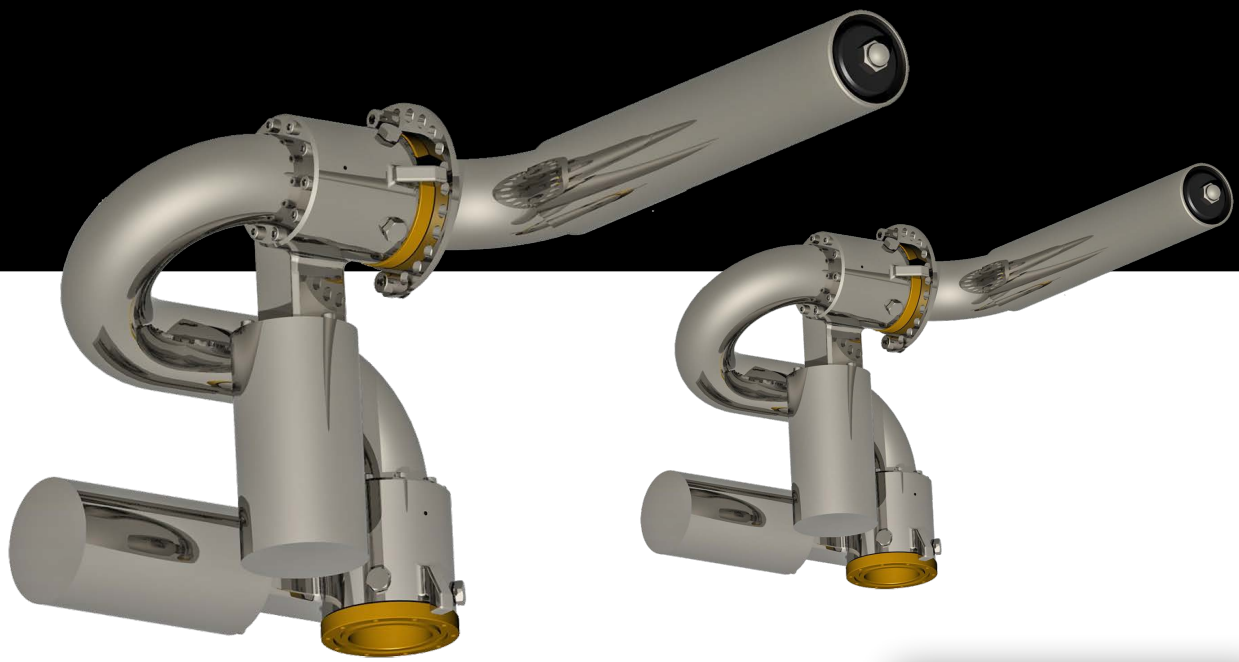
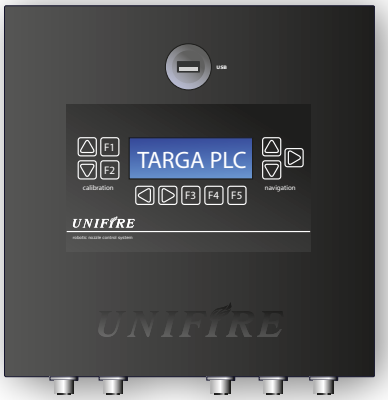
UNIFIRE

F50R-LT

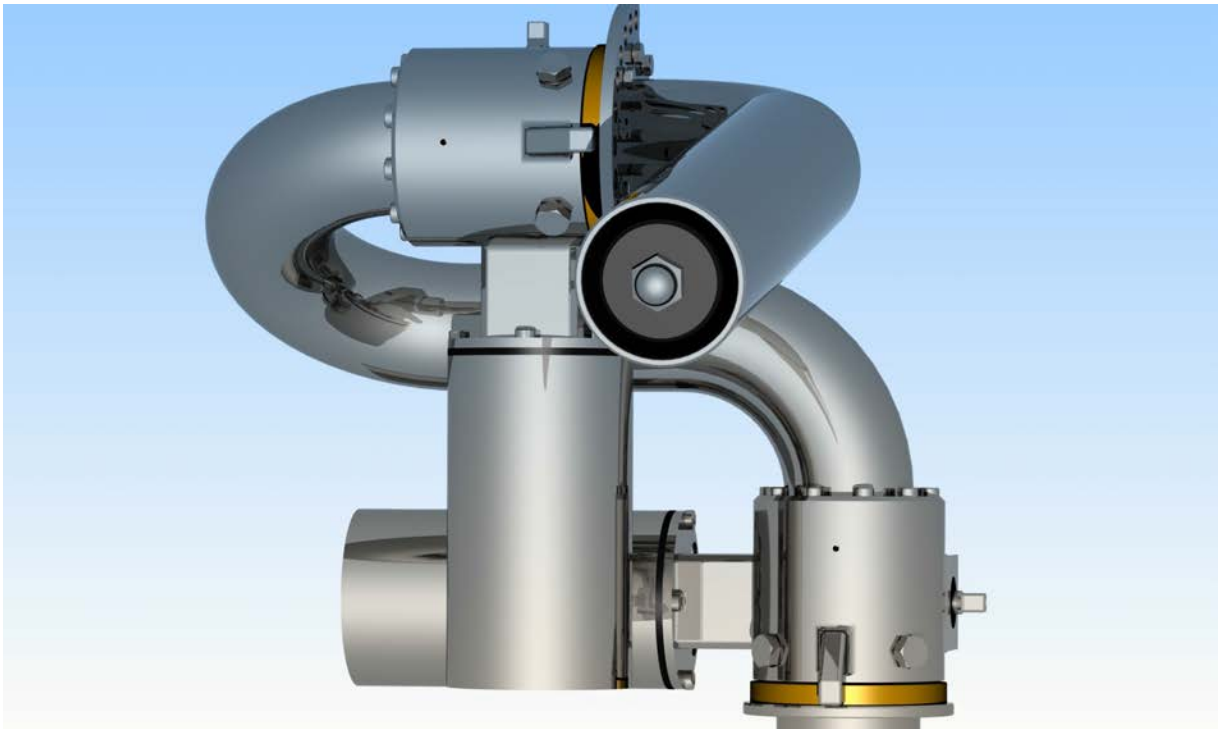
with TARGA Robotic Nozzle PLC generic system manual for riot truck systems





F50R-LT BLDC and the TARGA Robotic Nozzle PLC

Robotic Nozzle
Robotic Nozzle PLC



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 F50R-LT. It will familiarize you with the dangers associated with operation, as well as provide proper installation and operation instructions.

NOTE: EVERY SYSTEM HAS A CUSTOMER-SPECIFIC CONFIGURATION. ALSO READ THE DOCUMENT PROVIDED WITH YOUR ORDER DESCRIBING YOUR SPECIFIC 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. Video Tutorials and other technical information is also available at UnifireAcademy.com.

TECHNICAL SPECIFICATIONS F50R-LT

The UNIFIRE F50R-LT is a stainless steel foam and water robotic nozzle for use on- and off-shore. 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.

UNIFIRE FORCE Robotic Nozzles (a.k.a. "Robotic Nozzles") are the most advanced, highest quality and best performing system available in the market today.

F50R-LT Specifications:

Weight	15 Kg (with fully integrated JETRANGE nozzle)
Dimensions	59x29x30 cm (approximately)
Pipe dimension	50mm inside Ø
Power	24-30 V DC max 12 A
Range of motion	+/-90° vert , 360° rot
Speed (of high speed version)	38°/sec rotation , 24°/ 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	2200 lit/min at 12 bar up to 65 m at 12 bar
Reaction force	Up to 1800 N
Mechanical installation	Support must withstand 8000 N of force
Connection	2" male BSP or DN 50/65 flange
Pipe dimensions for installation	Min 65 mm (2.5")
Pump requirement for maximum performance	2400 lpm @ 12 bar
Communication	CANbus (Unican) 125 or 250 kbps. Interface for CANopen, profibus, modbus, etc. Option digital inputs fpr up/down/left/right/jet spray
Options	Network, radio remote, aux control, etc. Trigger operated Joystick, position LCD screen

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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 UnifireAcademy.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 F50R-LT 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 F50R-LT is capable of directing flows of up to approximately 2000 liters per minute (540 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 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 F50R-LT robotic nozzle is capable of withstanding a nozzle **reaction force of at least eight thousand (8,000) Newtons (800 kgf)**. The F50R-LT 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 F50R-LT 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 F50R-LT robotic nozzle is 12 bars (175 psi). Use of the F50R-LT 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 F50R-LT is between 7 and 8 bars (100 and 115 psi), which also will provide optimal performance**.

WARNING!

ONLY MOUNT THE F50R-LT 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 F50R-LT 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 use of any nozzle other than a Unifire nozzle made for the F50R-LT 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 F50R-LT 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 F50R-LT 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 of the F50R-LT 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.

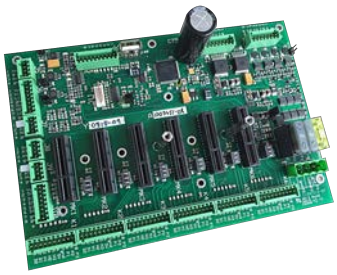
⚠ WARNING! **THE F50R-LT IS HEAVY. EXERCISE CAUTION AND SEEK ASSISTANCE WHEN INSTALLING AND TAKE CARE TO AVOID INJURY TO YOUR BACK**. Seek assistance to help support and twist the robotic nozzle during installation and take care to avoid injury to your back during handling and installation.

⚠ WARNING! **BE SURE THAT THE F50R-LT 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 F50R-LT is capable of withstanding a nozzle **reaction force of at least eight thousand (8,000) Newtons (800 kgf)**. The F50R-LT 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 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.

UNPACKING CHECKLIST/ Spare parts specification

ITEM NAME & IMAGE	PART #	BRIEF DESCRIPTION
COMPLETE GEAR ASSEMBLY	WG50	Complete worm gear assembly with gear wheel, gear screw, bearings, o-ring. Connected to the pipes by flange assembly.
Front pipe section	JR50-LT	FRONT SECTION complete with JETRANGE Nozzle (for F50R-LT only)
Middle pipe section	S50-LT	MID Robotic Nozzle SECTION complete with JETRANGE Nozzle (for F50R-LT only)
Complete BLDC motor with welded cover	3910103 3910107 3910108	BLDC 24:1 BLDC 49:1 BLDC 84:1

ITEM NAME & IMAGE	PART #	BRIEF DESCRIPTION
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)
POINTER 	PTR101	synchron control grip. Chromeplated brass / steel body. 1 x M12 5-pin , 1 x M12 3-pin connector.
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

ITEM NAME & IMAGE	PART #	BRIEF DESCRIPTION
TARGA PLC 	TARGA1….6	TARGA Robotic PLC with up to 6 x BLDC drivers. (TARGA2 has 2 BLDC motor drivers, TARGA3 has 3 BLDC motor drivers, etc.) Customer specific programming. See ”Sw”, ”App” and ”Node” of your system when ordering. Simple one-step programming by USB-stick.
M12 cables 	M1255 M1252	5 meter, 5-pin M12 cable 5 meter, 3-pin M12 cable

Introducing the F50R-LT Robotic Nozzle

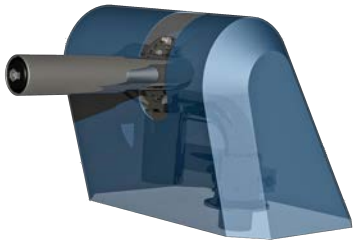
The F50R-LT is a robotic nozzle with a geometry specifically designed for use on the cabin roof of riot-control vehicles.

The F50R-LT is made of 316L Stainless steel. It is fitted with industrial-robot-type BLDC motors. This makes the F50R-LT both strong and quick, with extreme position accuracy and control. It also has exceptional service life.

Cobra-geometry

The Cobra-like geometry allows for shooting at negative 20° angle, while still keeping a low total vehicle height.

The geometry allows custom cover to be easily designed - to hold flood-lights, cameras and for protection. (Cover is optional, not necessary.)

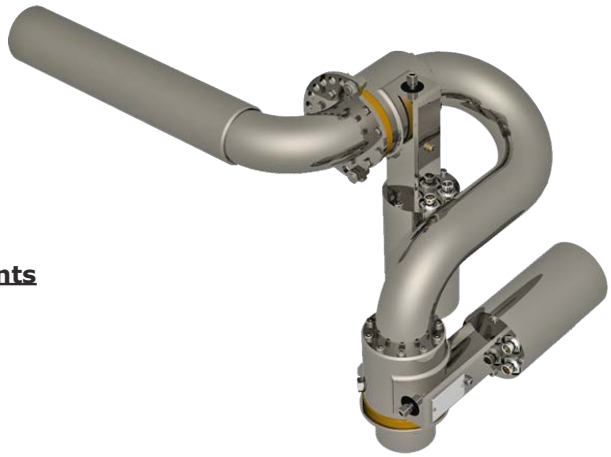


Installing the F50R-LT Robotic Nozzle

The F50R-LT comes delivered with either a 2” male BSP, or with flange connection.

We recommend that the stand-pipe is have a minimum internal pipe diameter of 65mm Ø to minimize friction loss.

The fixing must withstand a force of up to 8000 N.



Each motor has 2 x M12 connectors,

a 3-pin for BLDC motor phases, and a

5-pin for BLDC motor sensors.

Please refer to your system specific documents to see how your system is connected

Setting Operating Range

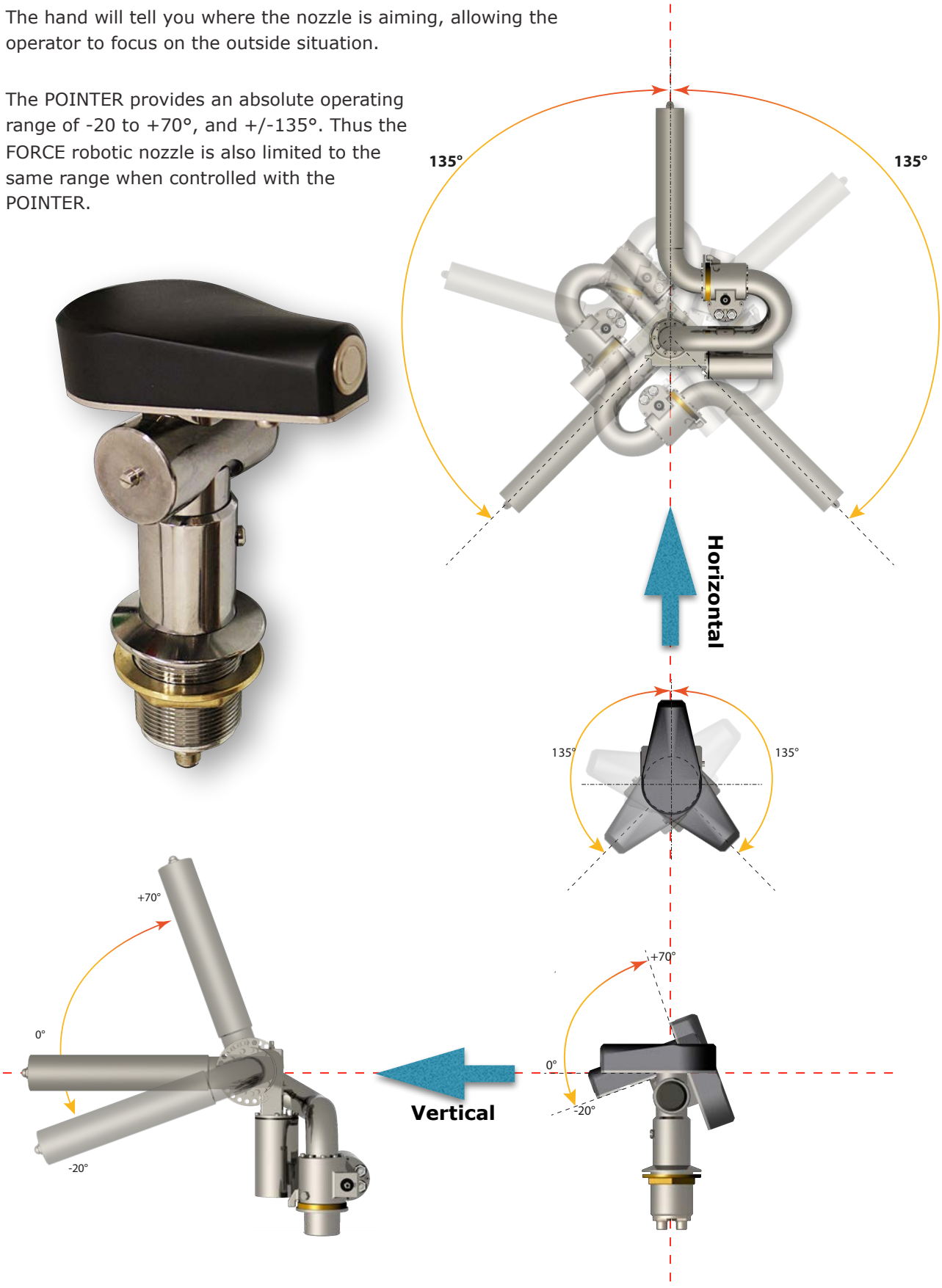
The F50R-LT operating range must be defined prior to operation. See how this is done in the TARGA PLC Operating Manual.

Also please visit www.unifireacademy.com for video instructions.

Introducing the POINTER Synchron control handle

The POINTER provides natural and intuitive control of the FORCE robotic nozzle. The stream is aimed in the same direction and elevation angle as the POINTER. This provides the operator perfect control and immediate feedback without even using his eyes.
The hand will tell you where the nozzle is aiming, allowing the operator to focus on the outside situation.

The POINTER provides an absolute operating range of -20 to +70°, and +/-135°. Thus the FORCE robotic nozzle is also limited to the same range when controlled with the POINTER.

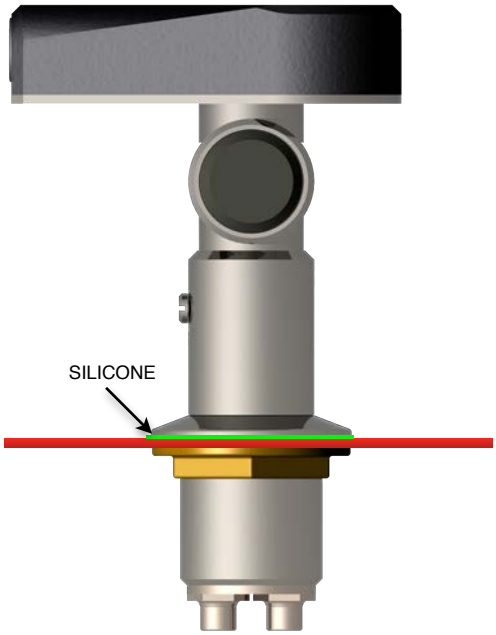


Installing the POINTER Synchron control handle

The POINTER is best installed low, next to the seat, on the console near the hand break and shift levers are found. This position provides an ergonomically correct grip and let your hand rest on the POINTER.

Make a 48 mmØ diameter hole in the console. Install the POINTER with a small amount of silicone at the base, then tighten the large flange nut.

The POINTER is massively strong - made of solid brass and stainless steel, with a flexible shock resistant plastic cover.



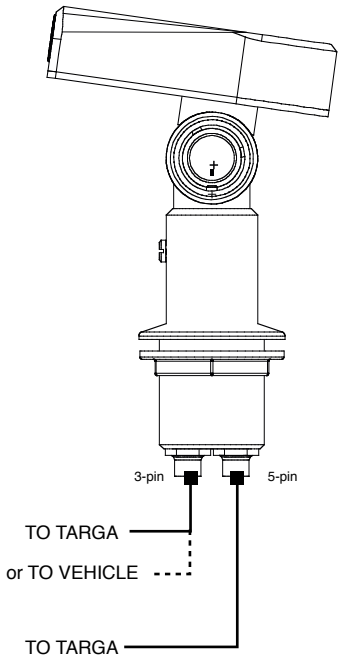
Electrical Connections

The POINTER has two M12 connector at its base.

The 3-pin connector is directly wired to the trigger. The trigger closes between pin P1 and P3.

The trigger can **either:** be wired directly to the vehicle - directly controlling and external valve;

OR the trigger can be connected to the TARGA PLC. This is useful when the TARGA PLC has a display (UNIweb system) com and you want to be able to display the trigger status, and/or control the valve form a touch-screen or other joystick as well.



The 5-pin connector

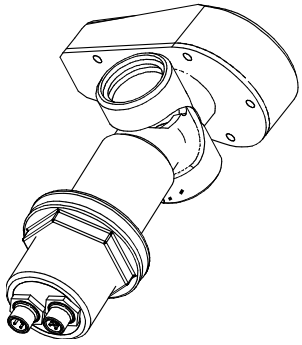
provides the position data (from 0-5V potentiometers) to the TARGA PLC.

Calibration

The POINTER must be calibrated prior to use.

Please see the calibration of analogue inputs section in the TARGA PLC operating manual.

And/or watch the instruction video on www.unifireacademy.com



TARGA PLC

TARGA Robotic Nozzle PLC compact version, is for installation in dry, clean environment. Customer specific requirements are easily implementable. Up to 6 x BLDC divers. In addition up to 8 x analogue and digital inputs and outputs, all generic and definable to your individual specifications.

SPECIFICATIONS:

- IP20 Steel cabinet (must be installed dry and dust protected)
- Stainless steel 316L
- 225 x 125 x 125 mm
- Display and with push-button panel for setup and system diagnosis
- TARGA Robotic Nozzle PLC supports up to 6 x BLDC drivers
- Large number of digital and analogue inputs and outputs (expansion cards available)
- Simple quick installation with M12 multi-connectors
- Connect pressure and flow gauges, push-button controls, ”panic-button”, etc.
- Fully programmable and expandable
- USB-port for simple program upgrade
- 24 VDC / 2 + 20A fuse
- Average consumption: less than 100 W

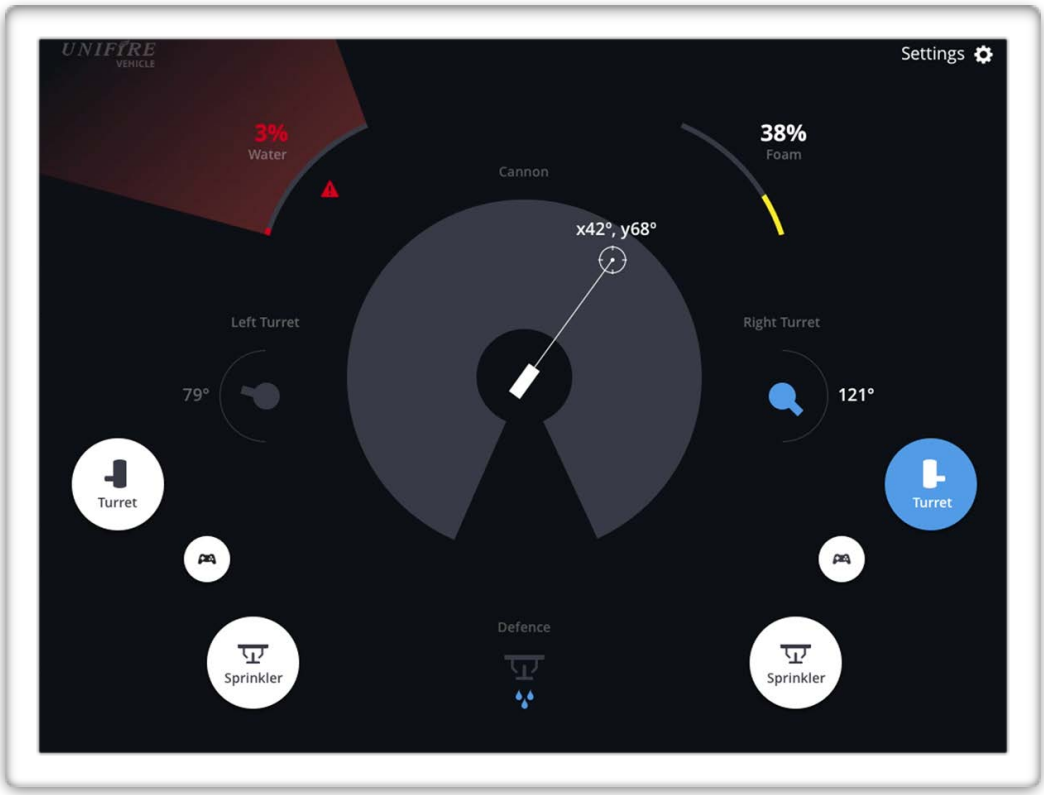
Please see separate operating manual for setup of the TARGA PLC

UNIweb Interface

The TARGA PLC can be expanded with a full LINUX embedded PC with CANbus interface to the TARGA PLC.

This provides full and unlimited a connectivity. Very simple and at low cost by using standard website technology and mass-produced components.

- Configuration and setup of the system can be done from any PC/Tablet/smartphone
- Any standard display or screen (or touch screen) can be connected by HDMI, and can display exactly what is going on within the TARGA PLC
- See flow/pressure, valve status, tank level, position of the robotic nozzles etc..
- Control all functions from the screen - in addition to the control already provided from the Joystick / POINTER controller
- Can be expanded with a standard WiFi router to allow remote control from any smartphone or tablet.
- Layout and content can be easily customized to fit every project—even down to specific operators on individual vehicles.
- Easily change appearance and functions. For example, add new buttons with custom functions, change language, etc.

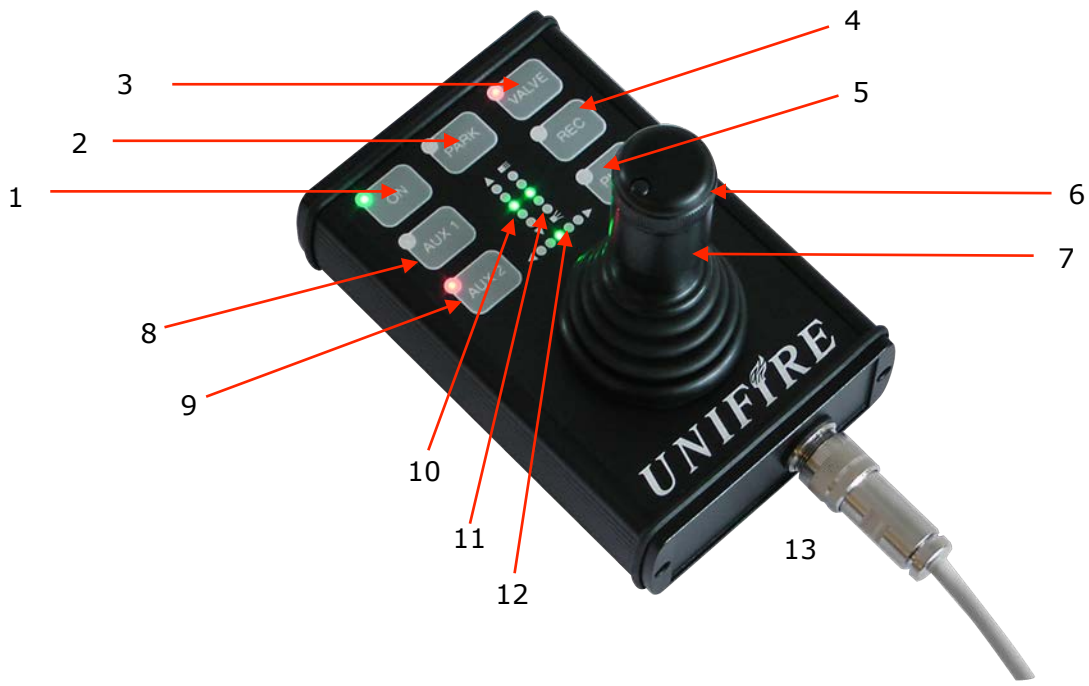


UNIweb screen example. All system information can be displayed and all functions can be controlled form the screen. Language versions can be easily implemented.

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 PI 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", such as foam valves or flood lights. In a networked system, the AUX1 and AUX2 can be used for controlling and switching between two robotic nozzles.

MANUAL OPERATION WITH CRANKS

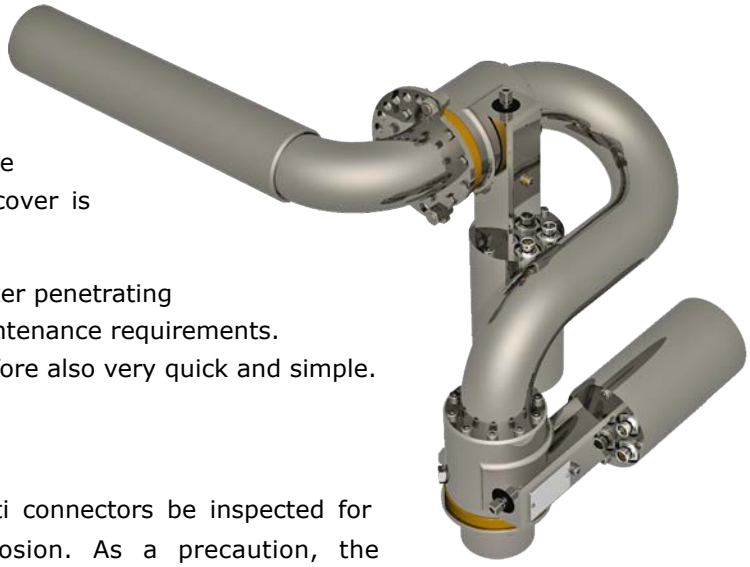
The robotic nozzle can be manually operated with cranks. This may be useful for service and maintenance, if and when the power is cut, or a motor is damaged. The FORCE robotic nozzles are not suitable for manual operation and manual cranks are for emergency use only.

If manual operation is necessary first disconnect the cables!

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.**

MAINTENANCE of the F50R-LT with BLDC motors

The F50R-LT with BLDC motors have fully laser-welded motor enclosures. The motor cover can not be opened. If a motor is found to be defective, the complete motor assembly with its cover is replaced.



This design minimizes the risk of water penetrating the motor cover. It also reduces maintenance requirements. 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.

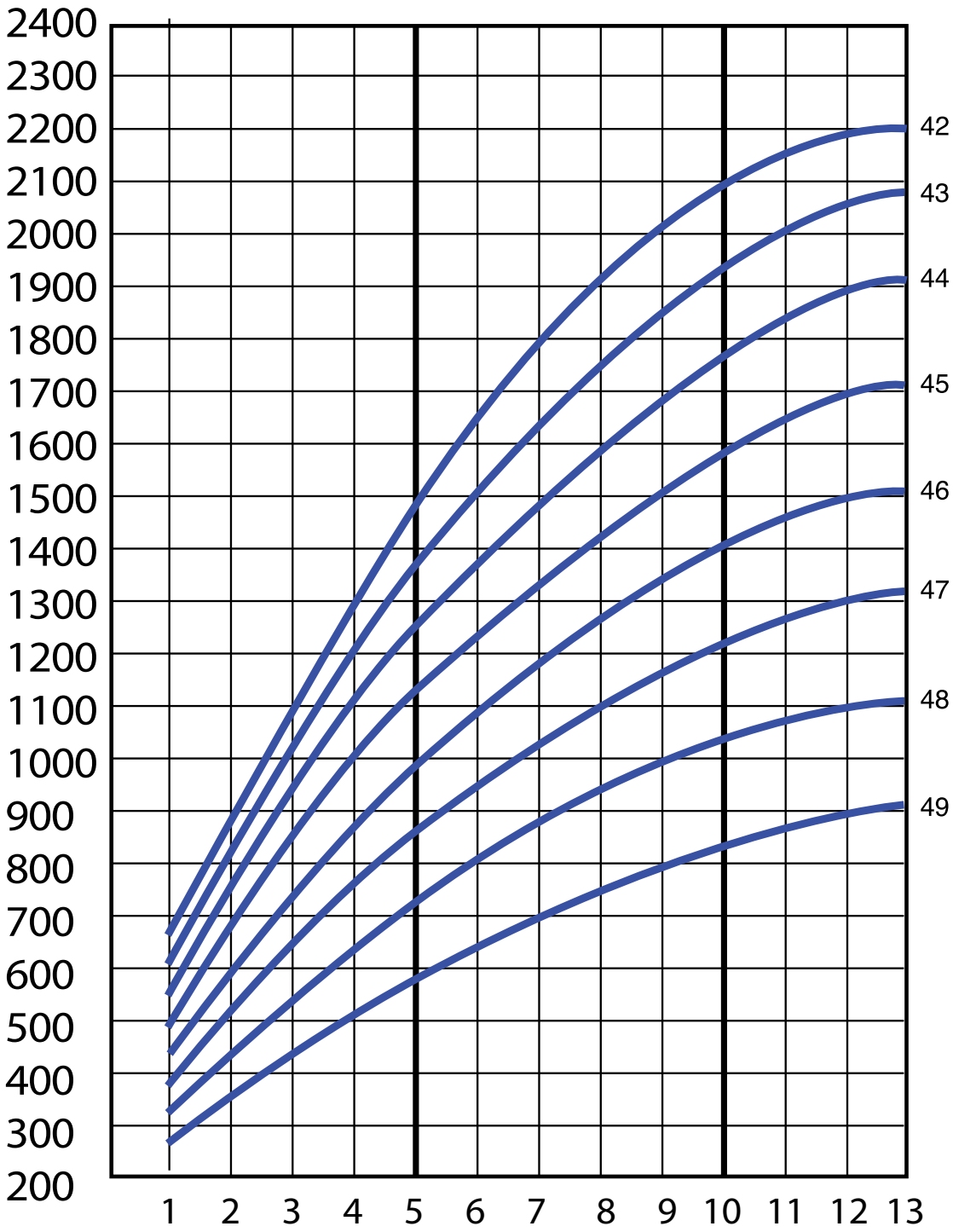
- **The worm gears must normally never be greased.** We recommend never greasing the gears, unless specifically recommended to do so by Unifire AB on an individual, case-by-case basis. If Unifire recommends greasing, then be sure to follow Unifire's instructions, including by using the proper type of 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.

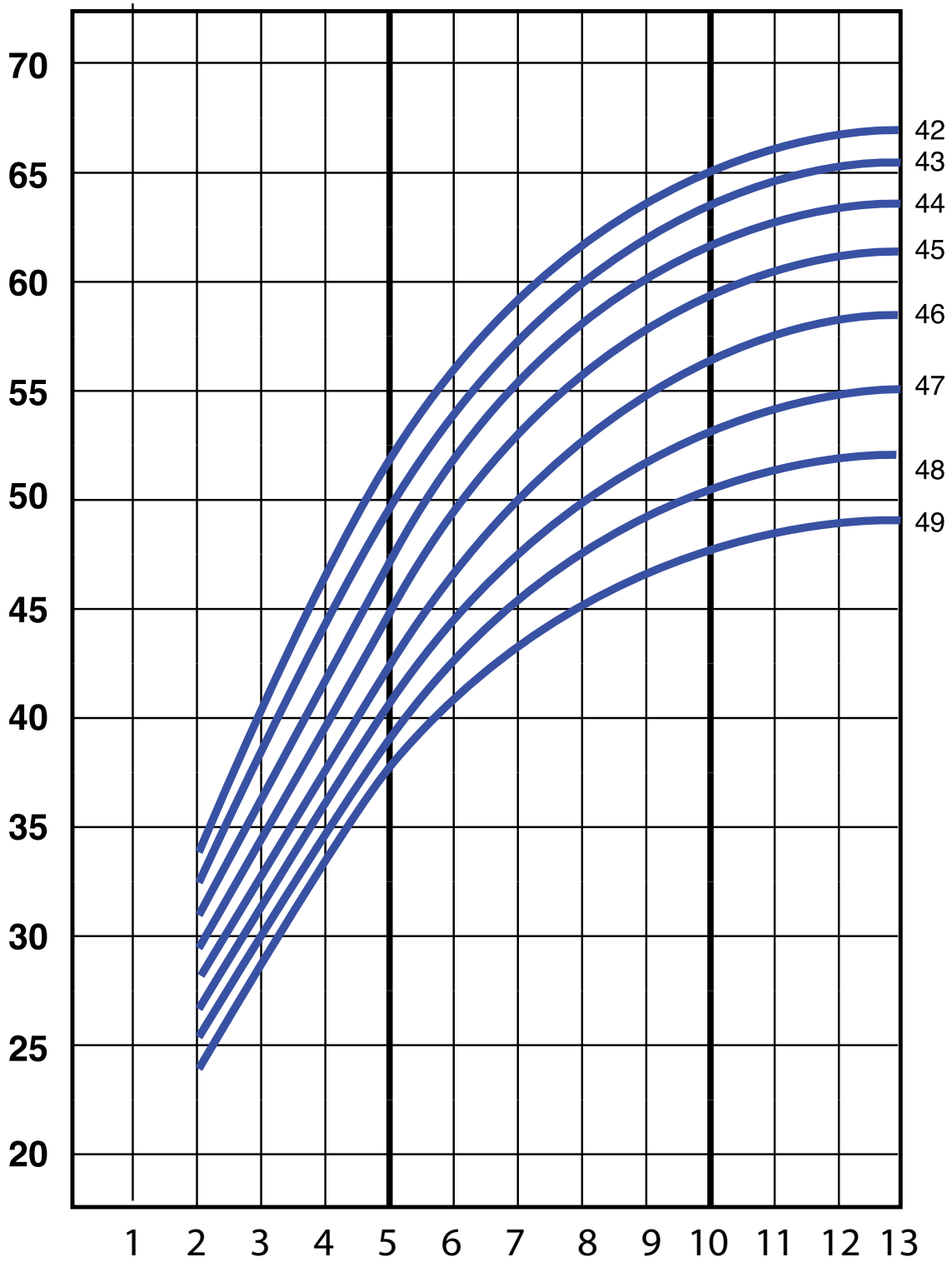
FLOW / pressure with flow disc Ø 42-49 mm

lit/min at bar

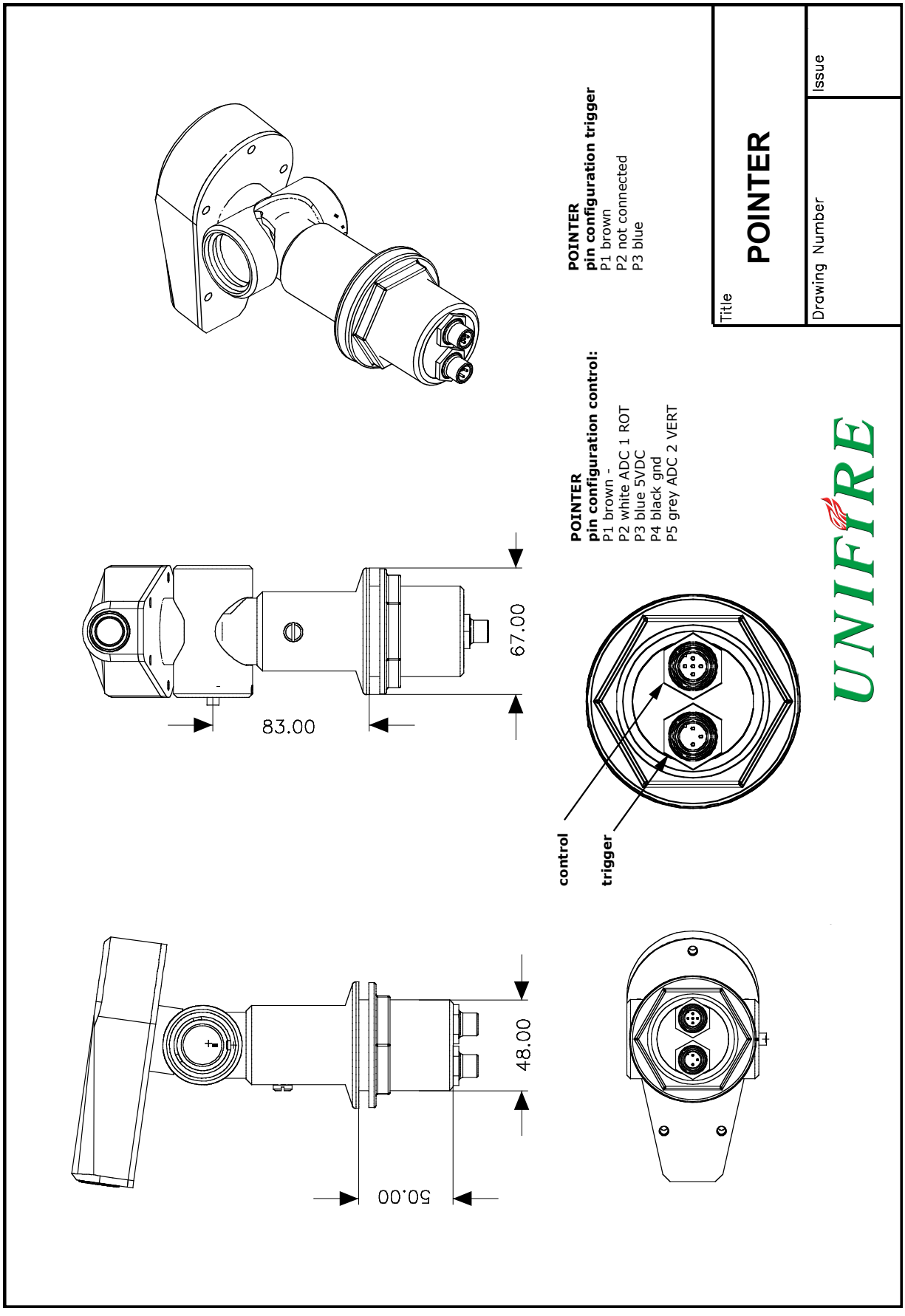


REACH / pressure with flow disc Ø 42-49 mm

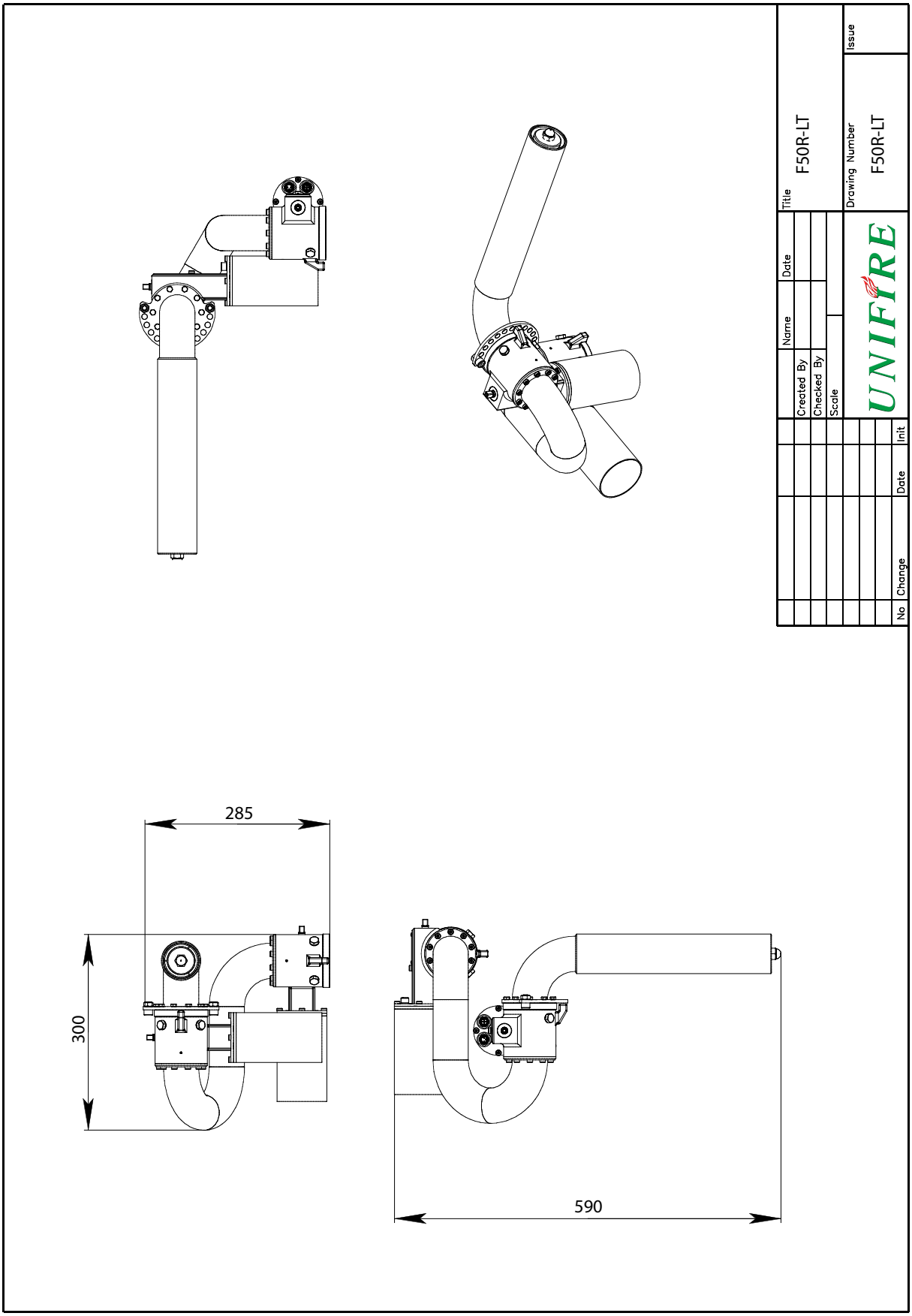
lit/min at bar



DIMENSIONS POINTER



DIMENSIONS F50R-LT



DIMENSIONS TARGA PLC

225

225

125

Text as example only.
Actual text will reflect
each individual
system setup.

PI Canbus JOYSTICK Description & Advanced Setup

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.

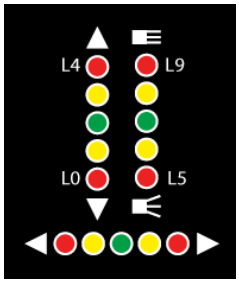
Entering setup modes is done by pressing and holding defined buttons while powering up and/or connecting the Joystick cable.

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 the LED is on.
2. Then move the top counter clockwise to the stop and then press and hold AUX 2 until the LED is on.

Startup mode MCU (IV)

Toggle 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 the 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.