



LOW-COST, 3 1/2 DIGIT STRAIN/MICROVOLTMETER

NEWPORT

MODEL 202A-S

3 Strain gauge/
microvoltmeters

STANDARD FEATURES

- Programmable preamplifier
- Isolated 10-24 V dc bridge excitation supply
- Independent bridge-balance, zero & span adjustments
- $\pm 1,999$ -count display span
- 120 dB CMR, 70 dB NMR
- Bright, 14.2 mm (0.56 in) LED display
- Automatic zero and polarity
- Display hold and test
- 115/230 V ac power
- EMI/RFI filter for AC power
- Screw-terminal barrier strip
- Short (4.1 in, 104 mm deep) 1/8 DIN case

OPTIONS

- Isolated 9-32 V dc power
- Isolated 26-56 V dc power
- NEMA-4 splash-proof lens cover

DESCRIPTION

Model 202A-S is a low-cost 3 1/2 digit panel meter in a short 4.1 in (104 mm deep) 1/8 DIN case for applications that require bridge excitation and resolution down to 10 microvolts. Zero, span and bridge-balance adjustments are accessible behind the lens, so that the 202A-S can read out directly in engineering units for a wide range of bridge inputs or other low-level signals.

APPLICATIONS

Model 202A-S is primarily intended as a digital indicator for pressure cells and metal-foil load cells. It can also be used as a low-level, high-impedance process meter with zero and span adjustments, or as a DC voltmeter with resolution down to 10 microvolts, required by 50 mV current shunts.



RESOLUTION AND ACCURACY

Resolution is 1 part in $\pm 1,999$ counts, or 0.05% of full scale. Accuracy is 99.9%. A ratiometric reference input eliminates AC line and load regulation errors and reduces overall meter span tempco to 0.01% of reading/ $^{\circ}$ C.

BRIDGE EXCITATION SUPPLY

The built-in excitation supply of the 202A-S is transformer-isolated to 500 V ac from the rest of the meter. A multiturn potentiometer accessible behind the lens allows adjustment of the output voltage from 10 to 24 V dc. Maximum output current is 30 mA.

MICROVOLT PREAMPLIFIER

The preamplifier of the 202A-S provides an input impedance in excess of 1 G Ω to ensure that the signal source is not overloaded. Gains of 1, 10 and 100 are selectable by solder bridges and provide resolutions of 1000, 100, and 10 μ V/count, respectively. Typical offset drift is only 0.3 μ V/ $^{\circ}$ C.

OPTIONS

Mechanical options are a PCB edge connector for hand-shake signals and a splash-proof lens cover which meets NEMA-4 requirements. Power options are isolated 9-32 V dc and 26-56 V dc.

SPECIFICATIONS

ANALOG INPUT

	Most-sensitive scaling	Least-sensitive scaling
Range	±19.99 mV	2.5 V (limited by CMV)
Resolution	10 µV/count	1 mV/count
Preamplifier gain	100	1
Gain attenuator	1	0.001
Configuration	Differential, ratiometric	
Polarity	Bipolar	
Input resistance	1 GΩ	
Bias current	1 nA typ, 5.5 nA max	
Maximum voltage	50 V	
Coarse preamplifier gains	1, 10, 100	
Gain attenuator	Adjustable from 0.001 to 1	
Bridge-balance range	±50% of bridge span	
Zero-adjustment range	-1,000 to +1,000 counts	
Span-adjustment range	0 to 2,000 counts	

NOISE REJECTION

NMR, SIG HI to SIG LO	70 dB, 50/60 Hz
CMR, SIG GND to SIG HI: 120 dB at gain 100, DC to 60 Hz	
CMV, SIG GND to SIG HI or LO	+2.5 V dc
CMR, SIG GND to PWR GND	120 dB, DC to 60 Hz
CMV, SIG GND to PWR GND	1500 Vp test, 354 Vp per IEC spacing

ACCURACY AT 25°C

Maximum error	±0.05% of reading ±1 count
Balance tempco	±0.3 µV/°C typ, ±1.0 µV/°C max
Zero tempco	±0.01% of zero/°C
Span tempco, ratiometric	±0.01% of reading/°C
Span tempco, non-ratiometric	±0.03% of reading/°C
Full-scale step response	1.0 s
Warmup to rated accuracy	10 min

ANALOG-TO-DIGITAL CONVERSION

Technique	Dual-slope, average-value
Signal integration period	100 ms
Read rate	2.5/s

BRIDGE EXCITATION SUPPLY

Output voltage	Adjustable 10 to 24 V dc
Output current	30 mA at 10 V dc decreasing to 12 mA at 24 V dc
Line regulation	±0.01%/V of AC power
Load regulation	±0.5%
Ripple at 50/60 Hz	±0.01%
Tempco	±0.02%/°C
Reference signal	1.0 V typ at 10 V output (Eliminates line and load regulation errors and reduces overall meter span tempco to ±0.01%/°C)

DISPLAY

Display type	7-segment, red LED
Display height	0.56 in (14.2 mm)
Symbols	-1.8.8.8
Decimal points	Three positions, programmable by jumpers behind lens or at connector, 10 mA sink
Overrange indication	Three least-significant digits blank

DIGITAL INPUTS

Level TTL or 5 V CMOS compatible

POWER

AC voltages	115 or 230 V ac ±15%
AC frequency	49 to 440 Hz
DC voltages	9-32 V dc, isolated to 300 Vp; 26-56 V dc, isolated to 300 Vp
Power consumption	3.7 W
Output voltages	+4.7 V dc and -4.7 V dc ±5%, 10 mA max

ENVIRONMENTAL

Operating temperature	0 to 60°C
Storage temperature	-40 to +85°C
Relative humidity	95% at 40°C (non-condensing)

MECHANICAL

Dimensions	Newport DIN2A (short 1/8 DIN) case (see Mechanical section for drawings)
Weight	15 oz (425 g)
Case material	94V-0 UL-rated polycarbonate
Connector for signal and power	D4 screw-terminal barrier strip (standard)
Connector for control lines	D1 36-pin PCB edge connector (optional)

MOST POPULAR MODELS		
MODEL	INPUT	
202A-S C1	0-100 mV	
202A-S C1, SPC4	0-100 mV	



Models 202A-S



3 1/2 DIGIT PROCESS METER WITH TRANSMITTER EXCITATION

NEWPORT

MODEL 202A-E

2
Process meters
r.g., 4-20 mA

STANDARD FEATURES

- Isolated transmitter excitation supply
- 50 mA current output at 10 to 24 V dc
- Zero and span adjustments of 2,000 counts each
- ±1,999-count display span
- Standard signal ranges of 4-20 mA, 1-5 V, 0-10 V
- 120 dB CMR, 56 dB NMR
- Bright, 0.56 in (14.2 mm) LED display
- Automatic polarity
- Display hold and test
- 115/230 V ac power
- EMI/RFI filter for AC power
- Screw-terminal barrier strip
- Short 4.1 in (104 mm deep) 1/8 DIN case

OPTIONS

- Isolated 9-32 V dc power
- Isolated 26-56 V dc power
- NEMA-4 splash-proof lens cover

DESCRIPTION

BUILT-IN TRANSMITTER EXCITATION SUPPLY

Model 202A-E is a low-cost 3 1/2 digit process meter which incorporates an electrically-floating supply for powering transmitters, active transducers and bridges. In many cases, this built-in supply can eliminate the need for a more expensive external supply. The output voltage is adjustable from 10 to 24 V dc. Maximum output current is 50 mA at any voltage setting.

LOW-COST PROCESS MONITOR

Except for the excitation supply, the 202A-E is identical to the 202A-P, a low-cost 3 1/2 digit (±1,999-count) process meter for applications where indication-only is required. It provides zero and span adjustments of 2,000 counts each for readout in engineering units from signals such as 4-20 mA, 1-5 V and 0-10 V. Scaling and calibration are easily accomplished in the field by multiturn potentiometers accessible behind the lens. Accuracy is 99.9% of reading.



COMPACT CASE

The 202A-E is housed in a 1/8 DIN case that requires less than 4.1 in (104 mm) behind the panel. A screw-terminal barrier strip for signal and power is standard.

OPTIONS

Options are isolated 9-32 V dc or 26-56 V dc power, a PCB edge connector for display control and output of +4.7 V dc and -4.7 V dc power, and a splash-proof lens cover which meets NEMA-4 requirements.

SPECIFICATIONS

ANALOG INPUT

Range	4-20 mA	1-5 V	0-10 V
Input resistance	13 Ω	1 MΩ	1 MΩ
Bias current	50 pA	10 pA	5 pA
Maximum input	55 mA	250 V	250 V

Ratiometric reference 0.05 - 0.2 or 0.5 - 2 V dc

NOISE REJECTION

NMR, SIG HI to SIG LO 56 dB, 50/60 Hz
 CMR, SIG GND to SIG HI: 120 dB at gain 100, DC to 60 Hz
 CMR, SIG GND to PWR GND 120 dB, DC to 60 Hz
 CMV, SIG GND to PWR GND 1500 Vp per HV test,
 354 Vp per IEC spacing

ACCURACY AT 25°C

Maximum error ±0.05% of reading ±1 count
 Zero tempco ±0.01% of offset/°C
 Span tempco, ratiometric ±0.01% of reading/°C
 Span tempco, non-ratiometric ±0.03% of reading/°C
 Full-scale step response 1 s
 Warmup to rated accuracy 1 min

ANALOG-TO-DIGITAL CONVERSION

Technique Dual-slope, average-value
Signal integration period 100 ms
Read rate 2.5/s

TRANSMITTER EXCITATION SUPPLY

Output voltage Adjustable from 10 to 24 V dc
Output current, max 50 mA
Line regulation $\pm 0.01\%/V$ of AC power
Load regulation $\pm 0.5\%$
Tempco $\pm 0.02\%/^{\circ}C$
Ripple at 50/60 Hz $\pm 0.01\%$

DISPLAY

Type 7-segment, red LED
Height 0.56 in (14.2 mm)
Symbols -1.8.8.8
Decimal points Three positions, programmable by jumpers or at connector, 10 mA sink
Overrange indication Three least-significant digits blank

DIGITAL INPUTS

Level TTL or 5 V CMOS compatible

POWER

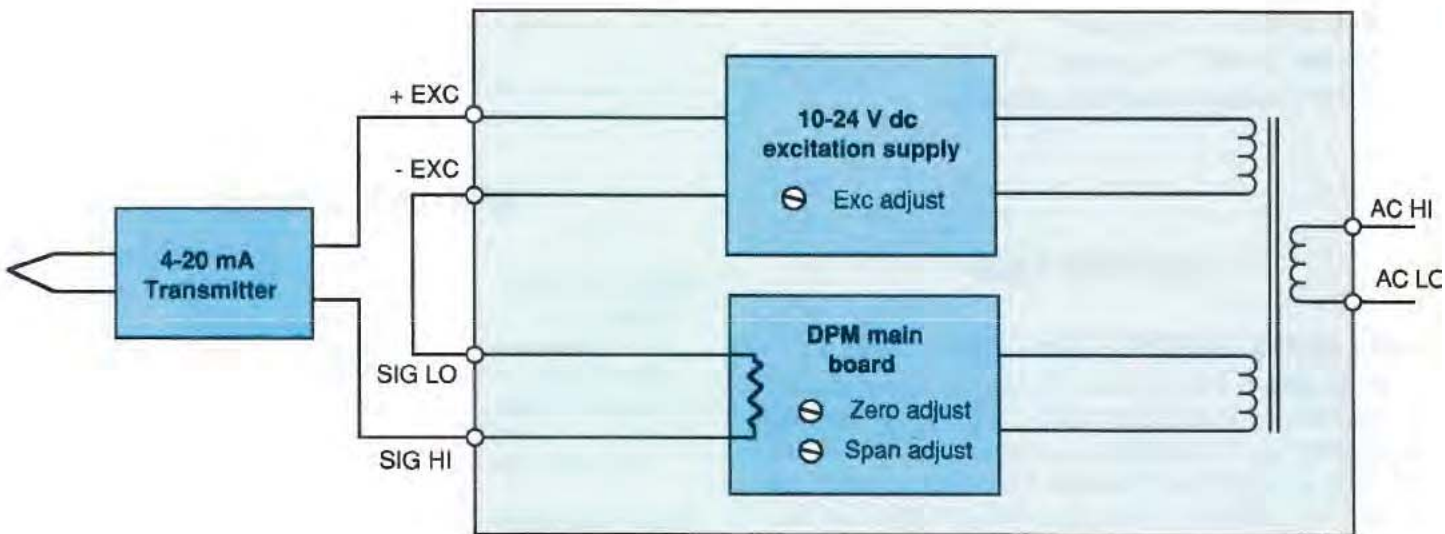
AC voltages 115 or 230 V ac $\pm 15\%$
AC frequency 49 to 440 Hz
DC voltages 9-32 V dc, isolated to 300 Vp;
26-56 V dc, isolated to 300 Vp
Power consumption 3.7 W
Output voltages +4.7 V dc and -4.7 V dc $\pm 5\%$,
10 mA max

ENVIRONMENTAL

Operating temperature 0 to 60°C
Storage temperature -40 to +85°C
Relative humidity 95% at 40°C (non-condensing)

MECHANICAL

Dimensions Newport DIN2A (short 1/8 DIN) case
(see Mechanical section for drawings)
Weight 15 oz (425 g)
Case material 94V-0 UL-rated polycarbonate



Model 202A-E with electrically-floating excitation supply and process signal conditioner, configured for operation with a 2-wire 4-20 mA transmitter (powered by 4-20 mA loop). Excitation return is tied to signal low.



LOW-COST, 3 1/2 DIGIT PROCESS METER

2 Process meters
e.g., 4-20 mA

NEWPORT

MODEL 202A-P

STANDARD FEATURES

- Zero and span adjustments of 2,000 counts each
- ±1,999-count display span
- Standard signal ranges of 4-20 mA, 1-5 V, 0-10 V
- 120 dB CMR, 56 dB NMR
- Bright, 0.56 in (14.2 mm) LED display
- Automatic polarity
- Display hold and test
- 115/230 V ac power
- EMI/RFI filter for AC power
- Screw-terminal barrier strip
- Short 4.1 in (104 mm deep) 1/8 DIN case

OPTIONS

- Isolated 9-32 V dc power
- Isolated 26-56 V dc power
- NEMA-4 splash-proof lens cover

DESCRIPTION

Model 202A-P is a low-cost 3 1/2 digit ($\pm 1,999$ count) process meter for applications where indication-only is required. It provides a span adjustment of 2,000 counts for all signals, a zero adjustment of $\pm 1,000$ counts for input signals of 4-20 mA and 1-5 V and a zero adjustment of -1,500 to +500 counts for input signals of 0-10 V. Scaling and calibration are easily accomplished in the field by multiturn potentiometers accessible behind the lens. Accuracy is 99.9% of reading.

The 202A-P can also be used in ratiometric pot-follower applications to determine liquid level or valve setting from the position of a potentiometric wiper. The required external reference voltage can be derived from the meter's own 4.7 V dc supply.



COMPACT CASE

The 202A-P is housed in a 1/8 DIN case that requires less than 4.1 in (104 mm) behind the panel. A screw-terminal barrier strip for signal and power is standard.

OPTIONS

Options are isolated 9-32 V dc or 26-56 V dc power, a PCB edge connector for display control and output of +4.7 V dc and -4.7 V dc power, and a splash-proof lens cover which meets NEMA-4 requirements.

SPECIFICATIONS

ANALOG INPUT

Range	4-20 mA	1-5 V	0-10 V
Input resistance	13 Ω	1 M Ω	1 M Ω
Bias current	50 pA	10 pA	5 pA
Maximum input	55 mA	250 V	250 V

Ratiometric reference 0.1 or 1.0 V dc +100%/-50%

NOISE REJECTION

NMR, SIG HI to SIG LO	56 dB, 50/60 Hz
CMR, SIG GND to SIG HI	120 dB, DC to 60 Hz
CMR, SIG GND to PWR GND	120 dB, DC to 60 Hz
CMV, SIG GND to PWR GND	1500 Vp per HV test, 354 Vp per IEC spacing

ACCURACY AT 25°C

Maximum error	±0.05% of reading ±1 count
Zero tempco	±0.01% of offset/°C
Span tempco, ratiometric	±0.01% of reading/°C
Span tempco, non-ratiometric	±0.03% of reading/°C
Full-scale step response	1 s
Warmup to rated accuracy	1 min

ANALOG-TO-DIGITAL CONVERSION

Technique	Dual-slope, average value
Signal integration period	100 ms
Read rate	2.5/s

DISPLAY

Type	7-segment, red LED
Height	0.56 in (14.2 mm)
Symbols	-1.8.8.8
Decimal points	Three positions, programmable by jumpers or at connector, 10 mA sink
Overrange indication	Three least-significant digits blank

DIGITAL INPUTS

Level	TTL or 5 V CMOS compatible
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POWER

AC voltages	115 or 230 V ac, ±15%
AC frequency	49 to 440 Hz
DC voltages	9-32 V dc, isolated to 300 Vp; 26-56 V dc, isolated to 300 Vp
Power consumption	3.7 W
Output voltages	+4.7 V dc and -4.7 V dc ±5%, 10 mA max

ENVIRONMENTAL

Operating temperature	0 to 60°C
Storage temperature	-40 to +85°C
Relative humidity	95% at 40°C (non-condensing)

MECHANICAL

Dimensions	Newport DIN2A (short 1/8 DIN) case (see Mechanical section for drawings)
Weight	15 oz (425 g)
Case material	94V-0 UL-rated polycarbonate

ORDERING GUIDE

Make a maximum of one entry per box and separate by commas. An asterisk "*" requires no entry.

Example: 202A-P, SPC4

This is a model 202A with calibration of 4-20 mA = 00.0 - 100.0 and splash-proof lens cover.

<input type="checkbox"/>	202A-P	3 1/2 DIGIT PROCESS METER Default calibration: 4-20 mA = 00.0 - 100.0
<input type="checkbox"/>	POWER	115 V ac
	*	230 V ac
	C1	Isolated 9-32 V dc
	C3C	Isolated 9-32 V dc
	C3E	Isolated 26-56 V dc
	ADDITIONAL OPTIONS	
<input type="checkbox"/>	FS	Custom calibration. Specify in volts or mA: min/max input; min/max display.
<input type="checkbox"/>	BL	Lens without Newport logo in lieu of standard lens
<input type="checkbox"/>	D1	PCB edge connector for display control
<input type="checkbox"/>	RP18	19" rack panel for one 1/8 DIN instrument (92 x 45 mm panel cutout)
<input type="checkbox"/>	RP28	19" rack panel for two 1/8 DIN instruments (92 x 45 mm panel cutout)
<input type="checkbox"/>	RP38	19" rack panel for three 1/8 DIN instruments (92 x 45 mm panel cutout)
<input type="checkbox"/>	TP1	Trimplate panel adapter. 4.3" x 2.5" (109 x 64 mm). Adapts DIN1A/DIN2A cases to larger panel cutouts.
<input type="checkbox"/>	SPC4	NEMA-4 splash-proof lens cover (includes gasketed bezel and clear cover)

It's easy to order

CONTACT YOUR LOCAL NEWPORT OFFICE. SEE THE BACK COVER FOR ADDRESS AND PHONE NUMBER



Models 202A-P mounted in optional RP38 rack panel

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