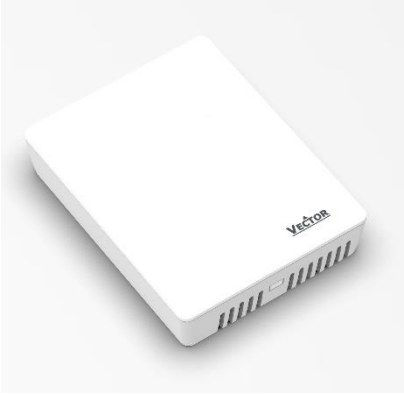


SRD2

SRD2-TOPIR

SRD2-OPIR

Programmable Differential Pressure Controller and Transmitter SRD2-THP

The SRD2 is a wall-mounted programmable differential pressure controller and transmitter with communication capabilities. Each control loop may use 2 PI sequences and multiple binary stages. The SRD2 comes with a built-in isolated RS485 communication interface that allows peer-to-peer communication with an operation terminal such as OPT1-(2TH)-VC. An optional built-in 3.5 in touch screen or a color display with touch buttons provide a perfect and flexible way to interact with the user.

Complete parameter sets may be copied by use of an accessory called AEC-PM2 or exchanged with a PC and the EasySet program using an RS485-USB converter or via Wi-Fi. The SRD2 uses the Vector Controls universal and flexible X2 operating system and is preconfigured according to this documentation.

Functions

- Four universally configurable control loops:
  - Functions for dehumidifying, set point shift and cascade control
  - Multiple auxiliary functions: heat-cool auto changeover, automatic enable, set point compensation
  - Free heating and cooling with economizer function based on enthalpy or temperature
  - Differential, averaging, min and max functions, enthalpy and dew point calculations
  - Transmitter function for sensors and set points
- Measures:
  - Differential Pressure with static or dynamic pressure sensors
  - Temperature
  - Humidity
- A passive infrared sensor (-IR type) which can be used for motion detection (occupied / unoccupied)
- 1.44 in Color display with backlight and touch button operation (-OP type)
- 3.5 in Capacitive touch color display (-TOP-type)
- Built-in humidity and temperature sensor (-TH type), CO2 sensor (-C type), VOC sensor (-Q type), dust particle sensor (-D type)
- 3 analogue voltage outputs (VDC) and one relay with a normally open and a normally closed contact (SPDT)
- 8 freely assigned alarm conditions, selectable state of outputs on alarm condition and alarm sound
- Serial Modbus RTU/ASCII or BACnet MS/TP via isolated RS485
- Modbus TCP or BACnet/IP via Wi-Fi
- Webserver for SRD2 operation from computer / mobile device or via "EasyX2" desktop/mobile app
- Password protected programmable user and control parameters
- EasySet access over TCP/IP for configuration (Wi-Fi interface required)

Applications

- Differential pressure control, clean room
- Ventilation control
- Temperature control
- Air humidifier and dehumidifier
- Motion detection action

Safety

DANGER! Safety advice
This device is for use as an operating controller or transmitter. It is not a safety device. Where a device failure could endanger human life and property, it is the responsibility of the client, installer and system designer to add additional safety devices to prevent such a device failure. Ignoring specifications and local regulations may cause equipment damage and endangers life and property. Tampering with the device and misapplication will void warranty.

Types and Ordering

Static Pressure Sensor

Product Name	Product No.	Option	Range	AO1	AO2	AO3
SRD2-THP2-411.103-OPIR-MOD	40-300268	MODBUS RTU	± 125 Pa (± 0.5 in H2O)	T.	H	P
SRD2-THP2-411.103-TOPIR-MOD	40-000321	MODBUS RTU	± 125 Pa (± 0.5 in H2O)	T.	H	P
SRD2-THP2-411.103-TOPIR-BAC	40-000322	BACnet MS/TP	± 125 Pa (± 0.5 in H2O)	T.	H	P

Dynamic Pressure Sensor

Product Name	Product No.	Option	Range	AO1	AO2	AO3
SRD2-THP2-411.103-OPIR-MOD-D	40-300327	MODBUS RTU	± 100 Pa (± 0.4 in H2O)	T.	H	P

Description

T = Temperature sensor
H = Humidity sensor
P = Differential pressure sensor
OP = With color display and touch buttons
TOP = With 3.5 in capacitive touch color display
TOP = 3.5 in color display with capacitive touch
IR = IR (PIR) sensor for motion detection
MOD = Communication with Modbus RTU or ASCII

Common to all devices are:

- 4 universal configurable control loops
- 1 digital output (DO1) low voltage relay
- 3 analogue outputs (AO) 0…10 VDC
- 1 active input 0…10 VDC (UI8)

AO1, AO2 and AO3 are the analogue outputs of the controller/transmitter. The device is pre-programmed and works as a transmitter. The sensors are assigned to the analogue outputs according to the table.

Accessories

Product Name	Product No.	Description
Pressure probe and tube		
AMP-1	40-510087	Differential pressure probes with 0.5 m tube Ø 6 mm
Communication		
AEC-USB-01	40-500046	USB to RS-485 converter cable kit used for EasySet tool. Not needed for -WIM or -WIB type
Memory		
AEC-PM2	40-500130	Plug-In memory module for saving and fast copying of parameter sets
External Operation Terminal		
OPT1-FA-TNV-VC	40-500136	A large range of external operation terminals may be found on our website www.vectorcontrols.com. All -VC type operation terminals work with this controller.
OPT1-FA-HTNV-VC	40-500135	
OPA2-VC	40-500007	
OPA2-2T-VC	40-500047	
OPA2-2HT-VC	40-500023	
OPF2-2T-VC	40-500159	
OPF2-2TH-VC	40-500158	

Technical specifications

Power supply	Power requirements	24 VAC ±10%, 50/60 Hz, 15…34 VDC SELV to HD 384, Class II, 48VA max	
	Power consumption	Max. 5 VA	
Electrical connection	Power, I/O	Push-In terminal for wire 0.25…1.3 mm^2 (AWG 24…16)	
	COM-Module (blue 3P-plug)	Detachable screw terminal for wire 0.34…2 mm^2 (AWG 22…14)	
	OP-connector (black 4P-plug)	Detachable screw terminal for wire 0.1…1.3 mm^2 (AWG 28-16)	
Temperature / Humidity Sensor	Temperature sensor Measuring accuracy Repeatability	-T See Figure 2 in section Sensors ± 0.1°C (± 0.2°F)	
	Humidity sensor Range Measuring accuracy Hysteresis Repeatability Stability	-H 0…100% RH See Figure 1 in section Sensors ± 1% ± 0.1% < 0.5% / year	
Static Sensor	Static differential pressure sensor	SCC2-P2 (Ceramic)	
		± 125 Pa, (± 0.5 in H2O)	
	Error band after zeroing	< 1.25% FSS	
	Stability over 1 year	0.1 FSS	
	Proof pressure (overload pressure) Burst pressure	7 kPa (1.0 psi) 20 kPa (2.9 psi)	
Dynamic Sensor	Dynamic differential pressure sensor	**SCC2-P2-D**	
	Pressure range	± 100 Pa, ± 0.4 in H_2O	
	Zero pressure offset accuracy	Typ: ± 0.1 %FSS,	Max. 0.2%FSS
	Span accuracy	Typ: ± 0.4 %,	Max. 0.75 % of reading
	Thermal effects on offset	5…55 °C: ± 0.2%FSS.	0…70 °C: ± 0.4 %FSS
	Thermal effects on span	5…55 °C: ± 1 %	0…70 °C: ± 2.75% of reading
	Proof pressure (overload pressure)	200 kPa (30 psi)	
	Burst pressure	500 kPa (75 psi)	
Infrared Sensor	Passive infrared sensor PIR Detection angle Detection range	Motion detection 120° horizontal and vertical 5.0m max., horizontal and vertical	
Signal Input	Voltage input Input signal Resolution Impedance	UI8 input 0…10 VDC 9.76 mV (10 bit) 98kΩ	
Signal outputs	Analog outputs Output signal Resolution Maximum load	AO1, AO2, AO3 0…10 VDC 9.76 mV (10 bit) Impedance: ≥1kΩ	
	Relay outputs: AC Voltage (SPDT) DC Voltage Insulation strength between relays contacts and system electronics: between neighbouring contacts:	0…48 VAC, full-load current 1A 0…30 VDC, full-load current 1A 500 VAC to EN 60 730-1 500 VAC to EN 60 730-1	
Display – OPIR	TFT display compact Buttons	1.44 in, 128 x 128 px 4 capacitive touch buttons	
- TOPIR	TFT display full	3.5 in, 320 x 480 px Capacitive touch display	
Connection to remote terminal	Hardware interface Cabling	RS485 in accordance with EIA/TIA 485 Twisted pair (STP) cable	
Environment	Operation Climatic conditions Temperature Humidity	To IEC 721-3-3 class 3K5 0…50 °C (32…122 °F) <85 % RH non-condensing	
	Transport & storage Climatic conditions Temperature Humidity Mechanical conditions	To IEC 721-3-2 and IEC 721-3-1 class 3K3 and class 1K3 0…50 °C (32…122 °F) <95 % RH non-condensing class 2M2	

Standards	Degree of Protection	IP30 to EN 60 529	
	Pollution Class	II (EN 60 730-1)	
	Safety Class	III (EN 60 730-1)	
	Overvoltage Category	II (EN 60 730-1)	
General	Material	Flame retardant PC+ABS plastic (UL94 class V-0)	
	Dimensions (H x W x D) -OPIR	115 x 90 x 24 mm (3.5 x 4.5 x 0.9 in)	
	-TOPIR	115 x 90 x 28 mm (3.5 x 4.5 x 1.1 in)	
	Weight (including package)	SRD2-THPx-411.103-OPIR-COM:	202 g (7.1 oz)
		SRD2-THPx-411.103-TOPIR-COM:	242 g (8.5 oz)

Technical specification for serial communication, -MOD and -BAC types

Network	Hardware interface	RS485 in accordance with EIA/TIA 485
	Max nodes per network	128
	Max nodes per segment	64 (Vector devices only)
	Conductors	Shielded Twisted Pair (STP) cable
	Impedance	100 - 130 ohm
	Nominal capacitance	100 pF/m 16 pF/ft. or lower
	Galvanic isolation	The communication circuitry is isolated
	Line termination	A line termination resistance (120 ohm) shall be connected between the terminals (+) and (-) of the furthermost node of the network
	Network topology	Daisy chain according EIA/TIA 485 specifications
	Recommended maximum length per chain	1200 m (4000 ft.)
Modbus (-MOD)	Communication standard	Modbus (www.modbus.org)
	Default setting	19200 baud rate, RTU 8 data bits, 1 even parity bit, 1 stop bit
	Communication speed	4800, 9600, 19200, 38400
	Protocol: Data bits	RTU - 8 data bits, ASCII – 7 data bits,
	Parity – stop bit	no parity – 2 stops, even or odd parity – 1 stop
BACnet (-BAC)	Communication standard	BACnet MS/TP over RS485 BTL tested and listed B-ASC
	Communication speed	9600, 19200, 38400, 57600, 76800, 115200

Technical specification for TCP/IP communication –WIM and -WIB types

Wi-Fi	Standards	Wi-Fi Alliance FCC/CE-RED/IC/TELEC/KCC/SRRC/NCC 802.11 b/g/n (802.11n up to 150 Mbps) A-MPDU and A-MSDU aggregation and 0.4 µs guard interval support
	Frequency range	2.4 GHz ~ 2.5 GHz
	Antenna	Internal
Modbus TCP (-WIM)	Standard	IEC 61158
	Communication protocol	Modbus TCP (www.modbus.org)
	Transport Layer	TCP/IP
	TCP/IP Port	502
BACnet/IP (-WIB)	Communication standard	BACnet/IP BTL tested and listed B-ASC
	Transport Layer	UDP
	UDP Port	47808

Product testing and certification

CE Declaration of conformity — Information on the conformity of our products can be found on our website www.vectorcontrols.com on the corresponding product page under "Downloads".

Mounting and Installation

Mounting location

- Mount the controller on an easy accessible interior wall, approx. 1.5 m above the floor in an area of average temperature.
- The following mounting locations should be avoided:
  - Protect from direct exposure to sunlight
  - Do not mount near heat sources or other heat-generating devices
  - Do not mount in a wet or condensation prone environment
  - Areas with poor air circulation and niches or behind doors
  - In the direct influence area of ventilation and fans
  - For the types with wireless transmission (-WIM or -WIB), avoid locations that interfere with the radio signals, e.g. metal boxes or devices that generate electrical interferences.

Important
Observe local regulations!

Sealing of cable entries

Important
All cable entries into the connection box must be sealed to prevent air drafts, which could otherwise affect the sensors in the device and prevent correct measurements!

Installation instructions

For the SRD2-THP device:

Refer to the SRD2-THP installation sheet, document no. 70-00-1044 (www.vectorcontrols.com).

Selection of actuators

Actuators

Choose modulating actuators with an input signal type of 0/2…10 VDC.
3-point actuators with constant running time are recommended.

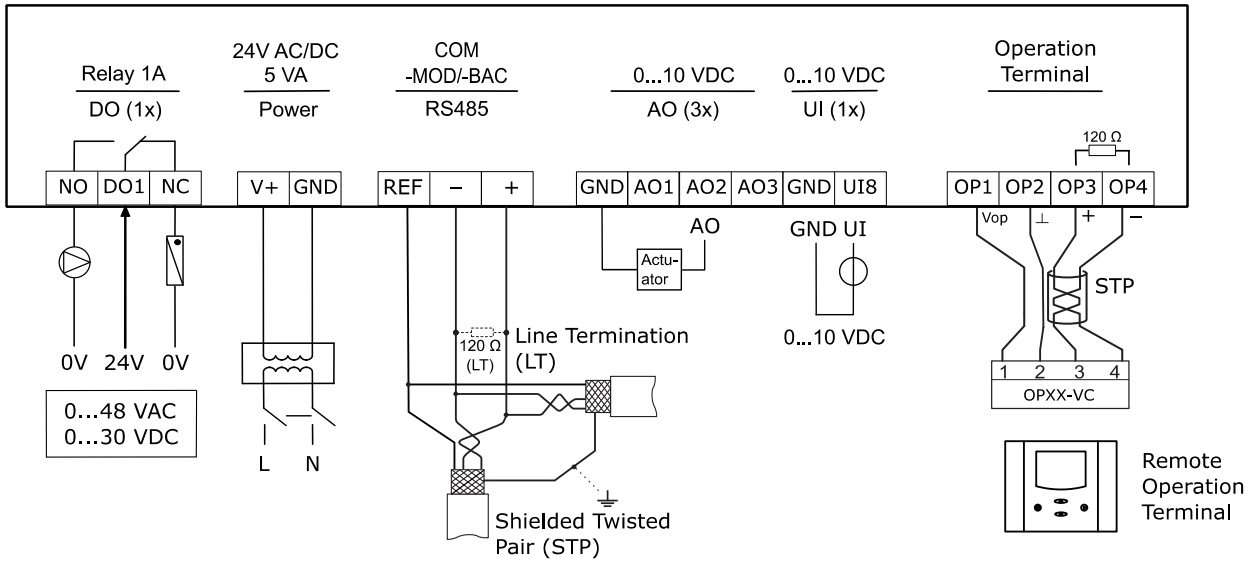
Binary auxiliary devices (e.g. pumps, fans, on/off valves, humidifiers, etc.)

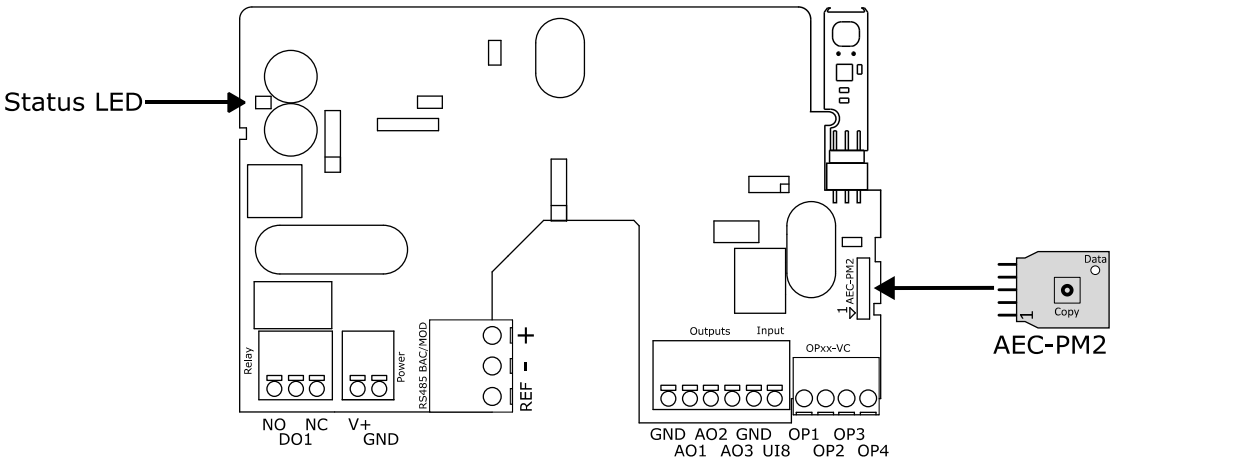
Do not directly connect devices that exceed specified limits in technical specifications – observe startup current on inductive loads.

Wiring and Connection

WARNING! Live Electrical Components

During installation, testing, servicing and troubleshooting of Vector Controls products, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury





GND	Power supply:	0V, -24VDC; common for power supply, analog in- and outputs
V+	Power supply:	24VAC, +24VDC
DO1	Binary outputs:	Potential free low voltage relays contacts (see technical specification)
AO	Analog output:	0…10 VDC
UI8	Analog input:	0…10 VDC

Note on how to use UI8 as DI (digital input)

- Connect OP1 to Door contact to UI8
- Configure UI8 as 0-10 V input:
  > 0V = 0% = contact open
  > 10V = 100% = contact closed

Important

For the SRD2-OPIR type the following preset X2 input is assigned:

- UI7 = PIR sensor (passive infrared) for motion detection

Wiring of communication (RS485)

Wire type

An EIA-485 network shall use shielded, twisted-pair cable for data signaling with characteristic impedance between 100 and 130 ohms. Distributed capacitance between conductors shall be less than 100 pF per meter (30 pF per foot). Distributed capacitance between conductors and shield shall be less than 200 pF per meter (60 pF per foot). Foil or braided shields are acceptable.

Maximum length

The maximum recommended length per segment is 1200 meters (4000 feet) with AWG 18 (0.82 mm2 conductor area) cable.

LED-indicators

SRD2 LED

A status LED is located on the SRD2 board in the controller housing. During normal operation, the LED flashes once every 5 seconds. If there is an alarm or fault condition, it will flash every second.
For -P2 devices, the status LED is uses as well to indicate 0-point calibration. Please see

The function of the system LED is explained in the X2 Engineering Manual, document no. 70-00-0737.

Modbus LED (-MOD type)

The Modbus interface features a green LED and a red LED for indication of traffic on the RS-485 bus. The green LED is lit when an incoming packet is received, and the red LED is lit when an outgoing packet is transmitted to the bus. At power-up, both LED blink twice simultaneously as a sign of the boot process being completed. A constantly lit LED serves as an indication of a fault condition in the reception or sending process.

BACnet LED (-BAC type)

The BACnet interface features a green LED and a red LED for indication of traffic on the RS-485 bus. The green LED is lit when an incoming packet is received, and the red LED is lit when an outgoing packet is transmitted to the bus. At powerup, both LED blink twice simultaneously as a sign of the boot process being completed. A constantly lit LED serves as an indication of a fault condition in the reception or sending process.

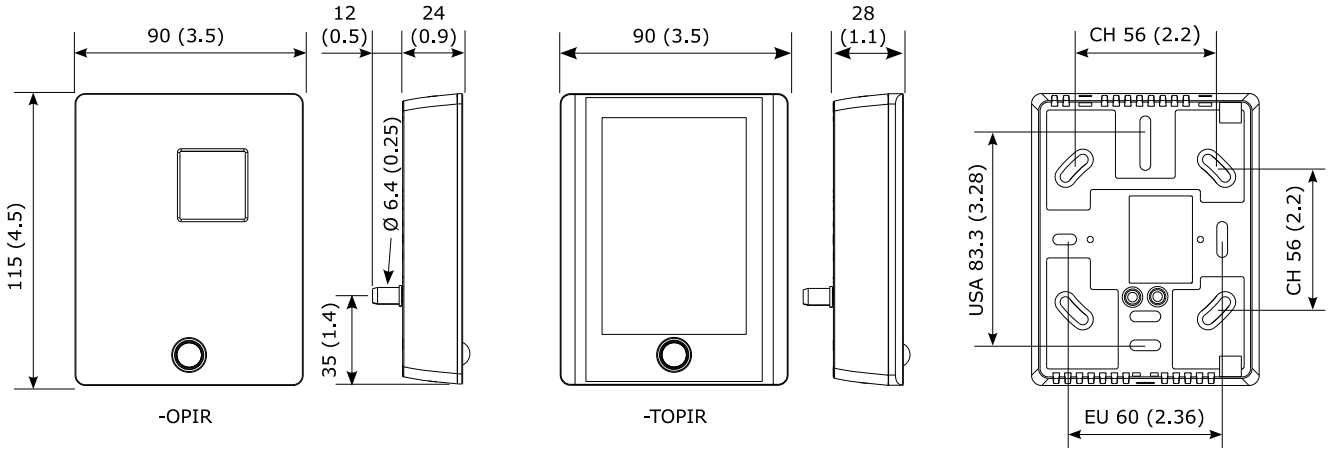
Signal sound

SRD2 Buzzer

The SRD2's buzzer can be activated in the event of an alarm.

The function of the signal sound is explained in the X2 Engineering Manual, document no. 70-00-0737.

Dimensions, mm (inch)



Sensors

Temperature & Humidity from RH sensor in –TH type

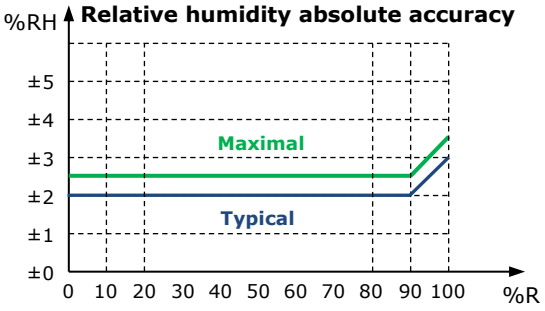


Figure 1: Typical and maximal RH accuracy at 25°C (77°F)

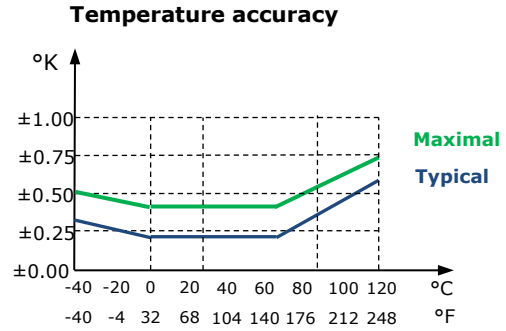


Figure 2: Typical and maximal temperature accuracy

Pressure sensor

The sensor measures the pressure using a ceramic or microthermal flow (-D) measuring element.
The measured value is temperature-compensated and calibrated. A microcontroller scans the pressure ten times per second, calculates the average value based on the preset number of measured values, and generates an output value depending on the preset minimum and maximum pressure values.

Altitude correction for dynamic pressure sensors

Dynamic pressure sensors are affected by ambient atmospheric pressure, which decreases with altitude. To ensure accurate pressure, velocity or airspeed measurements, the sensor output must be corrected for the operating altitude. This can be achieved by setting the altitude parameter UP 29. Without this correction, measurements may contain significant errors at higher elevations.

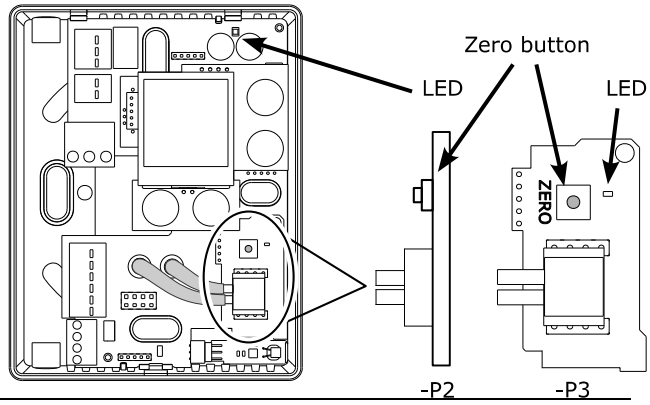
Zero-calibration of static pressure sensor

With the "Zero-calibration" function, it is possible to zero out a sensor offset. The "Zeroing" value is subtracted from the measurement at every sensor read. This allows for effective measuring the differential pressure in a system.

For optimal accuracy, we recommend repeating the "Zeroing" of the pressure sensor every 12 months
Zeroing is not required for dynamic sensors.

1. Open the SRD2 cover and power up the device.
2. Short press "ZERO" button on P-Sensor board.
3. For -P2 products: Status LED starts blinking.
   For -P3 products: LED on P-Sensor board starts blinking.
4. Press "ZERO" button again.
5. After "Zeroing" is successful, LED lights up constant for 5 seconds.
   If Zeroing is not successful (difference too large, signal not constant, etc) The LED blinks for 10 seconds in 1 second interval.

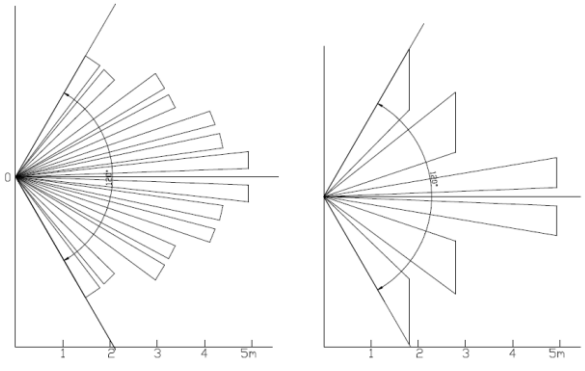
Note: If "ZERO" button is not pressed again, the sensor will return to normal operation after 10 seconds.



For details on how to open the device, consult the SRD2-THP installation sheet, document no. 70-00-1044 (www.vectorcontrols.com).

Passive infrared (PIR) sensor in –IR type

The 120° detection range of the PIR sensor of a wall mounted SRD2 is shown below.



Vertical range

Horizontal range

Operation and Configuration

Documentation

This controller uses the latest generation X2 operating system. Detailed operation instructions for all devices equipped with this operating system can be found on our website www.vectorcontrols.com.

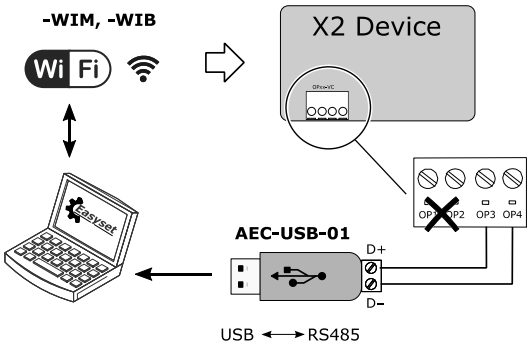
Also available are programming instructions for technicians and an application database.

More information on the X2 operating system can be found on our website www.vectorcontrols.com under "X2 Controls".

Configuration

Configuring with EasySet (free PC application)

We recommend to use the PC and the EasySet tool to easily configure the SRD2 to your needs. Connect the PC with the EasySet tool via the AEC-USB converter or use the PC's Wi-Fi communication to connect to the SRD2 (SRD2-WIM /-WIB types only). Refer to the SRD2 installation sheet for connection details and the X2 Engineering Manual for configuration details.



The device can be fully configured and commissioned using the EasySet program.
EasySet may be downloaded free of charge from our website www.vectorcontrols.com.

Configuring with operation terminal

Alternatively, the SRD2 can also be configured via an external operation terminal (OPT1-xx, OPA2-xx) to your needs. Connect the terminal to the OPxx-VC connectors on the SRD2. Refer to the SRD2 installation sheet for connection details and the X2 Engineering Manual for configuration details.

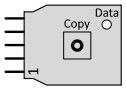
For more information on configuration, refer to the X2 Engineering Manual, document no. 70-00-0737.

Copy configuration to other SRD2 devices

Complete parameter sets may be copied using the accessory AEC-PM2 or exchanged with a PC using the EasySet tool and an RS485-USB converter or via Wi-Fi communication.

Copy configuration with the AEC-PM2 (plug-in memory)

To load the configuration into the AEC-PM2, we recommend using the EasySet "Copy Memory" function. Alternatively, an external operation terminal can be used to instruct the SRD2 to load the configuration into the AEC-PM2 (see X2 Engineering Manual and SRD2 Installation Sheet).



AEC-PM2

To copy the configuration to another SRD2, simply connect the AEC-PM2 plug-in memory to the SRD2 and press the copy button (see the SRD2 installation sheet for connection details).

Copy configuration with EasySet (free PC application)

To copy the configuration to another SRD2 device, connect the PC with the EasySet tool via the AEC-USB converter or use the PC's Wi-Fi communication to connect to the SRD2 (for SRD2-WIM /-WIB types only). Refer to the SRD2 installation sheet for connection details.

For more information on configuration, refer to the X2 Engineering Manual, document no. 70-00-0737.

Documentation overview

Document Type	Document No.	Description
SRD2-THP Data Sheet	70-00-0979	Product data sheet (this document)
SRD2-THP Install Sheet	70-00-1044	Mounting and installation manual
X2 Operations Manual touch button display	70-00-0994	Operations instructions of X2 system with touch button and display
X2 Web Interface operation manual	70-00-0952	Operations instructions of X2 Web interface
X2 Engineering Manual	70-00-0737	Guidelines for configuring the X2 system
X2 Modbus Communication Module (-MOD type)	70-00-0290	Setup and configuration manual Modbus (no Modbus TCP)
X2 Modbus Communication Module (-WIM type)	70-00-0925	Setup and configuration manual Modbus TCP
X2 BACnet Communication Module (-BAC type)	70-00-0218	Setup and configuration manual BACnet (no BACnet/IP)
X2 BACnet/IP Communication Module (-WIB type)	70-00-0899	Setup and configuration manual BACnet/IP
X2 Wi-Fi / Ethernet Communication Manual (-WIM, -WIB type)	70-00-0900	Setup and configuration manual TCP/IP

Note: The above list is not complete. The documents on the website are relevant.

BACnet (PICS)

Protocol Implementation Conformance Statement for BACnet MS/TP and BACnet IP network

The following is only valid for products with the **-BAC and -WIB** option.

Vendor Name: Vector Controls
Product Name: TRI2 Controls series
TRI2 product description: The TRI2 communicating BACnet controllers are designed as universal controls equipment suitable for a large number of applications. They may be used in zoning and other applications which are monitored by a BACnet MS/TP network.

▲ Supported BACnet Interoperability Blocks (BIBB)

The BACnet interface conforms to the B-ASC device profile (BACnet Application Specific Controller).
The following BACnet Interoperability Building Blocks (BIBB) is supported.

BIBB	Type	Name
DS-RP-B	Data sharing	Read property - B
DS-RPM-B	Data sharing	Read property multiple - B
DS-WP-B	Data sharing	Write property - B
DS-COV-B *1)	Data sharing	Change of value - B
DM-DCC-B	Device management	Device communication Control - B
DM-DDB-B	Device management	Dynamic device binding - B
DM-DOB-B	Device management	Dynamic object binding - B
DM-TS-B	Device management	Time synchronisation - B
DM-UTC-B	Device management	UTC Time synchronisation - B
DM-RD-B	Device management	Reinitialize device - B

*1) With -BAC, a maximum of 5 COV objects can be activated at the same time. This limitation does not apply to -WIB.

▲ Supported standard BACnet application services

- ReadProperty
- ReadPropertyMultiple
- WriteProperty
- DeviceCommunication (password protected)
- I-Am
- I-Have
- TimeSynchronisation
- UTCTimeSynchronisation
- ReinitializeDevice ("cold" or "warm") (password protected)

▲ Supported standard Object types

- Device
- Analog input
- Analog value
- Binary value
- Multi-state Value

X2 Functional Scope

The controller has the following X2 functions and elements:

Group	Modules	QTY	Description
UP			User and display parameters
UI	01U to 06U	6	Sensor inputs for temperature, humidity, CO2, VOC and dust particle sensor (PMxx)
	07U	1	PIR sensor as motion detector (only SRD2-OPIR type)
	08U	1	Active input 0…10 VDC
	09U to 12U	4	Virtual inputs for operation terminals, bus modules or special functions
AL	1AL to 8AL	8	Alarm conditions
LP	1L to 4L	4	Control loops
Ao	1A to 3A	3	Analog outputs for 0…10 VDC
FAN	1F	1	Fan or lead lag modules, 1 to 3 fan speeds, up to 3 switching lead-lag stages each
do	1d	1	Binary output with a normally open and a normally closed (SPDT) relays contact
FU	1FU	1	Remote Enable: Activation of the controller based on signal and alarm conditions
	2FU	1	Change Operation Mode: Switching occupied and unoccupied with control signals
	3FU	1	Heat/Cool Change: Switching heating and cooling based on a control signal
	4FU	1	Setpoint Compensation: Summer/winter compensation of setpoint
	5FU	1	Economizer (free heating or cooling due to the condition of outside and room air)
Co			Communication (if a communication module is available)
COPY			Copying complete parameter sets between run, default and external memory with up to 4 memory locations (AEC-PM2)

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Smart Sensors and Controls Made Easy!

Quality - Innovation – Partnership

Vector Controls GmbH
Switzerland

info@vectorcontrols.com
www.vectorcontrols.com