**TEST AND CALIBRATION**

Valve System Test Centre



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# General

This manual covers software version:

Software ID: DTC-SW-002

Software Version: 1.01

## Safety instructions

For a safe installation of a device, the following must be observed. The module must only be installed by qualified personnel who are familiar with the national and international laws,

directives and standards that apply to this product as well as all instructions in this manual.

The information in this user manual is subject to changes without notice.

# Purpose

It is the purpose of this document, to guide the user through how to test and if necessary re-calibrate the Valve System Test Centre.

# Test instruments

Instruments needed for the test:

* 4-20mA Loop Calibrator
* Voltmeter
* A simple wire for short-circuit of the Digital Inputs

|  |
| --- |
| **Calibrate Instrument** |
| Instrument Name | Last Calibrate Date | Ref |
|   |   |   |
|   |   |   |
|   |   |   |

 Tested by:

 Date:

 Approved by:

 Date:

# Test Voltage Input

Input 24V power supply terminals to be tested:

* Power Supply 24VDC

|  |
| --- |
| **Power supply test - Test**  |
| Test Signal from Calibrator | Value measured with voltmeter  | Expected Result | Approved |
| Power supply Voltage | Result: V  | 23.00V – 25.00V  |[ ]

# Test Analogue Inputs

Input 4-20mA ports to be tested:

* AI0, AI1, AI2, AI3, AI4
* Calibrator Instrument should be configured as Passive and Source.

The inputs can be measured in the VSTC menu

* Press Status 🡪 Live Status 🡪 AI0 .. AI4

|  |
| --- |
| **AI0 - Test**  |
| Test Signal from Calibrator | Value measured in VSTC Live Status menu  | Tolerance 0.1% | Approved |
| AI0 – Test Current 4.00mA | Result: mA  | 3.98 – 4.02 mA  |[ ]
| AI0 – Test Current 8.00mA | Result: mA  | 7.98 – 8.02 mA |[ ]
| AI0 – Test Current 12.00mA | Result: mA  | 11.98 – 12.02 mA |[ ]
| AI0 – Test Current 16.00mA | Result: mA  | 15.98 – 16.02 mA |[ ]
| AI0 – Test Current 20.00mA | Result: mA  | 19.98 – 20.02 mA |[ ]

|  |
| --- |
| **AI1 – Test** |
| Test Signal from Calibrator | Value measured in VSTC Live Status menu  | Tolerance 0.1% | Approved |
| AI1 – Test Current 4.00mA | Result: mA  | 3.98 – 4.02 mA  |[ ]
| AI1 – Test Current 8.00mA | Result: mA  | 7.98 – 8.02 mA |[ ]
| AI1 – Test Current 12.00mA | Result: mA  | 11.98 – 12.02 mA |[ ]
| AI1 – Test Current 16.00mA | Result: mA  | 15.98 – 16.02 mA |[ ]
| AI1 – Test Current 20.00mA | Result: mA  | 19.98 – 20.02 mA |[ ]

|  |
| --- |
| **AI2 – Test** |
| Test Signal from Calibrator | Value measured in VSTC Live Status menu  | Tolerance 0.1% | Approved |
| AI2 – Test Current 4.00mA | Result: mA  | 3.98 – 4.02 mA  |[ ]
| AI2 – Test Current 8.00mA | Result: mA  | 7.98 – 8.02 mA |[ ]
| AI2 – Test Current 12.00mA | Result: mA  | 11.98 – 12.02 mA |[ ]
| AI2 – Test Current 16.00mA | Result: mA  | 15.98 – 16.02 mA |[ ]
| AI2 – Test Current 20.00mA | Result: mA  | 19.98 – 20.02 mA |[ ]

|  |
| --- |
| **AI3 - Test**  |
| Test Signal from Calibrator | Value measured in VSTC Live Status menu  | Tolerance 0.1% | Approved |
| AI3 – Test Current 4.00mA | Result: mA  | 3.98 – 4.02 mA  |[ ]
| AI3 – Test Current 8.00mA | Result: mA  | 7.98 – 8.02 mA |[ ]
| AI3 – Test Current 12.00mA | Result: mA  | 11.98 – 12.02 mA |[ ]
| AI3 – Test Current 16.00mA | Result: mA  | 15.98 – 16.02 mA |[ ]
| AI3 – Test Current 20.00mA | Result: mA  | 19.98 – 20.02 mA |[ ]

|  |
| --- |
| **AI4 - Test** |
| Test Signal from Calibrator | Value measured in VSTC Live Status menu  | Tolerance 0.1% | Approved |
| AI4 – Test Current 4.00mA | Result: mA  | 3.98 – 4.02 mA  |[ ]
| AI4 – Test Current 8.00mA | Result: mA  | 7.98 – 8.02 mA |[ ]
| AI4 – Test Current 12.00mA | Result: mA  | 11.98 – 12.02 mA |[ ]
| AI4 – Test Current 16.00mA | Result: mA  | 15.98 – 16.02 mA |[ ]
| AI4 – Test Current 20.00mA | Result: mA  | 19.98 – 20.02 mA |[ ]

# Test Analogue Outputs

Output 4-20mA ports to be tested:

* AO1, AO2
* Calibrator Instrument should be configured as Passive and Measure.

The outputs can be controlled in the VSTC menu

* Press Menu 🡪 Advanced 🡪 Signal Test 🡪 AO1 .. AO2

|  |
| --- |
| **AO1 - Test**  |
| Port set in VSTC menu | Value measured on Calibrator  | Tolerance 0.1% | Approved |
| AO1 – Output set to 4.00mA | Result: mA  | 3.98 – 4.02  |[ ]
| AO1 – Output set to 8.00mA | Result: mA  | 7.98 – 8.02 |[ ]
| AO1 – Output set to 12.00mA | Result: mA  | 11.98 – 12.02 |[ ]
| AO1 – Output set to 16.00mA | Result: mA  | 15.98 – 16.02 |[ ]
| AO1 – Output set to 20.00mA | Result: mA  | 19.98 – 20.02 |[ ]

|  |
| --- |
| **AO2 - Test**  |
| Port set in VSTC menu | Value measured on Calibrator  | Tolerance 0.1% | Approved |
| AO2 – Output set to 4.00mA | Result: mA  | 3.98 – 4.02  |[ ]
| AO2 – Output set to 8.00mA | Result: mA  | 7.98 – 8.02 |[ ]
| AO2 – Output set to 12.00mA | Result: mA  | 11.98 – 12.02 |[ ]
| AO2 – Output set to 16.00mA | Result: mA  | 15.98 – 16.02 |[ ]
| AO2 – Output set to 20.00mA | Result: mA  | 19.98 – 20.02 |[ ]

# Test Digital Inputs

Digital Input ports to be tested:

* DI1, DI2, DI3, DI4, DI5, DI6
* Test is done by short circuit the port terminals with a simple wire.

The inputs can be measured in the VSTC menu

* Press Status 🡪 Live Status 🡪 DI1 .. DI6

|  |
| --- |
| **DI1 - Test**  |
| Test Signal | Value measured in VSTC menu  | Expected | Approved |
| DI1 – Not short circuit | Result:  | Off  |[ ]
| DI1 – Short circuit | Result:  | On |[ ]

|  |
| --- |
| **DI2 - Test**  |
| Test Signal | Value measured in VSTC menu  | Expected | Approved |
| DI2 – Not short circuit | Result:  | Off  |[ ]
| DI2 – Short circuit | Result:  | On |[ ]

|  |
| --- |
| **DI3 - Test**  |
| Test Signal | Value measured in VSTC menu | Expected | Approved |
| DI3 – Not short circuit | Result:  | Off  |[ ]
| DI3 – Short circuit | Result:  | On |[ ]

|  |
| --- |
| **DI4 - Test**  |
| Test Signal | Value measured in VSTC menu | Expected | Approved |
| DI4 – Not short circuit | Result:  | Off  |[ ]
| DI4 – Short circuit | Result:  | On |[ ]

|  |
| --- |
| **DI5- Test** |
| Test Signal | Value measured in VSTC menu | Expected | Approved |
| DI5 – Not short circuit | Result:  | Off  |[ ]
| DI5 – Short circuit | Result:  | On |[ ]

|  |
| --- |
| **DI6 - Test** |
| Test Signal | Value measured in VSTC menu | Expected | Approved |
| DI6 – Not short circuit | Result:  | Off  |[ ]
| DI6 – Short circuit | Result:  | On |[ ]

# Test Digital Outputs

Digital Outputs ports to be tested:

* DO1, DO2, DO3, DO4
* There is no load on the port.
* The port is turned on and off from the VSTC pc-app

The outputs can be controlled in the VSTC menu

* Press Menu 🡪 Advanced 🡪 Signal Test 🡪 DO1 .. DO4 🡪 On/Off

|  |
| --- |
| **DO1 - Test**  |
| Port set in VSTC menu | Voltage measured  | Expected | Approved |
| DO1 – Off ( without load) | Result: V | 0.00 – 10.30V  |[ ]
| DO1 – On | Result: V | 23.00 – 25.00V |[ ]

|  |
| --- |
| **DO2 - Test**  |
| Port set in VSTC menu | Voltage measured | Expected | Approved |
| DO2 – Off (without load) | Result: V | 0.00 – 10.30V  |[ ]
| DO2 – On | Result: V | 23.00 – 25.00V |[ ]

|  |
| --- |
| **DO3 - Test**  |
| Port set in VSTC menu | Voltage measured | Expected | Approved |
| DO3 – Off (without load) | Result: V | 0.00 – 10.30V  |[ ]
| DO3 – On | Result: V | 23.00 – 25.00V |[ ]

|  |
| --- |
| **DO4 - Test**  |
| Port set in VSTC menu | Voltage measured | Expected | Approved |
| DO4 – Off (without load) | Result: V | 0.00 – 10.30V  |[ ]
| DO4 – On | Result: V | 23.00 – 25.00V |[ ]

# Calibration of Analogue Inputs

If the, test failed, and the value is outside the tolerance of 0.1%, the analogue inputs can be calibrated.

This is done in the menu:

 Press Menu 🡪 Advanced 🡪 Signal Calibration 🡪 AI0 loop … AI4 loop

* Set 4mA on the connected loop calibrator, and Press [Menu] button.
* Set 20mA on the connected loop calibrator, and Press [Menu] button.

# Calibration of Analogue Outputs

If the, test failed, and the values are outside the tolerance of 0.1%, the analogue outputs can be calibrated.

This is done in the menu:

 Press Menu 🡪 Advanced 🡪 Signal Calibration 🡪 AO1 loop … AO2 loop

* Tune 4.0mA with [Up], [Down] buttons until the loop calibrator shows 4.00mA, and press [Menu] button.
* Tune 20.0mA with [Up], [Down] buttons until the loop calibrator shows 20.00mA, and press Menu button.