

## Batch Controller

with numerical keypad, remote control inputs and 3 control / alarm / pulse outputs



*Application examples: Truck or tank filling*



*Pharmaceutical industry*



*Food industry*

The N-Series distinguishes itself by its userfriendly features: Numerical keypad, easy ticket printing, clear programming menu structure, easy to read display and simple mounting enclosure. The numerical keypad allows simple and fast changing of the preset batch quantity.

### Advantages

- Save time and cost with the easy to operate numerical keypad.
- Intuitive "Know one, know them all!" configuration menu, saving time, cost and aggravation.
- Key information at a glance as it simultaneously shows actual value, preset value, batch process indication, relay status and selectable measuring units for volumetric or mass.
- Easy operation to enter a batch value and to control the proces.

### Features

- Rugged aluminum DIN-size panel mount enclosure
- 7 large digits (14mm, 0.56") for total, flow rate and acc. total.
- 10 smaller digits (8mm, 0.3") for preset value and batch count.
- Bright LED backlight.
- Ability to process all types of signals: Reed-switch, open collector, NPN/PNP pulse or active 8 / 12 / 24V pulse signals.
- Five control inputs for remote START, HOLD, RESUME, keypad lock and external alarm.
- Two heavy duty, mechanical relays (make-and-break/NO-NC), configurable for i.e. batching with one-stage or two-stage.
- One transistor output for connection to PLC's or other HMI.
- Modbus communication option RS232 / RS485.
- Power requirements: 24V DC / 110 - 230V AC.
- Sensor supply: 1.2 / 3 / 8.2 / 12 / 24V DC.
- No-flow monitoring and automatic overrun correction.

## Introduction

The N410 batch controller distinguishes itself by its userfriendly features: Numerical keypad, clear programming menu structure, easy to read display and simple mounting enclosure. The numerical keypad allows simple and fast changing of the preset batch quantity. Fluidwell stands for simplicity and reliability and it is now available in this customer focused and application driven batch controller.

## Display

The unique LCD display provides multiple batch control data at a glance. The main information like actual value, flow rate or batched total are displayed with 7 large digits (14mm, 0.56"). The preset value and units of measure are displayed with 10 smaller segments (8mm, 0.3"). A graphical indication of the batch process and relay status are displayed simultaneously. On-screen engineering units are easily configured in the configuration menu. All values are saved in EEPROM memory. The N410 is standard provided with a bright backlight, which ensures good readings during day and night and it can be adjusted in 6 steps from 0 to 100%.

## Configuration

The N410 uses the same highly appreciated configuration structure as our other product series. Each setting is clearly indicated with an alphanumeric description, eliminating confusing abbreviations. Once familiar with an N-series product, you will be able to program all models in all series without a manual. For example: the configuration menu of the (intrinsically safe) F-Series batch controllers operate almost identical to an N410! In other words: Know one, know them all. Operation and configuration is done via the easyto- operate numerical keypad. All settings are accessed via a simple operator menu that can be password protected.

## Overrun correction

The Fluidwell N410 measures the overrun quantity at the end of every batch. With the automatic overrun correction procedure, the batch is corrected automatically; every run is executed with the highest accuracy.



All info at a glance



Easy to install



Easy to program



Know one know them all!



Reliable



User-friendly

### No-flow monitor

Following the START command, the flowmeter generates a signal. If this fails to come within the programmed time, an alarm is triggered. The batch is interrupted and the latest process values are stored in the memory. At the same time, the cause of the alarm is displayed. Alarm conditions are indicated visibly and can be configured as an alarm output. The No-flow function detects the absence of liquid, an obstruction in the pipeline or a breakdown.

### Control, Pulse or Alarm outputs

Three outputs are available with the N410: two field replaceable, heavy duty relays and one transistor output. Relay 1 is fixed as the main batch control relay. Relay 2 and the transistor output can be configured as 1- or 2-stage batch control, alarm or pulse output.

### Power requirements

Two power inputs are available to power the N410 and sensor. A 110 - 230V AC and a 24V DC power supply. Both offer an 1.2 / 3 / 8.2 / 12 or 24V DC sensor supply to power the sensor.

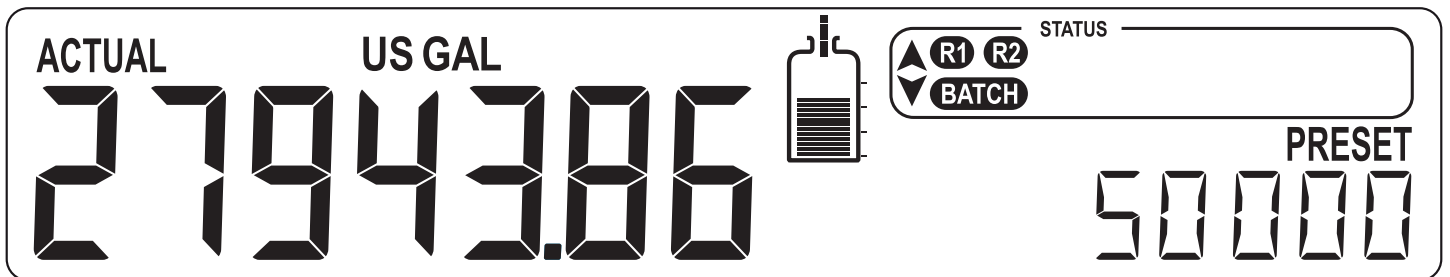
### Batch sizes

The preset value of the batched quantity can be programmed fast and easily by the operator via the numerical keypad. Repeating batches are executed, paused and reset easily with a start, hold and reset button. A just-in-time back-up stores the latest batch information in case of a power failure.

### Communication

All processed data and settings can be read and modified through the optional Modbus link (RS232 / RS485).

### Display example



User-friendly numerical keypad



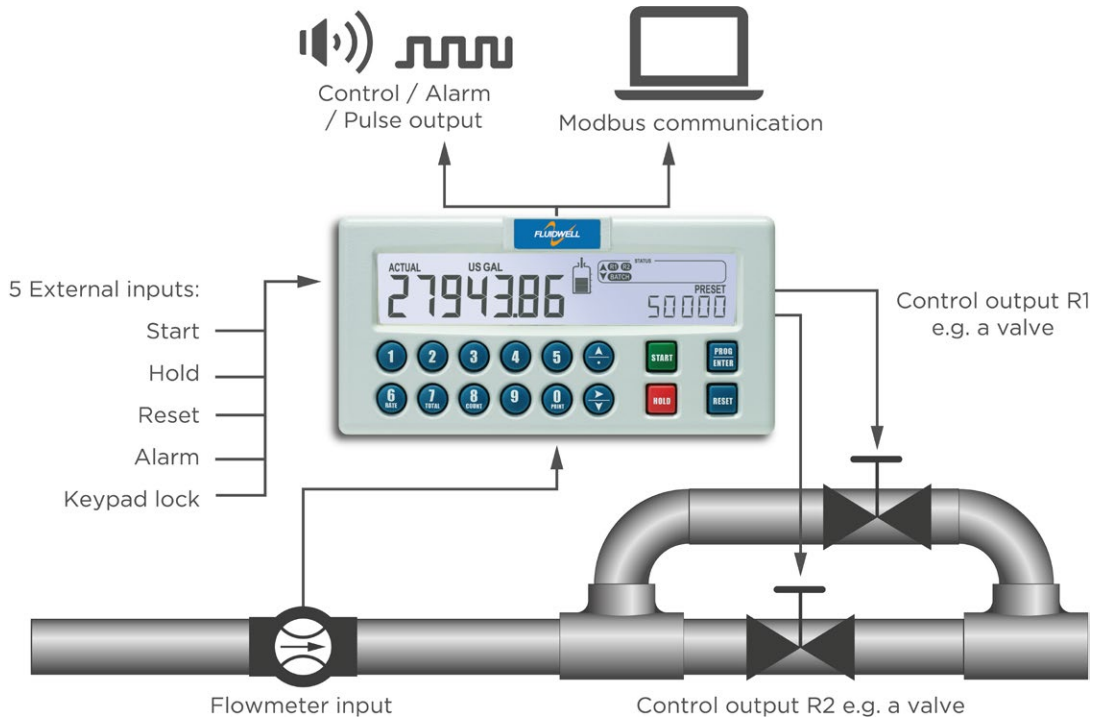
Panel mounted tank filling



Very easy menu structure

## Overview application N410

Accurate batching or filling of liquids where the batch size changes frequently. The N410 offers the perfect solution for batch control applications where a user-friendly instrument is required. Whether you focus on its clear display information, the very easy to operate numerical keypad or the easy menu-driven configuration structure, you've got to have a Fluidwell! Alternative Fluidwell products: D030 batch controller for safe area panel mount applications or F-Series for safe area and intrinsically safe applications.



## Signal input

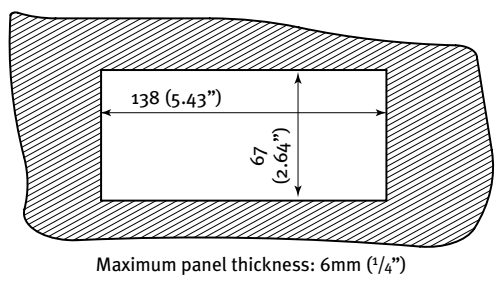
The N410 accepts various input signals for volume flow or mass flowmeters, like reed-switch, open collector, Namur, NPN, PNP, Sine wave (coil) or active 8/12/24V pulse signals.

Type of signal	Resistance	Low Pass filter (LP)	Max. frequency	Max. frequency Low Pass filter (LP)	Min. amplitude P-P	Remark
NPN	100kΩ pull-up	100kΩ pull-up	6kHz Threshold 1.2V	2.2kHz		Open collector
REED	1MΩ pull-up	1MΩ pull-up	1.2kHz Threshold 1.2V	120Hz		
PNP	100KΩ pull-down	100KΩ pull-down	6kHz Threshold 1.2V	700Hz		
NAMUR	820Ω pull-down	-	4kHz	-		External power required
COIL LO	-	-			90mV <sub>pp</sub>	Default sensitivity
COIL-HI	-	-			20mV <sub>pp</sub>	Sensitive for interference!
ACTIVE 8.2V DC	3KΩ		10kHz Threshold 4V			External power required
ACTIVE 12V DC	4KΩ		10kHz Threshold 6V			External power required
ACTIVE 24V DC	3KΩ		10kHz Threshold 12V			External power required

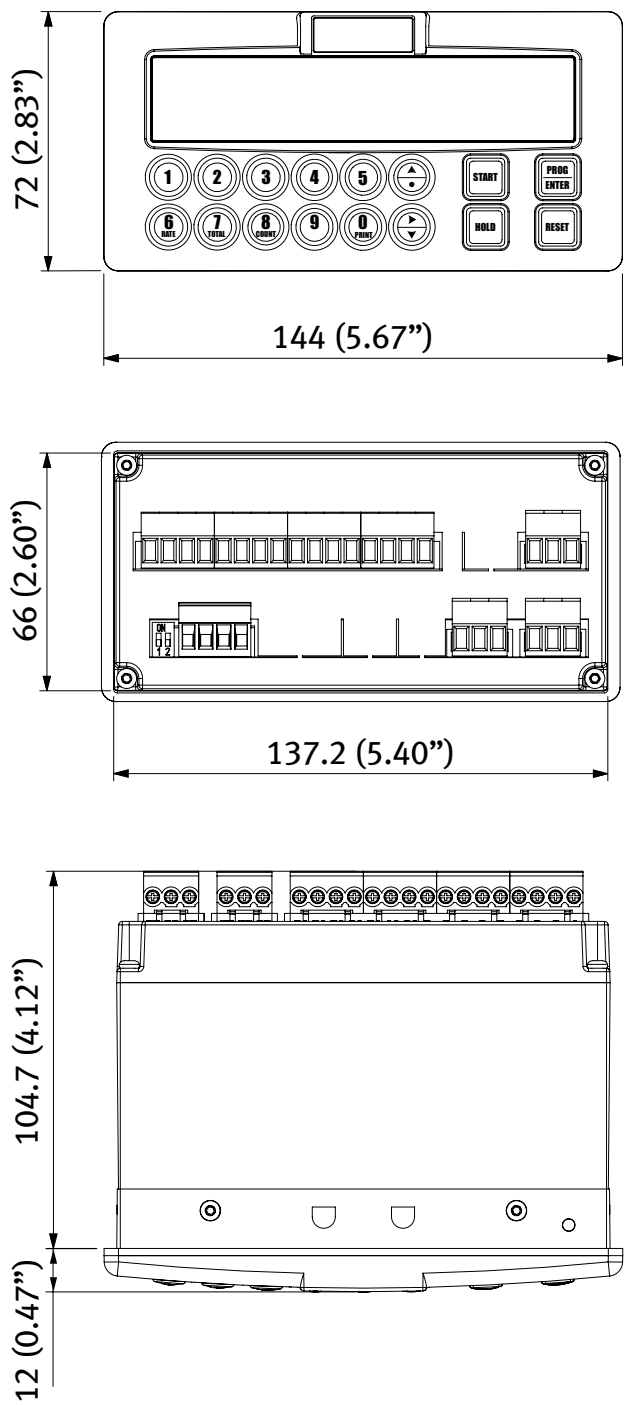
## Enclosures

The N410 has an IP67 (Type4X) aluminum DIN size front panel and an IP20 GRP back cover. The removable screw terminal connectors on the back-side and the 4 mounting clamps make the N410 very easy to install.

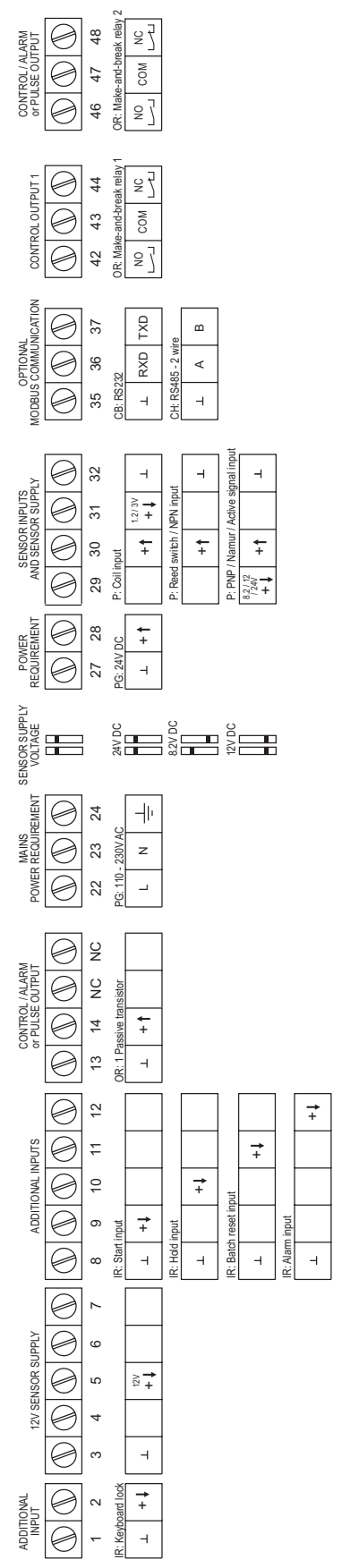
### Panel cut out



### Dimensions enclosures

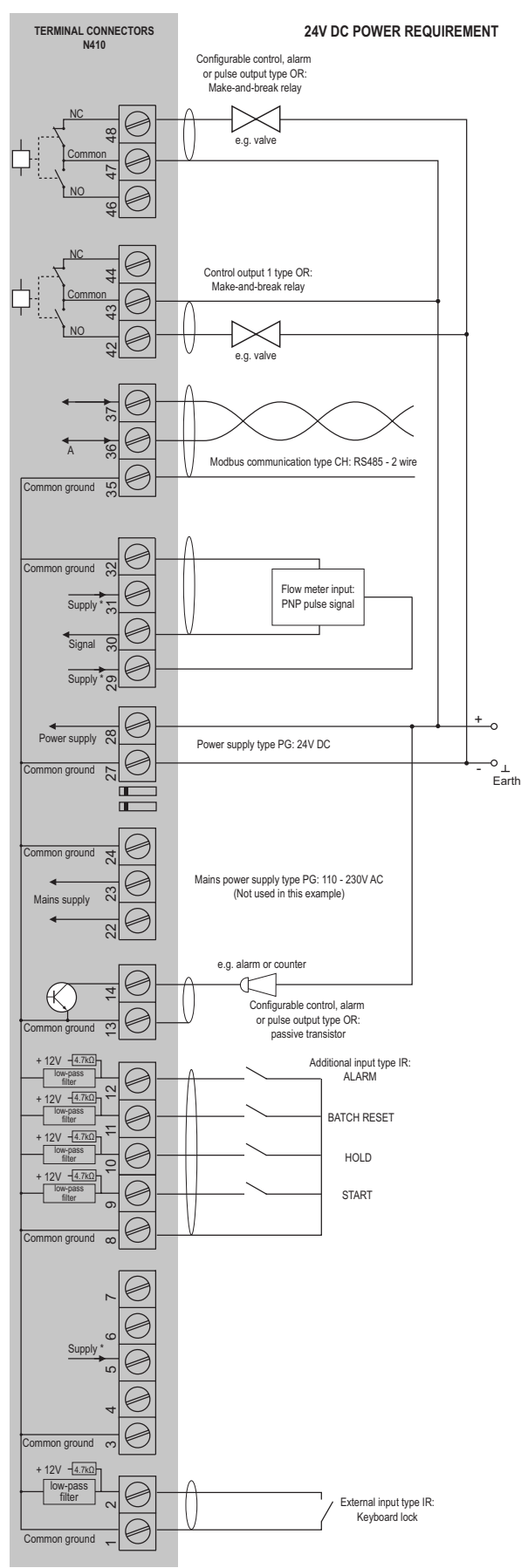


## Terminal connections

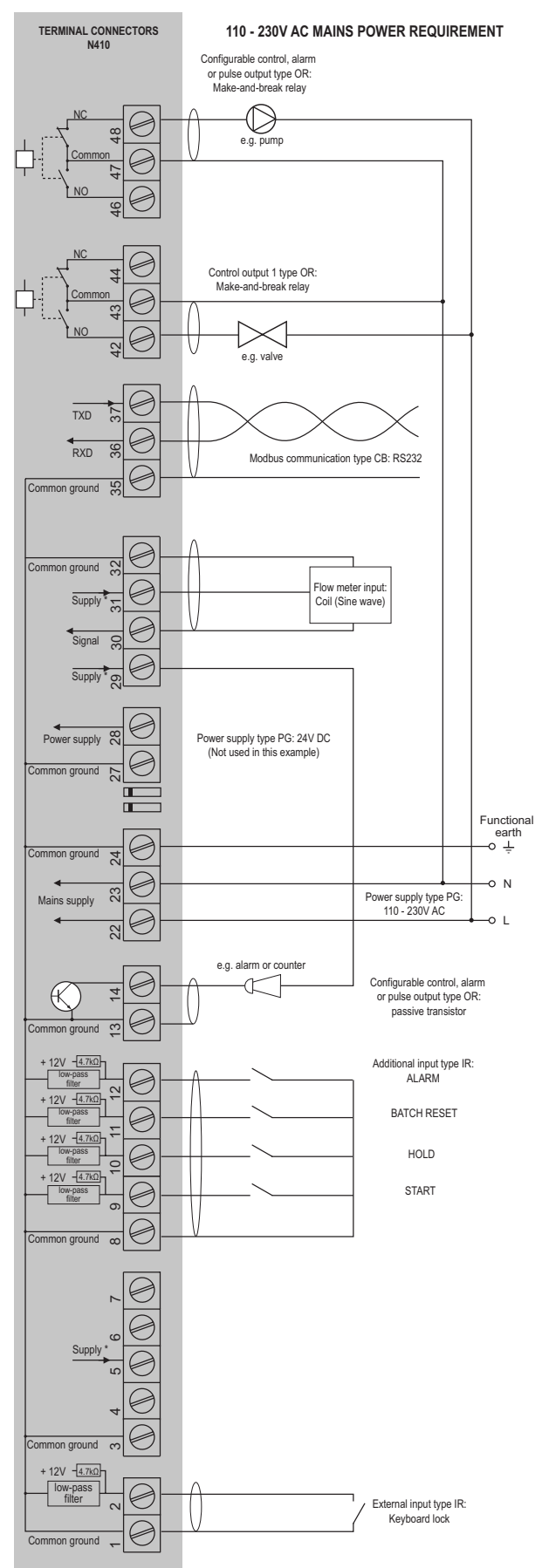


## N410-P-CH-HB-IR-OR-PG-XX-ZB.

## N410-P-CB-HB-IR-OR-PG-XX-ZB.



\*Sensor supply voltage terminal 5: 12V DC  
 Sensor supply voltage terminal 29: 8.2 / 12 / 24V DC  
 Sensor supply voltage terminal 31: 1.2 / 3V DC



\*Sensor supply voltage terminal 5: 12V DC  
 Sensor supply voltage terminal 29: 8.2 / 12 / 24V DC  
 Sensor supply voltage terminal 31: 1.2 / 3V DC

## Display

<b>Type</b>	High intensity transfective numeric and alphanumeric LCD, UV-resistant. Bright LED backlight. Intensity adjustable from 0 - 100% in steps of 20%. Good readings in full sunlight and in darkness.
<b>Dimensions</b>	22 x 116mm (0.87 x 4.57").
<b>Digits</b>	Seven 14mm (0.56") and ten 8mm (0.3") digits. Various symbols and measuring units.
<b>Refresh rate</b>	8 times/sec.

## Enclosure

<b>General</b>	Die-cast aluminum front panel, GRP back enclosure. Polycarbonate window, silicone gasket; UV stabilized and flame retardant material.
<b>Keypad</b>	Sixteen industrial micro-switch keys; UV-resistant silicone keypad; replaceable front.
<b>Painting</b>	UV-resistant 2-component industrial painting.
<b>Dimension</b>	144 x 72 x 110mm (5.67" x 2.83" x 4.33") - W x H x D.
<b>Classification</b>	IP67 (Type4X) at the front side. IP20 at the back side.
<b>Panel cut-out</b>	138 x 67mm (5.43" x 2.64") W x H.
<b>Weight</b>	650 gram / 1.7 lbs.
<b>Panel thickness</b>	Max. 6mm (1/4").

## Operating temperature / humidity

<b>Temperature</b>	-20°C to +60°C (-4°F to +140°F).
<b>Storage</b>	-40°C to +80°C (-40°F to +176°F).
<b>Humidity</b>	85% non-condensing, relative.

## Power requirements

<b>Type PG</b>	110 - 230V AC. Power consumption max. 10 Watt. 24V DC $\pm$ 10%. Power consumption max. 10 Watt.
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## Sensor excitation

<b>Type PG</b>	Terminal 5: 12V DC, $I_{out}$ max. 30mA. Terminal 29: 8.2 / 12 or 24V DC. 8.2V DC, $I_{out}$ max. 20mA. 12V DC, $I_{out}$ max. 30mA. 24V DC, $I_{out}$ max. 75mA. Terminal 31: 1.2 or 3V DC. For sensors with a very low power consumption. (Coil / reed-switch)
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## Terminal connections

<b>Type</b>	Removable plug-in terminal strip. Wire max. 2.5mm <sup>2</sup> .
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## Data protection

<b>Just-in-time</b>	EEPROM backup of all settings and latest batch and process information. Data retention at least 10 years.
<b>Password</b>	Configuration settings can be password protected.
<b>Lock function</b>	Complete keyboard can be locked with external input (e.g. key lock or PLC).

## Directives & Standards

<b>EMC</b>	Directive 2014/30/EU, FCC 47 CFR part 15.
<b>Low voltage</b>	Directive 2014/35/EU
<b>RoHS</b>	Directive 2011/65/EU
<b>IP &amp; NEMA</b>	EN 60529 & NEMA 250.

## Signal inputs - Flowmeter

<b>Type P</b>	Namur, Coil / sine wave (HI: 20mVpp or LO: 80mVpp, sensitivity selectable), NPN/PNP, open collector, reed-switch, active pulse signals 8 - 12 and 24V DC.
<b>Frequency</b>	Minimum 0Hz - maximum 5kHz for total and flow rate. Maximum frequency depends on signal type and internal low-pass filter. E.g. reed switch with low-pass filter: max. frequency 120Hz.
<b>K-Factor</b>	0.000010 - 9,999,999 with variable decimal position.
<b>Low-pass filter</b>	Available for all pulse signals.
<b>Low Level</b>	0V DC min. to 3V DC max.
<b>High Level</b>	8V DC min. to 24V DC max.
<b>Load impedance</b>	4.7kOhm pull-up to +12V DC.
<b>Current</b>	2.5mA steady state.

## Signal inputs - Additional input

<b>Function</b>	5 remote control inputs: start, hold, reset, keypad lock and external alarm.
<b>Type IR</b>	Current sinking.
<b>Logic</b>	Level sensitive.
<b>Low Level</b>	0V DC min. to 3V DC max..
<b>High Level</b>	8V DC min. to 24V DC max.
<b>Load impedance</b>	4.7kOhm pull-up to +12V DC.
<b>Current</b>	2.5mA steady state.
<b>Response</b>	100ms make and break time.

## Signal outputs - Digital output

<b>Type OR</b>	<ul style="list-style-type: none"> <li>One batch output (always a mechanical relay).</li> <li>Two configurable outputs (one mechanical relay and one transistor): batch / two-stage control / any alarm / scaled pulse output.</li> </ul>
<b>Pulse frequency</b>	Max. 500Hz. Pulse length user definable between 1msec up to 10 seconds.
<b>Relays</b>	2 isolated, field replaceable, electro-mechanical relays (NO-NC). Max. switching capacity (resistive load): 8A @ 250V AC / 30V DC Max. switching power (resistive load): 2000VA 240W.
<b>Transistor</b>	One passive transistor output - not isolated. Load max. 50V DC - 300mA.

## Communication option

<b>Function</b>	Reading display information, reading / writing all configuration settings.
<b>Type CB</b>	Modbus RTU - RS232.
<b>Type CH</b>	Modbus RTU - RS485 2-wire.
<b>Speed</b>	1200 - 2400 - 4800 - 9600 - 19200 - 38400 baud.
<b>Addressing</b>	Maximum 255 addresses.

## Operator functions

<b>Functions</b>	<ul style="list-style-type: none"> <li>• Enter a preset value.</li> <li>• Start, hold and stop the batch process.</li> <li>• Total can be reset to zero.</li> <li>• Batch counter can be reset to zero.</li> </ul>
<b>Displayed functions</b>	<ul style="list-style-type: none"> <li>• Preset value.</li> <li>• Running batch total or remaining quantity.</li> <li>• Flow rate, total and accumulated total.</li> <li>• Batch counter.</li> <li>• Graphical indication progress of the actual batch.</li> </ul>
<b>Additional functions</b>	<ul style="list-style-type: none"> <li>• Active overrun correction.</li> <li>• Minimum / maximum preset value.</li> <li>• No-Flow monitoring.</li> </ul>

## Preset / Total

<b>Digits</b>	7 digits.
<b>Units</b>	L, m <sup>3</sup> , USGAL, IGAL, ft <sup>3</sup> , bbl, kg, Ton, US Ton, lb.
<b>Decimals</b>	0 - 1 - 2 or 3.
<b>Note</b>	Total can be reset to zero.

## Accumulated total

<b>Digits</b>	10 digits.
<b>Units / decimals</b>	According to selection for preset.
<b>Note</b>	Cannot be reset to zero.

## Batch counter

<b>Digits</b>	10 digits.
<b>Note</b>	Counter can be reset to zero.

## Flow rate

<b>Digits</b>	7 digits.
<b>Units</b>	L, m <sup>3</sup> , USGAL, IGAL, ft <sup>3</sup> , bbl, kg, Ton, US Ton, lb.
<b>Decimals</b>	0 - 1 - 2 or 3.
<b>Time units</b>	/sec - /min - /hr - /day.

## N-Series accessories & spare parts

<b>ACN01</b>	Shock proof stainless steel mounting brackets (2pcs).
<b>SRN01</b>	Spare part: Set of field replaceable relays (2pcs).
<b>SNF01</b>	Spare part: Aluminum N-Series frontcover

		Description								
<b>Model</b>	<b>N410</b>	<b>Batch Controller with numerical keypad, remote control inputs and 3 control / alarm / pulse outputs.</b>								
<b>Input</b>	<b>P</b>	<b>Pulse input, e.g., coil, npn, pnp, namur.</b>				<b>-P</b>				
<b>Communication</b>	<b>CB</b>	RS232 communication - Modbus RTU.				<b>-CB</b>				
	<b>CH</b>	RS485 communication - 2-wire - Modbus RTU.				<b>-CH</b>				
	<b>CX</b>	<b>No communication.</b>				<b>-CX</b>				
<b>Enclosure</b>	<b>HB</b>	<b>Aluminum front panel - IP67 (Type4X).</b>				<b>-HB</b>				
<b>Additional</b>	<b>IR</b>	<b>Remote control input to start, hold, reset, keypad lock and alarm.</b>				<b>-IR</b>				
<b>Digital output</b>	<b>OR</b>	<b>2 field replaceable, mechanical relays (NO-NC) and 1 passive transistor output.</b>				<b>-OR</b>				
<b>Power</b>	<b>PG</b>	<b>24V DC and 110 - 230V AC, with sensor supply.</b>				<b>-PG</b>				
<b>Hazardous</b>	<b>XX</b>	<b>Safe area only.</b>				<b>-XX</b>				
<b>Options</b>	<b>ZB</b>	<b>Backlight is included as standard.</b>				<b>-ZB</b>				
		N410	-P	-C_	-HB	-IR	-OR	-PG	-XX	-ZB

The **bold** marked text contains the standard configuration: N410-P-CX-HB-IR-OR-PG-XX-ZB.