Safety for Industrial Processes

USER MANUAL
UI Configurable Converter Trip amplifier

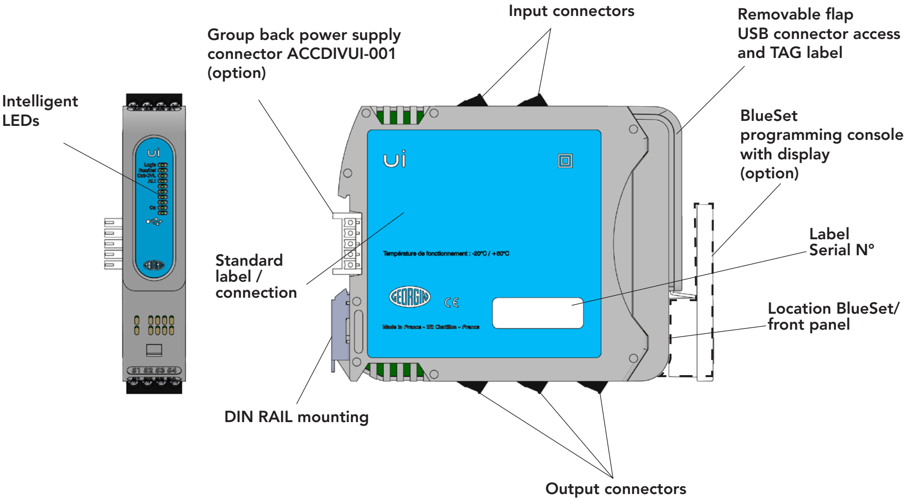
www.georgin.com

I. Characteristics of the device

1.1 Function

Configurable electrical value converter with universal input and trip amplifier function. Configuration by PC with ProgressX Manager software and a standard USB cable connection, or using the BlueSet backlit removable programming console.

1.2 Presentation of the device



Screw connector for rear power supply connector (option):

P/N ACCDIVUI-003 (connection on the left)

P/N ACCDIVUI-002 (connection on the right)

P/N ACCDIVUI-001

UI Configurable converter – Trip amplifier

The configurable universal electrical value converter UI, with galvanic isolation and trip amplifier function monitors or regulates the usual physical parameters (temperature, pressure, position, level, rate, etc.).

For the UI ATEX / IECEx version, the UI device is designed for surface industries as an associated equipment which must be installed in the safe zone. The UI device is qualified for intrinsic safety [Ex ia] for interface of:
Zone 0, 1 or 2 for gas of groups IIA, IIB or IIC (according to EN/CEI 60079-10-1)
Zone 20, 21 or 22 for dusts of groups IIIA, IIIB ou IIIC (according to EN/CEI 60079-10-2).

UI can linearize the input signal up to 20 points. Depending on the version, the unit has output relay contacts, combined with programmable trip values and a proportional 4-20 mA analog output. The unit has simulation functions for its relay outputs and for the 4-20 mA output. The UI has an individual status relay (NC) and a group status relay (NO) which are activated if a fault is detected on the unit input or output.

The UI is equipped with a universal power supply and can be connected to AC or DC supplies.
The UI is mounted on DIN rails in the control cabinets, in accordance with standard EN50022.
An optional rear connector provides a group power supply on the DIN RAIL.
Operating defects are indicated by intelligent flashing LEDs on the front panel.
The UI may be configured using the BlueSet removable console or through the USB port, with a standard cable and the ProgressX Manager software.

1.3 Electrical characteristics

Number of channels	1 or 2 depending on model (coming soon)
Power supply	■ Universal: 21.6 to 300 Vdc (removable terminals 11+ and 12-) 99 to 253 Vac (removable terminals 11 and 12 only) ■ 24 to 48 Vdc (with back power supply optional connector on DIN rail, maximum 48 units in 24 Vdc and 96 units in 48 Vdc) For intrinsic safety application, the power supply is 24Vdc only. ■ Through the USB port with a USB type A x micro USB type B cable (for the configuration only) ■ Front panel green LED "Logic"and "ON" when energized. ■ Reverse polarity protection ■ Warm-up time for optimum parameters: 5 minutes
Consumption	≤ 4 VA
Input signal	Universal input (from hazardous area). See table below

UI Configurable converter – Trip amplifier

Input	Scale	Input impedance	Minimum scale	Basic precision*	Characteristics	Thermal drift
Current	-2.5/21.5 mA	18.5 Ω	2 mA	10 µA	-	
Transmitter	3.5/21.5 mA	18.5 Ω	2 mA	10 µA	-	
Voltage	-1/10.1 V	1 MΩ	1 V	10 mV	-	
Voltage	-10/101 mV	15 MΩ	10 mV	10 µV	-	
Thermocouple J	-210/1200°C	15 MΩ	50°C	-210°C ≤ T < -100°C: 1.5°C -100°C ≤ T < 1200°C: 0.5°C	Cold junction compensable gives a maximum supplementary error of 1.5 x basic precision	10% of precision of rating / °C
Thermocouple K	-250/1372°C			-250°C ≤ T < -200°C: 5°C -200°C ≤ T < -100°C: 1.5°C -100°C ≤ T < 1372°C: 0.5°C		
Thermocouple B	+400/1820°C			400°C ≤ T < 900°C: 1.5°C 900°C ≤ T < 1820°C: 0.5°C		
Thermocouple R	-50/1768°C			-50°C ≤ T < 200°C: 5°C 200°C ≤ T < 1768°C: 1.5°C		
Thermocouple S	-50/1768°C			-50°C ≤ T < 200°C: 5°C 200°C ≤ T < 1768°C: 1.5°C		
Thermocouple T	-250/400°C			-250°C ≤ T < -200°C: 5°C -200°C ≤ T < -100°C: 1.5°C -100°C ≤ T < 400°C: 0.5°C		
Thermocouple E	-270/1000°C			-270°C ≤ T < -250°C: 10°C -250°C ≤ T < -200°C: 5°C -200°C ≤ T < -100°C: 1.5°C -100°C ≤ T < 1000°C: 0.5°C		
Thermocouple N	-240/1300°C			-240°C ≤ T < -200°C: 5°C -200°C ≤ T < -100°C: 1.5°C -100°C ≤ T < 1300°C: 0.5°C		
Thermocouple W5	-20/2320°C			-20°C ≤ T < 600°C: 1.5°C 600°C ≤ T < 2320°C: 0.5°C		
RTD100 2 wires	-220/750°C	Measurement current 500 µA	20°C	0.5°C	Influence of line 2.5°C /ohm	
RTD100 3 wires					*2.5°C/ohm out of balance between wires*	
RTD100 4 wires					-	
RTD100 2 wires extended	-270/750°C	Measurement current 500 µA	20°C	-270°C ≤ T < -220°C: 3°C -270°C ≤ T <750°C: 0.5°C	Influence of line	
RTD100 3 wires extended					*2.5°C / ohm out of balance between wires*	
RTD100 4 wires extended					-	
Potentiometer	0/100%	370 Ω	10%	0.5%	Potentiometer 1/20 kΩ	

* precision: ≤ 0.1%of FSD or less than the basic precision of the greater of the 2 values

Output signal (depending on model M1 to M6)

(Towards safe zone) **1 analog output** 4-20 mA (M1 to M3) generator with load of 800 Ω maximum (terminals 31+ and 32-) or receiver (terminals 32+ and 33-) or 0-10 V (M4 to M6) with charge 10 kΩ minimum

Depending on model:

- 1 **alarm threshold relay** (M1 and M4) type SPDT (value displayed on front panel by orange LED « AL1 ») 6A - 250 Vac on cos ρ = 1, breaking power 1500 VA.

or

- **2 alarm threshold relays** type NO (M2 and M5) or NC (M3 and M6), value displayed on front panel by orange LED «AL1» and «AL2» 6A - 250 Vac on cos ρ = 1, breaking power 1500 VA

For all versions

- **1 mechanical relay NC** for individual status (default display on front panel with red LED «Out-OVL»). 0.3 A under 125 Vac or 1 A under 30 Vdc on cos ρ = 1, breaking power 30 VA in Vdc and 37.5 VA in Vac (terminals 13-14)
- **1 static relay NO** «group» status (default display on front panel with red LED «Out-OVL») 70 mA - 50 Vdc breaking power3.5 W (terminals A-B)

Protection against reversed polarity

Response time

<2 seconds

Connections

- 10-pin connector on front panel for communication with BlueSet console
- Detachable screw terminals for cable 0.2 mm² to 2.5 mm² (number depends on model)
- Detachable DIN rail connector for power supply group and recovery of the «group status» signal (connector option)
- One or two USB ports, depending on the number of input channels, under the detachable label holder
- Utilization of a standard type A USB cable x micro type B

Configuration

The UI is either configurable by **the BlueSet backlit removable console** or by **the ProgressX Manager software**.

Galvanic isolation

Sensor input	Output 4/20mA Relay Power supply	2,5 kV
Power supply	Relay Output 4/20mA	3 kV
Relay	Output 4/20mA	3 kV
USB	Sensor input	2,5 kV
	Relay	3k V
	Output 4/20mA	at the same potential
	Power supply	3 kV

1.4 Structural characteristics

Installation	In safe area
Presentation	Polyamide case
Weight	Approx. 200 g
Storage temperature	-20 to 70°C
Operating temperature	-20 to 60°C
Relative humidity	5 to 95% without condensation
Connection	Removable terminals with screws
Mounting	On rail DIN EN 50022

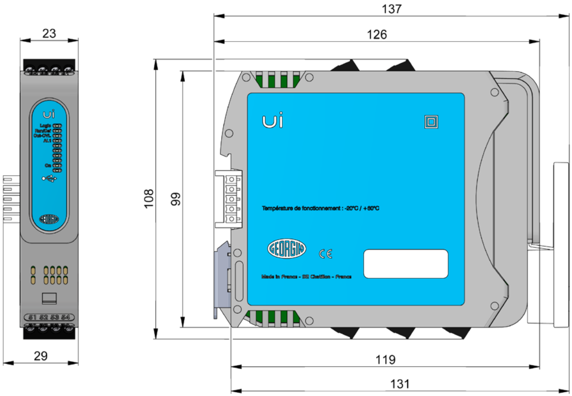
1.5 Certifications

EMC	2014/30/UE ; EN/CEI 61326 & EN/CEI 61000-6-2
Low Voltage Directive	2014/35/UE ; EN/CEI 61010-1
ATEX	2014/34/UE ; EN/CEI 60079-0 & EN/CEI 60079-11
Certificate ATEX	INERIS 19 ATEX0024X
Certificate IECEx	IECEx INE 19.0018X
Marking	CE 0081 II (1) GD [Ex ia Ga] IIC and [Ex ia Da] IIIC [Ex ia Ga] IIB and [Ex ia Da] IIIB
SIL	IEC 61508

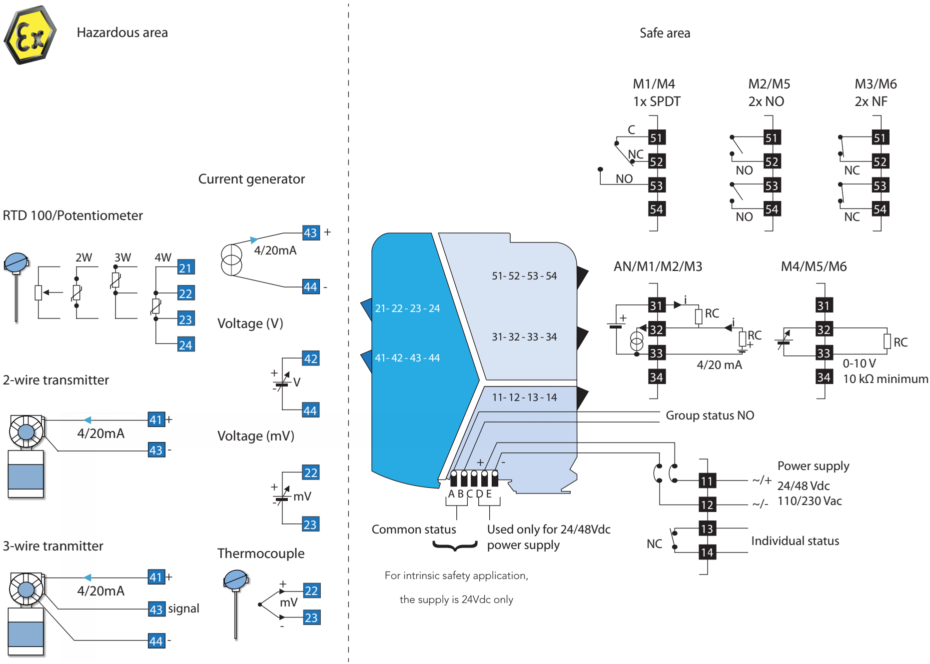
1.6 Intrinsic safety parameters

	Transmitter 2 and 3-wire 41 - 43 - 44	Inputs Current and voltage (V) 42 - 43 - 44	mV ,TC ,RTD100, Pot. 21 - 22 - 23 - 24
Voltage Uo (V)	25.83	7.875	7.875
Current Io (mA)	87.9	0.20	7.7
Power Po (mW)	567	0.4	15.1
Resistance Ro (Ω)	294	39904	1027
External capacitance (IIC) Co (µF)	0.1	8.7	8.7
External inductance (IIC) Lo (mH)	4.606	912935	605
L/R ratio (IIC) (mH/ohm)	0.062	91.513	2.355
External capacitance (IIB) Co (µF)	0.77	114.9	114.9
External inductance (IIB) Lo (mH)	18.425	3651740	2419
L/R ratio (IIB) (mH/ohm)	0.25	366.052	9.421

1.7 Dimensions (mm)



1.8 Connection



Do not connect 2 sensors at the same time. This could affect the safety of the equipment.

1.9 Coding

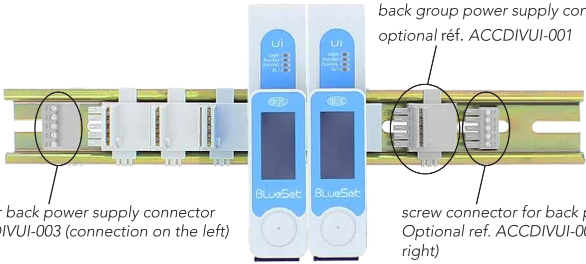
Type		Function		version ATEX/standard		Number of input channels		Input type		Number of input/output channels		Output		Power supply		Options	
UI	Entrée universelle	TA	Trip ampli-fier	X	ATEX Ex ia or IECEx	1	1 input	UN	Universal input 4-20 mA Active/Passive	1	1 output per input	M1	1 x 4-20 mA active or passive +1 switch SPDT	UC	24/48 Vdc	001	With*
				N	Standard							M2	1 x 4-20 mA active or passive + 2 contacts (2 poles) NO	UN	Universal	000	Without
												M3	1 x 4-20 mA active or passive + 2 contacts (2 poles) NC				
												M4	1 x 0-10 V + 1 switch SPDT				
												M5	1 x 0-10 V + 2 contacts (2 poles) NO				
												M6	1 x 0-10 V + 2 contacts (2 poles) NC				

* *Group back power supply connector*

II. Installation

2.1 Mounting

Installation and removable of back power supply connectors



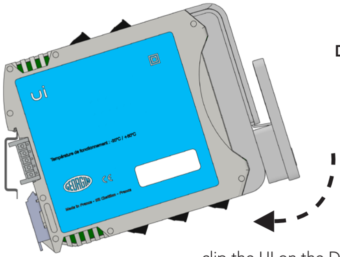
example of rear connector plugging

UI Configurable converter – Trip amplifier

The units are designed to be mounted on a DIN rail (profile EN50022) and may be mounted horizontally or vertically. Do not block the air vents. The connectors may be removed using a screwdriver, as shown below.

Mounting and dismounting the UI on the DIN rail*

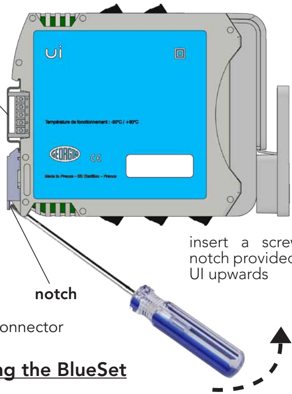
Mounting



clip the UI on the DIN rail

Dismounting

DIN rail



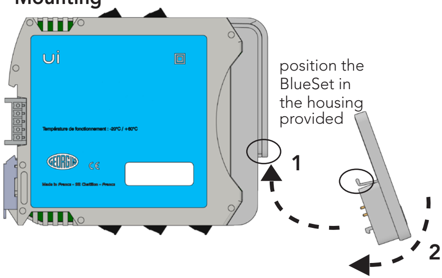
insert a screwdriver in the notch provided, to remove the UI upwards

notch

*mounting and dismounting are identical with the back power supply connector

Mounting and dismounting the BlueSet

Mounting

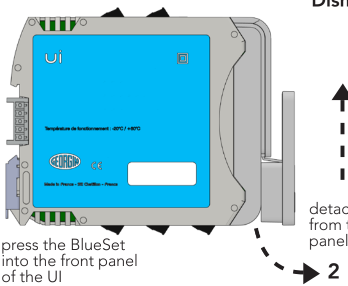


position the BlueSet in the housing provided

1

2 press the BlueSet into the front panel of the UI

Dismounting



1 push the BlueSet upwards

detach the BlueSet from the front panel of the UI

2

2.2 SIL

Necessary conditions when using the UI in a safety instrumented function system (SIL):

The user should determine the SIL level of the safety loop type and the safety-related system (continuous or intermittent use). In accordance with standard EN 61508, the UI must be regularly tested, with scheduled maintenance. As a reminder, the SIL level depends on the maintenance frequency (1 year).

The regular tests must be performed by GEORGIN or by the user, in accordance with the technical information of the user manual. The 4-20 mA analog output signal must be monitored in order to detect any safety system failure (off-scale signal detection). The 4-20 mA analog output default position must activate the safety function or activate an alarm to inform the operator. The activation of the SIL function for the UI equipment implies an analog output safety position <3.5 mA.

The activation is done using the ProgressXmanager software or the BlueSet console.

The use of trip amplifiers is limited to an activation of the safety functions with a trip amplifiers shut-off. The trip amplifier de-energized position (de-energized coil) must correspond with a condition of activation of the safety functions or trigger an alarm to warn the user.

The positions must be configured in the rest status if they are used for safety monitoring (this must be done using the ProgressXmanager software or the BlueSet console).

The UI configuration must be protected by a password. This is done using the ProgressXmanager software or the BlueSet console.

If it is used in a SIL safety loop, the stated failure rates are guaranteed for the following period of 10 years.

See also the dcsil-UI-fren declaration on www.georgin.com.

2.3 ATEX

2.3.1 Installation location

The equipment must be installed in a non-explosive atmosphere, in a clean environment, free of condensation and corrosive or conductive dust.

Overvoltage category: The UI equipment must be installed on an electrical installation of category II minimum.

Pollution factor: The UI equipement must be installed in an environment with a pollution factor 2 minimum non-condensing.

The device must be installed in a enclosure with a minimum IP54.

ATEX/IECEx:

If the equipment is to be used in an intrinsic safety combination, the installation must comply with standard EN/CEI 60079-14.

Intrinsic safety remains assured within the operating temperature range specified in 1.4. However, the life cycle of the electronic hardware is reduced when its utilization temperature rises (approximately by half every 10°C). You should therefore install the equipment in suitably ventilated equipment rooms, avoid the proximity of elements that may heat the equipment by radiation or which are likely to generate electromagnetic radiation greater than 10V/m.

2.3.2 Electrical connection

Electrical connections must be made when the equipment is DE-ENERGIZED, using wires with a maximum section of 2.5 mm².

The USB link is galvanically isolated from I.S. terminals, so that cables from dangerous zones can be left connected while the UI is being configured. The computer used for the configuration of the UI device must be powered by a power supply that complies with standard EN 60950-1 for a voltage lower than 24Vdc.

The terminal 11/12 must be link with a maximum voltage Um < 250Vac.

The terminal 13/14 must be link at the device comply with standard EN/IEC 61010-1 with maximum voltage Um < 24 Vdc.

The terminal 31/32/33/34 must be link at the device comply with standard EN/IEC 61010-1 with maximum voltage Um < 24 Vdc.

The terminal 51/52/53/54 must be link with maximum voltage Um < 250Vac.

The Power rail terminal A/B/C/D/E must be link with a power supply comply with standard EN/IEC 60950-1 or EN/IEC 61010-1 with maximum voltage Um < 24Vdc.

The intrinsic safety terminals must be connected only to hardware that is I.S. or compliant of section 5.7 in standard EN/CEI 60079-11.

The relay contacts must be connected to an equipment that complies with standard EN/CEI 61010-1.

In addition, the hardware/connecting cable combinations must be compatible in terms of intrinsic safety, as defined in standard EN/CEI 60079-25.

2.3.3 Cable routing

<u>For the ATEX/IECEx model:</u>

Full precautions must be taken to prevent electromagnetic disturbance with other cables that may generate dangerous voltages or currents. I.S. cables must be secured in order to prevent accidental contact with other cables if any cable is pulled off the terminal strip.

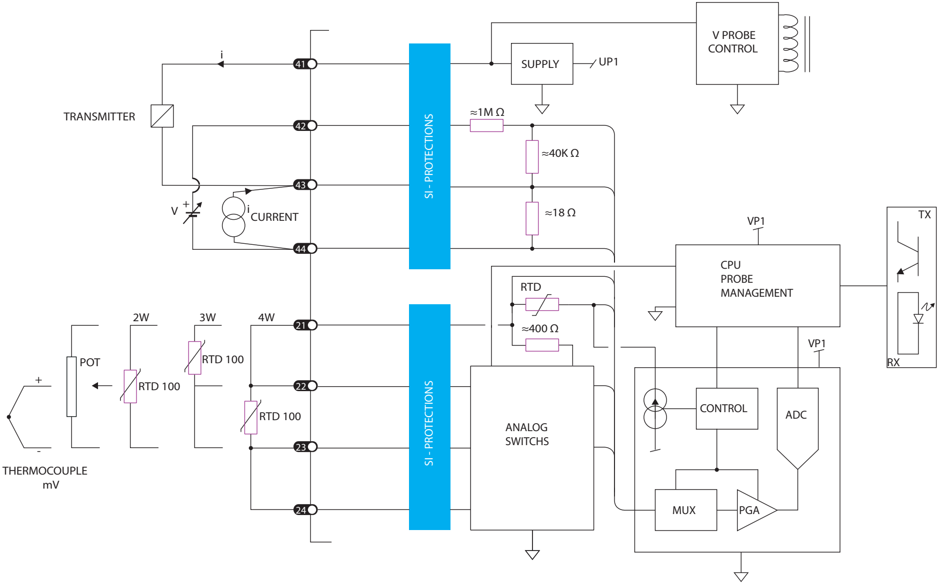
The nature and routing of the cables between the potentially explosive zone (I.S. cables) must meet the requirements defined in sections 6.2.1 and 6.3 of standard EN/CEI 60079-11, EN 60079-14 and EN 60079-25.

III. Operation

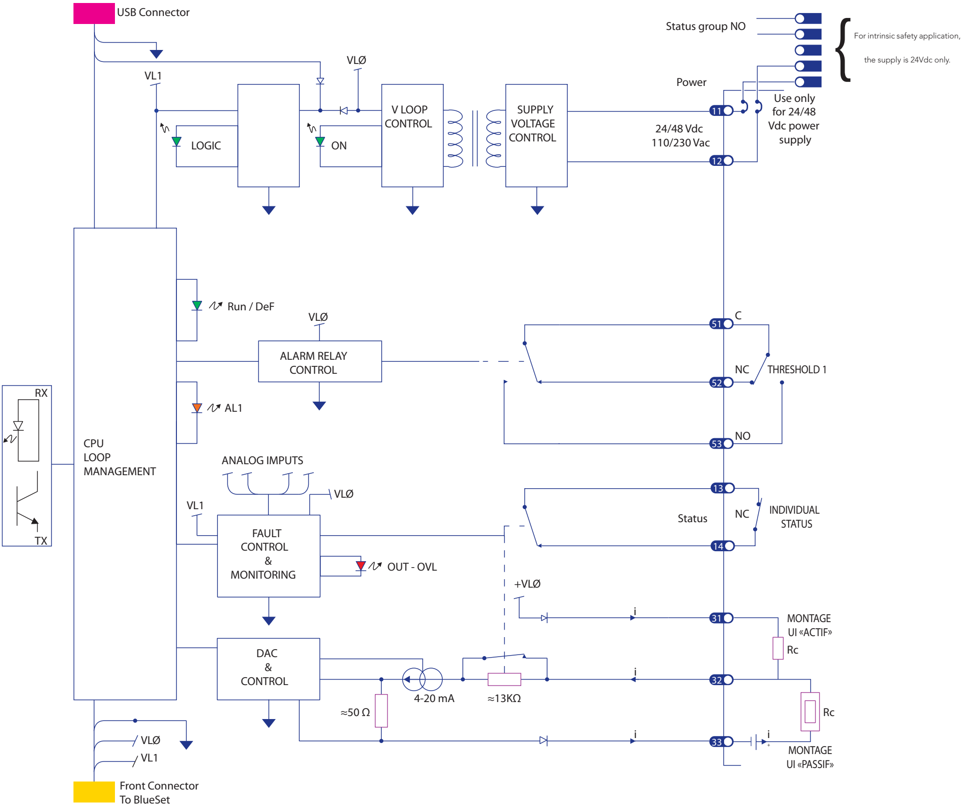
3.1 Internal operation principle

The UI is managed by two micro-controllers that are supporting the embedded program and all the setup parameters in their internal flash (backup) memory.

Example for an UITAX-1UN-1-M-UN000



IS CIRCUIT PART



SAFE CIRCUIT PART

3.2 Input processing

3.2.1 Input values

- Current received from 4-20 mA measurement transmitters
  The UI can be connected with either passive or active transmitters (2 or 3/4 wires).
  In the case of a passive transmitter, the transmitter is powered by the UI (only valid for UI models that have a transmitter power supply).
- Current mA
  This input operates as a milliammeter. Consult the « sensor faults » and « special functions » sections for an explanation of the differences between « current » and « transmitter » inputs.
- Voltage 100 mV
  This input operates as a millivoltmeter, with a very high input impedance (>15 MΩ) .
- Voltage 10 Vdc
  This input operates as a voltmeter with an input impedance of 1 MΩ.
- Temperature by thermocouple:
  Input that supports all the usual types of thermocouple sensors.
  The user may opt for cold junction compensation inside the UI or be compensate using an external circuit.
- Temperature platinum resistor probe (RTD100)
  Value from resistor probe wired with two, three or four wires, with line impedance compensation.
  Measurement current is 500 µA.
- Position by potentiometer sensor
  Measures the ratio (0 to 100%) between the voltage available on the cursor and the power supply voltage from the potentiometer sensor (supplied by the UI).

3.2.2 Input range

This is the part of the input scale that corresponds to an analog output variation from 4 mA (minimum) to 20 mA (maximum). When the input value is outside the range, the analog output goes either to its maximum value, or to its minimum value.

3.2.3 Special functions related to input sensors

Specific processing can be applied to certain sensors:

- 4-20 mA transmitter - extract square root: input value E is transformed into E' using the formula $E' = 4+4\sqrt{(E-4)}$

This quadratic transformation is only applicable to the 4-20 mA transmitter input and not to the 0-20mA current input! (this function is generally used for rate transmitters operating by differential pressure measurement: $Q = k\sqrt{\Delta p}$)

- Platinum probe with two wires – line resistance: this value is subtracted from the measured resistance of the platinum resistor probe (RTD100) between its two connection points.

The ProgressXmanager configuration software and the BlueSet console allow the line resistance value to be either entered or measured.

- Potentiometer – « dark zone »:

  The measured value (in %) can be corrected to take into account the real cursor movement.

  The configuration software or the BlueSet allow the two potentiometer « dark zones » to be either entered or measured.

  After correction, the input value will vary between 0 and 100% when the signal fluctuates between the two « dark zones ».

- Temperature by thermocouple sensor - internal cold junction compensation:

  When the value is measured with internal cold junction compensation, the UI corrects the voltage output by the thermocouple, to take into account the temperature of its connections on the UI terminal strip (cold junction), to obtain the hot weld temperature.

3.2.4 Analog-digital conversion - Input stage

The microcontroller connected to the ADC receives the input signal by digital value, which is provided by a DeltaSigma type ADC, with 19-bit resolution. Analog-digital conversion time is around 150 ms. Before conversion, all the inputs are formatted, and are then multiplexed and amplified, depending on their origin:

- 20 mA or 4-20 mA current: the signal passes through 18 Ω shunt.
- 100 mV voltage: the signal is injected directly onto the multiplexer.
- 10 V voltage: the signal is divided through a resistor bridge.
- Temperature by platinum resistor probe (RTD100): a constant current of 500 µA is injected onto the resistance to be measured. Depending on the wiring (2, 3 or 4 wires), the voltages across the resistor terminals are processed successively and the impact of the line resistances is eliminated by computing.
- Temperature by thermocouple probe: The voltage output by the thermocouple is applied directly to the multiplexer input. When selected « internal », the cold junction compensation is computed by measuring the temperature of the connection points, using a platinum resistor probe.
- Position by potentiometer sensor:

  The voltages from the power supply and potentiometer cursor are measured alternately, using the same process as for the 100 mV input.

  The cursor position is determined by computing, using these two signal values.

3.2.5 Physical value represented

This is the value of the physical parameter represented by the input value (e.g. sensor 0-100mV/0-50bar, an input value of 50 mV represents a physical value of 25 bar).
This is configured by defining physical values corresponding to the minimum and maximum parameter values.
Caution: it's the physical value that is used to configure the threshold setpoints. For temperature inputs, the physical value represented cannot be configured.

3.3 Output signal processing

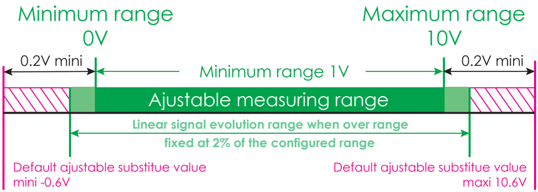
3.3.1 Output values

Depending on the options selected (consult the commercial references table to find the output combinations possible), the UI can manage:
- 1 or 2 threshold monitoring relays on the input value.
- a 4-20 mA or 0/10 V analog output

The output can be configured to be directly or inversely proportional. For example, a 4-20 mA output can be inversely proportional, so that the maximum scale value corresponds to an output of 4 mA and the minimum scale value corresponds to an output of 20 mA.

4/20 mA output:

0/10 V output:



Nota : in the case of the configuration of the 0-10V output with blueSet, it is preferable to start configuring the default substitue values before the range limits in order to avoid possible error messages when imputing them.

3.3.2 Analog-Digital conversion. Output phase

The microcontroller uses the measured input value and the configuration parameters to compute the analog output value. It then generates a signal, the duty factor of which is a function of the required analog value.
After isolation through optocouplers, a voltage-current converter converts the mean value of this signal into a current that is injected onto the 4-20 mA analog output.

3.3.3 Monitoring trip threshold

The threshold datas are processed (value, hysteresis and delay) by the microcontroller, which also controls the corresponding relays.
The operating way of the relays, when a threshold value is exceeded, is configured in the configuration setup.
The exceeding of a threshold value is indicated by an orange LED on the front panel.

3.3.4 Operation of alarm threshold values

Each alarm threshold is defined by four parameters:

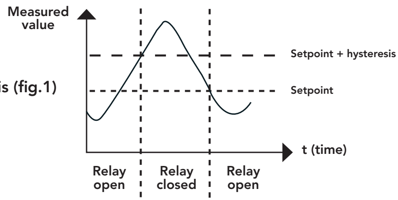
The theshold: this is the value for which the measured physical value is compared
Hysteresis (fig. 1)*:
Hysteresis is expressed as a % of the input range, depending on the physical values represented.
In practice, hysteresis prevents repeated relay status changes when an input value is fluctuating around the setpoint value.

Delay: Expressed in ms, this is the minimum time for which a threshold value must be exceeded (rising or falling) for the relay to be activated (or deactivated).
In practice, the timer allows short fluctuations of the input value to be ignored, but it delays the relay reaction to the exceeding of a threshold value.
Note: The threshold value statuses are indicated on the front panel: a LED lit up indicates that the corresponding threshold value is exceeded.

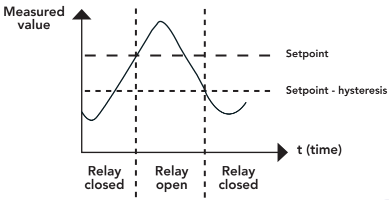
Cutout

De-energized when falling

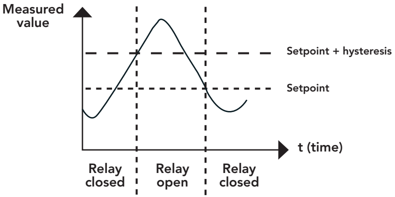
Hysteresis (fig.1)



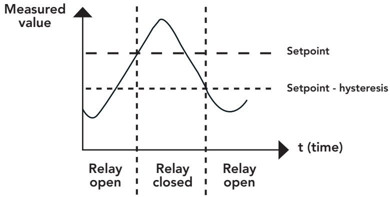
De-energized when rising



Energized when falling



Energized when rising



3.3.5 Output simulation

When the UI is connected to a PC, the configuration software or the Blue Set console :

- controls the power supply to the threshold relays and status relays: cutout or energized
- imposes a current value on the analog outputs.

Caution: This operating mode is displayed by the LED in front panel. See LED operation chapter.

3.4 Power supply, galvanic isolation

The UI power supply uses the switch mode type with FLYBACK topology. Operation is regulated by a specific circuit, working at a frequency of 50 kHz, which gives an excellent EMC performance.
The transformer used in the power supply provides galvanic isolation between three potentials:

- the power supply network potential.
- the input stages potentiometer (including the passive transmitters power supply) to which the microcontroller is also connected.
- the output stages potential: analog output and US

3.5 Operation in the event of a fault

An input sensor fault is detected in the following cases:

- 4-20 mA transmitter: input signal outside minimum or maximum values, according to recommendation NAMUR NE43.

- temperature by platinum resistor probe: one of the connecting wires broken.
- temperature by thermocouple: sensor broken or internal cold junction compensation probe broken.
- position by potentiometer sensor: one of the connecting wires broken.
- Voltage and current inputs (100 mV, 10V, 20 mA): input signal outside scale range.

If a sensor fault occurs, depending on the UI setup, it can:

- Treat the fault:
  By forcing the status of one or more threshold. In this case, the sensor fault is indicated by the flashing of the corresponding LED on the UI front panel.
  By forcing the current value on the 4-20 mA analog output (default value).
  The proposed values are 3.5 mA or 21.5 mA. If the SIL function is active, the loop current must be ≤ 3.5 mA.
- Ignore the fault: in this case, the output value goes to the minimum or maximum scale value (depending on the type of failure identified!).
  In the case of a sensor failure, the NO and NC status relays are activated, and also the corresponding red LED OUT OVL.
  In the case of an input or output fault, the UI indicates its status by specific LED flashing on the front panel (see section 5.1).

IV. Configuration

4.1 General

The UI is configured either:
Using the ProgressX Manager software (type of input, units, scale, value represented, square root extraction, SIL function, fault relay statuses, mode, value, hysteresis and alarm relay time, output simulation, output current, 20-point linearization), by connecting the UI to a PC. Data is transferred to the UI through a standard USB link (the USB port is under the openable and detachable flap on the front panel). The PC manages the dialog through optocouplers and a specific interface circuit that adapts the logic levels.
Or using BlueSet backlight removable console (same as with ProgressXManager except 20-point linearization) navigation, with a control joystick.
The BlueSet console can also be used to save a standard configuration, it can be duplicated in other instruments of the same type.
Note: the output simulation function are not available when the UI is connected using USB only (without its main power supply).

4.2 Configuration using the PC: ProgressXManager

ProgressXmanager is the configuration and running software for units of the ProgressX range, from a PC.
The configuration allows the following to be read:

- the value of the physical parameter measured.
- any sensor fault.
- threshold statuses.

- the value of the analog output current.

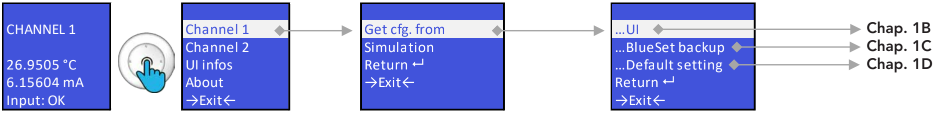
All the configuration parameters are saved in the UI ROM. In addition, access to UI setup changing can be protected by a password. The password is also saved in ROM.

The PC is connected to the UI using the USB type A cable x micro USB type B, and the operation doesn't need a specific driver.
The software was developed under a Windows 7 environment. It is user friendly and simple to use.
ProgressXmanager is a free download from the site www.georgin.com
Recommended minimum configuration: Windows 7and 1 GHz processor / 1 GB of RAM

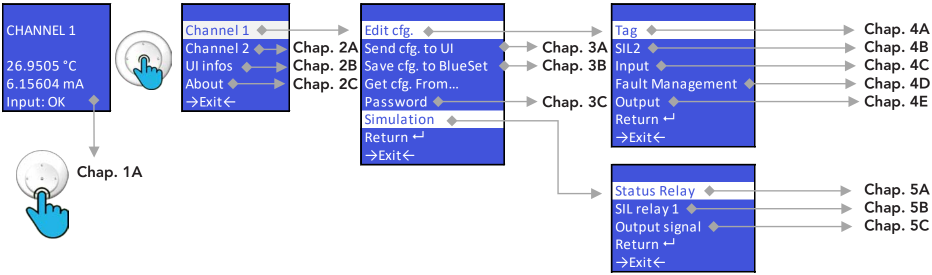
4.3 Configuration using the BlueSet removable display

4.2.1 Main menu

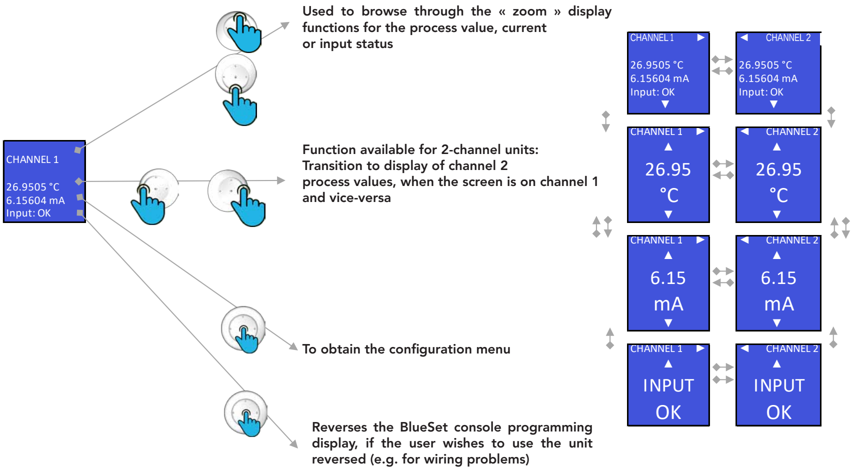
When the BlueSet is connected to the UI for the first time, the edit and configuration entry menu is not available and neither is the password menu.



When the BlueSet is connected to the UI and a configuration (UI, BlueSet memory or default) is loaded, the configuration can be edited:

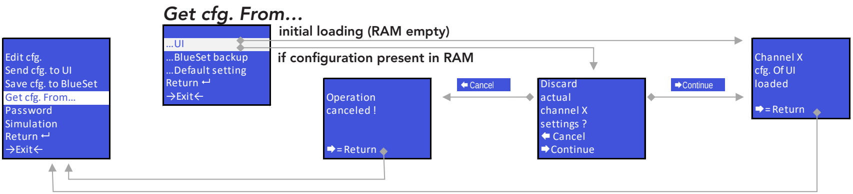


4.2.2 Chap. 1A - Display functions



4.2.3 Chap. 1B - Loading the UI configuration

BlueSet recovers the UI converter configuration and makes it available for editing.
This operation is necessary in order to be able to edit the UI configuration.

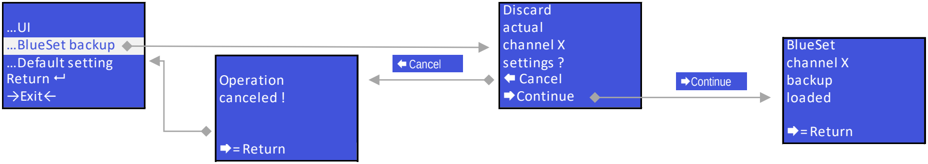


4.2.4 Chap. 1C - Loading the BlueSet configuration

BlueSet recovers its internal (backup) configuration and makes it available for editing.

This operation is necessary in order to send it to the UI converter or to edit it. When this operation is completed, the configuration can be edited and transferred into the BlueSet RAM or the UI RAM

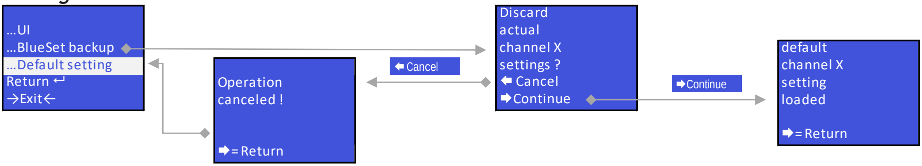
Get cfg. From...



4.2.5 Chap. 1D - Loading the default configuration

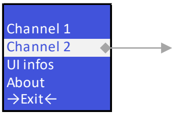
BlueSet recovers the default (factory) configuration and makes it available for editing.
This operation is necessary in order to send it to the UI converter or to edit it. When this operation is completed, the configuration can be edited and transferred into the BlueSet RAM or the UI RAM.

Get cfg. From...



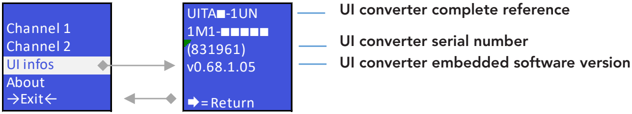
4.1.6 Chap. 2A - The UI channel 2 menu

The UI is available in the 2-channel version. In this case, the channel 2 menu is available and its structure is identical to that of channel 1)



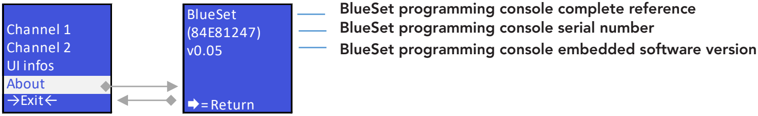
4.2.7 Chap. 2B - UI data

This menu is used to obtain specific data to the UI converter (complete reference, serial N°, embedded software version)



4.2.8 Chap. 2C - BlueSet data

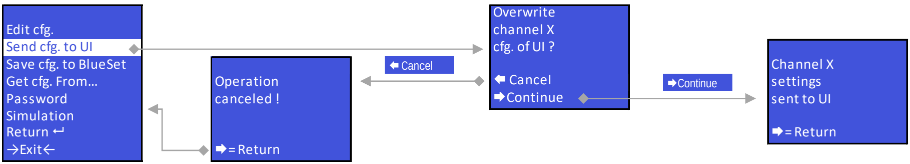
This menu is used to obtain specific data to the BlueSet programming console (complete reference, serial N°, embedded software version)



4.2.9 Chap. 3A - Transferring a configuration into the UI:

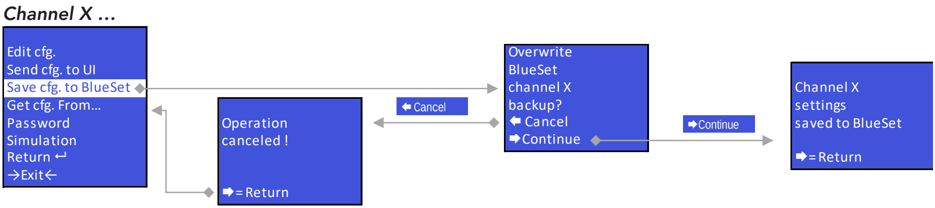
When the configuration has been edited, it has to be transferred into the UI converter, to be applied and used.

Channel X ....



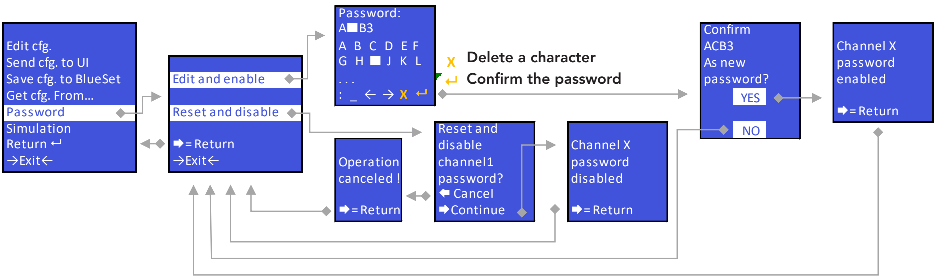
4.2.10 Chap. 3B - Transferring a configuration into the BlueSet ROM

When the configuration has been edited, it can also be saved in the BlueSet programming console ROM, that the same configuration can also be transferred into other UI converters, of the same reference, in the future.



4.2.11 Chap. 3C - Password

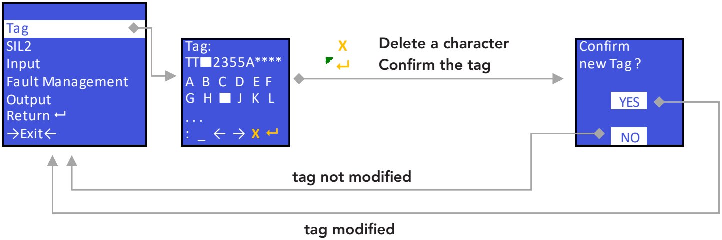
The UI converter has a SIL 2 capability. When the UI is used in SIL mode (chap 4B), it must be locked by a password. The password menu is used to define and activate the password, and also to delete it.
A password can be defined and activated, even if the SIL is not required.



4.2.12 Chap. 4A - Tag changing

The UI converter can be tagged using a string of 15 characters:

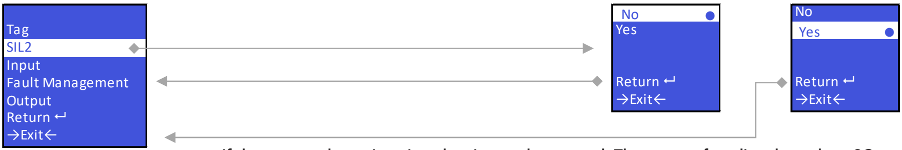
EditCfg….



4.2.13 Chap. 4B - SIL2 operating mode

The UI converter has a SIL 2 capability. In this operating mode, certain functions are automatically activated and mandatory, such as the password. Conversely, other functions are unavailable, such as setting the 4-20mA output to 21.5mA in the event of a fault.

EditCfg….

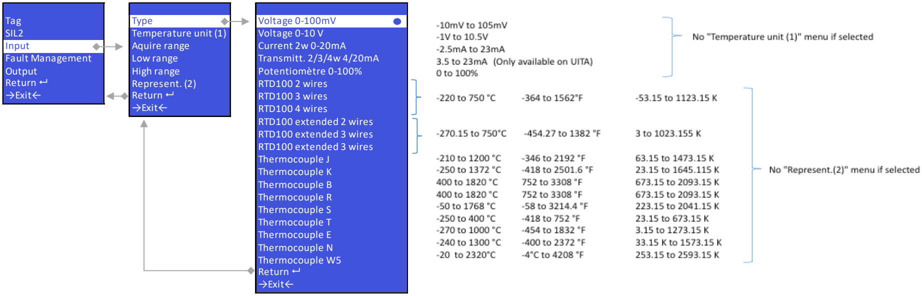


If the password wasn't active, then it must be entered. The menu refers directly to chap. 3C
Some functions in the configuration become unavailable

4.2.14 Chap. 4C-1 - Configuring the sensor input type

The UI converter has an universal input that can be configured as follows:

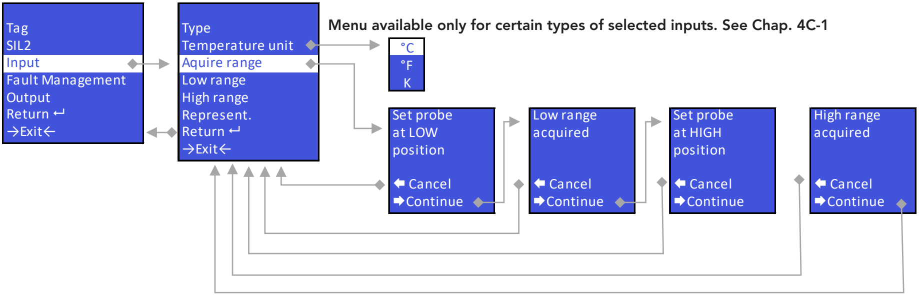
EditCfg....



4.2.15 Chap. 4C-2 - Selecting the unit and entering the minimum and maximum values

The range minimum and maximum entry function is used to define the « range maximum and minimum » values from the menu, by direct entry from the instrument connected in input

EditCfg....

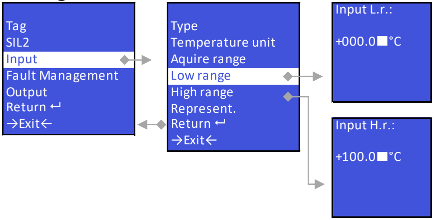


Values recorded in range Low and High

4.2.16 Chap. 4C-3 - Selecting the range minimum and maximum values by manual entry

In this section, the unit range minimum and maximum values must be entered manually.

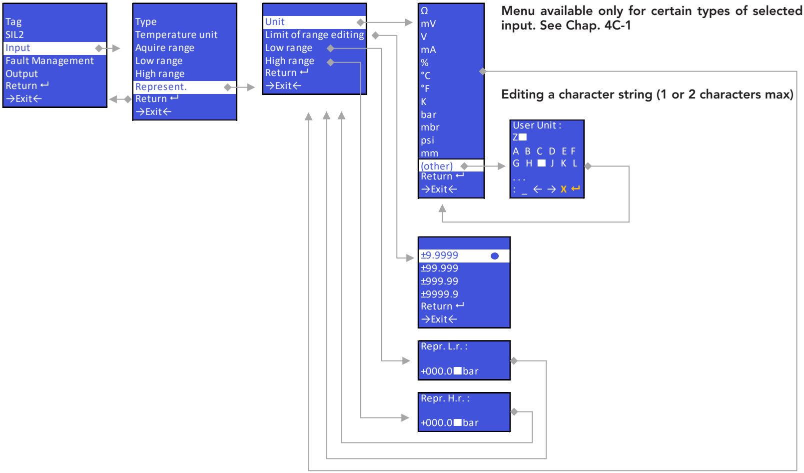
EditCfg....



4.2.17 Chap. 4C-4 - Editing the value represented

For certain types of selected input, the physical value represented can be edited.

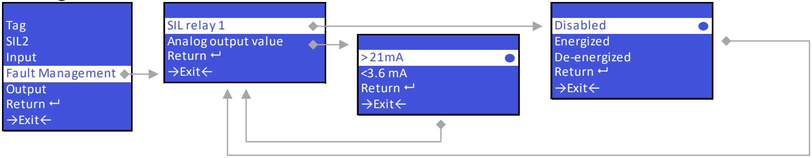
EditCfg....



4.2.18 Chap. 4D - Operation in the event of a fault

The UI converter allows output relay statuses and the analog output to be configured for operation in case:

EditCfg....

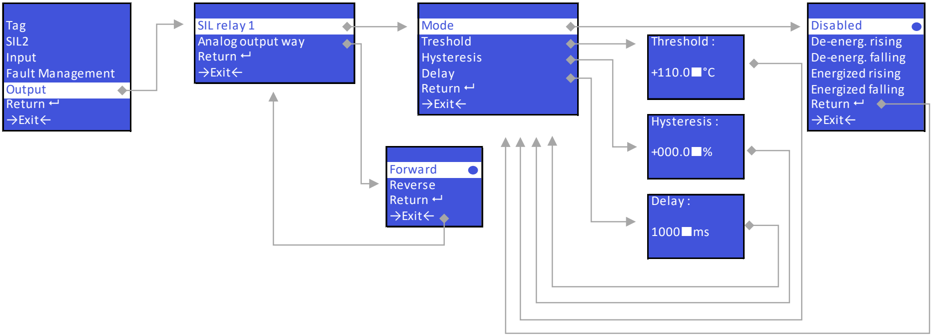


When operating in SIL mode (see Chap.4B) the 4-20mA output must be at the minimum default value <3.6mA.

The SIL relay can only be configured in de-energized mode

4.2.19 Chap. 4E - Configuring outputs

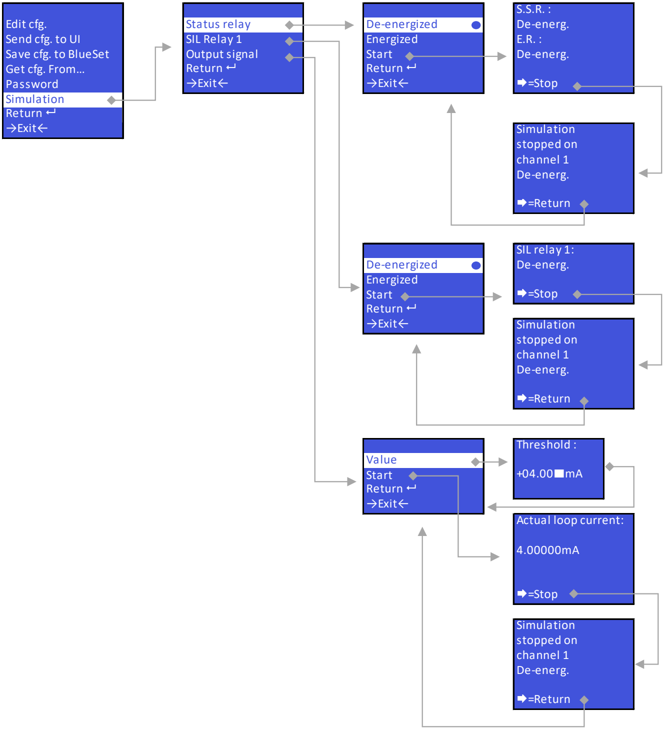
EditCfg.....



4.2.20 Chap. 5A, 5B, 5C - Output simulation

The UI converter allows modification of its outputs in simulation mode:
If the device is not used, the inverter switches to safety after 10 minutes (fault mode) LED “Run / Def” flashing “SYSTEM FAULT”

Chann. X…



IV. Diagnostic and maintenance

5.1. LED operation

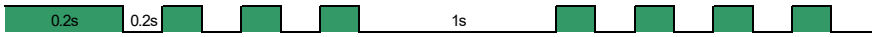
● LED lit up steady
○ LED out
●/○ LED flashing see frequency

UIXXX powered by its main power supply:

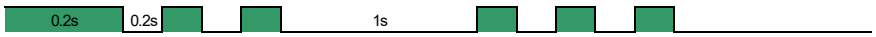
●/○ Flashing frequency Run/Del:

"NORMAL" operation:
Logic: ● ; Out-OVL: ○ ; AL1: ○ ; ON:● ; Run/Del: ●/○

Copy SATURATED (input value outside configured range)
Logic: ● ; Out-OVL: ○ ; AL1: ○ ; ON:● ; Run/Del: ●/○

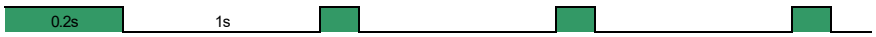


Sensor input DEFAULT:
Logic: ● ; Out-OVL: ● ; AL1: ○ ; ON:● ; Run/Del: ●/○



Copy 4-20mA OUT OF LOOP:
Logic: ● ; Out-OVL: ● ; AL1: ○ ; ON:● ; Run/Del: ●/○

Configuration by APPRENTICESHIP in progress:
Logic: ● ; Out-OVL: ● ; AL1: ○ ; ON:● ; Run/Del: ●/○

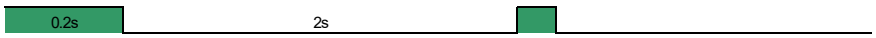


System DEFAULT
Logic: ● ; Out-OVL: ● ; AL1: ○ ; ON:● ; Run/Del: ●/○

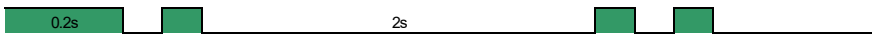
Unit "OUT OF CONTROL" theoretically impossible
Logic: ● ; Out-OVL: ○ or ● if fault ; AL1: ○ ; ON:● ; Run/Del: ○

Unit in "RESET" (requested by BlueSet module
or by ProgressX manager software and confirmed by operator)
Logic: ● ; Out-OVL: ● ; AL1: ○ ; ON:● ; Run/Del: ●/○

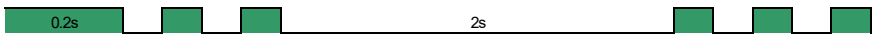
SIMULATION copy -> copy OK :
Logic: ● ; Out-OVL: ○ or ● if copy fault only ; AL1: ○ ; ON:● ; Run/Del: ●/○



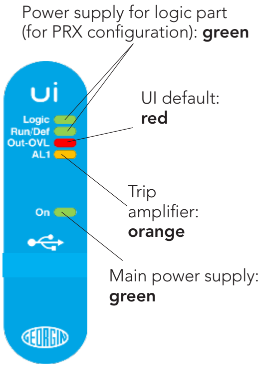
SIMULATION default relay -> relay "OFF" (cutout) :
Logic: ● ; Out-OVL: ● ; AL1: ○ ; ON:● ; Run/Del: ●/○



SIMULATION default relay -> relay "ON" (set) :
Logic: ● ; Out-OVL: ○ ; AL1: ○ ; ON:● ; Run/Del: ●/○



Data TRANSFER USB or BlueSet :
Logic: ● ; Out-OVL: ○ or ● if fault ; AL1: ○ ; ON:● ; Run/Del: ●/○



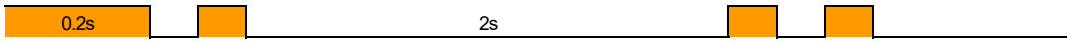
●/○ Flashing frequency AL1 (and AL2 if option) :

Threshold exceeded
Logic: ● ; Out-OVL: ○ or ● if fault ; ON:● ; Run/Del: ●/○ ; AL1: ●/○

Threshold inactive (no default or relay INACTIVE if default)
Logic: ● ; Out-OVL: ○ or ● if fault ; ON:● ; Run/Del: ●/○ ; AL1: ●/○

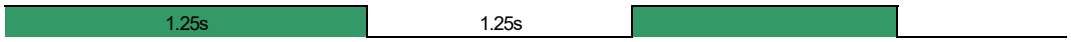
All types of default indicated on relay 1 or 2 (if configured active)
Logic: ● ; Out-OVL: ○ or ● if fault ; ON:● ; Run/Del: ●/○ ; AL1: ●/○

Relay SIMULATION Relay 1 or 2 -> Relay "OFF" (cutout):
Logic: ● ; Out-OVL: ○ or ● if fault ; ON:● ; Run/Del: ●/○ ; AL1: ●/○



UIXXX power supply through USB cable:

USB power supply/WAITING FOR CONTROL SIGNAL:
Logic: ● ; Out-OVL: ○ or ○ if fault ; AL1: ○ ; ON:○ ; Run/Del: ●/○



Data TRANSFER USB or BlueSet:
Logic: ● ; Out-OVL: ○ or ○ if fault ; AL1: ○ ; ON:○ ; Run/Del: ●/○

0.03s / 0.03s

USB power supply/ DIALOG IMPOSSIBLE:
Logic: ● ; Out-OVL: ○ or ○ if fault ; AL1: ○ ; ON:○ ; Run/Del: ●/○

System DEFAULT:
Logic: ● ; Out-OVL: ○ or ○ if fault ; AL1: ○ ; ON:○ ; Run/Del: ●/○

0.05s / 0.05s

Unit "OUT OF CONTROL" theoretically impossible

5.2 Blueset error messages

	"General" error codes
OK	No sensor default
F10	Sensor default that may appear very shortly when changing the type of input If this default remains, contact after-sales service
F11	Contact after-sales service
F12	Input measurement is lower than the value of the low threshold defined in configuration
F13	Input measurement is higher than the value of the high threshold defined in configuration
	Error code for current measurement
F20	Input measurement is outside the input rating of the UI device (current input)
	Error codes for 4 / 20mA transmitter measurement:
F21	Input measurement is outside input setting of the UI device (4 / 20mA transmitter input)
F22	Transmitter input measurement is higher than 21mA
F23	Transmitter input measurement is lower than 3.6mA

	Error codes for RTD probe measurement
F30	Cut-off of the input RTD probe in 2-wire circuit
F31	Break in the compensation wire of the 3-wire RTD probe
F32	Break in the measurement return wire of the 4-wire RTD probe
F33	Resistance reading of the compensation wire in 3-wire-RTD mode is higher than the upper limit
F34	Resistance reading of the compensation wires in 3-wire-RTD mode is below the lower limit
F40	Measurement is below the low limit of the RTD probe
F41	Measurement is higher than the high limit of the RTD probe
F42	Send the product to the after-sales service
	Error codes for thermocouple measurement
F50	Measurement is below the lower limit of the thermocouple
F51	Measurement is higher than the high limit of the thermocouple
F52	Thermocouple cut-off (value higher than the input caliber)
F53	Thermocouple cut-off (value lower than the input caliber)
F54	Cold junction compensation (CJC) is at a value below -20 ° C
F55	Cold junction compensation (CJC) is at a value higher than + 60 ° C
F56	Default on cold junction compensation (CJC)

F57	Unknown thermocouple type - Contact after-sales service
F58	Thermocouple custom fault - Contact after-sales service
	Error codes for potentiometer measurement
F60	Potentiometer slider wire cut
F61	Cut of the potentiometer power wire (+ or - wire)
F62	The potentiometer measurement indicates that the cursor is in a "dead" zone defined by the configuration
	Other error message
XXX	Contact after-sales service

5.3 Maintenance

Precautions necessary during maintenance: Dismounting must be carried out DE-ENERGIZED.
In the event of a suspected fault or a failure, please return the unit to our technical department or agent.
These are the only services authorized to conduct inspection or repair work.

Safety for Industrial Processes

"Designed, developed and manufactured in France "

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