
FLUIDWELL
Accurate Liquid Management

Count on us.

# Batch Controller

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


## Advantages

- Save time and cost with the easy to operate numerical keypad.
- Your crew is in control with our highly praised “know one, know them all” configuration structure, saving time, cost and aggravation.
- Key information at a glance as the display simultaneously shows actual value, preset value, batch process indication, relay status and measuring units.
- Easy installation with the rugged aluminum DIN-size panel mount enclosure.

## Features

- Five control inputs for remote START, HOLD, RESUME, keypad lock and external alarm.
- 7 large digits for actual value, flow rate, total and 10 smaller digits for preset value, accumulated total and batch count.
- Selectable on-screen engineering units; volumetric or mass.
- Power requirements: 24V DC / 110 - 230V AC.
- Sensor supply: 8.2 / 12 / 24V DC.
- No-flow monitoring.
- Automatic overrun correction.
- Modbus communication option RS232 / RS485.

## Outputs

- Two field replaceable, heavy duty, mechanical relays (make-and-break/ NO-NC), configurable for i.e. batching with one-stage or two-stage control.
- One transistor output for connection to PLC’s or other controlling equipment.

## Inputs

- Ability to process various types of volumetric or mass flowmeter signals: Reed-switch, open collector, NPN, PNP or active 8/12/24V pulse signals.

## Applications

- 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, Fluidwell is always your first and best choice.
- Alternative Fluidwell products: 300-Series.
  For analog inputs we offer our F-Series and D-Series batch controllers.
  For intrinsically safe applications we offer our field mount F-Series indicators.

# General information

## *Introduction*

**The N410 batch controller distinguishes itself by its user-friendly 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 highly appreciated configuration structure of our F- and D-Series. Each setting is clearly indicated with an alphanumerical 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 easy-to-operate numerical keypad. All settings are accessed via a simple operator menu that can be passcode protected.

## *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.

## *Flow meter input*

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

## *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.

## *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 fxed as the main batch control relay. Relay 2 and the transistor ouput can be configured as 1- or 2-stage batch control, alarm or pulse output.

## *Communication*

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

## *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 8.2, 12 or 24V DC sensor supply to power the sensor.

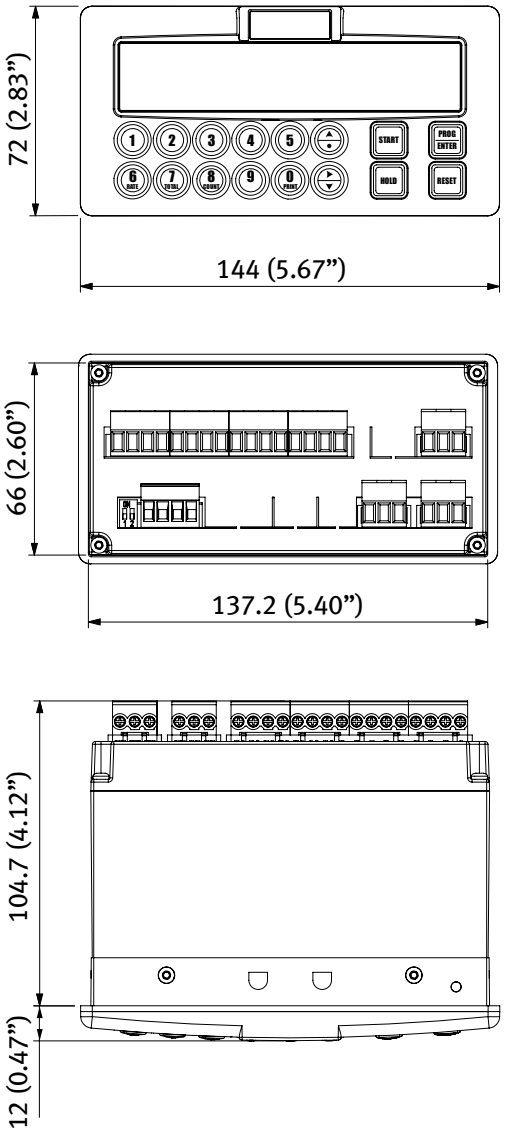
## *Enclosures*

The N410 has an IP67 (NEMA4X) 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.

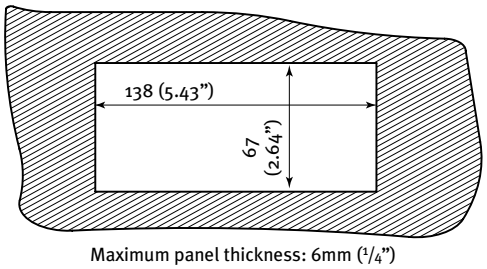
## *Limited depth clearance*

## *Very easy menu structure*

## Dimensions enclosures

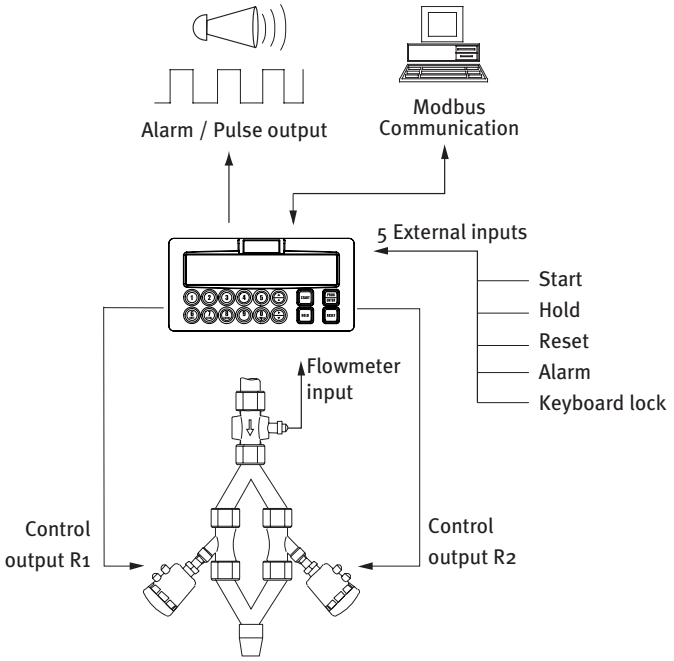



## Panel cut-out

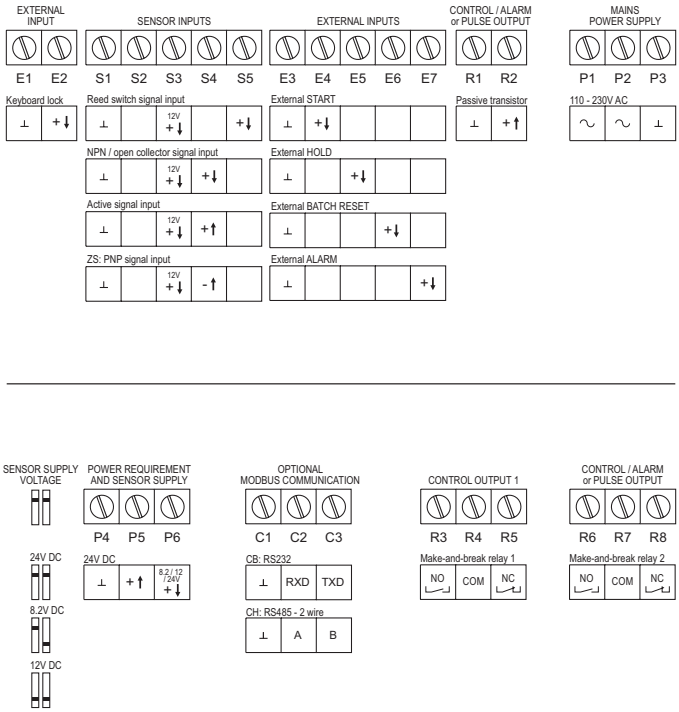



Maximum panel thickness: 6mm (¼")

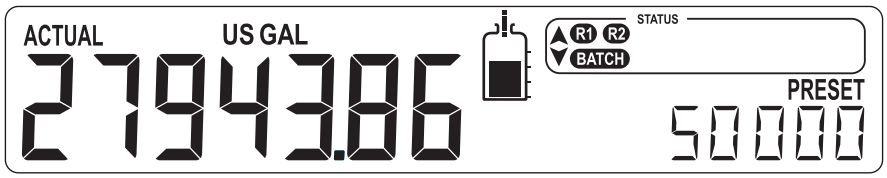
## Overview application N410



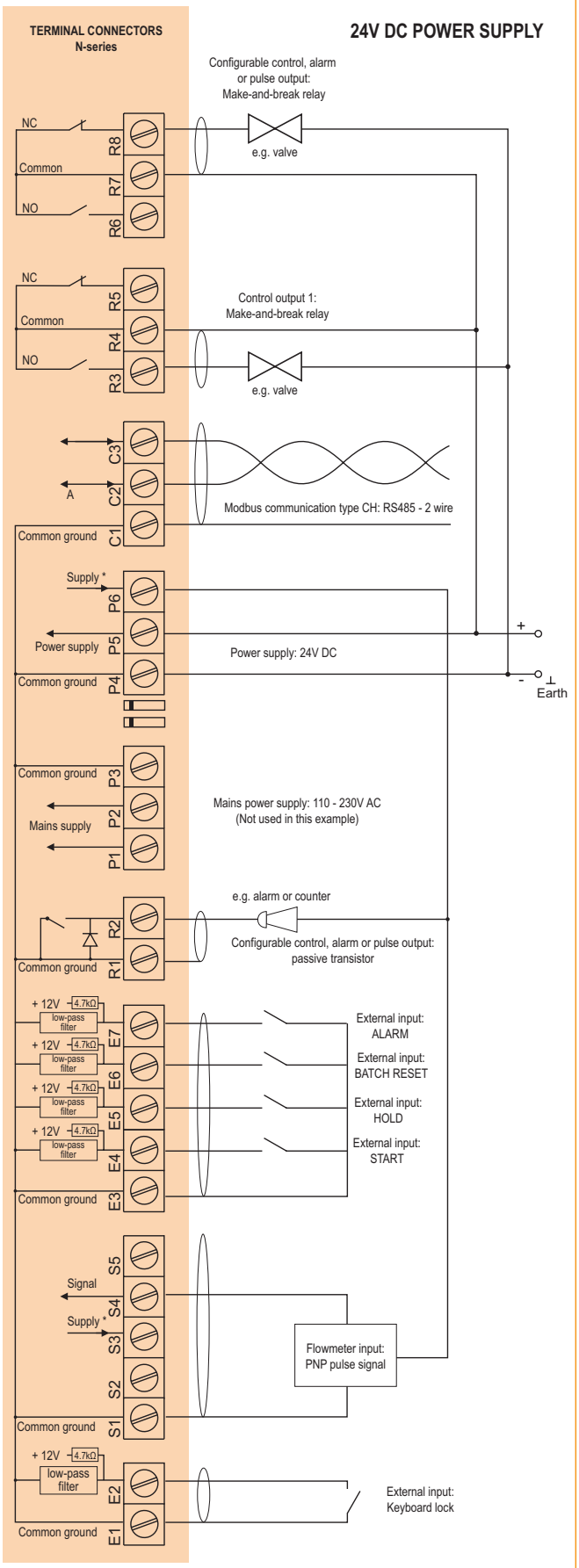

## Terminal connections




## Display example 1:1 - 22 x 116mm (0.87 x 4.57")

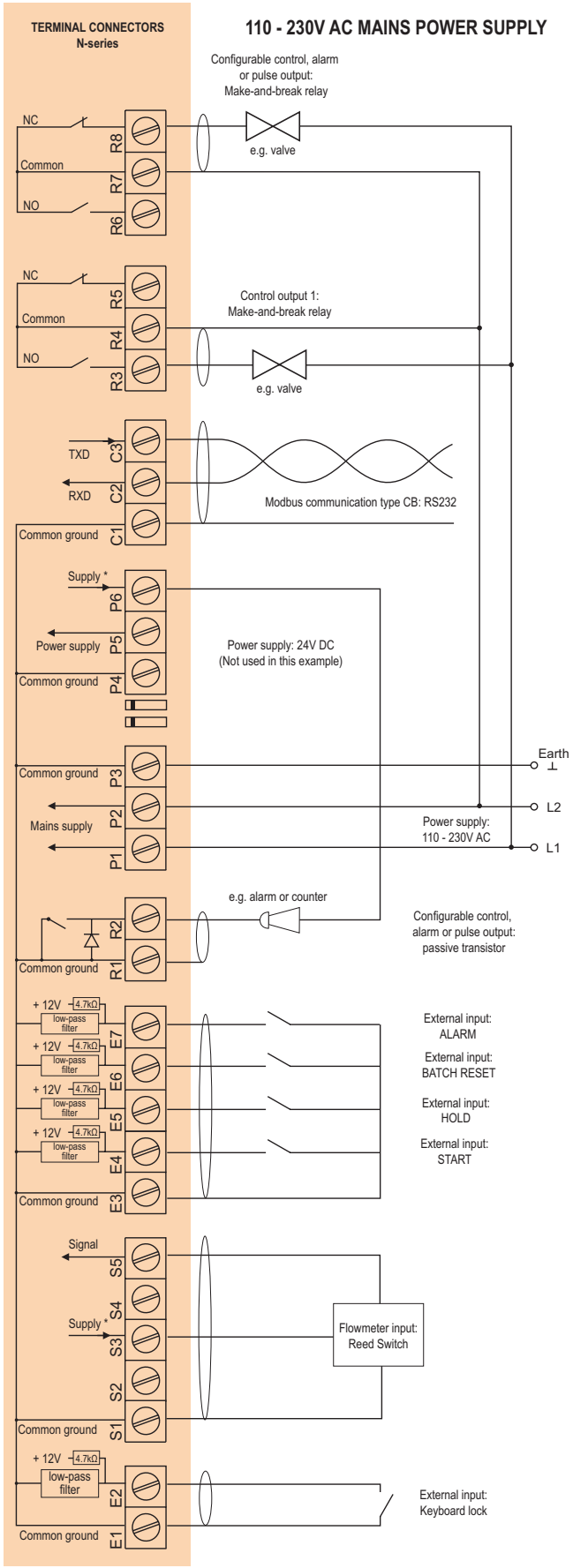


## Typical wiring diagram N410-P-CH-OR-PG-ZS




*Supply voltage S3: 12V DC and supply voltage P6: 8.2 / 12 / 24V DC to sensor

## Typical wiring diagram N410-P-CB-OR-PG




*Supply voltage S3: 12V DC and supply voltage P6: 8.2 / 12 / 24V DC to sensor

# Technical specification

## *General*

### Display

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

### Enclosure

| | |
|---|---|
| General | Die-cast aluminum front panel, GRP back enclosure. Polycarbonate window, silicone gasket; UV stabilized and flame retardant material. |
| *Keypad* | Sixteen industrial micro-switch keys; UV-resistant silicone keypad; replaceable front. |
| *Painting* | UV-resistant 2-component industrial painting. |
| *Dimension* | 144 x 72 x 110mm (5.67" x 2.83" x 4.33") – W x H x D. |
| *Classification* | IP67 (NEMA4X) at the front side. IP20 at the back side. |
| *Panel cut-out* | 138 x 67mm (5.43" x 2.64") W x H. |
| *Weight* | 650 gram / 1.7 lbs. |
| *Panel thickness* | Max. 6mm (¼"). |

### Operating temperature / humidity

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

### Power requirements

| | |
|---|---|
| Type PG | 110 - 230V AC. Power consumption max. 10 Watt. 24V DC ± 10%. Power consumption max. 10 Watt. |

### Sensor excitation

| | |
|---|---|
| Type PG | Terminal S3: 12V DC. $I_{out}$ max. 30mA. Terminal P6: 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 connections

| | |
|---|---|
| Type | Removable plug-in terminal strip. Wire max. 2.5mm². |

### Data protection

| | |
|---|---|
| Type | EEPROM backup of all settings. Backup of running totals every minute. Data retention at least 10 years. |
| Pass-code | Configuration settings can be pass-code protected. |
| Lock function | Complete keyboard can be locked with external input (e.g. key lock or PLC). |

### Directives

| | |
|---|---|
| EMC | EN61326-1, EN61000-6-2, EN61000-6-3, FCC 47 CFR part 15. |
| Low voltage | Compliant ref: EN61010-1. |

## *Signal input*

### Flowmeter sensor

| | |
|---|---|
| Type P | NPN, open collector, reed-switch, PNP or active 8 / 12 / 24V DC pulse signals. |
| Option ZS | PNP input signal instead of NPN input signal. |
| *Frequency* | 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. |
| *K-Factor* | 0.000010 - 9,999,999 with variable decimal position. |
| *Low-pass filter* | Available for all pulse signals. |
| *Low Level* | 0V DC min. to 3V DC max. |
| *High Level* | 8V DC min. to 24V DC max. |
| *Load impedance* | 4.7kOhm pull-up to +12V DC. |
| *Current* | 2.5mA steady state. |

### External inputs

| | |
|---|---|
| Function | Five remote inputs: START, HOLD, RESET, Keypad Lock and External Alarm. |
| *Type* | Current sinking. |
| *Logic* | Level sensitive. |
| *Low Level* | 0V DC min. to 3V DC max. |
| *High Level* | 8V DC min. to 24V DC max. |
| *Load impedance* | 4.7kOhm pull-up to +12V DC. |
| *Current* | 2.5mA steady state. |
| *Response* | 100ms make and break time. |

## *Signal output*

### Control, alarm or pulse output

| | |
|---|---|
| Type OR | • One batch output (always a mechanical relay).<br>• Two configurable outputs (one mechanical relay and one transistor): batch / two-stage control / any alarm / scaled pulse output. |
| *Pulse frequency* | Max. 500Hz. Pulse length user definable between 1msec up to 10 seconds. |
| Relays | 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. |
| Transistor | One passive transistor output - not isolated. Load max. 50V DC - 300mA. |

### Communication option

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


## *Operational*

| Operator functions | |
|---|---|
| Functions | • Enter a preset value.<br>• Start, hold and stop the batch process.<br>• Total can be reset to zero.<br>• Batch counter can be reset to zero. |
| Displayed functions | • Preset value.<br>• Running batch total or remaining quantity.<br>• Total and accumulated total.<br>• Flow rate.<br>• Batch counter.<br>• Graphical indication progress of the actual batch. |
| Additional functions | • Active overrun correction.<br>• Minimum / maximum preset value. |

| Preset / Total | |
|---|---|
| Digits | 7 digits. |
| Units | L, $m^3$, USGAL, IGAL, $ft^3$, bbl, kg, Ton, US Ton, lb. |
| Decimals | 0 - 1 - 2 or 3. |
| Note | Total can be reset to zero. |

| Accumulated total | |
|---|---|
| Digits | 10 digits. |
| Units / decimals | According to selection for preset. |
| Note | Cannot be reset to zero. |

| Batch counter | |
|---|---|
| Digits | 10 digits. |
| Note | Counter can be reset to zero. |

| Flow rate | |
|---|---|
| Digits | 7 digits. |
| Units | L, $m^3$, USGAL, IGAL, $ft^3$, bbl, kg, Ton, US Ton, lb. |
| Decimals | 0 - 1 - 2 or 3. |
| Time units | /sec - /min - /hr - /day. |

## Ordering information

*Standard configuration: N410-P-CX-HB-OR-PG-XX-ZX.*

| Ordering information: N410 | -P | -C _ | -HB | -OR | -PG | -XX | -Z _ |
|---|---|---|---|---|---|---|---|
| **Flowmeter input signal** | | | | | | | |
| **P** **NPN, open collector, reed-switch, active pulse signals.** | | | | | | | |
| **Communication** | | | | | | | |
| CB RS232 communication - Modbus RTU. | | | | | | | |
| CH RS485 communication - 2-wire - Modbus RTU. | | | | | | | |
| **CX** **No communication.** | | | | | | | |
| **Panel mount front enclosure** | | | | | | | |
| **HB** **Aluminum front panel - IP67 (NEMA4X).** | | | | | | | |
| **Outputs** | | | | | | | |
| **OR** **2 field replaceable, mechanical relays (NO-NC) and 1 passive transistor output.** | | | | | | | |
| **Power requirements** | | | | | | | |
| **PG** **24V DC and 110 - 230V AC, both with sensor supply.** | | | | | | | |
| **Hazardous area** | | | | | | | |
| **XX** **Safe areas only.** | | | | | | | |
| **Other options** | | | | | | | |
| ZS PNP input signal instead of NPN input signal. | | | | | | | |
| **ZX** **No options.** | | | | | | | |

The bold marked text contains the standard configuration.

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