Data Sheet

HDAC HVAC-R autonomous AI optimisation control system and data acquisition

Full digital sensor suite, plug and play operation. Suitable for all HVAC- R applications.

HDAC - Revolutionising HVAC-R Efficiency with AI-Driven Optimisation

Imagine a HVAC-R management system (HMS) that doesn't just operate—it *thinks*, *learns*, and *optimises* in real time, without the expense of programming.

Our fully autonomous **Plug & Play HDAC AI Optimisation Controller** delivers an unprecedented **20-40% peer reviewed (CSIRO) energy savings**. Designed for seamless integration and simplistic installation, HDAC enhances system performance while reducing energy usage and emissions, HDAC also offers **remote diagnostics and predictive maintenance**, reducing downtime and operational costs.

Unlock smarter, more efficient climate control—effortlessly with **HDAC**.

Features

Autonomous AI – No programming required

- AI system optimisation for energy savings
- AI system optimisation for plant life extension
- Self-diagnosing fault detection and reporting
- Self-learning, data calibration and baseline to controlling
- Self-calibrating digital sensor suite

Energy Savings

- Energy saving of 20-40%
- Observed savings of 40.6%
- Peer reviewed verification (CSIRO NP0031 REP01 – Report)

Preventative maintenance

- Failing compressors and fans
- Failing expansion device (valve)
- Blocked coils
- Major refrigerant leaks

System Health

- Gather diagnostic information about the health of the refrigeration system
- Comprehensive sensor suite for data gathering
- Standardised data across multiple HDAC units and multiple sites

Plant Life Extension

- If installed within the first 5 years, estimated 2.4 years extension achievable.

IoT Cloud

- Customer Portal
- HVAC Scheduling
- Power consumption reports (ESG)
- All-in-one system health

Security / Reliability

- Uninterruptable power supply (UPS) for safe shutdowns
- Isolated Power Supply

Scalable & Modular

- Modular Concept allows for multiple circuit types and configurations

Connectivity

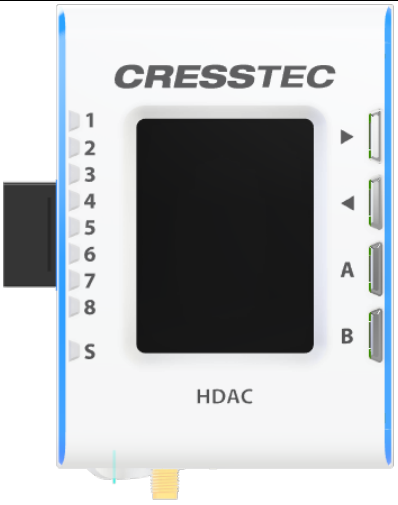
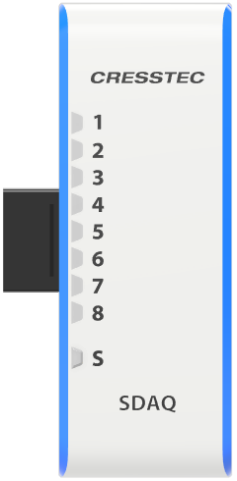
- 2 Ethernet ports RJ45
- 1 Interconnect Cable port RJ45
- 8 sensor ports SENSOR PORT RJ12 (6P6C)
- Plug-and-Play Digital sensors
- Auto-recognition of the RJ12 connectors (1-Wire and Modbus RS485 support)
- No special installation or wiring required
- 4G connectivity
- 4G LTE/4G Female (SMA) connector

OLED Display and LEDs

- OLED screen and LEDs for sensor and status
- 4 push button navigation
- At-a-glance status and sensor diagnostics
- Fault Display

System Overview

Table 1: HDAC system overview

	HDAC	SDAQ	UPS
			
Use	HVAC Data and Control	Sensor Data Acquisition	Uninterruptible Power Supply [1]
Requirement	1 per system	1 per circuit	1 per system
Connectors	8x Sensor Ports (RJ12 6P6C)	8x Sensor Ports (RJ12 6P6C)	
	2x Ethernet (RJ45)		
	1x LTE/4G Female (SMA) (4G)		
	1x Interconnect Cable Connector (RJ45) [2]	1x Interconnect Cable Connector (RJ45) [2]	
			1x 4 Pin Power Female
Terminal Blocks (Modbus RS485)	1x A/C Controller Connector (3 pin)		
	1x PDAQ [3] Connector (3 pin)		
	1x BMS [4] Connector (4 pin)		
Dimensions (LxWxH)	101mm x 76mm x 105mm	101mm x 38mm x 105mm	101mm x 25mm x 105mm
Mounting	DIN rail compatible		
Weight	400g	200g	200g
Operating Environment	-25 to +60 °C, 5% – 95% RH (non-condensing)		
Storage Temperature	-40 to +85 °C		
IP Rating	IP 42		
Power Supply	24V DC supplied by UPS [5]	24V DC supplied by UPS [5]	24V DC

[1] No lithium or lithium batteries are installed in the modules. Modules have no flight restrictions.

[2] Interconnect Cable is CAT5/CAT6 with RJ45 terminations

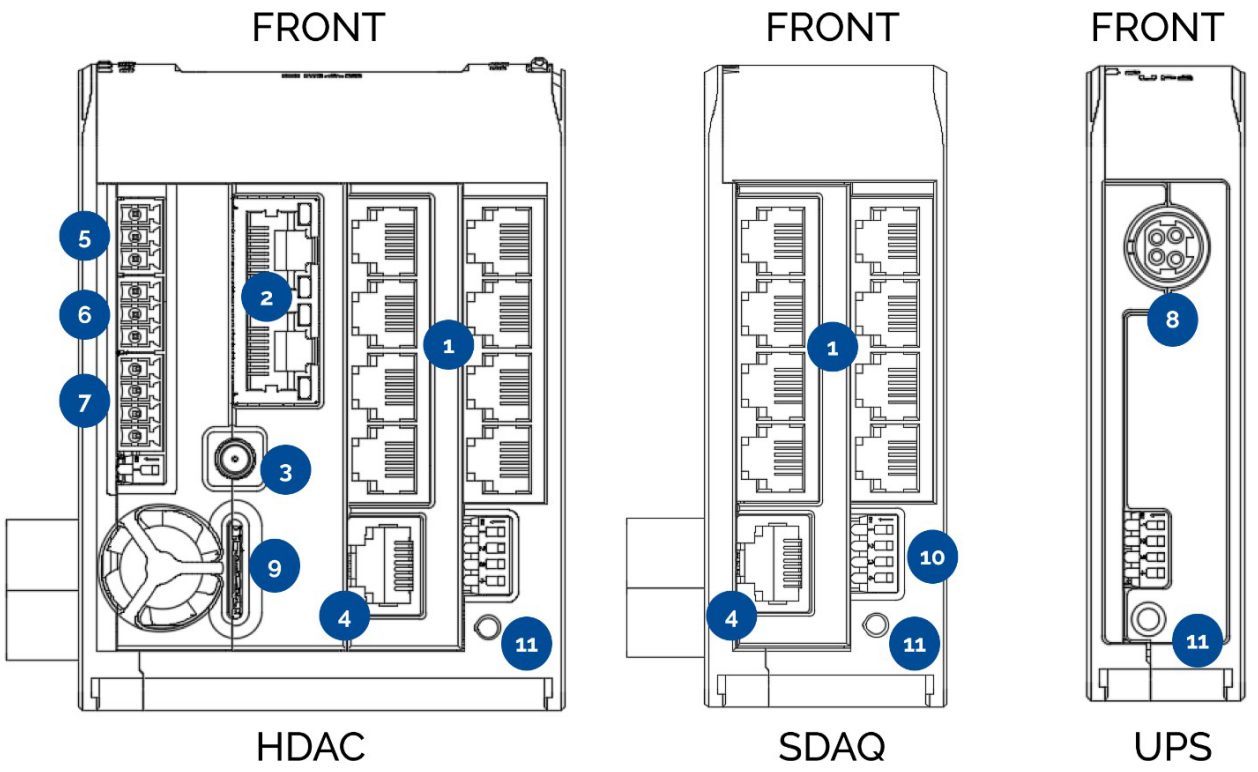
[3] PDAQ = Power Data Acquisition module

[4] BMS = Building Management System

[5] UPS provides 24V DC to the system. UPS is powered by 24V power supply using 4 pin jack.

Communication & Setup

Connectors and Interfaces



	Description	Colour	Use
1	Sensor Ports (RJ12 6P6C)	Black	Communication to digital sensors
2	Ethernet (RJ45)	Silver	Internet and LAN network connections
3	LTE/4G Female (SMA) (4G)	Gold	Internet connection
4	Interconnect Cable Connector (RJ45)	Grey	Communication to remote modules
5	A/C Unit Connector (3 pin)	Black	Communications to A/C unit controller
6	PDAQ Connector (3 pin)	Green	Communication to PDAQ Main [1]
7	BMS Connector (4 pin)	Green	Communications to BMS systems
8	4 Pin Power Female Jack	Silver	24V DC Power Supply Input
9	SIM Card Tray	Silver	Access to the data sim card
10	Slave Address DIP Switch	Black	Change slave address of module
11	Power Reset	Black	Reset the power of the module

[1] PDAQ Main will be connected to PDAQ submeters, only one connection from HDAC to PDAQ Main is necessary.

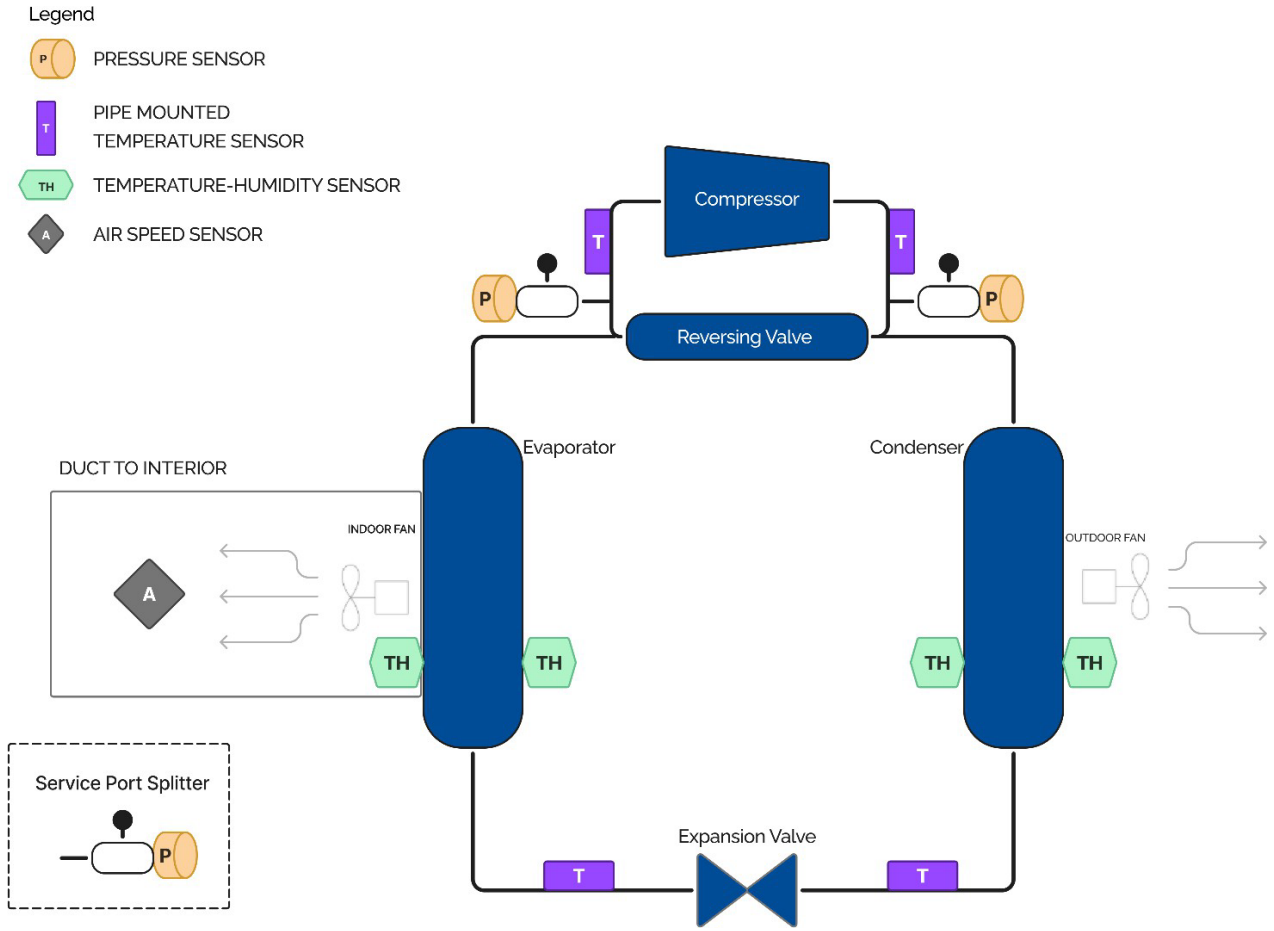
System Setup

The HDAC system is modular. The main system is a UPS + HDAC at a minimum. Additional SDAQs can be connected via the intermodule connector that is found on either side of the modules (with the UPS being the only exception). Remote SDAQs must be physically connected to the main system using a CAT5/6 cable with RJ45 terminations connecting the Interconnect Cable Connector found on the HDAC and SDAQ. Remote SDAQs are only required on HVAC systems where sensors need to be installed away from the main system. I.e. On DX Split Systems, a remote SDAQ is required for the internally located evaporator which is located away from the A/C unit.

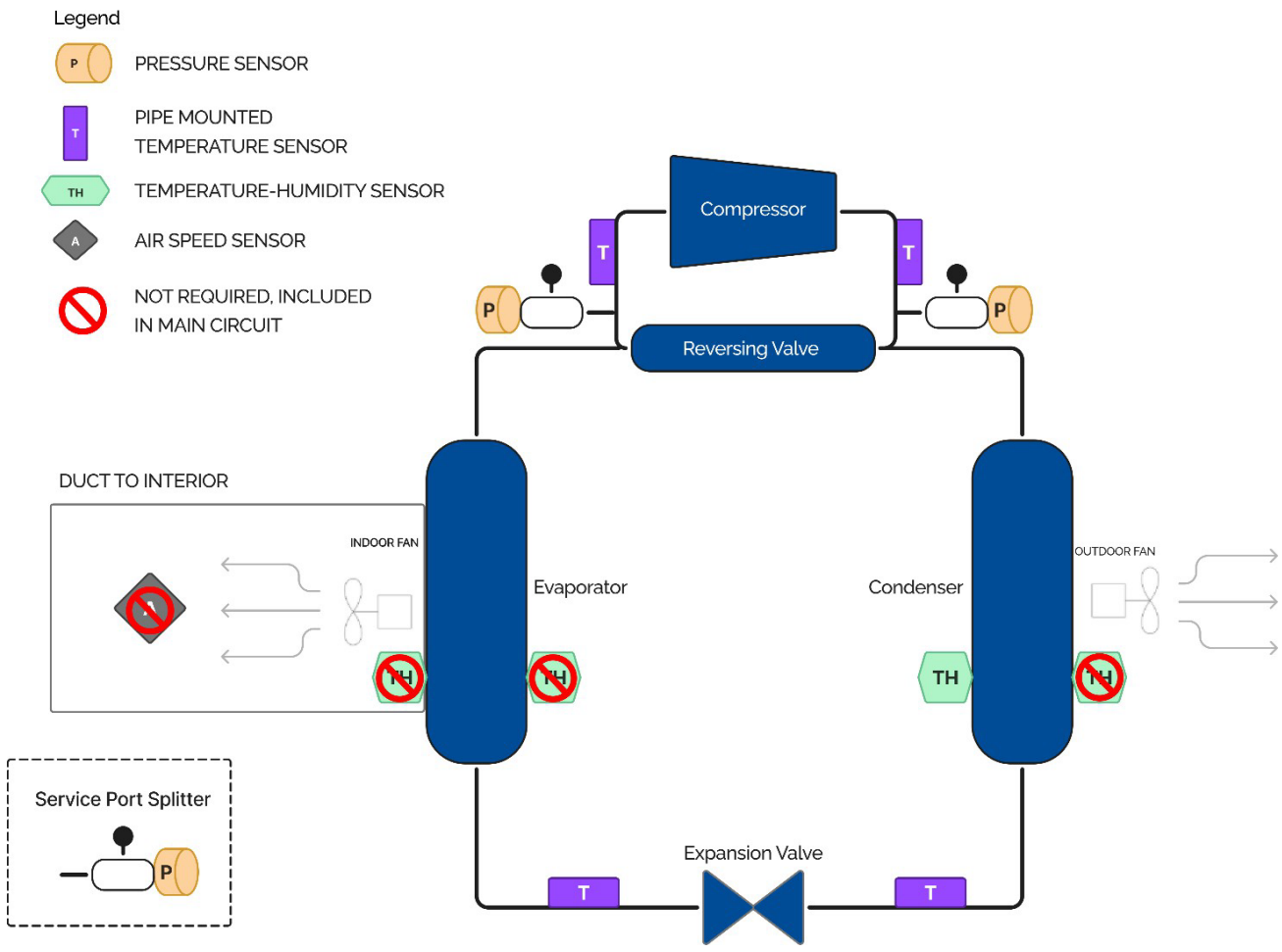
Recommended installation location for the main system will be a safe location away from the elements, rain, snow, direct sunlight, etc. E.g. In the same cabinet as the A/C unit electrical cabinet. Remote SDAQs will also need to be installed in similar locations.

The HDAC is capable of reading up to 8 digital sensors, paired with an SDAQ, it is capable of reading all required sensors for a main circuit. SDAQs may be added to sense additional circuits, up to a maximum of 16 circuits per HDAC.

Main Circuit

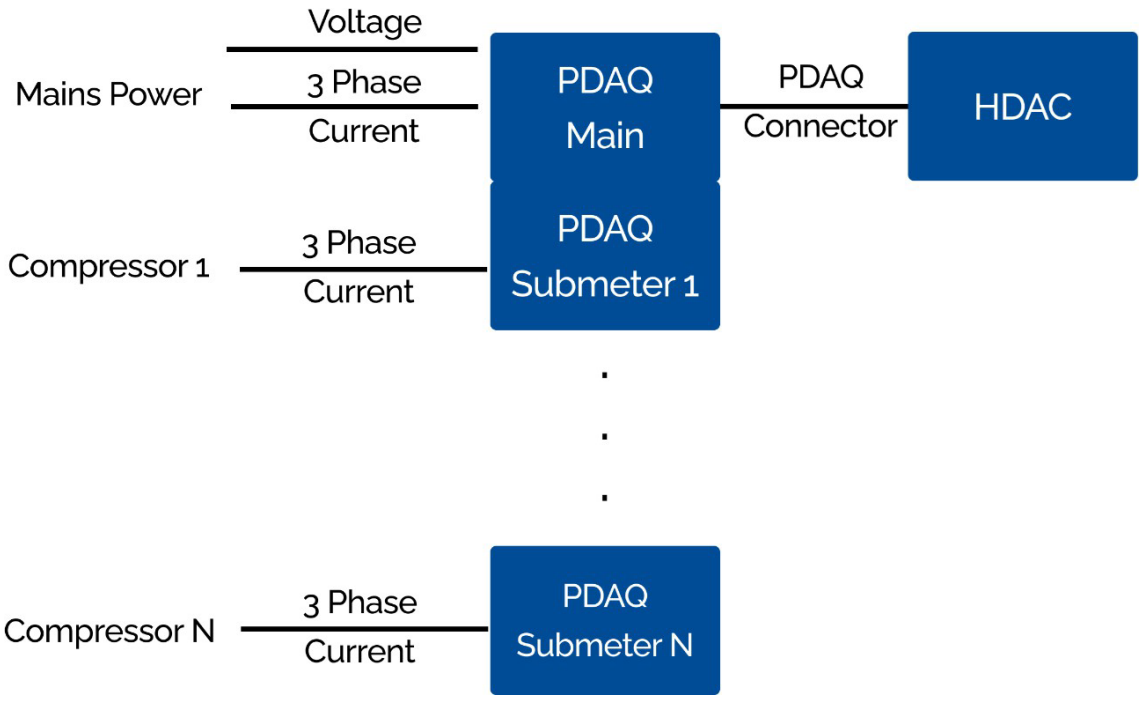


Additional Circuits



Note: Additional circuits will require less sensor installations due to overlap with the main circuit for select sensors, depending on the HVAC system being installed onto. The figure above outlines a generic case of an additional circuit alongside the main circuit. Interior air speed, evaporator entry and exit temperature humidity sensor and the entry condenser temperature humidity sensor will be shared with the main circuit. Generally, each additional circuit will require another SDAQ be added to the main system.

PDAQ Setup



Note: PDAQ Main can have PDAQ submeters physically connected via intermodule connectors. These intermodule connectors provide power and communications. PDAQ Main requires a connection to mains power. PDAQ Main provides Modbus RS485 connection to the HDAC via the PDAQ Connector.

Dimensions

Figure 1: HDAC

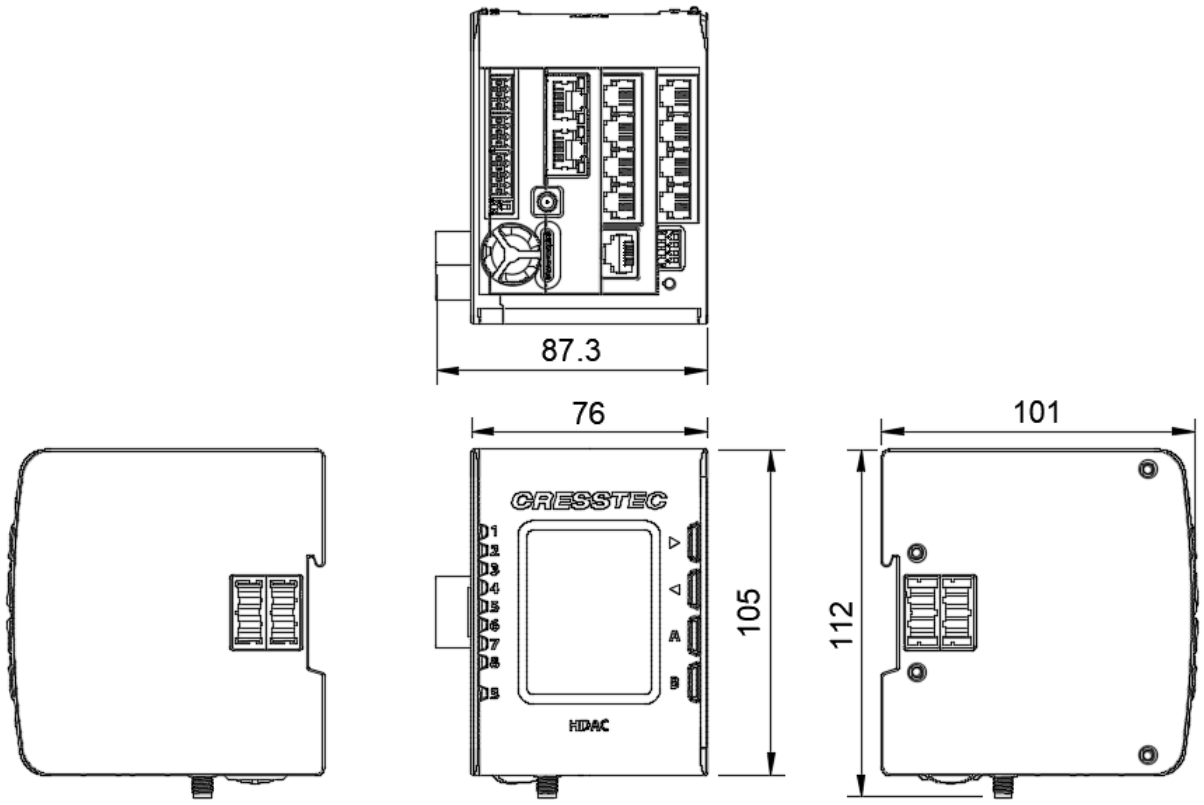
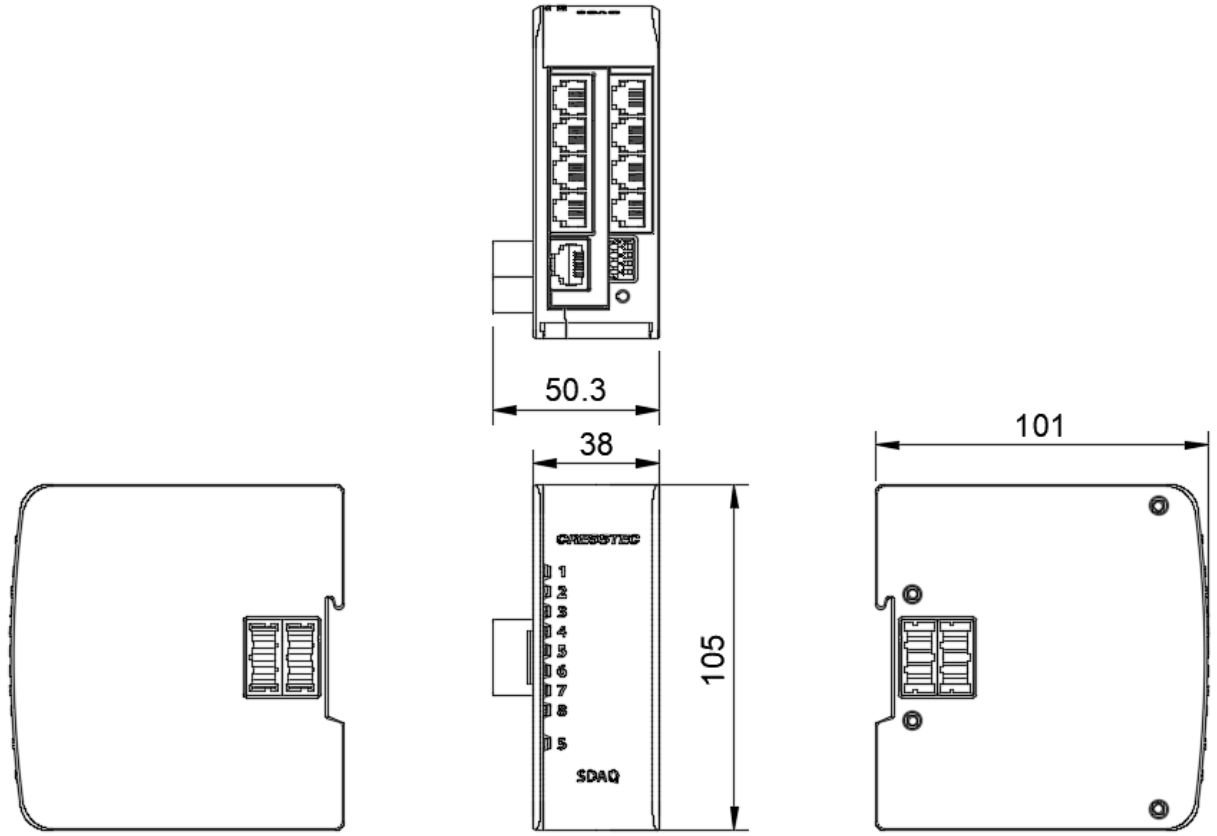


Figure 2: SDAQ



Dimensions – cont.

Figure 3: UPS

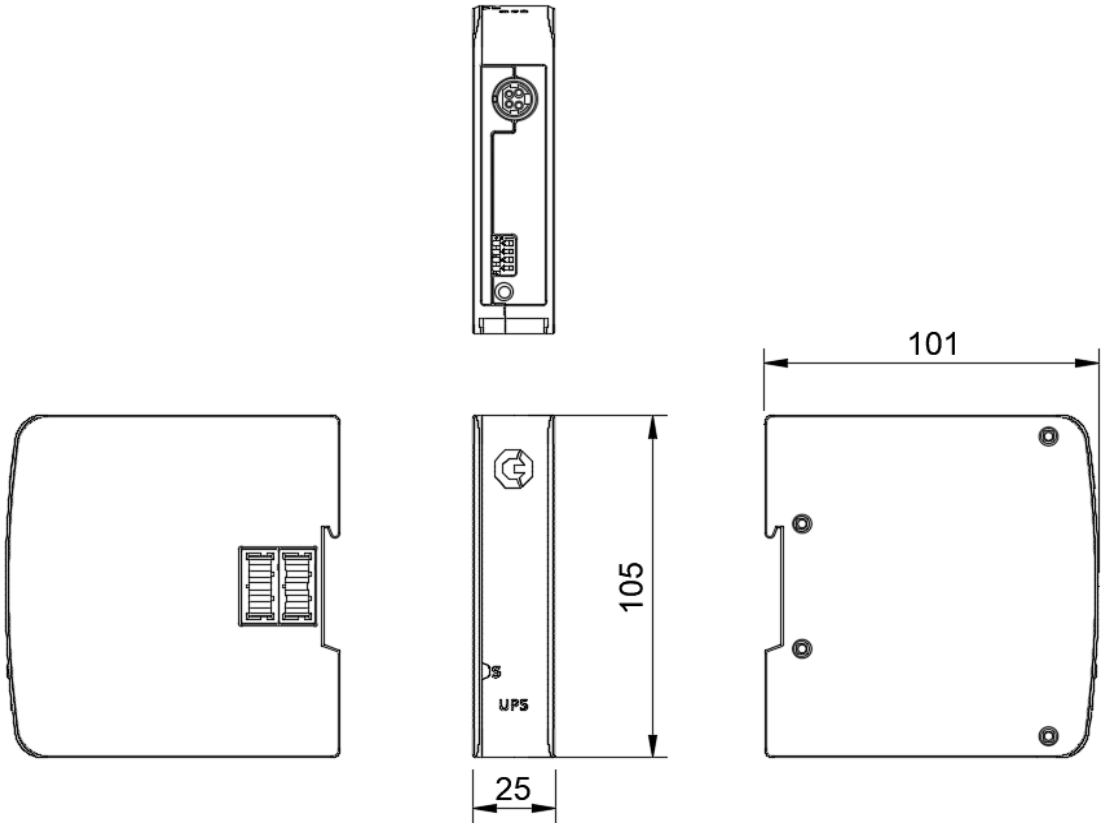
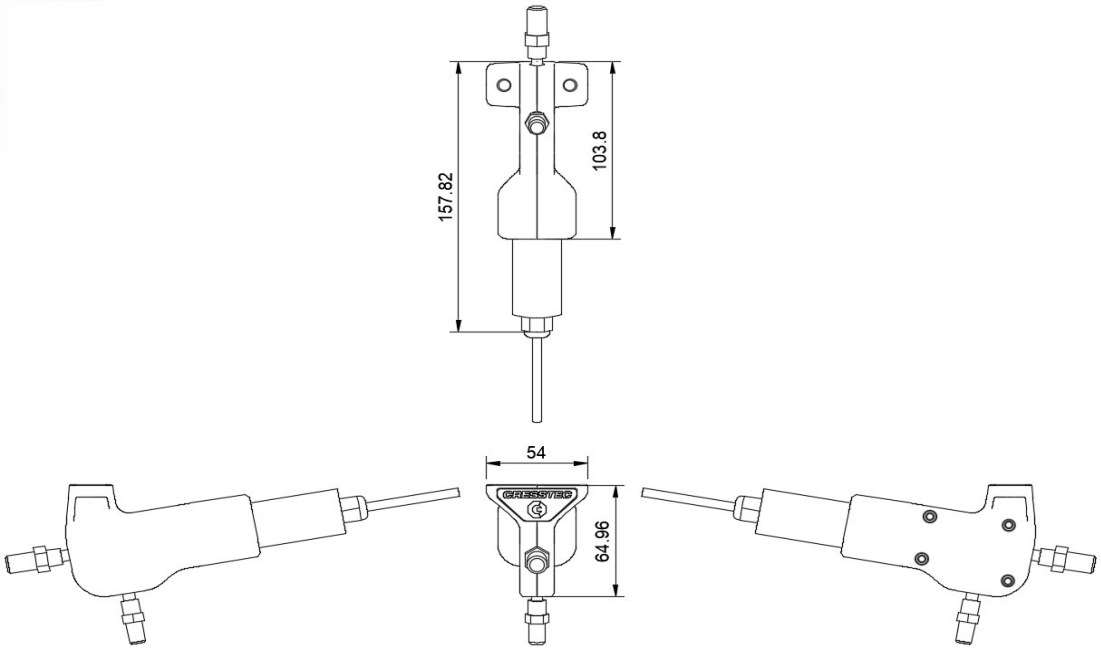


Figure 5: Pressure Sensor - Service Port



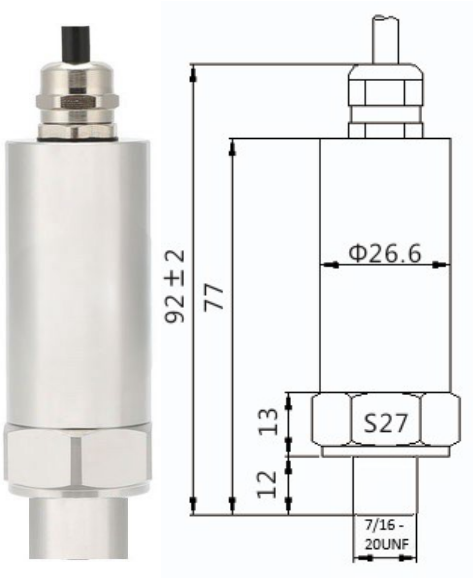
Pressure Sensor - Service Port Installation

Note: Installation of the service port will need to be above the existing service port to prevent oil accumulation in the sensor.

Sensor datasheet summary

Type	Measuring
Pressure	Refrigerant at discharge and suction of compressor
Temperature Humidity	Entry and exit of evaporator and condenser coils
Air Speed	Duct to interior room
Power	Mains power and compressors
Temperature	Refrigerant pipes before and after compressor and expansion valve

Pressure Sensor



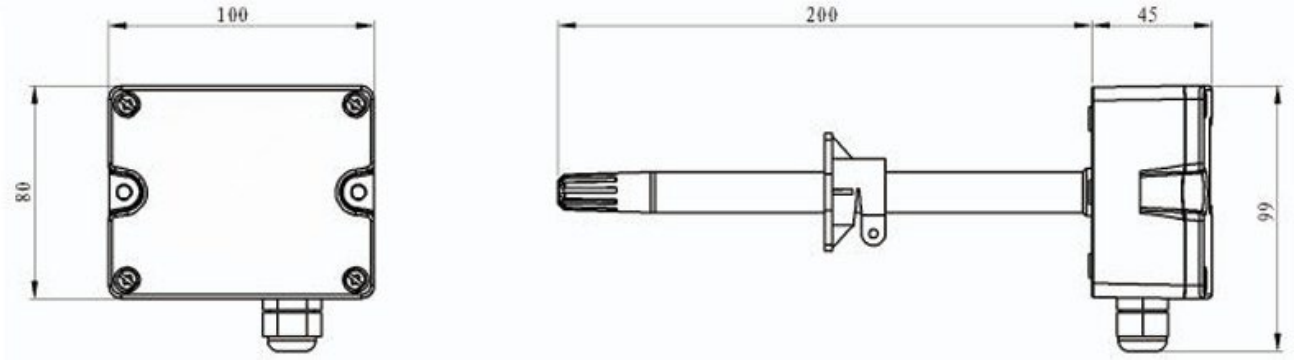
Dimensions in mm

Technical Specifications

Measurement	0 – 4500 kPa (Absolute)
Overload Pressure	1.5x max (100MPa)
Accuracy	± 0.5% F.S
Stability	< 0.5% F.S/Year
Working Temperature	-20°C - +85°C, 5% – 95% RH (non-condensing)
Storage Temperature	-40°C - +100°C
Medium Compatibility	All gas or liquid medium which can compatible with 304 & 316L stainless steel,fluorine rubber or NBR.
Ingress Protection Rating	IP65
Pressure Fitting	7/16-20UNF
Certification	Safety explosion-proof type E, RoHS, EU CE, REACH
Connection	Sensor Port RJ12 (6P6C)

Temperature-Humidity

Dimensions in mm

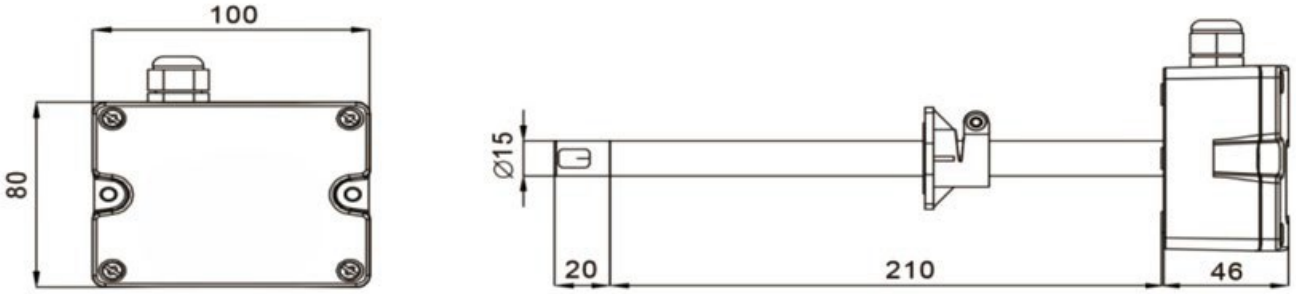


Technical Specifications

	Temperature	Humidity
Measurement	-20°C – +60°C	0% – 100% RH
Accuracy	± 0.3°C (5 – 60 °C)	± 3% (25°C, 20 – 80% RH)
Working Environment	-20°C – +60°C, 5% – 95% RH (non-condensing)	
Storage Temperature	-40°C – +100°C	
Ingress Protection Rating	IP65	
Mounting Type	Ducted	
Certification	RoHS,CE	
Connection	Sensor Port RJ12 (6P6C)	

Air Speed

Dimensions in mm

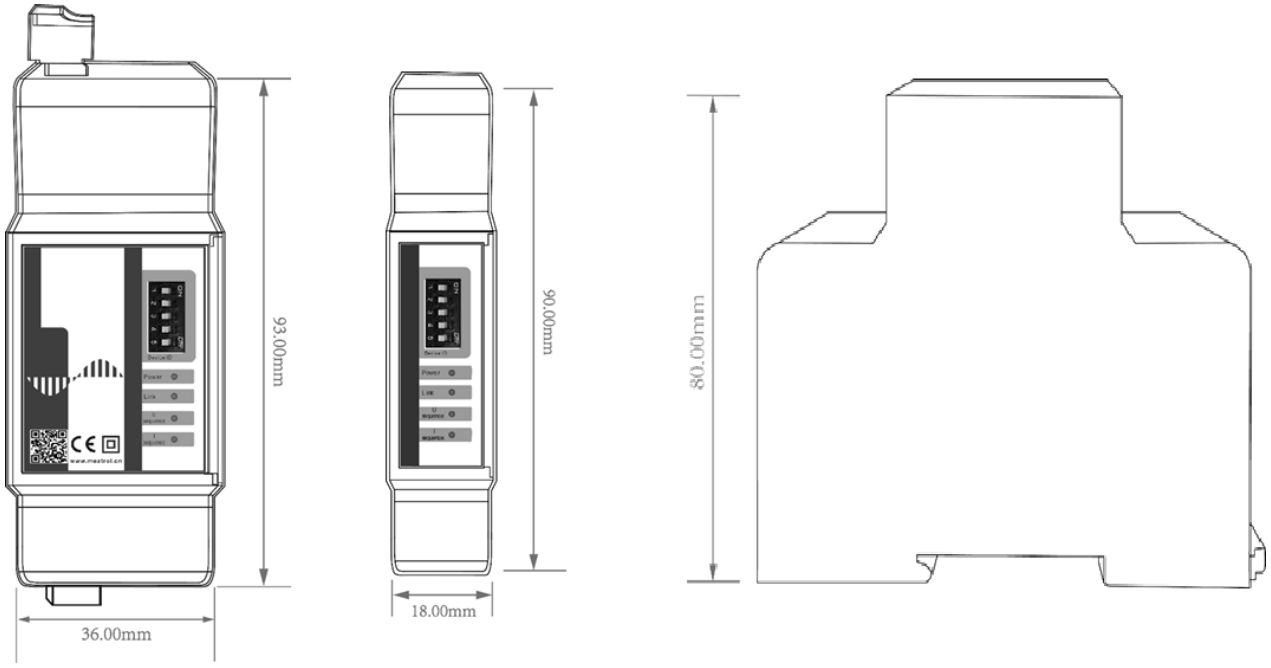


Technical Specifications

Measurement	0 – 20 m/s
Accuracy	± 0.2 m/s + 3% of MV (20°C, 45% RH at 101.3 kPa)
Resolution	0.01 m/s
Working Temperature	-10°C - +60°C, 5% – 95% RH (non-condensing)
Storage Temperature	-20°C - +80°C
Ingress Protection Rating	IP65
Mounting Type	Ducted
Certification	RoHS,CE
Electromagnetic Compatibility	EN 61326-1
Connection	Sensor Port RJ12 (6P6C)

PDAQ – Power

Main *Submeter*

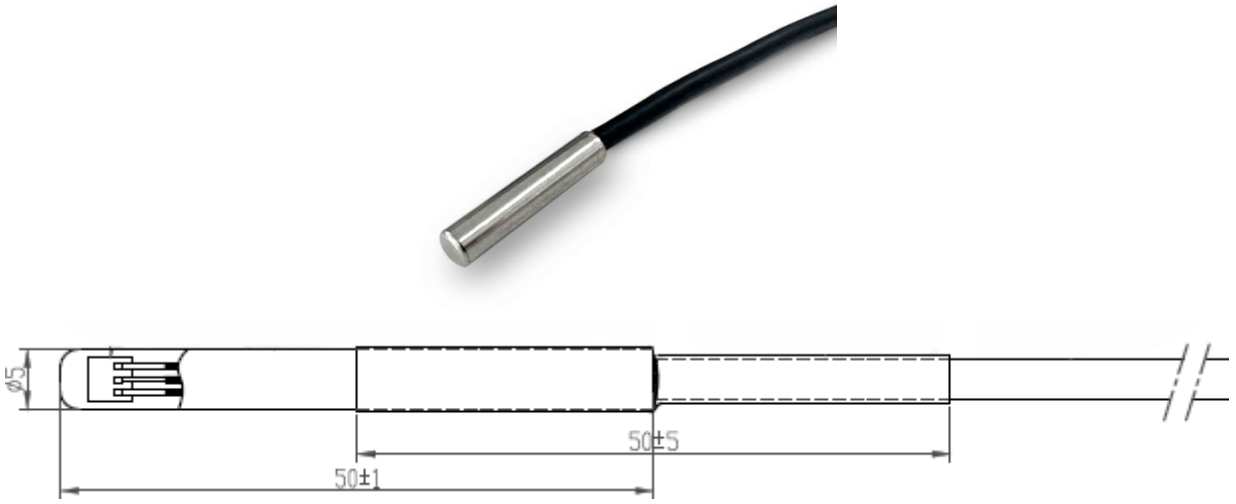


Dimensions in mm

Technical Specifications

Measurement	Three Phase				
	Power	Energy	Current	Voltage	Power Factor
Accuracy	0.5S/1S	0.5S/1S	±0.1%	±0.2%	±0.005
Sensor	Rogowski coil, RJ12				
Max Current Measurement	50mV/kA@50Hz(0-12000A), @60Hz(0-10000A)				
Working Temperature	-25℃ - +60℃, 5% – 95% RH (non-condensing)				
Storage Temperature	-40℃ - +85℃				
Overvoltage Capacity	II, Applicable to power distribution system below 277/480VAC				
Power Supply	85 – 265 VAC / 110 – 370 VDC, 45 - 60Hz				
Max Power Consumption	3.5 VA				
Ingress Protection Rating	IP20				
Certification	RoHS,CE				
Electromagnetic Compatibility	Level IV(IEC61000-4-2), Level III (IEC61000-4-3), Level IV (IEC61000-4-4), Level IV (IEC61000-4-5), Level III (IEC61000-4-6), 0.5mT (IEC61000-4-8), Class B (EN55022)				
Connection	PDAQ Connector (3 pin)				
Weight	Main: 122g			Submeter: 59g	

Pipe Temperature



Dimensions in mm

Technical Specifications

Measurement	-55°C - +125°C	
Accuracy	±0.5°C (-10°C - +85°C)	±2°C (-55°C - +125°C)
Operating Temperature	-55°C - +125°C	
Storage Temperature	-55°C - +125°C	
Ingress Protection Rating	IP65	
Connection	Sensor Port RJ12 (6P6C)	

Product Numbers

Description	**Code No.**
HDAC Module	HDAC-M01
SDAQ Module	SDAQ-M01
UPS Module	UPS-M01
PDAQ Main Module	PDAQ-M-M01
PDAQ Submeter Module	PDAQ-S-M01
Pressure Sensor	LFT2800
Air Speed Sensor	LFS10
Temperature Humidity Sensor	LFH10
Temperature Sensor	DS18B20