sifam tinsley
PRECISION INSTRUMENTATION

Multifunction Meters

Transducers & Isolators

Temperature Controllers

Converters & Recorders

Digital Panel Meters

Current Transformers

Analogue Panel Meters

Shunts

Digital Multimeters

Clamp Meters

Insulation Testers

THETA Hz
TRANSDUCERS & ISOLATORS

User Manual - Issue 1.0

![sifam tinsley PRECISION INSTRUMENTATION logo]

Features

➜ Fully onsite programmable input range

➜ Available in Single or Dual output type

➜ Onsite selectable output type.
   (DC current / DC voltage)

➜ Accuracy class 0.2 (IEC / EN 60688)

➜ Seven Segment LCD Display

➜ RS485(Modbus) Communication

➜ Output Response Time < 400 msec

1. Application

Theta Hz transducer is used for frequency measurement. The output signal is proportional to measured frequency and is either load independent DC Current or load independent DC Voltage.

2. Product Features

Measuring Input	Sine wave or distorted wave form of nominal input voltage with fundamental wave.
Analog Output (Single or dual)	Isolated analog output which can be set onsite to either voltage or current output.
Accuracy	Output signal accuracy Class 0.2 as per International Standard IEC / EN 60688.
Programmable Input/Output	The Transducer can be programmed onsite using front key & display or through programming port (COM) or through RS 485.
LED Indication	LED indication for power on and output type. (Current output : Red LED, Voltage output : Green LED)
Display Module (Optional)	OPtional 7 segment LCD display with backlit & keypad. For displaying measured paramaters & onsite configuration of input/output
Rs485 Communication (Optional)	Optional RS485 communication is available. For reading measured parameters and onsite configuration of input/output.

3. Symbols and their meanings

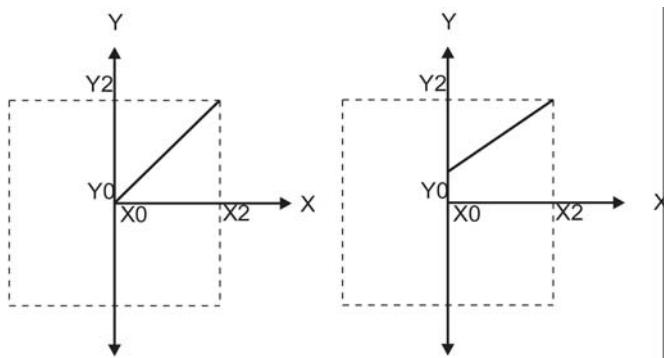|	
X	Input Frequency
X0	Start value of input
X1	Elbow value of input
X2	End value of input
Y	Output DC Voltage / DC Current
Y0	Start value of output DC Voltage / DC Current
Y1	Elbow value of output DC Voltage / DC Current
Y2	End value of output DC Voltage / DC Current
RN	Rated value of output burden
UN	Nominal input voltage

4. Technical Specifications

Reference conditions for Accuracy	
Ambient temperature	23°C +/- 1°C
Pre-conditioning	30 min acc. to IEC / EN 60688
Input Variable	Rated Voltage / Rated Current
Input waveform	Sinus oidal, Form Factor 1.1107
Input signal frequency	50 or 60Hz
Auxiliary supply voltage	At nominal range
Output Load	Rn = 7.5 V / Y2 ± 1% With DC current output signal Rn = Y2 / 1 mA ± 1% With DC voltage output signal
Miscellaneous	Acc. to IEC / EN 60688
Accuracy (Acc. to IEC / EN 60688)	
Reference Value	Output end Value Y2 (Voltage or Current)
Basic Accuracy	0.2*C

Factor C (The highest value applies if calculated C is less than 1,then C=1 applies

Linear characteristics

$$C = \frac{1 - \frac{Y0}{Y2}}{1 - \frac{X0}{X2}} \text{ or } C=1$$

Bent characteristics

For X0 < X < X1

$$C = \frac{Y1 - Y0 \ X2}{X1 - X0 \ Y2} \text{ or } C=1$$

For X1 < X < X2

$$C = \frac{1 - \frac{Y1}{Y2}}{1 - \frac{X1}{X2}} \text{ or } C=1$$

Technical Specifications Continued

Measuring Output Y (Single or Optional Dual) — ▶	
Output type	Load independent DC Voltage , DC Current onsite selectable through DIP switches.
Load independent DC output	0...20mA / 4...20mA OR 0...10V.
Output burden with DC current output Signal	$0 ≤ R ≤ 15V/Y2$
Output burden with DC voltage output Signal	$Y2/(2 mA) ≤ R ≤ ∞$
Current limit under overload R=0	$≤ 1.25 * Y2$ with current output $≤ 100$ mA with Voltage output
Voltage limit under R=∞	$< 1.25 * Y2$ with voltage output $≤ 30$ V with current output
Residual Ripple in Output signal	≤ 1% pk-pk
Response Time	< 400 msec
Auxiliary Power Supply	
AC/DC Auxiliary Supply	60V... 300 VAC-DC ± 5% or 24V... 60VAC-DC ± 10%
AC Auxiliary supply frequency range	40 to 65 Hz

Auxiliary supply consumption		
	60V...300 VAC-DC	< 8VA for Single output
		< 10VA for Dual output
	24V...60 VAC-DC	< 5 VA for Single output
		< 6 VA for Dual output

Environmental	
Nominal range of use	0 to 45 °C
Storage temperature	-40 °C to 70 °C
Relative humidity of annual mean	≤ 75%
Altitude	2000mm max
Influence of Variations	
As per IEC / EN 60688 standard Output Stability	< 30 m in

5. Output Characteristics

Example of setting with Linear Characteristics :   Ex ample of setting with bent Characteristics :
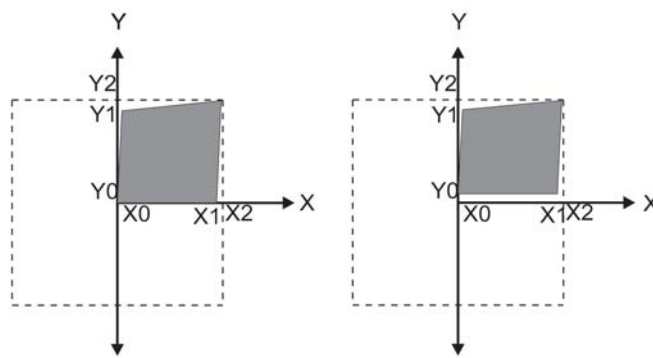
X0 = Start value of input Y0 = Start value of output
X1 = Elbow value of input Y1 = Elbow value of output
X2 = End value of input Y2 = End value of output
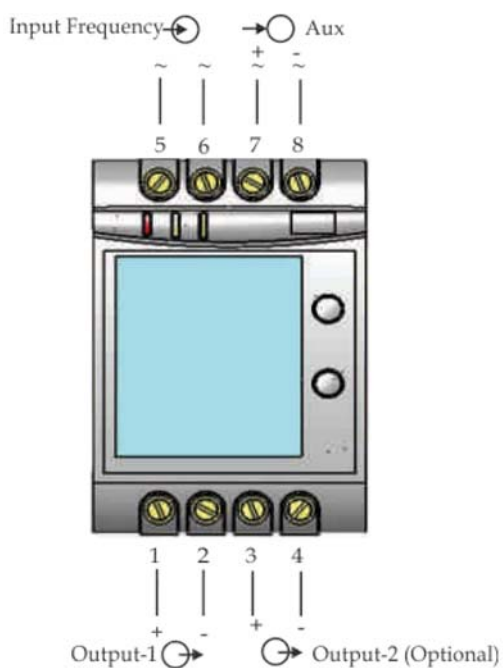**Note:** End value(Y2) of output cannot be changed onsite.

Technical Specifications Continued

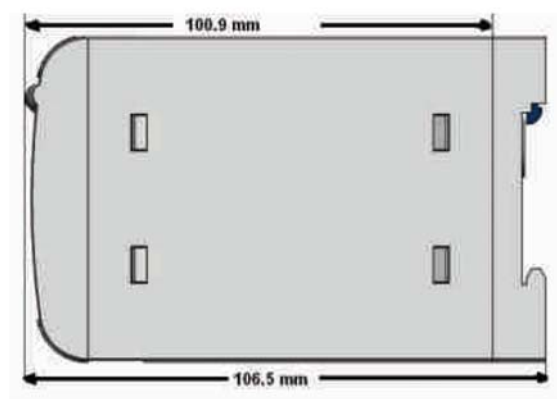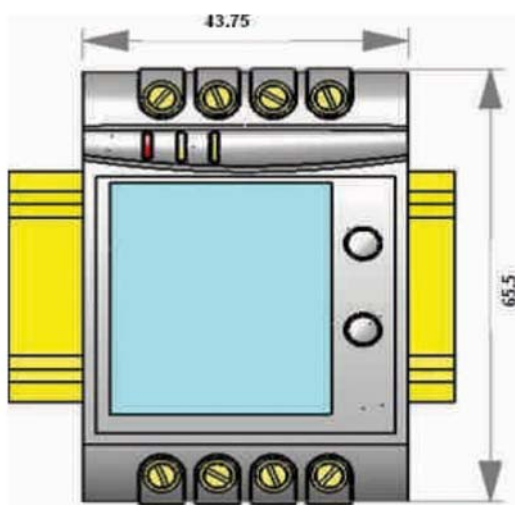| Safety	
Protection Class	II (Protection Isolated, EN 61010)
Protection	IP 40, housing according to EN 60 529 IP 20 ,terminal according to EN 60 529
Pollution degree	2
Installation Category	III
Insulation Voltage	50Hz,1min. (EN 61010-1) 7700VDC, Input versus outer surface 5200VDC, Input versus all other circuits 5200VDC, Auxiliary supply versus outer surface and output 690VDC, Output versus output versus each other versus outer surface.
Installation Data	
Mechanical Housing	Lexan 940 (polycarbonate) Flammability Class V-0 acc. to UL 94, self extinguishing, non dripping, free of halogen
Mounting position	Rail mounting / wall mounting
Weight	Approx. 0.4kg
Additional error	
Temperature influence	±0.2% /10°C
Connection Terminal	
Connection Element	Conventional Screw type terminal with indirect wire pressure
Permissible cross section of the connection lead	≤ 4.0 mm single wire or 2 x 2.5mm fine wire
Ambient tests	
EN 60 068-2-6	Vibration
Acceleration	± 2 g
Frequency range	10....150...10Hz, rate of frequency sweep: 1 octave/minute
Number of cycles	10, in each of the three axes
EN60 068-2-7	Shock
Acceleration	3*50g 3 shocks in each direction
EN 60 068-2-1/-2/-3	Cold, Dry, Damp heat
IEC 61000-4-2/-3/-4/-5/-6 EN 55 011	Electromagnetic compatibility.

LED Indication		
ON LED	Aux.supply healthy condition	Green LED continuous ON
O/P1 LED	Output1 voltage selection	Green LED continuous ON
	Output1 Current selection	Red LED continuous ON
O/P2 LED	Output2 voltage selection	Green LED continuous ON
	Output2 Current selection	Red LED continuous ON

6. Electrical Connections

| Connection	Terminal details	
Measuring input	~ ~	5 6
Auxilliary Power supply	~ , + ~,-	7 8
Measuring output - 1	+ -	1 2
Measuring output - 2	+ -	3 4

7. Dimensions

8. Programming

Programming of transducer can be done in three ways	1) Programming Via Front LCD & two keys. 2) Programming Via optional RS485(MODBUS) communication port (Device address, Password,communication parameter, Output Type & simulation mode can be programmed). 3) Programming Via Programming port available at front of Theta Hz Transducers using (optional) PRKAB601 Adapter.
Programming Via Programming port (COM)	A PC with RS232 C interface along with the programming cable PRKAB601 and the configuration software required to programme the transducer
The connections between	"PC ◄──► PRKAB 601 ◄──► Theta Transducer The power supply must be applied to the Transducer before it can be programmed. The configuration software is supplied on CD. The programming cable PRKAB601 adjusts the signal level and provides the electrical insulation between the PC and Theta Transducers.
Configuring Rish Con Transducer	To configure Theta Transducer Input / Output one of the three programming methods can be adapted along with mechanical switch setting (DIP switch setting on PCB for output).
DIP Switch Setting for OUTPUT	Type of output (current or voltage signal) has to be set by DIP switch (see Fig.5). For programming of DIP switch the user needs to open the transducer housing & set the DIP switch located on PCB to the desired output type Voltage or Current. Output range changing is not possible with DIP switch setting. Refer below Fig. 5 for DIP switch setting. The four pole DIP switch is located on the PCB in the Theta Transducer.
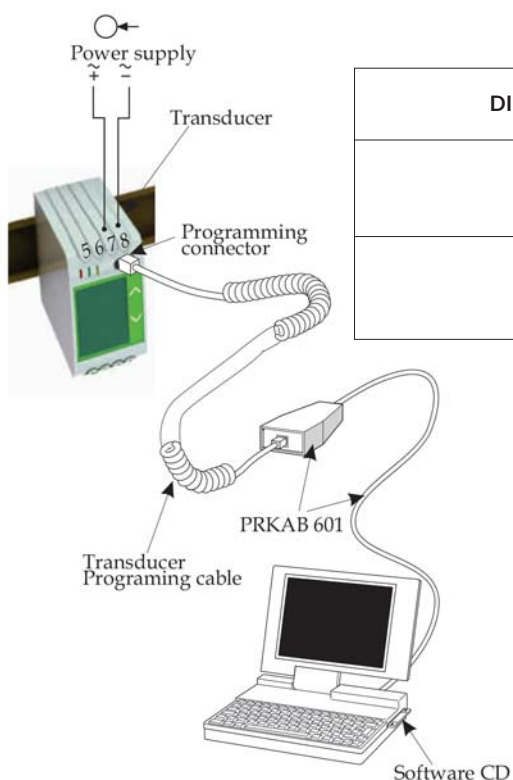
DIP Switch Setting	Type of Output Signal
ON ▮▮▮▮ 1234	load-independent current
ON ▮▮▮▮ 1234	load-independent voltage

9. Ordering Information

Product Code	TT25-	X	XX	X	X	X	X	X	00000
Input Range	45-55Hz	6							
	55-65Hz	B							
	45-65Hz	7							
	48-52Hz	A							
Input Range	100-500V		8F						
	60-300U			H					
Power Supply	24-60U			F					
Output	1 O/P 1O				1				
	2 O/P 2O				2				
Display Module	With Display					D			
	Without Display WD					Z			
RS485 Module	With RS-485 485						R		
	Without RS-485						Z		
Prog. Cable	With PRKAB 601 PRK							C	
	PRKAB 601							Z	

Contact

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