

# AC POWER TRANSDUCER

## ■ FEATURE

- 1Phase(1 I/O), 3Phases(3 I/O)
- Precision measurement even for distorted waveform
- Self powered or Loop powered models available
- Output signal programmable by dip-switch
- Low output ripple High impulse & Surge protection
- High stability & low cost
- CE

**DX2 - SERIES**

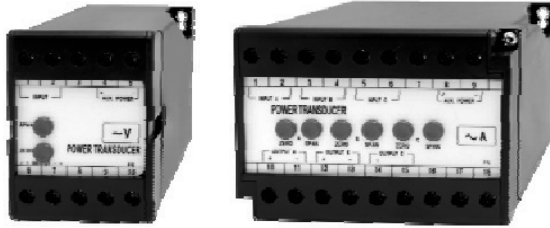
## Contents



	ITEMS		MODEL	PAGE
1	AC CURRENT / VOLTAGE TRANSDUCER		DA/DV	188 ~ 189
2	AC WATT/VAR/WATT & VAR TRANSDUCER		DW/DR/DWR	190 ~ 191
3	AC WATT-Hr/VAR-Hr TRANSDUCER		DWH/DRH	192 ~ 193
4	Hr TRANSDUCER		DW/HW/WATT	194 ~ 195
5	FREQUENCY TRANSDUCER		DF	196 ~ 197

# General Specifications

## AC CURRENT / VOLTAGE TRANSDUCER MODEL : DA/DV



- 1Phase(1 I/O), 3Phases(3 I/O)
- Precision measurement even for distorted waveform
- Self powered or Loop powered models available
- Output signal programmable by dip-switch
- Low output ripple
- High impulse & Surge protection
- High stability & low cost
- CE

### SPECIFICATION

INPUT: Current or Voltage

	AC Input	Input Burden	Input Frequency	
Current	Aux. Powered & Loop Powered	0 ~ 1 A	50 Hz $\pm$ 3 Hz	
		0 ~ 5 A		
		0 ~ 10 A	60 Hz $\pm$ 3 Hz	
Self Powered	20%-100% of input range	$\leq$ 1.50VA	50 Hz $\pm$ 1 Hz	
			60 Hz $\pm$ 1 Hz	
Voltage	Aux. Powered & Loop Powered	0 ~ 150 V	50 Hz $\pm$ 3 Hz	
		0 ~ 300 V		
		0 ~ 500 V		
	Self Powered	20%-100% of input range	$\leq$ 4.00VA	50 Hz $\pm$ 1 Hz
				60 Hz $\pm$ 1 Hz

OUTPUT: Current or Voltage O/P Programming by Dip Switch inside

Output Range	Load Resistance	Output Resistance	Output Ripple	
0 ~ 1 V	$\geq$ 500 $\Omega$	$\leq$ 0.001 $\Omega$	$\leq$ 0.2% F.S.	Self-powered units can not be used for 4-20mA, 1-5V and 2-10V output.
0 ~ 5 V	$\geq$ 500 $\Omega$ Self Powered: $\geq$ 2K $\Omega$			
0 ~ 10 V	$\geq$ 1000 $\Omega$ Self Powered: $\geq$ 2K $\Omega$			
1 ~ 5 V	$\geq$ 500 $\Omega$			
0 ~ 1 mA	0 ~ 12K $\Omega$	$\geq$ 20M $\Omega$		
0 ~ 10 mA	0 ~ 1200 $\Omega$ Self Powered: $\geq$ 500 $\Omega$	$\geq$ 6M $\Omega$		
0 ~ 20 mA	0 ~ 600 $\Omega$ Self Powered: $\geq$ 500 $\Omega$			
4 ~ 20 mA	0 ~ 600 $\Omega$			
Loop Powered 4 ~ 20 mA	Vs / (20 mA) - 900 $\Omega$			

※When Aux Powered is DC, The Load Resistance is about 70%

Accuracy :  $\leq$   $\pm$ 0.2% of F.S.; Self Powered  $\leq$   $\pm$ 0.2% of F.S.

Waveform effect  $\leq$  0.2% of F.S. at 30% distortion

Max. input over capability: Voltage: 1.5 x rated continuous  
2 x rated for 10 seconds  
4 x rated for 2 seconds

Current: 3 x rated continuous  
10 x rated for 10 seconds  
50 x rated for 1 second

Response time:  $\leq$  250 mS

Span adjustment:  $\leq$   $\pm$ 5% of F.S. (or  $\pm$ 20% of F.S. specify)

Zero adjustment:  $\leq$   $\pm$ 2% of F.S. (or  $\pm$ 20% of F.S. specify)

Output load effect: Current output  $\leq$  0.1% of F.S.

Voltage output  $\leq$  0.05% of F.S.

Power supply: ADH : AC 85-264V, DC 100-300V

ADL : AC / DC 20-56V

Loop powered DC 18 ~ 32V

Self Powered: Not required

$\leq$  0.05% F.S.

Power effect:  $\leq$  10 VA(1P2W) ;  $\leq$  12 VA(3P3W)

Power consumption:  $\leq$  0.1% R.O. between each element

Mutual interference effect: 400ATM  $\leq$  0.2% F.S.

Magnetic field strength: 0-60  $^{\circ}$ C

Operating temperature: 20-95 %RH, non-condensing

Operating relative:  $\leq$  100 PPM/ $^{\circ}$ C

Temperature coefficient: -10-70  $^{\circ}$ C

Storage temperature: IEC 414, IEC 688:1992, ANSI C37.90a

Dielectric Strength: Between Input / Output / Power / Case

Surge test:

AC 4KV, 50/60Hz, 1 min.

IEC 255-4, ANSI C37.90a

6KV, 1.2 x 50  $\mu$ sec

Common mode & differential mode

Insulation resistance:

$\geq$  100M ohm, DC 500V

Safety:

IEC 414, BS 5458

Enclosure:

IEC 529 (IP50)

Certification Standard

IEC 60688 (Except 3P3W )

CE:

EMC:EN61326:2003

Safety(LVD):

EN61010:2001

Mounting:

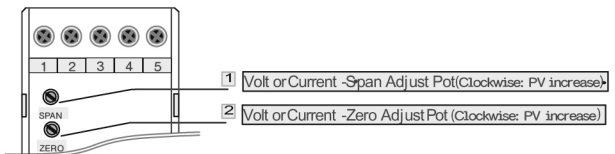
Wall or DIN rail (EN 50022)

Weight:

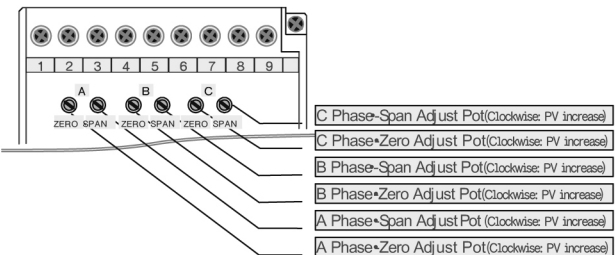
1P: under 450g, 3P: under 650g

### ADJUSTMENT

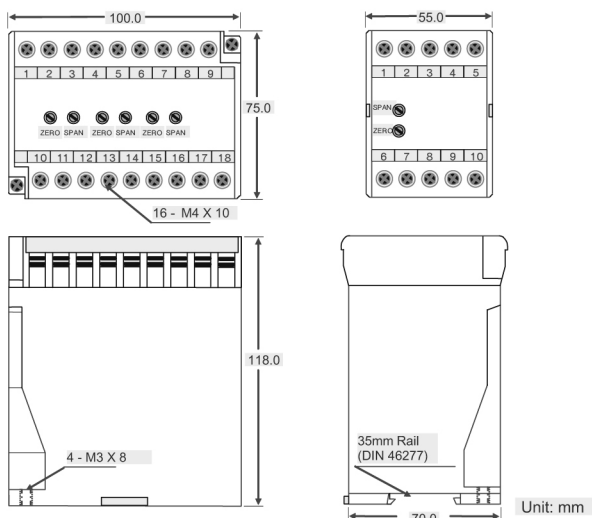
Volt or Current - 1 Phase



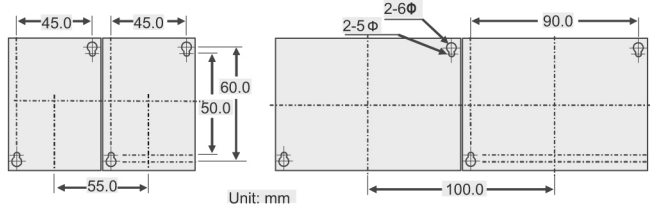
Volt or Current - 3 Phases



### DIMENSIONS



## PANEL MOUNTING HOLES



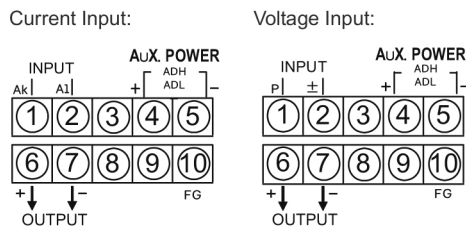
## OUTPUT RANGE PROGRAMMING

OUTPUT	Dip Switch							
	1	2	3	4	5	6	7	8
0 - 1 mA					on			
0 - 10 mA					on	on		
0 - 20 mA					on		on	
4 - 20 mA	on				on		on	
0 - 1 V		on	on	on				on
0 - 5 V			on	on				on
0 - 10 V				on				on
1 - 5 V	on	on	on					on

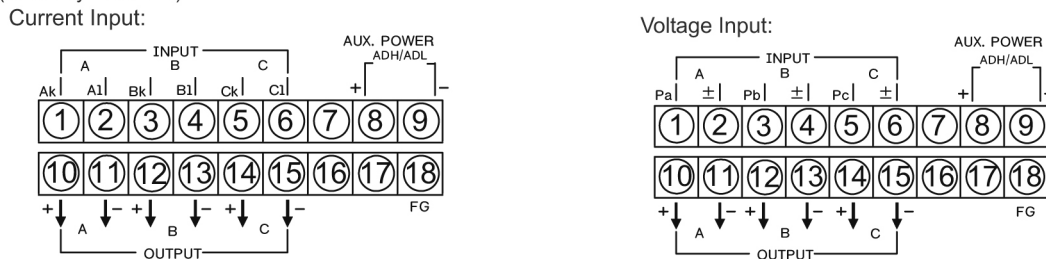
\* Pads: blank fields mean open.

## CONNECTION DIAGRAM

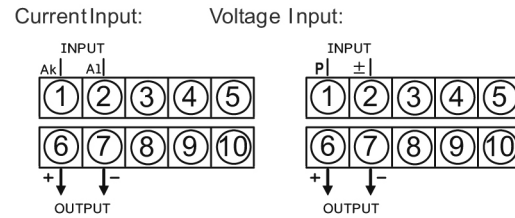
### 1 Phase (Auxiliary Powered)



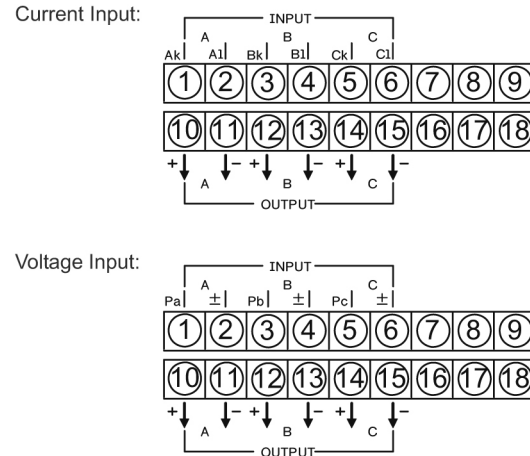
### 3 Phases (Auxiliary Powered)



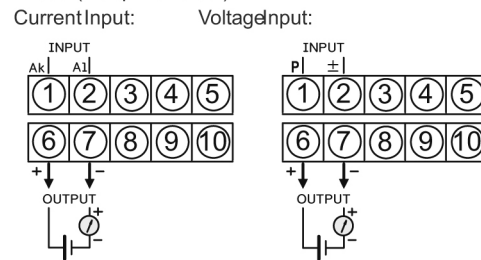
### 1 Phase (Self Powered)



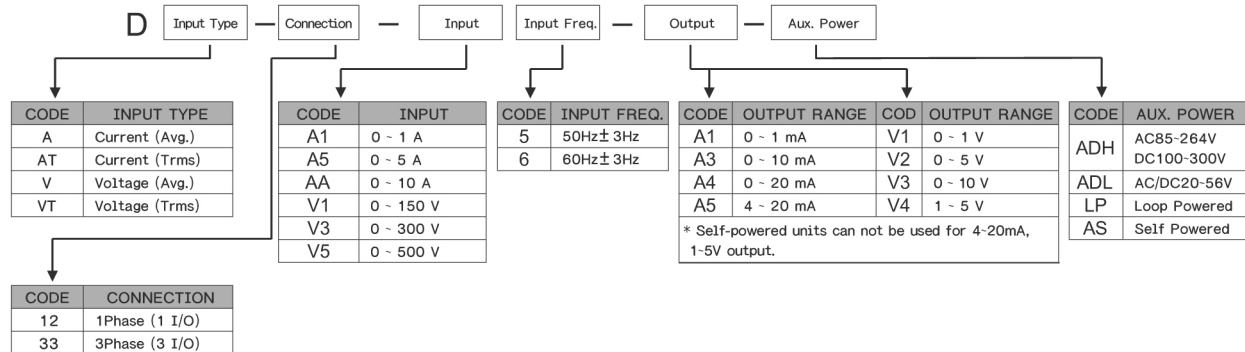
### 3 Phases (Self Powered)



### 1 Phase (Loop Powered)



## ORDERING INFORMATION



# General Specifications

## AC WATT/VAR/WATT&VAR TRANSDUCER MODEL : DW/DR/DWR



- Measuring Watt, Var or Watt & Var
- 1P2W, 1P3W, 3P3W, 3P4W Balanced or Unbalanced systems
- Precision measurement even for distorted wave
- Output range programmable by dip-switch
- Low output ripple
- High impulse & Surge protection
- High stability & low cost

### SPECIFICATION

INPUT: Watt / Var

Connection	AC Input		Basic Ref. Value Watt or Var	Input Burden
	Voltage	Current		
1P2W	110V or 120V	5A (1A) 10A**	±0.5 K (± 0.1K)	≤ 0.10VA or ≤ 0.15VA
	220V or 240V		±1.0 K (± 0.2K)	
1P3W	220V-110V		± 1.0 K (± 0.2K)	
3P3W	110V or 120V		± 1.0 K (± 0.2K)	
	220V or 240V		± 2.0 K (± 0.4K)	
	380V or 416V		± 3.0 K (± 0.6K)	
3P4W	190V <sub>LL</sub> -110V <sub>LN</sub> or 208V <sub>LL</sub> -120V <sub>LN</sub>		± 1.5 K (± 0.3K)	
	380V <sub>LL</sub> -220V <sub>LN</sub> or 416V <sub>LL</sub> -240V <sub>LN</sub>		± 3.0 K (± 0.6K)	

\* The maximum input is 450V and 5A in standard (10Amax input available in option), If the input over the level please connects with CT or PT to the transducer.  
\* V<sub>LL</sub> means Voltage of line to line; V<sub>LN</sub> means Voltage of line to neutral.  
\* The basic ref. value is base on second of PT & CT, and versus the high range of output.

OUTPUT: Watt or Var O/P Programming by Dip Switch inside

Output Range	Load Resistance	Output Resistance	Output Ripple
0 ~ 1 V / 0 ~ 0.5 ~ 1 V	≥ 500 ohm	≤ 0.001 ohm	≤ 0.2% of F.S.
0 ~ 5 V / 0 ~ 2.5 ~ 5 V	≥ 500 ohm		
0 ~ 10 V / 0 ~ 5 ~ 10 V	≥ 1000 ohm		
1 ~ 5 V / 1 ~ 3 ~ 5 V	≥ 500 ohm		
0 ~ 1 mA / 0 ~ 0.5 ~ 1 mA	0 ~ 12K ohm	≥ 20M ohm	
0 ~ 5 mA	0 ~ 2400 ohm	≥ 6M ohm	
0 ~ 10 mA / 0 ~ 5 ~ 10 mA	0 ~ 1200 ohm		
0 ~ 20 mA / 0 ~ 10 ~ 20 mA	0 ~ 600 ohm		
4 ~ 20 mA / 4 ~ 12 ~ 20 mA	0 ~ 600 ohm		

※When Aux Powered is DC, The Load Resistance is about 70%

**Accuracy:** ≤ ±0.2% of F.S.  
**Waveform effect:** ≤ 0.2% of F.S. at 30% distortion  
**Max. input over capability:** Voltage: 1.5 x rated continuous  
2 x rated for 10 seconds  
4 x rated for 2 seconds  
Current: 3 x rated continuous  
10 x rated for 10 seconds  
50 x rated for 1 second  
50 Hz ±3 Hz, 60 Hz ±3 Hz

**Input frequency:**  
**Response time:**  
**Span adjustment:** ≤ ±5% of F.S. (or ±20% of F.S. specify)  
**Zero adjustment:** ≤ ±2% of F.S. (or ±20% of F.S. specify)  
**Output load effect:** Current output ≤ 0.1% F.S.  
Voltage output ≤ 0.05% F.S.

**Power supply:** ADH:AC 85~264V; DC 100~300V  
ADL:AC/DC 20-56V  
Self Powered: Interior connection from input  
Working volt: ±15% rated of input voltage  
220Vac(MAX)

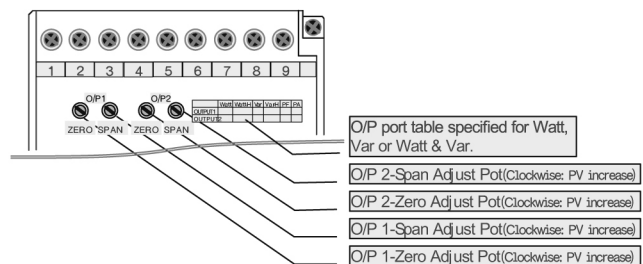
**Power effect:** ≤ 0.05% F.S.  
**Power consumption:** ≤ 8VA  
**Mutual interference effect:** ≤ 0.1% between each element  
**Magnetic field strength:** 400ATM ≤ 0.2% of F.S.  
**Operating temperature:** 0-60 °C  
**Operating relative humidity:** 20-95 %RH, non-condensing  
**Temperature coefficient:** ≤ 100 PPM/ °C

**Storage temperature:** -10-70 °C  
**Surge test:** IEC 414, IEC 688:1992, ANSI C37.90a  
Input / Output / Power / Case  
AC 4KV, 50/60Hz, 1 min.  
IEC 255-4, ANSI C37.90a  
6KV, 1.2 x 50 μsec  
Common mode & differential mode  
≥ 100M ohm, DC 500V  
**Insulation resistance:**  
**Safety:** IEC 414, BS 5458  
**Enclosure:** IEC 529 (IP50)  
**Performance:** IEC 60688

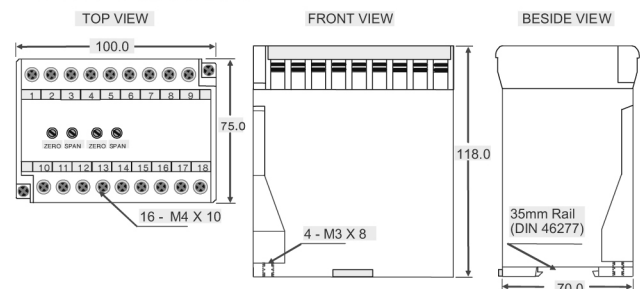
**CE:** EMC:EN61326:2003  
**LVD:** EN61010:2001  
**Mounting:** Wall or DIN rail (EN 50022)  
**Weight:** Under 650g

### ADJUSTMENT

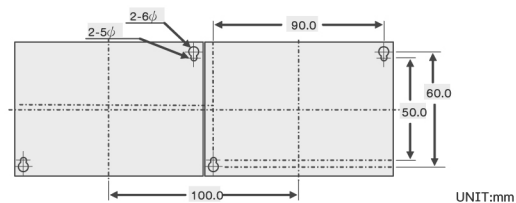
Watt / Var / Watt & Var:



### DIMENSIONS



### PANEL MOUNTING HOLES

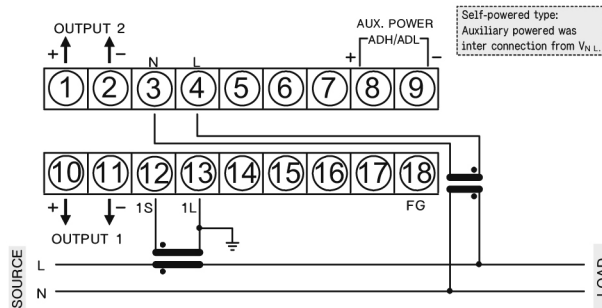


## OUTPUT RANGE PROGRAMMING

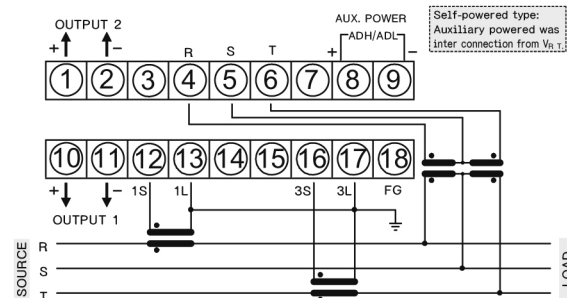
OUTPUT	pcb no. WQHP2-2									
	DIP SWITCH									
	1	2	3	4	5	6	7	8	9	10
0 ~ 1 mA					on					
0 ~ 5 mA					on	on				on
0 ~ 10 mA					on	on				
0 ~ 20 mA					on		on			
4 ~ 20 mA	on				on		on			
0 ~ 0.5 ~ 1 mA					on				on	on
0 ~ 5 ~ 10 mA					on	on			on	on
0 ~ 10 ~ 20 mA					on		on		on	on
4 ~ 12 ~ 20 mA	on				on		on		on	on
0 ~ 1 V		on	on	on					on	
0 ~ 5 V			on	on	on					
0 ~ 10 V				on					on	
1 ~ 5 V	on		on	on					on	
2 ~ 10 V	on			on					on	
0 ~ 0.5 ~ 1 V		on	on	on					on	on
0 ~ 2.5 ~ 5 V			on	on					on	on
0 ~ 5 ~ 10 V				on					on	on
1 ~ 3 ~ 5 V	on		on	on					on	on
2 ~ 6 ~ 10 V	on			on					on	on

## CONNECTION DIAGRAM

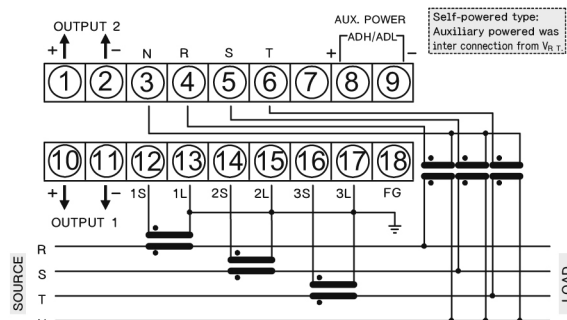
- Watt / Var / Watt & Var - 1  $\Phi$ 2W ( Unbalanced Load )



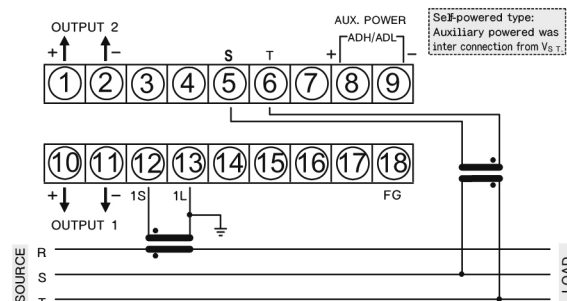
- Watt / Var / Watt & Var - 3  $\Phi$ 3W ( Unbalanced )



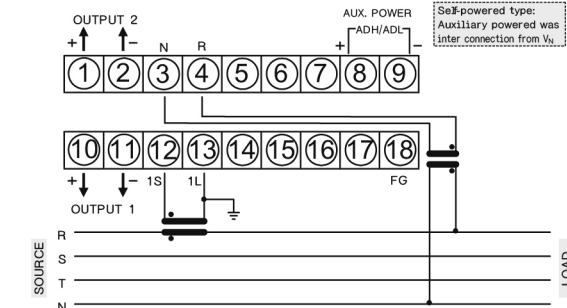
- Watt / Var / Watt & Var - 3  $\Phi$ 4W ( Unbalanced Load )



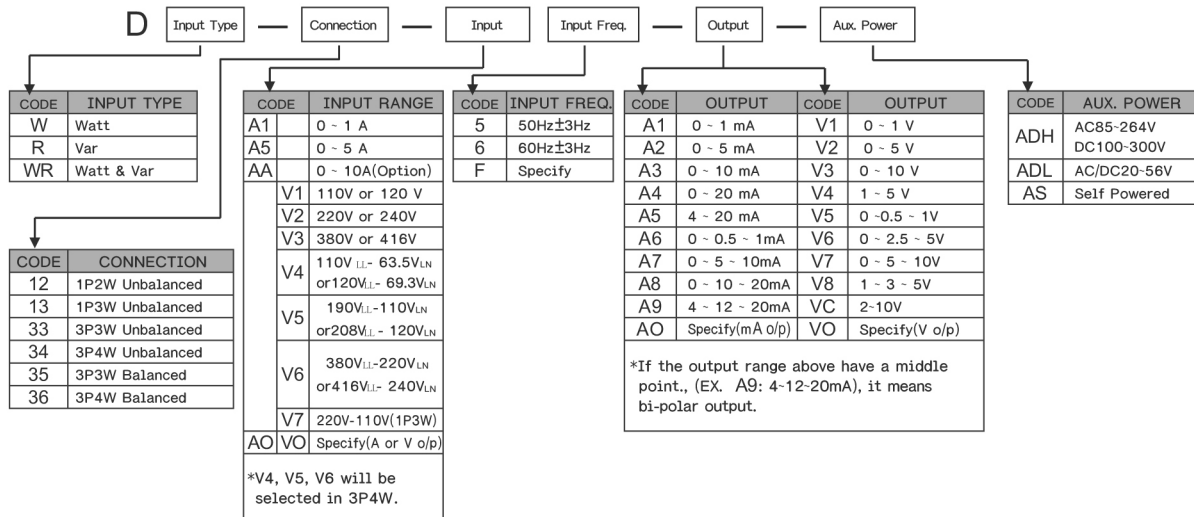
- Watt / Var / Watt & Var - 3  $\Phi$ 3W ( balanced Load )



- Watt / Var / Watt & Var - 3  $\Phi$ 4W ( balanced Load )



## ORDERING INFORMATION



# General Specifications

## AC WATT-Hr/VAR-Hr TRANSDUCER MODEL : DWH/DRH



- Measuring Watt-Hr, Var-Hr or Watt-Hr & Var-Hr
- 1P2W, 1P3W, 3P3W, 3P4W Balanced or Unbalanced systems
- Precision measurement even for distorted wave
- Output range programmable by dip-switch
- High impulse & Surge protection
- High stability & low cost
- CE

### SPECIFICATION

INPUT: Watt / Var.

Connection	AC Input		Basic Ref. Value Watt or Var	Input Burden
	Voltage	Current		
1P2W	110V or 120V	5A (1A)	$\pm 0.5 \text{ K } (\pm 0.1 \text{ K})$	$\leq 0.10 \text{ VA}$ or $\leq 0.15 \text{ VA}$
	220V or 240V		$\pm 1.0 \text{ K } (\pm 0.2 \text{ K})$	
1P3W	220V or 240V		$\pm 1.0 \text{ K } (\pm 0.2 \text{ K})$	
	110V or 120V		$\pm 1.0 \text{ K } (\pm 0.2 \text{ K})$	
3P3W	110V or 120V		$\pm 2.0 \text{ K } (\pm 0.4 \text{ K})$	
	220V or 240V		$\pm 3.0 \text{ K } (\pm 0.6 \text{ K})$	
	380V or 416V	$\pm 3.0 \text{ K } (\pm 0.6 \text{ K})$		
3P4W	190V <sub>LL</sub> -110V <sub>LN</sub> or 208V <sub>LL</sub> -120V <sub>LN</sub>	$\pm 1.5 \text{ K } (\pm 0.3 \text{ K})$		
	380V <sub>LL</sub> -220V <sub>LN</sub> or 416V <sub>LL</sub> -240V <sub>LN</sub>	$\pm 3.0 \text{ K } (\pm 0.6 \text{ K})$		

\* The maximum input is 450V and 5A. If the input over the level please connects with CT or PT to the transducer.

\*  $V_{ll}$  means Voltage of line to line;  $V_{ln}$  means Voltage of line to neutral.

\* The basic ref. value is base on second of PT & CT, and versus the high range of output.

OUTPUT: Programming by Dip Switch inside

Output Range		Output Mode		
Per KWH or Per KVARH	1 count	V Pulse	Open Collect	Relay Contact
	10 counts	DC 15V	DC 30V, 100mA	AC 110V, 0.5A
	100 counts	10mA	(DC 60V)	DC 24V, 1A
	1000 counts			Max. Freq.: 10Hz
	10000 counts			

Accuracy :  $\leq 0.2\%$  of F.S.

Waveform effect:  $\leq 0.01\%$  of F.S. at 15% distortion

Max. input over capability: Voltage: 1.5 x rated continuous  
2 x rated for 10 seconds  
4 x rated for 2 seconds

Current: 3 x rated continuous  
10 x rated for 10 seconds  
50 x rated for 1 second

Input Frequency : 50 Hz  $\pm 3$  Hz, 60 Hz  $\pm 3$  Hz

Response time:  $\leq 250$  m-sec.

Span adjustment:  $\leq \pm 5\%$  of F.S. (or  $\pm 20\%$  of F.S. specify)

Zero adjustment:  $\leq \pm 2\%$  of F.S. (or  $\pm 20\%$  of F.S. specify)

Output load effect: Current output  $\leq 0.1\%$  of F.S.

Voltage output  $\leq 0.05\%$  of F.S.

Power supply: ADH: AC 85~264V; DC 100~300V

ADL: AC/DC 20~56V

Self Powered: Interior connection from input volt

Working Volt:  $\pm 15\%$  rated of input voltage

Power effect:  $\leq 0.05\%$  of F.S.

Power consumption:  $\leq 8 \text{ VA}$

Mutual interference effect:  $\leq 0.1\%$  of F.S. between each element

Magnetic field strength: 400ATM  $\leq 0.2\%$  of F.S.

Operating temperature: 0~60 °C

Operating relative humidity: 20-95 %RH, non-condensing

Temperature coefficient:  $\leq 100$  PPM/°C

Storage temperature: -10~70 °C

Dielectric Strength: IEC 414, IEC 688:1992, ANSI C37.90a

Between Input / Output / Power / Case

AC 4KV, 50/60Hz, 1 min.

Surge test: IEC 255-4, ANSI C37.90a

6KV, 1.2x 50µsec

Common mode & differential mode

Insulation resistance:  $\geq 100 \text{ M } \Omega$ , DC 500V

Safety: IEC 414, BS 5458

Enclosure: IEC 529 (IP50)

Certification Standard

IEC 60688

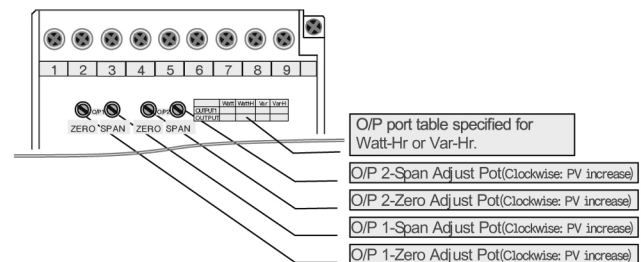
CE: EMC: EN61326:2003

Safety(LVD): EN61010:2001

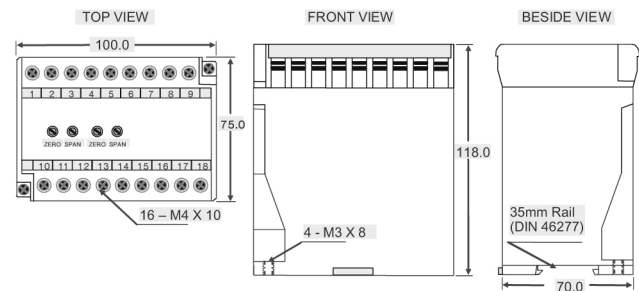
Mounting: Wall or DIN rail (EN 50022)

Weight: Under 650g

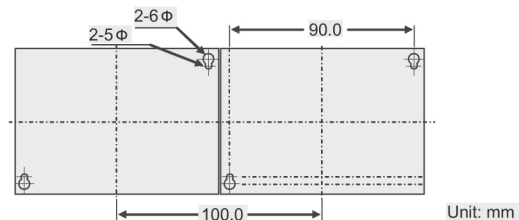
### ADJUSTMENT



### DIMENSIONS



### PANEL MOUNTING HOLES



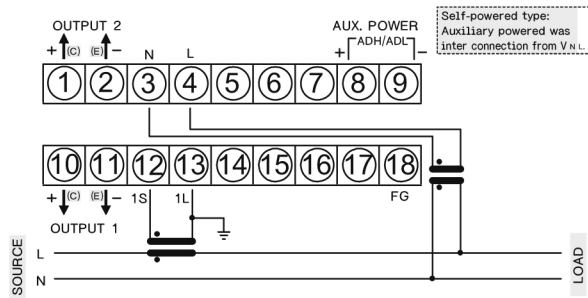
Unit: mm

## OUTPUT RANGE PROGRAMMING

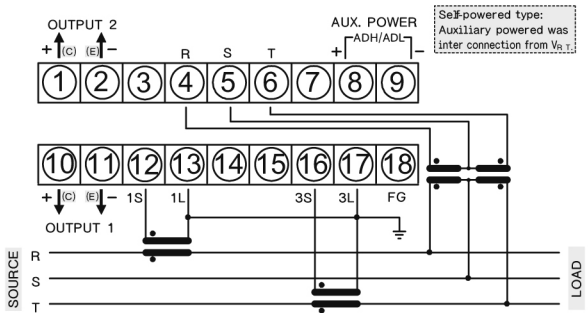
OUTPUT	DIP SWITCH WQHP22										DIP SWITCH WQHPHR2								WQHPHR1 (Test Point)
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	Freq.(T1, Gnd)
1 p / KWh (1 p / KVARh)	on	on	on	on	on	on	on	on	on	on									4.6205K Hz
10 p / KWh (10 p / KVARh)	on	on		on	on	on	on	on	on										9.9556K Hz
100 p / KWh (100 p / KVARh)			on	on	on	on	on	on											9.9556K Hz
1000 p / KWh (1000 p / KVARh)			on	on			on												9.9556K Hz
10000 p / KWh (10000 p / KVARh)	on	on																	9.9556K Hz

## CONNECTION DIAGRAM

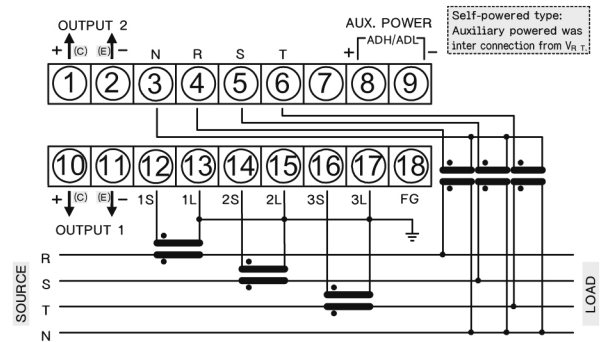
- Watt-Hr / Var-Hr / Watt-Hr & Var-Hr - 1Φ2W ( Unbalanced Load )



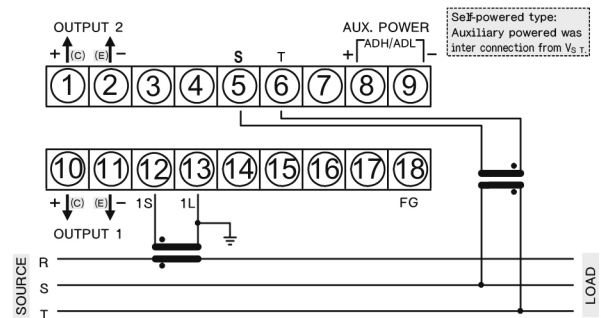
- Watt-Hr / Var-Hr / Watt-Hr & Var-Hr - 3Φ3W ( Unbalanced )



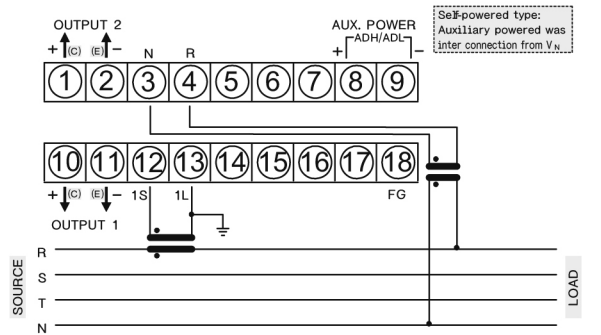
- Watt-Hr / Var-Hr / Watt-Hr & Var-Hr - 3Φ4W ( Unbalanced Load )



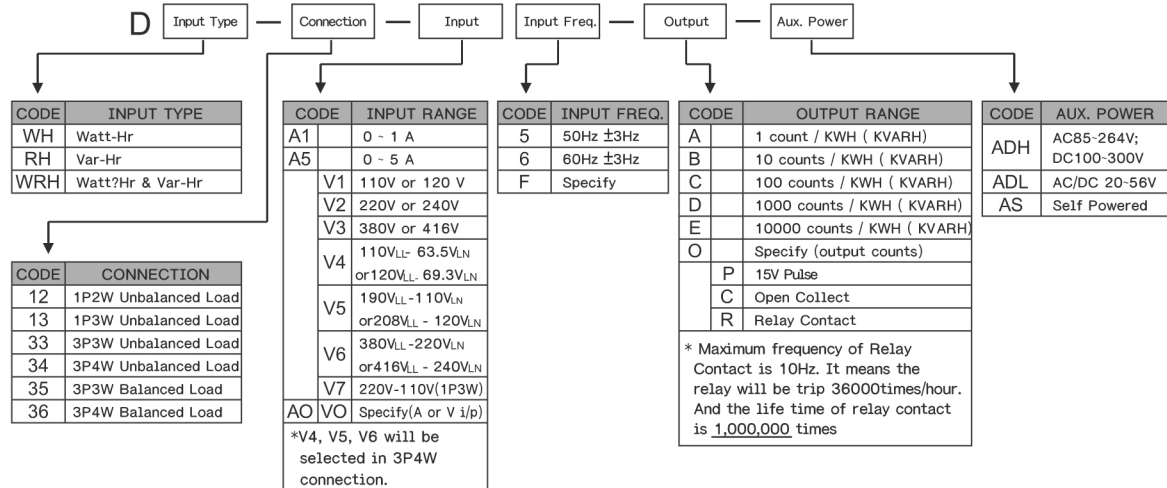
- Watt-Hr / Var-Hr / Watt-Hr & Var-Hr - 3Φ3W ( balanced Load )



- Watt-Hr / Var-Hr / Watt-Hr & Var-Hr - 3Φ4W ( balanced Load )



## ORDERING INFORMATION



# General Specifications

## Hr TRANSDUCER MODEL : DW(R)HW(R)WATT(VAR)&WATT(VAR)



- Measuring Watt & Watt-Hr or Var & Var-Hr  
1P2W, 1P3W, 3P3W, 3P4W Balanced or Unbalanced systems
- Precision measurement even for distorted wave
- Output range programmable by dip-switch
- Low output ripple
- High impulse & Surge protection
- High stability & low cost
- CE

### SPECIFICATION

INPUT: Watt / Var

Connection	AC Input		Basic Ref. Value Watt or Var	Input Burden
	Voltage	Current		
1P2W	110V or 120V	5A (1A)	±0.5 K (± 0.1K)	≤ 0.10VA or ≤ 0.15VA
1P3W	220V or 240V		± 1.0 K (± 0.2K)	
	220V or 240V		± 1.0 K (± 0.2K)	
3P3W	110V or 120V		± 1.0 K (± 0.2K)	
	220V or 240V		± 2.0 K (± 0.4K)	
3P4W	380V or 416V		± 3.0 K (± 0.6K)	
	190V <sub>LL</sub> -110V <sub>LN</sub> or 208V <sub>LL</sub> -120V <sub>LN</sub>	±1.5 K (± 0.3K)		
	380V <sub>LL</sub> -220V <sub>LN</sub> or 416V <sub>LL</sub> -240V <sub>LN</sub>	±3.0 K (± 0.6K)		

\* The maximum input is 450V and 5A. If the input over the level please connects with CT or PT to the transducer.  
\* V<sub>LL</sub> means Voltage of line to line; V<sub>LN</sub> means Voltage of line to neutral.  
\* The basic ref. value is base on second of PT & CT, and versus the high range of output.

OUTPUT: Watt or Var O/P Programming by Dip Switch inside

Output Range	Load Resistance	Output Resistance	Output Ripple
0 ~ 1 V / 0 ~ 0.5 ~ 1 V	≥ 500 ohm	≤ 0.001 ohm	≤ 0.2% of F.S.
0 ~ 5 V / 0 ~ 2.5 ~ 5 V	≥ 500 ohm		
0 ~ 10 V / 0 ~ 5 ~ 10 V	≥ 1000 ohm		
1 ~ 5 V / 1 ~ 3 ~ 5 V	≥ 500 ohm	≥ 20M ohm	
0 ~ 1 mA / 0 ~ 0.5 ~ 1 mA	0 ~ 12K ohm		
0 ~ 5 mA	0 ~ 2400 ohm		
0 ~ 10 mA / 0 ~ 5 ~ 10 mA	0 ~ 1200 ohm	≥ 6M ohm	
0 ~ 20 mA / 0 ~ 10 ~ 20 mA	0 ~ 600 ohm		
4 ~ 20 mA / 4 ~ 12 ~ 20 mA	0 ~ 600 ohm		

※When Aux Powered is DC, The Load Resistance is about 70%

OUTPUT: Watt-Hr or Var-Hr O/P Programming by Dip Switch inside

Output Range	Output Mode			
Per KWH or Per KVARH	1count 10 counts 100 counts 1000counts 10000 counts 100000 counts	V Pulse DC 15V 10mA	Open Collect DC 30V, 100mA (DC 60V)	Relay Contact AC 110V, 0.5A DC 24V, 1A Max. Freq.:10Hz

**Accuracy :** ≤ 0.2% of F.S.  
**Waveform effect:** ≤ 0.2% of F.S. at 30% distortion  
**Max. input over capability:** Voltage: 1.5 x rated continuous  
 2 x rated for 10 seconds  
 4 x rated for 2 seconds

Current: 3 x rated continuous  
 10 x rated for 10 seconds  
 50 x rated for 1 second

**Input frequency:** 50 Hz ± 3 Hz, 60 Hz ± 3Hz  
**Response time:** ≤ 250 m-sec.  
**Span adjustment:** ≤ ± 5% of F.S. (or ± 20% of F.S. specify)  
**Zero adjustment:** ≤ ± 2% of F.S. (or ± 20% of F.S. specify)  
**Output load effect:** Current output ≤ 0.1% of F.S.  
 Voltage output ≤ 0.05% of F.S.

**Power supply:** ADH: AC 85~264V; DC 100~300V  
 ADL: AC/DC 20~56V

Self Powered: Interior connection from input volt  
 Working volt: ± 15% rated of input voltage  
**Power effect:** ≤ 0.05% of F.S.

**Power consumption:** ≤ 8VA

**Mutual interference effect:** ≤ 0.1% of F.S. between each element  
**Magnetic field strength:** 400ATM ≤ 0.2% of F.S.  
**Operating temperature:** 0~60 °C  
**Temperature coefficient:** ≤ 100 PPM/°C  
**Storage temperature:** -10~70 °C  
**Dielectric Strength:** IEC 414, IEC 688:1992, ANSI C37.90a  
 Between Input / Output / Power / Case  
 AC 4KV, 50/60Hz, 1 min.

**Surge test:** IEC 255-4, ANSI C37.90a  
 6KV, 1.2 x 500 usec  
 Common mode & differential mode

**Insulation resistance:** ≥ 100M ohm, DC 500V

**Safety:** IEC 414, BS 5458

**Enclosure:** IEC 529 (IP50)

**Certification Standard**

IEC 60688

**CE:** EMC: EN61326:2003

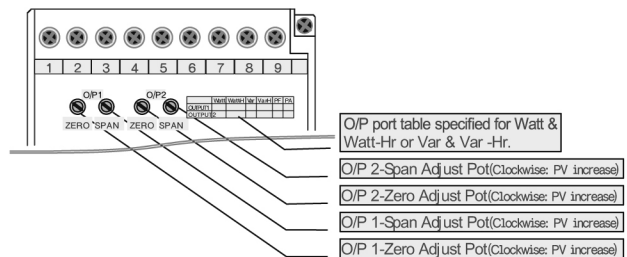
**Safety(LVD):** EN61010:2001

**Mounting:** Wall or DIN rail (EN 50022)

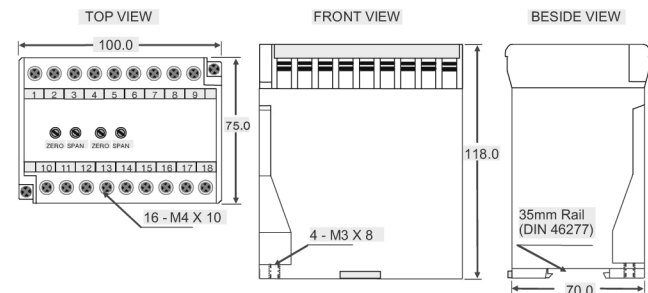
**Weight:** Under 650g

### ADJUSTMENT

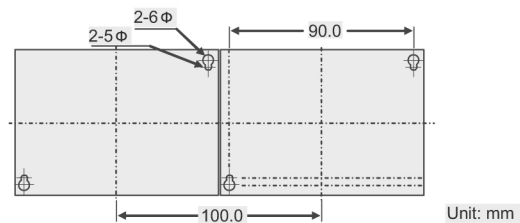
Watt & Watt-Hr / Var & Var-Hr:



### DIMENSIONS



### PANEL MOUNTING HOLES





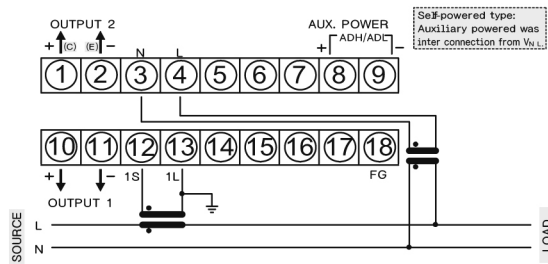
## OUTPUT RANGE PROGRAMMING

OUTPUT	pcb no. WQHP22									
	DIP-SWITCH									
	1	2	3	4	5	6	7	8	9	10
0 ~ 1 mA					on					
0 ~ 5 mA					on	on				on
0 ~ 10 mA					on	on				
0 ~ 20 mA					on		on			
4 ~ 20 mA	on				on		on			
0 ~ 0.5 ~ 1 mA					on				on	on
0 ~ 5 ~ 10 mA					on	on			on	on
0 ~ 10 ~ 20 mA					on		on		on	on
4 ~ 12 ~ 20 mA	on				on		on		on	on
0 ~ 1 V		on	on	on					on	
0 ~ 5 V			on	on					on	
0 ~ 10 V				on					on	
1 ~ 5 V	on		on	on					on	
2 ~ 10 V				on					on	
0 ~ 0.5 ~ 1 V		on	on	on					on	on
0 ~ 2.5 ~ 5 V			on	on					on	on
0 ~ 5 ~ 10 V				on					on	on
1 ~ 3 ~ 5 V	on		on	on					on	on
2 ~ 6 ~ 10 V	on			on					on	on

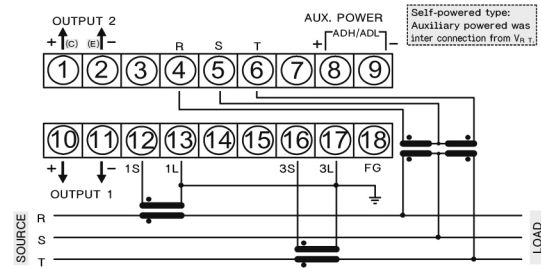
OUTPUT	pcb no. WQHP2-2										pcb no. WQHP-HR2								WQHP-HR1 (Test Point)
	DIP SWITCH										DIP SWITCH								Freq.(T1, Gnd)
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	
1 p / KWh (1 p / KVARh)	on	on	on	on	on	on	on	on	on	on	on	on	on	on	on	on	on	on	4.6205K Hz
10 p / KWh (10 p / KVARh)	on	on	on	on	on	on	on	on	on	on									9.9556K Hz
100 p / KWh (100 p / KVARh)	on	on	on	on	on	on	on	on	on	on									9.9556K Hz
1000 p / KWh (1000 p / KVARh)	on	on			on														9.9556K Hz
10000 p / KWh (10000 p / KVARh)	on	on	on																9.9556K Hz

## CONNECTION DIAGRAM

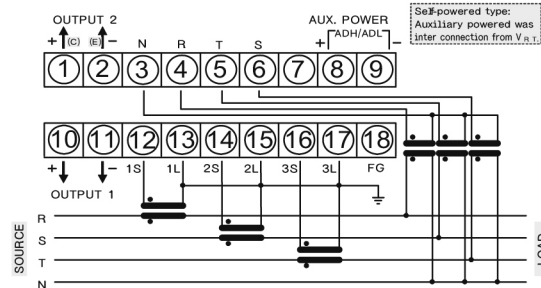
- Watt & Watt-Hr / Var & Var-Hr - 1Φ2W (Unbalanced Load)



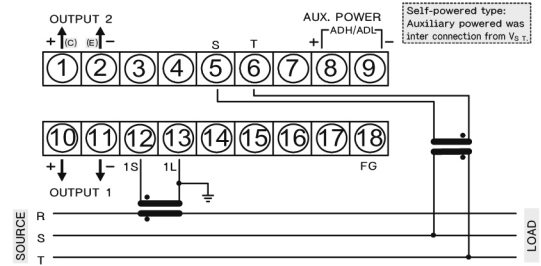
- Watt & Watt-Hr / Var & Var-Hr - 3Φ3W (Unbalanced)



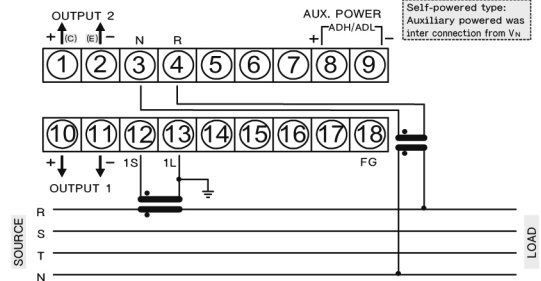
- Watt & Watt-Hr / Var & Var-Hr - 3Φ4W (Unbalanced Load)



- Watt & Watt-Hr / Var & Var-Hr - 3Φ3W (balanced Load)



- Watt & Watt-Hr / Var & Var-Hr - 3Φ4W (balanced Load)



## ORDERING INFORMATION

D Input Type		Connection		Input		Input Freq.		Watt (Var) Output		WH (VarH) Output		Aux. Power	
CODE	INPUT TYPE	CODE	INPUT RANGE	CODE	INPUT FREQ.	C	OUTPUT	C	OUTPUT	CODE	OUTPUT RANGE	CODE	AUX. POWER
WHW	Watt & Watt-Hr	A1	0 - 1 A	5	50Hz ±3Hz	A1	0-1 mA	V1	0-1 V	A	1 P / KWH ( KVARH)	ADH	AC85-264V
RHR	Var & Var-Hr	A5	0 - 5 A	6	60Hz ±3Hz	A2	0-5 mA	V2	0-5 V	B	10 P / KWH ( KVARH)	ADL	DC100-300V
		V1	110V or 120 V	F	Specify	A3	0-10 mA	V3	0-10 V	C	100 P / KWH ( KVARH)	AS	AC/DC20-56
		V2	220V or 240V			A4	0-20 mA	V4	1-5 V	D	1000 P / KWH ( KVARH)		Self Powered
		V3	380V or 416V			A5	4-20 mA	V5	0-0.5-1V	E	10000 P / KWH ( KVARH)		
		V4	110V <sub>LL</sub> - 63.5V <sub>LN</sub> or 120V <sub>LL</sub> - 69.3V <sub>LN</sub>			A6	0-0.5-1mA	V6	0-2.5-5V	O	Specify (output counts)		
		V5	190V <sub>LL</sub> - 110V <sub>LN</sub> or 208V <sub>LL</sub> - 120V <sub>LN</sub>			A7	0-5-10mA	V7	0-5-10V	P	15V Pulse		
		V6	380V <sub>LL</sub> - 220V <sub>LN</sub> or 416V <sub>LL</sub> - 240V <sub>LN</sub>			A8	0-10-20mA	V8	1-3-5V	C	Open Collect		
		V7	220V-110V(1P3W)			A9	4-12-20mA	VC	2-10V	R	Relay Contact		
		AO	VO Specify(A or V o/p)			AO	Specify(mA)	VO	Specify(V)				
			*V4, V5, V6 will be selected in 3P4W connection.										
							*If the output range above have a middle point., (EX. A9: 4-12-20mA), it means bi-polar output.						
													*Maximum frequency of Relay Contact is 10Hz. It means the relay will be trip 36000times/hour. And the life time of relay contact is 1,000,000 times

# General Specifications

## FREQUENCY TRANSDUCER MODEL : DF



- Measuring Frequency
- Output range programmable by dip-switch
- Low output ripple
- High impulse & Surge protection
- High stability & low cost
- CE

### SPECIFICATION

INPUT: Frequency

Input Range		Input Burden
Frequency	Voltage	
45 - 55 Hz 55 - 65 Hz 45 - 65 Hz	110V ±20%	≤ 0.15VA
	220V ±20%	
	380V ±20%	
	416V ±20%	

OUTPUT: Programming by Dip Switch inside

Output Range	Load Resistance	Output Resistance	Output Ripple
0 ~ 1 V	≥ 500 ohm	≤ 0.001 ohm	≤ 0.2% of F.S.
0 ~ 5 V	≥ 500 ohm		
0 ~ 10 V	≥ 1000 ohm		
1 ~ 5 V	≥ 500 ohm		
2 ~ 10 V	≥ 1000 ohm		
0 ~ 1 mA	0 ~ 12K ohm	≥ 20M ohm	
0 ~ 10 mA	0 ~ 1200 ohm	≥ 6M ohm	
0 ~ 20 mA	0 ~ 600 ohm		
4 ~ 20 mA	0 ~ 600 ohm		

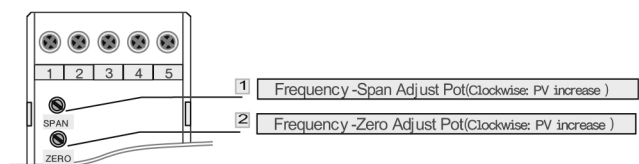
※When Aux Powered is DC The Load Resistance is about 70%

<u>Accuracy:</u>	≤ ±0.1% of F.S.
<u>Max. input over capability:</u>	Voltage: 1.5 x rated continuous 2 x rated for 10 seconds 4 x rated for 2 seconds
<u>Response time:</u>	≤ 250 msec.
<u>Span adjustment:</u>	≤ ±5% of F.S. (or ±20% of F.S. specify)
<u>Zero adjustment:</u>	≤ ±2% of F.S. (or ±20% of F.S. specify)
<u>Output load effect:</u>	Current output ≤ 0.1% of F.S. Voltage output ≤ 0.05% of F.S.
<u>Power supply:</u>	ADH: AC 85~264V; DC 100~300V ADL: AC/DC 20~56V Self Powered: Interior connection from input Volt Working Volt: ±15% rated of input voltage
<u>Power effect:</u>	≤ 0.05% of F.S.
<u>Power consumption:</u>	≤ 10VA
<u>Mutual interference effect:</u>	≤ 0.1% of F.S.
<u>Magnetic field strength:</u>	400ATM ≤ 0.2% of F.S.
<u>Operating temperature:</u>	0-60 °C
<u>Operating relative humidity:</u>	20-95 %RH, non-condensing
<u>Temperature coefficient:</u>	≤ 100 PPM/ °C
<u>Storage temperature:</u>	-10~70 °C
<u>Dielectric Strength:</u>	IEC 414, IEC 688:1992, ANSI C37.90a Between Input / Output / Power / Case AC 4KV, 50/60Hz, 1 min.
<u>Surge test:</u>	IEC 255-4, ANSI C37.90a 6KV, 1.2 x 50 µsec. Common mode & differential mode
<u>Insulation resistance:</u>	≥ 100M ohm, DC 500V
<u>Safety:</u>	IEC 414, BS 5458
<u>Enclosure:</u>	IEC 529 (IP50)
<u>Certification Standard</u>	IEC 60688
CE:	EMC: EN61326:2003
Safety(LVD):	EN61010:2001

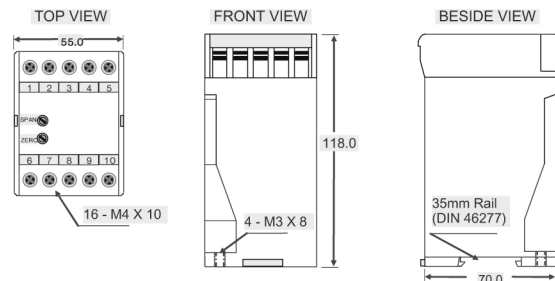
Mounting: Wall or DIN rail (EN 50022)  
Weight: under 450g

### ADJUSTMENT

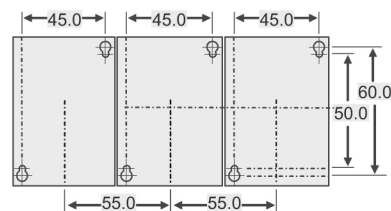
Frequency



### DIMENSIONS



### PANEL MOUNTING HOLES

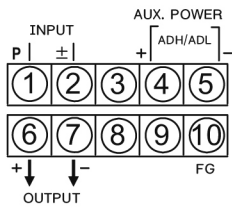


## ■ OUTPUT RANGE PROGRAMMING

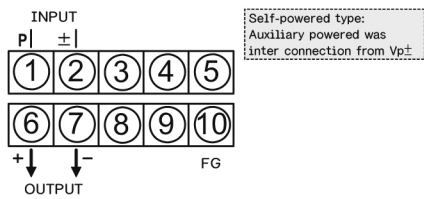
OUTPUT	Dip Switch							
	1	2	3	4	5	6	7	8
0 ~ 1 mA					on			
0 ~ 10 mA					on	on		
0 ~ 20 mA					on		on	
4 ~ 20 mA	on				on		on	
0 ~ 1 V		on	on	on				on
0 ~ 5 V			on	on				on
0 ~ 10 V				on				on
1 ~ 5 V	on		on	on				on
2 ~ 10 V	on			on				on

## ■ CONNECTION DIAGRAM

- 1Φ2W (Aux. Powered)



- 1Φ2W (Self Powered)



## ■ ORDERING INFORMATION

