

Super-mini Signal Conditioners *Mini-M Series*

SUBTRACTOR

MODEL M2SBS

MODEL & SUFFIX CODE SELECTION

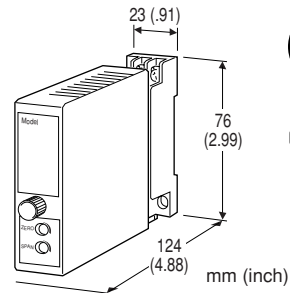
M2SBS-□□□□□

MODEL _____
 INPUT 1 _____
Current **Voltage**
A : 4 – 20mA DC **1** : 0 – 10mV DC
A1: 4 – 20mA DC *1 **2** : 0 – 100mV DC
B : 2 – 10mA DC **3** : 0 – 1V DC
C : 1 – 5mA DC **4** : 0 – 10V DC
D : 0 – 20mA DC **5** : 0 – 5V DC
E : 0 – 16mA DC **6** : 1 – 5V DC
F : 0 – 10mA DC **4W**: -10 – +10V DC
G : 0 – 1mA DC **5W**: -5 – +5V DC
H : 10 – 50mA DC **0** : Specify voltage
J : 0 – 10µA DC
K : 0 – 100µA DC
GW: -1 – +1mA DC
FW: -10 – +10mA DC
Z : Specify current
 *1 : 50Ω input resistance for Code A1

INPUT 2 _____
 Same range availability as Input 1
OUTPUT _____
Current **Voltage**
A : 4 – 20mA DC **1** : 0 – 10mV DC
B : 2 – 10mA DC **2** : 0 – 100mV DC
C : 1 – 5mA DC **3** : 0 – 1V DC
D : 0 – 20mA DC **4** : 0 – 10V DC
E : 0 – 16mA DC **5** : 0 – 5V DC
F : 0 – 10mA DC **6** : 1 – 5V DC
G : 0 – 1mA DC **4W**: -10 – +10V DC
Z : Specify current **5W**: -5 – +5V DC
0 : Specify voltage

POWER INPUT _____
AC Power **DC Power**
M2: 100 – 240V AC **R** : 24V DC
 R2: 11 – 27V DC *2
 P : 110V DC

*2 : Select 'N' for 'Standards & Approvals' code.
STANDARDS & APPROVALS _____
 /N : Without CE or UL
 /CE: CE marking
 /UL: UL approval (CE marking)



Functions & Features

- Receives two DC inputs and provides an output proportional to the subtraction of the inputs
- Universal power input
- High-density mounting
- CE marking and UL approval

Typical Applications

- Calculating temperature or flow differences

ORDERING INFORMATION

Specify code number and variables.

- **Code number** (e.g. M2SBS-6AA-M2/CE)
- **Ratios** (e.g. $K_1 = 2.00$, $K_2 = 0.10$)
- **Special input and output ranges** (For codes Z & 0)

GENERAL SPECIFICATIONS

Construction: Plug-in

Connection: M3 screw terminals (torque 0.8 N·m)

Housing material: Flame-resistant resin (black)

Isolation: Input 1 or input 2 to output to power (Negative sides of the input 1 and 2 must be of the same potential.)

Overrange output: 0 – approx. 120% at 1 – 5V

Front adjustments: Zero and span; ±5%

Equation: Output = $K_1 \times \text{Input 1} - K_2 \times \text{Input 2}$

($K_1 \times \text{Input 1} > K_2 \times \text{Input 2}$)

K_1 : 0.40 – 2.00 specified when ordering

K_2 : 0.10 – 2.00 specified when ordering

Input 1, Input 2: 0 – 120%

Forcibly limited to 0% and 120% respectively when the signal is out of range.

INPUT & OUTPUT**INPUTS (two)**

• **DC Current:** Input resistor incorporated

Input resistance: For resistance values other than listed below, specify when ordering.
(Resistance $\leq 0.25W \div [Current]^2$)

Input	Input Resistance
4 – 20mA	: 250 (Ω) (50 Ω for Code A1)
2 – 10mA	: 500
1 – 5mA	: 1000
0 – 20mA	: 50
0 – 16mA	: 62.5
0 – 10mA	: 100
0 – 1mA	: 1000
10 – 50mA	: 100
0 – 10 μ A	: 1000
0 – 100 μ A	: 1000
-1 – +1mA	: 1000
-10 – +10mA	: 100

• **DC Voltage:** -300 – +300V DC

Minimum span: 3mV

Zero suppression/elevation: max. 1.5 times span

Input resistance

Input Span	Input Resistance
3 – 10mV	: 10k (Ω minimum)
10 – 100mV	: 10k
0.1 – 1V	: 100k
$\geq 1V$: 1M

OUTPUT

• **DC Current:** 0 – 20mA DC

Minimum span: 1mA

Zero suppression/elevation: max. 1.5 times span

Load resistance: output drive 15V maximum

Output	Load Resistance
4 – 20mA	: 750 (Ω maximum)
2 – 10mA	: 1500
1 – 5mA	: 3000
0 – 20mA	: 750
0 – 16mA	: 900
0 – 10mA	: 1500
0 – 1mA	: 15k

• **DC Voltage:** -10 – +12V DC

Minimum span: 5mV

Zero suppression/elevation: max. 1.5 times span

Load resistance: output drive 1mA maximum; at $\geq 0.5V$

Output	Load Resistance
0 – 10mV	: 10k (Ω minimum)
0 – 100mV	: 100k
0 – 1V	: 1000
0 – 10V	: 10k
0 – 5V	: 5000
1 – 5V	: 5000
-10 – +10V	: 10k
-5 – +5V	: 5000

INSTALLATION**Power input**

AC: Operational voltage range 85 – 264V
(90 – 264V for UL);
47 – 66 Hz; approx. 3VA at 100V
approx. 4VA at 200V
approx. 5VA at 264V

DC: Operational voltage range for R: 24V $\pm 10\%$
or P: 85 – 150V (110V $\pm 10\%$ for UL);
ripple 10% p-p max.; approx. 3W

Operating temperature: -5 to +55°C (23 to 131°F)

Operating humidity: 30 to 90% RH (non-condensing)

Mounting: Surface or DIN rail

Dimensions: W23×H76×D124 mm (0.91"×2.99"×4.88")
See General Spec. Sheet Figure A-1.

Weight: 150 g (0.33 lbs)

Terminal assignment: See General Spec. Sheet Figure B-1.

PERFORMANCE in percentage of span

Accuracy: $\pm 0.2\%$ ($\pm 0.4\%$ with either or both K₁, K₂ exceeding 1.00)

Temp. coefficient: $\pm 0.015\%/^{\circ}C$ ($\pm 0.008\%/^{\circ}F$)

Response time: ≤ 0.5 seconds (0 – 90%)

Line voltage effect: $\pm 0.1\%$ over voltage range

Insulation resistance: $\geq 100M\Omega$ with 500V DC

Dielectric strength: 2000V AC @1 minute (input 1 or input 2 to output to power to ground)

STANDARDS & APPROVALS

CE conformity: EMC Directive (89/336/EEC)

EMI EN61000-6-4

EMS EN61000-6-2

Low Voltage Directive (73/23/EEC)

EN61010-1

Installation category II

Pollution degree 2

Max. operating voltage 300V

Input 1 or input 2 or output to power
– Reinforced insulation

Input 1 or input 2 to output – Basic insulation

Approval: UL/C-UL nonincendive

Class I, Division 2, Groups A, B, C, and D
(UL 1604, CAN/CSA-C22.2 No.213)

UL/C-UL general safety requirements

(UL 3111-1, CAN/CSA-C22.2 No.1010-1)

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

