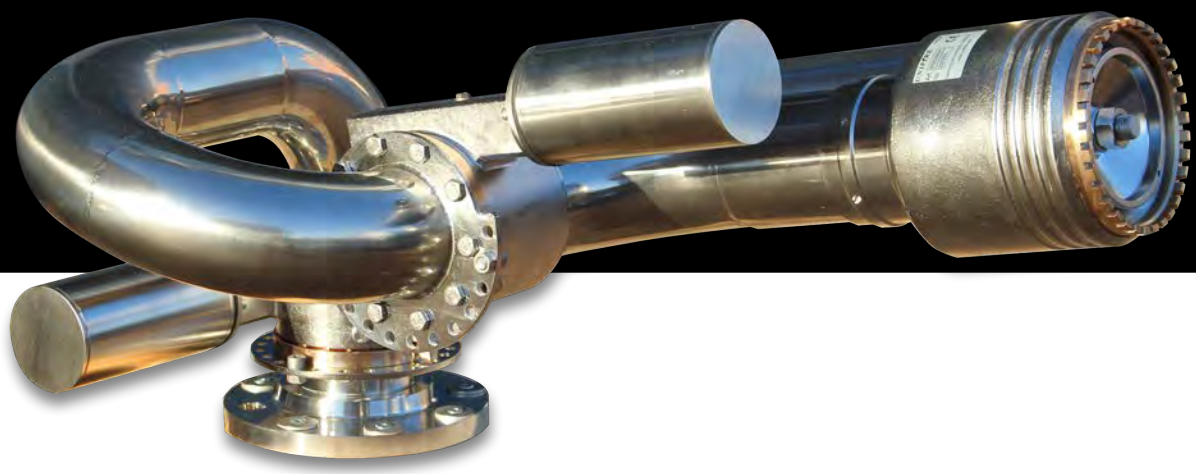
UNIFIRE

FORCE 80

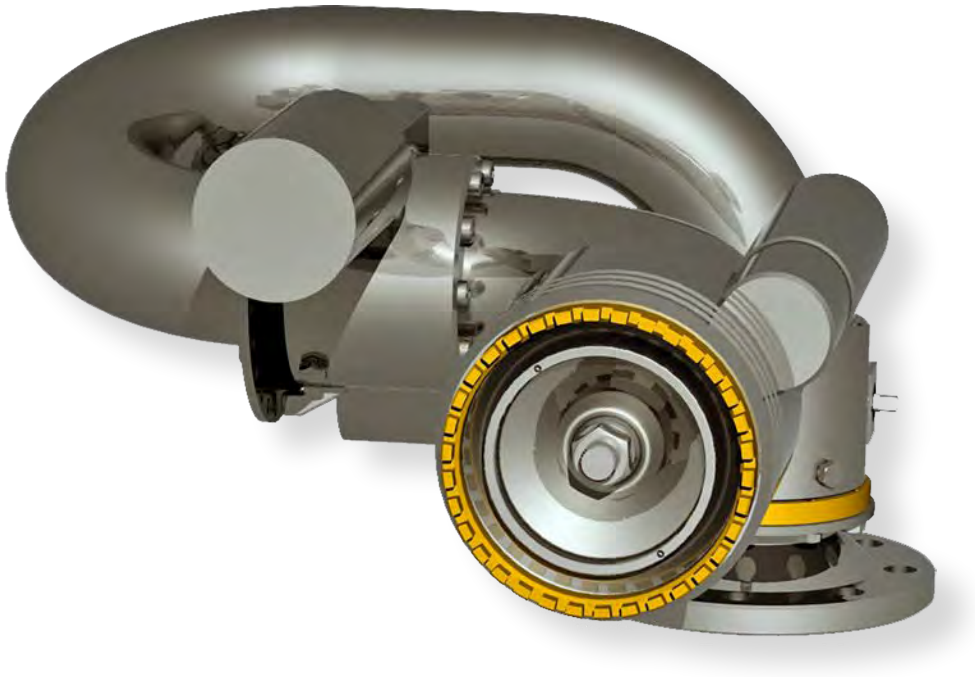
BLCD with TARGA Robotic Nozzle PLC

Generic system manual



FORCE50 BLDC and the TARGA Robotic Nozzle PLC

UNIFIRE



Welcome to the world of Unifire! And congratulations on your purchase of the world's most advanced, stainless steel, remote control robotic nozzle system.

This professional equipment should only be used by qualified and trained professionals who have read and understood this manual. So please read this manual before installing and operating your new FORCE 80. It will familiarize you with the dangers associated with operation, as well as provide proper installation and operation instructions.

NOTE: EVERY SYSTEM HAS CUSTOMER SPECIFIC CONFIGURATION. ALSO READ THE DOCUMENT PROVIDED WITH YOUR ORDER# DESCRIBING YOUR SYSTEM.

For technical support please contact Unifire AB by e-mail at: **support@unifire.com**

Unifire AB's warranty, and term and condition of sales are available for download at www.unifire.com

TECHNICAL SPECIFICATIONS FORCE 80 BLDC

The UNIFIRE FORCE 80 is a marine specification, stainless steel foam and water robotic nozzle. The finish is manually polished stainless steel, providing a long service life of fantastic look with minimum maintenance.

It features M12 multi-connectors on all connection points for simple installation and maintenance.

The optional Canbus Joystick has a one-step record and playback feature, valve control and position indication LED's.

The UNIFIRE FORCE Robotic nozzle is the most advanced, highest quality and best performing system available in the market today.

FORCE 80 Specification:

Weight	30 Kg (FORCE 80 with INTEG80 nozzle)
Dimensions	75x48x35 cm (approximately)
Pipe dimension	80mm inside Ø
Power	24-30 V DC max 12 A
Range of motion	+/-90° vert , 360° rot
Speed (of high speed version)	12°/sec rotation , 8°/ sec vertical Progressive speed control over joystick
Material	Body 316L Stainless Steel Gear bronze Nickel plated connectors (option) Gold-plated pins (option)
Max Flow Max Reach	up to 5500 lit/min at 12 bar up to 90 m at 12 bar
Reaction force	Up to 5000 N
Mechanical installation	Support must withstand 20000 N of force
Connection	3" male BSP or DN 80/100 flange
Pipe dimensions for installation	Min 100 mm
Pump requirement for maximum performance	5500 lpm @ 12 bar
Communication	Canbus (Unican) 125 or 250 kbps. Interface for Canopen, profibus, modbus, etc. Option digital inputs for up/down/left/right/jet spray
Options	Various network options, Canbus, TCP/IP Network, Web-server, radio remote Joystick, etc.

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TABLE OF CONTENTS

WARNING!

READ THIS INSTRUCTION MANUAL IN ITS ENTIRETY PRIOR TO INSTALLING, MAINTAINING, OR USING THE UNIFIRE FORCE™ ROBOTIC NOZZLE (AKA "ROBOTIC NOZZLE" OR "CANNON").

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 design, proper use, installation and maintenance of the equipment and 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 Unifire or download it at www.unifire.com. If you have any questions relating to this equipment and its safe use please contact Unifire prior to use at +46 303 248 400.

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 of the operator and/or others. Internal inspection, maintenance and repairs should only be performed by, or under the specific, express authority of Unifire AB.

WARNING!

NEVER POINT THE FORCE 80 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 80 is capable of directing flows of up to approximately 5500 liters per minute (1300 gallons per minute) at pressures of up to 12 bars (175 psi) and has a maximum throwing range of up to approximately 90 meters (95 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 lose 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 80 robotic nozzle is capable of withstanding a nozzle **reaction force of at least twenty thousand (20,000) Newtons (2000 kgf)**. The FORCE 80 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 80 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 80 robotic nozzle is 12 bars (175 psi). Use of the FORCE 80 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 80 is between 7 and 10 bars (100 and 130 psi), which also will provide optimal performance**.

WARNING!

ONLY MOUNT THE FORCE 80 SO THAT ITS BASE IS PERPENDICULAR TO THE GROUND. DO NOT install the robotic nozzle at an angle or upside-down without the specific prior written consent of Unifire AB. Doing so may cause damage to the robotic nozzle gears and motors, which could lead to malfunction.

WARNING!

FOLLOW ALL MAINTENANCE & INSPECTION PROCEDURES in this manual.

WARNING!

BE SURE TO USE THE PROPER TYPE AND SIZE OF THREADS AT THE ROBOTTIC NOZZLE BASE and also between the robotic nozzle and nozzle (if using a nozzle not supplied by Unifire 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 Unifire, contact Unifire for clarification prior to connecting the robotic nozzle and nozzle.

WARNING!

KEEP A SAFE DISTANCE DURING OPERATION AND MOVEMENT. The FORCE 80 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 UNIFIRE-APPROVED NOZZLES. The FORCE 80 was designed for use with the Unifire INTEG 80 and Unifire Smooth Bore nozzles. Use of any nozzle other than a Unifire nozzle made for the FORCE 80 without specific, written approval in advance by Unifire AB constitutes 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 80 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) nor the joystick in water and be sure to keep water out of their interiors. Unifire'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 protected form water and dust. IP67 rated enclosure is optional.

WARNING!

Do not use the electrical controls during operation of the emergency manual override cranks as doing so could cause injury.

WARNING!

ONLY USE THE MANUAL OVERRIDE IN CASE OF TRUE EMERGENCY & POWER FAILURE. The manual override controls on the FORCE 80 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 power and disable flow.

WARNING!

ONLY USE SPECIFIED ELECTRICAL SUPPLY, INSTALLED BY A QUALIFIED ELECTRICIAN. The power supply to the TARGA ROBOTIC NOZZLE PLC should be supplied through high-quality cables and fuses with proper power overload protection. Electrical overload can cause damage to the TARGA PLC and other electrical components, leading to failure of the robotic nozzle. Be sure that the electrical power supply to the robotic nozzle is connected through proper wires and fuses and installed or approved by a qualified electrician.

WARNING!

DO NOT MOUNT ANY DEVICES ON THE ROBOTIC NOZZLE. Mounting peripheral devices on the Robotic nozzle is not recommended and can cause undue wear and tear, possibly leading to damage to the gears welds, etc. Use of peripherals on the robotic nozzle will void warranty claims unless specifically approved in advance and in writing by Unifire AB.

WARNING!

FAILURE TO HEED ANY WARNING IN THIS MANUAL VOIDS WARRANTY CLAIMS & MAY CAUSE SERIOUS INJURY TO PERSONS OR PROPERTY.

INSTALLATION FORCE 80 Chassis

General Information & Warnings

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 Unifire 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 Unifire, contact Unifire for clarification prior to connecting the robotic nozzle and nozzle.

WARNING!

THE FORCE 80 IS HEAVY. EXERCISE CAUTION AND SEEK 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!

BE SURE THAT THE FORCE 80 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 80 is capable of withstanding a nozzle **reaction force of at least eight thousand (20,000) Newtons (2000 kgf)**. The FORCE 80 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!

ONLY MOUNT THE FORCE 80 robotic nozzle SO THAT ITS BASE IS PERPENDICULAR TO THE GROUND. DO NOT install the robotic nozzle at an angle or upside-down without the specific prior written consent of Unifire AB. Doing so voids the chassis warranty and may cause damage to the robotic nozzle gears and motors, which could lead to malfunction.

X-TARGA

RITTAL IP66 Steel
Plate Cabinet

X-TARGA-S

Weidmüller IP67
Stainless Steel cabinet

X-TARGA™ & X-TARGA-S

Unifire's Revolutionary, Industrial & Marine IP66 PLC for Total System Control

The X-TARGA is Unifire's revolutionary TARGA PLC (Programmable Logic Controller), mounted in one of two choices of IP66 cabinets, both designed for the harshets envri-onments and power supply from 110 to 230 V AC at 50 or 60 Hertz., for the total, flex-ible control of Unifire's advanced robotic nozzle systems and a virtually-endless variety of other system peripherals and components.The unique TARGA system allows users to simply and economically tailor water cannon systems to their individual needs. From basic, low-cost, stand alone installations, to highly sophisticated and integrated systems.

Both cabinet types are IP66 rated and designed for the harshets envrionments, both on- and off-shore. The X-TARGA comes standard with a builtin power converter from 110 to 230 V AC at 50 or 60 Hertz to TARGA's native 24VDC / 20 Amp requirement. The mounted TARGA (see TARGA section of this brochure) is a scaleable system plat-form that supports up to six BLDC motors and numerous analogue and digital inputs and outputs. The Unifire X-TARGA PLC controller for robotic nozzles, valves, lights, peripherals, automatic systems, system integration, and much more.

2019 technology allows our customers to control systems from their phone, tablet and computer, from anywhere in the world. Network systems together and control from a central control station, and even monitor the system status, learn of any com-ponent failures, and upload system software updates or system function changes requested from Unifire.

X-TARGA

X-TARGA-S

X-TARGA(-S) PLC SPECIFICATIONS

Models:	X-TARGA & X-TARGA-S (each followed by a number 1-6. representing the quantity of installed BLDC driver cards)
Power Input:	110/230 V AC, 50/60 Hz (built-in converter to 24VDC / 20 Amps)
Approximate Weight:	15 kg / 33 lbs.
Cabinet Types:	**Model: X-TARGA**: RITTAL IP66 Steel Plate cabinet type: AE 1045.500, Dimensions: 500 x 400 x 210 mm / 19.7" x 15.8" x 8.3" inches, mass: 13 kg. **Model: X-TARGA-S**: Weidmüller IP67 Stainless Steel cabinet type: KTB MH 453820 S4E1 Stainless Steel 316L Cabinet, Dimensions: 458 x 382 x 200 mm / 18" x 15" x 7.9" inches, mass: 11.54 kg.
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), others available per customer requirements
BLD Motor Driver Card Slots:	6 (each with 2 digital inputs)
Inputs:	4 digital inputs (NPT) + 2 per installed motor driver card, 6 analogue inputs (4-20 mA or 0-5V), expandable & customizable to customer requirements
Outputs:	8 digital outputs, of which 4 can be set to PWM, expandable to customer requirements
Connector Types:	M12 A/B coded, 4P, 5P, 8P, 12P
Certificates:	CE Marked, produced at ISO certified facilities

X-TARGA(-S) PLC SPECIFICATIONS

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Connector Types:	M12 A/B coded, 4P, 5P, 8P, 12P
Certificates:	CE Marked, produced at ISO 9000 and 14000 certified facilities
Max altitude	Never install the X-TARGA PLC over 4000 meter above sea level

TARGA Robotic Nozzle PLC TERMINAL SOCKETS

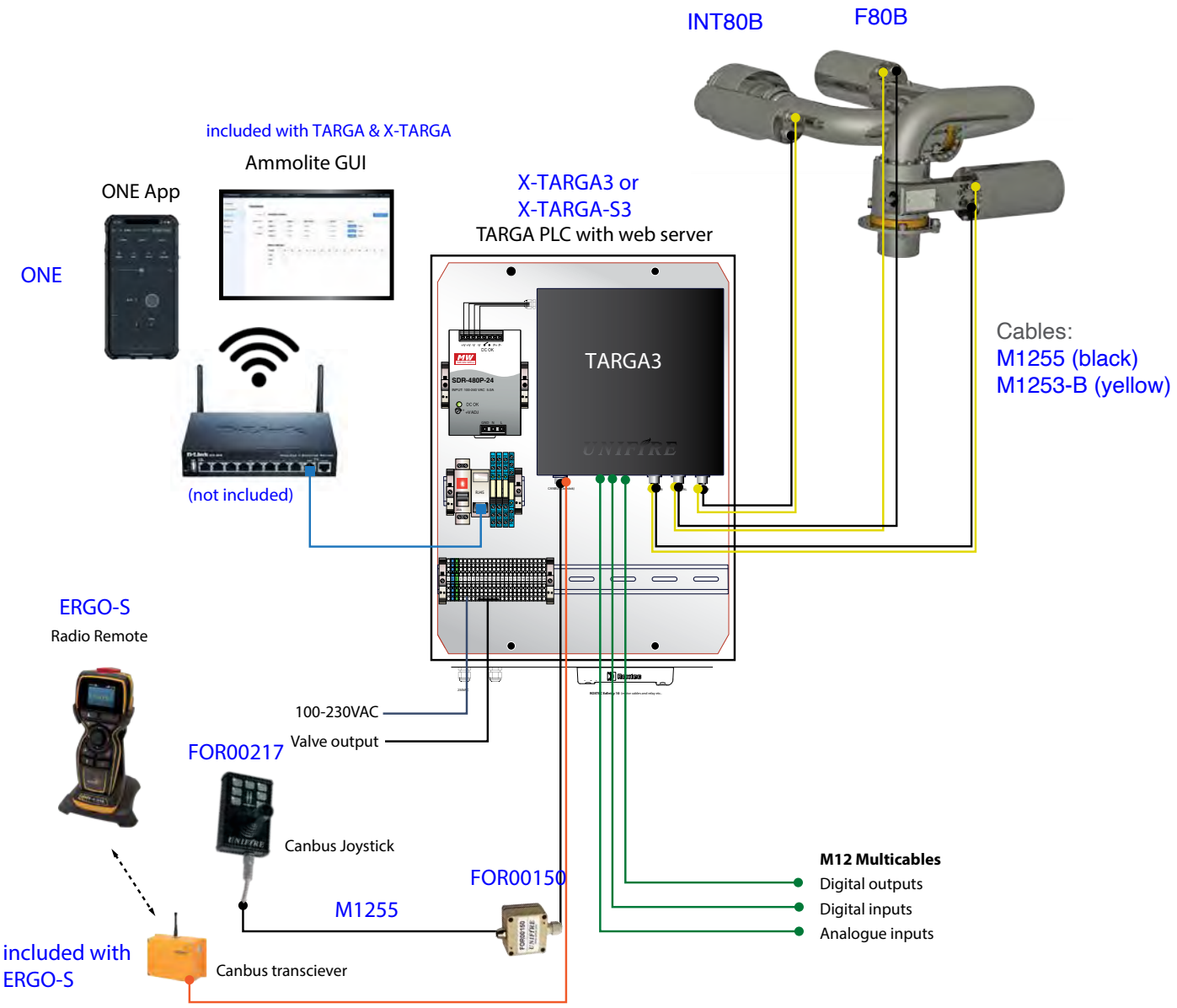
RITTAL 1045500

GENERIC TERMINAL SOCKET SPECIFICATION

Terminal	Function	Internal connection	External connection	Function	Cable mark	Cable dim.	Color marking
1	L1	L (PSU)	AC Power	Power	1	1,5 mm²	Brown
2	N	N (PSU)	AC Power	Power	2	1,5 mm²	Blue
3	GND	GND (PSU)	AC Power	Power	3	1,5 mm²	G/Y
4	CAN 1 H	Main board	Joystick connection box (Optional)	CAN		0,3 mm²	Black
5	CAN 1 L	Main board	Joystick connection box (Optional)	CAN		0,3 mm²	Grey / G/Y
6	GND	Main board	Joystick connection box (Optional)	CAN		0,3 mm²	Blue
7	VCC	Main board	Joystick connection box (Optional)	CAN		0,3 mm²	White
8	NC	Relay 1	Valve Signal	Relay	8	0,5 mm²	
9	COM	Relay 1	Valve Signal	Relay	9	0,5 mm²	
10	NO	Relay 1	Valve Signal	Relay	10	0,5 mm²	
11	NC	Relay 2	Valve Signal	Relay	11	0,5 mm²	
12	COM	Relay 2	Valve Signal	Relay	12	0,5 mm²	
13	NO	Relay 2	Valve Signal	Relay	13	0,5 mm²	
14	NC	Relay 3	Spare	Relay	14	0,5 mm²	
15	COM	Relay 3	Spare	Relay	15	0,5 mm²	
16	NO	Relay 3	Spare	Relay	16	0,5 mm²	
17	NC	Relay 4	Spare	Relay	17	0,5 mm²	
18	COM	Relay 4	Spare	Relay	18	0,5 mm²	
19	NO	Relay 4	Spare	Relay	19	0,5 mm²	

ELECTRICAL INSTALLATION - FORCE 80 WITH X-TARGA PLC

Below is a generic example of a typical system, although system configurations can and do vary.



TARGA™ PLC SPECIFICATIONS

Unifire's Revolutionary PLC for Total System Control

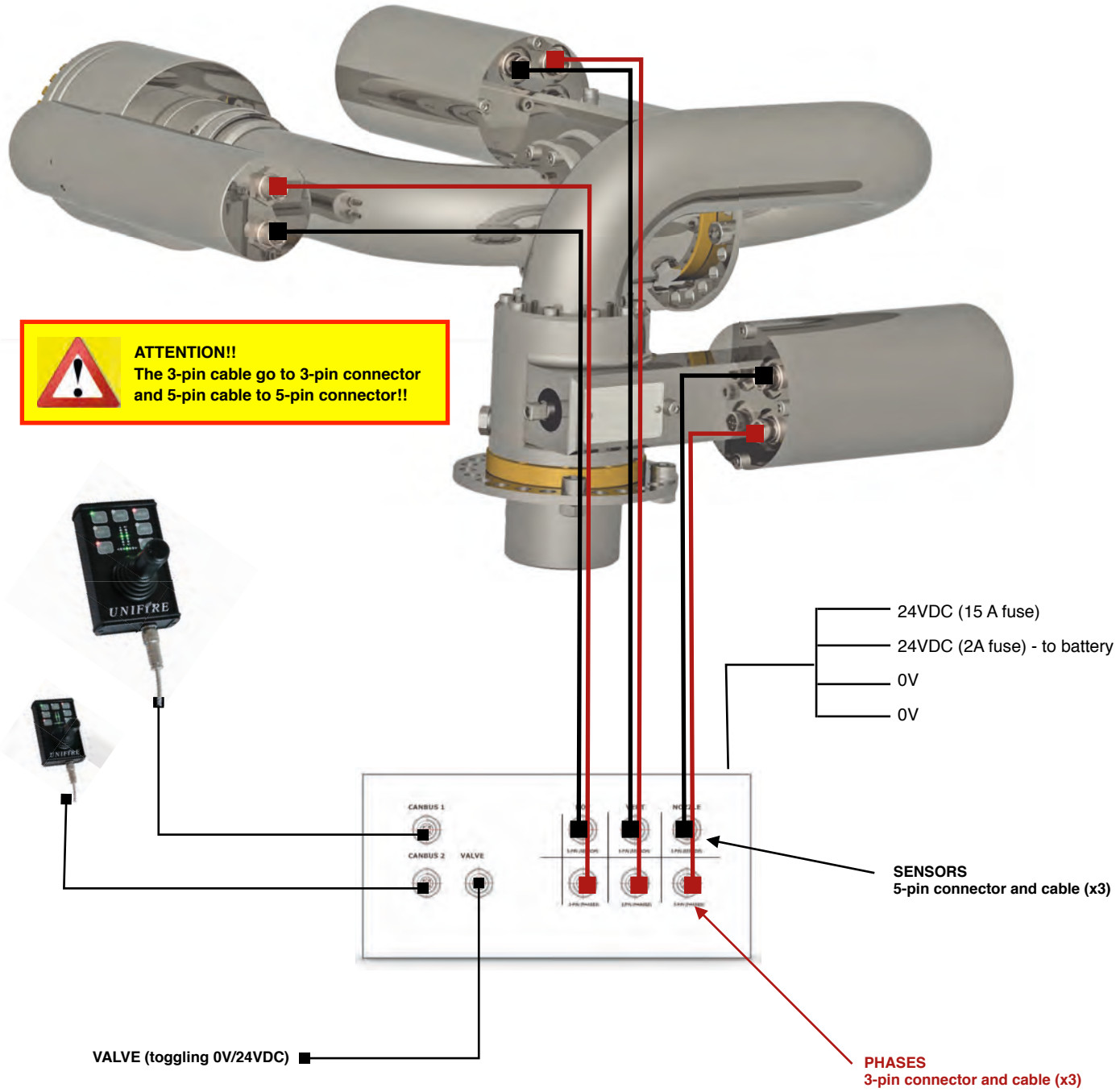
Models:	TARGA1, TARGA2, TARGA3, TARGA4, TARGA5 & TARGA6 (digit represents # of installed BLDC driver cards)
Power:	24V DC / 20 Amps
Weight:	1 kg / 2.2 lbs
Dimensions:	225 x 225 x 125 mm / 8.9" x 8.9" x 5" inches
Communication Protocols:	2 x CAN 2.0 29-bit header (UniCAN) 125.250.500 kB/s, RS232, RS485 (Modbus, DMX, etc.)
Physical Layer Protocols:	USB, Ethernet (TCP/IP, web socket), others available per customer requirements.
BLDC Motor Driver Card Slots:	6 (each with 2 digital inputs)
Inputs:	4 digital inputs (NPT) + 2 per installed motor driver card, 6 analogue inputs (4-20 mA or 0-5V), expandable & customizable to customer requirements
Outputs:	8 digital outputs, of which 4 can be set to PWM, expandable to customer requirements
Connector Types:	M12 A/B coded, 4P, 5P, 8P, 12P
Certificates:	CE Marked, Manufactured at ISO Certified facilities.

TARGA PLC DIMENSIONS

System overview generic
TYPE1 with TARGA PLC

incl 4 x ”M12” 5-pin multi-cables
and 3 ”M12” 3-pin multi-cables

FORCE 50 & FORCE 80 BLDC Models



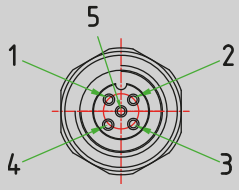
TARGA Robotic Nozzle PLC

Connections TYPE 1

M12 connectors generic pin specification and wire colour:

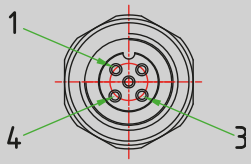
5-PIN

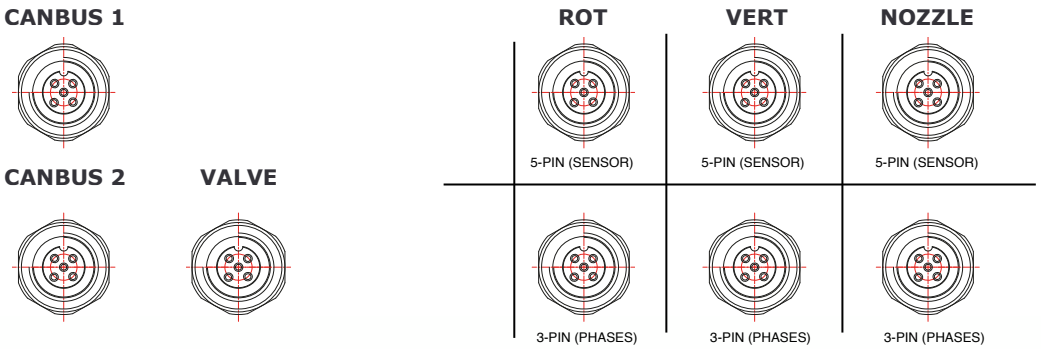
1 - BROWN
2 - WHITE
3 - BLUE
4 - BLACK
5 - GREY



3-PIN

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





CANBUS		VALVE (toggling)		BLDC sensor		BLDC phases	
P1	Shield	P1	0/24 VDC	P1	GND	P1	PHASE 1
P2	24 VDC	P2	not connected	P2	5 VDC	P2	not connected
P3	GND	P3	GND	P3	HALL 3	P3	PHASE 2
P4	CAN H	P4	24/0 VDC	P4	HALL 2	P4	PHASE 3
P5	CAN L	P5	not connected	P5	HALL 1	P5	not connected

TARGA Robotic Nozzle PLC

Connections TYPE 1

M12 connectors generic pin specification and wire colour:

5-PIN

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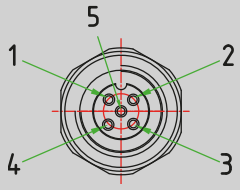
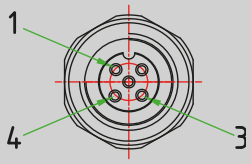
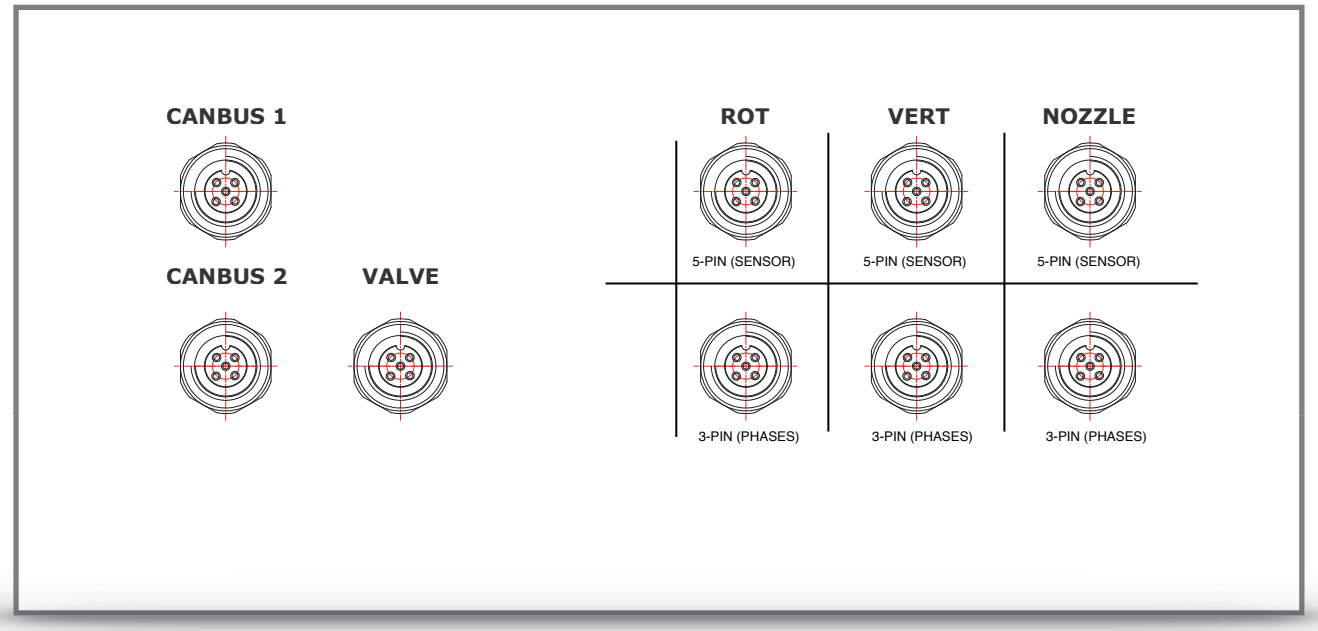


3-PIN

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





CANBUS		VALVE (toggling)		BLDC sensor		BLDC phases	
P1	Shield	P1	0/24 VDC	P1	GND	P1	PHASE 1
P2	24 VDC	P2	not connected	P2	5 VDC	P2	not connected
P3	GND	P3	GND	P3	HALL 3	P3	PHASE 2
P4	CAN H	P4	24/0 VDC	P4	HALL 2	P4	PHASE 3
P5	CAN L	P5	not connected	P5	HALL 1	P5	not connected

TARGA PCB

Unifire TARGA PCB

Many PLC's (programmable logic controllers) are commercially available on the market, and are used by many of Unifire's competitors.

But Unifire won't settle for standard, off-the-shelf solutions. At Unifire, we think for ourselves. And, we are very demanding.

Commerically-available PLC's are bulky, designed to suit a wide variety of industries and applications, and are therefore over-loaded with bulky electronics, components and software, markedly reducing efficiency, and often failing to include key features Unifire demands for its advanced systems.

That is why Unifire has spent years maticulously designing and improving our own TARGA PCB (printed circuit board), tailor-made for our robotic nozzle systems and their peripherals, and to accommodate technologies yet to come. Our newest generation PCB is cutting-edge technology and provides a huge range of possibilities, accommodates rapid, dynamic technological advances, maximizes efficiency in hardware and software design, and is the perfect solution for total control of our robotic nozzle systems.

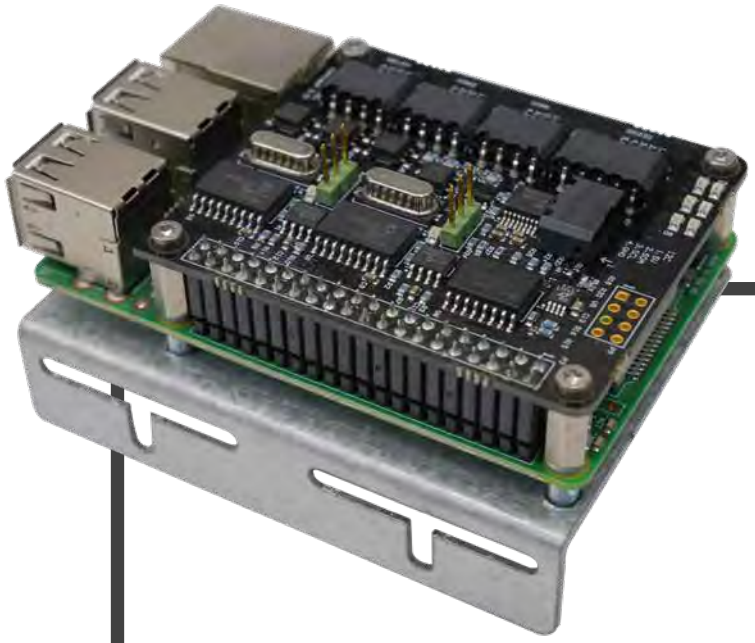
Manufactured for Unifire in Sweden at ISO 9001 & 14001 certified, state-of-the-art facilities, side-by-side with electronics for Ericsson, SAAB Space, Volvo, and other industry-leading, highly demanding companies.

When quality matters, look to Unifire.

Features

The Unifire TARGA PCB is laoded with features, including, to name a few:

- 6 BLDC Motor Driver Slots for the control of brushless motors
- A variety of communication protocols, including 2 x CAN 2.0 29-bit header (UniCAN) 125,250,500 kB/s, RS232, RS485 (Modbus, DMX, etc.
- USB, Ethernet (TCP/IP, web socket), others available per customer requirements
- 4 digital inputs (NPT) + 2 per installed motor driver card,
- 6 analogue inputs (4-20 mA or 0-5V), expandable & customizable to customer requirements
- 8 digital outputs, of which 4 can be set to PWM, expandable to customer requirements
- Reserved control pins, allows to work with other control boards
- Comes with development resources and manual (examples in wiringPi/ python)



Unifire Web Server

Take Complete Control Of Unifire's Robotic Nozzle Systems From Anywhere In The World, Thanks To Our Web Server— A Full-Blown, Internet-Ready Pc, Built In To Our Targa Plc, That Fits In The Palm Of Your Hand!!

Welcome to the Internet of Things!

The Unifire Web Server is our optional, full-functioned personal computer (PC) add-on to our entire line of TARGA PLC's.

The Unifire web server, combined with our CAN Bus Cape, allows all models of Unifire's TARGA PLC's to come fully online.

Thanks to the Unifire Web Server, our customers have the option of taking full, secure control of Unifire's advanced robotic nozzle systems with our InterAct software and app.

Have a phone? Control our systems. Have a tablet? Control our systems. Have a computer? Control our systems. Got Internet access? Control our systems from anywhere in the world!

Features

The Unifire Web Server is a key component of Unifire's InterAct system. Combined with our CANbus Cape. USB Router and InterAct software and Graphical User Interfacess, adds to Unifire's advanced robotic nozzle systems a host of networking and control capabilities, including over the Internet.

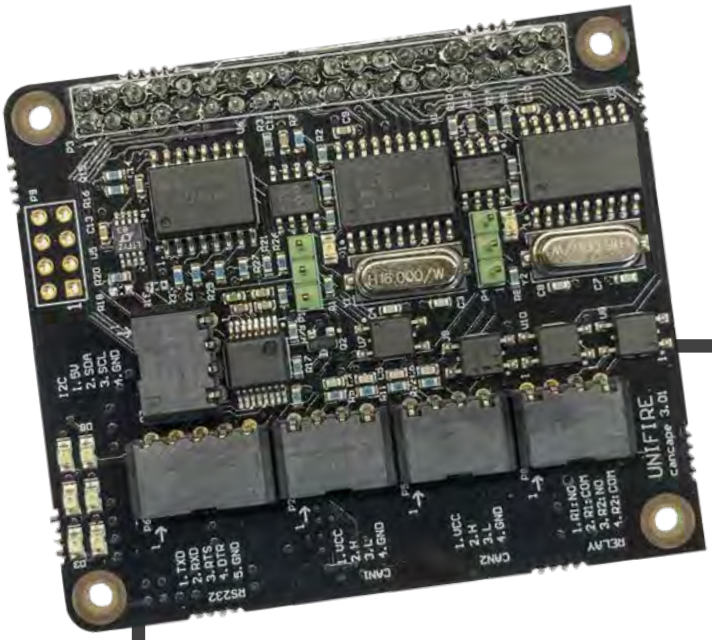
Unifire's already powerful and flexible InterAct graphical user interface can be custom designed to your specific needs, look, functionas, language and look, with virtually unlimited flexibility to control systems with advanced logic sequences and automated functions.

Specifications

- SOC: Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC
- CPU: 1.4GHz 64-bit quad-core ARM Cortex-A53 CPU
- RAM: 1GB LPDDR2 SDRAM
- Operating system support: Linux and Unix
- WIFI: Dual-band 802.11ac wireless LAN (2.4GHz and 5GHz) and Bluetooth 4.2, capable of running at 2.4GHz and 5GHz.
- Ethernet: Gigabit Ethernet over USB 2.0 (max 300 Mbps)
- Thermal management: Yes.
- Power over Ethernet
- Video: Yes – VideoCore IV 3D. Full-size HDMI
- USB 2.0: 4 ports
- Power: 5V/2.5A DC power input

"Here's to the crazy ones. The misfits. The rebels. The troublemakers. The round pegs in the square holes. The ones who see things differently. They're not fond of rules. And they have no respect for the status quo. You can quote them, disagree with them, glorify or vilify them. About the only thing you can't do is ignore them. Because they change things. They push the human race forward. And while some may see them as the crazy ones, we see genius. Because the people who are crazy enough to think they can change the world, are the ones who do."

— Apple Inc.



CAN Bus Cape

Unifire CAN Bus Cape for Raspberry Pi

Communication Hat with 2x CAN, RS232, I²C and relays.

Technical Overview

The Unifire CAN Cape adds serial networking options to your Raspberry Pi utilizing the GPIO.

The two onboard CAN Bus ports utilize the Microchip MCP2515 CAN controller, accessible per SPI interface, in combination with the Microchip MCP2551 CAN transceiver. 120Ω termination is available by jumper or control over GPIO.

The RS232 port is controlled via the RPi's UART using the MAX3232 line-driver and receiver.

The I²C is buffered by LTC4313 and the two onboard photoMOS relays allow for simple digital control of external equipment. The IO expander for the I²C bus allows for even further expansions.

Onboard is also a DC/DC transformer allowing the CAN cape to supply the RPi with power. PoCAN (Power over CAN) makes this possible.

The CAN cape is also equipped with six blue LED indicators.

UNIFIRE

BLDC Driver Card

Unifire BLDC Motor Driver Card

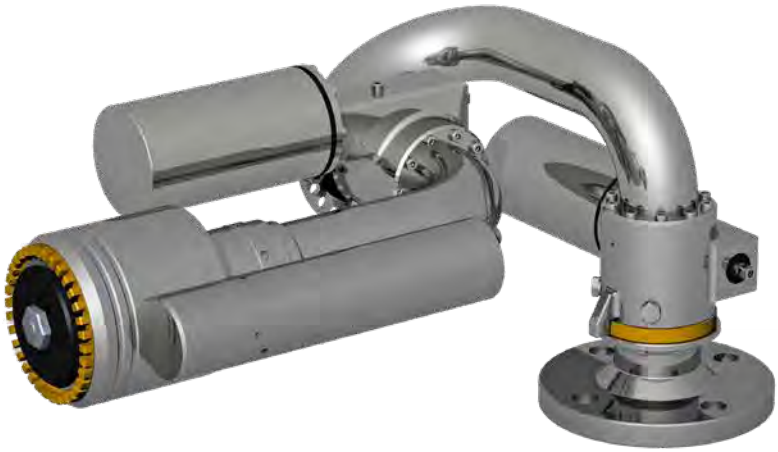
Like all of our electronics, Unifire designed its own BLDC motor driver card to deliver the functionality and efficiency unique to Unifire's robotic nozzle systems.

Unlike competing solutions, Unifire uses 3-phase 24V DC brushless (BLDC) motors to control its robotic nozzles. These are the same motors used in numerous industrial robots — and for good reason. BLDC motors offer numerous advantages over standard, "brushed" DC motors used in most competing products., such as higher torque, higher precision in their control, and much longer life.

Controlling BLDC motors, however, requires special electronics to precisely control the three phases sent to the motors. That's where Unifire's unique BLDC motor driver cards come in.

With Unifire's BLDC motor driver cards, our customers benefit from the highest precision steering and control of any robotic nozzle on the market —with an accuracy over over 1/50th of a degree.

CONTROLLERS & JOYSTICKS



UNIFIRE FORCE system

This installation and setup manual is intended to provide generic guidance for installation and commissioning of the UNIFIRE 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 specification, M12 pin-specifications and special customer specific software.

For further info please see Unifire Robotic Nozzle catalogue

And visit our websites:

www.unifire.com

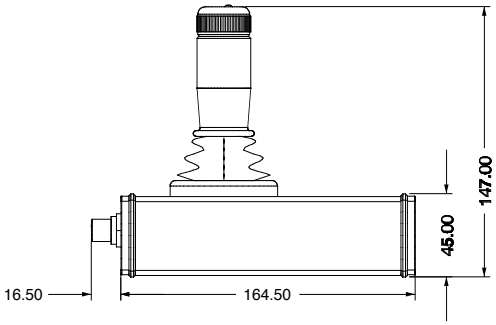
www.roboticnozzles.com

www.automaticfirefighting.com

and

www.youtube.com/unifireab

Also refer to the system specific documentation



π™ (Pi) CAN bus Joystick

CAN bus Progressive Speed, Full-Featured Joystick

Unifire's π (Pi) Joystick is Unifire's versatile, full-functioned, hand-held joystick for precise and intuitive control of Force robotic nozzles. Our most popular controller, it is robust and water resistent, with numerous features.

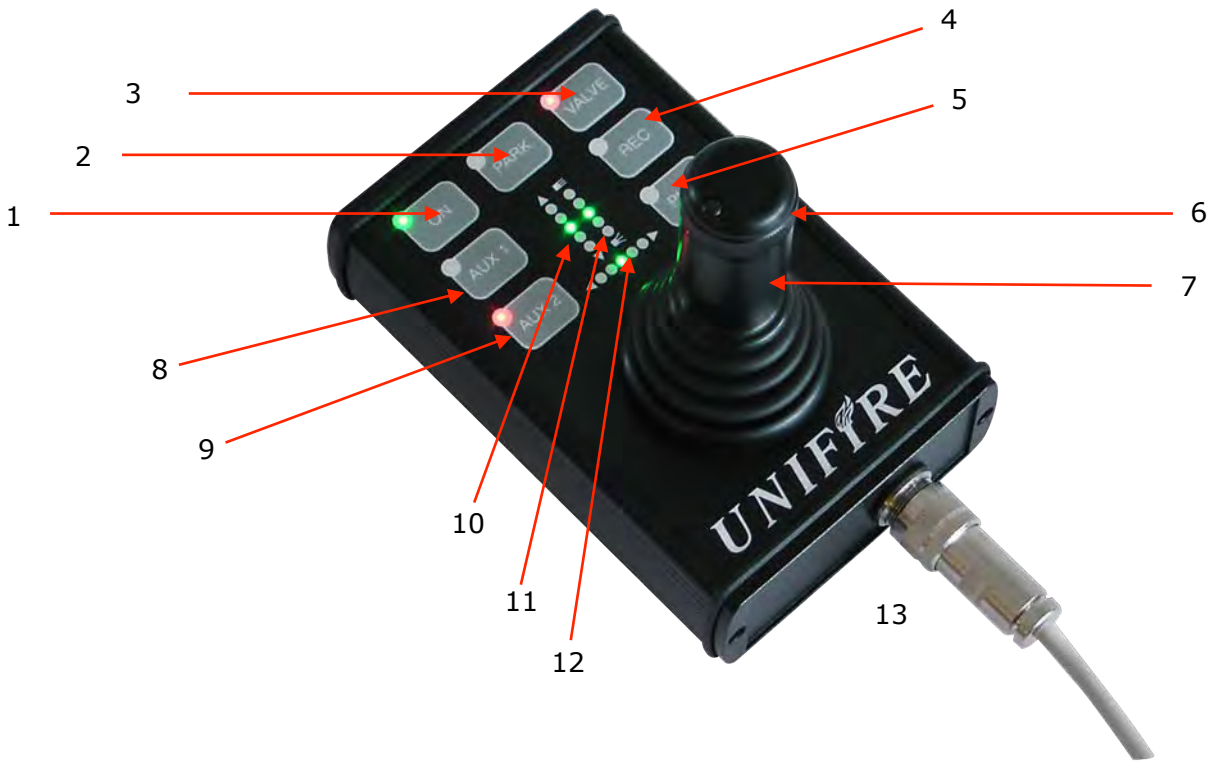
Specifications:

- Multifunctional CANbus joystick
- Intuitive, progressive speed control
- 3-Axis control (horizontal, vertical, nozzle)
- Nozzle spray pattern controlled by dial on tip of joystick shaft
- Record / Play - Record any sequence including velocity changes, pauses, & nozzle spray pattern. Play back in a continuous loop.
- Programmable park (stow) function
- LED Position Indicators for relative horizontal, vertical and nozzle positions
- Valve Control Button
- 2 auxiliary buttons for custom configuration & control of peripherals (e.g., lights).
- Up to 500 meter cable supported
- Hand-held
- Weighs only 1 Kg

Joystick “PI”

The following is an overview of the Unifire “PI” Joystick functions. For full operation instructions, see the Operation Instruction section.

For full technical specification and setup of the Joystick see **Appendix 2**



1. **ON** button for Joystick control activation
2. **Park** button for stowing the robotic nozzle after use
3. **Valve** button to open or close a valve
4. **Record** button for beginning and stopping a recording of the robotic nozzle’s movements
5. **Play** button
6. **Nozzle** control dial for changing Integ nozzles from jet to fog and back again
7. **Joystick** shaft for controlling robotic nozzle’s movements up/down and left/right (pressure sensitive, for progressive speed movement)
8. **Auxiliary #2** Control Button (custom configuration)
9. **Auxiliary #1** Control Button (custom configuration)
10. **Vertical Position Indicator LED**--indicates robotic nozzle’s relative position from full up, to center, to full down
11. **Nozzle Position Indicator LED**--indicates Integ nozzle’s relative position from full jet, to full fog, and in between
12. **Horizontal Position Indicator LED**--indicates robotic nozzle’s relative position from full left, to center, to full right
13. **Port** for joystick cable (M12 5-pin)

Operating the Joystick

CALIBRATION

Operating range setup / Calibration of the TARGA BLDC motor system is done directly on the TARGA setup-panel. Calibration MUST be done prior to operating the Joysticks. Ref to TRAGA PLC section of this manual.

START

To activate the Joystick, press the **ON button**. When the green ON LED is lit, the Joystick controller is active. (NOTE: the position LED's always show the robotic nozzle's relative positions, even when the Joystick is off.)

SET PARK

To select a park position, move to the required park position. Put the robotic nozzle control in OFF mode. While pressing PARK, also push ON, to activate the Joystick. Now the new park position has been selected.

GO TO PARK

Press and hold the PARK button for 2 seconds to make the robotic nozzle return to the pre-defined parking position. Abort park sequence or leave parking position by operating the Joystick, or press "PARK" again.

RECORD pattern

To record a pattern, press the **REC button** once. The red LED light will come on, indicating that recording is in progress. Begin recording any pattern you wish repeated and when finished, press the REC button again to end recording. The red LED will turn off. During recording, all robotic nozzle movements, including velocity changes, pauses and nozzle control, are recorded.

PLAY - automatic operation

Press the **PLAY** button to initiate playback of the last recorded sequence.

ABORT automatic operation

Manual operation of the joystick will abort playback. Pushing "PLAY" will also abort playback.

Pushing PLAY again will return to the last recorded pattern. NOTE: the nozzle control will not abort playback.

VALVE CONTROL

If a motorized water valve is connected, pressing the valve button will open or close the valve.

AUX 1 and AUX 2 (generic buttons)

These are generic buttons that can control "other functions". For example, foam valves or flood lights. In a networked system the AUX1 and AUX2 can be used for controlling and switching between 2 robotic nozzles.

MANUAL OPERATION WITH CRANKS

The robotic nozzle can be manually operated with cranks. This may be useful for service and maintenance, if and when the power is cut, or a motor is damaged. The FORCE robotic nozzles are not suitable for manual operation and manual cranks are for emergency use only.

If manual operation is necessary <u>first disconnect the cables!</u>

Then the robotic nozzle can be manually operated with cranks. Any attempt to manually operate the robotic nozzle without removing the connectors will be very difficult - virtually impossible - and also it will lead to damage to the electronics! **After manual operation of the robotic nozzle, you must recalibrate the robotic nozzle before resuming normal operation.**

Canbus JOYSTICK Description & Advanced Setup
(this section also applies to the Wireless PI Joysticks)

WARNING!!! This section is for technicians and qualified users. Do not attempt to change the setup of the Joystick unless you are qualified and authorized by Unifire to do so.

WARNING! Wrong settings WILL interrupt communication between the Joystick and the PLC. The system will stop working!!!

The Joystick provides position feedback in 9 steps.

Buttons for REC, PLAY, PARK and VALVE control.

Two undefined generic AUX buttons for controlling "other" functions, such as foam valve, telescopic pipe or swing-our arm, flood light, etc.

In a networked system the AUX1 and AUX2 can be used to choose which robotic nozzle is to be controlled.

X,Y axis and the Nozzle spray angle are controlled with the progressive Joystick.
The Nozzle control is on the tip of the Joystick shaft.

Joystick Buttons and LED Function Description

ON	Activates the Joystick communication for control of PLC and Robotic nozzle.
PARK	While pressed for 2 seconds it starts the park sequence of the PLC. Led flashes while Parking and is on when robotic nozzle is parked. Release from park by press PARK again or simply operate PLC with joystick.
VALVE	Toggle function that controls the VALVE output (or relays) of the PLC
REC	When pressed the PLC goes into record state and the Red LED indicates this state. Press again to exit record state and save the pattern.
PLAY	Activates the re-play of the pre-recorded pattern. Green LED indicates playback To exit this state, simply press PLAY again or start controlling the MCU with the joystick.
AUX 1	Undefined (used in setup mode). Accessible over CAN bus. Both Switch and LED
AUX 2	Undefined (used in setup mode). Accessible over CAN bus. Both Switch and LED

Setting baud rate, Master-slave mode and Canbus ID

For technicians trained and authorized by Unifire only

There are two setup modes on the PI Joystick: Setup A and Setup B

Setup mode ”A” is used to control the following functions:

I. Master/slave mode (REC)
II. Address (ID) of MCU controlled (if in master mode) or Joystick (if in slave mode) (PLAY)
III. Calibration of the absolute nozzle control (AUX 1, AUX 2 and dial on top of joystick handle)
IV. Startup behavior of MCU (if in master mode) (PARK)
V. Joystick handle vertical direction control - alters up/down (VALVE)

Setup mode ”B” is used to set the baud rate
(125kbps or 250kbps). 125kbps is default.

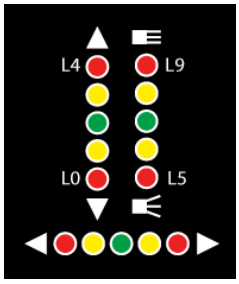
Entering setup modes is done by pressing and holding defined buttons while powering up and/or connecting the Joystick cable.

Setup mode "A"

Enter SETUP MODE A

While powering up the joystick press "**REC" and "PLAY"** until the corresponding LED's are ON. (Power up either by connecting a live Joystick cable, or switching on power) This puts the Joystick in setup mode.

Master/slave mode (I, II)



The position LED's indicates the mode and address when in setup mode: To switch between master and slave mode (indicated with full horizontal bar) Press REC to toggle between master and slave mode. To step through the address settings use the PLAY button.

When in **master mode** the LED's L0 to L9 represents the address of the MCU to be controlled (range from h41 to h4A). When in **slave mode** the LED's L0 to L9 represents the address of the joystick itself (range h51 to h5A)

Master mode	**Slave mode**
Horizontal bar all LED'S=ON.	Horizontal bar all LED's=OFF
For the control of 1 MCU	For the setting of Joystick ID
(slave address, one of h41 → h4A)	(Address, one of h51 → h5A)
L0 MCU address h41	L0 Joystick address h51
L1 MCU address h42	L1 Joystick address h52
L2 MCU address h43	L2 Joystick address h53
L3 MCU address h44	L3 Joystick address h54
L4 MCU address h45	L4 Joystick address h55
L5 MCU address h46	L5 Joystick address h56
L6 MCU address h47	L6 Joystick address h57
L7 MCU address h48	L7 Joystick address h58
L8 MCU address h49	L8 Joystick address h59
L9 MCU address h4A	L9 Joystick address h5A

Calibration of nozzle control. (III)

1. Move the top (nozzle-control) clockwise to the stop and then press and hold AUX 1 until LED is on.
2. Then move the top counter clockwise to the stop and then press and hold AUX 2 until LED is on.

Startup mode MCU (IV)

Alter the start up state of the MCU by using the "PARK". When PARK led is ON the MCU starts active (start LED is ON) and is ready to be controlled immediately. When PARK led is off activation of system is done by using the START button.

Joystick vertical control (V)

The VALVE button controls the vertical direction and alters the up/down functionality of the joystick. Press VALVE to alter state. When VALVE led is OFF joystick handle away from operator means robotic nozzle down and joystick handle towards operator means robotic nozzle up. When VALVE led is ON joystick handle away from operator means robotic nozzle up and joystick handle towards operator means robotic nozzle down.

Exit SETUP MODE A

When done with the described operations, simply press ON until all LED's are OFF (ON LED may go on if MCU hRelay is ON). This will save the new settings.

Setup mode ”B”

Enter SETUP MODE B

While powering up the joystick press **“VALVE” and “PLAY”** until the corresponding LED's are ON. This puts the Joystick in setup mode ”B”

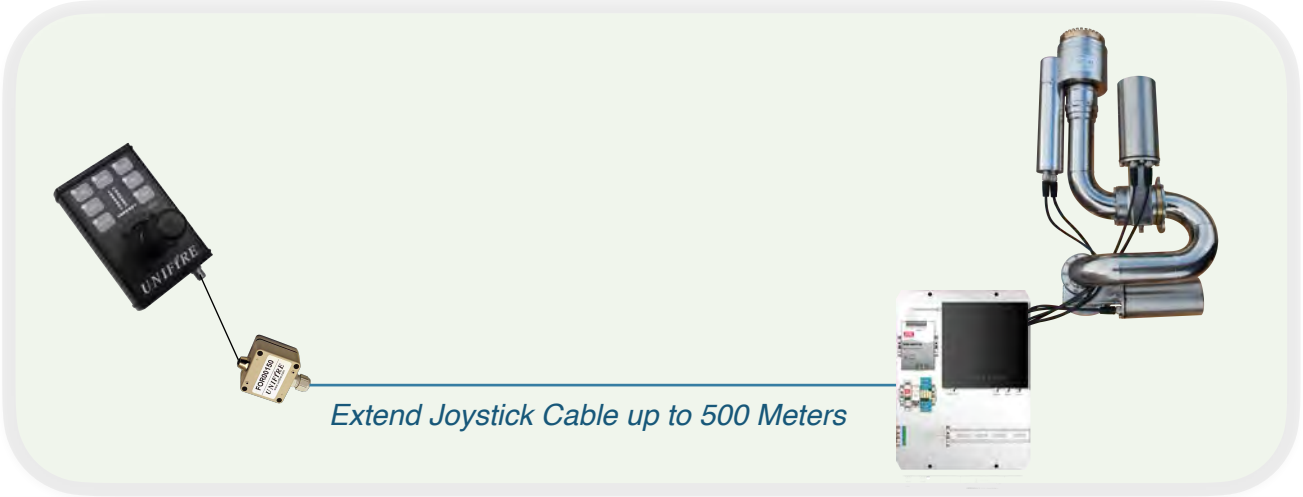
125kbps or 250kbps CAN bus

Press VALVE to switch between 125kbps and 250kbps (indicated with full horizontal bar). LED’s on indicate 250kbps and LED’s off 125kbps.

Exit SETUP MODE ”B”

When done with the described operations, simply press ON until all LED's are OFF (ON LED may go on if MCU hRelay is ON. This will save the new settings.

CANbus Connection Box for Unifire Joysticks



- Ideal for marine, industrial and other applications when you wish to extend the joystick cable a long distance.
- Allows simple extension of joystick cable to up to 500 meters.
- Run standard installation cable from TARGA or X-TARGA PLC to location from which you wish to install the joystick; connect it to the connection box; attach to joystick cable via quick M12 connector.
- Recommended installation cable: RS485 bus-cable, typically twisted pair, 2 x (2x0,75mm2), available locally and therefore not supplied by Unifire.

ONE Graphical User Interface

ONE

App for iOS & Android

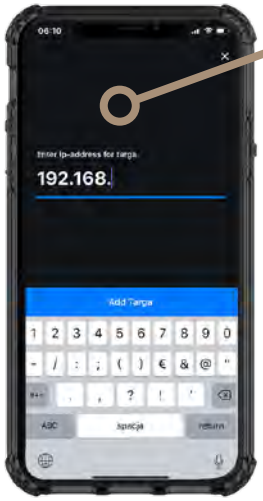
The First & Only Robotic Nozzle Control App on the Market, ***ONE*** is Unifire's revolutionary, full-functioned graphical user interface & virtual joystick for iOS & Android, available for free on Google Play Store and Apple iPhone App Store.

ONE

App for iOS & Android

Intuitive Menu

Easily control your system Connection, Settings or go to the Control Screen.



Simple Setup

Simply enter the IP Address of your System Router for quick system connection and control.

With Unifire's InterAct core technology and our ONE app, you no longer need a joystick.

For a fraction of the price of our competitors' tethered and wireless joysticks, you can turn any device into a powerful wireless controller. And, it's easier to use and comes loaded with more functions than most competing controllers!

Welcome to 21st Century robotic nozzle system control!

ERGO S

- Weight: 450g (0.99lbs)
- 10+ hrs. Continuous operation
- Joystick Control Capability
- TFT Color Display 320X240 2.4" Display
- Capability of User programmable GUI
- Range:- 100m (328 feet)
- USB (Type A) interface with 4Gb memory key
- Half or Full duplex transmission
- Protected Firmware against known cyber attacks

NEW ERGO S

The new ERGO S brings the ergonomics of handheld transmitter to a new level with functional safety to meet the highest standard.

The ERGO S is equipped with up to 12 programmable buttons, a 2.4" TFT screen and with a joystick control capable of operating in rugged environment with IP65 rating.

Tailor your ERGO S to meet various type of application requirements. It's the perfect solution for skip loaders, hook lifts, trucks, side loaders, cranes, crushers and more. The Transmitter is also equipped with a belt clipping feature and also a magnetic function to facilitate the user to attach the Transmitter to the equipment when not in used.

The charging station is flexible for both wall mounted and desk mounted charging and is designed as a docking station for the Transmitter but also as a charging station for Stand Alone batteries.

Capable of operating on a number of Frequencies including 4XX Mhz, 8xxMhz, 9xx MHz or the 2.4 GHz the ERGO S is also customer programmable with the Hetronic H-Link PC system. The Transmitter is also equipped with the latest Hetronic designed firmware which offer top safety features thereby reducing the vulnerability of the customer systems to any external malicious cyber attacks.

DIMENSIONS: H 236MM (9.28") X W 65MM (2.56")X D 104MM (4.09")

**Seriously Heavy duty!!
All chrome plated brass and stainless steel. Butter-smooth action. Massively supportive when the**

POINTER™ Synchron Joystick

Synchronized Movement of POINTER and Robotic Nozzle

The POINTER is Unifire's unique, synchron control device designed to provide a simple and intuitive human interface for controlling the Unifire's robotic nozzles.

The robotic nozzle's movements exactly follow and match the position of the POINTER.

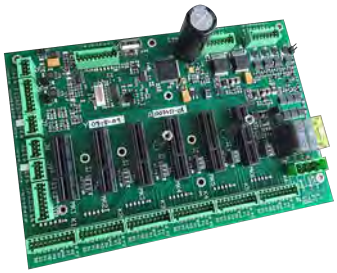
The base is fitted with potentiometer to provide exact position values to the TARGA PLC, which in turn aim the robots to exactly the same horizontal and vertical angles as the POINTER. The hand-grip has a trigger switch at the front. The switch has a spring return. The switch will be connected directly to the vehicle's discharge valve. The water is discharged when the trigger is held, and stops when the trigger is released.

Specifications:

- 142 x 130 x 70 mm (above the panel into which it is mounted)
- Material: Chrome plated brass base; heavy duty plastic grip cover on a 4 mm stainless steel plate
- 5-pin M12 connector connect to the TARGA PLC
- 3-pin M12 connector to route the trigger button to discharge valve control
- Standard rotation range: +70°/-20° vertical, 270° horizontal
- Scroll wheel option for progressive jet/spray nozzle tip control

Spare parts specification

ITEM NAME & IMAGE	PART #	BRIEF DESCRIPTION
Complete FORCE 80 Robotic nozzle 	FORCE 80BLDC	Unifire FORCE 80 Robotic Nozzle with BLDC motor. M12 multi-connectors, or cable-gland connection.
COMPLETE GEAR ASSEMBLY 	FOR80200	Complete worm gear assembly with gear wheel, gear screw, bearings, o-ring. Connected to the pipes by flange assembly.
INTEG80 Nozzle with BLDC motor 	INT80124B	. Specify M12 connectors or cable gland when ordering
Front pipe section 	FORCE 80-PS1	With stream straightener and 2” BSP male thread outlet. Flange connection wit 10 x (M5x16)

ITEM NAME & IMAGE	PART #	BRIEF DESCRIPTION
Middle pipe section 	FORCE 80-PS1	Flange connection with 10 x (M5x16) at both ends
Complete BLDC motor with welded cover 	3910103 3910107 3910108	BLDC 24:1 BLDC 49:1 BLDC 84:1
Control circuit board 	TARGA_BASE	Robotic Nozzle PLC Motherbard. Slots for 6 x BLDC drivers. 6 analogue and 4 digital inputs 4 analogue and 4 digital outputs 2 x Canbus USB, I2C, SPI, RS485 optional web-interface (allows control from any web-browser)
BLDC DRIVER CARD 	TARGA_DRIVE	BLDC driver card. up to 100W output (4A/24VDC)

ITEM NAME & IMAGE	PART #	BRIEF DESCRIPTION
JOYSTICK PI 	FOR00207 or FOR00209	Joystick PI, progressive joystick control, including LED position indicator lights, record/play, 2 x auxiliary. Weight: 1 Kg M12 5-pin connector
TARGA PLC 	TARGA1….6	TARGA Robotic PLC with up to 6 x BLDC driver. Customer specific programming. See ”Appconf” and ”Nodecnf” of your system when ordering. Simple one-step programming by USB-stick.
M12 cables 	M1255 M1253	5 meter, 5-pin M12 cable 5 meter, 3-pin M12 cable

BLDC Motors

& Complete Motor Can Assemblies

Motor Features

Where our competitors are still using run-of-the-mill “brushed” DC motors (which have been used since 1856), Unifire alone is blazing new trails by outfitting all of our robotic nozzles with industrial-robot-type brushless DC (BLDC) motors.

Brushless DC motors have no brushes to get worn out, they have significantly higher efficiency and performance, and a lower susceptibility to mechanical wear than standard brushed motors. Some of the other advantages include:

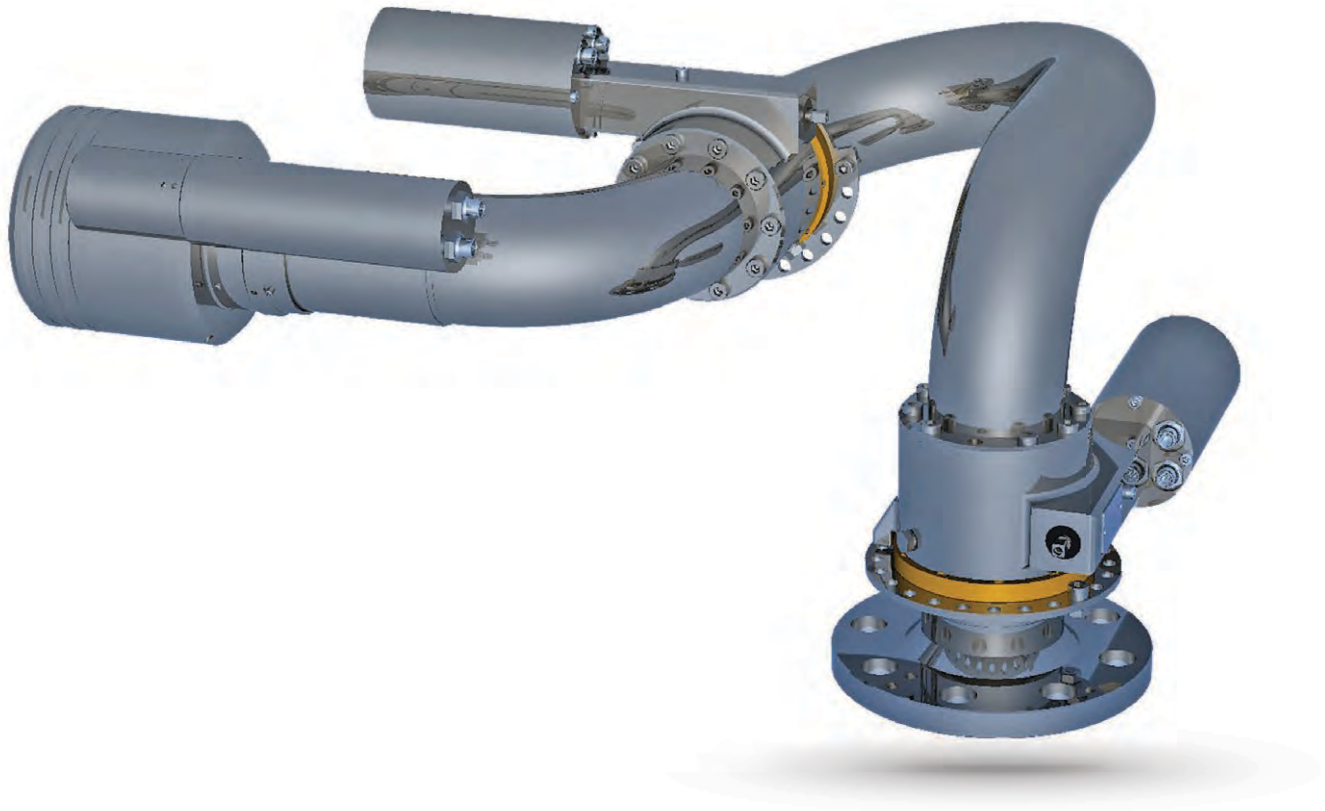
- Higher torque to weight ratio
- Increased torque per watt of power input (increased efficiency)
- Increased reliability and lower maintenance
- Reduced operational and mechanical noise
- Significantly longer life span (10 000 operational hours)

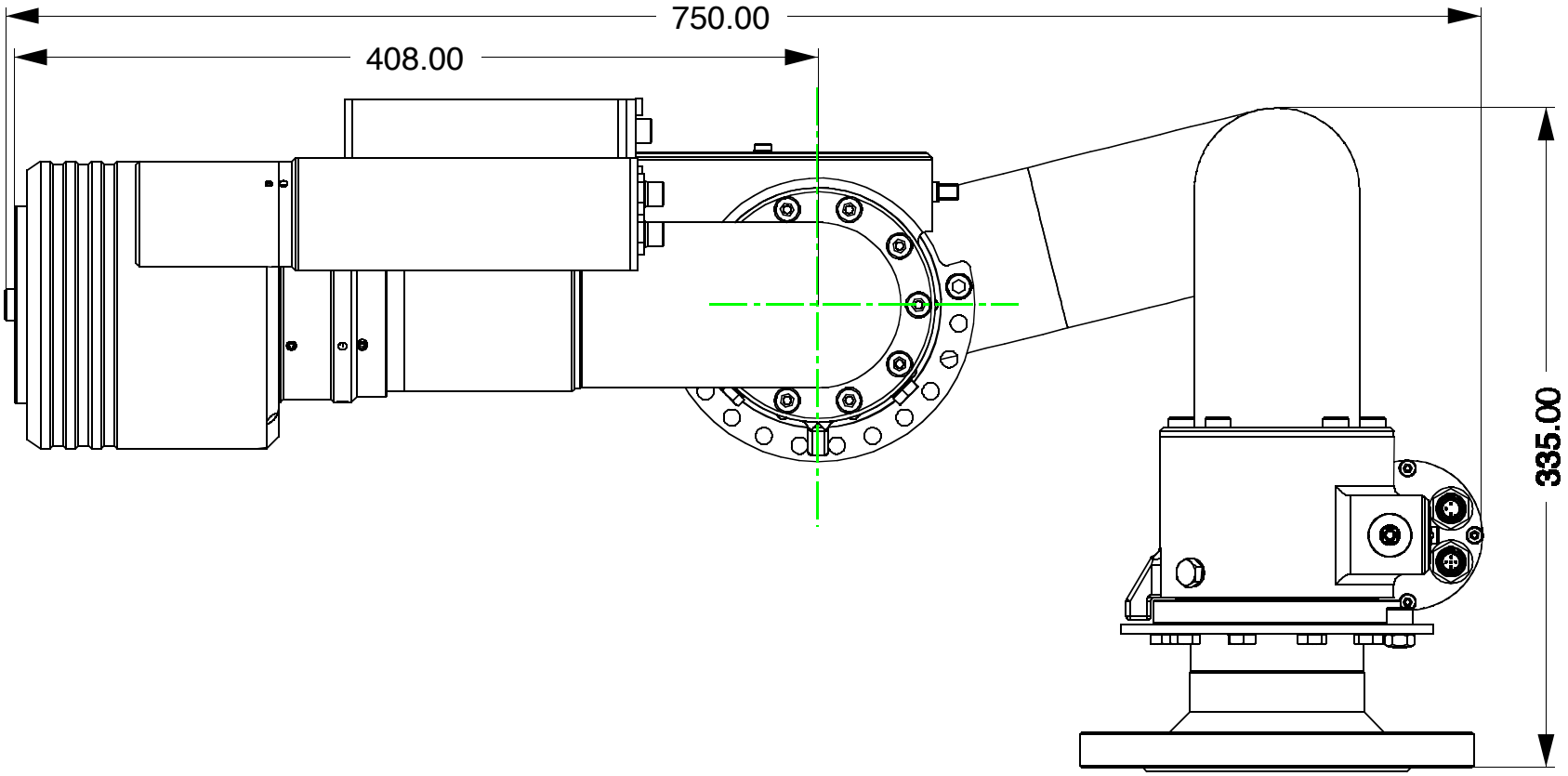
Although it is highly unlikely to ever require replacing a BLDC motor in our robotic nozzles, we do stock and can supply spare motors and complete motor can assemblies with motors pre-assembled for simple, quick replacement.

UNIFIRE AB
Bultgatan 40B
442 40 Kungälv
SWEDEN
www.unifire.com
sales@unfire.com
Tel: 0046 303 248402
(VAT# SE556265039901)

Force 80 BLDC with Integ 80 Tip
Dimensional Outline Drawings

FORCE 80 with BLDC Motors
INTEG 80 with BLDC Motors
M12 multi connectors
ND80/PN16 flange connection





DN80/PN16 flange

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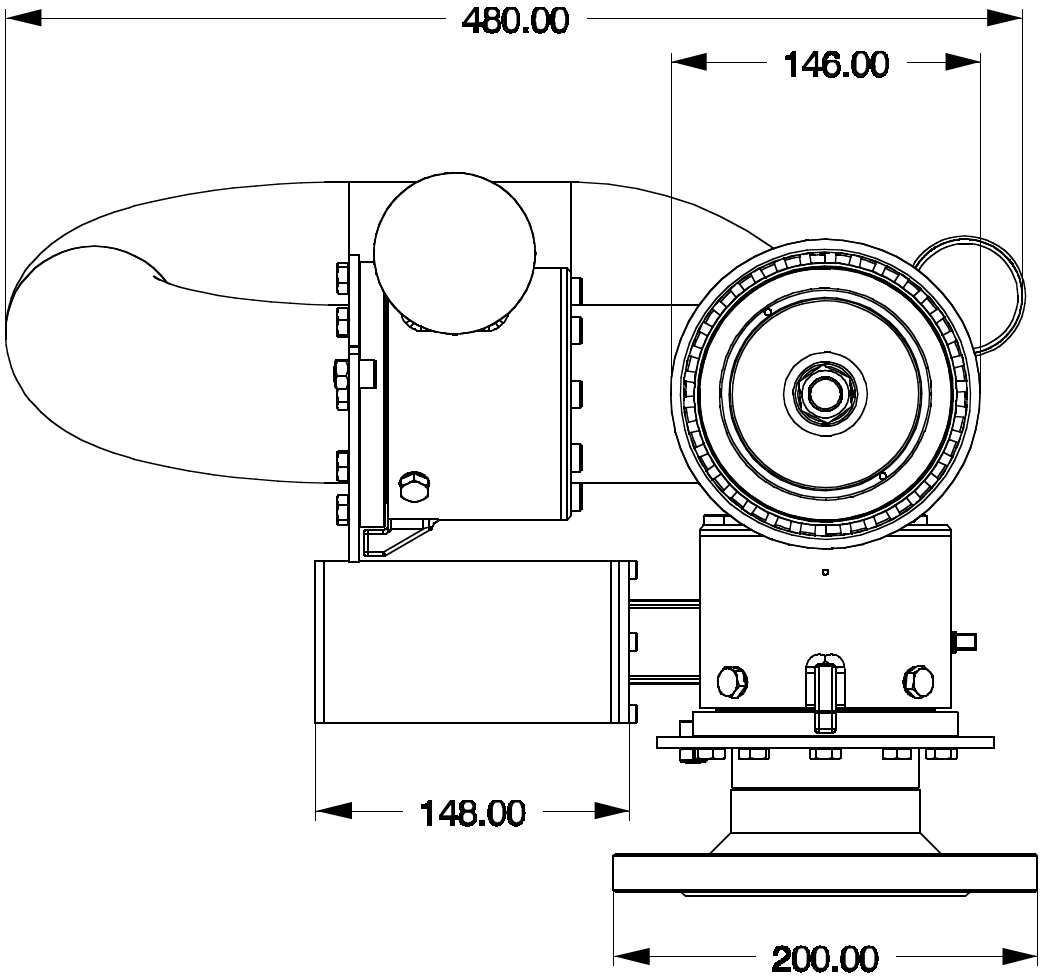
				Created By		
				Checked By		
				Scale		
				UNIFIRE		
No	Change	Date	Init			

Title: FORCE80 + INTEG80

Drawing Number: F80I80PN16

Issue:



DN80/PN16flange

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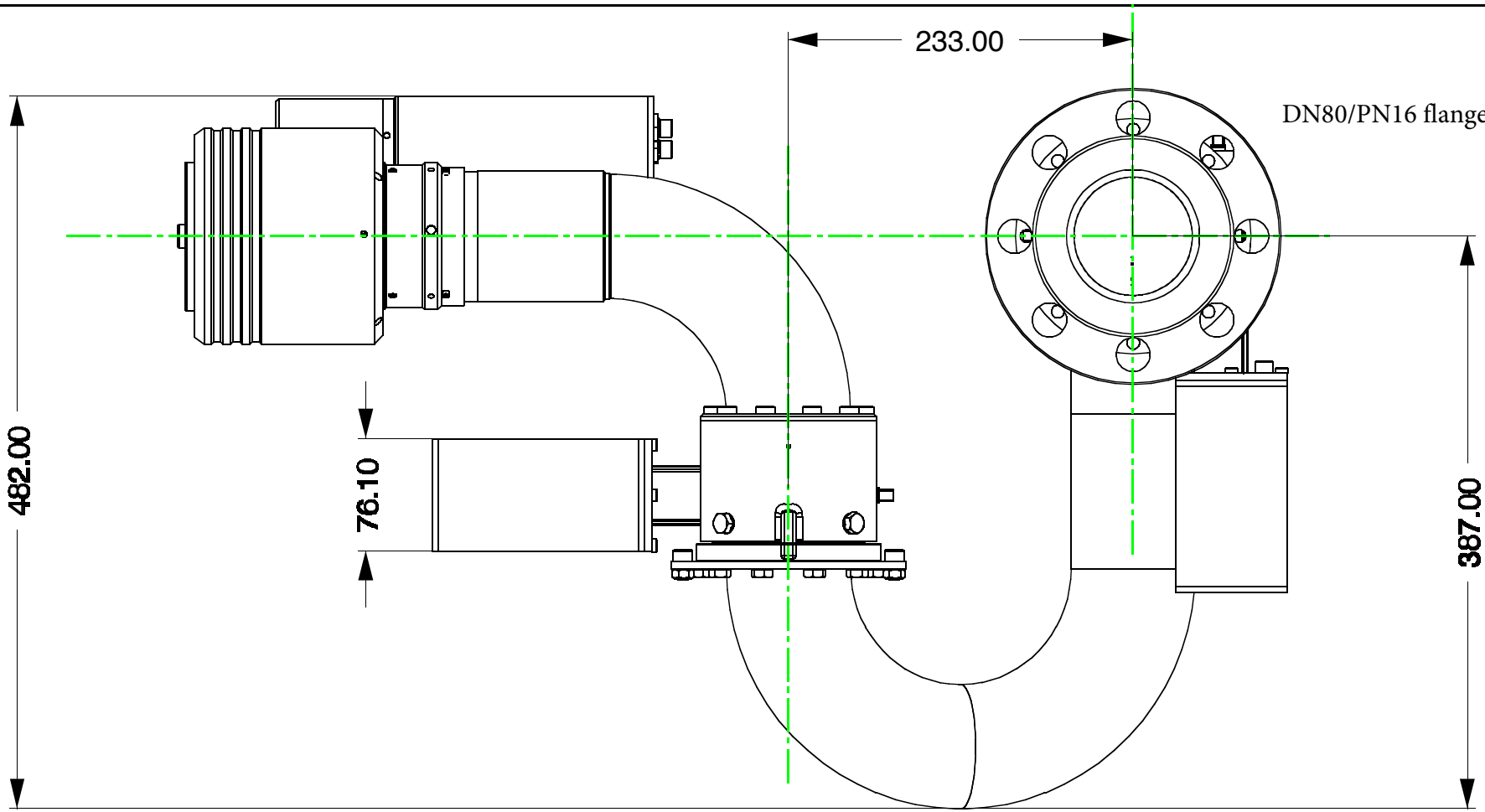
				Checked By		
				Scale		
				UNIFIRE		
No	Change	Date	Init			

Title
FORCE80 + INTEG80 BLDC
DN80/PN16 flange welded

Drawing Number
F80I80DN80

Issue



					Name	Date
				Created By		
				Checked By		
				Scale		
				UNIFIRE		
No	Change	Date	Init			

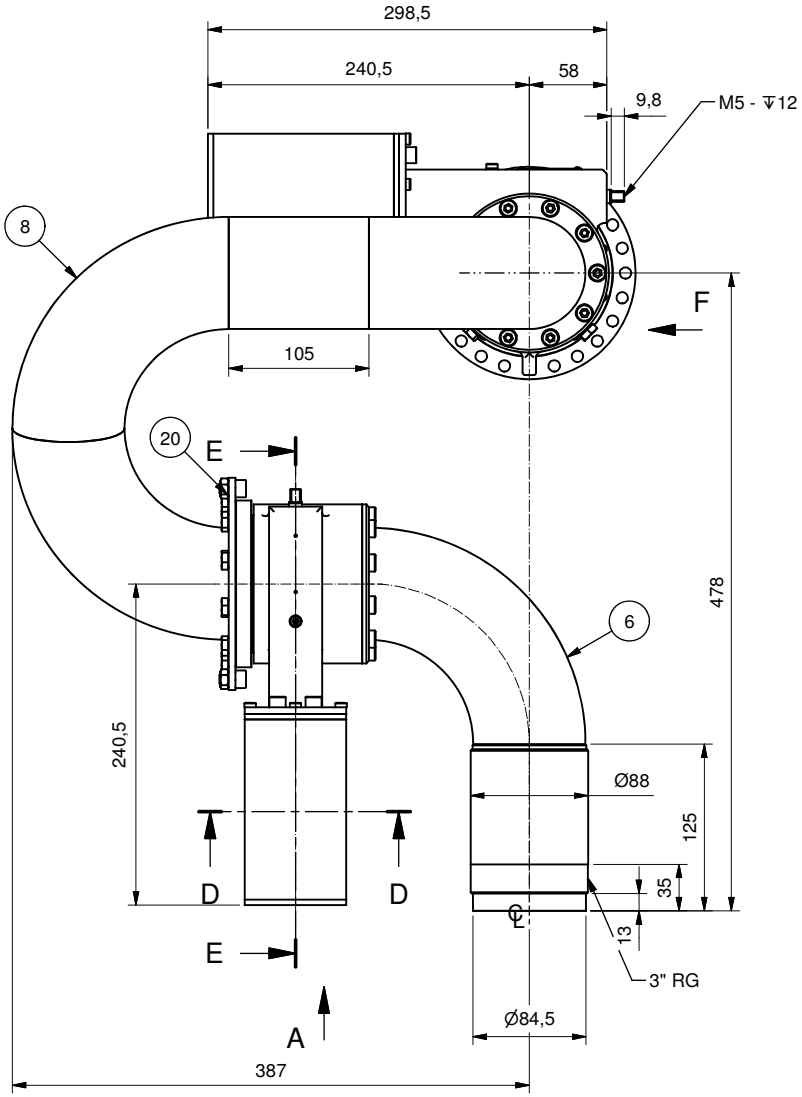
Title: FORCE80 + INTEG80 BLDC DN80/PN16flange welded

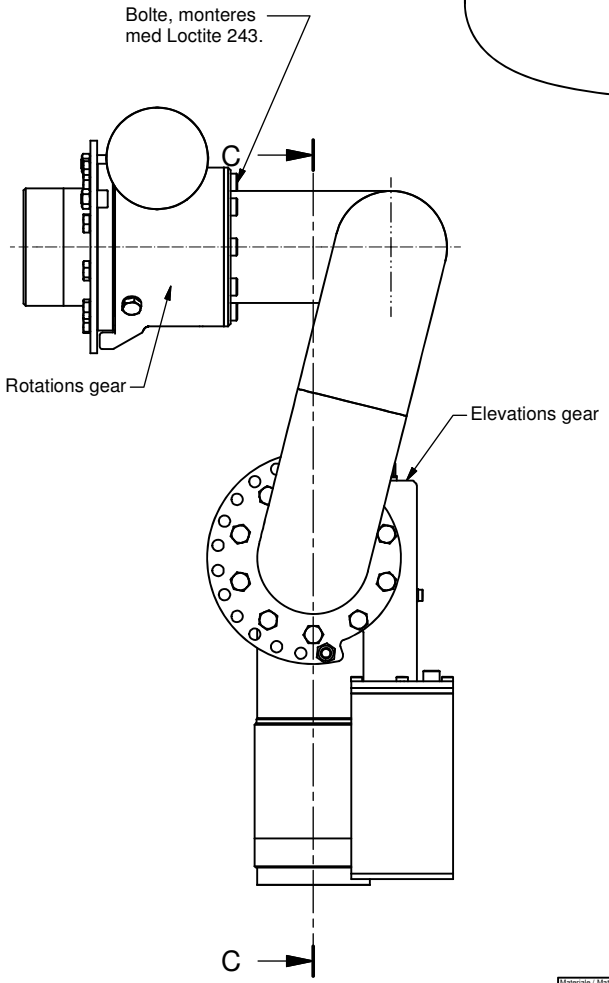
Drawing Number: F80I80DN80

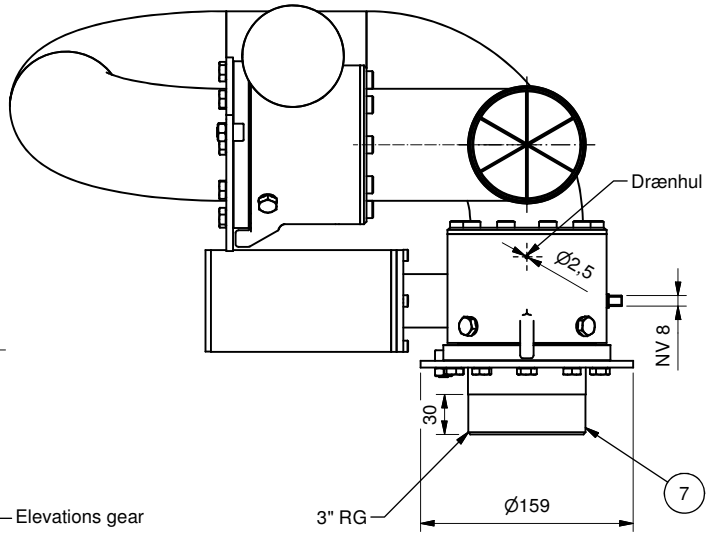
Issue:

UNIFIRE

A (1 : 4)







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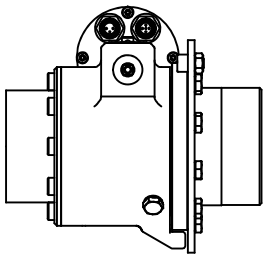
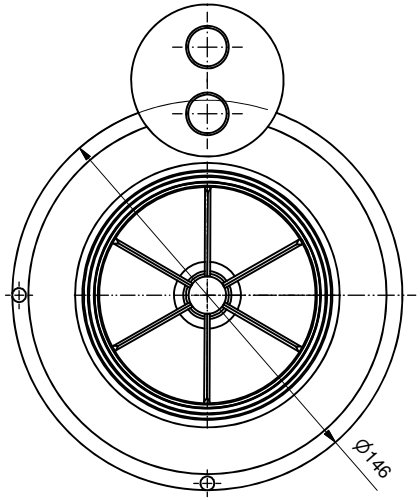
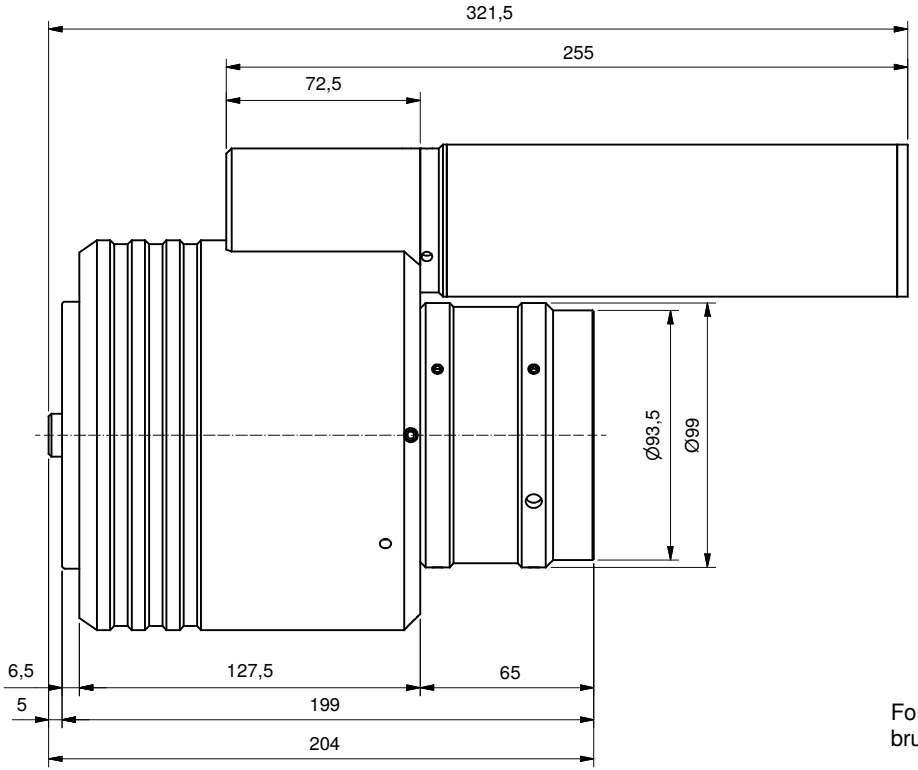


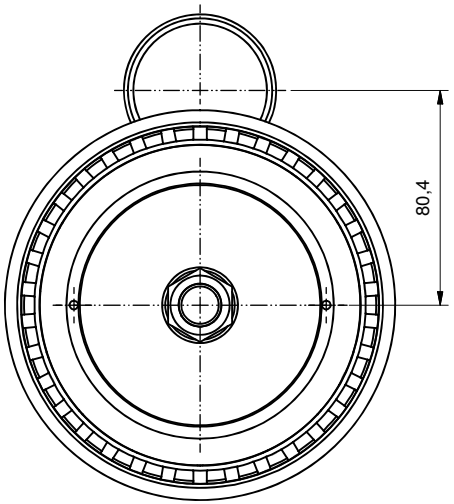
158-005

Materiale / Material:			bj-gear
u = Ra 6.3	x = Ra 1.6 Indstikslibes	Format: A3	Tel.: +45 87 40 80 80 www.bj-gear.com
v = Ra 6.3	y = U Ra 0.5 L Ra 0.3	Sign.: FJE	Beskrivelse / Description: FORCE 80, Chassis udv. 64:1 BLDC Motor
w = Ra 3.2	z = U Ra 18 L Ra 8	Date / Date: 21-08-2014	Vægt / Weight: 19,60 kg
Ikke tolerancesatte mål iht. DS/ISO 2768-f. Skarpe kanter rejfes. Non-toleranced measures acc. DS/ISO 2768-f. Deburr sharp edges.		Målforhold /Scale: 1:4	Tegn. nr. / Drawing id.: 5800305 rev 2007
Ovenstående gælder kun produktionstegninger. The above stated only applies production drawings.		Standard:	Rev.: Side / Page: 1 / 3

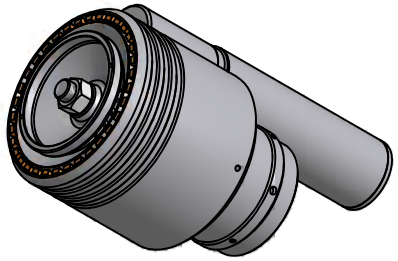
UNIFIRE

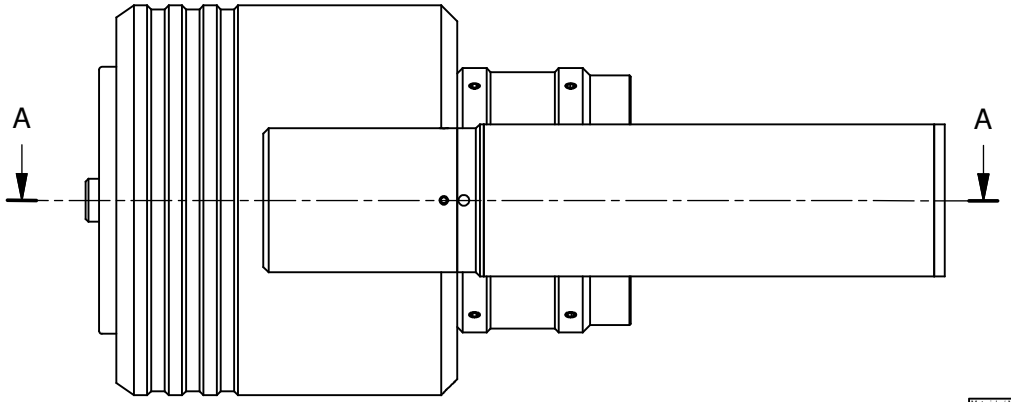


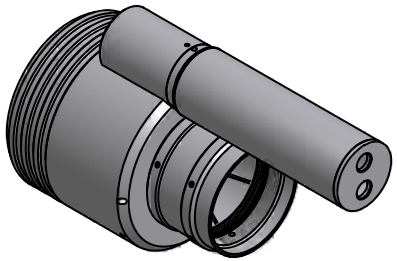




For alle skruer, som spændes fast, bruges Loctite 243.

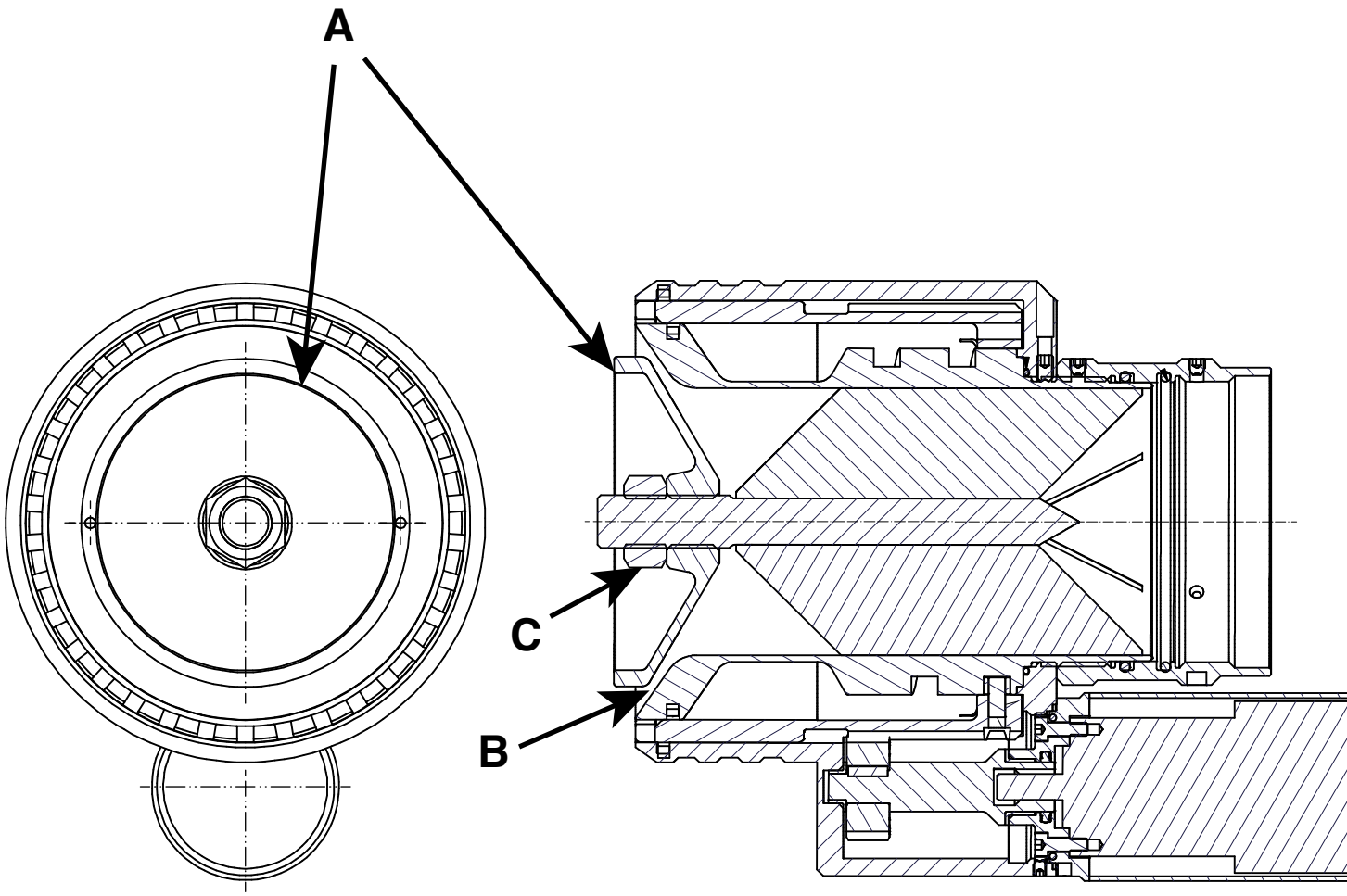






138-005

Materiale / Material:			bj-gear
u = Ra 6.3	x = Ra 1.6 Indstikslibes	Format: A3	Tel.: +45 87 40 80 80 www.bj-gear.com
v = Ra 6.3	y = U Ra 0.5 L Ra 0.3	Sign.: FJE	Beskrivelse / Description: Tandhjulsgear, Serie 80, 4,33:1 INTEG 80 Nozzle, BLDC Motor
w = Ra 3.2	z = U Ra 18 L Ra 8	Dato / Date: 20-08-2014	
		Vægt / Weight: 10,58 kg	
Ikke tolerancesatte mål iht. DS/ISO 2768-f. Skarpe kanter rejfes. Non-toleranced measures acc. DS/ISO 2768-f. Deburr sharp edges.		Målforhold / Scale: 1:2	Tegn. nr. / Drawing id.: 3800405 rev. 2007
Ovenstående gælder kun produktionstegninger. The above stated only applies production drawings.		Standard:	Rev.: Side / Page: 1 / 2



FLOW ADJUSTMENT of INTEG 80

The flow is set by adjusting the opening slot ”B”. (outlet area)
This is done by rotating the baffle ”A” that rides on a threaded rod, M16 x 2.

1. Rotate the baffle ”A” clockwise until it stops. Now the slot ”B” is closed. (pos=0)

2. Open by rotating counter-clockwise. 360° = 1 "Turn".

3. Lock baffle in position with the M16 counter-nut ”C”. Use locktite 243 or 577 on the nut.

For example: 720° (2 Turns) leaves slot ”B” open by 4,0 mm wich equals a flow of 3000 lit/min at 10 Bar inlet pressure

MECHANICAL INSTALLATION

INSTALLATION GEOMETRY OPTIONS

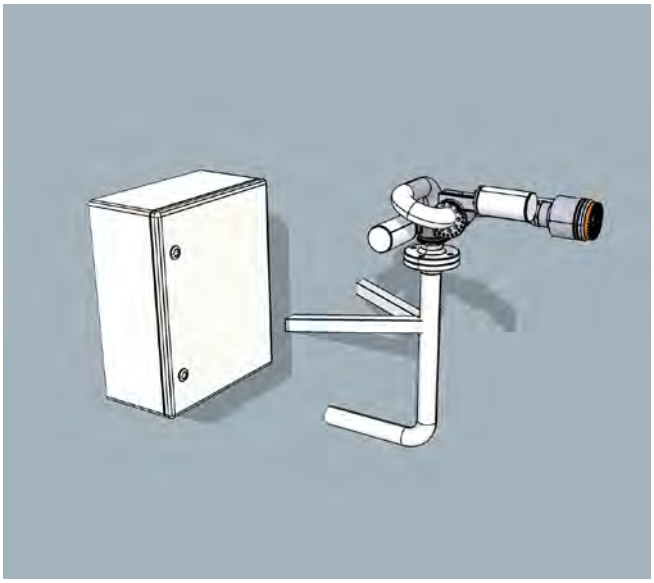
The FORCE 50 Robotic Nozzle can be installed geometrically in three different orientations:

The Robotic Nozzle can be installed with

Wall, Normal orientation

Wall, Inverted orientation

Ceiling, hanging orientation



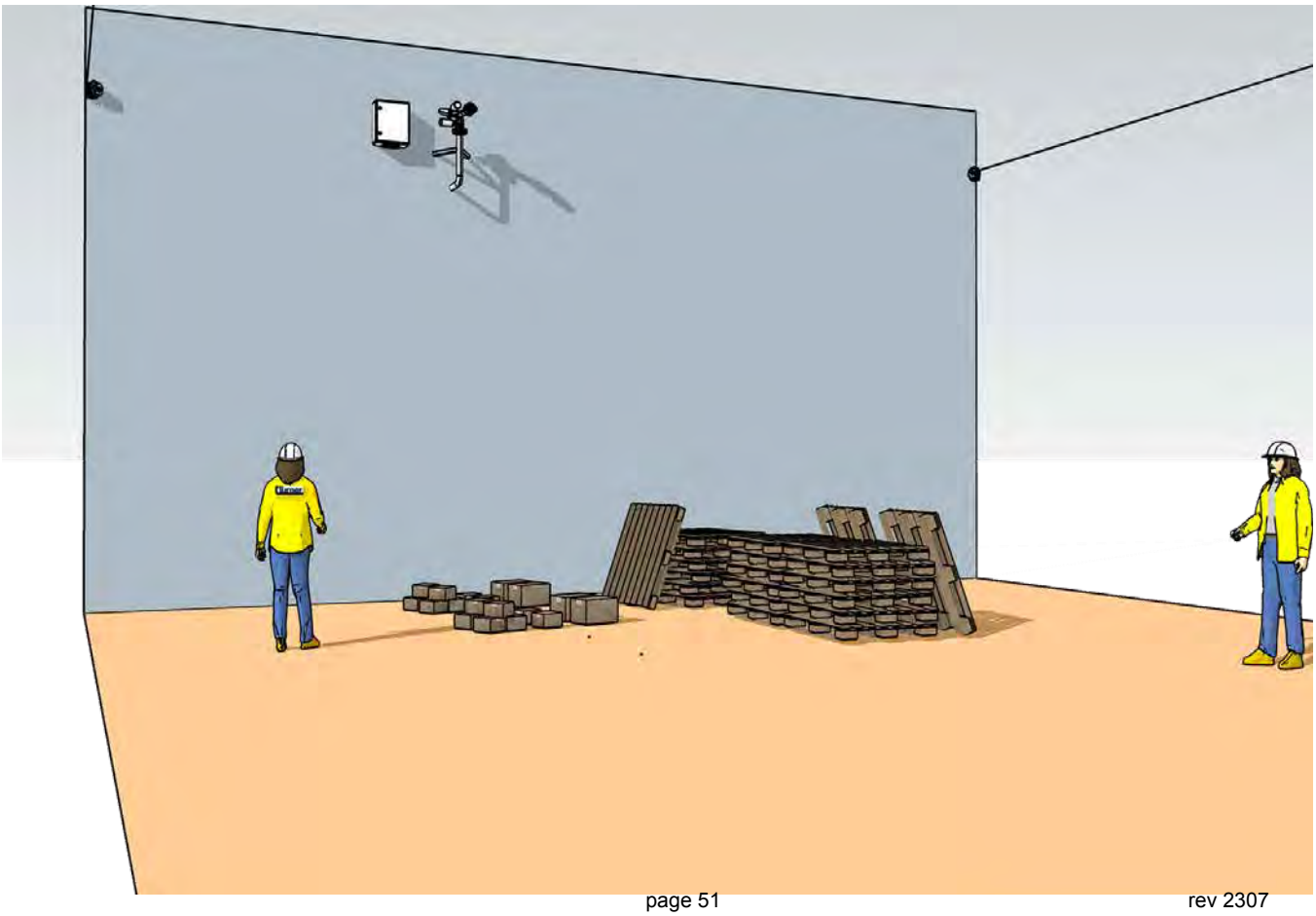
Wall, normal orientation

Use when the water supply comes from below

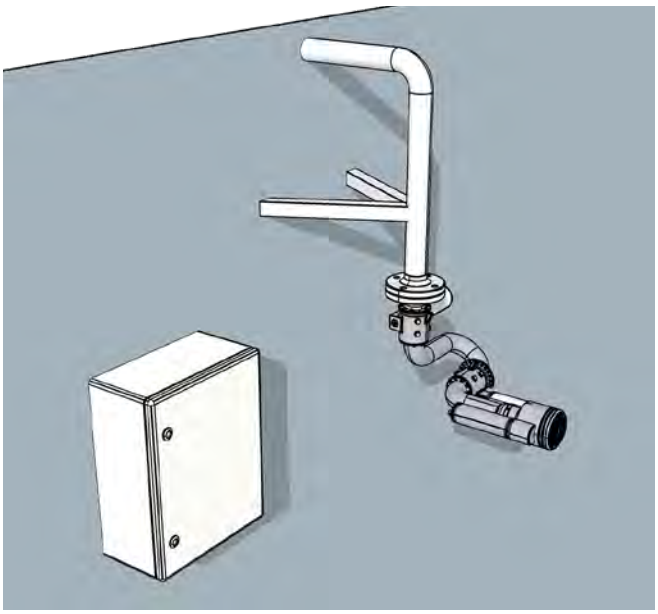
Use when the Robotic Nozzle is installed on a wall, allowing a maximum of 180° horizontal and +/- 90° vertical movement .The TARGA PLC must be installed next to the Robotic Nozzle

CAUTION!

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



Wall, inverted orientation



Use when the water supply comes from above.

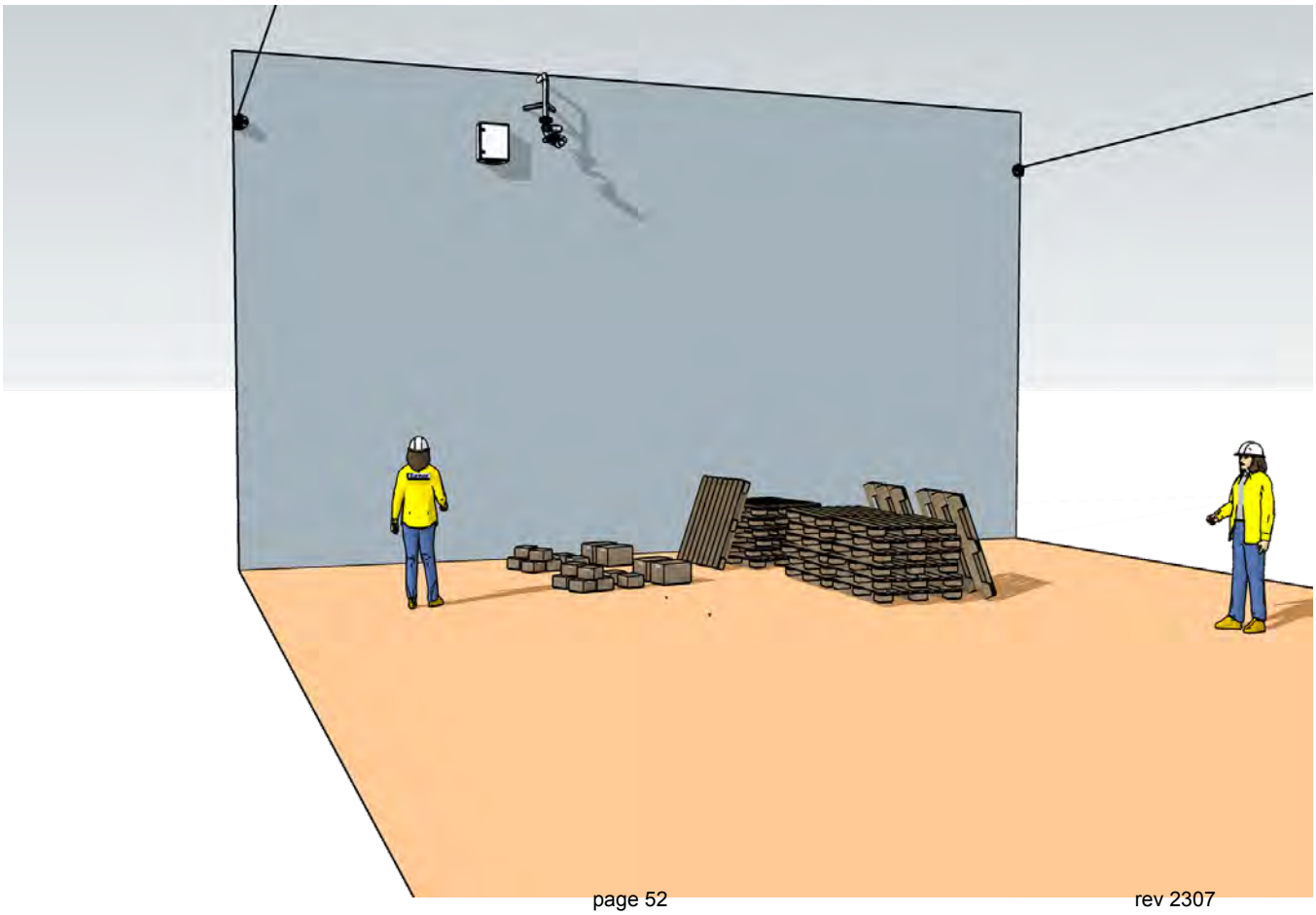
Use when the Robotic Nozzle is installed on a wall, allowing a maximum of 180° horizontal and +/- 90° vertical movement

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.



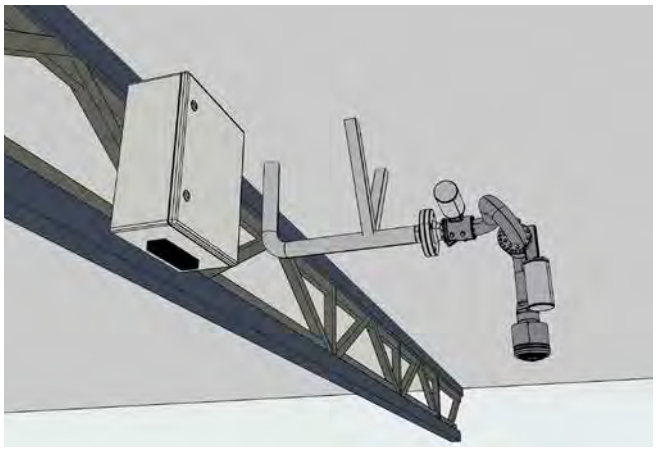
Ceiling, hanging orientation

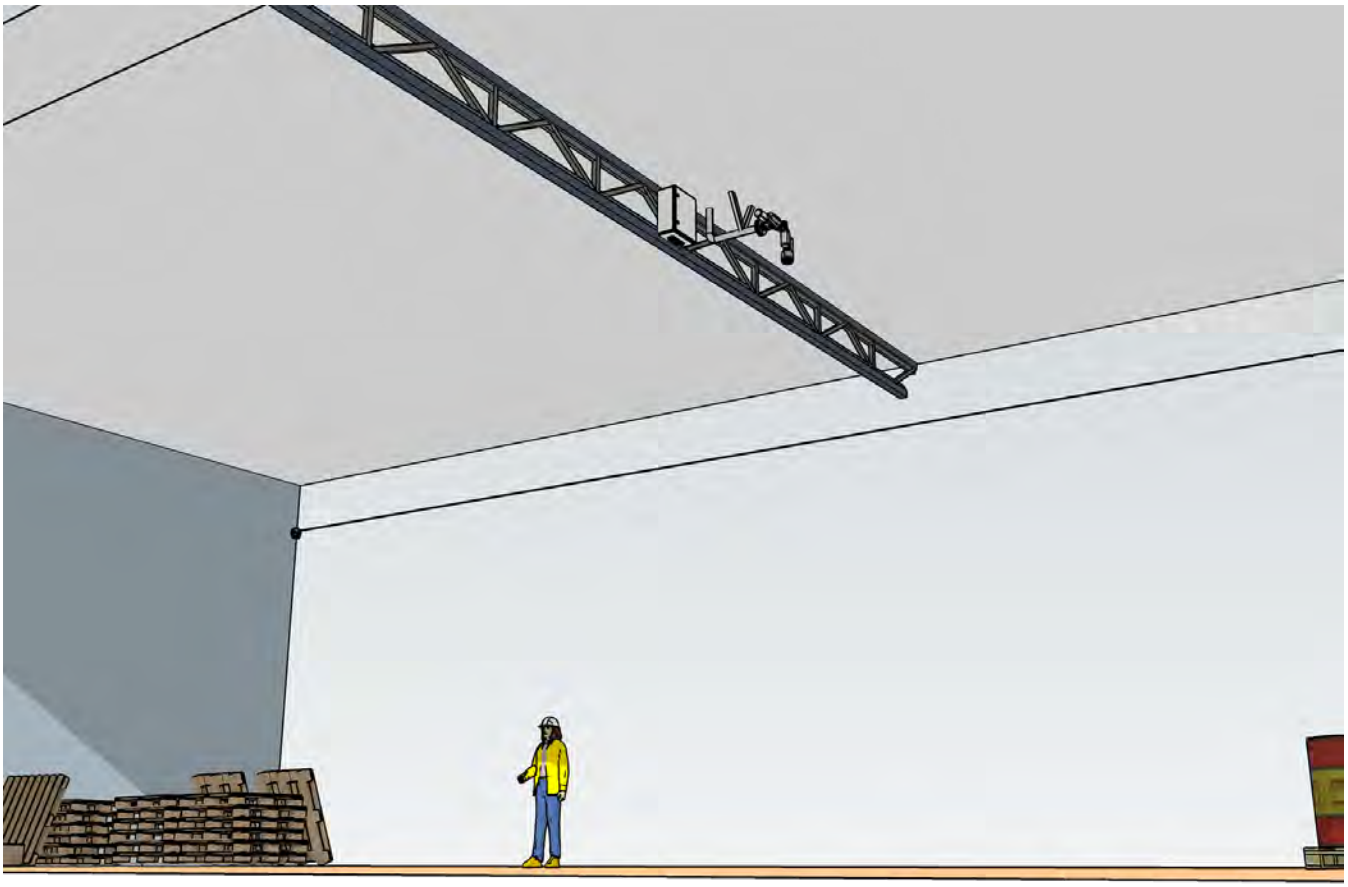
Installing the Robotic Nozzle hanging from the ceiling usually provide the best reach and coverage.

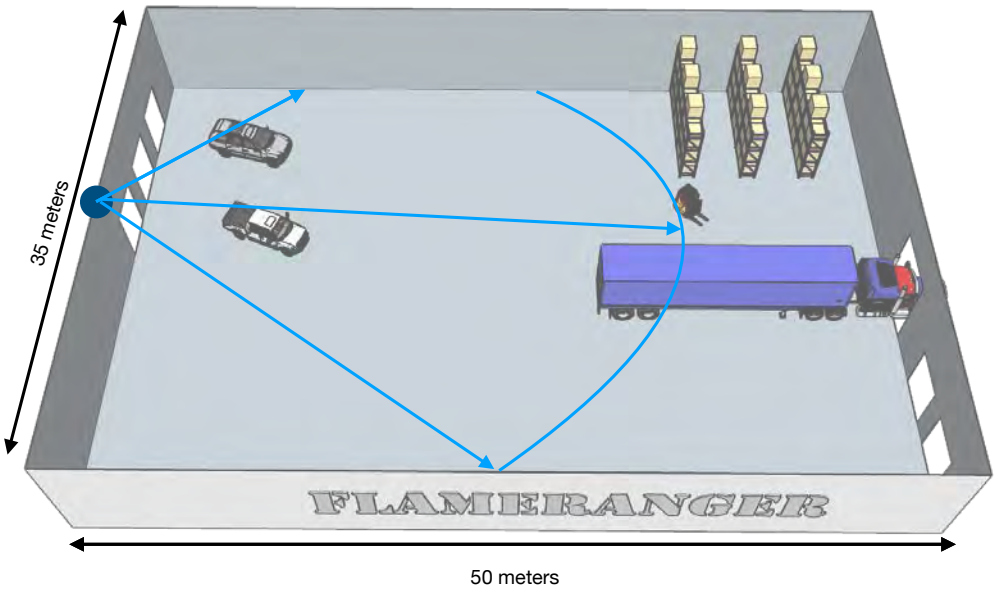
The Robotic Nozzle can be installed in the center of the area covered by the detector, thus allowing a full 360° coverage of up to 70 m Ø (35 m reach in all directions)

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

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

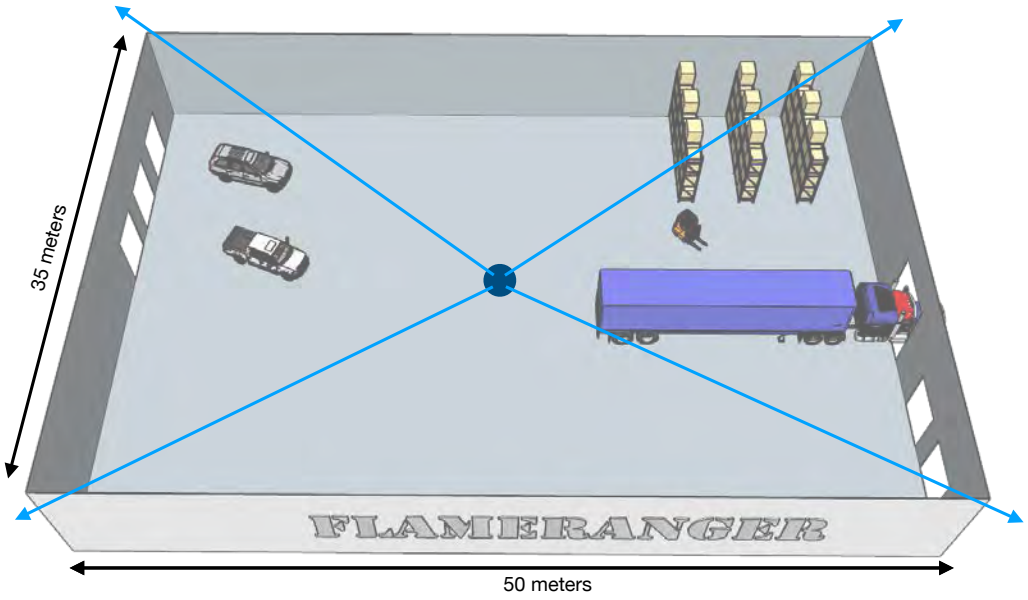






Installation on the wall

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

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 provide 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 default position.

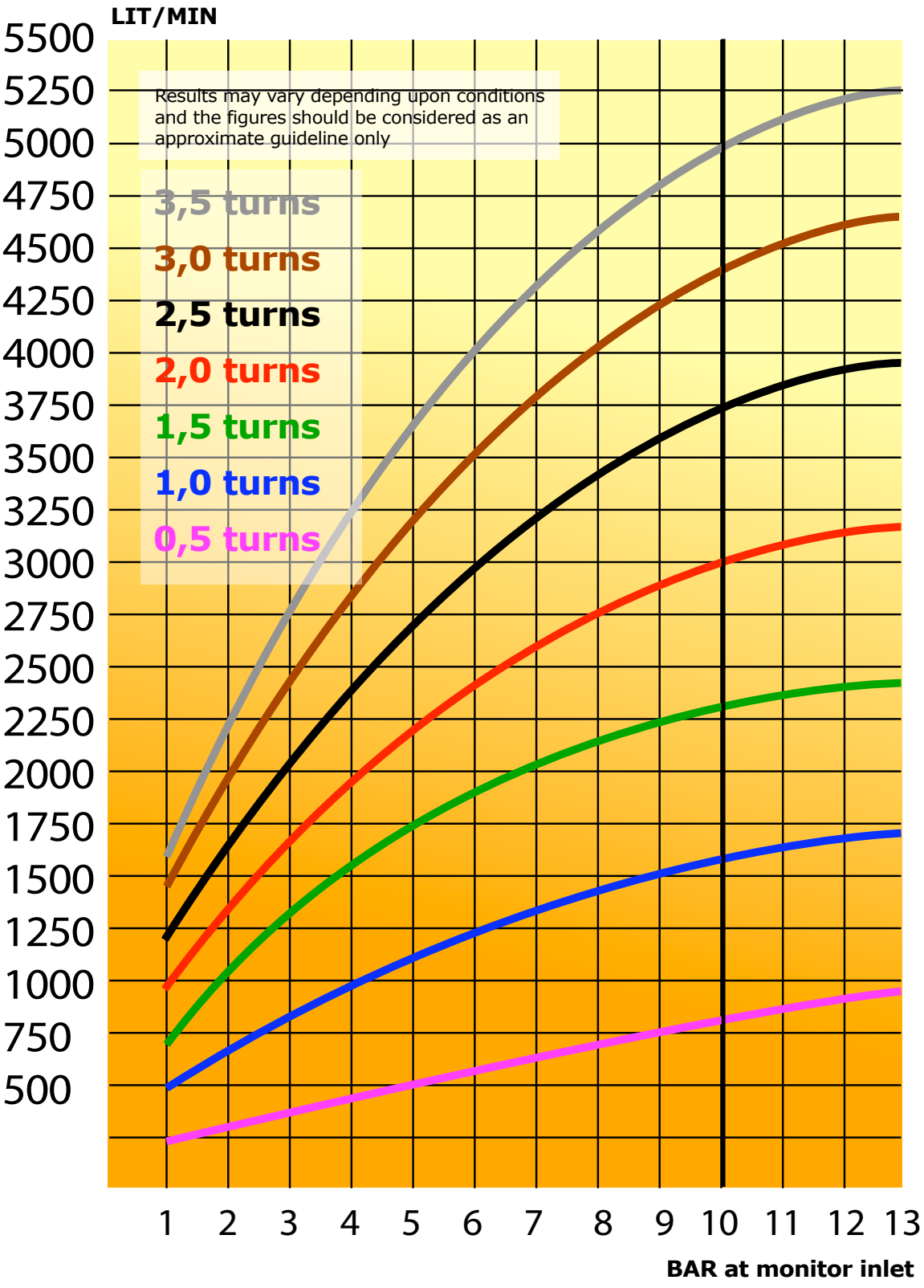
UNIFIRE

FORCE 80

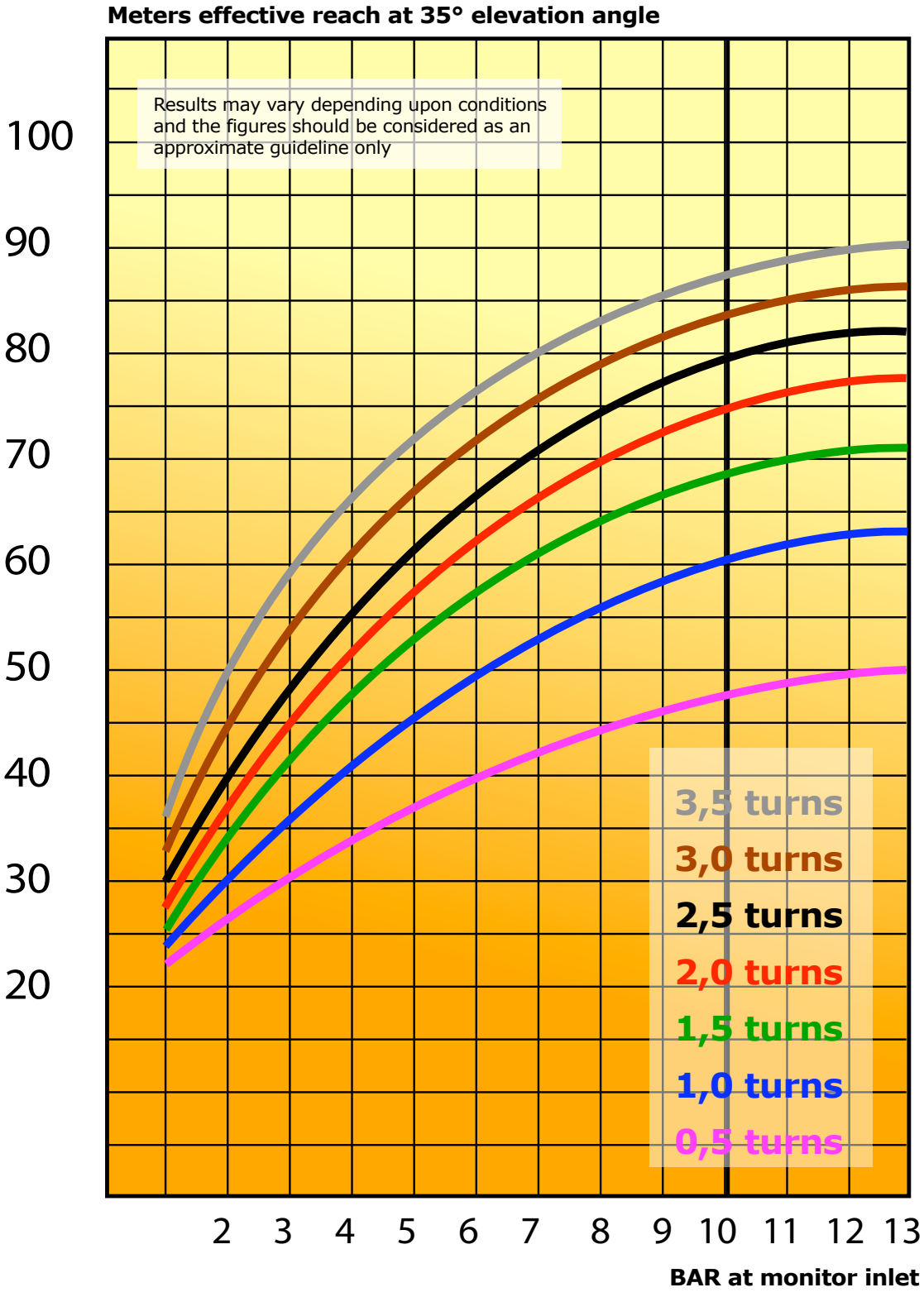
FLOW & REACH CHARATERISTICS

The future of firefighting

Flow chart with INTEG 80 nozzle



Reach chart with INTEG 80 nozzle



FORCE ROBOTIC NOZZLE SETUP INSTRUCTIONS

First start up and calibration of

UNIFIRE FORCE Robotic Nozzle

with Unifire's Ammolite™

Graphical User Interface

UNIFIRE

Introduction

Unifire's Force Robotic Nozzle set up is achieved through our web browser-based graphical user interface (GUI), called***Ammolite*** ™.

The Unifire 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.

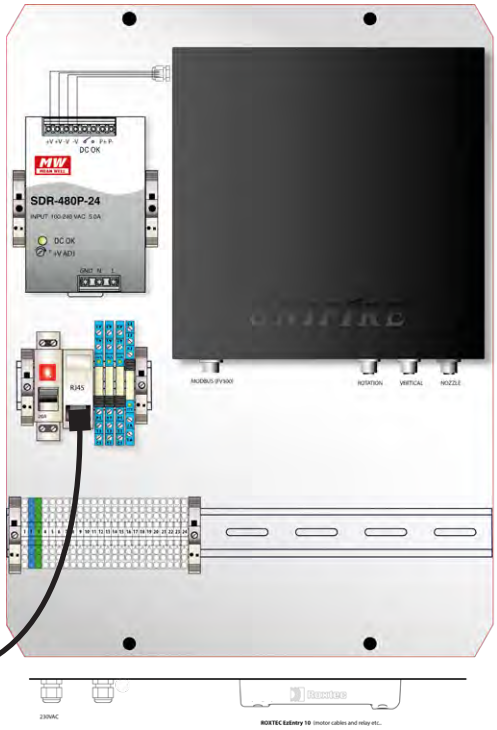
This can be a local router or a dedicated server in a larger network, administered by your IT department or similar.

To connect to the Ammolite setup graphical user interface, open a browser (Chrome, Firefox, Safari, Edge etc) and enter http:// followed by the IP address and :81 at the end (for example, if the IP address is 192.168.0.45, enter into the browser: http://192.168.0.45:81).

To access the Ammolite setup environment, enter the username and password, which were provided to you with your system.

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

For further assistance, send your inquiry to support@unifire.com or call +46 303 248 404.



NETWORK

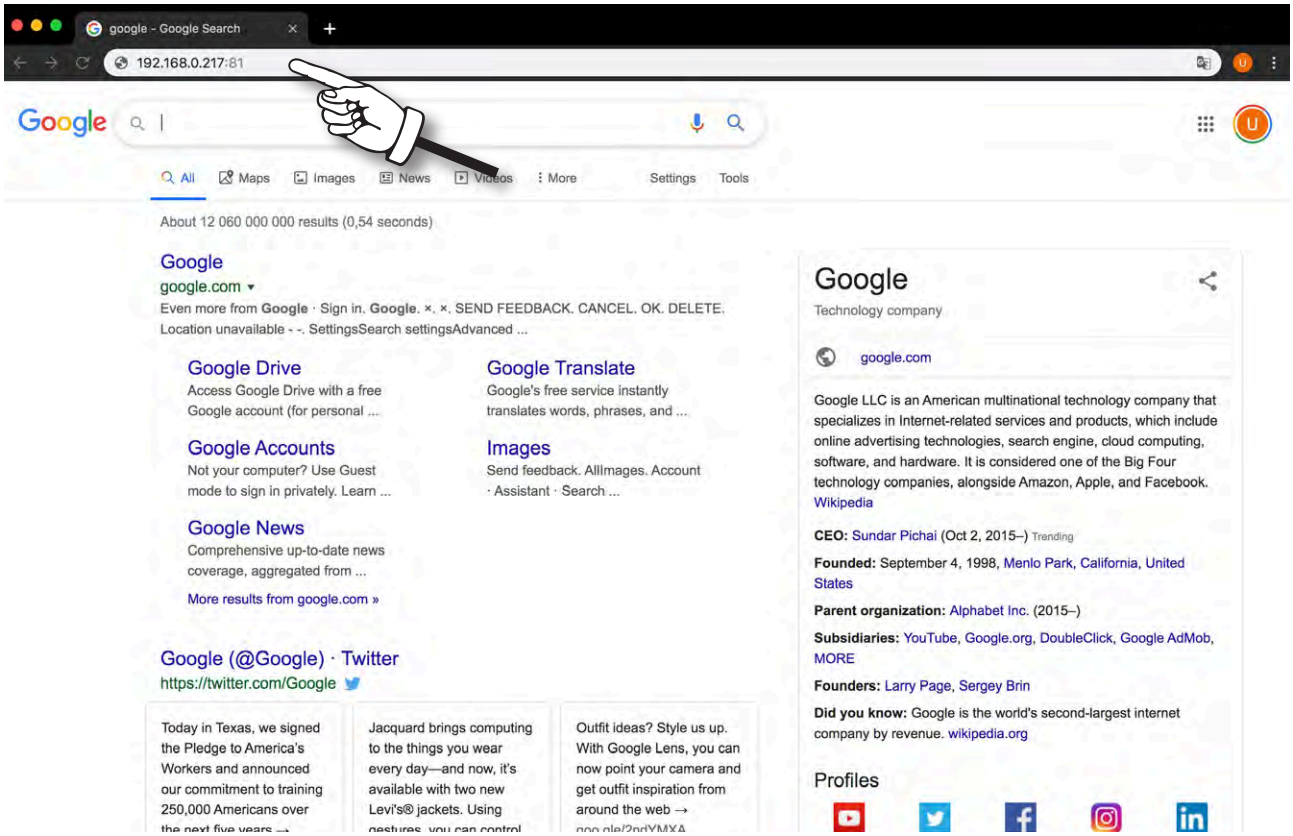
DHCP Server on
Local Router
or LAN

Connect your PC or Tablet by WiFi or cable to the same network as the TARGA PLC.

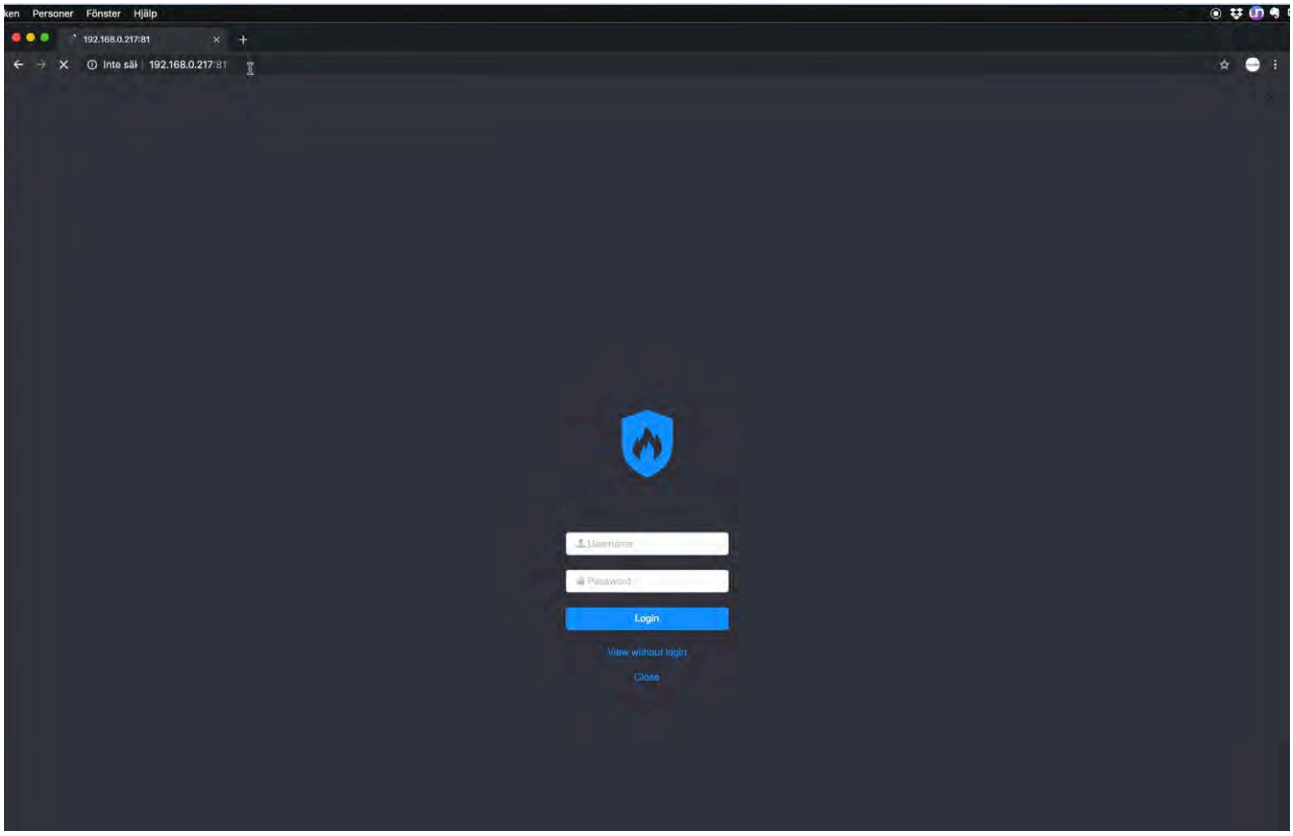
Find IP address of the TARGA PLC as automatically assigned by the DHCP server

Enter the IP address, followed by :81 in the browser window.
(for example http://192.168.0.45:81)

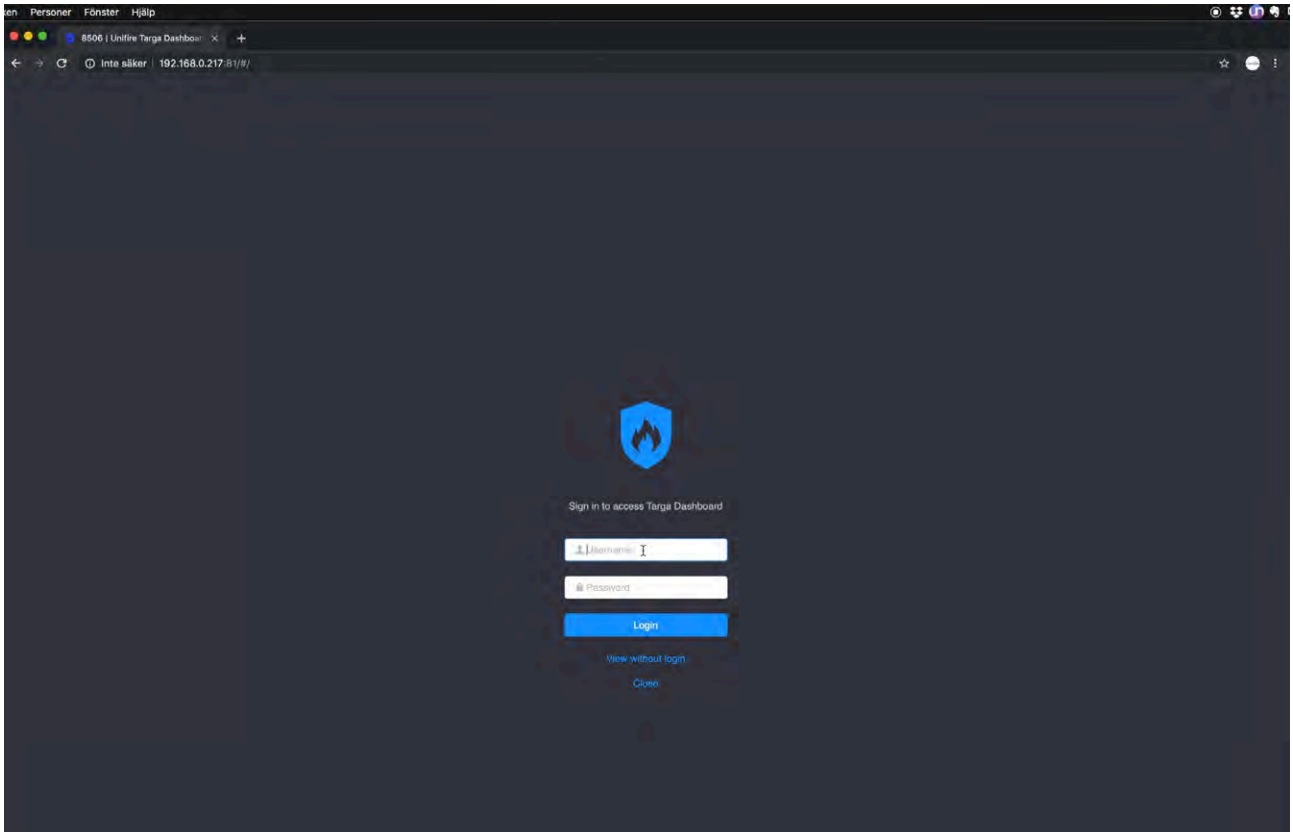
Follow instructions to calibrate in this manual.



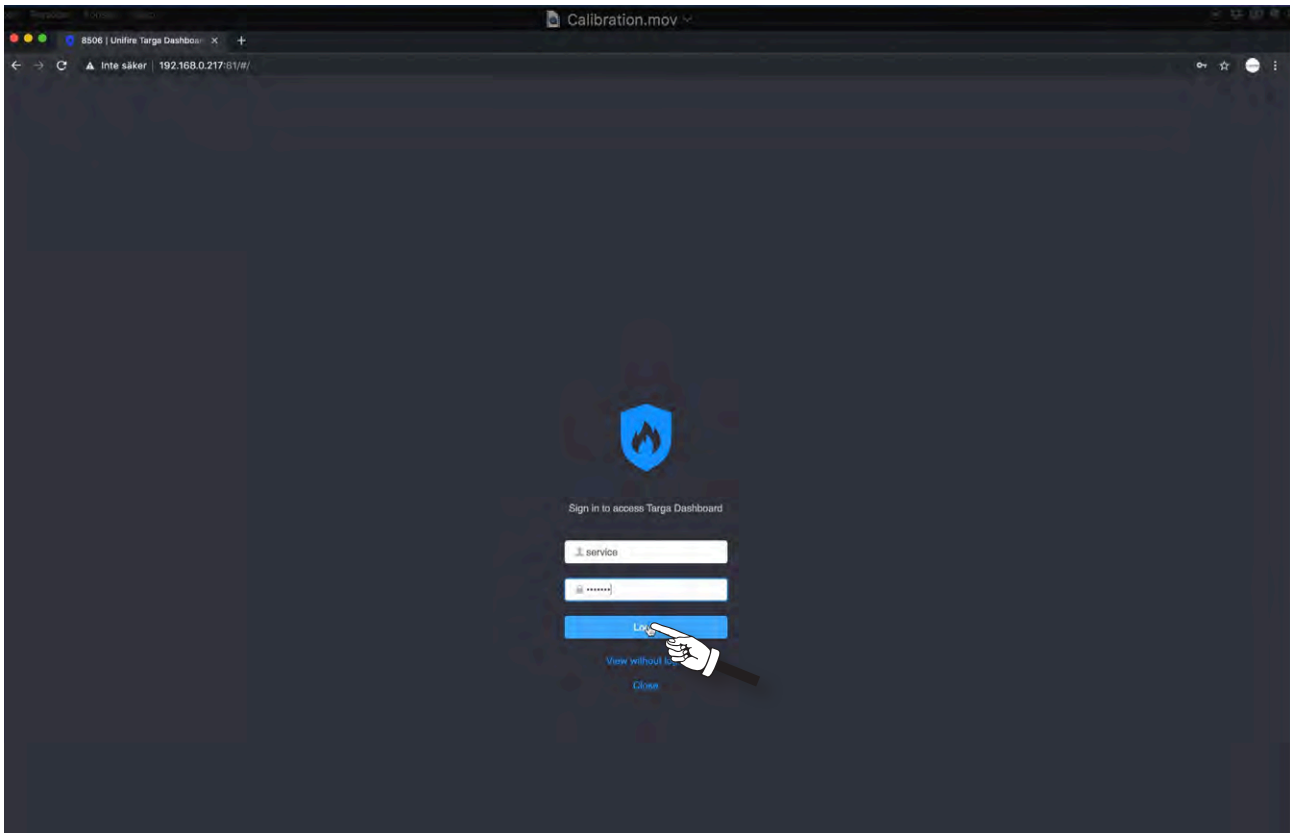
1) Open your web-browser (Safari, Chrome, Firefox or other).



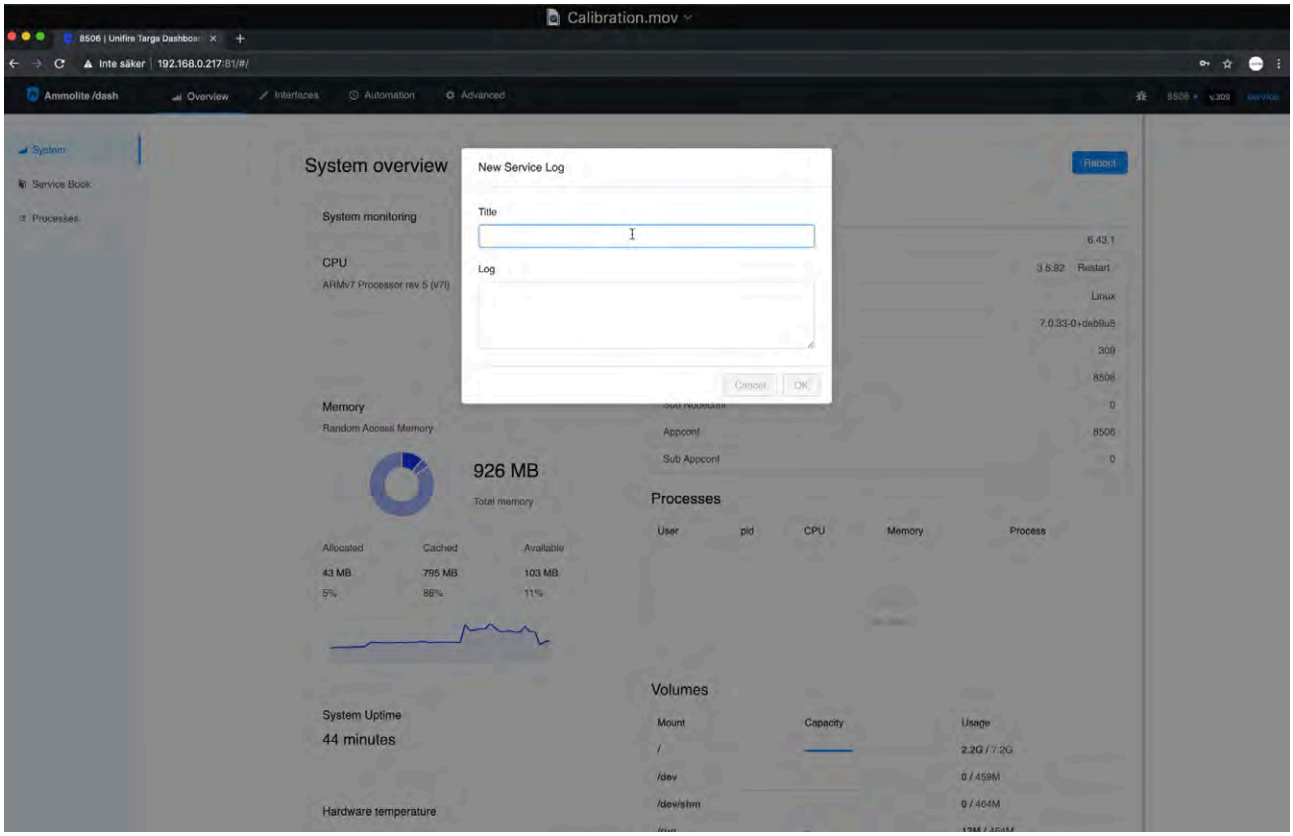
2) Enter the IP Address of the TARGA PLC, followed by :81 (for example http://192.168.0.217:81). Push Enter.



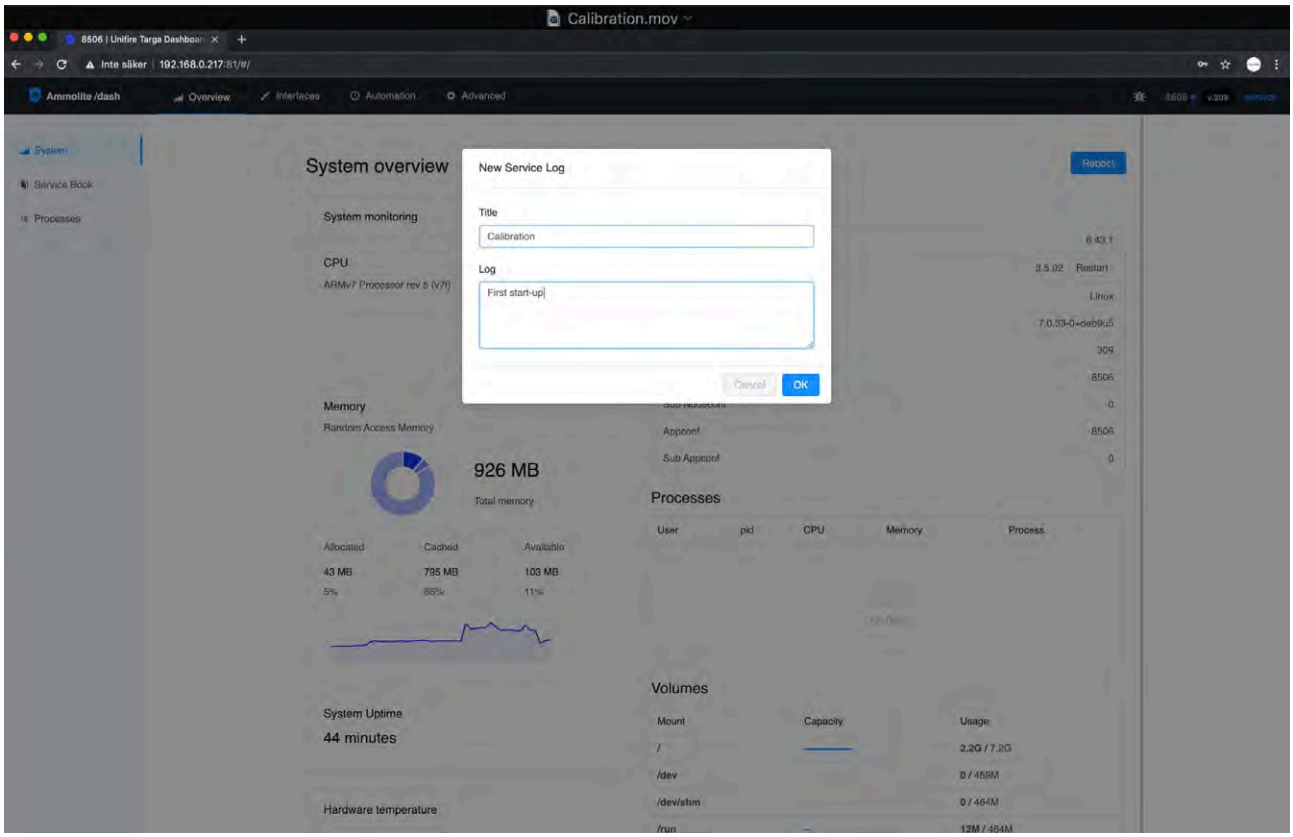
3) Enter the username and password provided with your delivery.



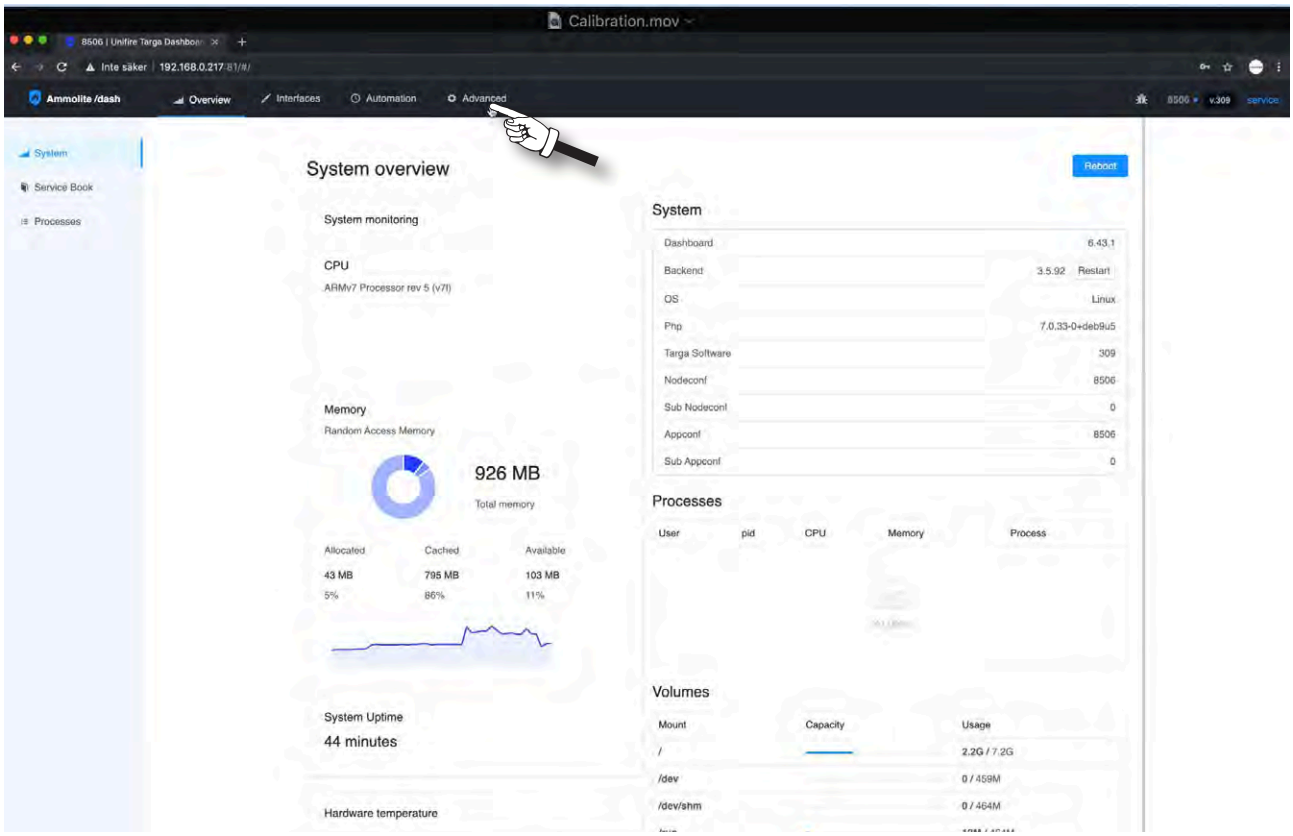
4) In this example, both the username and password are “service”. Click Login.



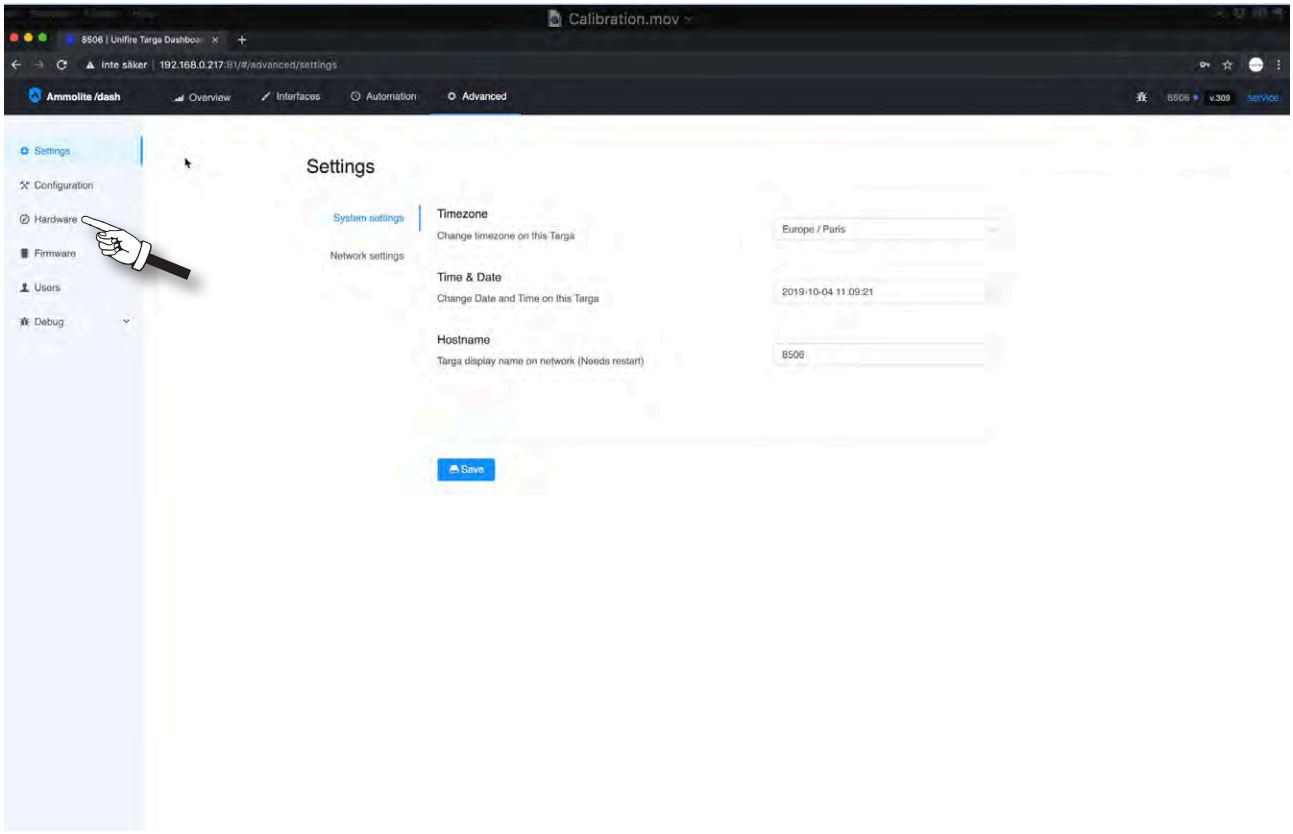
5) You are now requested to make a note in the service log.



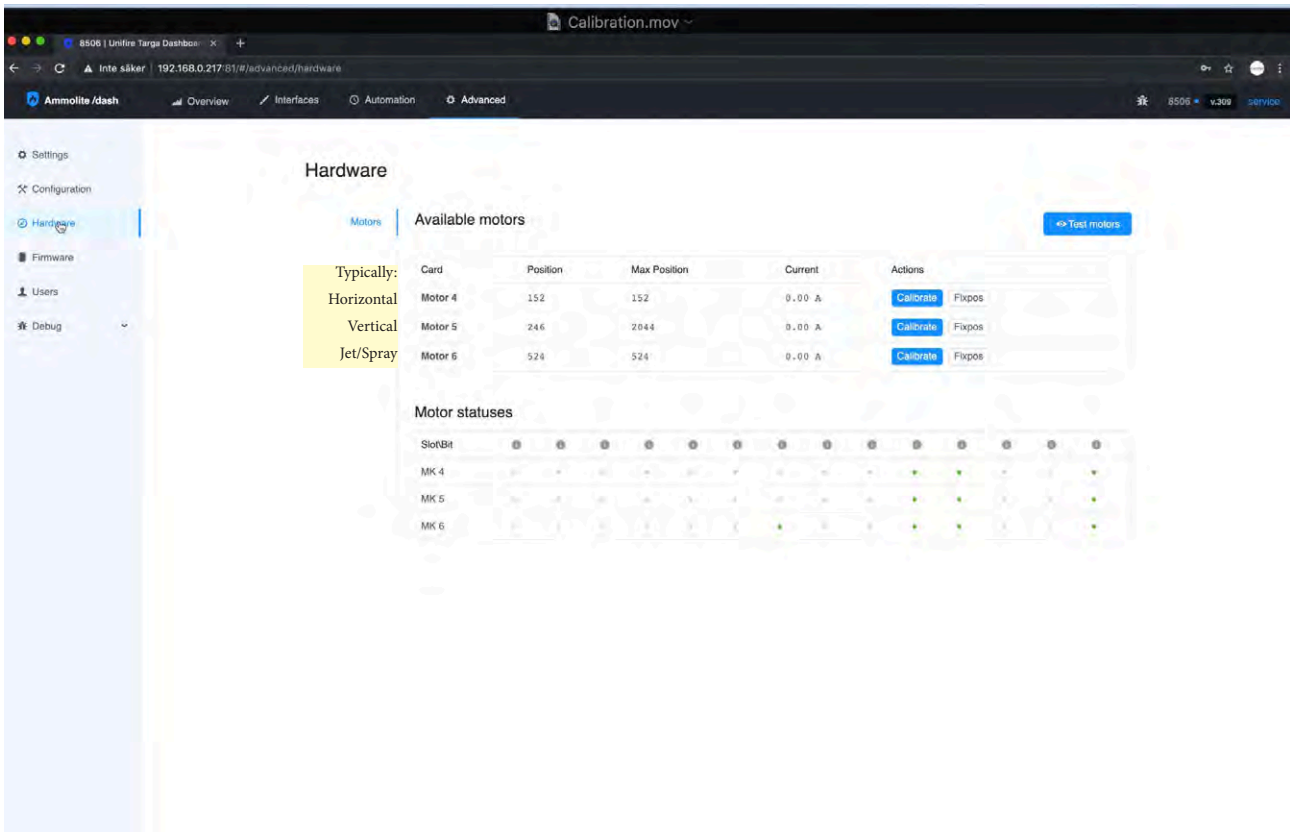
6) In this example we wrote, “Calibration” in the title, and “First start up” in the Log. Any text can be entered. After entering, this information, click **OK**.



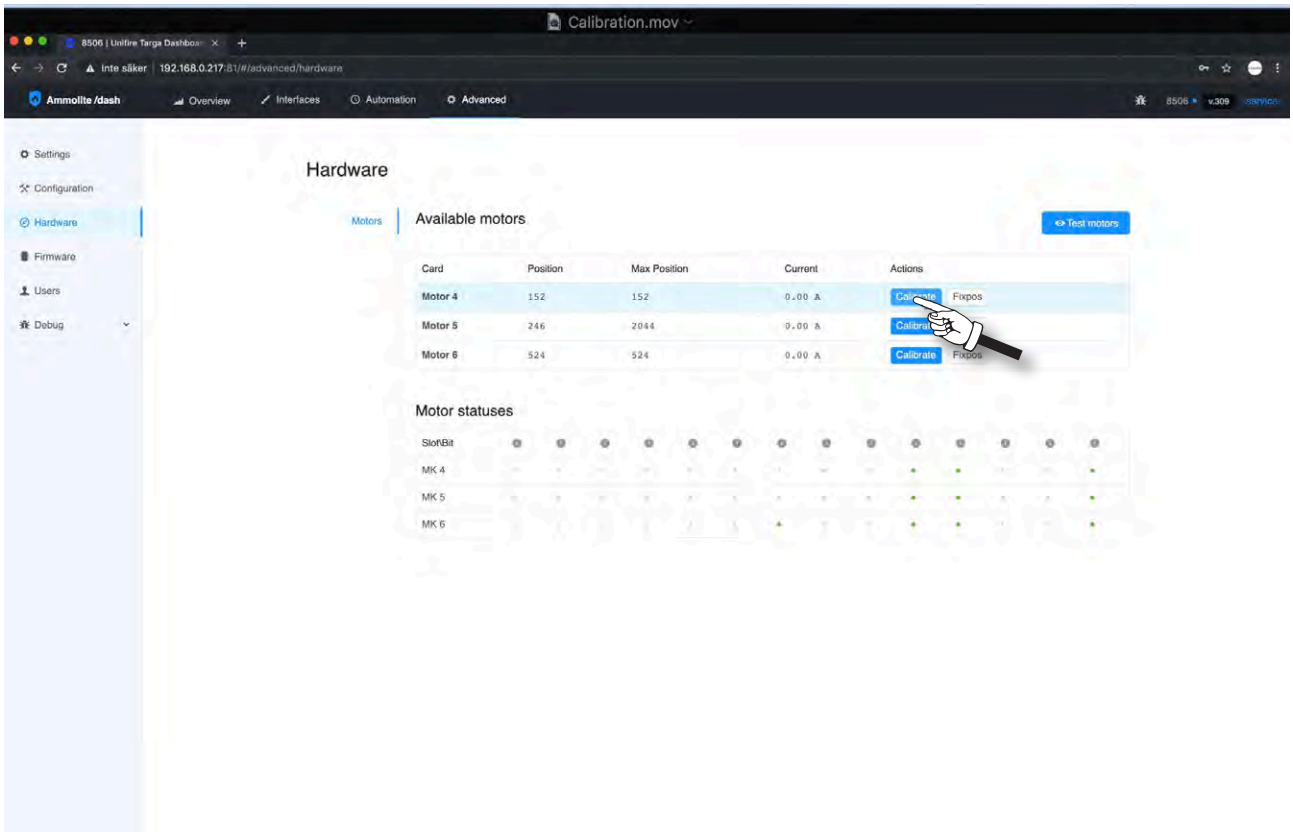
7) This opens up the start page of Ammolite. To initiate calibration of the operating range, click "**Advanced**".



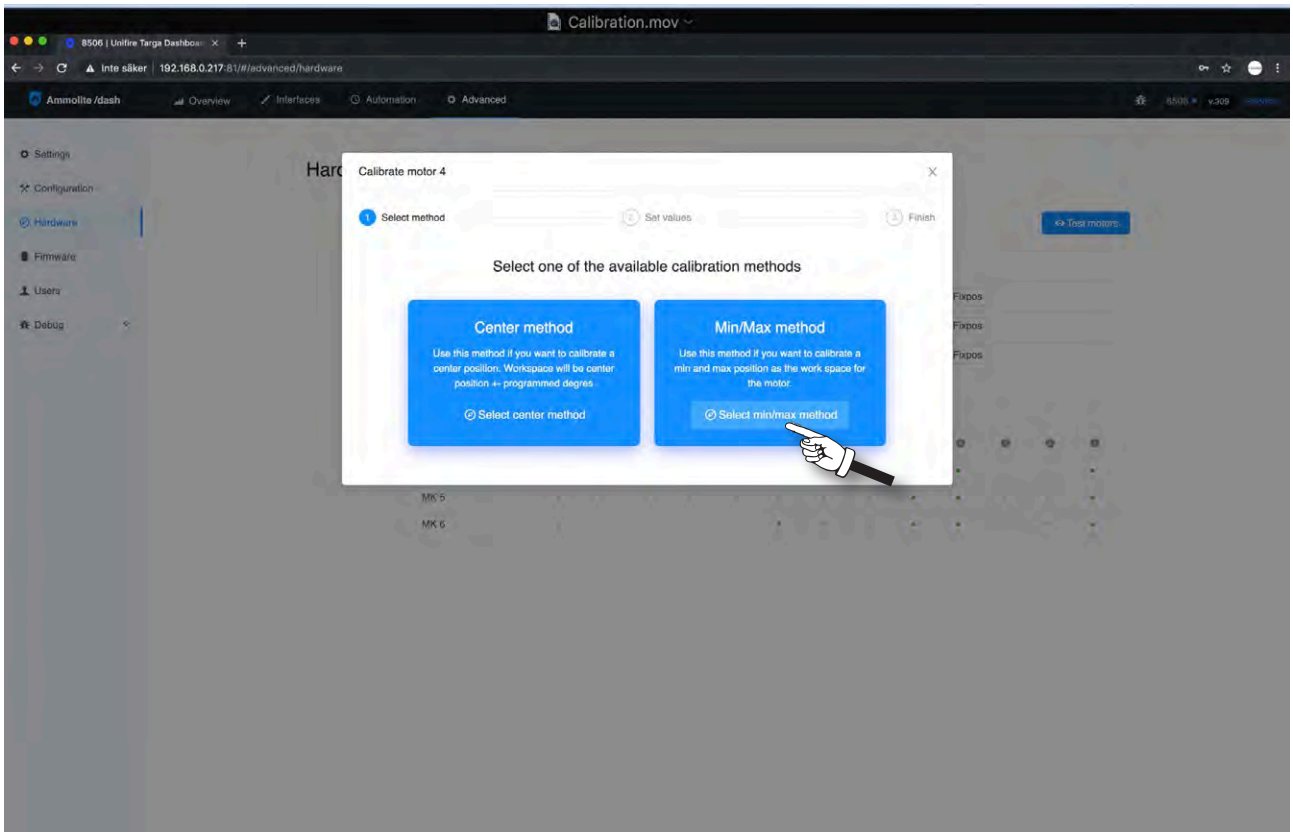
8) This opens up the section Advanced settings. Next click "**Hardware**".



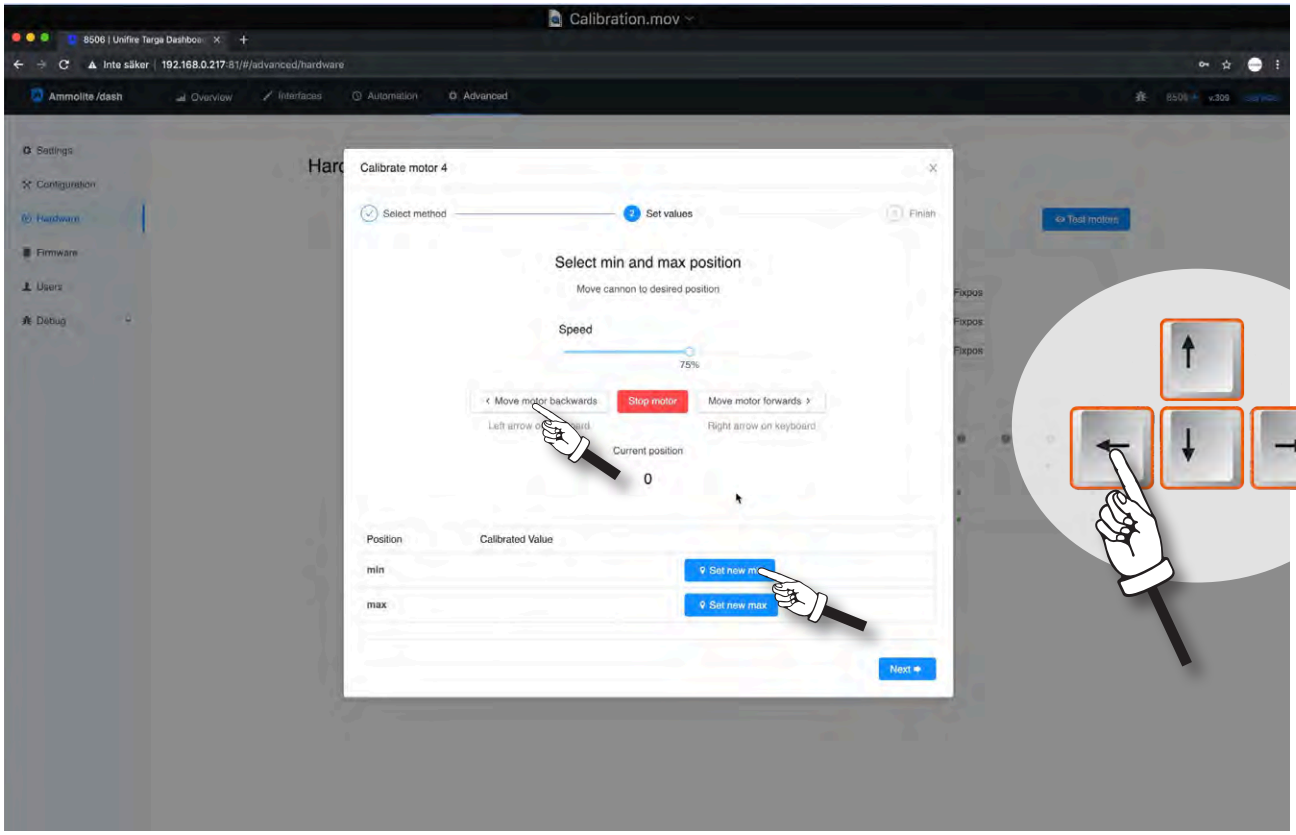
9) This opens up the Motor page. You can read the Position of the motors, calibrated max, actual real-time current draw (A), and Motor Status.
MK4 is usually horizontal, MK5 usually vertical, and MK6 usually nozzle jet/spray).



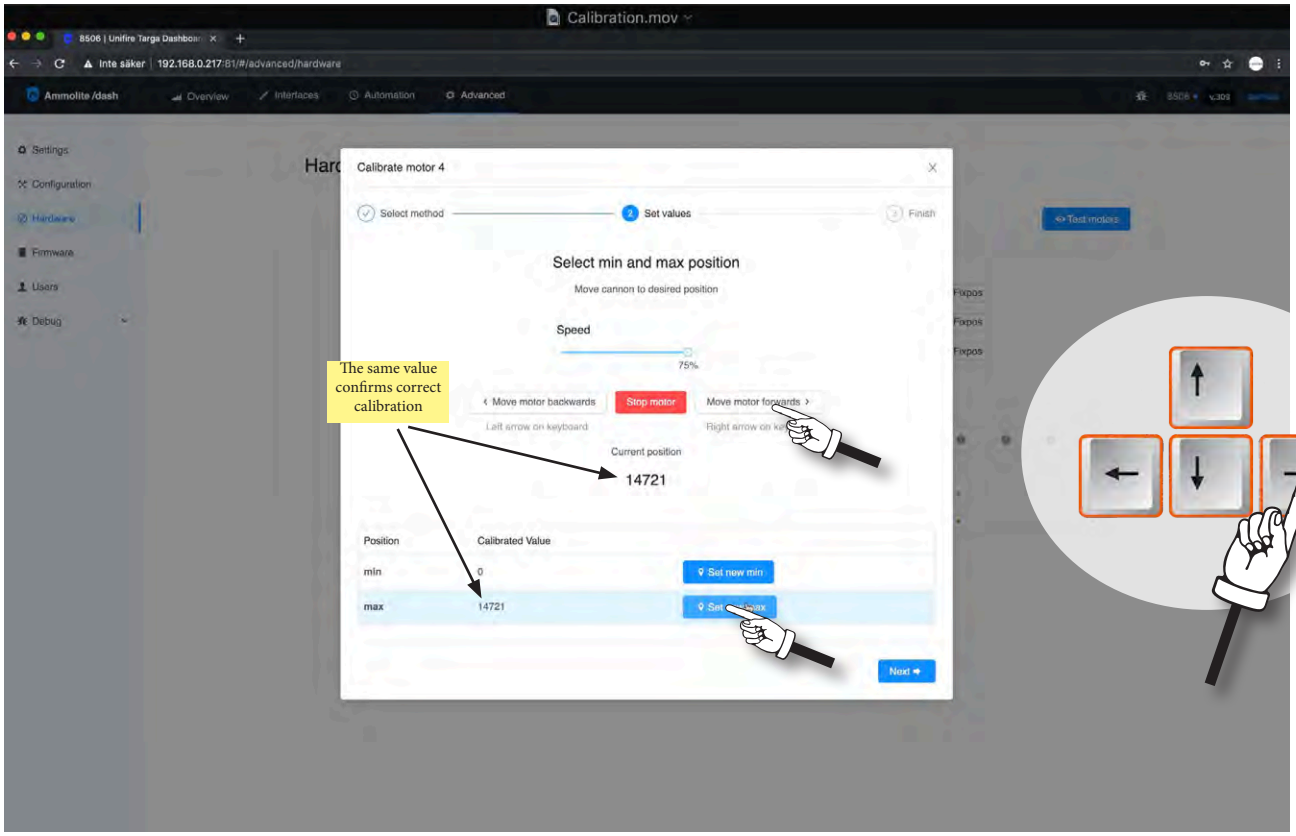
10) To calibrate Motor 4 (horizontal), click “**Calibrate**”.



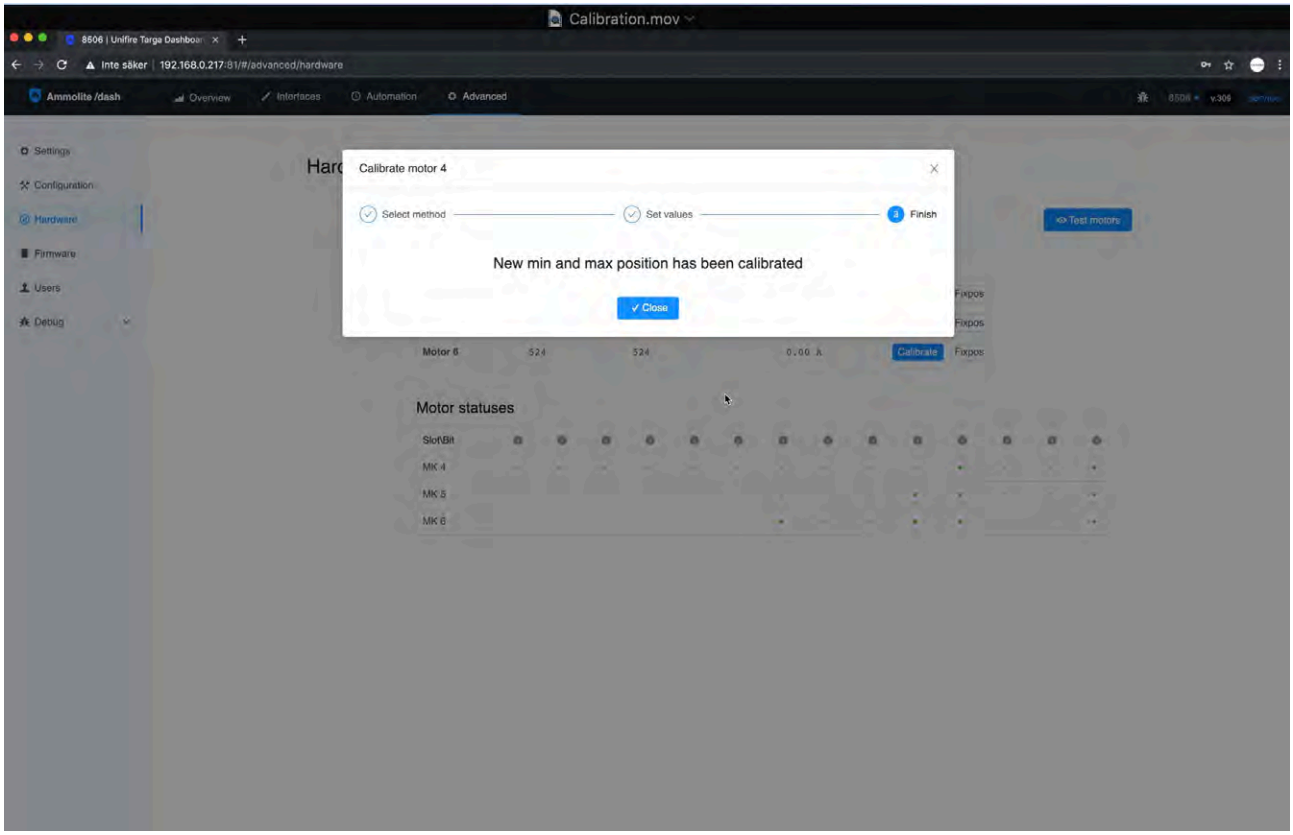
11) Select Min/Max method that allows you to freely select any operating range. (The Center method is used only for special applications when the operating range is pre-set in the software.)



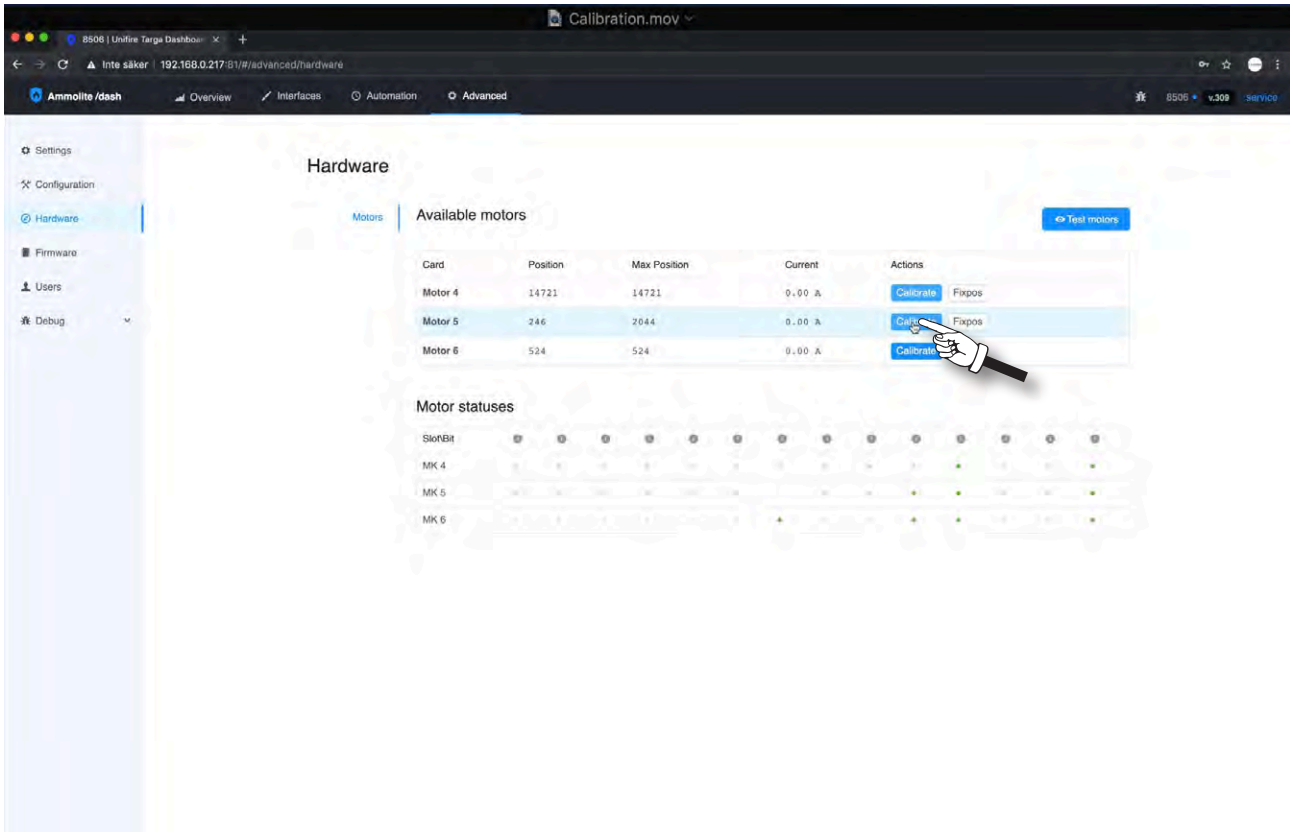
12) Run the motor to the required Min position (left arrow), by using either the buttons on the screen (for tablets), or using the right/left arrow keys on your PC Keyboard. Once you have the position, Click “**Set new min**”



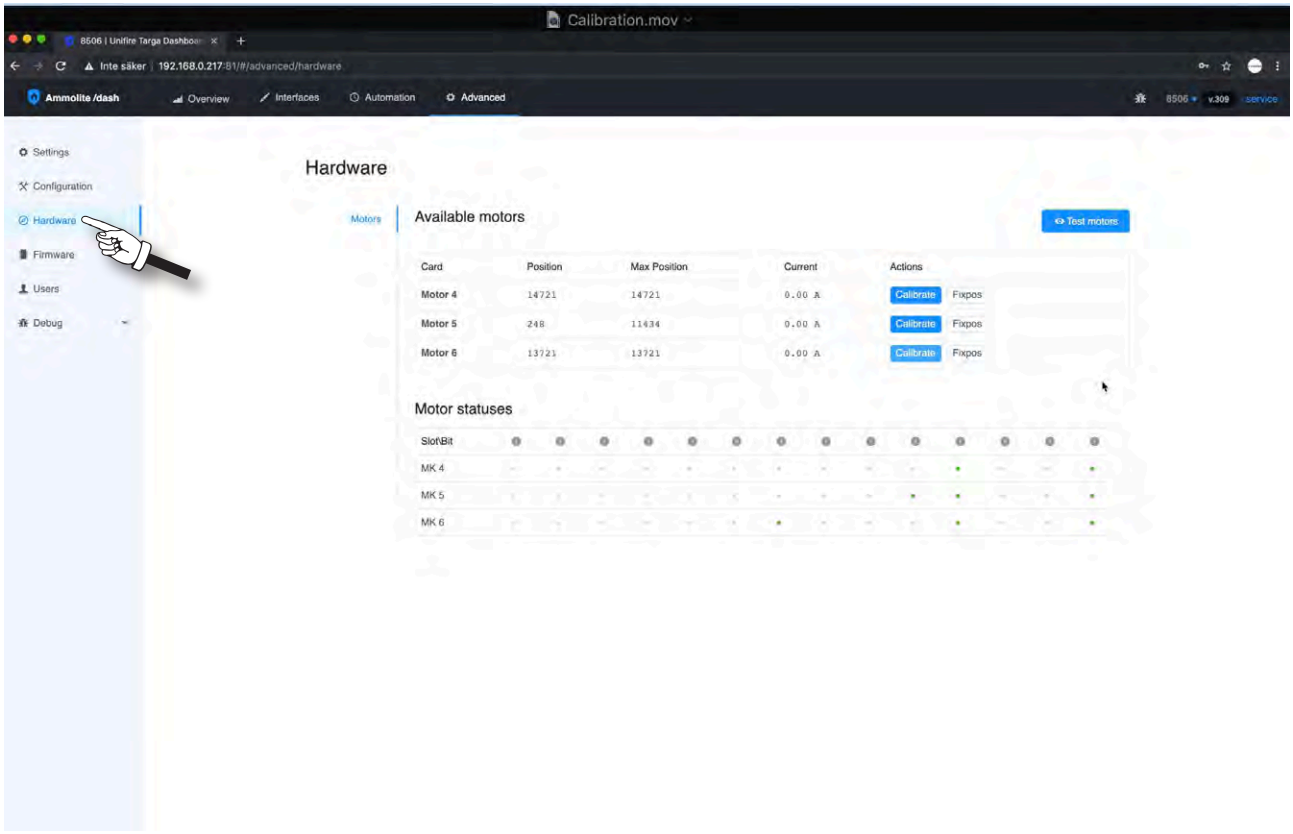
13) Run the motor to the required Max position (right arrow). Now the “Current position should read a value typically between 2 000 and 50 000. Click "**set new Max**".



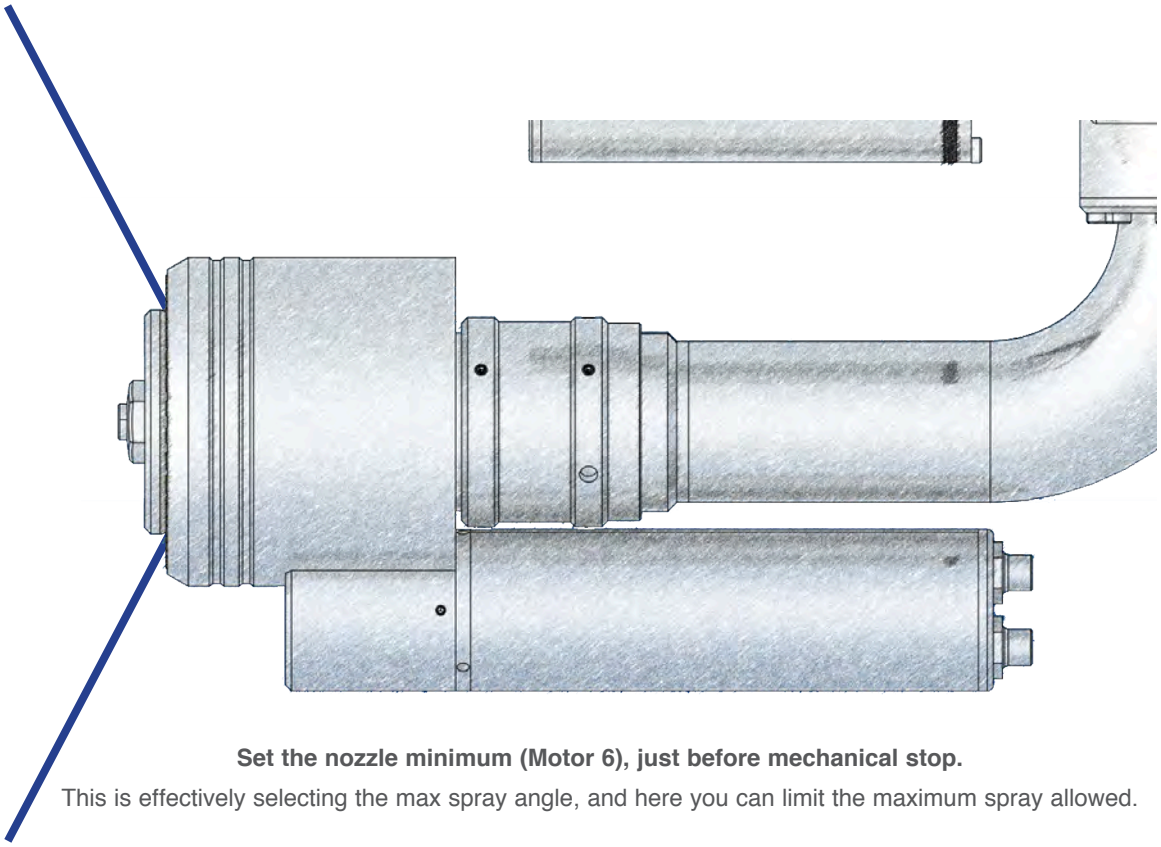
14) Next, you see this notice, confirming successful calibration.



15) Repeat steps 10 - 15 for Motor 5 (vertical)

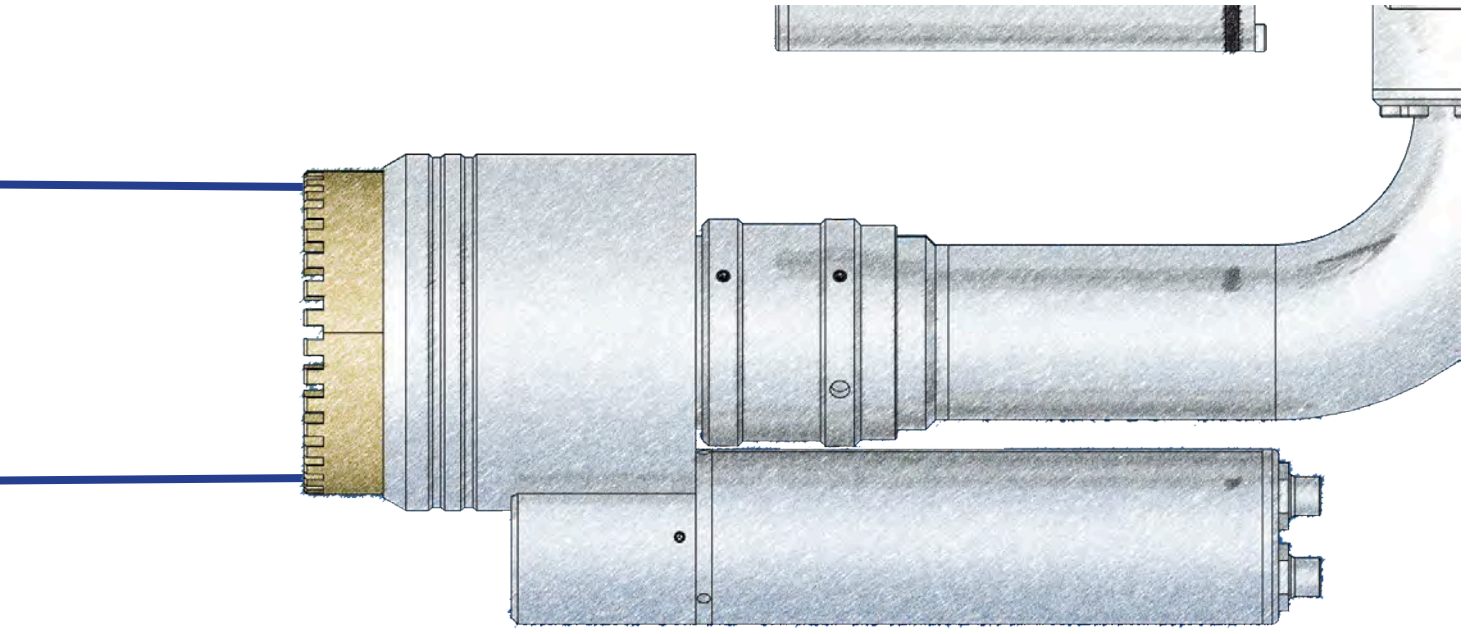


16) Calibrate Motor 6 (nozzle jet/spray) in the same manner as you did the other motors, but follow the instructions in step 17 on the next page.



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

This is effectively selecting the max spray angle, and here you can limit the maximum spray allowed.



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

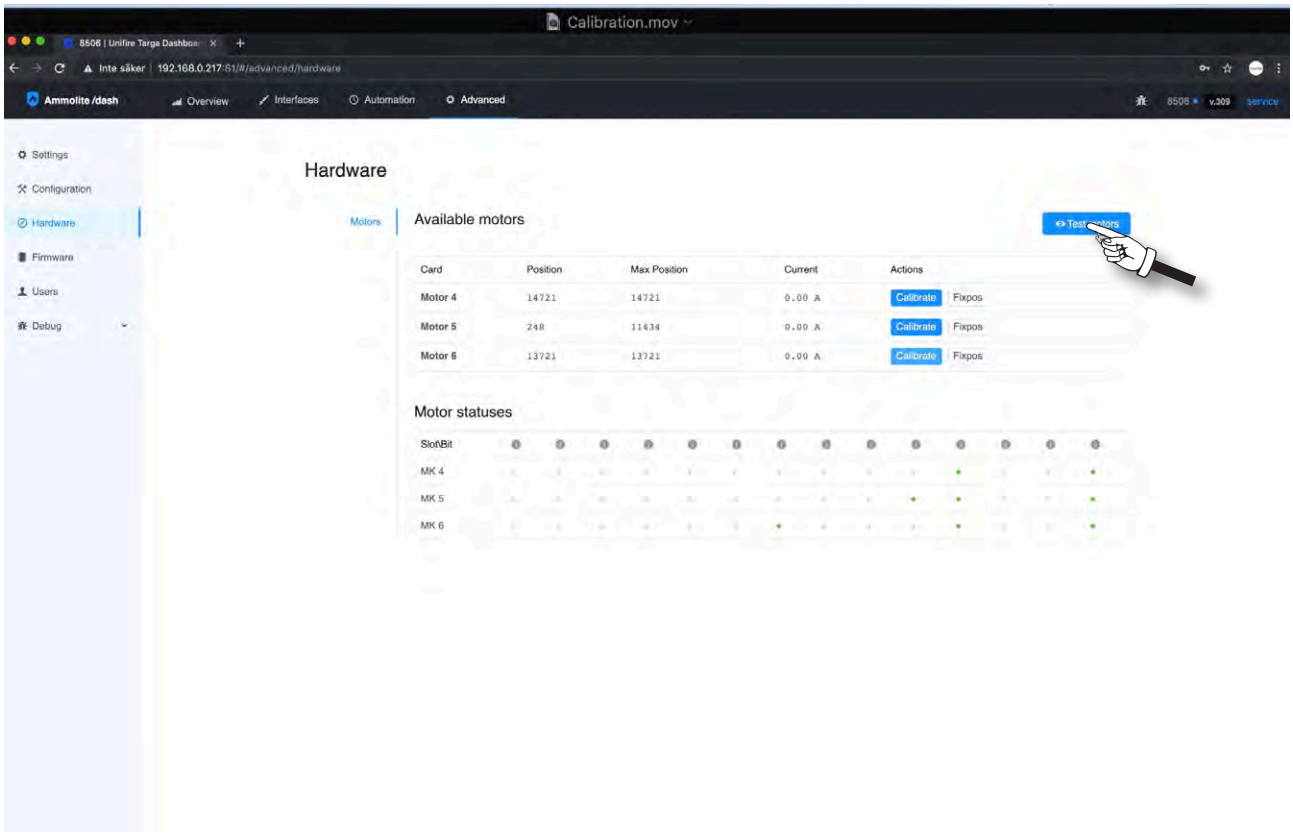
This is effectively selecting the straight stream.

Here you can block the straight stream by setting the

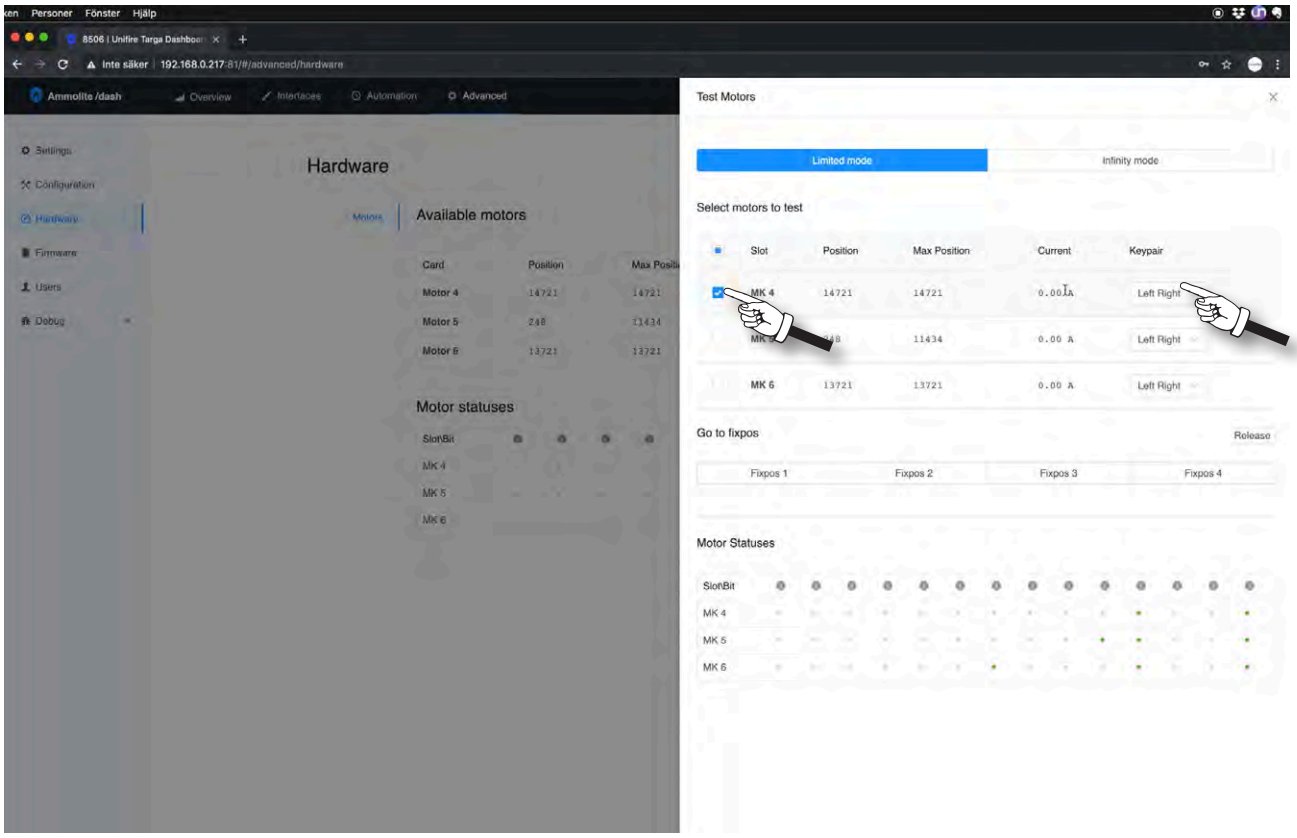
maximum to - say - 10 ° spray, and thereby avoid a straight steam.

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

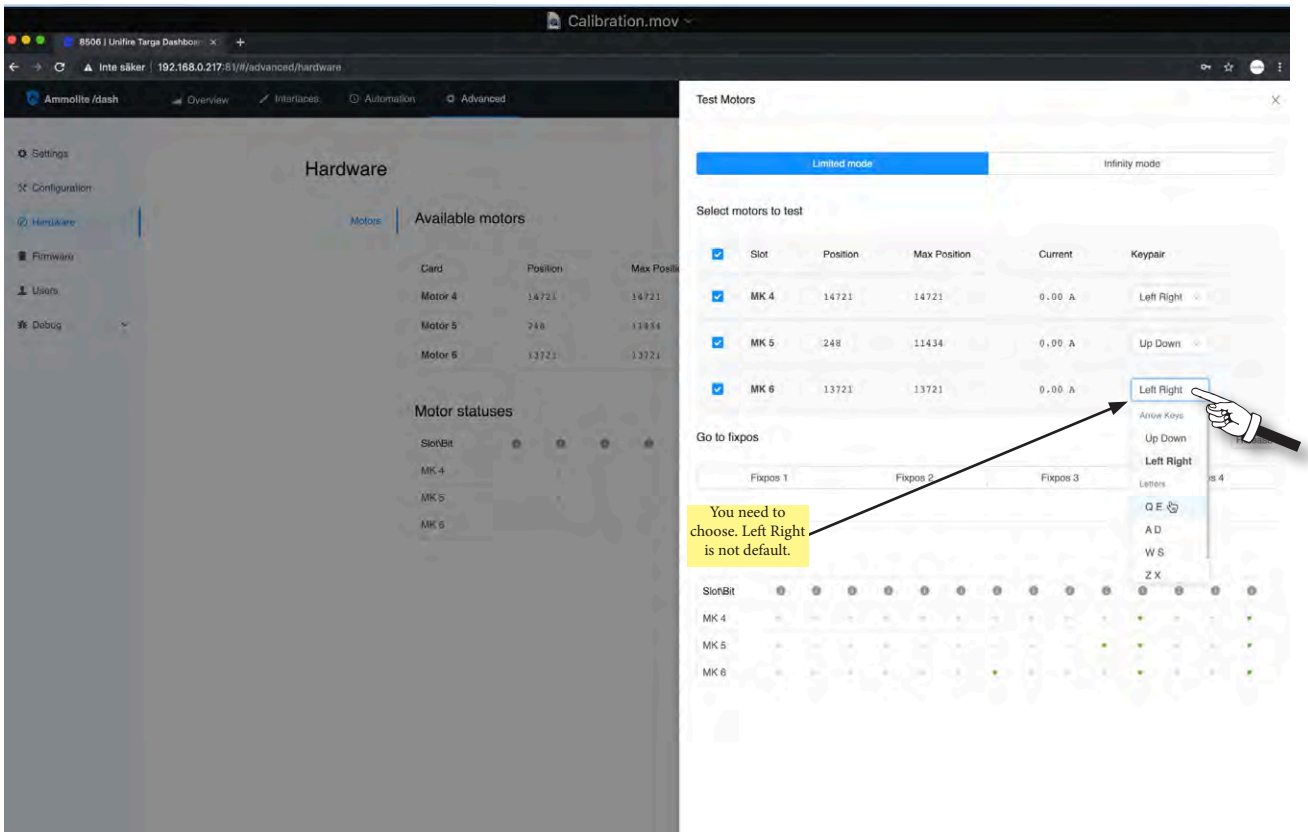
17) Calibrate Motor 6 (jet/spray nozzle) as Motor 4 and Motor 5



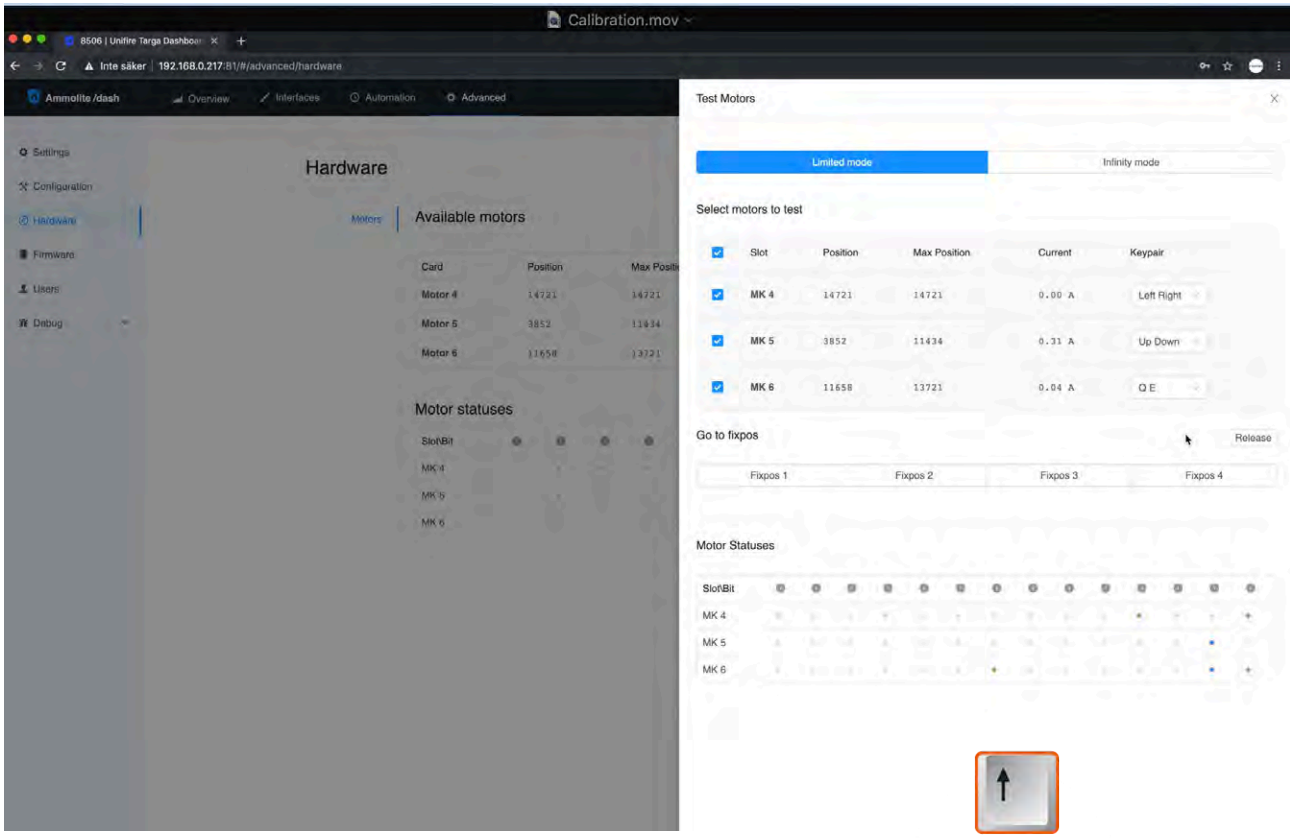
18) Next, you can test the motors and calibrated range directly form your PC. Click “**Test motors**”.



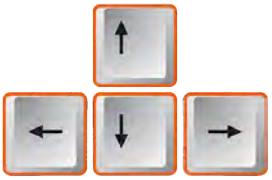
19) Check the box for each motor you want to run.

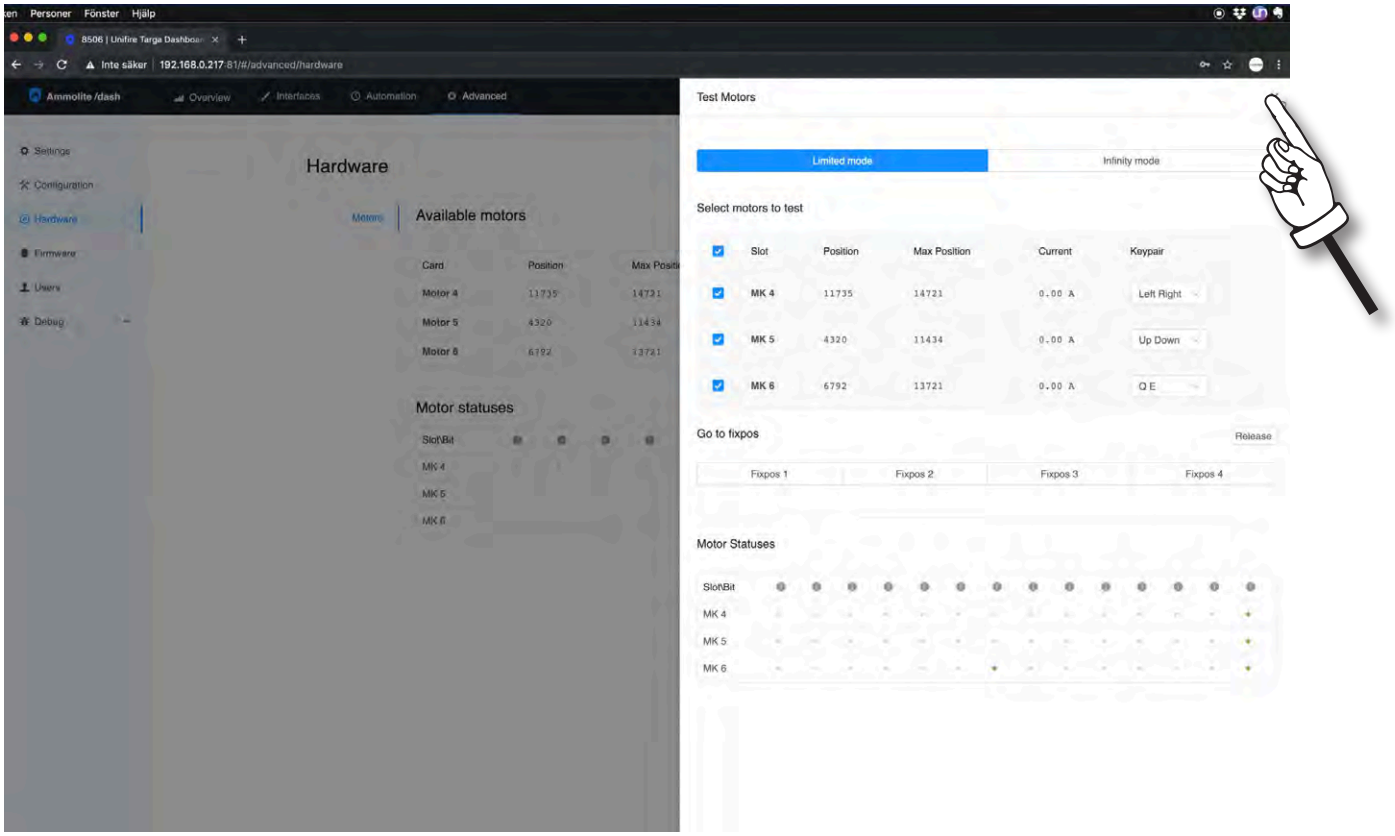


20) Then actively choose key pair. (This must be done.)



21) Now you can run the motors with the selected key pair.





22) Calibration is now complete and you can exit Test Motors and Ammolite.

If you require further assistance, contact support@unifire.com or call +46 303 248 404.

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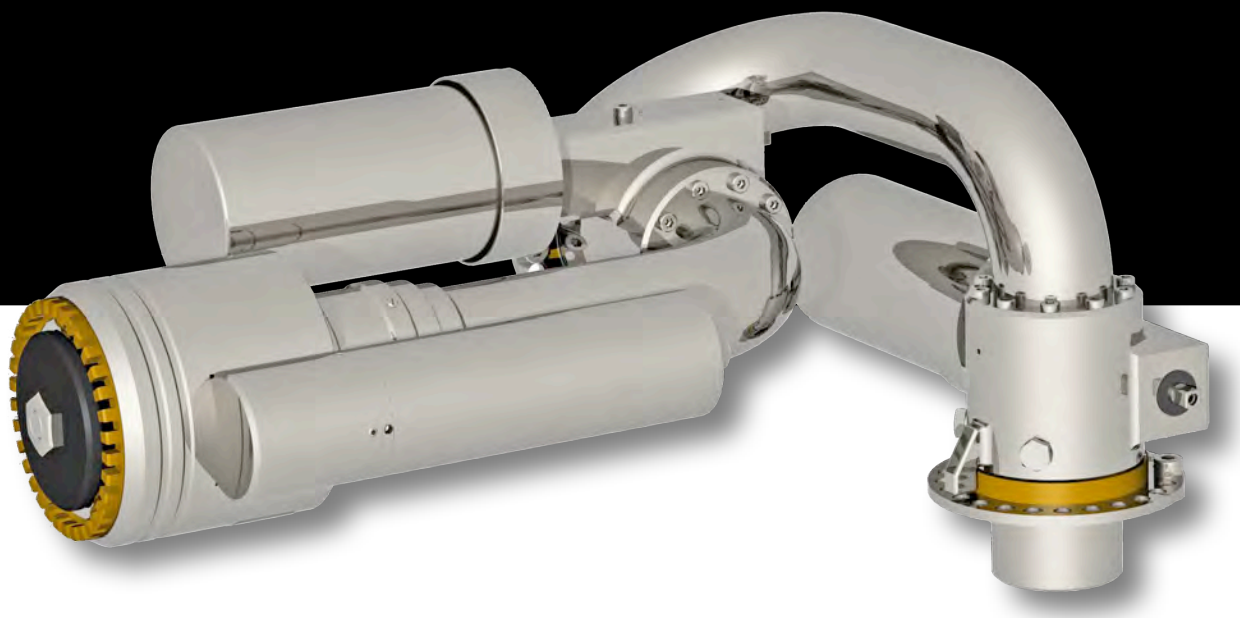
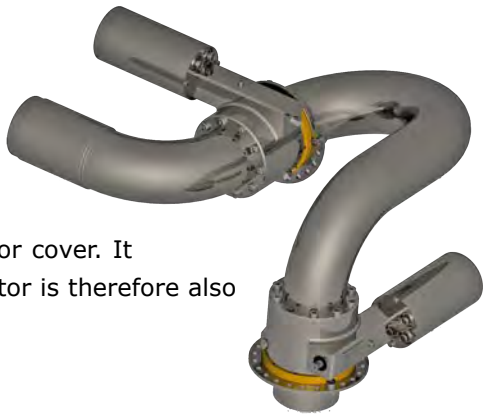
FORCE ROBOTIC NOZZLE

MAINTENANCE INSTRUCTIONS



The future of firefighting

MAINTENANCE of the FORCE 80 with BLDC motors



The FORCE 80 with BLDC motors has fully laser-welded motor enclosures. The motor cover can not be opened. If a motor is found to be defect, the complete motor assembly with its cover is replaced.

This design minimizes the risk of water penetrating the motor cover. It reduces maintenance requirement. Replacing a damaged motor is therefore also very quick and simple.

- We recommend that the multi connectors be inspected for water and/or signs of corrosion. As a precaution, the connectors should be sprayed with WD40 once per year.

- We recommend that the FORCE robotic nozzle be externally cleaned from time to time and when dirty. Clean with any cleaning agent and water, as with standard pieces of machinery. Because the FORCE robotic nozzle is made of polished (no surface treatment) 316L stainless steel, it can always be machine polished to look fantastic.

- The worm gears are filled with grease and hermetically sealed off with nitril X-rings. This means no dirt or water get into the gears. No air circulation will dry out the rubber seals. This is normally a maintenance free unit.

- **The worm gears must normally never be greased.** We recommend not ever greasing the gears unless specifically recommended to do so by Unifire AB on an individual, case-by-case basis. If Unifire recommends greasing, then be sure to follow Unifire's instructions, including by using the proper type of grease (Mobilith SHC460) and make sure to open the grease evacuation plug. Using the wrong type of grease WILL cause fatal damage to the mechanics or block the movement.

The worm-gears can not be disassembled. In case of damage, the complete unit is replaced.

See Drawing appendix for an exploded-views and parts-list.

MAINTENANCE of the INTEG 80 with BLDC motors

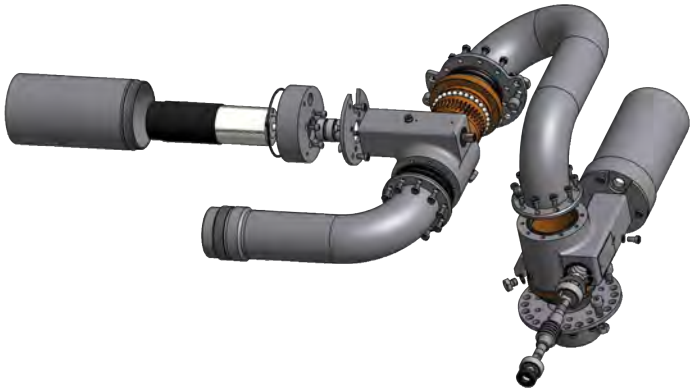
The INTEG 80 Nozzle with BLDC motor also has a fully laser-welded motor enclosure. The motor cover can not be opened. If a motor is found to be defect, the complete motor assembly with in its cover is replaced.

This design minimizes the risk of water penetrating the motor cover. It reduces maintenance requirement. Replacing a damaged motor is very quick and simple.

When nozzle is not in use, the stream shaper should always be parked in a fully retracted "spray" position. This prevents build-up of residues (salt/dirt) on the stream shaper. It keeps the stream-shaper protected and well lubricated - ready for use. If the stream-shaper is dirty, it must be cleaned with some WD40 and a brush. As a precaution the stream shaper can also be sprayed with WD40 once every couple of months…

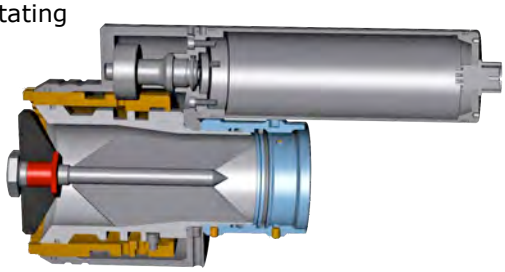
- We recommend that the multi connectors be inspected monthly for water and/or signs of corrosion. As a precaution, the connectors should be sprayed with WD40 once per year.
- We recommend that the stream-shaper be inspected for salt-buildup and dirt once per month.
- We recommend that the stream-shaper get a few drops WD40 every month as a precaution.
- The nozzle should not be disassembled by the end-user. If damaged, it must be sent to Unifire for repair, or be replaced.

MAINTENANCE of FORCE 50 & FORCE 80



- We recommend that the electric motors be inspected by opening the motor covers once per month. The purpose of this is to ensure that there is no water or moisture build up in the motor enclosures (which could be caused by a loose connector). If there is moisture, dry it thoroughly and be sure to connect the connector securely to prevent further exposure. The motors are not very sensitive to water, but checking once-in-a-while is good precaution.

- We also recommend that the multi connectors be inspected for water and/or signs of corrosion. As a precaution, the connectors should be sprayed with WD40 one per year.



- For the INTEG nozzle we recommend that the rotating stream shaper be cleaned and lubricated with WD40 once per month, as this may be exposed to air, dirt and grime.

- In stow position, the INTEG nozzle should be set to wide-spray (i.e., retracted), and the nozzle should face downwards. This will ensure that the stream shaper fully protected from dirt, salt, dust or ice, and well greased at all times, and will ensure proper drainage of the nozzle when stowed.

- We recommend that the FORCE monitor be externally cleaned from time to time and when dirty. Clean with any cleaning agent and water, as with standard pieces of machinery. Because the FORCE monitor is made of polished (no surface treatment) 316L stainless steel, it can always be machine polished to look fantastic.

- The worm gears are filled with grease and hermetically sealed off with nitril X-rings. This means no dirt or water get into the gears. No air circulation will dry out the rubber seals. This is normally a maintenance free unit.

- **The worm gears must normally never be greased.** We recommend not ever greasing the gears unless specifically recommended to do so by Unifire AB on an individual, case-by-case basis. If Unifire recommends greasing, then be sure to follow Unifire's instructions, including by using the proper type of grease (Mobilith SHC460) and make sure to open the grease evacuation plug (part 26 on the drawing). Using the wrong type of grease may cause fatal damage to the mechanics or block the movement.