

iSTAT i4Mx



Standard Digital Transducers

The iSTAT i4Mx provides a comprehensive but simple measurement solution.

The iSTAT i4Mx transducers are configurable class 0.5 digital multifunction transducers designed to meet the requirements of the medium and low voltage utility and industrial markets.

With a range of analogue, alarm and communication options the i4Mx can be used in many applications.

They are delivered for customer configuration and are completely programmable. Primary-secondary ratio (U, I), connection type, alarm limits, and analogue output settings are all programmed using the QDSP setting software. With the option of analogue outputs and RS232/485 communications, iSTAT i4Mx ensures simple integration on both existing sites and new sites employing digital communications. Accuracy and stability over a range of temperatures are assured by the use of microprocessor technology.

Key Features

- Measurements of instantaneous values of more than 50 quantities (V, A, kW, kVA, kvar, PF, Hz, MD thermal, THD, etc)
- Power accuracy class 0.5
- 16 programmable alarms
- Input frequency: 50/60 Hz
- Serial communication (RS232 or RS485 up to 115,200 bit/s) and USB
- 2.0 port for off-line programming
- MODBUS RTU communication protocol
- Up to 4 I/O (analogue outputs, alarm outputs, general purpose relay output)
- Single wide auxiliary power supply range 24 – 300 Vdc, 40 – 276 Vac
- Automatic range of current and voltage (max.12.5 A and 600 VL-N)
- Housing for DIN rail mounting
- User-friendly setting software, QDSP

Models Available

- i4MT class 0.5 multifunction communicating transducer
- i4MV class 0.5 voltage transducer (Also used for frequency)
- i4MC class 0.5 current transducer

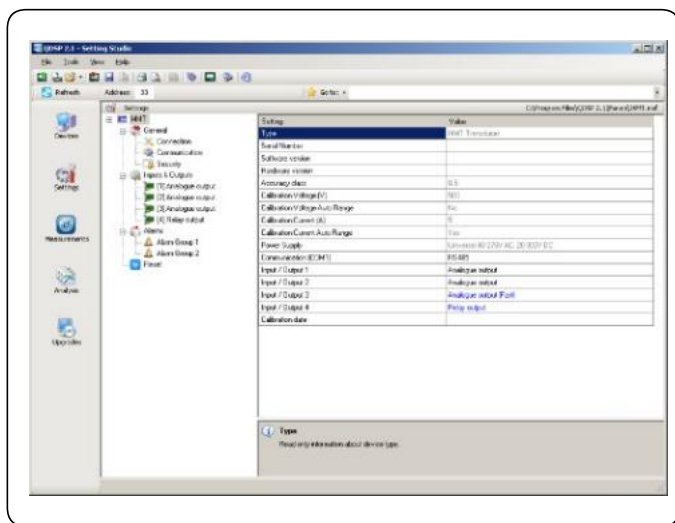
Key Benefits

- Comprehensive set of measurements
- High speed communication
- Easy integration with DCS/SCADA
- Easily configured

Features

Benefits

Multifunction configurable transducers	Many site applications can be fulfilled from a single product
Configurable connections for single and 3-phase, balanced and unbalanced loads	Easy to specify the transducers for any application, including when full details are not known
Auto-range current Inputs up to 5A, and voltage input range of 500 V	Easy to specify the transducers for any application, even when full details are not available
Universal AC/DC power supply as standard	Power supply suits most site requirements
0.5% measurement accuracy, true RMS	Accurate measurements of any electrical network regardless of distortion
RS232 or RS485 communications using MODBUS RTU	Allows connection to most remote energy management, DCS and SCADA systems
Analogue and fast response analogue (<50 ms) outputs available	Allow integration into systems requiring analogue signals for monitoring and control
Software and hardware alarms as an option	Alarms increase the range of applications that the transducers can be used for
Self powered Mini-USB configuration port always fitted	Allows customer configuration of the transducers before installation without the need for any wiring to be done
Configuration using QDSP software	Easy to use software allowing fast configuration of transducers



iSTAT–The standard measurement platform multifunction transducers:
 Simple to install – simple to set – simple to connect
 Advanced functionality
 Economical

The iSTAT i4Mx range uses the same QDSP setting software that is used across the entire range of programmable iSTAT measurement products supplied by GE

The iStat i4Mx Family Provides:

i4MT Class 0.5 Multifunction Communicating Transducer

i4MT is intended for measuring and monitoring electric quantities of single or three-phase electrical power distribution systems. It measures RMS value by means of fast sampling of voltage and current signals, which makes the instrument suitable for acquisition of transient events. A built-in microcontroller calculates measurements (voltage, current, frequency, power, power factor, THD phase angles, etc.) from the measured signals.

The i4MT is provided with 16 programmable software alarms, up to four output modules, analogue or alarm, and communications. With the RS232, RS485, and USB communication, the transducer can be configured and measurements can be checked.

The i4MT can be used as a power meter for monitoring and measuring electrical parameters in a power system.

i4MV Class 0.5 Voltage Transducer

i4MV is intended for measuring and monitoring single-phase voltages, both phase-neutral and phase-phase. The voltage input is electrically insulated from the system by means of a voltage transformer. It measures true RMS voltage values by means of fast sampling of the input voltage signals, which makes it suitable for acquisition of transient events. A built-in microcontroller calculates the measurements (voltage, frequency) from the measured signals. The measurements can then be converted into load independent DC current or voltage which is proportional to the true RMS measured value.

i4MC Class 0.5 Current Transducer

i4MC is intended for measuring and monitoring single-phase electrical power networks. The input current is electrically insulated from the system by means of a current transformer. It measures true RMS current value by means of fast sampling of the input current signals, which makes it suitable for acquisition of transient events.

A built-in microcontroller calculates the measurements (current, frequency) from the measured signals. The measurements can then be converted into load independent DC current or voltage which is proportional to the true RMS measured value.

Replacements

The i4Mx range replaced the AC RMS transducers from the i400 range:

- i4MT replaced: i4M, i4P, i4R, i4W, i4CF, i4VF
- i4MC replaced: i4CD
- i4MV replaced: i4VD, i4F



Measurements

The **i4Mx** family is ideally suited to applications where continuous monitoring of a single or three-phase system is required.

i4MC/V

They are ideally suited to applications where continuous monitoring of a single phase system is required.

i4MT

i4MT is ideally suited to applications where continuous monitoring of a single or three-phase system is required, particularly the local and remote indication for ac switchboard power measurements.

i4Mx Measurement Features

	i4MC	i4MV	i4MT
Voltage and Frequency		•	•
Current	•		•
P,Q,S,PF,PA			•
Maximum demand	•		•
THD	I	V	•

i4MT - Basic Measurement Features

Phase	Voltage U_1, U_2, U_3 and U_{\sim}
	Current I_1, I_2, I_3, I_n, I_t and I_{avg}
	Active power P_1, P_2, P_3 and P_t
	Reactive power Q_1, Q_2, Q_3 and Q_t
	Apparent power S_1, S_2, S_3 and S_t
	Power factor PF_1, PF_2, PF_3 and PF_{\sim}
	Power angle (Phase1, 2, 3 and total)
	THD of phase voltage U_{f1}, U_{f2} and U_{f3}
	THD of power angle I_1, I_2 and I_3
Phase-to-phase	Phase-to-phase voltage U_{12}, U_{23}, U_{31}
	Average phase-to-phase voltage U_{ff}
	Phase-to-phase angles ($_{12}, _{23}, _{31}$)
	THD of phase-to-phase voltage
Maximal values MD	Phase current I_1
	Phase current I_2
	Phase current I_3
	Active power P (Positive)
	Active power P (Negative)
	Reactive power Q - L
	Reactive power Q - C
Apparent power S	
Other	Frequency
	Internal temperature

Hardware Features

Communications

Communications and I/O	i4MC/V	i4MT
RS232 or RS485	option	•
Mini USB programming port	•	•
Modbus RTU	•	•
Standard analogue output (< 100 ms)	1	Up to 4
Fast analogue output (< 50 ms)		Up to 4
Alarm contacts		Up to 2

The i4MT is fitted with either RS232 or RS485 communications supporting Modbus RTU. The i4MC/V as standard has no communications, but can be supplied with either RS232 or RS485 supporting Modbus RTU.

USB Programming Port

All i4Mx variants are supplied with a programming port on the underside of the transducer, under a cover, which must always be refitted after use. This Mini-B USB port can be used for programming the transducer before installation and it powers the transducer so that no wiring needs to be done. A large number of similar devices can be programmed quickly, removing the need to purchase factory programmed devices.

Warning

- The USB port has only basic Insulation and can only be used when there is no wiring connected to the main terminals.
- The cover over the USB connector must be fitted prior to installation or storage, if not the warranty on the product will be void.

Analogue Output

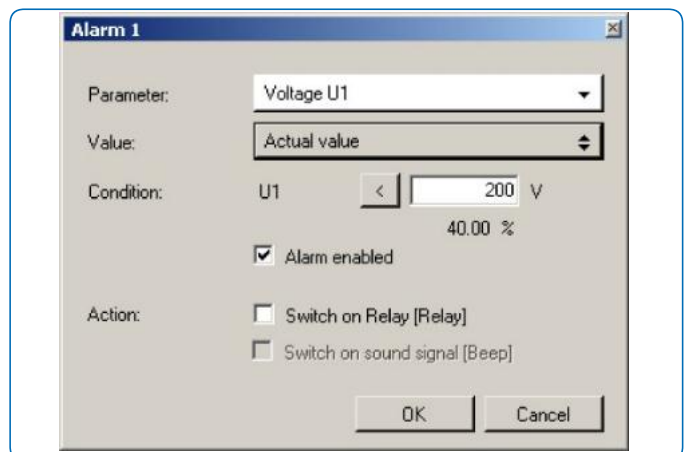
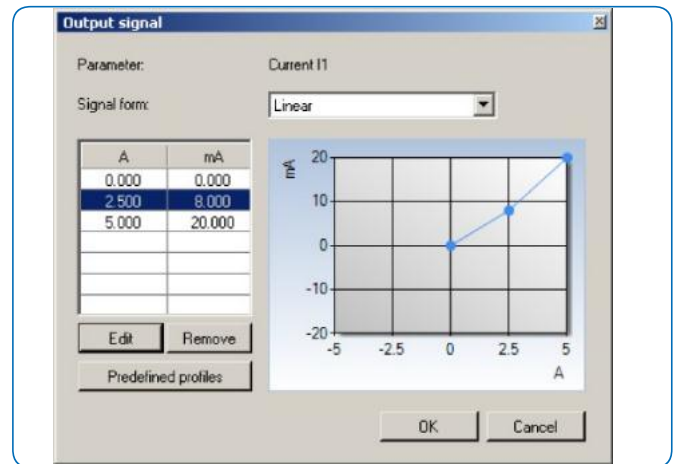
The i4MC/V are fitted with a single standard analogue output. The i4MT has four optional hardware modules that can be fitted with a standard analogue output (< 100 ms) or fast response analogue output (< 50 ms) or alarm output. The modules must be specified at the time of ordering as they can only be fitted in the factory.

The analogue outputs can be configured to output any signal in the range +/- 20 mA or +/- 10 V, either linear or customised. Integration into any existing scheme is simple.

Alarm Output

The i4MT has 16 software alarms which can be programmed to operate against most of the measured values. The alarms are organised as 2 groups of 8 and if the alarm relays are fitted in the optional hardware modules the status of the alarm groups can control the output relays.

The relay outputs can be programmed to operate in a number of different modes and they can also be controlled remotely from the device connected on the communications port.



iSTAT i4CA/VA Mean Sensing Transducers

The i4CA current and i4VA voltage mean sensing transducers were part of the i400 transducer family, but they have been repackaged and now resemble the i4Mx transducer range.

Mean sensing transducers are low cost, self powered devices that output an analogue value proportional to the input signal. Mean sensing transducers are not suited for measuring signals with a significant harmonic content; in such applications a true RMS transducer should be used.

The mean sensing transducers do not require an auxiliary power supply; they are powered from the signal being measured. The transducers require a full specification before manufacture and once manufactured the specification cannot be changed. They can only be supplied with a true zero output.



iSTAT I4X Communication Interfaces

The I4X is a range of communications interfaces designed for use with the Grid Solutions range of iSTAT communicating measurement centres and transducers. They can also be used with other serial devices such as protection relays. They can convert RS232 to RS485 and they can also allow products with RS232 and RS485 serial ports to communicate over Ethernet.

- Transmission rates from 1,200 to 115,200 bits per second
- Suitable for DIN rail mounting
- Universal ac/dc auxiliary power supply
- Low power consumption

The I4X allows a master station using an Ethernet or RS232 port to connect to a maximum of 32 devices. iSTAT products run the MODBUS RTU protocol, but other protocols can be used with the I4X interface.

The I4X used for Ethernet circuits has an RJ45 10/100 socket. On the EIA RS232 or RS485 side, screw terminals are provided for the communications twisted pair wires.

RS485 devices are linked with a screened twisted pair of wires - an arrangement developed for use in electrically hostile environments, on a single spur with a maximum run of 1000 m.

With every Ethernet unit, a unique MAC number is supplied. Using the MAC number, an IP address can be set in the I4X and then the I4X can be programmed using a standard web browser.

ISTAT i4Dx DIGITAL TRANSDUCERS

The i4Dx DC measurement transducers were part of the i400 range, the majority of which were replaced by the i4Mx.

The i4Dx transducers are customer configurable and are supplied with RS232 or RS485 communications to allow configuration of the transducer, using QDSP, and the transmission of measurement values to a host system. The transducers have an AC auxiliary supply as standard but with the option of a universal power supply.

Tap position indicator

The i4DA indicates the tap position by measuring the resistance proportional to the actual tap position. It monitors up to 100 steps with a minimum value of 30 Ohms per step, with a total resistance range of 100 to 500 k.

DC voltage and current

The i4DB voltage and i4DC current transducers measure DC values and convert them to proportional DC analogue values.

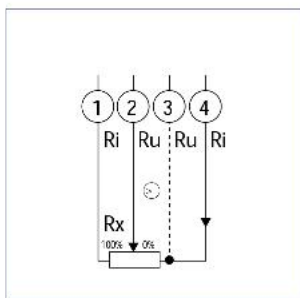
Resistance

The i4DF transducer measures resistance values using 2, 3 or 4 wire connections and converts this to a proportional DC analogue value. The measurement range can be 10 to 50 k Ohms or 100 to 500 k Ohms.

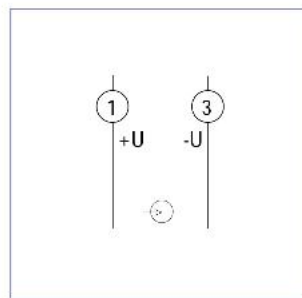


Temperature

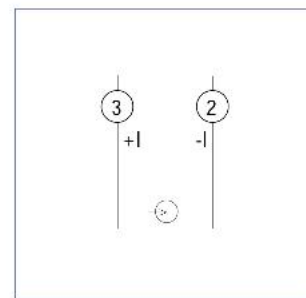
The i4DG transducer measures temperature using either Pt100, Pt1000, Ni100 RTD sensors and converts this to a proportional DC analogue value. The RTD sensors can be connected as 2, 3 or 4 wire. The RTD sensors are not supplied with the transducer. The measurement range can be -200°C to +850°C (Pt) or -608°C to +250°C (Ni).



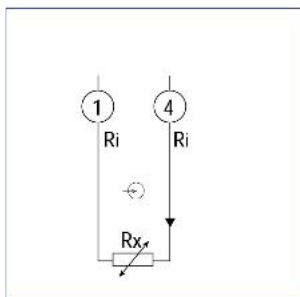
Tap Position Indicator



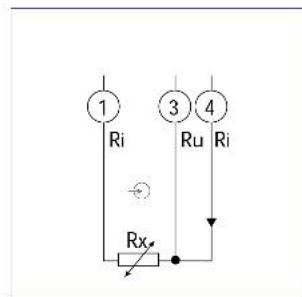
DC Voltage



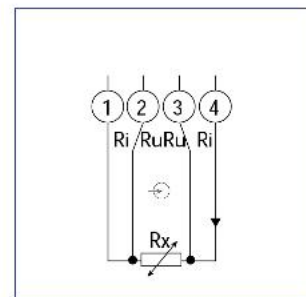
DC Current



Resistance, Temperature (RTD) - 2-wire

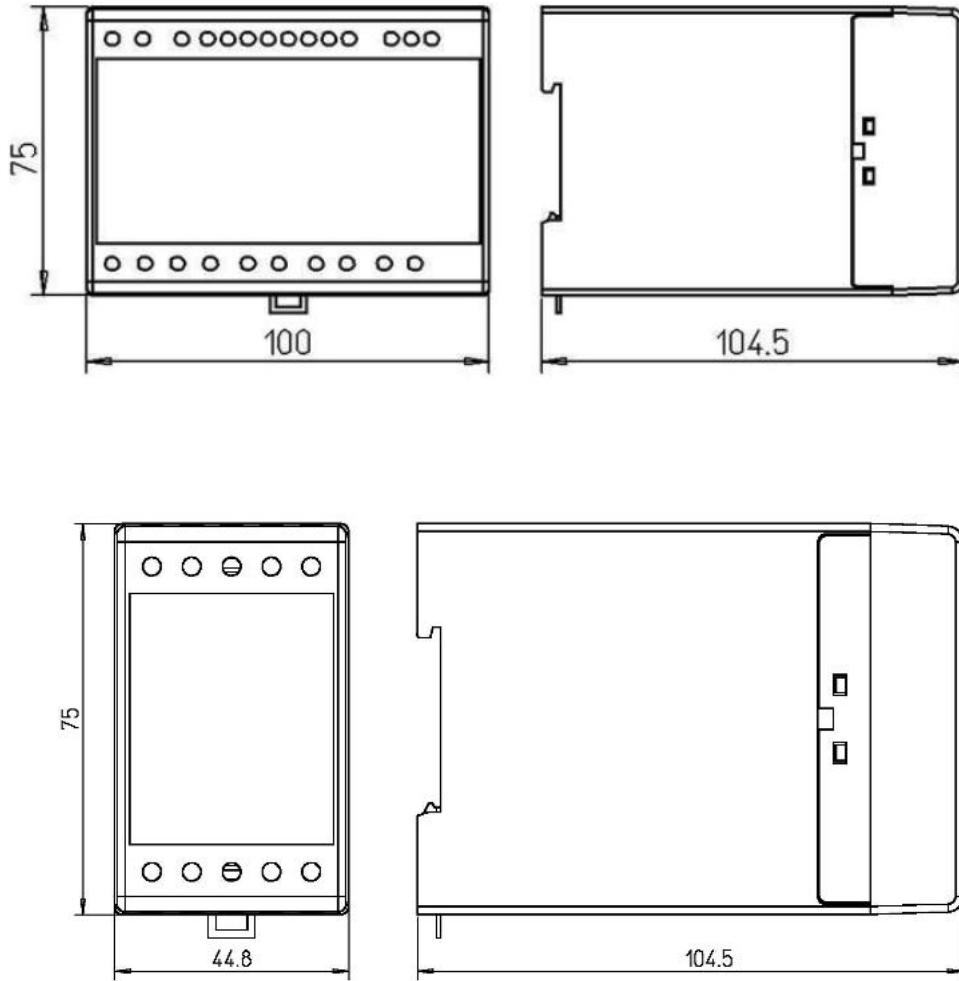


Resistance, Temperature (RTD) - 3-wire



Resistance, Temperature (RTD) - 4-wire

Dimensions



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Imagination at work