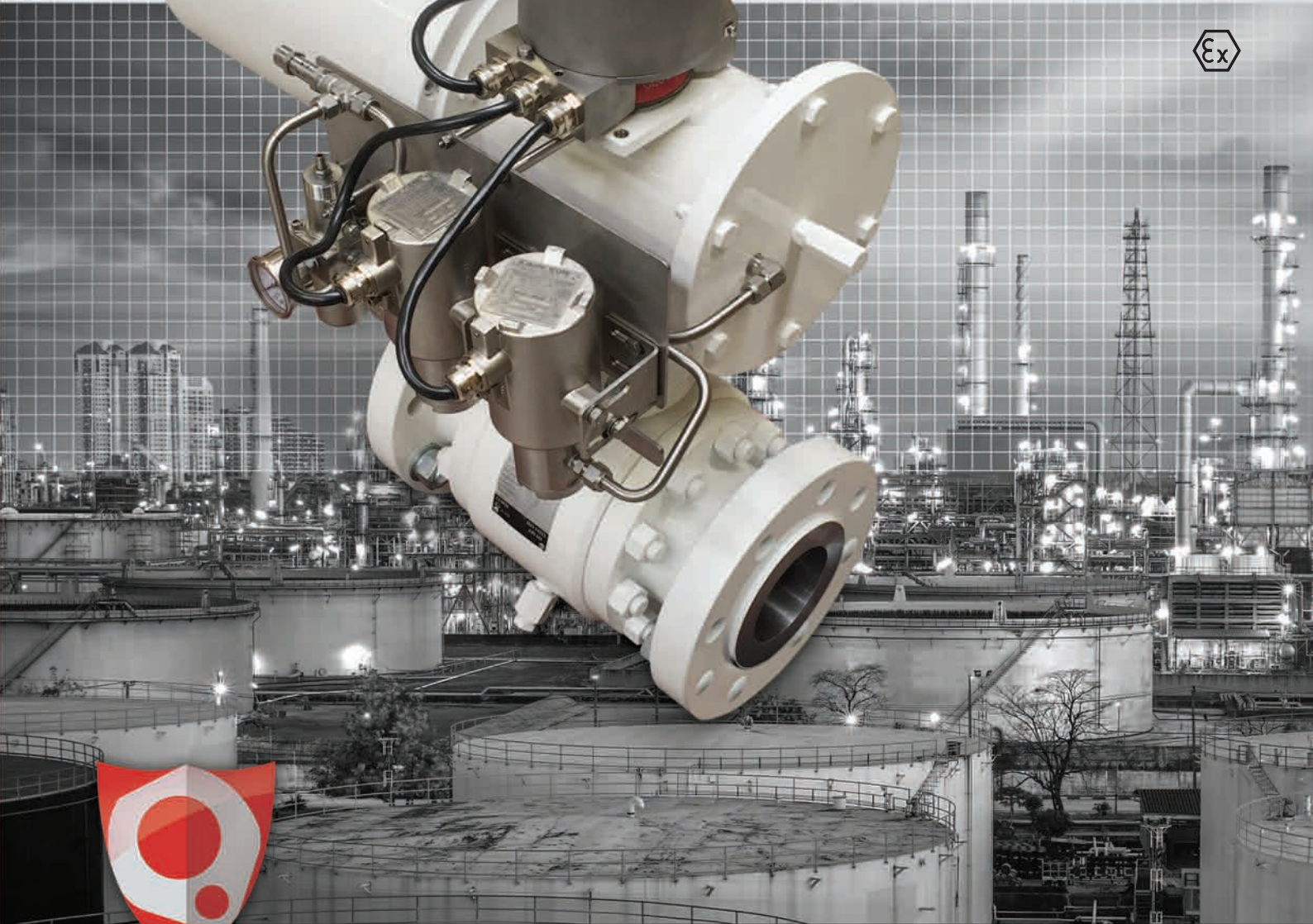


Camtorc TRIPGUARD SYSTEM

for Testing of Safety Critical Valves



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TRIPGUARD
SYSTEM



ACRODYNE

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With process-based industries continually seeking to make their plants more efficient, more reliable and above all safer operating environments, a number of equipment test and verification strategies have been developed to facilitate this.

Where operators employ Shut Down Valves to prevent dangerous plant conditions developing, the concept of Partial Stroke Testing (PST) has been promoted to improve efficiency, reliability and safety. Unfortunately, many operators choose not to utilise PST capabilities because of the associated risk of a Spurious Trip occurring.

The introduction of the Camtorc TripGuard system eliminates this Spurious Trip risk, thus allowing operators to get the full benefit of PST implementation.



Product Description

The Camtorc TripGuard has 3 functional elements. These are:

- Camtorc Pneumatic Spring Return Actuator
- Valvescan VSD Controller
- Dedicated PST Solenoid

Camtorc Actuator

The Camtorc Actuator has been in production for over 30 years during which time it has gained an unprecedented reputation for reliability and functionality. Utilising the Cam Yoke system at its core, the Camtorc Actuator is highly efficient and compact whilst offering reduced wear and servicing requirements. With the added benefit of using only Carbon Steel or Stainless Steel in its design and having a construction that does not use any tie rods, the Camtorc Actuator is the perfect work horse for automated valves in the most demanding applications.

Uniquely, the Camtorc Pneumatic Spring Return Actuator has two pressure pistons, as opposed to the typical single piston in most actuators, that operate independently of each other on the pressure stroke. With 2 supply ports, one piston (the spring piston) is dedicated to compressing the fail-safe spring in the actuator, whilst a smaller piston (body piston) is solely tasked with turning the valve. This has a significant advantage to the operator in limiting the rate of increase of torque output from the actuator as pressure increases (reducing valve stem shear risk), but also allows for much greater control of the actuator on the spring stroke.

Valvescan VSD Controller

The Valvescan VSD Controller acts as a test and diagnostic tool for the ESD valve, enabling plant operators to verify the capabilities of the most critical valves in their installations without having to significantly modify existing operating methodologies. The VSD Controller integrates Position Feedback and Valve Control into one enclosure and works in conjunction with one or two solenoids (one of which can be the ESD solenoid) to deliver testing without affecting the ability of the Safety loop to deliver an ESD Trip in any way.

Within the device's highly flexible platform, the VSD Controller offers the ability to perform a Full Stroke, Partial Stroke or Solenoid Test, allowing operators to gain detailed insight into the integrity of the Final Element in their Safety Instrumented System. In addition, the VSD Controller can be used to 'harvest' information during actual ESD events, enabling operators to take functional safety credit for every trip as well as gaining valuable operability information for use during maintenance shutdown.

Dedicated PST Solenoid

The dedicated PST solenoid is a 3/2 valve with Universal porting to enable air flow in both directions when the solenoid is energised. It can be of any brand or port size.

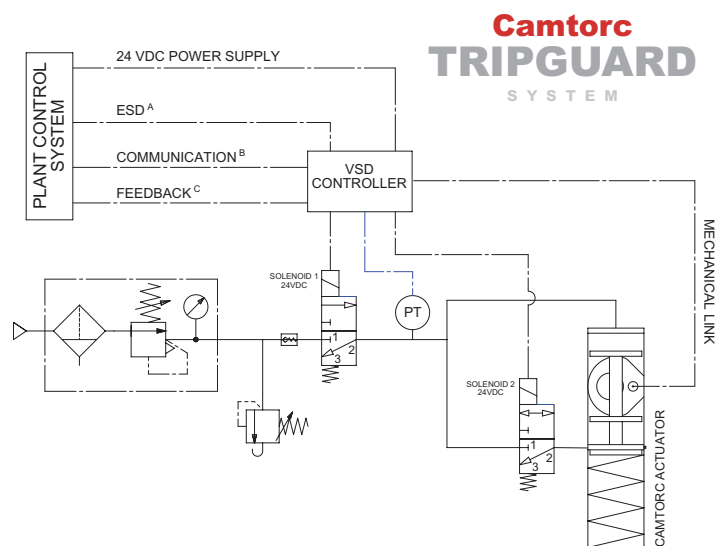


Core Principle of Operation

The Camtorc TripGuard System is installed and operated as any normal Shut Down system. It is fitted to the valve and connected to a pneumatic supply. A digital output (A) from the Safety System is supplied to the actuator assembly to control the main ESD Solenoid. Although it is terminated in the VSD Controller, the signal to the Solenoid passes straight the VSD unit without the integrity of the Safety loop being diminished (product Certified to this effect). Position feedback (C) can be provided to the Plant Control System from independent limit switches within the VSD Controller, or via an analogue output from the Controller.

The only additional requirement for the TripGuard system is a 24VDC supply that is provided to enable the dedicated PST Solenoid to be powered and controlled by the VSD Controller. Optionally, a Communication link (B) to the Plant Control System can also be included if remote test initiation and diagnostics are desired. Alternatively, testing can be done locally (Local Control Station) or semi-locally (Bluetooth). With the additional power supply on, which in-turn energises the PST Solenoid, the valve can be opened and closed from the Safety System by operation of the Digital Output to the ESD Solenoid.

To perform a PST, an instruction to the VSD Controller initiates the PST Solenoid to be de-energised until the configured PST position, as measured by the position transmitter in the VSD Controller is reached. The solenoid is then re-energised. Referring to the drawing above, it should be noted that as the PST Solenoid vents, it ONLY de-pressurises the Spring Piston in the Camtorc Actuator.

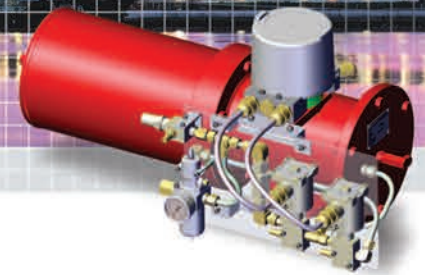


The Spring is then allowed to start closing the valve but, as it does so, it will also be driving the Body Piston that still has pressure on it. Should a problem occur on the test – e.g. the valve sticks initially before ‘jumping’ out of the seat – the pressure that is held on the Body Piston of the Camtorc Actuator acts as a brake for how far the actuator can physically travel before the pressure built on the piston produces sufficient force to stop the valve further closing the valve. Even if the solenoid should fail and pressure cannot be returned to the Spring Piston, the valve cannot close beyond a given point. Thus, there is no possibility of the PST causing a Spurious Trip event on the plant.

If an ESD Trip demand occurs whilst the valve is in the partially closed position reached during a problematic PST, the primary ESD Solenoid would de-energise, allowing the valve to perform the safety function as required. The ESD solenoid can also be tested as the VSD Controller can perform a Solenoid Test that de-energises the solenoid until either a valve movement is detected or an optional transmitter fitted to the VSD Controller detects a drop in pressure.

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Basic Specification

Description	Specification
Actuator Supply Pressure	Up to 12 BarG - Air
Actuator Construction	Carbon Steel or 316 Stainless Steel
Torque Output Range	20Nm to 25,000Nm Standard (up to 40,000Nm Available)
Controller Construction	316 Stainless Steel or Anodised Aluminium (Powder Coated)
Controller Power Supply	20.4 – 27.6VDC
Solenoid Power Supply	24VDC
Tests Possible	Full Stroke, Partial Stroke and Solenoid Test
No of Digital Inputs	3 + 1 for External Solenoid Control
No of Digital Outputs	2 + 1 for Solenoid Control
No of Analogue Inputs	1 Passive (Optional - HART Comms)
No of Analogue Outputs	1 Passive (Valve Position and / or HART Comms)
Independent Position Feedback	Up to 3 Switch/Sensor or 1 x Position Transmitter
Available Conduit Entries for Client Connections	4 Total – 3 x M25 / M20 + 1 x M20 (Optional - NPT entries - Please consult Technical Sales)
Partial Stroke Test Position	Typically 10 to 15% - configurable
TripGuard Max Travel	Approx 20 – 30% (depending on model)
Configuration	Via Valvescan Software Supplied with Unit
Communication Options	HART, Wireless HART, Modbus
Certification	Camtorc Actuator: ATEX VSD Controller: ATEX / IECEx II 2 G / Ex d (ib) IIC T4/T5/T6 Gb PST Solenoid: Exd or Exm

Options

Depending on the system requirements and set-up, the following options are available in the VSD Controller:

- **Pressure Monitoring** – The VSD Controller can be fitted with a 4-20mA Pressure Transmitter to allow additional diagnostics and Solenoid test to be performed.
- **Local Control Panel** – A Local Control Panel (LCP) can be connected to the VSD Controller to permit the valve testing to be performed locally if required. The LCP can be equipped Display Lamps to confirm the current status of the valve.
- **Testing Scheduler** – The VSD Controller can offer automatic scheduling of tests so that no human activation is required.
- **Extended Memory and Date Stamping** – The VSD Controller can be supplied with the capacity to store detailed information (valve signatures etc) from up to 2000 events. These can be date stamped for easy identification of when the event occurred.
- **Diagnostic Software** – The Valvescan VDCS Software enables diagnostic trends to be determined, enabling operators to employ a preventative maintenance regime.

NOTE: Above options may only be available in some applications – please consult Acrodyne Technical Sales.

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