

# // ZDR-20, ZDR-21, ZDR-22

## Demand Response Controller



### // Next-generation DSR

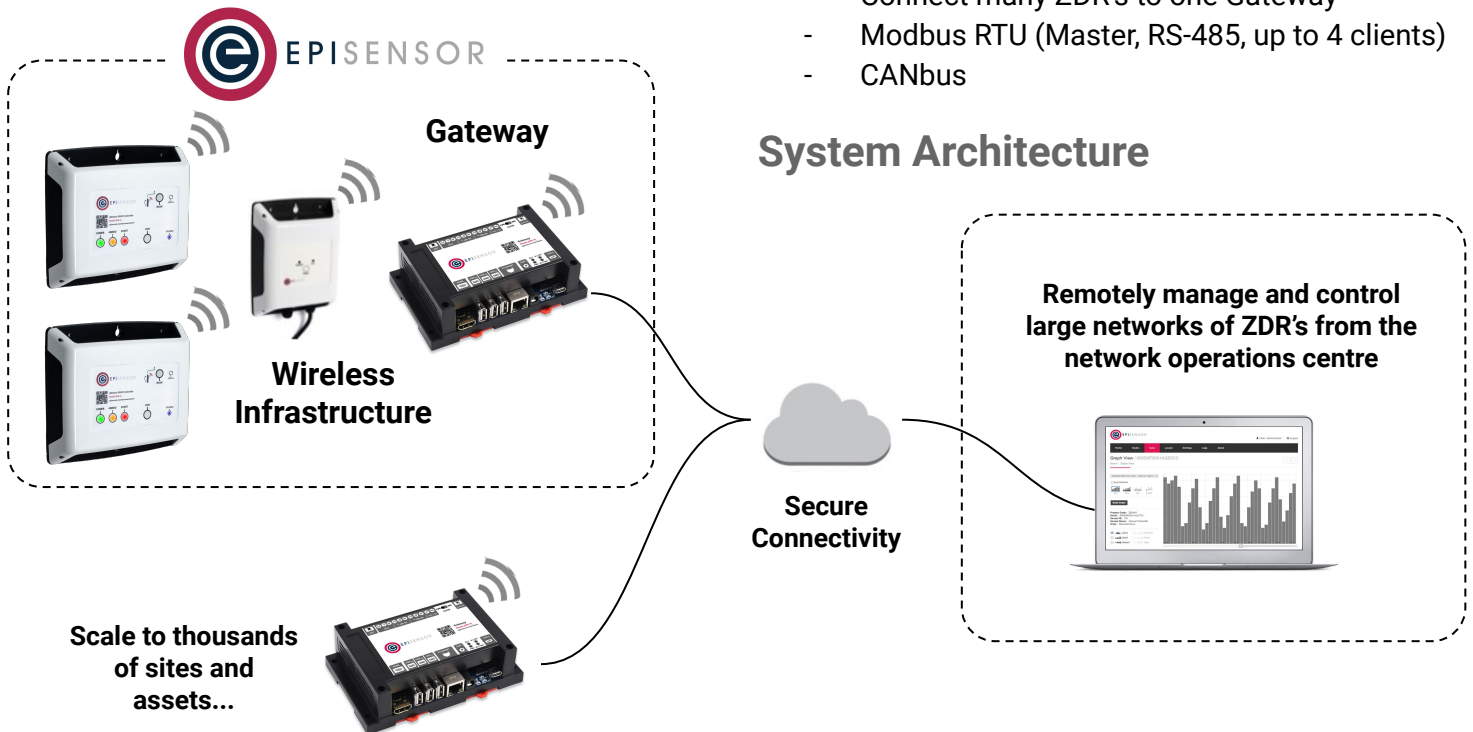
EpiSensor's ZDR is an all-in-one solution for large-scale Demand Side Response programs. Built on EpiSensor's hardened Industrial IoT platform, it meets the highest standards of accuracy, reliability and security, with a consumer-class user experience that's easy to install, configure and maintain.

### // Key Features

- Security from edge to cloud
- 1 second cloud data streaming
- 20ms event data recording
- GPS/GNSS time synchronisation
- 3-phase power meter (Class 0.5S)
- 5A / 250V switching capability
- 100ms under-frequency response time
- Fully wireless communications
- Connect many ZDR's to one Gateway
- Modbus RTU (Master, RS-485, up to 4 clients)
- CANbus

For more information, contact:  
[sales@episensor.com](mailto:sales@episensor.com)

visit <http://episensor.com> or call +353 61 512 500



# Technical Specification

## // Electricity Monitoring

Category	Parameter	Value
3-Phase AC Voltage Inputs	Voltage Measurement Range (L-L)	110 - 480VAC $\pm$ 10%
	Nominal Frequency ( $\pm$ 10%)	50 / 60 Hz
	Overvoltage Category (as per EN 61010-1)	CAT III (480V)
	Wiring configurations	3-phase / 3-wire or 4-wire
	Isolation	Digital / 5000V / 1 minute
AC Current Inputs	Supported CT Types	mA / Rogowski coil
	Impedance	1 $\Omega$ (mA)
	Nominal Frequency ( $\pm$ 10%)	50 / 60 Hz
Auxiliary Voltage Input	Operating Range	85 - 480 $\pm$ 10% V AC
	Power Consumption	Max. 3 Watts
	Overvoltage Category (as per EN 61010-1)	CAT III (480V)
	Frequency	50 / 60 Hz
Accuracy	Power (as per IEC 62053-22)	Class 0.5S
	Frequency	$\pm$ 0.01 Hz
Frequency Response	Reaction Time	$\leq$ 100ms
	Sample Rate	$\leq$ 100ms
	Resolution	0.01 Hz

## // Inputs & Outputs

Category	Parameter	Value
Display	Status LED	RED, IP67
	Power LED	GREEN, IP67
	Armed LED	AMBER, IP67
	Event LED	RED, IP67
	GPS/GNSS LED	BLUE, IP67
Buttons	ARM Key Switch	Keylock (NO), IP67
	MODE Pushbutton	Non-latching (NO), IP67
	EXIT Pushbutton	Non-latching (NO), IP67

# Technical Specification

Category	Parameter	Value
Relay Output	Max Operations at full load	5000
	Outputs	1
	Contact Arrangement (per relay)	1-pole, Form C (CO)
	Contact Rating (resistive)	4A / 250VAC, fused

## // Communications

Category	Parameter	Value
RS-485 (optional)	Protocol(s)	Modbus RTU Master
	Supported Function Codes	1, 2, 3, 4, 5, 6, 15, 16
	Withstand Isolation Voltage	2.5kVRMS / 1 minute
	Max Client (Slave) Devices	4
	Max Registers	20
CAN (optional)	Protocol(s)	CANbus
	Withstand Isolation Voltage	5kVRMS / 1 minute
Wireless Sensor Network	Radio Technology	ZigBee Pro
	Radio Frequency	2.4 GHz ISM band
	Channels	15 (802.15.4 Channels 11 to 25)
	Max Tx Power	+8dBm / +20dBm (with power amp)
	Rx Sensitivity	-106dBm
	Max Data Rate	256kbit/s
	Wireless Range	up to 50m indoor / 300m outdoor

## // Software Features

Category	Parameter	Value
Real Time Clock & Sync	Real Time Clock Backup	Capacitor
	Hold-up time	up to 72 hours
	Synchronisation	NTP time server via Gateway
	Timestamp Format(s)	ISO-8601, Unix Epoch
	Timestamp Resolution	1 second

# Technical Specification

Category	Parameter	Value
Data Logging	Storage Type	Non-volatile flash
	Capacity	up to 70,000 data points
Security	Sensor Network Encryption	AES 128-bit
	Server Communications	TLS v1.2 / various

## // Operating Conditions

Category	Parameter	Value
Operating Conditions	Operating Temperature	-30°C to 60°C (-22°F to 140°F)
	Storage Temperature	-40°C to 70°C (-40°F to 158°F)
	Operating Humidity Range	up to 100%
	Altitude	up to 2000m
Physical	Weight	0.6 kg
	Dimensions (W x H x D)	185 x 155 x 34mm
	IP degree of protection	IP67 (IEC 60529)

## // Certifications

Category	Parameter	Value	
Certifications	Safety/EMC	CE	
	Environmental	RoHS, WEEE	
	EMC/RF		Contains FCC ID: S4GEM358X
			Contains IC ID: 8735A-EM358X

EpiSensor products are not suitable or specifically designed, manufactured or licensed for use in military, aviation, powerplant, medical or in other inherently dangerous or safety critical applications.

# Technical Specification

## // Order Codes

SKU	Description
ZDR-20-mCT	Static FR, Mini-CT's for monitoring existing 1A/5A CT's, 10mm aperture
ZDR-20-300	Static FR, 300A per-phase split-core CT's, 24mm aperture
ZDR-20-r1k	Static FR, 1000A per-phase, flexible Rogowski coil CT's
ZDR-21-mCT	Static FR, Mini-CT's for monitoring existing 1A/5A CT's, 20ms data recording, GPS time sync
ZDR-21-300	Static FR, 300A per-phase split-core CT's, 24mm aperture, 20ms data recording, GPS time sync
ZDR-21-r1k	Static FR, 1000A per-phase, flexible Rogowski coil CT's, 20ms data recording, GPS time sync
ZDR-22-mCT	Dynamic FR, Mini-CT's for monitoring existing 1A/5A CT's, 20ms data recording, GPS time sync
ZDR-22-r1k	Dynamic FR, 1000A per-phase, flexible Rogowski coil CT's, 20ms data recording, GPS time sync

		Product Code Example:	ZDR -	21 -	r1k
Product Line	<b>ZDR:</b> Wireless Demand Response Controller				
Version	<b>20:</b> Relay Switch with Static Frequency Response and Demand Response <b>21:</b> As ZDR-20 with High Speed Data and GPS Time Sync <b>22:</b> Battery Control with Dynamic Frequency Response, High Speed Data and GPS Time Sync				
CT Current Rating	<b>120:</b> 120A per-phase, 16mm aperture, split-core mA CT's <b>300:</b> 300A per-phase, 24mm aperture, split-core mA CT's <b>r1k:</b> 1000A per-phase, flexible Rogowski coil CT's <b>r3k:</b> 3000A per-phase, flexible Rogowski coil CT's <b>mCT:</b> mini CT's for monitoring the secondary output of existing 1A or 5A CT's				

## Installation & Safety Notes



**HAZARD OF ELECTRIC SHOCK,  
EXPLOSION, OR ARC FLASH**



- EpiSensor equipment should be installed, operated, serviced and maintained only by qualified personnel. EpiSensor does not assume any responsibility for any consequences arising out of the use of this equipment.
- For detailed installation and safety information, consult the Install Sheet.

## // Contact

For technical support, please contact [support@episensor.com](mailto:support@episensor.com) or phone +353 61 512 500

**Address:** EpiSensor Ltd. National Technology Park, Limerick, V94 C61W, Ireland

Manufactured in an ISO 9001 / ISO 14001 certified facility.

Designed and  
manufactured  
in Ireland



# Dimensions & Mounting



## MOUNTING

### Keyhole slots (x2):

- Vertical distance: 135mm
- Screw head diameter 4 - 8mm

### Wall mounting holes (x4):

- Horizontal distance: 125mm
- Vertical distance: 130mm
- Screw head diameter: >= 5mm

## INPUTS / OUTPUTS

Variant	GPS Antenna	Relay	Serial	Key Switch
ZDR-20		✓	✓	
ZDR-21	✓	✓	✓	✓
ZDR-22	✓		✓	✓

# Frequently Asked Questions

## // What Current Transformer types and sizes does the ZDR support?

The ZDR is compatible with EpiSensor's standard range of mA CT's and flexible Rogowski coils. The standard mA (split core) range includes "mini CT's" that can monitor the secondary output from existing 1A or 5A CT's with a 10mm aperture, 120A/phase CT's with a 16mm aperture and 1000A/phase or 3000A/phase flexible Rogowski Coils in a variety of sizes.

## // Are EpiSensor cloud services required?

EpiSensor offer various premium support packages, which provide customers and partners with a defined service level and include software and firmware updates, but no cloud services are required from EpiSensor, and no customer data flows through EpiSensor servers.

## // What wireless range can I expect?

The wireless range you can achieve will depend on the fabric of the building and the location where the hardware is installed - but on average, each mains powered node (including the ZDR) will provide coverage for 1000m<sup>2</sup> of commercial / industrial floor area. The system uses ZigBee wireless mesh networking technology, so wireless coverage will improve with each node that's added.

## // What data is available from the ZDR?

There are up to 30 data feeds available from the ZDR that can be individually enabled or disabled, like kWh, kVAh, frequency, RMS current, power-factor, RMS voltage & many more.

## // Who can install the system?

The electricity meters must be installed by qualified electrical workers, and the installation must conform to local electrical standards.

## // Can EpiSensor systems be expanded to include multiple meters / sensors?

Yes! The exact number of nodes supported will depend on the number of sensors enabled and their reporting interval (the limit is measured in 'data points per hour') but an approximate limit would be up to 50 nodes, or 5 nodes with live-stream enabled can be connected to each EpiSensor Gateway.

## // What other sensors can be added to the system?

There are many types available, including wireless temperature sensors, humidity, pulse, 4-20mA and also Modbus/RS-485 and M-Bus, which can be used to extract live data from existing metering equipment in other locations.

## // Where can the ZDR be installed?

The ZDR is water and dust-proof to IP67 (NEMA 6) standard and double-insulated. This means it can be mounted inside or outside an electrical panel, indoors or outdoors, in clean or dirty environments. For more detailed product information, please check the technical specification.

## // What type of Internet connections are supported?

EpiSensor's IoT Gateways support Cellular (3G/4G), Wi-Fi and Ethernet network connections.

## // What security features are supported?

Data is encrypted at every layer in the system. On the ZigBee wireless sensor network, AES 128-bit security is used. Between the Gateway and server, industry standard TLS v1.2 encryption is used to protect customer data.