

Quick Start Manual



Large Bright
LED Display

NORYL Housing



LevelPro® — TVF-450 Series

Industrial Flow Batching Controller

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.

Specifications

General	
Display	LED 6 Digit 13mm High Red
Displayed Values	-99999 ~ 999999
RS485 Transmission	1200...115200 bit/s, 8N1 / 8N2 RS485
Housing Material	NORYL
Protection Class	IP65
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 (1A) 4-20mA + 1 x Relay (1A)
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 - 122°F -40 - 50°C

*Optional

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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
- In batcher mode : Pause / Start Batching



Symbol used in the manual : [Σ/RESET]

Functions:

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



Symbol used in the manual : [^] [v]

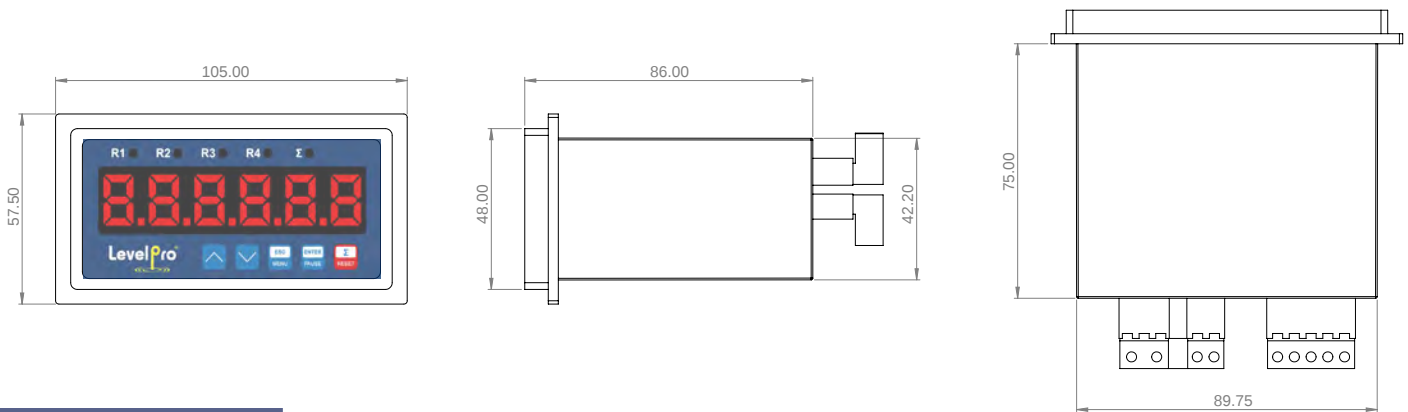
Functions:

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

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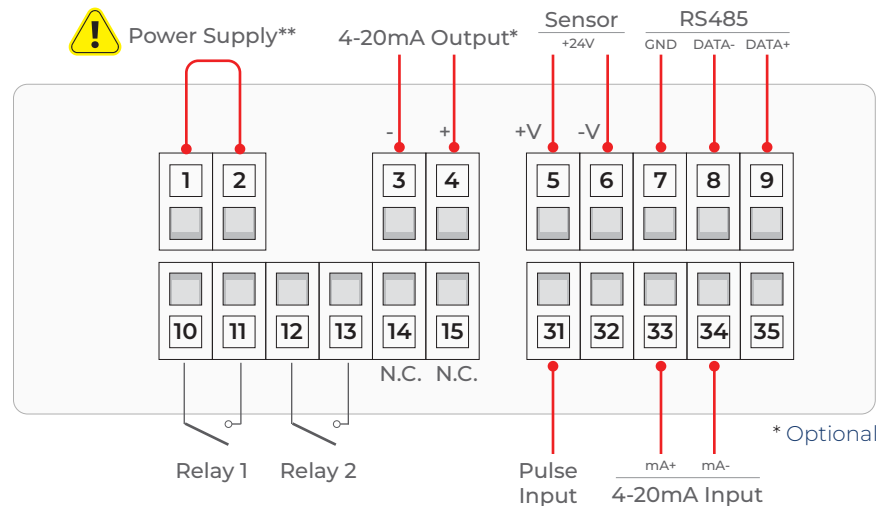
Dimensions



Wiring Diagram

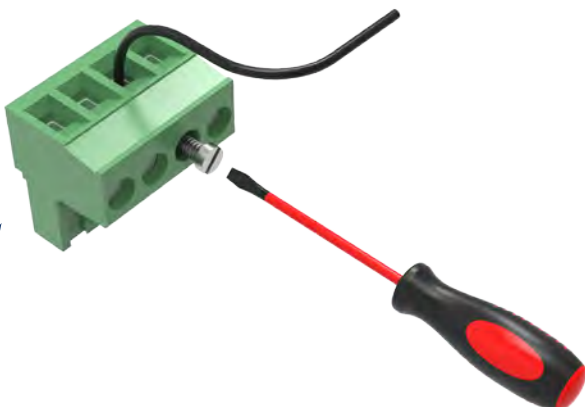


**** Depending on Version**
85/230/260V AC/DC ; 50 - 60 Hz
19/24 - 50V DC ; 16/24/35V AC



Wire Connection

- Loosen Set Screw
- Insert Wire
- Tighten Set Screw



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.

Installation

1. The unit is designed for mounting inside housings (control panel, switchboard) insuring appropriate protection against surges and interference. Metal housings must be connected to ground in a way that complies with the governing regulations.
2. Disconnect the power supply prior to starting assembly.
3. Check the connections are wired correctly prior to switching the unit on.

In order to install the unit, a 90.5 x 43 mm mounting hole (Figure A, B) must be prepared. The thickness of the material of which the panel is made must not exceed 5mm. When preparing the mounting hole take the grooves for catches located on both sides of the housing into consideration (Figure A, B). Place the unit in the mounting hole inserting it from the front side of the panel, and then fix it using the brackets (Figure C). The minimum distances between the centre points of multiple units, due to the thermal and mechanical conditions of operation are 115 mm x 67mm (Figure D).

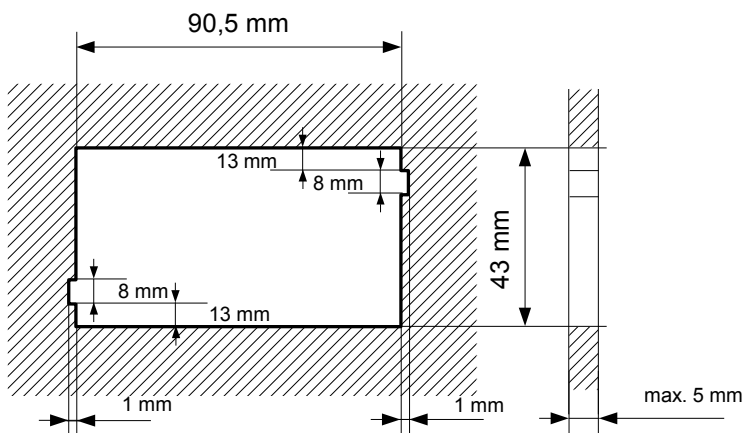


Fig.A – Recommended Mounting Hole Dimensions

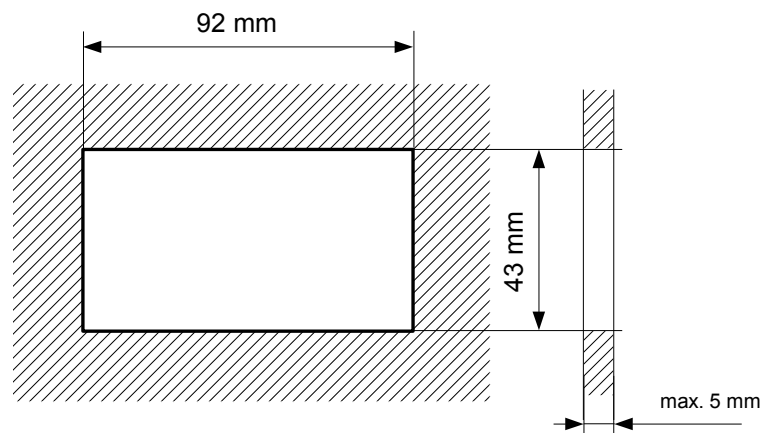


Fig.B – Allowable Mounting Hole Dimensions

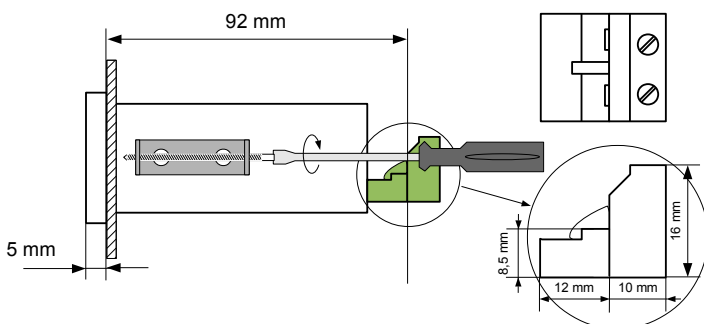


Fig.C – Bracket Installation & Connector Dimensions

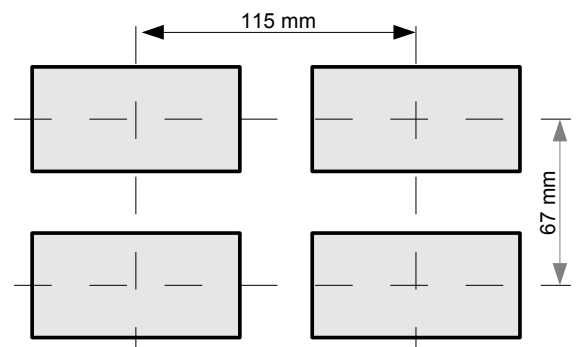
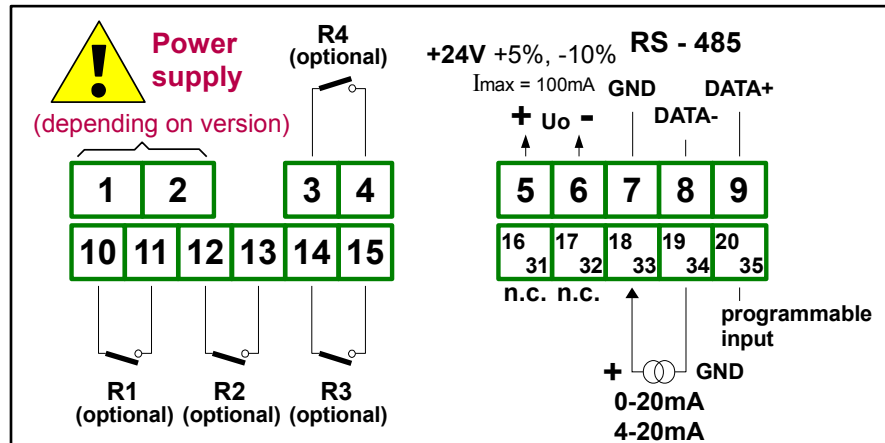
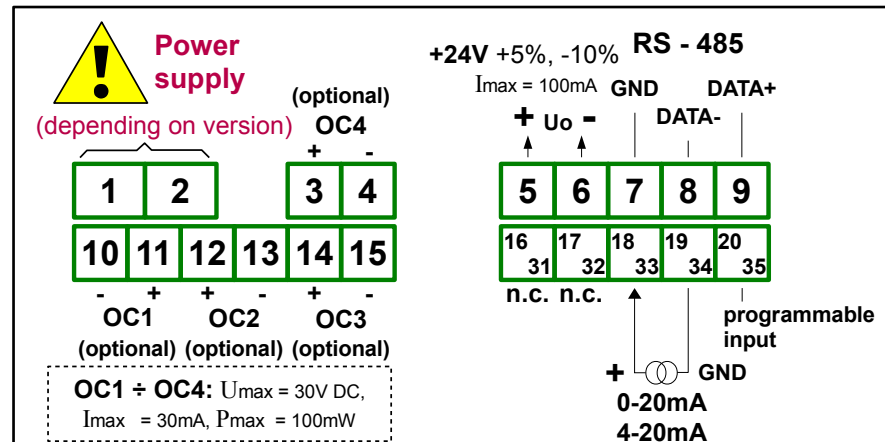


Fig.D – Minimum Distances when Assembling More than One Unit

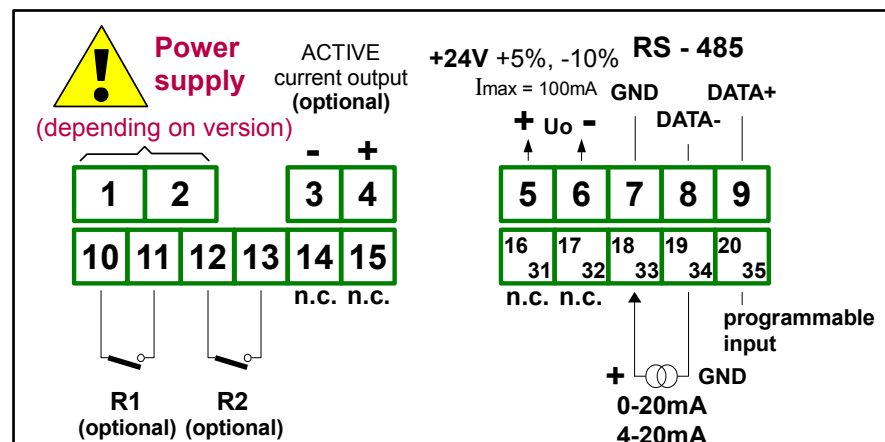
Terminal Descriptions



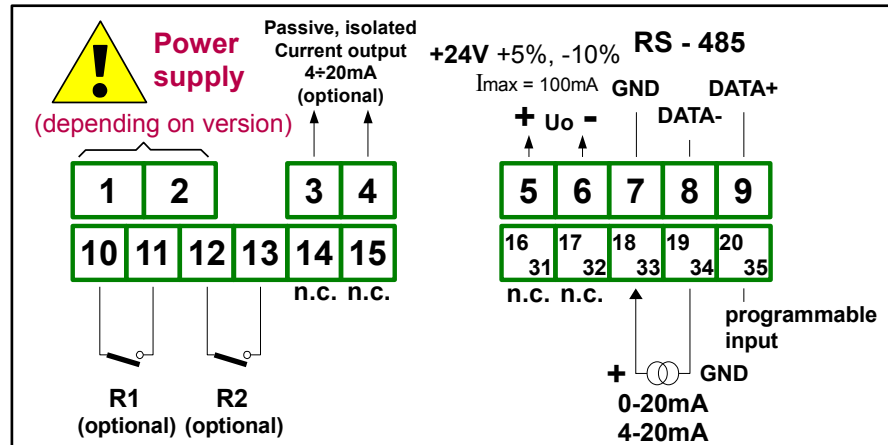
Relay Outputs



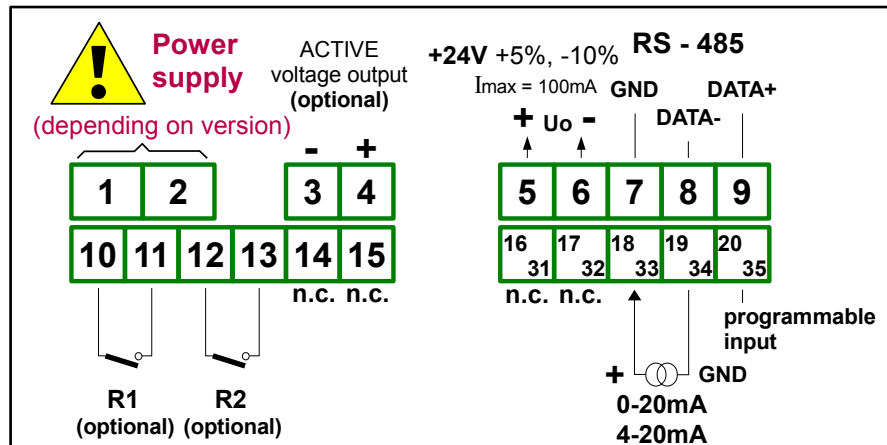
OC - Type Outputs



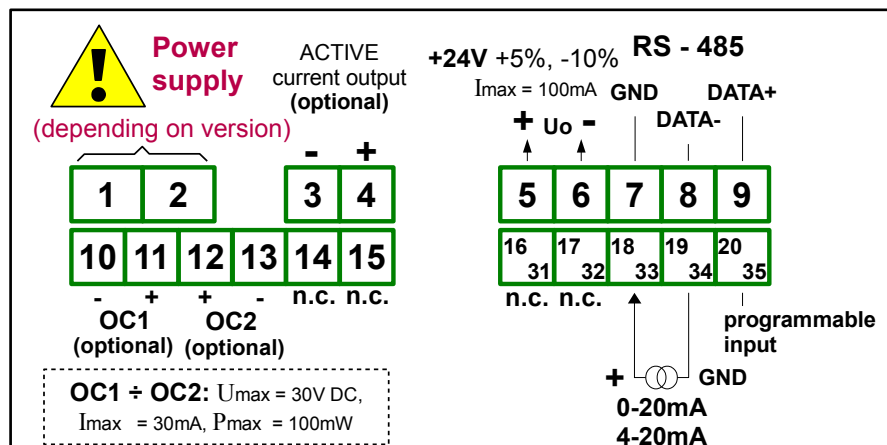
Relay & Active Current Outputs



Relay & Passive Current Outputs



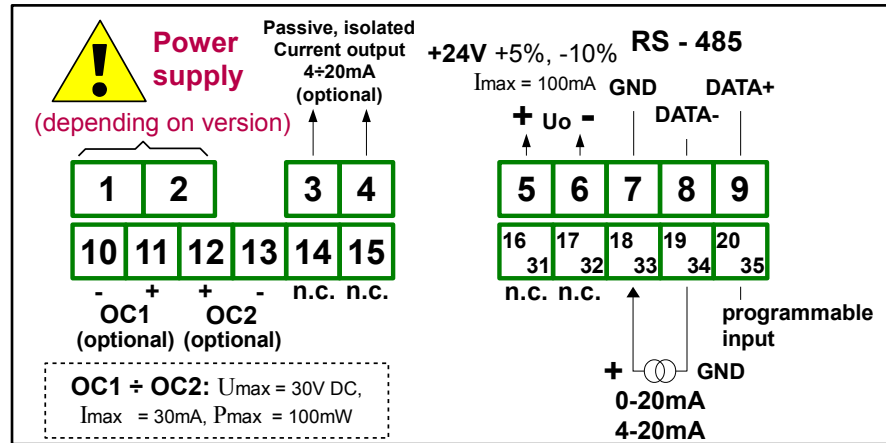
Relay & Active Voltage Outputs



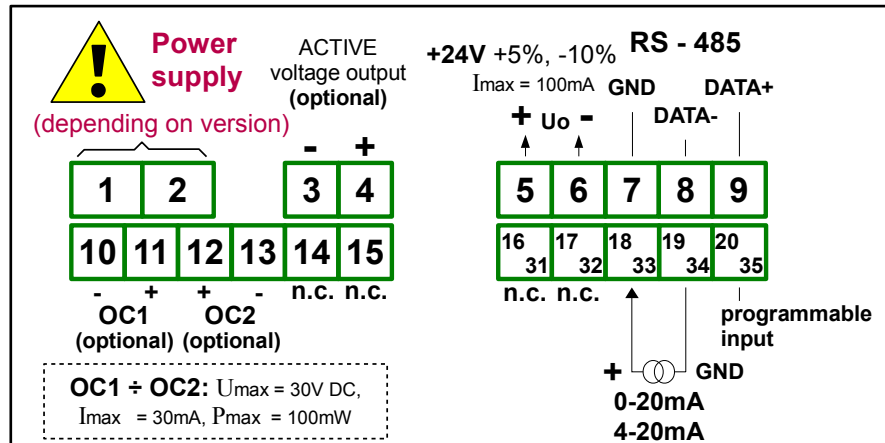
OC - Type & Active Current Outputs

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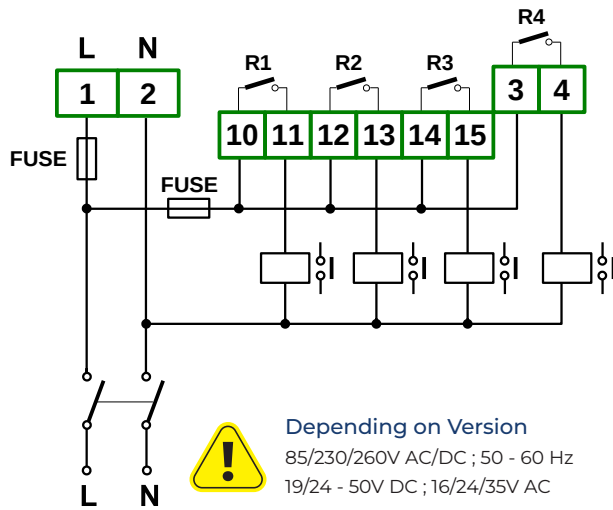


OC - Type & Passive Current Outputs



OC - Type & Active Voltage Outputs

Power Supply & Relay Connection



Note:

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

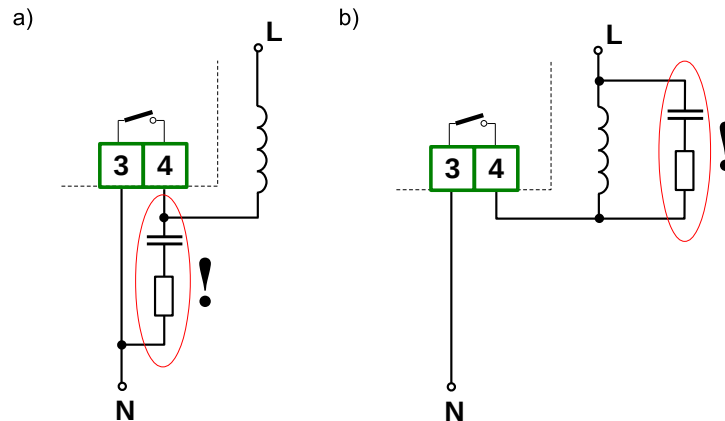


Figure: Examples of Suppression Circuit Connection
a) To Stepper Relay Terminals b) To the Inductive Load (Motor)

OC-Type Output Connection*

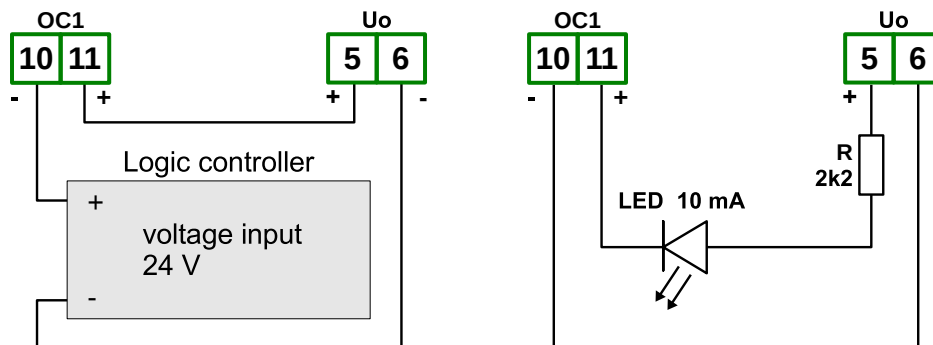


Figure: Examples of OC-type output connection

*Certain Models Only

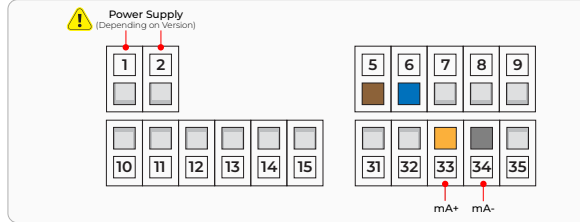
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Flow Meter Connections

TKM Series : 4-20mA Output

450 Terminal	Wire Color	Description
5	Brown	+VDC
6	Blue	-VDC
33	Yellow	mA+
34	Grey	mA-

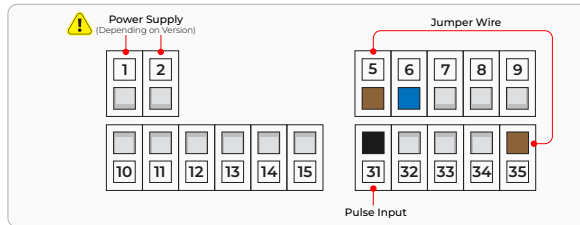


TKS Series : Pulse Output

GPM/Pulse = K factor

450 Terminal	Wire Color	Description
5	Brown	+VDC
6	Blue	-VDC
31	Black	NPN Pulse

Note : Jump 5 & 35

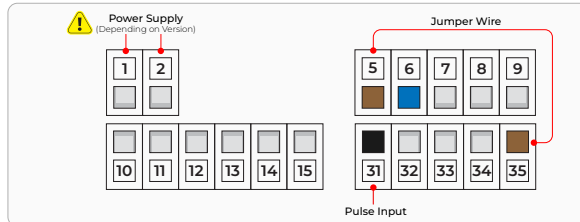


TKW Series : Pulse Output

GPM/Pulse = K factor

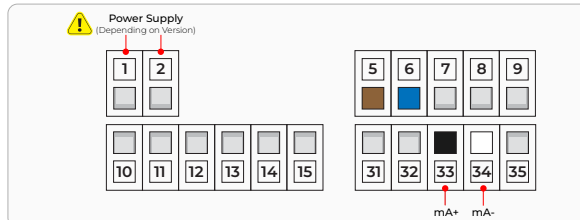
450 Terminal	Wire Color	Description
5	Brown	+VDC
6	Blue	-VDC
31	Black	Pulse

Note : Jump 5 & 35



TKW Series : 4-20mA Output

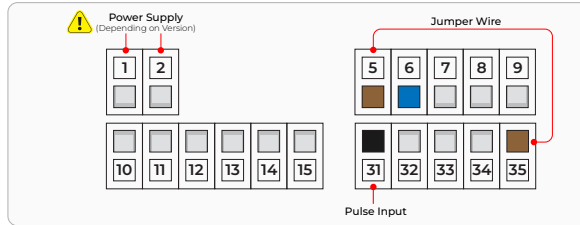
450 Terminal	Wire Color	Description
5	Brown	+VDC
6	Blue	-VDC
33	Black	mA+
34	White	mA-



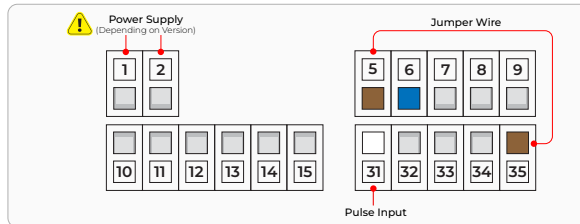
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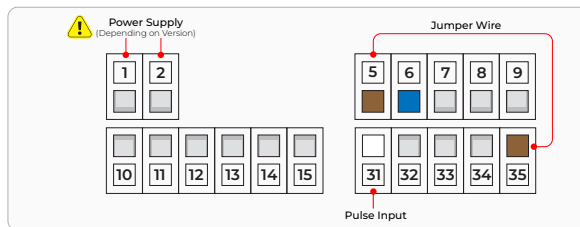
TKM TKP Series : Pulse Output		
GPM/Pulse = K factor		
450 Terminal	Wire Color	Description
5	Brown	+VDC
6	Blue	-VDC
31	Black	Pulse
Note : Jump 5 & 35		



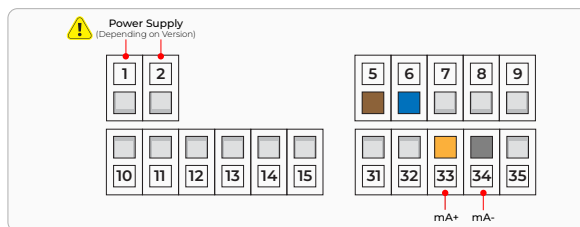
TIW Series : Pulse Output		
GPM/Pulse = K factor		
450 Terminal	Wire Color	Description
5	Brown	+VDC
6	Blue	-VDC
31	White	Pulse
Note : Jump 5 & 35		



TIM TIP Series : Pulse Output		
GPM/Pulse = K factor		
450 Terminal	Wire Color	Description
5	Brown	+VDC
6	Blue	-VDC
31	White	Pulse
Note : Jump 5 & 35		



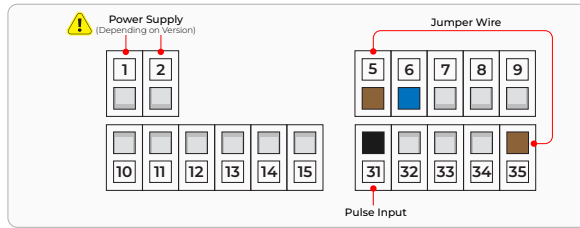
TIM Series : 4-20mA Output		
450 Terminal	Wire Color	Description
5	Brown	+VDC
6	Blue	-VDC
33	Yellow	mA+
34	Grey	mA-



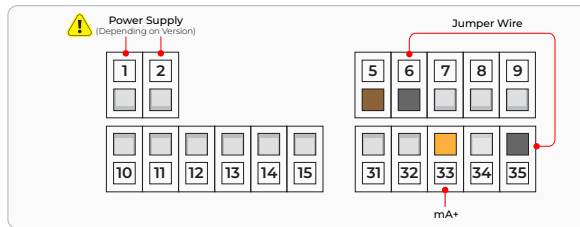
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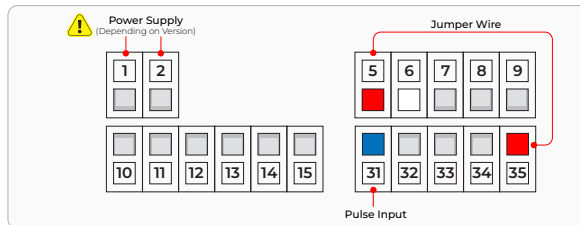
UF 1000 4000 5000 – Pulse Output		
GPM/Pulse = K factor		
450 Terminal	Pin	Description
5	1	+VDC
31	2	Pulse
6	3	-VDC
Note : Jump 5 & 35		



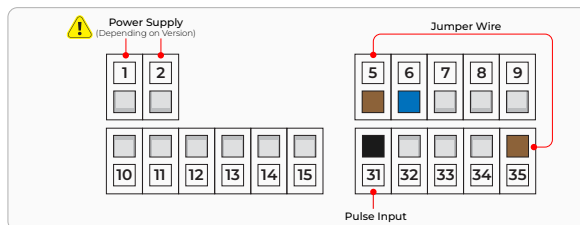
UF 1000 4000 5000 – 4-20mA Output		
450 Terminal	Pin	Description
5	1	+VDC
33	2	+mA
6	3	-VDC
Note : Jump 6 & 35		



ProPulse (Flying Lead) – Pulse Output		
GPM/Pulse = K factor		
450 Terminal	Wire Color	Description
5	Red	+VDC
6	Shield	-VDC
31	Blue	Pulse
Note : Jump 5 & 35		



ProPulse®2 – Pulse Output		
450 Terminal	Wire Color	Description
5	Brown	+VDC
6	Blue	-VDC
31	Black	Pulse
Note : Jump 5 & 35		



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Programming K Factor

STEPS	DISPLAY	OPERATION
1 Main Display ▶  ESC MENU  3 SEC		MAIN DISPLAY
2 Relay 1 ▶   X 5		RELAY 1 Settings
3 Input ▶  ENTER PAUSE		INPUT Menu
4 K Factor ▶  ENTER PAUSE		Press  or  → Select PULSEL (K Factor)
5 K Factor Value ▶  ENTER PAUSE  2 SEC		Enter K FACTOR Value Press  or  to change digit Press  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 ▶  ENTER PAUSE		Save Selection
7 K Factor ▶  ESC MENU		PULSEL
8 Input ▶  ESC MENU		Input Menu
9 Main Display ▶		Main Display

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Programming Relays

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 FLo (Flow)
5 Save ▶  ENTER PAUSE		Save Selection
6 Source ▶  		Source
7 Set Point 1 ▶  ENTER PAUSE		SET POINT 1
8 Set Point 1 Value ▶  ENTER PAUSE 2 SEC		Enter SET POINT 1 Value Press  or  to change digit Press  to advance to next digit
9 Save ▶  ENTER PAUSE		Save Value
10 Set Point 1 ▶  		SET POINT 1

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

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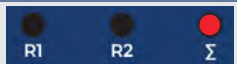
STEPS	DISPLAY	OPERATION
21 Save 		Save Selection
22 Mode 		Mode Menu
23 Relay 1 		Relay 1 Menu
24 Main Display		Main Display

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Industrial Flow Batching Controller

Programming Batching

STEPS	DISPLAY	OPERATION
1 Main Display		MAIN DISPLAY
ESC MENU 3 SEC		
2 Relay 1		RELAY 1 Settings
3 Source		SOURCE Menu
4 FLo bAt tot		Press or → Select bAt (Batch)
5 Save		Save Selection
6 Source		Source Menu
7 Set Point		SET POINT
8 Set Point Value		Enter SET POINT Value
2 SEC		Press or to change digit Press to advance to next digit
9 Save		Save Value
10 Set Point		Set Point
11 Relay 1		Relay 1 Menu
12 Main Display		Main Display
13 Batching Mode		BATCHING MODE
to start batching		



Note: Switching between Flow rate, Totalizer and Batching can be done by pressing Σ /RESET button. Kind of displayed value is signalled by " Σ " LED.
 Σ LED ON : Totalizer | Σ LED OFF: Flow Rate | Σ LED Pulsing: Batching

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Programming Output (For 4-20mA Output Models)

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

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Industrial Flow Batching Controller

STEPS	DISPLAY	OPERATION
11 Source 		Source Menu
12 4mA 		Setting 4mA (LOW VALUE)
13 4mA Value 2 SEC		Enter 4mA Value Press or to change digit Press to advance to next digit
14 Save 		Save Value
15 4mA 		4mA (Low Value)
16 20mA 		Setting 20mA (HIGH VALUE)
17 20mA Value 2 SEC		Enter 20mA Value Press or to change digit Press to advance to next digit
18 Save 		Save Value
19 20mA 		20mA (High value)
20 Output 		Output Menu
21 Main Display		Main Display

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Resetting Batch

STEPS	DISPLAY	OPERATION
1 Main Display    3 SEC		MAIN DISPLAY
2 Relay 1   X 7		Relay 1 Settings
3 Batch Settings  		BATCH Menu
4 Batch Resolution   X 5		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

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

Resetting Totalizer

STEPS	DISPLAY	OPERATION
1 Main Display 		MAIN DISPLAY
2 Relay 1 		Relay 1 Settings
3 Totalizer Menu 		TOTALIZER Menu
4 Totalizer Resolution 		BATCH RESOLUTION
5 Mode Clear 		MODE CLEAR
6 OFF ON 		Press  or  → Select on

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STEPS	DISPLAY	OPERATION
7 Save  ENTER PAUSE		Save Selection
8 Mode Clear  ESC MENU		Mode Clear
9 Totalizer Menu  ESC MENU		Totalizer Menu
10 Main Display  Σ RESET X 2		Main Display
11 Totalizer Mode  Σ RESET 3 SEC		TOTALIZER MODE R1 R2 Σ Note: Switching between Flow rate, Totalizer and Batching can be done by pressing Σ/RESET button. Kind of displayed value is signalised by "Σ" LED. Σ LED ON : Totalizer Σ LED OFF: Flow Rate Σ LED Pulsing: Batching
12 Clear  ENTER PAUSE		Clear Totalizer
13 Main Display		Main Display

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Setting Decimal Point

STEPS	DISPLAY	OPERATION
1 Main Display ▶  ESC MENU  3 SEC		MAIN DISPLAY
2 Relay 1 ▶   X 6		Relay 1 Settings
3 Flow Menu ▶  ENTER PAUSE		FLOW Menu *
4 Flow Precision ▶  ENTER PAUSE		FLOW PRECISION
5 Decimal Point ▶  ENTER PAUSE		DECIMAL POINT
		Press  or  to change Decimcal Point
6 Save ▶  ENTER PAUSE		Save Selection
7 Flow Precision ▶  ESC MENU		Flow Precision
8 Flow Menu ▶  ESC MENU		Flow Menu
9 Main Display ▶		Main Display

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

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Warranty, Returns and Limitations

Warranty

Icon Process Controls Ltd warrants to the original purchaser of its products that such products will be free from defects in material and workmanship under normal use and service in accordance with instructions furnished by **Icon Process Controls Ltd** for a period of one year from the date of sale of such products. **Icon Process Controls Ltd** obligation under this warranty is solely and exclusively limited to the repair or replacement, at Icon Process Controls Ltd option, of the products or components, which **Icon Process Controls Ltd** examination determines to its satisfaction to be defective in material or workmanship within the warranty period. **Icon Process Controls Ltd** must be notified pursuant to the instructions below of any claim under this warranty within thirty (30) days of any claimed lack of conformity of the product. Any product repaired under this warranty will be warranted only for the remainder of the original warranty period. Any product provided as a replacement under this warranty will be warranted for the one year from the date of replacement.

Returns

Products cannot be returned to **Icon Process Controls Ltd** without prior authorization. To return a product that is thought to be defective submit a customer return (MRA) request form and follow the instructions therein. All warranty and non-warranty product returns to **Icon Process Controls Ltd** must be shipped prepaid and insured. **Icon Process Controls Ltd** will not be responsible for any products lost or damaged in shipment.

Limitations

This warranty does not apply to products which: 1) are beyond the warranty period or are products for which the original purchaser does not follow the warranty procedures outlined above; 2) have been subjected to electrical, mechanical or chemical damage due to improper, accidental or negligent use; 3) have been modified or altered; 4) anyone other than service personnel authorized by **Icon Process Controls Ltd** have attempted to repair; 5) have been involved in accidents or natural disasters; or 6) are damaged during return shipment to **Icon Process Controls Ltd** reserves the right to unilaterally waive this warranty and dispose of any product returned to **Icon Process Controls Ltd** where: 1) there is evidence of a potentially hazardous material present with the product; or 2) the product has remained unclaimed at **Icon Process Controls Ltd** for more than 30 days after **Icon Process Controls Ltd** has dutifully requested disposition. This warranty contains the sole express warranty made by **Icon Process Controls Ltd** in connection with its products. **ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY DISCLAIMED.** The remedies of repair or replacement as stated above are the exclusive remedies for the breach of this warranty. **IN NO EVENT SHALL Icon Process Controls Ltd BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND INCLUDING PERSONAL OR REAL PROPERTY OR FOR INJURY TO ANY PERSON. THIS WARRANTY CONSTITUTES THE FINAL, COMPLETE AND EXCLUSIVE STATEMENT OF WARRANTY TERMS AND NO PERSON IS AUTHORIZED TO MAKE ANY OTHER WARRANTIES OR REPRESENTATIONS ON BEHALF OF Icon Process Controls Ltd.** This warranty will be interpreted pursuant to the laws of the province of Ontario, Canada.

If any portion of this warranty is held to be invalid or unenforceable for any reason, such finding will not invalidate any other provision of this warranty.

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