

## Universal uni-/bipolar signal transmitter

### 4184



- Measures DC inputs up to  $\pm 300$  V /  $\pm 100$  mA with spans as low as 25 mV / 0.5 mA
- Passive/active current output and buffered voltage output
- 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 4184 is suitable for nearly any DC voltage or current conversion.
- Freely programmable between  $\pm 300$  VDC and  $\pm 100$  mA.
- The excitation source allows measurement of a 2-wire transmitter, or a potentiometer.
- Converts narrow bipolar inputs to wide bipolar or unipolar outputs, e.g.,  $\pm 1$  volt input =  $\pm 10$  volt or 4...20 mA output.
- Configurable input limits control the output value for increased safety.
- $\pm 20$  VDC buffered voltage output for controlling devices like the PVG 32 valve (6...18 VDC).
- Designed according to strict safety requirements and is therefore suitable for application in SIL 2 installations.
- Suitable for the use in systems up to Performance Level "d" according to ISO-13849.

#### Technical characteristics

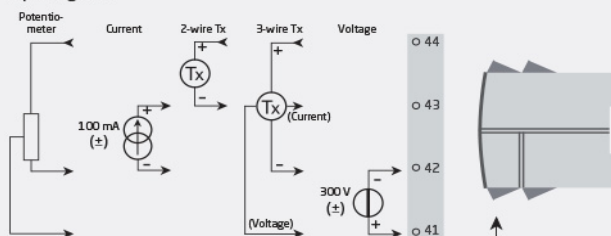
- The latest analog and digital techniques are used to obtain maximum accuracy and immunity to interference.
- Possibility of output safety readback by selecting S4...20 mA output.
- The current output can drive up to 1000 Ohms, with an adjustable response time of 0.0...60.0 seconds.
- Exceptional mA 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.
- Tested to a high 2.3 kVAC, 3-port galvanic isolation level.

#### Mounting / installation / programming

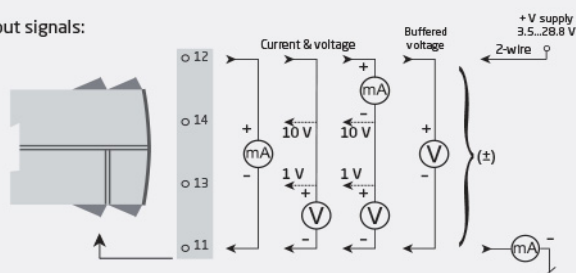
- Very low power consumption means units can be mounted side by side without an air gap – even at 60°C ambient temperature.
- Configuration, monitoring, 2-point process calibration and more are accomplished using PR's 4500 series of detachable displays.

#### Applications

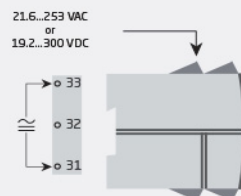
##### Input signals:



##### Output signals:



##### Power connection:



Order:

| Type |
|------|
| 4184 |

## 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                 |

## Mechanical specifications

|                                         |                                                          |
|-----------------------------------------|----------------------------------------------------------|
| Dimensions (HxWxD).....                 | 109 x 23.5 x 104 mm                                      |
| Dimensions (HxWxD) w/ PR 4500.....      | 109 x 23.5 x 131 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<br>stranded wire |
| Screw terminal torque.....              | 0.5 Nm                                                   |

## Common specifications

### Supply

|                                 |                                                 |
|---------------------------------|-------------------------------------------------|
| Supply voltage, universal.....  | 21.6...253 VAC, 50...60 Hz or<br>19.2...300 VDC |
| Max. required power.....        | ≤ 2.5 W                                         |
| Internal power dissipation..... | ≤ 2.0 W                                         |

### Isolation voltage

|                      |                                           |
|----------------------|-------------------------------------------|
| Test voltage.....    | 2.3 kVAC                                  |
| Working voltage..... | 250 VAC (reinforced) / 500 VAC<br>(basic) |

### Response time

|                                         |         |
|-----------------------------------------|---------|
| Response time (0...90%, 100...10%)..... | < 20 ms |
|-----------------------------------------|---------|

### Auxiliary supplies

|                                                               |                                        |
|---------------------------------------------------------------|----------------------------------------|
| 2-wire loop supply.....                                       | > 16 V @ 23 mA                         |
| 3-wire loop supply.....                                       | > 18...< 28 V @ 23...0 mA              |
| Loop supply limitation.....                                   | 27...35 mA avg., < 80 mA peak          |
| Reference voltage.....                                        | 2.5 VDC ±0.5%                          |
| Reference voltage, load.....                                  | 0...15 mA                              |
| Current limit, reference voltage.....                         | < 60 mA                                |
| Programming.....                                              | PR 4500 communication<br>interfaces    |
| Signal dynamics, input.....                                   | 24 bit                                 |
| Signal dynamics, output.....                                  | 18 bit                                 |
| Signal / noise ratio.....                                     | > 60 dB                                |
| Bandwidth.....                                                | > 40 Hz                                |
| Accuracy.....                                                 | Better than 0.05% of selected<br>range |
| EMC immunity influence.....                                   | < ±0.5% of span                        |
| Extended EMC immunity: NAMUR<br>NE21, A criterion, burst..... | < ±1% of span                          |
| Conducted emission, cl. A.....                                | 150 kHz...10 MHz                       |

## Input specifications

### Current input

|                                          |                                                                        |
|------------------------------------------|------------------------------------------------------------------------|
| Signal range.....                        | ±100 mA                                                                |
| Programmable measurement ranges.....     | 0...1, 0...5, 1...5, 0...20, 4...20,<br>±1, ±5, ±10, ±20, ±50, ±100 mA |
| Custom configurable signal<br>range..... | ±100 mA                                                                |
| Min. measurement range (span).....       | 0.5 mA                                                                 |
| Input voltage drop.....                  | 0.6 V @ 20 mA nom.                                                     |

### Voltage input

|                                          |                                                                                                                                  |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Signal range.....                        | ±300 VDC                                                                                                                         |
| Programmable measurement ranges.....     | 0...0.1, 0...1, 0.2...1, 0...2.5,<br>0...5, 1...5, 0...10, 2...10,<br>0...100, 0...300, ±0.1, ±1, ±2.5,<br>±5, ±10, ±100, ±300 V |
| Custom configurable signal<br>range..... | ±300 V                                                                                                                           |
| Min. measurement range (span).....       | 25 mV                                                                                                                            |
| Input resistance.....                    | Nom. 3 MΩ (> 2.5 VDC)                                                                                                            |
| Input resistance.....                    | Nom. > 10 MΩ (≤ 2.5 VDC)                                                                                                         |

### Potentiometer input

|                                    |          |
|------------------------------------|----------|
| 3-wire potentiometer input.....    | 0...100% |
| Reference voltage.....             | 2.5 V    |
| Calibration resistance.....        | 5 kΩ     |
| Min. potentiometer resistance..... | 200 Ω    |

## Output specifications

### Current output

|                                  |                            |
|----------------------------------|----------------------------|
| Signal range.....                | 0...23 mA (unipolar)       |
| Signal range.....                | -23...+23 mA (bipolar)     |
| Custom config. output range..... | ±20 mA                     |
| Min. signal range.....           | 4 mA                       |
| Load (@ current output).....     | ≤ 1000 Ω / ± 20 V @ ±20 mA |
| 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               |

### Passive 2-wire mA output

|                                    |                      |
|------------------------------------|----------------------|
| Programmable ranges.....           | 0...20 and 4...20 mA |
| Ext. 2-wire loop supply range..... | 3.5...28.8 VDC       |

### 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      |
| Load (@ voltage output).....     | ≥ 500 kΩ                       |
| Response time, programmable..... | 0.0...60.0 s                   |

### Shunted voltage output

|                                   |                                                                       |
|-----------------------------------|-----------------------------------------------------------------------|
| Signal range.....                 | ± 1.2 V / ± 12 V                                                      |
| Programmable standard ranges..... | 0...1, 0...2.5, 0...5, 1...5, 0...10,<br>2...10 V ±1, ±2.5, ±5, ±10 V |
| Min. span.....                    | 0.8 V                                                                 |
| Custom config. output range.....  | ±10 V                                                                 |
| Load, min.....                    | > 500 kΩ                                                              |

### Buffered voltage output

|                                   |                                                                                                       |
|-----------------------------------|-------------------------------------------------------------------------------------------------------|
| Signal range.....                 | ± 23 V                                                                                                |
| Programmable standard ranges..... | 0...1, 0.2...1, 0...2.5, 0...5, 1...5,<br>0...10, 2...10, 0...20, 4...20; ±1,<br>±2.5, ±5, ±10, ±20 V |
| Min. span.....                    | 0.8 V                                                                                                 |
| Custom config. output range.....  | ±20 V                                                                                                 |
| Current limit.....                | < 50 mA                                                                                               |
| Load, min.....                    | > 2 kΩ                                                                                                |

## 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                                          |
| SIL.....             | Hardware assessed for use in<br>SIL applications |