TEXMATE Smart Process Measurement & Control

POWER TRANSDUCERS

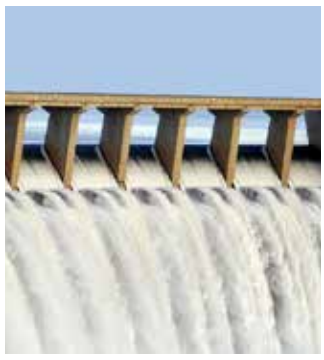
ABS DIN Rail Mount Case

Screw Mount Metal Case

HIGH ACCURACY
LEGENDARY RELIABILITY
FAST DELIVERY
FRIENDLY APPLICATION SUPPORT








www.texmate.com

(Z660)

Contents

AC CURRENT TRANSDUCERS Single Phase

MODELS OFFERED

TA-1 base model	Average sensing
TA-1T base model	True rms sensing

- True RMS sensing is recommended for input signals with distortion.
- Direct connect to the transducer for inputs ≤ 5A AC.
- Connect using a current Transformer (C.T.) for inputs greater than 5A AC.

FEATURES

- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277)**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/°C of span
≤60ppm/°C for ambient temperature of 25°C ±10°C

Temp. range ..... Storage temperature range -20°C to 60°C (-4°F to 140°F)
Operating temperature range 0°C to 50°C (32°F to 122°F)

Humidity range ..... Up to 95% RH non condensing

Isolation..... Between Input/Output/Power/Case

Dielectric test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin(94V-0) or metal

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
110V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input ..... 0 to 1Amps AC, 0 to 5Amps AC or custom input

Frequency ..... 45Hz to 65Hz, 400Hz

Burden..... ≤0.2VA

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Overload Capacity.... 3 times the rated input current continuously.
10 times the rated current for 10 seconds.
50 times the rated input current for 1 second.
80 times the rated input current for 0.5 second.

OUTPUT SPECIFICATIONS

Output Variables ..... DC mA or DC Volts

Ripple.....< 0.5% of rated output. Peak to Peak (maximum)

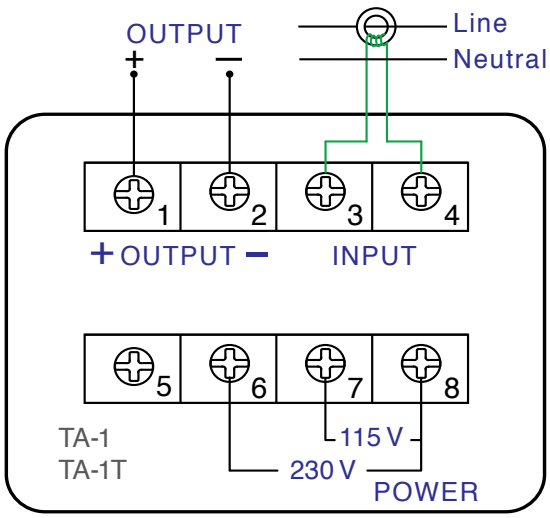
Response Time.....< 400 milliseconds to go from 0 to 99% of output

Zero Adjustment.....± 5% of rated output (minimum)

Span Adjustment.....± 10% of rated output (minimum)

Load Resistance..... 10K Ω maximum for 0 to 1mA output
500 Ω maximum for 4 to 20mA output
500 Ω minimum for 0 to 10V output

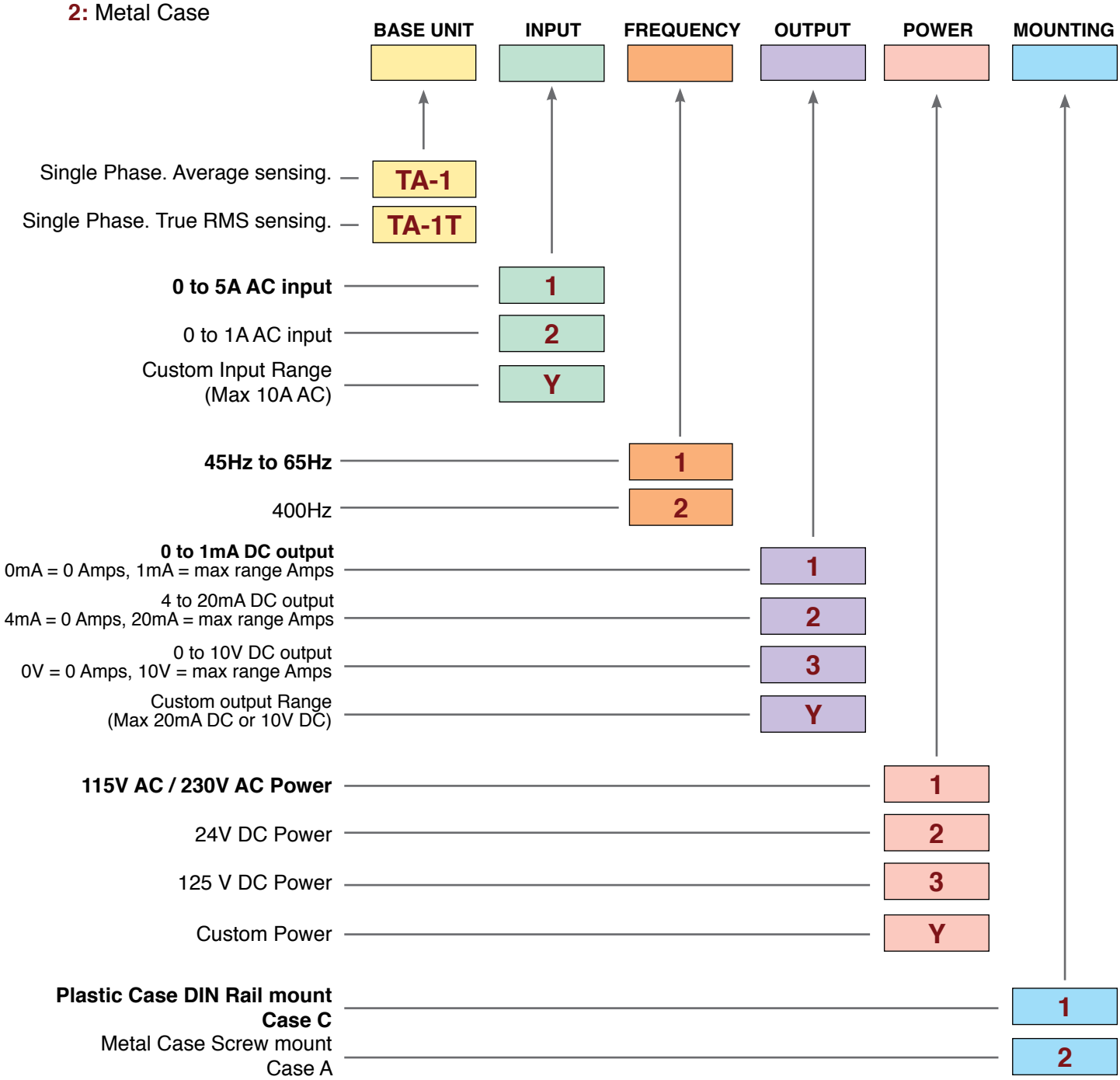
CONNECTION DIAGRAM



ORDERING INFORMATION

Example:
Product Ordering Code of TA-1T21212

TA-1T: Single Phase, True RMS sensing, AC Current transducer
2: 0 to 1 Amps AC input
1: 45Hz to 65Hz
2: 4 to 20 mA output
1: 115VAC or 230VAC power
2: Metal Case



SCREW MOUNT METAL CASE D ABS DIN RAIL MOUNT CASE D

MODELS OFFERED

TA-3 base model Average sensing

TA-3T base model True rms sensing

- True RMS sensing is recommended for input signals with distortion.
- Direct connect to the transducer for inputs ≤ 5A AC.
- Connect using a Potential Transformer (C.T.) for inputs > 5A AC.

FEATURES

- High accuracy ±0.2% of Rated Output (R.O.)
- Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.*
- High immunity to external noise.
- Quick and easy mounting to 35mm DIN Rail (DIN46277)
- Many input and output combinations

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/°C of span
≤60ppm/°C for ambient temperature of 25°C ±10°C

Temp. range ..... Storage temperature range -20°C to 60°C (-4°F to 140°F)
Operating temperature range 0°C to 50°C (32°F to 122°F)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input/Output/Power/Case

Dielectric test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 0 to 5A AC, 0 to 1A AC, custom input (10A AC maximum)

Frequency ..... 45Hz to 65Hz

Burden..... ≤0.2VA

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Overload Capacity.... 3 times the rated input current continuously.
10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... DC mA or DC Volts

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

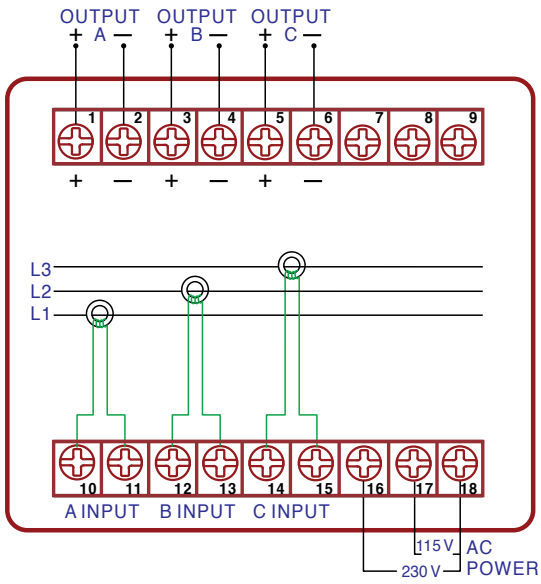
Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Load Resistance..... 10 kΩ maximum for 0 to 1mA output
500 Ω maximum for 4 to 20mA output
500 Ω minimum for 0 to 10V output

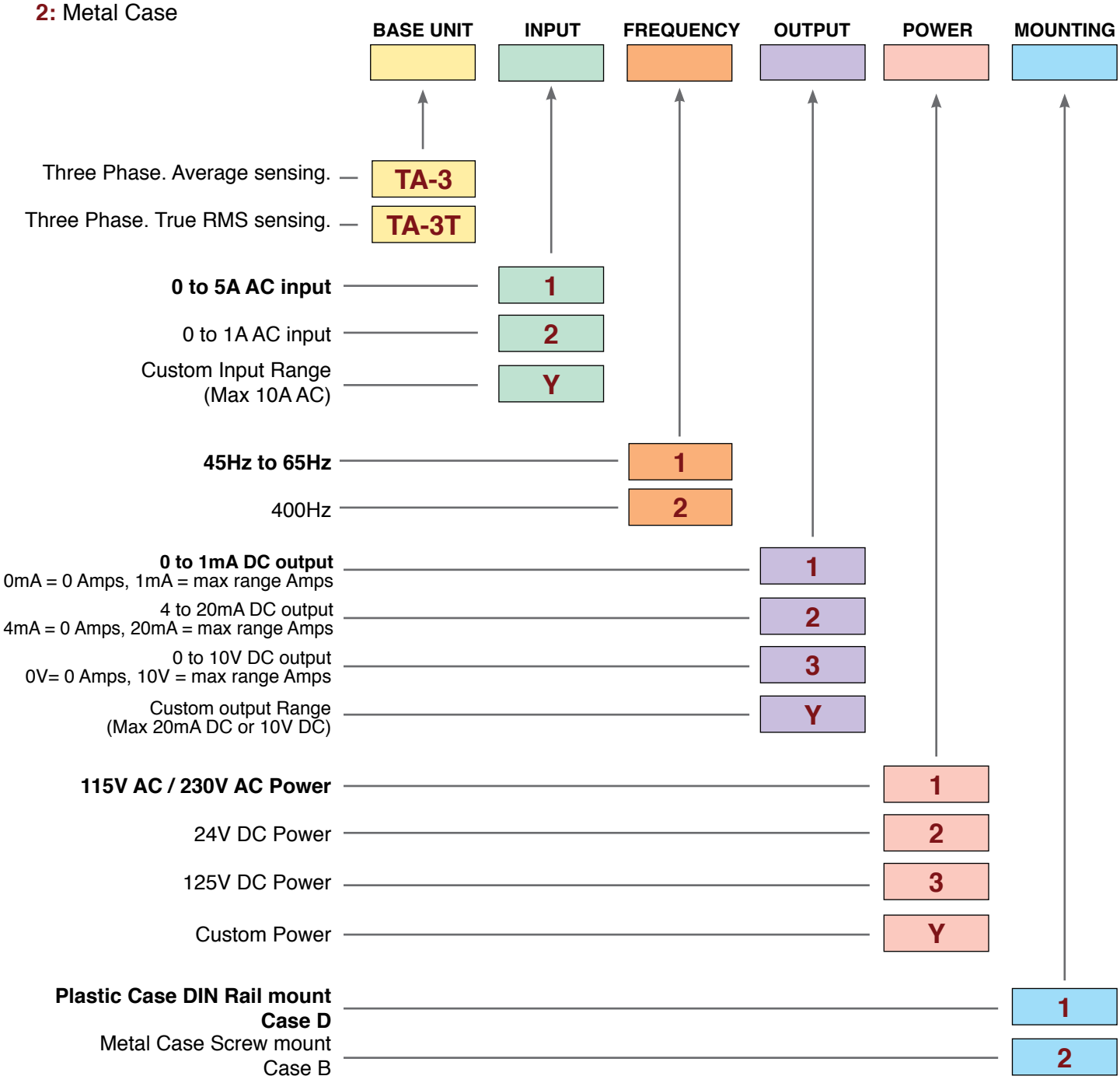
CONNECTION DIAGRAM



ORDERING INFORMATION

Example:
Product Ordering Code of TA-3T21212

TA-3T: 3 Phase, True RMS sensing, AC Current transducer
2: 0 to 1 Amps AC input
1: 45Hz to 65Hz
2: 4 to 20 output
1: 115VAC or 230VAC power
2: Metal Case



MODELS OFFERED

TV-1 base model	Average sensing
TV-1T base model	True rms sensing

- True RMS sensing is recommended for input signals with distortion.
- Direct connect to the transducer for inputs ≤ 600V AC.
- Connect using a Potential Transformer (P.T.) for inputs greater than 600V AC.

FEATURES

- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277)**
- **Many input and output combinations**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/°C of span
≤60ppm/°C for ambient temperature of 25°C ±10°C

Temp. range ..... Storage temperature range -20°C to 60°C (-4°F to 140°F)
Operating temperature range 0°C to 50°C (32°F to 122°F)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input/Output/Power/Case

Dielectric test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin(94V-0) or metal

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 0 to 150V AC, 0 to 300V AC, 0 to 600V AC or custom input

Frequency ..... 45Hz to 65Hz

Burden..... ≤0.1VA

Response Sensitivity..... ≤0.5% of measuring range to mazimum input range

Input Overload Capacity.... 1.25 times the rated input voltage continuously.
2 times the rated voltage for 10 seconds.
4 times the rated input voltage for 5 seconds.
Or 600V AC rms continuous.(absolute maximum)

OUTPUT SPECIFICATIONS

Output Variables..... DC mA or DC Volts

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

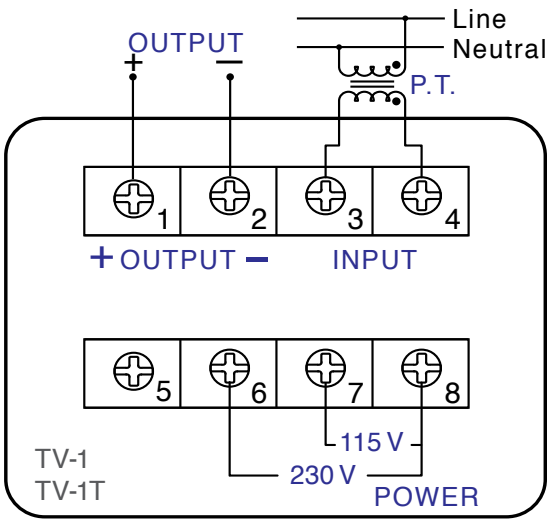
Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output minimum

Span Adjustment..... ± 10% of rated output minimum

Load Resistance..... 10K Ω maximum for 0 to 1mA output
500 Ω maximum for 4 to 20mA output
500 Ω minimum for 0 to 10V output

CONNECTION DIAGRAM

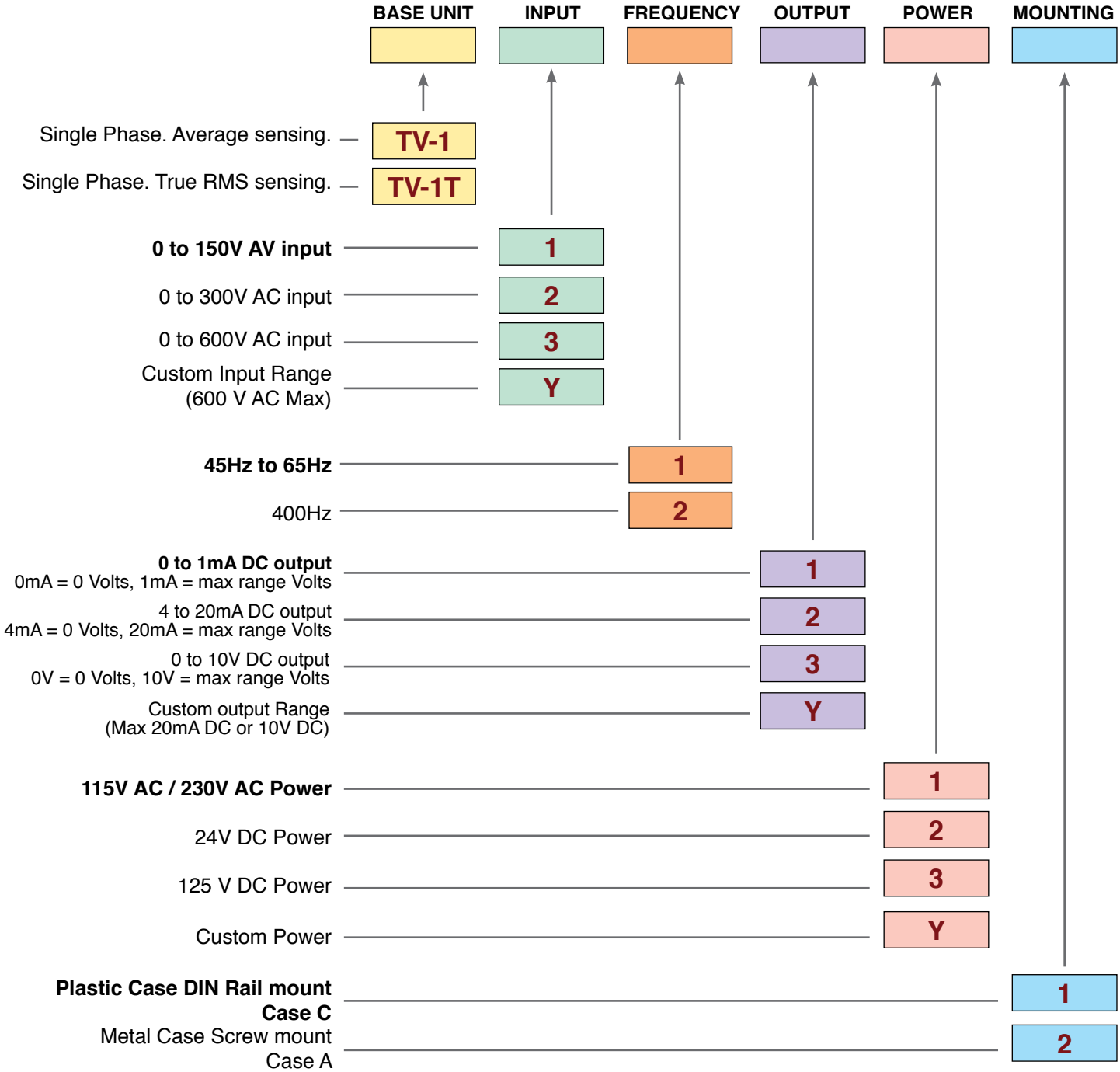


ORDERING INFORMATION

Example:

Product Ordering Code of TV-1T12312

TV-1T: Single Phase, True RMS sensing, AC Voltage transducer
1: 0 to 150V AC input
2: 400Hz
3: 0 to 10V DC output
1: 115VAC or 230VAC power
2: Metal Case



MODELS OFFERED

TV-3 base model Average sensing

TV-3T base model True rms sensing

- True RMS sensing is recommended for input signals with distortion.
- Direct connect to the transducer for inputs ≤ 600V AC.
- Connect using a Potential Transformer (P.T.) for inputs > 600V AC.

FEATURES

- High accuracy ±0.2% of Rated Output (R.O.)
- Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.*
- High immunity to external noise.
- Quick and easy mounting to 35mm DIN Rail (DIN46277)
- Many input and output combinations.

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/°C of span
≤60ppm/°C for ambient temperature of 25°C ±10°C

Temp. range ..... Storage temperature range -20°C to 60°C (-4°F to 140°F)
Operating temperature range 0°C to 50°C (32°F to 122°F)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input/Output/Power/Case

Dielectric test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin(94V-0) or metal

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 0 to 150V AC, 0 to 300V AC, 0 to 600V AC or custom input

Frequency ..... 45Hz to 65Hz

Burden..... ≤0.1VA

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Overload Capacity.... 600V AC rms continuous (absolute maximum)
1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

OUTPUT SPECIFICATIONS

Output Variables..... DC mA or DC Volts

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

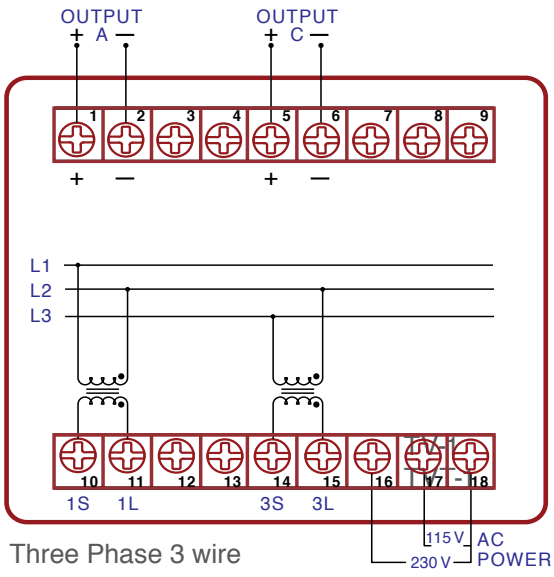
Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

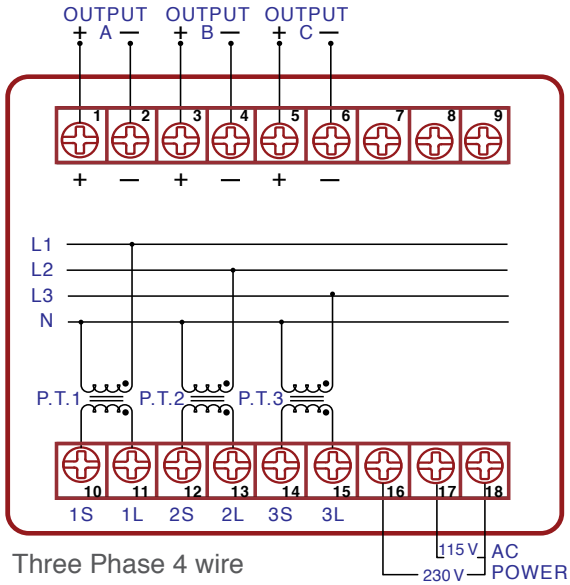
Span Adjustment..... ± 10% of rated output (minimum)

Load Resistance..... 10 kΩ maximum for 0 to 1mA output
500 Ω maximum for 4 to 20mA output
500 Ω minimum for 0 to 10V output

CONNECTION DIAGRAM



Three Phase 3 wire



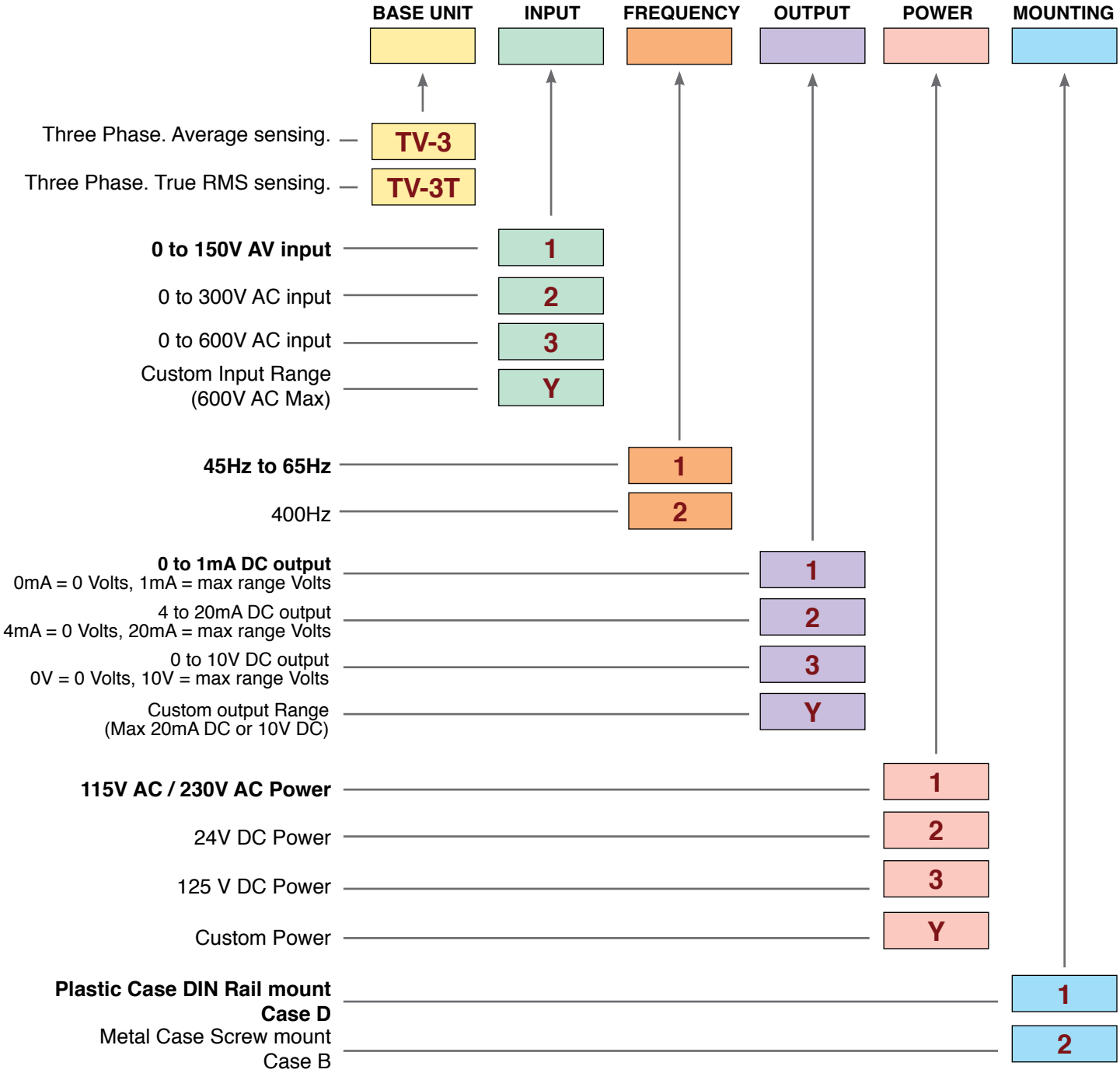
Three Phase 4 wire

ORDERING INFORMATION

Example:

Product Ordering Code of TV-3T12312

TV-3T: Three Phase, True RMS sensing, AC Voltage transducer
1: 0 to 150V AC input
2: 400Hz
3: 0 to 10V DC output
1: 115VAC or 230VAC power
2: Metal Case



MODELS OFFERED

TW-12 base model Single Phase, 2 Wire – 1 Element

TW-13 base model Single Phase, 3 Wire – 2 Element

- Accurate measurement of the active power Watts for balanced or unbalanced loads.
- The output signals are isolated load independent DC mA or DC Volts, representing the measured value of the active power Watts.

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/°C of span
≤60ppm/°C for ambient temperature of 25°C ±10°C

Temp. range ..... Storage temperature range -20°C to 60°C (-4°F to 140°F)
Operating temperature range 0°C to 50°C (32°F to 122°F)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 1 phase/2 Wire
240V/120V, 5A AC for 1 phase/3 Wire
custom input (600V max /10A AC max)

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... DC mA or DC Volts

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Load Resistance..... 10 kΩ maximum for 0 to 1mA output
500 Ω maximum for 4 to 20mA output
500 Ω minimum for 0 to 10V output

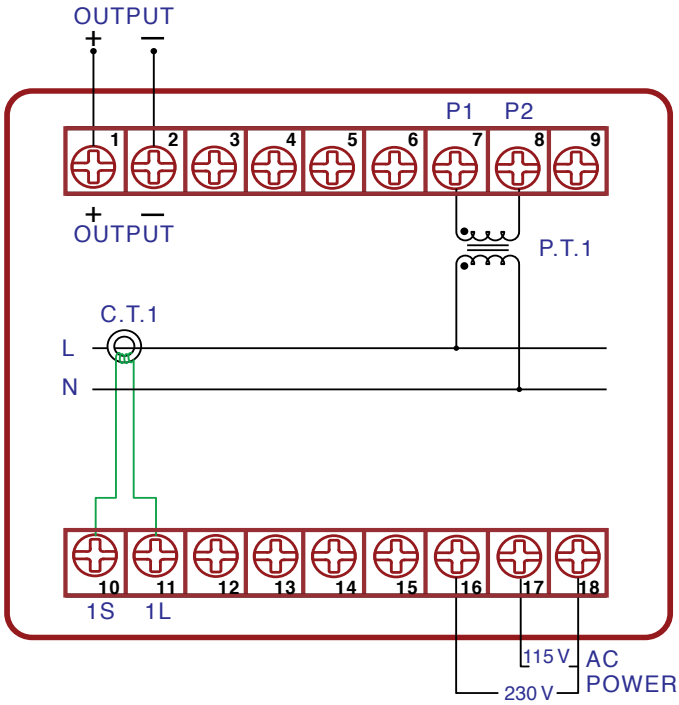
Model	Voltage	Current	Nominal Watts
TW-12 1 ø / 2 Wire	120V AC (110V)	5A AC	500
TW-12 1 ø / 2 Wire	240V AC (220V)	5A AC	1000
TW-13 1 ø / 3 Wire	240V/120V AC (220V/110V) Phase volts/Line Volts	5A AC	1000

Maximum Input range value = (CT Ratio) X (PT Ratio) X (Nominal Watts)

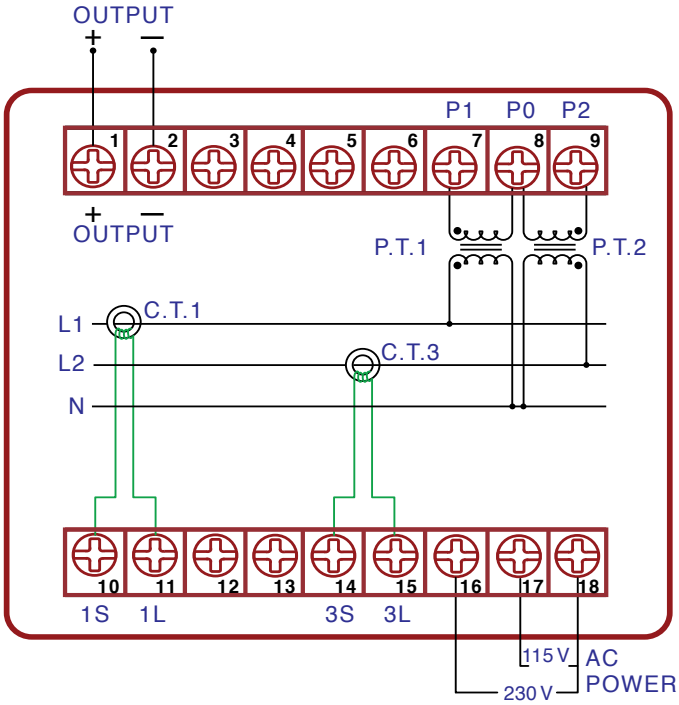
If CT = 200A:5A PT is 3300V:110V Nominal Watts = 500
then CT Ratio = 40 then PT Ratio = 30 and Maximum input range value = 40 x 30 x 500 = 600KW

CONNECTION DIAGRAM

TW-12



TW-13



ORDERING INFORMATION

Example:

Product Ordering Code of TW-1212121

TW-12: Single Phase / 2Wire, 1 element AC WATTS Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: 0 to 1mA DC Output
2: 24V DC Power
1: Plastic Case

MODELS OFFERED

TW-33 base model 3 Phase, 3 Wire – 2 Element

TW-34 base model 3 Phase, 4 Wire – 3 Element

- Accurate measurement of the active power Watts for balanced or unbalanced loads.
- The output signals are isolated load independent DC mA or DC Volts, representing the measured value of the active power Watts.

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/ºC of span
≤60ppm/ºC for ambient temperature of 25ºC ±10ºC

Temp. range ..... Storage temperature range -20ºC to 60ºC (-4ºF to 140ºF)
Operating temperature range 0ºC to 50ºC (32ºF to 122ºF)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 3 phase/3 Wire
208V/120V & 5A AC, 416V/240V & 5A AC, for 3 Phase / 4 Wire
custom input (600V max /10A AC max)

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... DC mA or DC Volts

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

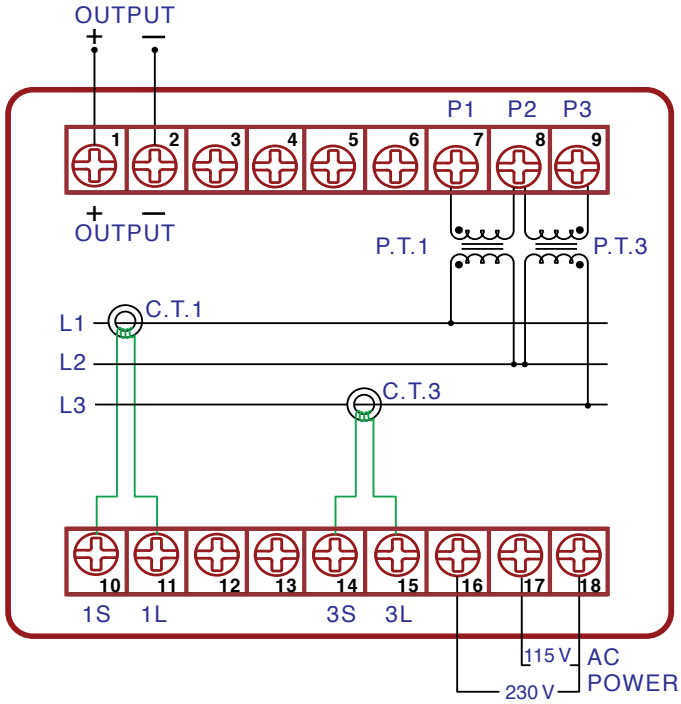
Load Resistance..... 10 kΩ maximum for 0 to 1mA output
500 Ω maximum for 4 to 20mA output
500 Ω minimum for 0 to 10V output

Model	Voltage	Current	Nominal Watts
TW-33 3 ø / 3 Wire	120V AC (110V)	5A AC	1000
TW-33 3 ø / 3 Wire	240V AC (220V)	5A AC	2000
TW-34 3 ø / 4 Wire	208V/120V AC (190V/110V) phase volts / line volts	5A AC	1500
TW-34 3 ø / 4 Wire	416V/240V AC (380V/220V) phase volts / line volts	5A AC	3000

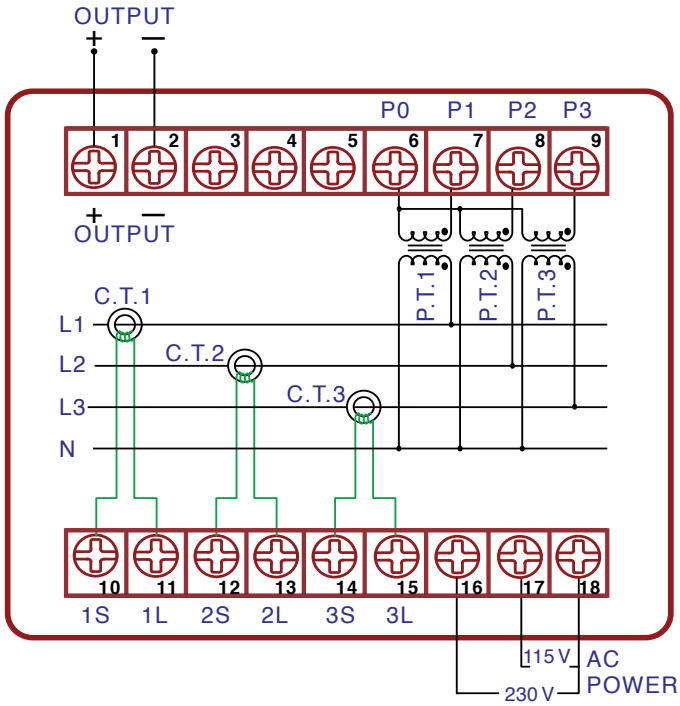
Maximum Input range value = (CT Ratio) X (PT Ratio) X (Nominal Watts)
If CT = 200A:5A PT is 3300V:110V Nominal Watts = 1000
then CT Ratio = 40 then PT Ratio = 30 and Maximum input range value = 40 x 30 x 1000 = 1200KW

CONNECTION DIAGRAM

TW-33



TW-34

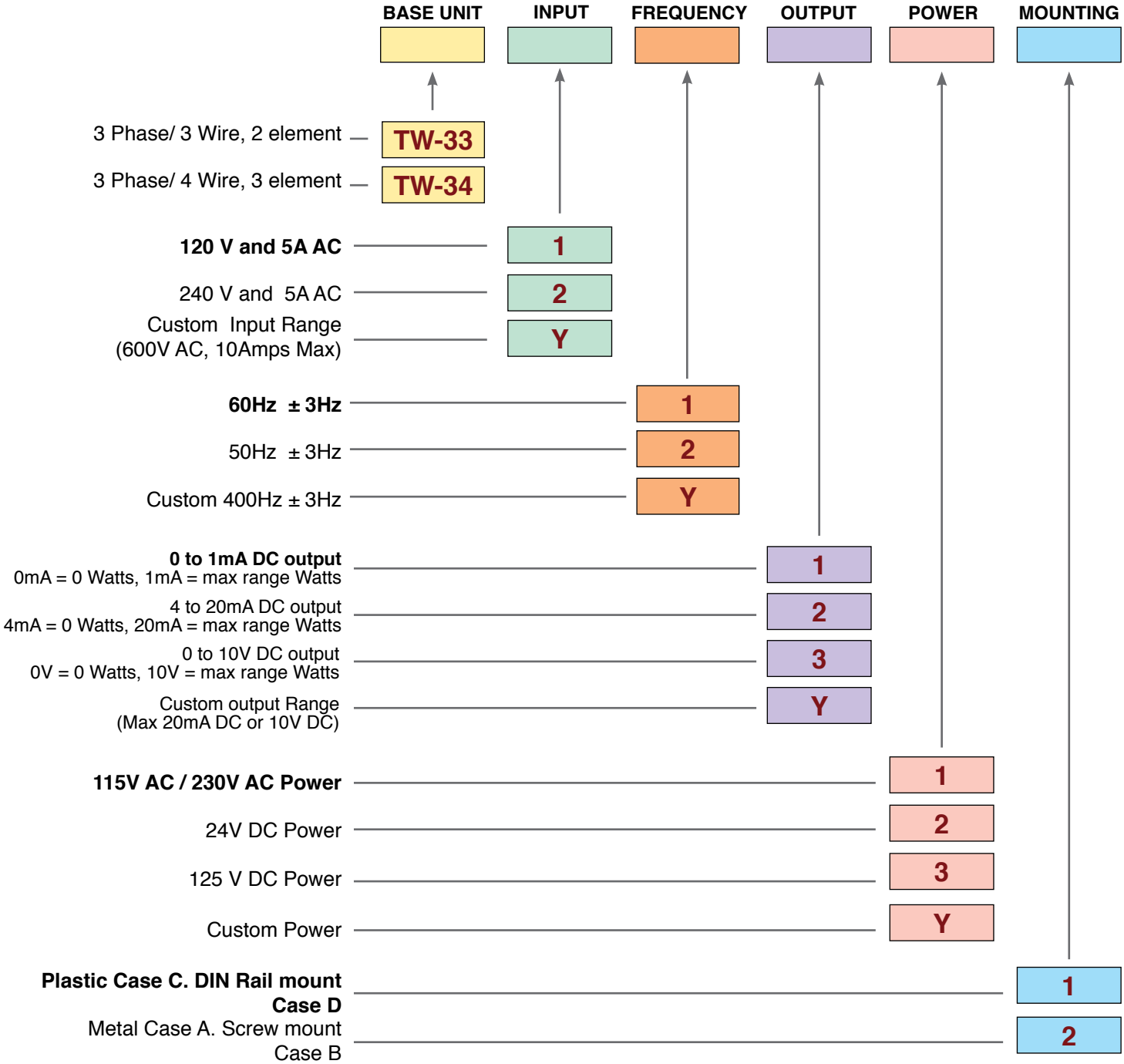


ORDERING INFORMATION

Example:

Product Ordering Code of TW-3312121

TW-33: Three Phase / 3Wire, 2 element AC WATTS Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: 0 to 1mA DC Output
2: 24V DC Power
1: Plastic Case



SCREW MOUNT METAL CASE B ABS DIN RAIL MOUNT CASE D C

MODELS OFFERED

TQ-12 base model Single Phase, 2 Wire – 1 Element

TQ-13 base model Single Phase, 3 Wire – 2 Element

- Accurate measurement of the reactive power VARs for balanced or unbalanced loads.
- The output signals are isolated load independent DC mA or DC Volts, representing the measured value of the reactive power VARs.

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/ºC of span
≤60ppm/ºC for ambient temperature of 25ºC ±10ºC

Temp. range ..... Storage temperature range -20ºC to 60ºC (-4ºF to 140ºF)
Operating temperature range 0ºC to 50ºC (32ºF to 122ºF)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 1 phase/2 Wire
240V/120V, 5A AC for 1 phase/3 Wire
custom input (600V max /10A AC max)

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... DC mA or DC Volts

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Load Resistance..... 10 kΩ maximum for 0 to 1mA output
500 Ω maximum for 4 to 20mA output
500 Ω minimum for 0 to 10V output

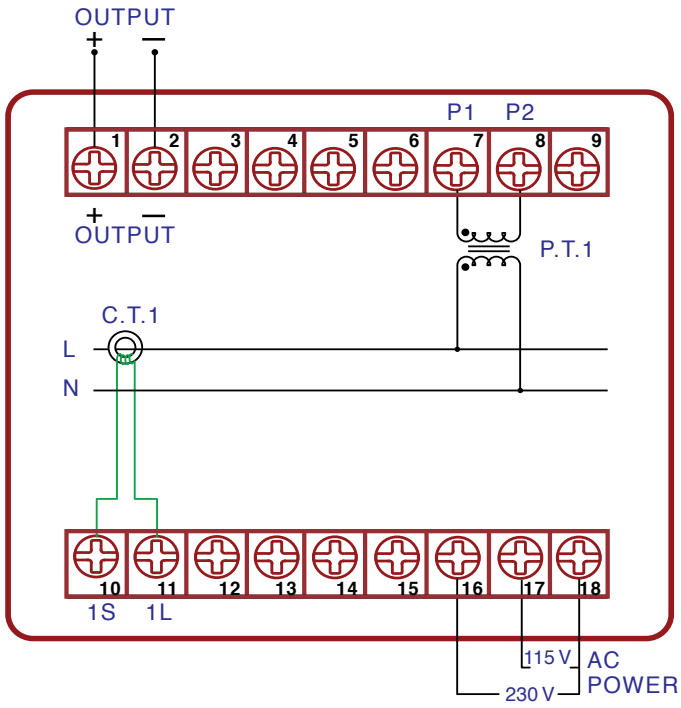
Model	Voltage	Current	Nominal VARs
TQ-12 1 ø / 2 Wire	120V AC (110V)	5A AC	500
TQ-12 1 ø / 2 Wire	240V AC (220V)	5A AC	1000
TQ-13 1 ø / 3 Wire	240V/120V AC (220V/110V) Phase volts/Line Volts	5A AC	1000

Maximum Input range value = (CT Ratio) X (PT Ratio) X (Nominal VARs)

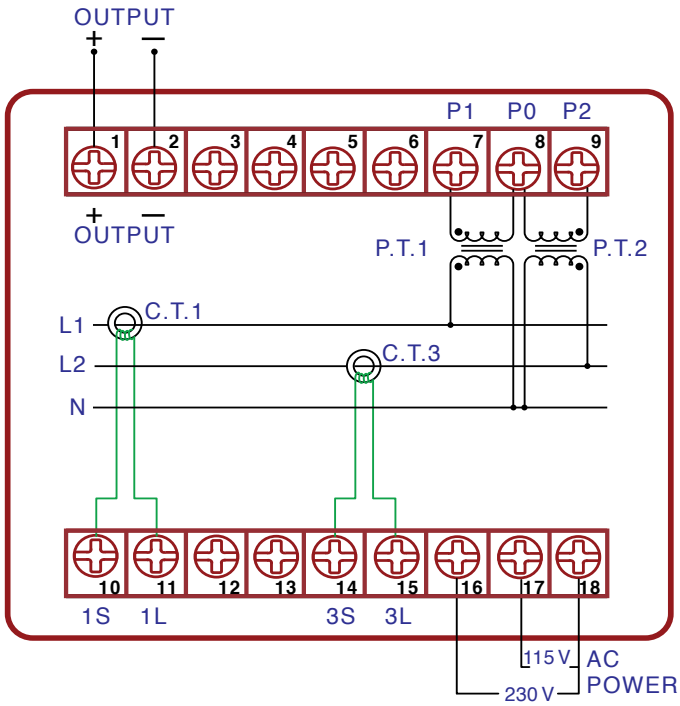
If CT = 200A:5A PT is 3300V:110V Nominal VARs = 500
CT Ratio = 40 PT Ratio = 30 and Maximum input range value = 40 x 30 x 500 = 600KVAR

CONNECTION DIAGRAM

TQ-12



TQ-13

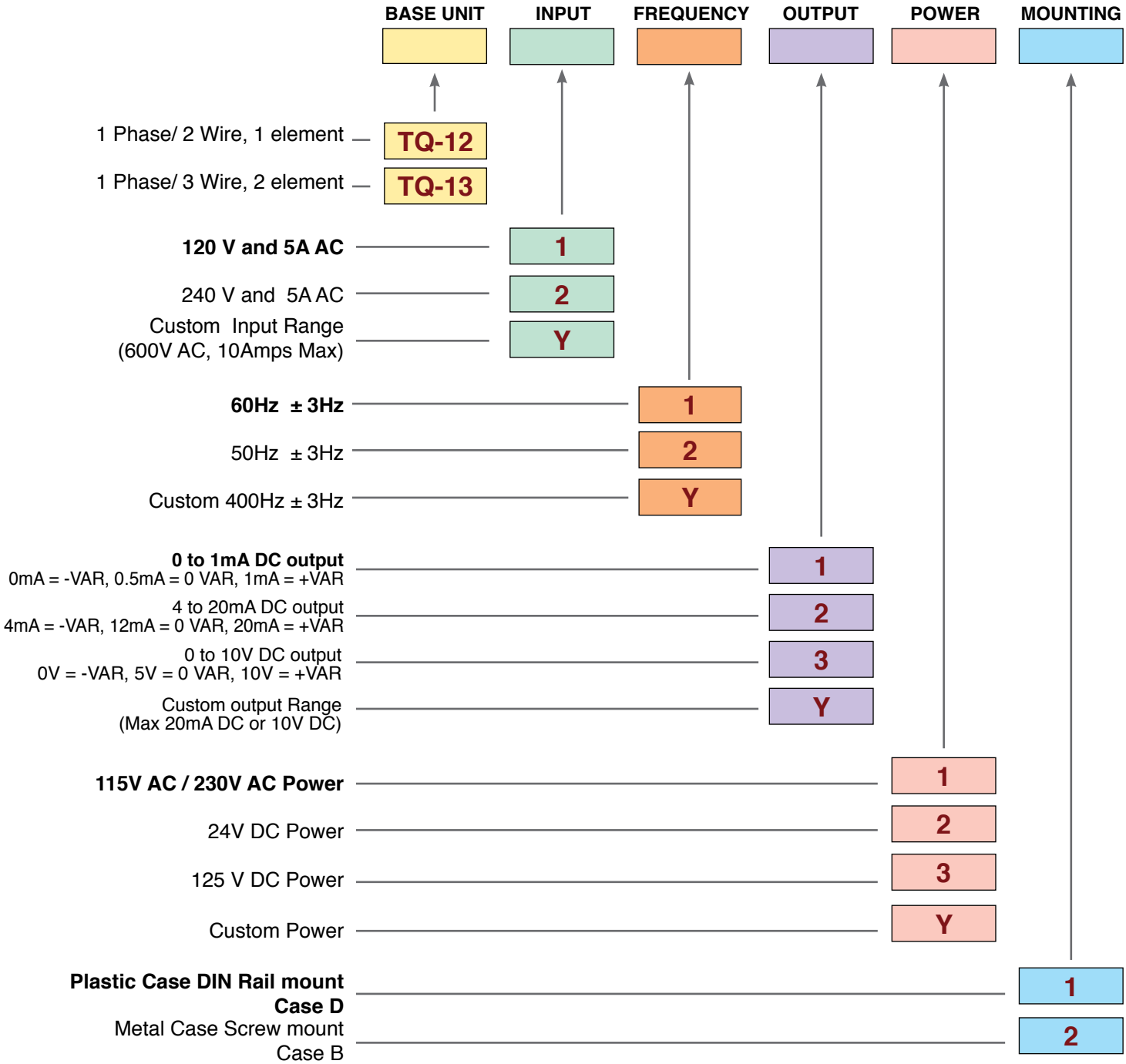


ORDERING INFORMATION

Example:

Product Ordering Code of TQ-1212121

TQ-12: Single Phase / 2Wire, 1 element VARs Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: 0 to 1mA DC Output
2: 24V DC Power
1: Plastic Case



MODELS OFFERED

TQ-33 base model 3 Phase, 3 Wire – 2 Element

TQ-34 base model 3 Phase, 4 Wire – 3 Element

- Accurate measurement of the reactive power VARs for balanced or unbalanced loads.
- The output signals are isolated load independent DC mA or DC Volts, representing the measured value of the reactive power VARs.

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/ºC of span
≤60ppm/ºC for ambient temperature of 25ºC ±10ºC

Temp. range ..... Storage temperature range -20ºC to 60ºC (-4ºF to 140ºF)
Operating temperature range 0ºC to 50ºC (32ºF to 122ºF)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 3 phase/3 Wire
208V/120V & 5A AC, 416V/240V & 5A AC, for 3 Phase / 4 Wire
custom input (600V max /10A AC max)

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... DC mA or DC Volts

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Load Resistance..... 10 kΩ maximum for 0 to 1mA output
500 Ω maximum for 4 to 20mA output
500 Ω minimum for 0 to 10V output

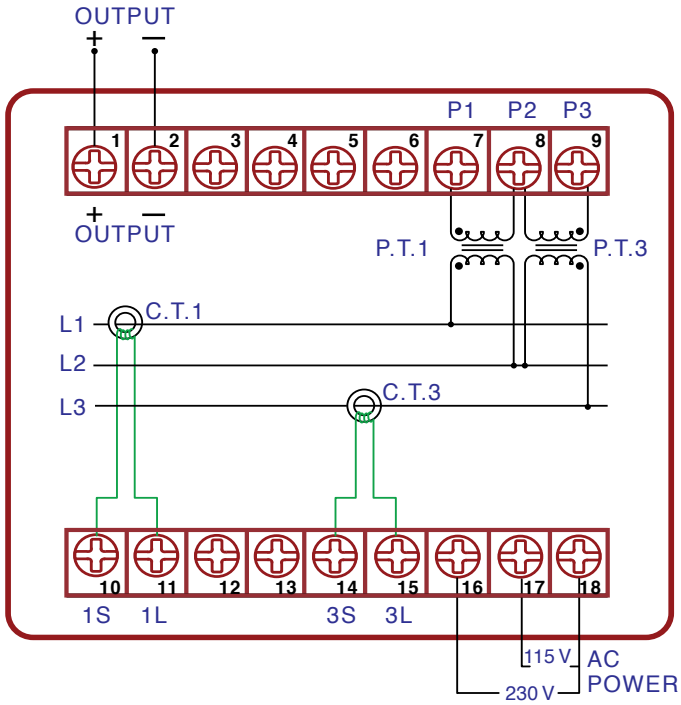
Model	Voltage	Current	Nominal VARs
TQ-33 3 ø / 3 Wire	120V AC (110V)	5A AC	1000
TQ-33 3 ø / 3 Wire	240V AC (220V)	5A AC	2000
TQ-34 3 ø / 4 Wire	208V/120V AC (190V/110V) phase volts / line volts	5A AC	1500
TQ-34 3 ø / 4 Wire	416V/240V AC (380V/220V) phase volts / line volts	5A AC	3000

Maximum Input range value = (CT Ratio) X (PT Ratio) X (Nominal VARs)

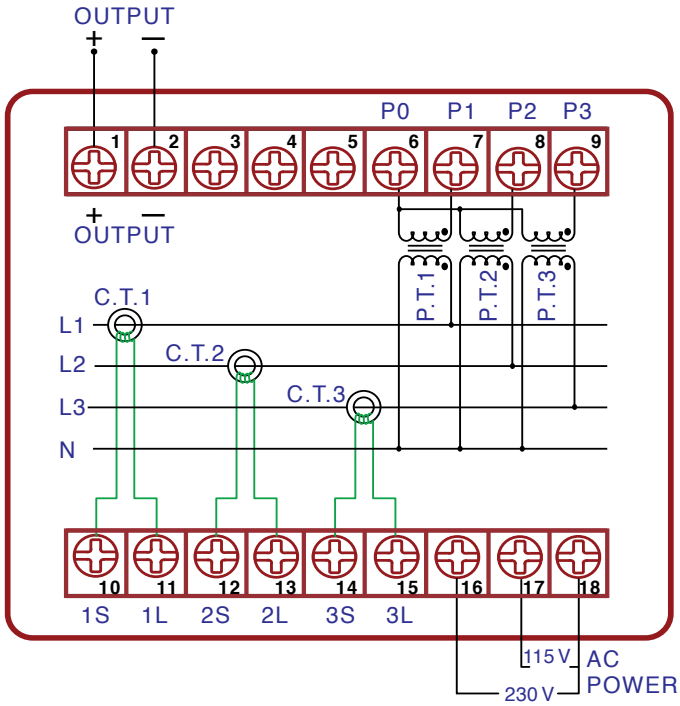
If CT = 200A:5A PT is 3300V:110V Nominal VARs = 1000
then CT Ratio = 40 then PT Ratio = 30 and Maximum input range value = 40 x 30 x 1000 = 1200KVAR

CONNECTION DIAGRAM

TQ-33



TQ-34

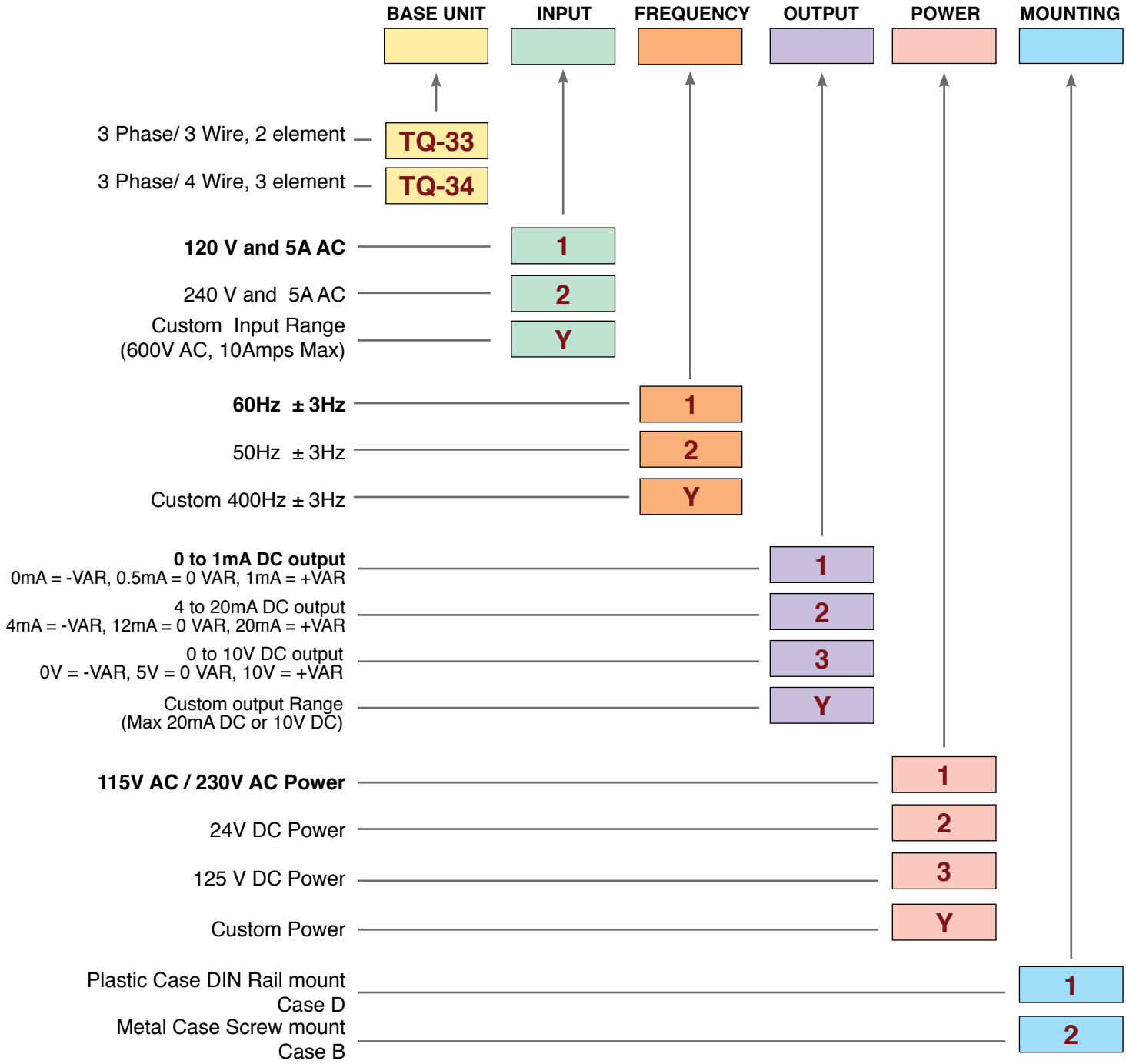


ORDERING INFORMATION

Example:

Product Ordering Code of TQ-3312121

TQ-33: Three Phase / 3Wire, 2 element VARs Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: 0 to 1mA DC Output
2: 24V DC Power
1: Plastic Case



MODELS OFFERED

TWQ-12 base model 1 Phase, 2 Wire – 1 Element

TWQ-13 base model 1 Phase, 3 Wire – 2 Element

- Accurate measurement of the active power and reactive power (Watts and VARs) of a single phase system with balanced or unbalanced loads.
- The output signals are isolated load independent DC mA or DC Volts, representing the measured value of the active and reactive power (Watts and VARs).

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/°C of span
≤60ppm/°C for ambient temperature of 25°C ±10°C

Temp. range ..... Storage temperature range -20°C to 60°C (-4°F to 140°F)
Operating temperature range 0°C to 50°C (32°F to 122°F)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 3 phase/3 Wire
208V/120V & 5A AC, 416V/240V & 5A AC, for 3 Phase / 4 Wire
custom input (600V max /10A AC max

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... DC mA or DC Volts

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Load Resistance..... 10 kΩ maximum for 0 to 1mA output
500 Ω maximum for 4 to 20mA output
500 Ω minimum for 0 to 10V output

Model	Voltage	Current	Nominal Watts	Nominal VARs
TWQ-12 1 ø / 2 Wire	120V AC (110V)	5A AC	500	500
TWQ-12 1 ø / 2 Wire	240V AC (220V)	5A AC	1000	1000
TWQ-13 1 ø / 3 Wire	240V/120V AC (220V/110V) Phase volts/Line Volts	5A AC	1000	1000

To calculate the actual Watts and VARs Maximum Input range value, the CT and PT ratios have to be factored in

Maximum input Range for Watts = (CT Ratio) X (PT Ratio) X (Nominal Watts)

Maximum Input range value for VARs = (CT Ratio) X (PT Ratio) X (Nominal VARs)

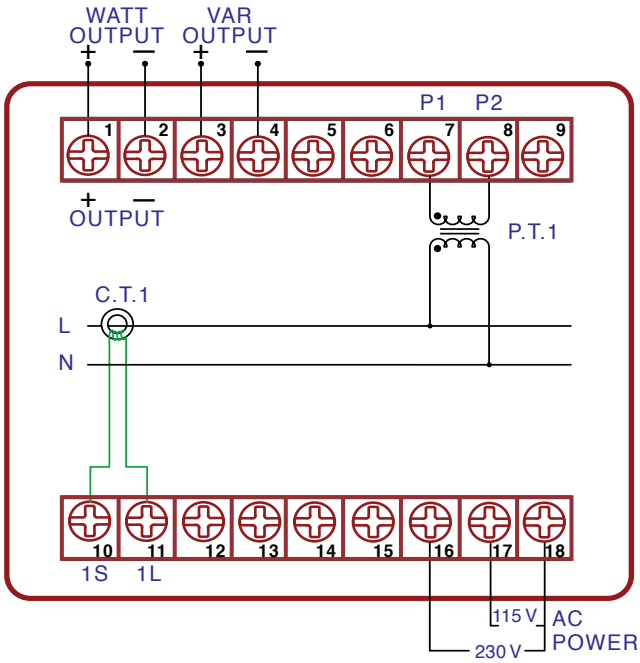
OUTPUT SPECIFICATIONS (CONTINUED)

For example:
If CT = 200A:5A PT is 3300V:110V Nominal Watts = 1000 Nominal VARs = 1000
then CT Ratio = 40 then PT Ratio = 30 and

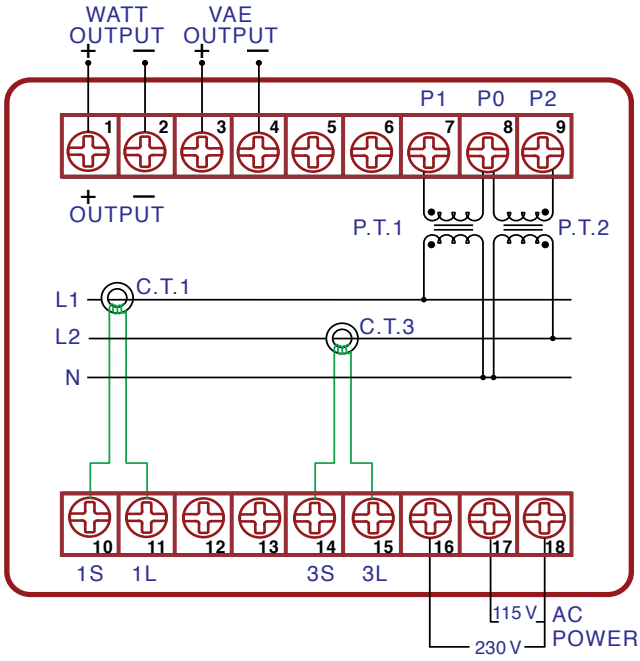
Maximum input range value for Watts = 40 x 30 x 1000 = 1200KWatts
Maximum input range value for VARs = 40 x 30 x 1000 = 1200KVARs

CONNECTION DIAGRAM

TWQ-12



TWQ-13

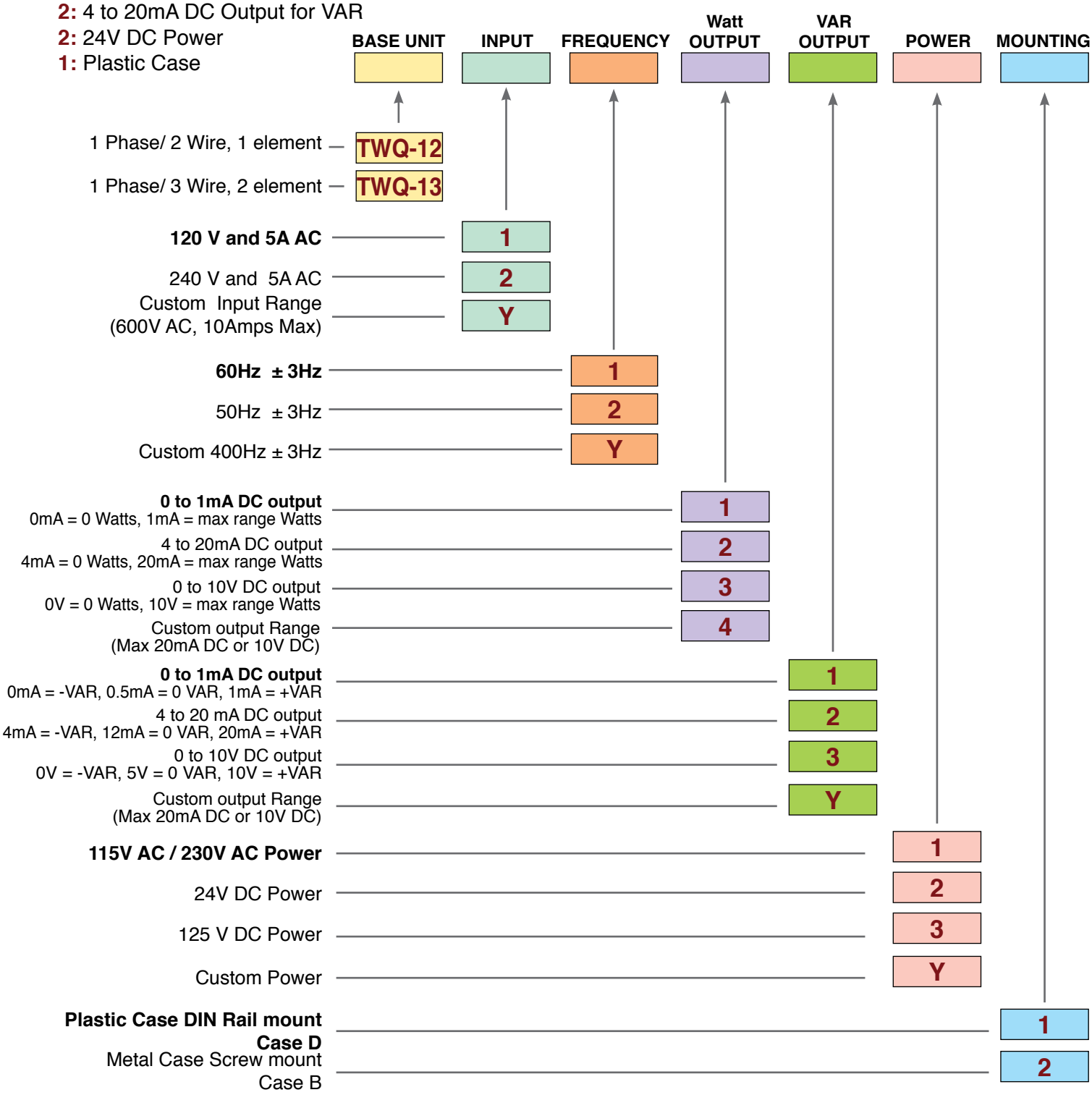


ORDERING INFORMATION

Example:

Product Ordering Code of TWQ-12121221

TWQ-12: Single Phase / 2Wire, 1 element WATT+ VARs Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: 0 to 1mA DC Output for Watt
2: 4 to 20mA DC Output for VAR
2: 24V DC Power
1: Plastic Case



Watts + VARs TRANSDUCERS Three Phase

MODELS OFFERED

TWQ-33 base model 3 Phase, 3 Wire – 2 Element

TWQ-34 base model 3 Phase, 4 Wire – 3 Element

- Accurate measurement of the active power and reactive power (Watts and VARs) of a three phase system with balanced or unbalanced loads.
- The output signals are isolated load independent DC mA or DC Volts, representing the measured value of the active and reactive power (Watts and VARs).

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/ºC of span
≤60ppm/ºC for ambient temperature of 25ºC ±10ºC

Temp. range ..... Storage temperature range -20ºC to 60ºC (-4ºF to 140ºF)
Operating temperature range 0ºC to 50ºC (32ºF to 122ºF)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 3 phase/3 Wire
208V/120V & 5A AC, 416V/240V & 5A AC, for 3 Phase / 4 Wire
custom input (600V max /10A AC max

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... DC mA or DC Volts

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Load Resistance..... 10 kΩ maximum for 0 to 1mA output
500 Ω maximum for 4 to 20mA output
500 Ω minimum for 0 to 10V output

Model	Voltage	Current	Nominal Watts	Nominal VARs
TWQ-33 3 ø / 3 Wire	120V AC (110V)	5A AC	1000	1000
TWQ-33 3 ø / 3Wire	240V AC (220V)	5A AC	2000	2000
TWQ-34 3 ø / 4 Wire	208V/120V AC (190V/110V) phase volts / line volts	5A AC	1500	1500
TWQ-34 3 ø / 4 Wire	416V/240V AC (380V/220V) phase volts / line volts	5A AC	3000	3000

To calculate the actual Watts and VARs Maximum Input range value, the CT and PT ratios have to be factored in

Maximum input Range for Watts = (CT Ratio) X (PT Ratio) X (Nominal Watts)

Maximum Input range value for VARs = (CT Ratio) X (PT Ratio) X (Nominal VARs)

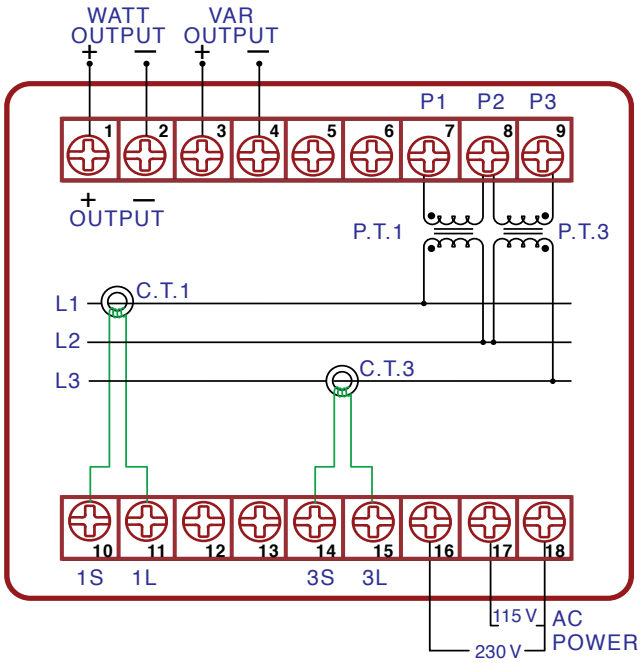
OUTPUT SPECIFICATIONS (CONTINUED)

For example:
If CT = 200A:5A then CT Ratio = 40
PT is 3300V:110V then PT Ratio = 30 and
Nominal Watts = 1000 and
Nominal VARs = 1000

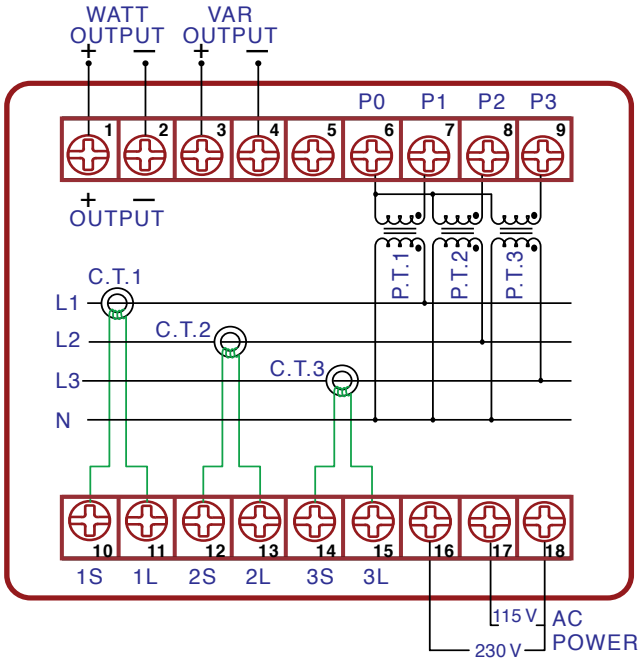
Maximum input range value for Watts = 40 x 30 x 1000 = 1200KWatts
Maximum input range value for VARs = 40 x 30 x 1000 = 1200KVARs

CONNECTION DIAGRAM

TWQ-33



TWQ-34

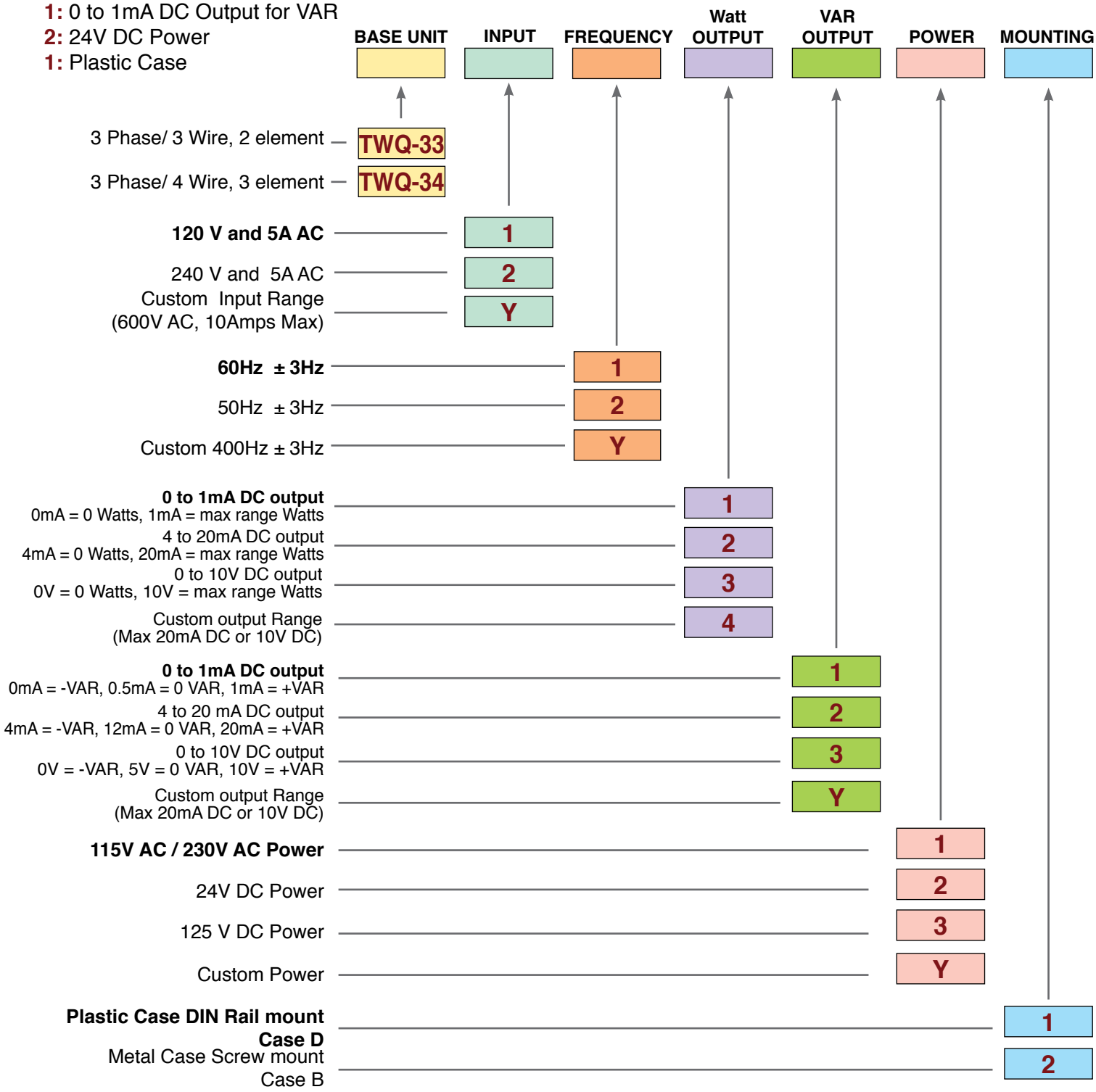


ORDERING INFORMATION

Example:

Product Ordering Code of TWQ-33121121

TWQ-33: Three Phase / 3Wire, 2 element WATT+ VARs Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: 0 to 1mA DC Output for Watt
1: 0 to 1mA DC Output for VAR
2: 24V DC Power
1: Plastic Case



Watt Hours TRANSDUCERS Single Phase

SCREW MOUNT METAL CASE B ABS DIN RAIL MOUNT CASE D C

MODELS OFFERED

TWH-12 base model 1 Phase, 2 Wire – 1 Element

TWH-13 base model 1 Phase, 3 Wire – 2 Element

- Accurate measurement of the active energy (Watt Hours) of a single phase system with balanced or unbalanced loads.
- The output signals are isolated load independent DC mA or DC Volts, representing the measured value of the active energy (WattHours, forward and reverse).

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations.**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/°C of span
≤60ppm/°C for ambient temperature of 25°C ±10°C

Temp. range ..... Storage temperature range -20°C to 60°C (-4°F to 140°F)
Operating temperature range 0°C to 50°C (32°F to 122°F)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 1 phase/2 Wire
240V/120V & 5A AC, for 1 Phase / 3 Wire
custom input (600V max /10A AC max)

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... Pulses

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Model	Voltage	Current	Nominal Watts	Nominal Pulses/ WattHours with NO CT or PT
TWH-12 1 ø / 2 Wire	120V AC (110V)	5A AC	500	1, 10, 100
TWH-12 1 ø / 2 Wire	240V AC (220V)	5A AC	1000	1, 10, 100
TWH-13 1 ø / 3 Wire	240V/120V AC (220V/110V) phase volts / line volts	5A AC	1000	1, 10, 100

To calculate the actual WattHours for each output pulse, the CT and PT ratios have to be factored in

$$\text{WattHours per Output Pulse} = \frac{\text{(CT Ratio) X (PT Ratio)}}{\text{Nominal Pulses /WattHour}}$$

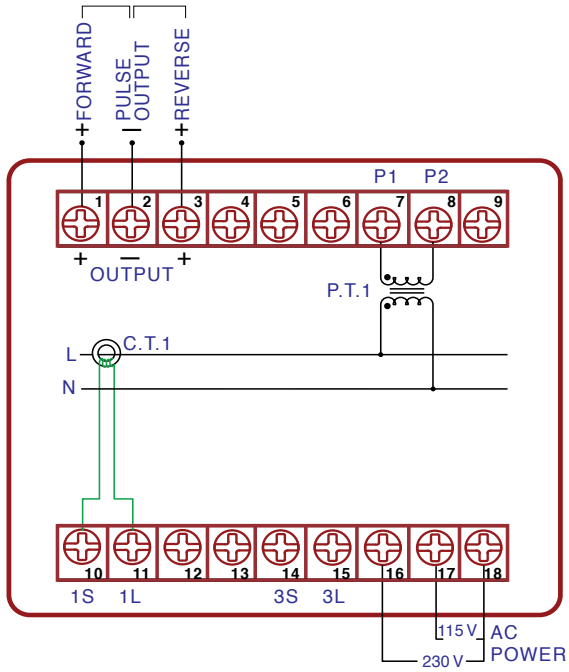
OUTPUT SPECIFICATIONS (CONTINUED)

Calculation example: For Single phase 2 wire, TWH-12
If CT = 200A:5A then CT Ratio = 40 PT is 3300V:110V then PT Ratio = 30

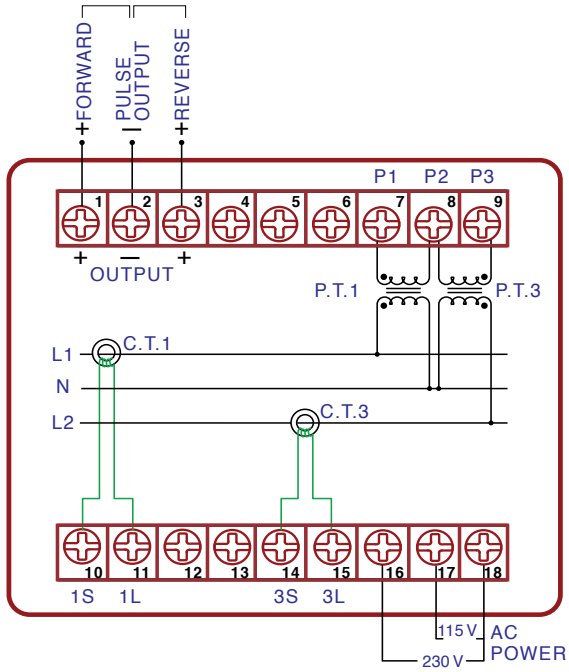
If 1 pulse per WattHour is selected, the output will actually be 1 pulse per 1200 WattHours
If 10 pulse per WattHour is selected, the output will actually be 1 pulse per 120 WattHours
If 100 pulse per WattHour is selected, the output will actually be 1 pulse per 12 WattHours

CONNECTION DIAGRAM

TWH-12



TWH-13

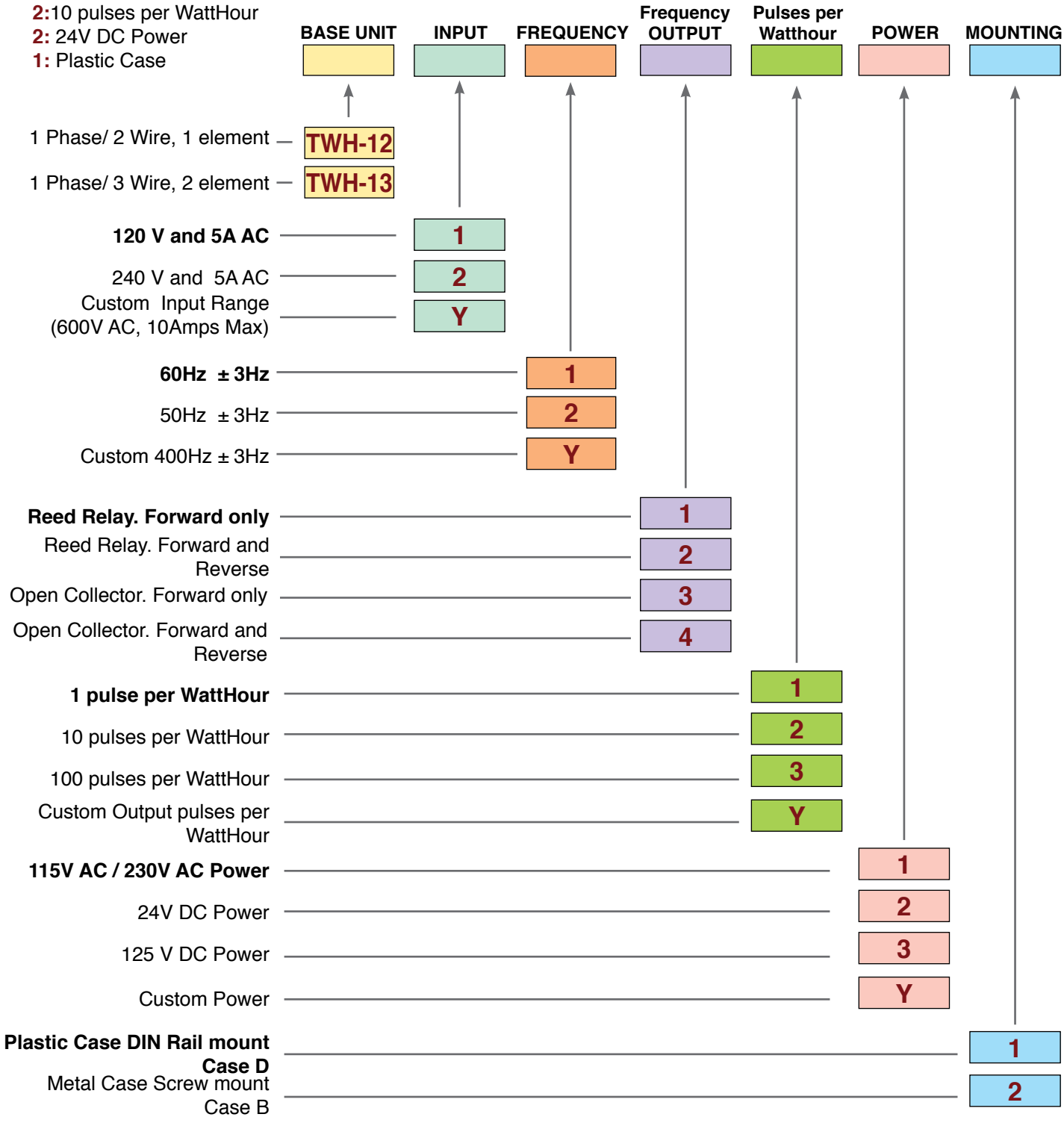


ORDERING INFORMATION

Example:

Product Ordering Code of TWH-12121221

TWH-12: Single Phase / 2Wire, 1 element Watt Hours Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: Reed Relay. Forward only
2:10 pulses per WattHour
2: 24V DC Power
1: Plastic Case



Watt Hours TRANSDUCERS Three Phase

SCREW MOUNT METAL CASE B ABS DIN RAIL MOUNT CASE D C

MODELS OFFERED

TWH-33 base model 3 Phase, 3 Wire – 2 Element

TWH-34 base model 3 Phase, 4 Wire – 3 Element

- Accurate measurement of the active energy (WattHours) of a three phase system with balanced or unbalanced loads.
- The output signals are isolated load independent pulses, representing the measured value of the active energy (WattHours, forward and reverse).

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations.**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/°C of span
≤60ppm/°C for ambient temperature of 25°C ±10°C

Temp. range ..... Storage temperature range -20°C to 60°C (-4°F to 140°F)
Operating temperature range 0°C to 50°C (32°F to 122°F)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 3 phase/3 Wire
208V/120V & 5A AC, 416V/240V, 5A, for 3 Phase / 4 Wire
custom input (600V max /10A AC max)

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... Pulses

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Model	Voltage	Current	Nominal Watts	Nominal Pulses/ WattHours with NO CT or PT
TWH-33 3 ø / 3 Wire	120V AC (110V)	5A AC	1000	1, 10, 100
TWH-33 3 ø / 3 Wire	240V AC (220V)	5A AC	2000	1, 10, 100
TWH-34 3 ø / 4 Wire	208V/120V AC (190V/110V) Phase volts/Line Volts	5A AC	1500	1, 10, 100
TWH-34 3 ø / 4 Wire	416V/240V AC (380V/220V) Phase volts/Line Volts	5A AC	3000	1, 10, 100

To calculate the actual WattHours for each output pulse, the CT and PT ratios have to be factored in

$$\text{WattHours per Output Pulse} = \frac{\text{(CT Ratio) X (PT Ratio)}}{\text{Nominal Pulses /WattHour}}$$

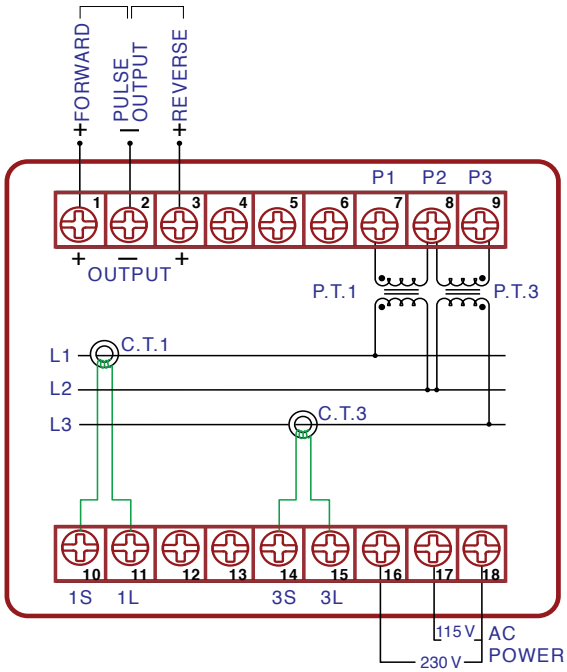
OUTPUT SPECIFICATIONS (CONTINUED)

Calculation example: For Three phase 3 wire, TWH-33
If CT = 200A:5A then CT Ratio = 40 PT is 3300V:110V then PT Ratio = 30

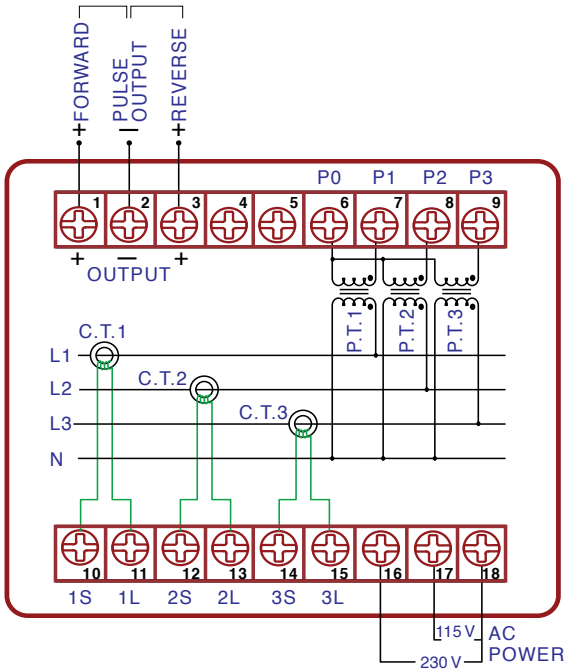
If 1 pulse per WattHour is selected, the output will actually be 1 pulse per 1200 WattHours
If 10 pulse per WattHour is selected, the output will actually be 1 pulse per 120 WattHours
If 100 pulse per WattHour is selected, the output will actually be 1 pulse per 12 WattHours

CONNECTION DIAGRAM

TWH-33



TWH-34

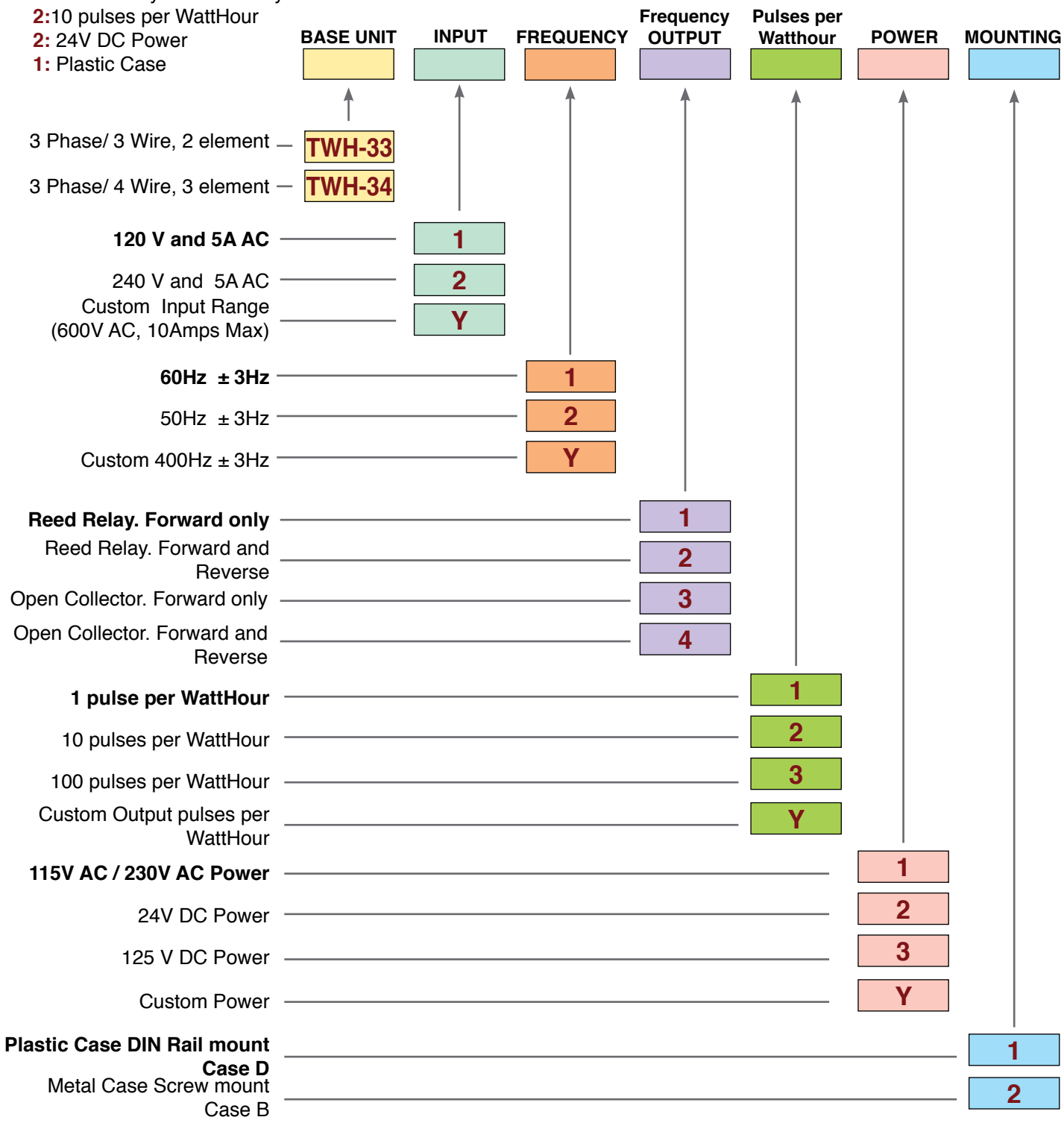


ORDERING INFORMATION

Example:

Product Ordering Code of TWH-33121221

TWH-12: Three Phase / 3Wire, 2 element Watt Hours Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: Reed Relay. Forward only
2:10 pulses per WattHour
2: 24V DC Power
1: Plastic Case



SCREW MOUNT METAL CASE B ABS DIN RAIL MOUNT CASE D C

MODELS OFFERED

TWWH-12 base model 1 Phase, 2 Wire – 1 Element

TWWH-13 base model 1 Phase, 3 Wire – 2 Element

- Accurate measurement of the active energy (WattHours) of a three phase system with balanced or unbalanced loads.
- The output signals are isolated load independent pulses, representing the measured value of the active energy (WattHours, forward and reverse) and DC mA or DC V for the active power (Watts).

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations.**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/ºC of span
≤60ppm/ºC for ambient temperature of 25ºC ±10ºC

Temp. range ..... Storage temperature range -20ºC to 60ºC (-4ºF to 140ºF)
Operating temperature range 0ºC to 50ºC (32ºF to 122ºF)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 1 phase/2 Wire
208V/120V & 5A AC for 1 Phase / 3 Wire
custom input (600V max /10A AC max)

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... Pulses (WattHours) and DC mA or DC V (Watts)

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Model	Voltage	Current	Nominal Watts	Nominal Pulses/ WattHours with NO CT or PT
TWWH-12 1 ø / 2 Wire	120V AC (110V)	5A AC	500	1, 10, 100
TWWH-12 1 ø / 2 Wire	240V AC (220V)	5A AC	1000	1, 10, 100
TWWH-13 1 ø / 3 Wire	240V/120V AC (220V/110V) phase volts / line volts	5A AC	1000	1, 10, 100

To calculate the actual WattHours and Watts for each output pulse, the CT and PT ratios have to be factored in

Watts = (CT Ratio) X (PT Ratio) x Nominal Watts

$$\text{WattHours per Output Pulse} = \frac{\text{(CT Ratio) X (PT Ratio)}}{\text{Nominal Pulses /WattHour}}$$

OUTPUT SPECIFICATIONS (CONTINUED)

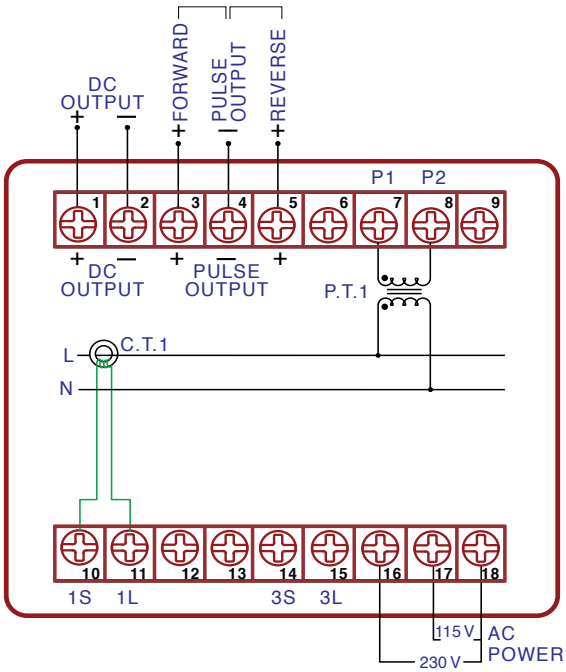
Calculation example: For Single phase 2 wire, TWWH-12
If CT = 200A:5A then CT Ratio = 40 PT is 3300V:110V then PT Ratio = 30

Watts = 30 x 40 x 500 = 600kW

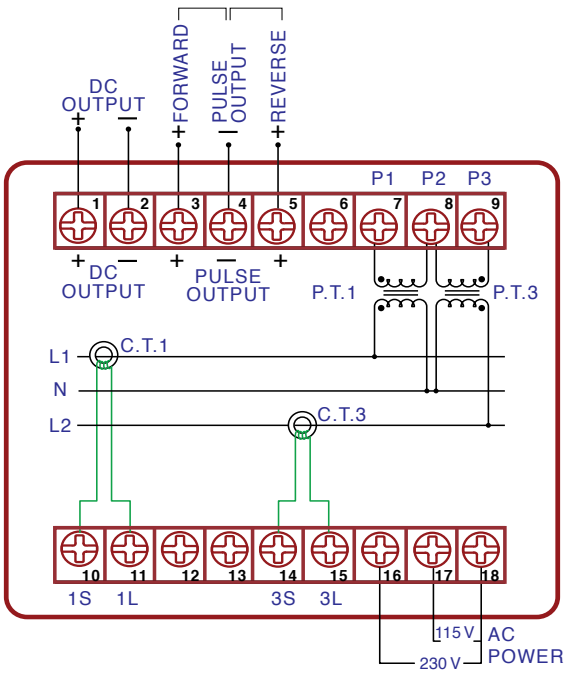
If 1 pulse per WattHour is selected, the output will actually be 1 pulse per 1200 WattHours
If 10 pulse per WattHour is selected, the output will actually be 1 pulse per 120 WattHours
If 100 pulse per WattHour is selected, the output will actually be 1 pulse per 12 WattHours

CONNECTION DIAGRAM

TWWH-12



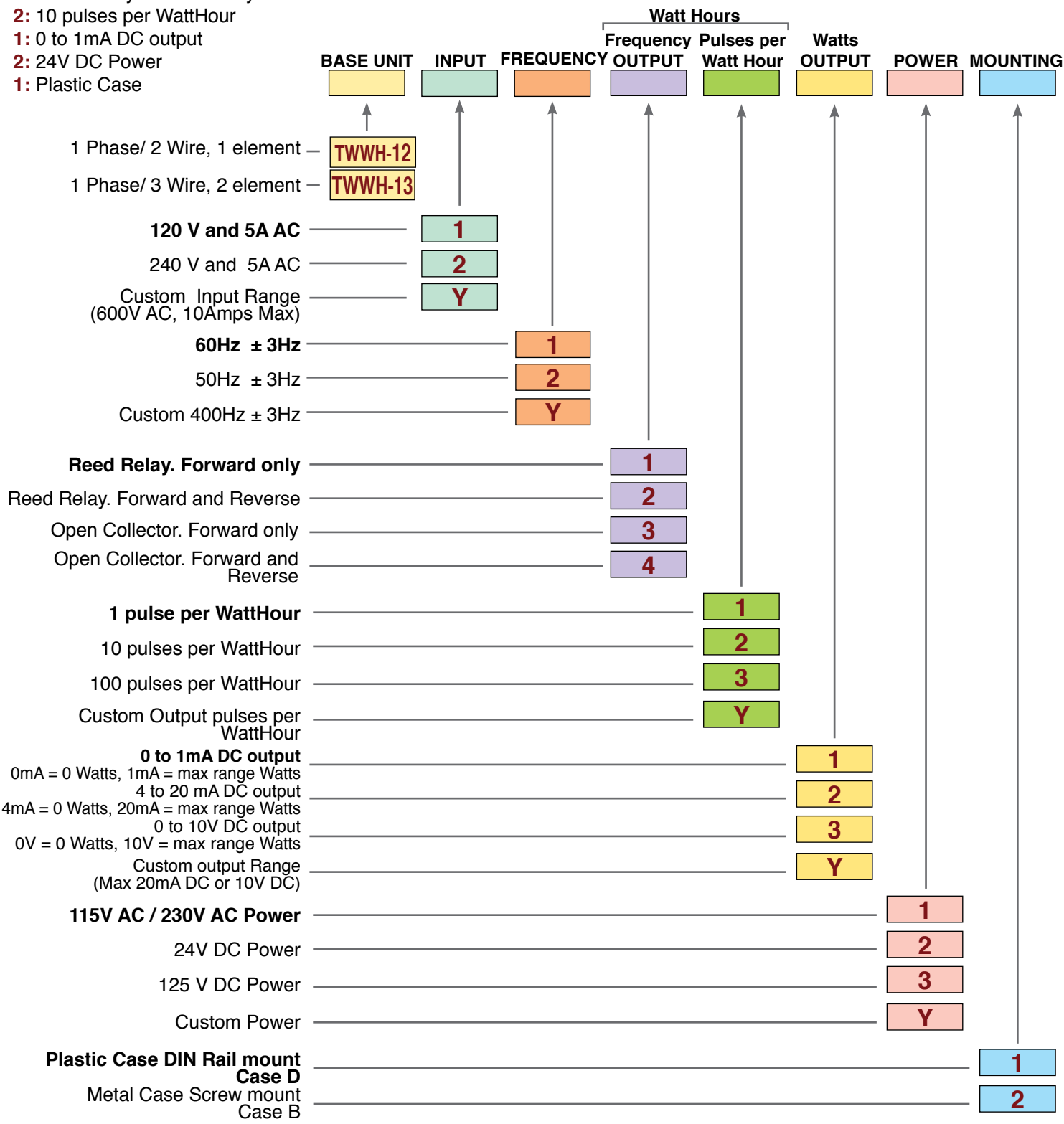
TWWH-13



ORDERING INFORMATION

Example: **Product Ordering Code of TWWH-121212121**

TWWH-12: Single Phase / 2Wire, 1 element Watts+Watt Hours Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: Reed Relay. Forward only
2: 10 pulses per WattHour
1: 0 to 1mA DC output
2: 24V DC Power
1: Plastic Case



Watt + Watt Hours TRANSDUCERS Three Phase

MODELS OFFERED

TWWH-33 base model 3 Phase, 3 Wire – 2 Element

TWWH-34 base model 3 Phase, 4 Wire – 3 Element

- Accurate measurement of the active power and active energy (Watta and WattHours) of a three phase system with balanced or unbalanced loads.
- The output signals are isolated load independent pulses, representing the measured value of the active energy (WattHours, forward and reverse) and DC mA or DC V for active power(Watts).

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations.**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/°C of span
≤60ppm/°C for ambient temperature of 25°C ±10°C

Temp. range ..... Storage temperature range -20°C to 60°C (-4°F to 140°F)
Operating temperature range 0°C to 50°C (32°F to 122°F)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 3 phase/3 Wire
208V/120V & 5A AC, 416V/240V, 5A, for 3 Phase / 4 Wire
custom input (600V max /10A AC max)

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... Pulses (WattHr) and DCmA or DCV (Watts)

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Model	Voltage	Current	Nominal Watts	Nominal Pulses/ WattHours with NO CT or PT
TWWH-33 3 ø / 3 Wire	120V AC (110V)	5A AC	1000	1, 10, 100
TWWH-33 3 ø / 3 Wire	240V AC (220V)	5A AC	2000	1, 10, 100
TWWH-34 3 ø / 4 Wire	208V/120V AC (190V/110V) Phase volts/Line Volts	5A AC	1500	1, 10, 100
TWWH-34 3 ø / 4 Wire	416V/240V AC (380V/220V) Phase volts/Line Volts	5A AC	3000	1, 10, 100

To calculate the actual WattHours for each output pulse, the CT and PT ratios have to be factored in

Watts = (CT Ratio) X (PT Ratio) X Nominal Watts

$$\textbf{WattHours per Output Pulse} = \frac{\textbf{(CT Ratio) X (PT Ratio)}}{\textbf{Nominal Pulses /WattHour}}$$

OUTPUT SPECIFICATIONS (CONTINUED)

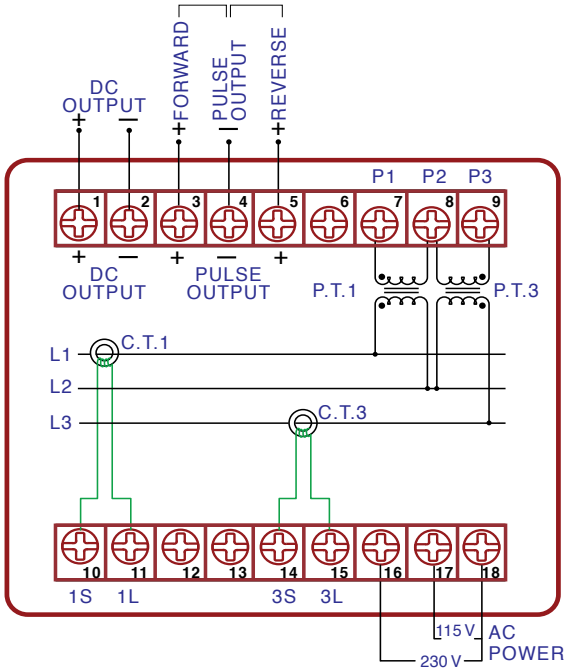
Calculation example: For Three phase 3 wire, TWWH-33
If CT = 200A:5A then CT Ratio = 40 PT is 3300V:110V then PT Ratio = 30

Watts = 40 x 30 x 1000 = 1200 KW

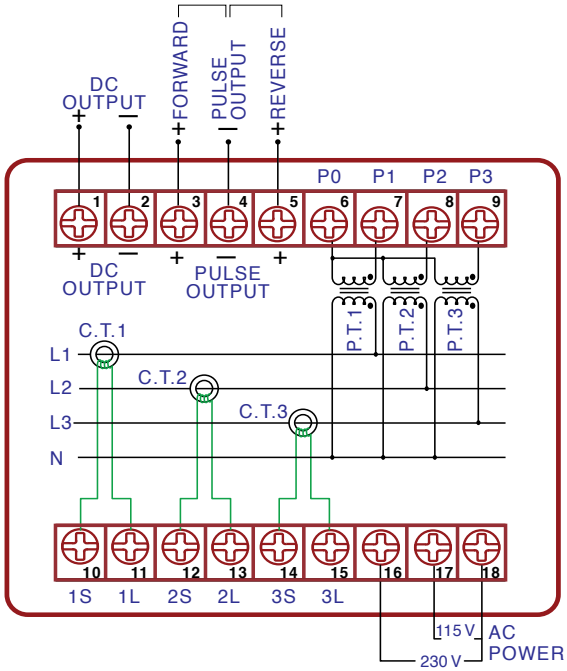
If 1 pulse per WattHour is selected, the output will actually be 1 pulse per 1200 WattHours
If 10 pulse per WattHour is selected, the output will actually be 1 pulse per 120 WattHours
If 100 pulse per WattHour is selected, the output will actually be 1 pulse per 12 WattHours

CONNECTION DIAGRAM

TWWH-33



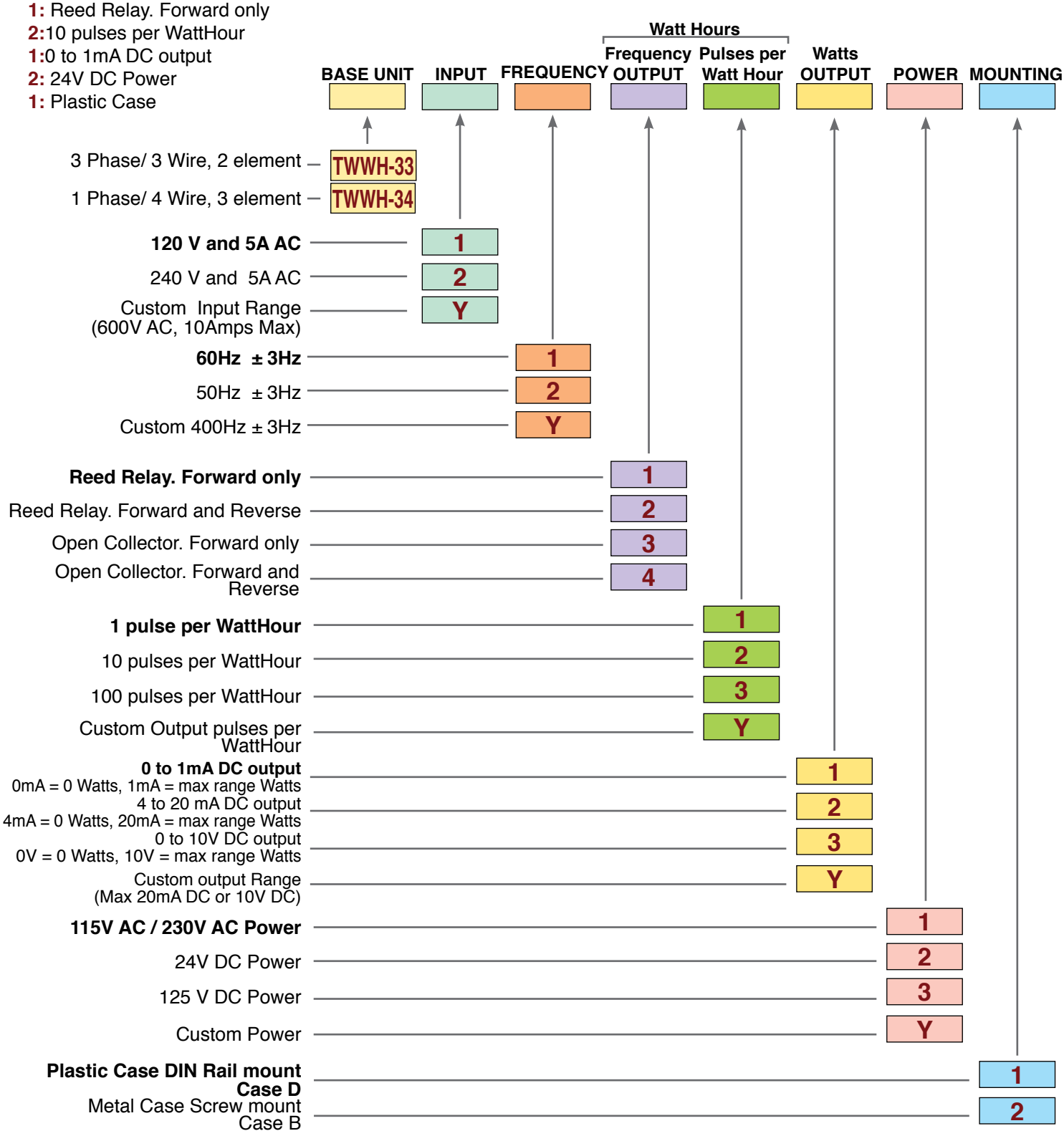
TWWH-34



ORDERING INFORMATION

Example: **Product Ordering Code of TWWH-331212121**

TWWH-33: Three Phase / 3Wire, 2 element Watt+Watt Hours Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: Reed Relay. Forward only
2:10 pulses per WattHour
1:0 to 1mA DC output
2: 24V DC Power
1: Plastic Case



VAR Hours TRANSDUCERS Single Phase

SCREW MOUNT METAL CASE B

ABS DIN RAIL MOUNT CASE D

MODELS OFFERED

TQH-12 base model 1 Phase, 2 Wire – 1 Element

TQH-13 base model 1 Phase, 3 Wire – 2 Element

- Accurate measurement of the reactive energy (VAR Hours) of a single phase system with balanced or unbalanced loads.
- The output signals are isolated load independent DC mA or DC Volts, representing the measured value of the active energy (WattHours, forward and reverse).

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations.**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/°C of span
≤60ppm/°C for ambient temperature of 25°C ±10°C

Temp. range ..... Storage temperature range -20°C to 60°C (-4°F to 140°F)
Operating temperature range 0°C to 50°C (32°F to 122°F)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 1 phase/2 Wire
240V/120V & 5A AC, for 1 Phase / 3 Wire
custom input (600V max /10A AC max)

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden ..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity ..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... Pulses

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Model	Voltage	Current	Nominal VARs	Nominal Pulses/ VAR Hours with NO CT or PT
TQH-12 1 ø / 2 Wire	120V AC (110V)	5A AC	500	1, 10, 100
TQH-12 1 ø / 2 Wire	240V AC (220V)	5A AC	1000	1, 10, 100
TQH-13 1 ø / 3 Wire	240V/120V AC (220V/110V) phase volts / line volts	5A AC	1000	1, 10, 100

To calculate the actual VARHours for each output pulse, the CT and PT ratios have to be factored in

$$\text{VARHours per Output Pulse} = \frac{\text{(CT Ratio) X (PT Ratio)}}{\text{Nominal Pulses /VARHour}}$$

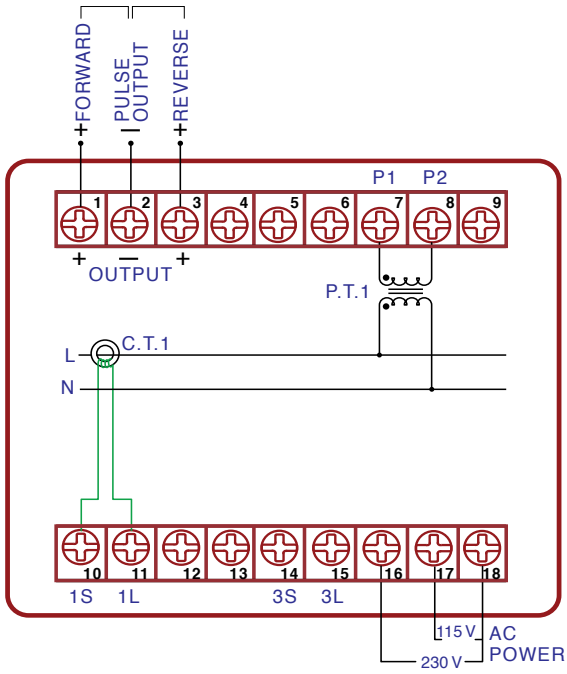
OUTPUT SPECIFICATIONS (CONTINUED)

Calculation example: For Single phase 2 wire, TQH-12
If CT = 200A:5A then CT Ratio = 40 PT is 3300V:110V then PT Ratio = 30

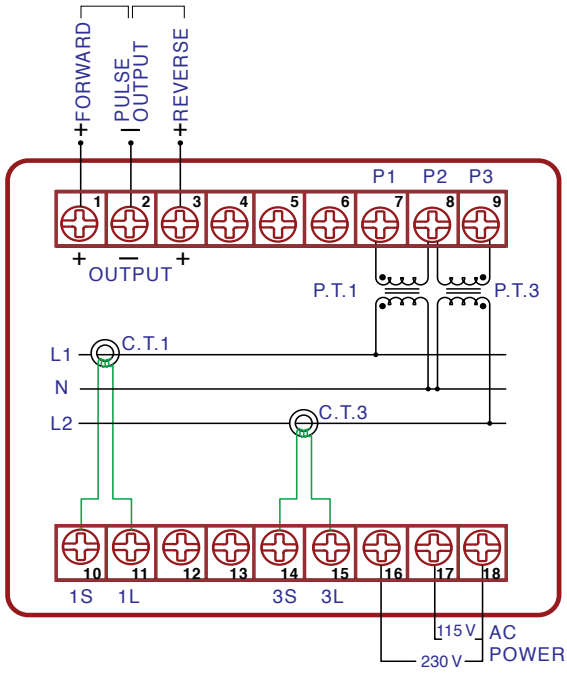
If 1 pulse per VARHour is selected, the output will actually be 1 pulse per 1200 WARHours
If 10 pulse per VARHour is selected, the output will actually be 1 pulse per 120 VARHours
If 100 pulse per VARHour is selected, the output will actually be 1 pulse per 12 VARHours

CONNECTION DIAGRAM

TQH-12



TQH-13

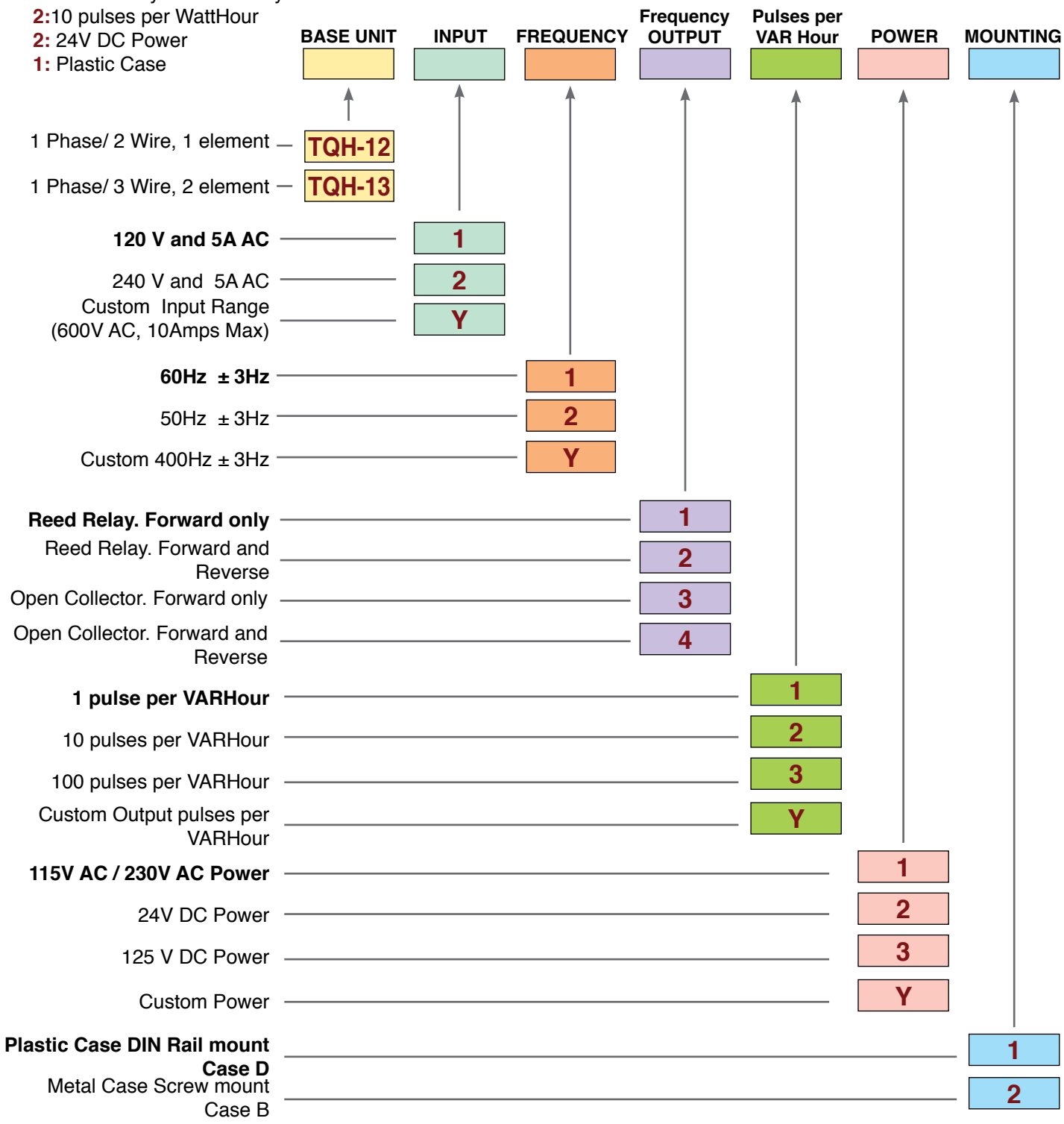


ORDERING INFORMATION

Example:

Product Ordering Code of TQH-12121221

TQH-12: Single Phase / 2Wire, 1 element VAR Hours Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: Reed Relay. Forward only
2:10 pulses per WattHour
2: 24V DC Power
1: Plastic Case



VAR Hours TRANSDUCERS Three Phase

MODELS OFFERED

TQH-33 base model 3 Phase, 3 Wire – 2 Element

TQH-34 base model 3 Phase, 4 Wire – 3 Element

- Accurate measurement of the reactive energy (VAR-Hours) of a three phase system with balanced or unbalanced loads.
- The output signals are isolated load independent pulses, representing the measured value of the reactive energy (VARHours, forward and reverse).

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations.**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/°C of span
≤60ppm/°C for ambient temperature of 25°C ±10°C

Temp. range ..... Storage temperature range -20°C to 60°C (-4°F to 140°F)
Operating temperature range 0°C to 50°C (32°F to 122°F)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 3 phase/3 Wire
208V/120V & 5A AC, 416V/240V, 5A, for 3 Phase / 4 Wire
custom input (600V max /10A AC max)

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... Pulses

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Model	Voltage	Current	Nominal VARs	Nominal Pulses/ VAR Hours with NO CT or PT
TQH-33 3 ø / 3 Wire	120V AC (110V)	5A AC	1000	1, 10, 100
TQH-33 3 ø / 3 Wire	240V AC (220V)	5A AC	2000	1, 10, 100
TQH-34 3 ø / 4 Wire	208V/120V AC (190V/110V) Phase volts/Line Volts	5A AC	1500	1, 10, 100
TQH-34 3 ø / 4 Wire	416V/240V AC (380V/220V) Phase volts/Line Volts	5A AC	3000	1, 10, 100

To calculate the actual VARHours for each output pulse, the CT and PT ratios have to be factored in

$$\text{VARHours per Output Pulse} = \frac{\text{(CT Ratio) X (PT Ratio)}}{\text{Nominal Pulses /VARHour}}$$

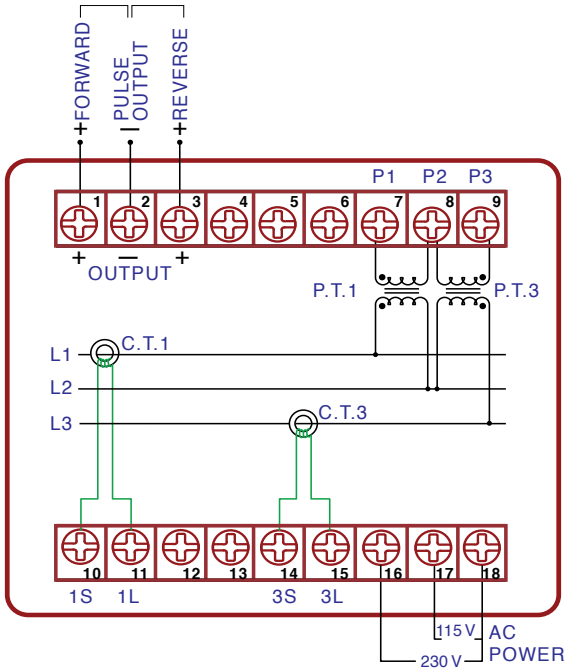
OUTPUT SPECIFICATIONS (CONTINUED)

Calculation example: For Three phase 3 wire, TQH-33
If CT = 200A:5A then CT Ratio = 40 PT is 3300V:110V then PT Ratio = 30

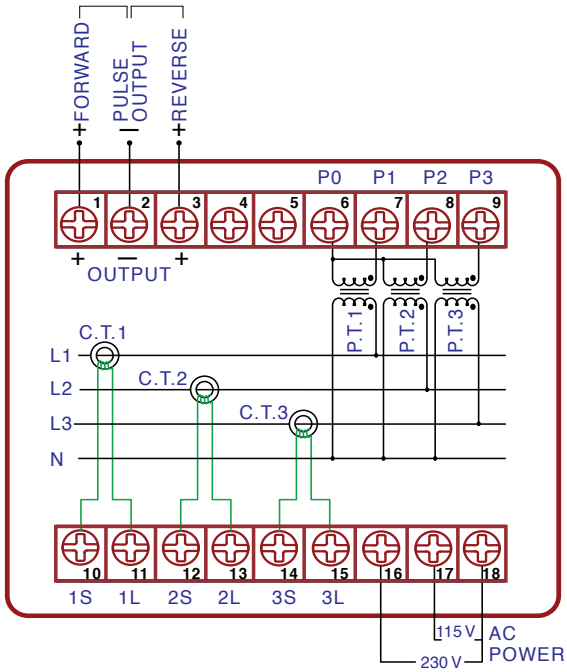
If 1 pulse per VARHour is selected, the output will actually be 1 pulse per 1200 VARHours
If 10 pulse per VARHour is selected, the output will actually be 1 pulse per 120 VARHours
If 100 pulse per VARHour is selected, the output will actually be 1 pulse per 12 VARHours

CONNECTION DIAGRAM

TQH-33



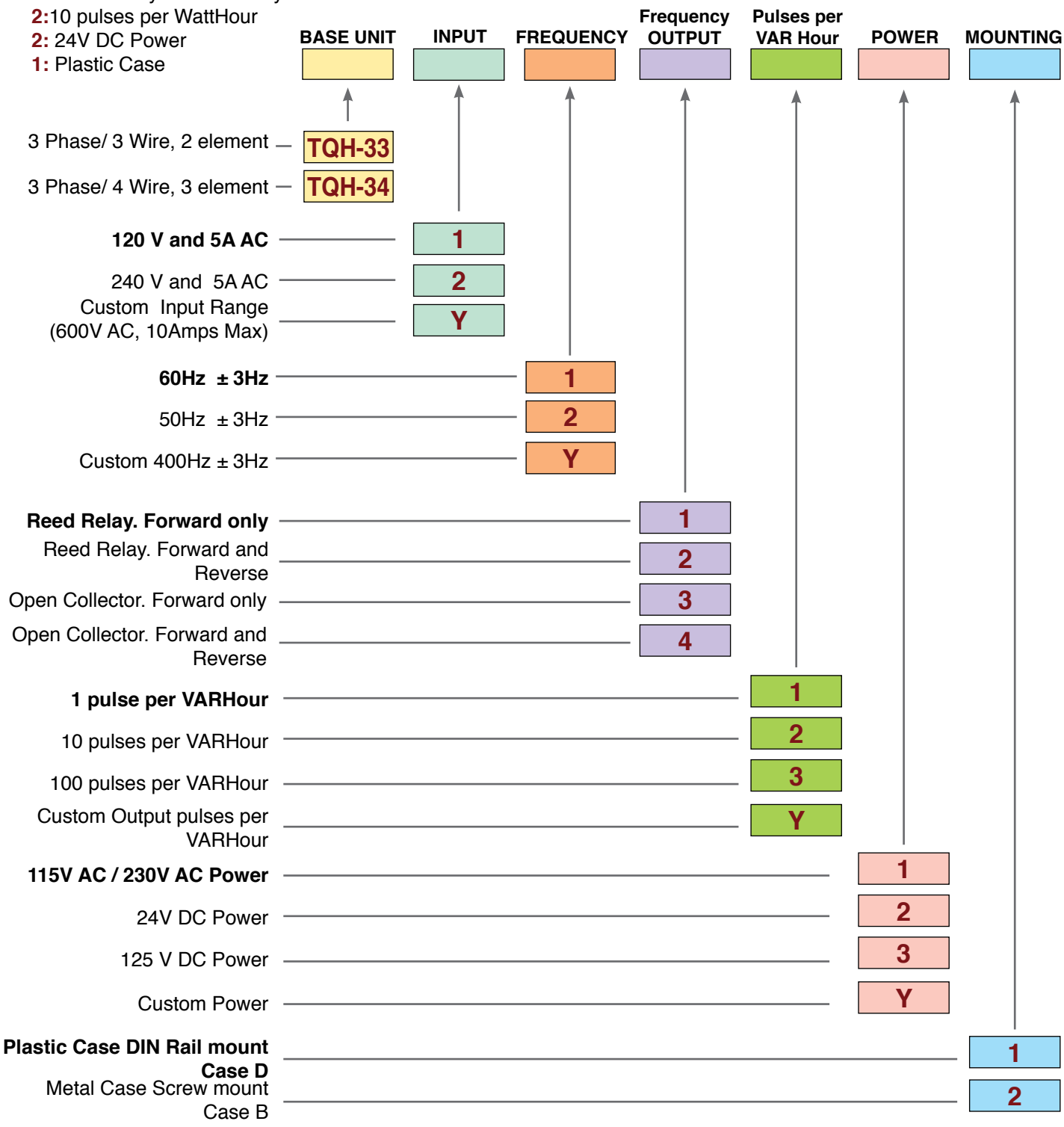
TQH-34



ORDERING INFORMATION

Example:
Product Ordering Code of TQH-33121221

TQH-33: Three Phase / 3Wire, 2 element VAR Hours Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: Reed Relay. Forward only
2:10 pulses per WattHour
2: 24V DC Power
1: Plastic Case



VARs+VAR Hours TRANSDUCERS Single Phase

MODELS OFFERED

TQQH-12 base model 1 Phase, 2 Wire – 1 Element

TQQH-13 base model 1 Phase, 3 Wire – 2 Element

- Accurate measurement of the reactive energy (WattHours) and reactive power (VARs) of a three phase system with balanced or unbalanced loads.
- The output signals are isolated load independent pulses, representing the measured value of the reactive energy (VARHours, forward and reverse) and DC mA or DC V for the reactive power (VARs).

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations.**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/ºC of span
≤60ppm/ºC for ambient temperature of 25ºC ±10ºC

Temp. range ..... Storage temperature range -20ºC to 60ºC (-4ºF to 140ºF)
Operating temperature range 0ºC to 50ºC (32ºF to 122ºF)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 1 phase/2 Wire
240V/120V & 5A AC, for 1 Phase / 3 Wire
custom input (600V max /10A AC max)

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... Pulses (VARHours) and DC mA or DC V (VARs)

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Model	Voltage	Current	Nominal VARs	Nominal Pulses/ VAR Hours with NO CT or PT
TQQH-12 1 ø / 2 Wire	120V AC (110V)	5A AC	500	1, 10, 100
TQQH-12 1 ø / 2 Wire	240V AC (220V)	5A AC	1000	1, 10, 100
TQQH-13 1 ø / 3 Wire	240V/120V AC (220V/110V) phase volts / line volts	5A AC	1000	1, 10, 100

To calculate the actual VARHours and VARs for each output pulse, the CT and PT ratios have to be factored in

VARs = (CT Ratio) X (PT Ratio) x Nominal Watts

$$\text{VARHours per Output Pulse} = \frac{\text{(CT Ratio) X (PT Ratio)}}{\text{Nominal Pulses /VARHour}}$$

OUTPUT SPECIFICATIONS (CONTINUED)

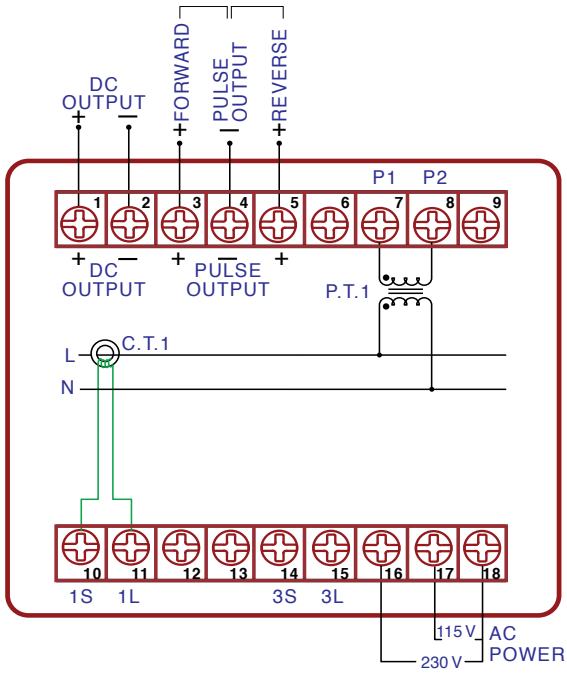
Calculation example: For Single phase 2 wire, TQQH-12
If CT = 200A:5A then CT Ratio = 40 PT is 3300V:110V then PT Ratio = 30

VARs = 30 x 40 x 500 = 600kVAR

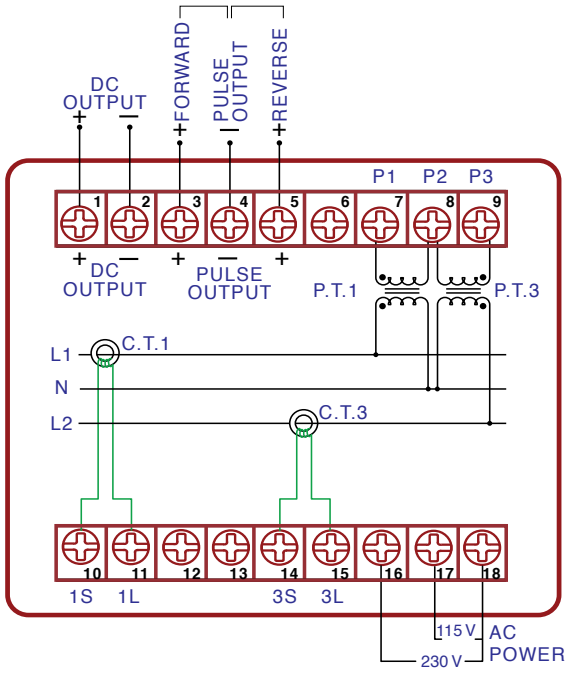
If 1 pulse per VARHour is selected, the output will actually be 1 pulse per 1200 VARHours
If 10 pulse per VARHour is selected, the output will actually be 1 pulse per 120 VARHours
If 100 pulse per VARHour is selected, the output will actually be 1 pulse per 12 VARHours

CONNECTION DIAGRAM

TQQH-12



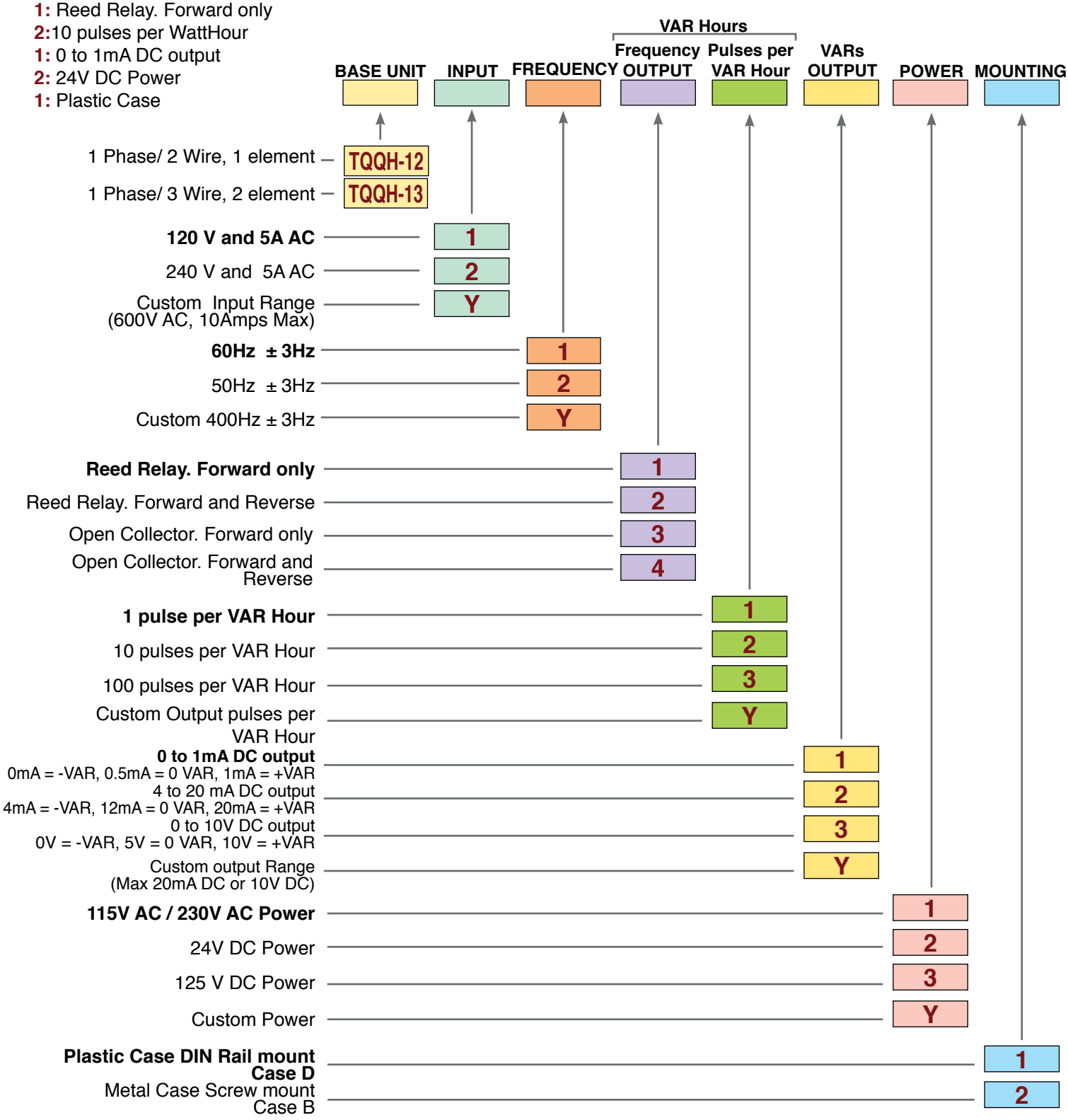
TQQH-13



ORDERING INFORMATION

Example: **Product Ordering Code of TQQH-121212121**

TQQH-12: Single Phase / 2Wire, 1 element VARS+VAR Hours Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: Reed Relay. Forward only
2:10 pulses per WattHour
1: 0 to 1mA DC output
2: 24V DC Power
1: Plastic Case



VARs+VAR Hours TRANSDUCERS Three Phase

MODELS OFFERED

TQQH-33 base model 3 Phase, 3 Wire – 2 Element

TQQH-34 base model 3 Phase, 4 Wire – 3 Element

- Accurate measurement of the reactive power and reactive energy (VARs and VARHours) of a three phase system with balanced or unbalanced loads.
- The output signals are isolated load independent pulses, representing the measured value of the reactive energy (VARHours, forward and reverse) and DC mA or DC mV for the reactive power (VAR).

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.2% of Rated Output (R.O.)**
- **Super high accuracy ±0.1% of Rated Output (R.O.) available as a special order.***
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations.**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/ºC of span
≤60ppm/ºC for ambient temperature of 25ºC ±10ºC

Temp. range ..... Storage temperature range -20ºC to 60ºC (-4ºF to 140ºF)
Operating temperature range 0ºC to 50ºC (32ºF to 122ºF)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input / Output / Power / Case

Dielectric Test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal steel sheet.

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Input..... 120V / 5A AC, 240V /5A AC for 3 phase/3 Wire
208V/120V & 5A AC, 416V/240V, 5A, for 3 Phase / 4 Wire
custom input (600V max /10A AC max)

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden ..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity ..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... Pulses (VARs) and DC mA or DC mV (VARs)

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Model	Voltage	Current	Nominal VARs	Nominal Pulses/ VAR Hours with NO CT or PT
TQQH-33 3 ø / 3 Wire	120V AC (110V)	5A AC	1000	1, 10, 100
TQQH-33 3 ø / 3 Wire	240V AC (220V)	5A AC	2000	1, 10, 100
TQQH-34 3 ø / 4 Wire	208V/120V AC (190V/110V) Phase volts/Line Volts	5A AC	1500	1, 10, 100
TQQH-34 3 ø / 4 Wire	416V/240V AC (380V/220V) Phase volts/Line Volts	5A AC	3000	1, 10, 100

To calculate the actual VARHours for each output pulse, the CT and PT ratios have to be factored in

VARs = (CT Ratio) X (PT Ratio) x Nominal VARs

$$\textbf{VARHours per Output Pulse} = \frac{\textbf{(CT Ratio) X (PT Ratio)}}{\textbf{Nominal Pulses /VARHour}}$$

OUTPUT SPECIFICATIONS (CONTINUED)

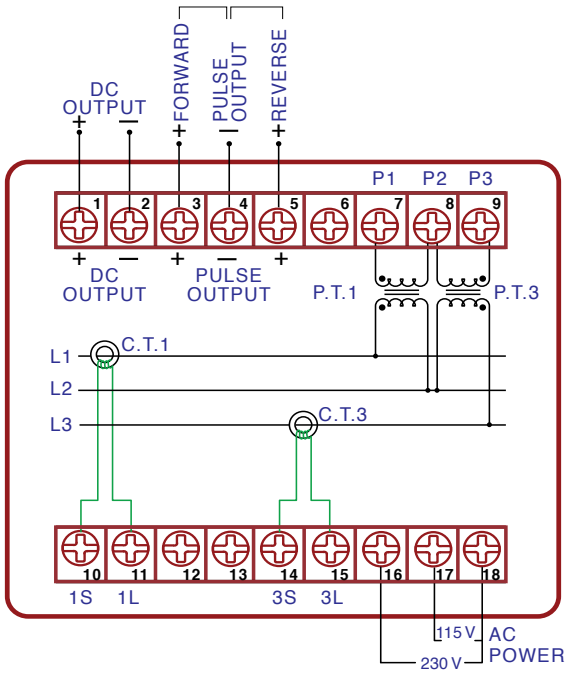
Calculation example: For Three phase 3 wire, TQH-33
If CT = 200A:5A then CT Ratio = 40 PT is 3300V:110V then PT Ratio = 30

VARs = 40 x 30 x 1000 = 1200kVARs

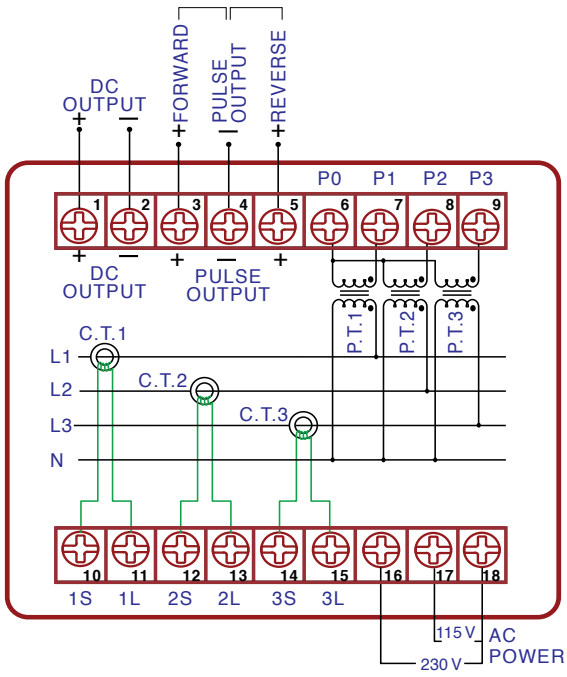
If 1 pulse per VARHour is selected, the output will actually be 1 pulse per 1200 VARHours
If 10 pulse per VARHour is selected, the output will actually be 1 pulse per 120 VARHours
If 100 pulse per VARHour is selected, the output will actually be 1 pulse per 12 VARHours

CONNECTION DIAGRAM

TQQH-33



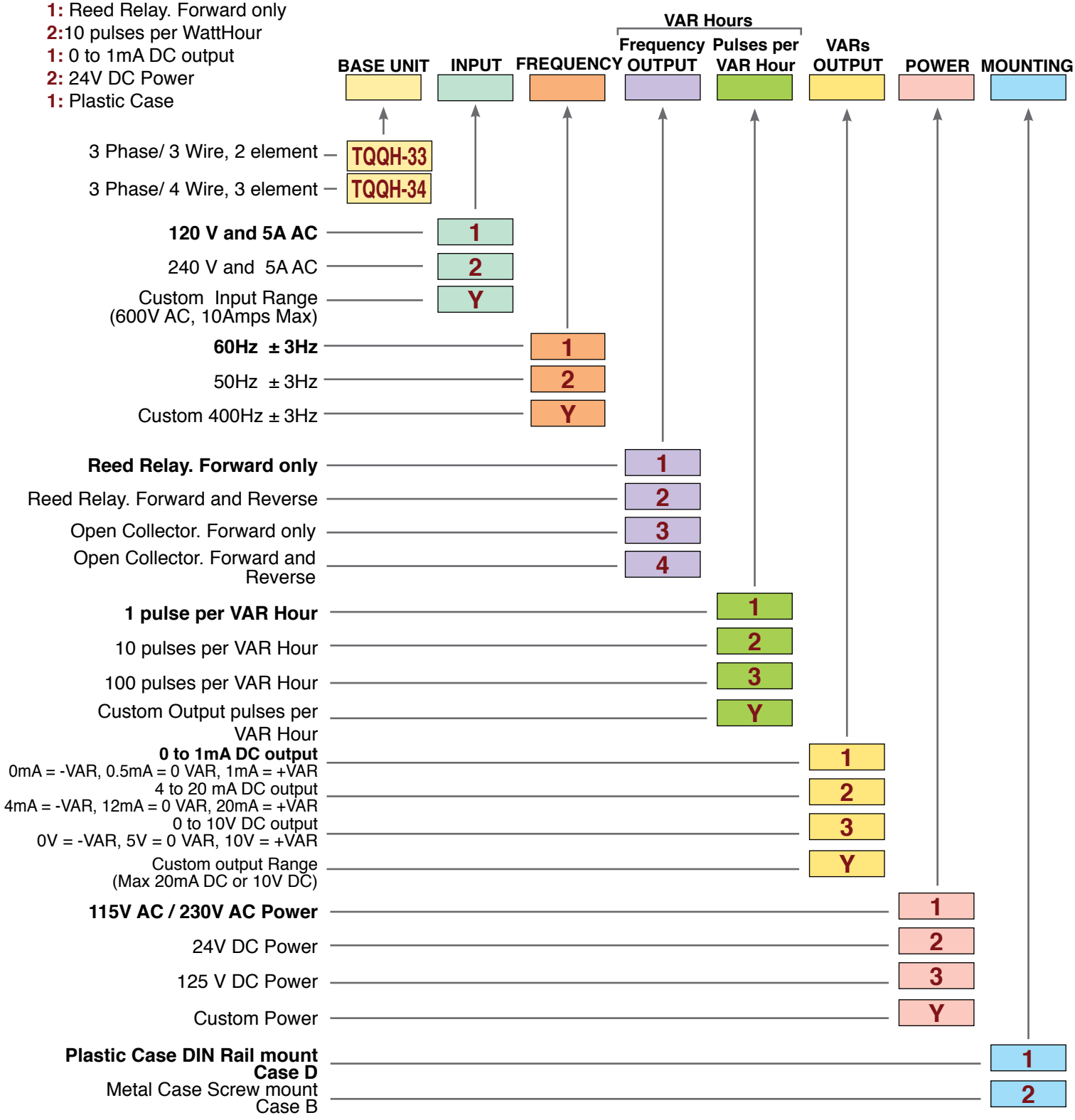
TQQH-34



ORDERING INFORMATION

Example: **Product Ordering Code of TQQH-331212121**

TQQH-33: Three Phase / 3Wire, 3element VARs+VAR Hours Transducer
1: 120 V and 5A AC Input
2: 50Hz ± 3Hz
1: Reed Relay. Forward only
2:10 pulses per WattHour
1: 0 to 1mA DC output
2: 24V DC Power
1: Plastic Case



SCREW MOUNT METAL CASE B

ABS DIN RAIL MOUNT CASE D

MODELS OFFERED

TPF-12 base model 1 Phase, 2 Wire – 1 Element

- Accurate measurement of the Power Factor (Cos ϕ) of a three phase system with balanced or unbalanced loads.
- The output signals are isolated load independent DC mA or DC V, representing the measured value of the Power Factor (Cos ϕ).

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.5% of Rated Output (R.O.).**
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations.**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/ºC of span
≤60ppm/ºC for ambient temperature of 25ºC ±10ºC

Temp. range ..... Storage temperature range -20ºC to 60ºC (-4ºF to 140ºF)
Operating temperature range 0ºC to 50ºC (32ºF to 122ºF)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input/Output/Power/Case

Dielectric test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

Measuring Range ..... Power Factor
Lead (capacitive) 0.5 …. 1 …. Lag (Inductive) 0.5

AC Voltage Input..... 30 to 600V

AC Current Input..... 0 to 5A AC

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage ..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current ..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... DCmA or DCV (Power Factor. Cos ϕ)

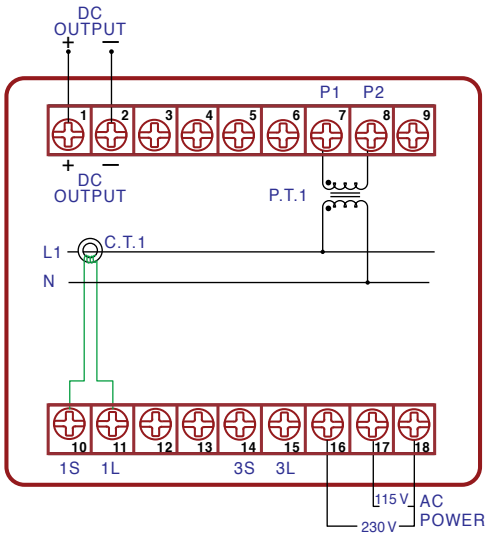
Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

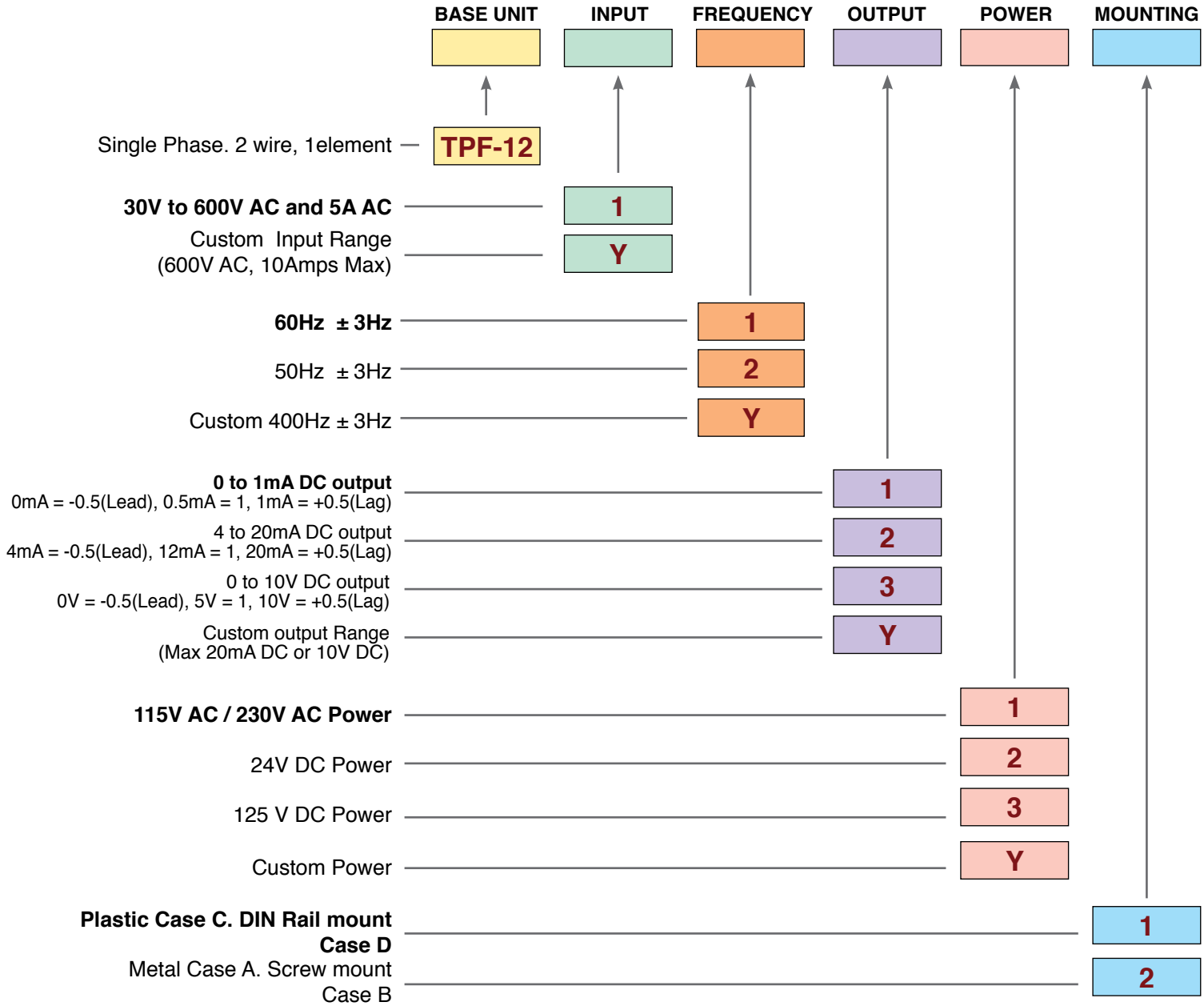
CONNECTION DIAGRAM



ORDERING INFORMATION

Example:
Product Ordering Code of TPF-1211212

TPF-12: Single Phase / 2Wire, 1element Power Factor Transducer
1: 30V to 600V AC and 5A AC
1: 60Hz ± 3Hz
2: 4 to 20mA DC output
1: 115VAC or 230VAC power
2: Metal Case



AC Power Factor TRANSDUCERS Three Phase

MODELS OFFERED

TPF-33 base model 3 Phase, 3 Wire – 2 Element

TPF-34 base model 3 Phase, 4 Wire – 3 Element

- Accurate measurement of the Power Factor (Cos ϕ) of a three phase system with balanced or unbalanced loads.
- The output signals are isolated load independent DC mA or DC V, representing the measured value of the Power Factor (Cos ϕ).

FEATURES

- **Uses Time Division Multiplication (TDM) for precision measurement of even distorted signals.**
- **High accuracy ±0.5% of Rated Output (R.O.).**
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations.**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/°C of span
≤60ppm/°C for ambient temperature of 25°C ±10°C

Temp. range ..... Storage temperature range -20°C to 60°C (-4°F to 140°F)
Operating temperature range 0°C to 50°C (32°F to 122°F)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input/Output/Power/Case

Dielectric test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

Measuring Range ..... Power Factor
Lead (capacitive) 0.5 …. 1 …. Lag (Inductive) 0.5

AC Voltage Input..... 30 to 600V

AC Current Input..... 0 to 5A AC

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity..... ≤0.5% of measuring range to maximum input range

Input Voltage ..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

Input Current ..... 3 times the rated input current continuously.
Overload Capacity 10 times the rated input current for 10 secs.
50 times the rated input current for 1 sec.
80 times the rated input current for 0.5 secs

OUTPUT SPECIFICATIONS

Output Variables..... DCmA or DCV (Power Factor. Cos ϕ)

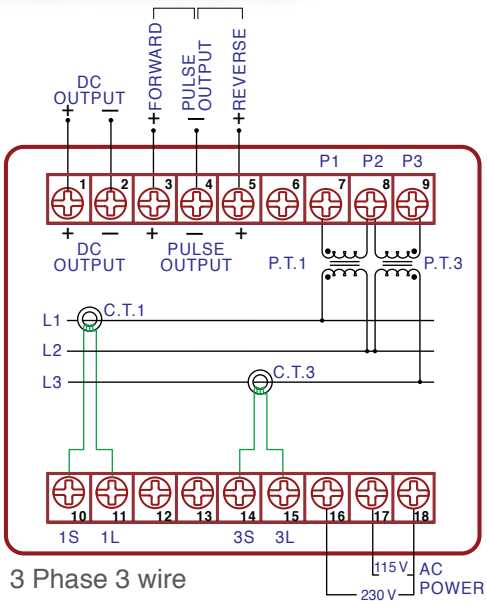
Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

Response Time..... < 400 milliseconds to go from 0 to 99% of output

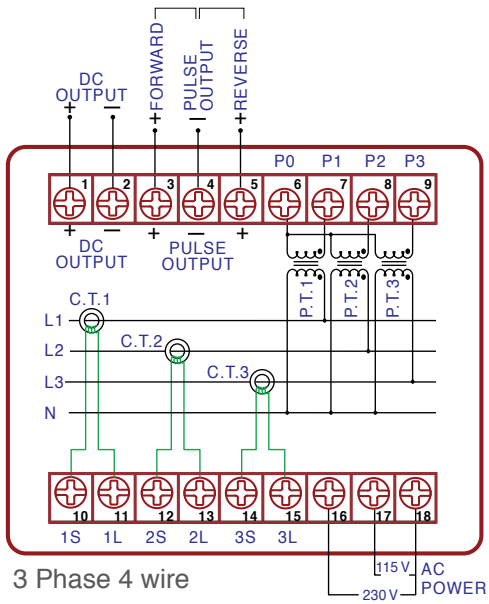
Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

CONNECTION DIAGRAM



3 Phase 3 wire

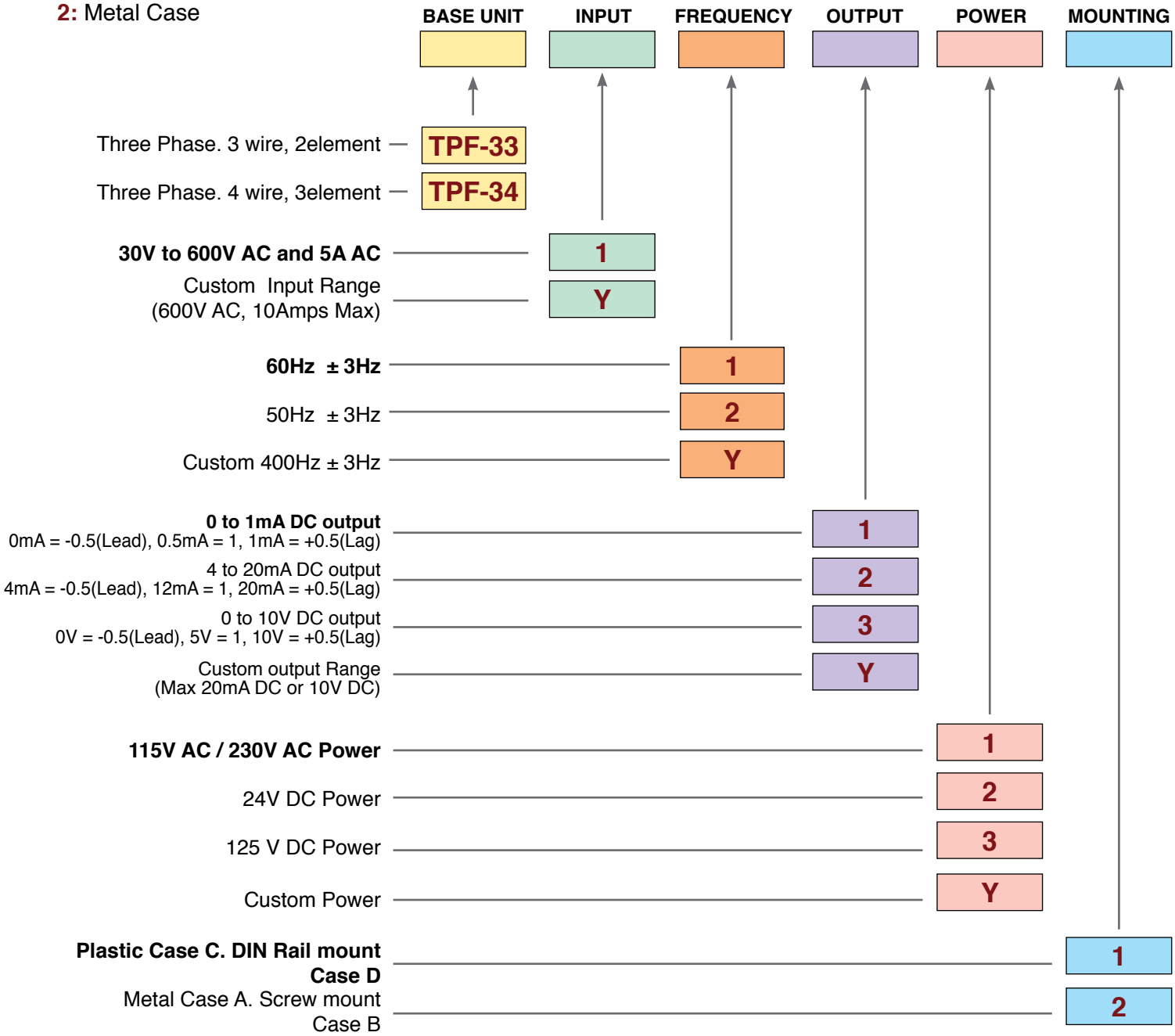


3 Phase 4 wire

ORDERING INFORMATION

Example:
Product Ordering Code of TPF-3311212

TPF-33: Three Phase / 3Wire, 2element Power Factor Transducer
1: 30V to 600V AC and 5A AC
1: 60Hz ±3Hz
2: 4 to 20mA DC output
1: 115VAC or 230VAC power
2: Metal Case



MODELS OFFERED

TF-1 base model Frequency

- Accurate measurement of the Frequency of a single or three phase system with balanced or unbalanced loads.
- The output signals are isolated load independent DC mA or DC V, representing the measured value of the Frequency.

FEATURES

- **High accuracy ±0.05% of Rated Output (R.O.).**
- **Frequency range from 45 Hz to 10KHz.**
- **High immunity to external noise.**
- **Quick and easy mounting to 35mm DIN Rail (DIN46277) or screw mounting.**
- **Many input and output signal combinations.**

GENERAL SPECIFICATIONS

Accuracy ..... ± 0.2% R.O. Standard for 10 to 100% of rated output
± 0.1% R.O. (Special Option)

Temp. coefficient..... ≤100ppm/ºC of span
≤60ppm/ºC for ambient temperature of 25ºC ±10ºC

Temp. range ..... Storage temperature range -20ºC to 60ºC (-4ºF to 140ºF)
Operating temperature range 0ºC to 50ºC (32ºF to 122ºF)

Humidity range ..... Up to 95% RH non condensing.

Isolation..... Between Input/Output/Power/Case

Dielectric test..... DIN-IEC 688
2K Vrms/1 min, Between terminal to terminal
2.8K Vrms/1 min, Between terminal to case

Surge test..... DIN-IEC 255-4, ANSI C37 90a/1974 5KV(1.2x50 μs)

Insulation Resistance ..... Greater than 100 M Ω at 500V DC

Housing material ..... ABS Resin (94V-0) or metal

Mounting ..... Screw mount metal case or Plastic DIN Rail 35mm

Auxiliary Power..... AC 115/230V ± 15%, 50/60Hz, 3VA
DC 24V ± 20%(optional)
125V DC ± 20%(optional)

INPUT SPECIFICATIONS

AC Voltage Input range..... 2V to 200V AC or 30 to 600V AC

Frequency ..... 60Hz ±3Hz, 50Hz ±3Hz, 400Hz ±3Hz

Burden ..... ≤0.2VA per current circuit, ≤0.1VA per voltage circuit.

Response Sensitivity ..... ≤0.5% of measuring range to maximum input range

Input Voltage..... 600V AC rms continuous (absolute maximum)
Overload Capacity 1.25 times the rated input Voltage continuously.
2 times the rated input Voltage for 10 secs.
4 times the rated input Voltage for 5 secs.

OUTPUT SPECIFICATIONS

Output Variables..... DCmA or DCV

Ripple..... < 0.5% of rated output. Peak to Peak (maximum)

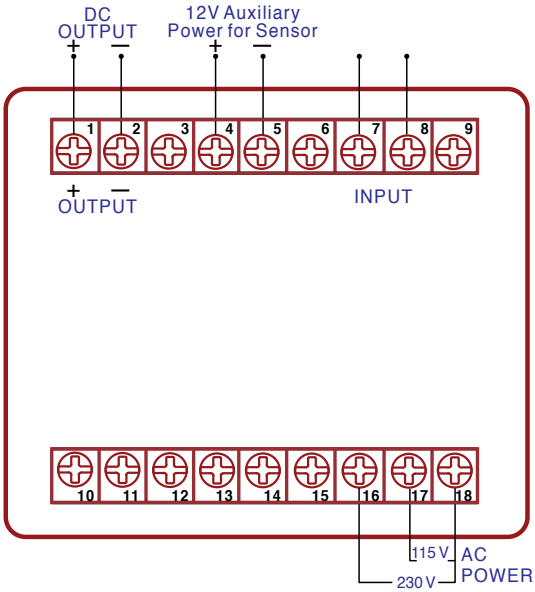
Response Time..... < 400 milliseconds to go from 0 to 99% of output

Zero Adjustment..... ± 5% of rated output (minimum)

Span Adjustment..... ± 10% of rated output (minimum)

Load Resistance..... 10 kΩ maximum for 0 to 1mA output
500 Ω maximum for 4 to 20mA output
500 Ω minimum for 0 to 10V output

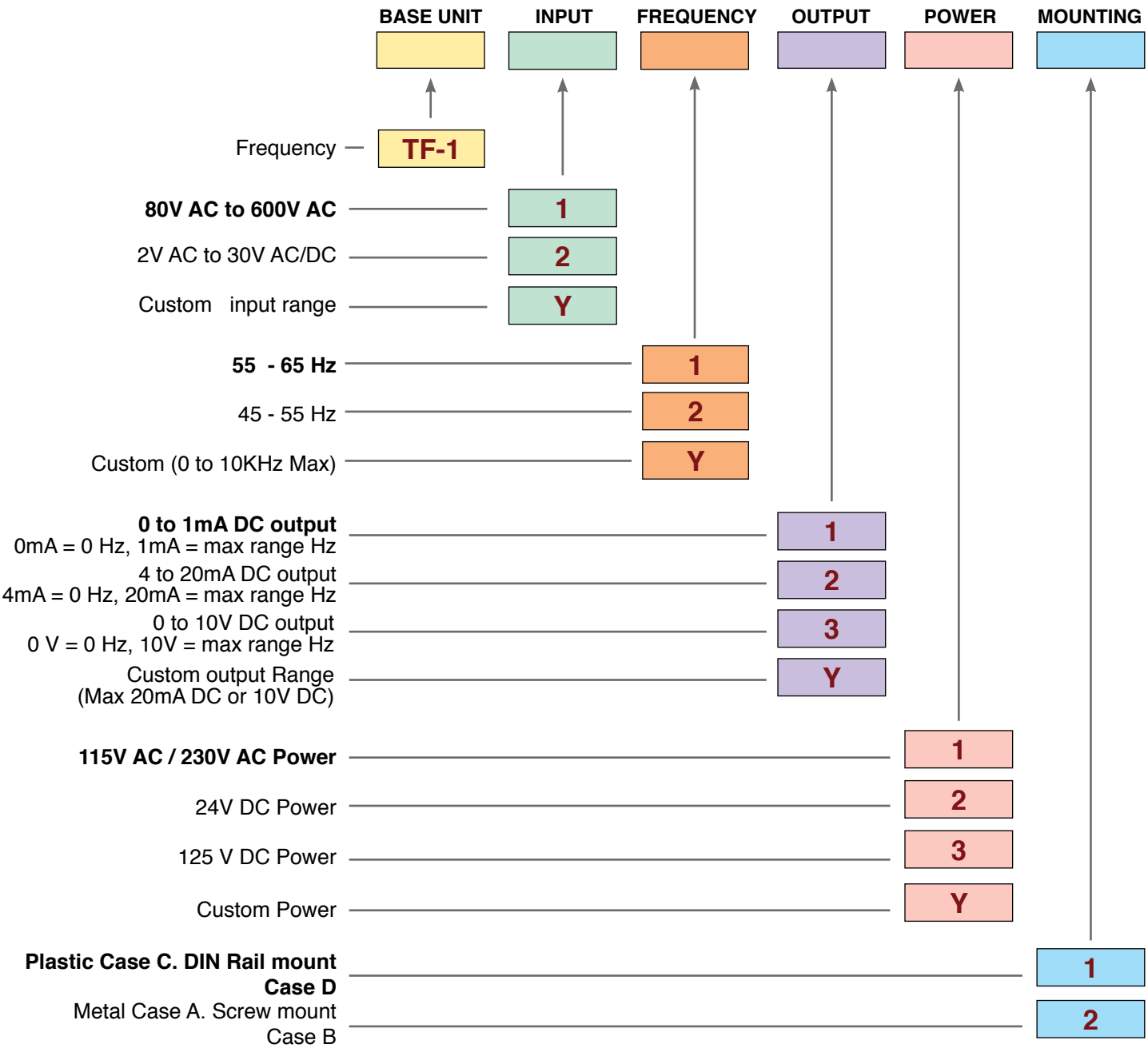
CONNECTION DIAGRAM



ORDERING INFORMATION

Example:
Product Ordering Code of TF-111212

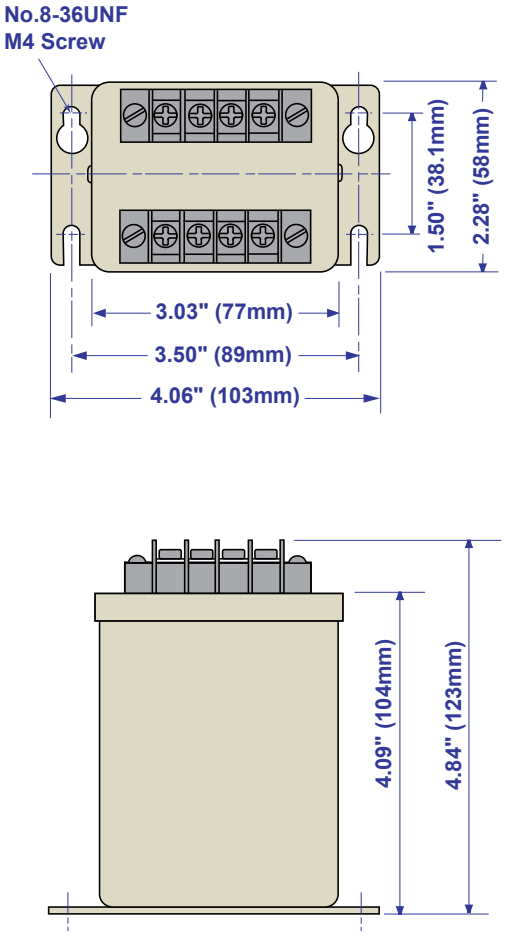
TF-1: Frequency Transducer
1: 30V to 600V AC and 5A AC
1: 60Hz ± 3Hz
2: 4 to 20mA DC output
1: 115VAC or 230VAC power
2: Metal Case



CASE DIMENSIONS

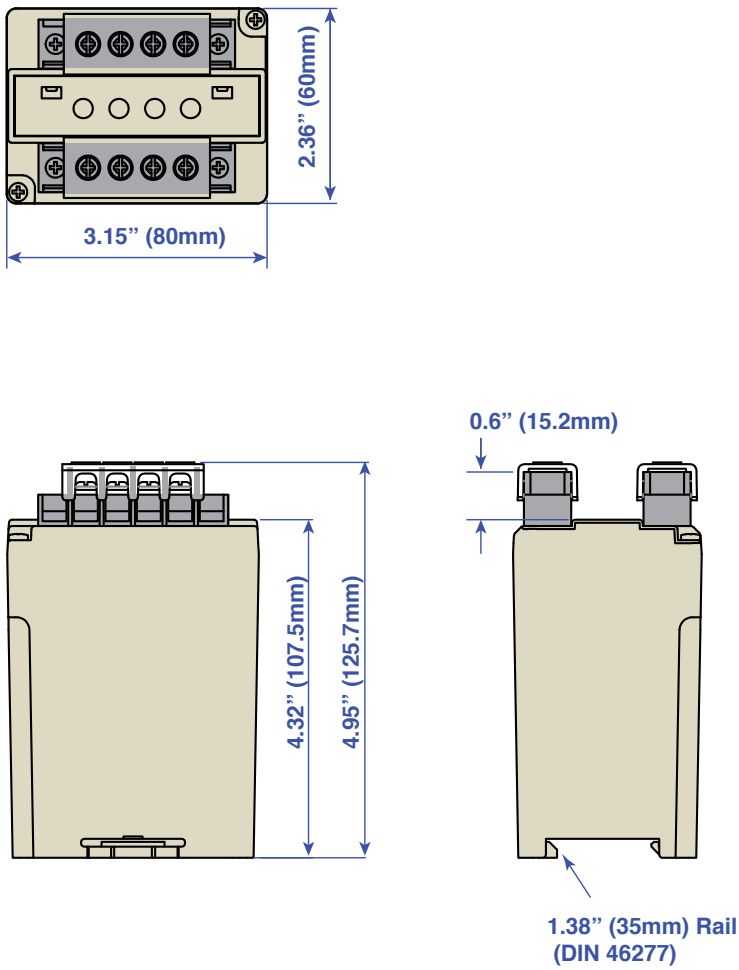
Case A

Metal Case, Screw Mounting



Case C

Fire Retardant, ABS Case
DIN Rail Mounting

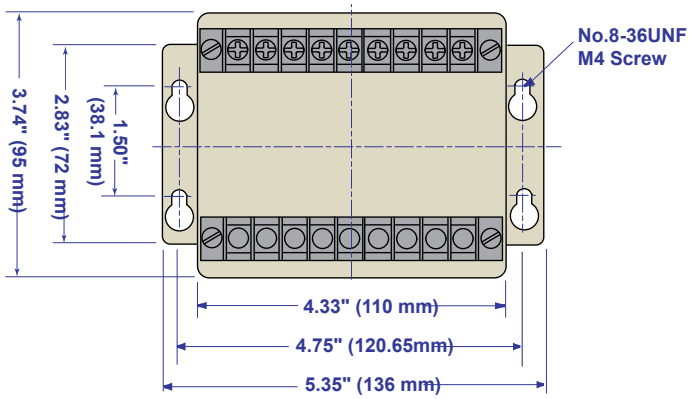


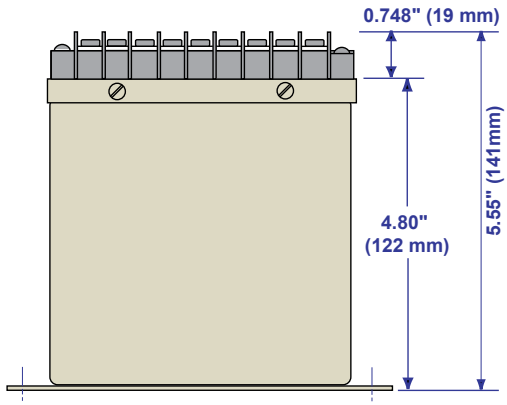
TEXMATE INC
450 State Place, Escondido, CA 92029
• For ordering info call: 1-800-TEXMATE (1-800-839-6283) or 760 598-9899
• Email: orders@texmate.com • 24 Hours • Fax: (760) 598-9828 •
• For tech assistance call: (760) 598-9899

CASE DIMENSIONS

Case B

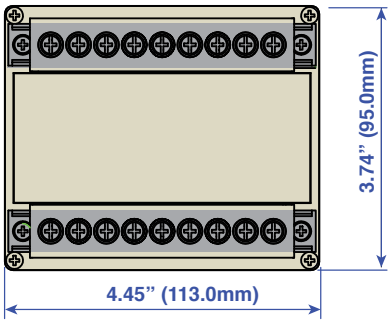
Metal Case, Screw Mounting

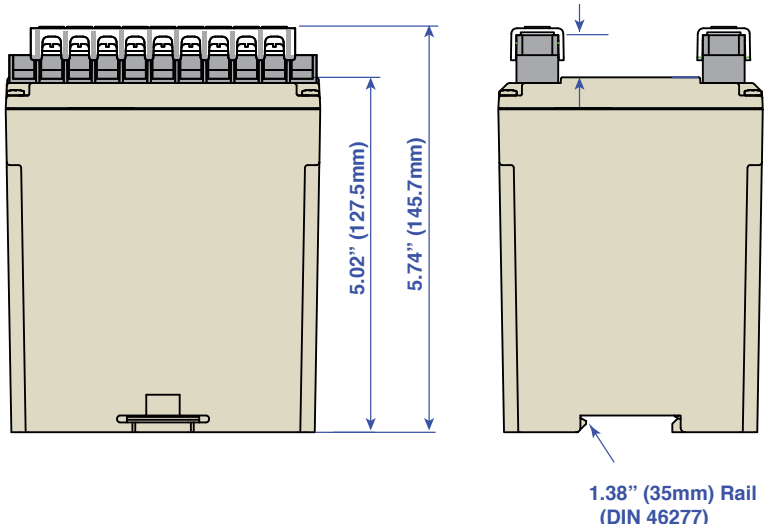




Case D

Fire Retardant, ABS Case
DIN Rail Mounting





TEXMATE INC
450 State Place, Escondido, CA 92029

• For ordering info call: 1-800-TEXMATE (1-800-839-6283) or 760 598-9899
• Email: orders@texmate.com • 24 Hours • Fax: (760) 598-9828 •
• For tech assistance call: (760) 598-9899

 (Z660)