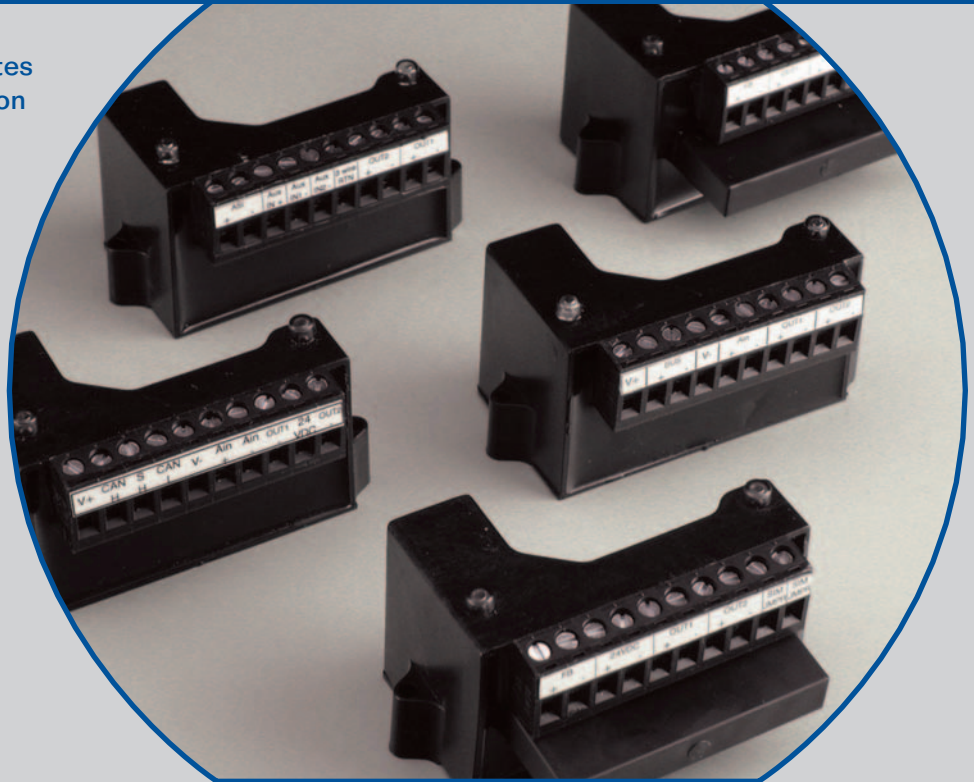


Dual Module VCT

The Dual Module VCT integrates position sensing, communication electronics, power outputs, auxiliary inputs and wire termination into a fully sealed compact package. The module also integrates a terminal strip directly connected to the potted and sealed electronic circuits. Sensors are triggered by stainless steel targets on StoneL's touch and tune adjustable cams.



1. High Intensity LEDs Show Status

Dual modules come standard with bright **Green** and **Red** LEDs that correspond to open and closed valve position.

2. Highest Reliability Sensors

Solid state inductive sensors are integrated into the module for the ultimate in position sensing reliability.

3. Integrated Terminal Strip Eliminates Wires

By eliminating extra wires and termination points, reliability and space efficiency are dramatically improved.

4. Precise Triggering with Stainless Steel

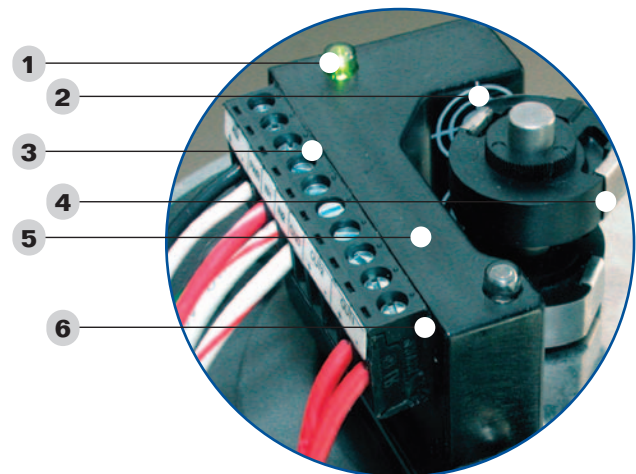
Sensors repeat within one degree and are tuned to a two degree dead-band. They may be triggered to operate as normally open or normally closed.

5. Lexan® Enclosure is Water & Corrosion Proof

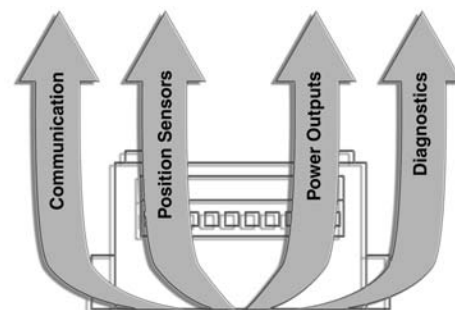
Contaminants will not affect the module as long as terminal strip is not immersed.

6. Fully Filled and Sealed

All solid state electronics are sealed to prevent contamination and make the module highly tolerant to shock and vibration.



Dual module sensors are triggered by the stainless steel bands permanently attached to the touch and tune cams. Settings may be made to hold sensors energized until position is reached (simulates normally closed) or remain unenergized until position is reached (simulates normally open). Simply adjust the stainless steel target band on the touch and tune cams to the desired position and settings are conveniently locked into place.



AS-Interface Dual Module

Actuator Sensor Interface Protocol

Up to 31 VCTs may be linked on a single pair of wires using the AS-Interface protocol. Power and control is supplied to solenoid valves over the AS-Interface two wire network.

The AS-Interface (Actuator Sensor Interface) protocol is becoming a worldwide standard for discrete apparatus. The AS-Interface network is simple, reliable and field proven. It is suitable for both general purpose and hazardous area process environments.



AS-Interface is designed to complement higher level bus networks. It is well suited to directly gateway into existing networks using Modbus or Modbus+, which have become defacto standards for SCADA in the process industries. AS-Interface also conveniently gateways into PROFIBUS, DeviceNet and Ethernet.

AS-Interface System and Dual Module Benefits

- Cut installation costs by over 40%.
- Suitable for both hazardous and general purpose environments.
- Simple electronics for robust performance.
- Two wire unshielded cable for both power and data delivery is very low cost.
- High tolerance to electromagnetic interference.
- Easy to install and understand.
- Free choice of network topology.
- Gateways seamlessly to higher level networks.



Economic Analysis

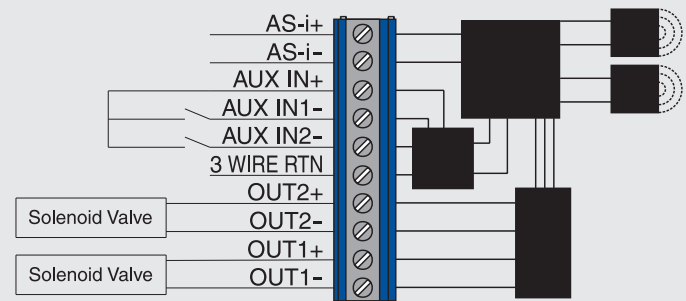
	Conventional	AS-i
VCT with Solenoid	\$ 525	\$ 555
Conduit & Wiring (\$8/ft)	\$1,200	\$ 240
I/O Cards; Gateway (AS-i)	\$ 30	\$ 100
Power Supply	\$ 10	\$ 50
Total Installed Cost (per VCT)	\$1,765	\$ 945

An \$820 or 46% savings has been demonstrated using AS-Interface over conventional systems. This analysis is based on 10 VCTs in a hazardous area. More savings may be realized for space savings, wiring flexibility and additional devices on the same network.

Network Specifications

Topology	Linear, star, tree or ring
Cabling	Unshielded and untwisted pair
Bus Power	Up to 8 Amps over signal pair
Number of Devices	Up to 62 per network
Current Carrying Capacity	8 Amps @ 30 VDC
Cable Length	100 meters; 300 meters with repeaters
Transmission Rate	167 kbits/second
Cycle Time	5 mseconds max. with 31 devices
Communication Method	Master/Slave with cyclic polling
Data Signal	Manchester II coding with alternating pulse modulation
Error Detection	Detection and retransmission of disturbed telegram

AS-Interface Dual Module Wiring Diagram



(96) AS-Interface Dual Module Specifications

Configuration	(2) Discrete Sensor Inputs (2) Auxiliary Discrete Inputs (2) Power Outputs (Solenoids)
Max. Current	160mA, Both Outputs Combined (Current Limited to 200mA)
Outputs, Max. Power	4 Watts, Both Outputs Combined
Outputs, Voltage	25 to 30 VDC
Temperature Range	-40° to 82°C (-40° to 180°F)
Configuration Code	F4; User Defined 4 in/2 out
AS-i Version	2.1
Devices per Network	31

(97) AS-Interface Dual Module with Extended Addressing Specifications

Configuration	(2) Discrete Sensor Inputs (2) Auxiliary Discrete Inputs (1) Power Output (Solenoid)
Max. Current	100mA
Output, Max. Power	2.4 watts
Output, Voltage	25 to 30 VDC
Temperature Range	-40° to 82°C (-40° to 180°F)
Configuration Code	A4; User Defined 4 in/1 out
AS-i Version	2.1
Devices per Network	62

DeviceNet Dual Module

DeviceNet Protocol

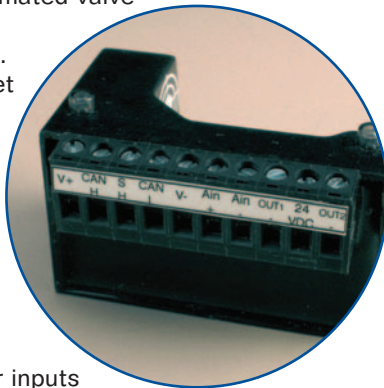
DeviceNet dramatically cuts installation costs by integrating up to 62 devices on a 4-wire trunk network. DeviceNet interfaces directly with many popular PCs and PLCs including Allen Bradley, GE Fanuc and others. The DeviceNet protocol is based on CAN (Controller Area Network) technology originally developed for automotive applications and extensively used throughout that industry.

DeviceNet. DeviceNet enables you to directly attach simple discrete and complex analog devices. Power is carried over two wires with data on another bundled two wires making up the four wire bus. DeviceNet has been designed for, and proven in, mission critical applications such as anti-lock brakes and air bags. It also has high noise immunity, making it suitable for industrial and process environments.

DeviceNet VCTs feature an electronic data sheet (EDS), which includes a definition of the device's configurable parameters and public interfaces to those parameters. ODVA (Open DeviceNet Vendors Association) and StoneL maintain a directory of the EDS files for you to download from our Web Sites.

DeviceNet System and Dual Module Benefits

- Save over 30% on installation costs.
- Power and communication supplied over 4-wire bus.
- Install up to 62 devices on the same bus network.
- Cycle count for automated valve and other diagnostics available.
- Electronic Data Sheet provides for rapid commissioning of devices.
- Auxiliary bus-powered 4 to 20 mA input attaches conventional analog devices for more wire savings.
- Open/Closed sensor inputs and 2 power outputs available to handle all On/Off automated valve applications.
- Hot insertion of devices may be done without dropping bus power.



Economic Analysis

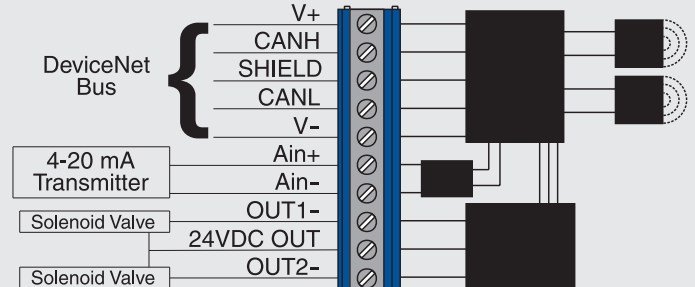
	Conventional	DeviceNet
VCT with Solenoid	\$ 525	\$ 695
Conduit & Wiring (\$8/ft)	\$1,200	\$ 300
I/O Cards; DeviceNet Scanner	\$ 30	\$ 100
Power Supply	\$ 10	\$ 10
Total Installed Cost (per VCT)	\$1,765	\$1,105

A \$660 or 37% savings has been demonstrated using DeviceNet over conventional systems. This analysis is based on 20 VCTs in a hazardous area. More savings may be realized for design time reduction, space savings, wiring flexibility and additional devices on the same network.

Network Specifications

Topology	Trunk line with drop and branch lines, trunk terminators required		
Cabling	Two separate shielded twisted pairs contained in one shielded cable (DeviceNet Specifications.)		
Number of Devices	62 per network		
Data Delivery	8 bytes of data for I/O; can be unlimited if using fragmentation services		
Current Carrying Capacity	8 Amps @ 24 VDC (Thick cable)		
Cable Length (Thick cable)	Dependent on bus transmission rate (see table below)		
Transmission	Drop Length		
Rate	Trunk Length	Maximum	Cumulative
125 kb/s	500m (1,640ft)	6m (20ft)	156m (512ft)
250 kb/s	250m (820ft)	6m (20ft)	78m (256ft)
500 kb/s	100m (328ft)	6m (20ft)	39m (128ft)
Communication Method	Master/Slave, multi-master and peer-to-peer polling		
Data Signal	Non-Return to zero with bit stuffing		
Error Detection	Automatic retransmission of corrupted messages and autonomous switching off of defective nodes		

DeviceNet Dual Module Wiring Diagram



DeviceNet Dual Module Specifications

Configuration	(2) Discrete Inputs (Open & Closed) (2) Power Outputs (Solenoids) (1) 4-20 mA Auxiliary Input, 8 Bit Resolution; No Additional Power Source Required
Baud Rates	Software Selectable 125K, 250K or 500K baud
Messaging Outputs	Polling, Cyclic & Change of State Max. Current 160mA, Both Outputs Combined (Current Limited to 250mA)
Max. Power Outputs, Voltage	4 Watts, Both Outputs Combined 24 VDC
Temperature Range	-40° to 82°C (-40° to 180°F)
Other Features	Stores Number of Actuations; Stores Date of Last Service; Predetermined Output Fail State

DeviceNet is a trademark of the Open DeviceNet Vendor Association, Inc.

Modbus Dual Module

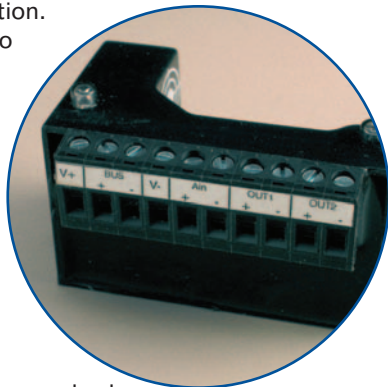
Modbus Protocol

Modbus has been the de facto standard for interfacing field I/O systems to the DCS in the process industries for the past 15 years. Many plants are currently using Modbus based field networks. This enables rapid connection into the existing control architecture using existing software drivers.

The Modbus protocol uses either an RS232, RS422 or an RS485 serial interface for its physical layer (wiring topology and electrical connections). For field use RS485 is the preferred serial interface featuring a long trunk length (over 1200 meters) and 32 drops to individual field devices. Since RS485 does not carry power, an additional 24 VDC power supply wire pair is recommended to power the field devices.

Modbus System and Dual Module Benefits

- Same bus may be used for both analog and discrete process instrumentation.
- Interfaces readily into most DCS systems and software.
- Install up to 32 devices on the same trunk network.
- Long bus length of up to 1200m (4,000 ft).
- Separately powered outputs supply up to 4 watts.
- Voltage regulator keeps output for powering auxiliary solenoids at 24 VDC with supply levels as low as 10 VDC.
- Modbus Dual Module accepts a standard 4 to 20 mA input from conventional analog instrumentation.



Economic Analysis

	Conventional	Modbus
VCT with Solenoid	\$ 525	\$ 675
Conduit and Wiring (\$8/ft)	\$1,200	\$ 200
I/O Cards; Modbus Interface	\$ 30	\$ 20
Power Supply	\$ 10	\$ 10
Total Installed Cost	\$1,765	\$ 900

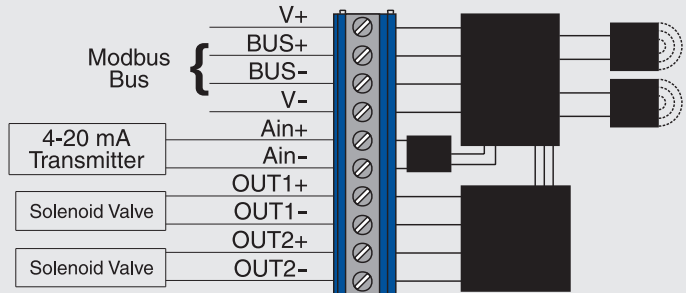
Modbus VCTs offer an \$865 wiring savings over conventional monitors. This analysis is based on 10 VCTs in a hazardous area. More savings may be realized for space savings, wiring flexibility and additional devices on the same network.

Specifications

Network Specifications

Topology	Bus/tree, terminators required
Cabling	One shielded twisted pair for signal and one pair for 24 VDC supply.
Bus Power	Must have auxiliary 24 VDC supply
Max. Number of Devices	32 per network
Data Delivery	Unlimited
Max. Cable Length	1,200 meters (4,000 feet)
Typical Data Access	Cyclic Polling using Query-Response Method
Transmission Rate	1.2 to 115 kbits/second
Approximate Cycle Time	74 msec for 32 field devices @ 38.4 kbits/second
Error Detection	Cyclic Redundancy Check

Modbus Dual Module Wiring Diagram



Modbus Dual Module

Configuration	(2) Discrete Inputs (Open and Closed) (2) Power Outputs (Solenoids) (1) 4-20mA Auxiliary Input, 10 Bit Resolution
Outputs	4 Watts @ 24 VDC Both Outputs Combined (Current Limited to 200mA)
Outputs, Max. Power	4 Watts, Both Outputs Combined
Outputs, Volt. Supply	24 VDC (Regulated with range from 10 to 24 VDC)
Transmission Rate	Software selectable for 9.6, 19.6 or 38.4 kbits/sec
Transmission Mode	RTU (Remote Terminal Unit)
Temperature Range	-40° to 82° C (-40° to 180° F)
Other Features	Predetermined Output Fail State

FOUNDATION Fieldbus Dual Module

FOUNDATION Fieldbus Protocol

Designed for use in the process industries, FOUNDATION Fieldbus offers multi-drop capabilities, long trunk length, and is fully compatible with intrinsic safety circuits.

FOUNDATION Fieldbus H1 level has been designed as the ideal digital bus replacement for the 4 to 20 mA analog standard in the process industries.



FOUNDATION fieldbus has a unique user layer that features Device Description (DD) and a set of communication blocks. The DD is a standardized

description of the functions in a device. It enables the host device to learn about capabilities of other devices on the network even though some capabilities may have never been seen before. Function blocks, one type of communication block in the user layer, describe the control and I/O behavior of the device in object form. By interconnecting function blocks, the user may construct PID control loops and other process control algorithms.

The physical layer of FOUNDATION Fieldbus has been designed to operate with intrinsically safe wiring. It is standardized by ISA, S50.02-1992 and IEC 1158.2.

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FOUNDATION Fieldbus and Dual Module Benefits

- Same bus may be used for both analog and discrete process instrumentation.
- Intrinsic safety wiring option for hazardous environments.
- Standardized function block descriptions represent process variables and speed control setup. (Multiple function blocks may reside in a single device.)
- Long bus length of 1900m (6,175ft) and spurs up to 120m (390ft) span most process systems.
- Bus wiring may be the same as standard 4 to 20 mA wiring to further reduce wiring costs.
- FF is a worldwide standard for use in the process industry and is supported by many of the world's process instrumentation suppliers.
- FF dual module offers separately powered (isolated from bus) power outputs, or bus powered outputs.



Economic Analysis

	Conventional	FF
VCT with Solenoid	\$ 525	\$ 990
Conduit & Wiring (\$8/ft)	\$1,200	\$ 200
I/O Cards; FF Master	\$ 30	\$ 100
Power Supply	\$ 10	\$ 10
Total Installed Cost	\$1,765	\$1,300

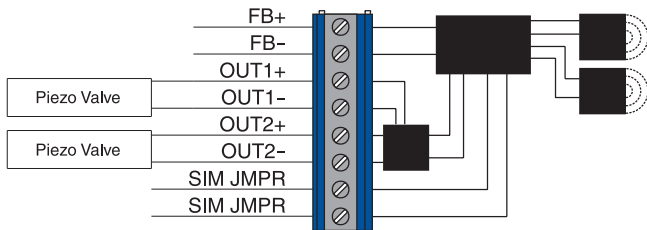
FOUNDATION Fieldbus VCTs offer a \$465 wiring savings over conventional monitors. This analysis is based on 10 VCTs in a hazardous area. More savings may be realized for space savings, wiring flexibility and additional devices on the same network or by IS wiring.

Network Specifications

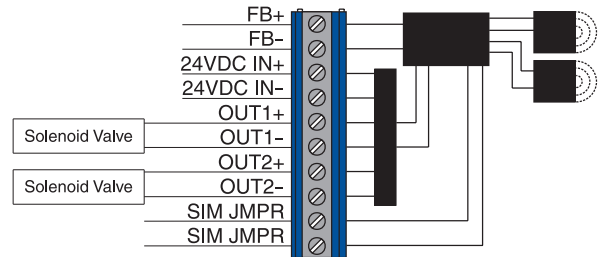
Topology	Bus/tree, terminators required
Cabling	Shielded twisted pair
Bus Power	Typically 20mA/device at 9 to 32 VDC
Number of Devices	2 to 16 per network typical
Data Delivery	Unlimited
Max. Cable Length	1900 meters, 120 meters/spur
Transmission Rate	31.25 kbits/second
Cycle Time	Link Active Scheduler determines priority
Communication Method	Delegated token passing with cyclic and acyclic option
Data Signal	Manchester Biphase-L decoding with synchronous serial signaling
Error Detection	Frame check sequence comparison

FOUNDATION Fieldbus Dual Module

(93) Bus Powered FOUNDATION Fieldbus Dual Module Wiring Diagram



(94) Externally Powered FOUNDATION Fieldbus Dual Module Wiring Diagram



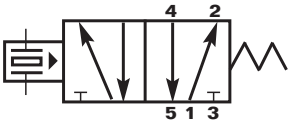
(93) Bus Powered FOUNDATION Fieldbus Dual Module Specifications (uses piezo)

Configuration	(2) Discrete Inputs, DI (Open & Closed) (2) Discrete Outputs, DO (Piezo Valves)
Outputs	2mA @ 6.5 VDC each; Current Limited to 2mA (Bus Powered)
Temperature Range	-40° to 82°C (-40° to 180° F)
Other Features	Stores Number of Actuations Stores Date of Last Service Predetermined Output Fail State

(94) Externally Powered FOUNDATION Fieldbus Dual Module Specifications

Configuration	(2) Discrete Inputs, DI (Open & Closed) (2) Power Outputs, DO (Solenoids)
Outputs	4 watts total @ 24VDC Both outputs combined (Current Limited to 200mA) (externally powered)
Temperature Range	-40° to 82°C (-40° to 180° F)
Other Features	Stores Number of Actuations Stores Date of Last Service Predetermined Output Fail State

Piezo Ultra Low Power Valve for use with (93) Bus Powered FOUNDATION Fieldbus



Use either the 0.5 Cv or the 1.3 Cv Namur mount pneumatic valve with StoneL FOUNDATION Fieldbus Bus Powered VCTs. These are Ultra Low Power valves that use piezo technology to actuate, utilizing just 2mA @ 7.5VDC to operate either device. Both of these 5-Way 2 position, spring return pneumatic valves are designed to meet the Namur standards for actuator pad mount solenoid valves.



0.5 Cv (443015)



1.3 Cv (443016)

Specifications

0.5 Cv and 1.3 Cv Models

Configuration	Piezo Operated 5-way spool valve, 2 position, spring return
Operating Pressure	36 to 120 psi (2.5 to 7.5 bar)
Media	Dried / filtered air (30 micron)
Manual Override	External
Operating Life	1 million cycles
Operating Temperature	-10° to 60° C (14° to 140° F)
DC Coil Power	2mA@6.5VDC
Operating Voltage	5.5 to 9 VDC
Mounting	2 Screws (M5) per Namur standards
Connection	Plug to DIN 43650B
Electrical Protection	EE ia IIC T6

Namur Mount 0.5Cv (443015)

Flow Rating	Cv - 0.5 (Kv - 7.1)
Manifold Porting	1/8" NPT
Exhaust Porting	1/8" NPT

Namur Mount 1.3Cv (443016)

Flow Rating	Cv - 1.3 (Kv - 18.5)
Manifold Porting	1/4" NPT
Exhaust Porting	1/4" NPT