Kilowatt Hour Energy Meters

240 'H' Series DIN Panel

Features

- *1% of reading to IEC 1036 / BS EN 61036*
- *Compact 96mm Din case*
- *Switchboard panel door mountable*
- *Combination of kW.h or kVAr.h and instantaneous analogue Watts or Vars*
- *Pulsed and analogue output options*
- *7 digit electro-mechanical counter*
- *Customer CT and VT Selection*
- *1% of reading measurement*

Application

- *Secondary metering*
- *Energy management*
- *Load control*
- *Import / Export Energy Management*
- *Process control*
- *Distorted waveform power measurement*
- *Load profile data logging*

This class 1.0 instrument uses microprocessor controlled circuitry for optimum performance and accuracy. The unit takes the incoming voltage and current signals and converts them into numbers representing the instantaneous values. These are then multiplied together to give the instantaneous power.

This sampling is repeated many times during each cycle of the wave form, which allows accurate measurements of distorted waveforms. These values are accumulated until enough energy has been measured to increment the counter by one digit. There is also an LED indicator which is pulsed when power is flowing.

Introduction

The new class 1.0 series of kilowatt hour meters is a major upgrade on Cromptons world beating innovative range of self contained kW.h meters designed as either a kilowatt hour counter or as a combined kW.h counter with an analogue display of instantaneous power in kilowatts in a single integrated instrument. This provides savings in both cost and space when replacing conventional instruments.

These instruments are ideal for class 1.0 or secondary metering in switchgear, plant instrumentation and process control applications offering considerable advantages over the traditional disc type kilowatt hour meter together with the ability to indicate instantaneous Watts and to provide a pulsed output of kilowatt hours for data loggers or computers.

This range of products can be scaled in Watts, Kilowatts and Megawatts; and a range of kVAr.h meters is also available. All models are switchboard panel mountable.

Principles of operation

The electro-mechanical counters are auto-resetting.* Resetting is available as an option on the LCD counter versions. The counter pulses may optionally be outputted via volt-free relay contacts or from an opto-isolator for high pulse rates.

Instrument models displaying instantaneous power use a moving coil meter to provide the analogue readout.

As an option, the instantaneous power reading can be made available as a current or voltage signal, similar to a power transducer.

* Automatically resets to 0000000 from 9999999

Crompton INSTRUMENTS

Energy Meters

Kilowatt Hour Energy Meters

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Options

The following 5 models all measure Watts or VArs but vary in the display options offered. All models are optionally available with analogue kW signal terminals and kW.h pulse terminals at the rear. Analogue output is not available on LCD counter version.

Single Electro-mechanical Counter Model

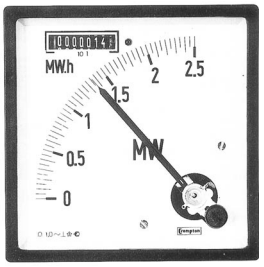
This model incorporates a 7 digit auto-resetting* electromechanical kW.h or kVAr.h counter with customer selectable CT & VT ratios. Relay or opto isolator pulsed output and analogue output options are also available. This is the simplest model in the range, replacing a rotating disc meter, in a much smaller space. The optional analogue output could show the instantaneous Watts or Vars on a separate analogue indicator.

* Automatically resets to 0000000 at 9999999

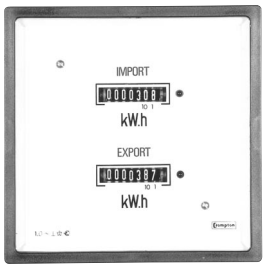
Electro-mechanical Counter & Shortscale Indicator Model

This model incorporates a 7 digit auto-resetting* electromechanical kW.h or kVAr.h counter and a short scale instantaneous indicator of Watts or Vars. Relay or opto isolator pulsed output and analogue output options are also available. This is the simplest model in the range with an indicator, replacing a rotating disc meter and a separate instantaneous wattmeter.

* Automatically resets to 0000000 at 9999999



Two Electro-mechanical Counters Model



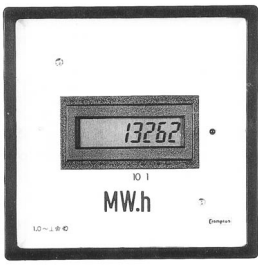
This model incorporates two 7 digit auto-resetting* electro-mechanical kW.h or kVAr.h counters with customer selectable CT & VT ratios. Relay or opto isolator pulsed output and analogue output options are also available. Two counters permit the registering of both import and export of kW.h or kVAr.h.

* Automatically resets to 0000000 at 9999999

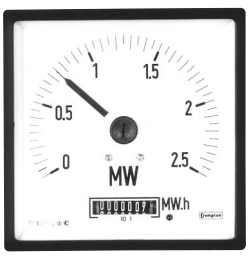
Single LCD Counter Model

This model incorporates an 8 digit optional externally resettable LCD kW.h or kVAr.h counter with customer selectable CT & VT ratios. Relay or opto isolator pulsed output options are also available. An internal battery ensures constant display even in the absence of A.C. power, with a 10 year memory backup. This model can also replace a rotating disc meter in a much smaller space.

* Automatically resets to 00000000 at 99999999 but will display an * in the top left hand corner of the display



Electro-mechanical Counter & Longscale Indicator Model



This model incorporates a 7 digit auto-resetting* electro-mechanical kW.h or kVAr.h counter and a long scale instantaneous indicator of Watts or Vars. Relay or opto isolator pulsed output and analogue output options are also available. This model gives precise indication of Watts or Vars and replaces a rotating disc meter in one unit.

* Automatically resets to 0000000 at 9999999

Crompton INSTRUMENTS

Energy Meters

Kilowatt Hour Energy Meters

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Ordering Codes for Wattmeters

Voltage System	Mechanical Counter Only	Mechanical Counter + Meter 90° Scale	Import Export Counter only	LCD Counter Only	Mechanical Counter + Meter 240° Scale
Single Phase	244-HWM	244-HWG	244-HEM	244-HWS	244-HWB
3 Phase 3 Wire Balanced Load	244-HWN	244-HWH	244-HEN	244-HWT	244-HWC
3 Phase 3 Wire Balanced Load with reversed C.T.s	244-HW2	244-HW3	-	244-HW4	-
3 Phase 4Wire Balanced Load	244-HWY	244-HWV	244-HE7	244-HWZ	244-HWU
3 Phase 3 Wire Unbalanced Load	244-HWP	244-HWJ	244-HEP	244-HWW	244-HWD
3 Phase 4 Wire Unbalanced Load	244-HWQ	244-HWK	244-HEQ	244-HWX	244-HWE
Transducer Inputs	244-KWL	244-KWF	-	244-KWR	244-KWA

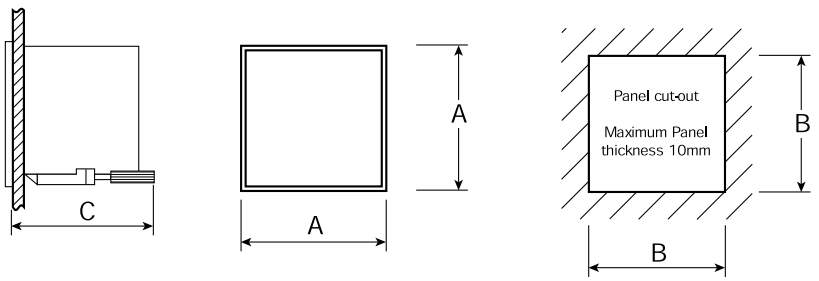
Example: 3ph 4W unbalanced mechanical counter with 240° meter.
Specify: 244-HWE followed by voltage ratio, current ratio, frequency, Fsd Watts, energy/pulse and options if required.

Ordering Codes for Varmeters

Voltage System	Mechanical Counter Only	Mechanical Counter + Meter 90° Scale	Import Export Counter only	LCD Counter Only	Mechanical Counter + Meter 240° Scale
Single Phase	244-HXM	244-HXG	244-HIM	244-HWS	244-HXB
3 Phase 3 Wire Balanced Load	244-HXN	244-HXH	244-HIN	244-HXT	244-HXC
3 Phase 3 Wire Unbalanced Load	244-HXP	244-HXJ	244-HIP	244-HXW	244-HXD
3 Phase 4 Wire Unbalanced Load	244-HXQ	244-HXK	244-HIQ	244-HXX	244-HXE
Transducer Inputs	244-KXL	244-KXF	-	244-KXR	244-KXA

Example: 3ph 4W unbalanced mechanical counter with 240° meter.
Specify: 244-HXE followed by voltage ratio, current ratio, frequency, Fsd Watts, energy/pulse and options if required.

Dimensions



	A	B	C
244	96	92	142

Dimensions in mm

Crompton INSTRUMENTS

Energy Meters

Kilowatt Hour Energy Meters

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Specifications

To comply with:	IEC 1036/ BS EN 61036
Case:	Grade UL94V2
Enclosure Code:	IP54 to IEC529 IP55 optional
Safety Requirements:	IEC 1010-1 (300V A.C. RMS Installation category III pollution degree 2)
Vibration:	To Lloyd's shipping specification
Dielectric Strength:	2kV rms for 1 minute
Temperature Range:	Operational 0°C to +60°C Storage -25°C to +70°C Calibrated at 23°C
Temperature Coeflicient:	0.05% /per °C
Humidity Range:	Up to 95% (non-condensing)
Accuracy:	kW.h or kVAr.h ±1 % of reading Watts or Vars ±1.5% of F.S. for long scale indicator Watts or Vars ±2% of F.S. for short scale indicator Class1 to IEC1036 and BS EN61036 (kW.h functionality only)
Input:	
Voltage:	Nominal voltages 63.5, 110, 120, 220, 230, 240, 400, 415, 440, 480V A.C. or via VT
Voltage Range:	57.7V to 480V A.C. or via VT
Voltage Variation:	±20% of nominal system Voltage
Current:	1 Amp or 5 Amps A.C. C.T. operated.
Frequency:	45Hz to 65Hz inclusive
Burden:	
Voltage:	Maximum 4VA per circuit
Current:	Maximum 0.2VA per circuit
Overload:	
Voltage:	1.2 times continuously 2 x rating for 5 seconds
Current:	2 times continuously 10 x rating for 5 seconds
Counter:	
Electro-mechanical:	7 digit counts 9999999 and automatically resets at 9999999. Digit height 4mm.
Liquid Crystal Display: (LCD)	8 digit counts 99999999. When the maximum reading is reached an asterisk will display in the top left hand corner. The digits will return to zero and the asterisk will remain. Has option of counter resettable via the terminals at the rear of the unit. Digit height 8mm. A Lithium battery gives a 10 year back up.
EMC:	Please consult our Technical Sheet T89/336 for full information.

Output options for kW.h measurement

Note: The pulse rate must be the same as the counter rate

Single Pole Relay:

Ratings A.C.:	120V 5A non-inductive
Ratings D.C.:	30V resistive 5A resistive
Energy/Pulse:	Standard 1kW.h/pulse
Maximum Pulse rate:	10000/hr
Pulse duration:	50ms

Opto-Isolator:

Output:	Open collector
Switching:	Up to 40mA 25 Volts D.C. Observe the polarity
Energy/Pulse:	Standard 1kW.h/pulse
Maximum pulse rate:	10000/hr
Pulse duration:	50ms.

Analog Output:

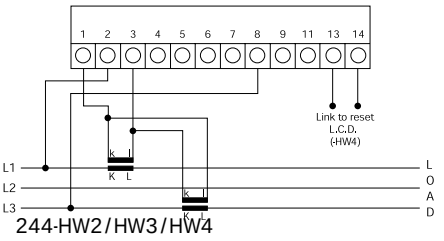
Any standard transducer output
(For instantaneous kW & kVAr measurement)

To BSEN 60688 class 0.5 (IEC688:1992)

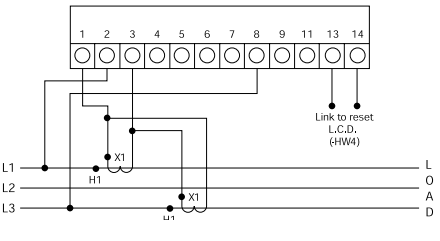
Accuracy range:	0/120%
Response time:	<250ms
Compliance Voltage:	10V
Open Circuit:	<20V
Available outputs:	0/1 mA, 0/5mA, 0/1 OmA, 0/20mA and bipolar 0-1V, 0-5V, 0-10V and bipolar 4/20mA,1-5V
Compliance Voltage:	10V
Open circuit O/P Voltage:	<20V
Dielectric withstand test voltage:	2.2kV RMS for 1 minute

Connections

3 Phase 3 Wire Balanced Load with Reversed Connected C.T.s



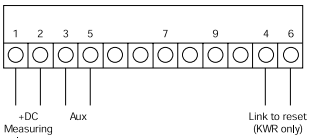
244-HW2/HW3/HW4



Transducer Input Models

Pulsed output connections (optional)
via relay 7 (NO), 9 (COM) and 11 (NC)
via transistor 7 (+VE) and 9 (-VE)

244-KWA/KWF/KWL/KWR



Crompton INSTRUMENTS

Energy Meters

Kilowatt Hour Energy Meters

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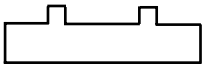
244 - HW and HX

Opto isolator output connection

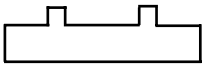
N/O +VE COM -VE



15	16		25	28	26
+	-		COM	N/O	N/C

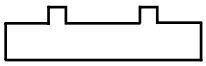
15 (+) Analog O/P
16 (-) Analog O/P

244 - HE and HI



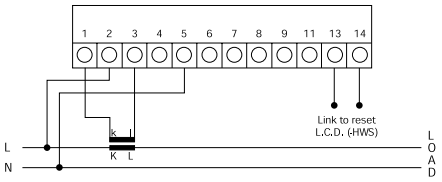
21	24	15	25	28	16
COM	N/O	N/C	COM	N/O	N/C
EXPORT			IMPORT		

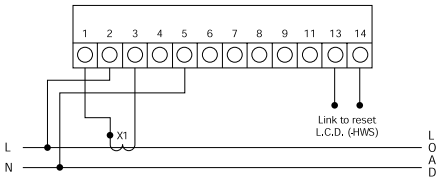
With analogue output



15	16	21	24	25	28
+	-	COM	N/O	COM	N/O
		EXPORT		IMPORT	

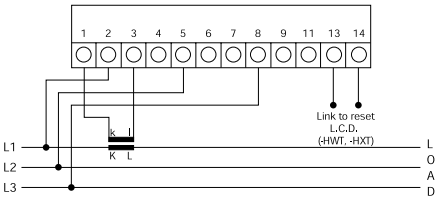
Single Phase

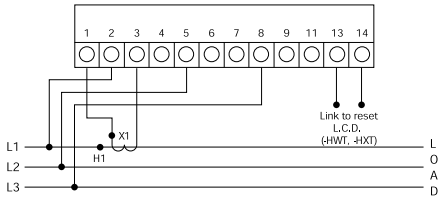




244-HWM/HWG/HWS/HWB
244-HEM
244-HXM/HXG/HXS/HXB/HIM

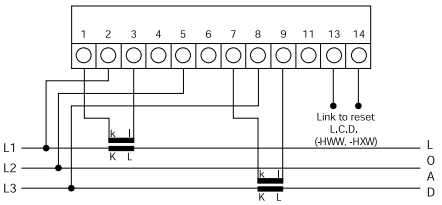
3 Phase 3 Wire Balanced Load

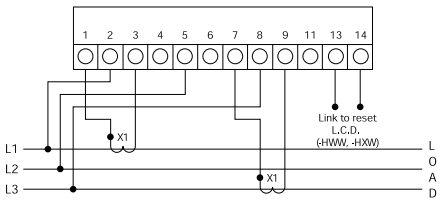




244-HWN/HWH/HWT/HWC
244-HEN
244-HXN/HXH/HXT/HXC
244-HIN

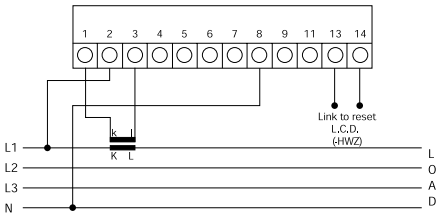
3 Phase 3 Wire Unbalanced Load

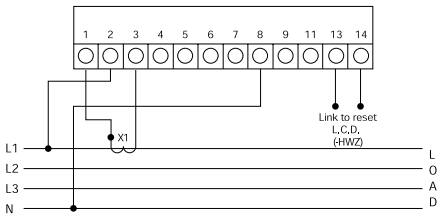




244-HWP/HWJ/HWW/HWD
244-HEP
244-HXP/HXJ/HXW/HXD
244-HIP

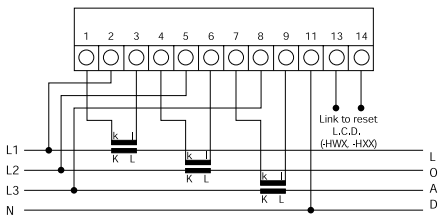
3 Phase 4 Wire Balanced Load

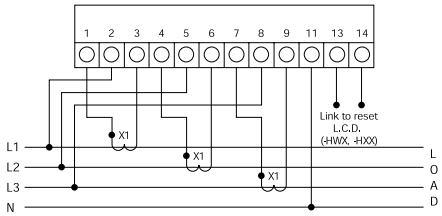




244-HWY/HWV/HWZ/HWU/HE7

3 Phase 4 Wire Unbalanced Load





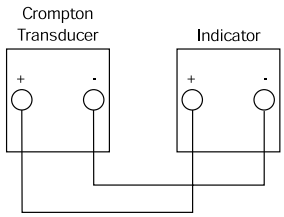
244-HWQ/KWQ/HWK/HWX/HWE
244-HEQ
244-HXQ/HXK/HXX/HXE
244-HIQ

Crompton INSTRUMENTS

Energy Meters

240 Series DIN Panel Meters

Connections



Process Indicators

Used to check process functions locally or remotely at centralised controls. These moving coil instruments offer a wide variety of electrical and mechanical readouts operated by transducer, tachogenerator, thermocouple, resistance bulb or other D.C. analogue signals. Suppressed, centre and offset zero models are available on request.

Specification

Accuracy:	Class 1.5
Ratings:	1, 2, 5, 10 & 20mA. 4/20mA suppressed zero.
Burden:	See our technical data sheet T118.

Product Codes – Short Scale Models

Bezel Size mm	48	72	96	144
Scale length mm	42	65	94	145
Product Codes				
Watts	242-895	243-015	244-015	246-105
VArs	242-896	243-016	244-016	246-106
VA	242-897	243-017	244-017	246-107

Product Codes – Long Scale Models

Bezel Size mm	48	72	96	144
Scale length mm	72	112	150	230
Product Codes				
Watts	242-055	243-055	244-055	246-055
VArs	242-056	243-056	244-056	246-056
VA	242-057	243-057	244-057	246-057

240 Series DIN Panel Meters

Wattmeters & Varmeters

The 244/246 models are self contained and are available to measure active power and reactive power in both balanced and unbalanced, single and 3 phase 3 or 4 wire systems. These Wattmeters are ideal for clear precise analogue indication of power in applications such as power generation, industrial control panels and power distribution.

Specification

Accuracy:	Shortscale Class 2.5 Longscale Class 1.5
Measuring Ranges:	Voltage 94-106% Current 0-120%
Frequency Influence:	0.4% / Hz
Rating:	Current: 0.2A to 5A direct connected 1A or 5A for C.T.'s. Voltages: From 57.7 to 480V
Overload:	120% of nominal continuous voltage up to 600V maximum
Maximum Input:	600V
Frequency:	50Hz or 60Hz
Power factor:	Unity Power Factor assumed range 0.5/1/0.5
Burden:	Current: 1VA per phase Voltage: 1VA per phase
Warm-up-Time:	<15 minutes

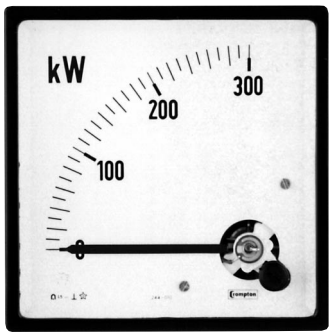
Product Codes – Short Scale Models

Bezel Size mm	72	96	144
Scale Length mm	65	95	145
Wattmeters Product Code			
Single Phase	243-015G-FA+256-TWK	244-210	246-210
3 Phase 3 Wire Balanced Load	243-015G-FA+256-TWL	244-211	246-211
3 Phase 4 Wire Balanced Load	243-015G-FA+256-TWH	244-21C	246-21C
3 Phase 3 Wire Unbalanced Load	243-015G-FA+256-TWM	244-213	246-213
3 Phase 4 Wire Unbal. Star C.T.s	243-015G-FA+256-TWN	244-214	246-214
3 Phase 4 Wire Unbal. Delta C.T.s	243-015G-FA+256-TWJ	244-21E	246-21E
3 Phase 4 Wire 3 Element	243-015G-FA+256-XWW	244-21Y	246-21Y
Varmeters Product Codes			
3 Phase 3 or 4 Wire Balanced Load	243-016G-FA+256-TXG	244-310	246-310
3 Phase 3 Wire Unbalanced Load	243-016G-FA+256-TXM	244-31S	246-31S
3 Phase 4 Wire Unbal. Star C.T.s	243-016G-FA+256-TXN	244-314	246-314
3 Phase 4 Wire Unbal. Delta C.T.s	243-016G-FA+256-TXJ	244-31E	246-31E

Product Codes – Long Scale Models

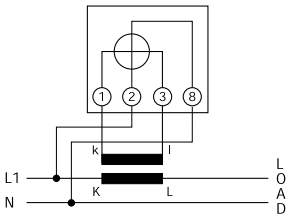
Bezel Size mm	72	96	144
Scale Length mm	112	150	230
Wattmeters Product Code			
Single Phase	243-055G-FA+256-TWK	244-215	246-215
3 Phase 3 Wire Balanced Load	243-055G-FA+256-TWL	244-216	246-216
3 Phase 4 Wire Balanced Load	243-055G-FA+256-TWH	244-21D	246-21D
3 Phase 3 Wire Unbalanced Load	243-055G-FA+256-TWM	244-218	246-218
3 Phase 4 Wire Unbal. Star C.T.s	243-055G-FA+256-TWN	244-219	246-219
3 Phase 4 Wire Unbal. Delta C.T.s	243-055G-FA+256-TWJ	244-21F	246-21F
3 Phase 4 Wire 3 Element	243-055G-FA+256-XWW	244-21Z	246-21Z
Varmeters Product Codes			
3 Phase 3 or 4 Wire Balanced Load	243-056G-FA+256-TXG	244-315	246-315
3 Phase 3 Wire Unbalanced Load	243-056G-FA+256-TXM	244-31L	246-31L
3 Phase 4 Wire Unbal. Star C.T.s	243-056G-FA+256-TXN	244-319	246-319
3 Phase 4 Wire Unbal. Delta C.T.s	243-056G-FA+256-TXJ	244-31F	246-31F

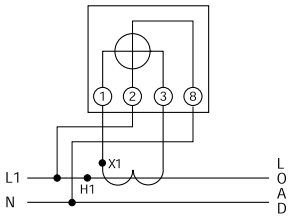
Models 243-015, 243-016, 243-055 & 243-056 use a separate transducer.
Our transducer range is ideal for this application. Our product code reference assumes a 1mA output. Other outputs of 5, 10, 20 or 4/20mA can also be used.



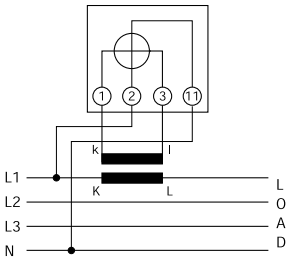
Wattmeter Connection Diagrams

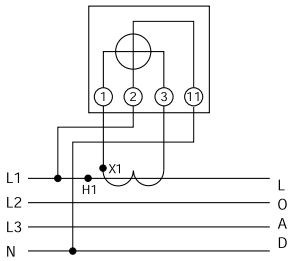
Single Phase
224-210, 244-215, 246-210, 246-215



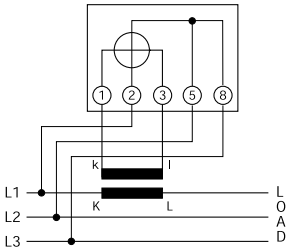


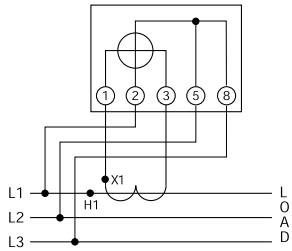
3 Phase 4 Wire Balanced Load
244-21C, 246-21C, 244-21D, 246-21D



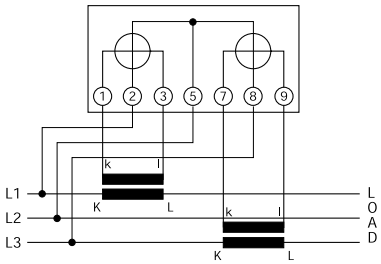


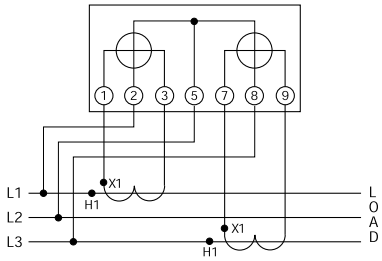
3 Phase 3 Wire Balanced Load
244-211, 246-211, 244-216, 246-216

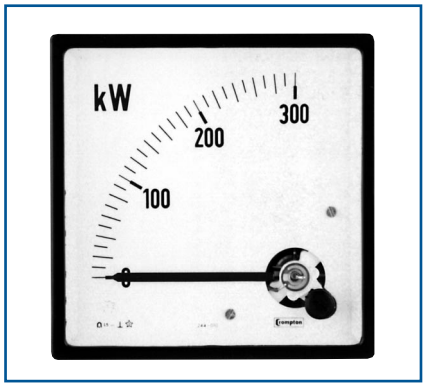




3 Phase 3 Wire Unbalanced Load 2 Element
244-213, 246-213, 244-218, 246-218

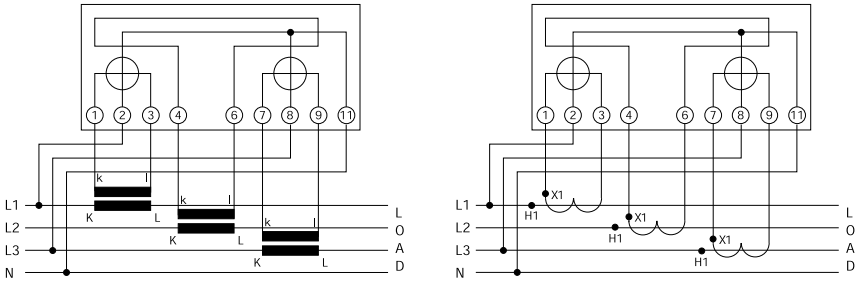




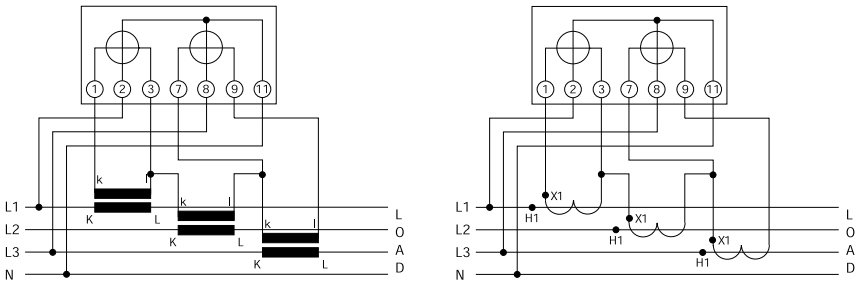


Wattmeter Connection Diagrams

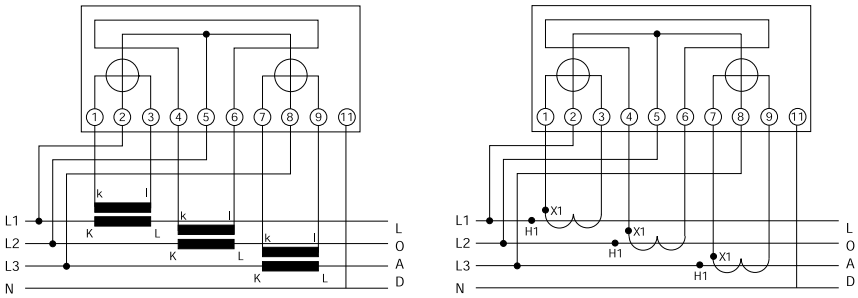
3 Phase 4 Wire Unbalanced Load Star Connected C.T.s 2 1/2 Element
244-214, 246-214, 244-219, 246-219

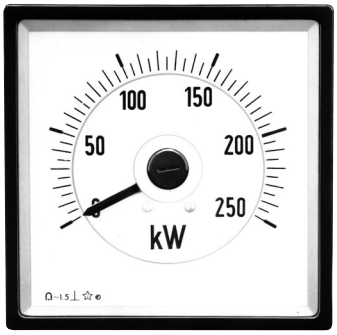


3 Phase 4 Wire Unbalanced Load Delta Connected C.T.s
244-21E, 246-21E, 244-21F, 246-21F



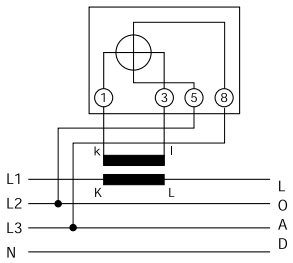
3 Phase 4 Wire Unbalanced Load Star Connected C.T.s 3 Element
244-21Y, 246-21Y, 244-21Z, 246-21Z

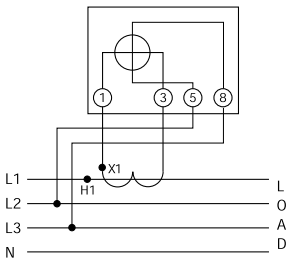




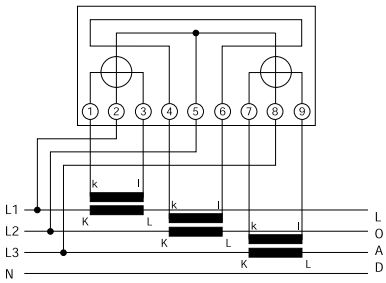
Varmeter Connection Diagrams

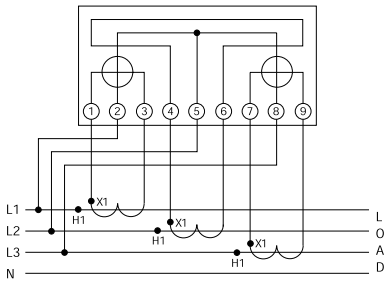
3 Phase 3 or 4 Wire Balanced Load 1 Element
244-310, 246-310, 244-315, 246-315



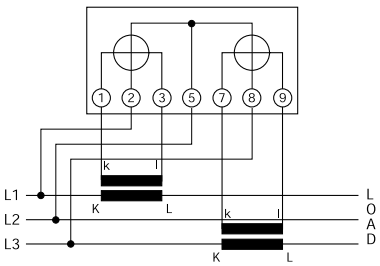


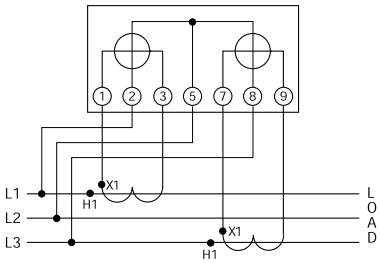
3 Phase 4 Wire Unbalanced Star Connected C.T.s 2 1/2 Element
244-314, 246-314, 244-319, 246-319





3 Phase 3 Wire Unbalanced Load 2 Element
244-31S, 246-31S, 244-31L, 246-31L





3 Phase 4 Wire Unbalanced Delta Connected C.T.s 2 1/2 Element
244-31E, 246-31E, 244-31F, 246-31F