FORCE 50 and INTEG 50 Robotic Nozzle System

Generic Installation and Setup Manual

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TABLE OF CONTENTS

Warnings 1

Introduction to this Manual

Force 50 System 5
Acronym Definitions 6

Planning – Before Installation

About This Manual 7
Contacts 7
Approvals and Standards 7
Safety Warning 7
Authorized Personnel 7
Structural Alterations 7
System Limitations 9
Building Construction 9
Determining a Location 9
Water Connection 9

Mechanical Installation

Installation Geometry Options 10
Wall, Normal Orientation 10
Wall, Inverted Orientation 11
Ceiling, Hanging Orientation 12
Installation on the wall 13
Installation hanging from the ceiling 13
Installing the Robotic Nozzle 14

Flow Settings

Nozzle Flow Setting 16
Flow Shims 16
Flow Chart 17
Reach Chart 18

Electrical Installation

Generic System Overview 20
Connecting the FORCE 50 to the TARGA PLC 21
TARGA PLC Generic Pin Specification 22
TARGA PLC M12 – 12 Pin Specification 23
12-Pin Extension Box Terminal Socket Specification 24
TARGA Robotic Nozzle PLC Terminal Sockets 25

Software & Calibration

Calibrating the Robotic Nozzle's Operating Range 26
Ammolite Software Introduction 28
Connect your PC or TABLET 29
TARGA PLC 46
Manual Joystick Operation 47
UNIFIRE ONE App 48

Maintenance, Testing & Inspection Schedule

Maintenance, Testing & Inspection Schedule 49
Quarterly Maintenance and Inspection 51

WARNINGS

 **WARNING**	**READ THIS INSTRUCTION MANUAL IN ITS ENTIRETY PRIOR TO INSTALLING, MAINTAINING, OR USING THE FORCE™ ROBOTIC NOZZLE** (a.k.a. "robotic nozzle" or "water cannon" or "fire monitor")**.** Failure by any installer, maintenance personnel, or operator to receive proper training, including reading and understanding this manual, prior to its use constitutes misuse of the equipment and could result in serious bodily injury or death and/or damage to the robotic nozzle or other property. Only qualified and trained professionals who are familiar with this equipment and general safety procedures may operate the Force robotic nozzle. The purpose of this manual is to provide all users, installers, and maintenance personnel with the relevant information concerning the equipment's design, proper use, installation, and maintenance. It should be read and made available to all such persons. This manual will help prevent danger and injury to you and others. If you would like further copies of this manual, ask Fike or download it at www.Fike.com. If you have any questions relating to this equipment and its safe use, please contact Fike prior to use.
 **WARNING**	**DO NOT ATTEMPT TO MODIFY THIS EQUIPMENT IN ANY WAY.** Modification of the equipment may result in damage to or malfunction of the equipment, which could lead to serious injury to the operator and/or others. Internal inspection, maintenance, and repairs should only be performed by or under the specific express authority of Fike.
 **WARNING**	**NEVER POINT THE FORCE 50 OR ANY ROBOTIC NOZZLE DIRECTLY AT HUMANS WHILE WATER IS SPRAYING THROUGH IT,** as doing so can result in serious injury or possibly death. The FORCE 50 is capable of directing flows of up to approximately 2200 liters per minute (580 gallons per minute) at pressures of up to 12 bars (175 psi) and has a maximum throwing range of up to approximately 65 meters (70 yards). Such forces are very dangerous and capable of producing serious injury or death to persons and serious damage to property. They are also capable of throwing objects with extreme force and velocity into other objects or persons. Accordingly, only professional, trained firefighters or other qualified individuals may operate this equipment after being thoroughly familiar with the manual and always by exercising extreme caution to avoid hitting people or loose objects with the water (or other fluid) stream.
 **WARNING**	**BE SURE THAT THE ROBOTIC NOZZLE IS TIGHTLY AND PROPERLY SECURED AT ALL TIMES DURING OPERATION!** Serious injury or death can occur if the robotic nozzle is not fully and properly secured and supported. Be sure that the mounting pipe for the FORCE 50 robotic nozzle is capable of withstanding a nozzle reaction force of at least eight thousand (8,000) Newtons (800 kgf). The FORCE 50 robotic nozzle should not be used on a portable stand of any kind, as such use can be extremely dangerous and can result in serious injury or death.

 **WARNING**	**The FORCE 50 IS HEAVY.** Use caution and assistance when installing, and take care to avoid injury to your back. Seek assistance to help support and twist the robotic nozzle during installation, and take care to avoid injury to your back during handling and installation.
 **WARNING**	**NEVER USE THE ROBOTIC NOZZLE AT PRESSURES HIGHER THAN 12 BARS (175 PSI).** The maximum operating pressure for the FORCE 50 robotic nozzle is 12 bars (175 psi). Use of the FORCE 50 at pressures higher than 12 bars is dangerous and can lead to serious injury or death or may damage the robotic nozzle. Moreover, the recommended operating pressure of the FORCE 50 is between 5 to 8 bars (75 to 115 psi), which also will provide optimal performance.
 **WARNING**	**THE FORCE 50 ROBOTIC NOZZLE CAN BE INSTALLED WITH VARIOUS ORIENTATIONS**, namely Normal orientation, inverted or ceiling-mounted. If you plan to install the robotic nozzle inverted or ceiling-mounted, please consult Fike when ordering. Special gear ratio and programming may be required.
 **WARNING**	**FOLLOW ALL MAINTENANCE & INSPECTION PROCEDURES IN THIS MANUAL.** Failure to do so could result in the malfunction of this equipment.
 **WARNING**	**BE SURE TO USE THE PROPER TYPE AND SIZE OF THREADS AT THE ROBOTIC NOZZLE BASE** and also between the robotic nozzle and nozzle (if using a nozzle not supplied by Fike specifically for use with this robotic nozzle). Use of the wrong type or size of threads will result in an improper connection, which can cause leaking and also may cause the robotic nozzle and/or nozzle to dislodge under high pressure, possibly leading to serious injury or death to persons and/or serious damage to property. If you have any doubts as to the exact thread supplied by Fike, contact Fike for clarification prior to connecting the robotic nozzle and nozzle.
 **WARNING**	**KEEP A SAFE DISTANCE DURING OPERATION AND MOVEMENT.** The FORCE 50 Robotic nozzle has moving parts. Be sure to keep a safe distance from the robotic nozzle as it moves and keep hands and fingers away from pinch points to avoid injury.
 **WARNING**	**AVOID RAPID CHARGING**. Rapid charging of the robotic nozzle is potentially dangerous and can cause serious injury to persons and/or property and may cause damage to the robotic nozzle. Charge the robotic nozzle slowly to avoid creating a potentially dangerous, high-pressure surge.

 **WARNING**	**USE ONLY FIKE-APPROVED NOZZLES / NOZZLE TIPS.** The FORCE 50 was designed for use with the Fike INTEG 50, Fike Smooth Bore, and JETRANGE nozzle tips. Use of any nozzle other than a Fike nozzle made for the FORCE 50 without specific, written approval in advance by Fike constitutes a misuse of the product and could affect the safety, performance, and/or operation of the robotic nozzle. Such malfunctions could also result in the nozzle coming loose and being rapidly ejected with high force, which could cause serious injury or even death.
 **WARNING**	**DO NOT OPERATE IN EXPLOSIVE ZONES OR ENVIRONMENTS!** The electric motors and other components are potential ignition sources and could spark ignition if used in explosive environments. The FORCE 50 is not approved for operation in explosive environments, and therefore, it should never be used in such environments.
 **WARNING**	**DO NOT IMMERSE EQUIPMENT IN WATER**. Do not immerse the robotic nozzle, its control box (the TARGA PLC or the X-TARGA PLC), nor the joystick in water, and be sure to keep water out of their interiors. Fike's robotic nozzles and joystick are designed to withstand moderate exposure to rain and water splashing during normal use of the robotic nozzle. Prolonged or extreme exposure to water, including submersion, however, will cause damage and could also cause electrical shock resulting in injury. The TARGA PLC must be installed and protected from water and dust. Fike also offers the TARGA PLC in optional IP66 (X-TARGA) and IP67 (X-TARGA-S rated enclosures.
 **WARNING**	**DISCONNECT THE MOTOR CABLES BEFORE USING THE OVERRIDE CRANKS.** Attempting to move the motors with the cables connected will damage the electronics. Installing override cranks on an active system may cause severe injury.
 **WARNING**	**ONLY USE THE MANUAL OVERRIDE IN CASE OF TRUE EMERGENCY & POWER FAILURE**. The manual override controls on the FORCE 50 are not designed for normal operation and should only be used in the case of extreme emergency and when the remote control feature is not working sufficiently to control the robotic nozzle by means of the electronic controls. In case of use in such an emergency, first, disconnect the cables from the motor connections!!
 **WARNING**	**DISCONNECT POWER PRIOR TO INSTALLATION, MAINTENANCE OR REPAIR.** Prior to installation, maintenance, or repair, be sure to disconnect the power and disable the flow.

 **WARNING**	**BE SURE TO USE THE PROPER TYPE AND SIZE OF THREADS (OR FLANGE, IF APPLICABLE) AT THE ROBOTIC NOZZLE BASE AND ALSO BETWEEN THE ROBOTIC NOZZLE AND NOZZLE** (if using a nozzle not supplied by Fike specifically for use with this robotic nozzle). Use of the wrong type or size of threads will result in an improper connection, which can cause leaking and also may cause the robotic nozzle and/or nozzle to dislodge under high pressure, possibly leading to serious injury or death to persons and/or serious damage to property. If you have any doubts as to the exact thread supplied by Fike, contact Fike for clarification prior to connecting the robotic nozzle and nozzle.
 **WARNING**	**CONSULT A NETWORK PROFESSIONAL TO ENSURE ANY NETWORKED CONNECTION TO THE FORCE 50 SYSTEM IS FULLY SECURE.** For a system connected to a network, it is important that the network be highly secure and inaccessible to non-qualified persons, hackers, or bad actors who may be able to activate and control the system, which could lead to serious injury or death and/or damage to property.
 **WARNING**	**USE AND UNINTERRUPTIBLE POWER SOURCE (UPS).** It is strongly advised to use an appropriate UPS to ensure that the TARGA PLC has power at all times. A power failure of the PLC will cause the Force 50 system to be inoperable during power loss. Moreover, after power returns, the PLC and any fire detection system may take several minutes to reboot, and it will be inoperable during that time. A UPS should be capable of providing power for 2 hours of active operation, at least 250W for 2 hours = 0,5 KWh.

INTRODUCTION TO THIS MANUAL

FORCE 50 System

This installation and setup manual is intended to provide generic guidance for the installation and commissioning of the FORCE 50 system, including the TARGA Robotic Nozzle PLC and the Ammolite User Interface.

Your system is delivered with user specific functions that can be different than what is described in this manual. Therefore, it is important that you reference the order-specific documents provided with the delivery.

This can include custom I/O, terminal socket specifications, M12 pin specifications, and special customer-specific software.

Also, refer to the system-specific documentation.

ACRONYM DEFINITIONS

Table 1 defines the acronyms in the user manual.

Table 1: ACRONYM DEFINITIONS

Acronym	Definition
AFS	Autonomous fire suppression
AHJ	Authority having jurisdiction
DSP	Digital signal processor
dm	Decimeter
ft	Foot (or Feet)
FACP	Fire alarm control panel
HR	Horizontal range
IR	Infrared
kg	Kilogram
lb (lbs)	Pound(s)
m	Meter
mm	Millimeter
Lpm	Liters per minute
PLC	Programmable logic controller
VDC	Volts of direct current

PLANNING - BEFORE INSTALLATION

About This Manual

This manual is a comprehensive guide that contains the information necessary to design, install, operate, and maintain the FORCE 50 Robotic Nozzle system.

Users of this manual are assumed to be competent fire engineers with a basic knowledge of such systems. Users who are not familiar with the equipment should first read the complete manual.

Only certified personnel who have undergone Fike training are allowed to install this equipment.

Contacts

Should any part of this manual not be understood, or there are queries concerning the system, contact Fike Technical Support using the following details:

Fike Corporate World Headquarters
704 SW 10th Street, Blue Springs, MO, 64015

Main: +001-816-229-3405
Toll Free: 1-800-YES-FIKE (+1-800-937-3553), US only
www.fike.com

Approvals and Standards

See Section 8, Technical Specification System Components, for approval and listing information for the various components.

Safety Warnings

A properly designed and installed FORCE 50 Robotic Nozzle should not present any significant health or safety problems. Take basic precautions to avoid accidents. The various aspects of the system's operation must be understood. Observe best practices.

WARNING!

Do not operate this device without a full understanding and comprehension of this manual. Personnel responsible for the FORCE 50 system must be fully trained on the system components.

WARNING!

The installer should pay specific attention to the danger, caution, warning, and notice statements in this manual. Failure to observe safety warnings could cause serious injury and potentially create liability.

⚠ DANGER

Do not direct the flow stream towards people, as it could result in serious personal injury or death.

- Operate and maintain the FORCE 50 Robotic Nozzle system in compliance with this document and with applicable standards, in addition to the standards of any other authorities having jurisdiction (AHJ). Failure to do so impairs the proper operation and integrity of this device.
- The owner must maintain the fire protection unit or system and devices in proper operating conditions.
- Do not, under any circumstance, operate this system outside the water flow or pressure range indicated in this manual.
- The owner must ensure that an uninterrupted supply of water is maintained to the Robotic Nozzle.

Authorized Personnel

The FORCE 50 system shall be installed by authorized personnel certified by Fike. Use components and accessories authorized only by Fike.

Structural Alterations

This installation manual details the suggested installation method. Any structural alteration necessary for installation must comply with local building code requirements.

⚠ DANGER

DO NOT PRESSURIZE THE UNIT until the flange has been properly tightened.

DO NOT PRESSURIZE THE UNIT until the electrical installation and software calibration procedure has been completed.

DO NOT PRESSURIZE THE UNIT until the system commissioning has been completed by certified technicians and a formal release note/approval has been issued.

System Limitations

The system designer shall take into account the building construction or vehicle requirements, location, hydraulic design, coverage area, and number of systems required. If the limitations in these areas are not maintained, the system may not operate correctly.

Building Construction

Water demand: Evaluate the FORCE 50 water system demand as an independent addition to the existing building water supply. Conduct a hydraulic analysis to ensure that it does not affect the building's existing water system design criteria. It is possible to achieve this without significant system supply modifications. However, the system may require increased pump sizes, storage tank capacity, and pipe sizes.

Determining a Location

Contact your local technical support team for assistance in determining the optimal location of the system components.

Water connection

The FORCE 50 is normally delivered with a DN50/PN16 stainless steel flange. The DN50 flange is to be installed with 4 x M16 bolts and a flange seal (flat seal).

Options include 2" male BSP thread, JIS and ANSI flanges, and customer-specific brackets.

Please discuss the connection with your sales representative and specify the requested connection when ordering.

DN50/PN16 Flange

MECHANICAL INSTALLATION

Installation Geometry Options

The FORCE 50 Robotic Nozzle can be installed geometrically in three different orientations.

The Robotic Nozzle can be installed with:

Wall, Normal Orientation

Wall, Inverted Orientation

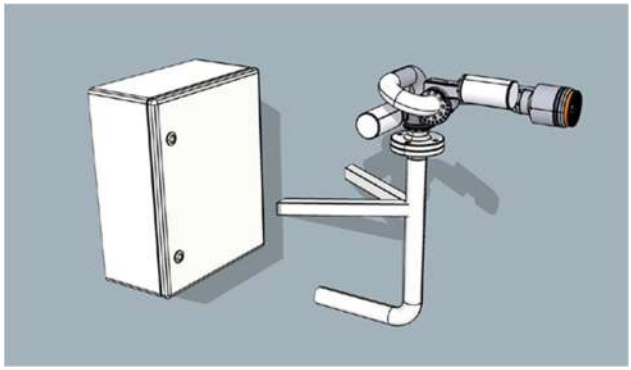
Ceiling, Hanging Orientation

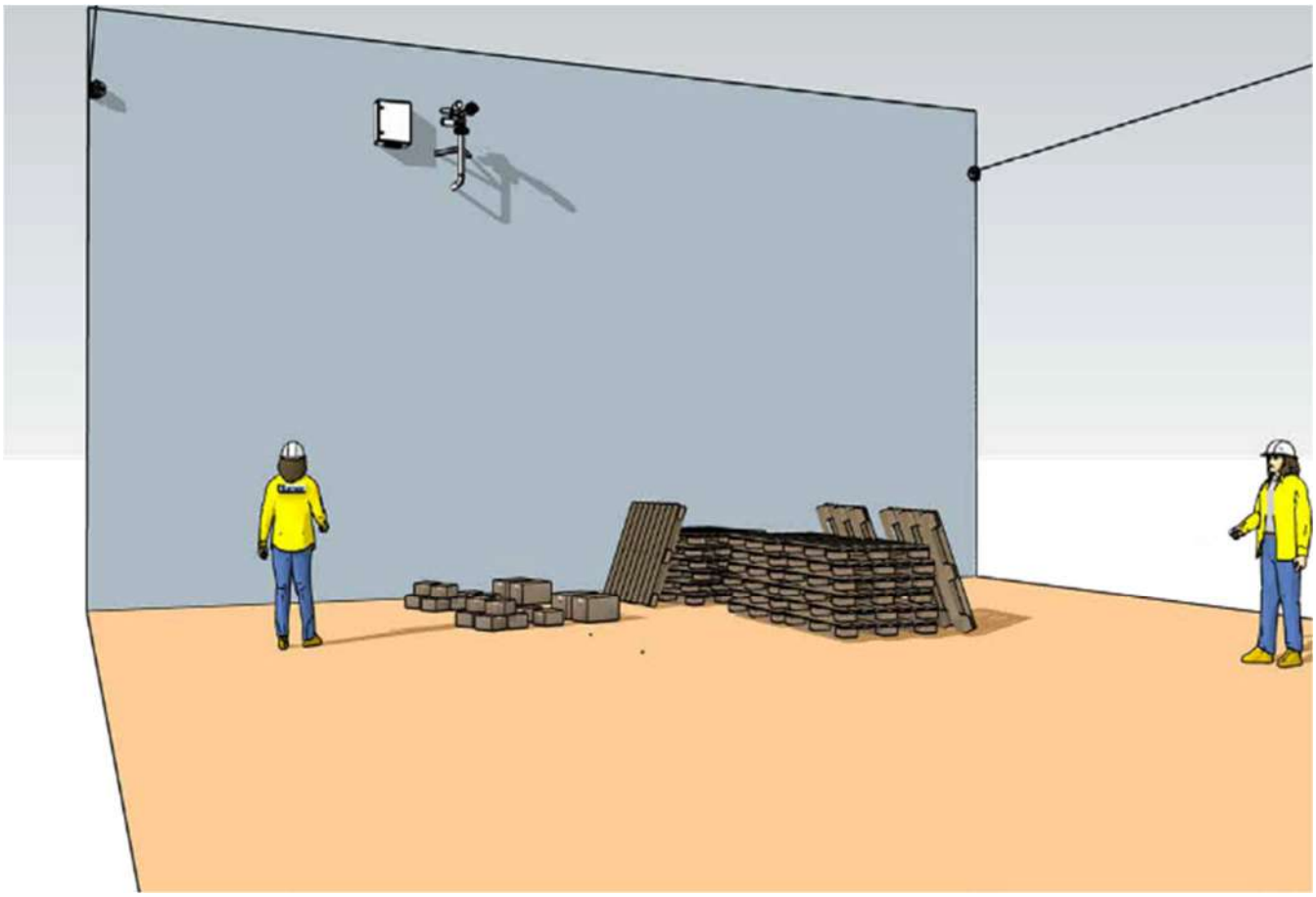
Wall, Normal Orientation

Use when the water supply comes from below.

Use when the Robotic Nozzle is installed on a wall, allowing a maximum of 180° horizontal and +/- 90° vertical movement. The TARGA PLC must be installed next to the Robotic Nozzle

This orientation is suitable for manual operation with Joystick. This is standard geometry.



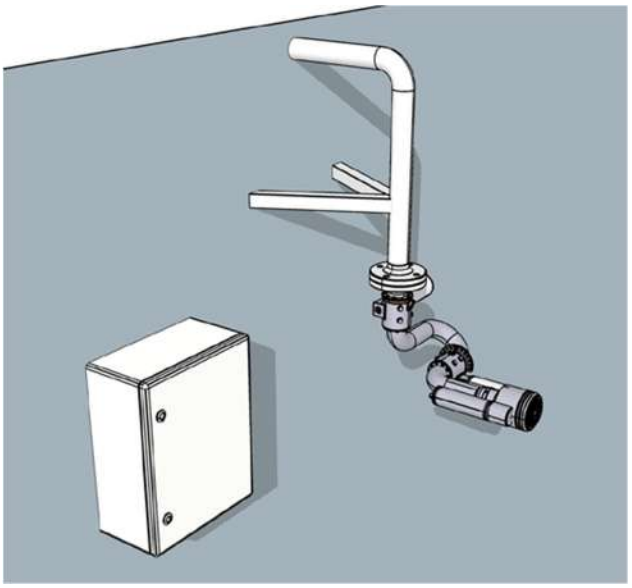


Wall, Inverted Orientation

Use when the water supply comes from above. Use when the Robotic Nozzle is installed on a wall, allowing a maximum of 180° horizontal and +/- 90° vertical movement.

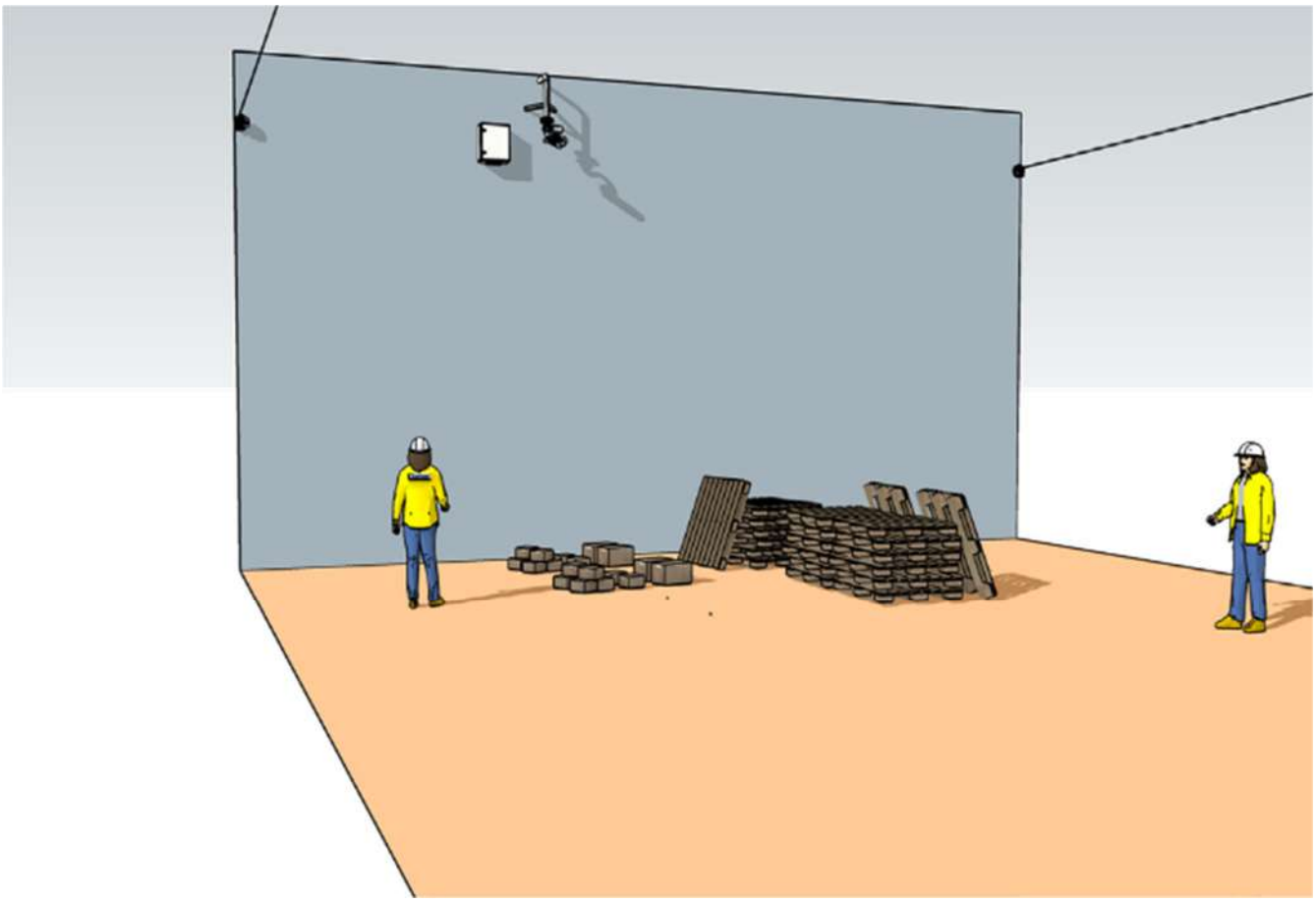
The TARGA PLC must be installed next to the Robotic Nozzle.

This geometry is suitable for manual operation with Joystick.



! CAUTION

For inverted orientation, the geometry of the FORCE 50 must be inverted, hence please advise the required orientation/geometry when ordering.



Ceiling, Hanging Orientation

Installing the Robotic Nozzle hanging from the ceiling usually provides the best reach and coverage.

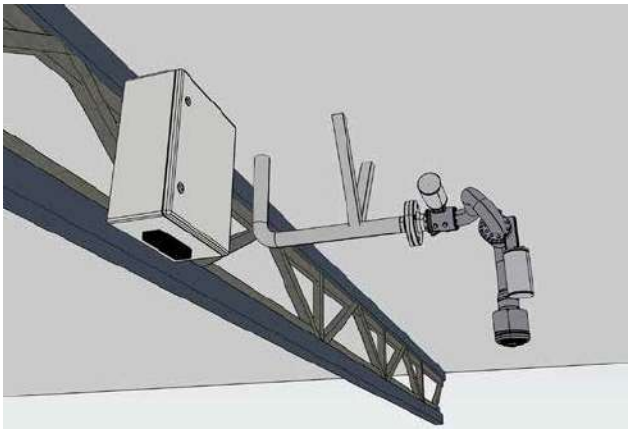
The Robotic Nozzle can be installed in the center of the area covered by the detector, thus allowing a full 360° coverage of up to 70 m Ø (35 m reach in all directions)

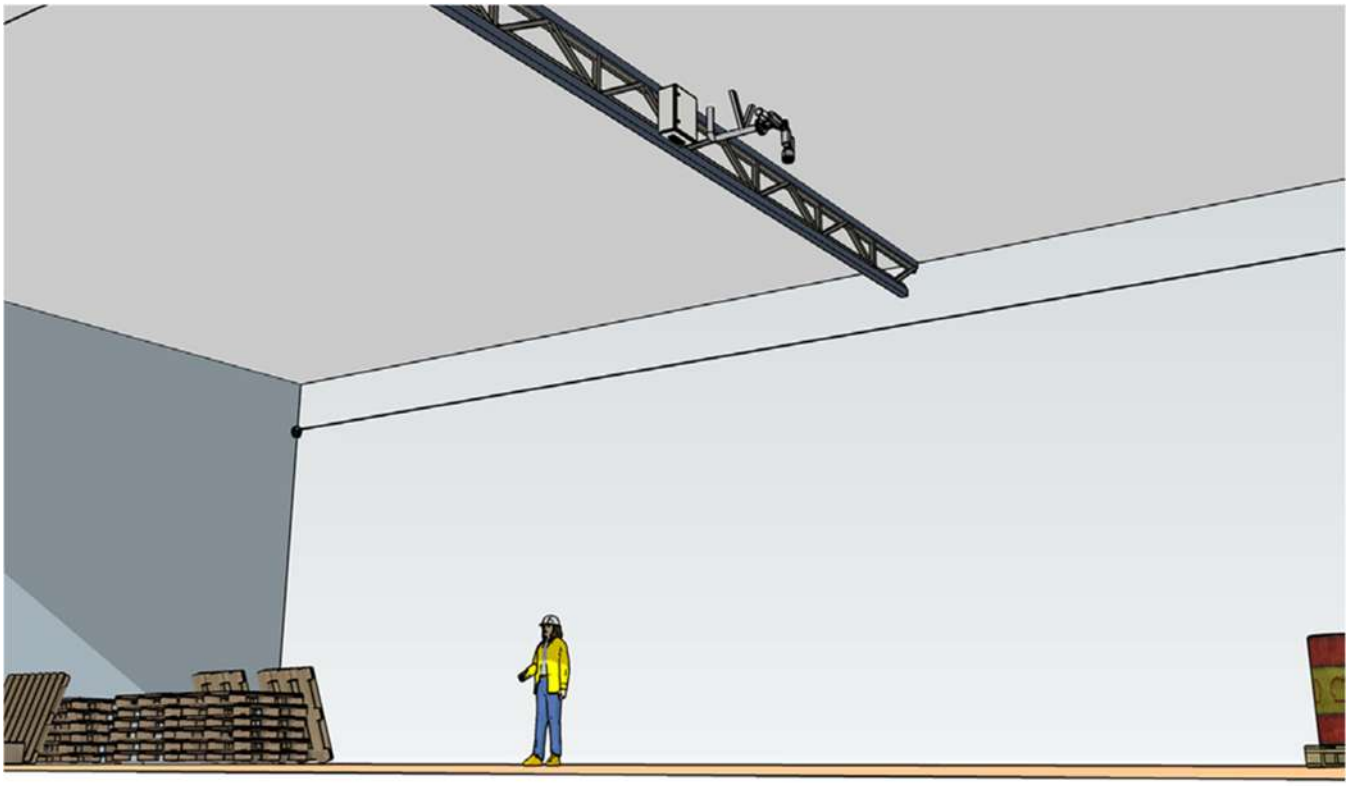
This is usually the preferred orientation for autonomous systems - when the FORCE 50 is controlled from detectors or a Thermal imaging system.

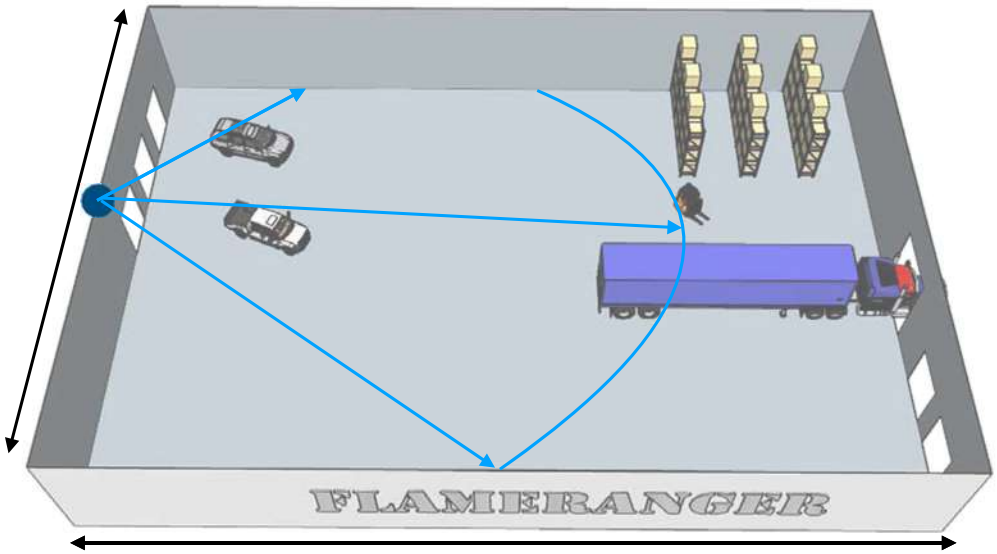
! CAUTION

This orientation is not suited for manual operation with a Joystick or the ONE App.

For ceiling orientation, the ONE-DIRECT graphical interface floor plan joystick can be used. Upload your floor plan and aim the stream simply by pointing or clicking on the target area.

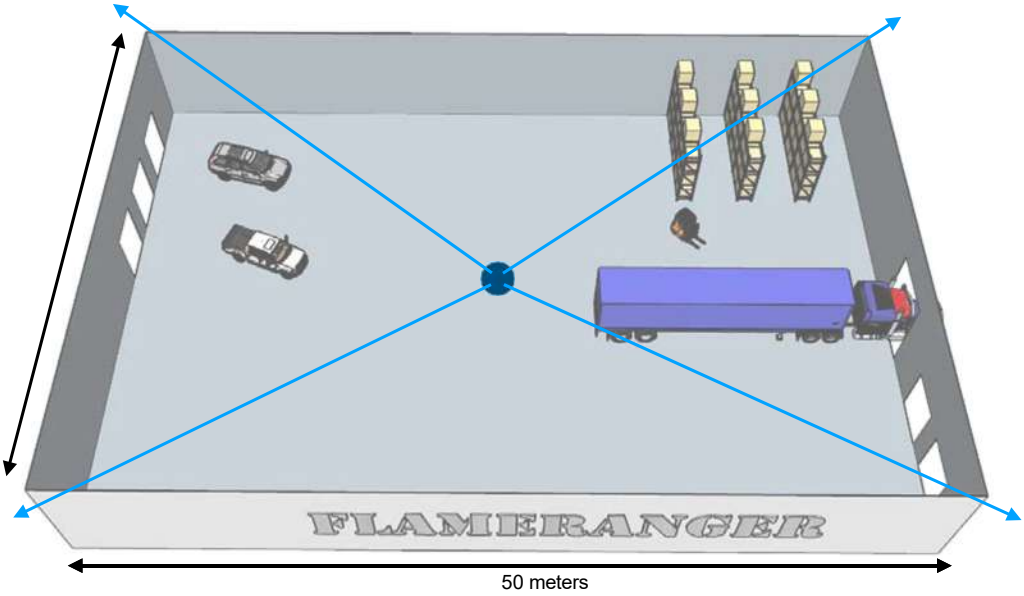






Installation on the wall

Usually provides easier access; thus, it makes installation easier. The cover is limited to only 180° horizontal reach. An area of up to 40 m radius is protected. Installing on a wall provides a geometry suited for manual Joystick control.



Installation hanging from the ceiling

It is recommended for fully automatic systems. It usually will provide better reach, the stream is less obstructed by objects on the floor. Up to 40 m, reach provides a full 80-meter Ø cover. It is, however, difficult to control with a manual Joystick because the geometry is rotated 90°, with the Nozzle facing straight down in the default position.

Installing the Robotic Nozzle

By now, we assume you have decided if the Robotic Nozzle is to be installed on the wall or hanging from the ceiling.

The FORCE 50 Robotic Nozzle is fitted with a DN50/PN16 flange (or similar size 2" ANSI flange or JIS flange).

! WARNING

The maximum reaction force at 2000 lit/min and 10 bar is 1400 N. The mounting pipe and bracket must withstand a minimum 8 000 N of Force to provide a safe and stable base.

The flange itself provides the required support to hold the FORCE 50. Additional support and brackets must be applied to the feeding pipe to keep it stable under operation. This is especially important during fully automatic operation.

Use suitable M16 bolts and a flat seal to install the flange.

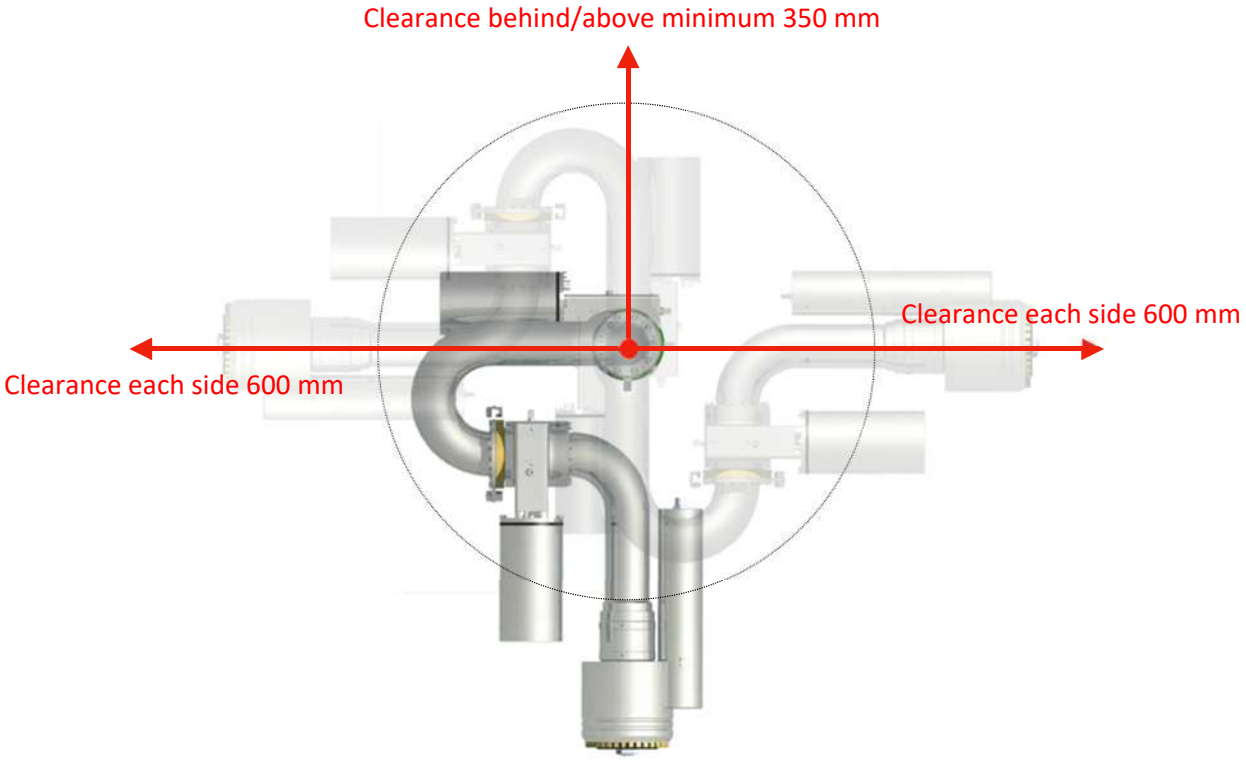
! CAUTION

Clearance!!

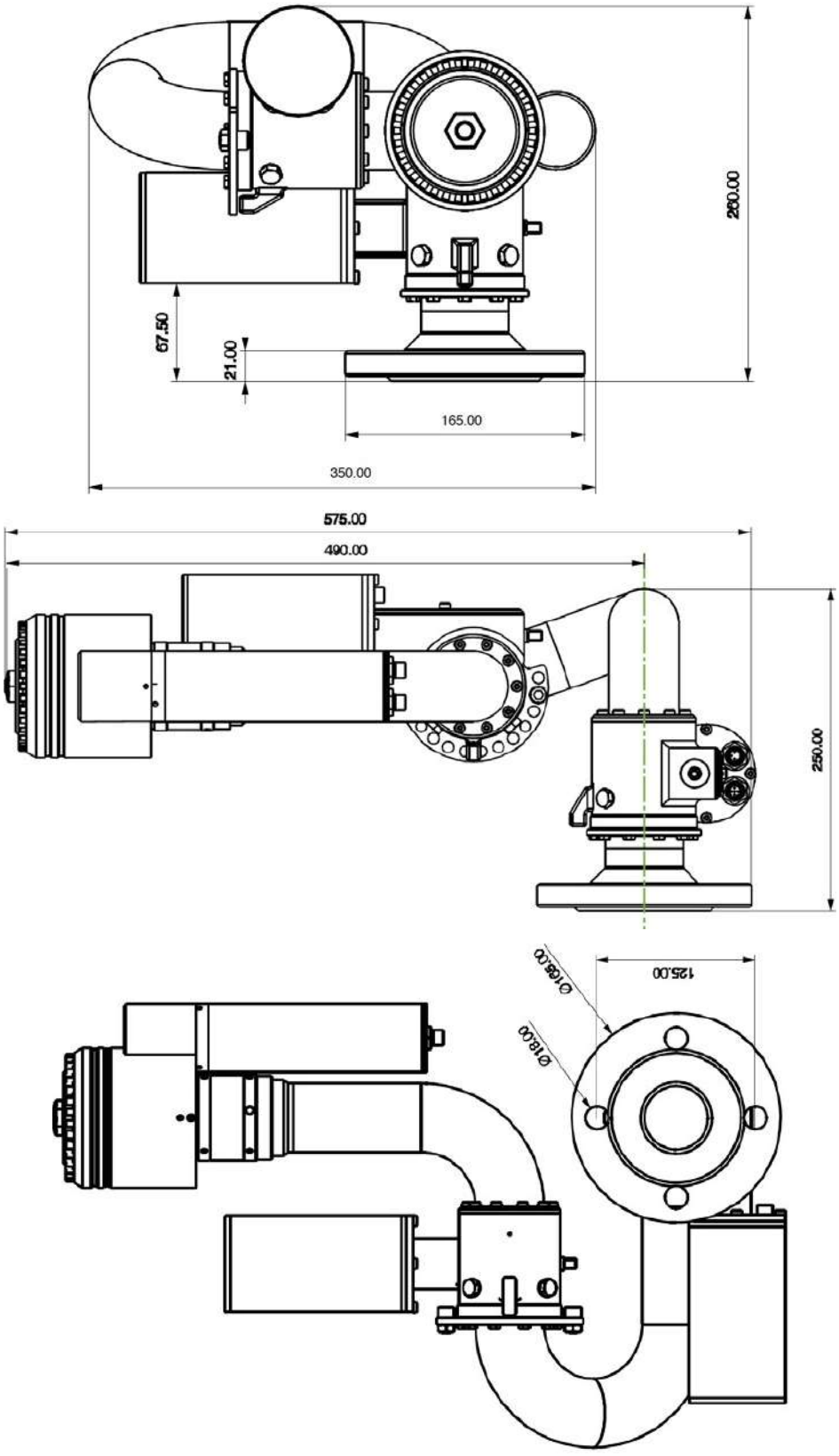
Take special precautions to ensure the Robotic Nozzle can move and rotate freely +/- 90° in all directions.

Make sure there are no obstructions with 600 mm from the center of rotation.

The FORCE 50 weighs 19 Kg incl the flange and nozzle



Dimensions


260.00
67.50
21.00
165.00
350.00
575.00
490.00
250.00
125.00
Ø168.00
Ø180

FLOW SETTINGS

Nozzle Flow Setting

The Nozzle flow can easily be selected by fitting the appropriate flow shim.

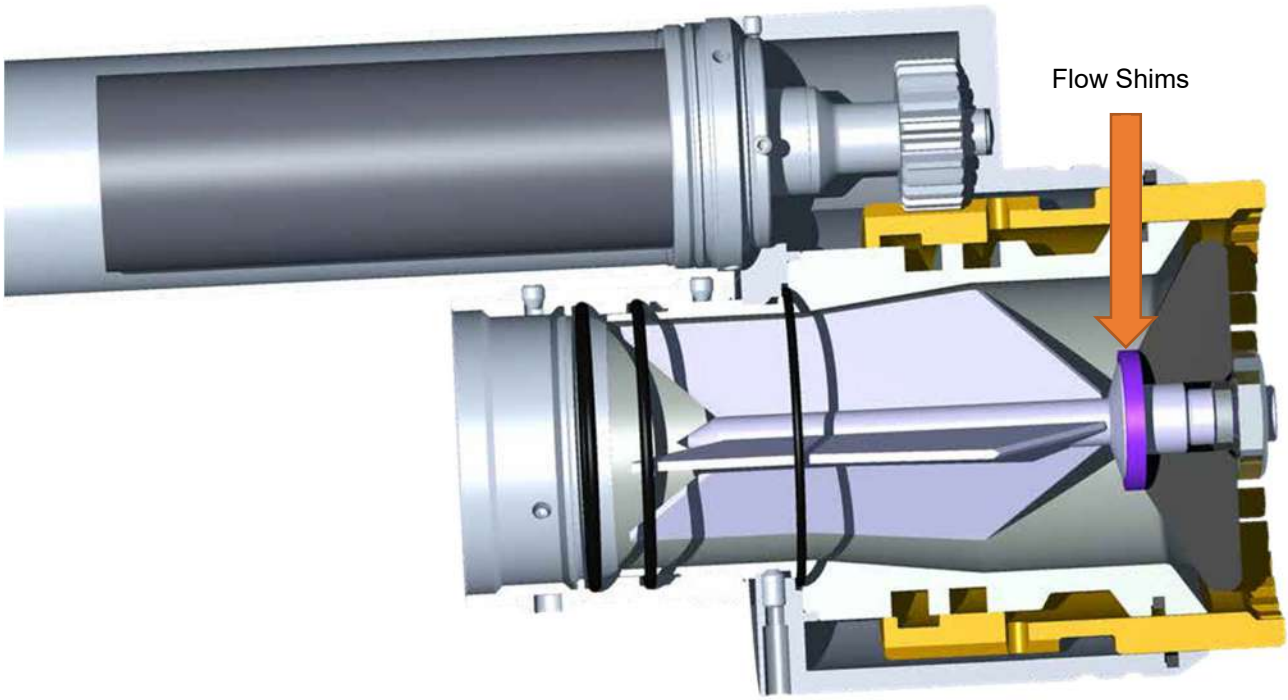
The shim is custom manufactured (3D printed) to fit each order.

Please specify your required flow at your system pressure when ordering.

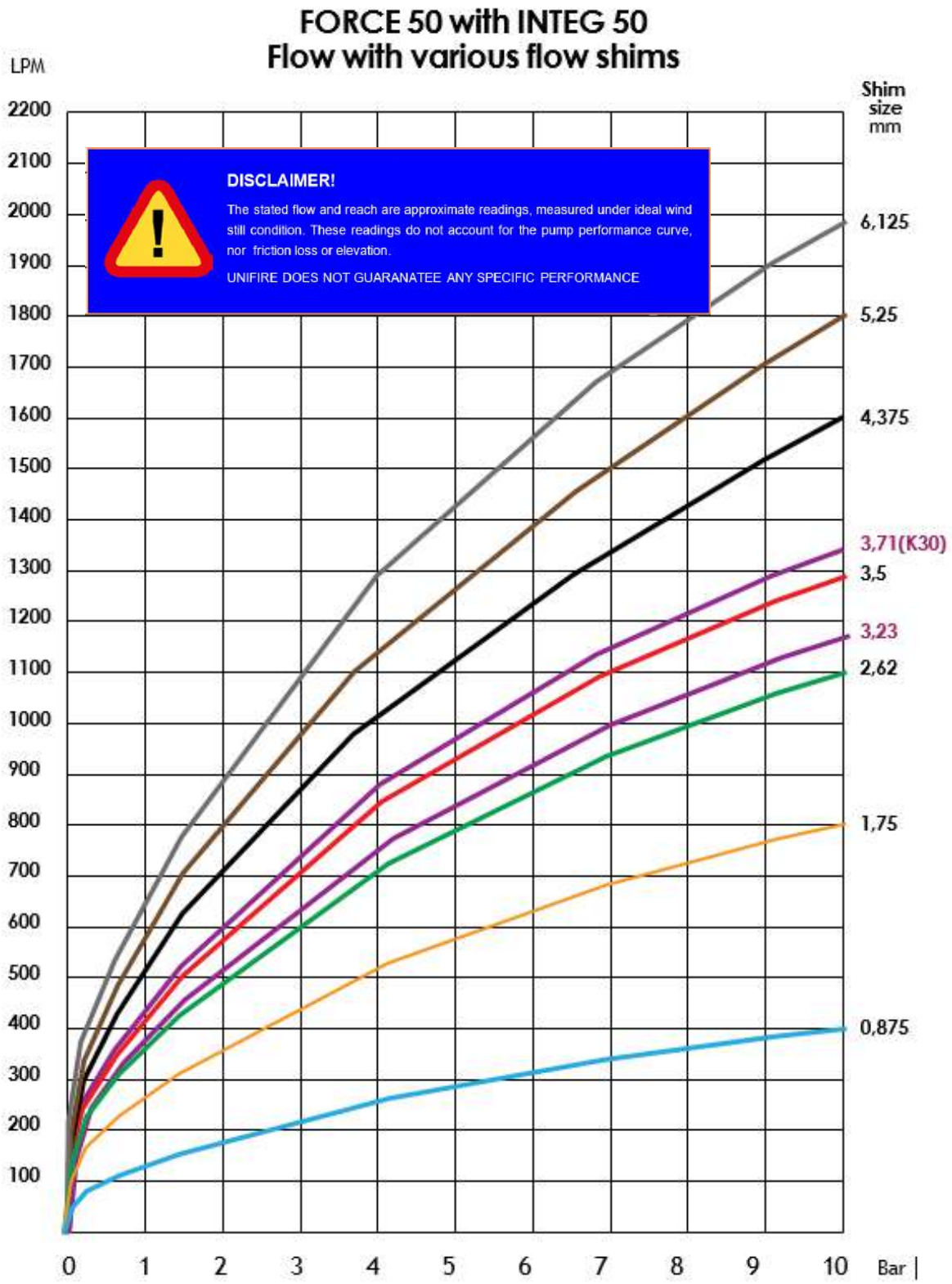
Flow Shims

Flow shims are 3D printed specifically to order. Typically in dimension (thickness) 0,8-6,2 mm.

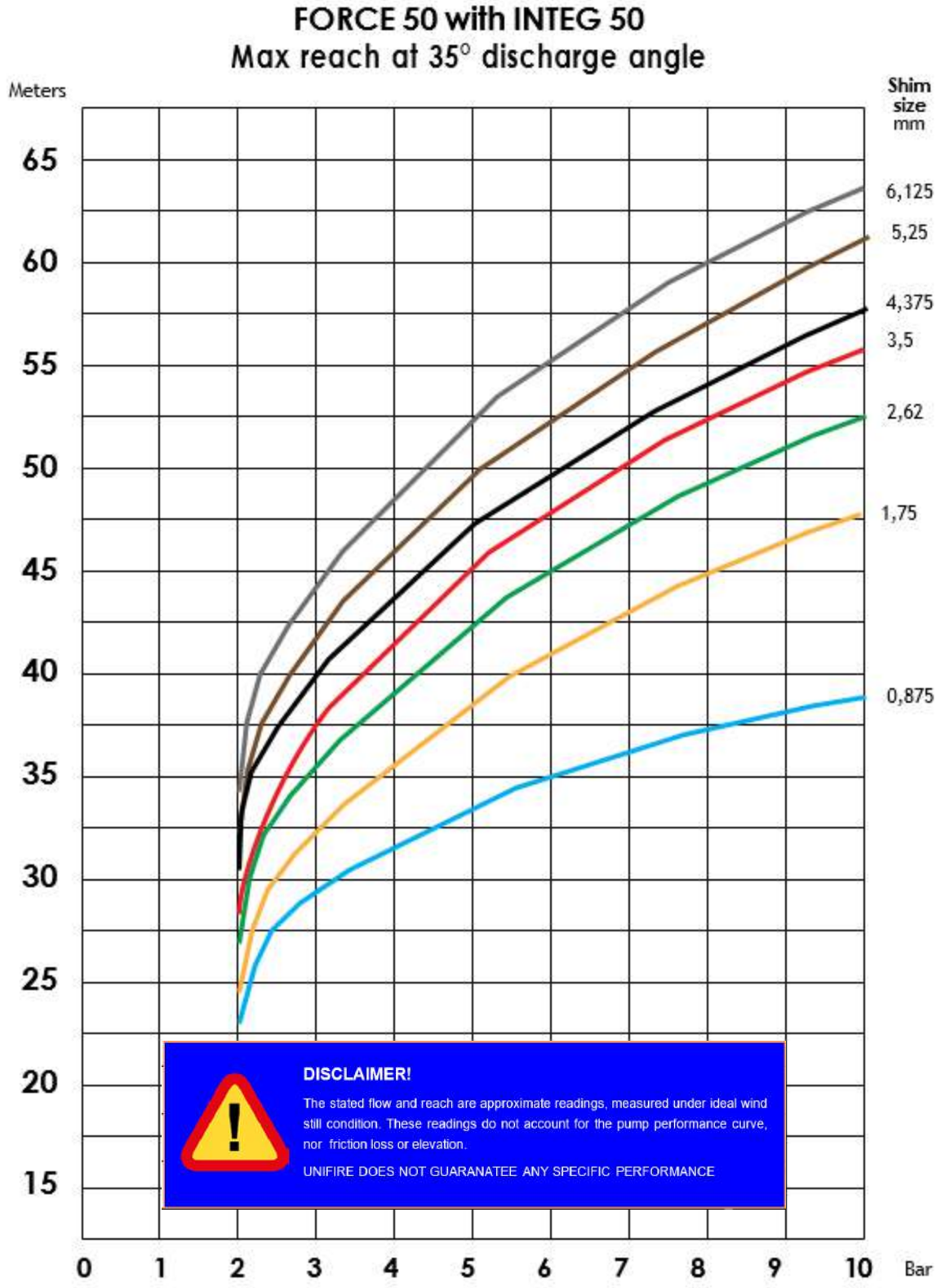
See flow and reach charts on the following pages.



Flow Chart


FORCE 50 with INTEG 50
Flow with various flow shims
LPM
Shim size mm
DISCLAIMER!
The stated flow and reach are approximate readings, measured under ideal wind still condition. These readings do not account for the pump performance curve, nor friction loss or elevation.
UNIFIRE DOES NOT GUARANATEE ANY SPECIFIC PERFORMANCE
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
1
2
3
4
5
6
7
8
9
10
Bar
6,125
5,25
4,375
3,71(K30)
3,5
3,23
2,62
1,75
0,875

Reach Chart


FORCE 50 with INTEG 50
Max reach at 35° discharge angle
Meters
Shim size mm
6,125
5,25
4,375
3,5
2,62
1,75
0,875
65
60
55
50
45
40
35
30
25
20
15
0
1
2
3
4
5
6
7
8
9
10
Bar
DISCLAIMER!
The stated flow and reach are approximate readings, measured under ideal wind still condition. These readings do not account for the pump performance curve, nor friction loss or elevation.
UNIFIRE DOES NOT GUARANATEE ANY SPECIFIC PERFORMANCE


2020-06-10 12:56:20
Monitor 2

ELECTRICAL INSTALLATION

Generic System Overview

The TARGA Robotic Nozzle PLC is a highly capable programmable PLC. With support for up to 6 x BLDC drivers.

Communication Protocols: 2 x CAN 2.0 29-bit header (UniCAN) 125,250,500 kB/s, RS232, RS485 (Modbus, DMX, etc.)

Physical Layer Protocols: USB, Ethernet (TCP/IP, web socket), and others available per customer requirements.

6 BLDC Motor Driver Card Slots (optional: slots for DO or DI/AI expansion cards).

Inputs: 4 digital inputs (NPN) + 2 per installed motor driver card, 6 analog inputs (4-20 mA or 0-5V), expandable & customizable to customer requirements

Outputs: 8 digital outputs, of which 4 can be set to PWM.

Below is a generic example of what a system can look like.

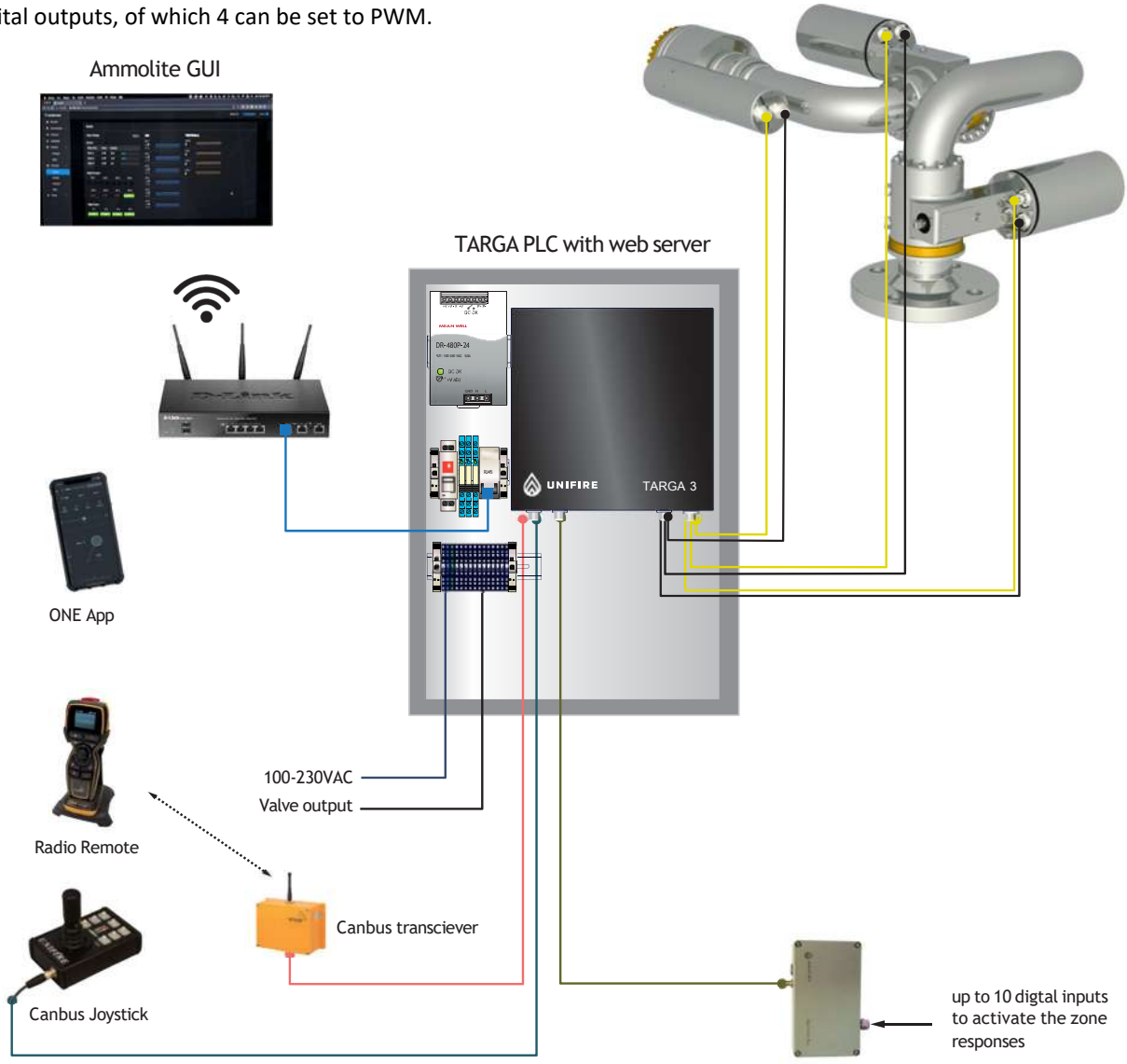
A DHCP Router is required to set up the system with the Ammolite GUI. This will also allow for the ONE App to be activated.

Over the web interface, the systems can be remotely controlled, remotely configured, and monitored from anywhere in the world.

A cabled Canbus Joystick can be connected for local control.

An industrial radio remote control (Hetronic ERGO-S) can also be locally connected.

Digital and analog outputs are generic and can be used to operate valves and send or receive status signals.



Connecting the FORCE 50 to the TARGA PLC

The FORCE 50 system is fitted with an M12 multi-connector. The standard system is delivered with 5-meter M12 cables.

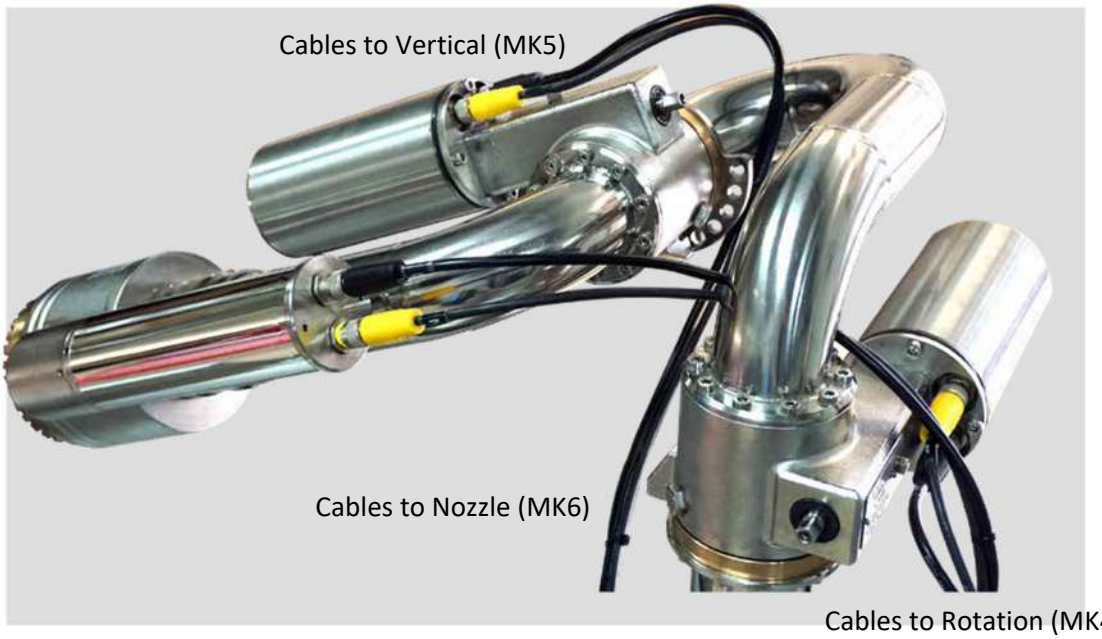
Connect the 6 x 5 meter M12 cables from the PLC to the Robotic Nozzle

From top to bottom: Rotation, Vertical, Nozzle

Yellow A-coded connectors are for the BLDC Motor Sensors

Black B-coded connectors are for the BLDC Motor Phases.

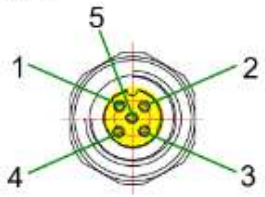
The mechanical key-coding makes it impossible to accidentally cross the cables.



TARGA PLC Generic Pin Specification

5-PIN A-coded (sensors)

1 - BROWN
2 - WHITE
3 - BLUE
4 - BLACK
5 - GREY



Joystick 5P Canbus			BLDC sensors M12 A-coded 5-pin Rotation / Vertical / Nozzle	
P1	Shield		P1	GND
P2	24 VDC		P2	5 VDC
P3	GND		P3	HALL 3
P4	CAN H		P4	HALL 2
P5	CAN L		P5	HALL 1

4-PIN B-coded (phases)

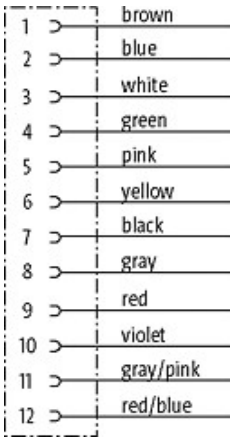
1 - BROWN
2 - n/a
3 - BLUE
4 - BLACK
5 - n/a

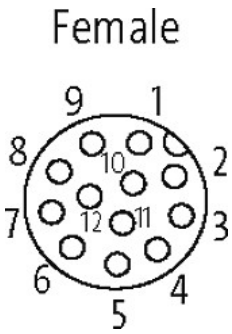
M12 5, 8 or 12-pin Dig In/Out			BLDC phases M12 B-coded 4-pin Rotation / Vertical / Nozzle	
P1	generic		P1	PHASE 1
P2	generic		P2	not connected
P3	generic		P3	PHASE 2
P4	generic		P4	PHASE 3
P5	generic		P5	not connected

TARGA PLC M12 - 12 Pin specification

These are default and generic specifications for the 12-pin digital in – and outputs.

Please note that your system may have special functions and, therefore, other pin distribution.

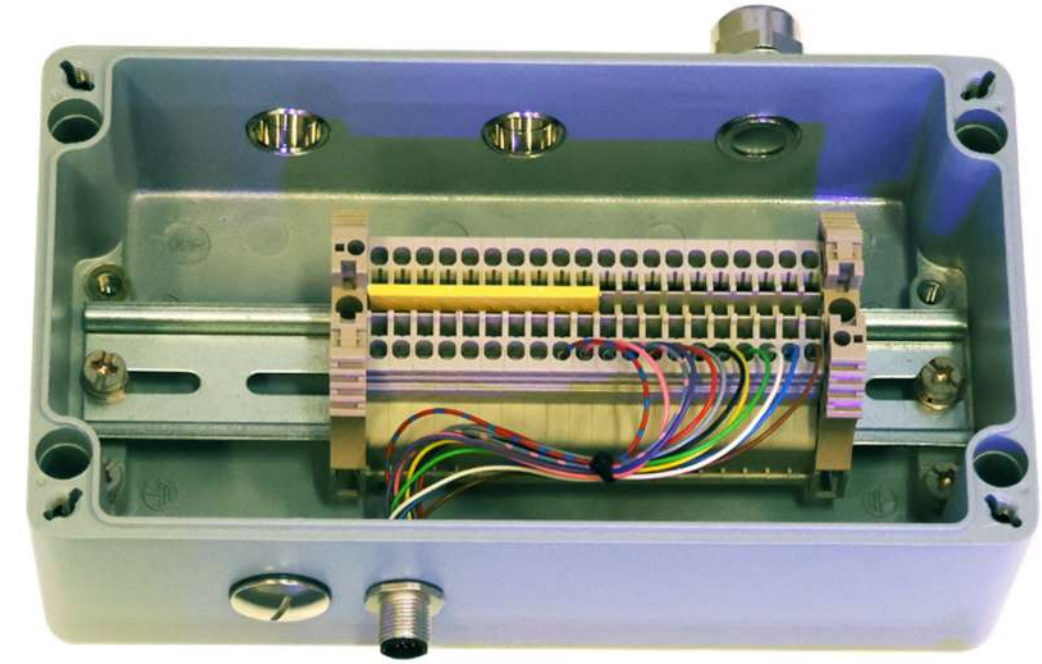


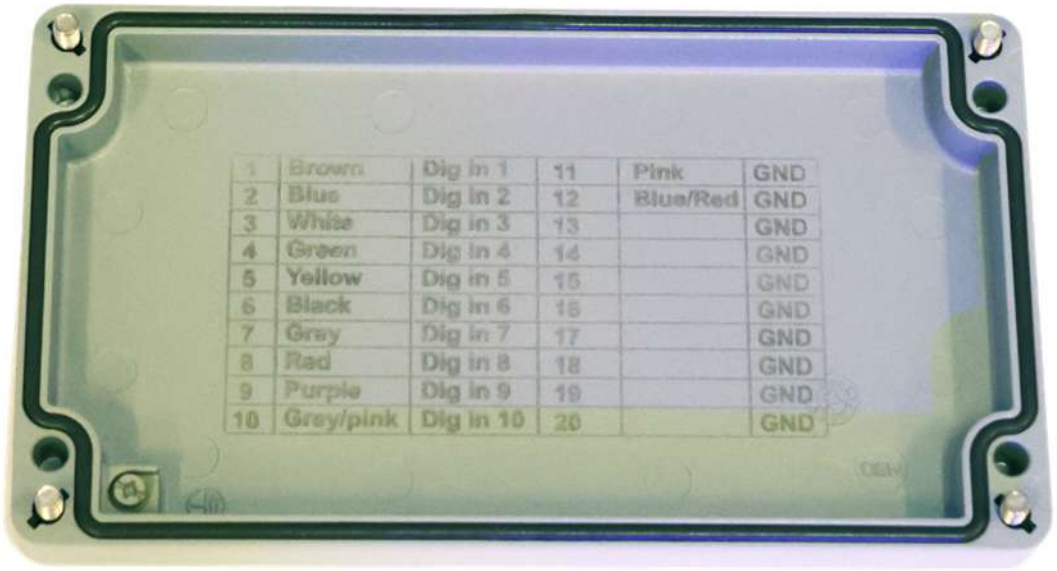


	Dig Out 12P			Dig Out 12P		
#	**Color**	**PCB connector**	**Default**	**Color**	**PCB conn**	**Default**
1	Brown	MK1 DI1 J11:2	-	Brown	DO1 J13:2	-
2	Blue	MK2 DI1 J11:3	-	Blue	DO2 J13:3	-
3	White	MK3 DI1 J10:2	-	White	GND J13:4	GND
4	Green	MK4 DI1 J10:3	-	Green	DO3 J14:2	-
5	Pink	MK5 DI1 J10:4	-	Pink	DO4 J14:3	-
6	Yellow	MK6 DI1 J26:1	-	Yellow	GND J14:4	GND
7	Black	MK6 DI1 J26:1	-	Black	DO5 J15:2	Valve relay
8	Grey	MK6 DI1 J29:1	-	Grey	DO6 J15:3	Valve relay
9	Red	MK6 DI1 J29:2	-	Red	GND J15:4	GND
10	Violet	MK6 DI1 J32:3	-	Violet	DO7 J16:2	Sum alarm relay
11	Grey/Pink	MK6 DI1 J32:2	GND	Grey/Pink	DO8 J16:3	-
12	Red/Blue	MK6 DI1 J32:3	GND	Red/Blue	GND J16:4	GND

12-Pin Extension Box Terminal Socket Specification

This is the generic and default specification for the optional digital input extension box.





1	Brown	Dig in 1	11	Pink	GND
2	Blue	Dig in 2	12	Blue/Red	GND
3	White	Dig in 3	13		GND
4	Green	Dig in 4	14		GND
5	Yellow	Dig in 5	15		GND
6	Black	Dig in 6	16		GND
7	Grey	Dig in 7	17		GND
8	Red	Dig in 8	18		GND
9	Purple	Dig in 9	19		GND
10	Grey/pink	Dig in 10	20		GND

TARGA Robotic Nozzle PLC Terminal Sockets

This is the generic and default terminal socket specification for the X-TARGA PLC. Your system may have different terminal specifications.

Weidmüller IP67 Stainless Steel cabinet

GENERIC TERMINAL SOCKET SPECIFICATION							
Terminal	**Function**	**Internal connection**	**External connection**	**Function**	**Cable mark**	**Cable dim.**	**Color marking**
1	L	PSU (L)	L	Power	1	1,5 mm^2	
2	N	PSU (N)	N	Power	2	1,5 mm^2	
3	G	PSU (⏚)	G	Power	3	1,5 mm^2	
4	CAN 1 H	Main board	Joystick Connection Box	CAN		0,3 mm^2	Black
5	CAN 1 L	Main board	Joystick Connection Box	CAN		0,3 mm^2	G/Y or Grey
6	GND	Main board	Joystick Connection Box	CAN		0,3 mm^2	Blue
7	VCC	Main board	Joystick Connection Box	CAN		0,3 mm^2	White
8	NC	Relay 1 (DO5)	Valve	Relay	8	0,5 mm^2	
9	COM	Relay 1 (DO5)	Valve	Relay	9	0,5 mm^2	
10	NO	Relay 1 (DO5)	Valve	Relay	10	0,5 mm^2	
11	NC	Relay 2 (DO6)	Valve	Relay	11	0,5 mm^2	
12	COM	Relay 2 (DO6)	Valve	Relay	12	0,5 mm^2	
13	NO	Relay 2 (DO6)	Valve	Relay	13	0,5 mm^2	
14	COM	Relay 3	Spare	Relay	14	0,5 mm^2	
15	NO	Relay 3	Spare	Relay	15	0,5 mm^2	

SOFTWARE & CALIBRATION

Calibrating the Robotic Nozzle's Operating Range

Before attempting to operate, the Robotic Nozzle must be calibrated = given an operating range.

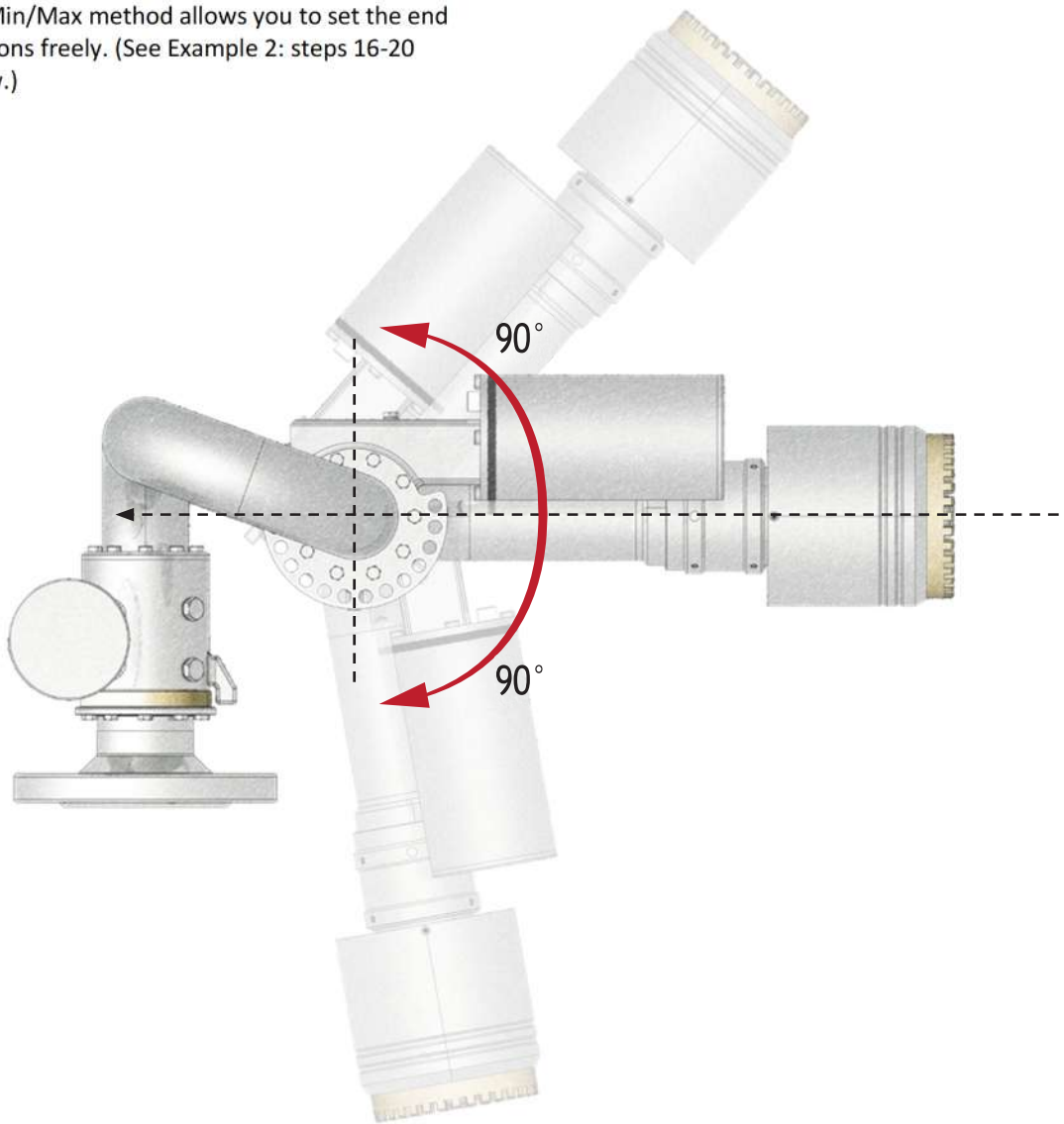
The calibration is performed through the Ammolite user interface, as described in this section.

There are two methods of calibrating: either the "Center" method or the "Min/Max" (minimum/maximum) method.

- The Center method is used for special applications when the operating range is preset in the software - typically to +/-90° exactly. (See Example 1, steps 13-15, below.)
- The Min/Max method allows you to set the end positions freely. (See Example 2: steps 16-20 below.)

Calibrate the operating range by following steps 1-25 on the following pages.

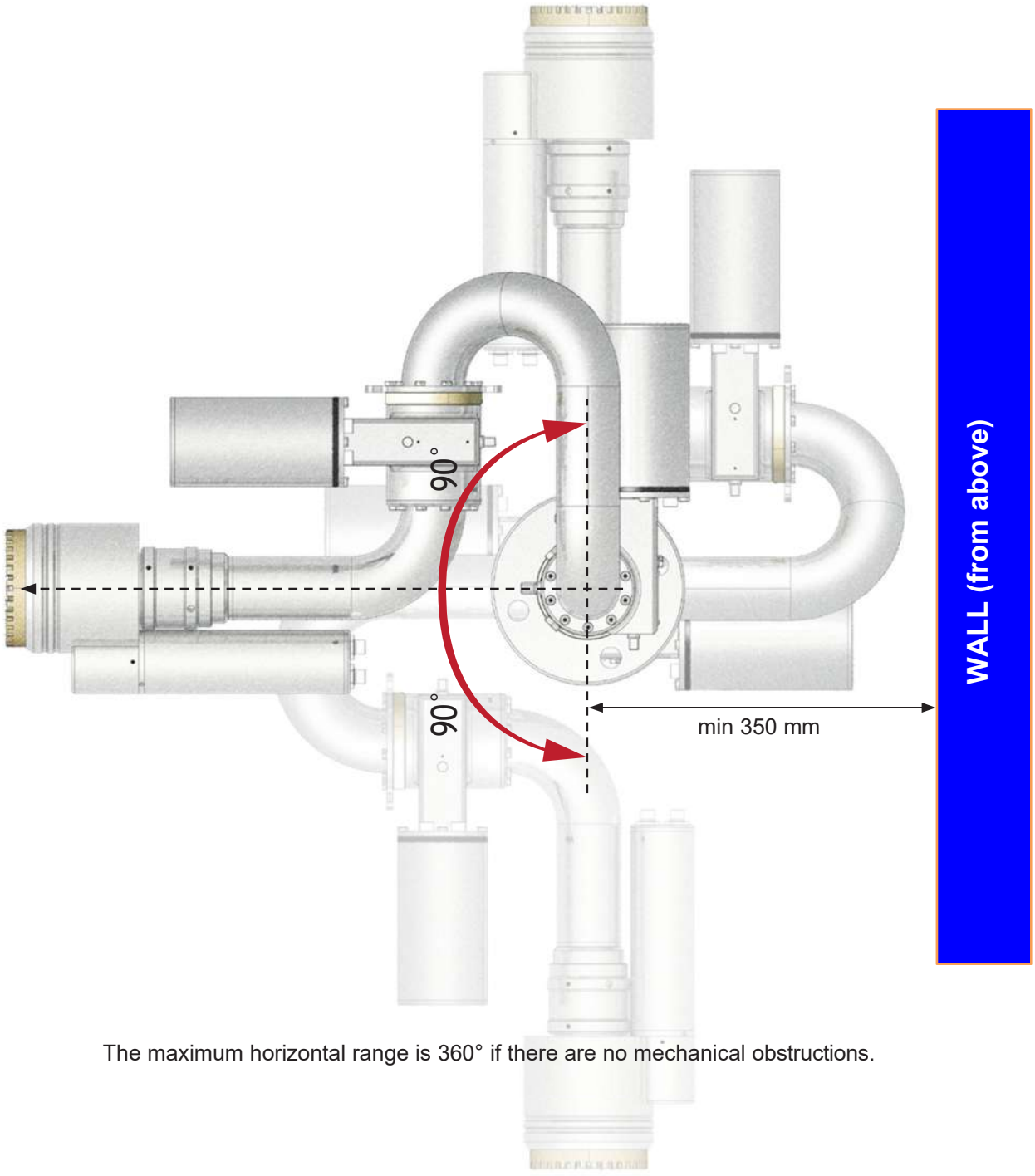
Note: avoid setting the minimum and maximum values at the extreme mechanical limits. Rather, set the limit to just before the monitor or nozzle reaches any mechanical stop. This avoids physical damage and unnecessary mechanical wear and tear.



The maximum vertical range is +/-90° if there are no mechanical obstructions.

Wall Mounted Nozzle

For a wall-mounted system, the normal default position is that the nozzle is pointing center (with +/.90° horizontal movement) and level to the ground (with +/- 90° vertical movement).



The maximum horizontal range is 360° if there are no mechanical obstructions.

Ammolite Software Introduction

The setup of the Fike FORCE 50 is achieved through our web browser-based graphical user interface (GUI) called "Ammolite™.

The Fike TARGA ROBOTIC NOZZLE PLC connects to a standard TCP/IP-based network. The built-in web server has been set up to be assigned an IP address by an external DHCP server. This can be a local router or a dedicated server in a larger network, administered by your IT department or similar.

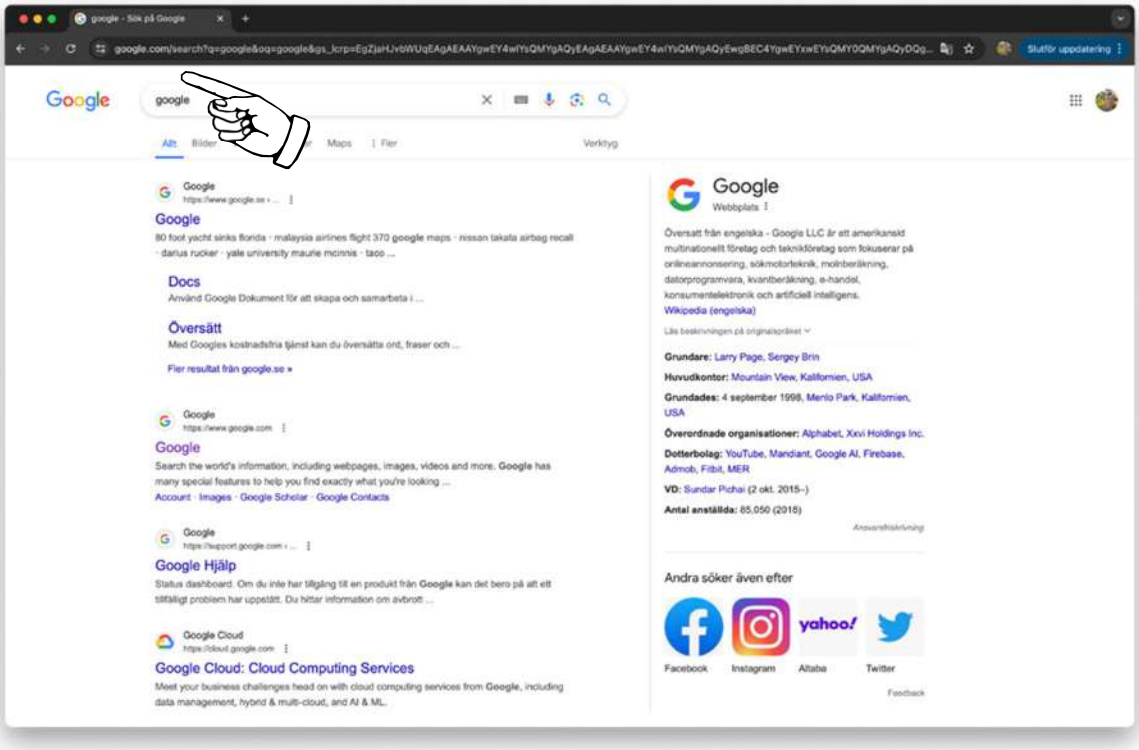
To connect to the web server, open a browser, Chrome or Firefox, and enter the IP address followed by 81 (ex: http://192.168.0.45:81, replace 192.168.0.45 with the actual IP).

Enter the username and password provided for your system to access the setup environment.

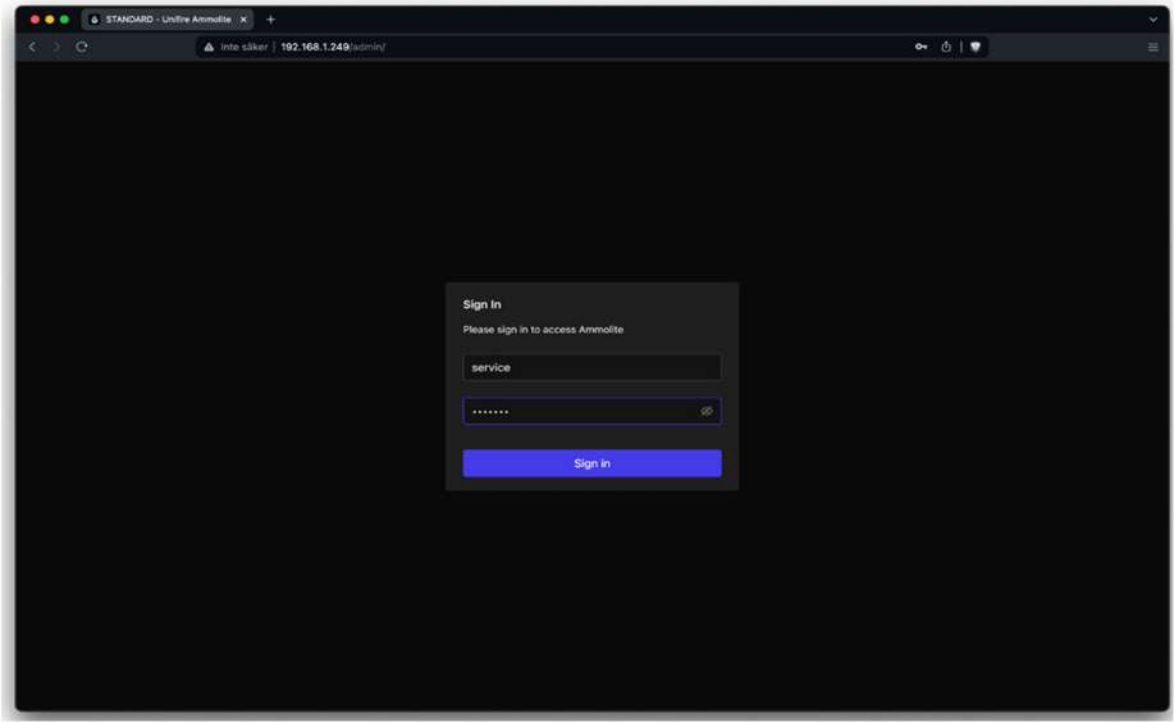
It is required that you make a note in the service log at login.

Connect your PC or TABLET

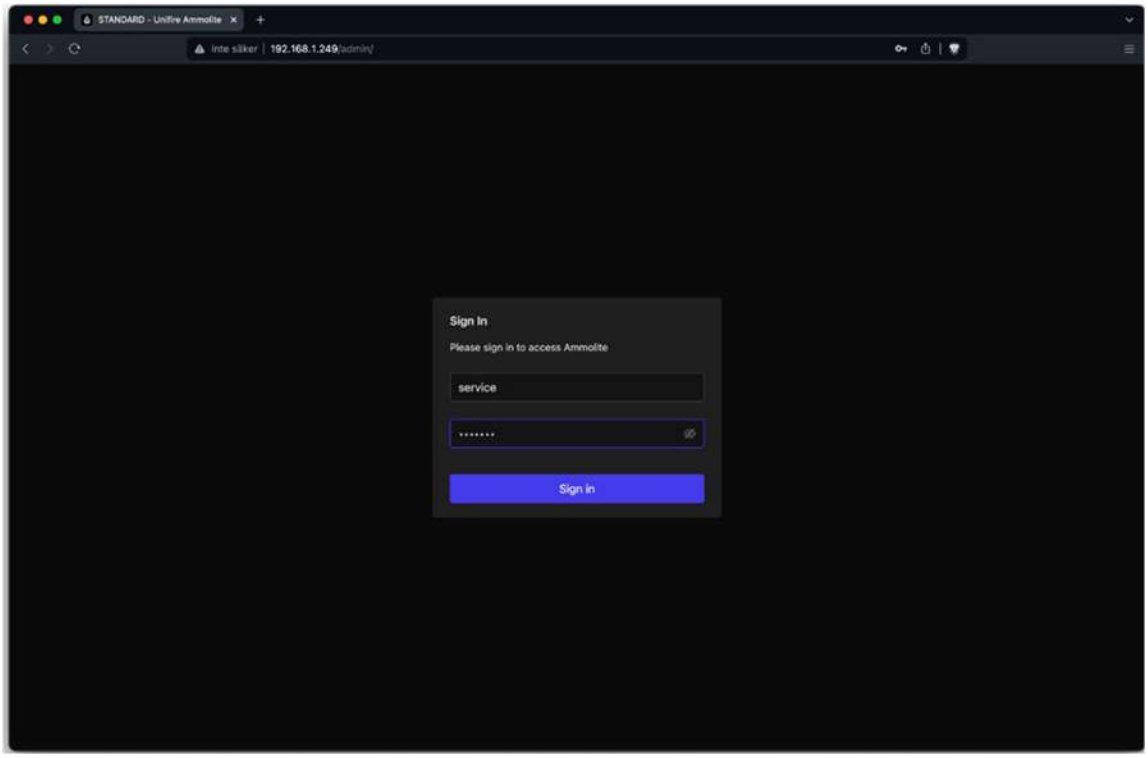
1. Connect your PC or Tablet by WiFi or cable to the same network as the TARGA PLC.
2. Find the IP address of the TARGA PLC, which is automatically assigned by the DHCP server.
3. Enter the IP address, followed by 81 in the browser window (e.g., http://192.186.0.45:81).
4. To calibrate, follow the instructions on the following pages.



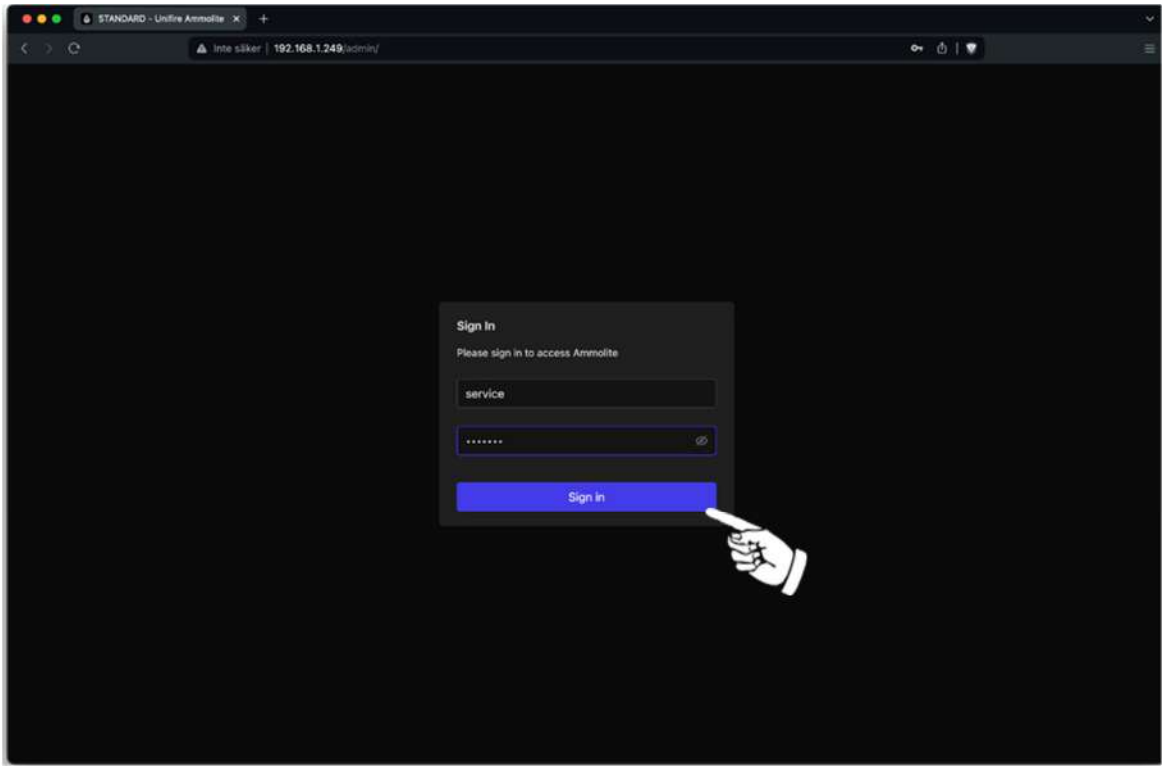
1) Open your web browser (Safari, Chrome, Firefox, or other...)



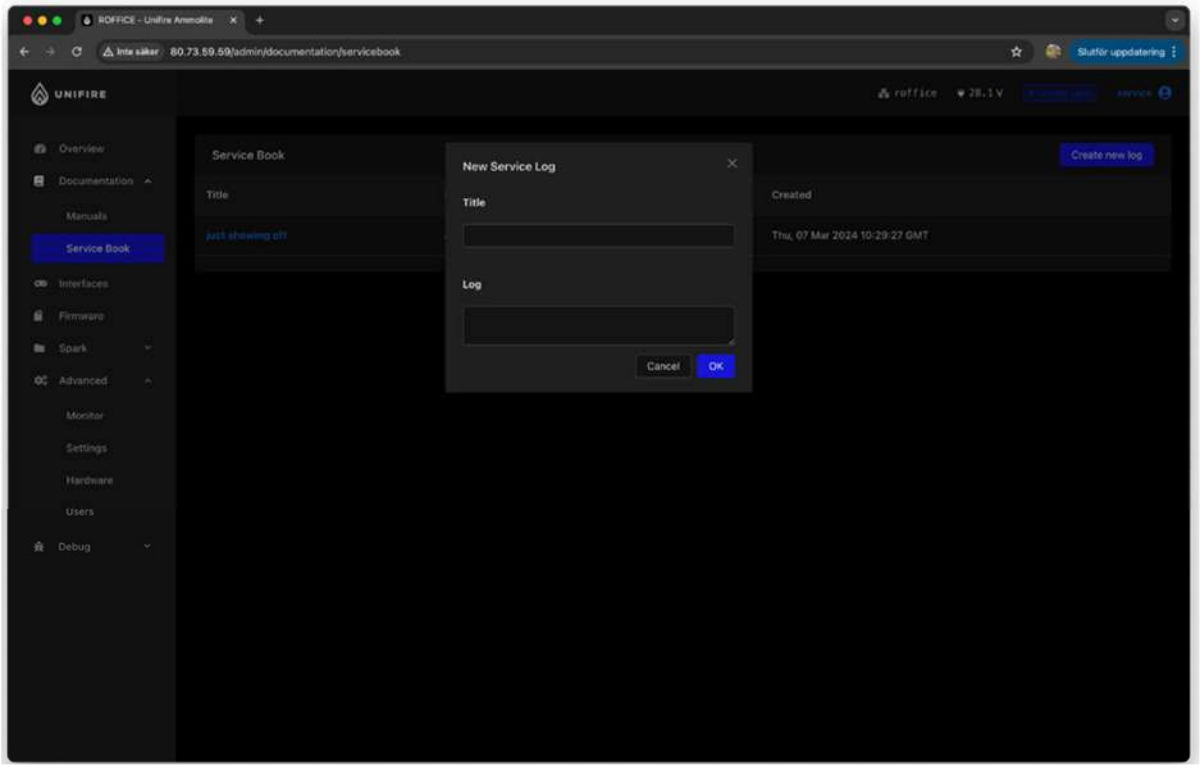
2) Enter the IP Address of the TARGA PLC, followed by:81 (e.g., http://192.168.0.217:81). Push Enter.



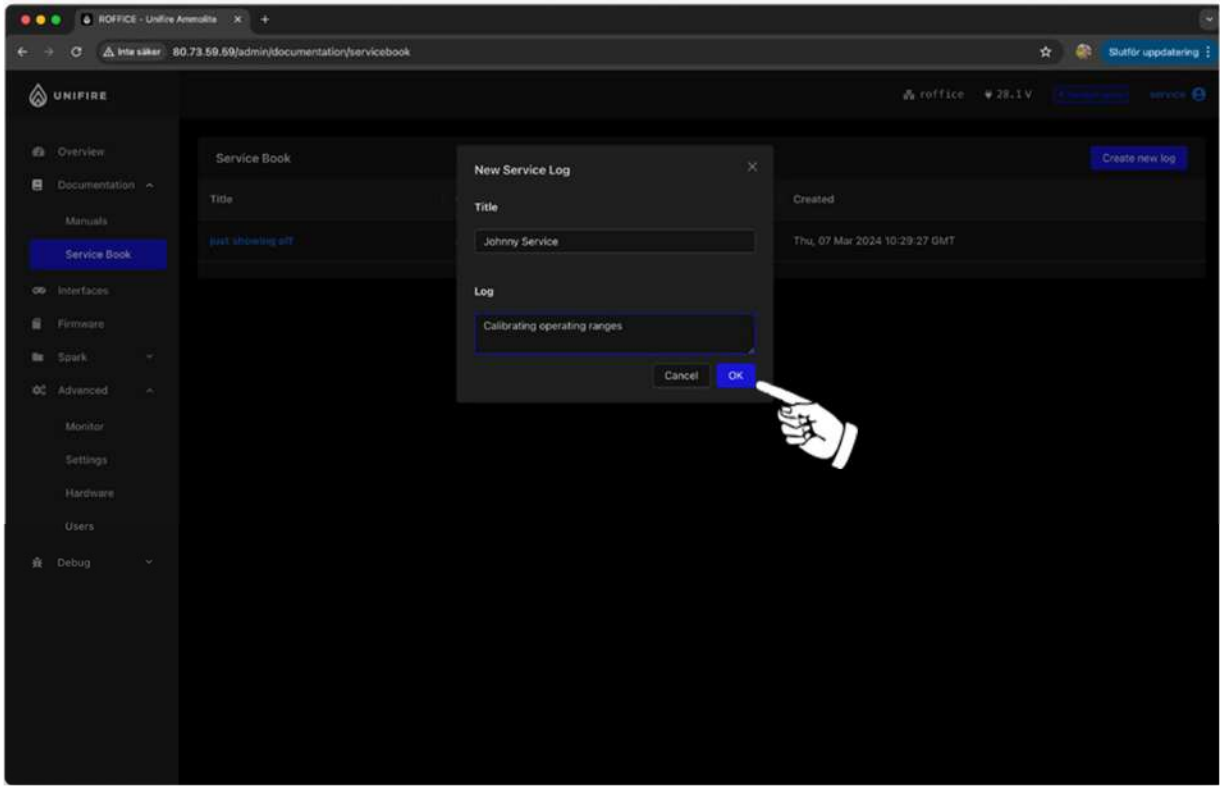
3) Enter the username and password provided with your delivery.



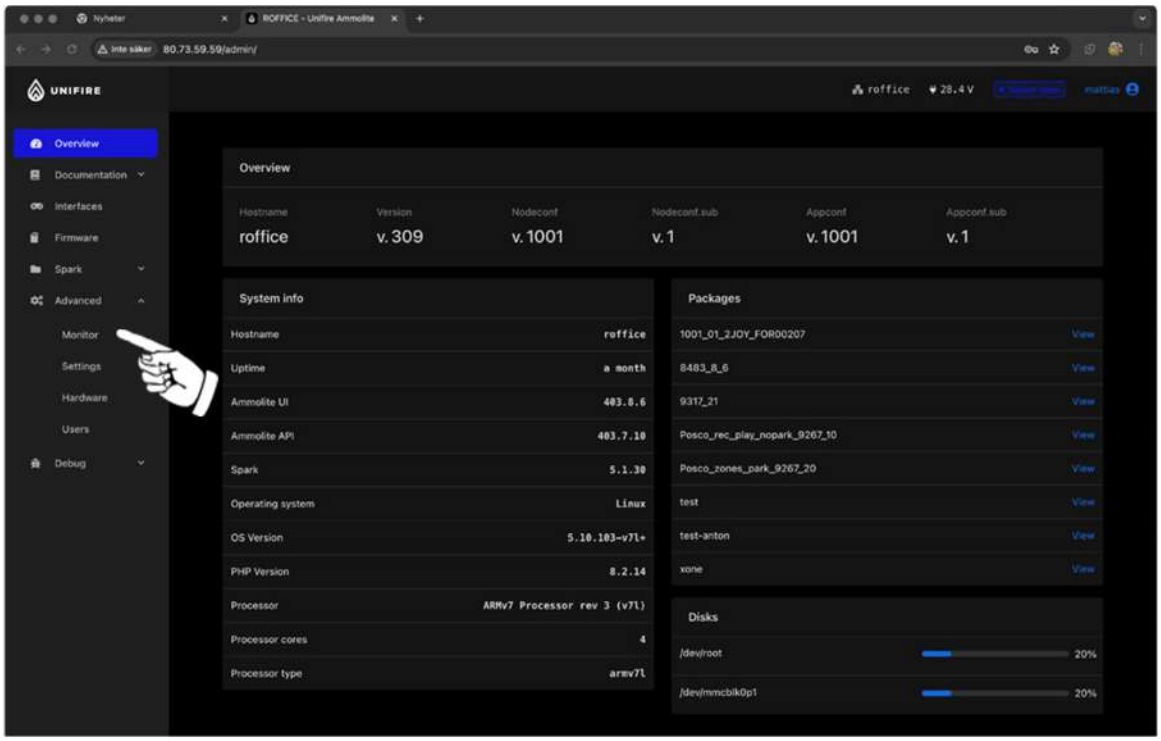
4) In this example, it is "service" and "service". Click Login.



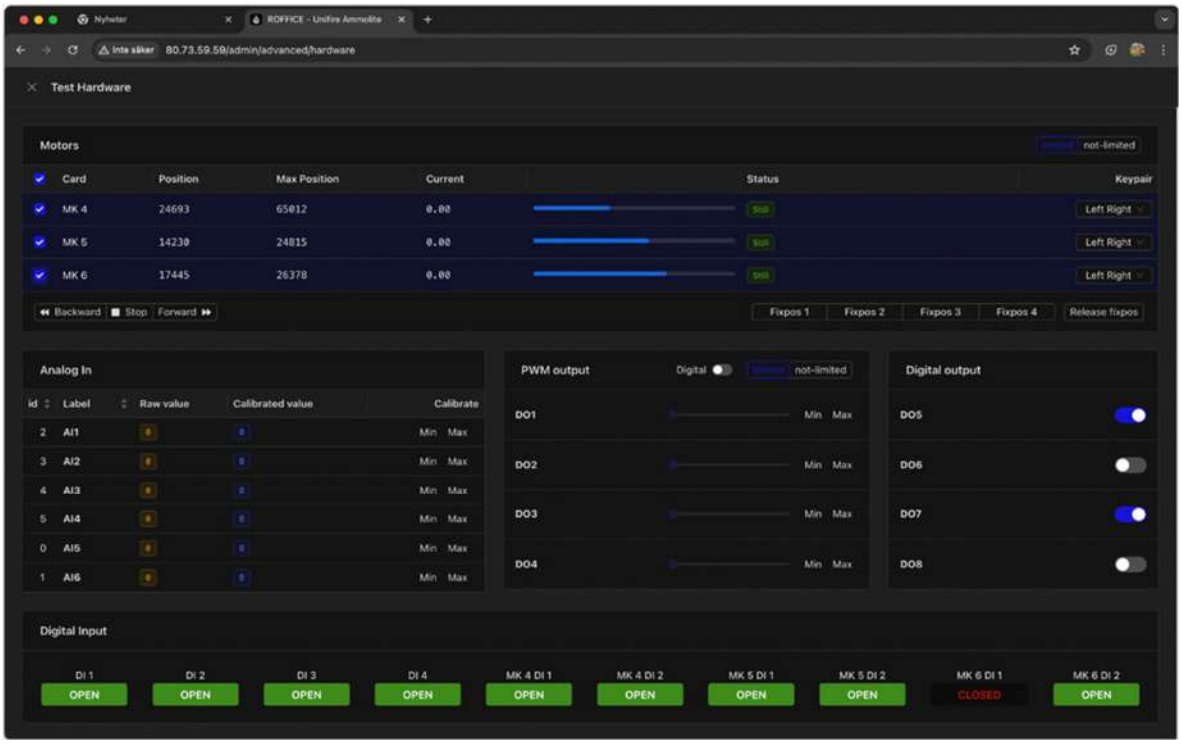
5) You are now requested to make a note in the service log.



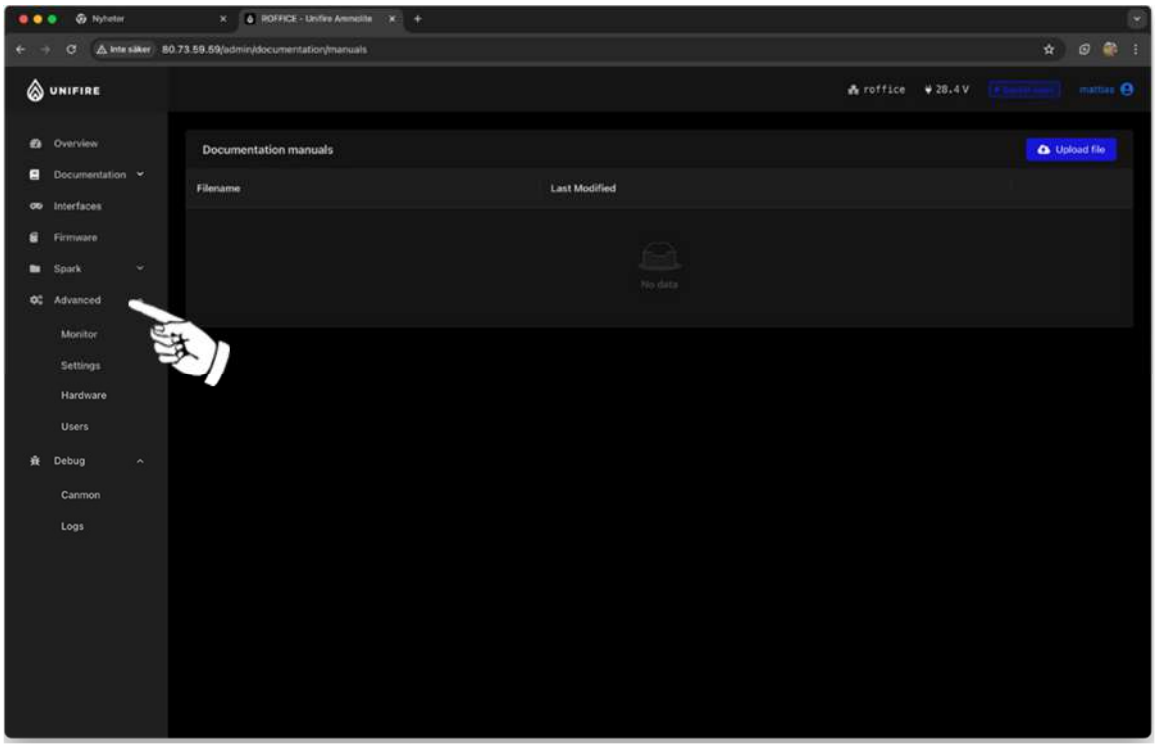
6) In this example, we write, "Johnny Service".... "Calibrating operating ranges." Any text can be entered. Click OK.



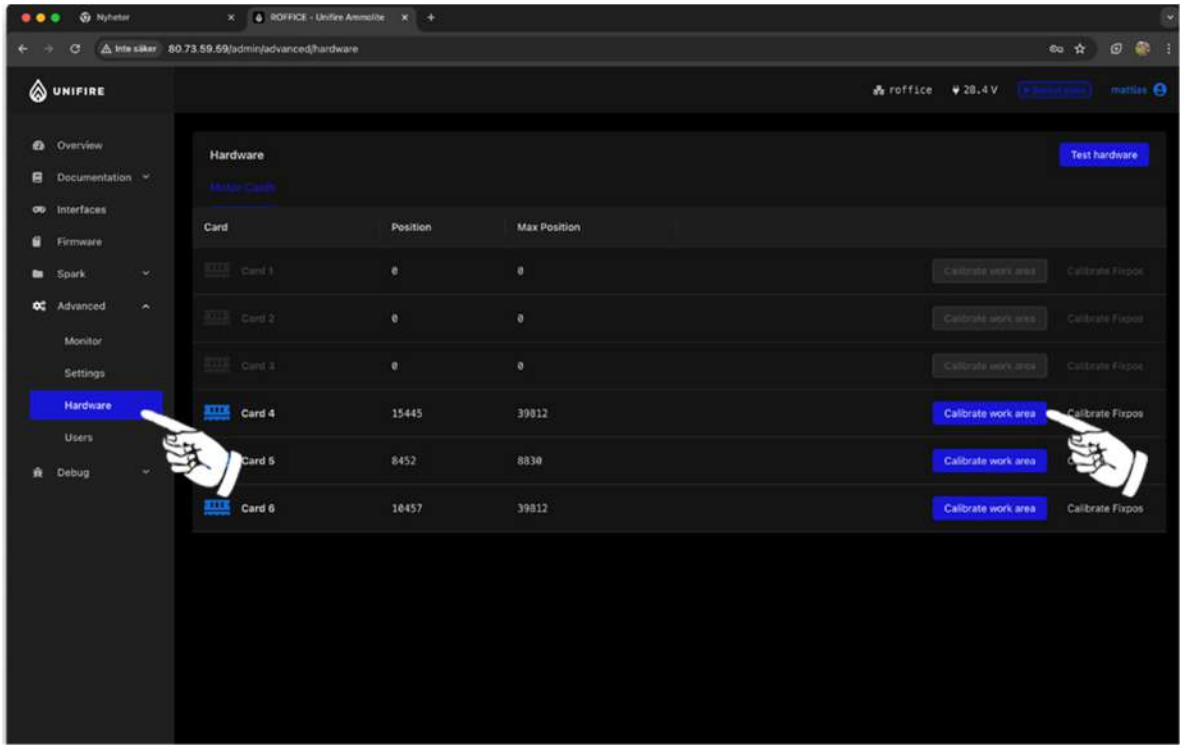
7) This opens up Ammolite's start page. To see the system status, click "Monitor".



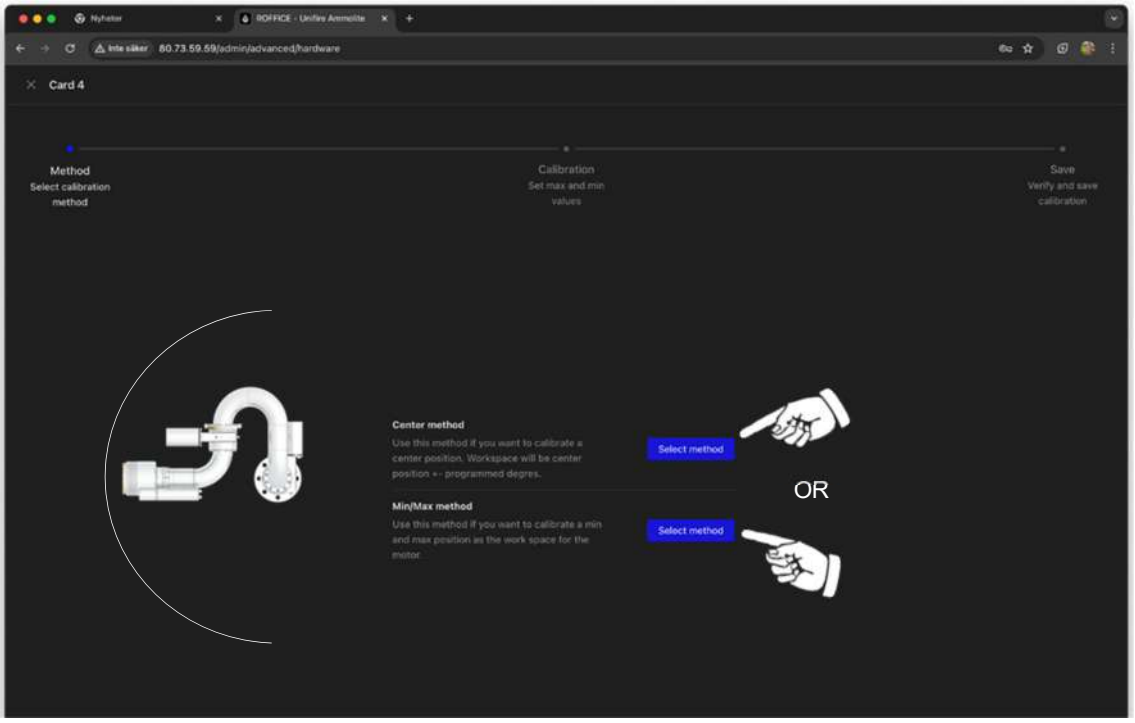
8) This opens up the system overview page. Here, you can read the position of the motors, calibrated max, see the actual real time current draw (A), and the motor status. You can also see the status of the generic digital and analog inputs and outputs. (MK4 is usually horizontal, MK5 is usually vertical, and MK6 is usually nozzle jet/spray.)



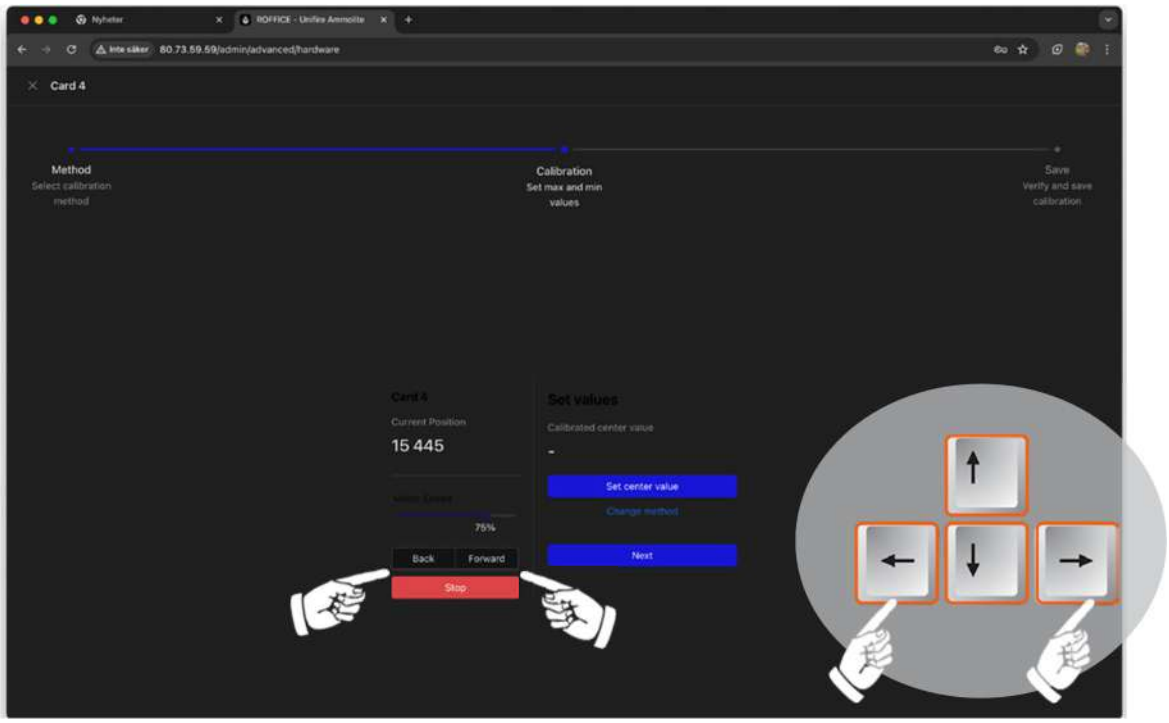
9) To open the calibration window, click "Advanced"…



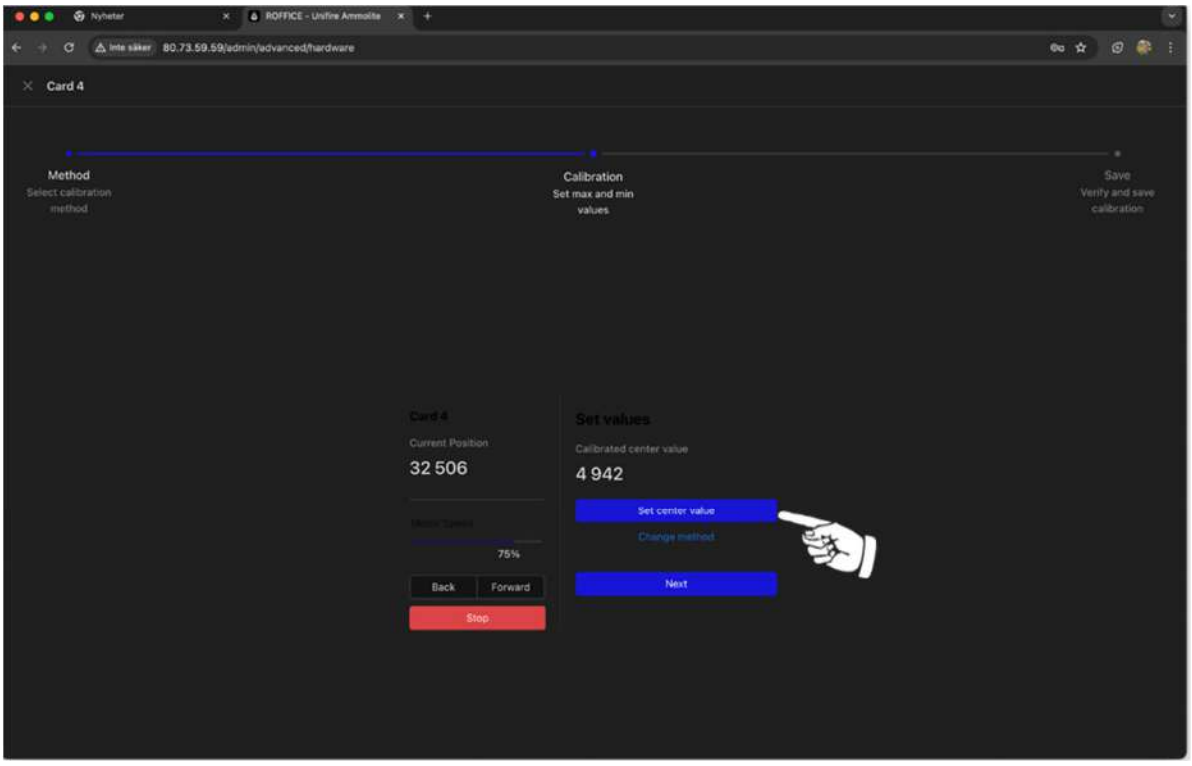
10) ....and then "Hardware"..., and then select a BLDC motor driver to calibrate. In this example, we start with Card 4, the horizontal motor with normal orientation.



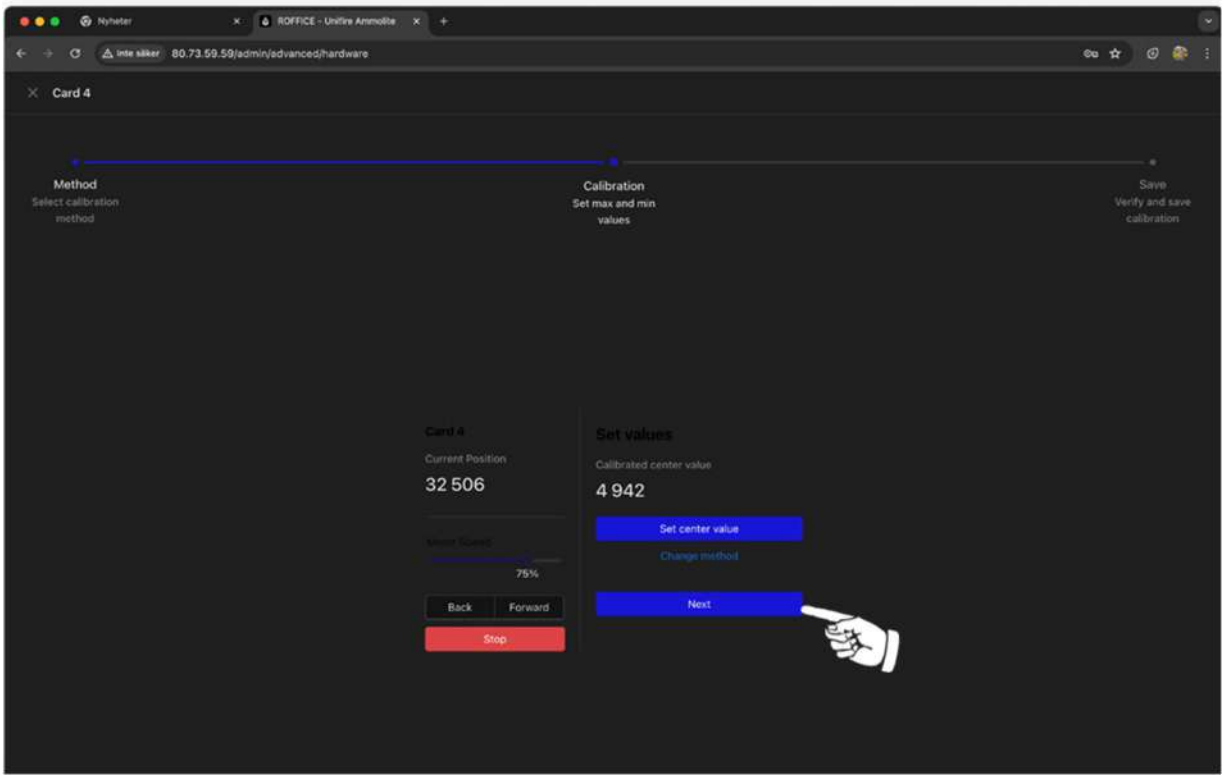
11) Now choose the Center method or Min/Max method. The center method is used for special applications when the operating range is preset in the software - typically to +/-90° exactly. Min/Max allows you to set the end positions freely. In Example 1 (steps 13-15, below), we use the Center method; in Example 2 (steps 16-20), the MIN/MAX method.



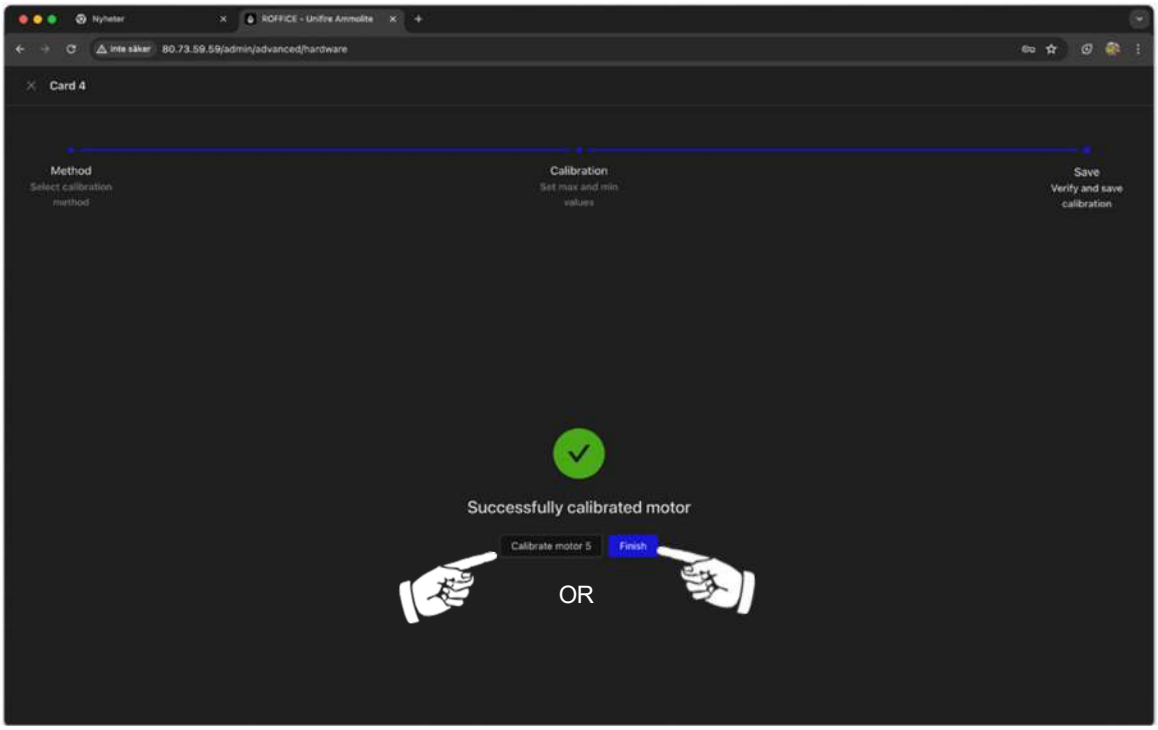
12) To run the motors, please use the Back or Forward buttons or the Arrow keys on your computer.



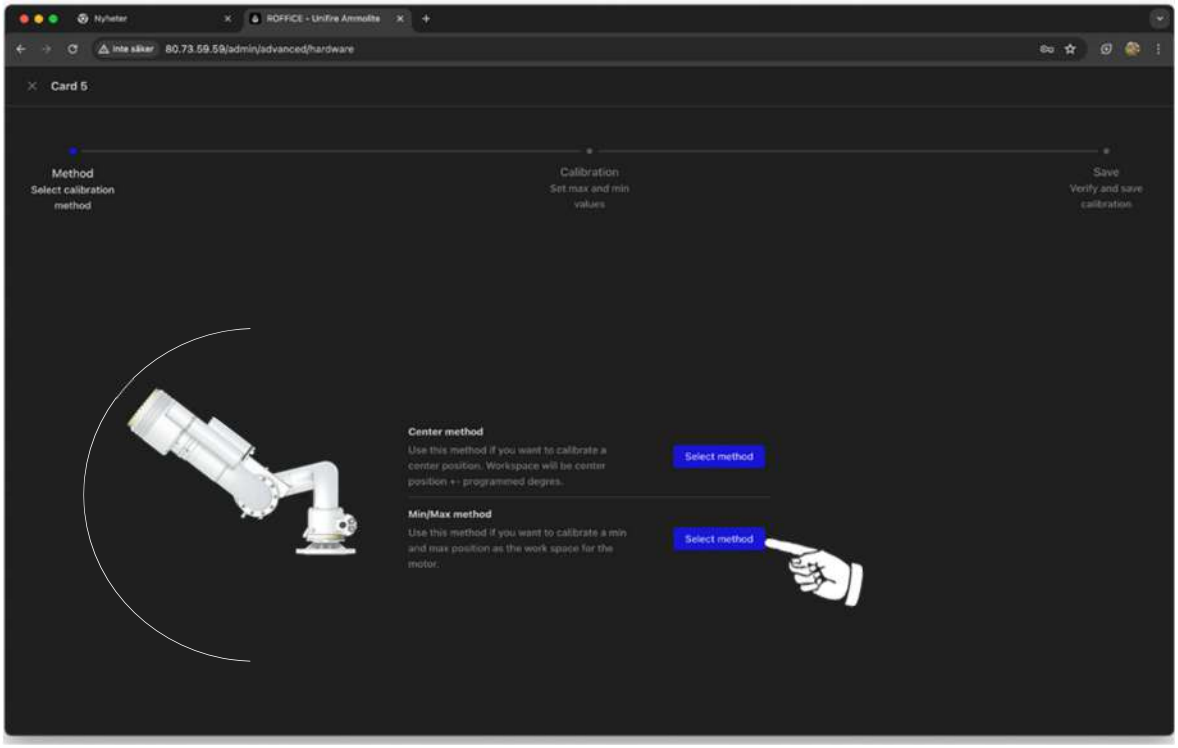
13) **Example 1, Center Method**: When you have moved the robotic nozzle to the required center position, click "Set center value." (Typically, the calibrated total range will be exactly twice the calibrated center value.).



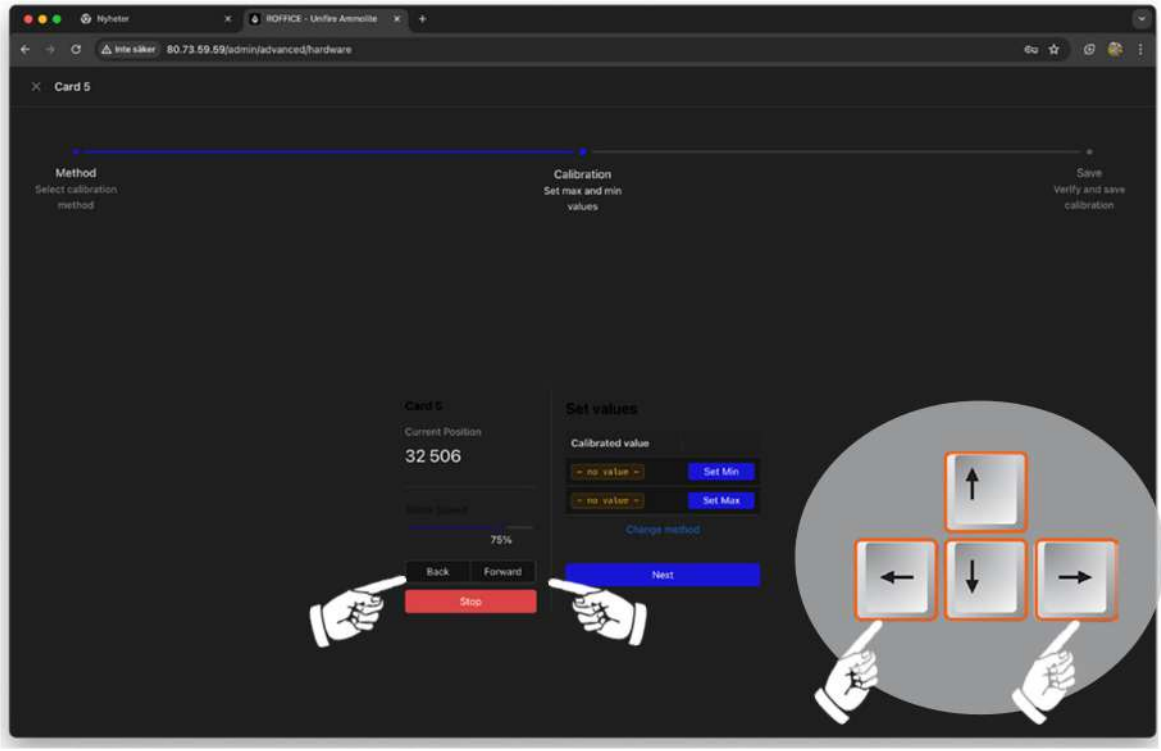
14) Click Next to exit the calibration.



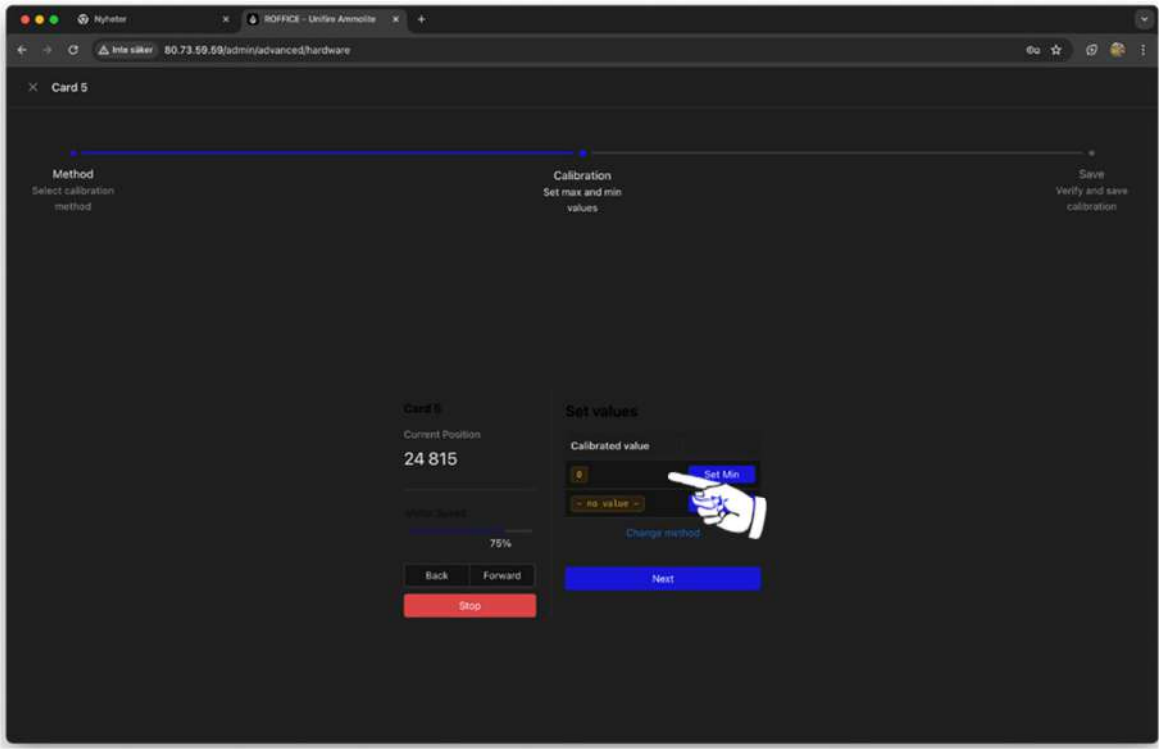
15) When you have successfully calibrated motor 4, you may want to continue with motor 5 (and repeat steps 12-14) or exit calibration. (Be sure that all connected motors are calibrated prior to operating the system.).



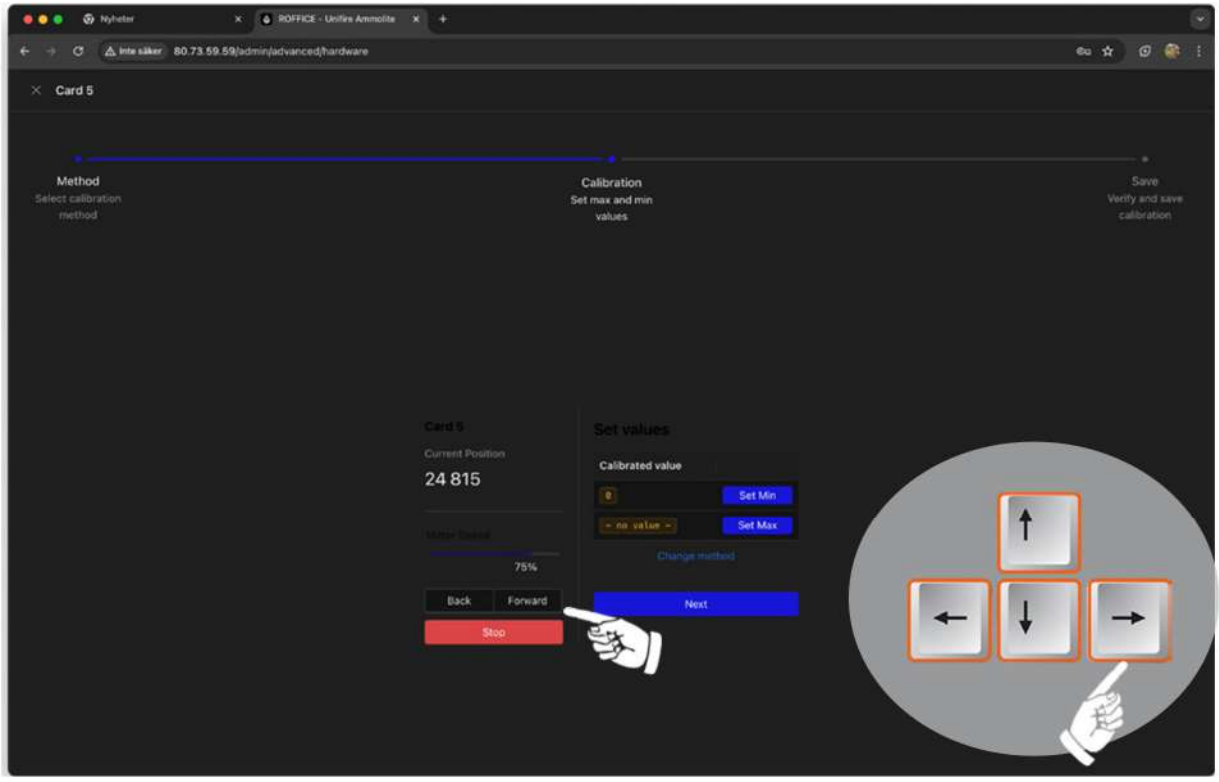
16) **Example 2, Min/Max method:** Click "Select method" next to Min/Max to proceed.



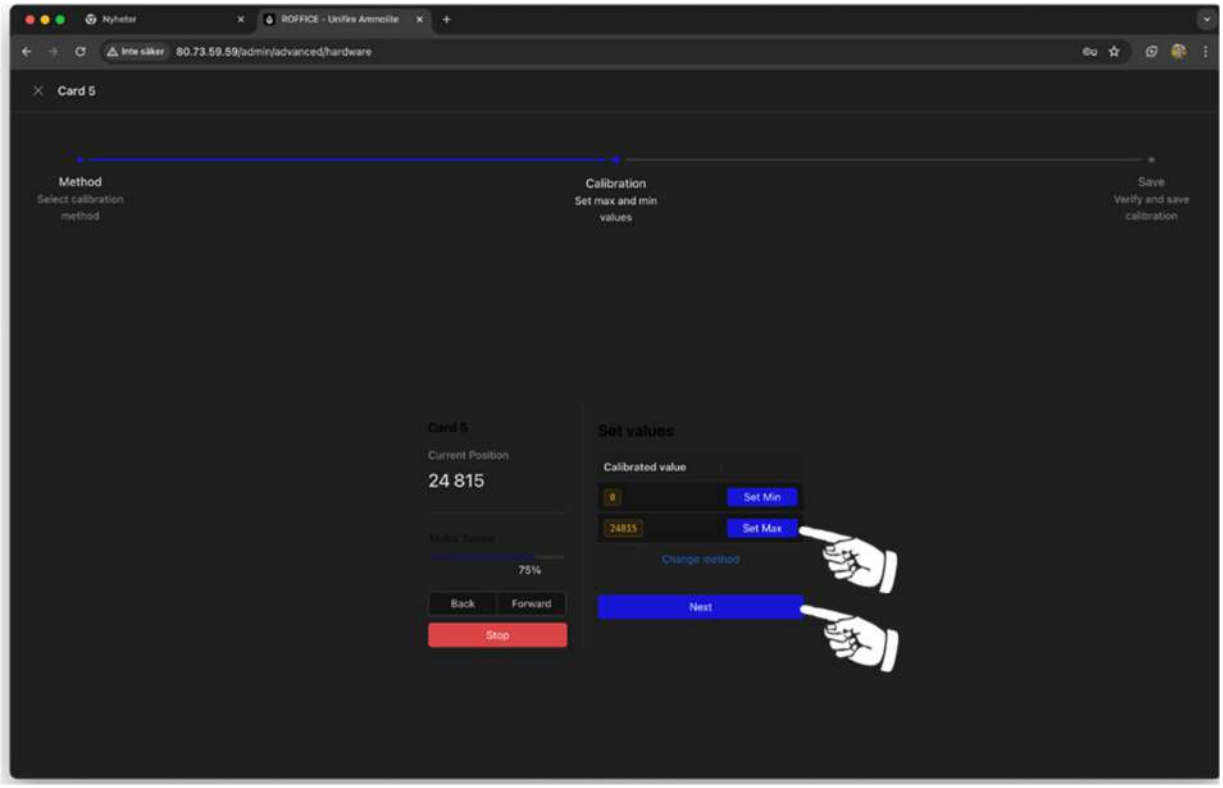
17) To run the motors, please use the Back or Forward buttons or the Arrow keys on your computer. Move the robotic nozzle to the required minimum position.



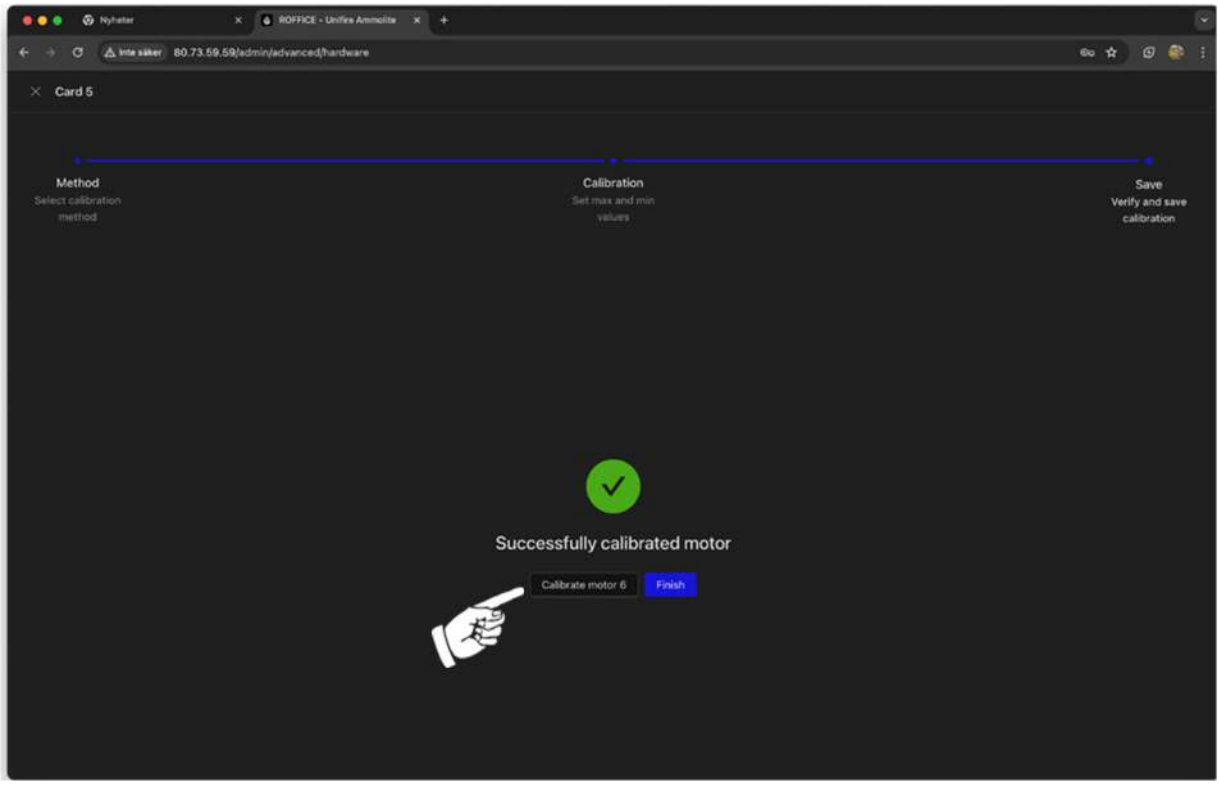
18) Now save and set the minimum value (it will be zero (0))/



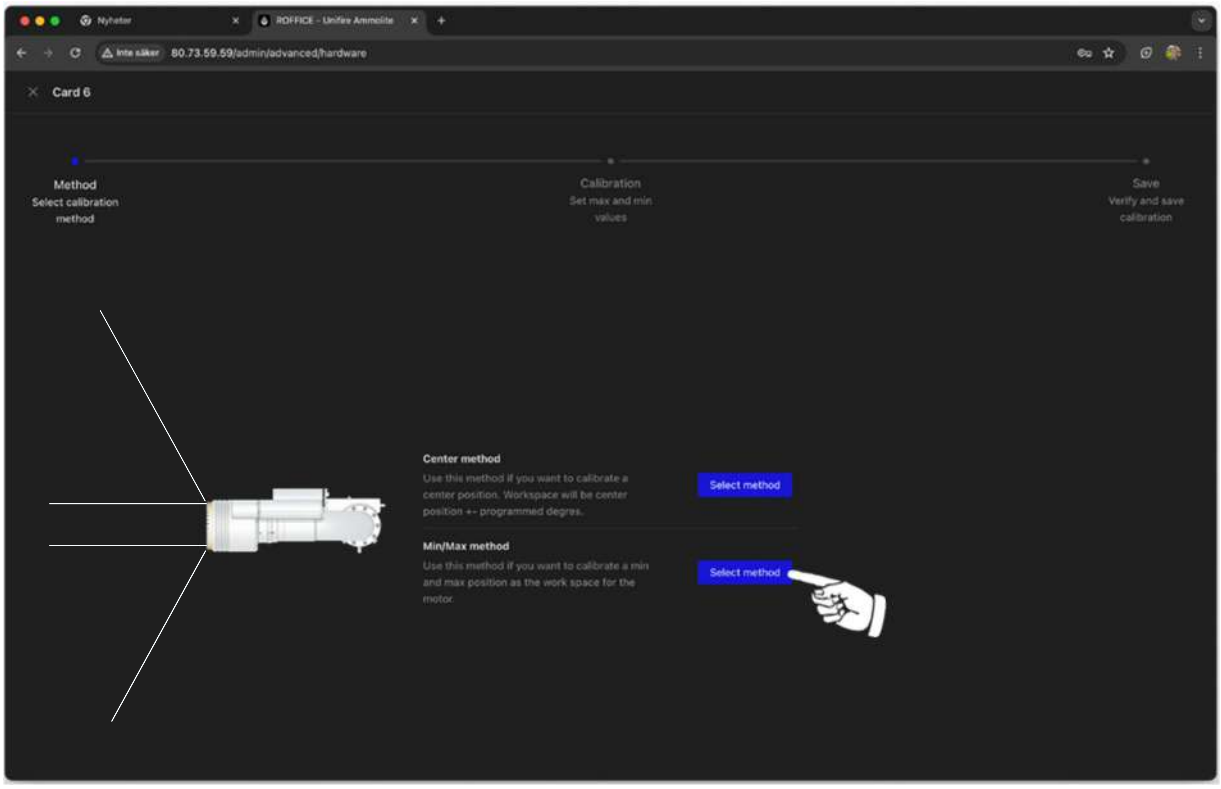
19) Next, move the robotic nozzle to the desired maximum range.



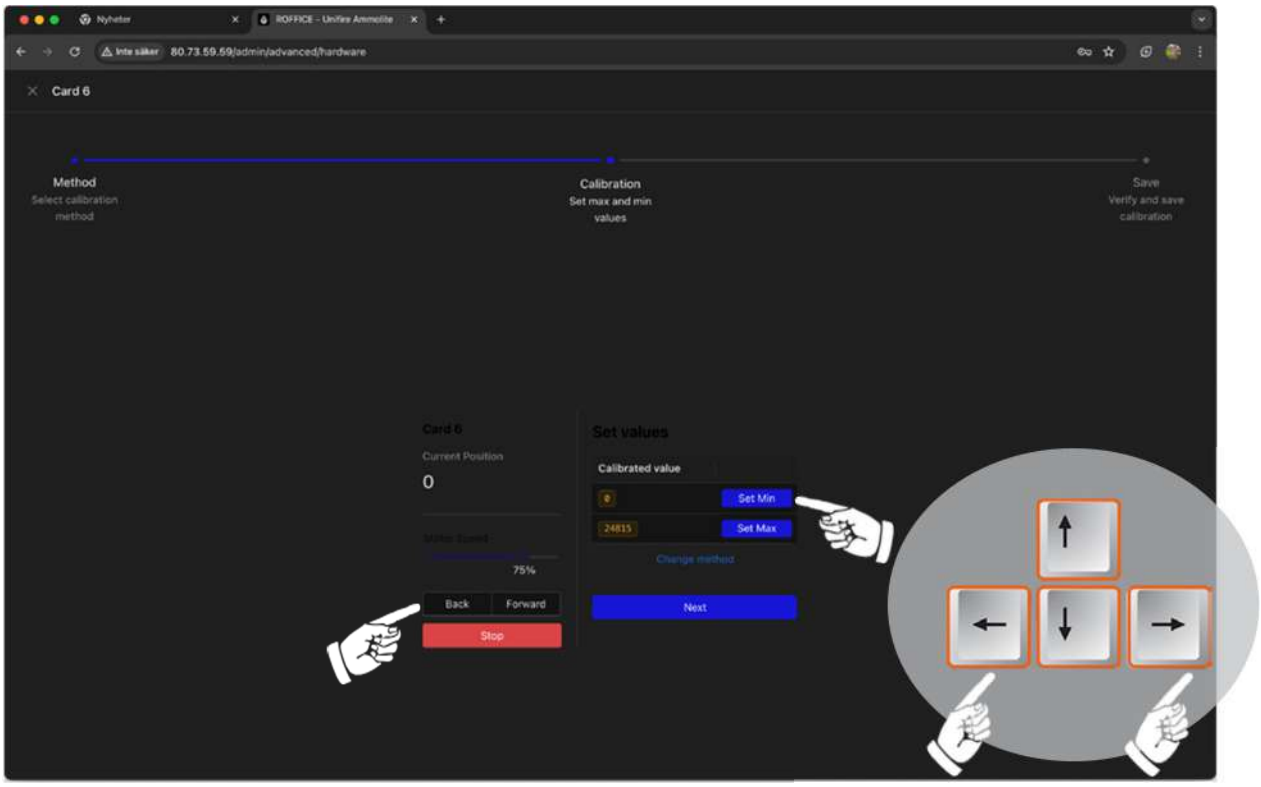
20) Click Set Max. Set Max calibrated value, and the Current position will read the same value. Click Next to exit.



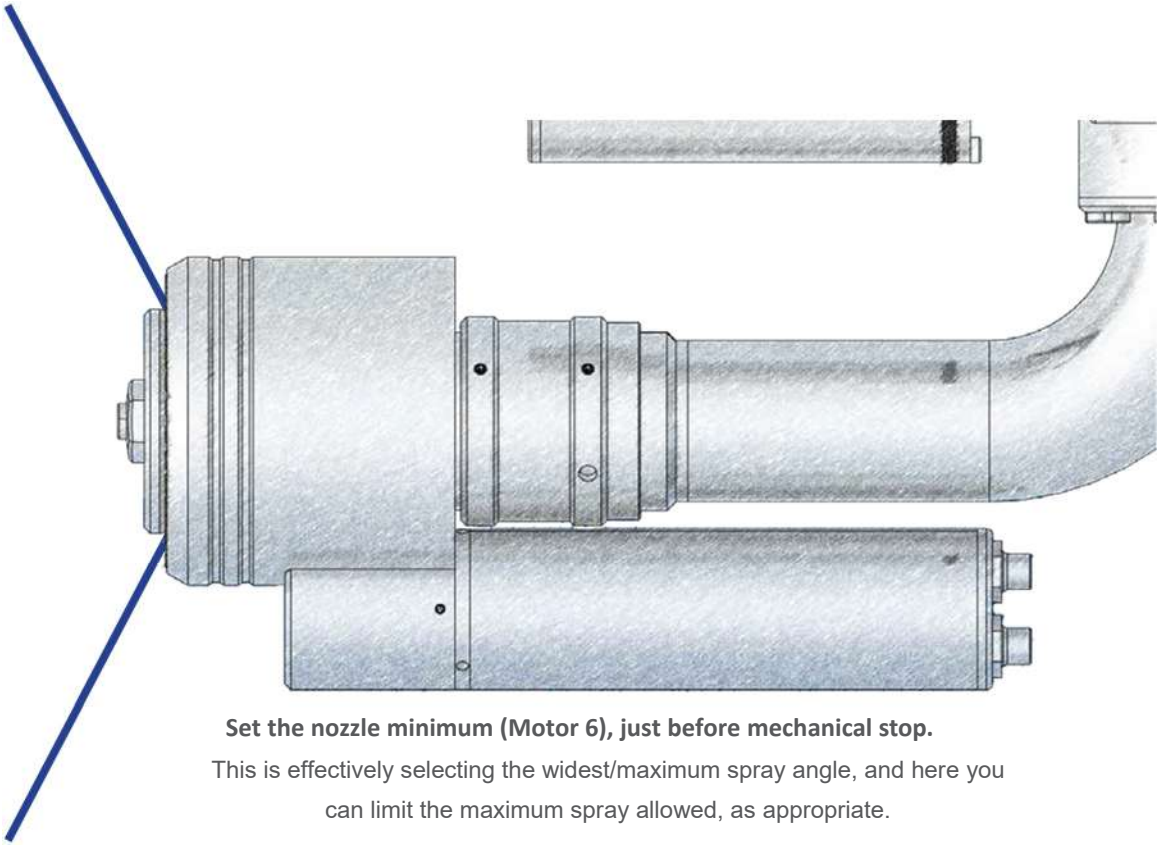
21) INTEG Nozzle Tip Calibration: Next, calibrate the INTEG jet/spray nozzle motor (typically, motor 6).



22) The INTEG nozzle motor is always calibrated using the Min/Max method (not the Center method).

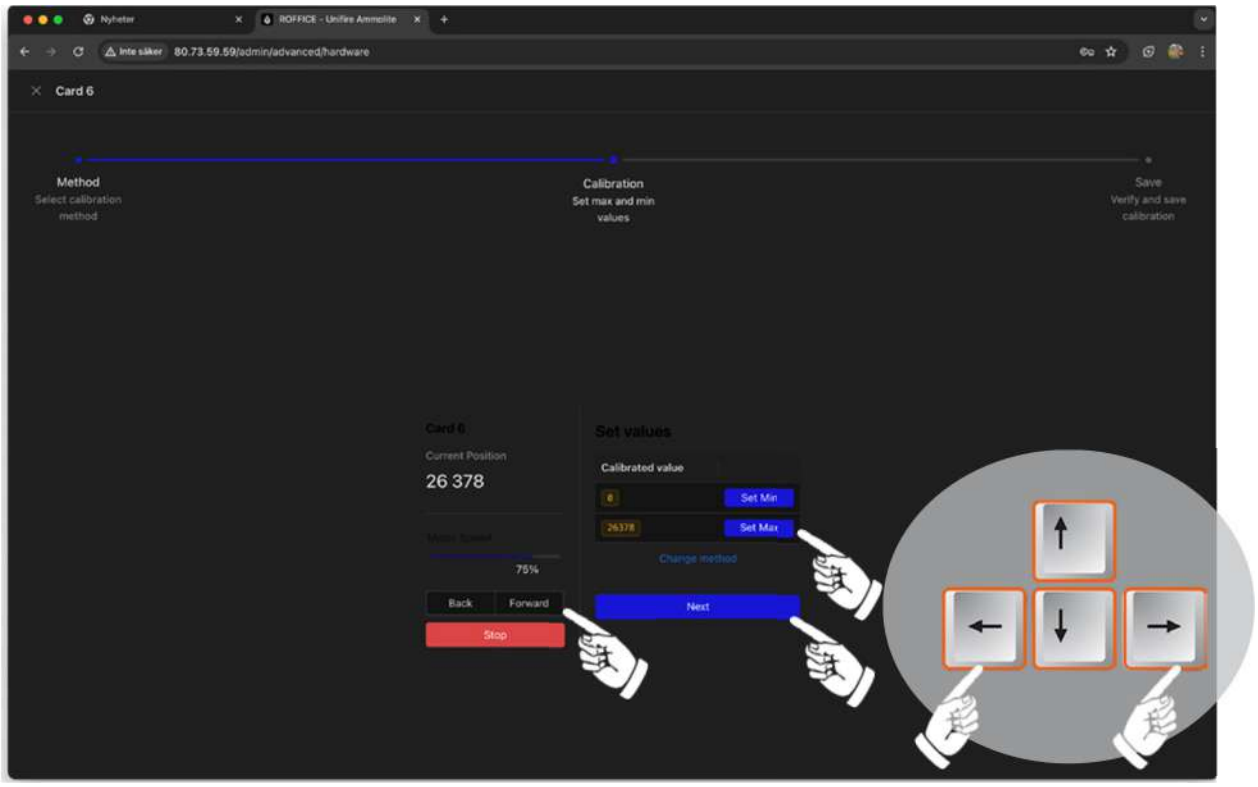


23) Run the motor to the Min (minimum) position, which is fully retracted and provides the widest spray angle). Click S Min

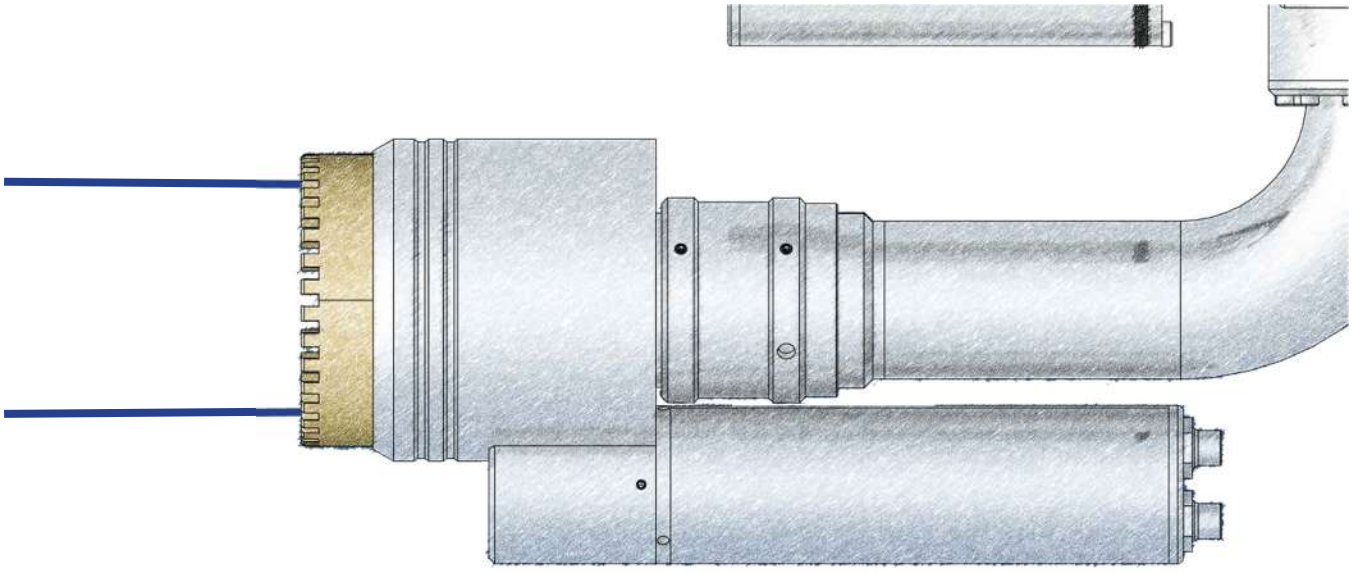


Set the nozzle minimum (Motor 6), just before mechanical stop.

This is effectively selecting the widest/maximum spray angle, and here you can limit the maximum spray allowed, as appropriate.



24) Run the motor to the Max (maximum) position desired. In the fully extended position, the nozzle tip provides the narrowest jet stream. Note: as with the other motors, if you intend to set the position to the full minimum or maximum position, do not set the Min or Max position to the very end of the mechanical stop; rather, slightly retract it from the extreme mechanical stop, in order to avoid mechanical wear and tear. When satisfied with the Max setting, click Set Max. Exit by clicking Next.

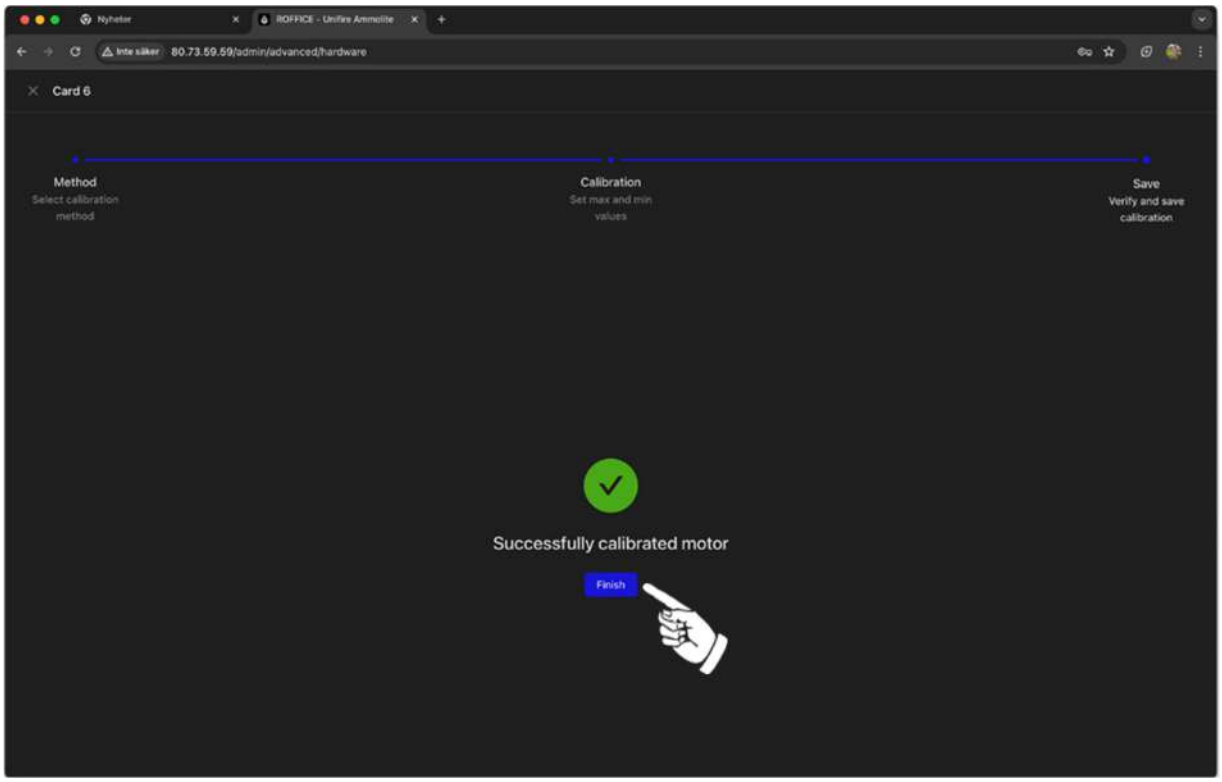


Set the nozzle maximum (Motor 6) just before the mechanical stop.

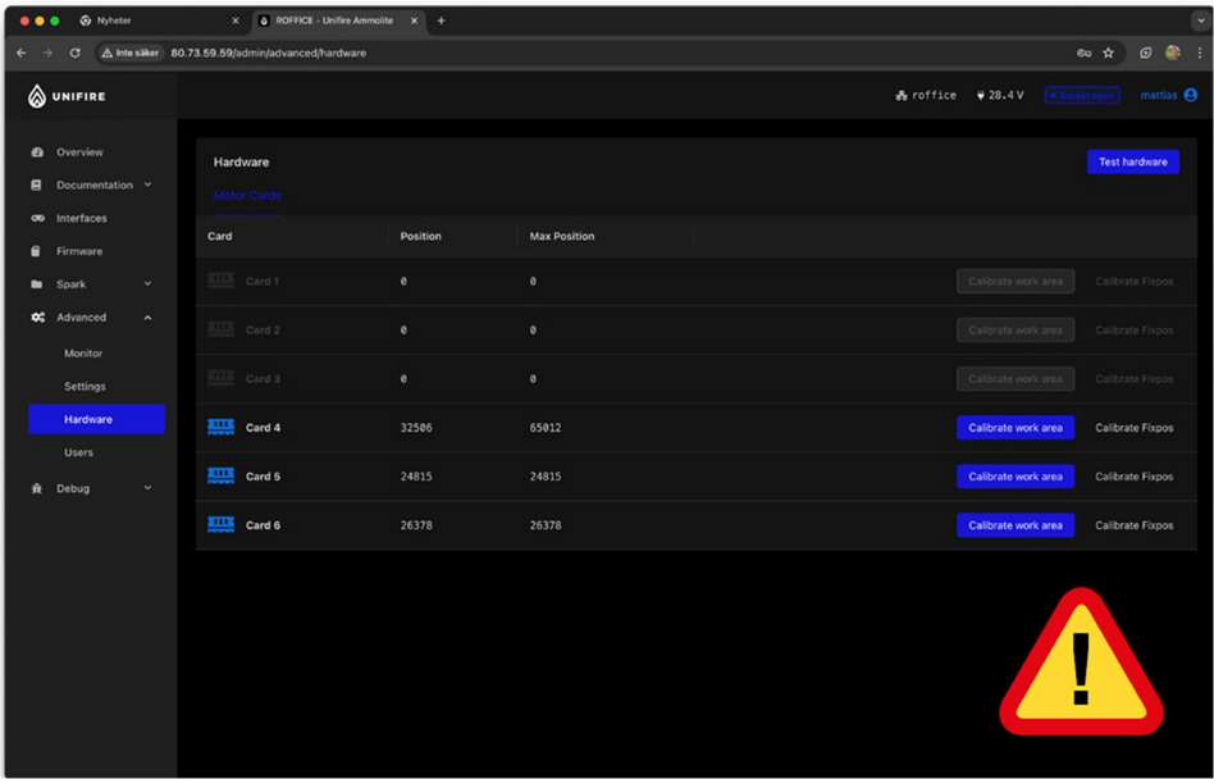
This is effectively selecting the straight stream.

Here you can block the straight stream by setting the Maximum to - say - 10 ° spray, and thereby avoid using a straight steam.

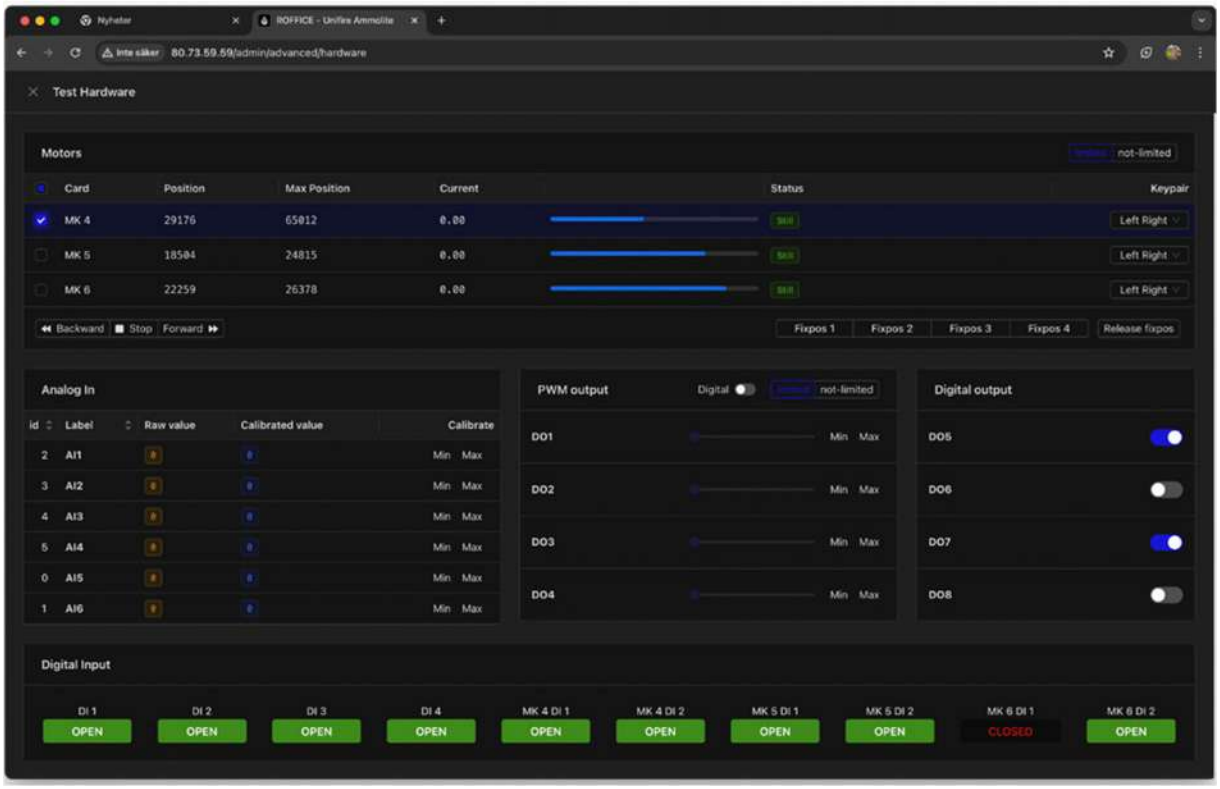
This is useful when the required reach is short, and you want to avoid a hard-hitting straight steam altogether.



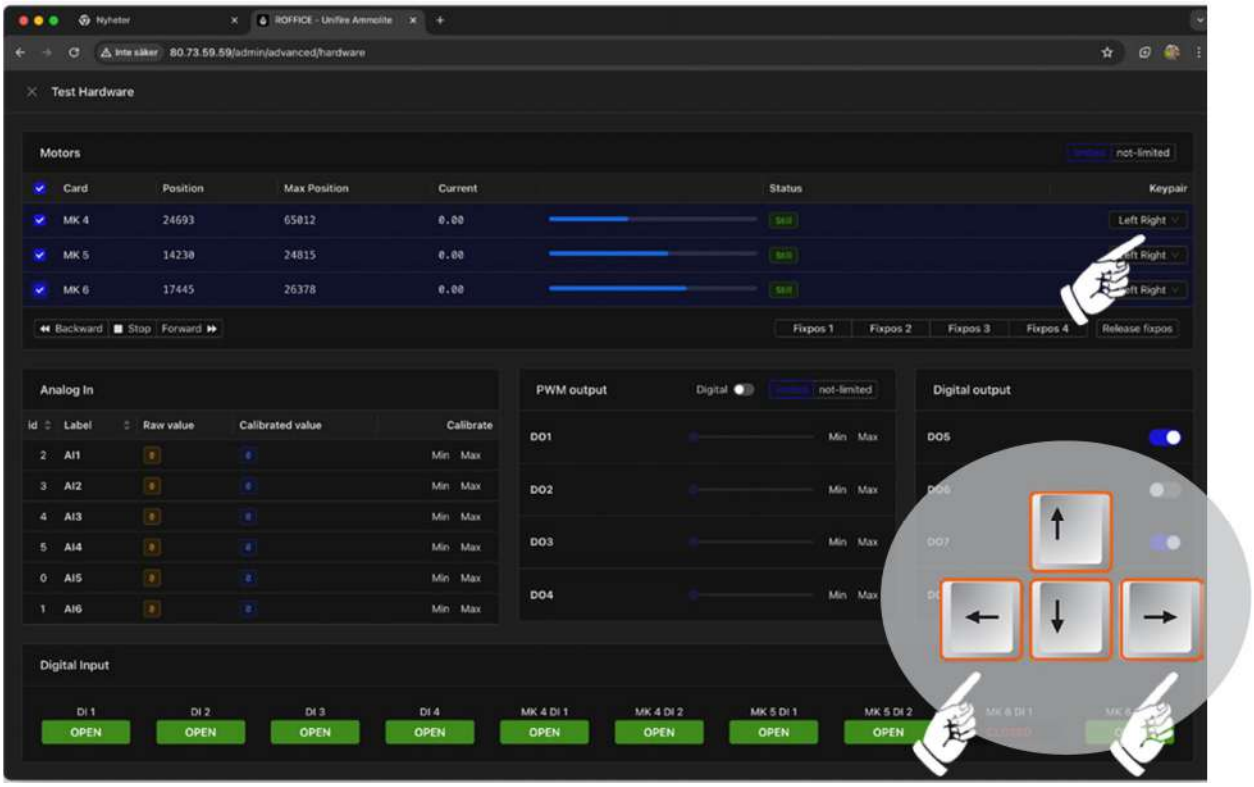
25) Now, when you have successfully calibrated all three motors, please click Finish to Exit.



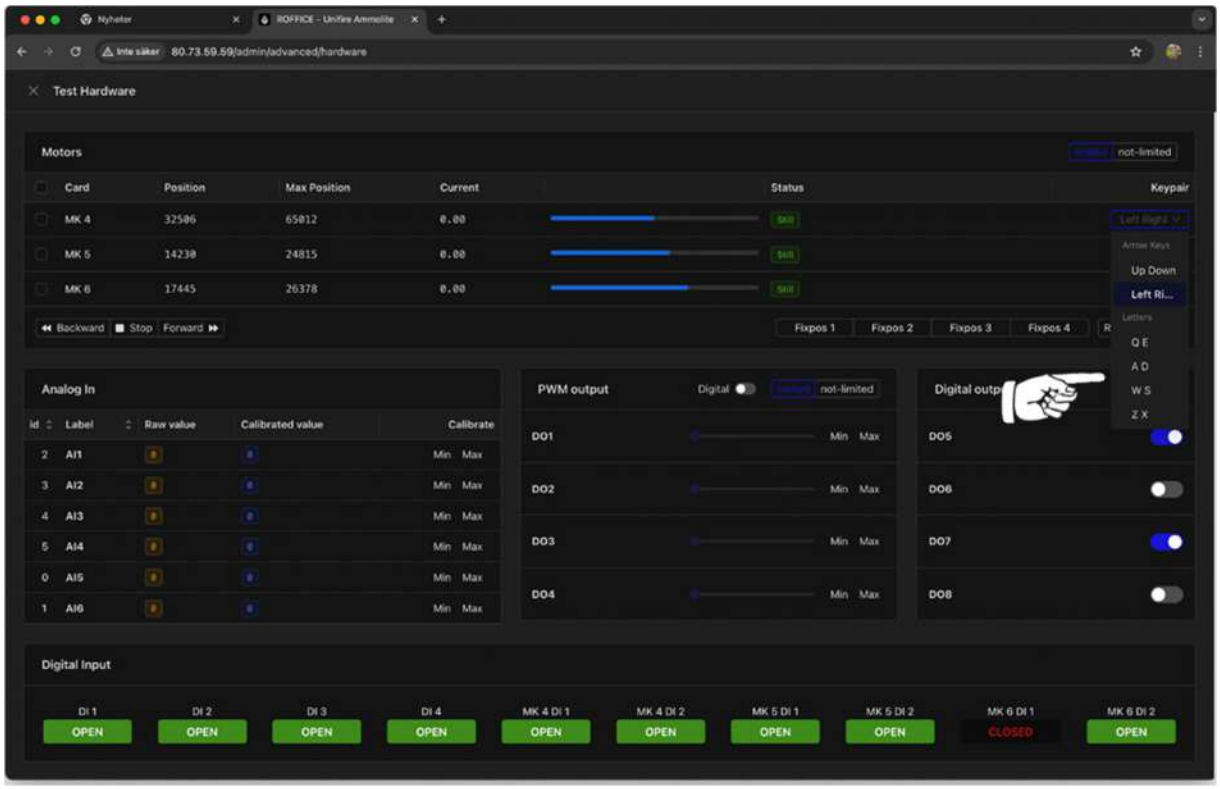
26) Next, you can test the motors and the calibrated range directly from your PC. From the Hardware tab, please click Test Hardware. **Please note that "Test Hardware" blocks any other Joystick or controller connected to the system. Hence, you must remember to exit this view when you are done.**



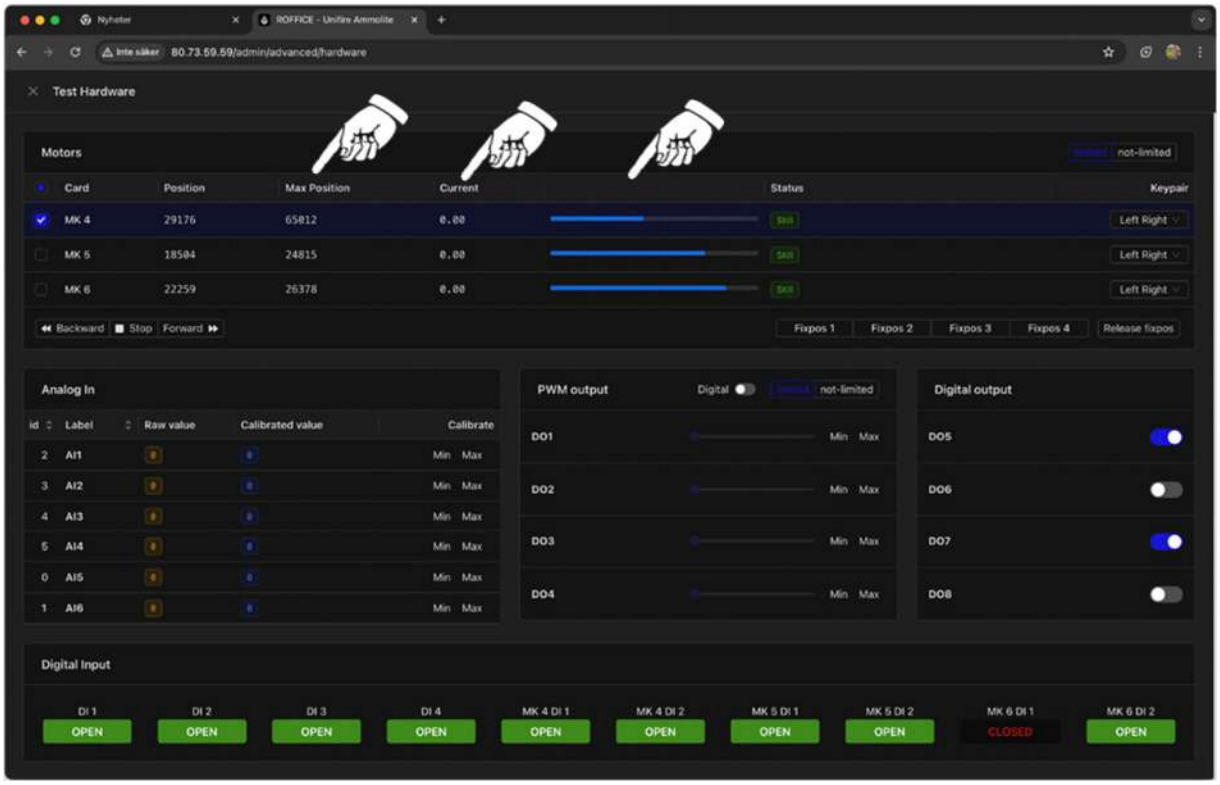
27) Check the boxes for each motor you want to run. Select one or several motors.



28) Now, you can run the motor with the selected key pair. The Left/Right arrows on your keypad are set as the default.



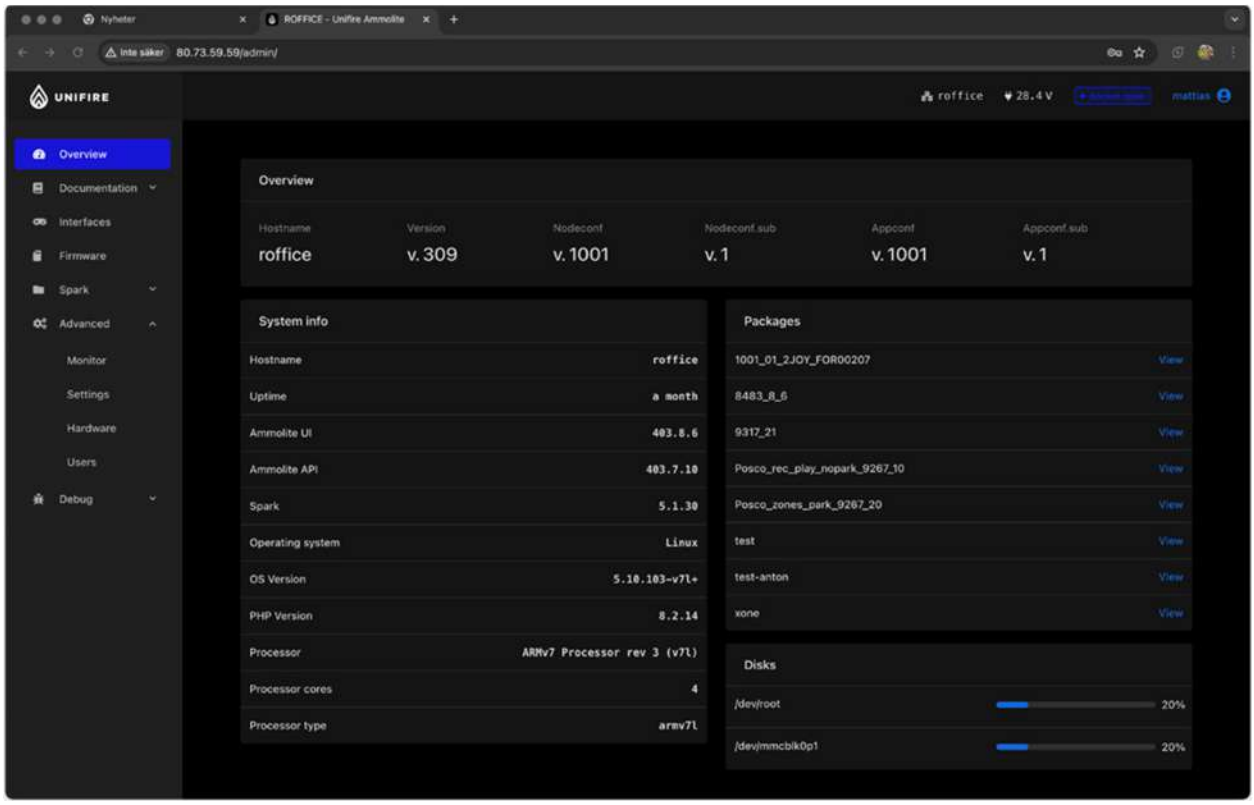
29) …but you can choose a different key pair for each motor.



30) When you run the motors, you can read the absolute position on the pulse level, and you can see the real-time current draw for each motor. The blue bars show the current real-time position relative to the calibrated range.

The other information displayed in this view regards the status of the analog inputs, PWM outputs, digital outputs, and digital inputs.

You can read the status of the PWM outputs the digital outputs, and, at the bottom, you see the status of the digital inputs.



31) Calibration is now complete, and you can exit Test Hardware and Ammolite.

***REMEMBER** to check that you have exited the "Test Hardware" view, as described in step 26 above.

Targa PLC

The TARGA PLC is a very capable PLC with plenty of generic functionality, making it suitable for custom system designs, projects, and solutions. The TARGA PLC electronic hardware and software have been developed by Fike for industrial robotic nozzle systems for use on vehicles, in fixed industrial applications, and on ships and other marine and off-shore applications.

The TARGA PLC is a generic piece of hardware that is highly capable of supporting auxiliary components and devices. It can be an analog joystick, level gauge, pressure gauge, or any other analog signal connected to the TARGA PLC.

Connect push buttons or relays to activate a zoned response, control valves, and/or get position feedback from potentiometers and limit switches.

Please contact Fike for more in-depth information and training.

Manual Joystick Operation

The FORCE 50 robotic nozzle can be manually operated in various ways:

- With a cable connected to the Canbus Joystick
- With the Unifire ONE App on a smartphone or Tablet
- With the Unifire ONE Web / PC
- With the ONE-DIRECT floor plan graphical aiming
- From a hand-held industrial remote control (Hetronic ERGO-S or similar)

The PI Canbus Joystick

The joystick is a convenient, fully self-contained device that can be carried by hand or installed in a dashboard or control room.

How to operate

Push the **ON** button to activate the Joystick - this will take over control from any other manual or autonomous system currently in control.

Move the Joystick in the desired direction to operate manually. The speed is proportional to the angle.

Rotate the tip of the joystick grip to control the nozzle spray pattern.

The LEDs indicate the position of the Robotic Nozzle relative to the calibrated operating range.

VALVE will open/close the valve (if connected)

PARK will send the Robotic Nozzle to its predefined parking position

AUX 1 is a generic button for custom functions

AUX 2 is a generic button for custom functions

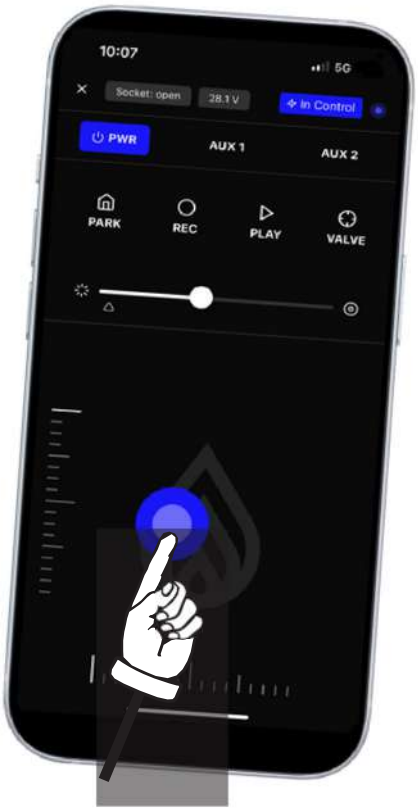
REC - push REC to start recording a sequence - including velocity changes, pauses, and nozzle spray patterns for up to 3 minutes. Save by pushing REC again.

PLAY - push PLAY to run the recorded sequence. Abort playback by simply taking over with the Joystick manually (or push PLAY again)

Setting a new PARK position

With the PI Joystick, move the robotic nozzle to the desired PARK position. Turn the Joystick OFF (= green LED goes out). Press and hold the PARK button while turning the Joystick back on. A new PARK position has now been set.

UNIFIRE ONE App



The ONE App provides the same functions as the PI Joystick. With the added convenience of being wireless, the controller is always in your pocket and ready.

Several ONE Apps can be assigned to the same system, allowing multiple operators to have the ability to take control instantly.

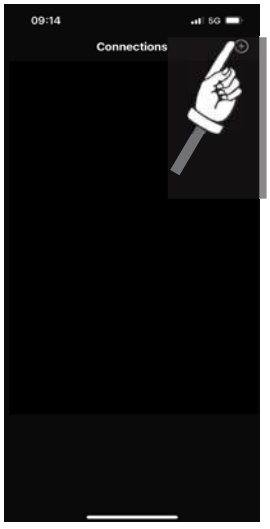
To get started:

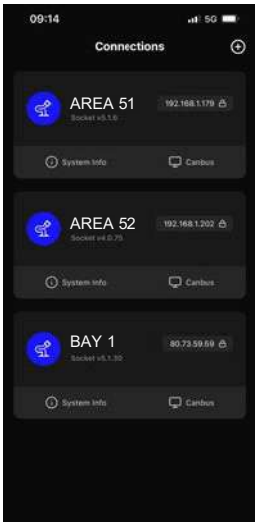
Download the UNIFIRE ONE app from the App Store or Google Play Open the App. Click the add connection icon.

Enter the TARGA IP address or URL.

You can add several systems to your ONE App, allowing you to control a large number of systems directly from your phone. You can assign nicknames to each unit.

Click to choose which system to control. Click PWR to activate the ONE App. The "In control" button is used to take control of another App, Joystick, or high-level system that is currently in control (for example, an autonomous Flameranger system).





MAINTENANCE, TESTING & INSPECTION SCHEDULE

The following are Fike's minimum recommendations for the proper maintenance, testing, and inspection of the Force robotic nozzle systems and FlameRanger autonomous robotic fire suppression systems.

It is important to note that some components delivered by Fike are manufactured by third parties, and those components should be maintained, tested, and inspected according to the respective manufacturer's recommendations. Moreover, the proper function of Fike's equipment depends on the proper functioning of other third-party systems and components, such as valves, pumps, piping, foam proportioning systems, continuous and proper electrical supply to all system components, etc.

Due to the importance of properly functioning fire safety equipment, Fike strongly advises strict adherence to the recommendations below, as well as the proper maintenance, testing, and inspection of all other components of the fire fighting system, of which Fike's equipment is only a part. In that regard, please refer and strictly adhere not only to Fike's recommendations set out below but also to the recommendations of third-party manufacturers' components delivered by Fike, as well as to all relevant local and international requirements (including, when used on ships, MSC.1/Circ. 1432 and MSC.1/Circ. 1516, as amended; see also: LASH FIRE D10.3 Report starting at page 89)

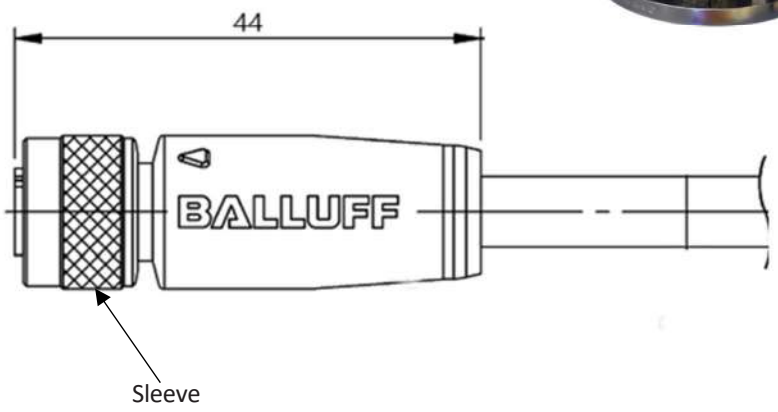
PLEASE NOTE

It is very important that the M12 connectors be properly tightened by hand. Do not use any tools to tighten them. The M12 connector is fitted with an O-ring to provide a perfect seal when properly installed.

If the sleeve is left loose, water will enter the connector and cause corrosion. If over-tightened, such as with a pair of pliers, the sleeve may easily break.

It is recommended that every three (3) months (quarterly):

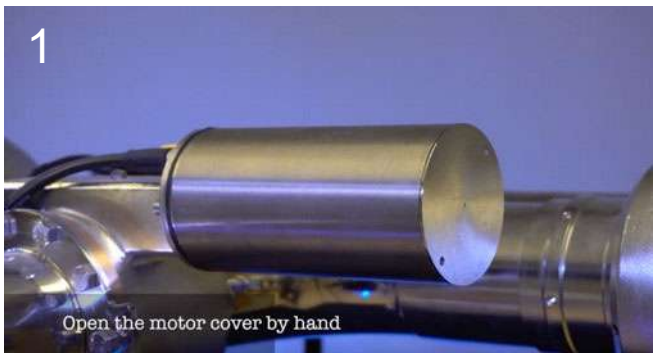
- Inspect the connectors. A drop of WD40 can be applied to the pins to ensure longevity.
- Inspect the cables for any mechanical damage.



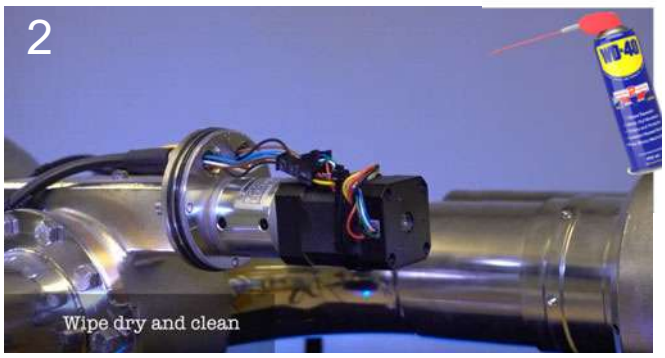
Time Interval	Type of System	Action
Monthly	Force remote control fire monitor system	Briefly run the Force remote-controlled fire monitor in all axes (directions) and adjust the spray pattern several times to "exercise" the gears to prevent gear locking. This should be done without the use of water. Ensure the proper function of all system joysticks and controllers, including all functions thereof.
Quarterly	Force remote control fire monitor system.	Visually inspect the monitors' motors, motor cables, and connectors to ensure they are in good condition. Open the motor cover to check for moisture. Dry clean and spray with some WD40 or similar if required. (See pages below and see: https://youtu.be/3CIE1Zt-pZE?si=ZxJnojPk2r29gJMu) Inspect the exterior and interior of X-TARGA PLC; ensure that the interior is dry and clean, all electrical contacts are properly connected, and the seal is in good condition.
Annually	Force remote control fire monitor system.	Verify the proper operation of the Force fire monitor system by flowing water and confirming full coverage of the area it is intended to protect. Ensure all piping is thoroughly flushed with fresh water after service. Visually inspect all accessible components for proper condition. Flow test all pumps for proper pressure and capacity. Verify all pump relief valves, if provided, are properly set. Examine all system filters/strainers to verify that they are free of debris and contamination. Clean surfaces of the monitor, nozzle tip, and cable connections. Test emergency power supply switchover, where applicable. Check for any changes that may affect the system, such as obstructions.
5-year	Force remote control fire monitor system.	Perform internal inspection of all control/section valves and all fire monitors. Replace all system M12 motor cables and joystick M12 cables with new cables supplied by Unifire AB.
10-year	Force remote control fire monitor system.	These systems should be inspected and tested by a competent person as per the manufacturer's instructions, and as a minimum, should include a hydrostatic test and internal examination for gas and water pressure cylinders according to EN 1968:2002.

QUARTERLY MAINTENANCE AND INSPECTION

Please watch the full instruction video here: https://youtu.be/3CIE1Zt-pZE?si=U2nxWuOnWIGXGt3e

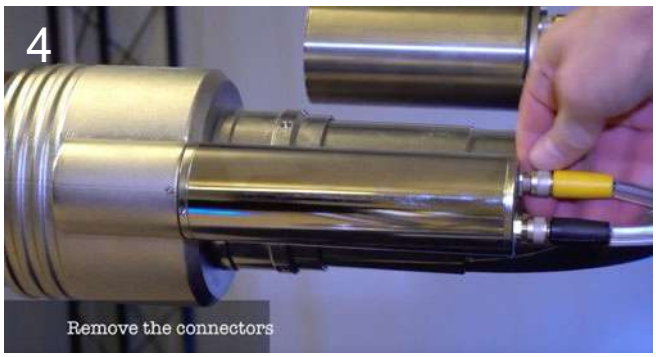


Open the motor cover for the vertical motor.

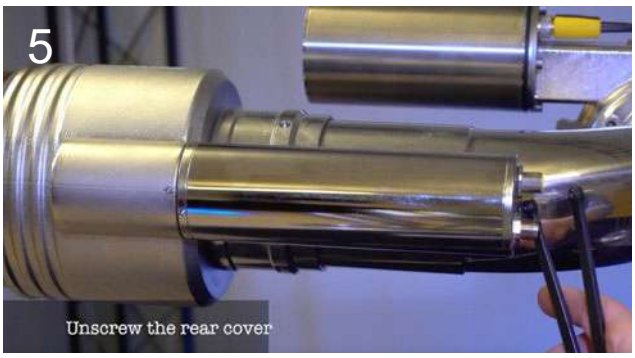


Wipe off moisture, visually inspect, and then cover the motor with WD40 before reassembly.

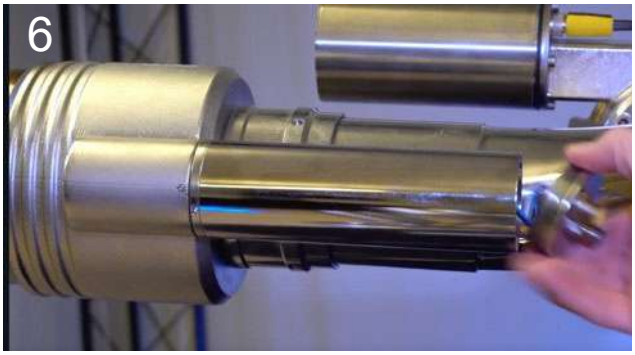
Repeat 1-3 for the horizontal motor.



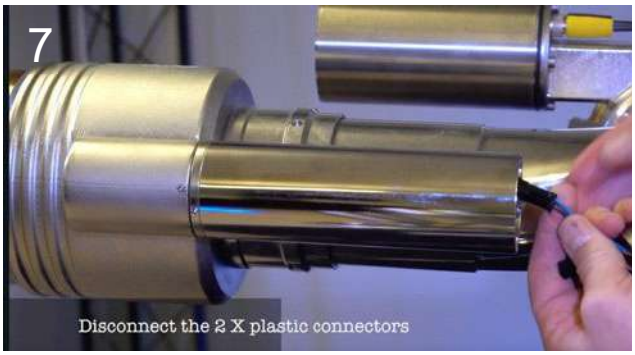
To inspect the nozzle, first remove the connectors.



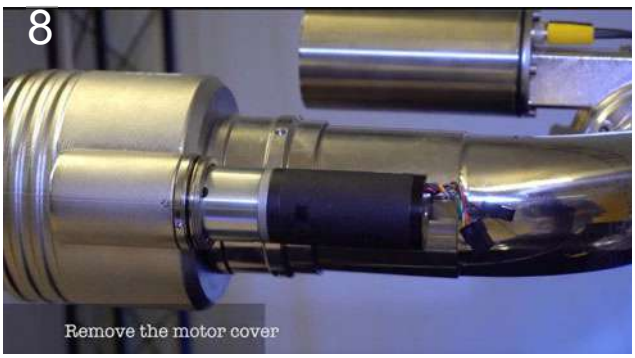
Loosen the cover with a wrench.



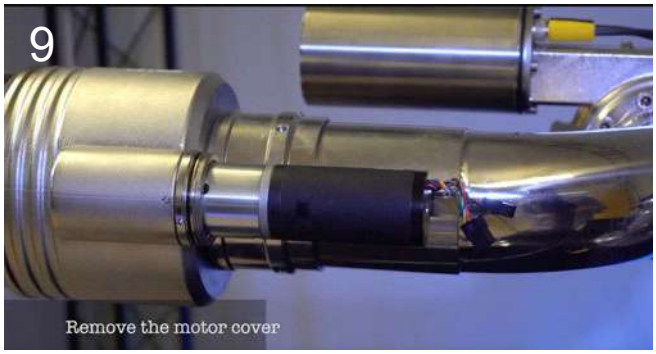
Unscrew the end cap by hand.



Disconnect the connectors.

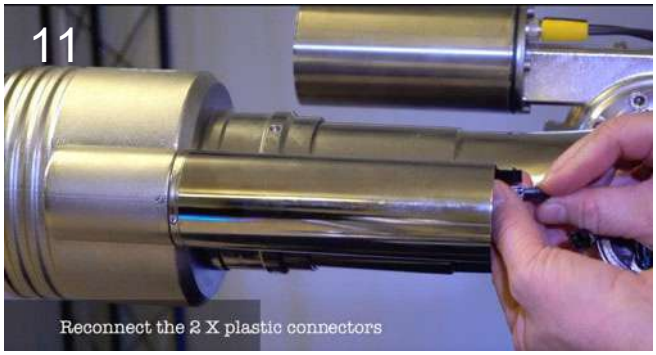


Unscrew the cover by hand.

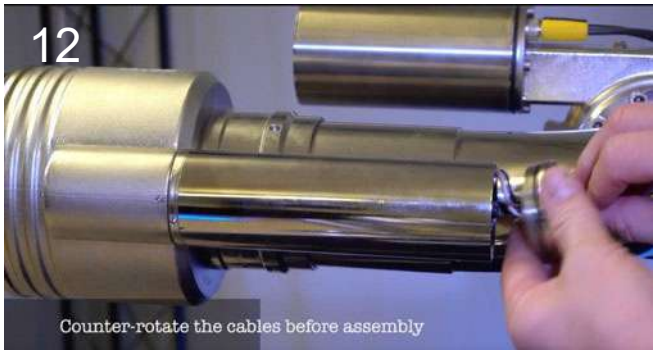


Wipe off moisture, inspect, and cover the motor with some WD40 before reassembly.

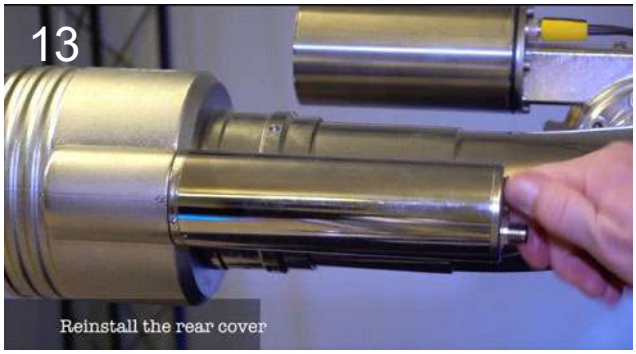
Reinstall the motor cover by hand.



Reconnect the 2 x plastic connectors.



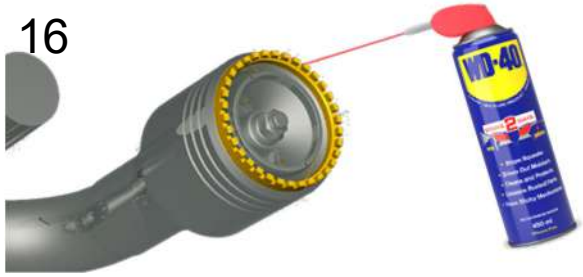
Counter-rotate the wires at the end of the end-cap 720° before assembly.



Reassemble by hand.

Tighten.

Install the connectors. Make sure to tighten the M12 connector by hand (do not use any tools).



Wiping off and putting a few drops of WD40 on the stream shaper prevents the build-up of grime and goo. Please perform when required.