



DLS-1000 series

Cybersecure PM1/2.5/10/CO/CO2/HCHO/TVOC/NH3/
H2S/SO2/O2/Pressure/Temperature/Humidity/
Dew Point Data logger Module

Features

- Able to record particle concentration and various gas concentrations
- Non-dispersive Infrared (NDIR) CO₂ Sensor
- Up to 180,000 records with date and time stamps
- Supports automatic data upload (FTP, Google Drive, OneDrive)
- Supports the Modbus UDP/TCP/TLS, MQTT TLS, OPC UA, RESTful API Protocols
- Enhanced cybersecurity: supports secure protocols, authentication, and DDoS protection
- Supports the LINE, Telegram, Facebook Messenger, WhatsApp instant messaging
- Built-in HTTP/HTTPS Web Server
- Simple and Powerful Software Utility, Windows, IOS, Android Included
- Relay Output for Audible/Visual Alarm or IAQ Device Control
- Includes redundant power inputs: PoE and DC input
- IP43 Protection Approval



Introduction

The DLS-1000 series is a cybersecurity-enhanced version of the DL-1000 series. While maintaining the original particulate and gas detection capabilities, it further supports communication protocols with integrated cybersecurity features, making it ideal for environments with stringent requirements for network security and device management. The DLS-1000 series measures various environmental indicators and triggers alarms when values exceed preset thresholds, facilitating real-time monitoring of environmental conditions:

- **Particulate Matter :**
 - ▶ PM Concentration: PM1, PM2.5, PM10
 - ▶ Particle Count: 0.3µm, 0.5µm, 1µm, 2.5µm, 5µm, 10µm
- **Multiple Gas Options: :**
 - ▶ CO, CO₂, HCHO, TVOC, NH₃, O₂, H₂S, SO₂

The system can store up to 180,000 records with automatic upload to cloud platforms. Within the same network, users can remotely access real-time data via free Windows software or iOS/Android apps.

The device features an IP43 protection rating and a robust RJ-45 connector, guaranteeing reliable operation even in applications subject to high vibration and shock.

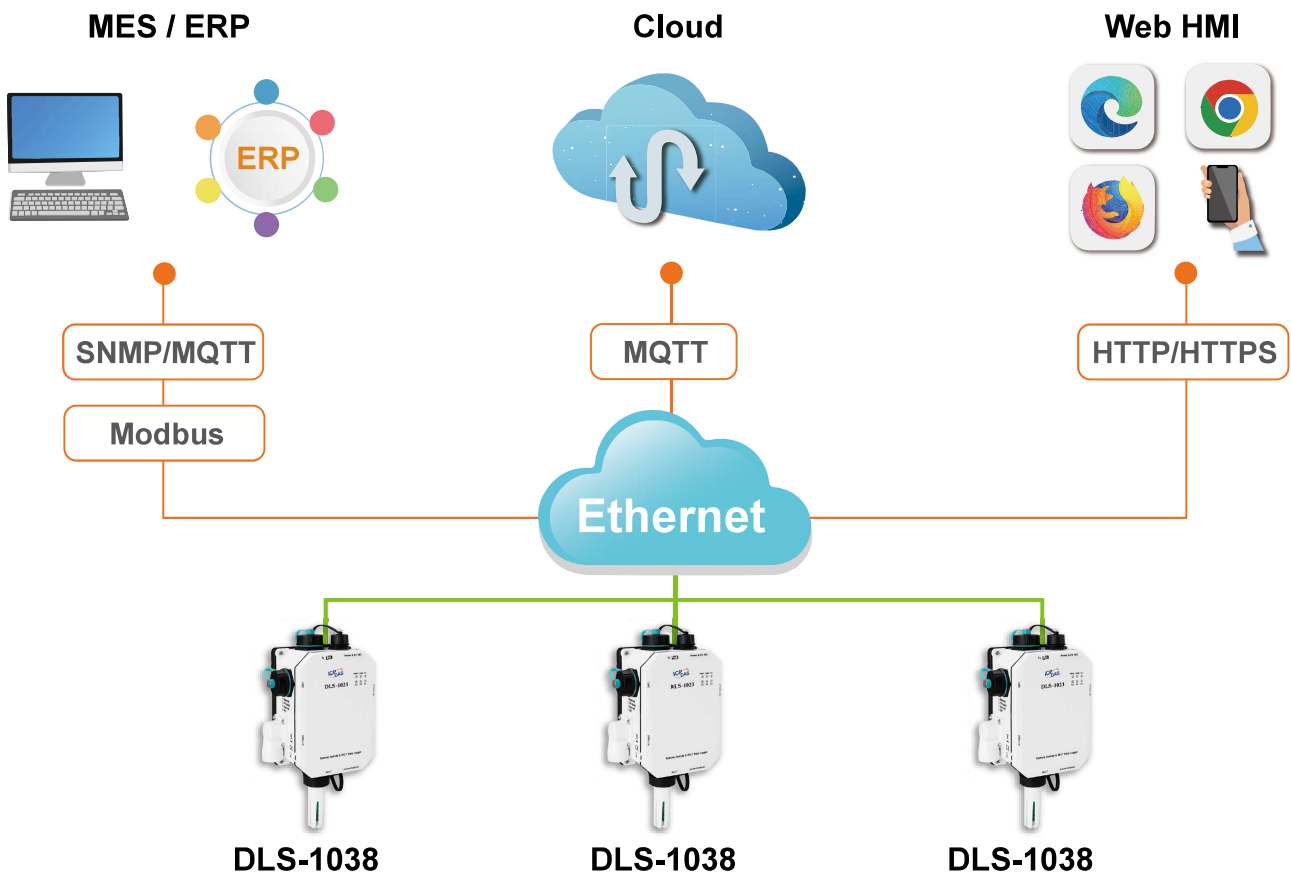
↪ DLS-1000 vs DL-1000 Comparison

	DLS-1000 (Cybersecurity)	DL-1000 (Standard)
Modbus	Modbus UDP/TCP/TLS	Modbus RTU/TCP
MQTT	TLS, Account/Password, Certificate	Account/Password
LwM2M	Account/Password, Certificate	-
Web/Restful API	http/https/RESTful API	http
Transmission Encryption	TLS	-
Real-Time Communication	LINE, Telegram, Facebook Messenger, WhatsApp	-
Protocols	OPC UA, SNMP	DCON
DDoS Protection	Yes	No

➤ Multiple Communication Interfaces and Protocols for Real-time Remote Access

The DLS-1000 series seamlessly integrates into SCADA systems or HMI devices. By supporting multiple communication protocols, it ensures reliable data transmission and system stability within distributed system architectures.

- ▶ **Communication Protocols:** Modbus UDP/TCP/TLS, MQTT TLS, RESTful API, OPC UA, LwM2M, SNMP
- ▶ **Communication Interface:** Ethernet (PoE)



➤ RESTful API : Secure and Standardized System Integration

The series provides an HTTPS-based RESTful API, enabling secure reading and writing of both physical and virtual data points to facilitate cross-platform integration and remote management. Its standardized interface design offers exceptional scalability, ensuring the system can seamlessly adapt to expansion and future application requirements.

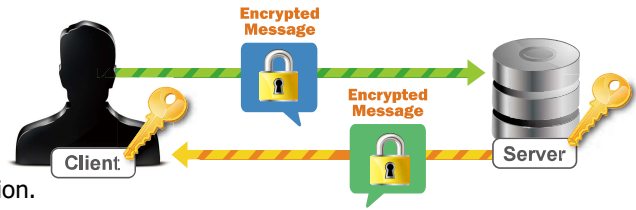


Industrial-Grade Cybersecurity: Ensuring Secure Data Transmission and System Access

The DLS-1000 series incorporates multiple cybersecurity mechanisms to ensure data and system security in industrial network environments:

1. Encrypted Communication and Authentication

- Supports TLS encrypted communication.
- Utilizes PKI (Public Key Infrastructure) architecture.
- Ensures data confidentiality and integrity during transmission.
- Prevents unauthorized access and Man-in-the-Middle (MitM) attacks.



2. IP Access Control (Allow-list)

- Restricts connections to authorized devices only.
- Includes Account / Password / Certificate authentication mechanisms

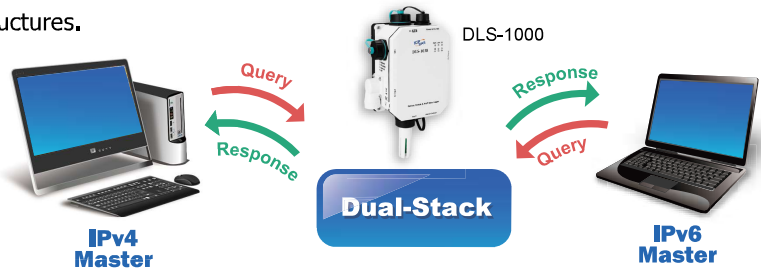
3. DoS / DDoS Attack Protection

- Safeguards the system against service interruptions caused by network attacks.



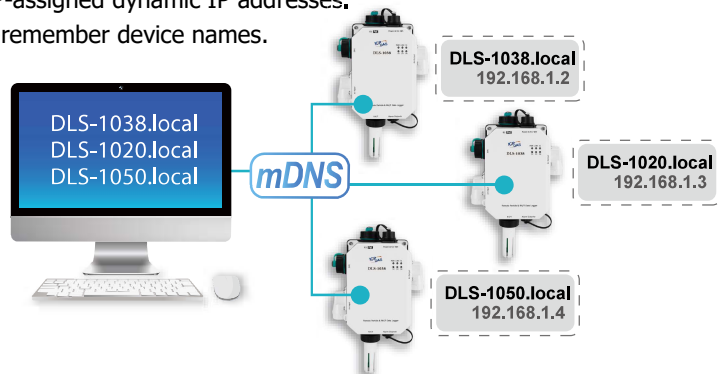
Enterprise-Grade IP Compatibility: Supports IPv4 / IPv6 Dual Stack

- Compatible with existing IPv4 network infrastructures.
- Supports IPv6 to meet future network upgrade requirements.
- Suitable for both enterprise and industrial network environments.



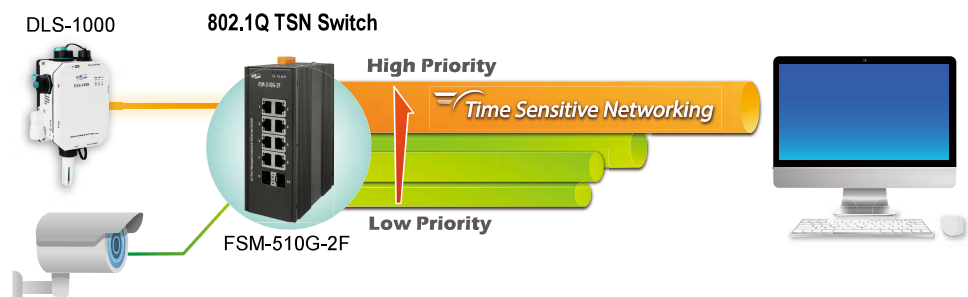
Device Discovery and Connectivity Convenience (mDNS Support)

- Ensures stable connectivity even when using DHCP-assigned dynamic IP addresses.
- Access devices on the local network using easy-to-remember device names.
- Eliminates the need to memorize or look up IP addresses.
- Supports direct access via web browsers or compatible software.



Prioritized Transmission for Critical Data in Bandwidth-Constrained Environments (QoS)

- Ensures low latency and high reliability for time-sensitive data in bandwidth-limited environments.
- Supports IEEE 802.1Q / 802.1P
- Configurable transmission priority based on data type.
- Compatible with VLAN / QoS-supported switches.



➔ Supports IoTstar: ICP DAS Cloud Management Software

By integrating IoTstar, users can quickly deploy IoT application systems such as cloud-based machine maintenance, cloud infrastructure management, and cloud environment monitoring and maintenance.



Complementary Software: The Ultimate Tool for Remote Monitoring

• Windows System:

The iAir Utility provides a robust interface to configure modules and monitor real-time data. It allows users to organize DLS-1000 series modules into groups for collective management and status tracking. Furthermore, data can be downloaded and exported in industry-standard CSV format, ensuring seamless integration with spreadsheet software or other industrial analytical tools.

• Mobile Systems:

iAir iOS/Android remote monitoring mobile app allows users to access real-time measurement data from modules on mobile devices such as smartphones or tablets, as well as manage these sensor modules in groups.

Replaceable Filter Patch (FLT-C001)

The DLS-1000 features a wind-shield filter design and includes replaceable dust filter patches. This allows users to easily perform maintenance, reducing service costs caused by dust accumulation that could affect sensor accuracy.

Applications

Factory air quality monitoring applications

In some factories, H₂S is one of the harmful gases. Since the colorless and odorless are two characteristics quite hard to find or feel, sometimes the workers inside the factory get injured inevitably. Joint liability from the injury brings the company massive fines.

DLS-1026 H₂S detector module can be put on the spot. It is equipped with standard industrial protocols and with high flexibility to integrate information from devices and transmit it back to the control center. When the concentration of gas is too high, DLS-1026 can also send alarm signals to inform relative personnel to evacuate people there.



System Specifications

Power	Powered from Terminal Block	+8 to +48 VDC		
	Powered from PoE	IEEE 802.3af, Class 2 (48 V)		
	Power Consumption	PoE	5.8 W MAX	
		Non-PoE	5.5 W MAX	
System	Alarm	PM1/PM2.5/PM10/O ₂ /CO/CO ₂ /HCHO/TVOC/NH ₃ /H ₂ S/Pressure/SO ₂ /RH/Temperature		
	Real Time Clock	Yes		
	Data Logger (Note1)	Yes, up to 180,000 records		
	Relay Output	PhotoMos Relay × 4, 100 VDC @ 1 A		
LED Indicators	PWR	Green for normal operation		
	Link	Green for the Ethernet-linked		
	S1 ~ S4	Red for an alarm condition		
Environment	Operating Temperature	-20 to +50°C		
	Storage Temperature	-30 to +75°C		
	Humidity	10 to 90% RH, Non-condensing		
	Protection Rating	IP43		
Communication	Ethernet Port	10/100 Base-TX, 8-Pin RJ-45 x1 (Auto-negotiating, Auto-MDI/MDIX, LED indicators)		
	Security	IP filter (whitelist) and Password (web)		
	Protocol	Modbus UDP/TCP/TLS(Ethernet), MQTT(TLS option), OPC UA and HTTP/HTTPS/RESTful API		
	Dual Watchdog	Yes, Module (2.3 sec), Communication (Programmable)		
Mechanical	Installation	DIN-Rail or Wall Mounting		
	Dimensions (W x L x H)	130 × 210 × 70 (W × L × H)		

Note1: DL-1038 Data Logger up to 160,000 records

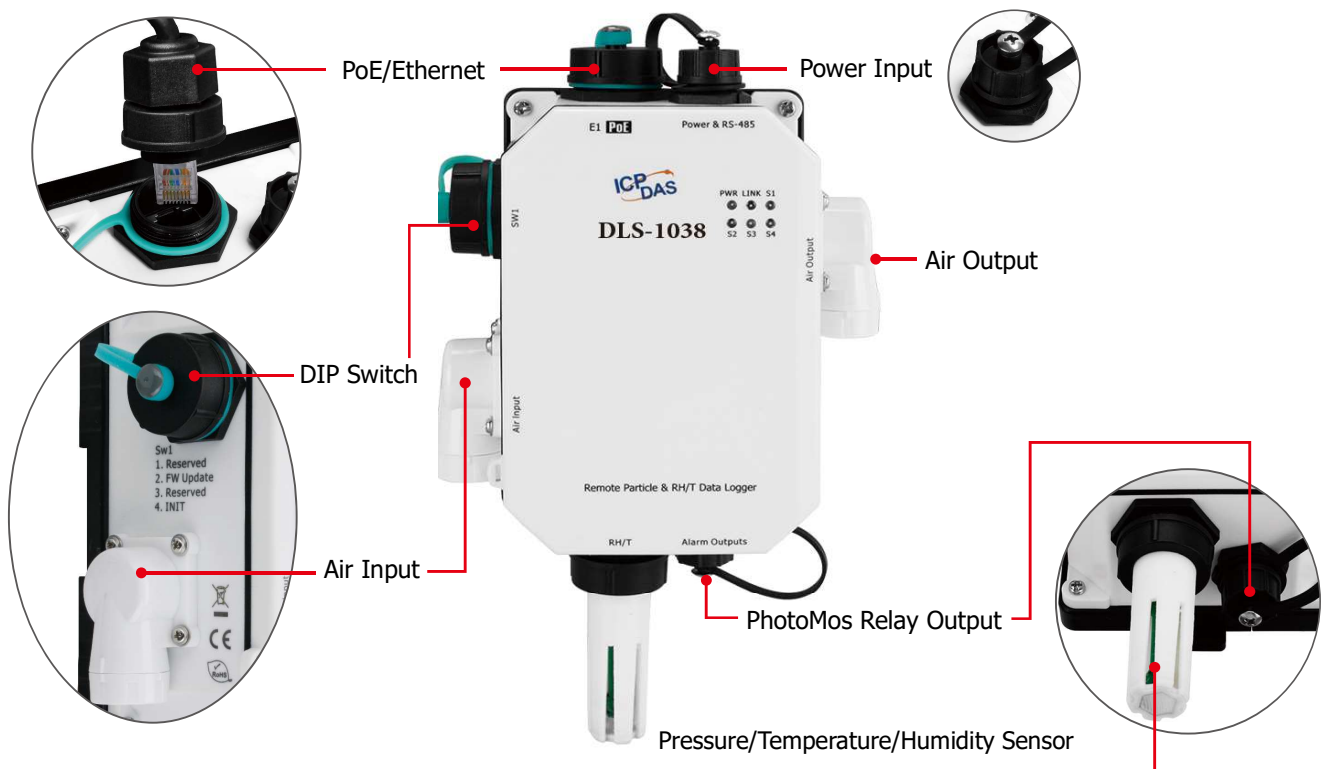
I/O Specifications

Type of Sensor	Range	Resolution	Accuracy	Response Time	Warn-up Time	Life Time
PM1/PM2.5/PM10 (Note)	0 ~ 1000 ug/m3 (Laser Type)	1µg/m3	±10 %	1 seconds	20 seconds	5 years
CO	0 ~ 1000 pm (Electrochemical)	1 ppm	±5 %	30 seconds	60 seconds	5 years
CO2	0 ~ 9999 ppm (NDIR)	1 ppm	±3 %	120 seconds	300 seconds	15 years
HCHO	0 ~ 2000 ppb (Electrochemical)	1 ppb	-	≤60 seconds	180 seconds	3 years
TVOC	0 ~ 60000 ppb (MEMS Metal Oxide)	1 ppb	±15%	60 seconds	180 seconds	5 years
NH3	0 ~ 100 ppm (Electrochemical)	1 ppm	±5%	< 40 seconds	60 seconds	2 years
H2S	0 ~ 100 ppm (Electrochemical)	1 ppm	±5%	< 30 seconds	60 seconds	2 years
O2	0 ~ 25 % (Luminescence for O2 sensor)	0.01%	±2%	< 30 seconds	120 seconds	5 years
SO2	0 ~ 100 ppm (Electrochemical)	± 5%	0.1 ppm	< 40 seconds	60 seconds	5 years
Temperature	-20 to +50°C	0.1°C	±0.6°C	-	-	10 years
Relative Humidity	0 ~ 100 % (Non-condensing)	0.1% (Non-condensing)	±5% (Non-condensing)	-	-	10 years
Dew Point	Calculated using temperature and relative humidity	0.1°C	-	-	-	-
Pressure	300 ~ 1200 hPa	0.1 hPa	1 hPa	-	-	10 years

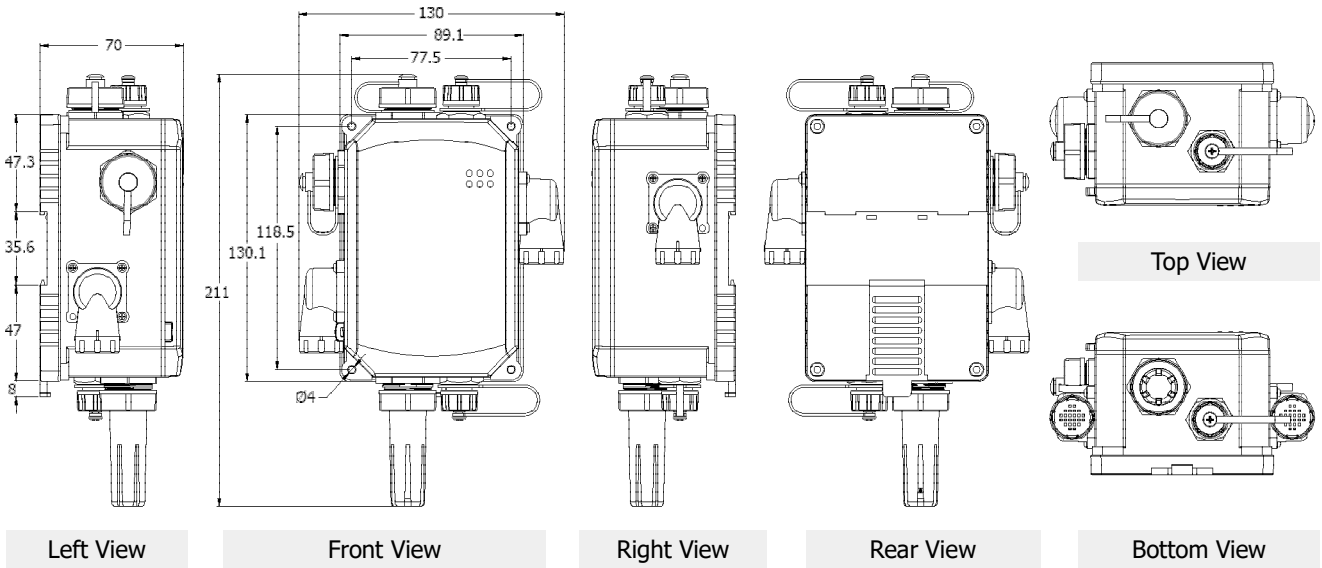
Note: The filter patch (FLT-C001) by replaceable

Particle Count	
Particle Size	0.3um, 0.5um, 1um , 2.5um, 5um, 10um

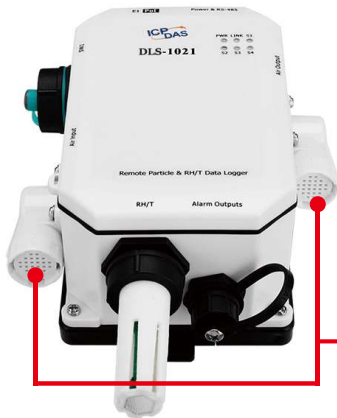
Appearance



■ Dimensions (Units: mm)






■ Standard Accessories



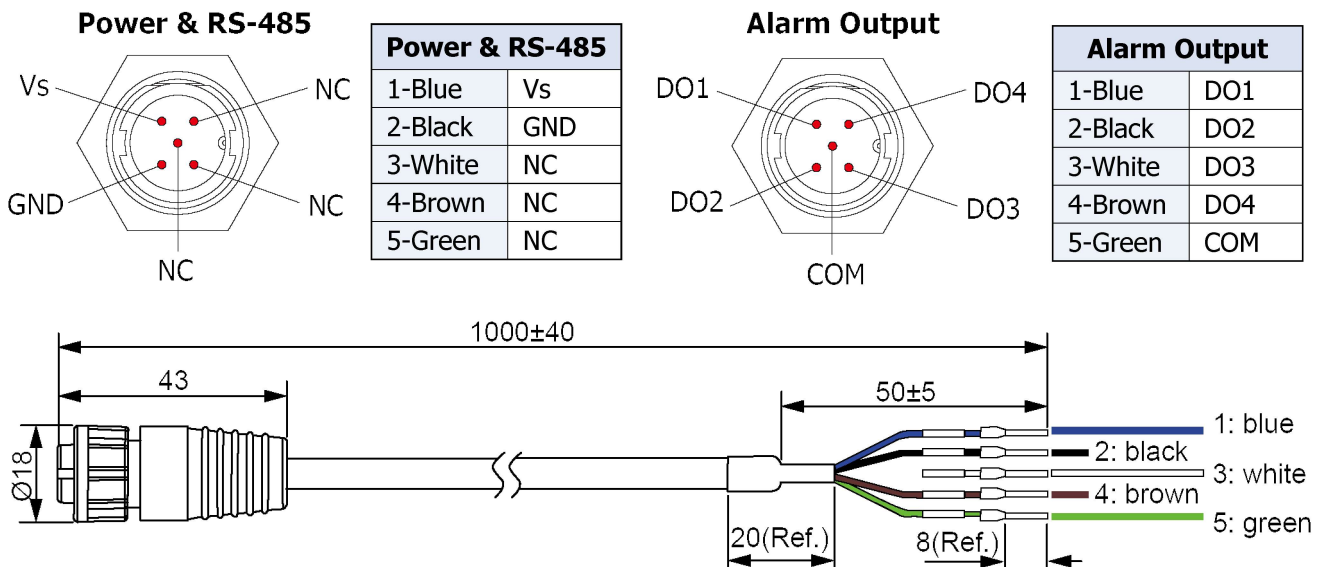
<p>Filter Patch</p>	<p>FLT-C001</p>
	<p>Replaceable Filter Patch (Circle) (1 Pack 4 Patches) (RoHS) Size: (OD :35.5 · ID:30.6) mm</p>

<p>1 × 4SASO-0001</p>	<p>2 × CA-05BFFM-LL7A01</p>
<p>IP67 RJ45 Plug</p>	<p>IP67, 1 m waterproof line</p>
<p>for Ethernet</p>	<p>for Power & RS-485, Alarm Output</p>

Standard Accessories

Mode Name	NS-205-IP67	NS-208PSE-IP67	NS-208-IP67
Picture			
PoE	-	802.3af × 8	-
Input Voltage Range	+10 VDC ~ +30 VDC (1 kV Isolated)	+46 VDC ~ +53 VDC	+12 VDC ~ +53 VDC
Installation	Wall Mounting	Wall Mounting	
Dimensions (Unit: mm)	85 × 76 × 137 (W × L × H)	190 × 155 × 104 (W × L × H)	

Pin Assignments



Ordering Information

DLS-1020 CR	Cybersecure PM1/2.5/10/Temperature/Humidity/Dew Point Data Logger Module (RS-485 · Ethernet · PoE) (RoHS)
DLS-1021 CR	Cybersecure PM1/2.5/10/CO/Temperature/Humidity/Dew Point Data Logger Module (RS-485 · Ethernet · PoE) (RoHS)
DLS-1022 CR	Cybersecure PM1/2.5/10/CO2/Temperature/Humidity/Dew Point Data Logger Module (RS-485 · Ethernet · PoE) (RoHS)
DLS-1023 CR	Cybersecure PM1/2.5/10/CO/CO2/Temperature/Humidity/Dew Point Data Logger Module (RS-485 · Ethernet · PoE) (RoHS)
DLS-1025 CR	Cybersecure PM1/2.5/10/NH3/Temperature/Humidity/Dew Point Data Logger Module (RS-485 · Ethernet · PoE) (RoHS)
DLS-1028 CR	Cybersecure PM1/2.5/10/TVOC/Temperature/Humidity/Dew Point Data Logger Module (RS-485 · Ethernet · PoE) (RoHS)
DLS-1038 CR	Cybersecure PM1/2.5/10/CO/CO2/TVOC/Temperature/Humidity/Dew Point Data Logger Module (RS-485 · Ethernet · PoE) (RoHS)
DLS-1050 CR	Cybersecure O2/Temperature/Humidity/Dew Point Data Logger Module (RS-485 · Ethernet · PoE) (RoHS)
DLS-1052 CR	Cybersecure O2/CO2/Temperature/Humidity/Dew Point Data Logger Module (RS-485 · Ethernet · PoE) (RoHS)