

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 4501 display 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., ± 1 volt input = ± 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

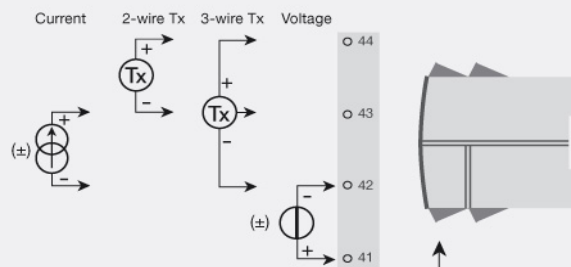
- The latest analog and digital techniques are used to obtain maximum accuracy and immunity to interference.
- The current output can drive up to 800 Ohms, with an adjustable response time of 0.0...60.0 seconds.
- Exceptional mA output load stability of $\pm 0.001\%$ of span/100 Ohm.
- Meets the NAMUR NE21 standard, ensuring high accuracy in harsh EMC environments.
- Meets the NAMUR NE43 standard, 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

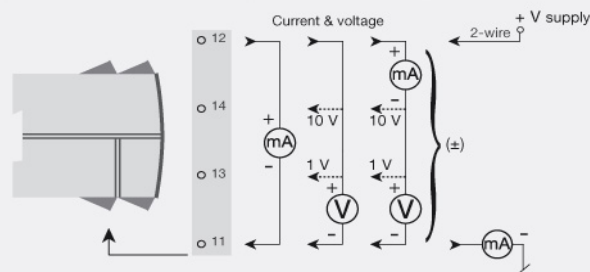
- Very low power consumption means units can be mounted side by side without an air gap – even at 60°C ambient temperature.
- Approved for marine applications.
- Programming, monitoring, and 2-point process calibration is accomplished with the 4501 detachable display.
- All programming can be password protected.

Connection

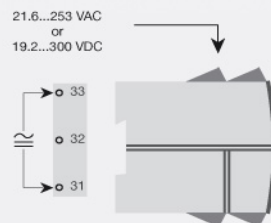
Input signals



Output signals



Supply



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

Environmental Conditions

| | |
|------------------------------|--|
| Specifications range..... | -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 & measurement / overvoltage category II |

Mechanical specifications

| | |
|---|---|
| Dimensions (HxWxD)..... | 109 x 23.5 x 104 mm |
| Dimensions (HxWxD) w/ display 4501..... | 109 x 23.5 x 116 mm |
| Weight approx..... | 250 g |
| Weight incl. 4501 / 4511 (approx.)..... | 265 g / 350 g |
| DIN rail type..... | DIN EN 60715 - 35 mm |
| Wire size..... | 0.13...2.08 mm ² AWG 26...14 stranded wire |
| Screw terminal torque..... | 0.5 Nm |

Common specifications

| | |
|---|--|
| Supply voltage, universal..... | 21.6...253 VAC, 50...60 Hz or 19.2...300 VDC |
| Max. power consumption..... | ≤ 2.5 W |
| Internal consumption..... | ≤ 2.0 W |
| Isolation voltage, test / working..... | 2.3 kVAC / 250 VAC |
| MTBF, acc. to IEC 61709 (SN29500)..... | > 111 years |
| Signal / noise ratio..... | > 60 dB |
| Response time (0...90%, 100...10%)..... | < 20 ms |
| Cut-off frequency (3 dB)..... | > 40 Hz |
| EMC immunity influence..... | < ±0.5% of span |
| Extended EMC immunity: NAMUR NE 21, A criterion, burst..... | < ±1% of span |

Input specifications

| | |
|---|----------------------------------|
| Current input: Signal range..... | ±23 mA |
| Current input: Programmable measurement ranges..... | 0...20 and 4...20 mA |
| Current input: 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 |
| 2-wire loop supply, (terminal 43 & 44)..... | > 16 V / 20 mA |
| 3-wire loop supply, (terminal 42 & 44)..... | > 18 V / 20 mA |
| Loop supply limitation, terminal 44, nom..... | 30 mA |
| Voltage input: Signal range..... | ±12 V |
| Programmable measurement ranges, VDC..... | 0/0.2...1, 0/1...5, 0/2...10 VDC |
| Programmable measurement ranges, VDC..... | ±1, ±5 and ±10 V |
| Input resistance, voltage input..... | > 2 MΩ |

Output specifications

| | |
|---|--|
| Current output: Signal range..... | 0...23 mA (unipolar) |
| Current output: Signal range..... | -23...+23 mA (bipolar) |
| Load stability, current output..... | ≤ 0.001% of span / 100 Ω |
| Current limit..... | ≤ 28 mA (unipolar) |
| Current limit..... | ± 28 mA (bipolar) |
| Programmable damping, current signals..... | 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 |
| Current output: Active unipolar and bipolar programmable ranges..... | 0...20 and 4...20 mA |
| Current output: Active unipolar and bipolar programmable ranges..... | ±10 and ±20 mA |
| Current output: Active unipolar and bipolar programmable ranges..... | Direct or Inverted Action |
| V-curve function, active signals, 100-0-100%..... | 20-0-20 mA |
| Load (max.)..... | 800 Ω / ± 16 V @ ± 20 mA |
| Passive 2-wire mA: Programmable ranges..... | 0...20 and 4...20 mA |
| Passive 2-wire mA: Programmable ranges..... | Direct or Inverted action |
| V-curve function, passive signals, 100-0-100%..... | 20-0-20 mA |
| External 2-wire loop supply..... | 3.5 - 26 V |
| Programmable signal ranges, VDC..... | 0/0.2...1, 0/1...5, 0/2...10 V |
| Programmable signal ranges, VDC..... | ±1, ±5 and ±10 V |
| Programmable signal ranges, VDC..... | Direct or Inverted action |
| V-curve function, voltage output, 100-0-100%..... | 1-0-1, 5-0-5 and 10-0-10 V |
| Load (min.)..... | > 500 kΩ |
| Programmable damping, voltage signals..... | 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 |

Approvals

| | |
|-----------------|-----------------------------|
| EMC..... | EN 61326-1 |
| LVD..... | EN 61010-1 |
| UL..... | UL 508 |
| FM..... | 3025177 |
| GOST R..... | Yes |
| DNV Marine..... | Stand. f. Certific. No. 2.4 |