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## Automatic Water Level Recorder System Constant Bubble Type AL-131-BS



### ABOUT:

The AL-131-BS is a purpose built automatic water level recording system which combines the worlds best data logging equipment, water level sensing instrumentation and state of the art supporting hardware and software

### FEATURES:

- Built for harsh environments with the toughest Stainless Steel enclosure for long life. Design protects against harsh weather with sloping roof to protect from heavy rain and reflects heat away to keep instrumentation cool. Is fully sealed, has louvered vents for airflow and mesh for protection against insects.
- The enclosure door is fitted with a security switch and a waterproof LCD scrolling display enabling real time data to be viewed without the need to access the data logger.
- The Bubble System is equipped with its own LCD and push buttons for configuration and setting the water level
- Because of the high quality fit for purpose components used in the AL-131-BS means installation is quick, operation is user friendly, and will provide years of reliable trouble free service.
- The system requires minimal onsite maintenance with the ability to add additional monitoring instrumentation.
- The system allows for integration with either cloud based or enterprise SCADA systems, using GSM, Radio Telemetry, Satellite, or cable.
- All solutions are configurable according to individual requirements
- Highly accurate and reliable results are guaranteed if installed in accordance with our instructions

### APPLICATIONS:

- Dam reservoir water level monitoring
- Catchment water level monitoring
- Many other general water level monitoring purposes

### SPECIFICATIONS:

- 316 Stainless Steel IP66 enclosure complete with 30 degrees sloping roof for outdoor deployment,.
- HYQUEST Air Bubble System including pressure sensor to 30m range
- Campbell Scientific CR800 or CR310 data logger, program and CD295 font door mounted Dataview for external viewing of water level
- Solar regulator and 20W solar panel and bracket
- Electrical main switch, fuses and terminals earth cable and fittings
- Security Door Switch
- Drawings and Manuals Included
- Telemetry options include: GSM, Satellite, Radio Transmission, RS485 or Fibre Optic cable

<b>Telemetry Options:</b>	AL-131-BS (no Telemetry) AL-131-BS-GSM (with GSM Telemetry) AL-131-BS-RT (with Radio Telemetry)
<b>Power</b>	Max Power Consumption 35A Solar Panel Size: 12V 20W Batteries : 2 x 212V 28Ah Solar Regulator: 12V 5A AC powered version available upon request
<b>Enclosure:</b>	IP66 SS 316 Two door locks 2 air vents
<b>Data Logger:</b>	12V DC, <1mA quiescent
<b>Temperature Display:</b>	12V LCD
<b>Pressure Line:</b>	200m of pressure tubing
<b>Outlet:</b>	Gas Chamber Orifice with fittings
<b>Range:</b>	50m
<b>Packed Dimensions:</b>	66cm x 115cm x 33cm weight: 51kg



## Automatic Water Level Recording Float System AL-131 Series

### ABOUT:

The AL-131-FS is a simple method of measuring water level in a stilling well equipped with a float and shaft encoder. The components of this type of gauge include

- A stilling well,
- Inlet pipes from the water,
- Float tape,
- Wheel and shaft encoder which electronically sends signals to the data collection platform (pictured above)

### FEATURES:

- Built for harsh environments with the toughest Stainless Steel enclosure for long life. Design protects against harsh weather with sloping roof to protect from heavy rain and reflects heat away to keep instrumentation cool. Is fully sealed, has louvered vents for airflow and mesh for protection against insects.
- The enclosure door is fitted with a security switch and a waterproof LCD scrolling display enabling real time data to be viewed without the need to access the data logger.
- The Shaft Encoder is equipped with its own LCD and push buttons for configuration and setting the water level
- The float system is suited for retrofit to existing systems or for new applications where a floatwell system is economically viable.
- The system requires minimal onsite maintenance with the ability to add additional monitoring instrumentation.
- The system allows for integration with either cloud based or enterprise SCADA systems, using GSM, Radio Telemetry, Satellite, or cable.
- All solutions are configurable according to individual requirements
- Highly accurate and reliable results are guaranteed if installed in accordance with our instructions.

### APPLICATIONS:

- Dam reservoir water level monitoring
- Catchment water level monitoring

### SPECIFICATIONS:

- Stainless Steel fully sealed enclosure complete with 30 degrees sloping roof for outdoor deployment,
- Automatic Water Level Recorder System complete with Shaft Encoder and Float system
- < 25m uses Single Wire System
- > 25m uses Endless Wire System
- Campbell Scientific CR800 data logger, program and CD295 External Dataview for external viewing of water level
- Solar regulator and 20W solar panel and bracket
- Electrical main switch, fuses and terminals earth cable and fittings
- Security Door Switch
- Drawings and Manuals Included
- Telemetry options include: GSM, Satellite, Radio Transmission, RS485 or Fibre Optic cable

**Telemetry Options:** AWL-131-BS Standalone  
AWL-131-BS-GSM (with GSM Telemetry)  
AWL-131-BS-RT (with Radio Telemetry)

**Power:** 12V DC, 0.5A maximum  
12V 20W  
12V 56Ah minimum Use 2 x 12V 28Ah in parallel

**Enclosure:** P65  
SS 316  
Two door locks  
2 air vents

**Data Logger:** 12V DC, <1mA quiescent

**Display:** 12V LCD

**Pressure Line:** 200m of pressure tubing

**Outlet:** Gas Chamber Orifice with fittings

**Packed Dimensions:**



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## Automatic Water Level Recording Radar Sensor System AL-131-RS Series



Radar Sensors  
VEGAPULS  
WL S61

### ABOUT:

The AL-131-RS is a purpose built automatic water level recording system which combines the worlds best data logging equipment, with the worlds best Radar Sensors.

Multiple sensors can attach to the data logger provide accurate readings from specific locations that are unsuitable for cabinet

### FEATURES:

- Built for harsh environments with the toughest Stainless Steel enclosure for long life. Design protects against harsh weather with sloping roof to protect from heavy rain and reflects heat away to keep instrumentation cool. Is fully sealed, has lowered vents for airflow and mesh for protection against insects.
- The enclosure door is fitted with a security switch and a waterproof LCD scrolling display enabling real time data to be viewed without the need to access the data logger.
- Setting the water level is undertaken using a notebook device
- The radar based system is ideal for V-Notch weir monitoring providing repeatable and accurate measurements. Other applications include locations where a suitable mount for a radar sensor is available or can be constructed.
- The system requires minimal onsite maintenance with the ability to add additional monitoring instrumentation.
- The system allows for integration with either cloud based or enterprise SCADA systems, using GSM, Radio Telemetry, Satellite, or cable.
- All solutions are configurable according to individual requirements
- Highly accurate and reliable results are guaranteed if installed in accordance with our instructions.

### APPLICATIONS:

- Dam reservoir water level monitoring
- Catchment water level monitoring
- V-Notch water level and seepage monitoring

### SPECIFICATIONS:

- Stainless Steel fully sealed enclosure complete with 30 degrees sloping roof for outdoor deployment,.
- Radar Sensor- the VEGAPULS WL S 61r
- V-notch Structure
- Campbell Scientific CR800 data logger, program and CD295 External Dataview for external viewing of water level
- Solar regulator and 20W solar panel and bracket
- Electrical main switch, fuses and terminals earth cable and fittings
- Security Door Switch
- Drawings and Manuals Included
- Telemetry options include: GSM, Satellite, Radio Transmission, RS485 or Fibre Optic cable

<b>Telemetry</b>	AWL-131-RS no Telemetry
<b>Options:</b>	AWL-131-RS-GSM (with GSM Telemetry) AWL-131-RS-RT (with Radio Telemetry)
<b>Power</b>	Max Power Consumption 35A Solar Panel Size: 12V 20W Batteries : 2 x 212V 28Ah Solar Regulator: 12V 5A AC powered version available upon request
<b>Enclosure:</b>	Enclosure 1 - IP66 S Sloping Roof Two door locks 2 air vents
<b>Data Logger:</b>	12V DC, <1mA quiescent
<b>Temperature Display:</b>	12V LCD
<b>Pressure Line:</b>	200m of pressure tubing
<b>Range:</b>	50M
<b>Packed Dimensions:</b>	44cm x 90cm x 27cm size 21kg weight



# V-Notch Seepage Weirs.



## ABOUT

- V-Notch is used for **water seepage monitoring** at the dam wall structure.
- V-Notch can be also used for dam reservoir water level monitoring and catchment water level monitoring
- The basic principle is that discharge is directly related to the water depth above the crotch (bottom) of the V; this distance is called head (h).
- The V-notch design causes small changes in discharge to have a large change in depth allowing more accurate head measurement than with a rectangular weir.

## SPECIFICATIONS

- Automatic Water Level Recorder System
- WL61 Radar Sensor - 1m range and 10m of cable.
- Bracket included.
- Data logger CR800, CD295 display and program.
- Stainless Steel cabinet with 30 degree sloping roof, side vents.
- Security door switch.
- Solar Power supply.
- Drawings and manual included
- Telemetry options include: GSM, Satellite, Radio Transmission, RS485 or Fibre Optic cable

## FEATURES

- Vega WL61 Radar type water level sensor
- V-Notch Frame
- AL-131 with Campbell Scientific Data Logger, GSM or Radio Telemetry package
- Solar power equipped
- Ability to connect multiple sensors to one data logger

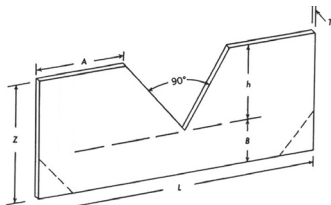
## RADAR SENSOR:

The **VEGAPULS WL S 61** uses radar sensor for continuous level measurement of water and wastewater and is the ideal sensor for all typical application in water and waste water. It is particularly suitable for level measurement in the water processing, in pump stations and overflow basins.



**Radar Sensor**  
The VEGAPULS  
WL61

The V-notch design



Data Logger  
Campbell Scientific  
CR300



Telemetry Options  
Cable



Radio





**Automatic Pore Pressure Recording System  
AL-131-VWP**



**Gecko SMA-HR Strong Motion Accelerograph**

**ABOUT**

- A sensor is positioned deep into the ground to measure **pore water pressure in the dam.**
- The data logger sends signal to the pressure plate which can detect the pore water pressure.
- The data logger records the measured pore water pressure sensed by the vibrating wire piezometers (VWP)
- The calibration factors are programmed into the data logger for each VWP.
- The data is stored locally and can be view on the enclosure front door mounted display screen.
- Data is acquired by the Supervisory Control and Data Acquisition System software application EM1000 via GSM or Radio Telemetry.

**FEATURES**

- VWP can system include 1 or 2 multiplexers depending on the number of VWP's and whether 2 wire or 4 wire.
- One multiplexer caters for 16 VWPS including pressure and temperature monitoring (4 wires).
- One multiplexer caters for 32 VWPS if only pressure and 2 wires.
- System is designed for AC power.
- Up to 22 VWPS's (4 wires) or 44 VWPS (2 wires)
- Up to 38 VWPS's (4 wires) or 64 VWPS (2 wires)

**SPECIFICATIONS**

- Automatic VWP System complete with AM16/32 Multiplexer.
- Data logger CR6 with program display.
- IP66 Stainless Steel cabinet, side vents.
- Security door switch.
- AC supply with surge protection.
- Drawings and manual included.
- Includes GSM Telemetry or Radio Telemetry

**ABOUT:**

For structural monitoring of your dam, power station building, or any asset at risk of **earthquake damage** You can install multiple Seismic Monitoring Alarms to record synchronised response of status of structure

**FEATURES:**

- Use the Seismic Alarm to record events and trigger its own control system
- Set trigger level as a percentate of full scale, or to a ratio of change in average signal level

**SPECIFICATIONS:**

- 24-bit ADC
- up to 2kHz sampling
- Internal triaxial ±2g accelerometer
- Locked to absolute time using GPS
- USB data storage
- Continuous recording
- Absolute Level triggered recording
- Average Signal Level triggering
- Ethernet for remote web login
- Optional LCD panel & keypad
- Optional internal battery
- Optional alarm outputs
- Bolts to wall or floor
- Includes mounting plate & tookit



## Emmet-100 Suite Meteorological Station

### SPECIFICATIONS:

#### Enclosure

**Cabinet**

AL-131 Series 316 Stainless Steel Enclosure with sloped roof to deter extreme rain and heat

**Telemetry**

GSM Packet Data Modem - RV50

**Data Logger & Software**

Campbell Scientific CR1000X  
Campbell PC200W software  
Loggernet software available upon request

#### Instrumentation

**Precipitation:**

Hyquest TB4 0.2mm Tipping Bucket Rain Gauge

**Wind Speed & Direction:**

RM Young 05103 including cross-arm and cable

**Temperature & Humidity**

VIASALA HMP60L including RAD06 Shield

**Solar Radiation**

KIPPS and ZONEN SP LITE2 & brackets

**Barometric Pressure**

Setra 208

### ABOUT:

The Emmet-100 Suite Climatological Station is our Professional Meteorological Monitoring Suite

### FEATURES:

- Tripod or Tower (optional)
- Prewired Stainless Steel Enclosure
- Solar Power Supply
- High Quality Sensors
- Campbell Scientific CR1000X Data Logger
- 4G Packet data modem
- Antenna equipment
- Lightning protection
- Grounding kit
- Meteorological monitoring Instrumentation

### APPLICATIONS:

- Dam reservoir rainfall & climatic monitoring
- Catchment rainfall & climatic monitoring
- General Meteorological monitoring



## ENCLOSURE

### CABINET

#### 316 STAINLESS STEEL ENCLOSURE WITH RAIN ROOF



#### 316 Stainless Steel Enclosure 400Hx-400Wx200D 30 Degree Sloping Roof

##### Includes:

- Insect screened ventilation top & bottom alternate sides
- Powder Coated backing board
- All wiring
- Glands
- Fuses
- Ducting
- Wiring diagram
- Optional front panel display

##### SOLAR POWER SUPPLY

- Solar panel 12V - 20W
- Solar regulator - 12V 6A
- Batteries - 12V 28Ah Sealed Lead Acid
- Solar panel frame and clamps

### TELEMETRY

#### GSM PACKET DATA



Packet Data 3G/4G Modem with Ethernet Port connectivity to Campbell CR1000X Proven in Indonesia.

Network Technology	4G with automatic fallback to 3G and 2G).
RF Connectors	3 female SMA jacks (for primary cellular and optional diversity cellular and GPS).
Operating Temperature Range	-30° to +70
Host Interface	> 10/100/1000 Ethernet RJ45 > RS-232 Serial DTE D89 Female > USB 2.0 Micro-8
Dimensions	11.9 x 9.4 x 3.4 cm (4.69 x 3.7 x 1.34 in)
Weight	320 b (11.3 oz)



## DATA LOGGER

### SPECIFICATIONS

Operating Temperature Range	-40° to +70°C (standard)
Analog Inputs	16 single-ended or 8 differential (individually configured).
Pulse Counters	10 (P1 to P2 and C1 to C8)
Voltage Excitation Terminals	4 (VX1 to VX4)
Communications Ports	<ul style="list-style-type: none"> <li>• Ethernet</li> <li>• USB</li> <li>• CS I/O</li> <li>• RS-232</li> <li>• CPI</li> <li>• RS-485</li> </ul>
Data Storage Ports	microSD
Switched 12 Volt	2 terminals
Digital I/O	8 terminals (C1 to C8) configurable for digital input and output includes status high/low, pulse width modulation, external interrupt, edge timing, switch closure pulse counting, high frequency pulse counting, UART, RS-232, RS-485, SDM, SDI-12, 12C, and SPI function. Terminals are configurable in pairs for 5 V or 3.3 V logic for some functions
Analog Voltage Accuracy	<p>&gt; Accuracy specifications do not include sensor or measurement noise</p> <p>&gt; <math>\pm(0.04\%</math> of measurement + offset) at 0° to 40°C</p> <p>&gt; <math>\pm(0.06\%</math> of measurement + offset) at -40° to +70°C</p> <p>&gt; <math>\pm(0.08\%</math> of measurement + offset) at -55° to +85°C</p> <p>(extended temperature range)</p>



### CAMPBELL SCIENTIFIC CR1000X6 Data Logger including Campbell PC200W software.

Input Limits	$\pm 5$ V
ADC	24-bit
Power Requirements	10 to 18 Vdc
Real-Time Clock Accuracy	$\pm 3$ min. per year (Optional GPS correction to 10 us)
Internet Protocols	Ethernet, PPP, CS I/O IP.RNDIS, ICMP/Ping. Auto-IP9APIPA), IPv4, IPv6, UDP, TCP, TLS, DNS, DHCP, SLAAC, SNMPv3, NTP, Telnet, HTTP(S), FTP(S), SMTP/TLS, POP3/TLS
Communications Protocols	PakBus, Modbus, DNP3, SDI-12, TCP, UDP, and others
Warranty	3 years (against defects in materials and workmanship)
Battery-backed SRAM for CPU Usage & Final Storage	4 MB
Data Storage	4 MB SRAM + 72 MB flash Storage expansion of up to 8 GB with removable microSD flash memory card
Idle Current Drain, Average	, < 1 mA (@ 12 Vdc)
Active Current Drain, Average	> 1 mA (1 Hz scan @ 12 Vdc) > 55 mA (20 Hz scan @ 12 Vdc)
Dimensions	23.8 c 10.1 x 6.2 cm (9.36 x 3.98 x 2.42 in) Additional clearance required for cables and leads
Weight	0.86 kg (1.9 lb)





## RM YOUNG -05103-L

### SPECIFICATIONS

Operating Temperature Range	-50° to +50°C (assuming non-riming conditions)
Mounting Pipe Description	>34 mm (1.34 in ) OD > Standard 1.0-in IPS schedule 40
Housing Diameter	5 cm (2.0 in.)
Propellar Diameter	18 cm (7.1 in)
Height	37 cm (14.6 in.)
Length	55 cm (21.7 in.)
Weight	1.5 kg (3.2 lb())

### WIND SPEED

Range	0 to 100 m/s (0 to 224 mph)
Accuracy	±0.3 m/s (±0.6 mph) or 1% reading
Starting Threshold	1.0 m/s (2.2 mph)
Distance Constant	2.7 m (8.9 ft) 63% recovery
Output	AC voltage (three pulses per revolution)
Resolution	(0.0980 m s <sup>-1</sup> ) / (scan rate in seconds) or (0.2192 mph) / (scan rate in seconds)

## WIND SPEED AND DIRECTION



### CROSSARM

#### ABOUT CROSSARM AND CROSSARM BRACKET

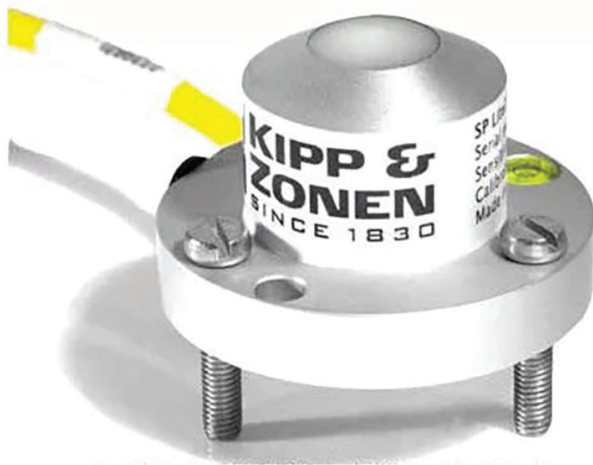
The crossarm provides a rugged attachment point for securing the 05103-L to our tripods and towers. The design of the crossarm places the sensor at a distance away from the midline of the tower or tripod thereby serving to reduce the effects of the mount on the sensor measurement

#### WIND DIRECTION

Mechanical Range	0 to 360°
Electrical Range	355° (5° open)
Accuracy	±3°
Starting Threshold	1.1 m/s (2.4 mph) at 10° displacement
Distance Constant	1.3 m (4.3 ft) 50% recovery
Damping Ration	0.3
Dampened Natural Wavelength	7.4 m (24.3 ft)
Undampened Natural Wavelength	7.4 m (23.6 ft)
Output	> Analog DC voltage from potentiometer (resistance 10 kohm) > Linearity is 0.25% > Life expectancy is 50 million revolutions
Voltage	Power Switched excitation voltage supplied by datalogger

## SOLAR RADIATION:

### KIPPS AND ZONEN SP LITE 2 WITH MOUNTING BRACKET



#### SP LITE 2



#### Mounting Bracket Kit

#### SPECIFICATIONS

- Spectral range: 400 to 1100 nm
- Sensitivity 60 to 100 (option,  $10 \pm 0.5$ )  $\mu\text{V}/\text{W}/\text{m}^2$
- Response time SP LITE2 (95%) < 500 ns
- Directional error (up to  $80^\circ$  with  $1000 \text{ W}/\text{m}^2$  beam): <  $5 \text{ W}/\text{m}^2$
- Temperature dependence:  $-0.15 \% / ^\circ\text{C}$
- Operating temperature range:  $-40^\circ\text{C}$  to  $+80^\circ\text{C}$
- Maximum solar irradiance:  $2000 \text{ W}/\text{m}^2$
- Field of view:  $180^\circ$
- Cable Length: 48m standard (user specified optional)
- Warranty 2 years



## TEMPERATURE & RELATIVE HUMIDITY



### VIASALA HMP60L

#### SPECIFICATIONS

Supply Voltage	5 to 28 Vdc (typically powered by datalogger's 12 V Supply)
Current Consumption	> 1 mA (typical) > 5 mA (maximum)
Filter Description	0.2 µm Teflon membrane
Setting Time	1 s
House Classification	IP65
Housing Material	AISI 316 stainless steel
Filter Cap Material	Chrome-coated ABS plastic
Sensor Diameter	1.2 cm (0.5 in.)
Filter Diameter	1.2 cm (0.5 in.)
Length	7.1 cm (2.8 in)
Weight	0.05 kg (0.1 lb) with 1.83 (6ft) cable
Sensor	Vaisala's INTERCAP capacitive chip
Measurement Range	0 to 100% RH (non-condensing)
Typical Accuracy at -40° to 0°C	> ±5% (0 to 90% RH) > ±7% (90 to 100% RH)
Typical Accuracy at 0° to 40°C	> ±3% (0 to 90% RH) > ±5% (90 to 100% RH)
Typical Accuracy at 40° to 60°C	> ±5% (0 to 90% RH) > ±7% (90 to 100% RH)

#### Air Temperature

Sensor	1000 ohm Platinum Resistance Thermometer (PRT)
Measurement Range	-40° to +60°C
Accuracy	±0.6°C

### RAD06 RADIATION SHIELD

Included with HMP60L



The RAD06 includes a 2 in. U-bolt with a plastic V-block. The U-bolt is placed in the holes on the side of the bracket for attachment to a mast or vertical pole. The U-bolt is placed in the holes on the bottom of the bracket for attachment to a cross-arm.

## BAROMETRIC PRESSURE

### SETRA 278



#### SPECIFICATIONS

- NOTE -	1 HPA = 1 MBAR
Pressure Range	600 to 1100 hPa
Long-Term Stability	±0.1 hPa per year
Response Time	< 100 ms
Resolution	±0.01 hPa
Excitation	9.5 to 28 Vdc
Linearity	±0.4hPa
Hysteresis	±0.05 hPa
Repeatability	±0.03 hPa

#### Accuracy

> Accuracy refers to the root sum squared (RSS) of end point non-linearity, hysteresis, repeatability, and calibration uncertainty

- > ±0.5 hPa (@+20°C)
- > ±1.0 hPa (@ 0° to 40°C)
- > ±1.5 hPa (@ -20° to +50°C)
- > ±2.0 hPa (@ -40° to +60°C)

#### Warm up Time

< 1 s

#### External Trigger Voltage

> 0 Vdc (sleep mode)  
> 3 to 28 Vdc (operating mode)

#### Current Consumption

> <3 mA (active)  
> <1 µA (sleep mode)

#### Operating Temperature Range

-40° to +60°C

#### Cable Diameter

0.8 cm (0.3 in.)

#### Dimensions

9.1 x 6.1 x 2.5 cm (3.6 x 2.4 x 1.0 in.)

#### Weight

135 g (4.8 oz)



## PRECIPITATION



**TB4 RAIN GAUGE**



**EM-240 LEVELLING BASE**

### HYQUEST 200mm 0.2mm TIPPING BUCKET RAIN GAUGE with LEVELLING BASE

#### SPECIFICATIONS

Sensor Type	Tipping bucket with siphon
Accuracy	> $\pm 2\%$ @ ,250 mm/h (9.8 in./h) > 3% @ 250 to 500 mm/h (9.8 to 19.7 in./h)
Resolution	0.254 mm (0.01 in.)
Measurement Range	0 to 700 mm/h (0 to 27.6 in./h)
Operating Temperature Range	0° to 70°C
Humidity Range	0 to 100%
Cable Type	Two-conductor shielded
Drain Tuybe Size	Both Filters accept 12 mm (0.47 in.) ID tubing
Office Diameter	20 cm (7.9 in.)
Height	34.2 cm (13.5 in.)
Weight	3.3kg (7.4 lb) with 7.623-m (25ft) cable