



ADTECH
Analog-Digital Technology, Inc.

The Adtech Model MDB 52 Analog Multiplier/Divider Module accepts up to three process signal inputs and performs one of the following computations: multiply/divide, multiply, divide, square root, and the square root of ratio or product. (Refer to the "Basic Equations" section at the right.)

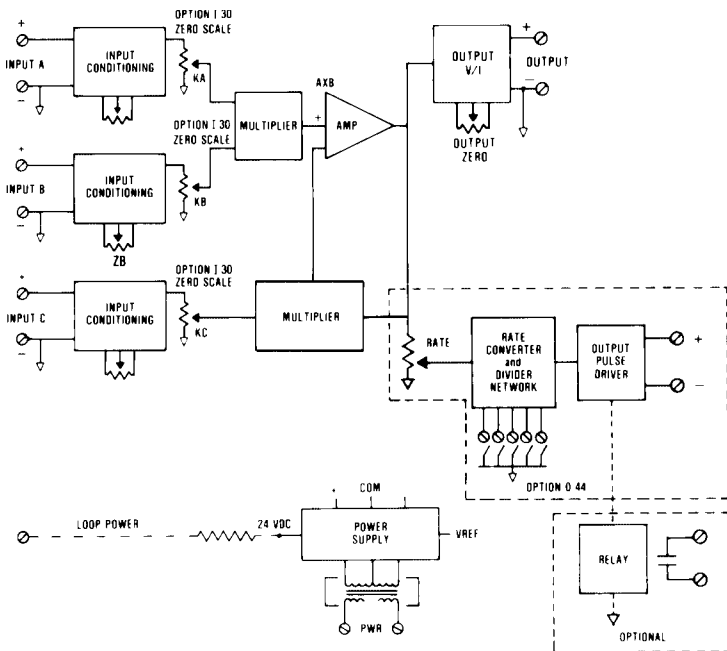
An exclusive output option (O 44) provides a pulse rate output along with the standard analog output. This eliminates the need for a separate linear integrator, LIT 56, if the output is to be totalized.

Digital and analog techniques are utilized for achieving very high accuracy and temperature stability.

The MDB 52 provides standard process current or voltage signals on the output with a maximum of 10 mV P/P output ripple.

Recalibration to other desired ranges is accomplished easily. Temperature-stable, low-noise components provide excellent stability and noise immunity.

The MDB 52 employs the latest design and components, and utilizes proven techniques for superior reliability, accuracy, and serviceability.



Features

- **Computations:** Multiply/divide, multiply, divide, square root, square root of ratio, or product
- **DC Current Inputs / DC Voltage Inputs**
- **High Input Impedance:** 10 megohms minimum
- **DC Process Signal Outputs:** Current and voltage
- **Repeatability:** ±0.02% of span typical
- **High Accuracy:** ±0.1% of span
- **Span Adjustment:** 0-100% all inputs
- **Zero Suppression:** 0-100% two inputs--optional

Analog Multiplier/Divider Module

Model No. MDB 52

Typical Applications

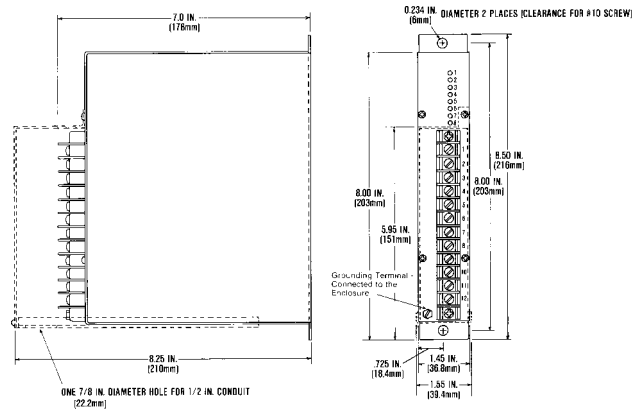
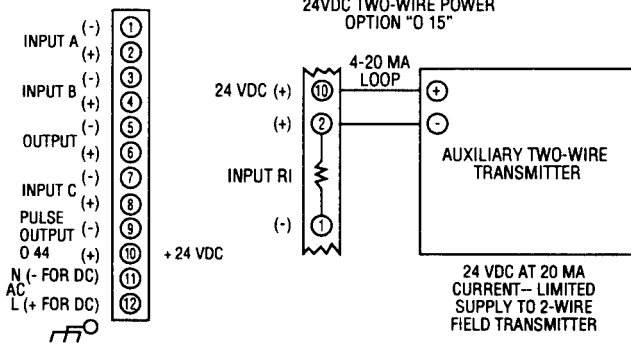
- **Ratio control**
- **Temperature/pressure compensation of flow**
- **Mass flow computation: See Model MFM 32**
- **Equation computation**
- **B.T.U. computation**

Basic Equations:

- | | |
|------------------------|------------------------------|
| 1) $D=K \frac{AB}{C}$ | 7) $D=K\sqrt{\frac{A}{B}}$ |
| 2) $D=KAB$ | 8) $D=K \frac{A}{C}$ |
| 3) $D=K \frac{A^2}{C}$ | 9) $D=K ABC$ |
| 4) $D=KA^2$ | 10) $D=K \frac{A}{B^2}$ |
| 5) $D=K\sqrt{AB}$ | 11) $D=K C\sqrt{A}$ |
| 6) $D=K\sqrt{A}$ | 12) $D=K \frac{A}{\sqrt{B}}$ |



Connections/Dimensions



Input/Output

Input Signals

- 4-20 mA DC (Z in 250 ohms)
- 10-50 mA DC (Z in 100 ohms)
- 0-1 mA DC (Z in 5k ohms)
- 0-10 mA DC (Z in 500 ohms)
- 1-5 VDC (Z in 10 megohms)
- 0-5 VDC (Z in 10 megohms)
- 0-10 VDC (Z in 1 megohm)

Other zero-based current and voltages are available.

Note: Input C range limited to 10%-100% for division.

Output Signals/Output Drive (RL)

Signal	AC Power (RL)	DC Power (RL)
4-20 mA DC	0-1,000 ohms max.	0-900 ohms max.
10-50 mA DC	0-400 ohms max.	0-350 ohms max.
0-1 mA DC	0-20,000 ohms max.	0-18,000 ohms max.
1-5 VDC	100k ohms min.	100k ohms min.
0-10 VDC	200k ohms min.	200k ohms min.

Performance

Calibrated Accuracy: $\pm 0.1\%$ referred to input

Linearity: $\pm 0.1\%$ for multiplying equations

$\pm 0.1\% \times \text{ratio}_{\text{Demon.}}$ max. for dividing equations

Repeatability: $\pm 0.1\%$ maximum

Temperature Stability: $\pm 0.01\%/^{\circ}\text{F}$ max.,
 $\pm 0.004\%/^{\circ}\text{F}$ typical

Note: All accuracies are given as a percentage of span.

Load Effect: $\pm 0.01\%$ zero to full load

Output Ripple: 10 mV P/P maximum

Response Time: 150 milliseconds

Temperature Range: 0° to 140°F (-18° to 60°C)
operating; -40° to 185°F (-40° to 85°C) storage

Power Supply Effect: $\pm 0.05\%$ for a $\pm 10\%$
power variation

Power

115 VAC: 50/60 Hz, 0.7 PF (Standard)

12 VDC: Isolated (Option P8)

24 VDC: Non-isolated (Option P1)

24 VDC: Isolated (Option P2)

Note: All units 3 watts maximum, with a $\pm 10\%$ power variation unless noted.

48 VDC: Isolated (Option P3)

125 VDC: Isolated (105-140 VDC) (Option P4)

230 VAC: 50/60 Hz, 0.7 PF (Option P5)

Mechanical

Electrical Classification: General purpose

Connection: Barrier terminal strip (3/8" spacing, No. 6 screws)

Controls: Multiturn output zero, KA, KB, KC, ZA, ZB, and ZC controls, and optional rate control

Mounting: Surface mounting standard. See Housings Section for options.

Weight: Net Unit: 2.6 pounds (1.18 kilograms); Shipping: 3.0 pounds (1.36 kilograms)

Options

Option Number

I 14

Description

Voltage inputs to 200 VDC, 1 megohm min. impedance; current inputs of 100 mA max.

I 18

Low impedance DC current inputs (1/10 of standard Z)

I 30

Zero suppression/elevation

O 10

Bipolar current (larger than ± 1 mA)

O 11

Bipolar voltage to ± 10 VDC: at 1 mA, bipolar current ± 1 mA

O 15

Two-wire transmitter excitation

O 21

Voltage pulse--specify voltage (with option O 44)

O 44

Pulse output

O 59

10-1,000 CPS output (with option O 44)

H 10

Thin-line conduit mounting plate and terminal cover

H 13B, H 14B, H 15B

NEMA 4, 7, and 12 enclosures

H 16

PFA 12 high-density, plug-in enclosure

Ordering Information

- Model number
- Input signals
- Equation
- Output signal
- Prime power with option no.
- Input/output options
- Housing and miscellaneous options

Please refer to the Housing and/or Option Section for more specific and detailed information.

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