AREVA

iSTAT I400

Digital Transducers

Service Manual

I400/EN M/B11

SAFETY SECTION

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1. INTRODUCTION

This guide and the relevant operating or service manual documentation for the equipment provide full information on safe handling, commissioning and testing of this equipment and also includes descriptions of equipment label markings.

Documentation for equipment ordered from AREVA Energy Automation & Information is despatched separately from manufactured goods and may not be received at the same time. Therefore this guide is provided to ensure that printed information normally present on equipment is fully understood by the recipient.

Before carrying out any work on the equipment the user should be familiar with the contents of this Safety Guide.

Reference should be made to the external connection diagram before the equipment is installed, commissioned or serviced.

Language specific, self-adhesive User Interface labels are provided in a bag for some equipment.

2. HEALTH AND SAFETY

The information in the Safety Section of the equipment documentation is intended to ensure that equipment is properly installed and handled in order to maintain it in a safe condition.

It is assumed that everyone who will be associated with the equipment will be familiar with the contents of that Safety Section, or this Safety Guide.

When electrical equipment is in operation, dangerous voltages will be present in certain parts of the equipment. Failure to observe warning notices, incorrect use, or improper use may endanger personnel and equipment and cause personal injury or physical damage.

Before working in the terminal strip area, the equipment must be isolated.

Proper and safe operation of the equipment depends on appropriate shipping and handling, proper storage, installation and commissioning, and on careful operation, maintenance and servicing. For this reason only qualified personnel may work on or operate the equipment.

Qualified personnel are individuals who

- are familiar with the installation, commissioning, and operation of the equipment and of the system to which it is being connected;
- are able to safely perform switching operations in accordance with accepted safety engineering practices and are authorised to energize and de-energize equipment and to isolate, ground, and label it;
- are trained in the care and use of safety apparatus in accordance with safety engineering practices;
- are trained in emergency procedures (first aid).

The operating manual for the equipment gives instructions for its installation, commissioning, and operation. However, the manual cannot cover all conceivable circumstances or include detailed information on all topics. In the event of questions or specific problems, do not take any action without proper authorization. Contact the appropriate AREVA technical sales office and request the necessary information.

3. SYMBOLS AND EXTERNAL LABELS ON THE EQUIPMENT

For safety reasons the following symbols and external labels, which may be used on the equipment or referred to in the equipment documentation, should be understood before the equipment is installed or commissioned.

3.1 Symbols

Caution: refer to equipment documentation

Caution: risk of electric shock

Protective Conductor (*Earth) terminal.

Functional/Protective Conductor Earth terminal
Note – This symbol may also be used for a Protective Conductor (Earth) terminal if that terminal is part of a terminal block or sub-assembly e.g. power supply.

*NOTE: THE TERM EARTH USED THROUGHOUT THIS GUIDE IS THE DIRECT EQUIVALENT OF THE NORTH AMERICAN TERM GROUND.

3.2 Labels

See "Safety Guide" (SFTY/4L M) for equipment labelling information.

4. INSTALLING, COMMISSIONING AND SERVICING

Equipment connections

Personnel undertaking installation, commissioning or servicing work for this equipment should be aware of the correct working procedures to ensure safety.

The equipment documentation should be consulted before installing, commissioning or servicing the equipment.

Terminals exposed during installation, commissioning and maintenance may present a hazardous voltage unless the equipment is electrically isolated.

Any disassembly of the equipment may expose parts at hazardous voltage, also electronic parts may be damaged if suitable electrostatic voltage discharge (ESD) precautions are not taken.

If there is unlocked access to the rear of the equipment, care should be taken by all personnel to avoid electric shock or energy hazards.

Voltage and current connections should be made using insulated crimp terminations to ensure that terminal block insulation requirements are maintained for safety.
To ensure that wires are correctly terminated the correct crimp terminal and tool for the wire size should be used.

The equipment must be connected in accordance with the appropriate connection diagram.

Protection Class I Equipment

- Before energising the equipment it must be earthed using the protective conductor terminal, if provided, or the appropriate termination of the supply plug in the case of plug connected equipment.
- The protective conductor (earth) connection must not be removed since the protection against electric shock provided by the equipment would be lost.

The recommended minimum protective conductor (earth) wire size is 2.5 mm² (3.3 mm² for North America) unless otherwise stated in the technical data section of the equipment documentation, or otherwise required by local or country wiring regulations.

The protective conductor (earth) connection must be low-inductance and as short as possible.

All connections to the equipment must have a defined potential. Connections that are pre-wired, but not used, should preferably be grounded when binary inputs and output relays are isolated. When binary inputs and output relays are connected to common potential, the pre-wired but unused connections should be connected to the common potential of the grouped connections.

Before energising the equipment, the following should be checked:

- Voltage rating/polarity (rating label/equipment documentation);
- CT circuit rating (rating label) and integrity of connections;
- Protective fuse rating;
- Integrity of the protective conductor (earth) connection (where applicable);
- Voltage and current rating of external wiring, applicable to the application.

Equipment Use

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Removal of the equipment front panel/cover

Removal of the equipment front panel/cover may expose hazardous live parts which must not be touched until the electrical power is removed.

UL and CSA Listed or Recognized Equipment

To maintain UL and CSA approvals the equipment should be installed using UL and/or CSA Listed or Recognized parts of the following type: connection cables, protective fuses/fuseholders or circuit breakers, insulation crimp terminals, and replacement internal battery, as specified in the equipment documentation.

Equipment operating conditions

The equipment should be operated within the specified electrical and environmental limits.

Current transformer circuits

Do not open the secondary circuit of a live CT since the high voltage produced may be lethal to personnel and could damage insulation.
Generally, for safety, the secondary of the line CT must be shorted before opening any connections to it.

For most equipment with ring-terminal connections, the threaded terminal block for current transformer termination has automatic CT shorting on removal of the module. Therefore external shorting of the CTs may not be required, the equipment documentation should be checked to see if this applies.

For equipment with pin-terminal connections, the threaded terminal block for current transformer termination does NOT have automatic CT shorting on removal of the module.

External resistors, including voltage dependent resistors (VDRs)

Where external resistors, including voltage dependent resistors (VDRs), are fitted to the equipment, these may present a risk of electric shock or burns, if touched.

Battery replacement

Where internal batteries are fitted they should be replaced with the recommended type and be installed with the correct polarity to avoid possible damage to the equipment, buildings and persons.

Insulation and dielectric strength testing

Insulation testing may leave capacitors charged up to a hazardous voltage. At the end of each part of the test, the voltage should be gradually reduced to zero, to discharge capacitors, before the test leads are disconnected.

Insertion of modules and pcb cards

Modules and pcb cards must not be inserted into or withdrawn from the equipment whilst it is energised, since this may result in damage.

Insertion and withdrawal of extender cards

Extender cards are available for some equipment. If an extender card is used, this should not be inserted or withdrawn from the equipment whilst it is energised. This is to avoid possible shock or damage hazards. Hazardous live voltages may be accessible on the extender card.

Insertion and withdrawal of integral heavy current test plugs

It is possible to use an integral heavy current test plug with some equipment. CT shorting links must be in place before insertion or removal of heavy current test plugs, to avoid potentially lethal voltages.

External test blocks and test plugs

Great care should be taken when using external test blocks and test plugs such as the MMLG, MMLB and MiCOM P990 types, hazardous voltages may be accessible when using these. *CT shorting links must be in place before the insertion or removal of MMLB test plugs, to avoid potentially lethal voltages.

*Note – when a MiCOM P992 Test Plug is inserted into the MiCOM P991 Test Block, the secondaries of the line CTs are automatically shorted, making them safe.

Fibre optic communication

Where fibre optic communication devices are fitted, these should not be viewed directly. Optical power meters should be used to determine the operation or signal level of the device.

Cleaning

The equipment may be cleaned using a lint free cloth dampened with clean water, when no connections are energised. Contact fingers of test plugs are normally protected by petroleum jelly which should not be removed.

5. DECOMMISSIONING AND DISPOSAL

Decommissioning:

The supply input (auxiliary) for the equipment may include capacitors across the supply or to earth. To avoid electric shock or energy hazards, after completely isolating the supplies to the equipment (both poles of any dc supply), the capacitors should be safely discharged via the external terminals prior to decommissioning.

Disposal:

It is recommended that incineration and disposal to water courses is avoided. The equipment should be disposed of in a safe manner. Any equipment containing batteries should have them removed before disposal, taking precautions to avoid short circuits. Particular regulations within the country of operation, may apply to the disposal of batteries.

6. EQUIPMENT WHICH INCLUDES ELECTROMECHANICAL ELEMENTS

Electrical adjustments

It is possible to change current or voltage settings on some equipment by direct physical adjustment e.g. adjustment of a plug-bridge setting. The electrical power should be removed before making any change, to avoid the risk of electric shock.

Exposure of live parts

Removal of the cover may expose hazardous live parts such as relay contacts, these should not be touched before removing the electrical power.

7. TECHNICAL SPECIFICATIONS FOR SAFETY

7.1 Protective fuse rating

The recommended maximum rating of the external protective fuse for equipments is 16A, high rupture capacity (HRC) Red Spot type NIT, or TIA, or equivalent, unless otherwise stated in the technical data section of the equipment documentation. The protective fuse should be located as close to the unit as possible.

DANGER - CTs must NOT be fused since open circuiting them may produce lethal hazardous voltages.

7.2 Protective Class

IEC 61010-1: 2001 EN 61010-1: 2001	Class I (unless otherwise specified in the equipment documentation). This equipment requires a protective conductor (earth) connection to ensure user safety.

7.3 Installation Category

IEC 61010-1: 2001 EN 61010-1: 2001	Installation Category III (Overvoltage Category III): Distribution level, fixed installation. Equipment in this category is qualification tested at 5kV peak, 1.2/50µs, 500 , 0.5J, between all supply circuits and earth and also between independent circuits

7.4 Environment

The equipment is intended for indoor installation and use only. If it is required for use in an outdoor environment then it must be mounted in a specific cabinet or housing which will enable it to meet the requirements of IEC 60529 with the classification of degree of protection IP54 (dust and splashing water protected).

Pollution Degree – Pollution Degree 2 Altitude – operation up to 2000 m IEC 61010-1: 2001 EN 61010-1: 2001	Compliance is demonstrated by reference to safety standards.

8. CE MARKING

CE Marking	Compliance with all relevant European Community directives:
Product safety: Low Voltage Directive - 73/23/EEC amended by 93/68/EEC EN 61010-1: 2001 EN 60950-1: 2001 EN 60255-5: 2001 IEC 60664-1: 2001	Compliance demonstrated by reference to safety standards.
Electromagnetic Compatibility Directive (EMC) 89/336/EEC amended by 93/68/EEC. The following Product Specific Standard was used to establish conformity: EN 50263 : 2000	Compliance demonstrated via the Technical Construction File route.

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1. INTRODUCTION

iSTAT I400 digital transducers provide local and remote indication for precision electrical measurement and control when used with instruments, recorders, data loggers and SCADA (Supervisory Control and Data Acquisition) systems.

The I400 range contains the following type of devices:

(1) A.C. input transducers

- I4CA Mean-Sensing Current (single phase)
- I4VA Mean-Sensing Voltage (single phase)
- I4CD, I4CF RMS Current (single-, three-phase)
- I4VD, I4VF RMS Voltage (single-, three-phase)
- I4F Frequency
- I4P Phase Angle
- I4W Watts
- I4R VArs
- I4M Multi-function
- I4E Multi-function Energy

(2) D.C. input transducers

- I4DA Tap Position Indicator (T.P.I.)
- I4DB D.C. Voltage
- I4DC D.C. Current
- I4DF Resistance
- I4DG Temperature (RTD input)

(3) Ancillary Equipment

- I4X RS232/RS485 Communications Interface

Provision of both analogue outputs, pulsed electronic switches (I4E only) and MODBUS communication allows integration within existing sites and also in new facilities, where digital communications can be used.

The AREVA software package “IDSP” is used to program the I400 transducers. The ease of programmability of digital transducers is an important feature in the provision of cost effective system control. Systems can be easily changed or expanded as required. Scaling may be programmed on site, thereby avoiding costly project delays.

NOTE: When programming a transducer using the IDSP software, it may additionally be necessary to physically change jumper positions within the transducer case. Refer to section 3.3 for further details.

Applications are found in electrical utilities, energy management systems, SCADA, building management and control systems, and process control environments.

2. TECHNICAL DATA

2.1 Input Ratings – A.C. transducers

2.1.1 Voltage transducers

Mean-sensing:

Nominal voltage (U_n)	57.7V, 63.5V, 69.3V, 100V, 110V, 120V, 127V, 220V, 240V, 380V, 400V, 415V, 500V
Measuring range	10 to 120% U_n
Burden	2 VA
Overload	1.2 x U_n continuously 2 x Un for 1s

RMS:

Nominal voltage (U_n)	57.7V, 63.5V, 69.3V, 100V, 110V, 120V, 127V, 220V, 240V, 380V, 400V, 415V, 500V
Measuring range	0 to 120% U_n
Burden	1mA x U_n
Overload	1.5 x U_n continuously 2 x U_n for 1s

2.1.2 Current transducers

Mean-sensing:

Nominal current (I_n)	1A or 5A
Measuring range	0 to 120% I_n
Burden	2 VA
Overload	2 x I_n continuously 20 x I_n for 1s

RMS:

Nominal current (I_n)	1A or 5A
Measuring range	0 to 120% I_n
Burden	0.5 VA
Overload	2 x I_n continuously 20 x I_n for 1s

2.1.3 Frequency transducers

Nominal frequency (f_n)	50Hz or 60Hz
Measuring range	45Hz to 65Hz
Burden (voltage circuit)	1mA x U_n
Overload (voltage circuit)	1.2 x U_n continuously 2 x U_n for 1s

2.1.4 Watts, VArs, Phase Angle

Nominal voltage (U_n)	57.7V, 63.5V, 69.3V, 100V, 110V, 120V, 127V, 220V, 240V, 380V, 400V, 415V, 500V
Nominal current (I_n)	1A or 5A
Measuring range	0 to 120% I_n , 0 to 120% U_n
Burden (voltage circuit)	1mA x U_n
Overload (voltage circuit)	1.2 x U_n continuously 2 x U_n for 1s
Burden (current circuit)	0.5 VA
Overload (current circuit)	2 x I_n continuously 20 x I_n for 1s

2.1.5 Multi-function transducers

Nominal voltage (U_n)	57.7V, 63.5V, 69.3V, 100V, 110V, 120V, 127V, 220V, 240V, 380V, 400V, 415V, 500V
Nominal current (I_n)	1A or 5A
Measuring range	0 to 120% I_n , 0 to 120% U_n
Burden (voltage circuit)	0.2mA x U_n
Overload (voltage circuit)	1.5 x U_n continuously 2 x U_n for 1s
Burden (current circuit)	0.01Ω x I_n^2
Overload (current circuit)	2 x I_n continuously 20 x I_n for 1s

2.2 Input Ratings – D.C. transducers

2.2.1 Tap Position Indicator

Nominal resistance (R_n)	100 Ω to 500k Ω
Number of steps	1 to 100
Minimum step value	30Ω
Measuring voltage	<2.2V
Lead resistance	<50Ω per lead
Burden	<0.5 VA

2.2.2 D.C. Voltage

Nominal voltage (U_n)	50mV, 100mV, 500mV, 1V, 1.5V, 2V, 2.5V, 4V, 5V, 6V, 10V, 15V, 20V, 40V, 50V, 60V, 100V, 150V, 200V, 250V, 300V (programmable)	
Measuring ranges	50mV to 1V 1V to 50 V 50V to 300V	Input impedance >2.5MΩ Input impedance 250kΩ Input impedance 2.5MΩ
Burden	<0.5 VA	
Overload	1.2 x U_n continuously 2 x Un for 1s	

2.2.3 D.C. Current

Nominal current (I_n)	1mA, 1.5mA, 2mA, 2.5mA, 4mA, 5mA, 6mA, 10mA (programmable) 15mA, 20mA, 40mA, 50mA, 60mA, 100mA (programmable)
Measuring ranges	1mA to 10mA Input impedance 100Ω 10mA to 100mA Input impedance 10Ω
Burden	<0.5 VA
Overload	2 x I_n continuously 20 x I_n for 1s

2.2.4 Resistance

Nominal resistance (R_n)	10Ω to 50kΩ (programmable) 100Ω to 500kΩ (programmable)
Measuring voltage	<2.2V
Lead resistance	<10Ω per lead
Burden	<0.5 VA

2.2.5 Temperature (RTD)

RTD sensor type	Pt100, Pt1000, Ni100
Measuring method	2-wire, 3-wire or 4-wire
Measuring ranges	-200°C to 850°C (Pt), -60°C to 250°C (Ni) (programmable)
RTD sensor limit values	20Ω to 10kΩ
Measuring voltage	<2.2V
Lead resistance	<10Ω per lead
Burden	<0.5 VA

2.3 Auxiliary Supply Input

2.3.1 Universal AC/DC auxiliary supply

	Nominal voltage	Operative range
DC	24 V to 220 V	19 V to 300 V
AC	50 V to 230 V (40…70 Hz)	40 V to 276 V (40…70 Hz)
Burden	<3VA	

2.3.2 AC auxiliary supply

	Nominal voltage (Ur)	Operative range
AC	57.7 V 63.5 V 69.3 V 100 V 110 V 115 V 120 V 208 V 230 V	80…120 % Ur
Frequency	Range 45…65 Hz	
Burden	<3VA	

2.4 Analogue Output Ratings – A.C. transducers

2.4.1 Output Ranges

DC Current output

Nominal values	0..1mA, -1..0..1mA, 0..5mA, -5..0..5mA, 0..10mA, -10..0..10mA, 0..20mA, 4..20mA, -20..0..20mA
Compliance voltage	15V
Response time (0…99.5%)	<300 ms

DC Voltage output

Nominal values	0..1V, -1..0..1V, 0..10V, -10..0..10V
Maximum current	20mA
Response time (0…99.5%)	<300 ms

2.4.2 Accuracy

EN 60688 (analogue outputs) and via communications.

% of full scale unless otherwise stated.

Voltage (Mean Sensing/RMS)	±0.5%
Voltage (Suppressed Zero RMS)	±0.5% U_n
Phase current	±0.5%
Neutral current	±1%
Power	±0.5%
Phase angle	±0.2°
Demand values	±1%
Frequency	±0.1% (0.01% via communications) *
THD	±1%

* Accuracy of frequency is % of centre scale frequency

2.5 Analogue Output Ratings – D.C. transducers

2.5.1 Output Ranges

DC Current output

Nominal values	0..1mA, -1..0..1mA, 0..5mA, -5..0..5mA, 0..10mA, -10..0..10mA, 0..20mA, 4..20mA, -20..0..20mA
Compliance voltage	15V
Response time (0…99.5%)	500 ms

DC Voltage output

Nominal values	0..1V, -1..0..1V, 0..10V, -10..0..10V
Maximum current	20mA
Response time (0…99.5%)	500 ms

2.5.2 Accuracy

Analogue outputs and via communications.

% of full scale.

T.P.I.	±0.5%
DC Voltage	±0.5%
DC Current	±0.5%
Resistance	±0.5%
Temperature (RTD)	±0.5%

2.6 Pulsed energy switches (I4E)

2.6.1 Output range

Type Pulsed	electronic switch
Pulse width	2 to 510 ms
Signal level	40V ac or dc maximum, 27mA maximum resistive load

2.6.2 Accuracy

Energy	Active energy Class 1, Reactive energy Class 2 (EN61036 and EN61268)

2.7 Communication ports

2.7.1 EIA232 Port

Connection type	Point to point
Signal levels	EIA232
Cable type	Screened multi-core
Maximum cable length	15m
Connector	Screw terminals (I4X also has the option of a 9 pin D type socket)
Isolation	3.7kV rms for 1 minute between all terminals and all other circuits
Transmission mode	Asynchronous
Protocol	MODBUS RTU
Data rate	1200 to 115200 bits/s

2.7.2 EIA485 Port

Connection type	Multi-drop (32 connections per link)
Signal levels	EIA485
Cable type	Screened twisted pair
Maximum cable length	1000m
Connector	Screw terminals
Isolation	3.7kV rms for 1 minute between all terminals and other circuits
Transmission mode	Asynchronous
Protocol	MODBUS RTU
Data rate	1200 to 115200 bits/s

2.8 Electrical Environment

Insulation

EN 61010-1: 1990	Insulation Class II (500V RMS) Tested at 3.7kV peak

EMC compliance

89/336/EEC

The following generic standards were used to establish conformity.

EN 61326-1: 1997	Electrical equipment for measurement, control, and laboratory use.

EMC Requirements

Low Voltage Directive

73/23/EEC

The following generic standards were used to establish conformity.

EN 61010-1: 1993	Electrical equipment for measurement, control, and laboratory use.
EN 61010-A3: 1995	Part 1: General requirements

2.9 Environmental Conditions

2.9.1 Atmospheric environment

Temperature and humidity

EN 60688: 1992	Class 2
JVF (DIN 40 040)	
Nominal range of operation	-10°C to 55°C
Storage and transit	-40°C to 70°C
Temperature coefficient (A.C. transducers)	0.02% / °C
Temperature coefficient (D.C. transducers)	0.05% / °C
Annual mean relative humidity	≤ 75%

2.9.2 Construction

	Material	Flammability protection	UL 94 V-0
	Enclosure protection	IEC 60529: 1989	IP 50 (IP 20 for connection terminals)
	Mounting	EN 50022: 1978	DIN rail 35x15 mm
	Dimensions	100mm Case	100x75x104.5 mm
		45mm Case	45x75x104.5 mm
	Weight	AC auxiliary supply units	<0.6kg
		Universal aux. supply units	<0.5kg

3. INSTALLATION

3.1 Dimensions

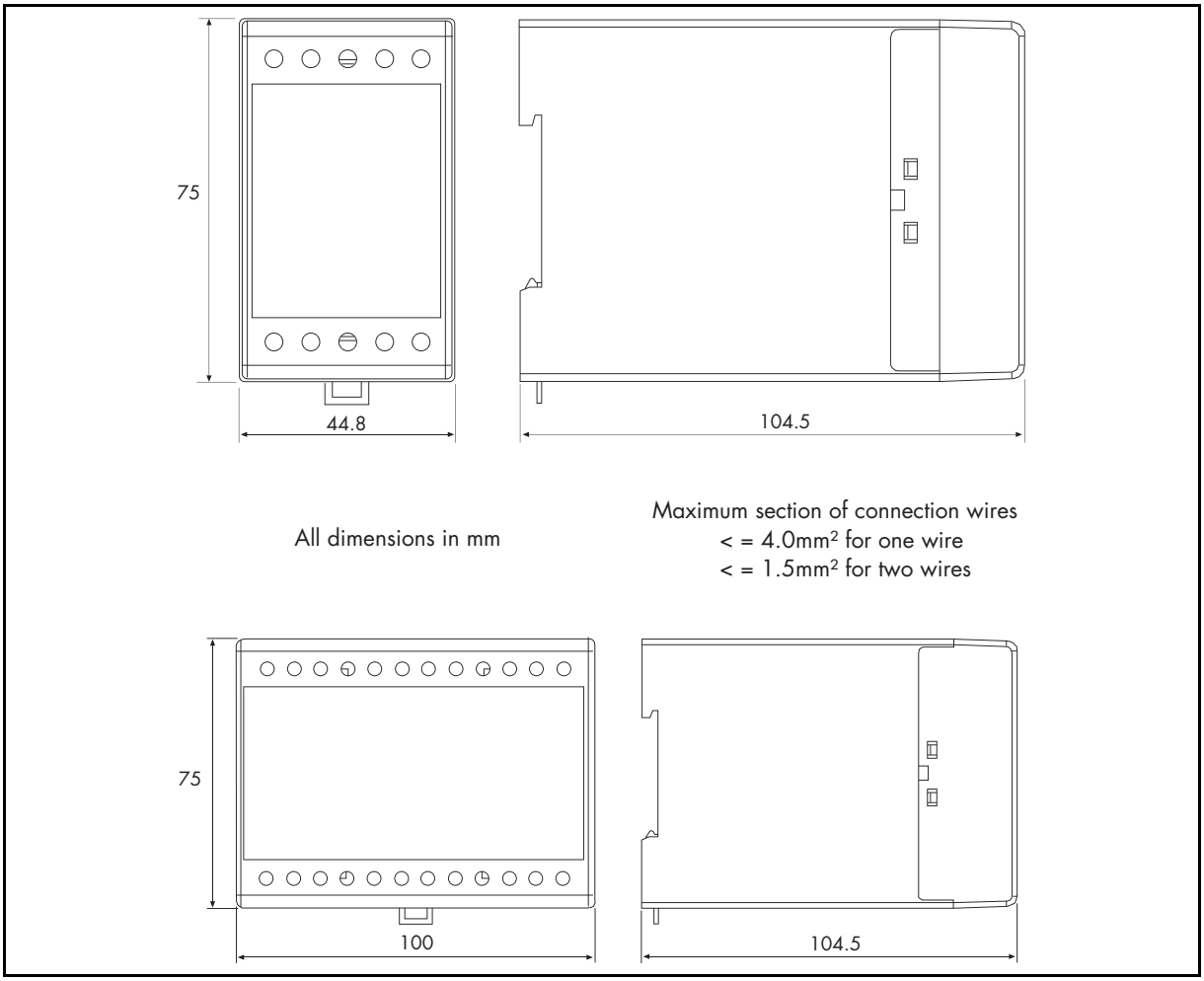


FIGURE 1 : I400 DIMENSIONS

Models with case width 44.8mm	I4CA, I4VA, I4CD, I4VD, I4F, I4D and I4X
Models with case width 100mm	I4P, I4W, I4R, I4M and I4E

3.2 Mounting

Mounting is at the rear of the unit, for 35x15 mm DIN rail according to EN 50022: 1978 .

3.3 Internal Jumpers

On programmable models of transducers, input and output values can be programmed using the IDSP setting software via the EIA232 or EIA485 communication port. However, before this is done, the hardware output range of each analogue output must be selected, by physically setting jumper positions on the output module within the transducer case.

It is possible to choose between three hardware output ranges:

- 0…±5 mA
- 0…±20 mA
- 0…±10 V

By selecting one of these three hardware output ranges, it is possible to program any linear or multiple-slope (with maximum 5 break points) output characteristic using the IDSP setting software.

Caution: Electrical adjustments

Equipments which require direct physical adjustments to their operating mechanism to change current or voltage settings, should have the electrical power removed before making the change, to avoid any risk of electrical shock.

The location of the jumpers is as shown in the diagram below. Single output transducers will have only Jumper 1 fitted.

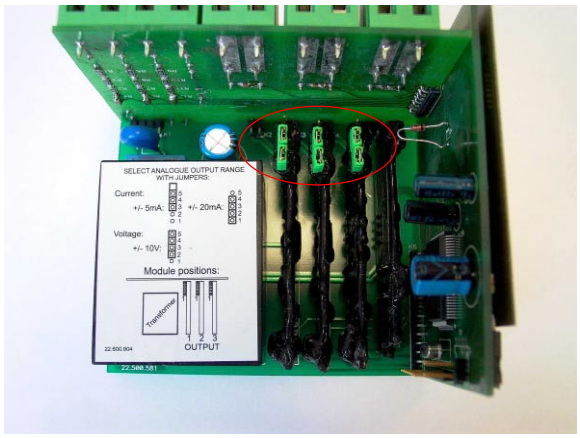


FIGURE 2 : I400 JUMPER POSITIONS

For information, the IDSP setting software displays for each analogue output, on the Output graphical display in the Device Settings window, the positions to which the jumpers must be set to match the currently-selected output type.

If it is attempted in IDSP to select an output type which is not in the currently-selected hardware range, IDSP will display an error message, to indicate that the jumper positions must be physically changed.

4. CONNECTIONS

4.1 Auxiliary Supply Connection

An auxiliary power supply is necessary for all I400 transducers, except for the self-powered mean sensing current and voltage transducers (I4CA and I4VA).

4.1.1 A.C. auxiliary supply

If the I400 transducer is fitted with an A.C. auxiliary supply, the terminal allocations are as follows:

Terminal Number	Terminal Marking	Description
13	~	Live
14	~	Neutral

4.1.2 Universal auxiliary supply

If the I400 transducer is fitted with a universal AC/DC auxiliary supply, the terminal allocations are as follows:

Terminal Number	Terminal Marking	Description
13	+/~	+ / Live
14	– /~	Common / Neutral

4.2 Communications Connections

To be able to establish communication with an I400 unit, it has to be physically connected to the serial port of the computer or Remote Terminal Unit, etc.

I400 transducer connections are identified on the transducer label beside the screw terminals. In order to communicate with the device, auxiliary power must be applied to the device, and the communications connection must be correctly wired.

4.2.1 EIA232 port

If the I400 transducer is fitted with an EIA232 communications port, the terminal allocations are as follows:

Description	I400 Terminal number	Terminal marking	RS232 9 pin connection
			PC Terminal
Receive (from IDSP)	21	Rx	3
Signal Ground	22	⏚	5
Transmit (to IDSP)	23	Tx	2

The EIA232 communications port is configured as a DTE (Data Terminal Equipment) device, which means that a crossover cable will be required to connect to a standard EIA232 serial port on a PC (also a DTE). The maximum connection length is 15 metres.

4.2.2 EIA485 port

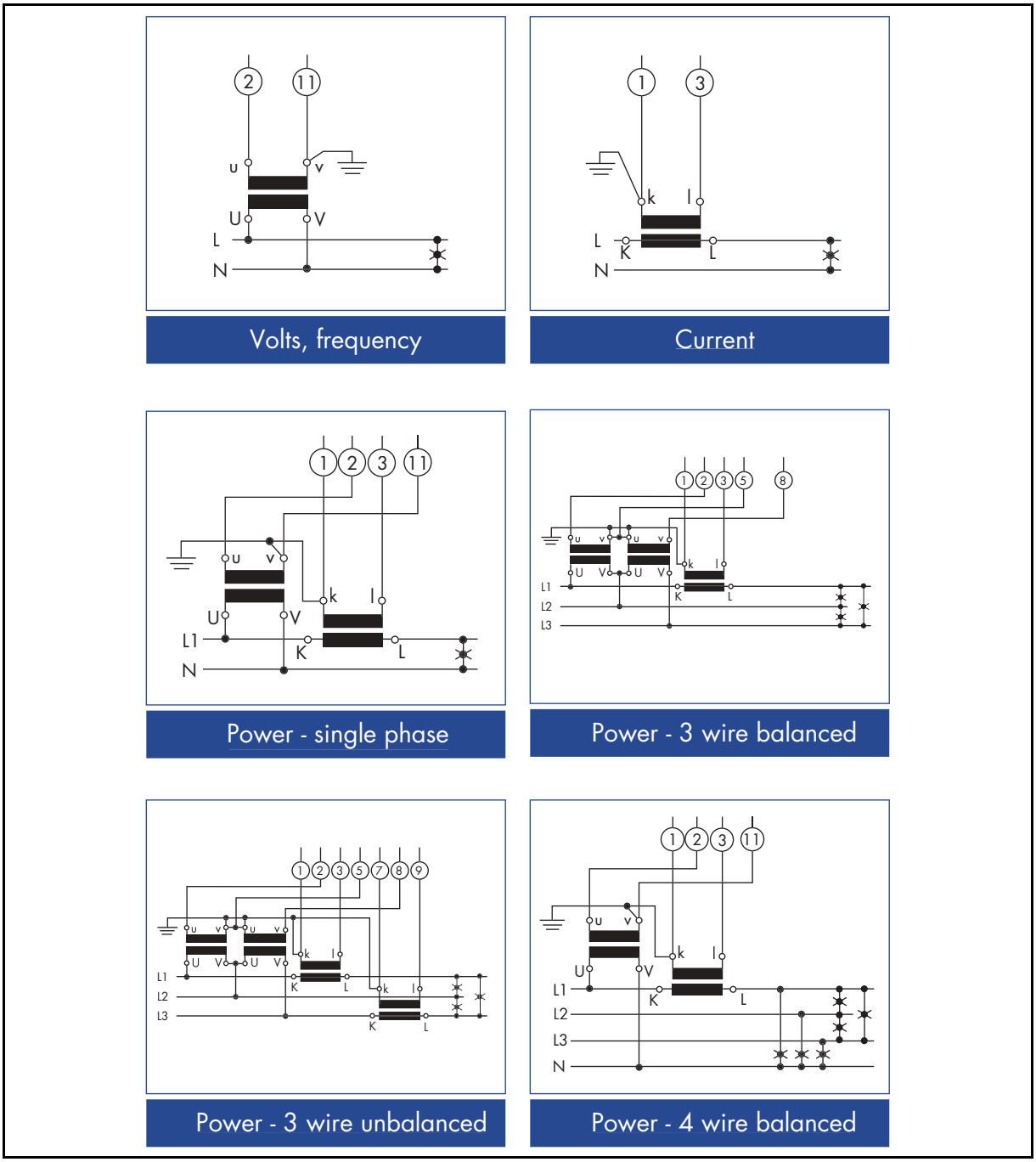
If the I400 transducer is fitted with an EIA485 communications port, the terminal allocations are as follows:

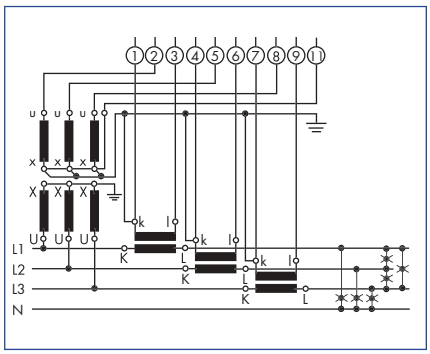
Terminal Number	Terminal Marking	Description
21	**A**	TxRxA (DATA+)
22	**C**	No connection
23	**B**	TxRxB (DATA-)

Two-wire EIA485 only is used. A PC will require either an EIA485 communications port or, for a PC with a standard EIA232 serial port, an external EIA232/EIA485 (2-wire) interface which must provide automatic EIA485 data flow control. The maximum connection length is 1000 metres. Conductors A and B should be terminated with a 120Ω terminating resistor.

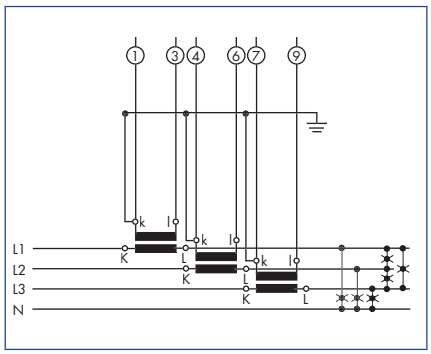
4.3 Input Connections

4.3.1 A.C. input transducers

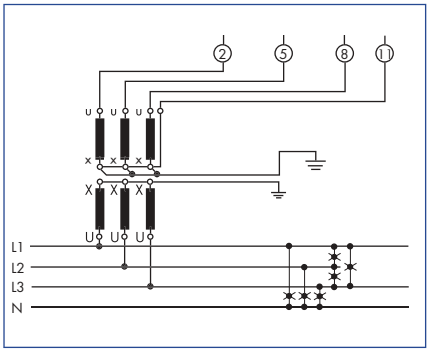




Power - 4 wire unbalanced



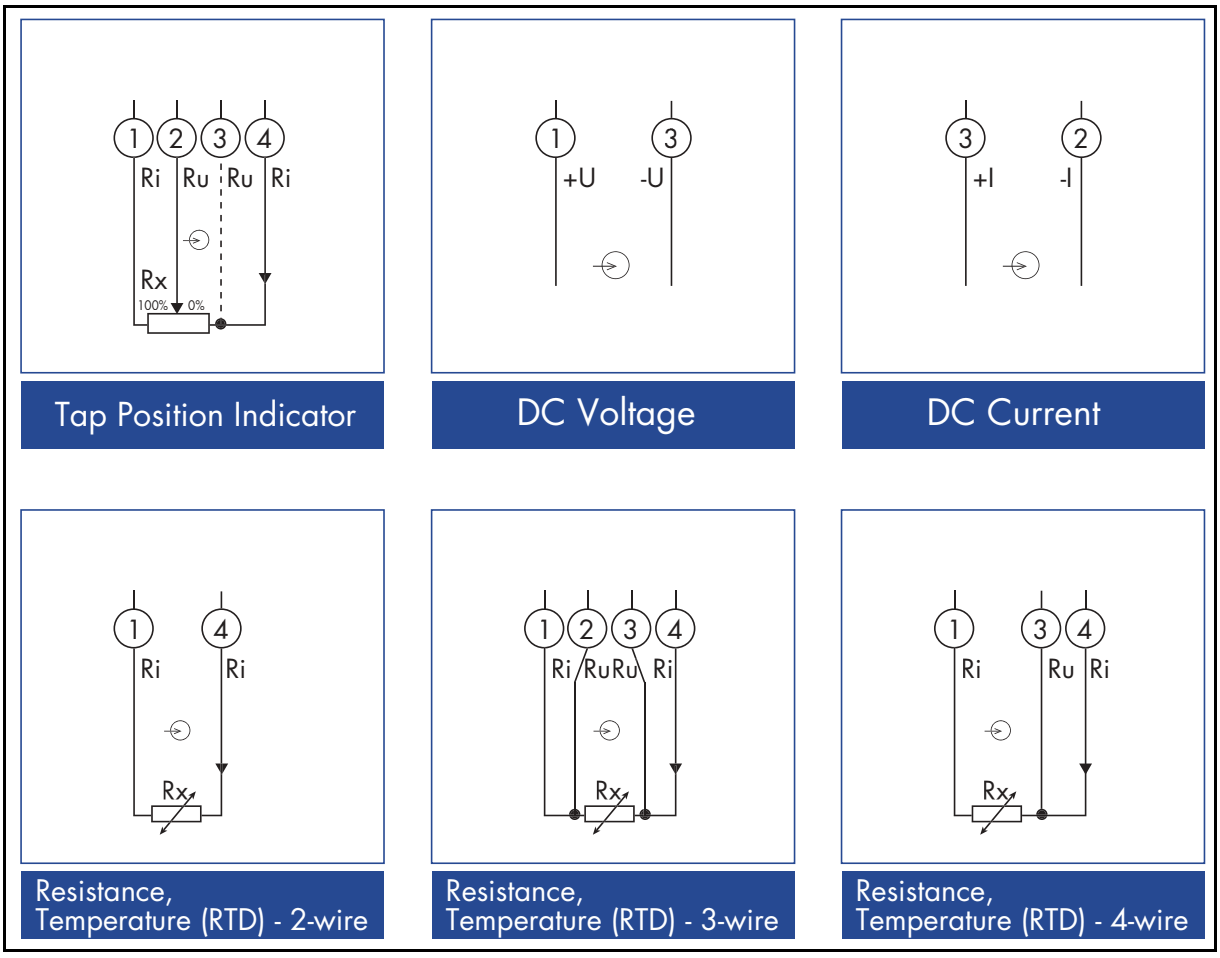
Triple current



Triple voltage

NOTE: The diagrams referred to as 'Power' are applicable to Watt, VAr, Phase Angle and Multifunction transducers.

4.3.2 D.C. input transducers



4.4 Output Connections

The I400 transducer output terminal allocations are as follows, where fitted:

Terminal Number	Terminal Marking	Description
15	+	Output 1 +
16	–	Output 1 –
17	+	Output 2 +
18	–	Output 2 –
19	+	Output 3 +
20	–	Output 3 –

By default single output transducers always use Output 1 terminals (15 and 16).

I4M Multifunction transducers may be fitted with none, one, two or three outputs depending on order option.

I4E Multifunction energy transducers are always fitted with a pulse electronic switch on Output 1 terminals (15 and 16). If fitted, the other two outputs can be ordered as either additional electronic switches or analogue outputs.

All D.C. input transducers are single output transducers.

5. RELATED DOCUMENTS

Ref	Document	Title
1	I400/EN BR/Bc	I400 Digital Transducers – Brochure
2	IDSP/EN U/A11	IDSP Setting and Monitoring Software User Guide and Modbus Register Map for I400 Digital Transducers
3	I9-113	Application Guide for Electrical Measuring Transducers

REPAIR FORM

Please complete this form and return it to AREVA T&D Ltd - Automation & Information Systems Business with the equipment to be repaired. This form may also be used in the case of application queries.

AREVA T&D Ltd

Automation & Information Systems Business
St. Leonards Works
Stafford
ST17 4LX
England

For : After Sales Service Department

Customer Ref: _____ Model No: _____

AREVA Contract Ref: _____ Serial No: _____

Date: _____ Software Ref: _____

1. What parameters were in use at the time the fault occurred?

AC Volts _____ Main VT/Test set

DC Volts _____ Battery/Power supply

AC current _____ Main CT/Test set

Frequency _____

2. Which type of test was being used? _____

3. Were all the external components fitted where required? Yes / No
(Delete as appropriate)

4. List the unit settings being used

_____

_____

_____

5. What did you expect to happen?

_____

_____

_____

_____

6. What did happen?

_____

_____

_____

7. When did the fault occur?

Instant	Yes / No	Intermittent	Yes / No
Time delayed	Yes / No	(Delete as appropriate)	
By how long?	_____		

8. What indications if any did the unit show?

_____

_____

_____

_____

9. Was there any visual damage?

_____

_____

_____

10. Any other remarks which may be useful:

_____

_____

_____

Signature	Title
Name (in capitals)	Company name

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T&D Worldwide Contact Centre online 24 hours a day: +44 (0) 1785 25 00 70 http://www.areva-td.com/contactcentre/