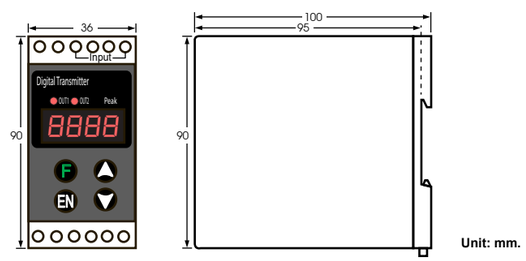
IM-B SIGNAL TRANSMITTER

TECHNICAL SPECIFICATION

Power Supply			90-240 VAC 50/60 Hz
			24 VAC/VDC ±15%
Power Consumption			3.5 VA
Display			7-Segment, 0.4 Inch 4 Digit
Input	DC Voltage		0 - 500 VDC
	Accuracy		± 0.25 % FSR @ 25 °C
	Sampling Time		250 mSec
Output	Maximum 2 Output		
	Alarm Output		Relay Contact, 5A/250VAC
	Analog Output		4-20 mA Maximum 500 Ω
			0-10 VDC Minimum 1 kΩ
	Analog Output Accuracy	4-20 mA	±0.05% FSR, ± 3 ppm/ °C
		0-10 VDC	0-10 VDC ±0.05% FSR, ± 2 ppm/ °C
Communication	Protocol		MODBUS RTU
	Baud Rate		2400,4800,9600,19200,38400,57600
	Parity		None, Even, Odd
	Data Bit		8 bit
	Stop Bit		1, 2
	Support Device Node		128 Node.
Ambient Operation	Temperature		-10 °C to 60 °C
	Humidity		<85% RH Non-Condensing
Ambient Storage	Temperature		-20 °C to 80 °C
	Humidity		<85% RH Non-Condensing
Protection Degree			IP30
Installation			DIN RAIL
Material			ABS-V0
Size			36 x 100 x 90 mm.
Weight			225 g.

DIMENSION



Unit: mm.

DESCRIPTION

- Device convert voltage signal from direct current to Standard analog 4-20 mA, 0-10 Vdc
- Can choose Output to be Relay Alarm
- Input and Output is isolate from other (Isolation)
- Display by 7-Segment 4 Digits
- LED status Output1, Output2
- Communicated by RS-485 Modbus RTU (via Output 2)

GENERAL DESCRIPTION

IM-B(Sugnal Transmitter) convert from direct voltage to standard analog signal 4-20 mA, 0-10VDC, RS-485 or Relay Alarm by IM-B can choose Output maximum 2 set per 1 signal Input

IM-B have measure system to measure Input and Output signal both isolate from from each other protect problem about Input/Output distrub each other. IM-B has 7-Segment 4 digits for show measure result Input sensor or analog output 4-20mA, 0-10 VDC made them convince to analyze and check Input/Output signal

IM-B can communication via Modbus RTU by choose purchase Output 2 to be RS-485 made it can use with SCADA system.

Alarm Relay operation

Alarm operation system user can choose function at variable ALF1 and ALF2. The variable consist of

1. Most significant digit when user set it to be 1 define Alarm Relay operate as holding alarm relay is when Alarm Relay operated. It will continue operation until it turn ON/OFF again and when user set it to be 0 is normal Alarm Relay.

2. Second digit

When set this digit to 0 is it will operate by use Hysteresis without Stand-by sequence, Alarm relay will work relate with ALH1, ALL1, HYS1, ALH2, ALL2 and HYS2 by Alarm by Alarm relay will work immediately that it follows condition see calculation at Picture 1

When set to it be 1 is it operate by use Hysteresis with Stand-by sequence. It means device will operate as 0 but Alarm relay will not operate until Process value will have value in correct range see calculation in picture 1.

When set to it be 2 the operation with no Hysteresis in this mode when Process Value be range that Alarm relay operate will be delay time follow dt1 or dt2 in previously they will operate see calculation in picture 1.

3. last significant digit for choosing Alarm function

when set to be 0 means Alarm relay do not operate.

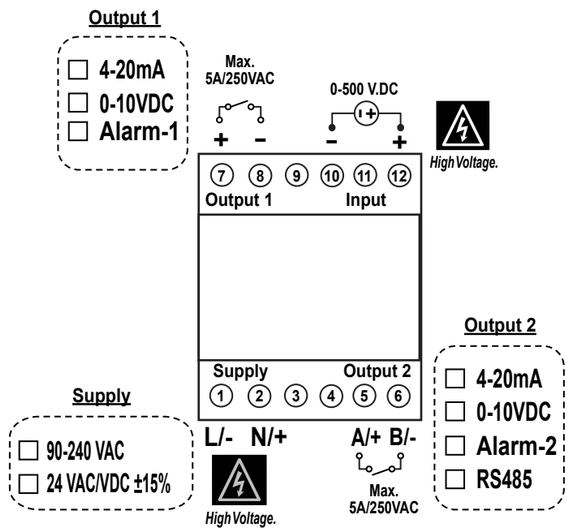
when set to be 1 means Process value high alarm.

when set to be 2 means Process value high alarm.

when set to be 3 means Process value low alarm.

when set to be 4 means Process value high low range alarm.

WIRING DIAGRAM



ALARM OUTPUT : Process value (PV) to be used as Alarm Output

Stand-by sequence : After starting operation of step, alarm output does not turn on unles the process value reach the value of OFF position of alarm output.

Hysteresis Mode

1. Hysteresis by Absolute Value (Fig. 1)
2. Hysteresis by Time (Fig. 2)

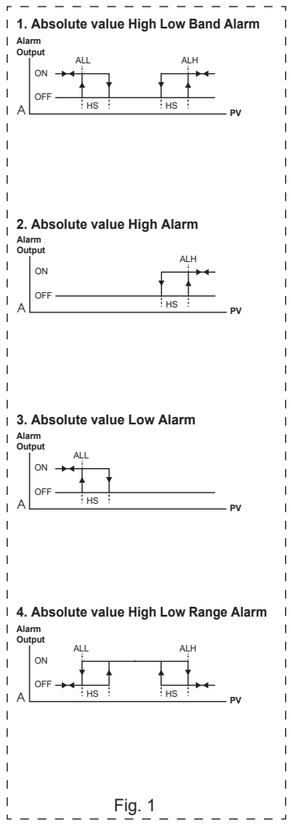


Fig. 1

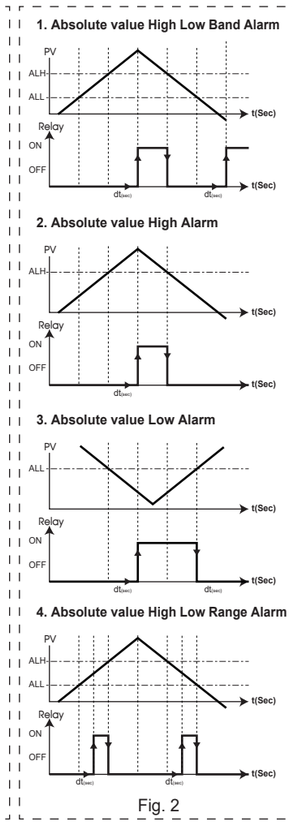
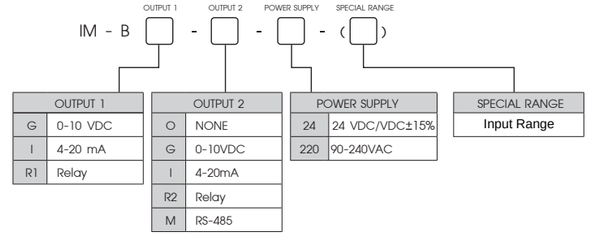


Fig. 2

ORDERING CODE



Example: IM-B-I-G-220

Output 1 = 4-20 mA, Output 2 = 0-10VDC

Power Supply 90-240 VAC

IM-B SIGNAL TRANSMITTER

Primus
User Manual

< SET 1 : Initial Setting >

- Power ON — 8888 — Blink for 4 seconds. For initial Hardware
- Display for Input Type — InP → 00 — Display for last input setting.
- Operation mode display — 500 — Process value display.

Press F hold for 2 Sec.

F Key
- Analog Input Display — 12.00 — Only Analog input. and dot blink 500 ms.
- F Key Operation mode display
- < When Select Output 1 as I, V >
- Analog Output 1 Display — 12.00 — Only Analog Output 1.
- F Key Operation mode display
- < When Select Output 1 as Alarm >
- High limit setting for alarm 1 — ALH1 → 0.0 — Set high limit value.
- F Key
- Low limit setting for alarm 1 — ALL1 → 0.0 — Set low limit value.
- F Key
- < When Select ALF 1 = X0X / X1X >
- Hysteresis setting for alarm 1 — HYS1 → 0.0 — Set Hysteresis when required.
- < When Select ALF 1 = X2X >
- Time Delay On for alarm 1 — dt1 → 0 — Set time delay on when required.
- F Key Operation mode display
- < When Select Output 2 as I, V >
- Analog Output 2 Display — 12.00 — Only Analog Output 2.
- F Key Operation mode display
- < When Select Output 2 as Alarm >
- High limit setting for alarm 2 — ALH2 → 0.0 — Set high limit value.
- F Key
- Low limit setting for alarm 2 — ALL2 → 0.0 — Set low limit value.
- F Key
- < When Select ALF 2 = X0X / X1X >
- Hysteresis setting for alarm 2 — HYS2 → 0.0 — Set Hysteresis when required.
- < When Select ALF 2 = X2X >
- Time Delay On for alarm 2 — dt2 → 0 — Set time delay on when required.
- F Key Operation mode display

BN Key
< When FunC = 1 >
- PV Maximum Display — 500 — Led Peak Blink 500 mSec
- BN Key
- PV Minimum Display — 200 — Led Peak Blink 100 mSec
- ▼ Key More than 5 seconds Reset Min/Max
- BN Key Operation mode display

1. Initial setting display — SEt 1 — Initial setting mode calling display.
- F Key
2. Input type setting — InP → 30 — Input type
- F Key
3. PV correction gain — PuG → 1.00 — When measurement value comes an error, set the correction value (Multiplication)
- F Key
4. Zero point setting for PV correction — PuS → 0 — When measurement value comes an error, set the correction value (Addition)
- F Key
5. Filter input — PuF → 0 — CR filter effect is operational on software when making first-order lag operation to process value(PV).
- F Key
6. Position of decimal point — dP → 0.0 — Function key setting. Selectable below functions.
  - 0 Not required
  - 0.0 Required
- F Key
7. Key lock setting — LoC → 0 — Key lock setting for protection of error operation. Selectable below functions
  - 0 None
  - 1 All lock
  - 2 Operation mode lock only
  - 3 Except operation mode
- F Key
8. Function Key setting — FUnC → 0 — Function key setting. Selectable below functions.
  - 0 None
  - 1 Show Peak
- F Key
9. Low limit setting in PV limiter (Current/Voltage) — SLL → 0 — Display of low limit setting & Analog output low limit setting (Within setting range of Table 1)
- F Key
10. High limit setting in PV limiter (Current/Voltage) — SLH → 1000 — Display of high limit setting &Analog output high limit setting (Within setting range of Table 1)
- F Key Initial Setting Display

Key

< SET 2 : Event Output 1 >

11. Event output 1 setting — SEt2 — Output 1 setting mode Calling display
- F Key

< When Select Alarm Output >

12. Function setting for alarm 1 — ALF1 → 000 — Select below functions.

PV Alarm functions
0 : None
1 : Process value High Low Band Alarm
2 : Process value High Alarm
3 : Process value Low Alarm
4 : Process value High Low Range Alarm

Additional Alarm functions 1
0 : None
1 : Stand-by sequence
2 : Time delay on

Additional Alarm functions 2
0 : None
1 : Hold (reset by power off)

- F Key
13. High limit setting for alarm 1 — ALH1 → 0.0 — Set high limit value.
- F Key
14. Low limit setting for alarm 1 — ALL1 → 0.0 — Set low limit value.
- F Key
- < When Select ALF 1 = X0X / X1X >
15. Hysteresis setting for alarm 1 — HYS1 → 0.0 — Set Hysteresis when required.
- < When Select ALF 1 = X2X >
16. Time Delay On for alarm 1 — dt1 → 0 — Set time delay on when required.
- F Key Event Output 1 Display
- < When Select Analog Output >
17. Inverse output setting for analog 1 — trP1 → 0 — Selectable below functions.
  - 0 Normal
  - 1 Inverse
- F Key
18. Output low limit setting for analog 1 — trL1 → 0.00 — Set output low limit value.
- F Key
19. Output high limit setting for analog 1 — trH1 → 10.00 — Set output high limit value.
- F Key Event Output 1 Display

Key

< SET 3 : Event Output 2 >

20. Event output 2 setting — SEt3 — Output 2 setting mode Calling display
- F Key

< When Select Alarm Output >

21. Function setting for alarm 2 — ALF2 → 000 — Select below functions.

PV Alarm functions
0 : None
1 : Process value High Low Band Alarm
2 : Process value High Alarm
3 : Process value Low Alarm
4 : Process value High Low Range Alarm

Additional Alarm functions 1
0 : None
1 : Stand-by sequence
2 : Time delay on

Additional Alarm functions 2
0 : None
1 : Hold (reset by power off)

- F Key
22. High limit setting for alarm 2 — ALH2 → 0.0 — Set high limit value.
- F Key
23. Low limit setting for alarm 2 — ALL2 → 0.0 — Set low limit value.
- F Key
- < When Select ALF 2 = X0X / X1X >
24. Hysteresis setting for alarm 2 — HYS2 → 0.0 — Set Hysteresis when required.
- < When Select ALF 2 = X2X >
25. Time Delay On for alarm 2 — dt2 → 0 — Set time delay on when required.
- F Key Event Output 2 Display
- < When Select Analog Output >
26. Inverse output setting for analog 2 — trP2 → 0 — Selectable below functions.
  - 0 Normal
  - 1 Inverse
- F Key
27. Output low limit setting for analog 2 — trL2 → 0.00 — Set output low limit value.
- F Key
28. Output high limit setting for analog 2 — trH2 → 10.00 — Set output high limit value.
- F Key Event Output 2 Display
- < When Select RS-485 >
29. Speed setting — bPS → 9.6 — Selectable below functions.
  - 2.4 2400 bps
  - 4.8 4800 bps
  - 9.6 9600 bps
  - 19.2 19200 bps
  - 38.4 38400 bps
  - 57.6 57600 bps
- F K ey
30. Parameter setting for communication — COMM → b8n1 — Selectable below functions.

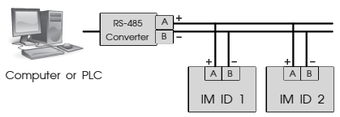
b8n1
Stop bit length
1 : 1 bit
2 : 2 bit
Parity check
n : Nill
o : Odd number
E : Even number

- F Key
31. Address setting — Adr → 1 — Setting range : 1~128
- F Key Event Output 2 Display

SERIAL COMMUNICATIONS

The IM-Series are equipped with a RS-485 Series communication interface to allow connection to computer or PLCs. MODBUS protocol is provided as standard communication. The user can connect IM-Series as network up to 128 Node.

Wiring Diagram



MODBUS PROTOCOL

This MODBUS Protocol has been implement in accordance with MODBUS.ORG MODBUS Application Protocol Specification V1.1 With the following conditions applying.

The following conditions apply Baudrate can selected refer 22.Speed setting the format is MODBUS RTU UART data can selected refer 23.Communication setting Data is considered to be half duplex using 2 wire.

Modbus Function Code

Function code	Operation	Brodcast
0x03	Read Holding Registers	No
0x04	Read Multiple Registers	No
0x06	Preset Single Registers	Yes
0x08	Loop Back Diagnostic	No

Modbus Exception Code

Code	Name	Meaning
01	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the server (or slave).
02	ILLEGAL DATA ADDRESS	The data address received in the data field is not an allowable value for server (or slave).
03	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for server (or slave).

Example of a Client Request and Server Exception Response

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
Slave Address	01	Slave Address	01
Function	04	Function	84
Starting Address Hi	00	Exception Code	02
Starting Address Lo	00	CRC Hi	C2
Quantity of Input Reg. Hi	00	CRC Lo	C1
Quantity of Input Reg. Lo	1E		
CRC Hi	70		
CRC Lo	02		

Modbus Function Code

Register Address Decimal	Register Address Hex	Contents	Format	Word	Access
0	0x0	PV	int	1	Read Only
1	0x1	Analog Output 1	int	1	Read Only
2	0x2	Analog Output 2	int	1	Read Only
3	0x3	Alarm Status	int	1	Read Only
4	0x4	Input Type	int	1	Read Only
5	0x5	PV Correction Gain	int	1	R/W
6	0x6	PV Correction offset	int	1	R/W
7	0x7	PV Filter	int	1	R/W
8	0x8	Decimal Point	int	1	R/W
9	0x9	Unit	int	1	Read Only[1]
10	0xA	Lock Key Function	int	1	R/W
11	0xB	Function Key	int	1	R/W
12	0xC	Analog Input Low Limit	int	1	Read Only[1]
13	0xD	Analog Input High Limit	int	1	Read Only[1]
14	0xE	Low Limit	int	1	R/W
15	0xF	High Limit	int	1	R/W
16	0x10	Function Alarm 1	int	1	R/W
17	0x11	Alarm 1 High	int	1	R/W
18	0x12	Alarm 1 Lo	int	1	R/W
19	0x13	Alarm 1 Sensitivity	int	1	R/W
20	0x14	Inverse output setting for analog 1	int	1	R/W
21	0x15	Output low limit setting for analog 1	int	1	R/W
22	0x16	Output high limit setting for analog 1	int	1	R/W

[1]Data Return 0.

Here is an Example of a Request to Read Input Register 1:

Request		Respones	
Field Name	(Hex)	Field Name	(Hex)
Slave Address	0x00	Slave Address	01
Function	0x04	Function	04
Starting Address Hi	0x00	Byte Count	02
Start Address Lo	0x00	Input Reg. 1 Hi	00
Quantity of Input Reg. Hi	0x00	Input Reg. 1 Lo	19
Quantity of Input Reg. Lo	0x01	CRC Hi	78
CRC Hi	0x31	CRC Lo	FA
CRC Lo	0xCA		

The contents of input register 1 are shown as the 2 bytes values of 00 19 hex, or 25 decimal.

Here is an Example of a Request to Write Input Register 2 to 00 08 Hex:

Request		Response	
Field Name	(Hex)	Field Name	(Hex)
Slave Device ID	01	Slave Device ID	01
Function	06	Function	06
Register Address Hi	00	Register Address Hi	00
Register Address Lo	01	Register Address Lo	00
Register Value Hi	00	Register Value Hi	00
Register Value Lo	08	Register Value Lo	08
CRC Hi	D9	CRC Hi	D9
CRC Lo	CC	CRC Lo	CC

IM-B

บริษัท ไพรมัส จำกัด
119 ซ.สี่ม่วงอนุสรณ์ ถ.สุทธิสารวินิจฉัย แขวงดินแดง
เขตดินแดง กรุงเทพ 10400
โทร 0-2693-7005, 0-2277-8027 แฟกซ์ 0-2277-3565
E-mail : sales@primusthai.com