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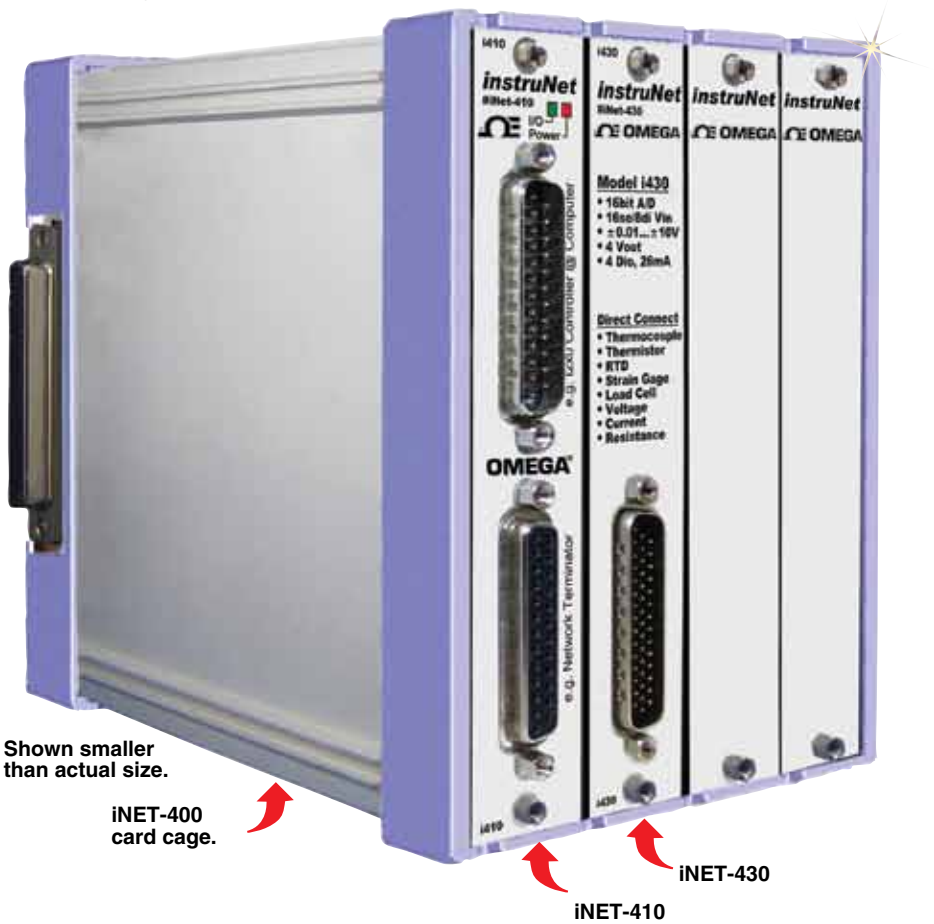
Find the *OMEGA iNET-400* at our website: ***Click HERE***

Expandable Modular Data Acquisition System

iNET-400 Series

1 YEAR WARRANTY

- **USB 2.0 High Speed Data Acquisition Hardware for Windows® ≥XP SP2, Vista, 7 or 8 (XP/VS/7/8)**
- **Analog and Digital Input and Outputs**
- **Free instruNet World Software**
- **Directly Connects to Thermocouple, RTD, Thermistor, Strain Gage, Load Cell, Voltage, Current, Resistance and Accelerometer Input's**
- **Reduce Noise by Placing Boxes Near Sensors and up to 1000' From Noisy Computer**
- **Digitize Any Combination of Channels at 166,000 Samples Per Second Aggregate**
- **Each Channel has Independently Programmable Analog Filters, Integration Time, Voltage Range, and Sample Rate; Programmable Digital Filters on All Channels (LP, HP, BP, BS)**



The iNET-400 system is a low cost card cage that attaches to Windows computers via USB 2.0. The advantage of a card cage is that you can select which I/O modules to install as needed to build a customized system. The instruNet card cage typically has one A/D measurement module and additional modules provide signal conditioning. The conditioned analog signal is routed to the A/D module via the backplane.

This is dramatically different from comparable systems which place A/D measurement electronics on each module. The advantage of the iNET-400 topology is cost. After the 1st module is installed, additional iNET-400 channels are conditioned at a very low cost per channel.

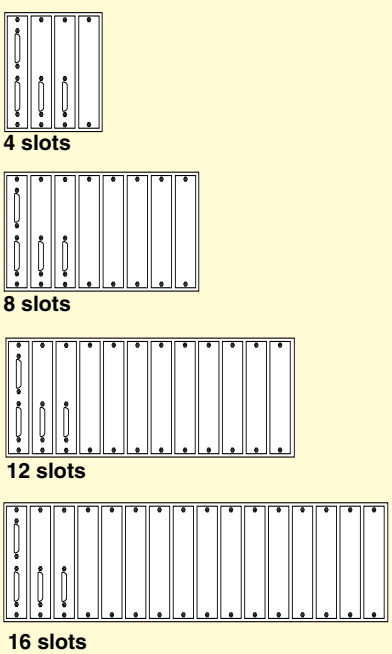
iNET-400 measurement modules have universal inputs that enable one to directly connect each channel to one of: thermocouple, thermistor, strain gage, load cell, counter/timer, RTD, voltage, current, resistance and accelerometer.

Absolute accuracy for all of these sensor types is specified. In some cases, the end user adds an external shunt resistor. The advantage of universal inputs is cost.

Low Cost 4/8/12/16-Slot Card Cages

The iNET-400 card cage provides 4 slots, and multiple iNET-400's can be bolted together by the end user, side-by-side, to create an 8, 12, or 16 slot system. In many applications, one iNET-400 with 4 slots is sufficient.

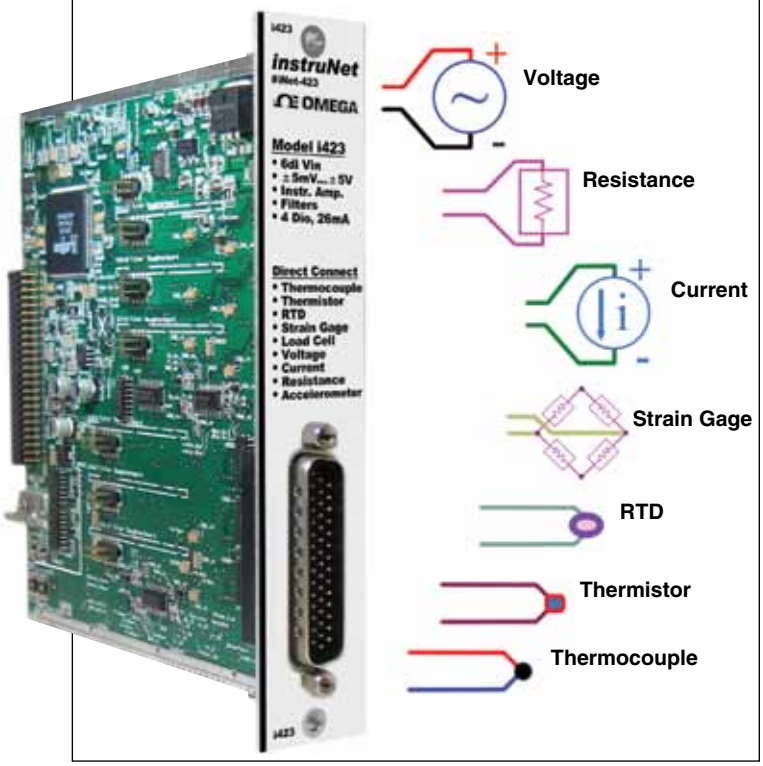
4/8/12/16-slot card cages



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Connect Directly to Common Sensors

Data acquisition cards connect directly to thermocouple, thermistor, strain gage, load cell, counter/timer, RTD, voltage, current, resistance and accelerometer.

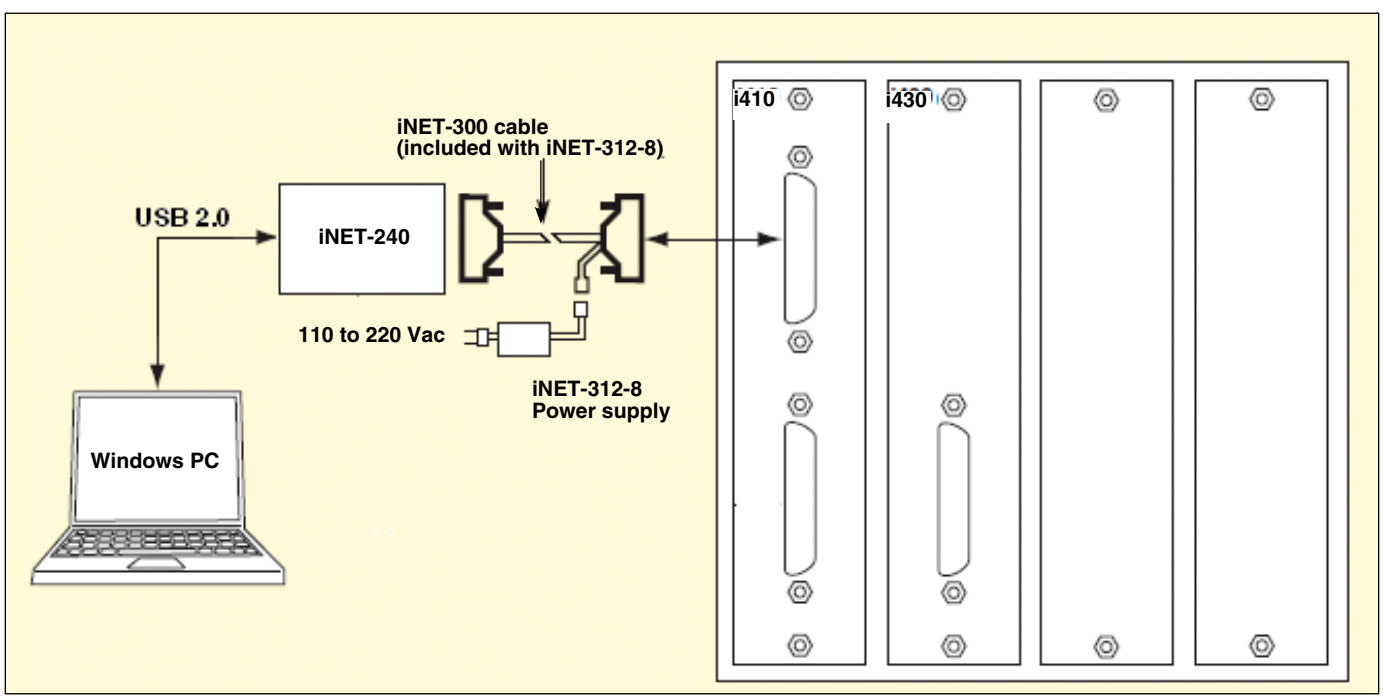


The iNET-400 card cage is 15 D x 11 W x 14 cm H (6 x 4.5 x 5.6") in size. The slots are numbered such that #1 is the left-most slot, #2 is to the right of #1, and so forth and so on. Cards are held into position with jackscrews that are tightened with a slotted screwdriver. Slot #1 is a special slot and is used to interface to a computer.

The iNET-410 card slides into slot #1 and then cables to the computer via a DB25 cable that connects to an instruNet controller. Also, an iNET-300 Power Adaptor cable is used to route power from an iNET-312-8 desktop power supply to the iNET-410 interface card in slot #1, which in turn routes that power to the card cage backplane (i.e. pcb at back of card cage that attaches to all cards). This is illustrated in the below diagram.

The iNET-400 Card Cage needs at least one iNET-430 A/D card if analog voltages are to be measured. The iNET-430 cards includes an A/D converter and serves this purpose.

The iNET-420 and iNET-423 cards contain various signal conditioning circuits and route signals along the backplane to the iNET-430 for measurement. This happens automatically and does not require programmer intervention, other than insertion of cards and attaching end user signals to the card's front panel connectors.



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iNET-240 instruNet DSP Card

Each instruNet Network is controlled by an instruNet DSP controller card that attaches to a Microsoft Windows computer. The iNET-240 attaches to a free USB 2.0 high speed port (requires Windows ≥ XP SP2). Each Controller is an independent computer in itself that utilizes a powerful 32-bit DSP processor and onboard RAM to control all aspects of data acquisition along its network. All real-time tasks are off-loaded to this processor, therefore the host computer is not burdened with real-time issues. Between 1 and 4 controllers can be installed, space permitting, since each controller operates independently.



iNET-240 USB controller, shown smaller than actual size

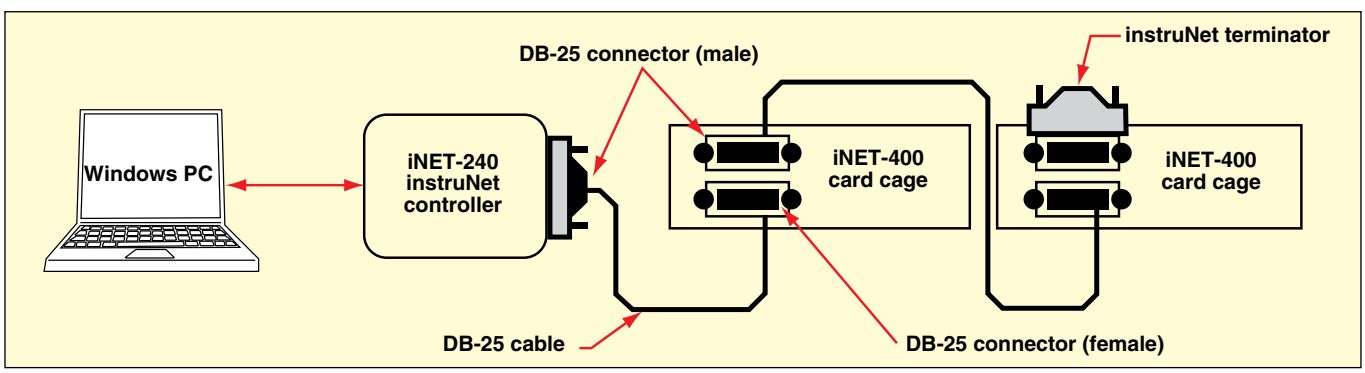
Connect up to 8 iNET-400 Card Cages

Each instruNet network supports up to 8 instruNet iNET-400 card cages.



instruNet Network

These devices are connected in a daisy-chain configuration to form a chain of Devices. Each network can be up to 300 meters long. All networks are anchored with an instruNet Terminator at the far end, and an instruNet Controller at the near end. This makes instruNet a cost effective method for designing large scale, high speed, multi-channel data acquisition systems.



Summary of Computers Compatible with instruNet

Model No.	Controller Type	Size	Computer Required
iNET-240	USB 2.0	4 x 2 x 1"	32-bit or 64-bit Windows ≥ XP SP2, Vista, 7 or 8 (XP/VS/7/8) Computer with 1 available USB 2.0 High Speed port (480Mbaud).

instruNet Version ≥ 3.0 software requires Windows XP, Vista, 7 or 8 (XP/VS/7/8) computer with at least 256MB of RAM Memory and at least 256 MB of free disk space. The iNET-240 USB controller requires 32-bit or 64-bit Windows XP SP2 (service pack #2) or newer.

iNET-400 Series Data Acquisition Cards



iNET-410



iNET-420



iNET-423



iNET-430



iNET-460

iNET-410 Communications Card

The iNET-410 communications card connects an iNET-400 card cage to a Windows computer via an instruNET iNET-240 USB controller. The iNET-410 plugs into the left-most slot (slot #1) of an iNET-400 card cage. One and only one iNET-410 is required per iNET-400 card cage when working with instruNet controllers. The iNET-410 provides the following features:

- Two DB25 connectors allow daisy-chaining multiple iNET-400 card cage devices to one instruNet controller card.
- Front panel red power light shows presence of 5V, 12V and -12V power.
- Front panel green I/O light blinks when computer communicates with card cage.
- Includes one DB25 male to female 3 m (10') cable.

iNET-420 Analog I/O Module

The iNET-420 provides 20 single-ended (SE)/10 differential (DI) voltage input channels and 4 universal digital I/O (20 mA sink, -10V to 30V) and requires the iNET-430 A/D module to measure voltages. The iNET-420 connects directly to voltage, thermocouple, thermistor, RTD, load cell, strain gage, potentiometer, current and resistance inputs.

iNET-423 Analog I/O Module

The iNET-423 provides 6 differential (DI) voltage input channels, 4 universal digital I/O (20 mA sink, -10 to 30V) and requires the iNET-430 A/D module to measure voltages. The iNET-423 connects directly to voltage, thermocouple, thermistor, RTD, load cell, strain gage, potentiometer, current and resistance inputs. Each input channel passes through it's own amplifier with a software selectable gain of 1 or 64 and optional low pass filter. The 8-pole iNET-500 analog low pass Butterworth filter daughter board is ideal for anti-aliasing. Between one and six filter daughter boards can be installed onto each iNET-423 card (one per channel). There are four different analog low pass filters, each with a different cut off frequency: iNET-500-380HZ, iNET-500-1KHZ, iNET-500-3300HZ and iNET-500-10KHZ.

iNET-430 A/D Module

The iNET-430 provides 16 single-ended (SE)/8 differential (DI) voltage input channels with a 16-bit A/D converter, 2 precision analog voltage outputs (±10V, 14-bit D/A), 2 analog voltage outputs (0 to 10 V output, 8-bit D/A) and 4 universal digital I/O (20 mA sink, -10 to 30 V). The iNET-430 connects directly to voltage, thermocouple, thermistor, RTD, load cell, strain gage, potentiometer, current and resistance inputs.

iNET-460 Digital I/O Module

The iNET-460 provides 12 universal digital I/O (20 mA sink, -10 to 30 V) and 16 digital I/O (200 mA sink, -10 to 30 V).

iNET-400 cards are installed by the end user into an instruNET card cage that is 4, 8, 12 or 16 slots wide. Each card is 13 x 2.5 x 13 cm (5.1 x 1.0 x 5.1") in size. Below is a list of available cards.

	Voltage Input			Voltage Outputs		Digital I/O	
Model No.	Number of Channels	Range	Low Pass (KHz)	Number of Channels	Range	Number of Channels	mA Sink
iNET-420	20SE/10DI	±10V.. ±20mV				4	20
iNET-423	6DI	±5V.. ±5mV	0.006,4			4	20
iNET-430	16SE/8DI	±10V.. ±10mV		2 2	±10V.. 0-10V	4	20
iNET-460						12 16	20 200
iNET-410	*The iNET-410 connects card cage to windows computer via an instruNet controller.*						

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The following table shows maximum aggregate sample rates for an iNET-240 USB controller attached to an iNET-400 card cage. To calculate the sample rate for each channel, divide by the number of channels attached to the iNET-240 controller. For example, if the maximum aggregate sample rate is 166K samples/sec/controller, and you digitize 4 channels, then you could digitize each channel at 41Ks/sec/channel. Up to four iNET-240 controllers can be attached to a computer to increase total system throughput.

Max Aggregate Sample Rate per Controller (K samples/sec/controller)				
Model No.	**±10V Range**	**±5V Range**	**±1.2V Range**	**±10mV.. ±80mV Range**
iNET-430	166	166	129	1.4
iNET-430	90	90	83	1.4
iNET-423	113	113	98	68

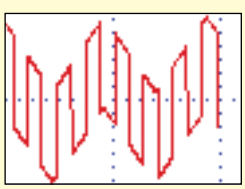
Sensor Connection Table

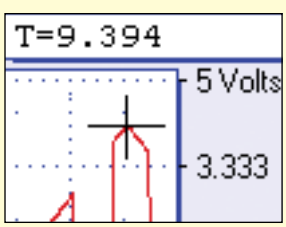
The table below shows which sensors directly connect to each hardware product. The numbers in the table refer to number of channels. The following sensors require an external shunt resistor: RTD, thermistor, resistance measurement, current measurement, 1/4 bridge strain gage, and 1/2 bridge strain gage. Thermocouple sensors require an iNET-510 Wiring Box attached to the iNET-400 card.

Model No.	Voltage	Current	Resistance	Thermistor	RTD	T/C	Load Cell	Accelerometer	Strain Gage
iNET-420	20SE/10DI	10	10	10	10	10	10	–	10
iNET-423	6DI	6	6	6	6	6	6	6	6
iNET-430	16SE/8DI	8	8	8	8	8	8	–	8

instruNet Software

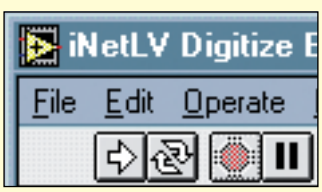
instruNet includes software to interrogate, test, configure, and do I/O with all network channels. This includes an application program called "instruNet World" and interfaces to Visual Basic, C, and C++. instruNet software can configure all I/O channels, store your settings, view digitized data in real time, stream data to disk, and scroll through your waveform post-acquisition. instruNet software runs on Windows computers.


instruNet World

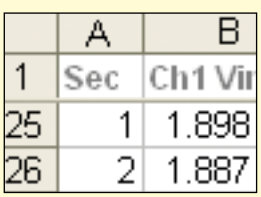


instruNet World Plus (iW+)

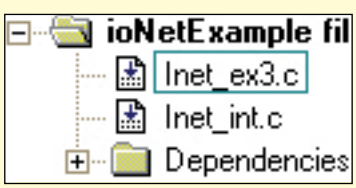

DASYLab



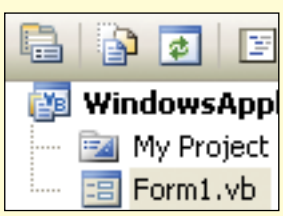
LabView



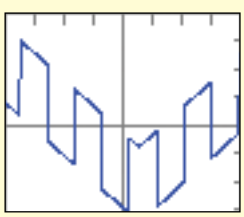
Direct To Excel



C/C++



Visual BASIC


instruNet Scope

The iNET-555 Starter System, shown to the right, provides the following:

- USB 2.0 High Speed Data Acquisition Hardware for Windows ≥ XP SP2, Vista 7 or 8 (XP/VS/7/8)
- instruNet Software
- 16se/8di Voltage Inputs, 16-bit A/D
- 2x Precision Voltage Out (±10V, 14 bit)
- 2x Voltage Outputs (0..+10V, 8 bit)
- 4x Universal Digital I/O (10V, 30V)
- Connect Directly to Sensors: Voltage, Thermocouple, Thermistor, RTD, Load Cell, Strain Gage, Potentiometer, Current, Resistance.
- Easily expand via 2 free slots in 4 slot iNET-400 Card Cage
- The iNET-555 Includes the Following Products: iNET-240, iNET-430, iNET-510, iNET-400, iNET-410, iNET-312-8.



SPECIFICATIONS

iNET-400

No. of Slots: Each iNET-400 supports up to four cards. Multiple iNET-400's can be bolted together side-by-side to create an 8, 12, or 16 slot system

Material: Solid aluminum construction

Dimensions:
15 D x 11 W x 14 cm H
(6 x 4.5 x 5.6")

Mounting: Place on desktop, affix to DIN rail, 19" rack, or wall mount

ANALOG INPUTS
No. of Channels:

iNET-420: 20 single-ended (SE)/10 differential (DI)

iNET-423: 6 differential (DI)

iNET-430: 16 single-ended (SE)/ 8 differential (DI)

A/D Converter: 16-bit (iNET-430 only)

Voltage: See voltage accuracy/ range charts (on next page)

Thermocouple: J/K/T/E/R/S/B/N/ C/G/D

Thermistor: 2252 Ω (OMEGA 44000 Series)

RTD: 100 Ω, 500 Ω, 1 kΩ platinum

Load Cell: 10 kg, 25 kg, 100 kg, 250 kg, 1000 kg, 5000 kg

Strain: 350 Ω (1/4 bridge, half bridge or full bridge), 1 kΩ (1/4 bridge)

Potentiometer: 10 kΩ, 50 kΩ

Current: ±80 uA, ±120 uA, ±500 uA, ±600 uA, ±800 uA, ±1.2 mA, ±2.5 mA, ±12 mA, ±24 mA, 0 to 24 mA

Resistance: 0 to 33 Ω, 0 to 100 Ω, 0 to 330 Ω, 0 to 1 kΩ, 0 to 3300 Ω, 0 to 10 kΩ

Common Mode Voltage: ±10 Vdc (iNET-420 and iNET-430), ±5 Vdc (iNET-423)

Crosstalk: < -80 dB typical

Input Impedance: 100 MΩ

iNET-430 PRECISION ANALOG VOLTAGE OUTPUTS
No. of Channels: 2

Resolution: 14-bit

Range: ±10.1V

Output Current Drive: ±4 mA

iNET-430 ANALOG VOLTAGE OUTPUTS
No. of Channels: 2

Resolution: 8-bit

Range: 0 to 10.1V

Output Current Drive: ±4 mA

DIGITAL I/O (iNET-420/423/430)
No. of Channels: 4 universal digital I/O (20 mA sink, -10 to 30V)

Working Voltage: -10 to 30 Vdc

"0" Input Voltage: -10 to 0.65V

"0" Input Current: Amps = (4.5V – Vin)/3900

"1" Input Voltage: 2.1 to 30 Vdc

"1" Input Current: <1.4 mA

"0" Output Voltage: <0.8V @ < 5 mA; < 2V @ <20 mA

"1" Output Voltage: 3.9 to 4.5V

"1" Output Current: See "1" input current

Pull-Up Resistor: 3.9 kΩ±10%

Schmitt Trigger Input: Yes

ENVIRONMENTAL
Operating Environment: 1 to 45°C (34 to 113°F), <90% RH

Storage Temperature: -20 to 70°C (-4 to 158°F)

POWER
Required: +5 Vdc, ±12 Vdc required (supplied by iNET-312-8)

User Available: 3.3 Vdc, 5 Vdc, ±12 Vdc

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Thermocouple Range/Accuracy

T/C	Range	Accuracy		
		iNET-420	iNET-423	iNET-430
J	0 to750°C	±1.2°C	±1°C	±1°C
K	-200 to 1250°C	±1.4°C	±1.4°C	±1.2°C
B	250 to 1540°C	±3.8°C	±4.3°C	±3.7°C
C	0 to 2190°C	±2.6°C	±2.9°C	±2.6°C
D	0 to 1540°C	±2.6°C	±2.9°C	±2.6°C
E	-200 to 990°C	±1°C	±1.2°C	±1°C
G	0 to 2300°C	±5.4°C	±6.2°C	±5.3°C
N	-200 to 1140°C	±1.7°C	±2.2°C	±1.7°C
R	-40 to 1500°C	±2.9°C	±3.6°C	±2.9°C
S	-40 to 1500°C	±2.6°C	±2.9°C	±2.5°C
T	-200 to 400°C	±1.2°C	±1.4°C	±1.2°C



Shown smaller than actual size.

RTD (Requires OMEGA 10 kΩ shunt resistor iNET-R-10K)

RTD Resistance	Range	Accuracy		
		iNET-420	iNET-423	iNET-430
100 Ω	-200 to -100°C	±3.1°C	±1.4°C	±1.3°C
100 Ω	-100 to 300°C	±0.79°C	±0.79°C	±0.7°C
100 Ω	300 to 850°C	±5.4°C	±5.4°C	±2.6°C
500 Ω	-100 to 300°C	±1.4°C	±1.4°C	±0.84°C
1,000 Ω	-100 to 300°C	±0.44°C	±0.44°C	±0.8°C

Thermistor (Requires OMEGA 10 kΩ shunt resistor iNET-R-10K)

Thermistor Resistance	Range	Accuracy		
		iNET-420	iNET-423	iNET-430
2252 Ω	0 to 100°C	±0.27°C	±0.47°C	±0.47°C

Voltage Range/Accuracy

Voltage Range 1	Absolute Accuracy (MAX Gain + Offset Error) with 1 ms Averaging		
	iNET-420	iNET-423	iNET-430
± 10V	±(0.017% + 671.µV)	–	±(0.017% + 669.4µV)
± 5V	±(0.017% + 364.3µV)	±(0.015% + 347.9µV)	±(0.010% + 332.7µV)
± 2.5V	±(0.017% + 290.7µV)	±(0.015% + 194.2µV)	±(0.010% + 178.9µV)
± 1.2V	–	±(0.016% + 129.8µV)	±(0.010% + 141.9µV)
± 600 mV	–	±(0.016% + 91.8µV)	±(0.010% + 94.6µV)
± 300 mV	–	±(0.016% + 82.9µV)	–
± 80 mV	±(0.015% + 10.3µV)	±(0.018% + 9.8µV)	±(0.015% + 10.1µV)
± 40 mV	±(0.015% + 8.0µV)	±(0.018% + 7.4µV)	±(0.015% + 7.7µV)
± 20 mV	±(0.015% + 7.4µV)	±(0.019% + 6.5µV)	±(0.015% + 7.2µV)
± 10 mV	–	±(0.019% + 5.9µV)	±(0.015% + 6.5µV)
± 5 mV	–	±(0.019% + 5.8µV)	–
0 to 10V	±(0.017% + 364.8µV)	–	–
0 to 5V	±(0.017% + 290.7µV)	±(0.015% + 194.2µV)	±(0.010% + 178.9µV)
0 to 2.5V	–	±(0.015% + 157.3µV)	±(0.010% + 141.9µV)
0 to 1.2V	–	–	±(0.010% + 94.6µV)
0 to 80 mV	–	±(0.018% + 7.4µV)	–
0 to 40mV	–	±(0.018% + 6.9µV)	–

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OMEGACARE℠ Extended Warranty Program

OMEGACARE℠ extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARE℠ covers parts, labor and equivalent loaners.

To Order

Model No.	Description
Starter System	
iNET-555	Starter system, USA plug
iNET-555-EU	Starter system, European plug
iNET-400 Cards	
iNET-410	Interface between iNET-240 contoller and iNET-400 card cage
iNET-420	20SE/10DI voltage input, multiplexer, 4 digital I/O
iNET-423	6DI voltage input, amplifier, filter, 4 digital I/O
iNET-430	16-bit A/D, 16SE/8DI voltage input, multiplexer, 4 voltage out, 4 DIO
iNET-460	28 digital I/O channels
iNET-400 Card Cage	
iNET-400	Card cage for iNET-410/420/423/430/460 cards, 4 slots, expandable

***Ordering Example: iNET-555** starter system including **iNET-240, iNET-430, iNET-510, iNET-400, iNET-410 and iNET-312-8** and **OCW-1** OMEGACARE℠ 1-year extended warranty adds 1-year to standard 1-year warranty.*

Accessories

Model No.	Description
iNET-510	Wiring box with screw terminals
iNET-511	Wiring box with BNC connectors
iNET-512	Strain gage/sensor wiring box with screw terminals (not for thermocouples - use iNET-510 for thermocouple measurement)
iNET-HD44MF-3M	Cable, Hd44m to Hd44f, 26 Awg, 3 m (10')
iNET-330	Optical isolator between iNET-240 controller and device
iNET-530	Wall and DIN rail mounting kit for one iNET-400 card cage
iNET-500-380HZ	Analog low pass Butterworth filter daughter board for iNET-423 card, 380 Hz cut off frequency (package of 2)
iNET-500-1KHZ	Analog low pass Butterworth filter daughter board for iNET-423 card, 1 kHz cut off frequency (package of 2)
iNET-500-3300HZ	Analog low pass Butterworth filter daughter board for iNET-423 card, 3300 Hz cut off frequency (package of 2)
iNET-500-10KHZ	Analog low pass Butterworth filter daughter board for iNET-423 card, 10 kHz cut off frequency (package of 2)
InstruNet Controller	
iNET-240	USB instruNet controller for Windows ≥ XP SP2, comes complete with 3 m (10') USB cable, instruNet network terminator and instruNet World software on CD (requires iNET-312-8 power supply).
Power Supplies	
iNET-312-8	Power supply, USA Plug, 110/220 Vac, (includes iNET-300 power adaptor)
iNET-312-8EU	Power supply, European plug, 110/220 Vac, (includes iNET-300 power adaptor)
iNET-300	Power adaptor
Software	
iNET-iWPLUS	instruNet World Plus software (iW+)
iNET-380	LabVIEW drivers (LabVIEW versions ≥4 currently supported on Windows ≥XP)
Shunt Resistors	
iNET-R-33	33 Ω, 8-pack, 0.05%, 5 ppm/°C drift
iNET-R-120	120 Ω, 8-pack, 0.05%, 5 ppm/°C drift
iNET-R-350	350 Ω, 8-pack, 0.05%, 5 ppm/°C drift
iNET-R-1K	1000 Ω, 8-pack, 0.05%, 5 ppm/°C drift
iNET-R-3300	3300 Ω, 8-pack, 0.05%, 5 ppm/°C drift
iNET-R-10K	10 kΩ, 8-pack, 0.05%, 5 ppm/°C drift
iNET-R-33K	33 kΩ, 8-pack, 0.05%, 5 ppm/°C drift

***Ordering Example: iNET-240,** USB instruNet controller for Windows ≥ XP SP2.*

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