

## Universal uni-/bipolar signal transmitter

### 4104



- Measures and outputs uni-/bipolar voltage and current signals
- Works with both passive and active inputs and outputs
- Uses the PR 4500 display series for programming and process monitoring
- Fast < 20 ms response time and excellent < 0.05% accuracy
- Universally powered by 21.6...253 VAC / 19.2...300 VDC



#### Application

- Fast < 20 ms response time for measuring signals produced by torque, position, current & acceleration sensors.
- User configurable bipolar or unipolar I/O means the 4104 is suitable for nearly any voltage or current conversion.
- The excitation source enables measurement of two or three wire transmitters.
- The active or passive I/O makes the 4104 perfect for power matching current loops.
- Converts narrow bipolar inputs to wide bipolar or unipolar outputs, e.g.,  $\pm 1$  volt input =  $\pm 10$  volt or 4...20 mA output.
- Selectable direct or inverse I/O makes the 4104 suitable for proportional control applications.
- The "V-curve" function outputs 100% – 0 – 100% when a 0 – 100% input signal is present.

#### Technical characteristics

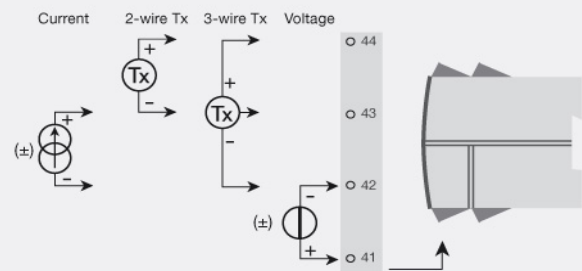
- The latest analog and digital techniques are used to obtain maximum accuracy and immunity to interference.
- The current output can drive up to 800 Ohms, with an adjustable response time of 0.0...60.0 seconds.
- Exceptional mA output load stability of < 0.001% of span/100 Ohm.
- Meets the NAMUR NE21 recommendations, ensuring high accuracy in harsh EMC environments.
- Meets the NAMUR NE43 recommendations, allowing the control system to easily detect a sensor error.
- Each unit is tested to a high 2.3 kVAC, 3-port galvanic isolation level.
- Excellent signal to noise ratio of > 60 dB.

#### Mounting / installation / programming

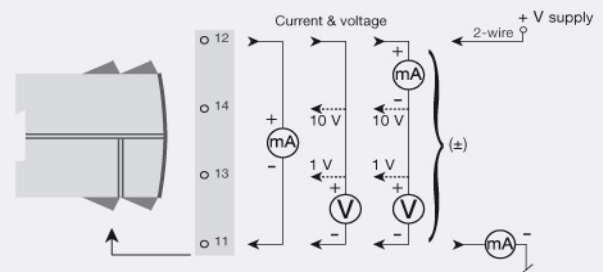
- Very low power consumption means units can be mounted side by side without an air gap – even at 60°C ambient temperature.
- Approved for marine applications.
- Configuration, monitoring, 2-point process calibration and more are accomplished using PR's 4500 series of detachable displays.
- All programming can be password protected.

#### Applications

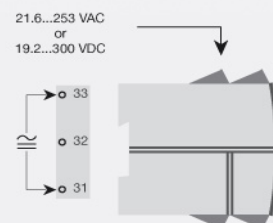
##### Input signals



##### Output signals



##### Supply



**Safe Area or  
Zone 2 / Cl. 1, Div. 2, gr. A-D**

Order:

Type
4104

## Environmental Conditions

Operating temperature.....	-20°C to +60°C
Storage temperature.....	-20°C to +85°C
Calibration temperature.....	20...28°C
Relative humidity.....	< 95% RH (non-cond.)
Protection degree.....	IP20
Installation in.....	Pollution degree 2 & meas. / overvoltage cat. II

## Mechanical specifications

Dimensions (HxWxD).....	109 x 23.5 x 104 mm
Weight approx.....	155 g
Weight incl. 4501 / 451x (approx.).....	170 g / 185 g
DIN rail type.....	DIN EN 60715/35 mm
Wire size.....	0.13...2.08 mm <sup>2</sup> AWG 26...14 stranded wire
Screw terminal torque.....	0.5 Nm
Vibration.....	IEC 60068-2-6
2...13.2 Hz.....	±1 mm
13.2...100 Hz.....	±0.7 g

## Common specifications

### Supply

Supply voltage, universal.....	21.6...253 VAC, 50...60 Hz or 19.2...300 VDC
Max. required power.....	≤ 2.5 W
Max. power dissipation.....	≤ 2.5 W

### Isolation voltage

Isolation voltage, test / working.....	2.3 kVAC / 250 VAC
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### Response time

Response time (0...90%, 100...10%).....	< 20 ms
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### Auxiliary supplies

2-wire loop supply.....	> 16 V / 20 mA
3-wire loop supply.....	> 18 V / 20 mA
Loop supply limitation.....	30 mA
Programming.....	PR 4500 communication interfaces
Signal / noise ratio.....	> 60 dB
Cut-off frequency (3 dB).....	> 40 Hz
Accuracy.....	Better than 0.05% of selected range
EMC immunity influence.....	< ±0.5% of span
Extended EMC immunity: NAMUR NE21, A criterion, burst.....	< ±1% of span

## Input specifications

### Current input

Signal range.....	±23 mA
Programmable measurement ranges.....	0...20 and 4...20 mA
Programmable measurement ranges.....	± 10 and ± 20 mA
Input voltage drop.....	1.4 V @ 20 mA
Loop error detection, 4...20 mA: Low.....	< 3.6 mA
Loop error detection, 4...20 mA: High.....	> 21 mA

### Voltage input

Signal range.....	±12 V
Programmable measurement ranges.....	0/0.2...1, 0/1...5, 0/2...10 VDC
Programmable measurement ranges.....	±1, ±5 and ±10 V
Input resistance.....	> 2 MΩ

## Output specifications

### Current output

Signal range.....	0...23 mA (unipolar)
Signal range.....	-23...+23 mA (bipolar)
Current limit.....	≤ 28 mA (unipolar)
Current limit.....	± 28 mA (bipolar)
Load stability.....	≤ 0.001% of span / 100 Ω
Response time, programmable.....	0.0...60.0 s
Output limitation, on 4...20 and 20...4 mA signals.....	3.8...20.5 mA
Output limitation, on other unipolar mA signals.....	0 and 115% of max. value
Output limitation, on bipolar mA signals.....	±115% of min. & max. values
Sensor error indication, at 4...20 mA input: selectable.....	Low, High, Zero, None

### Active unipolar and bipolar mA output

Programmable ranges.....	0...20 and 4...20 mA
Programmable ranges.....	±10 and ±20 mA
Programmable ranges.....	Direct or Inverted Action
V-curve function, active signals, 100-0-100%.....	20-0-20 mA
Load (@ current output).....	≤ 800 Ω

### Passive 2-wire mA output

Programmable ranges.....	0...20 and 4...20 mA
Programmable ranges.....	Direct or Inverted action
V-curve function, 100-0-100%.....	20-0-20 mA
External loop supply.....	3.5 - 26 V

### Voltage output

Programmable signal ranges.....	0/0.2...1; 0/1...5; 0/2...10 V
Programmable signal ranges.....	±1, ±5 and ±10 V
Programmable signal ranges.....	Direct or Inverted action
V-curve function, 100-0-100%.....	1-0-1, 5-0-5 and 10-0-10 V
Load (@ voltage output).....	≥ 500 kΩ
Response time, programmable.....	0.0...60.0 s
Output limitation - outside range: on unipolar V signals starting from 0.....	0 and 115% of max. value
Output limitation - outside range: on unipolar V signals with offset.....	-5% of min. value and 115% of max. value
Output limitation - outside range: on bipolar V signals.....	±115% of min. & max. values
Sensor error indication, at 4...20 mA input: selectable.....	Low, High, Zero, None

## Observed authority requirements

EMC.....	2014/30/EU & UK SI 2016/1091
LVD.....	2014/35/EU & UK SI 2016/1101
RoHS.....	2011/65/EU & UK SI 2012/3032
EAC.....	TR-CU 020/2011

## Approvals

c UL us, UL 508.....	E248256
FM.....	3025177
DNV Marine.....	TAA0000101