



Multifunction Meters

Transducers & Isolators

Temperature Controllers

Converters & Recorders

Digital Panel Meters

Current Transformers

Analogue Panel Meters

Shunts

Digital Multimeters

Clamp Meters

Insulation Testers

THETA 30P POWER / PHASE ANGLE / POWER FACTOR TRANSDUCER

The Sifam Tinsley - P transducer is used to measure and convert active, reactive, apparent power, Phase angle & Power Factor of a Single-phase or Three-phase AC system with balanced or unbalanced load into a proportional load independent DC current or voltage output signal.

Features

- Measuring Input: AC Voltage/Current input signal, sine wave or distorted wave form
- Analogue Output (Single or dual): Isolated analogue output which can be set to voltage or current output onsite
- Accuracy: Output signal accuracy class 0.2 as per International IEC / EN 60688 Standard
- Programmable Input/Output: The Transducer can be programmed onsite using front key & display or through programming port (COM) or through RS485
- LED Indication: LED indication for power on and output type. (Current output : Red LED, Voltage output : Green LED).

SUBJECT TO CHANGE WITHOUT NOTICE

This manual superseded all previous versions – please keep for future reference


Salient Features :

- True RMS measurement.
- Fully onsite programmable input voltage range & input current range
- On Site Configurable as Active / Reactive / Apparent Transducer / Phase Angle / Power Factor
- Onsite selectable output type(DC current / DC voltage)
- Single or Dual output
- Accuracy Class 0.2 (IEC / EN 60688) for Power
- Accuracy Class 0.5 (IEC / EN 60688) for Phase Angle / Power Factor
- Seven Segment LCD Display
- Rs485(Modbus) Communication
- Wide Auxiliary power supply. Accepts any input between 60V-300V AC/DC or 24V-60V AC/DC
- Output Response Time < 750 ms standard
- Fast and easy installation on DIN RAIL or onto a wall.

Display Module(Optional):

Optional 7 segment LCD display with backlit & keypad.

For displaying measured parameter & onsite configuration of Input/output.

RS485 Communication(Optional):

Optional RS485 communication is available. For reading measured parameter & onsite configuration of input/output.

Symbols and their meaning:

X	Input Apparent /Active/Reactive Power Factor / Phase Angle
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 FN Nominal Frequency

Technical Specifications:

Measured Parameter ↻	
Active Power / Reactive Power / Apparent Power / Power Factor /Phase Angle.	
Network Type Supported by Power transducer:	Single Phase / 3 phase 3 wire Unbalanced / 3 phase 4 wire Unbalanced 3 phase 3 wire balanced / 3 phase 4 wire balanced
Network Type Supported by Power Factor & Phase Angle :	Single Phase / (U12 I1) 3 Phase Balanced load (U13 I1) 3 Phase Balanced load / (U23 I1) 3 Phase Balanced load 3 phase 3 wire balanced / 3 Phase 4 wire Balanced load
Nominal Voltage Input(UN):	
Nominal input Voltage (AC RMS) (PT Secondary range)	$100V \leq UN \leq 500V$ -L
PT Primary range	100V to 692 KVL-L
Nominal Frequency FN	25 Hz to 60 Hz
Nominal input Voltage burden	< 0.6 VA per phase at UN
Overload Capacity:	1.2 * UN continuously, 2 * UN for 1 second, repeated 10 times at 10 minute intervals (Un maximum 300V with power supply powered from measuring input).
Nominal Current Input(IN):	
Nominal input Current (AC RMS) (CT Secondary range)	$1A \leq IN \leq 5A$
CT Primary range	1 A to 9999 A
Nominal Frequency FN	25 Hz to 60 Hz
Nominal input Current burden	< 0.2 VA per phase at IN
Overload Capacity:	1.2 * IN continuously, 10 * IN for 3 second, repeated 5 times at 5 minute intervals. 50 * IN for 1 second, repeated 1 times at 1 hour interval (Max 250 A).
Allowed measuring range end values X2 (calibration factor Xc):	
With single phase AC active/reactive/apparent power $0.30 \leq (X2/Rated\ Power) < 1.3 \cdot UN / \sqrt{3} \cdot IN$ With 3-phase AC active/reactive/apparent power $0.30 \leq (X2/Rated\ Power) < 1.3 \cdot \sqrt{3} \cdot UN \cdot IN$ (For single phase Rated Power= $UN / \sqrt{3} \cdot IN$) (For Three phase Rated Power= $\sqrt{3} \cdot UN \cdot IN$)	
Phase Angle & Power Factor measuring Range:	Minimum span 20° to Maximum Span 360°
Measuring Output Y(Single or Optional Dual): ↻	
Output type	Load independent DC Voltage , DC Current On site selectable through DIP switches.
Load independent DC output	Unipolar 0...20mA / 4...20mA OR 0...10V. Bipolar -20mA...0...+20mA OR -10V...0...+10V
Output burden with DC current output Signal	$0 \leq R \leq 15V/Y2$
Output burden with DC voltage output Signal	$Y2/(2\ mA) \leq R \leq \infty$

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	< 500mS

Auxiliary Power Supply:

AC/DC Auxiliary Supply	60V... 300 VAC-DC ± 5% or 24V...60V VAC-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

Accuracy :(Acc. to IEC / EN 60688)

Reference Value	Output end Value Y2 (Voltage or Current)
Basic Accuracy for power transducer	0.2°C
Basic Accuracy for Phase Angle & Power Factor transducer	0.5°C

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

Linear characteristics: $C = \frac{1 - \frac{Y_0}{Y_2}}{1 - \frac{X_0}{X_2}} \text{ or } C=1$	Bent characteristics: For $X_0 < X < X_1$ $C = \frac{Y_1 - Y_0 X_2}{X_1 - X_0 Y_2}$ or $C=1$ For $X_1 < X < X_2$ $C = \frac{1 - \frac{Y_1}{Y_2}}{1 - \frac{X_1}{X_2}}$ or $C=1$
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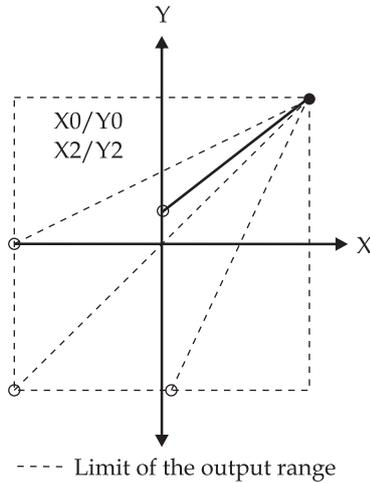
Reference conditions for Accuracy :

For Power Transducer:	
Ambient temperature	23°C +/- 1°C
Pre-conditioning	30 min acc. to IEC / EN 60688
Input Variable	Voltage Rated / Current Rated
Input waveform	Sinusoidal, Form Factor 1.1107
Input signal frequency	50 or 60Hz
Active / Reactive factor	Cos φ = 1 resp. Sin φ = 1
For Phase Angle & Power Factor Transducer:	
Reference Value	For Phase angle = 90° resp. For power factor = 0.5
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

Version: L 29/05/13

Output Characteristics:

Example of setting with Linear Characteristics :

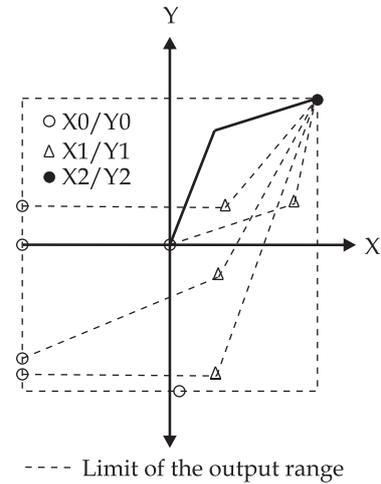


X0 = Start value of input
 Y0 = Start value of output
 X1 = Elbow value of input

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.

Example of setting with bent Characteristics :


Additional Error:

Temperature influence

 $\pm 0.2\%/10^\circ\text{C}$
Influence of Variations:

As per IEC / EN 60688 standard.

Output stability

< 30 min

Safety:

Protection Class

Protection

II (Protection Isolated, EN 61010)

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)

5500V, Input versus outer surface

3700V, Input versus all other circuits

3700V, Auxiliary supply versus outer surface and output

490V, 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

Rail mounting / wall mounting

Mounting position

Weight

Approx. 0.4kg

Connection Terminal

Connection Element

Conventional Screw type terminal with indirect wire pressure

Permissible cross section of the connection lead

 $\leq 4.0 \text{ mm}^2$ single wire or $2 \times 2.5 \text{ mm}^2$ fine wire

Environmental:

Operating temperature	0°C...23°C...45°C(usage Group II)
Storage temperature	-40 °C to 70 °C
Relative humidity of annual mean	≤ 75%
Altitude	2000m max

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 x 50g
	3 shocks in each direction
EN 60 068-2-1/-2/-3	Cold, Dry, Damp heat
IEC 1000-4-2/-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

Electrical Connections:

Connection	Terminal details	
Measuring Voltage Input	UL1	2
	UL2	5
	UL3	8
	N	11
Auxilliary Power supply	~, +	13
	~, -	14
Measuring output - 1	+	15
	-	16

Connection	Terminal details	
Measuring Current Input	I1	1
	I1'	3
	I2	4
	I2'	6
	I3	7
	I3'	9
Measuring output - 2	+	17
	-	18

Electrical Networks :

<p>3 Phase 4 Wire Unbalanced Load</p>	
<p>3 Phase 3 Wire Unbalanced Load</p>	
<p>3 Phase 4 Wire Balanced Load</p>	
<p>3 Phase 3 Wire Balanced Load</p>	
<p>1 Phase 2 Wire</p>	
<p>U12 I1 3 Phase Balanced Load</p>	
<p>U13 I1 3 Phase Balanced Load</p>	
<p>U23 I1 3 Phase Balanced Load</p>	

Terminal Details

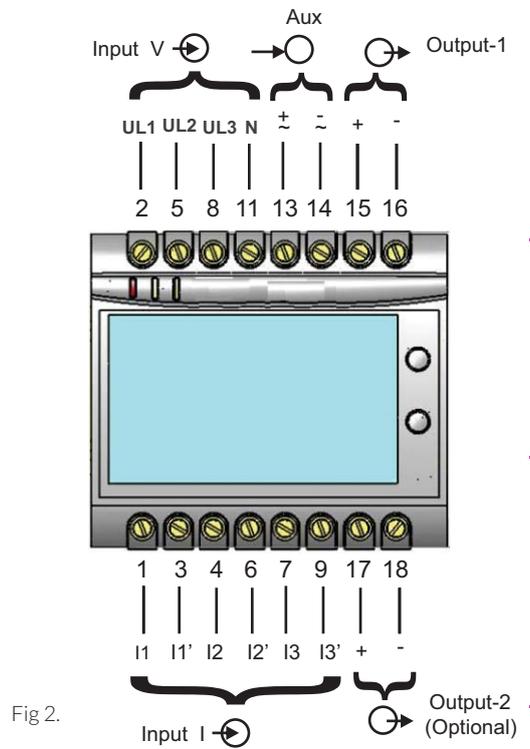


Fig 2.

Dimensions

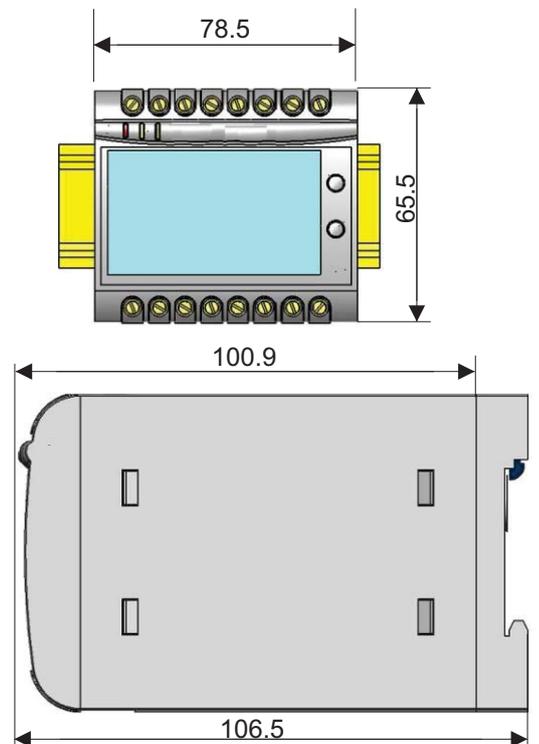


Fig 3. (All dimensions are in mm.)

Programming (Figs: 4 and 5)

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,PT Ratio,CT Ratio,Transducer type,Password, communication parameter,Output Type & simulation mode can be programmed).
- 3) Programming Via Programming port available at front of Sifam Tinsley 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.

The connections between

PC ↔ PRKAB 601 ↔ Sifam Tinsley Transducer. The power supply must be applied to transducer before it can.

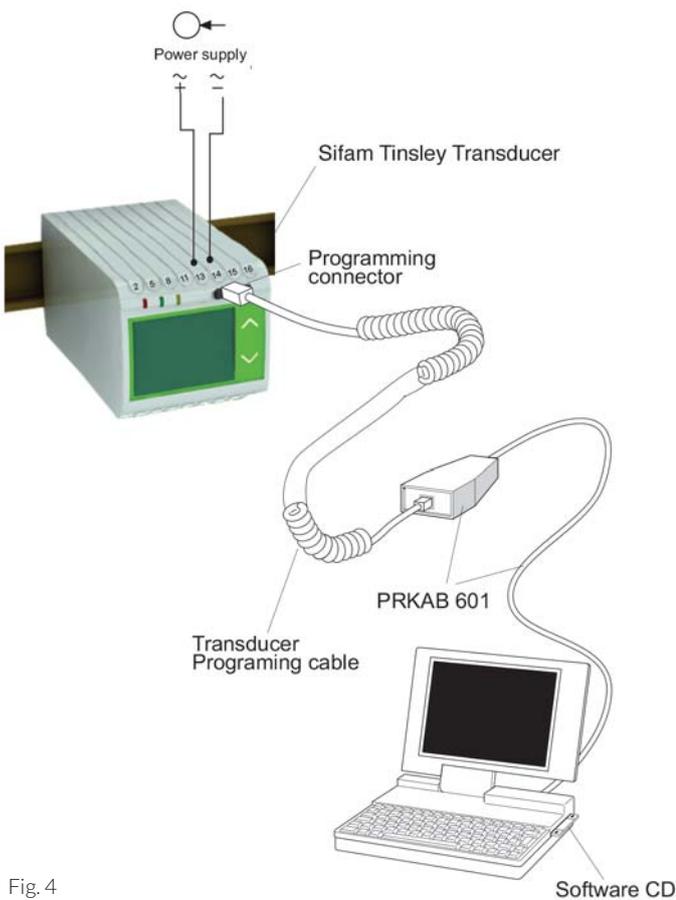


Fig. 4

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 Sifam Tinsley Transducers.

Configuring Sifam Tinsley Transducer :

To configure Sifam Tinsley Transducer Input / Output one of the three programming methods can be adapted along with mechanical switch setting (DIP switch setting on PCB).

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 Sifam Tinsley Transducer.

DIP Switch Setting	Type of Output Signal
	load-independent current
	load-independent voltage

Fig. 5

Ordering Information

Product Code	TT30-	X	X	XX	XX	X	X	X	X	X	00
Product Type	Active Power Active P	P									
	Reactive Power Reactive Q	Q									
	Apparent Power Apparent S	S									
System Type	1P2W		1								
	3WUB		2								
	4WUB		3								
	4WB		4								
	3WB		5								
	3WB-U12		6								
	3WB-U13		7								
	3WB-U23		8								
Input Range	100-500V			8F							
Input Current	1/5A				75						
Power Supply	60-300U					H					
	24-60					F					
Output	1 O/P 10							1			
	2 O/P 20							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
	Without PRKAB 601										Z

Contact



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