fluvo®
innovative schwimmbadtechnik

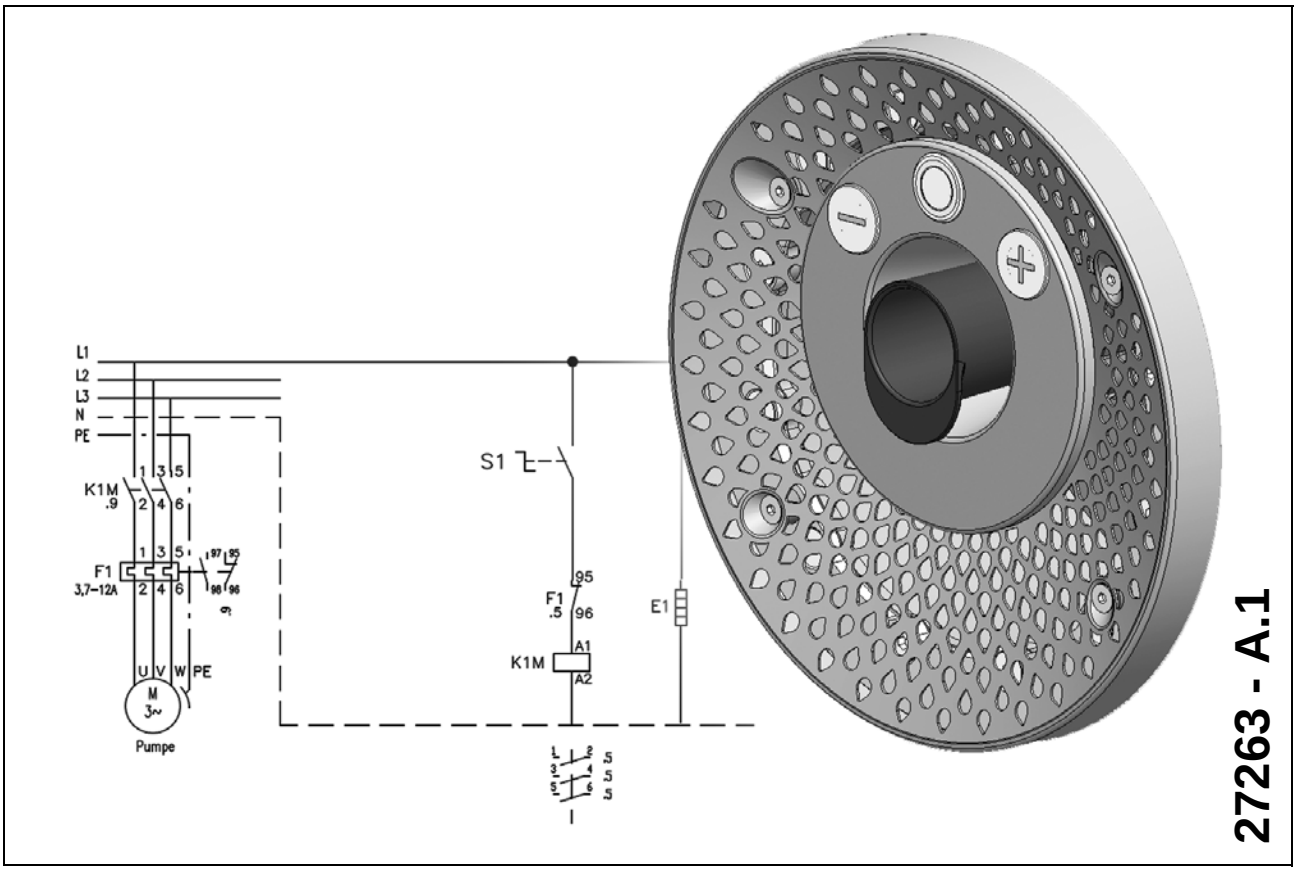
schmalenberger
strömungstechnologie

# *XANAS*® Electrical Installation

GB

## Operator's Manual / assembly instructions

Translation of the original



# Table of contents

# 1 General information

## 1.1 Warranty notice

The entire system or parts of it are not suitable for use in other systems. The function of the entire system in combination with other systems or components can not be guaranteed. Accordingly we explicitly instruct you only to use such parts or the entire system for their intended purpose.
Failure to comply with the information provided in this operator's manual voids all claims under warrantee.

## 1.2 General information

All parts in contact with media are designed for water quality according to DIN 19643.
This counter-current system (*XANAS*®) represents the state of the art. It has been manufactured with the greatest care and is subject to continuous quality control.
This Operator's Manual contains important information to ensure that the counter-current system is operated safely, properly and economically.
Your strict observance is necessary to prevent dangers and ensure a long service life for the counter-current system.
This operator's manual does not take into consideration local requirements. The operator is responsible for ensuring these requirements are met, including personnel retained to assemble the system.
The rating plate indicates the series and frame size, the most important operating data and the factory number. If additional information is required, please always specify it when reordering or ordering spare parts.

## 1.3 Proper use

The counter-current system was designed for use in private swimming pools.
Therefore it should not be installed in public swimming pools. The counter-current system must not be operated beyond the values specified in technical data (3.1). If you have any questions, please contact your Customer Service representative or the manufacturer.

# 2 Safety Instructions

## 2.1 General information

- Make certain before commissioning that the operating personnel have read and understood the operator's manual. It is the owner rather than the operator who is responsible for safety.
- Make certain the safety requirements and laws for the use of counter-current systems which apply to the operating company and/or country in which the system is operated are observed.
- Use the counter-current system only when it is in flawless condition technically and according to its intended purpose. Be conscious of safety and dangers and observe all the instructions of this Operator’s Manual!
- Eliminate all malfunctions that could have a detrimental effect on safety immediately.
- Before making repairs to the counter-current system, disconnect it from its electrical power source and prevent it from being turned on again.
- Repairs of any nature must only be made by qualified specialists. The counter-current system must also be emptied.
- The operator must ensure that:
  - the operator's manual is always available for operating personnel,
  - the instructions in the operator's manual are observed,
  - the counter-current system is stopped immediately if any abnormal electrical voltages, vibrations, temperatures, noises, vibrations, leaks, or other faults occur.
- All persons involved in setting up, commissioning, operating, maintaining, and repairing this device must:
  - consider the operator's manual to be part of the product,
  - keep the operator's manual in a safe place throughout the service life of the product,
  - forward the operator's manual to each successive owner or user of the product,
  - ensure that all additions that are received are inserted into the operator's manual,
  - observe all legal requirements.

## 2.2 Marking

The following symbols are used in this operator's manual to make special reference to dangers.

**Caution! Risk of injury! / Attention! Risk of damage!**
**This symbol warns of hazards due to mechanical effects and of actions that will damage the product.**

**Caution! Danger of death!**
This symbol warns you of dangers due to electrical current.

Notices placed directly on the pump, such as the arrow for direction of rotation, must always be observed and must be maintained in legible condition.

## 2.3 Safety instructions for the operator

Electrical equipment must only be installed and serviced by qualified personnel.
Applicable safety regulations and equipment requirements at the installation site must be observed.

The term qualified specialist (Fachkraft) is defined in VDE 0105 and IEC 364. This operator's manual does not contain any information for non-qualified persons. We explicitly draw to your attention that the stipulations of the EC prohibit the use of non-qualified persons on electrical systems.

**Danger of lethal electrical current!**
Electrical connections must only be made by a professional electrician in accordance with VDE Regulation 0100. Observe the local requirements of the responsible electrical power provider as well as standards and safety requirements for electrical systems in swimming pools.
**Comply with DIN EN 13451!**

**Note!**
Comply with DIN EN 13451 in the design of the suction unit.

**Important!**
When installing a frequency inverter, follow the instructions in the Operator's Manual "INVEOR Drive Controller" of the manufacturer (KOSTAL).

- If serious operating problems occur, disconnect the system from the electrical power source.
- Check the device and the electrical power line at regular intervals for damage.
- The L/N/PE connection of the power supply voltage must be made in accordance with VDE 0100 and VDE 0160.
- A protective and isolating device must be provided for turning off the power supply voltage.

**In case of damage caused by failure to observe the information provided in these operator's manual, all claims under warranty shall be void. The manufacturer cannot accept any liability for resulting consequential damages.**

**Attention:**

- Failure to observe the safety instructions, for example touching live parts while the device is open or handling the device in an improper manner is hazardous with potentially fatal consequences.
- If the guarantee seal is destroyed, the guarantee and manufacturer's warranty shall be rendered null and void.
- If the values listed in the technical data are exceeded there is danger of the device overheating, which can destroy the power supply and adversely affect electrical safety.

# 3 Description of the device / general technical data

- The counter-current system meets the requirements of the VDE regulations.
- The electric motor and pump through which water flows are electrically separated.
- The electric motor corresponds to protection type IP 55.
- The counter-current system as a whole meets the requirements of protection class I.

## 3.1 Technical data for pump kit (sample selection)

| System type: | *XANAS*® 1.5 | *XANAS*® 1.5 WS | *XANAS*® 1.9 (FU) | *XANAS*® 1.9 WS | *XANAS*® 3.0 (FU) | *XANAS*® 4.0 (FU) |
|---|---|---|---|---|---|---|
| Output | 1.5 kW | 1.5 kW | 1.9 kW | 1.9 kW | 3.0 kW | 4.0 kW |
| Mains voltage | 3~ 400 V | 1~ 230 V | 3~ 400 V | 1~ 230 V | 3~ 400 V | 3~ 400 V |
| Mains frequency | 50 Hz | 50 Hz | 50 Hz | 50 Hz | 50 Hz | 50 Hz |
| Motor voltage | Y 400 V | 230 V | Y 400 V | 230 V | Y 400 V | Δ 400 V |
| Rated current $I_{max}$ | 2.9 A | 9.5 A | 4.1 A (4.6 A) | 11.5 A | 6.6 A (6.2 A) | 8.5 A (7.9 A) |
| Speed | 2900 rpm | 2900 rpm | (1200 -) 2900 rpm | 2900 rpm | (1200 -) 2900 rpm | (1200 -) 2900 rpm |
| max. pump capacity | 700 l/min (42 m³/h) | 700 l/min (42 m³/h) | 800 l/min (48 m ³/h) | 800 l/min (48 m ³/h) | 1000 l/min (60 m³/h) | 1200 l/min (72 m³/h) |
| max. delivery pressure | 1.2 bar | 1.2 bar | 1.4 bar | 1.4 bar | 1.9 bar | 2.0 bar |
| max. water temperature | 50° C | | | | | |
| Usage limit (pump only) | 3000 mg/l Cl | | | | | |
| expected acoustic pressure level | 65 + 2dB (A) | 65 + 2dB (A) | 67 + 2dB (A) | 67 + 2dB (A) | 70 + 2dB (A) | 71 + 2dB (A) |
| Connections | Pressure side DN 50<br>Suction side DN 65 | | | | | Pressure side DN 65<br>Suction side DN 80 |
| Weight | 27.5 kg | 27.5 kg | 29.5 kg (38 kg) | 29.5 kg | 36.5 kg (45 kg) | 43 kg (51 kg) |
| Item no. PBS | 98420 | 98421 | 98422 (98390) | 98423 | 98425 (98391) | 98426 (98392) |

**Definition of abbreviations used**

WS - Single-phase alternating current motor (German Wechselstrommotor)

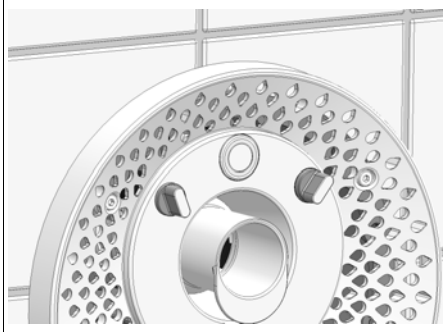
FU - Frequency inverter (German Frequenzumrichter), drive controller, speed-controlled pump

## 3.2 Technical design of pump kit

*XANAS*® is available in **two** different control variants

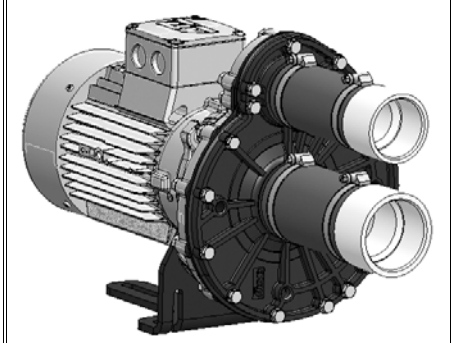
a) Manually controlled design
b) Sensor-controlled design

### 3.2.1 Manually controlled design



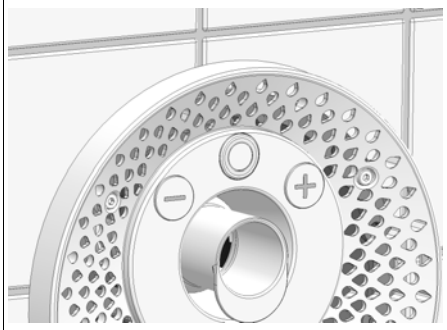
Control unit
with 1 sensor button
and 2 twist grips

Control box NT



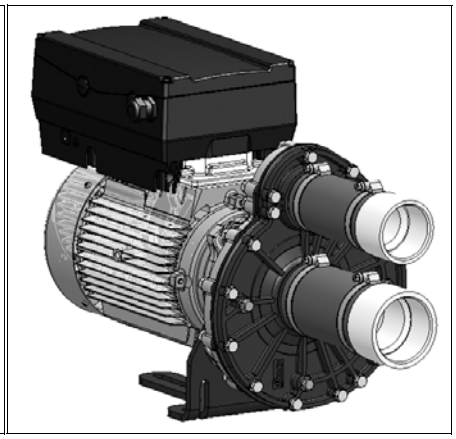
Centrifugal pump WK

### 3.2.2 Sensor-controlled design



Control unit
with 3 sensor buttons

Converter box
for the safety isolation

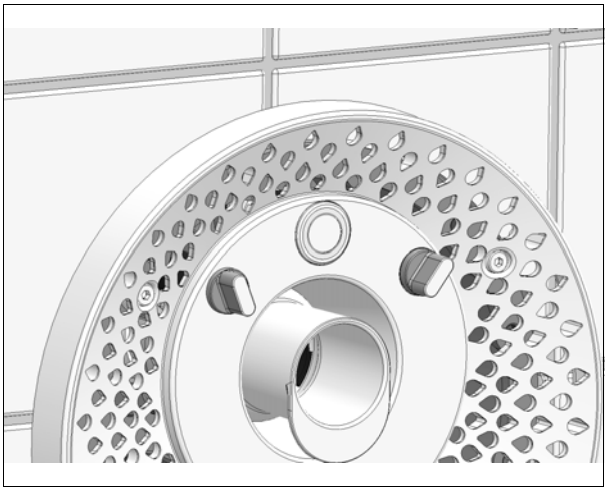


Centrifugal pump WK
with FU

**The two design variants are presented separately from each other below.**

## 3.3 "Manually controlled design" modules

### 3.3.1 Control unit



Activation via
1 x sensor button lit
2 x twist grips

**Sensor button connection cable**

- 5-wire special cable
- Standard cable length 2m
- Colour coded DIN 47100
- External diameter 5.5mm
- Wire cross-section 0.5 mm²

**Sensor button - connection assignment**

| Wire colour | Functions |
|---|---|
| White | Switching contact S1 |
| Brown | Switching contact 24V |
| Grey | LED1 |
| Yellow | LED2 |
| Green | LED3 |

**Sensor button - technical information**

| | |
|---|---|
| Effect of switching: | Pulse activated one time |
| Electrical function: | normally open / N/O contact |
| Electrical data: | $I_{max}$ = 200mA / $U_B$ = 24V DC |

**See also section 3.5 "Installation instructions for sensor button and control unit"**

**Note:**
When laying cables, safe isolation between different types of currents within an installation system must be ensured **without exception**. Comply with the requirements of DIN EN 50174 and DIN VDE 0100-520 for communication wiring when laying the cables.

**Safety isolation**
For reasons of electrical safety, the sensor button must without exception be operated via "safety isolation" such as a control box item no. 61405 or directly on the NT switch box. The defined maximum line lengths must also be observed.

### 3.3.2 Control box NT

**Control box NT**
**The control box can be used to switch a 1-phase or 3-phase pump on and off.**

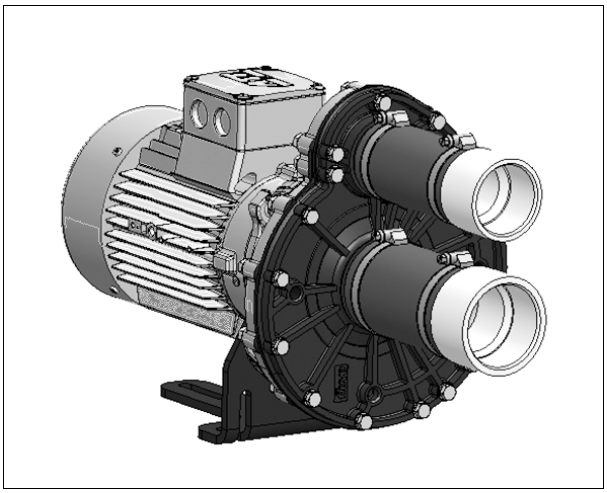
The sensor button is designed as an actuator.
The device status is displayed by two operating LEDs with output via two floating feedback contacts.

**The control box must always be positioned above the water level of the pool!**

**Operator's Manual 27248 "Control Box Control NT" applies**

- Technical data
- Wall installation with dimensions
- Connections and settings
  - Mains pump / connection terminal
  - Connection terminals for control and feedback contacts
  - Bus connection
  - Terminal compartment disconnection
- Fault message
- Current monitoring
- 1-Phase and 3-Phase Operation
- Run time limit, time relay function

### 3.3.3 Pump type WK



**Operator's Manual 27220 "Centrifugal Pump WK" applies**

- General information with data sheet for pump WK
- Safety Instructions
- Transport and storage
- Electrical connection of the pump
- Operating the Centrifugal Pump

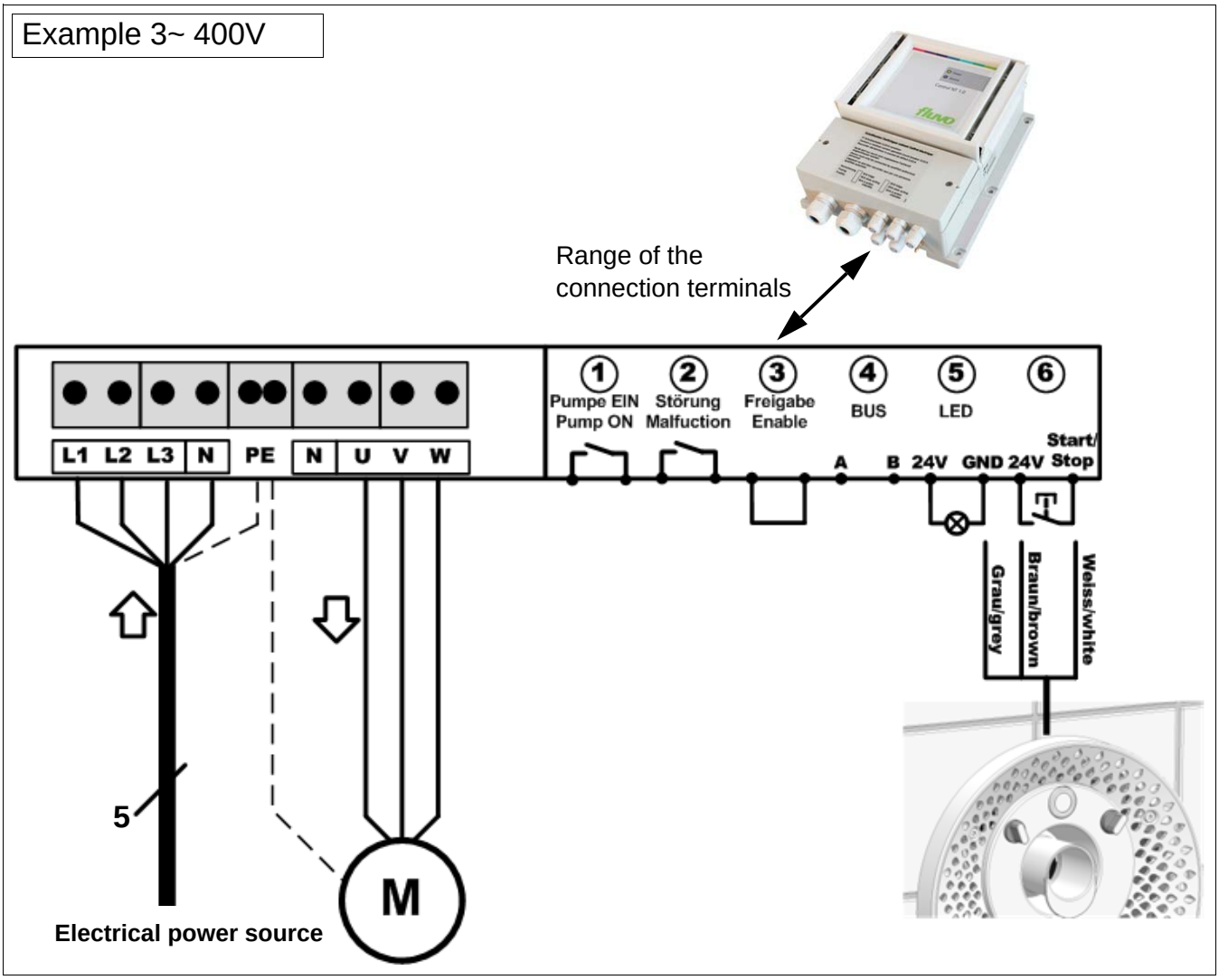
The electrical output values between the switch box NT and centrifugal pump WK are coordinated in the device kit.

**Check the circuit type Y / Δ .**

During installation note

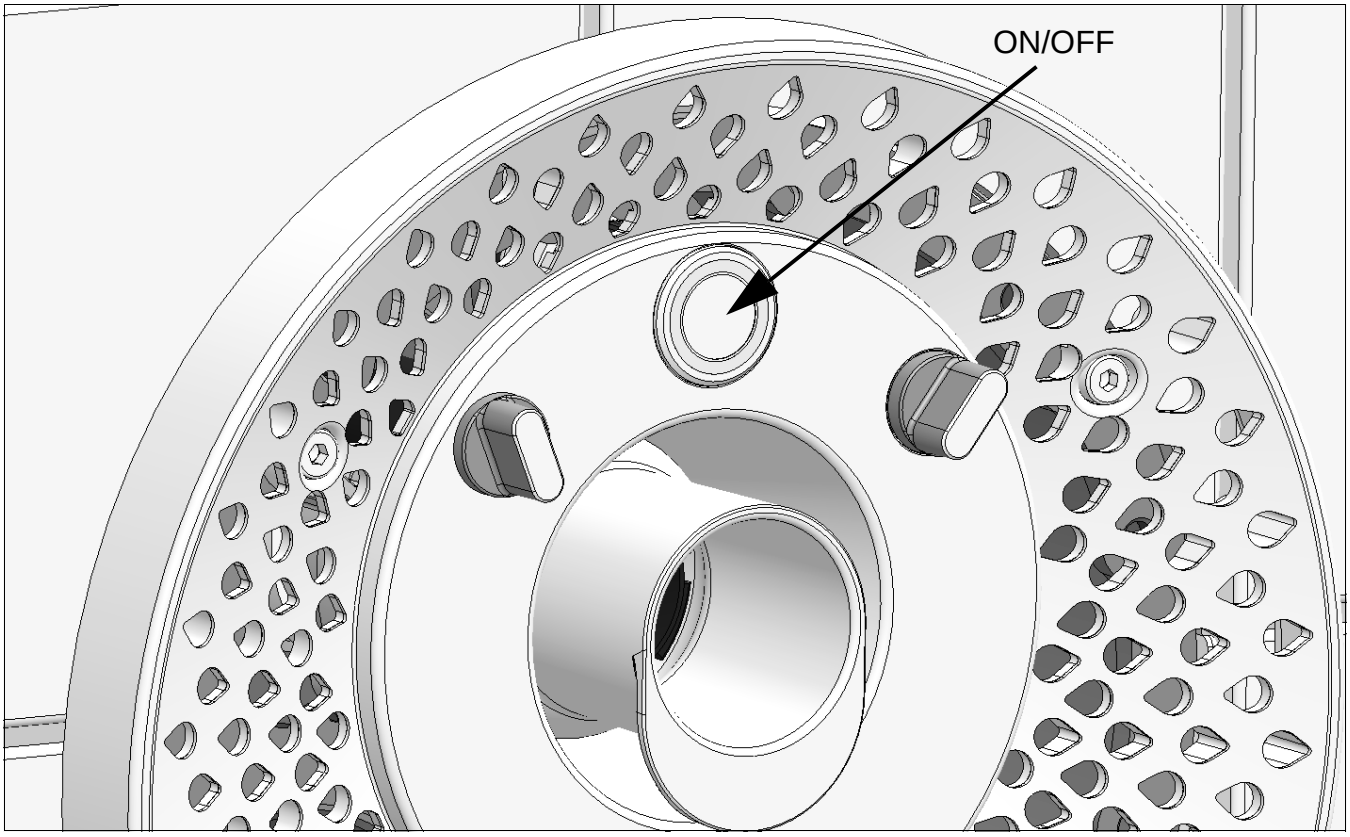
- the mains voltage information on the type plate of the control box and motor
- the direction of rotation arrow on the pump

### 3.3.4 Connection diagrams - Manually controlled design



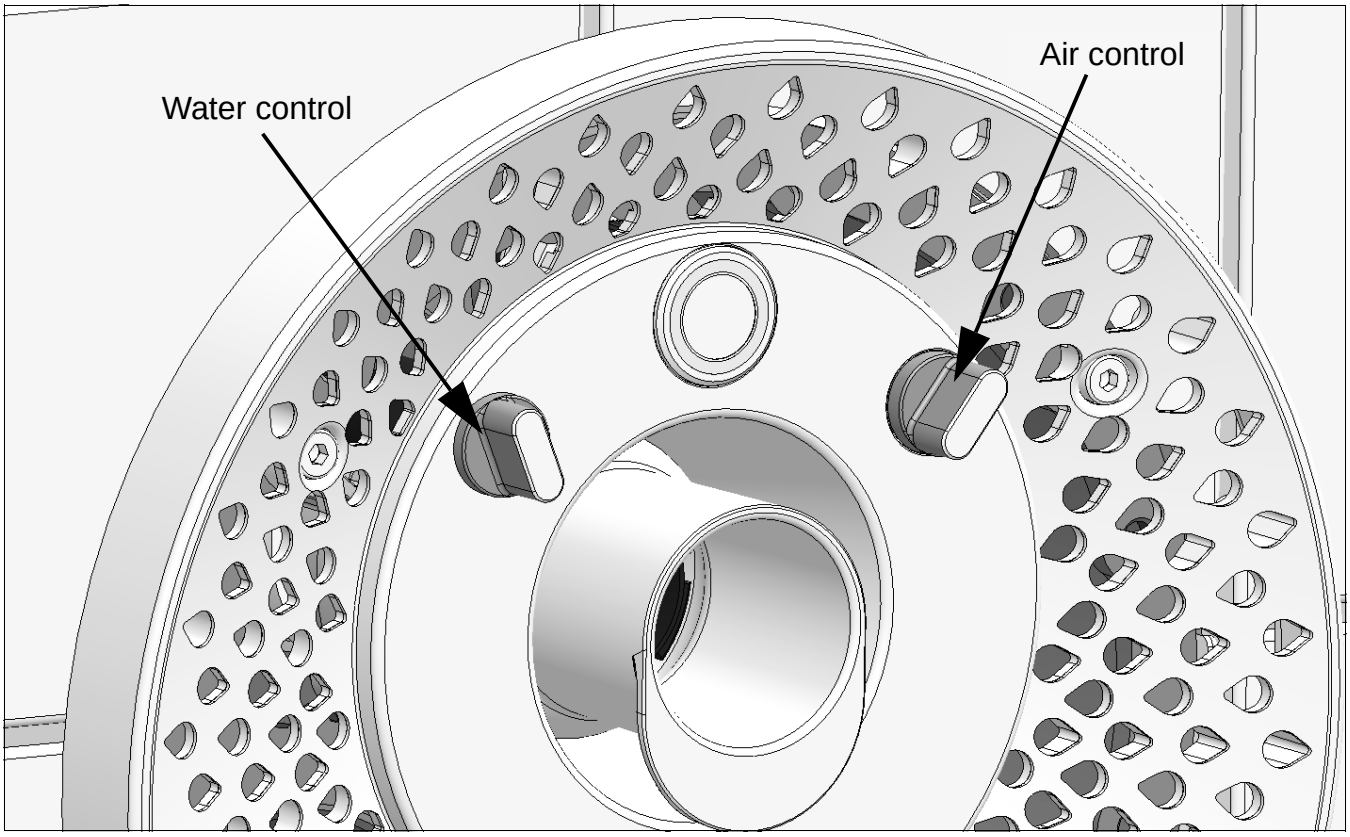
### 3.3.5 Operation - Manually controlled design

**Switching On/Off**



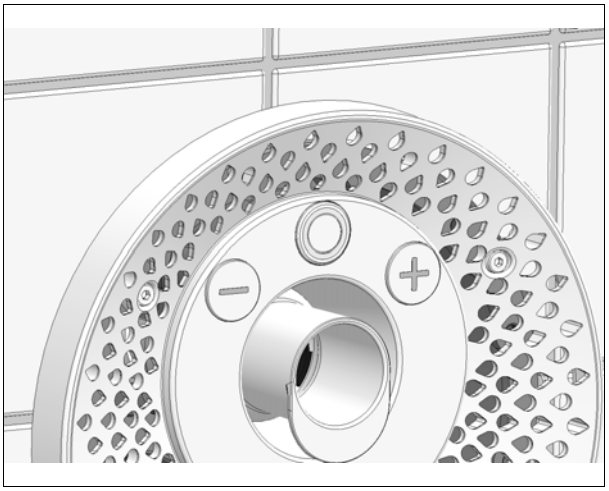

Pressing the ON/OFF button turns the system on or off. The button is always lit and flashes to provide visual feedback.

**Regulating the intensity**



## 3.4 "Sensor-controlled design" modules

### 3.4.1 Control unit



Activation via
1 x sensor button lit
2 x sensor buttons unlit

**Sensor button connection cable**

- 9-wire special cable
- Standard cable length 2m
- Colour coded DIN 47100
- External diameter 6.3mm
- Wire cross-section 0.25 mm²

**Sensor button - connection assignment**

| Wire colour | Functions |
|---|---|
| White | LED1 |
| Brown | Switching contact S1 |
| Green | 24V |
| Yellow | LED2 |
| Grey | Switching contact S2 |
| Pink | 24V |
| Blue | LED3 |
| Red | Switching contact S3 |
| Black | 24V |

Note: Arrangement corresponds to the order of terminals in the corresponds to box

**Sensor button - technical information**

| | |
|---|---|
| Effect of switching: | Pulse activated one time |
| Electrical function: | normally open / N/O contact |
| Electrical data: | $I_{max}$ = 200mA / $U_B$ = 24V DC |

**See also section 3.5 "Installation instructions for sensor button and control unit“**

**Note:**
When laying cables, safe isolation between different types of currents within an installation system must be ensured **without exception**. Comply with the requirements of DIN EN 50174 and DIN VDE 0100-520 for communication wiring when laying the cables.

**Safety isolation**
For reasons of electrical safety, the sensor button must without exception be operated via "safety isolation" such as a control box item no. 61405 or directly on the NT switch box. The defined maximum line lengths must also be observed.

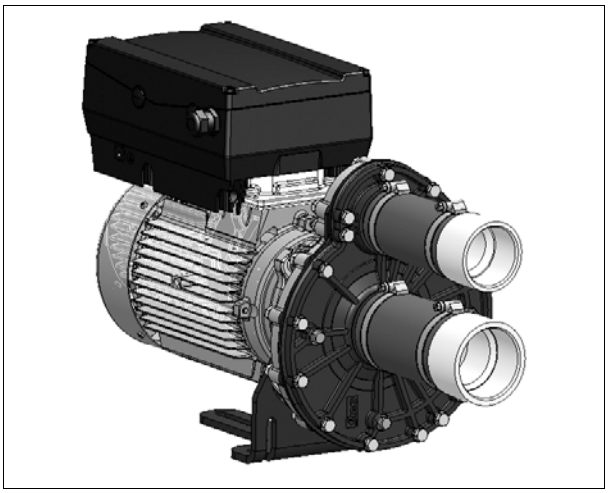
### 3.4.2 Converter box

**The converter box 3.0 also serves as a safety isolating element and for evaluating button pulses of the sensor button.**
The signal output for the *XANAS*® is via an analog output (AOUT).
The main task of the converter box is to ensure a safe isolation between the sensor buttons (buttons 1-3) on one side and the analog and Vcc connections on the other side of the frequency inverter. The purpose of the converter box is to ensure safe and reliable operation of the sensor buttons in the swimming pool.

**The converter box must always be positioned above the water level of the pool!**

**Operator's Manual 27251 "Converter Box 3.0" applies**
- Device overview
- Operating mode – mode 1 "THREE-button control with analog signal“
- Installation instructions and cable length
- Housing dimensions

### 3.4.3 Pump type WK-FU



**Operator's Manual 27220 "Centrifugal Pump WK" applies**

- General information with data sheet for pump WK
- Safety Instructions
- Transport and storage
- Electrical connection of the pump
- Operating the Centrifugal Pump

The abbreviation FU stands for the frequency inverter (German Frequenzumrichter) and the drive controller

**Operator's Manual "INVEOR drive controller" applies**
**http://www.kostal-industrie-elektrik.com/de-DE/Download/Antriebs-technik**

- General information
- Safety Instructions
- Installation
- Start-up
- Detecting and eliminating errors
- Technical data

If three-phase frequency inverters are used, conventional FI circuit breakers type A, also called RCD (residual current-operated protective device) are **not** approved for protection against direct or indirect contact!
In accordance with DIN VDE 0160 and EN 50178, the FI circuit breaker must be a FI circuit breaker RCD type B (sensitive to all currents)!

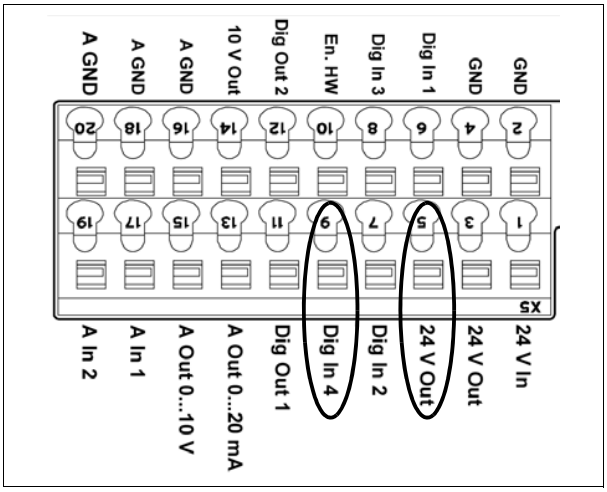
### 3.4.4 FU programming - *XANAS*® specific delivery state

**Information to supplement the INVEOR Operator's Manual**

The centrifugal pump is generally delivered with the FU attached. The power data is coordinated between the FU and the motor.
The FU has an active motor overcurrent protection function. The mains power connection for the FU must be designed according to the information in the INVEOR Operator's Manual (KOSTAL).

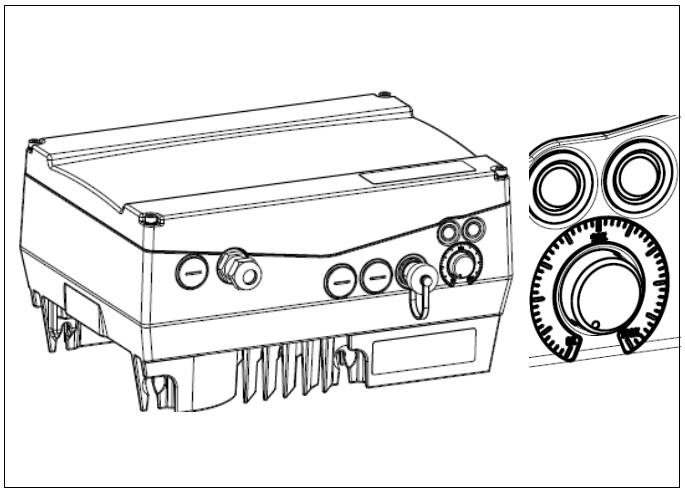
### 3.4.4.1 Operating modes:

The FU is delivered with two operating modes.
At the time of delivery operating mode 2 is activated via a wire jumper.
You can change between the two operating modes with DigIn4.




**Operating mode 1:**
**Internal potentiometer**

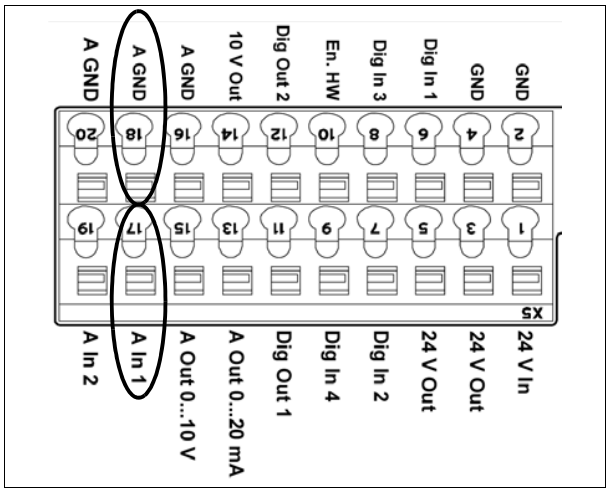
Commissioning function



- Manual speed setting via rotary potentiometer directly on the FU
- Control range between saved MIN / MAX speed
- Active when DigIn4 is unassigned

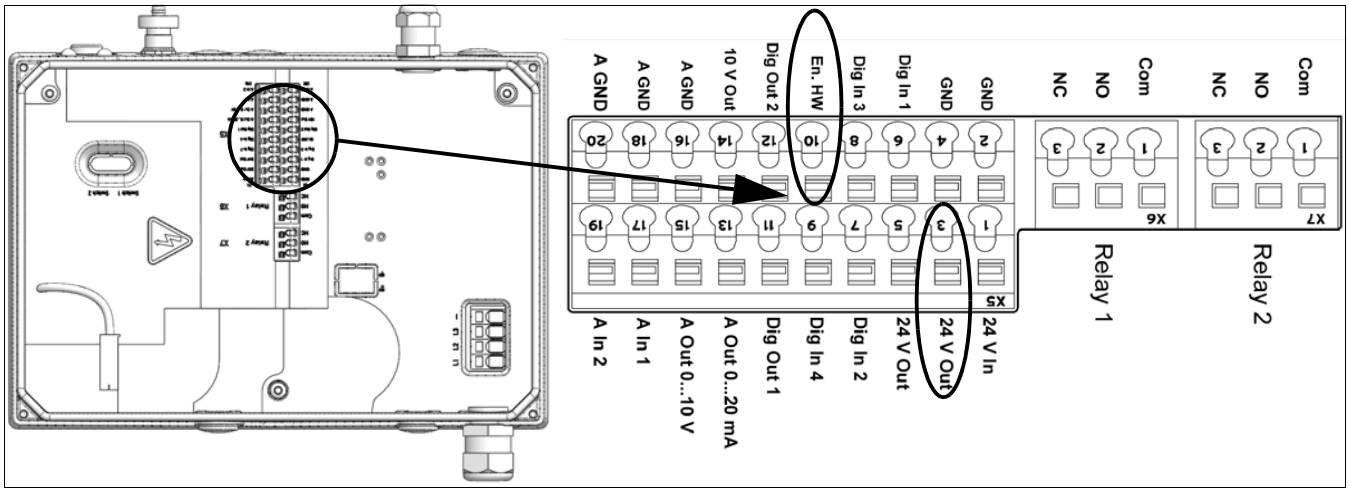
**Operating mode 2:**
**Analog control**

*XANAS*® function




- Speed setting via analog signal 0-10V on control terminal A In1
- Control range between saved MIN / MAX speed
- Active with jumper between DigIn4 and 24VOut

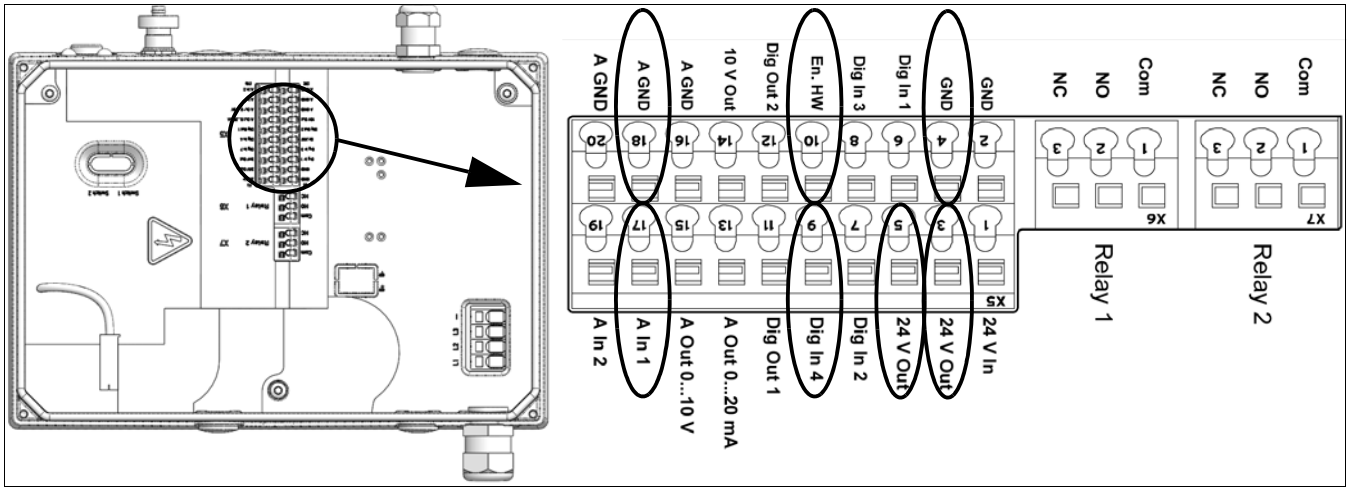
### 3.4.4.2 "Internal potentiometer" operating mode




The FU does not start up until the hardware enable (En.HW) is set.
At the time of delivery the hardware enable (En.HW) is not set.
The FU is ready for operation when the green signal LED is flashing. Mains voltage is applied then with the hardware enable not set. If the hardware enable is set now, the green signal LED is lit continuously, the motor can start up and manual speed control between MIN and MAX speed is now possible using the potentiometer on the FU.

### 3.4.4.3 "Analog control" operating mode

**As terminals for *XANAS*® function**




The FU does not start up until the hardware enable (En.HW) is set.
At the time of delivery the hardware enable (En.HW) is not set.
The FU is ready for operation when the green signal LED is flashing. Mains voltage is applied then with the hardware enable not set. If the hardware enable is set now, the green signal LED is lit continuously.
The hardware enable is set via Dout4 when the converter box is connected according to the connection diagrams, sensor-controlled design. This Dout4 is switched together with Aout when the Start button is pressed.
This ensures that the FU is disabled in Stop status.
The analog signal 0-10V which is present is used to control the speed between the MIN and MAX speed value.

### 3.4.4.4 Additional feedback contacts

**Switches with "Malfunction"**
Relay 1 (potential-free change) + DigiOUT1

**Switches with "Operation"**
Relay 2 (potential-free change) + DigiOUT2

For additional terminal assignments, please see the INVEOR Operator's Manual
Section 3.3.4 Control connections table, 4 Terminal assignment

### 3.4.4.5 Error message on FU

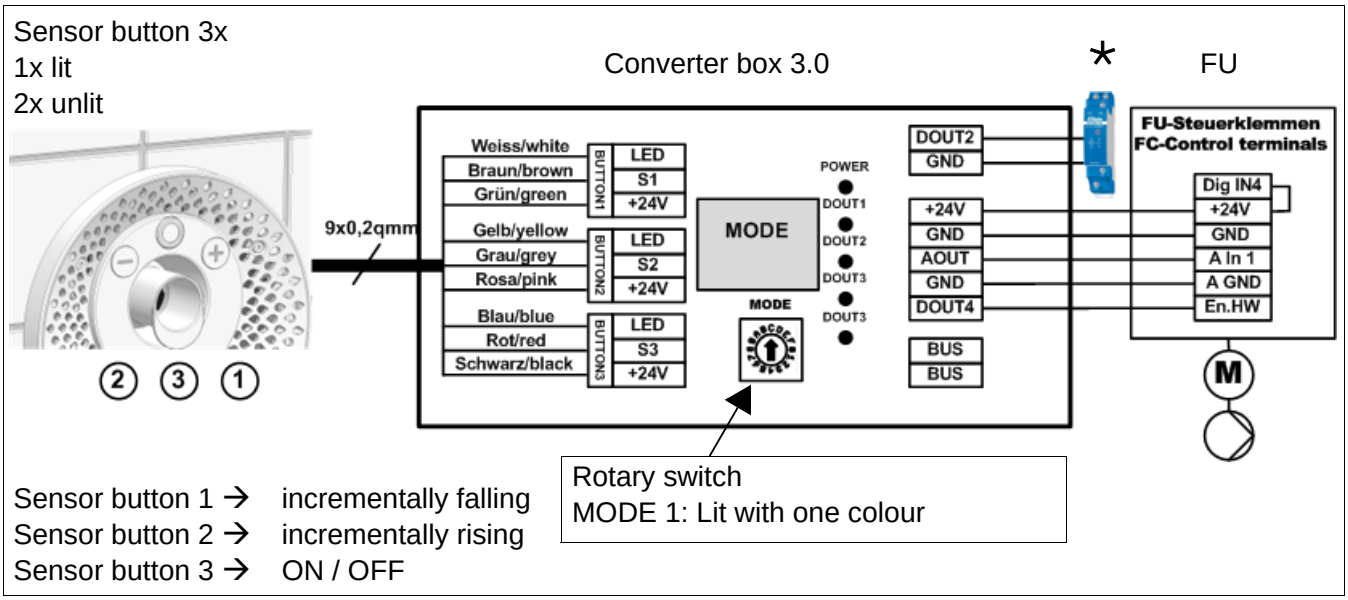
| Red LED | Green LED | Status |
|---|---|---|
| ✳ | ● | Warning |
| ● | ○ | Error |

| Key | | | |
|---|---|---|---|
| ○ | LED off | ● | LED on |
| ✳ | LED flashing | ✳ | LED flashing quickly |

### 3.4.5 Connection diagrams - Sensor-controlled design

**Function of *XANAS*® switching unit with 3 sensor buttons**

Connection diagram of the switching unit with 3 sensor buttons and a 9-pin connection cable




**The button pulses (buttons 1-3) cause an incremental change to analog output AOUT.**

**A lit button provides visual feedback.**

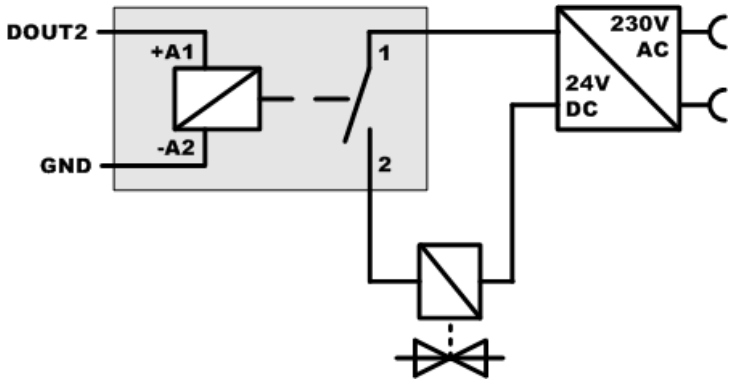
When a lit button is connected, optical feedback (flashing) is generated when it is activated.
AOUT: Starting voltage 4V control range 4 / 5 / 6 / 7 / 8 / 9 / 10V
Dout4: ON when AOUT is active / ON when AOUT 0V and non-active (enable)

**✶Air valve control:**

If AOUT is active, a pulse combination to S2 (2 pulses within 0.5sec) causes digital output DOUT2 to be activated.
DOUT2 can be set to inactive again with

a) S3 - System OFF
b) Pulse combination to S2 (2 pulses within 0.5sec)

Switching output of Dout2: 24V DC Imax = 20mA DC
To be able to switch an air valve with a higher electrical output, a multi-function relay item no. 55323 can be connected to DOUT2.



### 3.4.5.1 Testing the wiring

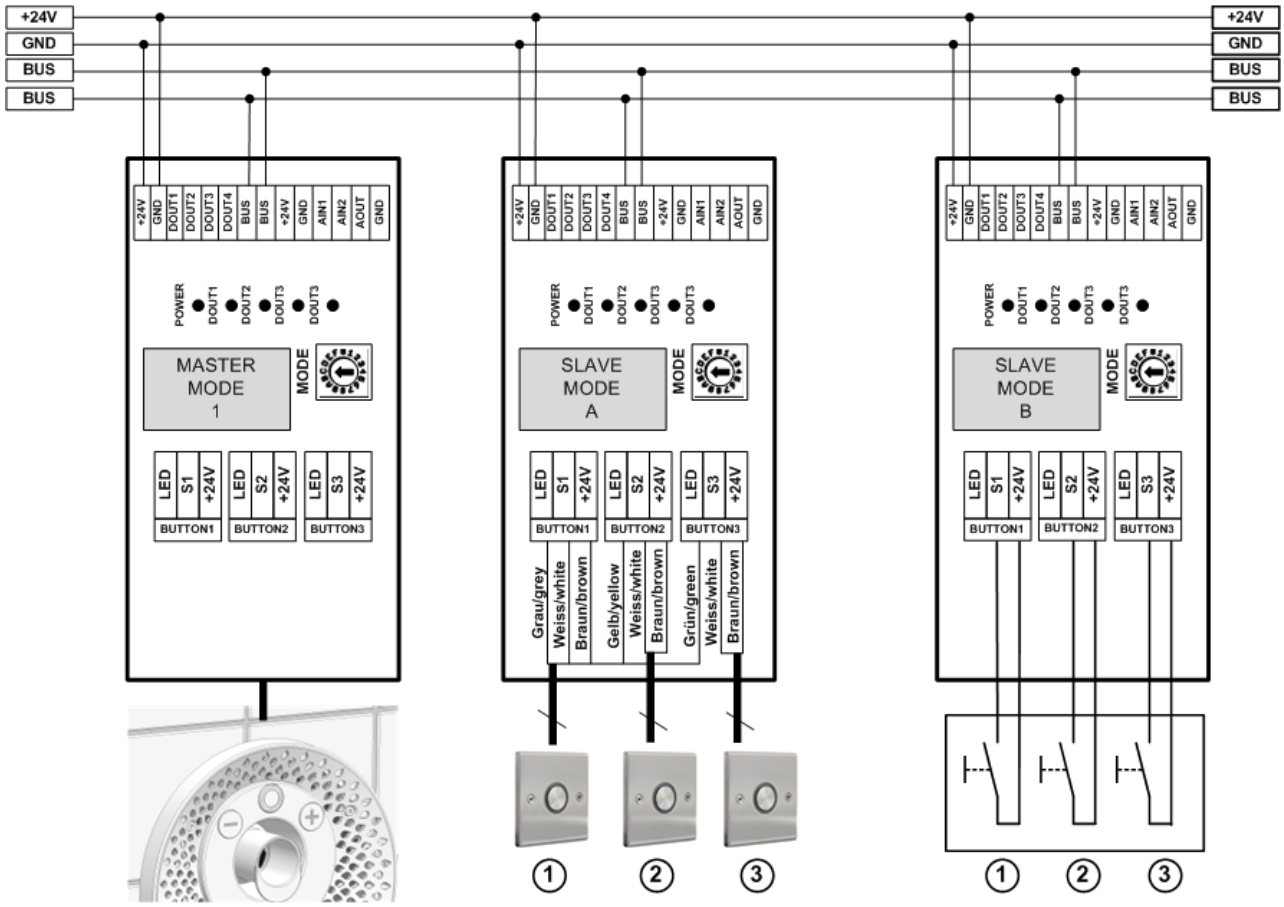
Sensor button with converter box.

1. The button pulse of the connected sensor buttons is received by the connected box when the lit ON/OFF button indicates this visually by flashing.

2. MODE1 active via rotary switch  .
   Measurable signals
   OFF →Aout = 0V / Dout4 = 0V
   ON → Start status AOUT = 4 / 5 / 6 / 7 / 8 / 9 / 10V / Dout4 = 24V
   Pressing the +/- key causes AOUT to change +/- 1V
   Lower limit: AOUT = 4V
   Upper limit: AOUT = 10V

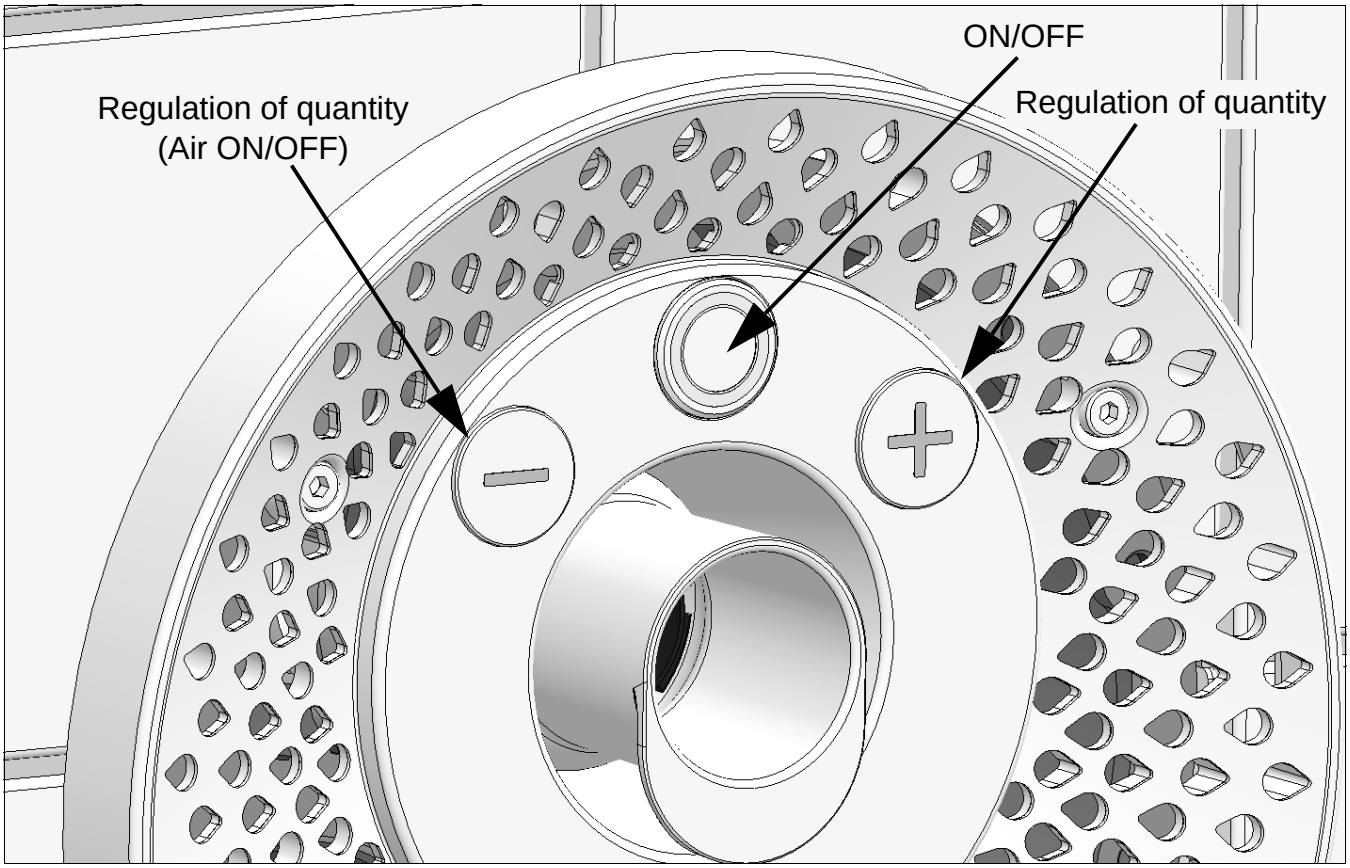
Reaching the lower and upper limit is indicated by the button flashing several times.

### 3.4.6 Connection for external operation




Optional: Customer connection

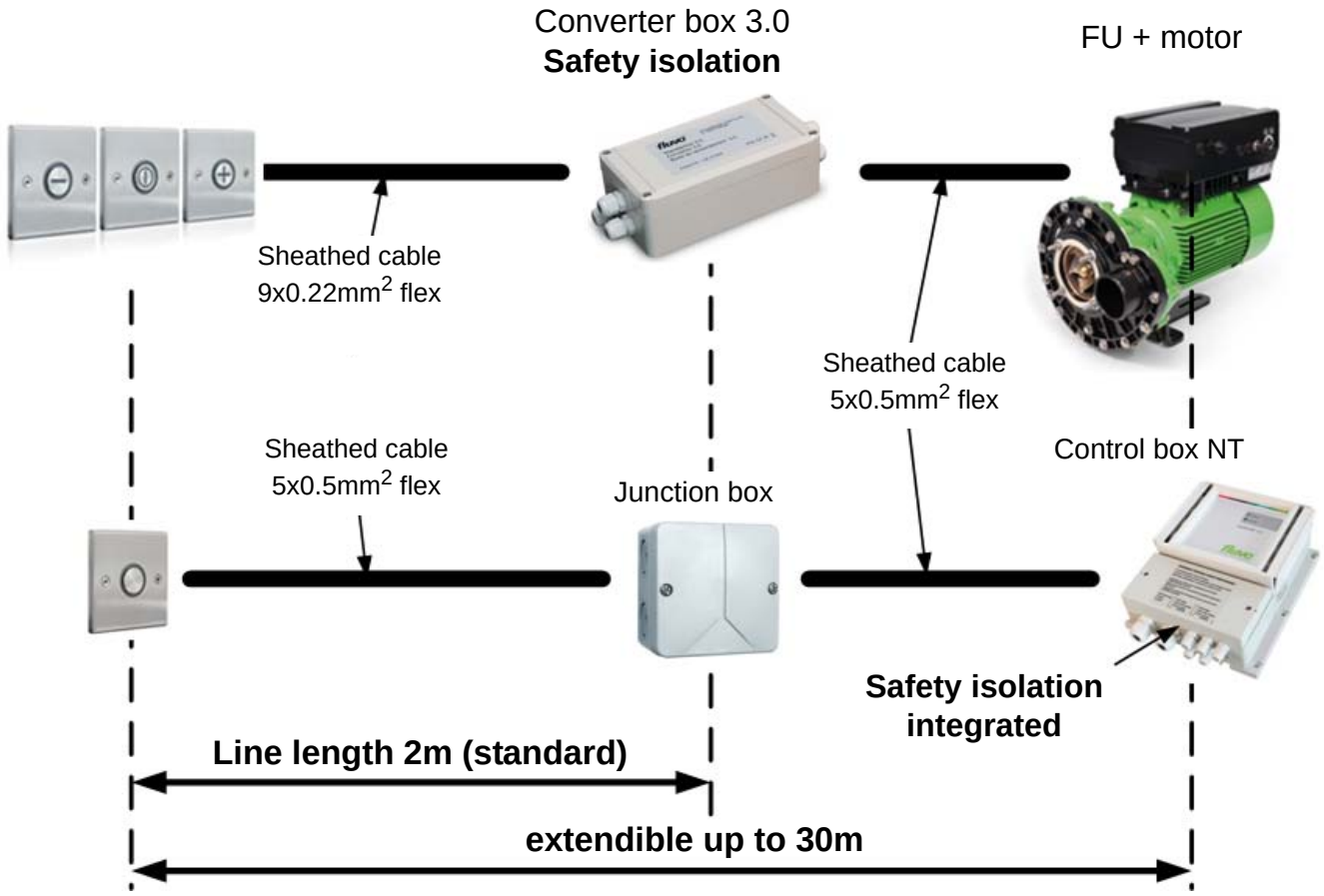
### 3.4.7 Operation - Sensor-controlled design




Pressing the ON/OFF button turns the system on or off. The button is always lit and flashes to provide visual feedback.
Pressing the + / - keys increases or reduces the corresponding amount. The lit sensor button flashes to provide visual feedback. When the maximum or minimum quantity is reached, the button flashes several times to provide visual feedback.

**Air ON/OFF**
The Quantity ⊖ button can be pressed twice quickly to turn the air supply on or off if an air valve is installed. See also section 3.4.5.

## 3.5 Installation instructions for sensor button and control unit



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