RISHABH

Data Sheet

RISH CON-P

Measure Control Record Analyze Optimize

Data Sheet

RISH CON-P

Application

The **RISH** CON **- 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.

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** (Optional)
- **Rs485(Modbus)** Communication (Optional)
- 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 or in a panel using optional screw hole bracket
- Connection Terminal : Conventional Screw type.

Product Features

Measuring Input:
AC Voltage/Current input signal,sine wave or distorted wave form.

Analog Output (Single or dual):
Isolated analog 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 RS 485.

LED Indication:
LED indication for power on and output type.
(Current output : Red LED, Voltage output : Green LED).

Fig. 1 RISH CON - P

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	
R_N	Rated value of output burden
F_N	Nominal Frequency

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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(U_N):

Nominal input Voltage (AC RMS) (PT Secondary range)	100 V ≤ U_N ≤ 500 VL-L
PT Primary range	100V to 692.8 KVL-L
Nominal Frequency F_N	25 Hz to 65 Hz
Nominal input Voltage burden	< 0.6 VA per phase at U_N
Overload Capacity:	1.2 * U_N continuously, 2* U_N for 1 second, repeated 10 times at 10 minute intervals (Un maximum 300V with power supply powered from measuring input).

Nominal Current Input(I_N):

Nominal input Current (AC RMS) (CT Secondary range)	1 A ≤ I_N ≤ 5 A
CT Primary range	1 A to 9999 A
Nominal Frequency F_N	25 Hz to 65 Hz
Nominal input Current burden	< 0.2 VA per phase at I_N
Overload Capacity:	1.2 * I_N continuously, 10 * I_N for 3 second, repeated 5 times at 5 minute intervals. 50* I_N for 1 second, repeated 1 times at 1 hour interval(M ax 250 A).

Allowed measuring range end values X2 (calibration factor Xc):

With single phase AC active/reactive/apparent power 0.30 ≤ (X2/Rated Power) ≤ 1.3 • U_N /√3 • I_N
With 3-phase AC active/reactive/apparent power 0.30 ≤ (X2/Rated Power) ≤ 1.3 • √3 • U_N • I_N
(For single phase Rated Power=U_N /√3 • I_N)
(For Three phase Rated Power=√3 • U_N • I_N)

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 ≤ 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	< 750 ms
Measurement TRMS	Up to the 15th harmonic

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:

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

Bent characteristics:

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

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

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

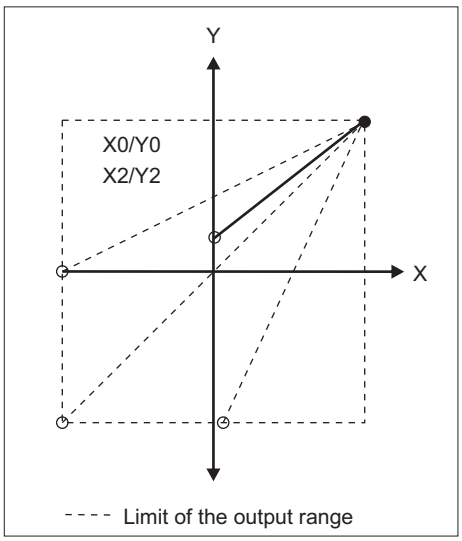
For Phase Angle & Power Factor Transducer:

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	

Output Characteristics:

Example of setting with Linear Characteristics **:**

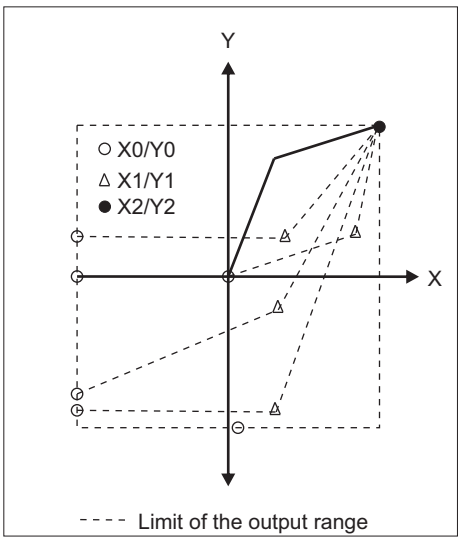


X0 = Start value of input
Y0 = Start value of output
X1 = Elbow value of input

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 ± 0.2%/10°C

Influence of Variations:
As per IEC / EN 60688 standard.
Output stability < 30 min

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	1min. (EN 61010-1) 7700V DC, Input versus outer surface 5200V DC, Input versus all other circuits 5200V DC, Auxiliary supply versus outer surface and output 690V DC, 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

Connection Terminal

Connection Element	Conventional Screw type terminal with indirect wire pressure
Permissible cross section of the connection lead	≤ 4.0 mm² single wire or 2 x 2.5 mm² 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 Rate of frequency sweep	10....150...10Hz, 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
IEC 1000-4-2/-3/-4/-5/-6 EN 55 011	Electromagnetic compatibility.

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LED Indication:

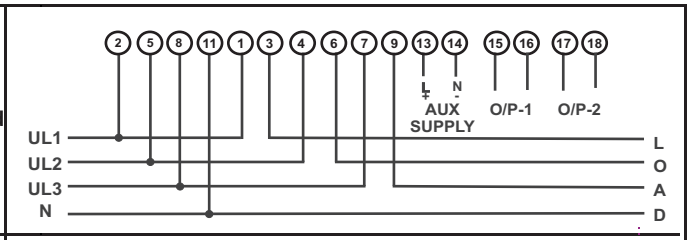
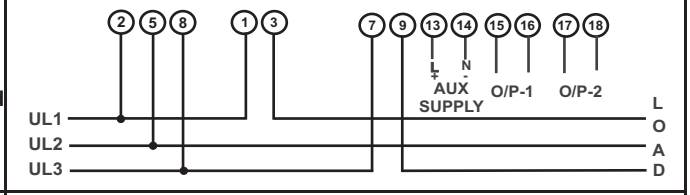
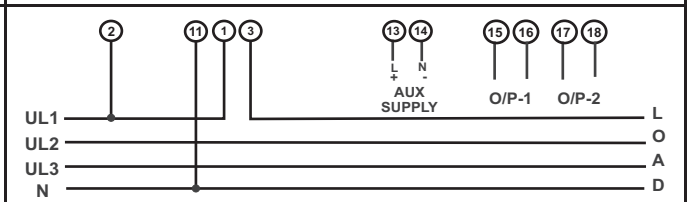
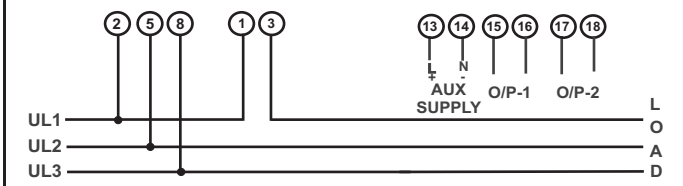
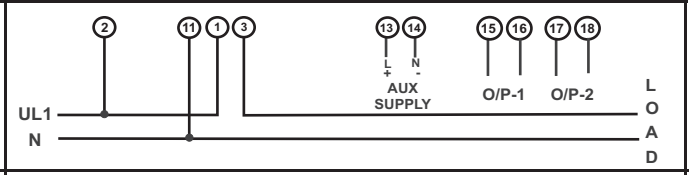
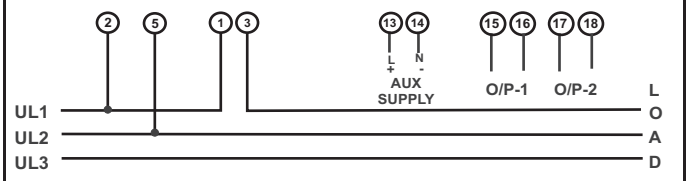
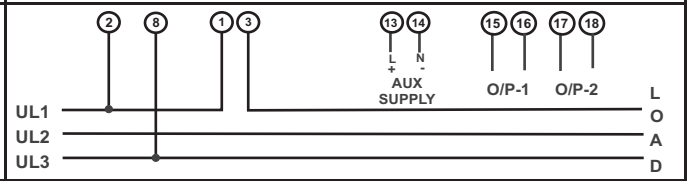
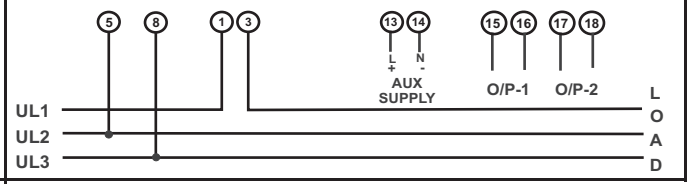
ON LED	Aux.supply healthy condition	Green LED continuous ON
O/P1 LED	Output1 voltage selection	Green LED continuous ON
	Output1 current selection	Red LED continuous ON
O/P2 LED	Output2 voltage selection	Green LED continuous ON
	Output2 current selection	Red LED continuous ON

Electrical Connections:

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

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

Electrical Networks

3 Phase 4 Wire Unbalanced Load	
3 Phase 3 Wire Unbalanced Load	
3 Phase 4 Wire Balanced Load	
3 Phase 3 Wire Balanced Load	
1 Phase 2 Wire	
U12 I1 3 Phase Balanced Load	
U13 I1 3 Phase Balanced Load	
U23 I1 3 Phase Balanced Load	

Terminal Details

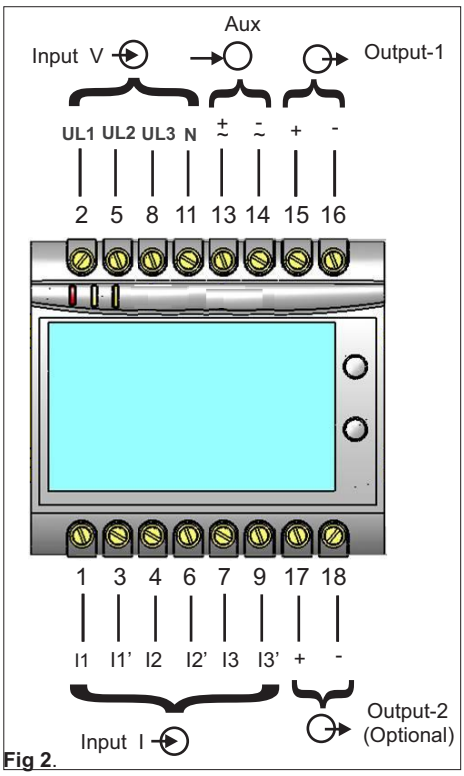


Fig 2.

Dimensions

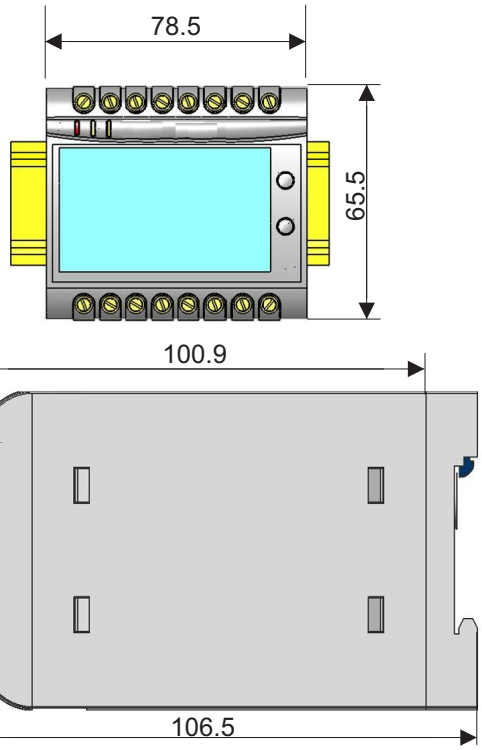


Fig 3. (All dimensions are in mm.)

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Programming (Figs.4 and 5)

Programming of transducer can be done in three ways :

1) Programming Via Front LCD & two keys for with display model.

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 RISH CON 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 ⟷ Rish CON Transducer.
The powersupply mustbe applied to transducer b efore it can be programmed.

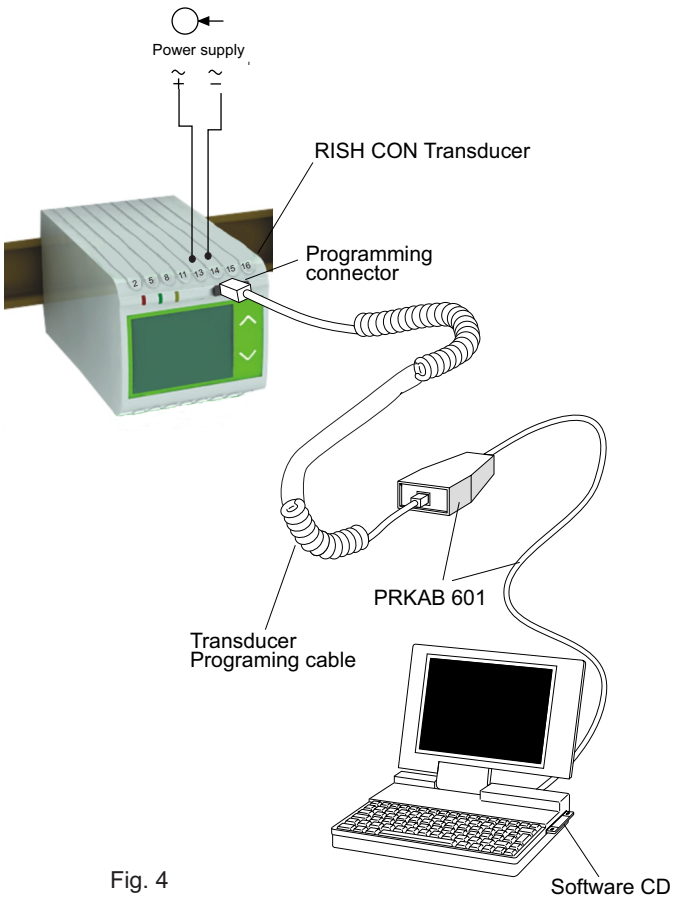

Fig. 4

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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 RISH CON Transducers.

Configuring RISH CON Transducer :
To configure RISH CON 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 RISH CON Transducer

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

Fig. 5

Ordering Information

ProductCode	CP41-	X	X	XX	XX	X	X	X	X	X	00
Model	ProgrammablePowerTransducer	P									
Systemtype	4WUB(OnsiteSelectable1Ph.2W, 3Ph.3W/4W&Balanced/ Unbalanced)		3								
InputVoltage	Programmable100...500V			8F							
InputCurrent	Programmable1…5A				75						
PowerSupply	60-300VAC/DC					H					
	24-60VAC/DC					F					
Output	1O/P						1				
	2O/P						2				
DisplayModule	WithDisplay							D			
	WithoutDisplay							Z			
RS485Module	WithRS-485								R		
	WithoutRS-485								Z		
ProgrammingCable	With-PRKAB601									C	
	Without-PRKAB601									Z	

OrderingExample–CP41-P38F75F1DRZ00–RishCONP,Programmablepowertransducer,3Phase4Wire, 100…500VAC,1…5A,Aux24-60VAC/DC,1O/P,Withdisplay,WithRS485,Without-PRKAB601

AnalogDCoutputoptionsasbelow,tobespecifiedwhileorderingonly

CurrentOutput	VoltageOutput	DIPOption
StandardRanges		
0/4.....20mA	0.....10V	Yes
-20…0…20mA	-10…0…10mA	
Optionalfactorysetranges		
0.....10mA	0.....5V	No
0.....5mA	0.....2.5V	No
0.....2.5mA	0.....1V	No
0.....1mA		

Note:

1.Endvalueofoutputcannotbechangedonsite.

2.-20…0…20mAand-10…0…10Voutputrangesarenotapplicableforapparentpower.

RISHABH

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RISHABH INSTRUMENTS LIMITED
Domestic (India): +91 253 2202099 | marketing@rishabh.co.in
International: +91 253 2202004/06/08/99 | global@rishabh.co.in
www.rishabh.co.in