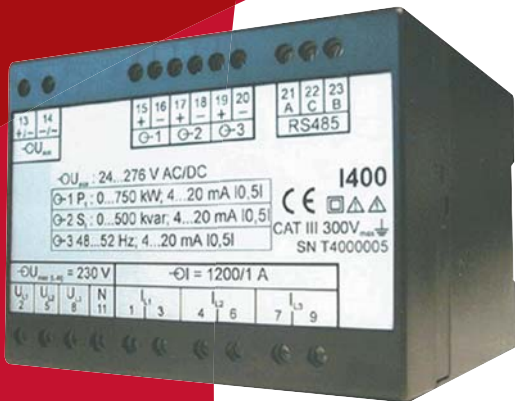




ISTAT I400

Digital Transducers



ISTAT I400

VERSATILE SOLUTIONS FOR A DIGITAL WORLD

- > High accuracy analogue outputs
- > Digital communications
- > Easy to program and configure
- > Competitive pricing

STAYING AHEAD OF THE GAME

In a rapidly changing business environment you need leading-edge solutions to optimize assets and maximize performance. AREVA T&D offers complete solutions for the entire energy chain, from primary equipment to market management software.

WORLD-CLASS SOLUTIONS

ISTAT I400 digital transducers offer high accuracy with optional digital communications at a competitive price. Available in two compact case sizes of 45mm and 100mm wide, these state-of-the-art transducers can be pre-configured or customised to your needs using QDSP setting software.

WIDE RANGE OF APPLICATIONS

ISTAT I400 transducers can be used in electrical utility and industry substations, for interfacing with SCADA (Supervisory Control and Data Acquisition), building management systems, process control equipment and switchboard instrumentation.

VERSATILE PERFORMANCE

ISTAT I400 digital transducers provide local and remote indication for precision electrical measurement and control when used with instruments, data loggers and SCADA systems. With the option of analogue outputs and RS232/485 MODBUS communications, ISTAT I400 ensures simple integration with both existing sites and new sites employing digital communications.

Easy to program, these digital transducers enable quick, simple, cost-effective system modification.

WHY CHOOSE ISTAT I400?

As well as allowing integration into digital control systems, ISTAT I400 digital transducers can be configured using only a personal computer and QDSP configuration software. Accuracy and stability over a range of temperatures are assured by the use of microprocessor technology.

Customer Benefits

- Comprehensive set of measurements
- High speed communications
- Optional Universal Power Supply to suit all applications

KEY FEATURES

- > Full range of AC and DC measurements
- > Programmable versions
- > Multifunction transducer for measuring current, Volts, frequency, phase angle, power factor, Watts, vars, VA, demand and THD
- > Up to four isolated analogue outputs on multifunction transducers
- > Multi-slope analogue outputs
- > Standard high speed RS232 or optional RS485 communications (except rms voltage and current)
- > Optional Universal AC/DC power supply
- > High sample rate (64 samples per cycle) for accurate measurement of harmonics
- > Two times continuous overload rating
- > 0.5% full scale accuracy for all transducers
- > Compact design for DIN rail mounting
- > Stripped wire terminations
- > Tested to DIN 57875 level N for radio frequency and electromagnetic interference immunity

KEY BENEFITS

- > All your requirements from one supplier
- > Configurable on site using free of charge QDSP software and a laptop PC.
- > Simplified ordering and re-configuration if site expands or changes.
- > Reduced costs for sites requiring multiple measurements
- > Analogue schemes require fewer transducers resulting in lower costs
- > Integration into modern control schemes utilising digital communications technology
- > Flexibility in power requirements with reduced stock levels
- > Accurate measurements of parameters critical for optimum plant use.
- > Lifetime durability and reliability
- > Occupies minimal panel space
- > Fast, secure wiring
- > Complies with relevant international standards

DC MODEL RANGE

Model	Application	Option	
		C	U
I4DA	Tap Position Indicator	F	•
I4DB	Voltage	F	•
I4DC	Current	F	•
I4DF	2/3/4 wire Resistance	F	•
I4DG	Temperature	F	•

Option
C = communications, **U** = Universal Power Supply
F = fitted as standard

AC MODEL RANGE

Model	Application	Option	
		C	U
I4CA	Mean sensing Current		
I4CD	True RMS Current	•	•
I4CF	3 x True RMS Current	•	F
I4FA	Frequency	F	F
I4E	Multifunction Energy	F	F
I4M*	Multifunction range	F	F
I4P*	Phase Angle range	F	•
I4R*	Vars range	F	•
I4VA	Mean sensing Voltage		
I4VD	True RMS Voltage	•	•
I4VF	3 x True RMS Voltage	•	F
I4W*	Watts range	F	•

Option
C = communications, **U** = Universal Power Supply
F = fitted as standard

I400: Used by Industrial or Utility engineers, at low or distribution voltage level

DETAILS OF RANGE

> AC Mean Sensing

The I4CA current and I4VA voltage transducers do not require an external power supply. These transducers require a full specification before manufacture and, since they are not communicating, these settings cannot be changed by the user.

> AC True RMS

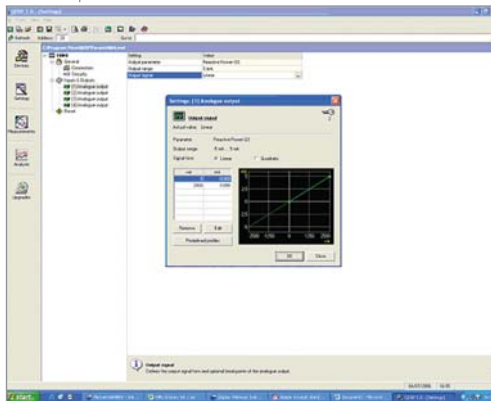
The I4CD single / I4CF three phase current and I4VD single / I4VF three phase voltage transducers can be supplied with a universal power supply if required.

These can be supplied with a communications option for configuration by the user on site. If supplied without the communications option, a full specification is required before manufacture.

> Frequency

The I4FA is fitted with an RS232 port as standard to enable on site configuration. The two options are: RS485 communications instead of RS232 and a universal power supply. The accuracy of this transducer is 0.1% of centre scale for analogue output and 0.01% over the communications network.

Fig1 QDSP setting software showing analogue output slope and jumper settings



**I400:
Multifunction
transducers
with up to
4 analogue outputs**

> Watts, Vars, phase angle and power factor

These transducers are fitted with an RS232 port as standard to enable on site configuration. The two options are: RS485 communications instead of RS232 and a universal power supply.

	Watts	VAR	Phase Angle
single phase	I4WA	I4RA	I4PA
3 phase, 3 wire balanced	I4WB	I4RB	I4PB
3 phase, 4 wire balanced	I4WC	I4RC	I4PC
3 phase, 3 wire unbalanced	I4WD	I4RD	I4PD
3 phase, 4 wire unbalanced	I4WF	I4RF	I4PF

> AC Multifunction

The I4M* and I4E transducers are fully configurable and measure a wide range of parameters. These are supplied with the Communications and Universal Power Supply as standard.

The I4M has five models available: I4M0 with no analogue output, I4M1 with a single analogue output, I4M2 with two analogue outputs, I4M3 with three analogue outputs and I4M4 with four analogue outputs.

The I4E measures energy and has a single pulsed energy contact as standard, in addition it has two remaining outputs that can be configured as either a analogue output or a pulsed energy contact.

The full range of measurements available are:

Instantaneous values	
Current	Ia, Ib, Ic, In, I average
Phase Voltage	Ua, Ub, Uc, U1-n average
Line Voltage	Uab, Ubc, Uca, Ull average
Frequency	F
Active Power	Pa, Pb, Pc, Pt
Reactive Power	Qa, Qb, Qc, Qt
Apparent Power	Sa, Sb, Sc, St
Phase angle	Phase angle V-I and V-V, phase and total
Power angle	Arctan2 (PtQt)

Demand values	
Phase current	Ia, Ib, Ic
Total active power	Pt
Total reactive power	Qt
Total apparent power	St

Measurements available only over the communications port	
Total Harmonic distortion %THD :	
Current	Ia, Ib, Ic
Phase Voltage	Ua, Ub, Uc
Line Voltage	Uab, Ubc, Uca
Device internal temperature	
Phase angle between Voltages	Uab, Ubc, Uca

> **Tap Position Indication**

The I4DA indicates the tap position by measuring the resistance proportional to the actual tap position. It monitors upto 100 steps with a minimum value of 30 Ω per step, with a total resistance range of 100Ω to 500KΩ.

These transducers are fitted with an RS232 port as standard to enable on site configuration. The two options are: RS485 communications instead of RS232 and a universal power supply

> **DC Voltage and current**

The I4DB voltage and I4DC current transducers measure DC values and convert them to a proportional DC analogue value.

These transducers are fitted with an RS232 port as standard to enable on site configuration. The two options are: RS485 communications instead of RS232 and a universal power supply.

> **Resistance**

The I4DF transducer measures resistance values using the 2, 3 or 4 wire connection method and converts this to a proportional DC analogue value. The measurement range can be 10Ω to 50kΩ or 100Ω to 500kΩ.

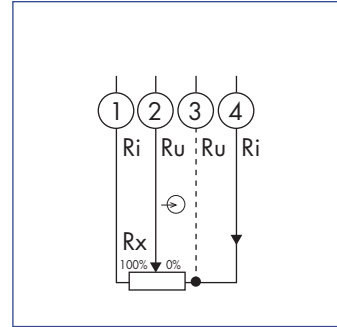
These transducers are fitted with an RS232 port as standard to enable on site configuration. The two options are: RS485 communications instead of RS232 and a universal power supply

> **Temperature**

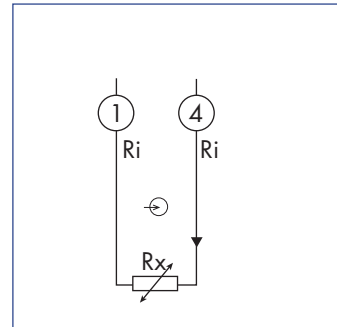
The I4DG transducer measures temperature using either Pt100, Pt1000 or Ni100 RTD sensors and converts this to a proportional DC analogue value. The RTD sensors can be connected with either 2, 3 or 4 wire methods. The RTD sensors are not supplied with this transducer. The measurement range can be from -200° C to +850 ° C (Pt) or -608 to +250° C (Ni).

These transducers are fitted with an RS232 port as standard to enable on site configuration. The two options are: RS485 communications instead of RS232 and a universal power supply

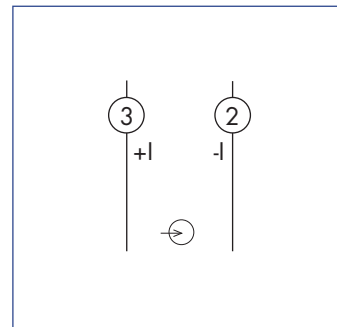
>>> **Typical diagrams
DC Transducers
Input connections**



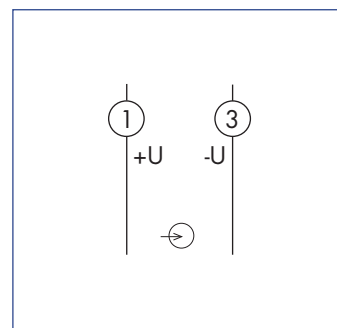
Tap Position Indicator



Resistance, Temperature (RTD) - 2-wire



DC Current



DC Voltage

OPTIONS

> Communications

A rear communications port is provided, which must be specified as either EIA RS232 or RS485. An RS232 port is supplied as standard for all transducers except the I4CA, I4VA, I4CD, I4VD, I4CF and I4VF. The protocol used is MODBUS RTU. The baud rate can be set between 1200 and 115200 bps.

RS232	RS485	I400 Terminal	I4M4 only
Rx	RxTxA	21	23
Com	No connection	22	24
Tx	RxTxB	23	25

> Universal Power Supply

Transducers can be supplied as self powered (Mean Sensing) or ac powered. However where a dc supply is available or when the supply is not known, the Universal Power Supply option can be used. This has the range 24 .. 220vdc and 50 ... 230 vac.

> Configuration

Transducers supplied without the communications option must be factory configured. All scaling details need to be supplied with the order.

Transducers supplied with the communications option can be user configured. The QDSP setting software is a free issue programme that can be downloaded from our web site.

HARDWARE DESCRIPTION

> Analogue Output

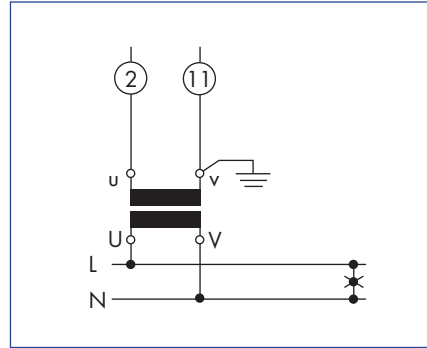
With the exception of the I4M0, each I400 transducer is supplied with one or more analogue outputs. These can be configured either as a True Zero output, e.g. a range from 0 to 10mA, or as a Biased output, e.g. 4 to 20mA.

> Output connections

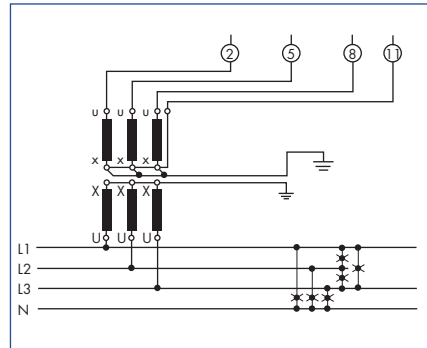
Function	Terminal marking	I400 Terminal	I4M4 Terminal
Output 1	+	15	15
Output 1	-	16	16
Output 2	+	17	17
Output 2	-	18	18
Output 3	+	19	19
Output 3	-	20	20
Output 4	+	n/a	21
Output 4	-	n/a	22
Auxiliary Supply	+dc/ac	13	13
	-dc/ac	14	14

I400:
QDSP setting software
is a free download
from our web site

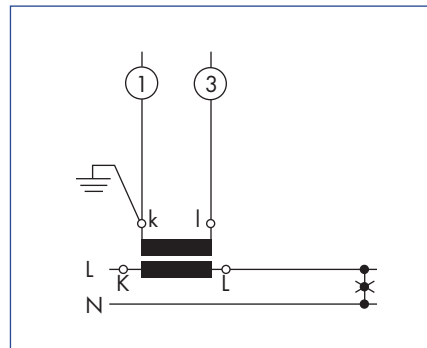
Typical diagrams AC Transducers Input connections



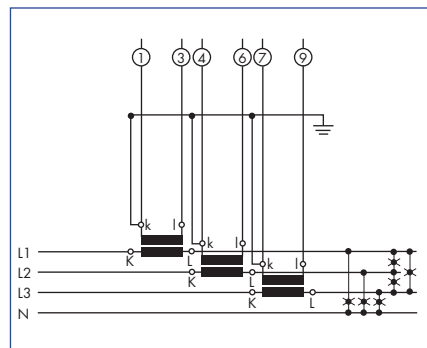
Volts, frequency



Triple voltage



Current



Triple current

Transducers with the communications option will be supplied with a default setting but this output can be changed using the QDSP software and, where necessary, changing an internal jumper. This allows the user to choose from any of the True Zero or Biased current or voltage options that are available.

In addition, whereas most transducers are supplied with a linear output, the I400 offers the option of selecting a number of breakpoints to modify this characteristic.

One use for this feature would be to suppress part of the scale of an indicating instrument being fed from the output, so that another part of the scale can be opened for a clearer reading of the information being displayed (see Fig 2 below).

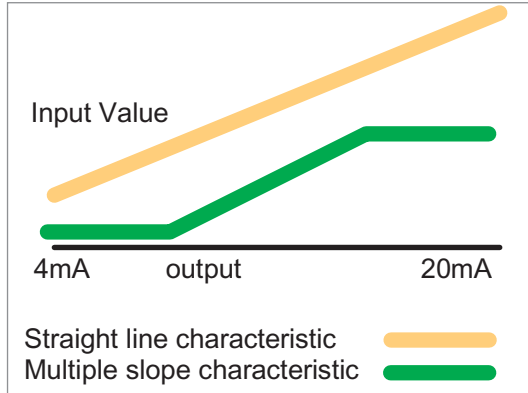


Fig2 Different analogue output slopes

SHIPPING INFORMATION

> Case size

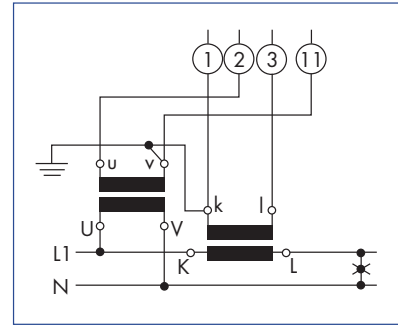
Model	Power supply AC or AC/DC	Housing
All models	AC	45mm
	AC/DC	45mm
Single measurement power	AC	100mm
	AC/DC	100mm
Multiple measurement	AC/DC	100mm

> Case weights

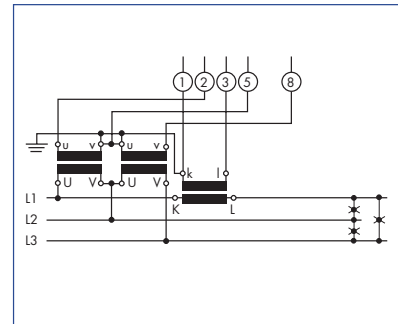
Model	Power supply AC or AC/DC	Max weight
All models	AC	320g
	AC/DC	200g
Single measurement power	AC	460g
	AC/DC	340g
Multiple measurement	AC/DC	460g

I400:
MODBUS protocol
for network
integration
and information

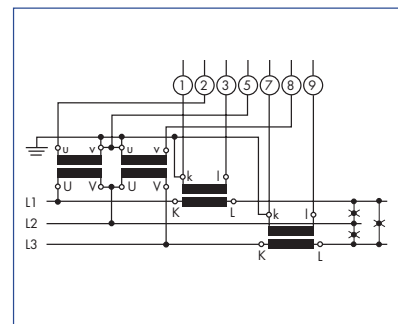
Typical diagrams - Power transducers Input connections



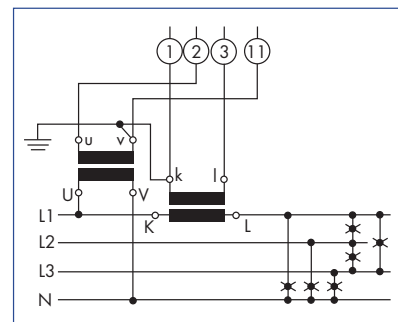
Power - single phase



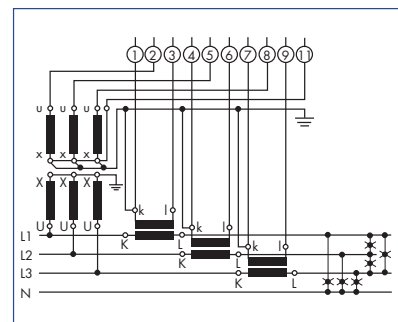
Power - 3 wire balanced



Power - 3 wire unbalanced



Power - 4 wire balanced



Power - 4 wire unbalanced

INFORMATION REQUIRED WITH ORDER

> AC models (except mean sensing)

This example shows a single element rms Current transducer with 0 ... 1mA output, with a universal power supply and RS232 communications options.

Example	I4CD	A	U	2
Model Type				
Fixed Output				
0...1mA	A			
0...5mA	B			
0...10mA	D			
0...20mA	E			
4...20mA	F			
4...12... 20mA	G			
0...5... 10mA	H			
1...0... 1mA	J			
10...0... 10mA	K			
20...0... 20mA	U			
10...0... 10V	M			
Programmable Output				
1mA to 5mA full scale	P			
6mA to 20mA full scale	Q			
1V to 10V full scale	R			
Auxiliary Supply				
Self powered	A			
57.7vac	2			
63.5vac	B			
69.3vac	C			
100vac	D			
110vac	E			
115vac	F			
120vac	G			
208vac	H			
230vac	V			
Universal power supply	U			
Communications				
Not required				0
With RS232				2
With RS485				4

> Pre configured models

Where the I400 transducer is to be supplied pre-configured, the following additional scaling details will be required: Input Scaling, CT ratio and VT ratio

NOTE all transducers supplied without communications must be factory configured.

> Mean sensing Models

The mean sensing transducers can only be supplied with a true zero output. All other transducers can be supplied as either True Zero or Biased.

Example	I4CA	B	A0	1
Model Type				
Fixed Input / Output				
1A/ 0...5mA	B	0	1	
1A/ 0...10mA	D	0	1	
1A/0...20mA	E	0	1	
5A/ 0...5mA	B	0	5	
5A/ 0...10mA	D	0	5	
5A/0...20mA	E	0	5	
0...110V/ 0...5mA	B	0	110	
0...110V/0...10mA	D	0	110	
0...110V/0...20mA	E	0	110	
0...120V/ 0...5mA	B	0	120	
0...120V/0...10mA	D	0	120	
0...120V/0...20mA	E	0	120	

Other models are available on request.

> DC models

The model numbers follow the AC model format above. However, with the exception of the I4DA and I4DG, three additional characters are used to define the extra information required.

DC Voltage I4DB			
50mV to 1V	0	0	1
1V to 50V	0	5	0
50V to 300V	3	0	0
DC Current I4DC			
1mA to 10mA	0	1	0
10mA to 100mA	1	0	0
Resistance I4DF			
10Ω to 50kΩ	0	5	0
100Ω to 500kΩ	5	0	0

I4DA: the number of steps and resistance per step needs to be specified at the time of order. These parameters cannot be changed by the QDSP setting program.

I4DG and I4DF : all models can be configured in 2, 3 or 4 wire measuring modes. The **I4DG** also requires the temperature range to be specified at the time of order if the non communicating version is needed.

I400 supporting documents:

- I400 user manual I400/EN M/A11
- QDSP Setting software help files
- eCORTEC Product configurator



AREVA T&D Worldwide Contact Centre:
<http://www.aveva-td.com/contactcentre/>
Tel.: +44 (0) 1785 250 070

www.aveva-td.com
www.aveva-td.com/measurements

Our policy is one of continuous development. Accordingly the design of our products may change at any time. Whilst every effort is made to produce up to date literature, this brochure should only be regarded as a guide and is intended for information purposes only. Its contents do not constitute an offer for sale or advise on the application of any product referred to in it. We cannot be held responsible for any reliance on any decisions taken on its contents without specific advice.