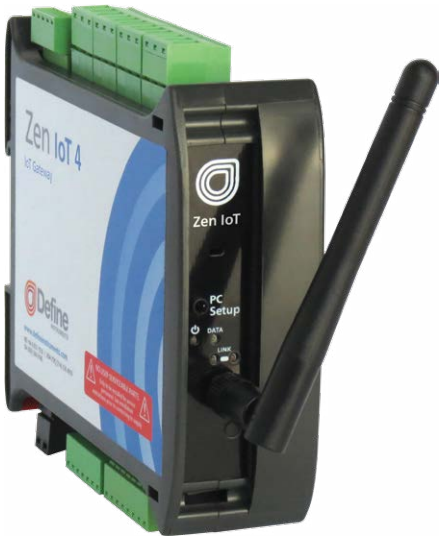
Zen IoT Gateway

Edge Processing Device

Connect your standalone hardware to the Cloud with this IoT gateway



The Zen IoT is a bridging device for connecting legacy standalone infrastructure (PLCs or other discrete control systems) to the Cloud. Use it also for Edge Processing: to collate data, perform calculations and send the results to the Cloud.

Convert process signals direct to wireless

While most gateway devices only convert Modbus to wireless, the Zen IoT converts process signals straight to wireless! No additional devices needed. It features industrial grade analog and digital I/O, with 4–20mA, RTD, TC and many more available options.

Integrates with all your existing equipment

The Zen IoT supports a wide range of communication protocols, including Modbus, and new IoT comms like MQTT. Physical connections include Ethernet, WiFi, 3G/4G modems, RS485 and Bluetooth*.

Potential applications include AMR (Automatic Meter Reading), remote monitoring of assets, and data collation and transmission. Additionally, the Zen IoT offers a flexible logic engine which can be programmed with a powerful scripting language for custom applications.

Uses extra layer of IoT security

Privacy and security are big concerns, but the Zen IoT gives you peace of mind. It has its own WiFi port, and connects with an extra layer of security: Transport Layer Security (TLS). Additionally, it has an Ethernet port which uses only Modbus TCP, so the port cannot be hijacked for other communication uses.

Unique low power design for space and cost savings

The Zen IoT features a unique low power design which can be programmed to start at power levels of less than 1/20W, making battery packs and solar panel systems smaller and more cost effective.

Key features:

- **Up to 12 Universal isolated inputs**
  TC, RTD, mA, mV, V, Potentiometer, Frequency, Counter and more
- **Variety of physical connection options**
  Including WiFi, 3G/4G modems, Ethernet, RS485 and Bluetooth Low Energy (BLE)*
- **Wide connection to leading Cloud service providers**
- **Includes real-time clock and data logging**
- **Scripting logic engine** For custom applications
- **Low power design with sleep options**
- **4 Digital inputs**
- **1 Relay output & 3 Solid state relays**
- **Easy USB programming and data log retrieval**
  defineinstruments.com/workbench

* Bluetooth option available to OEM's on request. Please inquire.

Modbus MEMBER

CE

E2180

Cloud connection options

Wired Ethernet Port

An Ethernet port (use order code 'EIOT') is available for wired internet connection. (Ethernet Modbus TCP is also supported by this instrument and is available to OEM's on request.)

WiFi

WiFi connection (use order code 'WIFI') enables LOS transmission of up to 1476ft (450m) using the supplied 3dBi wireless antenna.

External 3G or 4G modem

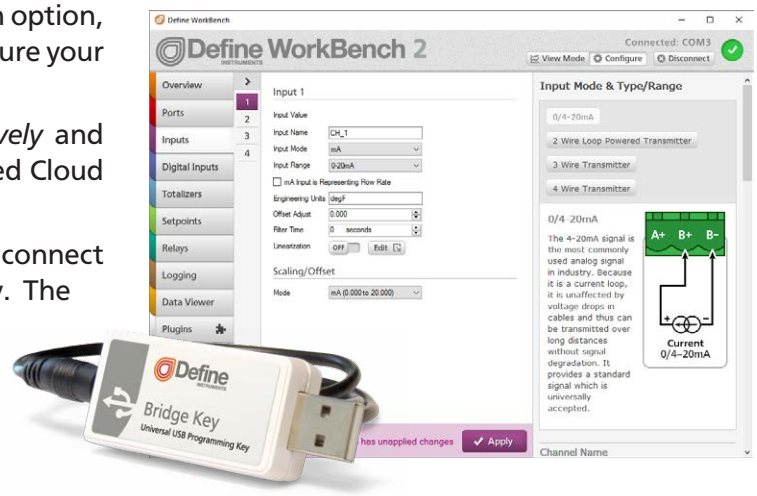
An external 3G or 4G modem may be used for remote devices, and is especially useful when other connections are not an option. The Zen IoT supports 3G/4G modems by default via the included RS485 serial port. (You can also order an additional RS485 comm if required for connection to your PLC.) The external modem supported at this time is the *GateTel GT-HE910-NAD* with type approval for AT&T and T-Mobile.

Simple setup with Define WorkBench

Once you have decided on a Cloud connection option, Define WorkBench can then be used to configure your Cloud/server connection settings.

Currently supported Cloud platforms are *Xively* and *deviceWISE* (please contact us if your preferred Cloud provider is not listed).

A *Custom* connection can also be used to connect to your own server or that of a third party. The *Custom* connection is secured using TLS and uses MQTT as the protocol transfer mechanism. It sends JSON packets containing the industry standard SenML (Sensor markup language) data.



WorkBench also enables easy setup of your inputs, setpoints and totalizers, with presets for hassle-free scaling (no calibration required). A Data Viewer module is included for convenient data log extraction, export and visualization.

Download WorkBench for free at defineinstruments.com/workbench

Ordering Options

ZEN-IOT-4	**4x Universal Isolated Inputs**, 4 digital inputs, 1 relay, 3 solid state relays, 1 comm port (RS485 / RS232). Battery low power. Real-time clock and data logging (32MB). *Case width 1.38" (35mm)*
ZEN-IOT-12	**12x Universal Isolated Inputs**, 4 digital inputs, 1 relay, 3 solid state relays, 1 comm port (RS485 / RS232). Battery low power. Real-time clock and data logging (32MB). *Case width 2.36" (60mm)*
Additional Comms Options:	
	No additional comms
-RS	RS485 / RS232 (auto-detecting)
-EIOT	Ethernet IoT
-WIFI	WiFi (3dBi antenna included)

NOTE: Bluetooth and Modbus TCP comms are also supported by this instrument and are offered to OEM's, subject to minimum order requirements. Please inquire.

General specifications

Power

Power supply Battery Low Voltage, 10–30V DC

Analog input

Universal isolated analog inputs
Zen IoT 4: 4 Input channels
Zen IoT 12: 12 Input channels
PTO for input specifications

Input isolation 2,500V AC 1 minute between all input channels

Isolation test voltage
1000V DC for 1min (Analog input to digital output, Analog input to analog input)

Input resolution 16 bits

Accurate to <±0.1% FSO (unless otherwise stated in input specifications)

General specifications

Linearity & repeatability <±0.1% FSO

Channel separation 125db minimum

RF immunity <±1% effect FSO typical

Noise immunity (CMRR) 160dB tested at 300V RMS 50Hz

Permanent memory (E^2ROM)
100,000 writes per input parameter

Relay output

1 x latching relay output
1A, 30V DC (Form C)

3 x solid state relays
0.4A, 30V DC (Form A)

Digital input

4 x Digital inputs

Functions Status, up counter, up/down counter with direction, debounced counter, frequency, gated frequency

Counter register output 32 bit

Frequency range 0–10,000Hz

Input types NPN, Clean Contact, Voltage 2–30V DC

Threshold 1.2V typical

Debounce counter range 0–100Hz

Isolation Not isolated to power supply

Comms

Protocols Modbus RTU, RS485, RS232 or Define ASCII

Default comm port RS485 / RS232 auto-select. Selectable baud rate 2400–230000 baud
Format 8 bit, no parity, 1 stop

Isolation test voltage 1000V DC for 1min (Comm to analog input, Comm to digital input/output)

Optional additional comm (front panel) Select WiFi, Ethernet IoT or RS485/232 (auto-detecting)

Programming

USB programmable Via 'PC Setup' port using Bridge Key USB programmer (sold separately)

Define WorkBench Simple configuration using Define WorkBench: defineinstruments.com/workbench

Datalogging

Real-time clock

Data logging 32MB (31,774 samples for all channels)

Simple data log retrieval and visualization, using Define WorkBench

Construction

Casing DIN 35 rail mounting; Material: ABS inflammability V0 (UL94)

Dimensions (H x W x D)
Zen IoT 4 = 3.98 x 1.38 x 4.72"
(101 x 35 x 120mm)
Zen IoT 12 = 3.98 x 2.36 x 4.72"
(101 x 60 x 120mm)

Height with antenna
4.65" (118mm), WiFi model only

Environmental conditions

Operating temperature –40 to 176°F (–40 to 80°C)

Storage temperature –40 to 176°F (–40 to 80°C)

Operating humidity 5–85% RH max, non-condensing

Compliances

EN-61326-1:2006

EMC Emissions EN 558022-A; Immunity EN 50082-1; Safety EN 60950

Accessories (Sold Separately)

BRIDGE-KEY	USB Bridge Key, required for PC programming using our free WorkBench software.
GT-HE910-NAD	GateTel cellular modem for 3G/4G connections

Input types

Thermocouple Input

Thermocouple types
B= 32 to 3272°F (0 to 1800°C)
E= -328 to 1292°F (-200 to 700°C)
J= -328 to 1832°F (-200 to 1000°C)
K= -328 to 2300°F (-200 to 1260°C)
N= -328 to 2372°F (-200 to 1300°C)
R= 32 to 3092°F (0 to 1700°C)
S= 32 to 3092°F (0 to 1700°C)
T= -328 to 752°F (-200 to 400°C)

Input impedance >500KΩ

T/C lead resistance 100Ω max

Cold junction compensation
14 to 140°F (–10 to 60°C)

CJC drift <0.02°C/°C typical for all inputs

Accuracy 0.1% of FSO ±1°C typical

Sensor open Upscale

RTD Input

RTD input type
Pt100 3 wire RTD DIN 43760: 1980
Pt1000 3 wire RTD standard

Range
-328–572°F (-200–300°C),
0.02°F (0.01°C) resolution
-328–1472°F (-200–800°C),
0.1°F (0.1°C) resolution

Lead wire resistance 10Ω/lead max recommended

Sensor current 0.6mA continuous

Sensor fail Upscale

Accuracy
-328–572°F (-200–300°C) = ±0.1°C;
-328–1472°F (-200–800°C) = ±0.3°C

Ambient drift 0.003°C/°C typical

Voltage Input

Ranges ±200mV, –200mV to 1V, 0–10V, 0–18V

Input impedance >500KΩ on all ranges

Maximum over voltage 24V DC

Linearity & repeatability 0.1% FSO max

Accuracy 0.1% FSO max

Channel separation 0.001% max

Ambient drift 0.003%/°C FSO typical

RF immunity 1% effect FSO typical

Current Input

Range 0–20mA, 4–20mA

Input impedance 45Ω

Max over-range Protected by PTC to 24V DC

Linearity & repeatability 0.1% FSO max

Accuracy 0.1% FSO max

Channel separation 0.001% max

Ambient drift 0.003%/°C FSO typical

RF immunity 1% effect FSO typical

Digital Pulse Input

Frequency range 0–2500.0Hz

Fast counter range 0–2500.0Hz

Sensors Open collector (NPN, PNP), TTL or Clean Contact

Frequency resolution 0.1Hz

Debounce counter range 0–50Hz max

Counter register output 32 bit

Accuracy ±0.5%

Potentiometer Input

Potentiometer input 3-wire

Excitation voltage Variable

Potentiometer resistance <2kΩ low pot; >2kΩ high pot

Field prog zero 0–90% of span

Field prog span 0.1–100%

Linearity & repeatability <±0.05% FSO typical

Response time 100msec

Ambient drift <50ppm/°C

AC Current Sensor Input

Sensor type Current transformer ACCS-420, ACCS-420-L and ACCS-010

Amperage range Header selectable
ACCS-420/010= 100/150/200A
ACCS-420-L= 10/20/50A

Overload (continuous)
ACCS-420/010= 175/300/400A
ACCS-420-L = 80/120/200A

Output (Representing 0–100% of full scale input range)
ACCS-420(-L)= 4–20mA DC loop powered
ACCS-010= 0–10V DC

Power supply
ACCS-420(-L)= Loop powered, 15–36V DC
ACCS-010= Self powered

Accuracy 1% of full scale

Response time 250ms (10–90%)

Isolation voltage 2,000V

Frequency 50–60Hz

Attenuator Input

Attenuator type Define Instruments HVA-1000, differential resistive attenuator

Max input voltage 1000V DC

Attenuation factor 1000 ±0.1%

Input impedance 3.8MΩ

Output impedance 3.8kΩ

Ambient drift 50ppm/°C max

ZEN-IOT-DS-16V05 (1011)
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