Slim Plug-In Subtractor with Isolated Single/Dual Output
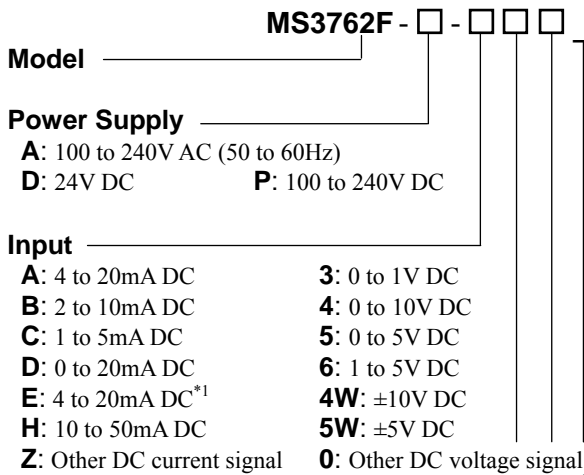(Fast Response Model)

DESCRIPTION

The MS3762F is a slim, plug-in subtractor (fast response model) that receives two DC current or voltage signals and outputs a signal proportional to the difference between those signals. The unit provides isolated single or dual output.

ORDERING CODE

MS3762F - ☐ - ☐☐☐

Model

Power Supply
A: 100 to 240V AC (50 to 60Hz)
D: 24V DC   **P**: 100 to 240V DC

Input
A: 4 to 20mA DC	**3**: 0 to 1V DC
B: 2 to 10mA DC	**4**: 0 to 10V DC
C: 1 to 5mA DC	**5**: 0 to 5V DC
D: 0 to 20mA DC	**6**: 1 to 5V DC
E: 4 to 20mA DC[*1]	**4W**: ±10V DC
H: 10 to 50mA DC	**5W**: ±5V DC
Z: Other DC current signal	**0**: Other DC voltage signal

* 1: Shunt resistor 50Ω

Output 1
A: 4 to 20mA DC	**1**: 0 to 10mV DC
D: 0 to 20mA DC	**2**: 0 to 100mV DC
Z: Other DC current signal	**3**: 0 to 1V DC
	4: 0 to 10V DC
	5: 0 to 5V DC
	6: 1 to 5V DC
	3W: ±1V DC
	4W: ±10V DC
	5W: ±5V DC
	0: Other DC voltage signal

Output 2
No code: None
The codes are the same as for Output 1.

Note 1: When a voltage output is selected for Output 1, a current output cannot be selected for Output 2.
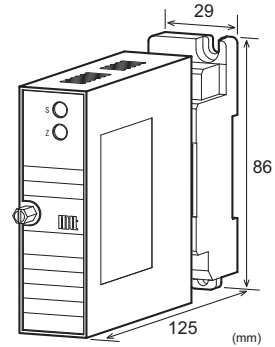Note 2: When the code A (4 to 20mA) is selected for both of the two outputs, the output load will be 550Ω maximum for Output 1 and 350Ω maximum for Output 2.

Options
No code: None
/X: Special order
* For non-standard options, ask MTT for availability.

ORDERING INFORMATION

* Note that the Input-1 factor (K1) should be specified between 0.4 and 2.0, and the Input-2 factor (K2) between 0.1 and 2.0.

Other Ordering Examples:
For an input code of "0": MS3762F-A-0AA (K1 = 1.0 / K2 = 1.0 / Input: 0.2 to 1V)
For an output code of "0": MS3762F-A-A60 (K1 = 1.0 / K2 = 1.0 / Output: 2 to 5V)

SPECIFICATIONS

●POWER SECTION

Power Requirements	100 to 240V AC: 85 to 264V AC (47 to 63Hz) 24V DC: 24V DC±10% 100 to 240V DC: 85 to 264V DC
Power Sensitivity	Better than ±0.1% of span for each power supply range.
Power Line Fuse	160mA fuse is installed (standard).

Power Consumption

Power	100-240V AC	24V DC	100-240V DC
Single Output	5.5VA max	1.8W max	2.2W max
Dual Output	6.3VA max	2.0W max	2.5W max

●INPUT SECTION

Input Resistance
Voltage Input (DC)	With or without power: 1MΩ min.	
Current Input (DC)	4 to 20mA (std.)	250Ω
	2 to 10mA	250Ω
	1 to 5 mA	100Ω
	0 to 20mA	250Ω
	10 to 50mA	10Ω

Allowable Input Voltage
Voltage Input Model	30V DC max., continuous. (for a span up to 10V)
Current Input Model	40mA DC max., continuous. (for 4 to 20mA)

Ranges Available

	Current Signal	Voltage Signal
Input Range (DC)	-100 to 100mA	-300 to 300V
Input Span (DC)	100μA[*1] to 200mA	200mV[*2] to 600V
Input Bias	-100 to 100%	-100 to 100%

Note: For any input range including negative input signals, the input spans for current and voltage signals range from [*1]200μA to 200mA and [*2]400mV to 600V, respectively.

Input Spec. Ex.1: For 3 to 8V input, the input span is 5V and the bias +60%.

Input Spec. Ex. 2: For -5 to 0V input, the input span is 5V and the bias -100%.

●OUTPUT SECTION

Allowable Output Load

Voltage Output (DC)	1V span and up	2mA max.
	10mV	10kΩ min.
	100mV	100kΩ min.
Current Output (DC)	4-20mA single output	750Ω max.
	4-20mA dual output	Output 1: 550Ω max. Output 2: 350Ω max.

Zero Adjustment	Approx. ±5% of span. (Adjustable by the front-accessible trimmer.)
Span Adjustment	Approx. ±5% span. (Adjustable by the front-accessible trimmer.)
Output Range	0 to approx. 120%

Equation

Output (%) = IN1 (%) × K1 - IN2 (%) × K2

where

IN1: Input 1 (%), K1: Input-1 factor

IN2: Input 2 (%), K2: Input-2 factor

* IN1 & IN2: 0 to 120%

(Example)

Input: 1 to 5V / Output: 0 to 10V, K1: 0.7, K2: 0.3

When the Input 1 is 3V (50%) and the Input 2 is 2V (25%), the output is:

50% × 0.7 - 25% × 0.3 = 27.5% (2.75V)

Ranges Available

	Current Signal	Voltage Signal
Output Range (DC)	0 to 20mA	-10 to 10V
Output Span (DC)	4 to 20mA	10mV to 20V
Output Bias	0 to 100%	-100 to 100%

* For current output signals, the accuracy of any current output smaller than 0.1mA is not guaranteed.

Output Spec. Ex.1: For 4 to 20mA output, the output span is 16mA and the bias +25%.

Output Spec. Ex. 2: For -1 to 4V output, the output span is 5V and the bias -20%.

●PERFORMANCE

Accuracy Rating	Better than ±0.1% of span (at 25°C±5°C).
Temperature Effect	Better than ±0.2% of span per 10°C change in ambient.
Response Time	400μs max. (0 to 90%) with a step input at 100%.
CMRR	100dB min. (500V AC, 50/60Hz)
Isolation	4-way isolation between input, output [Output 1/Output 2], power, and ground.

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Insulation Resistance	100MΩ min. (@ 500V DC) between input, output [Output 1/Output 2], power, and ground.
Dielectric Strength	Input / Output [Output 1/Output 2] / [Power, Ground]: 2000V AC for 1 minute (Cutoff current: 0.5mA) Power / Ground: 2000V AC for 1 minute (Cutoff current: 5mA) Output 1 / Output 2: 500V AC for 1 minute (Cutoff current: 0.5mA)
Surge Withstand Capability	Tested as per ANSI/IEEE C37.90.1-1989.
Operating Environment	Ambient temperature: -5 to 55°C Humidity: 5 to 90% RH (non-condensing)
Storage Temperature	-10 to 60°C

●PHYSICAL

Installation	Wall/DIN rail mounting
Wiring	M3.5 screw terminal connection (with a power terminal block cover & drop-out prevention screws)
Screwing Torque	0.8 to 1.0 [Nm] * Recommended
External Dimensions	W29 × H86 × D125mm (including the mounting screw and socket)
Weight	Main unit: 120g max. Socket: 80g max.

●MATERIALS

Housing	ABS resin (UL 94V-0)
Terminal Block	PBT resin (UL 94V-0)
Terminal Block Cover	PC resin (UL 94V-2)
DIN Rail Stopper	PP resin (UL 94HB)
Screw Terminal	Nickel-plated steel
Contacts Material and Finish	Brass with 0.2μm gold plating
Printed Circuit Board	Glass fabric epoxy resin (FR-4: UL 94V-0)
Anti-Humidity Coating	HumiSeal® 1A27NSLU (Polyurethane)

* HumiSeal® is a registered trademark of Chase Corporation.

TERMINAL ASSIGNMENT
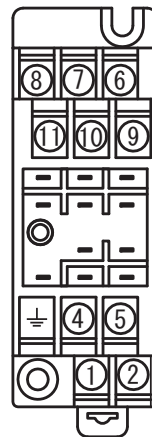
①	P (+)	POWER
②	N (-)	
⏚	GND	
④	+ OUTPUT 1	
⑤	- OUTPUT 1	
⑥	- INPUT 2	
⑦	+ OUTPUT 2	
⑧	- OUTPUT 2	
⑨	+ INPUT 1	
⑩	- INPUT 1	
⑪	+ INPUT 2	

MTT Corporation

BLOCK DIAGRAM