## OleumTech®

# DATASHEET





### Highlights

- Wirelessly gather/distribute sensor data
- Map I/O anywhere within the network
- Modbus Master/Slave functionality
- Supports local Over-the-Air (OTA) functionality for updating OleumTech wireless devices (OTA Link Adapter required)\*
- I configurable Serial/RTU port (RS232/RS485)
- 1 dedicated RS485 port (RJ-45)
- 4 analog inputs (0-5 Vdc)
- 2 discrete inputs & 2 discrete outputs
- -40 °C to 80 °C (-40 °F to 176 °F)
- = 900 MHz / 915 MHz / 2.4 GHz / 868 MHz
- Secure AES encryption
- Class I, Division 2 (Zone 2) certified



US Patent #6,967,589





#### **Primary Data Collection Point**

The OleumTech<sup>®</sup> DH1 Wireless Gateway plays an integral role in the OTC Wireless Sensor and I/O Network. It possesses the ability to aggregate data from OTC wireless transmitters and I/O modules onto its 320-point register holding table. Third-party devices can access the data over the Modbus or LevelMaster ASCII protocol.

#### Advanced Peer-to-Peer Networking

Deploy multiple gateways to the OTC platform, creating a custom, highly scalable network. The gateways have the ability to communicate with one another. Leverage the peer-to-peer technology and funnel data to the primary gateway, optimizing network efficiency and/or designing an extremely flexible I/O mapping system across the entire wireless network.

#### Serial Interfaces

With the provided RS232/RS485 configurable Serial port, the DH1 can virtually interface with any third-party Modbus device either as a Master or Slave device. The DH1 can also be configured as a LevelMaster ASCII Slave or ROC Link Master. Its dedicated RS485 port (RJ-45) can be utilized for connecting to another Serial device.

#### Onboard I/O

The DH1 is equipped with onboard I/O, comprised of 4 analog inputs (0-5 Vdc), 2 digital inputs, and 2 digital outputs. If additional I/O points are needed, integrate the OleumTech RS485 Modular I/O Expansion System with the DH1 or any other gateway for added versatility.

### **Technical Specifications**

**OleumTech**<sup>®</sup>

### Networking Diagram

HARDWARE FEATURES		
Device Functionality	· Serial Wireless Gateway with Onboard I/O	
Embedded Controller	· 32-bit Low Power ARM7 Microcontroller with Internal FLASH (Field Upgradeable)	
	· RTU Port (RS232/RS485) Terminal Block	
Serial Interfaces	· Modbus Master/Slave, LevelMaster ASCII Slave, ROC-Link Master (Supports Opcodes 17 and 10)	
	· RS485 Expansion Port - Modbus Master or Slave (RJ-45)	
	· 4 Analog Inputs (0-5 Vdc) with 12-bit ADC	
	· 2 Discrete Inputs (0-24 Vdc) for Dry Contact Relay or Open-Drain Output Devices	
I/O Interfaces	· 2 Open-Drain Outputs (Imax = 240 mA (Continuous Sink Current @ 80 °C), Vmax = 24 Vdc)	
	Devices for Controlling External Devices (Valves, Relays, Etc.)	
Configuration	· Config / Debug Port - RS232 Slave Only (RJ-45) / BreeZ <sup>®</sup> Software for PC	
WIRELESS COMMUNICATIO	NS	
Radio Band	· ISM Band (License-Free)	
900 MHz / 915 MHz	· FHSS, FSK, AES Encryption 256-bit (900 MHz), 128-bit (915 MHz)	
2.4 GHz	· DSSS, AES Encryption 128-bit	
868 MHz	· LBT-AFA, AES Encryption 128-bit	
Bit Rate	· 900/915 MHz: 9600 bps / 115.2 kbps; 2.4 GHz: 250 kbps; 868 MHz: 80 kpbs	
Output Power (Max)	· 900/915 MHz: 1000 mW; 2.4 GHz: 63 mW; 868 MHz: 25mW	
De seiving Constitute	· 900/915 MHz: -110 dBm @ 9600 bps, -100 dBm @ 115.2 kbps	
Receiving sensitivity	· 2.4 GHz: -101 dBm @ 250 kbps; 868 MHz: -106 dBm @ 80 kbps	
	· 900/915 MHz: Up to 40 Miles / 64 km with Clear Line of Sight <sup>1</sup> (Gateway to Gateway)	
	900/915 MHz: Up to 7500 Feet / 1.4 Miles / 2.3 km with Clear Line of Sight <sup>1</sup> (Transmitter to Gateway)	
RF Range	· 2.4 GHz: Up to 4.3 Miles / 7 km with Clear Line of Sight <sup>1</sup> (Gateway to Gateway)	
	868 MHz: Up to 5.2 Miles / 8.4 km with Clear Line of Sight <sup>1</sup> (Gateway to Gateway)	
<b>CERTIFICATIONS &amp; COMPLI</b>	ANCE	
	· FCC Part 15 (USA), IC ICES-003 (Canada), ACMA (Australia)	
	· AS/NZS CISPR 32 (Australia), EN55032 & EN55024 (EU)	
æ	· Class I, Division 2, Groups A, B, C, D T4; Ex nA IIC T4	
	· Class I Zone 2 AEx nA IIC T4	
	· ATEX: Sira 14ATEX4143X; II 3 G Ex nA IIC T4 Gc	
	· IECEx: SIR 13.0055X; Ex nA IIC T4 Gc	
MECHANICAL SPECIFICATIO	NS .	
Dimensions	· 4.9" (W) x 3" (H) x 1.4" (D) / 124.5 mm (W) x 76.2 mm (H) x 35.6 mm (D)	
Package Dimensions	· 8" (W) x 6" (H) x 2.5" (D) / 203 mm (W) x 152 mm (H) x 63 mm (D)	
Package Weight	· ~1 lbs / 0.4 kg	
Mounting	· DIN Rail Mountable with Height Adjustability	
ELECTRICAL SPECIFICATION	IS	
DC Power Input	• 9-30 Vdc	
Average Power Input	· 2 Watt	
	· 900/915 MHz @ 1000 mW: Receive Avg 63 mA, Transmit Avg 348 mA	
Power Consumption @12 Vdc	· 2.4 GHz @ 63 mW: Receive Avg 61 mA, Transmit Avg 112 mA	
	· 868 MHz @ 25 mW: Receive Avg 58 mA, Transmit Avg 72 mA	
	· 900/915 MHz @ 1000 mW: Receive Avg 40 mA, Transmit Avg 174 mA	
Power Consumption @24 Vdc	· 2.4 GHz @ 63 mW: Receive Avg 38 mA, Transmit Avg 61 mA	
	· 868 MHz @ 25 mW: Receive Avg 37 mA, Transmit Avg 45 mA	
GENERAL SPECIFICATIONS		
Operating Conditions	· Temperature: Class I, Division 2 (Zone 2): -40 °C to 80 °C (-40 °F to 176 °F)	
	· Humidity: 0 to 99 %, Non-Condensing	
Warranty	· 2-Year Parts and Labor	
Country of Origin	·USA	
ORDERING INFORMATION		
Model Numbers	·WG-0900-DH1,WG-0915-DH1,WG-2400-DH1,WG-0868-DH1	
Wirelessly Connects To	· OTC Wireless Devices (Gateways, Transmitters, I/O Modules)	
Configuration Cable	· SX1000-CC2, 20-ft All-in-One Configuration Cable	
OTA Link Adapter	· SXxxxx-OTA (xxxx = RF Type), SMA-Male, USB, Antenna Sold Separately	

#### OTC GATEWAY - DH1



"OTA functionality does not support changing the radio settings or upgrading the device firmware.

<sup>1</sup>The maximum RF range data was collected under optimal test conditions, including a clear line of sight between antennas. Actual wireless RF range may vary depending on location, RF interference, weather, antenna type, cable type, and line of sight.

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## OleumTech

DH2 WIRELESS GATEWAY

#### DATASHEET DH2

## 



### Highlights

- Wirelessly gather/distribute sensor data
- Map I/O anywhere within the network
- Modbus Master/Slave functionality
- 1 configurable Serial/RTU port (RS232/RS485)
- Supports local Over-the-Air (OTA) functionality for updating OleumTech wireless devices (OTA Link Adapter required)<sup>1</sup>
- -40 °C to 80 °C (-40 °F to 176 °F)
- 900 MHz / 915 MHz / 2.4 GHz / 868 MHz
- Secure AES encryption
- Class I, Division 2 (Zone 2) certified





**OTC Transmitters** 

**OTC Gateway** 

Network Infrastructure

Cloud (Analytics)

## Wireless Gateway with Serial Connectivity

#### **Primary Data Collection Point**

The OleumTech® DH2 Wireless Gateway plays an integral role in the OTC Wireless Sensor and I/O Network. It possesses the ability to aggregate data from OTC wireless transmitters and I/O modules onto its 1920-point register holding table. Third-party devices can access the data over the Modbus or LevelMaster ASCII protocol.

#### Advanced Peer-to-Peer Networking

Deploy multiple gateways to the OTC platform, creating a custom, highly scalable network. The gateways have the ability to communicate with one another. Leverage the peer-to-peer technology and funnel data to the primary gateway, optimizing network efficiency and/or designing an extremely flexible I/O mapping system across the entire wireless network.

#### Serial Interface

With the provided RS232/RS485 configurable Serial port, the DH2 can virtually interface with any third-party Modbus device either as a Master or Slave device. You can gain visibility and control of stranded assets by using the DH2 as a secondary gateway or as a Master device. You can also integrate I/O capabilities for added versatility.

#### **Reliable**, Trusted

The DH2 has been widely used for OTC Network deployments for over a decade, proving its reliability and robustness in harsh oilfields. The DH2 is the standard of excellence, resembling OleumTech's commitment to quality and innovation.

## **OleumTech**<sup>®</sup>

### **Technical Specifications**

### Networking Diagram

HARDWARE FEATURES			
Device Functionality	· Serial Wireless Gateway		
Embedded Controller	· 32-bit Low Power ARM7 Microcontroller with Internal FLASH (Field Upgradeable)		
Sorial Interfaces	· RTU Port (RS232/RS485) Terminal Block	OIC GAIEW.	AY - DHZ
Senai Internaces	$\cdot$ Modbus Master/Slave, LevelMaster ASCII Slave, ROC-Link Master (Supports Opcodes 17 and 10)		
Configuration	$\cdot$ Config / Debug Port - RS232 Slave Only (RJ-45) / BreeZ° Software for PC		
WIRELESS COMMUNICATION	IS	DH2 shown with optional omni-directional antenna.	PC
Radio Band	· ISM Band (License-Free)		
900 MHz / 915 MHz	· FHSS, FSK, AES Encryption 256-bit (900 MHz), 128-bit (915 MHz)		
2.4 GHz	· DSSS, AES Encryption 128-bit		RS232
868 MHz	· LBT-AFA, AES Encryption 128-bit		Config Port
Bit Rate	· 900/915 MHz: 9600 bps / 115.2 kbps; 2.4 GHz: 250 kbps; 868 MHz: 80 kpbs		
Output Power (Max)	· 900/915 MHz: 1000 mW; 2.4 GHz: 63 mW; 868 MHz: 25mW	• •	
	· 900/915 MHz: -110 dBm @ 9600 bps, -100 dBm @ 115.2 kbps	ΟΤ«	DH2.
Receiving Sensitivity	· 2.4 GHz: -101 dBm @ 250 kbps; 868 MHz: -106 dBm @ 80 kbps	6	OleumTech 🙆
	• 900/915 MHz: Up to 40 Miles / 64 km with Clear Line of Sight <sup>2</sup> (Gateway to Gateway)	MMCX JJJJJ	13930
	• 900/915 MHz: Up to 7500 Feet / 1.4 Miles / 2.3 km with Clear Line of Sight <sup>2</sup> (Transmitter to Gateway)		
RF Range	· 2.4 GHz: Up to 4.3 Miles / 7 km with Clear Line of Sight <sup>2</sup> (Gateway to Gateway)		1 1 1 E N - N
	· 868 MHz: Up to 5.2 Miles / 8.4 km with Clear Line of Sight <sup>2</sup> (Gateway to Gateway)		
<b>CERTIFICATIONS &amp; COMPLIA</b>	NCE		
	· FCC Part 15 (USA), IC ICES-003 (Canada), ACMA (Australia)		RS232
	· AS/NZS CISPR 32 (Australia), EN55032 & EN55024 (EU)		
ÆD.	· Class I, Division 2, Groups A, B, C, D T4; Ex nA IIC T4		
Cofety Color	· Class I Zone 2 AEx nA IIC T4	OTC TRANSMITTERS	PLC/RTU/
	· ATEX: Sira 14ATEX4143X; II 3 G Ex nA IIC T4 Gc		RF M
	· IECEx: SIR 13.0055X; Ex nA IIC T4 Gc		or C
MECHANICAL SPECIFICATIO	NS		Modbus
Dimensions	· 3.8" (W) x 3" (H) x 1.4" (D) / 96.5 mm (W) x 76.2 mm (H) x 35.6 mm (D)		Slave
Package Dimensions	· 8" (W) x 6" (H) x 2.5" (D) / 203 mm (W) x 152 mm (H) x 63 mm (D)		BOC-Lir
Package Weight	·~1 lbs / 0.4 kg		Field
Mounting	· DIN Rail Mountable with Height Adjustability		
ELECTRICAL SPECIFICATIONS	5		
DC Power Input	· 9-30 Vdc		
Average Power Input	· 2 Watt		
	· 900/915 MHz @ 1000 mW: Receive Avg 55 mA, Transmit Avg 312 mA	, ľ	( scada/
Power Consumption @12 Vdc	· 2.4 GHz @ 63 mW: Receive Avg 57 mA, Transmit Avg 117 mA		
	· 868 MHz @ 25 mW: Receive Avg 54 mA, Transmit Avg 64 mA		
	· 900/915 MHz @ 1000 mW: Receive Avg 35 mA, Transmit Avg 175 mA	Ó	
Power Consumption @24 Vdc	· 2.4 GHz @ 63 mW: Receive Avg 37 mA, Transmit Avg 63 mA		
	· 868 MHz @ 25 mW: Receive Avg 35 mA, Transmit Avg 46 mA		
GENERAL SPECIFICATIONS			
Operating Conditions	· Temperature: Class I, Division 2 (Zone 2): -40 °C to 80 °C (-40 °F to 176 °F)		
	· Humidity: 0 to 99 %, Non-Condensing		
Warranty	· 2-Year Parts and Labor		
Country of Origin	· USA	1	
ORDERING INFORMATION		ł	
Model Numbers	·WG-0900-DH2, WG-0915-DH2, WG-2400-DH2, WG-0868-DH2		
Wirelessly Connects To	• OTC Wireless Devices (Gateways, Transmitters, I/O Modules)		
Configuration Cable	SX1000-CC2, 20-ft All-in-One Configuration Cable		
OTA Link Adapter	<ul> <li>SXxxxx-OTA (xxxx = RF Type), SMA-Male, USB, Antenna Sold Separately</li> </ul>		

OT DH2

PLC/RTU/EFM/HMI/ RF MODEM or Other Modbus Master/ Slave Device, LevelMaster, ROC-Link Slave, Field Asset

RS232/RS485



<sup>1</sup>OTA functionality does not support changing the radio settings or upgrading the device firmware.

<sup>2</sup>The maximum RF range data was collected under optimal test conditions, including a clear line of sight between antennas. Actual wireless RF range may vary depending on location, RF interference, weather, antenna type, cable type, and line of sight.

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## OleumTech

# DATASHEET



## Highlights

- Wirelessly gather/distribute sensor data
- Map I/O points anywhere within the network
- Point-to-multipoint, peer-to-peer connectivity
- Modbus Master/Slave functionality
- Serial/RTU interface (RS232/RS485)
- Supports local Over-the-Air (OTA) functionality for updating OleumTech wireless devices (OTA Link Adapter required)\*
- Integrate OleumTech I/O Expansion Modules without sacrificing its Serial port
- I/O Expansion Modules available (isolated)
- Compact form factor
- -40 °C to 80 °C (-40 °F to 176 °F)
- 900 MHz / 915 MHz / 2.4 GHz / 868 MHz
- Secure AES encryption
- Class I, Division 2 (Zone 2) certified



US Patent #6,967,589

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**OTC Transmitters** 

OTC Gateway



Network Infrastructure

Cloud (Analytics)

### Serial Gateway with Modular I/O Expansion Capabilities

Local Controller RTU/EFM/PLC/ DCS/HMI/ Long-Haul Radio

#### Primary Data Collection Point

The OleumTech® DH2-W Wireless Gateway plays an integral role in the OTC Wireless Sensor and I/O Network. It possesses the ability to aggregate data from OTC wireless transmitters and I/O modules onto its 1920-point register holding table. Third-party devices can access the data over the Modbus or LevelMaster ASCII protocol.

#### Advanced Peer-to-Peer Networking

Deploy multiple gateways to the OTC platform, creating a custom, highly scalable network. The gateways have the ability to communicate with one another. Leverage the peer-to-peer technology and funnel data to the primary gateway, optimizing network efficiency and/or designing an extremely flexible I/O mapping system across the entire wireless network.

#### Compact and Versatile

The DH2-W is a full-function gateway and is ideal for fitment where enclosure space is a premium. When it is deployed alone, it can be installed on a DIN rail having less than 1" width of space. The DH2-W can be configured as a Modbus Master or Slave device and provides Serial RS232/RS485 connectivity.

#### Modular Wireless I/O Expansion Solution

The DH2-W can be integrated with OleumTech's isolated Analog 0-10 Vdc, 4-20 mA, and Digital I/O Expansion Modules for solving various I/O challenges. The I/O Modules can be used in any mix or combination with the DH2-W. The BreeZ<sup>®</sup> Software makes it extremely easy to add and configure I/O points. A standard 35 mm DIN rail is required for I/O Expansion Module(s) integration.

## OleumTech®

### Technical Specifications (DH2-W)

### Networking Diagram

HARDWARE FEATURES			
Device Functionality	· Serial Wireless Gateway with I/O Expansion Capabilities		
Embedded Controller	· 32-bit Low Power ARM7 Microcontroller with Internal FLASH (Field Upgradeable)	OTC GATEWAY	′ - DH2-W
	· RTU Port (RS232/RS485) Terminal Block		
Serial Interfaces	· Modbus Master/Slave, LevelMaster ASCII Slave, ROC-Link Master (Supports Opcodes 17 and 10)		
Configuration	$\cdot$ Config / Debug Port - RS232 Slave Only (Mini-USB) / BreeZ* Software for PC	DH2-W shown with c	ptional
Device Diagnostics	· Health Tag: Supply Voltage	omni-directional ant	enna.
WIRELESS COMMUNICATIO	NS		
Radio Band	· ISM Band (License-Free)		
900 MHz / 915 MHz	· FHSS, FSK, AES Encryption 256-bit (900 MHz), 128-bit (915 MHz)	Constant Con	Access to I/O
2.4 GHz	· DSSS, AES Encryption 128-bit	PC 1	Expansion
868 MHz	· LBT-AFA, AES Encryption 128-bit		Modules
Bit Rate	· 900/915 MHz: 9600 bps / 115.2 kbps; 2.4 GHz: 250 kbps; 868 MHz: 80 kpbs		
Output Power (Max)	· 900/915 MHz: 1000 mW; 2.4 GHz: 63 mW; 868 MHz: 25mW		
Descriving Constitution	· 900/915 MHz: -110 dBm @ 9600 bps, -100 dBm @ 115.2 kbps		SMA
Receiving sensitivity	· 2.4 GHz: -101 dBm @ 250 kbps; 868 MHz: -106 dBm @ 80 kbps		
	$\cdot$ 900/915 MHz: Up to 40 Miles / 64 km with Clear Line of Sight $^1$ (Gateway to Gateway)		
	• 900/915 MHz: Up to 7500 Feet / 1.4 Miles / 2.3 km with Clear Line of Sight <sup>1</sup> (Transmitter to Gateway)		DC222/DC405
RF Range	• 2.4 GHz: Up to 4.3 Miles / 7 km with Clear Line of Sight <sup>1</sup> (Gateway to Gateway)		R5232/R5485
	· 868 MHz: Up to 5.2 Miles / 8.4 km with Clear Line of Sight <sup>1</sup> (Gateway to Gateway)		
SOFTWARE USER INTERFA	CE (PC APPLICATION)	OTC TRANSMITTERS	PIC/RTU/FEM/HMI/
Version/PC Platform	• BreeZ <sup>®</sup> Software v6.0 or Later; PC with Windows <sup>®</sup> 7 or Later		RF MODEM
<b>CERTIFICATIONS &amp; COMPLI</b>	ANCE		or Other
	· FCC Part 15 (USA), IC ICES-003 (Canada), ACMA (Australia)		Modbus Master/
emc/emi <b>FC:</b> 🖉	AS/NZS CISPR 32 (Australia), EN55032 & EN55024 (EU)		Slave Device,
G	· Class I. Division 2. Groups A, B, C, D T4: Ex nA IIC T4 Gc	T T X	LevelMaster,
SP:	Class I Zone 2 AEx nA IIC T4 Gc	14 🔍	RUC-LINK Slave,
Safety	• ATEX: Sira 15ATEX4134X: Ex nA IIC T4 Gc. II 3 G	f = <del>≥</del> -	Field Asset
( E 🖭 🛄	· IECEx: SIR 15.0055X: Ex nA IIC T4 Gc	8	
MECHANICAL SPECIFICATIO	DNS	l I	
Dimensions	• 0.7 x 3.9 x 4.5-in / 17.5 x 99 x 114 mm	ľ	
Package Dimensions	· GM1: 4.8 x 5.1 x 2.8-in / 123 x 129 x 72 mm   GM1K: 5.5 x 10.1 x 2.8-in / 140 x 257 x 72 mm		SCADA/CLOUD
Package Weight	· GM1: 0.5 lbs / 227 g   GM1K: ~1 lbs / 0.4 kg	-	
DIN Rail Mounting	· 35 mm x 7.5 mm DIN Rail		
I/O Module Support	· Up to 5 I/O Modules using 156 mm DataBail Bus		
ELECTRICAL SPECIFICATION	IS		
DC Power Input	· 9-30 Vdc	I	
Average Power Input	· 2 Watt		
	· 900/915 MHz @ 1000 mW: Receive Avg 62 mA. Transmit Avg 291 mA		
Power Consumption @12 Vdc	· 2.4 GHz @ 63 mW: Receive Avg 62 mA. Transmit Avg 109 mA		
· · · · · · · · · · · · · · · · · · ·	· 868 MHz @ 25 mW· Receive Avg 59 mA. Transmit Avg 75 mA		
	• 900/915 MHz @ 1000 mW <sup>.</sup> Beceive Avg 37 mA. Transmit Avg 168 mA		
Power Consumption @24 Vdc	. 2 4 GHz @ 63 mW· Receive Avg 37 mA Transmit Avg 62 mA	· · · · · · · · · · · · · · · · · · ·	
· · · · · · · · · · · · · · · · · · ·	· 868 MHz @ 25 mW· Receive Avg 35 mA Transmit Avg 45 mA		
GENERAL SPECIFICATIONS		P4 POWER P1 RS485-HA	FDUPLEX
GENERAL SI ECH ICATIONS	Temperature: Class   Division 2 (Zone 2): -40 °C to 80 °C (-40 °E to 176 °E)	Gateway Module Premier Research and the Research and the Com 9-36/Vide Com Particular Research and the Resea	•
Operating Conditions	Humidity 0 to 00 % Non Condensing	tende kands), interformer part (E. Pen- terner), francés and a ministration of the second sec	32
Warranty	- Turnindity, 0 to 35 %, Nor-Condensing	<u> </u>	€ <b>2</b>
Country of Origin		Leven Salida I → Concentional     Leven Salida I → Concentional     Red 100 Link Failure ]     If See Bet     TXD RXD	GND 000
	-05A	•	
		<b>L</b>	, /
Gateway Unity (GIVIT)	· DWD-OURU , DWD-D-OURU , DWD-2400-UWI , DWD-U808-UWI PM www. CM1K (Includes DataDail and Meuntine Hardware)	Saul and S	
DIM Dail Mounting Kit	SA1000 W/1 (1 DeteDail + Mounting H/M/ Cours 2 End Tomains Detedated A Tomains Dial		
	- SATUUU-WKT (T Datakali + Mounting H/W: Cover, 2 End Terminal Brackets, 4 Terminal Plugs)		
4-20 mA I/O Module	· BM-A420-1225 (Single Pack) / BM-A420-122D (Dual Pack)		
0-10 V I/O Module	· BM-A010-1225 (Single Pack) / BM-A010-122D (Dual Pack)		
Digital I/O Module	·BM-D100-144S (Single Pack) / BM-D100-144D (Dual Pack)		
Wirelessly Connects To	· OTC Wireless Devices (Gateways, Transmitters, I/O Modules)		
Configuration Cable	· SX1000-CC2, 20-ft All-in-One Configuration Cable		
OTA Link Adapter	· SXxxxx-OTA (xxxx = RF Type), SMA-Male, USB, Antenna Sold Separately		

<sup>\*</sup>OTA functionality does not support changing the radio settings or upgrading the device firmware. <sup>1</sup>The maximum RF range data was collected under optimal test conditions, including a clear line of sight between antennas.

Actual wireless RF range may vary depending on location, RF interference, weather, antenna type, cable type, and line of sight.

# **OleumTech**<sup>®</sup>

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### Technical Specifications (I/O Modules)

#### HARDWARE FEATURES

Maximum I/O Module Capacity	<ul> <li>Max Capacity Depends on I/O Combination Impacting Power</li> </ul>	200 230 203 303 303 303 33
When Using More Than 5 Modules	· Use Power Budget Calculator http://goo.gl/Z7xC5M	
DIN Rail Mounting Compatibility	· 35 mm x 7.5 mm DIN Rail	
DataRail® Included with GM1K	$\cdot6.1"$ / 156 mm - Supports Up to 5 I/O Modules, Other Lengths Also Available	
I/O Module Slave ID Selection	· 16-Position Rotary Switch	
DataRail Mounting Hardware	· 4-Claw Attachment to 35 mm DIN Rail with End Terminal Bracket	
Built-In Mounting Hardware	· Spring-Loaded Clip-On System	
Wire Gauge	· Solid / Stranded (AWG) 28-12 Gauge	Aller
Wire Rating	· UL: 300 V RMS, 80 °C and 300 V, 105 °C / CSA: 300 V RMS, 105 °C	
Package Dimensions (WxHxD)	· 4.8 x 5.1 x 2.8-in / 123 x 129 x 72 mm	DH2-W Shown with
Package Weight	· Single Pack: 0.5 lbs / 227 g; Dual Pack: 0.8 lbs / 363 g	I/O Modules
Warranty	· 2-Year Limited	
SAFETY & COMPLIANCE		
Operational Temperature	40 °C to 80 °C (-40 °F to 176 °F)	
Ambient Temperature	· -20 °C to 80 °C (-4 °F to 176 °F)	fffffffff
Humidity	· 0 to 99 %, Non-condensing	P1/72 MPUTS 113,5V AL COM
Degree of Protection	· IP20 / Plastic	0-19 V Module ID SETUP Verificerary watch
	· Class I, Division 2, Groups A, B, C, D T4; Ex nA IIC T4 Gc	
	· Class I Zone 2 AEx nA IIC T4 Gc	
	· ATEX: Sira 15ATEX4134X; Ex nA IIC T4 Gc	
	· IECEx: SIR 15.0055X; Ex nA IIC T4 Gc	
ANALOG 0-10 V I/O MODULE		
Number of Inputs and Outputs	· 2 Inputs (24-bit Resolution) / 2 Outputs (16-bit Resolution)	0-10 V I/O Module
Signal Range	• 0 Vdc to 10 Vdc (10.5 V Max)	
Isolation Voltage	· 2500 V r.m.s.	
Accuracy	· < 0.1 % of Full Scale	
Al Input Impedance	· 40K ohm	·
AO Output Impedance	· 10 ohm	
Power Consumption	· Typical: 40 mA / Max: 45 mA @12 Vdc	ID SETUP
ANALOG 4-20 mA I/O MODULE		ENKIGE EXCLUSION
Number of Inputs and Outputs	· 2 Inputs (24-bit Resolution) / 2 Outputs (16-bit Resolution)	
Signal Range	· 4 mA to 20 mA	<b>.</b>
Isolation Voltage	· 2500 V r.m.s.	
Accuracy	$\cdot$ < 0.2 % of Full Scale	4-20 mA I/O Module
Internal Loop Power	· +13.5 Vdc	
Maximum Current	· 84 mA @ 12 Vdc	
Al Input Impedance (loop)	• 128 ohm	
AO Terminal Voltage Range	· 10 Vdc Min. / 31.5 Vdc Max.	YIIIIIII .
Power Consumption	· Typical: 50 mA / Max: 75 mA @12 Vdc	
DIGITAL I/O MODULE		
Number of Inputs and Outputs	· 4 Inputs / 4 Outputs	Under for interformer to subject the first of the first
Input Voltage Range	· 3-30 Vdc	Or curve of the second s
Isolation Voltage	· 2500 V r.m.s.	
Input Voltage Threshold	• Signal ("H"): > 2.3 Vdc / 0 Signal ("L"): < 1.1 Vdc	
Output Rating	1 A Sink Current for Open-Drain Outputs / NPN	
Green LEDs	Line-Driven Input Indicators	Digital I/O Module
Red LEDs	Output Indicators	
Power Consumption	• Typical: 18 mA / Max: 26 mA @12 Vdc	



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## OleumTech®

# DATASHEET

## **OT**《



## Highlights

- Wirelessly gather/distribute sensor data
- Map I/O points anywhere within the network
- Modbus Master/Slave functionality
- Ethernet connectivity facilitates IoT and IIoT implementations
- MQTT/Sparkplug B functionality<sup>1</sup>
- Supports remote and local Over-the-Air (OTA) functionality for updating OTC wireless devices<sup>2</sup>
- 2 configurable Serial/RTU ports (RS232/RS485)
- Data logging capabilities / integrated web server
  - -40 °C to 70°C (-40 °F to 158 °F)
  - 900 MHz / 915 MHz / 2.4 GHz / 868 MHz
  - Secure AES encryption
  - Class I, Division 2 (Zone 2) certified



#### US Patent #6,967,589



## Gateway with Ethernet and Serial Connectivity

#### Primary Data Collection Point

The OleumTech® DH3 Wireless Gateway plays an integral role in the OTC Wireless Sensor and I/O Network. It possesses the ability to aggregate data from OTC wireless transmitters, I/O modules, and other gateways onto its 1920-point register holding table. Third-party devices can access the data over the Modbus, LevelMaster ASCII, and/or MQTT/Sparkplug B<sup>1</sup> protocols.

#### Advanced Peer-to-Peer Networking

Multiple gateways can be deployed to the OTC platform for creating a custom, highly scalable network. The gateways have the power to communicate with each other. You can leverage the peer-to-peer technology for funneling data to the primary gateway for optimizing network efficiency and/or designing an extremely flexible I/O mapping system across the entire wireless network.

#### Data Logging Capabilities

The DH3 offers both event-based data logging and time-based trending/logging capabilities. The data can be stored onto its internal RAM (volatile) or onto an optional industrial-grade Micro SD card (non-volatile). Trend graphs are accessible via the DH3's secure web server.

#### Ethernet + Serial + Local Display Option

Equipped with both Ethernet and Serial ports, the DH3 is designed for interfacing multiple third-party devices. Having both Modbus Master and Slave functionalities, the DH3 provides endless possibilities for solving telemetry challenges. OleumTech offers a local I/O expansion solution for integrating analog and discrete I/O capabilities to the DH3. An optional touchscreen display is also available for added convenience.

# OleumTech

Networking Diagram

### **Technical Specifications**

HARDWARE FEATURES	
Device Functionality	· Wireless Gateway with Ethernet/Serial Connectivity and Data Logging Capabilities
Embedded Controller	· 32-Bit Power ARM Cortex - A9core Microprocessor, Up to 800 MHz CPU Speed
Memory	· Flash Memory: 4 GB / SD RAM Memory: 512 MB
	· MQTT*, Modbus TCP/IP Master/Slave, DHCP Client/Static IP (Device Designed to Work Behind Firewall
Ethernet 10/100/1000BASE-T	$\cdot$ Supports Local/Remote Device Configuration and F/W Upgrade Using BreeZ $^{\circ}$ 5.0 or Higher
	· Supports Auto-MDIX/Auto-Crossover for ad-hoc networking (PC directly to DH3)
	· 2 RTU Ports (RS232/RS485 Software Configurable)
Serial Interfaces	$\cdot$ Modbus Master/Slave, LevelMaster ASCII Slave, ROC-Link Master (Supports Opcodes 17 and 10)
	ROC: Read up to 10 User Configurable (TLP) Points, INT16 (signed or unsigned) or FL(OAT)
2 USB 2.0 Host Ports	· Reserved for Future Use
Mini-USB (OTG)	· Supports Local Device Configuration and F/W Upgrade Using BreeZ <sup>®</sup> 5.0 or Higher
Micro SD Card Slot	· Only Use Industrial-Grade Micro SD Cards: Part # SX1000-SD2 (-40 °C to 70 °C)
Device Diagnostics	· Health Tag: Supply Voltage
DATA LOGGING	Records Data to Internal RAM, MicroSD Card Option for Data Persistence
Trending (RAM/Micro SD)	· 800,000 Pts Max Regardless of Memory Capacity; Supports Multiple Trends; Exportable to .CSV
5 (2444/44)	· 100,000 Pts Max Regardless of Memory Capacity
Event Logging (RAM/Micro SD)	Event Types: Rising or Falling Edge Event Control: Deadband or On-Delay; Exportable to .CSV
System Logging (RAM/Micro SD)	100,000 Pts Max Regardless of Memory Capacity, Viewable on Web Server or Local Display
WEB SERVER	
Features	· View Modbus Data, Trends, Event and System Logs, Device/Network Settings, and More
Security/Privacy	Role-based Authentication (Admin/User/Guest), HTTPS
BreeZ <sup>®</sup> SOFTWARE INTERFA	ICE (PC APPLICATION)
Version/PC Platform	· Bree7° Version 5.0 or Later: PC with Windows° 7 or Later
Connectivity	· Configurable via Ethernet Port or Mini-USB Port
Security/Privacy	· Role-based Authentication (Admin/User). Remote Communication Secured via SSI /TLS v1.2
Badio Band	· ISM Band (License-Free)
900 MHz / 915 MHz	EHSS ESK AFS Encryption 256-bit (900 MHz) 128-bit (915 MHz)
24 GHz	DCSS AES Encryption 230 bit
	I DE AFA AFE Exemption 120 bit
Bit Data	LDI-AFA, AES EICLYPTION 128-DIL     OOD/015 MUE 0000 hers (115 2 libres 2.4 CUE 250 libres 0.00 MUE 00 limbs
Output Rower (Max)	- 900/915 MHz: 9000 Dps / 115.2 KDps; 2.4 GHz: 230 KDps; 808 MHz: 80 Kpbs
Output Power (Max)	- 900/915 MHz: 1000 MW; 2.4 GH2: 05 MW; 808 MH2: 25 MW
Receiving Sensitivity	- 900/915 MH2: -110 dBm @ 9000 Bps, -100 dBm @ 115.2 kBps
	- 2.4 GHZ: - 101 dbm @ 250 kbps; 868 MHZ: - 106 dbm @ 80 kbps
	900/915 MHz: Up to 40 Miles / 64 km with Clear Line of Sight" (Gateway to Gateway)
RF Range	900/915 MHz: Up to 7500 Feet / 1.4 Miles / 2.3 km with Clear Line of Sight <sup>-</sup> (Transmitter to Gateway)
	<ul> <li>2.4 GHz: Up to 4.3 Miles / 7 km with Clear Line of Sight<sup>2</sup> (Gateway to Gateway)</li> </ul>
	<ul> <li>868 MHz: Up to 5.2 Miles / 8.4 km with Clear Line of Sight<sup>3</sup> (Gateway to Gateway)</li> </ul>
CERTIFICATIONS	
emc/emi FC	· FCC Part 15 (USA), IC ICES-003 (Canada), ACMA (Australia)
	· AS/NZS CISPR 32 (Australia), EN55032 & EN55024 (EU)
(II)	· Class I Division 2; Groups A, B, C, D; AEx ec nC IIC T4 Gc
Safety ETLIGCA101901123	· Class I, Zone 2; Groups A, B, C, D; Ex ec nC IIC T4 Gc
	· ATEX: ITS15ATEX48231X II 3 G Ex nA nC IIC T4 Gc
	· IECEx: ETL15.0039X; Ex nA nC IIC T4 Gc
MECHANICAL SPECIFICATIO	NS
DH3 Dimensions	· 4.6" (W) x 3.0" (H) x 2.0" (D) / 117 mm (W) x 76 mm (H) x 50 mm (D)
Package Dimensions	· 8" (W) x 6" (H) x 2.5" (D) / 203 mm (W) x 152 mm (H) x 63 mm (D)
Package Weight	· 1.3 lbs / 570 g
Mounting	· DIN Rail Clip (Spring-Loaded)
ELECTRICAL SPECIFICATION	S
DC Power Input	· 9-30 Vdc
Average Power Input	· Local Display Off: 3 Watt; Local Display On: 5 Watt
	· 900 / 915 MHz @ 1000 mW: Receive Avg 172 mA, Transmit Avg 401 mA
Power Consumption @12 Vdc	· 2.4 GHz @ 63 mW: Receive Avg 154 mA, Transmit Avg 209 mA
	· 868 MHz @ 25 mW: Receive Avg 168 mA, Transmit Avg 231 mA
	· 900 / 915 MHz @ 1000 mW: Receive Avg 113 mA, Transmit Avg 228 mA
Power Consumption @24 Vdc	· 2.4 GHz @ 63 mW: Receive Avg 99 mA, Transmit Avg 139 mA
	· 868 MHz @ 25 mW: Receive Avg 99 mA, Transmit Avg 132 mA
GENERAL SPECIFICATIONS	
	• Temperature: -40 °C to +70 °C (-40 °F to 158 °F)
Operating Conditions	· Temperature with Optional LCD: -20 °C to +70 °C (-4 °F to 158 °F)
	· Humidity: 0 to 99 %, Non-Condensing
Warranty	· 2-Year Parts and Labor
Country of Origin	·USA



Wirelessly Connects To	• OTC Wireless Devices (Gateways, Transmitters, I/O Modules)
Micro SD Card	<ul> <li>Only Use Industrial-Grade Micro SD Cards: Part # SX1000-SD2 (-40 °C to 70 °C)</li> </ul>
Local Display	· 5.7" Local HMI Display WX-1000-LCD
Configuration Cable	· WX-1001-CA2, 15-ft USB to Mini-USB Cable or SX1000-CC2, 20-ft All-in-One Configuration Cable
OTA Link Adapte	er · SXxxxx-OTA (xxxx = RF Type), SMA-Male, USB, Antenna Sold Separately

<sup>1</sup>OTA functionality does not support changing the radio settings or upgrading the device firmware.

<sup>2</sup>Requires firmware v2.0 or later on a DH3 for enabling MQTT functionality.

<sup>3</sup>The maximum RF range data was collected under optimal test conditions, including a clear line of sight between antennas. Actual wireless RF range may vary depending on location, RF interference, weather, antenna type, cable type, and line of sight.

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