DATA SHEET

vibro–meter®

VibroSmart®
VSI010 + VSB010
communications
interface module

KEY FEATURES AND BENEFITS

- VibroSight® compatible hardware from the vibro-meter® product line

- Communications interfaces for industry standard fieldbuses: Modbus RTU, Modbus TCP, PROFIBUS DP and GOOSE (IEC 61850)

- PROFIsafe safety layer to ensure more reliable and secure PROFIBUS DP communications

- Two VSI010 modules per VibroSmart measurement block allows redundant operation

- AND, OR and majority voting logic functions for the combination of alarm and status information for a VibroSmart measurement block

- VibroSmart® security (module lock)

- Redundant communications and redundant power supply inputs to improve availability

- Discrete outputs: 2 local relays

- Real-time Ethernet communications

- Live insertion and removal of modules (hot-swappable) with automatic reconfiguration

**VSI010 communications interface module
(+ VSB010 terminal base)**

CE   UK CA   Ex   IECEx   CSA   EAC   Ex

IEC 61850-3 EMC and IEC 61850 GOOSE

KEY BENEFITS AND FEATURES *(continued)*

- Fully software configurable
- Robust enclosures with DIN rail mounting

APPLICATIONS

- Communications bridge between a VibroSmart system and third-party systems, such as a DCS or PLC

- Machinery protection and/or condition monitoring

- Conforms to IEC 61850-3 requirements for power plant and utility applications

DESCRIPTION

Introduction

The VibroSmart® distributed monitoring system (DMS) is a system of modular and scalable products designed for condition monitoring and machinery protection applications for power generation turbines, oil and gas applications and auxiliary balance-of-plant equipment.

VibroSmart® modules can be mounted directly on machinery, reducing the need for expensive cabling, because they are designed and certified to work in extremes, such as harsh industrial environments characterised by potentially explosive atmospheres (Ex Zone 2), high temperatures (70°C, 158°F) and high mechanical stress. VibroSmart complements the VM600 series of rack-based solutions from Meggitt's vibro-meter® product line and is compatible with the same VibroSight® machinery monitoring system software.

The VibroSmart® VSI010 communications interface module is an optional communications module for use with other VibroSmart modules in a monitoring system. The VSI010 module supports up to two fieldbus channels and allows the data from the VibroSmart modules in a measurement block to be read by fieldbus master devices.

VibroSmart distributed monitoring system

A VibroSmart® distributed monitoring system (DMS) is a network of small and economical modules providing measurement, communications or other functions that are connected together in distributed, networked measurement blocks in order to provide the functionality normally offered by rack-based machinery monitoring systems. A VibroSmart system consists of one or more measurement blocks, each containing up to sixteen VibroSmart modules, a power supply and an optional host computer running the VibroSight software.

A measurement block is a logical grouping of VibroSmart modules that allows data such as tachometer, trigger and alarm information to be shared, for example, in order to monitor the same machine. Measurement blocks are configured using the VibroSight software.

Note: A VibroSmart system is limited to a maximum of two VSI010 modules per measurement block.

A VibroSmart module consists of an electronics module (providing configurable machinery monitoring functions) that clips into a VibroSmart terminal base, which mounts on a DIN rail. A range of plug-in fieldbus communications adaptors that interface directly with the VSI010 module are available to provide an integrated solution for interfacing to fieldbuses.

VibroSmart terminal bases incorporate buses and connectors to provide all of the I/O connections required to interface to a VibroSmart module. Terminal bases also include non-volatile memory to store the configuration of the attached VibroSmart module, which allows modules to be hot-swapped. Modules and terminal bases use mechanical key-coding for a system that is simple to operate and use.

Different VibroSmart modules, terminal bases and fieldbus communications adaptors can be combined to offer unique combinations of functionality, versatility and safety assurance. In this way, a monitoring system can be built to meet the exact needs of an application resulting in a more cost-effective and reliable solution.

VSI010 communications interface module

The VibroSmart VSI010 communications interface module acts as a data communications bridge between a measurement block and external devices that use fieldbus networks. To do this, the VSI010 acts as a fieldbus server (slave) device and obtains measurements and data from the other VibroSmart modules in the same measurement block, such as VSV30x monitoring modules.

The VSI010 module then shares this information with third-party systems such as a DCS or PLC over one of the industry standard communications interfaces (fieldbuses) supported. The VSI010 supports up to two serial-based communications interfaces (Modbus RTU or PROFIBUS DP) *or* one Ethernet-based communications interface (Modbus TCP) *or* one GOOSE (IEC 61850) communications interface (Ethernet-based) at any one time.

In addition, the VSI010 module has eight basic and four advanced logic functions that can be used to combine alarm and status information from other VibroSmart modules in the same measurement block in order to drive the module's relays.

DESCRIPTION (*continued*)

Like all VibroSmart modules, the VSI010 module is fully software configurable using the VibroSight software. For example, to configure a fieldbus interface, VibroSight Configurator is used to select and configure the type of communications interface (port), then the data/measurements to be shared are selected from the available VibroSmart modules and simply mapped to the interface (memory space/map/address). The fieldbus interfaces, data/measurements and memory mapping (addressing) are all configurable in order to easily and efficiently meet the interfacing requirements of any third-party system.

Communications

All VibroSmart modules and devices communicate using a system bus (SBUS), based on Ethernet technology, that supports data transfer rates of 100 Mbps at distances up to 100 m. The SBUS ensures the transfer of both non-real-time (standard) and real-time (time critical) information between VibroSmart modules, and supports communication with the host computer running the VibroSight software.

VibroSmart modules can either be located side-by-side (adjacent to each other) or separate from one another. This flexibility allows the functionality of the monitoring system to be distributed depending on the size of and access to the machine being monitored. It also helps reduce the expensive sensor cabling typically required between sensors and monitoring modules, by effectively replacing it with lower cost Ethernet and power supply cabling.

VibroSmart modules that are located side-by-side can communicate directly (no Ethernet cabling required) using the sidebus connectors on the terminal base that support both SBUS and redundant power supply distribution. VibroSmart modules that are mounted separate from one another can communicate over standard and redundant Ethernet networks of shielded twisted-pair Ethernet cable using the Ethernet connectors on the terminal base. However, using these Ethernet connectors does require that the power supply is distributed separately.

Discrete signal interface (DSI) inputs, including the module lock signal, and tachometer signals can be connected directly to individual modules (locally). Alternatively, to reduce external wiring, these signals can be connected to a single VibroSmart module and shared among modules in the same measurement block using the SBUS.

Security

The VSI010 + VSB010 support a module lock feature that can be used to limit the functionality of a VibroSmart® distributed monitoring system (DMS), as required. Enabling module lock, for a module, measurement block or system, helps to reduce the possibility of interference in the operation of the monitoring system itself and in the machinery being monitored.

Accordingly, VibroSmart® security (module lock) makes it easier for operators to comply with international security / critical infrastructure regulations. Refer to the *VibroSmart® distributed monitoring system (DMS) hardware manual* for further information.

Software

The VibroSight software supports the configuration and operation of VibroSmart modules, including the configuration of the VSI010 fieldbuses used to share measurements and data via Modbus, PROFIBUS or GOOSE (IEC 61850).

Refer to the *VibroSight® machinery monitoring system software data sheet* for further information.

Applications information

The VSI010 communications interface module is designed for sharing the data generated by VibroSmart systems that monitor, protect, analyse and diagnose critical assets such as gas turbines, steam turbines, hydro turbines and other rotating machines.

VibroSmart® systems (VSV30x + VSB300, VSI010 + VSB010 and VSN010) conform to the IEC 61850-3 requirements for power plant and utility applications – when installed in specific configurations. Contact Meggitt SA and/or refer to the *VibroSmart® distributed monitoring system (DMS) hardware manual* for further information.

For specific applications and other information, contact your local Meggitt representative.

SPECIFICATIONS

Processing functions

Communications	: Fieldbus server (slave) device acting as a data bridge between the modules in a VibroSmart measurement block and fieldbus master devices (third-party systems)
• Number of channels	: Up to 2 fieldbus ports
• Number of registers	: Up to 750 outputs (registers) per fieldbus port
Logic functions	: Combination of alarm and status information from the modules in a VibroSmart measurement block
Relay outputs	: Actuation based on logic function outputs and relay settings such as normally energised or de-energised, and latched or unlatched

Fieldbus interfaces – serial

Network interface	: RS-485 (half-duplex)
Number	: 2, available via J5 and J6 of the terminal base – for use with a VibroSmart VSF001 serial fieldbus communications adaptor only (see **Connectors on page 10**)
Data transfer rate	: Up to 12 Mbps
Distance between serial fieldbus devices	: Up to 100 m. Note: Depends on the applicable fieldbus standard (physical interface).
Network topologies	: Linear (daisy-chained) for half-duplex (RS-485) networks
Protocols	: Modbus RTU or PROFIBUS DP. Note: Individual PROFIBUS slots can be configured as PROFIsafe to help ensure more reliable and secure communications.

Fieldbus interfaces – Ethernet

Network interface	: 100BASE-TX
Number	: 2, available via J4 of the terminal base – for use with a VibroSmart VSF002 Ethernet fieldbus communications adaptor only (see **Connectors on page 10**). Note: Only 1 × Ethernet communications interface at any one time.
Data transfer rate	: Up to 100 Mbps
Distance between Ethernet fieldbus devices	: Up to 100 m
Network topologies	: Linear and star. Note: Depends on the applicable fieldbus standard (protocol).
Protocols	: Modbus TCP or GOOSE (IEC 61850)

Notes
The VSI010 module firmware supports the Modbus RTU, Modbus TCP, PROFIBUS DP and GOOSE (IEC 61850) fieldbus communications protocols. The actual communications interfaces used by an application depends on the configuration of the VSI010 module's communications interfaces (Modbus, PROFIBUS *or* GOOSE) and the VSF00x fieldbus communications adaptor used. The permitted fieldbus combinations are:
• Up to 2 × Modbus RTU interfaces – using a VSF001 serial fieldbus communications adaptor
  (see **VSF001 serial fieldbus communications adaptor on page 11**).
• Up to 2 × PROFIBUS DP interfaces – using a VSF001 serial fieldbus communications adaptor
  (see **VSF001 serial fieldbus communications adaptor on page 11**).
• 1 × Modbus TCP interface – using a VSF002 Ethernet fieldbus communications adaptor
  (see **VSF002 Ethernet fieldbus communications adaptor on page 11**).
• 1 × GOOSE (IEC 61850) interface – using a direct connection to an Ethernet connector (Eth1 or Eth2).
When using serial-based fieldbus interfaces, only one protocol can be used at any one time, so a single VSI010 module can support either Modbus RTU *or* PROFIBUS DP at any one time.

SPECIFICATIONS *(continued)*

Alarm combination

Logic functions : AND, OR and majority voting logic, with optional inversion of individual inputs

Basic logic functions
• Number : 8
• Configurable inputs : From the sensor OK checks, measurement alarms (Danger+, Alert+, Alert−, Danger−) and validity indicators, logic function outputs, DSI inputs and module operating modes of the modules in the same measurement block as the VSI010

Advanced logic functions
• Number : 4
• Configurable inputs : From the basic logic function outputs of the module

Discrete signal interface (DSI) inputs

Control signal
• Alarm bypass (AB) : A closed contact between the DSI AB and RET inputs inhibits the local relay outputs.

• Alarm reset (AR) : A closed contact between the DSI AR and RET inputs resets the alarms latched by the module

• Trip multiply (TM) : A closed contact between the DSI TM and RET inputs multiplies the alarm levels by a scale factor (software configurable), to enable trip multiplier-based adaptive monitoring

• Module lock (Lock) : A closed contact between the DSI Lock and RET inputs effectively locks the module, for operational and/or security reasons.
Note: A locked module prevents configuration changes (operational configuration, firmware updates, time synchronisation and network settings) and restricts operations (no alarm bypass (AB), Trip multiply (TM) or channel bypass from VibroSight Scope).

Operating principle : Detection of an open circuit or a closed circuit on the input. These control signals can be connected directly to individual modules (locally) or connected to a single module (the DSI Master) and shared among modules in the same measurement block using the SBUS (remotely).

Discrete signal interface (DSI) commands

VibroSight Scope command
• Alarm bypass (AB) : Software command to control module functionality as per equivalent DSI control input signal

• Alarm reset (AR) : Software command to control module functionality as per equivalent DSI control input signal

• Trip multiply (TM) : Software command to control module functionality as per equivalent DSI control input signal

• Channel 1 bypass, Channel 2 bypass, Aux channel bypass : Software commands to inhibit the local relay outputs for a particular channel of a module.
Note: This functionality is intended for temporary use in order to support machinery maintenance activities.

Operating principle : In the VibroSight Scope software, DSI commands (controls) are used to enable/disable DSI functionality for the connected module

SPECIFICATIONS *(continued)*

Discrete outputs

Local relays

• Number	: 2
• Configurable functions	: Normally energised (NE) or normally de-energised (NDE). Latched or unlatched.
• Configurable inputs	: From the logic function outputs of the module

Relay characteristics

Number	: 2 × user-configurable relays (RL1 and RL2)
Type	: Double-pole double-throw (DPDT) / 2 Form C
Contact arrangement	: 1 × COM, 1 × NC and 1 × NO contact per relay (RL1 and RL2) available on J3 of the terminal base. See **Connectors on page 10**.
Nominal switching capacity (resistive load)	: 1 A 30 V_{DC} / 0.5 A 125 V_{AC}
Maximum switching power (resistive load)	: 60 W / 62.5 VA
Maximum switching voltage	: 220 V_{DC} / 125 V_{AC}
Maximum switching current	: 1 A
Minimum switching capacity	: 10 μA, 10 mV_{DC}
Operate / release time	: 4 ms (max.) / 4 ms (max.)
Breakdown voltage	: >500 V
Insulation resistance	: 1000 MΩ min. (at 500 V_{DC})
Mechanical life	: >10^8 operations (min.)
Electrical life	: >10^5 operations (min.)

Note: In general, VSI010 + VSB010 module relays are limited to 63 V_{AC} max. in accordance with the EN 61010 electrical safety standard. For applications, the relays withstand 125 V_{AC} and VibroSmart modules are routinely tested with a dielectric voltage of 500 V_{AC}.

⚠ **For Ex Zone 2 applications, the voltage and current switched by a VSI010 + VSB010 relay must be limited in accordance with Table A.1 of EN/IEC 60079-11, with a maximum voltage of 45 V or a maximum current of 0.95 A.**

Environmental

Operating

• Temperature	: −20 to 70°C (−4 to 158°F)
• Humidity	: 0 to 90% non-condensing

Storage

• Temperature	: −40 to 85°C (−40 to 185°F)
• Humidity	: 0 to 95% non-condensing
Protection rating (according to IEC 60529)	: IP20. It is also possible to deploy VibroSmart modules and devices within an industrial housing in order to attain a protection rating of IP56. Contact Meggitt for further information.

⚠ **For Ex Zone 2 applications, a VSI010 + VSB010 communications interface module and terminal base must be installed in an enclosure that ensures a protection rating of at least IP54 (or equivalent).**

SPECIFICATIONS *(continued)*

Potentially explosive atmospheres
Ex approved for use in hazardous areas

Type of protection Ex ic: intrinsic safety, Ex nA: non-sparking		
Europe	EC type examination certificate	⟨Ex⟩ II 3 G (Zone 2) Ex nA IIC T6…T4 Gc LCIE 14 ATEX 1027 X
International	IECEx certificate of conformity	Ex nA IIC T6…T4 Gc IECEx LCIE 14.0056X
North America	cCSAus certificate of compliance	Class I, Division 2, Groups A, B, C, D Ex ic nA IIC T6…T4 Gc Class I, Zone 2 AEx ic nA IIC T6…T4 Gc cCSAus 70059792
United Kingdom	Type examination certificate*	⟨Ex⟩ II 3 G Ex nA IIC T6…T4 Gc CML 21 UKEX 4545 X
Russian Federation	ЕАЭС RU certificate of conformity	2Ex nA IIC T6…T4 Gc X ЕАЭС RU C-CH.АД07.B.04690/22

*Not engraved/marked on the product.

⚠ **For specific parameters of the mode of protection concerned and special conditions for safe use, refer to the Ex certificates that are available from Meggitt SA.**

⚠ **When using protection mode "Ex nA" (non-sparking), the user must ensure that the VSI010 + VSB010 are installed in an industrial housing or enclosure that ensures a protection rating of at least IP54 (or equivalent).**

⚠ **For the most recent information on the Ex certifications that are applicable to this product, refer to the *Ex product register (PL-1511) document* that is available from Meggitt SA.**

Approvals

Conformity	:	European Union (EU) declaration of conformity (CE marking). United Kingdom (UKCA) declaration of conformity. EAC marking, Eurasian Customs Union (EACU) certificate/declaration of conformity.
Electromagnetic compatibility (EMC)	:	EN 61000-6-2:2005. EN 61000-6-4:2007 + A1:2011. EN 61326-1:2006. TR CU 020/2011. IEC 61850-3 (Note: Specific VibroSmart configurations only).
Electrical safety	:	EN 61010-1:2010. TR CU 004/2011.
PROFIBUS and PROFINET International (PI)	:	Certificate no. Z02058: DP-V0: MS0, Sync, Freeze, Fail_Safe. DP-V1: MS1, MS2, I&M. Physical layer: RS485.

SPECIFICATIONS *(continued)*

Environmental management	: RoHS compliant (2011/65/EU)
Hazardous areas	: Ex approved (see **Potentially explosive atmospheres on page 7**)
Russian federal agency for technical regulation and metrology (Rosstandart)	: Pattern approval certificate OC.C.28.004.A N° 60224

SBUS communications

Type	: Real-time Ethernet
Network interface	: 100BASE-TX
Data transfer rate	: Up to 100 Mbps
Distance between devices	: Up to 100 m at 100 Mbps (100BASE-T compliant)
Network topologies	: Linear and HSR ring
Number of modules	: Up to 128 × modules per VibroSmart system (without using VSN010 real-time Ethernet switches) with: • Up to 16 × modules per measurement block (2 × VSI010 modules max.) • Up to 8 × measurement blocks per VibroSmart system.

Signals shared across a measurement block

• Real-time	: Tachometric time-stamp, trigger and alarm messages
• Non-real-time	: Remote DSI inputs. Measurement data (processed outputs and extracted data).

Note: SBUS is the system bus, based on real-time Ethernet, used by a VibroSmart system for all communications. The SBUS supports inter-module communication between VibroSmart modules such as the transfer of non-real-time information and real-time information such as tachometric time-stamps, triggers and alarms. It also supports extra-module communications such as the exchange of commands, configuration information and measurement data between VibroSmart modules and a host computer running the VibroSight software. The SBUS is also used for communication with external NTP and/or PTP network time server(s), if used.

Configuration

VibroSmart modules	: Fully software configurable over Ethernet, using a host computer running the VibroSight software
Terminal bases	: A DIP switch on the terminal base selects either the sidebus connector (J1x) or the Ethernet connector (Ethx) as the active SBUS port for each side of the terminal base. Only two physical ports can be active at any one time, that is, either J11 or Eth1 (right side) and either J10 or Eth2 (left side).
Fieldbus communications adaptors	: A switch on the VSF001 serial fieldbus communications adaptor selects either half-duplex (2-wire) or full-duplex (4-wire) operation

Time synchronisation

Local synchronisation between VibroSmart modules (inter-module synchronisation)

• Protocol	: Precision time protocol (PTP)
• Accuracy	: <1 µs. Note: Module to module measurement time synchronisation between different VibroSmart modules in the same measurement block.
• Required	: Yes (mandatory). For each VibroSmart measurement block, one module automatically acts as the PTP server (slave) for the other (client) modules in the measurement block.

SPECIFICATIONS *(continued)*

Global synchronisation between VibroSmart systems and other systems (extra-module synchronisation)

• Protocols	: Network time protocol (NTP)
• Accuracy	: <10 ms typ. with an external NTP server. Note: Module to module measurement time synchronisation between different VibroSmart modules (VSV30x and VSI010) in the same VibroSmart system.
• Required	: No (optional). For a VibroSmart system, an NTP server can be manually configured as a common time reference in order to synchronise VibroSmart modules and/or third-party systems.

Local/global synchronisation between VibroSmart modules, VibroSmart systems and other systems
(using a VSN010 switch as a PTP bridge)

• Protocols	: Precision time protocol (PTP)
• Accuracy	: <1 ms (<0.5 ms typ.) with an external PTP server. Note: Module to module measurement time synchronisation between different VibroSmart modules (VSV30x only) and VibroSmart systems.
• Required	: No (optional). For a VibroSmart system, a VSN010 switch can be used as a PTP bridge device (that is, configured to use a PTP server) in order to synchronise VibroSmart modules, VibroSmart systems and/or third-party systems.

Power supply (input)

Voltage	: 24 V_{DC} nominal (+16 to +32 V_{DC} input range)
Redundancy	: Two separate inputs for connection to different external power supplies

Power supply to fieldbuses (output)

Constant voltage	: +5V_{DC} ±2% (90 mA max.)

Power consumption

Total power consumption	: <8 W, including fieldbus power supply

LED indicators

Status	: Diag – indicates the status of the module, such as normal operation, configuration status or internal hardware or firmware failures. Network – indicates Ethernet link activity and status, and network time server synchronisation. Safety – indicates the status of the module's safety function and any active adaptive monitoring functions (AB or TM).
Fieldbus 1 and Fieldbus 2	: Link – indicates the link status for each fieldbus. Activity – indicates the activity status for each fieldbus.

SPECIFICATIONS *(continued)*

Connectors

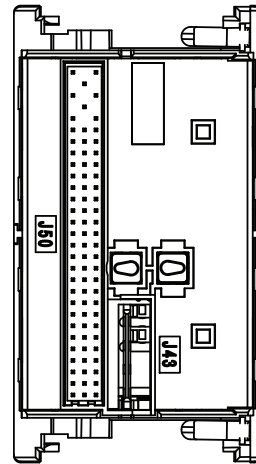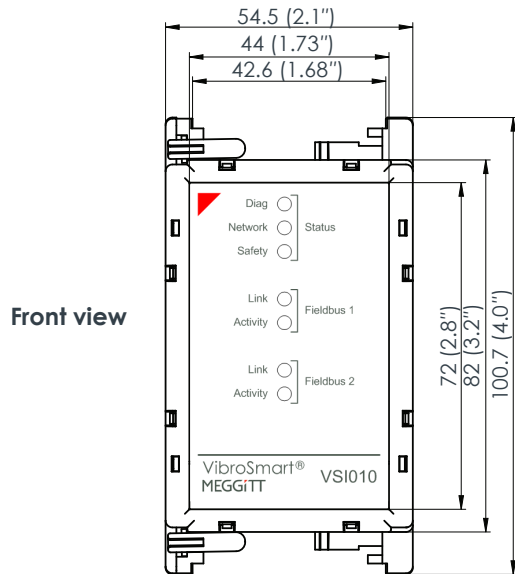|		
J1 to J6	:	10-pin terminal strip headers (male). Compatible with 10-pin BCF plug-in connectors (female) with PUSH IN spring connections having a clamping range from 0.14 to 1.5 mm^2 (26 to 16 AWG) and a recommended stripping length of 9 mm. See **Recommendations for reliable connections on page 18**.
• J1, bottom rear	:	Redundant power supply inputs and local DSI inputs
• J2, bottom centre	:	Reserved for future use
• J3, bottom front	:	Local relay contacts (COM, NC and NO)
• J4, top front	:	Ethernet-based fieldbuses 1 and 2 that support communication between the VSI010 module (fieldbus server) and a fieldbus master. Note: A VSF002 Ethernet fieldbus communications adaptor must be used for Ethernet interfaces (Modbus TCP).
• J5, top centre	:	Serial-based fieldbus 1 that supports communication between the VSI010 module (fieldbus server) and a fieldbus master. Note: A VSF001 serial fieldbus communications adaptor must be used for serial interfaces (Modbus RTU or PROFIBUS DP).
• J6, top rear	:	Serial-based fieldbus 2 that supports communication between the VSI010 module (fieldbus server) and a fieldbus master. Note: A VSF001 serial fieldbus communications adaptor must be used for serial interfaces (Modbus RTU or PROFIBUS DP).
J10, right side J11, left side	:	Proprietary connectors. Sidebus connectors for SBUS communications (extra-module and inter-module) to a VibroSmart network and for the distribution of power to modules (redundant physical paths).
Eth1, bottom right Eth2, bottom left	:	8P8C (RJ45) connectors, female. Ethernet connectors for SBUS communications (extra-module and inter-module) to a VibroSmart network. The Ethernet connectors (Ethx) are IEEE 802.3 Ethernet compatible with an isolation voltage of 1500 V$_{RMS}$.

Physical

Module mounting	:	The VSI010 module clips into the VSB010 terminal base, which mounts on a TH 35 DIN rail (according to EN 50022 / IEC 60715). For example, TH 35-7.5 or TH 35-15.
Connection to other modules	:	Sidebus connectors J10 and J11 allow direct connections between modules that are located side-by-side. Ethernet connectors Eth1 and Eth2 allow connections between modules mounted further apart, using twisted-pair Ethernet cable.
Connection to a host computer	:	Ethernet connectors Eth1 and Eth2 allow connections to a host computer or network, using twisted-pair Ethernet cable
Ethernet cabling		
• Cable lengths (network segments) less than 50 m	:	Category 5 enhanced (Cat 5e) cable of type SF/UTP. A SF/UTP cable has overall (outer) screening using braided or foil shielding.
• Cable lengths (network segments) up to 100 m	:	Augmented category 6 (Cat 6a) or augmented category 7 (Cat 7a) cable of type S/FTP. A S/FTP cable has overall (outer) screening using braided shielding and individual pair shielding using foil.

SPECIFICATIONS *(continued)*

Connection to a fieldbus (third-party system)	: Connector J4 is dedicated to Ethernet-based (Modbus TCP) fieldbuses, while connector J5 and J6 are dedicated to serial-based fieldbuses. See **Fieldbus interfaces – serial on page 4**.
Connection to a power supply	: VibroSmart modules that are located side-by-side can distribute the power supply via the sidebus connectors J10 and J11 when at least one module is connected to the external +24 V_{DC} supply. VibroSmart modules that are mounted separate from one another require that each module is connected to the external +24 V_{DC} supply via its J1 connector.

Dimensions
• VSI010 module : See **Mechanical drawings on page 12**
• VSB010 terminal base : See **Mechanical drawings on page 12**

Weight
• VSI010 module : 300 g (0.66 lb) approx.
• VSB010 terminal base : 550 g (1.21 lb) approx.

VSF001 serial fieldbus communications adaptor

Network interface	: Supports two serial fieldbus interfaces. RS-485 (up to 12 Mbps).
Fieldbus connectors	: Two 9-pin D-sub connectors
VibroSmart connectors	: Plugs directly into the J4, J5 and J6 screw-terminal connectors on the VSB010 terminal base used by a VSI010 module, with retaining screws
Dimensions	: See mechanical drawings on page 12 **on page 14**
Weight	: 66 g (0.15 lb) approx.

VSF002 Ethernet fieldbus communications adaptor

Network interface	: Supports two Ethernet fieldbus interfaces. IEEE 802.3u 10/100BASE-T (up to 100 Mbps).
Fieldbus connectors	: Two 8P8C (RJ45) connectors
VibroSmart connectors	: Plugs directly into the J4 screw-terminal connector on the VSB010 terminal base used by the VSI010 module, with retaining screws
Dimensions	: See mechanical drawings on page 12 **on page 15**
Weight	: 40 g (0.09 lb) approx.

Notes

Only one VSF00x fieldbus communications adaptor can be used at a time (due to mechanical constraints), so a single VSI010 module can be used for either serial-based *or* Ethernet-based fieldbus communications.

A VSF001 serial fieldbus communications adaptor must be used for serial interfaces (Modbus RTU or PROFIBUS DP) in order to provide the required isolation, RS-485 driver/receiver and D-sub connectors, and help ensure reliable communications.

A VSF002 Ethernet fieldbus communications adaptor must be used for Ethernet interfaces (Modbus TCP) in order to provide the required Ethernet magnetics and connectors, and help ensure reliable communications. No VSF00x fieldbus communications adaptor is required for GOOSE (IEC 61850) interfaces as a direct connection via either one of the two Ethernet connectors (Eth1 or Eth2) is used.

When using serial-based fieldbus communications, only one protocol can be used at a time, so a single VSI010 module can support either up to 2 × Modbus RTU *or* up to 2 × PROFIBUS DP fieldbuses at any one time. However, changing the VSI010 module's configuration and swapping the VSF00x fieldbus communications adaptor is all that is required in order to change the communications interface from serial-based to Ethernet-based (or vice versa).

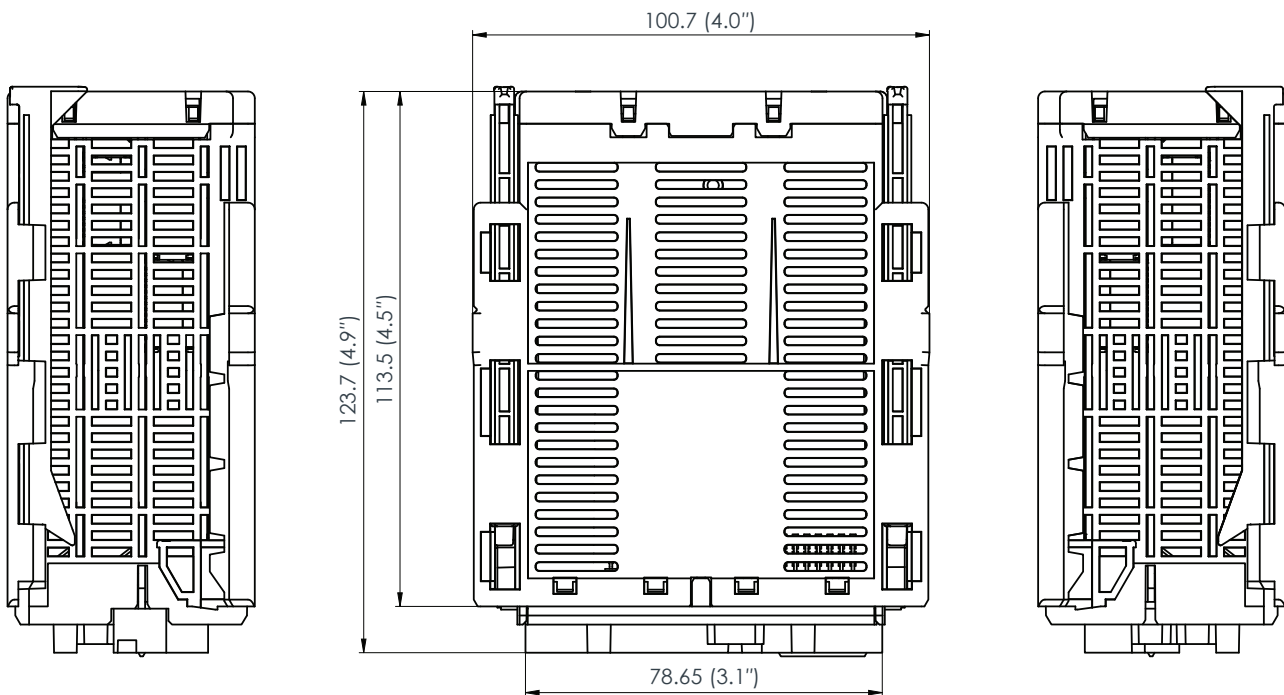## MECHANICAL DRAWINGS

VSI010 module – front view

Front view

Diag
Network   Status
Safety

Link   Fieldbus 1
Activity

Link   Fieldbus 2
Activity

VibroSmart®
MEGGiTT   VSI010

54.5 (2.1")
44 (1.73")
42.6 (1.68")

72 (2.8")
82 (3.2")
100.7 (4.0")

Rear view

Note: All dimensions in mm (in) unless otherwise stated.

VSI010 module – other views

Top view   **Side view**   **Bottom view**

100.7 (4.0")

123.7 (4.9")
113.5 (4.5")

78.65 (3.1")

Note: All dimensions in mm (in) unless otherwise stated.

MECHANICAL DRAWINGS *(continued)*

VSB010 terminal base – front and rear views
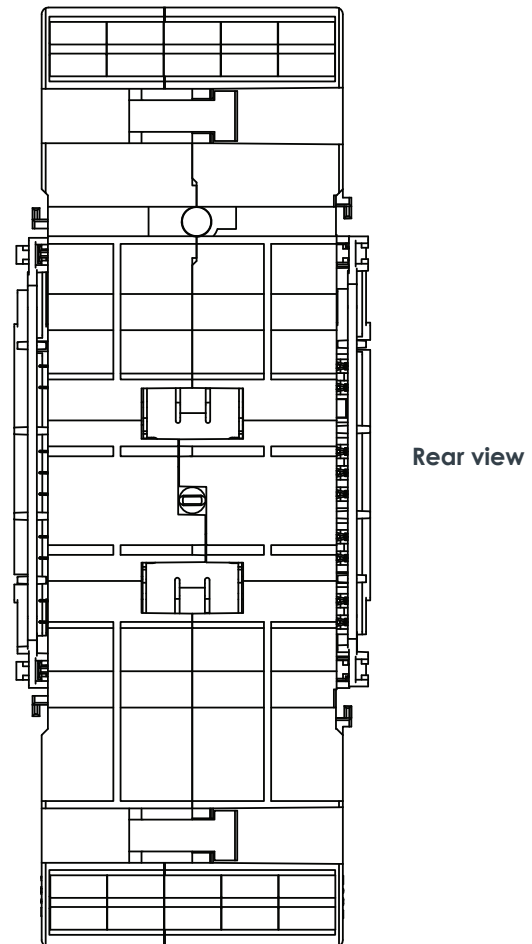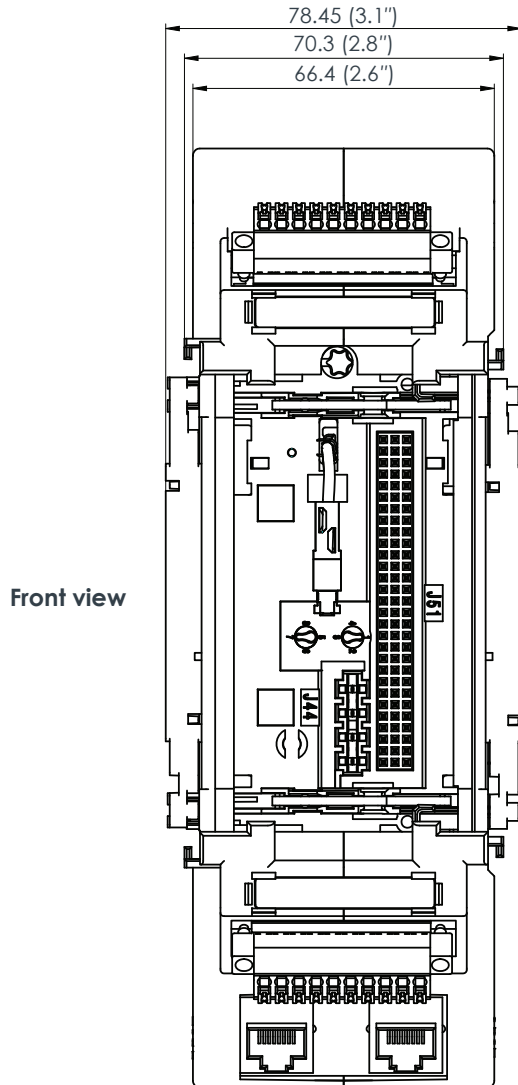
78.45 (3.1")
70.3 (2.8")
66.4 (2.6")

Front view

Rear view

Note: All dimensions in mm (in) unless otherwise stated.

MECHANICAL DRAWINGS *(continued)*

VSB010 terminal base – side view
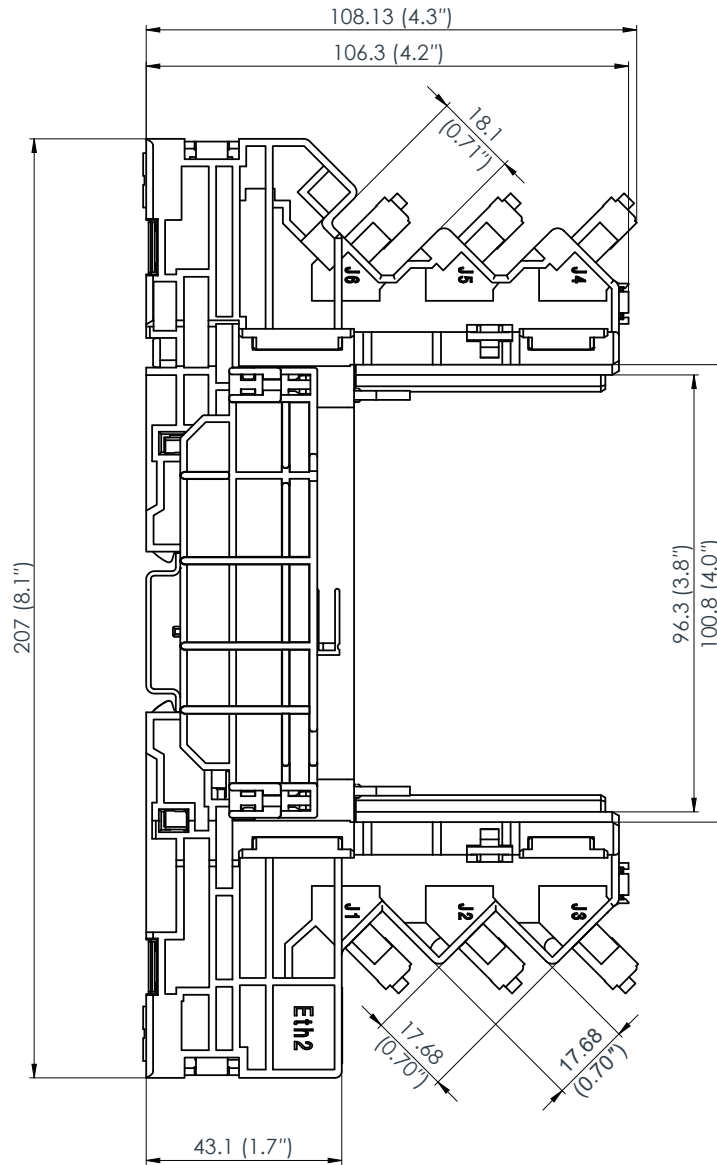
Note: All dimensions in mm (in) unless otherwise stated.

MECHANICAL DRAWINGS *(continued)*

VSF001 serial fieldbus communications adaptor

Front view

Port 2   Port 1

VSF001
MEGGiTT

UP
DN
4 wire
2 wire

25 (0.98")
29.7 (1.2")

18 (0.71")   18 (0.71")   18 (0.71")

Side view

17.8 (0.70")
J6
J5
J4
17.7 (0.70")
17.7 (0.70")
25.6 (1.0")

Rear view

MARKING
70.4 (2.8")
54 (2.1")

Bottom view

MARKING
MARKING
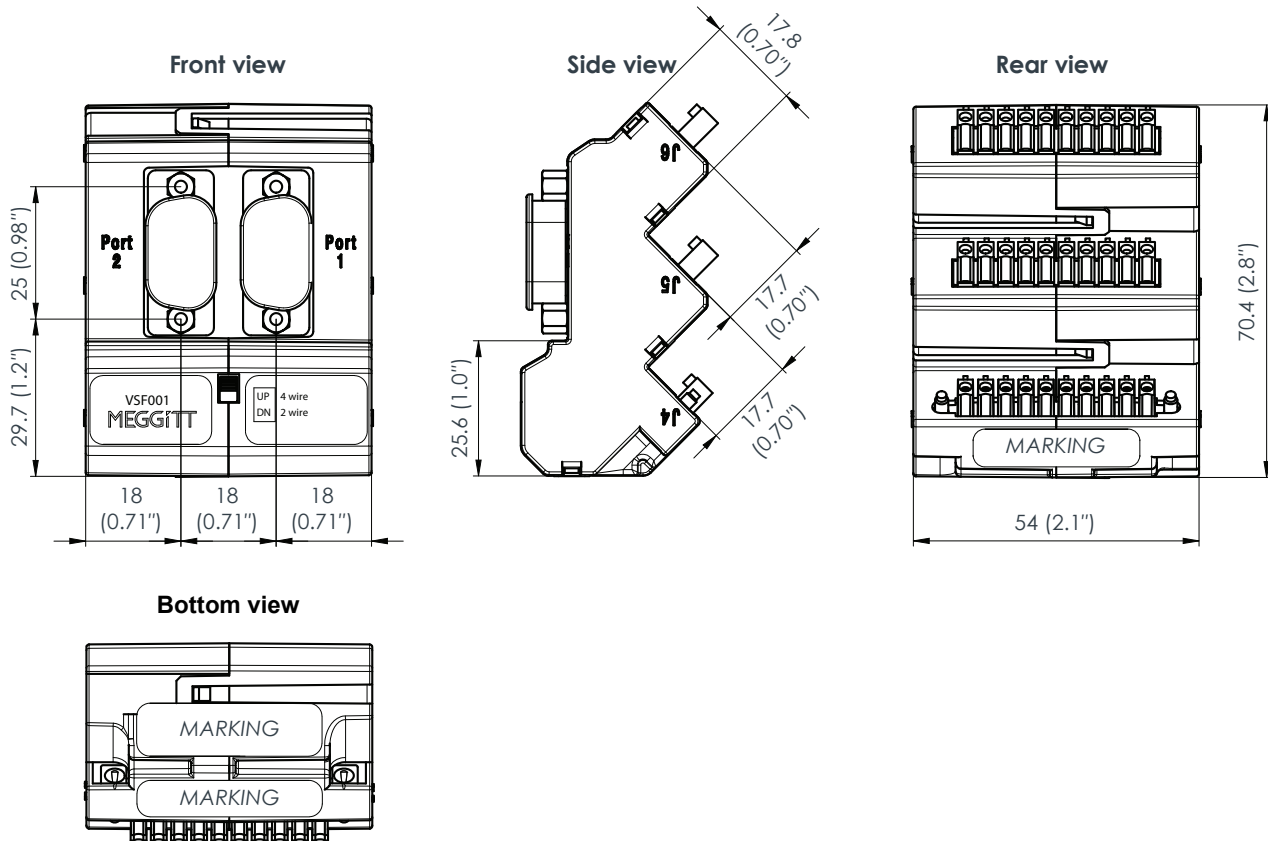
Notes
All dimensions in mm (in) unless otherwise stated.
For a VSF001 serial fieldbus communications adaptor, a vertical clearance of at least 60 mm (2.4") above the top of the VSB010 terminal base is recommended in order to help ensure that the fieldbus communications adaptor and any associated cabling and connectors can be inserted and removed. In practice, the actual clearance required depends on the type of serial cabling and connectors used.

MECHANICAL DRAWINGS *(continued)*

VSF002 Ethernet fieldbus communications adaptor

Top view

MARKING

VSF002
MEGGiTT

Front view

16.9
(0.67")

9.2
(0.36")

5.65 (0.22")

Port 2   Port 1

MARKING

Side view

25.1 (0.99")

16.9 (0.67")

17.7
(0.70")

Rear view

MARKING

Bottom view

Port 2   Port 1

43.5 (1.7")

54.3 (2.1")
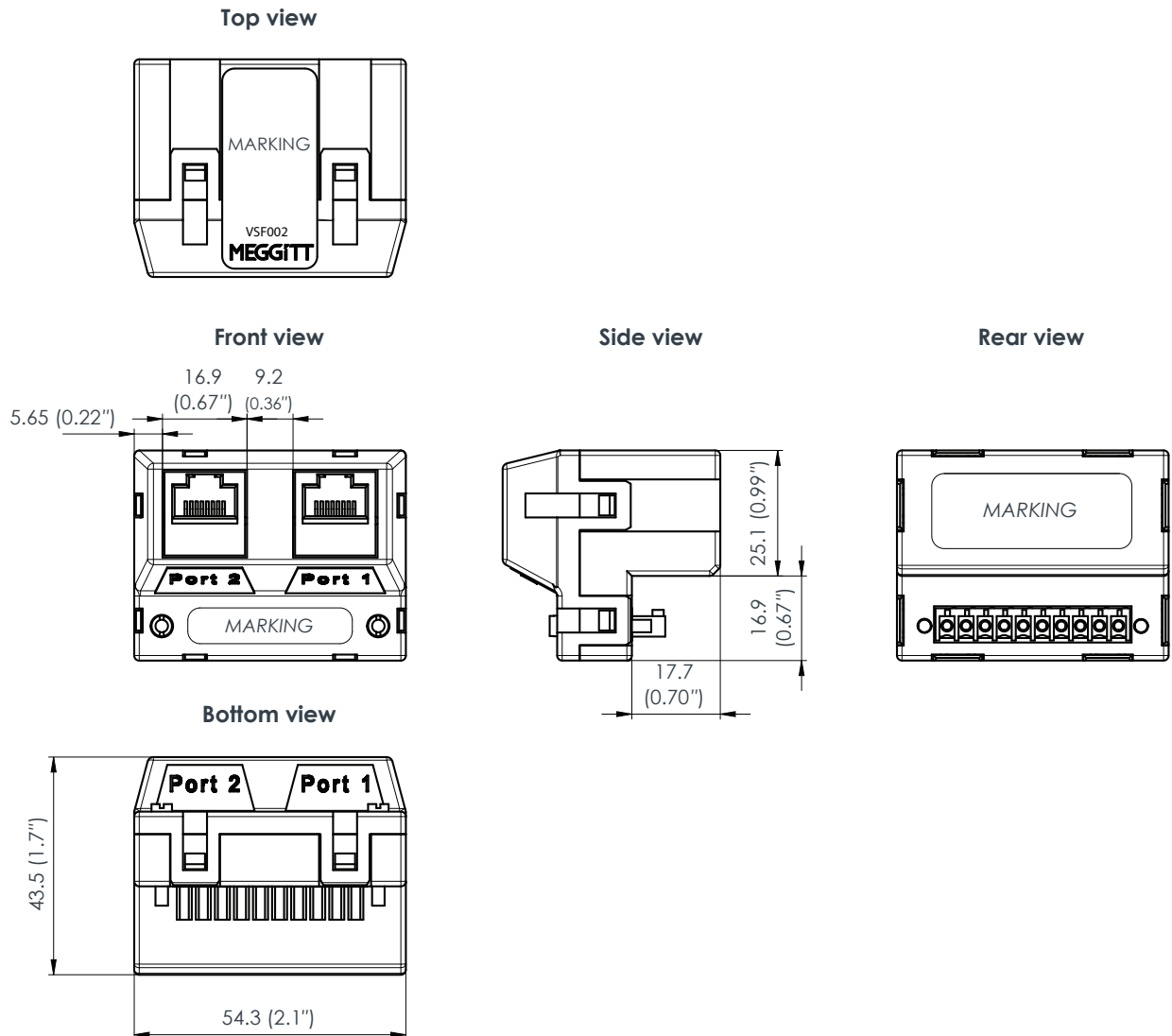
Notes
All dimensions in mm (in) unless otherwise stated.
For a VSF002 Ethernet fieldbus communications adaptor, a vertical clearance of at least 40 mm (1.6") above the top of the VSB010 terminal base is recommended in order to help ensure that the fieldbus communications adaptor and any associated cabling and connectors can be inserted and removed. In practice, the actual clearance required depends on the type of Ethernet cabling and connectors used.

ORDERING INFORMATION

To order please specify

Type	Designation	Part number (PNR)
VSI010	VibroSmart communications interface module	600-010
VSB010	Terminal base for a VSI010 module	600-011

Notes

The VSB010 is supplied with a set of 6 × terminal base BCF plug-in connectors for J1 to J6 that are labelled and mechanically key-coded for the VSI010 + VSB010. Sets of additional connectors can be ordered as VSK003. See **Accessories on page 17**.

Any fieldbus communications adaptor(s) required by an application must be ordered separately:
• A VSF001 serial fieldbus communications adaptor must be used for serial interfaces (Modbus RTU and PROFIBUS DP).
• A VSF002 Ethernet fieldbus communications adaptor must be used for Ethernet interfaces (Modbus TCP).
• No VSF00x fieldbus communications adaptor is required for GOOSE (IEC 61850) interfaces.
See **Accessories on page 17**.

ACCESSORIES

To order please specify

Type	Designation	Part number (PNR)
VSA001	T30 Torx driver with a length of 150 mm (suitable for the DIN rail adaptor in VSBxxx terminal bases)	975.51.54.0030
VSF001	Serial fieldbus communications adaptor	600-031
VSF002	Ethernet fieldbus communications adaptor	600-032
VSK003	Set of 6 × terminal base BCF plug-in connectors for J1 to J6 (labelled and mechanically key-coded for a VSI010 + VSB010)	622-019-200-001

RECOMMENDATIONS FOR RELIABLE CONNECTIONS

It is highly recommended to terminate all wires connected to the BCF plug-in connectors (female) used by J1 to J6 of the VSB010 terminal base by crimping them with the appropriate industry standard wire-end ferrules, in order to help ensure consistent and reliable connections.

RELATED PRODUCTS

APF19x	24 V_{DC} power supplies	: Refer to corresponding data sheets
APF20x	24 V_{DC} power supplies with Ex approval	: Refer to corresponding data sheets
VSA00x	VibroSmart® BNC cable assemblies and patch panels	: Refer to corresponding data sheet
VSN010	VibroSmart® real-time Ethernet switch	: Refer to corresponding data sheet
VSV301 + VSB300	VibroSmart® monitoring module	: Refer to corresponding data sheet
VibroSight	VibroSight® machinery monitoring system software	: Refer to corresponding data sheet