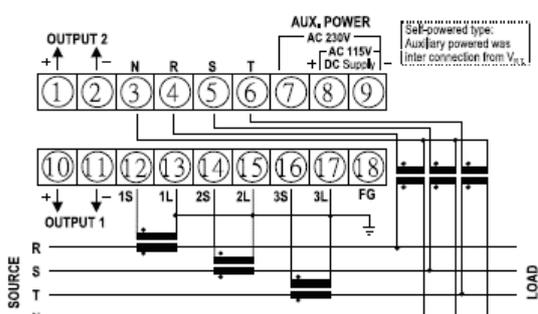
1 Phase, 2 Wire, Unbalanced Load



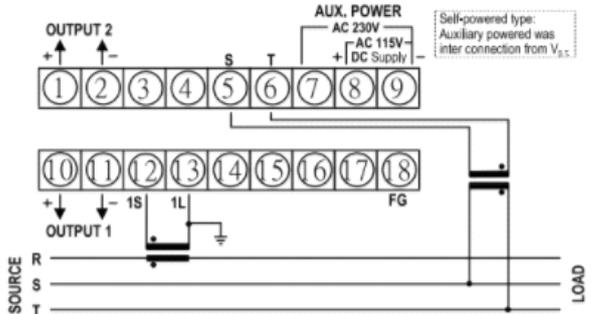
3 Phase, 3 Wire, Unbalanced Load



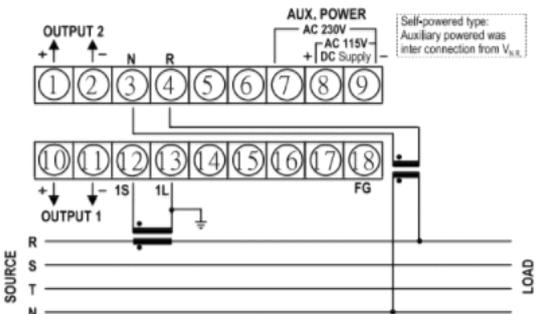
3 Phase, 4 Wire, Unbalanced Load



3 Phase, 3 Wire, Balanced Load



3 Phase, 4 Wire, Balanced Load



AC Watt-Hr Transducer

Part Number	Product Description	Price (Baht)
254-SKK	1-Ph,2-W, Unbalanced Load, AC Watt -Hr	33,500
254-SKM	3-Ph,3-W, Unbalanced Load, AC Watt-Hr	38,500
254-SKW	3-Ph,4-W, Unbalanced Load, AC Watt-Hr	38,500
254-SKL	3-Ph,3-W, Balanced Load, AC Watt-Hr	38,500
254-SKH	3-Ph,4-W, Balanced Load, AC Watt-Hr	38,500
Option*	DC Auxiliary	Add 3,500

AC VAR-Hr Transducer

Part Number	Product Description	Price (Baht)
254-SQK	1-Ph,2-W, Unbalanced Load, AC VAR-Hr	33,500
254-SQM	3-Ph,3-W, Unbalanced Load, AC VAR-Hr	38,500
254-SQW	3-Ph,4-W, Unbalanced Load, AC VAR-Hr	38,500
254-SQL	3-Ph,3-W, Balanced Load, AC VAR-Hr	38,500
254-SQH	3-Ph,4-W, Balanced Load, AC VAR-Hr	38,500
Option*	DC Auxiliary	Add 3,500

AC Watt & Watt-Hr Transducer

Part Number	Product Description	Price (Baht)
254-SSK	1-Ph,2-W, Unbal Load, AC Watt & Watt-Hr	40,000
254-SKM	3-Ph,3-W, Unbad Load, AC Watt & Watt-Hr	45,500
254-SKW	3-Ph,4-W, Unbal Load, AC Watt & Watt-Hr	45,500
254-SSL	3-Ph,3-W, Balanced Load, AC Watt & Watt-Hr	45,500
254-SSH	3-Ph,4-W, Balanced Load, AC Watt & Watt-Hr	45,500
Option*	DC Auxiliary	Add 3,500

AC VARs & VARs-Hr Transducer

Part Number	Product Description	Price (Baht)
254-SJK	1-Ph,2-W, Unbalanced Load, AC VAR & VAR-Hr	40,000
254-SJM	3-Ph,3-W, Unbalanced Load, AC VAR & VAR-Hr	45,500
254-SJW	3-Ph,4-W, Unbalanced Load, AC VAR & VAR-Hr	45,500
254-SJL	3-Ph,3-W, Balanced Load, AC VAR & VAR-Hr	45,500
254-SJH	3-Ph,4-W, Balanced Load, AC VAR & VAR-Hr	45,500
Option*	DC Auxiliary	Add 3,500

6 Module Version



3 Module Version



1 Module Version



Other Features

- Power on green LED.
- Designed to avoid nuisance tripping.
- Inputs galvanically isolated.
- Provides a continuous surveillance of monitored circuits.
- Selectable input ranges.

Module Style Protector Trip Relay

Protector trip relays provide continuous monitoring and protection of any electrical parameter. DIN-rail protectors offer numerous trip functions for single and three-phase power systems, including over and under voltage, current, frequency, phase sequence/failure or balance, reverse power, synchro-check, speed sensing and power systems, including over/under voltage, current, frequency, phase, DC inputs, RTD & earth leakage.

General Specifications

Setpoint repeatability:	0.5% of full span
Input ratings depending on product chosen	
AC current products:	1A, 2A, 3A, 4A, 5A, 8A, 10A
AC voltage products:	(L-N) 57.7V, 63.5V, 69.3V, 100V, 110V, 115V, 120V, 127V, 139V, 220V, 230V, 240V, 254V, 265V, 277V, 300V, 380V, 400V, 415V, 440V, 480V, 500V (L-L) 100V, 110V, 120V, 173V, 190V, 200V, 208V, 220V, 240V, 380V, 400V, 415V, 440, 460V, 480V & 500V.
Frequency products:	50Hz, 60Hz, 400Hz
Current overload:	2 x nominal continuous 10 x nominal for 3 seconds
Voltage overload:	1.25 x nominal continuous 1.5 x nominal for 10 seconds
Burden	
AC Current product:	1A(0.1VA), 5A(0.5VA)
AC Voltage product:	1VA-5VA (depending on product range)
Auxiliary supply:	24-240V AC/DC (3VA) ±10% (45/65Hz) 12-24V DC (1.2W) ±10%
	Only available on certain models.
Output relays:	Capacity: 250V/8A max 2000VA AC, 30V/8A DC 1 or 2 changeover AgNi plated
Time delay:	0.5-10s adjustable (certain models only)
Hysteresis(differential):	Internal set or adjustable 1-15% (depending on product range)
Operating temperature:	-20 to +55°C
Enclosure:	Front IP 40, terminals IP10
Case dimensions	
1 Module version :	H90 x W17.6 x D64mm
3 Module version :	H90 x W52 x D65mm
6 Module version :	H90 x W105 x D64mm
Enclosure style:	DIN-rail
Approvals:	EN 60255-6, EN 60255-27 EN61000-6-2, EN 61000-6-4

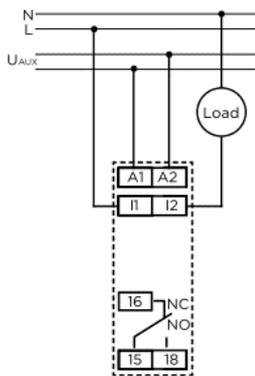
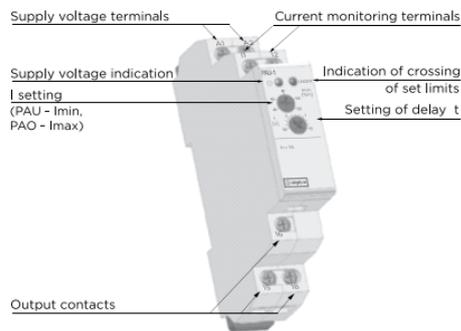
Protector Trip Relays

Connections & Prices

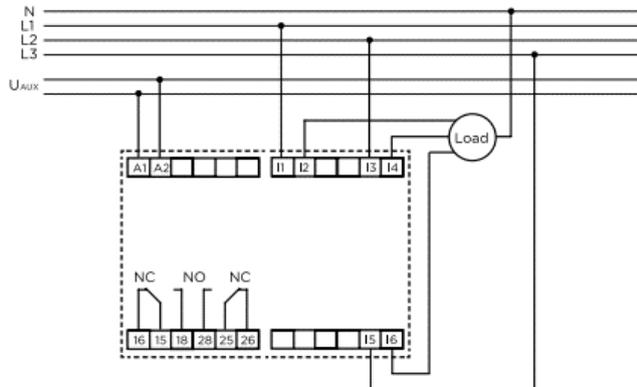
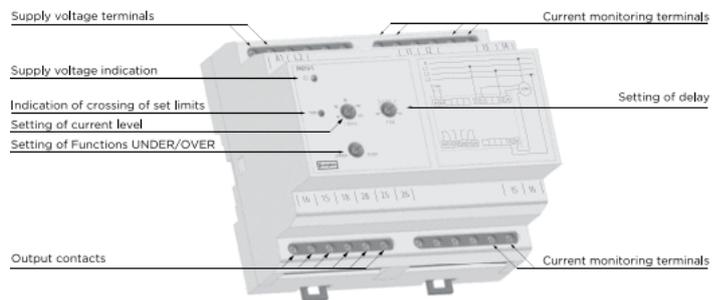
AC Current Protector Relay

AC Current with adjustable time delay 0.5-10s, differential preset at 1% internally.		
Part Number	Product Description	Price (Baht)
PAU-5 (Under trip)	1-Ph, 5A AC, 50/60Hz, Aux 24/240V AC/DC	12,000
PAU-1 (Under trip)	1-Ph, 1A AC, 50/60Hz, Aux 24/240V AC/DC	12,000
PAO-5 (Over trip)	1-Ph, 5A AC, 50/60Hz, Aux 24/240V AC/DC	12,000
PAO-1 (Over trip)	1-Ph, 1A AC, 50/60Hz, Aux 24/240V AC/DC	12,000
PAD-5 (Under/Over trip)	1-Ph, 5A AC, 50/60Hz, Aux 24/240V AC/DC	18,000
PAD-1 (Under/Over trip)	1-Ph, 1A AC, 50/60Hz, Aux 24/240V AC/DC	18,000
PAP/V-5 (Under/Over trip)	3-Ph 3/4W, 5A AC, 50/60Hz, Aux 24/240V AC/DC	15,000
PAP/V-1 (Under/Over trip)	3-Ph 3/4W, 1A AC, 50/60Hz, Aux 24/240V AC/DC	15,000

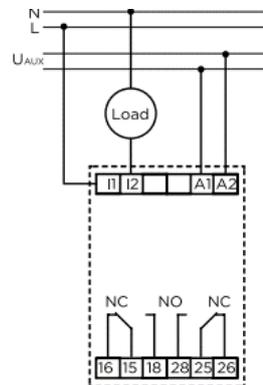
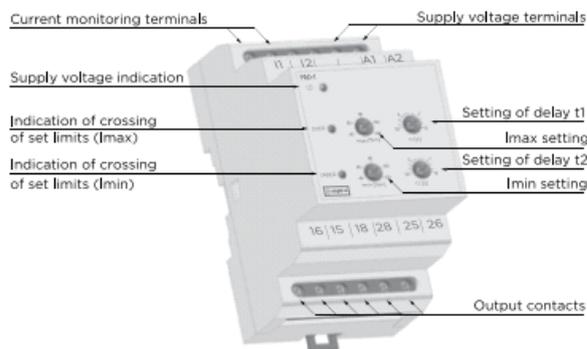
PAO & PAU - 1 x relay Adjustable Trip (40%-120%)



PAP/V - 2 x relay Adjustable Trip (40%-120%)



PAD - 2 x relay Adjustable Trip (40%-120%)



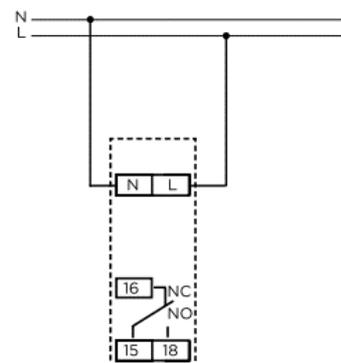
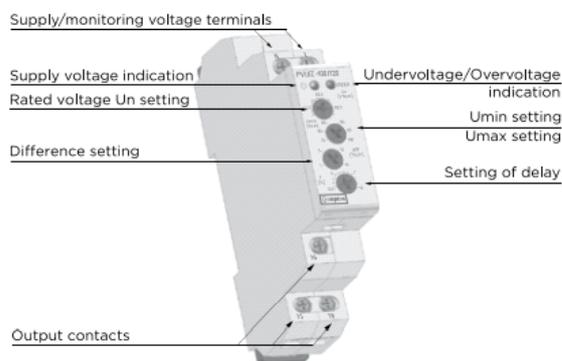
AC Voltage Protector Relay

AC Voltage with adjustable time delay 0.5-10s, differential adjustable 1-15%.		
Part Number	Product Description	Price (Baht)
PVU/Z-100/120(Under Trip)	1-Ph, 57.7V & 63.5V & 69.3V (L-N) 50/60Hz	12,000
PVU/Z-173/240(Under Trip)	1-Ph, 100V to 139V (L-N) 50/60Hz	12,000
PVU/Z-380/480(Under Trip)	1-Ph, 220V to 277V (L-N) 50/60Hz	12,000
PVO/H-100/120(Over Trip)	1-Ph, 57.7V & 63.5V & 69.3V (L-N) 50/60Hz	12,000
PVO/H-173/240(Over Trip)	1-Ph, 100V to 139V (L-N) 50/60Hz	12,000
PVO/H-380/480(Over Trip)	1-Ph, 220V to 277V (L-N) 50/60Hz	12,000
PVB-100/120(Under/Over Trip)	1-Ph, 57.7V & 63.5V & 69.3V (L-N) 50/60Hz	18,000
PVB-173/240(Under/Over Trip)	1-Ph, 100V to 139V (L-N) 50/60Hz	18,000
PVB-380/480(Under/Over Trip)	1-Ph, 220V to 277V (L-N) 50/60Hz	18,000
PVK/J-100/120(Under Trip)	3-Ph, 3-W, 100V & 110V & 120V (L-L) 50/60Hz	12,000
PVK/J-173/240(Under Trip)	3-Ph, 3-W, 173V to 240V (L-L) 50/60Hz	12,000
PVK/J-380/480(Under Trip)	3-Ph, 3-W, 380V to 480V (L-L) 50/60Hz	12,000
PVA/C-100/120(Over Trip)	3-Ph, 3-W, 100V & 110V & 120V (L-L) 50/60Hz	12,000
PVA/C-173/240(Over Trip)	3-Ph, 3-W, 173V to 240V (L-L) 50/60Hz	12,000
PVA/C-380/480(Over Trip)	3-Ph, 3-W, 380V to 480V (L-L) 50/60Hz	12,000
PVM-100/120(Under/Over Trip)	3-ph, 3-W, 100V & 110V & 120V (L-L) 50/60Hz	15,000
PVM-173/240(Under/Over Trip)	3-Ph, 3-W, 173V to 240V (L-L) 50/60Hz	15,000
PVM-380/480(Under/Over Trip)	3-Ph, 3-W, 380V to 480V (L-L) 50/60Hz	15,000
PVV/X-100/120(Under Trip)	3-Ph, 4-W, 57.7V & 63.5V & 69.3V (L-N) 50/60Hz	12,000
PVV/X-173/240(Under Trip)	3-Ph, 4-W, 100V to 139V (L-N) 50/60Hz	12,000
PVV/X-380/480(Under Trip)	3-Ph, 4-W, 220V to 277V (L-N) 50/60Hz	12,000
PVP/S-100/120(Over Trip)	3-Ph, 4-W, 57.7V & 63.5V & 69.3V (L-N) 50/60Hz	12,000
PVP/S-173/240(Over Trip)	3-Ph, 4-W, 100V to 139V (L-N) 50/60Hz	12,000
PVP/S-380/480(Over Trip)	3-Ph, 4-W, 220V to 277V (L-N) 50/60Hz	12,000
PVE-100/120(Under/Over Trip)	3-Ph, 4-W, 57.7V & 63.5V & 69.3V (L-N) 50/60Hz	15,000
PVE-173/240(Under/Over Trip)	3-Ph, 4-W, 100V to 139V (L-N) 50/60Hz	15,000
PVE-380/480(Under/Over Trip)	3-Ph, 4-W, 220V to 277V (L-N) 50/60Hz	15,000

Optional auxiliary supply available on selected products, contact PMK sales office for more Info.

PVU/Z & PVO/H - 1 x relay

Adjustable Trip (75%-100%) Under Trip (100%-125%) Over Trip

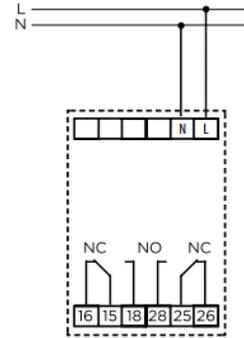
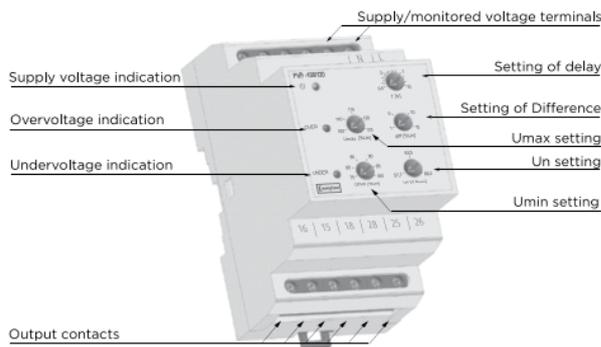


Protector Trip Relays

Connections & Prices

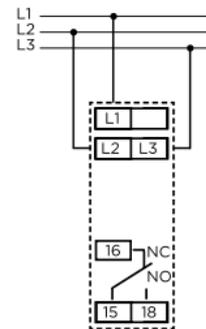
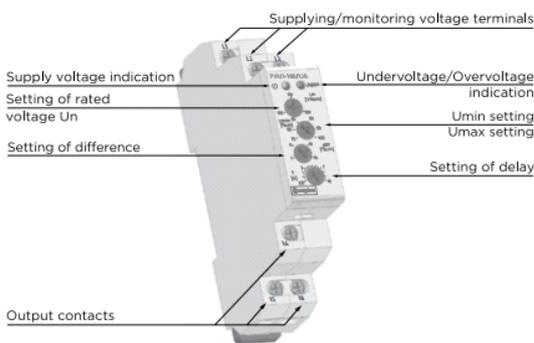
PVB - 2 x relay

Adjustable Trip (75%-100%) Under Trip (100%-125%) Over Trip



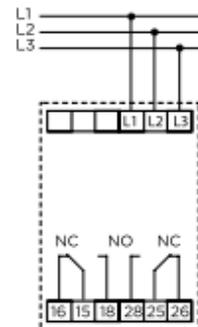
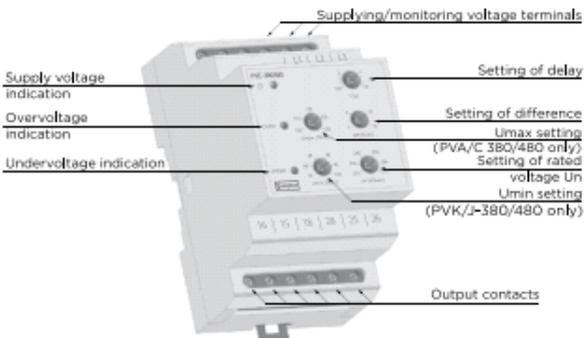
PVK/J & PVA/C - 1 x relay (100/120,173,240)

Adjustable Trip (75%-100%) Under Trip (100%-125%) Over Trip



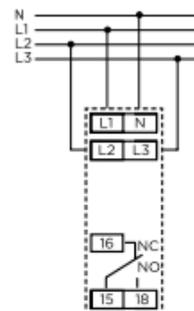
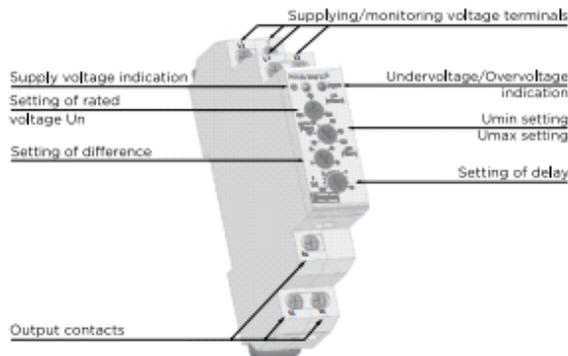
PVM - 2 x relay & PVK/J & PVA/C - 1 x relay (380/480)

Adjustable Trip (75%-100%) Under Trip (100%-125%) Over Trip



PVV/X & PVP/S - 1 x relay (100/120,173,240)

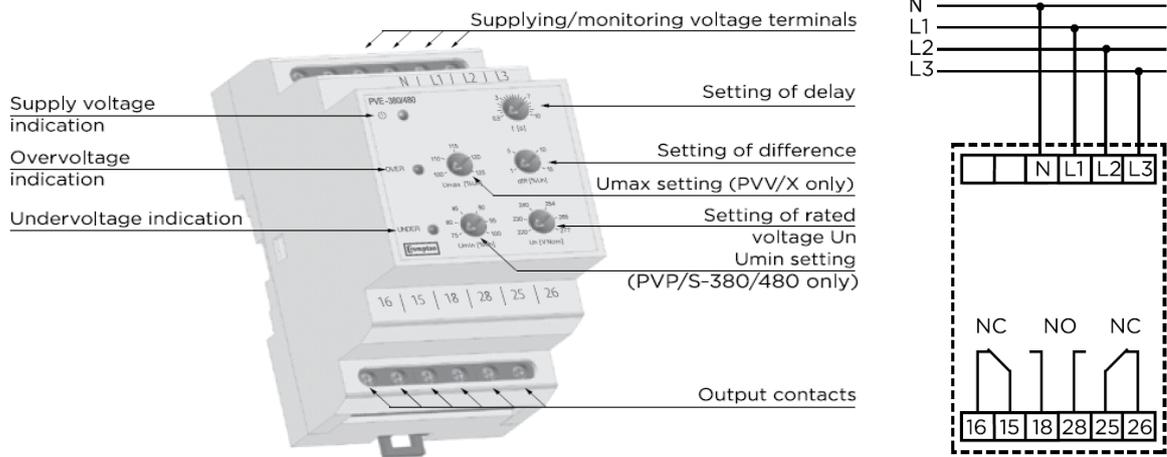
Adjustable Trip (75%-100%) Under Trip (100%-125%) Over Trip



Protector Trip Relays

Connections & Prices

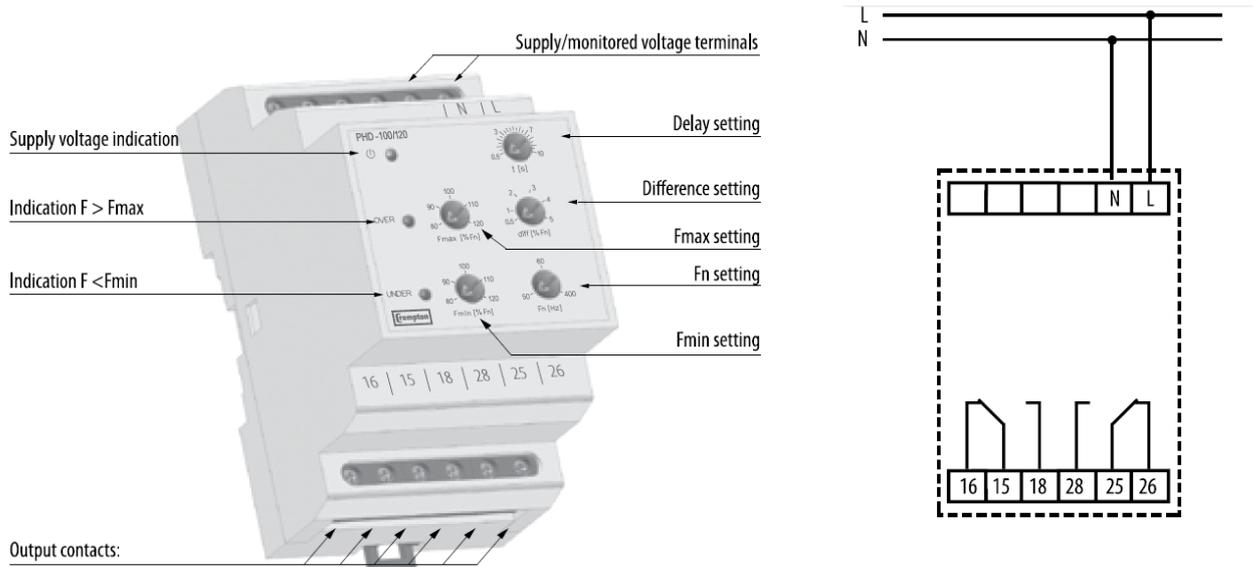
PVE - 2 x relay & PVV/X & PVP/S - 1 x relay (380/480) Adjustable Trip (75%-100%) Under Trip (100%-125%) Over Trip



AC Frequency Protector Relay

AC Frequency with adjustable time delay 0.5-10s, differential adjustable 0.5-5%.		
Part Number	Product Description	Price (Baht)
PHD-100/120(Under/Over Trip)	1-Ph, 57.7/69.3V L/N L/L AC (50, 60 and 400Hz)	12,000
PHD-173/240(Under/Over Trip)	1-Ph, 100/139V L/N L/L AC (50, 60 and 400Hz)	12,000
PHD-380/480(Under/Over Trip)	1-Ph, 220/277V L/N L/L AC (50, 60 and 400Hz)	12,000
PHD-280/860(Under/Over Trip)	1-Ph, 161/500V L/N L/L AC (50, 60 and 400Hz)	12,000

PHD x 2 relay Adjustable Trip (80%-120%)

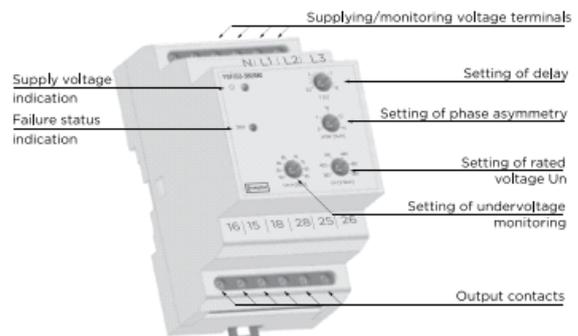
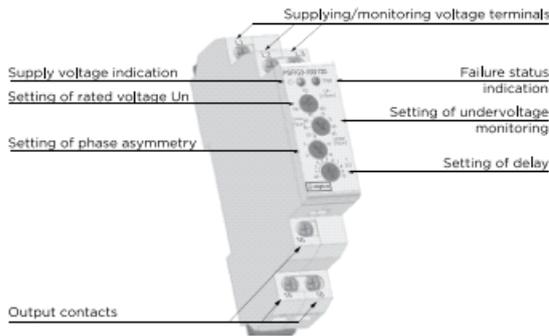


Phase Sequence and Phase Failure Protector Relay

Phase sequence/failure with fixed time delay 0.5s, differential fixed at 1%.		
Part Number	Product Description	Price (Baht)
PVR3-100/120(Under Trip)(Phase)	3-Ph, 3-W, 100 to 120V (L-L) AC 50/60Hz	10,000
PVR3-173/240(Under Trip)(Phase)	3-Ph, 3-W, 173 to 240V (L-L) AC 50/60Hz	10,000
PVR3-380/480(Under Trip)(Phase)	3-Ph, 3-W, 380 to 480V (L-L) AC 50/60Hz	10,000
PVR4-100/120(Under Trip)(Phase)	3-Ph, 4-W, 57.7 to 69.3V (L-N) AC 50/60Hz	10,000
PVR4-173/240(Under Trip)(Phase)	3-Ph, 4-W, 100 to 139V (L-N) AC 50/60Hz	10,000
PVR4-380/480(Under Trip)(Phase)	3-Ph, 4-W, 220 to 277V (L-N) AC 50/60Hz	10,000

Phase Balance, Sequence and Voltage Monitor Protector Relay

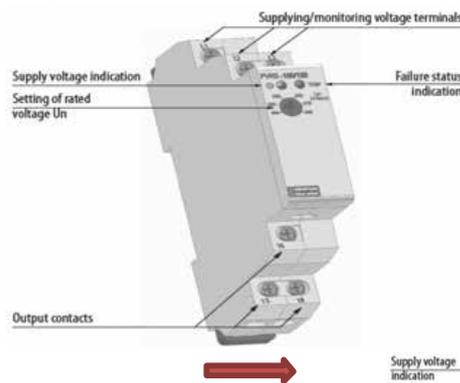
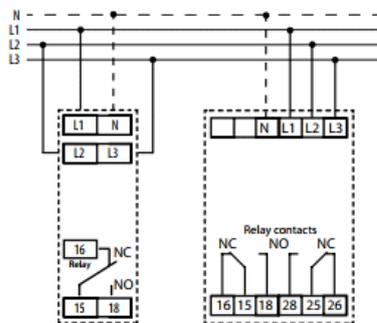
Phase sequence/balance with adjustable time delay 0.5-10s, differential fixed at 1%. Low voltage trip level adjustable (50-85%), phase inbalanced trip adjustable (5-15%).		
Part Number	Product Description	Price (Baht)
PSF/G3-100/120(Under Trip)(Phase)	3-Ph, 3-W, 100 to 120V (L-L) AC 50/60Hz	12,000
PSF/G3-173/240(Under Trip)(Phase)	3-Ph, 3-W, 173 to 240V (L-L) AC 50/60Hz	12,000
PSF/G3-380/480(Under Trip)(Phase)	3-Ph, 3-W, 380 to 480V (L-L) AC 50/60Hz	12,000
PSF/G4-100/120(Under Trip)(Phase)	3-Ph, 4-W, 57.7 to 69.3V (L-N) AC 50/60Hz	12,000
PSF/G4-173/240(Under Trip)(Phase)	3-Ph, 4-W, 100 to 139V (L-N) AC 50/60Hz	12,000
PSF/G4-380/480(Under Trip)(Phase)	3-Ph, 4-W, 220 to 277V (L-N) AC 50/60Hz	12,000



PSF/G3/4 - 1 x relay (100/120, 173/240)

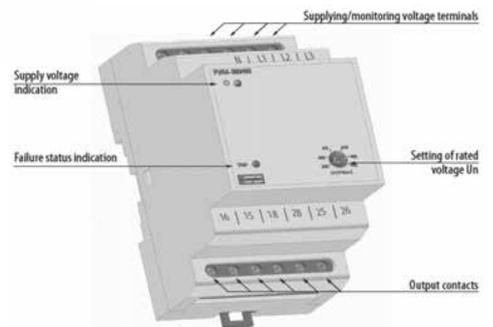
PSF/G3/4 - 2 x relay (380/480)

**Connection for PSF/G & PVR
Neutral connection for 4W only.**



**PVR3/4 - 1 x relay
(100/120, 173/240)
Fixed (85%) Under Trip**

**PVR3/4 - 2 x relay (380/480)
Fixed (85%) Under Trip**

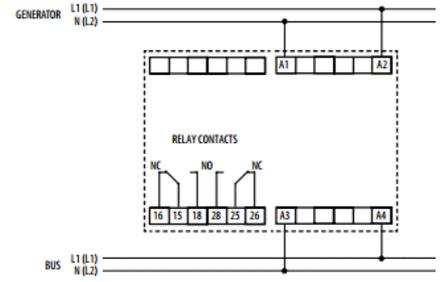
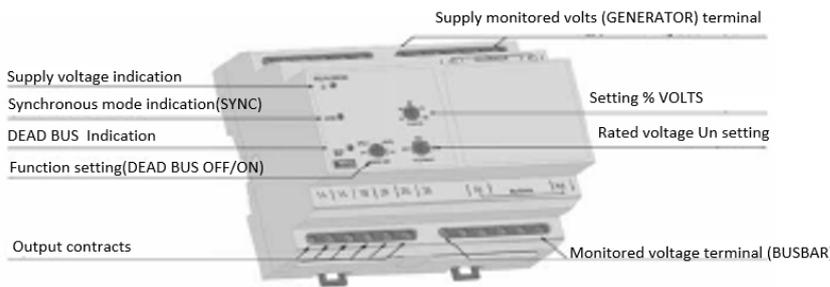


Synchro-Check Protector Relay (Paralleling)

Synchro-check with adjustable Sync tolerance 10-30%, dead bus on Udbon 25% Uon dead bus off Udboff 50% Uon. Burden ≤ 5VA.

Part Number	Product Description	Price (Baht)
PLL/D-100/120	1-Ph or 3-Ph 3/4 W, 57.7V, 63.5V, 69.3V 45-65Hz	21,500
PLL/D-173/240	1-Ph or 3-Ph 3/4 W, 100 - 139V, 45-65Hz	21,500
PLL/D-380/480	1-Ph or 3-Ph 3/4 W, 220 - 277V, 45-65Hz	21,500
PLL/D-277/500	1-Ph or 3-Ph 3/4 W, 277 - 500V, 45-65Hz	21,500

PLL/D x 2 relay

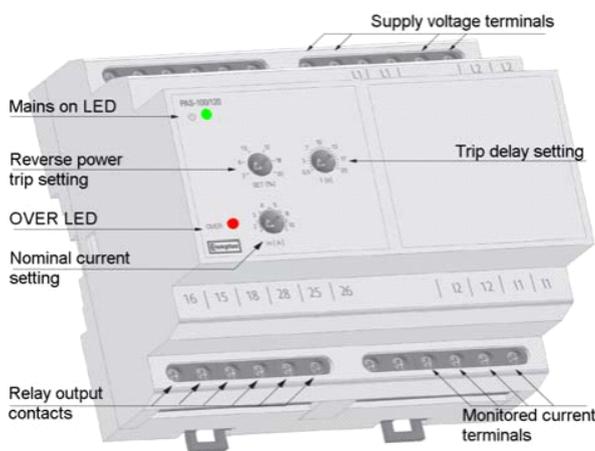


Reverse Power (Current) Protector Relay

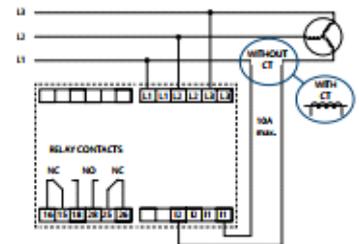
Reverse Power with adjustable reverse trip 2-20% (Cos φ = 1), with adjustable time delay 0.5-20 seconds, differential fixed at 1%. range 2-100% (0.2/0/0.2 Cap/Ind). Burden ≤ 5VA

Part Number	Product Description	Price (Baht)
PAT-100/120	3-Ph, 3-W, 100 - 120V, 2A - 10A, 45-65Hz	13,000
PAT-173/240	3-Ph, 3-W, 173 - 240V, 2A - 10A, 45-65Hz	13,000
PAT-380/480	3-Ph, 3-W, 380 - 480V, 2A - 10A, 45-65Hz	13,000
PAS-100/120	1-Ph or 3-Ph, 4-W, 57.7- 69.3V, 2A - 10A, 45-65Hz	13,000
PAS-173/240	1-Ph or 3-Ph, 4-W, 100 - 139V, 2A - 10A, 45-65Hz	13,000
PAS-380/480	1-Ph or 3-Ph, 4-W, 220 - 277V, 2A - 10A, 45-65Hz	13,000

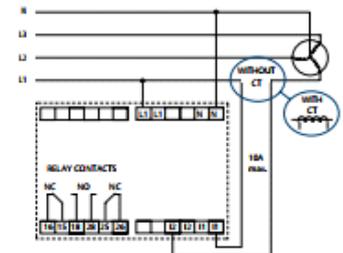
PAT & PAS x 2 relay



PAS



PAT



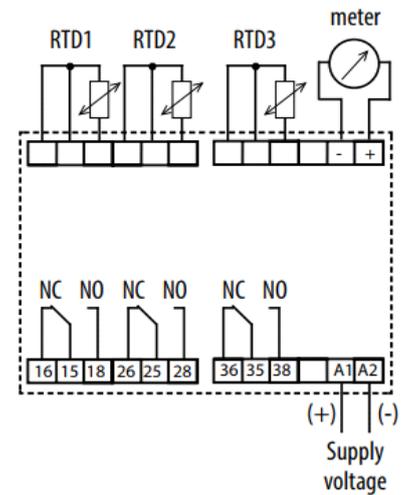
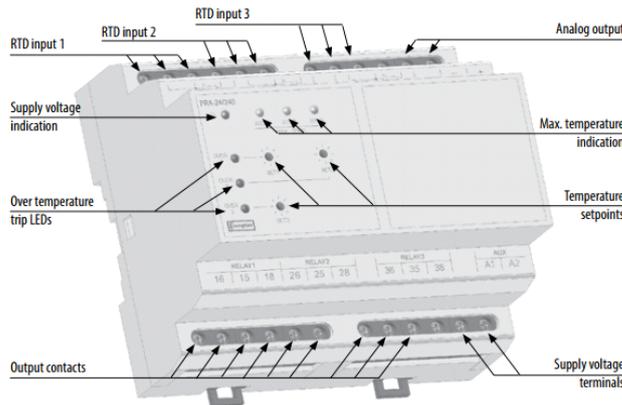
Protector Trip Relays

Connections & Prices

Hot Spot RTD 3 Temperature Relay

RTD Temperature, range 0-250°C, 1mA O/P = 250°C, differential fixed at 2%		
Part Number	Product Description	Price (Baht)
PRA-12/24-100	3 RTD PT100 3 Set Points, Auxiliary 12-24V DC	TBA
PRA-24/240-100	3 RTD PT100 3 Set Points, Auxiliary 24/240V AC/DC	TBA
PRB-12/24-100	3 RTD PT100 2 Set Points, Auxiliary 12-24V DC	TBA
PRB-24/240-100	3 RTD PT100 2 Set Points, Auxiliary 24/240V AC/DC	TBA
PRC-12/24-100	3 RTD PT100 1 Set Points, Auxiliary 12-24V DC	TBA
PRC-24/240-100	3 RTD PT100 1 Set Points, Auxiliary 24/240V AC/DC	TBA

PRA/B/C 1 to 3 relays

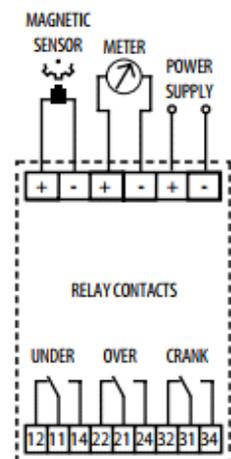
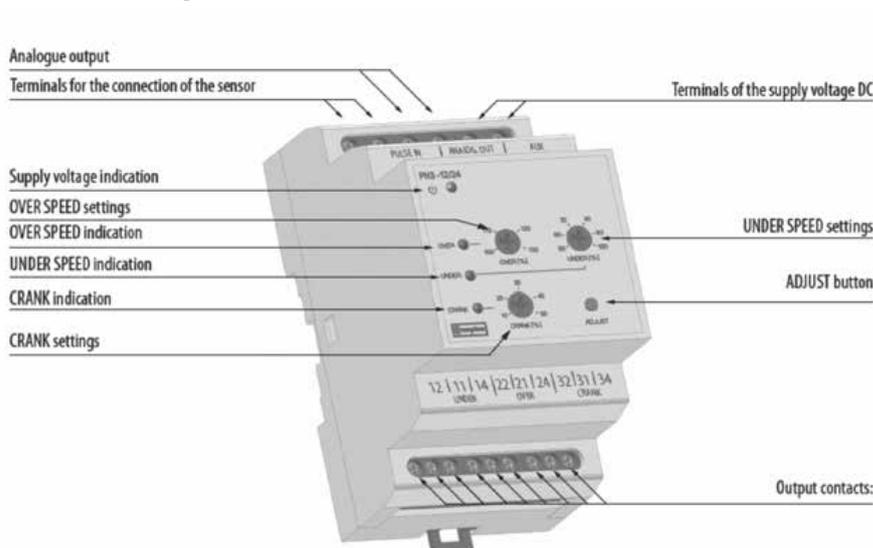


Speed Sensing Protector Relay

Speed sensing, adjustable trips 'Crank' 10-50%, 'Under-speed' 50-100%, 'Over-speed' 100-130% differential fixed at 2%, 1mA O/P =133% of rated speed. Magnetic pick up input.

Part Number	Product Description	Price (Baht)
PH3-12/24	5-75V p-p, 0-1kHz Min 0-10kHz Max, Aux 12-24V DC	19,000

PH3 x 3 relay

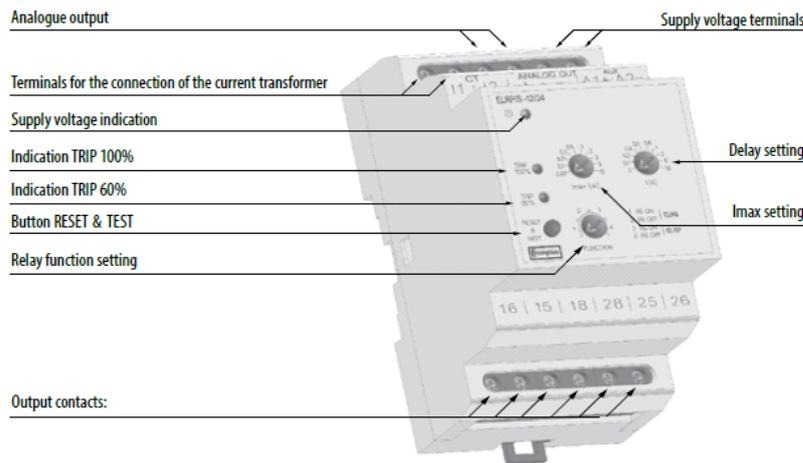


ELR Earth Leakage Protector Relay

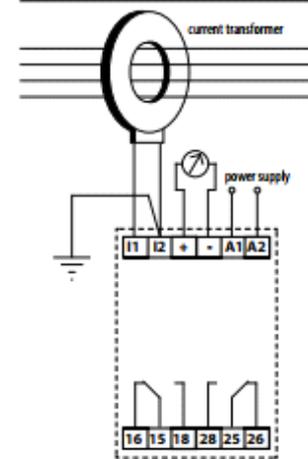
Earth leakage sensing, adjustable trip levels 0.03A-10A, time delay from 0-10 seconds. Analogue O/P, I_{pa} current level=60%(I_{max}), Pre-alarm difference=10%, response time<40ms, 20x overload 1s

Part Number	Product Description	Price (Baht)
ELRP/S-12/24	Input Core Balance CT, Auxiliary 12-24V DC	TBA
ELRP/S-24/240	Input Core Balance CT, Auxiliary 24/240V AC/DC	TBA

ELRP/S x 2 relay

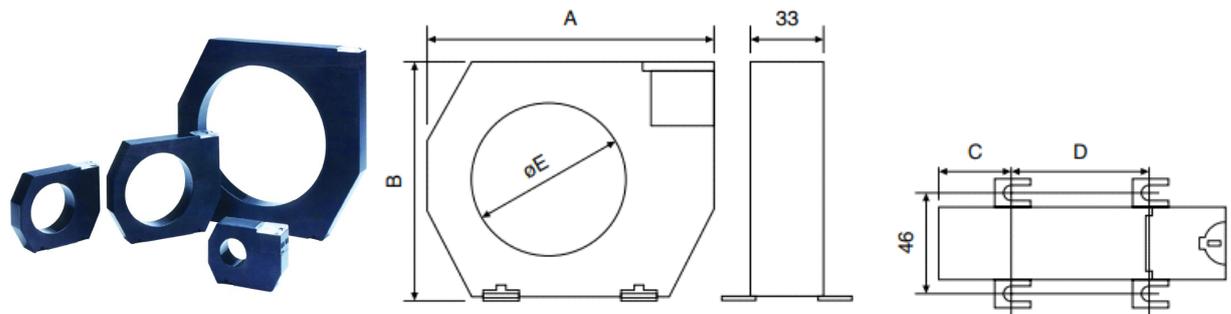


The grounding device must lead outside the current transformer.



Core Balanced Current Transformer

For use with ELRP/S and 373-ELR products. All system conductors are passed through the CT aperture, the CT measures the current flowing to the load and returning, when subtracted from each other if the result is not zero then this is the leakage current which will flow into protector.



Approvals: IEC 60044-1, VDE 0414

Core balance CT, range 0.03 - 10A, system voltage 720V maximum. 50Hz or 60Hz, IP20						
Part Number	Dim A	Dim B	Dim C	Dim D	Dim E	Price (Baht)
CBT-94F-035	100mm	79mm	26mm	48.5mm	35mm	10,000
CBT-94F-070	130mm	110mm	32mm	66mm	70mm	14,500
CBT-94F-105	170mm	146mm	38mm	94mm	105mm	21,000
CBT-94F-140	220mm	196mm	49mm	123mm	140mm	27,000
CBT-94F-210	299mm	284mm	69mm	161mm	210mm	33,000
CBT-94F-300	400mm	380mm	-	-	300mm	41,000

Protector Trip Relays

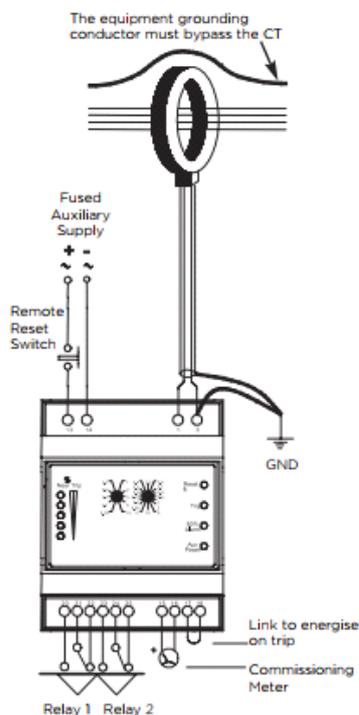
Features and Benefits



Other Features

- UL approval E203000.
- Yellow bar graph visual indication of leakage.
- User selectable energise de-energise on trip.
- Test/Reset button.
- 2xSPCO plus near trip alarm.

Connections



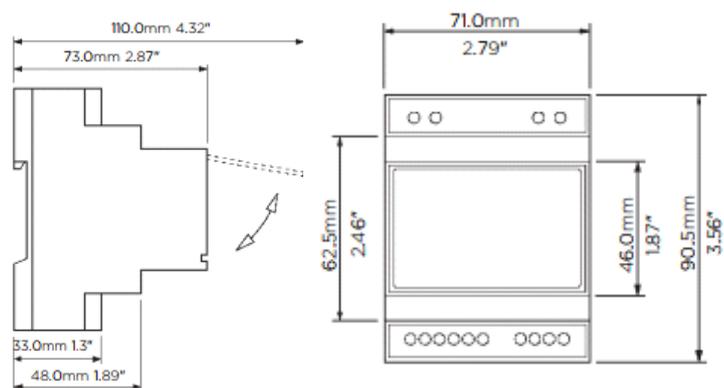
373-ELR Earth Leakage Protector Relay

Residual current devices are used to detect potentially dangerous earth fault currents before damage is caused. An undetected fault current may lead to cables overheating & cause fire if high fault currents are involved. Hazardous voltages may appear on earth equipment putting lives at risk. This product is designed to protect against any such instances.

General Specifications

Setpoint accuracy:	50% < trip point current ≤ 100% as per IEC1543
Input rating:	30mA-10A supplied from CBT
Time delay:	16 positions between 0 to 10 seconds when trip is set to 30mA delay is disabled
Frequency:	50Hz or 60Hz ±10%
Overload:	20 x nominal for 1 second
Response time:	< 40ms
Auxiliary voltage:	12-48VDC or 24-48VDC or 100/250V AC/DC* DC = +25/-15%, AC = ±20% tolerance
Burden:	Less than 1.5 Watts
Analogue output:	0-1mA = 0-100% of trip level
Relay contacts:	2 x SPCO 8 amps @ 250VAC or 30VDC latch until reset, de-energise on trip
Operating temperature:	-20 to +60°C
Enclosure:	Terminals IP20

Dimensions



Part No.	Product Description	Price (Baht)
373-ELR	Input core balance CT	38,000

* Please select auxiliary required.

Protector Trip Relays

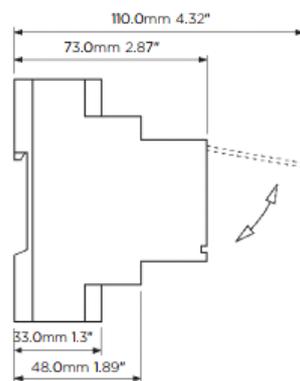
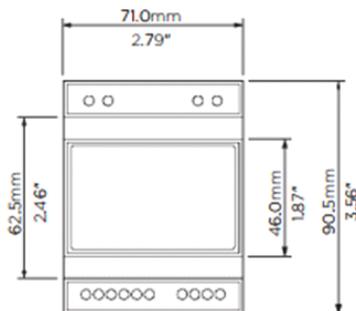
Features and Benefits



Other Features

- UL approval E203000.
- Yellow bar graph visual indication of leakage.
- Test/Reset button.

Dimensions



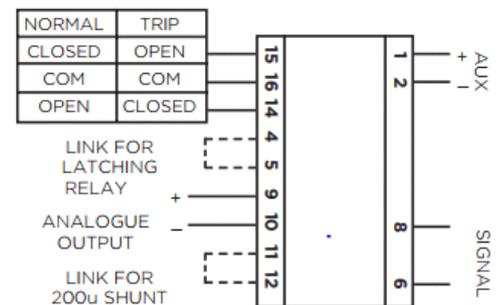
373-GFR Ground Fault Protector Relay

Designed to detect dangerous ground fault currents before damage is caused to expensive power assets. An undetected fault current may lead to cables overheating and cause fire if high fault currents are involved. Hazardous voltages may appear on earth equipment putting lives at risk. The fault current is continuously monitored and compared with the user selected trip level, if this is exceeded the relay will indicate a fault condition with a fast response time < 40ms so supply can be disconnected before serious damage can occur.

General Specifications

Setpoint accuracy:	50% < trip point current ≤ 100% as per IEC1543
Measuring input:	A.C. voltage developed across N-G link.
Measuring range:	0.2Ω or 2Ω shunt impedance link selectable
Trip settings:	100, 150, 200, 250, 300, 450, 600, 750, 800 & 1200A
Time delay:	16 positions between 0 to 10 seconds
Frequency:	50Hz/60Hz
Overload:	Maximum input voltage 600V
Response time:	< 40ms (at 5x rated trip amps ignoring T delay)
Auxiliary voltage:	12-48VDC or 24-48VDC or 100/250V AC/DC* DC = +25/-15% , AC = ±20% tolerance
Burden:	Less than 1.5 Watts
Analogue output:	0-1mA = 0-100% of trip level
Relay contacts:	2 x SPCO 8 amps @ 250VAC or 30VDC latch until reset, de-energise on trip
Operating temperature:	-20 to +60°C
Enclosure:	terminals IP20.

Connections: Install the neutral to ground shunt resistor in a suitable location. Connect the shunt sense wires directly to terminals N (neutral side) and G (ground side) on the relay. Cabling between the shunt resistor and the ground fault relay kept to a minimum.



Part No.	Product Description	Price (Baht)
373-GFR	AC voltage developed across N-G link	40,000

* Please select auxiliary required.



252-Case



253-Case



256-Case

250 Series Protector Trip Relay

Protector trip relays provide continuous monitoring and protection of any electrical parameter. DIN-rail protectors offer numerous trip functions for single and three-phase power systems, including over and under voltage, current, frequency, phase sequence/failure or balance, reverse power, synchro-check, speed sensing and power systems, including over/under voltage, current, frequency, phase, DC inputs, RTD & earth leakage.

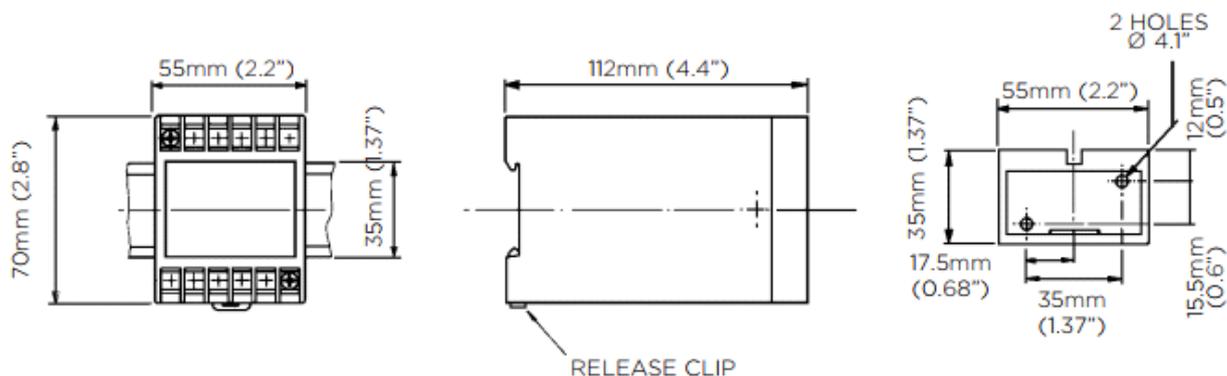
General Specifications

Setpoint Repeatability:	0.5% of full span.
Input ratings depending on product chosen.	
AC current products:	1A or 5A CT, 0.2A to 10A on request
AC voltage products:	100V, 110V, 115V, 120V, 208V, 220V, 240V, 270V, 277V, 280V, 400V, 415V, 440V or 480V
Frequency products:	50Hz, 60Hz, 400Hz (Also available with AC current and voltage protectors)
RTD products:	10Ω copper & 100Ω platinum
Current overload:	2 x nominal continuous 10 x nominal for 3 seconds
Voltage overload:	1.25 x nominal continuous 1.5 x nominal for 10 seconds
Burden	
AC Current product:	0.1-2VA (depending on product range)
AC Voltage product:	0.3 to 5VA (depending on product range)
Auxiliary supply:	AC: 100V, 110V, 120V, 208V, 220V, 240V, 480V DC: 12V, 24V, 48V, 110V & 125V ±20% 4VA Only available on certain models.
Operating temperature:	-20 to +60 °C
Output relays:	AC: 240V 5A non-inductive DC: 24V 5A resistive 2 pole change
Time delay:	0.5-10s adjustable (on certain models) 1-30s factory pre-set (on certain models)
Hysteresis(differential):	Internal set or adjustable 1-15% (depending on product range)
Enclosure:	IP 50
Enclosure style:	DIN-rail
Approvals:	UL approval LR52 592 CSA approval E113067

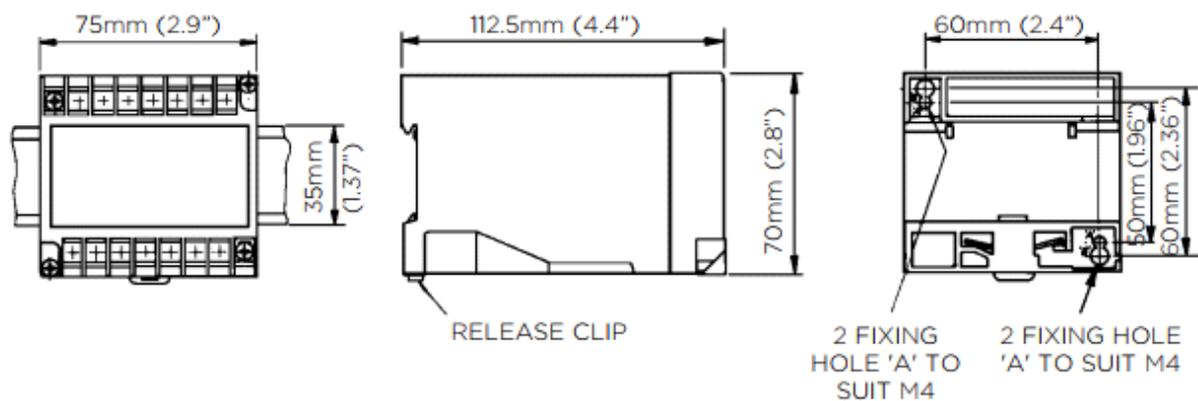
Protector Trip Relays

Dimensions

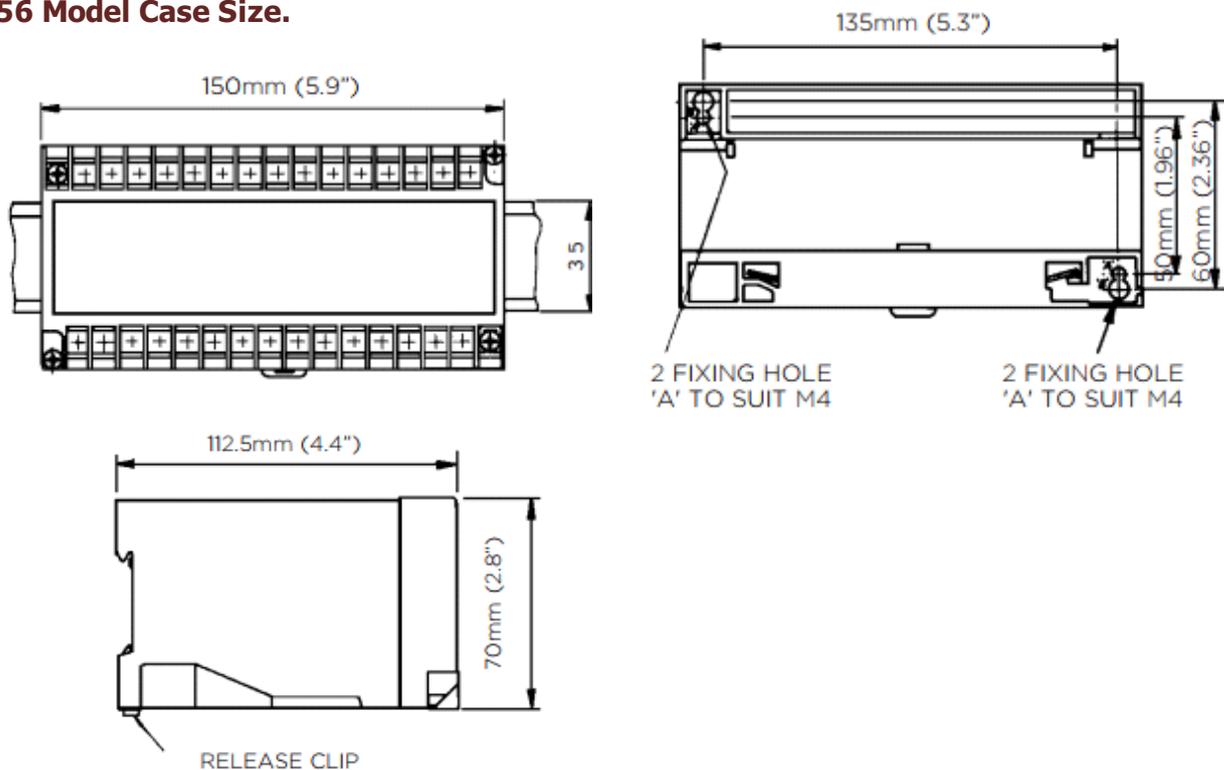
252 Model Case Size.



253 Model Case Size.



256 Model Case Size.



AC Current Protector Relay

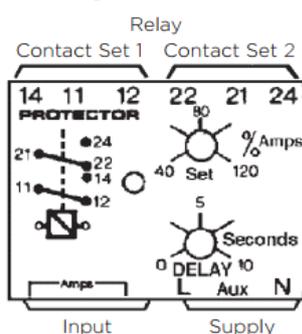
Select Input Current:	5 Amp version	1 Amp version	Values between 0.2 and 10A**
Select Auxiliary Supply :	AC: 100V, 110V, 120V, 208V, 220V, 240V, 400V, 415V, 480V +/-20% DC: 12V, 24V, 48V, 110V or 125V +/- 20%		
Select Frequency:	50Hz	60Hz	400Hz
Differential (Hysteresis) :	Preset at 1% std	Values between 1% and 10% contact PMK sales team	
Time Delay :	0-10 seconds user adjustable as standard		
Relay Trip :	40%-120% user adjustable		

Please select from the above table the configuration required.

** for non standard input values please contact PMK sales team.

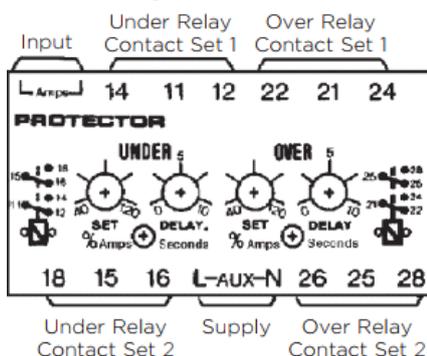
252-PAO & 252-PAU

2 x relay contacts



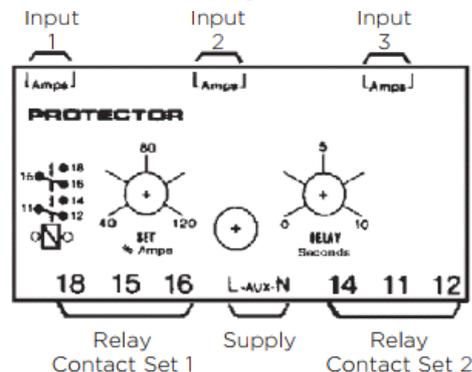
253-PAD

4 x relay contacts



253-PAP & PAV

2 x relay contacts



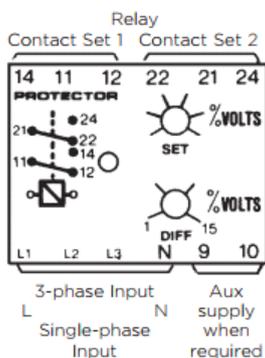
Part Number	Product Description	ANSI No.	Price (Baht)
252-PAUW5A(Under trip)	1-Ph, 5A AC, 50/60Hz, Aux, de-energise	37	14,000
252-PAUW1A(Under trip)	1-Ph, 1A AC, 50/60Hz, Aux, de-energise	37	14,000
252-PAOW5A (Over trip)	1-Ph, 5A AC, 50/60Hz, Aux, energise	51	14,000
252-PAOW1A (Over trip)	1-Ph, 1A AC, 50/60Hz, Aux, energise	51	14,000
253-PADW5A(Under/Over trip)	1-Ph, 5A AC, 50/60Hz, Aux, de or energise	37/51	22,000
253-PADW1A(Under/Over trip)	1-Ph, 1A AC, 50/60Hz, Aux, de or energise	37/51	22,000
253-PAVW5A(Under trip)	3-Ph 3/4W, 5A AC, 50/60Hz, Aux, de-energise	37	18,000
253-PAVW1A(Under trip)	3-Ph 3/4W, 1A AC, 50/60Hz, Aux, de-energise	37	18,000
253-PAPW5A(Over trip)	3-Ph 3/4W, 5A AC, 50/60Hz, Aux, energise	51	18,000
253-PAPW1A(Over trip)	3-Ph 3/4W, 1A AC, 50/60Hz, Aux, energise	51	18,000
Option	DC auxiliary		add 2,000
Option	400Hz calibration		add 3,500
Option	Fixed preset differential available 1-10%		No Charge

AC Voltage Protector Relay

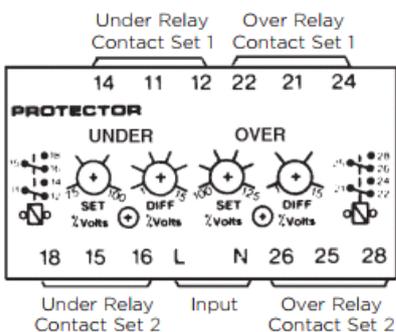
Select Input Voltage:	100V, 110V, 120V, 208V, 220V, 270V, 280V, 400V, 415V, 440V, 480V	
Select Auxiliary Supply:	AC: 100V, 110V, 120V, 208V, 220V, 240V, 400V, 415V, 480V +/-20% DC: 12V, 24V, 48V, 110V or 125V +/- 20%	
Select Frequency:	45/65 Hz	360/440 Hz
Differential (Hysteresis):	Preset at 1% std	1 to 15% user adjustable as standard
Time Delay:	Preset up to 30s	0 - 10 seconds user adjustable as standard
Relay Trip:	Under trip 75 to 100% & Over trip 100 to 125% user adjustable	

Please select from the above table the configuration required.

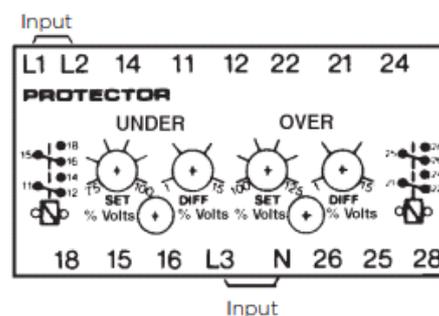
With adjustable differential
252-PVU, 252-PVO, 252-PVV,
252-PVP, 252-PVK, 252-PVA



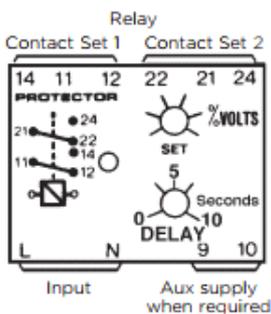
With adjustable differential
253-PVB



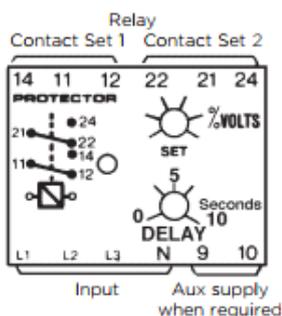
With adjustable differential
253-PVE & 253-PVM



With adjustable time delay
252-PVZ, 252-PVH



With adjustable time delay
252-PVX, 252-PVS, 252-PVC



Protector Trip Relays

Connections & Prices

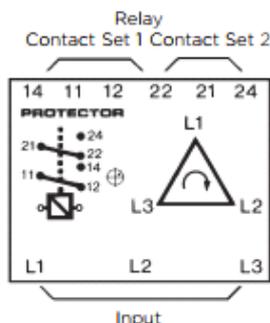
Part Number	Product Description	ANSI No.	Price (Baht)
Adjustable differential fixed preset time delay.			
252-PVUW(Under trip)	1-Ph, Volts AC, 50/60Hz, de-energise	27	14,000
252-PVOW(Over trip)	1-Ph, Volts AC, 50/60Hz, energise	59	14,000
253-PVB(Under/Over trip)	1-Ph, Volts AC, 50/60Hz, de/energise	27/59	22,000
252-PVKW(Under trip)	3-Ph, 3-W, Volts AC, 50/60Hz, de-energise	27	16,000
252-PVAW(Over trip)	3-Ph, 3-W, Volts AC, 50/60Hz, energise	59	16,000
253-PVM(Under/Over trip)	3-Ph, 3-W, Volts AC, 50/60Hz, de/energise	27/59	18,000
252-PVVW(Under trip)	3-Ph, 4-W, Volts AC, 50/60Hz, de-energise	27	16,000
252-PVPW(Over trip)	3-Ph, 4-W, Volts AC, 50/60Hz, energise	59	16,000
253-PVE(Under/Over trip)	3-Ph, 4-W, Volts AC, 50/60Hz, de/energise	27/59	18,000
Option	Fixed preset time delay available 0-30 secs		add 3,000
Option	AC auxiliary		No Charge
Option	DC auxiliary		add 2,000
Option	400Hz calibration		add 3,500
Adjustable time delay fixed preset differential.			
252-PVZW(Under trip)	1-Ph, Volts AC, 50/60Hz, de-energise	27	16,000
252-PVHW(Over trip)	1-Ph, Volts AC, 50/60Hz, energise	59	16,000
252-PVJW(Under trip)	3-Ph, 3-W, Volts AC, 50/60Hz, de-energise	27	18,000
252-PVCW(Over trip)	3-Ph, 3-W, Volts AC, 50/60Hz, energise	59	18,000
252-PVXW(Under trip)	3-Ph, 4-W, Volts AC, 50/60Hz, de-energise	27	14,000
252-PVSW(Over trip)	3-Ph, 4-W, Volts AC, 50/60Hz, energise	59	14,000
Option	AC auxiliary		No Charge
Option	Dc auxiliary		add 2,000
Option	400Hz calibration		add 3,500
Option	Fixed preset differential available between 1-10%		No Charge

Phase Sequence and Phase Failure Protector Relay

Select Input Voltage:	100V, 110V, 120V, 208V, 220V, 270V, 280V, 400V, 415V, 440V		
Select Frequency:	50Hz	60Hz	400Hz
Relay Trip:	Fixed preset at 85% of nominal		

Please select from the above table the configuration required.

252-PVR



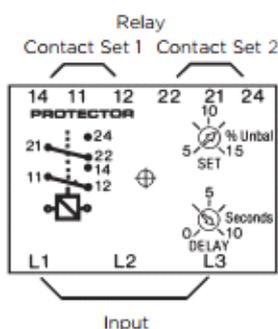
Part Number	Product Description	ANSI No.	Price (Baht)
252-PVR(Phase)	3-Ph, 3-W, AC voltage, de-energise trip	47	9,000

Phase Balance, Sequence and Voltage Monitor Protector Relay

Select Input Voltage:	100V, 110V, 120V, 208V, 220V, 270V, 280V, 400V, 415V, 440V, 480V		
Select Frequency:	50Hz	60Hz	
Under Voltage setpoint:	Preset at 15% of nominal voltage (252-PSG only) 10 to 30% on requested		
Time Delay:	0-10 seconds user adjustable as standard	values 10 to 30s contact PMK	
Relay Trip:	Phase unbalance adjustable 5 to 15%		

Please select from the above table the configuration required.

252-PSF & 252-PSG



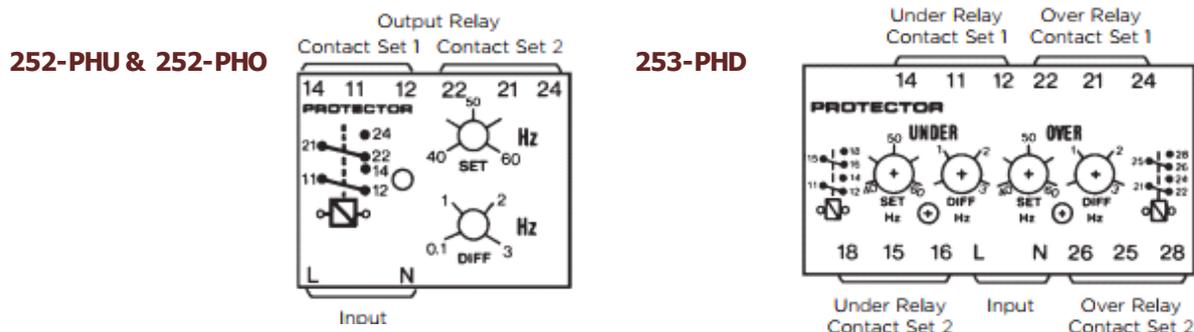
Note: Neutral connection not required.

Part Number	Product Description	ANSI No.	Price (Baht)
252-PSF(Phase)	3-Ph 3/4W, AC voltage, de-energise trip	47	14,000
252-PSG(Phase)(Under Volts 5-15%)	3-Ph 3/4W, AC voltage, de-energise trip	47/27	14,000

AC Frequency Protector Relay

Select Input Voltage:	100V, 110V, 120V, 208V, 220V, 270V, 280V, 400V, 415V, 440V, 480V		
Select Frequency:	40/60Hz	50/70Hz	360/440 Hz
Differential (Hysteresis):	40/60Hz, 50/70Hz adjustable 0.1-0.3Hz		360/440Hz adjustable 10-30Hz

Please select from the above table the configuration required.

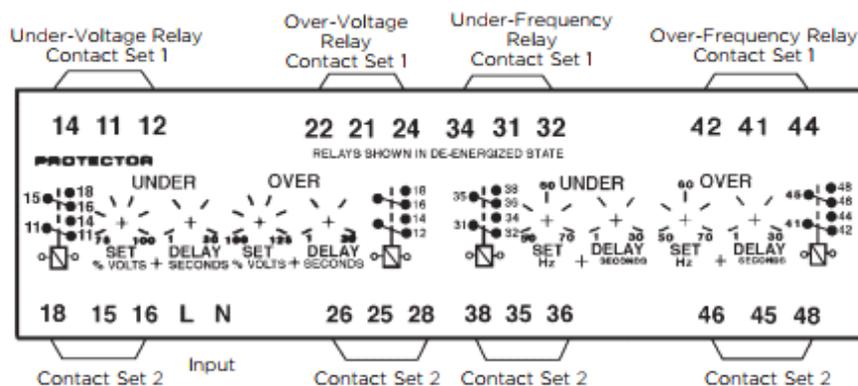


Part Number	Product Description	ANSI No.	Price (Baht)
252-PHU (Under)	1-Ph de-energise on trip	81U	16,000
252-PHO (Over)	1-Ph energise on trip	81O	16,000
253-PHD(Under/Over Trip)	1-Ph de/energise on trip	81O/U	18,000

Combined AC Voltage Under/Over & Frequency Protector Relay

Select Input Voltage:	100V, 110V, 120V, 208V, 220V, 270V, 280V, 400V, 415V, 440V		
Select Frequency:	40/60Hz	50/70Hz	360/440 Hz
Differential (Hysteresis) Hertz:	40/60Hz, 50/70Hz fixed preset at 0.1Hz		360/440Hz fixed preset 10Hz
Differential (Hysteresis) Volts:	fixed internally at 1%		
Time Delay:	0-30 seconds user adjustable as standard		
Relay Trip Voltage:	Under trip 75 to 100% & Over trip 100 to 125% user adjustable		

Please select from the above table the configuration required.

256-PHV

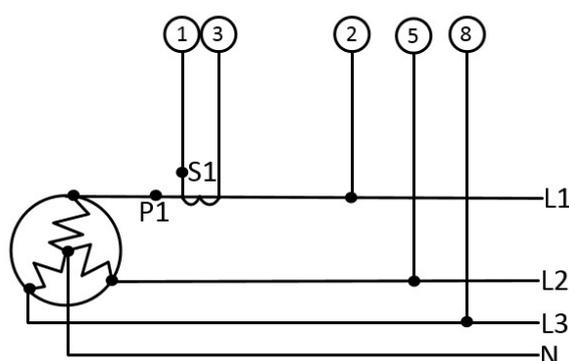
Part Number	Product Description	ANSI No.	Price (Baht)
253-PHV(Under/Over Trip)	1-Ph de/energise on trip, for AC voltage and frequency	27/59 81O/U	48,500

Reverse Power (Current) Protector Relay

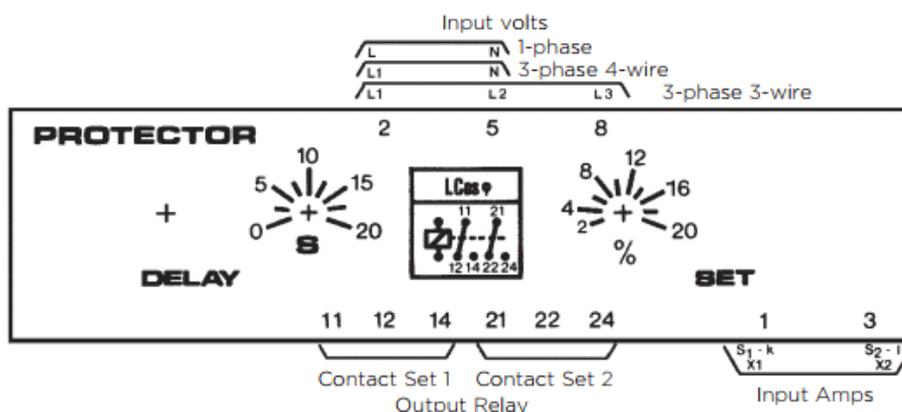
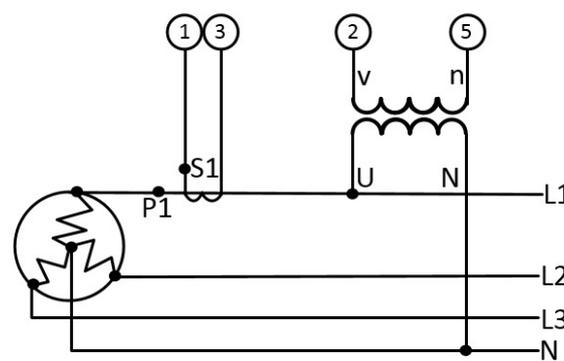
Select Input Voltage:	100V, 110V, 120V, 208V, 220V, 270V, 280V, 400V, 415V, 440V		
Select Input Current:	5A or 2, 3, 4, 6, 8 and 10A		
Select Frequency:	50Hz	60Hz	400Hz
Monitoring Range Capacitive:	Power Factor: 0.5 inductive/unity/0.2 Current: 20 to 100% of nominal		
Relay Trip:	2 to 20% customer adjustment		
Differential (Hysteresis):	Fixed preset at 1%		
Time Delay:	0 to 20 seconds adjustable.		

Please select from the above table the configuration required.

256-PAR & 256-PAT



256-PAS & 256-PAQ



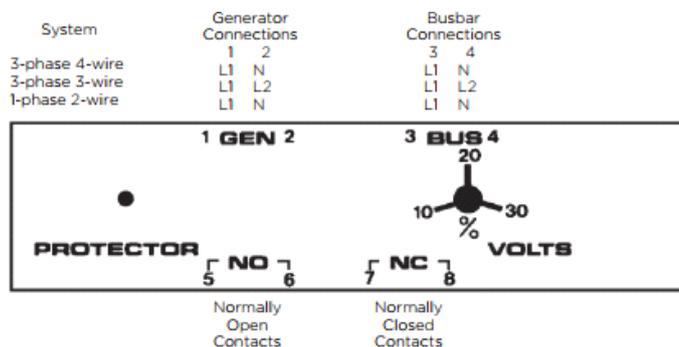
Part Number	Product Description	ANSI No.	Price (Baht)
256-PAS	1-Ph & 3-Ph, 4-W, AC power, energise trip	32	18,000
256-PAQ (with test button)	1-Ph & 3-Ph, 4-W, AC power, energise trip	32	22,800
256-PAT	3-Ph, 3-W, AC power, energise trip	32	18,000
256-PAR (with test button)	3-Ph, 3-W, AC power, energise trip	32	22,800

Synchro-Check Protector Relay (Paralleling)

Select Input Voltage:	100V, 110V, 120V, 208V, 220V, 270V, 280V, 400V, 415V, 440V				
Select Frequency:	45Hz	50Hz	55Hz	60Hz	65Hz
Differential (Hysteresis):	Preset at 1% std		values between 1% and 10% contact PMK sales team		
Relay Trip:	10 to 30% of nominal voltage (6° to 20° electrical adjustment)				
Time Delay:	0 to 20 seconds adjustable.				

Please select from the above table the configuration required.

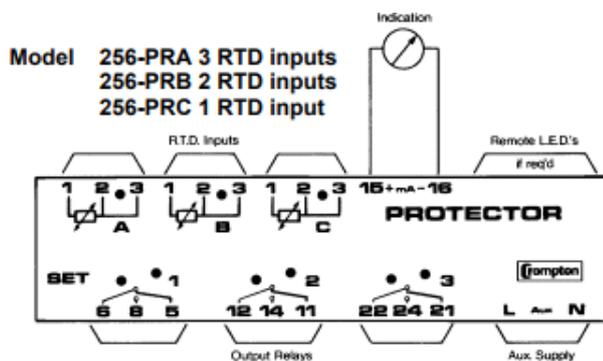
256-PLL & 256-PLD



Part Number	Product Description	ANSI No.	Price (Baht)
256-PLL (Synchro-check)	1-Ph & 3-Ph 3/4W, AC voltage, energise trip	25	22,000
256-PLD (Synchro-check + dead bus)	1-Ph & 3-Ph 3/4W, AC voltage, energise trip	25	23,000

Hot Spot RTD 3 Temperature Relay

Select AC Auxiliary Voltage:	100V, 110V, 120V, 208V, 220V, 270V, 280V, 400V, 415V, 440V, 480V	
RTD Input:	100Ω platinum PT100	10Ω copper
Differential (Hysteresis):	Preset at 2% of range	
Input Range:	Minimum span 100°C	
Analogue Output:	0-1mA into 4kΩ	



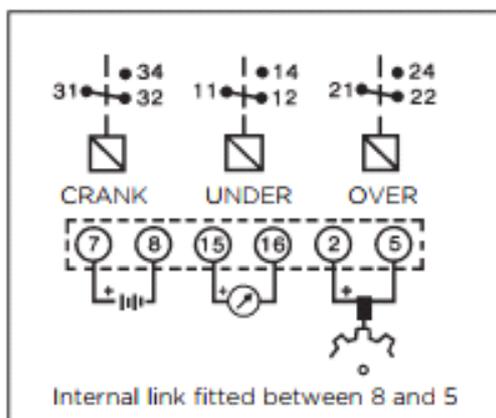
Part Number	Product Description	ANSI No.	Price (Baht)
256-PRA	3 RTD inputs, 3 set points, AC Aux	49	74,500
256-PRB	3 RTD inputs, 2 set points, AC Aux	49	65,000
256-PRC	3 RTD inputs, 1 set points, AC Aux	49	58,000

Speed Sensing Protector Relay

Pulse Input Voltage:	5V to 75V peak to peak		
Select Frequency Input:	0-1kHz to 0-10kHz		
Set Point Trip Level*:	SP1 = 10 to 50%	SP2 = 50 to 100%	SP3 = 100 to 130%
Differential (Hysteresis):	Pre-Set at 2% (SP1 resets at 20% of setting)		
Analogue Output:	0.75mA=100% nominal speed, 1mA = 133% nominal speed. Into 1kΩ load		
Select Auxiliary Supply:	12VDC or 24VDC +/- 20%		
Time Delay:	0 to 20 seconds adjustable.		

* The product can be either supplied to be commissioned by the customer so all settings are set to max speed or can be pre-set to the customers specification. For this please supply the required information:

- Nominal pulse frequency in (Hz) or nominal running speed (RPM) plus the number of flywheel teeth
- The battery supply.
- SP1 (Crank) setting trip point.
- SP2 (Under speed) setting trip point
- SP3 (Over speed) setting trip point



SP1 = de-energise on trip.

SP2 = energise on trip.

SP3 = de-energise on trip.

Part Number	Product Description	ANSI No.	Price (Baht)
253-PH3 12VDC	Crank, Under & Over trips, DC Aux	12/24	26,000
253-PH3 24VDC	Crank, Under & Over trips, DC Aux	12/24	26,000



Displays

3 x 3 digit-7 segment

LED display showing:

- Load amps (L1, L2, L3)
- Earth current (IEA)
- Generator kWh
- Generator kW
- Generator kVARh
- Generator Power Factor (PF)

1 x 3 digit-7 segment

LED display showing:

Mains volts (L1-N, L2-N, L3-N)
 Mains volts (L1-L2, L2-L3, L3-L1)
 Generator volts (L1-N, L2-N, L3-N)
 Generator volts (L1-L2, L2-L3, L3-L1)

1 x 4 digit-7 segment

LED display showing:

Generator Hz
 Mains Hz

Approvals

EN 61000-6-4
 EN 61000-6-2
 EN 61010-1

GEN-TRANS-EN/D Generator Set Controllers

Automatic Transfer and Switching unit for diesel or gas generators. The GEN-TRANS-EN/D controller unit offers automatic engine starting, stopping, transfer switching, protection, control and metering of generator sets. In the event of a mains supply failure, the unit automatically transfers the load from the mains to the generator. Microprocessor technology allows exact measurement, set point adjustment and timing functions of up to 83 parameters to be simply programmed and displayed from the front panel or communicated via PC-based RS232 standards.

General Specifications

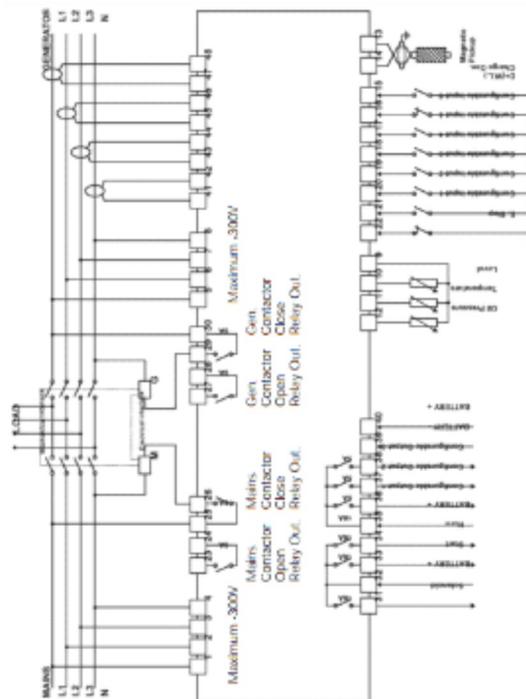
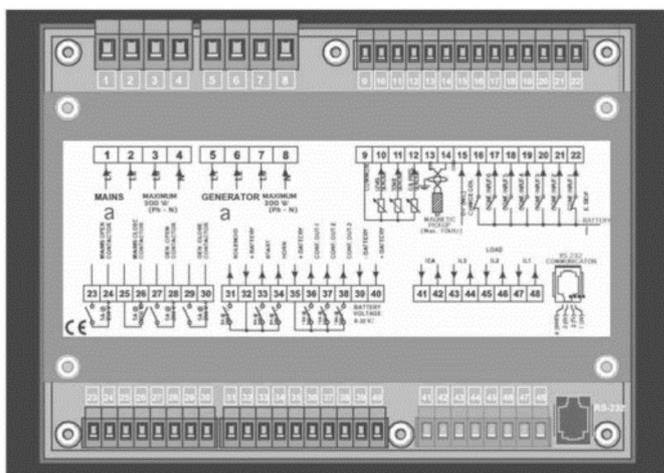
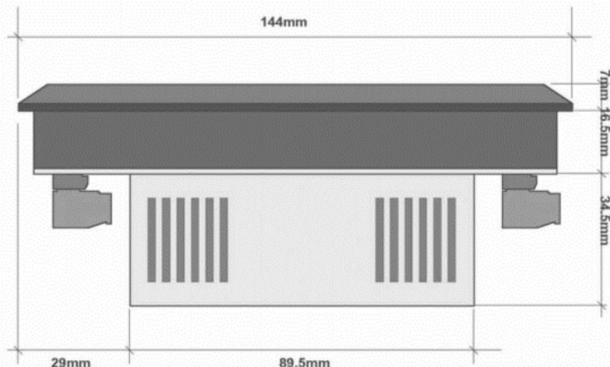
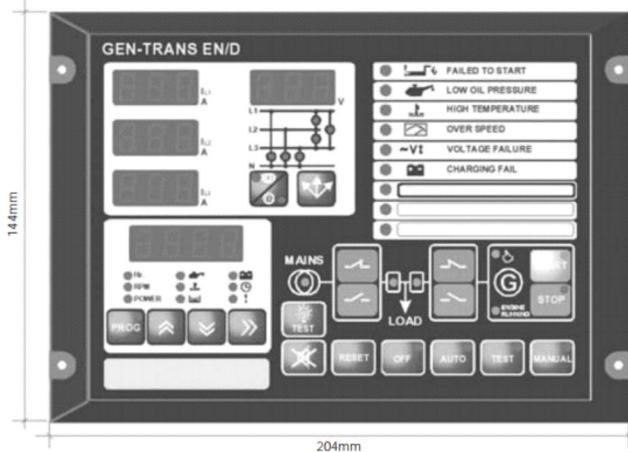
Accuracy:	Volts = 1% , Frequency = 0.25% of range
Generator speed	
Measurement:	from generator output or magnetic pick up
Inputs	
Mains input voltage:	35 to 300V L-N AC 3 phase 4 wire system
Generator voltage:	35 to 300V L-N AC 2 wire connection
Generator frequency:	15.6 to 99.9Hz (resolution 0.1Hz)
Magnetic pickup range:	3 to 35 volts peak continuously
Magnetic pickup frequency:	35Hz to 10kHz
CT secondary:	5A
DC battery supply :	8-32V DC. Operating current is 360mA cranking rodpoets can be 0V for 100ms
Battery voltage measurement:	8-32V DC, accuracy 1% , 0.1V res
Charge generator:	Excitation Current 220mA, max 4 watts
Outputs	
Fuel relay output:	16 Amp DC at DC supply voltage
Start relay output:	16 Amp DC at DC supply voltage
Horn relay output:	16 Amp DC at DC supply voltage
Mains open relay output:	5 Amp at DC supply voltage
Mains close relay output:	5 Amp at DC supply voltage
Generator open relay output:	5 Amp at DC supply voltage
Generator close relay output:	5 Amp at DC supply voltage
3 x configurable outputs 1 to 3:	5 Amp at DC supply voltage
Contact sensing inputs:	6 x Configurable failure inputs 1 to 6 1 x Emergency stop
Programmable communication:	RS232 serial port
Operating temperature:	- 40 to + 70°C
Enclosure:	IP54 front panel, IP20 rear of panel
Operating/Storage humidity:	90% (Non-Condensing)
Password protected:	Via front panel or RS232 port

Generator Set Controllers

Connections & Prices

LED Indicators and Alarms.

Failure Indicators	Status Indicators	Information Alarms
Engine Start Failure	Off Mode LED	Low Battery Voltage
High Temperature	Test Mode LED	Emergency
Low Oil Pressure	Automatic Mode LED	Maintenance Due
Engine Over Speed	Manual Mode LED	
Generator Voltage Failure	Manual Engine Start LED	
Charge Generator Failure	Manual Engine Stop LED	
Over Current	Engine Running	
User Definable Input 1 to 6	Mains Voltage Available LED	
	Gen. Voltage Ready LED	
	Gen. Contactor LED	
	Mains Contactor LED	



Panel Cut Out = 186mm x 138mm

Part Number	Product Description	Price (Baht)
GEN-TRANS-EN/D	Automatic Transfer & Switching unit for diesel & gas generator	45,000
GEN-SOFT	PC Communication and Programming software	Free



Technical Appendix I

When specifying current transformers for an application or system, it is advisable when calculating the total VA load drawn from the current transformer is to take into consideration the VA loss which occurs when copper wires are connected between the secondary of the current transformer and the measuring device. Below are tables to assist in this calculation.

Loss in copper wires between instrument and CT for 5A secondary

Wire cross section In mm ²	Loss in VA (both wires)					
	1m	2m	4m	6m	8m	10m
1.5	0.60	1.19	2.38	3.57	4.76	5.95
2.5	0.36	0.71	1.43	2.14	2.86	3.57
4	0.22	0.45	0.89	1.34	1.79	2.23
6	0.15	0.30	0.60	1.89	1.19	1.49
10	0.09	0.18	0.36	0.54	0.71	0.89

Loss in copper wires between instrument and CT for 1A secondary

Wire cross section In mm ²	Loss in VA (both wires)					
	10m	20m	40m	60m	80m	100m
1	0.36	0.71	1.43	2.14	2.86	3.57
1.5	0.24	0.48	0.95	1.43	1.90	2.38
2.5	0.14	0.29	0.57	0.86	1.14	1.43
4	0.09	0.18	0.36	0.54	0.71	0.89
6	0.06	0.12	0.24	0.36	0.48	0.60
10	0.04	0.07	0.14	0.21	0.29	0.36

Example of burden calculation.

252-SAR AC RMS transducer load = 2.5VA

E244-02A AC ammeter load = 0.5VA

1.5 mm² cable 2 meters long, load = 1.19 VA

Total VA load = 4.39VA

So used with AS1B-250/5A which a VA of 5 this will be adequate for this application.

Technical Appendix II

FOR 3 PHASE 380/440V MOTORS RECOMMENED CT, AMMETER & WATTMETER SYSTEM CONFIGURATION

AC Motor Rating			Ammeter Scale (A)	Wattmeter Scale (kW)	CT Primary	CT Part No.
h.p	Amps approx	kW				
0.5	1.2	0.37	0/1.5/9	0/1	Directed connect	CT no required
0.75	1.6	0.55	0/2/12	0/1	Directed connect	CT no required
1	1.8	0.75	0/3/18	0/1.5	Directed connect	CT no required
1.5	2.6	1.1	0/5/30	0/2	Directed connect	CT no required
2	3.5	1.5	0/5/30	0/2	Directed connect	CT no required
3	5	2.2	0/6/36	0/3	Directed connect	CT no required
4	6.2	3	0/8/48	0/4	Directed connect	CT no required
5.5	7.5	4	0/10/60	0/6	Directed connect	CT no required
7.5	11	5.5	0/15/90	0/8	Directed connect	CT no required
10	14	7.5	0/20/120	0/10	Directed connect	CT no required
15	21	11	0/30/180	0/15	30A	AS1A-30/5A
20	28	15	0/50/300	0/20	40A	AS1A-50/5A
25	35	18.5	0/50/300	0/30	50A	AS1A-50/5A
30	40	22	0/60/360	0/30	60A	AS1A-60/5A
40	55	30	0/80/480	0/40	80A	AS1B-80/5A
50	66	37	0/80/480	0/50	80A	AS1B-80/5A
60	80	45	0/100/600	0/60	100A	AS1B-100/5A
75	100	55	0/150/900	0/80	150A	AS1B-150/5A
100	135	75	0/200/1200	0/150	200A	AS1B-200/5A
125	165	90	0/200/1200	0/150	200A	AS1B-200/5A
150	200	110	0/300/1800	0/200	300A	AS1B-300/5A
175	230	132	0/300/1800	0/200	300A	AS1B-300/5A
200	275	150	0/300/1800	0/200	300A	AS1B-300/5A

- a) 6x overload scales suitable for direct online motor. For star/delta and resistor starter motors standard scales are usually preferred.
- b) Wattmeters used with direct online or frequency duty star/delta and resistor start motors should have their current elements shorted during the initial start period.
- c) Ammeter applications where the cable connection from the secondary of the CT is less than 1 m, a class 3 CT 0.5 to 1.5VA burden is generally sufficient.
- d) For applications where Watts are required to be measured we recommend a CT of and minimum of 1 VA for a 1m cable run.

PMK Group Est. 1981. Consisting of 2 main companies: **PMK Corp.** (Sales & Distribution), **PI - PMK Industry** (Switchboard Design & Manufacture).

Operating in both private and government sectors, offering an optimum service and high quality products to a valued customer base.

By fostering new innovations and ideas, PMK group is set for continuous growth into the future.

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