

Instructions

Type VSD Valve Controllers are designed to provide high accuracy feedback of valve position with comprehensive diagnostics, including Partial Stroke Testing (PST). This document, outlines the essential safety information for installing the device, connecting into the device (including connecting the primary solenoid) and the connection to and setting of the independent feedback systems. Additional connections to and operation of the Valve Diagnostic/PST system within the device are covered by document VSD-IOM-001.

Installation - Mounting

Attach mounting plate (1) to the actuator using fasteners (2) and lockwashers (2a) provided with mounting kit (if supplied by Imtex).

Loosen indicator cover set screw (3) and rotate indicator cover (4) to desired viewing angle. Retighten set screw (3).

Fit VSD assembly to actuator ensuring that the NAMUR coupler (7) engages the shaft of the actuator (9). If a torque coupler (7a) is used instead of the NAMUR Coupler on Non-NAMUR actuators, ensure this is securely fitted to the underside of the controller using the screw, flatwasher and lockwasher supplied (7b/7c/7d) before fitting over the flats on the actuator shaft (9). Secure the assembly using the screws (10) and lockwashers (11) provided with the mounting kit. Eccentricity of the shaft must not exceed 0.25mm. If it should be necessary, re-align controller by loosening mount screws (10). Retighten screws when satisfied with alignment.

Fine tune the indicator cover (4) by loosening set screw (3). Retighten set screw when completed.

Installation - Wiring and Setting Internally Wired Transmitter and Independent Switches

Once the controller is fitted to the actuator, remove cover (12) by loosening 2 x cover lock screws (13).

Bring field wiring into the enclosure via the conduit entries (14) fitted with a suitable cable gland. Use blanking plugs to block off any un-used cable entries. If wiring in the actuator solenoid(s) or additional components, bring these into the enclosure using conduit entries 14a to facilitate wiring. NOTE: Suitable IP6x rated cable glands, blanking plugs and thread adaptors must be used to maintain controller IP rating. On flameproof enclosures, only ATEX/IECEx certified Exd cable gland, blanking plugs and thread adaptors can be used. Blanking plugs must not be used with a gland adaptor.

Connect wiring to the terminals (15, 15a, 15b) within the enclosure according to the wiring diagram and terminal labelling. Connect earth conductor (which forms part of the supply cable and MUST be at least equal to the size of the phase conductors) to the internal earth points (18). Connect the external earth/equipotential bonding conductor to the controller using the external earth clamp assembly(19). Conductor should be 4mm² (min)

The next stage of the installation requires the actuator to be stroked. This can be done in a number of ways depending on the configuration of the controller installed. Document VSD-IOM-001 covers how the actuator might be stroked using the controller. Otherwise, the actuator can be stroked using the solenoid(s) backwired into the controller as operated from the control room, (may require a separate 24VDC power supply to be connected depending on unit supplied).

The internally wired transmitter is factory set to provide feedback for 90 degree rotation - clockwise to close. If required, the internally wired transmitter can be re-programmed. **NOTE: THIS SHOULD ONLY BE DONE IF CONFIDENT THE TRANSMITTER REQUIRES RESETTING BECAUSE IT IS PROVIDING AN INVERTED SIGNAL.** Clear the transmitter (20) programming by pressing and holding buttons 'A' and 'B' for 2 seconds until the LED blinks. Drive the actuator to closed position. Press and hold button 'A' for 2 sec until it blinks. Drive the actuator to open position. Press and hold button 'B' for 2 sec until it blinks.

For controllers fitted with standard cam/spline activated switches/sensors, drive the actuator to the first required indication position and set the bottom switch by lifting and rotating the bottom cam (16). Secure the cam by allowing it to fully re-engage with the spline (17). Repeat the process for each switch in-turn by lifting/pushing down the appropriate cam, rotating and re-engaging as desired position is reached.

For controllers with barrel or slotted sensors, or with a transmitter, consult page 2 of these instructions for 'Further Setting Instructions'.

Once completed, verify that indication is as required by fully stroking the actuator. Then refit cover (12) and secure using the 2 x cover lock screws (13).

SPECIAL CONDITIONS FOR SAFE USE OF CERTIFIED ENCLOSURES - ATEX / IECEx

Installation should be carried out by suitably trained personnel to an applicable Code of Practice (eg IEC/EN60079-14 & IEC/EN61241-14).

Only suitably IP and Exd certified and temperature rated cable glands, thread adaptors and blanking plugs are permitted for use with ATEX/IECEx flameproof enclosures.

The equipment shall not be subjected to a build up of dust and is to be cleaned regularly to prevent dust build up forming on the enclosure.

Where intrinsically safe components are fitted and are to be used within an Intrinsically Safe Circuit, they MUST be supplied by an ATEX/IECEx approved barrier that is suitable to work with Input Parameters of the respective components

WARNING - For units operating at +85°C, cable, cable glands or conductors in conduit shall be rated +100°C (minimum).

WARNING - Monitor includes external plastic parts and presents an Electrostatic Hazard: Clean Only with a Damp Cloth.

WARNING - Do not install on an external source of heating or cooling e.g. by hot/cold air blowing temperature units

WARNING - Locate monitor to prevent propagating brush discharges

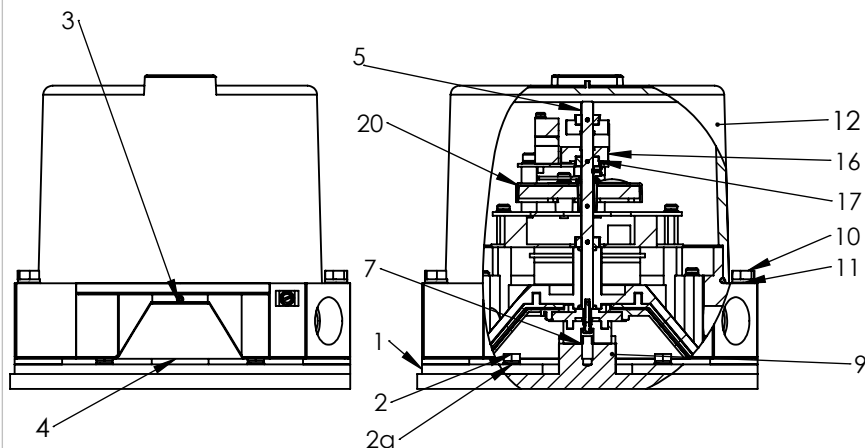
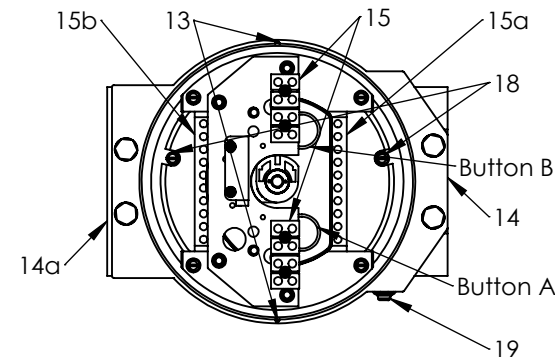
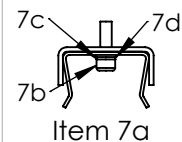
WARNING - Monitor should not be opened when energised or an explosive atmosphere may be present. The cover screws (13) must be loosened before opening and re-tightened before the controller re-enters service.

The maximum constructional gap (i_c) is less than that required by

Table 1 of IEC 60079-1:2007 clause 5.2.2 as detailed below:

Flamepath - Through Shaft
Max Gap (mm) - 0.07
Comment - Cylindrical Spigot Joint

Reference Diagram



Additional Instructions for Safe Use

The certification for this monitor relies upon the following materials used in its construction:

- Stainless Steel
- EDPM 70

If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection provided by the equipment is not compromised. Aggressive substances might be: acidic liquids or gases that attack Stainless Steel, or direct and prolonged contact with some Hydrocarbons that could affect the seals. Regular checks/inspections should be carried out if aggressive substances are present.

REV	DRAWN	DATE	CHK'D	ECO
	PT	28.2.13		13-2019
A	PT	14.2.17		17-2618
B	PT	1.2.18		18-2692

TITLE:

Installation, Operating & Maintenance

VSD - IECEx/ATEX

Intex Controls Limited

Tel:+44(0)8700-340002

Website: www.imtex-controls.com

DWG NO.

VSD-IOM-002

SHEET 1 OF 3

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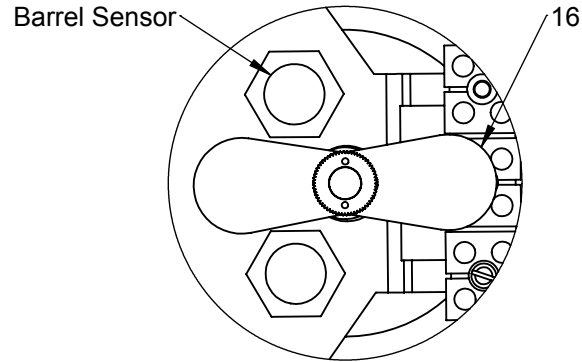
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Further Setting Instructions

Barrel/Slot Sensor Setting

Drive the actuator to the first required indication position and set the first switch by pushing round the lower metal shim on the shaft (16) to cover the sensor.

Repeat the process for each sensor in-turn by driving the actuator to the indication position and adjusting the appropriate shim to cover the corresponding sensor.



Independent Transmitter Setting

NOTE: The Type VSD Transmitter is factory set to provide position information over a 90 Degree span. The Transmitter type and setting is done following the same method as the internally wired transmitter. The independent transmitter will be located above the internally wired transmitter.

Clear the transmitter programming by pressing and holding buttons 'A' and 'B' for 2 seconds until the LED blinks. Drive the actuator to closed position. Press and hold button 'A' for 2 sec until it blinks. Drive the actuator to open position. Press and hold button 'B' for 2 sec until it blinks. For controllers fitted with standard cam/spline activated switches/sensors, drive the actuator to the first required indication position and set the bottom switch by lifting and rotating the bottom cam (16). Secure the cam by allowing it to fully re-engage with the spline (17).

Maintenance

The Type VSD requires no servicing during normal working life, if installed correctly. However, it is advisable to check mounting screws/bolts, o-rings and terminal wiring for signs of loosening or corrosion as part of the routine plant maintenance to ensure continued operation. Ensure safety warnings are observed during maintenance. Inspection & maintenance to ATEX/IECEX flameproof enclosures to be carried out by suitably trained personnel with applicable code of practice (eg IEC/EN60079-17). Repairs to Type SRX ATEX/IECEX flameproof enclosures are not permitted. Please consult factory.

Referenced Standards

The following standards have been referred to in these instructions and are applicable to the use of this product when used in an environment where an explosive atmosphere may be present:

- IEC 60079-0:2017 7th Ed
- IEC60079-1:2014 7th Ed
- IEC60079-11:2011 6th Ed
- IEC 60079-31:2014 2nd Ed
- EN60079-0:2012
- EN60079-1:2014
- EN60079-11:2012
- EN60079-31:2014

Cable Entries

The number and type of cable entry on the Controller can be determined by reference to the 7th digit of the monitor part number. For example, in part number -

VSD16SYSR0-100

the seven digit is a 'Y' which corresponds to the monitor having 3 off M25 x 1.5 cable entry and 3 off M20 x 1.5 cable entry. Refer to table below for details.

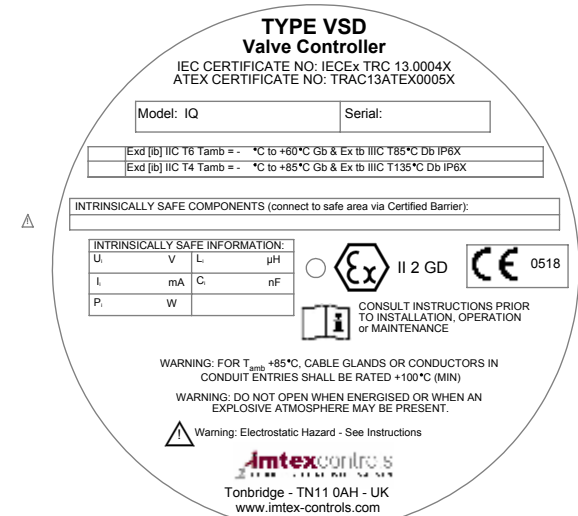
CABLE ENTRY GUIDE			
DIGIT	ENTRIES SUPPLIED	DIGIT	ENTRIES SUPPLIED
Z	(6) M20 x 1.5	U	(3) 3/4"NPT / (3) 1/2" NPT
Y	(3) M25 x 1.5 / (3) M20 x 1.5	T	(2) 3/4"NPT / (4) 1/2" NPT
X	(2) M25 x 1.5 / (4) M20 x 1.5	S	(1) 3/4"NPT / (5) 1/2" NPT
W	(1) M25 x 1.5 / (5) M20 x 1.5		
V	(6) 1/2" NPT		

NPT Threads conform to ANSI/ASME B1.20.1 and shall be made up wrench tight

Metric Thread tolerance to ISO 965-1 and ISO 965-3

Product Markings

The label on the controller should be as below:



NOTE: The year of manufacture of the monitor can be obtained from the last 2 digits of the serial number

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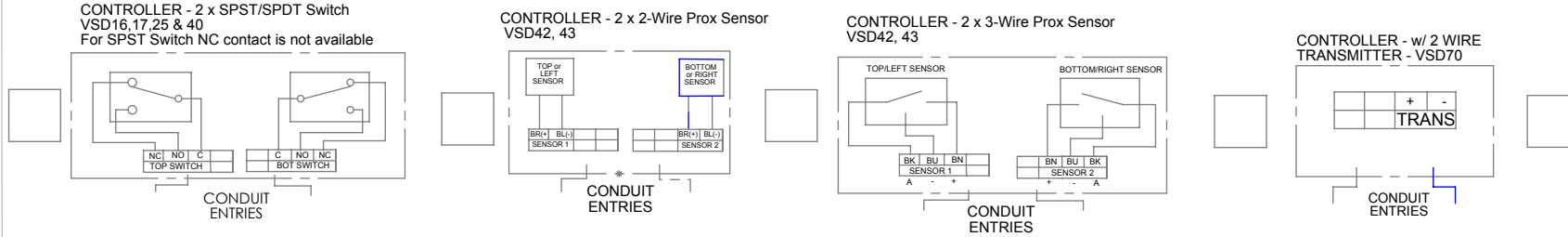
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WIRING DIAGRAMS ('X' Indicates the applicable Diagram)



VALVE CONTROLLER BOARD - NOTE: TERMINAL 7 MUST BE CONNECTED TO GROUND. ALL OTHER GROUNDS ARE INTERNALLY CONNECTED

TERMINAL	ALLOCATION	TERMINAL	ALLOCATION	TERMINAL	ALLOCATION	TERMINAL	ALLOCATION	TERMINAL	ALLOCATION	TERMINAL	ALLOCATION
1	'+' PASSIVE ANALOGUE INPUT (OPTIONAL)	7	EXTERNAL POWER SUPPLY - GROUND	13	'+' ACTIVE ANALOGUE INPUT 2	27	'+' DIGITAL OUTPUT 1	33	'+' DIGITAL OUTPUT 3	43	'+' DIGITAL INPUT 3
2	'-' PASSIVE ANALOGUE INPUT (OPTIONAL)	8	NOT USED	14	'-' ACTIVE ANALOGUE INPUT 2	28	'-' DIGITAL OUTPUT 1	34	'-' DIGITAL OUTPUT 3	44	'-' DIGITAL INPUT 3
3	'+' PASSIVE ANALOGUE OUTPUT (OPTIONAL)	9	NOT USED	21	EMERGENCY SHUTDOWN INPUT (+)	29	GROUND	39	'+' DIGITAL INPUT 1	39	
4	'-' PASSIVE ANALOGUE OUTPUT (OPTIONAL)	10	NOT USED	22	EMERGENCY SHUTDOWN INPUT (-)	30	'+' DIGITAL OUTPUT 2	40	'-' DIGITAL INPUT 1	40	
5	EXTERNAL. 24VDC POWER SUPPLY (+)	11	'+' ACTIVE ANALOGUE INPUT 1	23	EMERGENCY SHUTDOWN OUTPUT (+)	31	'-' DIGITAL OUTPUT 2	41	'+' DIGITAL INPUT 2	41	
6	EXTERNAL. 24VDC POWER SUPPLY (-)	12	'-' ACTIVE ANALOGUE INPUT 1	24	EMERGENCY SHUTDOWN OUTPUT (-)	32	GROUND	42	'-' DIGITAL INPUT 2	42	

NOTE: Terminal 7 must be connected to Ground. All other Electronic Board grounds are connected internally

NOTE 2: If VSD is fitted to actuator with 2 Solenoids but where only one is backwired into the Controller, Terminals 21 to 24 would be for Power and Connections to the PST Solenoid.

ELECTRICAL CHARACTERISTICS - NON-I.S. COMPONENTS ('X' Indicates the applicable Rating(s))

INTRINSICALLY SAFE PARAMETERS

VSD16 - Mechanical w/ Silver Contacts

Electrical Ratings: 10.0A @ 125/250VAC
0.5A @ 125 VDC
Temp Range: -40 to +60 °C
Operating Life: 400,000 Cycles

Not recommended for circuits operating less than 20mA @24VDC

VSD25 (A140077-SU) - SPDT(Hermetically Sealed Reed)- w/ Choke

Electrical Ratings: 0.15A @ 125VAC / 30VDC
Inductance: 680 µH
Resistance: 10 Ohms
Temp. Range: -40 to +60 °C (T6) or +85 °C (T4)
Operating Life: 5,000,000 Cycles

VSD70 - Analogue Transmitter - Non-Contact Style

Supply Voltage: 12 to 24VDC
Load Impedance: $R < (U - 9) / 0.02$
Linearity: < 1% of FS
Repeatability: < 0.36°
Op Temp Range: -40 to +85 Deg C

See Unit Title Plate

VSD17 - Mechanical w/ Gold Contacts

Electrical Ratings: 1.0A @ 125VAC
0.5A @ 30 VDC
Temp Range: -40 to +60 °C
Operating Life: 100,000 Cycles

Recommended for use in 24VDC computer input circuits

VSD25 (A140077) - SPDT (Rhodium) Reed Switch

Electrical Ratings: 0.5A (Switching Current)
1.0A (Steady State Current)
120V Max (Voltage)
10W/VA Max (Power)
Temp. Range: -50 to +60 °C (T6) or +85 °C (T4)
Operating Life: 5,000,000 Cycles

BASE BOARD

Supply Voltage: 24VDC
Max Dissipated Power under Max Load Conditions: 3.57 Watts
Op Temp Range: -40 to +85 Deg C

VSD40 (A140077-SU) - SPST(Hermetically Sealed Reed - w/ Choke)

Electrical Ratings: 0.15A @ 125VAC / 30VDC
Inductance: 680 µH
Resistance: 10 Ohms
Temp. Range: -40 to +60 °C (T6) or +85 °C (T4)
Operating Life: 5,000,000 Cycles

VSD42 - NAMUR Proximity Sensor

Current Ratings: Target Present - Current < 1.0mA
Target Absent - Current > 3.0mA
Voltage Range: 5 to 25VDC (nominal 8VDC)
Temp. Range: -25 to +60 °C (T6) or +72 °C (T4)
Operating Life: Unlimited Cycles

Use with intrinsically safe repeater barrier. Namur sensors fully conform to EN60947-5-6 (VDE0660 Part 212) standard.

SPECIAL NOTE:

Installation of Reed Switches (without Choke): Where reed switches (particularly low power, Rhodium contact versions) are installed at the end of long cable runs, it is the responsibility of the installer to ensure suitable precautions are taken to ensure cable capacitance does not induce premature switch failure. Consult Intex for further information

VSD25 (A140088) - High Power SPDT(Hermetically Sealed Reed - Tungsten)

Electrical Ratings: Max Current: 3 Amps
Max Power: 100 Watts/VA
Min Power: 2 Watts
Temp. Range: -40 to +60 °C (T6) or +85 °C (T4)
Operating Life: 5,000,000 Cycles
Not recommended for use in 24VDC operating at <20mA

REV	DRAWN	DATE	CHK'D	ECO
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SHEET 3 OF 3

A4