Technical Data Sheet

Theta Hz

File No. E471457



Theta Hz the 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.

Special 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

Application

Theta Hz the 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.

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 parameters & onsite configuration of Input/output
Rs485 Communication (Optional)	Optional RS485 communication is available. For reading measured parameters & onsite configuration of input/output.

Symbols and their meaning

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

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	Sinusoidal, 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

$$\text{For } X0 \le X \le X1: \quad C=\frac{Y1-Y0}{X1-X0}\cdot\frac{X2}{Y2} \text{ or } C=1$$

$$\text{For } X1 \le X \le X2: \quad C=\frac{1-\frac{Y1}{Y2}}{1-\frac{X1}{X2}} \text{ or } C=1$$

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 / 0…1mA 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

Technical Specifications

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

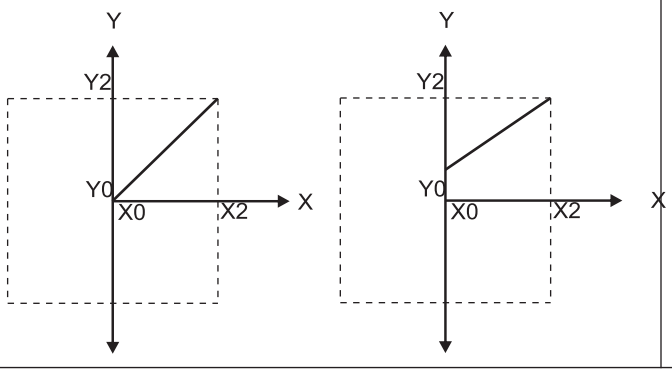
Nominal range of use	0 to 45 °C
Storage temperature	-40° C to 70° C
Relative humidity of annual mean	≤ 75%
Altitude	2000m max

Influence of Variations

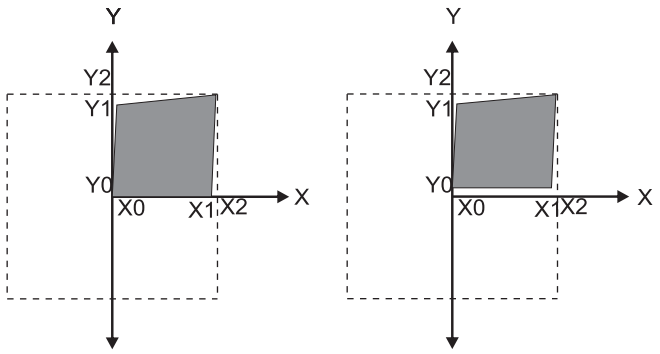
As per IEC / EN 60688 standard Output Stability	< 30 min

Output Characteristics

Example of setting with Linear Characteristics :



Example of setting with bent Characteristics :



X0 = Start value of input
X1 = Elbow value of input
X2 = End value of input
Y0 = Start value of output
Y1 = Elbow value of output
Y2 = End value of output

Note: End value(Y2) of output cannot be changed onsite.

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 2.5 mm fine wire

Ambient tests

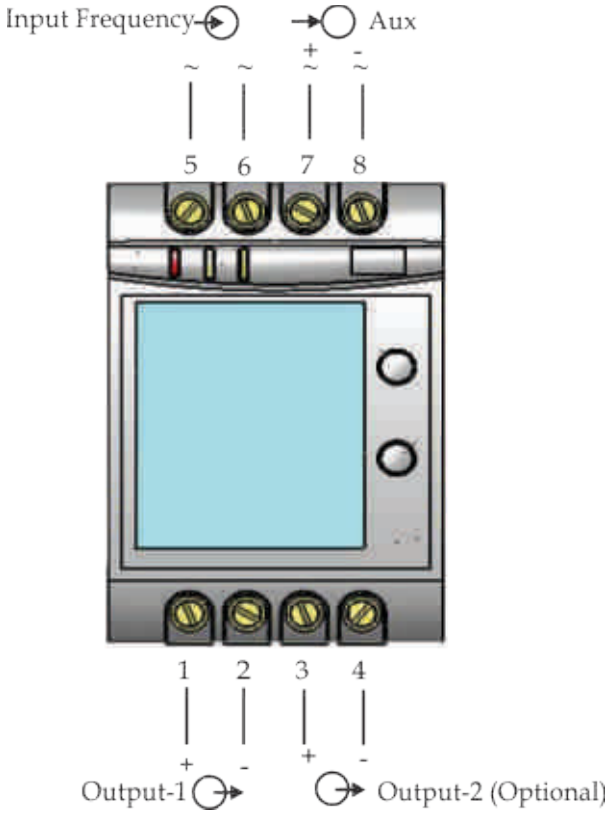
EN 60 068-2-6	Vibration
Acceleration	± 2 g
Frequency range	10....150...10Hz, rate of frequency sweep: 1 octave/minute
Number of cycles	10, in each of the three axes
EN 60 068-2-7	Shock
Acceleration	3*50g 3 shocks in each direction
EN 60 068-2-1/-2/-3	Cold, Dry, Damp heat
IEC 61000-4-2/-3/-4/-5/-6 EN 55 011	Electromagnetic compatibility.

Technical Specifications

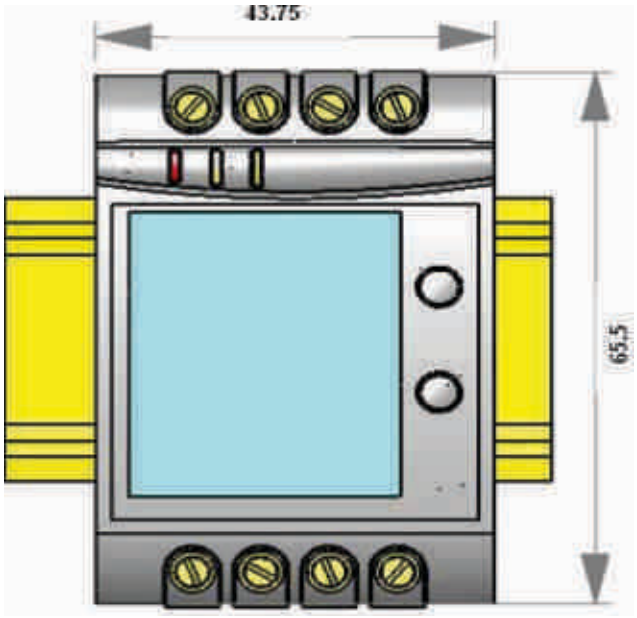
ON LED	Aux.supply healthy condition	Green LED continuous ON
O/P1 LED	Output1 voltage selection	Green LED continuous ON
	Output1 Current selection	Red LED continuous ON
O/P2 LED	Output2 voltage selection	Green LED continuous ON
	Output2 Current selection	Red LED continuous ON

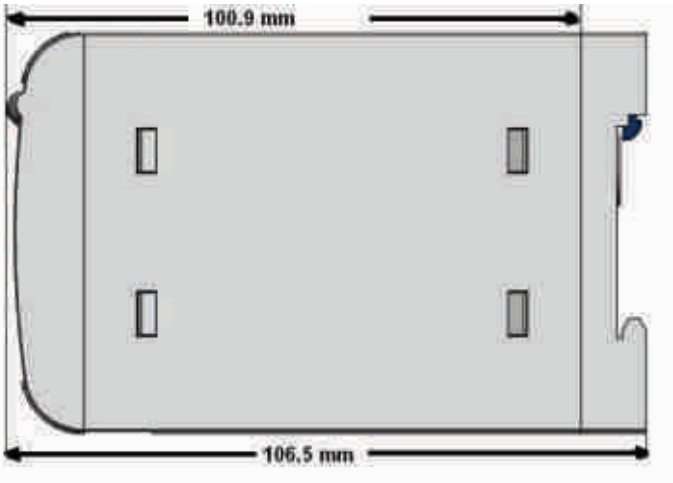
Electrical Connections

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



Dimensions





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 vailable at front of Theta Hz Transducers using (optional) PRKAB601 Adapter.
Programming Via Programming port (COM)	A PC with RS 232 C interface along with the programming cable PRKAB601 and the configuration software are required to program the transducer.

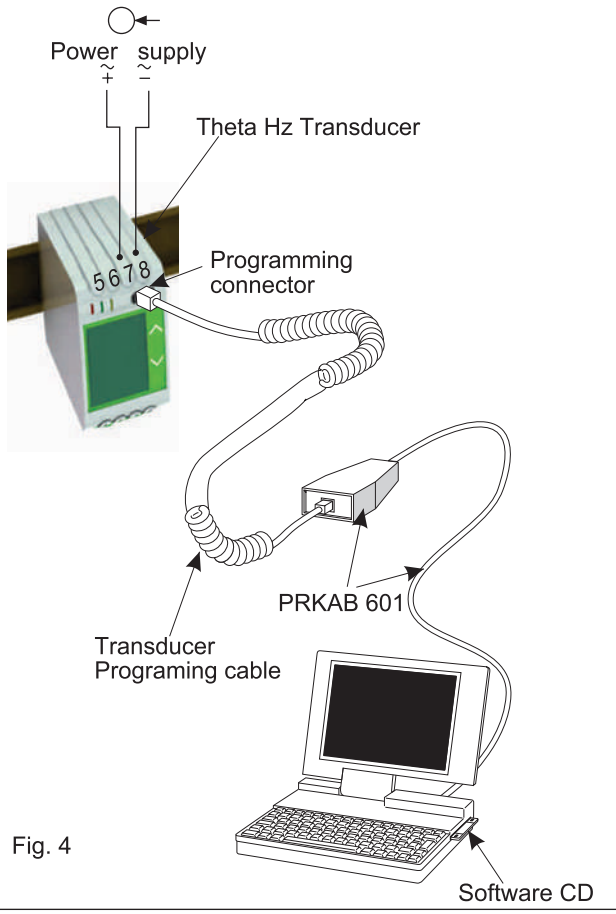


Fig. 4

The connections between	"PC ↔ PRKAB 601↔ Theta Transducer The power supply must be applied to Transducer be fore it can be programmed. The Configuration software is supplied on a 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
	load-independent current
	load-independent voltage

Fig. 5

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	

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