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TARGA Robotic Nozzle PLC operating manual



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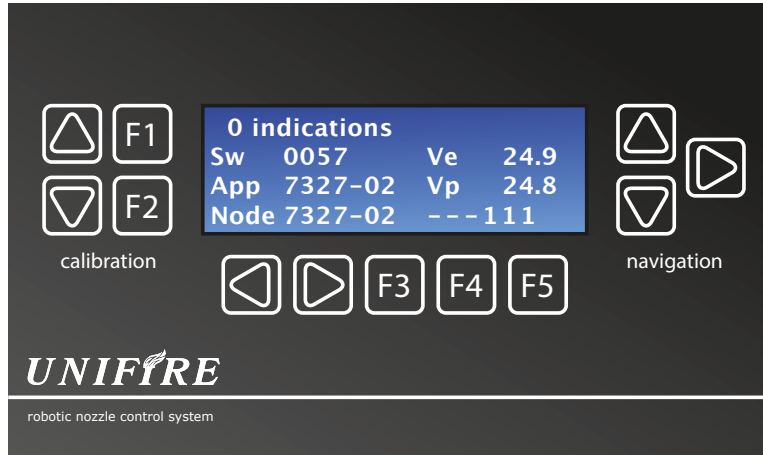
PAGE 1 - main page

Start/overview

On the main page there is general information about the system.

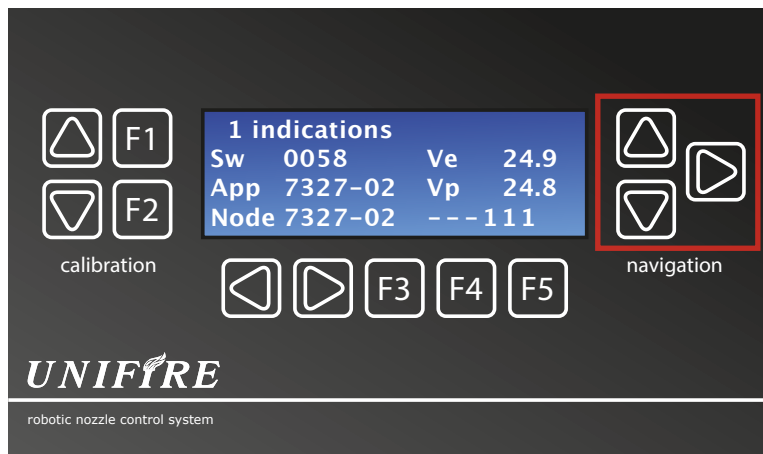
From top to bottom and left to right:

- On the top there is information about the state (indications etc). To show them in plain text use the right arrow to the right of the display
- **Sw** – mCORTEX version (0057)
- **App** – Appconf version (7327-2)
- **Node** – Nodeconf version (7327-2)
- **Ve** VDC on electronic feed
- **Vp** VDC on effect feed
- **---** **1 1 1** show number of BLDC driver cards installed on the TARGA PCB.
(....in this example; 3 driver cards installed on MK 4, MK5 and MK 6, of maximum 6)



Navigation

- Use the arrows to the right of the display for navigation.
- UP and DOWN arrows scrolls between the main function pages
- UP takes you to page 2, then to 3, 4...
- RIGHT arrow is used to move between Sub-pages (if available) or functions/positions on the current main page
- RIGHT arrow from start page will show in plain text what alarms or indications are active (if any)

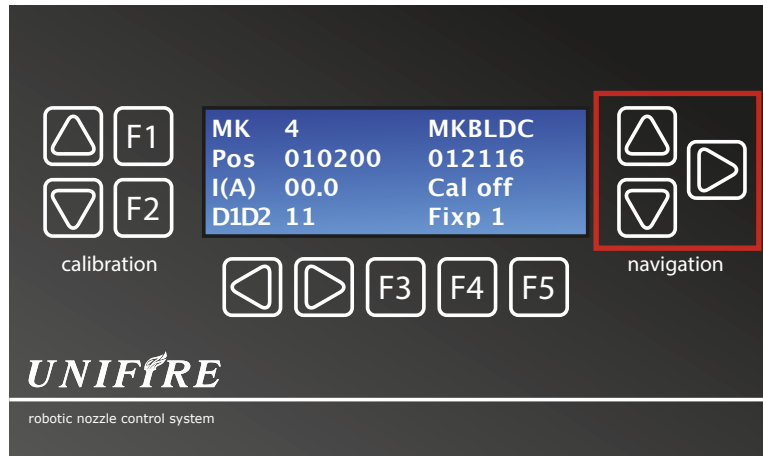


PAGE 2 - MK motor control

MK (motor control)

Use the **up/down arrow** to go to the motor control page where information on each motor is available. Use the right arrow to switch motor (1 to 6 available)

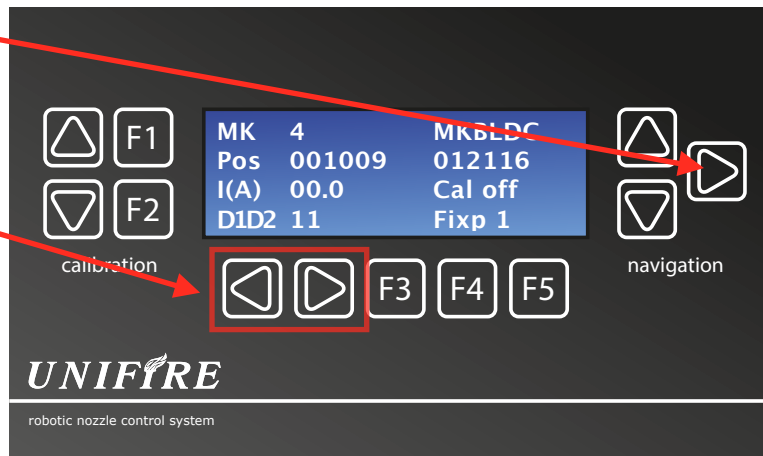
- **MK** (in this case **1**) indicates subpage/which motor
- **MKBLDC** indicates motor type (can also be MKDC for std DC motors)
- **Pos (1)** shows the current motor position in pulses relative to the 0 position
- **Pos (2)** shows the calibrated max value
- **Cal off/on** indicate if calibration is active or inactive
- **I(A)** the actual real-time current-read on the motor
- **D1D2** show status of the digital inputs available on each driver card



Manual control from the TARGA PANEL

Use the right navigation arrow to switch motor (1 to 6 available)

With the two arrows below the display it is then possible to manually operate the individual motor chosen (MK 1) or (MK 2), or (MK 3) etc..



The direction is dependent on settings in the configuration file and differs from system to system. However the right arrow moves towards 0 position and the left towards max position.

Calibration explained:

The TARGA Robotic Nozzle PLC must be calibrated with the FORCE Robotic Nozzle (a.k.a "water cannon" or "monitor"), so that the total operating range of the specific installation is known (can be 0-720°), and the absolute position within this range is known. On pulse level, the position accuracy is better than 1/100°.

Essentially any operating range can be freely selected.

The calibration can be executed in 2 different ways:

MANUAL = Run the motor (each axis or the INTEG nozzle) to the requested end-position and store each end-position manually

This also applies to the INTEG nozzle where the maximum spray angle must be set, and the focused straight stream must be set.

FIXPOINT = The operating range is pre-set in the *appconf* file. FIXPOINT requires that the installer run the robotic nozzle to its fixpoint (reference point), which is stored as the system's start point / reference point.

POINTER NOTES:



When a POINTER synchron control handle is used, the operating range is pre-set to +70°/-20° vertical, and +/- 135° horizontal. This is the same range as is provided by the POINTER.

Go to centre position, and save with **F5** when nozzle straight forward, and level (parallel) with ground.

The POINTER (being an analogue controller) must be calibrated with the system

NOTE: If a POINTER synchron controller is connected, that also must be calibrated prior to operation. See "page 5 - analogue inputs"

....turn to next page.

PAGE 2 - calibration of operating range

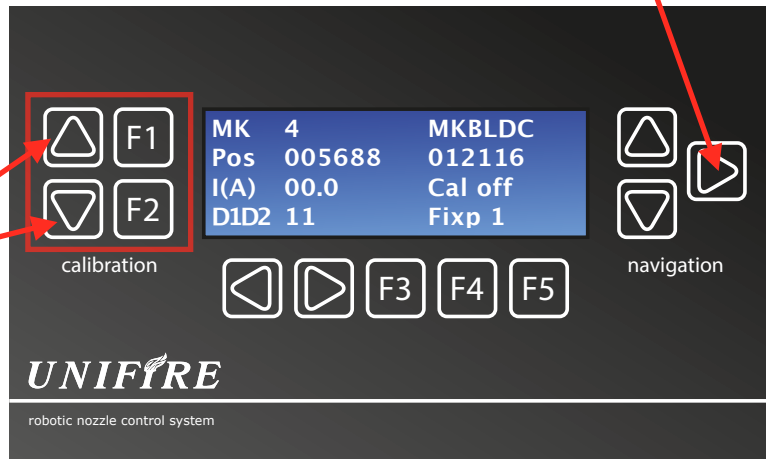
Calibration MANUAL (F1/F2)

Use the right arrow to switch motor (1-6 available)

Manually set the zero and max position by using the buttons on the left side of the display.

Initiate calibration by pressing the **UP** or **DOWN** arrow.

(Cal on, and max value is 000000)



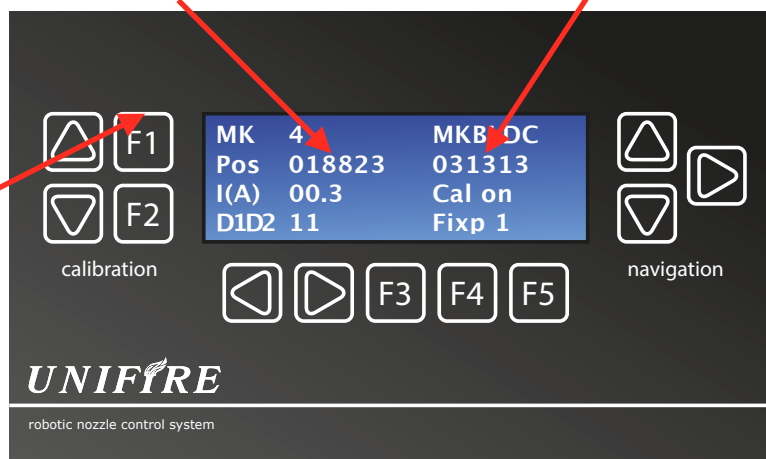
This will move the motor (axis) and set **Cal** indication to **on**. And max calibrated value to 000000.

Use Up and DOWN arrow until you have reached the start position of choice.

Confirm the zero end-position (origo) with **F1**.

Actual position

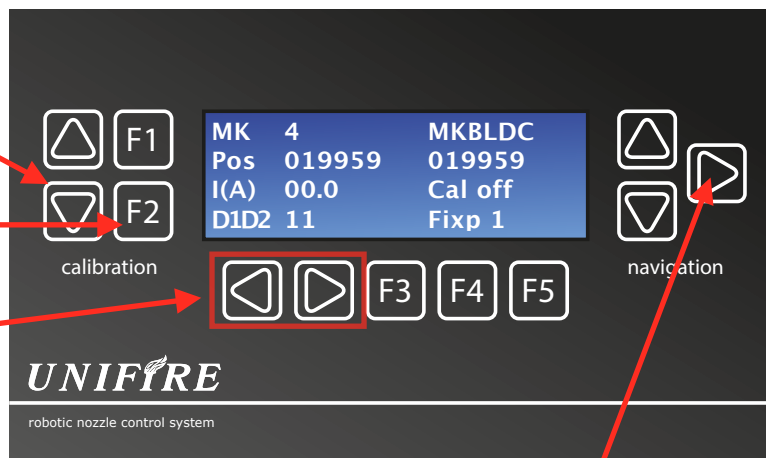
Max calibrated value



Use **DOWN** arrow to move to the desired maximum position.

Confirm with **F2** and verify with the control-arrows below the display.

Manual operation of individual motors (control)

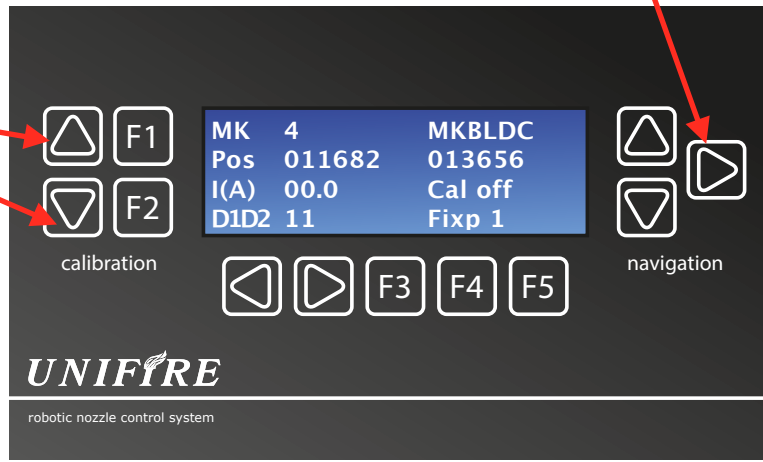


Use the sub page navigator to move to the next axis and repeat calibration until you are done calibrating all connected BLDC motors.

Calibration FIXPOINT (F5)

Use the right arrow to switch motor (1-6 available)

Initiate calibration by pressing the **UP or DOWN-arrow**

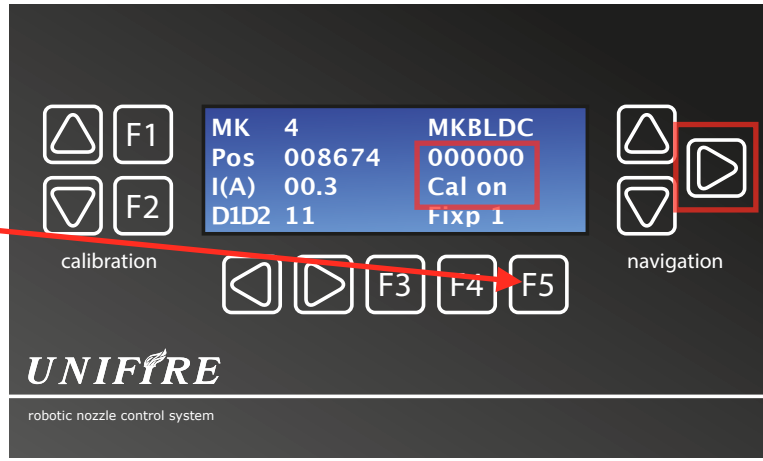


This will move the motor (axis) and set **Cal** indication to **Cal on**.

Run with UP and DOWN arrow to your center position
Confirm center position (fixed point)-position with **F5**.

Switch axis with **right arrow**

Then repeat with next axis.



Pos = Actual relative position of the axis on actual pulse-level.

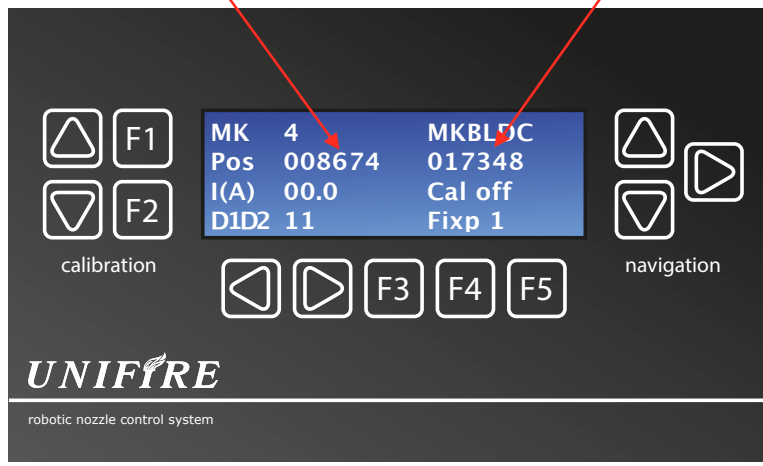
First value show actual position.

Second value show max value in the calibrated operating range.

(18 pulses per motor rev, geared down 49:1 in planetary gear, and 64:1 in worm gear...
=56448 pulses / 360°)

Actual current position

Max calibrated value

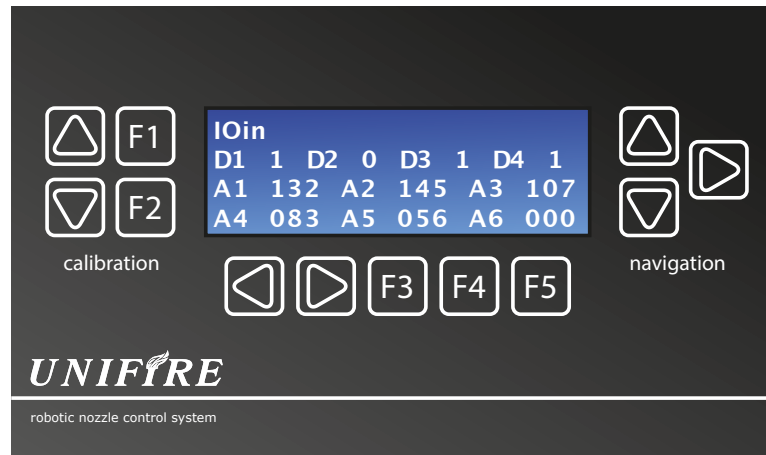


PAGE 3 - IOin

Digital and analog inputs status page

D1...D4 show active values of the four digital inputs (0 or 1).

A1...A6 show active values of the six analog inputs



PAGE 4 - IOout

Digital output status page

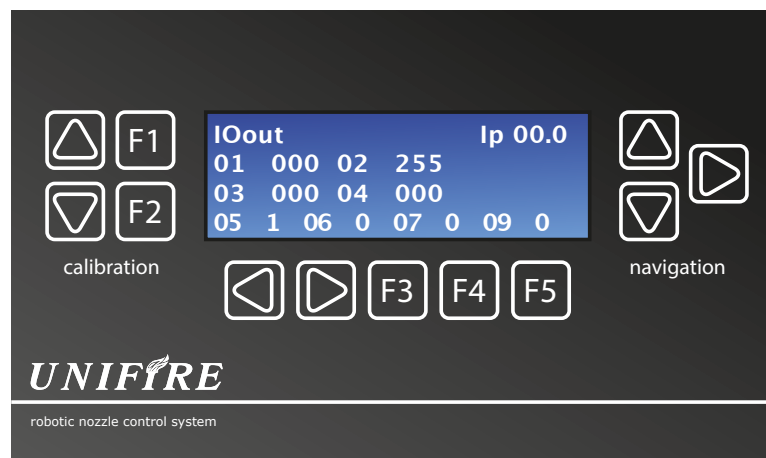
Displays the digital outputs status.

By using the right navigation arrow it is possible to switch between the outputs and by using F4 it is possible to manipulate the outputs.

01-04 are PWM outputs and is stepped from 0-255. 05-08 are digital and can be set on or off.

01...04 shows active value of the four PWM outputs (000 to 255).

05...09 shows active value of the four digital outputs (0 or 1).



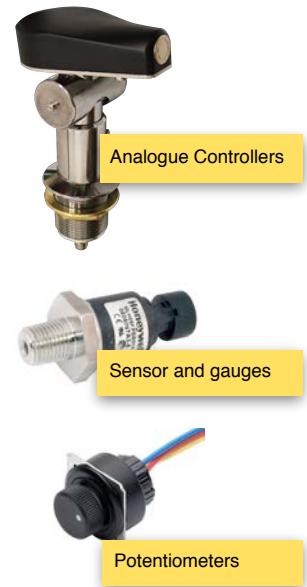
PAGE 5 - analogue inputs: Calibration of analog inputs page

This section is relevant to the calibration of analogue control devices, such as the POINTER synchron controller, or any other analogue 0-5V device. For example : generic analog Joysticks, flow an pressure sensors, level gauges, potentiometers, etc..

The incoming value is displayed as a value from 0 to 255 on A1... through A6

The raw input value must be calibrated so that outgoing value "C 1.... trough C6) is 0-255

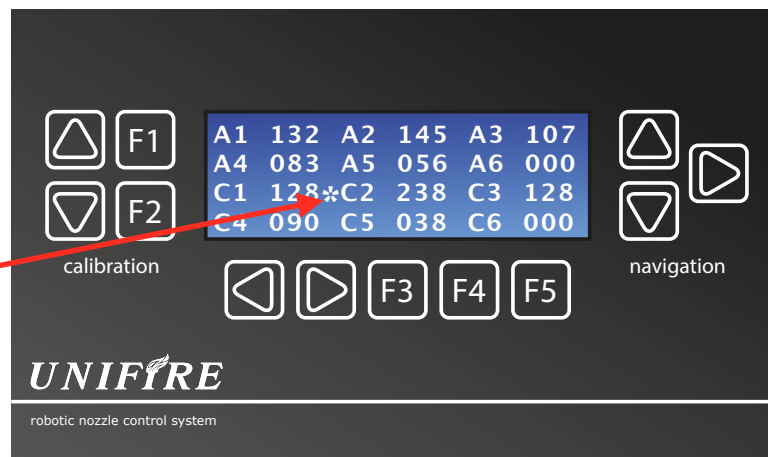
To have proper function both the analogue INPUTS and the operating range of the robotic nozzle must be calibrated.



A1...A6 shows raw input data (000 to 255)

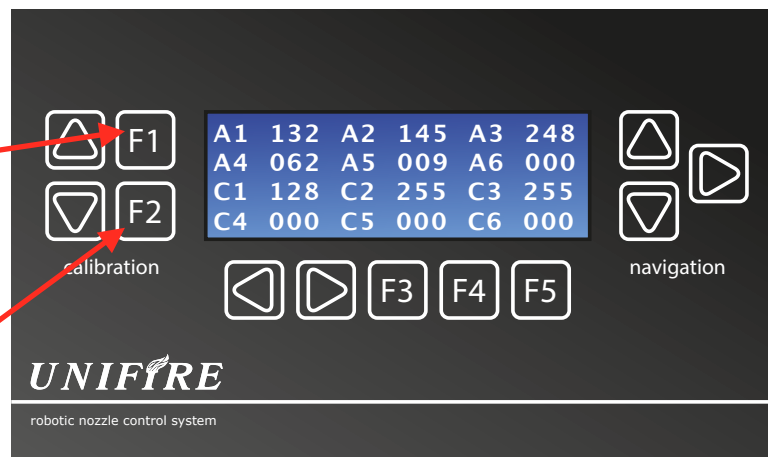
C1...C6 shows corresponding calibrated value (000 to 255)

Select input with right navigation arrow. (moves "*")



Apply the highest voltage of the required range to the input. (e.g. move a joystick/potentiometer to its highest position) and press **F1** to save this value.

Apply the lowest voltage of the required range to the input. (e.g. move a joystick/potentiometer to its lowest value/ position) and press **F2** to save this value.



When calibration is complete, the outgoing values (C1-C6) from all connected analogue inputs must be ranging from zero (0) to 255

PAGE 6 - EEprom test



This page is used to test and verify the EEPROM memory on the motherboard and on the installed BLDC driver cards.

The test writes new data to all EEPROM'S that are installed, and verifies by reading back the data.

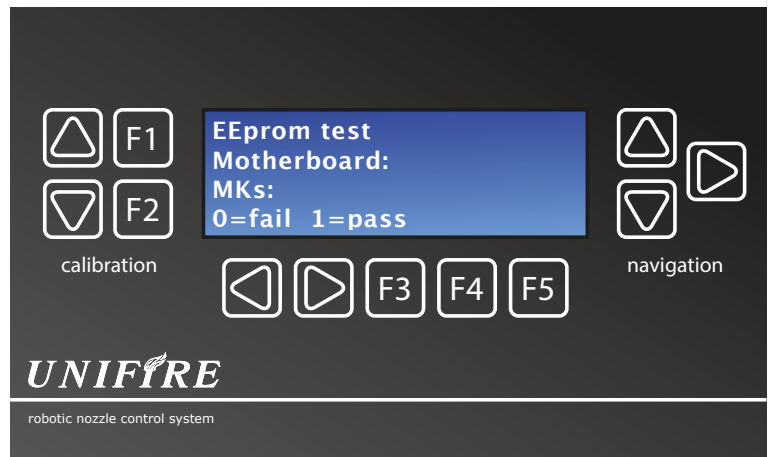
All data previously stored are lost upon this test.

The EEPROM memory stores calibration values, actual positions, etc.

To run the test, press F4.

'1' indicates a working memory circuit.

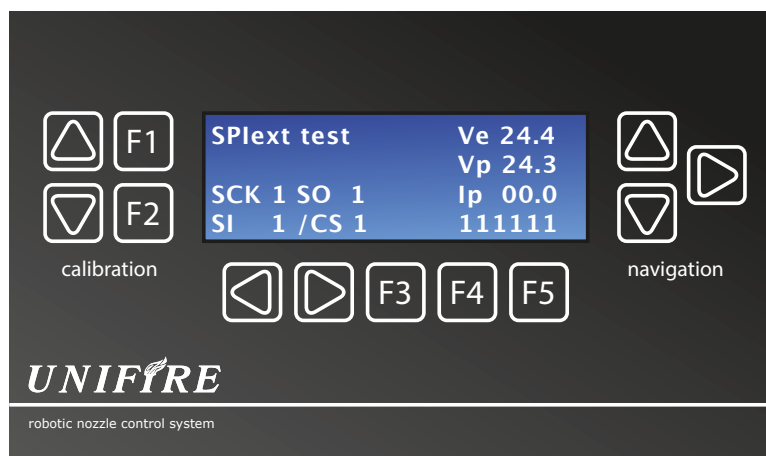
'0' indicates that something is broken and should be replaced



PAGE 7 - SPIext test

This page display the status of the external SPI bus (located at J11).

It also shows the current voltage of electronics and power (same as on the first page) and the current draw from the power line.



TARGA PLC programming explained

What are the Sw, App and Node files?

mCORTEX (Sw) = Operating System

This is the framework under which the nodeconf and appconf can run.

The mCORTEX is generic and essentially stays the same regardless of what the system looks like. The mCORTEX is however updated as soon as new generic functions are added.

appconf (App) = Automation configuration

This file defines what the connected components are and what they do.

For example if the motors are installed on the robotic nozzle, how many and what type of robotic nozzle e.t.c. (The motors can also be used for running actuators of various kinds)

Further the appconf can address an input to run a specific sequence, for example open a valve, or run a prerecorded spray sequence...

nodeconf (Node) = System configuration

Defines and tells the TARGA what components that are physically connected to the TARGA for each specific system.

For example: How many motors, how many and what type of Joystick or controller, what analogue and digital inputs and outputs are connected, etc...

Also the nodeconf defines if the TARGA is a Canbus Master in a larger system with additional TARGA's or external Canbus I/O units