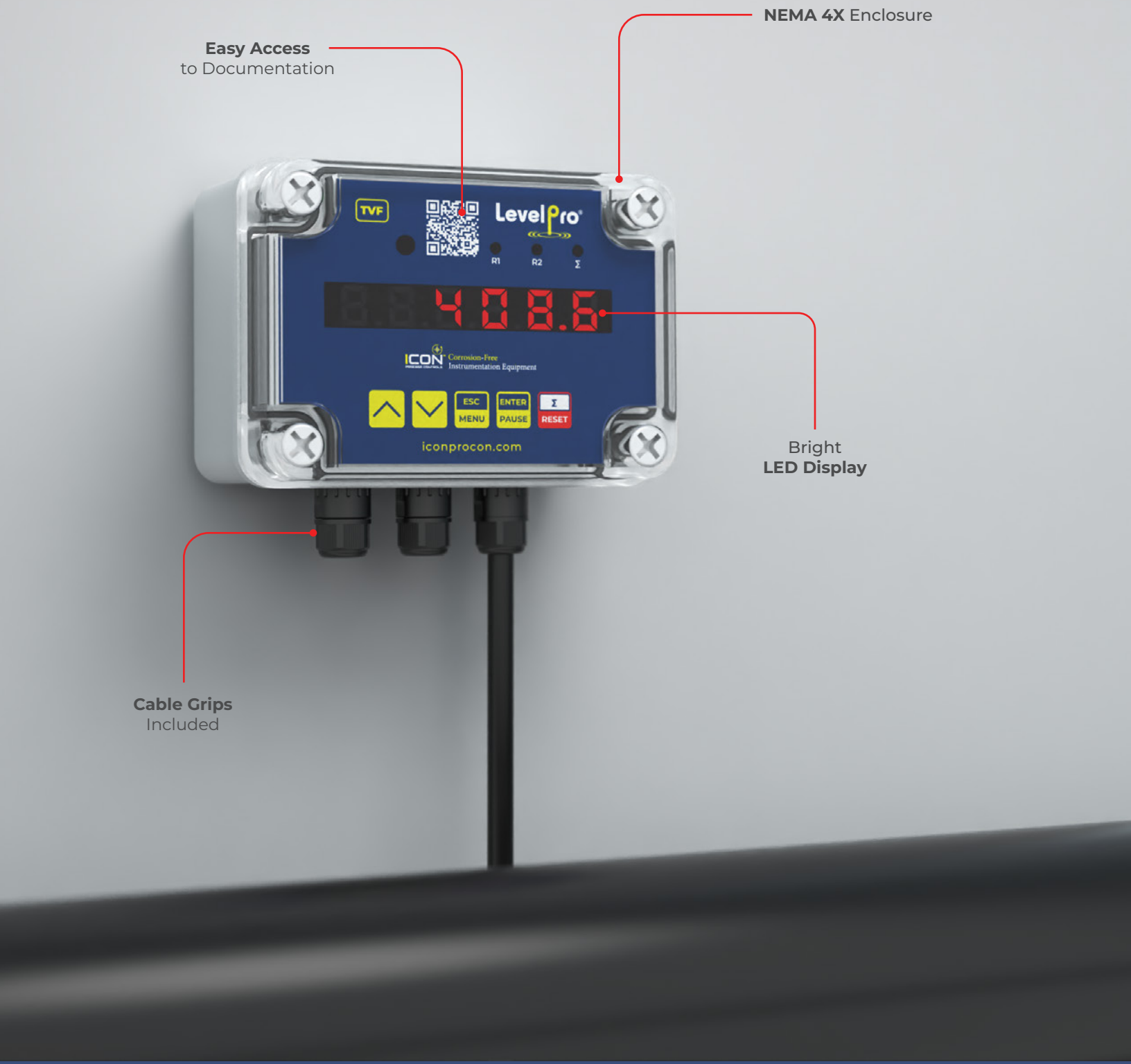
Quick Start Manual



Symbol Explanation

This symbol denotes especially important guidelines concerning the installation and operation of the device. Not complying with the guidelines denoted by this symbol may cause an accident, damage or equipment destruction.

Basic Requirements | User Safety

- Do not use the unit in areas threatened with excessive shocks, vibrations, dust, humidity, corrosive gasses and oils.
- Do not use the unit in areas where there is risk of explosions.
- Do not use the unit in areas with significant temperature variations, exposure to condensation or ice.
- The manufacturer is not responsible for any damages caused by inappropriate installation, not maintaining the proper environmental conditions and using the unit contrary to its assignment.
- If in the case of a unit malfunction there is a risk of a serious threat to the safety of people or property additional, independent systems and solutions to prevent such a threat must be used.
- The unit uses dangerous voltage that can cause a lethal accident. The unit must be switched off and disconnected from the power supply prior to starting installation of troubleshooting (in the case of malfunction).
- Do not attempt to disassemble, repair or modify the unit yourself. The unit has no user serviceable parts.
- Defective units must be disconnected and submitted for repairs at an authorized service center.

Specifications

General	
Display	LED | 6 Digit | 13mm High | Red | Adjustable Brightness
Displayed Values	0 ~ 999999
RS485 Transmission	1200...115200 bit/s, 8N1 / 8N2
Housing Material	Polycarbonate
Protection Class	NEMA 4X | IP67
Input Signal | Supply	
Standard	Current: 4-20mA | 0-20mA | 0-5V* | 0-10V*
Voltage	85 - 260V AC/DC | 16 - 35V AC, 19 - 50V DC*
Output Signal | Supply	
Standard	2 x Relays (5A) | 1 x Relay (5A) + 4-20mA
Communication	RS485
Voltage	24VDC
Passive current output *	4-20mA | (Operating Range Max. 2.8 - 24mA)
Performance	
Accuracy	0.1% @ 25°C One Digit
Temperatures	
Operating Temperature	-40 - 158°F | -40 - 70°C

*Optional

Front Panel Description

Function of Push Buttons

Symbol used in the manual : [ESC/MENU]

Functions:

- Enter to main menu (press and hold for at least 3 sec.)
- Exit the current Screen and Enter to previous menu (or measure mode)
- Cancel the changes made in parameter being edited

Symbol used in the manual : [ENTER/PAUSE]

Functions:

- Start to edit the parameter
- Enter into the sub-menu
- Confirmation of changes made in parameter being edited
- While batcher mode : Pause / Start Batching

Symbol used in the manual : [∑ /RESET]

Functions:

- Switching of the display between total and instantaneous measurements or batcher counter (while batcher mode only)
- Zeroing the currently displayed counter (Press & Hold for at least 2 Sec), the zeroing must be confirmed by **[ENTER]** button

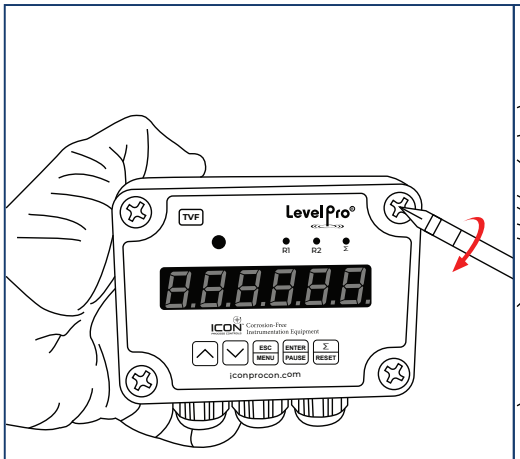
Symbol used in the manual : [⌃] [⌄]

Functions:

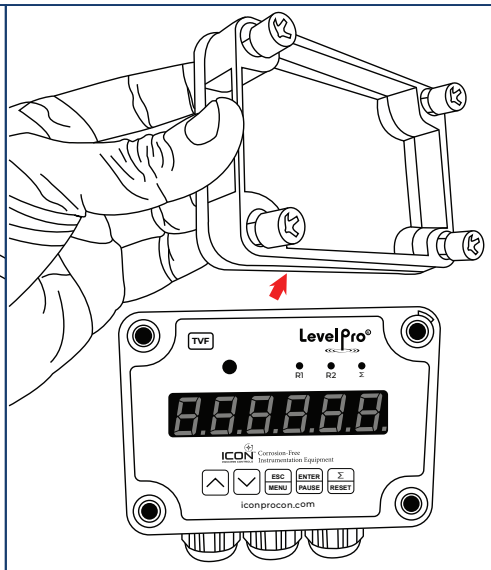
- Change of the present menu
- Modification of the parameter value
- Switching of the display between relay thresholds and number of batches counter.

Installation – Wall Mount

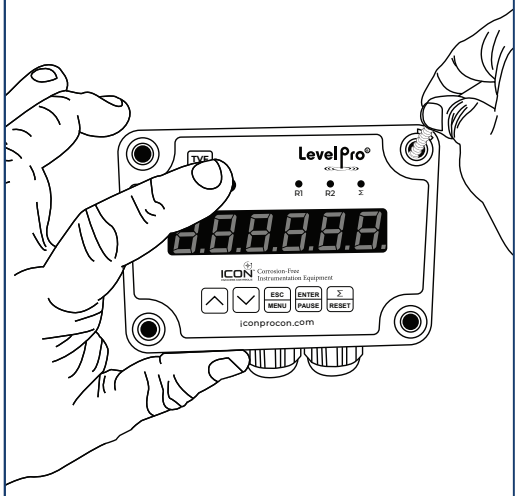
Note : Ensure that holes are made on the wall according to the provided dimensions.



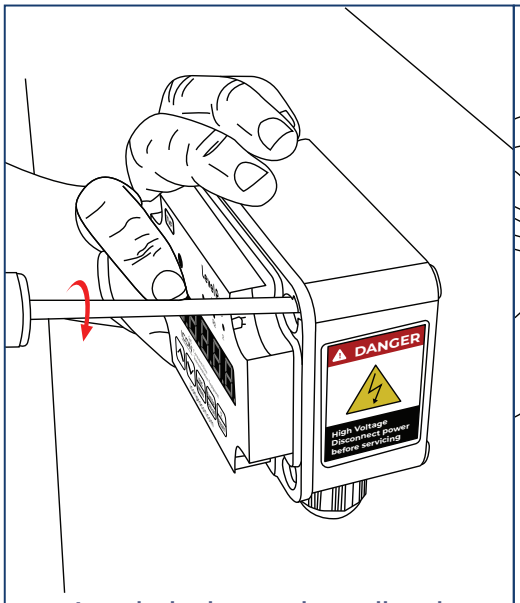
Loosen Box Screws



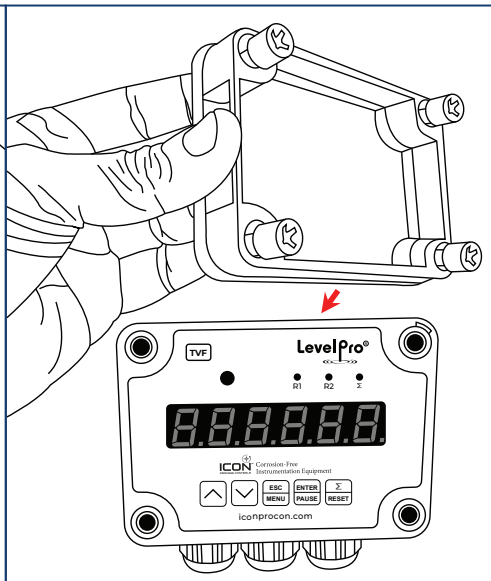
Remove Display Cover



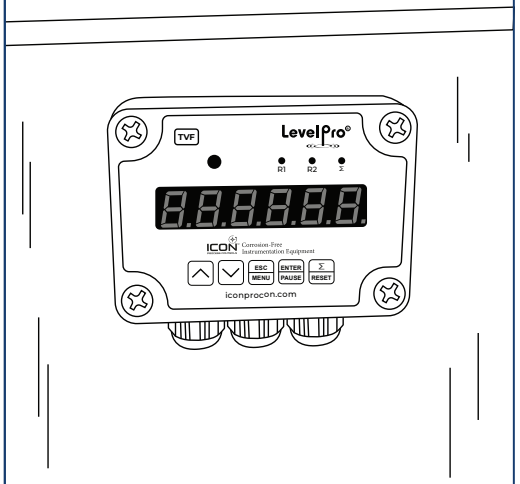
Insert the Wall Screws



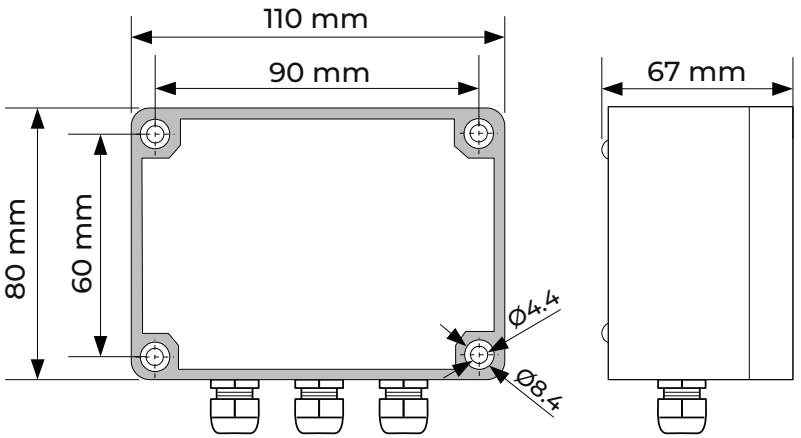
Attach the box to the wall and secure it by tightening the screws.



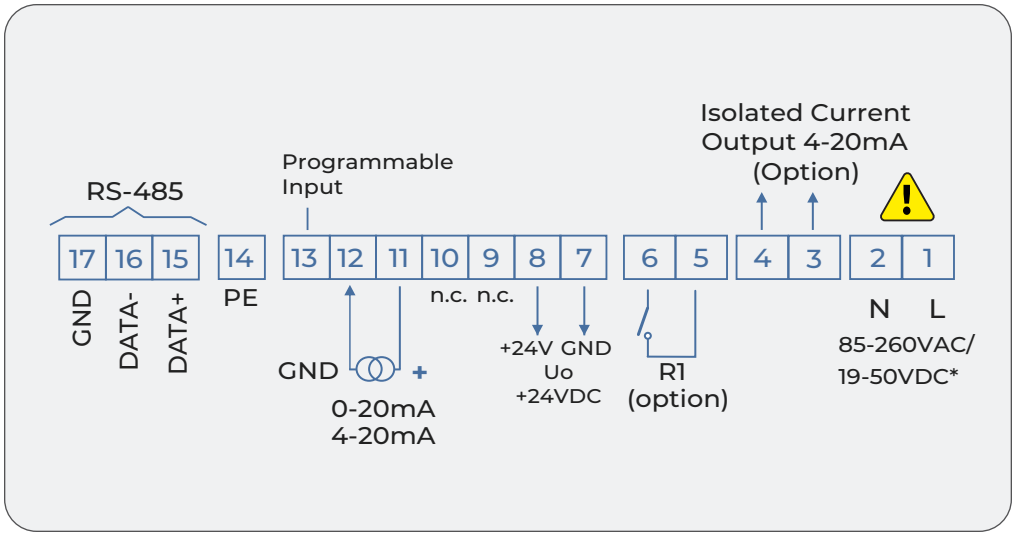
Replace the display cover and securely tighten the box screws.

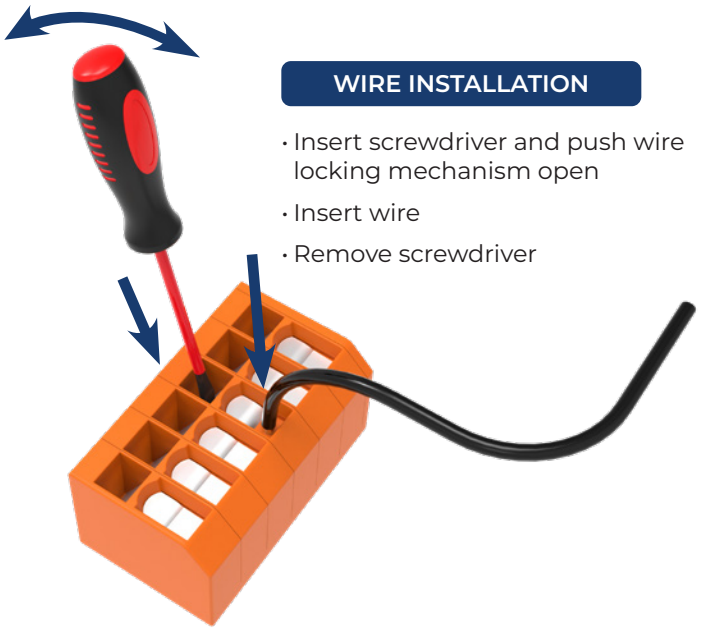


Dimensions



Wiring Diagram





WIRE INSTALLATION

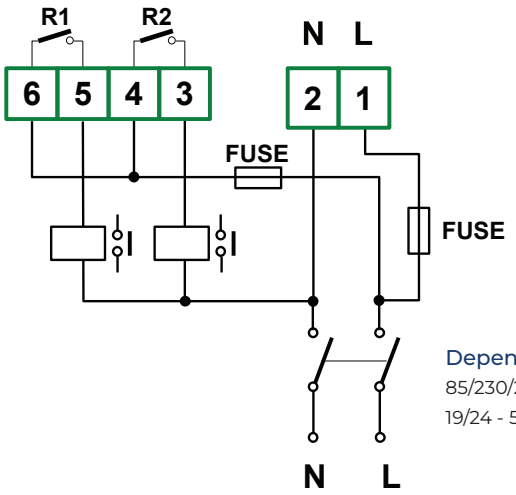
- Insert screwdriver and push wire locking mechanism open
- Insert wire
- Remove screwdriver

Due to possible significant interference in industrial installations, appropriate measures assuring correct operation of the unit must be applied.

The unit is not equipped with an internal fuse or power supply circuit breaker.

For this reason, an external time-delay cut-out fuse with a small nominal current value must be used (recommended bipolar, max. 2A) and a power supply circuit breaker located near the unit.

Power Supply & Relay Connection



Depending on Version
85/230/260V AC/DC ; 50 - 60 Hz
19/24 - 50V DC ; 16/24/35V AC

Contacts of relay outputs are not equipped with spark suppressors. When using the relay outputs for switching of inductive loads (coils, contactors, power relays, electromagnets, motors etc.) it is required to use additional suppression circuit (typically capacitor 47nF/ min. 250VAC in series with 100R/5W resistor), connected in parallel to relay terminals or (better) directly on the load.

Suppression Circuit Connection

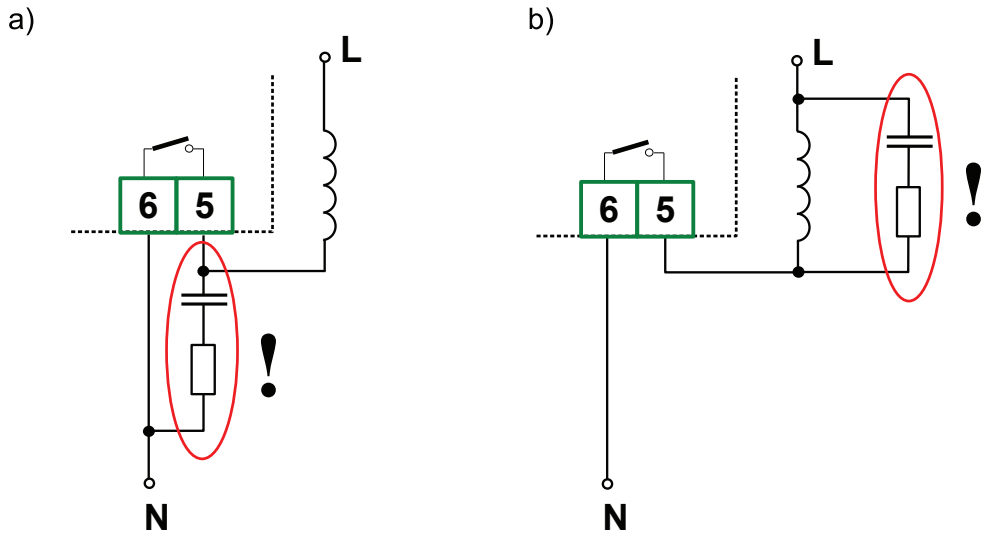


Figure: Examples of Suppression Circuit Connection
a) To Stepper Relay Terminals b) To the Inductive Load (Motor)

OC-Type Output Connection

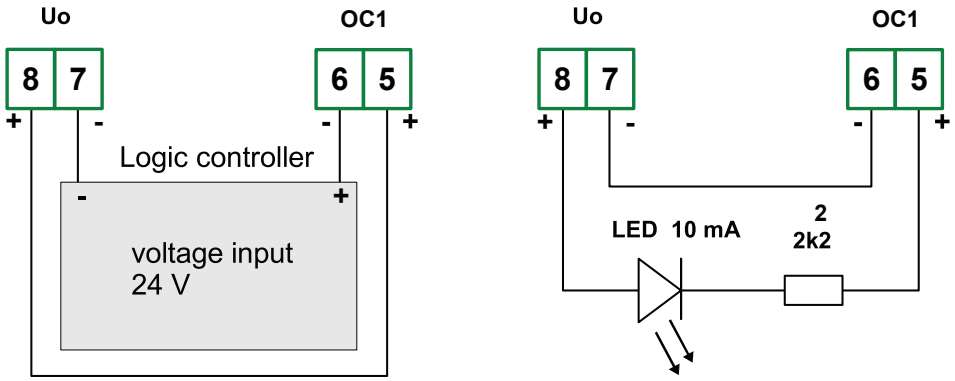


Figure: Examples of OC-type output connection

Current Output Connection Using Internal Power Supply

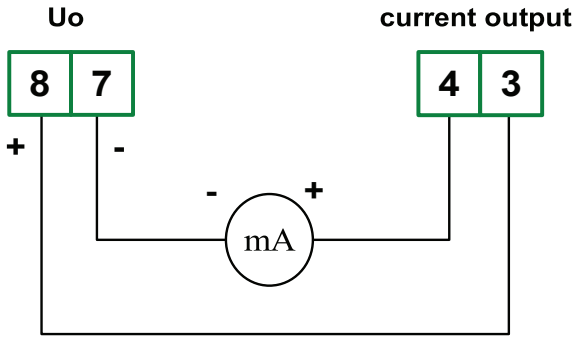


Figure: Example of current output connection using internal power supply

Current Output Connection Using External Power Supply

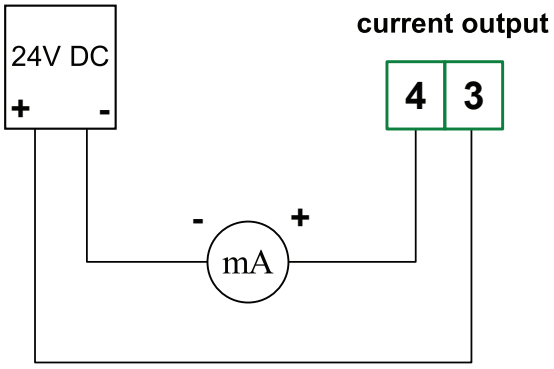
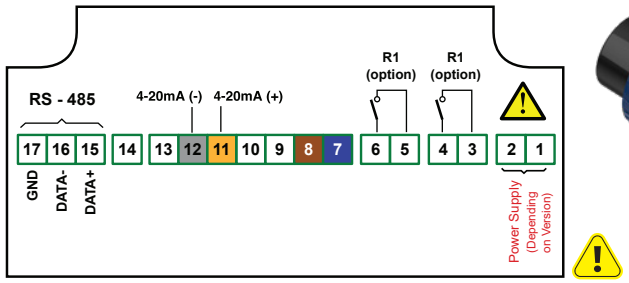


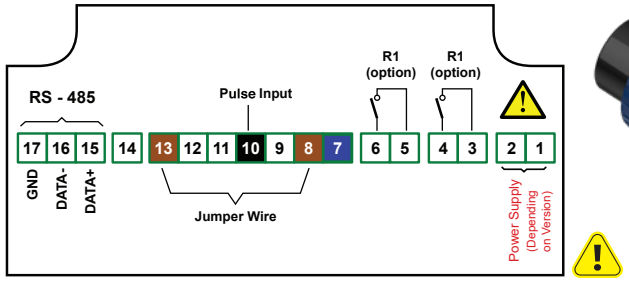
Figure: Example of current output connection using external power supply

Flow Meter Connections (Relay Type)

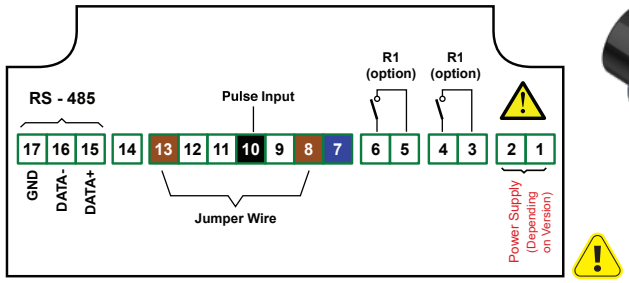
TKM Series : 4-20mA Output		
TVF Terminal	Wire Color	Description
7	Blue	-VDC
8	Brown	+VDC
11	Yellow	mA+
12	Grey	mA-



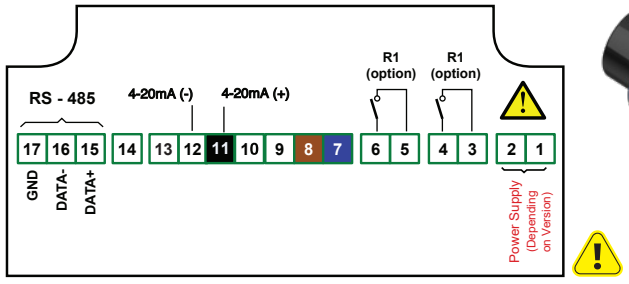
TKS Series : Pulse Output		
GPM/Pulse = K factor		
TVF Terminal	Wire Color	Description
7	Blue	-VDC
8	Brown	+VDC
10	Black	NPN Pulse
Jump 13 & 8		



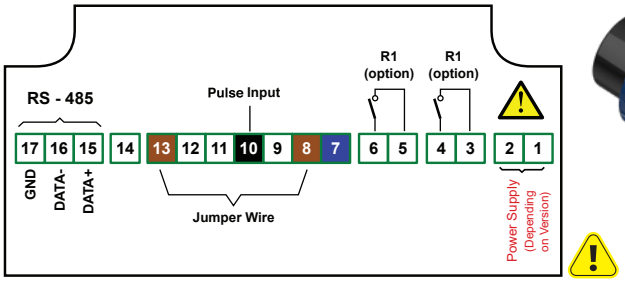
TKW Series : Pulse Output		
GPM/Pulse = K factor		
TVF Terminal	Wire Color	Description
7	Blue	-VDC
8	Brown	+VDC
10	Black	Pulse
Jump 13 & 8		



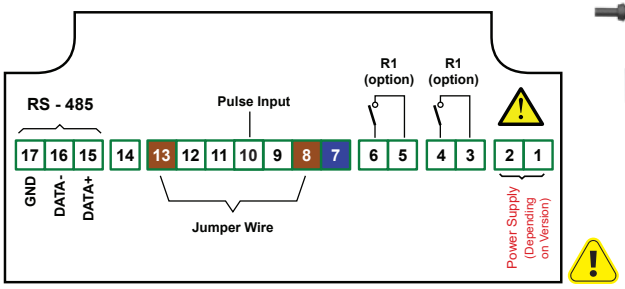
TKW Series : 4-20mA Output		
TVF Terminal	Wire Color	Description
7	Blue	-VDC
8	Brown	+VDC
11	Black	mA+
12	White	mA-



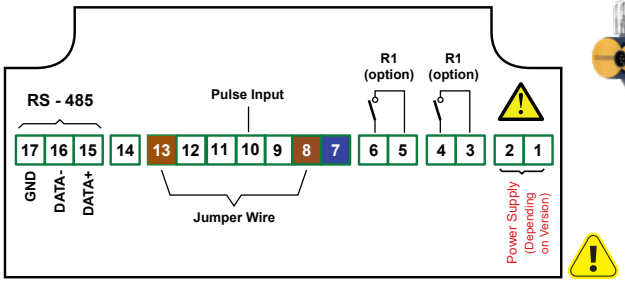
TKM | TKP Series : Pulse Output		
GPM/Pulse = K factor		
TVF Terminal	Wire Color	Description
7	Blue	-VDC
8	Brown	+VDC
10	Black	Pulse
Jump 13 & 8		



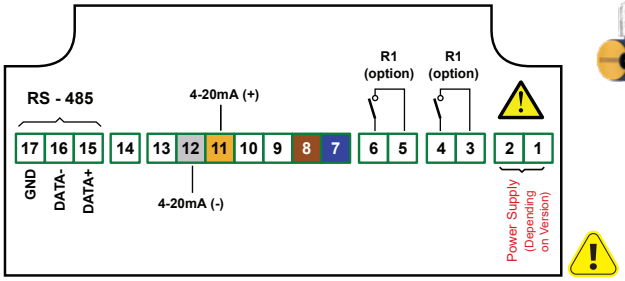
TIW Series : Pulse Output		
GPM/Pulse = K factor		
TVF Terminal	Wire Color	Description
7	Blue	-VDC
8	Brown	+VDC
10	White	Pulse
Jump 13 & 8		



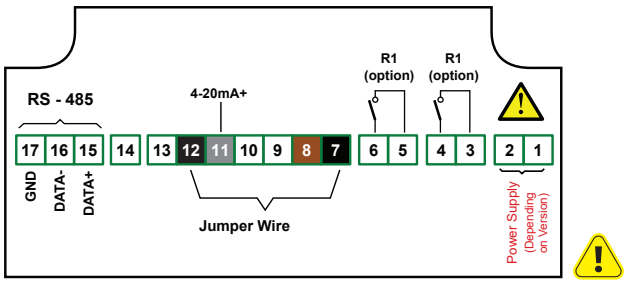
TIM | TIP Series : Pulse Output		
GPM/Pulse = K factor		
TVF Terminal	Wire Color	Description
7	Blue	-VDC
8	Brown	+VDC
10	White	Pulse
Jump 13 & 8		



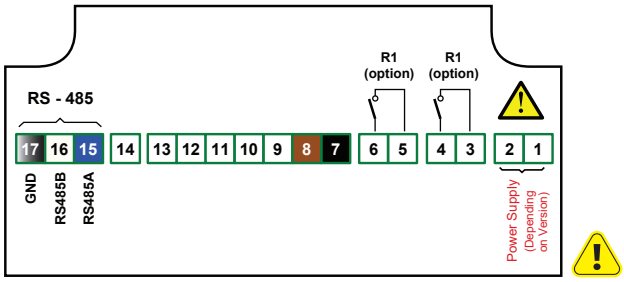
TIM Series : 4-20mA Output		
TVF Terminal	Wire Color	Description
7	Blue	-VDC
8	Brown	+VDC
11	Yellow	mA+
12	Grey	mA-



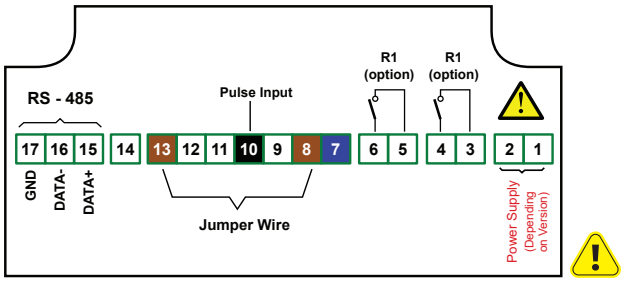
UF500 – 4-20mA Output		
TVF Terminal	Wire Color	Description
7	Black	-VDC
8	Brown	+VDC
11	Gray	+mA
Jump 12 & 7		



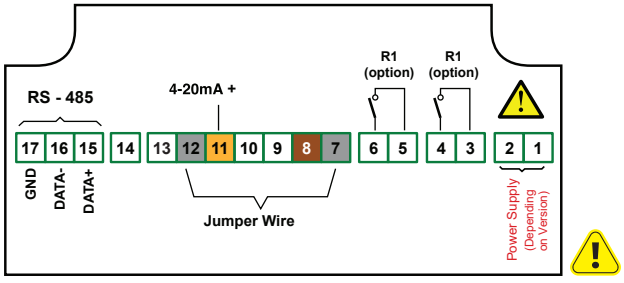
UF500 – RS485 Output		
TVF Terminal	Wire Color	Description
7	Black	-VDC
8	Brown	+VDC
15	Blue	RS485A
16	White	RS485B
17	Shield (Thick Black)	GND



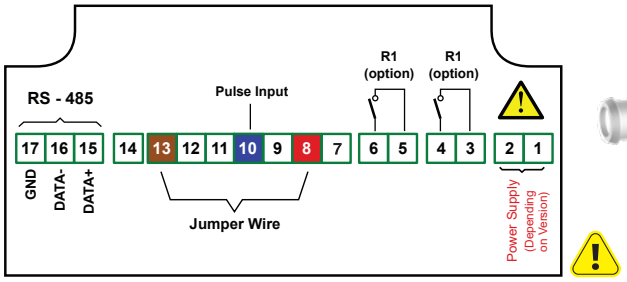
UF 1000 | 4000 | 5000 – Pulse Output		
GPM/Pulse = K factor		
TVF Terminal	Pin	Description
8	1	+VDC
10	2	Pulse
7	3	-VDC
Jump 13 & 8		



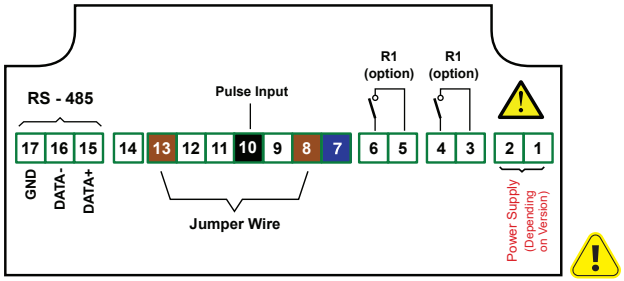
UF 1000 | 4000 | 5000 – 4-20mA Output		
TVF Terminal	Pin	Description
8	1	+VDC
11	2	+mA
7	3	-VDC
Jump 12 & 7		



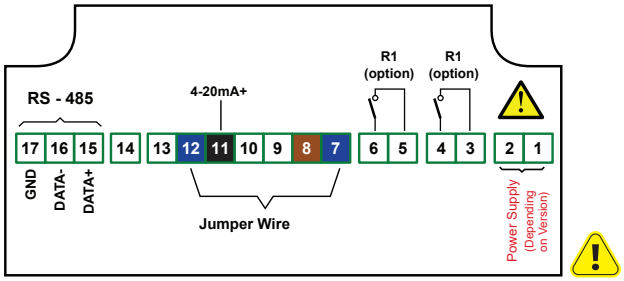
ProPulse (Flying Lead) – Pulse Output		
GPM/Pulse = K factor		
TVF Terminal	Wire Color	Description
7	Shield	-VDC
8	Red	+VDC
10	Blue	Pulse
Jump 13 & 8		



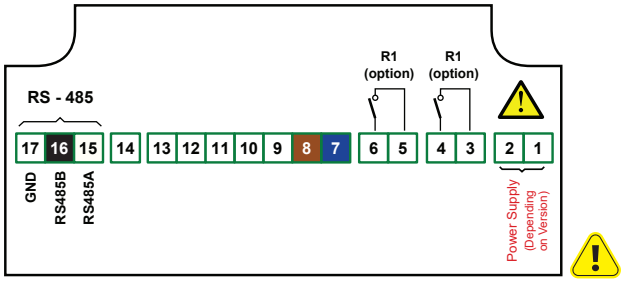
ProPulse®2 – Pulse Output		
GPM/Pulse = K factor		
TVF Terminal	Wire Color	Description
7	Blue	-VDC
8	Brown	+VDC
10	Black	Pulse
Jump 13 & 8		



ProPulse®2 – 4-20mA Output		
TVF Terminal	Wire Color	Description
7	Blue	-VDC
8	Brown	+VDC
11	Black	+mA
Jump 12 & 7		



ProPulse®2 – RS485 Output		
TVF Terminal	Wire Color	Description
7	Blue	-VDC
8	Brown	+VDC
15	White	RS485A
16	Black	RS485B



Programming K Factor (For Pulse Input Models)

STEPS	DISPLAY	OPERATION
1 **Main Display** ▸ 		**MAIN DISPLAY**
2 **Relay 1** ▸ 		**RELAY 1** Settings
3 **Input** ▸ 		**INPUT** Menu
4 **K Factor** ▸ 		Press ⌄ or ⌃ → Select **PULSEL** (K Factor)
5 **K Factor Value** ▸ 		Enter **K FACTOR** Value Press ⌄ or ⌃ to change digit Press ENTER PAUSE to advance to next digit Note: Enter the K Factor value according to the Flow Unit. Eg: To display flow in GPM, Enter K Factor corresponding to GPM.
6 **Save Value** ▸ 		Save Selection
7 **K Factor** ▸ 		PULSEL
8 **Input** ▸ 		Input Menu
9 **Main Display** ▸		Main Display

Programming 4-20mA Input (For 4-20mA Input Models)

STEPS	DISPLAY	OPERATION
1 **Main Display** → ESC MENU 3 SEC		**MAIN DISPLAY**
2 **Relay 1** → X 2		**RELAY 1** Settings
3 **Flow Menu** → ENTER PAUSE		**FLOW** Menu
4 **Input Type** → X 6		**INPUT TYPE** Factory Default: 4-20mA
5 **Low Calibration (4mA)** → ENTER PAUSE		**LOW CALIBRATION** Setting Lo CAL = 4mA Value
6 **4mA Value** → ENTER PAUSE 2 SEC		Enter **4mA** Value Factory Default: 000.0 Press ▼ or ▲ to change digit Press ENTER PAUSE to advance to next digit
7 **Save Selection** → ENTER PAUSE		Save Selection
8 **Low Calibration (4mA)** →		Low Calibration Setting
9 **High Calibration (20mA)** → ENTER PAUSE		**HIGH CALIBRATION** Setting Hi CAL = 20mA Value

STEPS	DISPLAY	OPERATION
10 20mA Value ▸ ENTER PAUSE 2 SEC		Enter **20mA** Value Factory Default: 100.0 Press ⌄ or ⌃ to change digit Press ENTER PAUSE to advance to next digit
11 Save Selection ▸ ENTER PAUSE		Save Selection
12 High Calibration (20mA) ▸ ESC MENU		High Calibration Setting
13 Flow Menu ▸ ESC MENU		Flow Menu
14 Main Display ▸		Main Display

Programming Relays

STEPS	DISPLAY	OPERATION
1 **Main Display** ▸ 		**MAIN DISPLAY**
2 **Relay 1** ▸ 		**RELAY 1** Settings
3 **Source** ▸ 		**SOURCE** Menu
4 **FLo | bAt | tot** ▸ 		Press ⌄ or ⌃ → Select **FLo** (Flow)
5 **Save** ▸ 		Save Selection
6 **Source** ▸ 		Source
7 **Set Point 1** ▸ 		**SET POINT 1**
8 **Set Point 1 Value** ▸ 		Enter **SET POINT 1** Value Press ⌄ or ⌃ to change digit Press ENTER PAUSE to advance to next digit
9 **Save** ▸ 		Save Value
10 **Set Point 1** ▸ 		**SET POINT 1**

STEPS	DISPLAY	OPERATION
11 Set Point 2 ▸ ENTER PAUSE		**SET POINT 2*** * Option available only when the MODE is set to In/Out
12 Set Point 2 Value ▸ ENTER PAUSE 2 SEC		Enter **SET POINT 2** Value Press ⌄ or ⌃ to change digit Press ENTER PAUSE to advance to next digit
13 Save ▸ ENTER PAUSE		Save Value
14 Set Point 2 ▸ ⌄		Set Point 2
15 Hysterisis ▸ ENTER PAUSE		**HYSTERISIS** Menu
16 Hysterisis Value ▸ ENTER PAUSE 2 SEC		Enter **HYSTERISIS** Value Press ⌄ or ⌃ to change digit Press ENTER PAUSE to advance to next digit
17 Save ▸ ENTER PAUSE		Save Value
18 Hysterisis ▸ ⌄		Hysterisis Menu
19 Mode ▸ ENTER PAUSE		**MODE** Menu
20 On | Off | In | Out ▸ ENTER PAUSE		Press ⌄ or ⌃ → Select **On | OFF | In | Out**

STEPS	DISPLAY	OPERATION
21 Save ▸  22 Mode ▸  23 Relay 1 ▸  24 Main Display ▸		Save Selection
		Mode Menu
		Relay 1 Menu
		Main Display

Programming Batching

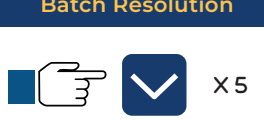
STEPS	DISPLAY	OPERATION
1 **Main Display** → ESC MENU 3 SEC		**MAIN DISPLAY**
2 **Relay 1** → ENTER PAUSE		**RELAY 1** Settings
3 **Source** → ENTER PAUSE		**SOURCE** Menu
4 **FLo | bAt | tot** → ENTER PAUSE		Press ⌄ or ⌃ → Select **bAt** (Batch)
5 **Save** → ENTER PAUSE		Save Selection
6 **Source** → ⌄		Source Menu
7 **Set Point** → ENTER PAUSE		**SET POINT**
8 **Set Point Value** → ENTER PAUSE 2 SEC		Enter **SET POINT** Value Press ⌄ or ⌃ to change digit Press ENTER PAUSE to advance to next digit
9 **Save** → ENTER PAUSE		Save Value
10 **Set Point** → ESC MENU		Set Point
11 **Relay 1** → ESC MENU		Relay 1 Menu
12 **Main Display** → Σ RESET		Main Display
13 **Batching Mode** → ENTER PAUSE to start batching		**BATCHING MODE** (R1 R2 Σ) **Note:** Switching between Flow rate, Totalizer and Batching can be done by pressing ∑/RESET button. Kind of displayed value is signalised by "∑" LED. ∑ LED ON : Totalizer | ∑ LED OFF: Flow Rate | ∑ LED Pulsing: Batching

Programming Output (For 4-20mA Output Models)

STEPS	DISPLAY	OPERATION
1 **Main Display** ▸ 		**MAIN DISPLAY**
2 **Relay 1** ▸ 		Relay 1 Settings
3 **Output** ▸ 		**OUTPUT** Menu
4 **Output Mode** ▸ 		**OUTPUT MODE**
5 **4-20mA** ▸ 		Press or → Select **4-20**
6 **Save** ▸ 		Save Selection
7 **Output Mode** ▸ 		Select **OUTPUT MODE**
8 **Source** ▸ 		**SOURCE** Menu
9 **FLo | bAt | tot** ▸ 		Press or → Select **FLo** (Flow)
10 **Save** ▸ 		Save Selection

STEPS	DISPLAY	OPERATION
11 Source ▸ 		Source Menu
12 4mA ▸ 		Setting **4mA (LOW VALUE)**
13 4mA Value ▸ 		Enter **4mA** Value Press ⌄ or ⌃ to change digit Press ENTER PAUSE to advance to next digit
14 Save ▸ 		Save Value
15 4mA ▸ 		4mA (Low Value)
16 20mA ▸ 		Setting **20mA (HIGH VALUE)**
17 20mA Value ▸ 		Enter **20mA** Value Press ⌄ or ⌃ to change digit Press ENTER PAUSE to advance to next digit
18 Save ▸ 		Save Value
19 20mA ▸ 		20mA (High value)
20 Output ▸ 		Output Menu
21 Main Display ▸		Main Display

Resetting Batch

STEPS	DISPLAY	OPERATION
1 Main Display ▸ 		**MAIN DISPLAY**
2 Relay 1 ▸ 		Relay 1 Settings
3 Batch Settings ▸ 		**BATCH** Menu
4 Batch Resolution ▸ 		**BATCH RESOLUTION**
5 Mode Clear ▸ 		**MODE CLEAR**
6 oFF | on ▸ 		Press ⌄ or ⌃ → Select **on**
7 Save ▸ 		Save Selection
8 Mode Clear ▸ 		Mode Clear
9 Batch Settings ▸ 		Batch Menu
10 Main Display ▸ 		Main Display

STEPS	DISPLAY	OPERATION
11 Batching Mode ▸ Σ RESET — 3 SEC 12 Clear Batch ▸ ENTER PAUSE 13 Main Display ▸		**BATCHING MODE**  **Note:** Switching between Flow rate, Totalizer and Batching can be done by pressing ∑/RESET button. Kind of displayed value is signalised by "∑" LED. ∑ LED ON : Totalizer | ∑ LED OFF: Flow Rate | ∑ LED Pulsing: Batching
		Clear Batch
		Main Display

Resetting Totalizer

STEPS	DISPLAY	OPERATION
1 Main Display ▸ ESC MENU — 3 SEC 2 Relay 1 ▸ X 5 3 Totalizer Menu ▸ ENTER PAUSE 4 Totalizer Resolution ▸ X 5 5 Mode Clear ▸ ENTER PAUSE 6 oFF | on ▸ ENTER PAUSE		**MAIN DISPLAY**
		Relay 1 Settings
		**TOTALIZER** Menu
		**BATCH RESOLUTION**
		**MODE CLEAR**
		Press ⌄ or ⌃ → Select **on**

STEPS	DISPLAY	OPERATION
7 Save ▸ 		Save Selection
8 Mode Clear ▸ 		Mode Clear
9 Totalizer Menu ▸ 		Totalizer Menu
10 Main Display ▸  X 2		Main Display
11 Totalizer Mode ▸  3 SEC		**TOTALIZER MODE**  **Note:** Switching between Flow rate, Totalizer and Batching can be done by pressing ∑/RESET button. Kind of displayed value is signalised by "∑" LED. ∑ LED ON : Totalizer | ∑ LED OFF: Flow Rate | ∑ LED Pulsing: Batching
12 Clear ▸ 		Clear Totalizer
13 Main Display ▸		Main Display

Setting Decimal Point

STEPS	DISPLAY	OPERATION
1 Main Display ▸ 		**MAIN DISPLAY**
2 Relay 1 ▸ 		Relay 1 Settings
3 Flow Menu ▸ 		**FLOW** Menu *
4 Flow Precision ▸ 		**FLOW PRECISION**
5 Decimal Point ▸ 		**DECIMAL POINT**
		Press ⌄ or ⌃ to change Decimcal Point
6 Save ▸ 		Save Selection
7 Flow Precision ▸ 		Flow Precision
8 Flow Menu ▸ 		Flow Menu
9 Main Display ▸		Main Display

* To change decimal points for Batch | Totalizer, select Batch | Totalizer Menu

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