Specifications

MIS-202-PT/PP

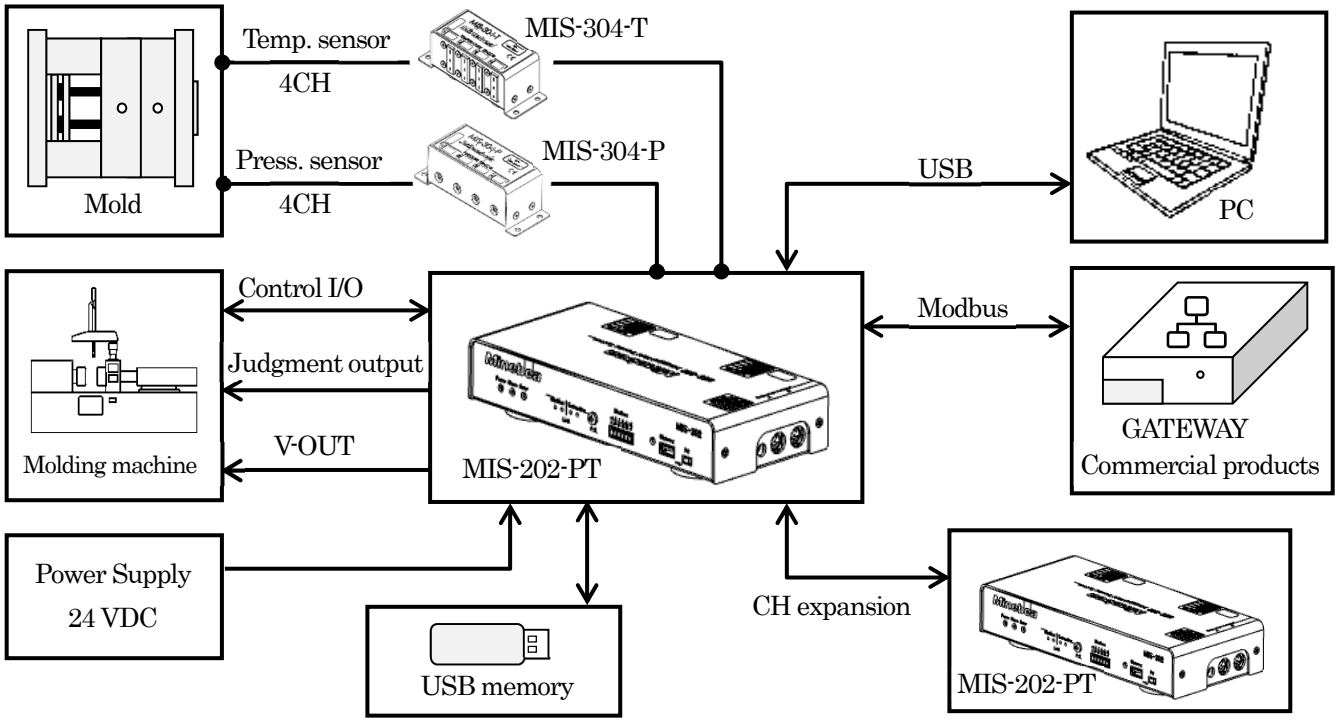
Specification No. EN382202D 1/20

Integrated system amplifier for mold cavity measurement

1. Introduction

This device can measure the resin pressure and the cavity temperature in the mold of injection molding machine at the same time, and the monitoring and the watching can be provided by the special application. This "Integrated system amplifier for mold cavity measurement" aims at the improvement and the stabilization of the molded piece quality because it cooperates with the molding machine and peripherals by the installed various interfaces.

1-1. System chart



1-2. Main futures

- The mold cavity pressure and the cavity temperature can be measured at the same time. Also, they displayed at the same time by the special application.
- The composition of the channel is selected by the model selection with every four channels (pressure/temperature).
- The channel is increased by the multi device connection. Up to 32 channels or less.
- Data is saved in the USB memory.
  (When PC is not connected and the measurement application MS-Anest is not started.)
- The quality judgment is output with each channel, and 0 to 10 V in an analog voltage is output.
- The measuring data is output to the networking gear. (Conforming to Modbus RTU.

1-3. Composition of equipment

1-3-1. System amplifier

Description	Model No.	Pressure channel	Temperature channel
Pressure and temperature amplifier	MIS-202-PT	4	4
8 channels pressure amplifier	MIS-202-PP	8	0

1-3-2. Relay box and cable for the sensor (as an option)

Description	Model No.	Specification
Relay box for pressure sensor	MIS-304-P	Exclusive use for pressure sensor, up to 4 channels or less
Relay cable for pressure sensor	FA409-548-2M FA409-548-5M FA409-548-10M	Exclusive use for pressure signal of relay box Selectable from 2 m, 5 m and 10 m
Relay box for temperature sensor	MIS-304-T	Exclusive use for temperature sensor Up to 4 channels or less
Relay cable for temperature sensor	FA409-549-2M FA409-549-5M FA409-549-10M	Exclusive use for temperature signal of relay box. Selectable from 2 m, 5 m and 10 m.

1-3-3. Optional cable

Description	Model No.	Specification
Power supply cable	FA409-550	DC cable for 24 VDC, 2.5 m
Control I/O cable	FA409-551	2.5 m
Judgement I/O cable	FA409-552	2.5 m
V-OUT cable	FA409-553	2.5 m
Channel extension cable	FA409-554	1.0 m
Modbus cable	FA409-555	1.0 m

* The USB cable is an accessory of system amplifier MIS-202-PT/PP.

2. Specifications of analog

2-1. Input of pressure sensor

• Bridge power supply	5VDC±0.25 VDC within 20 mA per 1 channel
• Applicable sensor	Strain gage based transducer (350 Ω, 1 unit/channel) LSMS-S06,LSMSA series (20K, 50K, 100K, 200K, 500K, 1T, 3T)
• Numbers of input points	MIS-202-PT : 4 channels MIS-202-PP : 4 channels × 2
• Input range	-0.1 mV/V ~ 0.8 mV/V
• Zero adjustment range	-0.1 mV/V ~ 0.7 mV/V
• Non-linearity	±1.0 %F.S.
• Analog filter	Approx. 500 Hz

2-2. Input of temperature sensor

• Applicable sensor	K type thermo couple MMTK-01
• Numbers of input points	MIS-202-PT : 4 channels
• Input range	0 ~ 400 ℃
• Input allowance voltage	10 VDC at the maximum continuously
• Conversion accuracy	±0.2 %F.S. (at 25℃±5℃)
• Cold contact copensation accuracy	within ±3℃ (at 25℃±5℃)
• Input disconnection characteristic	down scale (When disconnecting, the temperature of approx.-46℃ is output.)
• Response speed	10 ms or less (0 ~ 90 %)

2-3. Common of sensor input

• Measurement time	120 seconds at the maximum, 1800 seconds or less in the long-time measurement.
• Sampling interval	10 ms per 1 channel (Changeable to 0.5 ms, 1 ms, 2 ms, 5 ms, 20 ms and 50 ms.) * Limited to 10 ms, 20 ms and 50 ms in the long-time measurement.
• A/D Internal resolution	16 bit

2-4. Analog voltage output

• Voltage output range	0 VDC ～ 10 VDC
• Numbers of output points	8 channels
• Load resistance	5 kΩ or more
• Resolution	1/12 000 or more
• Output frequency	Synchronized with A/D sampling rate.
• Over range	Approx. 11 VDC at 110 % or more of the rated pressure Approx. -1 VDC at -10% or less of the rated pressure

3. Interface

3-1. USB interface (USB mini-B type)

The measurement are monitored and the various parameters are set by PC that the measurement application (MIS-Anest) is installed.

- Specification Conforming to USB 2.0 interface
- Output connector USB connector mini-B type (female)
- Destination to be connect Personal computer

※ Installation of the attached driver to the personal computer is required.

3-2. USB interface (USB A type)

When the personal computer is not connected, the measuring data is saved in the USB memory inserted.

- Specification Conforming to USB 1.1 interface
- Output connector USB connector A type (female)
- Connecting destination USB memory
- Recommended specification of USB memory
  Format: FAT32, Capacity: 64 GB or less

※ Operating result of USB memory

- TNU-A008G (by Toshiba)
- SDCZ48-064G-U46 (by SanDisk)
- DTIG4/32GB (by Kingston)
- SP064GBUF3M01V1B (by SILICON POWER)

3-3. Modbus interface

This interface can perform the concentrated observation and be remotely monitored by connecting the net-working gear such as gateways through this interface.

- Communication standard RS-485 interface
- Protocol Conforming to Modbus RTU
- Synchronous method Start stop synchronous method
- Communication method 4-wires method full duplex
- Terminator Non
- Baud rate Selectable from 1 200 bps, 2 400 bps, 4 800 bps, 9 600 bps, 19 200 bps, 38 400 bps, 57 600 bps, 76 800 bps, 115 200 bps and 230 400 bps.
- Data bit length fixed to 8 bit
- Parity bit Selectable from none, even and odd.
- Stop bit Selectable from 1 bit or 2 bit
- Address Select one from 00 to 31
- Terminating resistance Built-in

3-4. RS-485 interface for channel increase

The number of channels is increased by connecting two or more devices.

- Communication method RS-485
- Number of connecting unit Up to 4 units (Three slaves against the host)
- Host / Slave to be set with the rotary switch of the main body. (1: Host, 2 ~ 4: slave 1~3)
- Termination resistance Built-in

4. Status LED

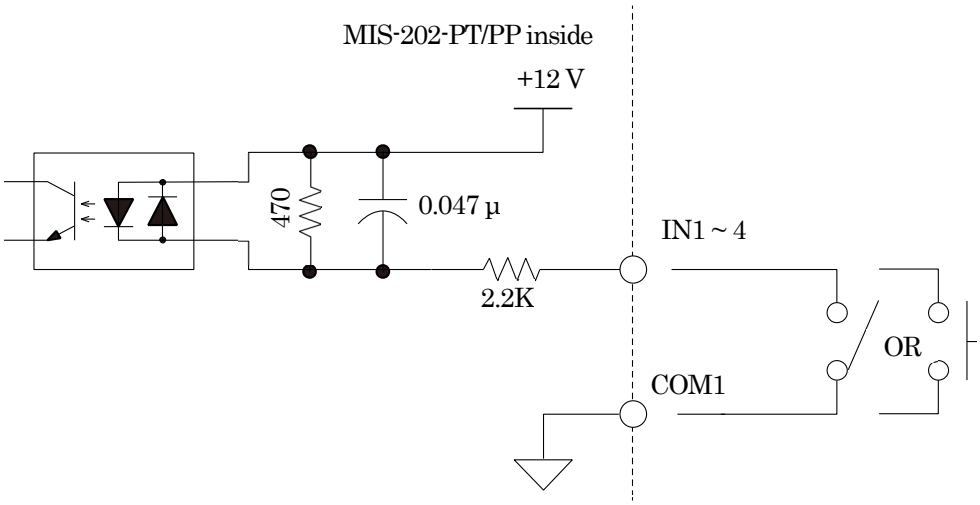
Name		Color	Description	Remarks
Power		Blue	Power supply	Light at turn on the power.
Alarm		Red	Alarm judgement NG	Light at alarm occurred.
Error		Red	Error generation	Light and blinking during error being occurred.
R/W		Blue	Reading and writing USB memory	USB memory
LINK	Modbus TX	Green	Modbus communication - Receive	Blinking when communicating
	Modbus RX	Green	Modbus communication - Send	Blinking when communicating
	Extension TX	Green	Channel increase communication -Receive	Blinking when communicating
	Extension RX	Green	Channel increase communication - Send	Blinking when communicating

5. External control I/O

5-1. External control input signal

- Start trigger input — Start measurement
- Alarm reset input — Reset the alarm output condition
- Alarm stop input — Change to invalid or stop the alarm output

- Equivalent circuit of external control input
  - ・No voltage contact input, and insulated with the internal circuit by the photo coupler.
  - ・Internal power supply: 12 VDC, Current in short-circuited: 5 mA

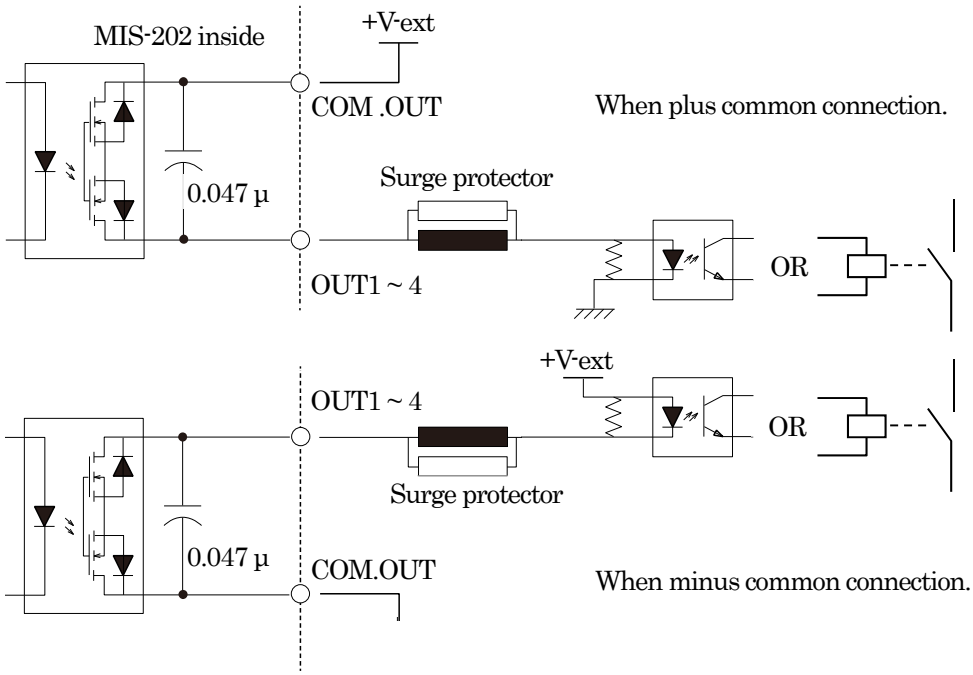


※ The signal is input by short-circuited and opening about the input terminal and the COM terminal. It is short-circuited by contact (relay and switch, etc.) and non-contact (transistor and open collector output, etc.).

5-2. External control output signal

- Alarm The judgment result on various alarm conditions is output.
- Error Error is output when the error occurs in the amplifier.

- External control output equivalent circuit
  - ・This circuit is insulated with the internal circtuit because of the photo MOS relay output.
  - ・A plus common connection or a minus common connection is available.
  - ・Rating V_{CE} = 35 VDC max.、I_c = 100 mADC max.



6. Judgement result output

- Alarm of channel 1 to channel 8
  The judgment result of each channel on various alarm conditions is output.
- External control output equivalent circuit
  The equivalent circtuit of the judgement result output and its usage are the same as the equivalent circuit of external control output.

7. Specifications of set

7-1. Measuring condition

- Measurement mode: Trigger mode and continuous mode
- Pressure sensor: Name of channel
  Rated capacity:196.1 N ~ 29.42 kN
  Rated output: 0.0001 mV/V ~ 0.8 mV/V
  Shape of pressure receiving part: [Round], [Rectangle] and [Other]
  Cross sectional area: 0.01 mm ~ 100.00 mm in diameter
  (Input by length and breadth, or the sectional area)
- Measurement time: 120 second at the maximum, 1 800 second or less in long-time measurement.
  Sampling interval: 0.5 ms, 1 ms, 2 ms, 5 ms, 10 ms, 20 ms and 50 ms
- Protruding detecting time
  Start time: 0.00 s ~ 1 800.00 s
  Finish time: 0.00 s ~ 1 800.00 s

※ The time of 121 second or more is only for long time measurement.

- Start trigger input signal
  [Rising], [Falling], Enabled once with pulse width of 50 ms or more
- Start trigger input delay time
  0.0 s ~ 25.0 s
- Interrupt: [Valid], [Invalid]

7-2. Graph

- Realtime: Graph range of [Pressure] and [Temperature]
- Aquired: Graph range of [Pressure] and [Temperature]
  Maximum number of shots: 1 shots ~ 100 shots
- Trend: Graph range of [Peak], [Integral] and [Protruding],
  Numbers of display shots: 10 shots ~ 10 000 shots
- Template: [Display], [No display], [Shift], [Display intensity], [Line thickness], [Line style].

7-3. Set of alarm function

- Valid/Invalid of channel
  [Valid] or [Invalid] of alarm monitoring of each channel
- Alarm monitoring condition
  [Valid] or [Invalid] of monitoring 1 ~ 3 of each channel
  Monitoring of [Area], [Peak], [Point], [Time to peak]
  Pressure: Upper and lower limit 100.00 MPa ～500.00 MPa
  Temperature: Upper and lower limit 50.00 ℃~ 450 ℃
  Time: Start and finish- 0.00 s ~ 1800.00 s

※ Time of 121 second or more is only in the long-time measurement

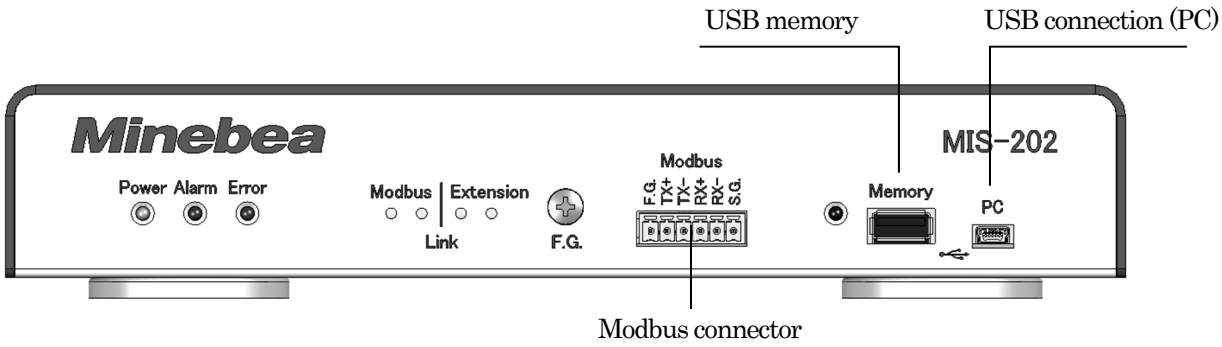
※ The area monitoring can be set in monitoring 1 and monitoring 3

※ Monitoring of [Point] and [Time to peak] cannot be set in two or more monitoring.

- Condition of integral: Valid and invalid of each channel
  Integral monitoring, Integral to peak monitoring
  Pressure integral: Upper and lower limit 24×10^6 MPa・s ~ 120×10^6 MPa・s
  Temperature integral: Upper and lower limit 12×10^6 MPa・s ~ 108×10^6 MPa・s
- Alarm output signal: [Rising], [Falling]]
- Alarm cnacel time: [Valid] or [Invalid] of time control, Set time in valid: 1.0 s ～25.0 s
- Alarm cancel signal: [Valid] or [Invalid] of alarm cancel signal, Set signal in valid: Rising or Falling

8. Wiring and connector pin configuration

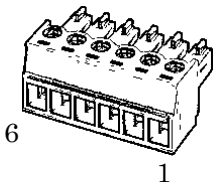
8-1. Front panel



- USB connector (Personal computer)
  USB mini-B type

※ USB cable: 2.0 m (as an accessory)

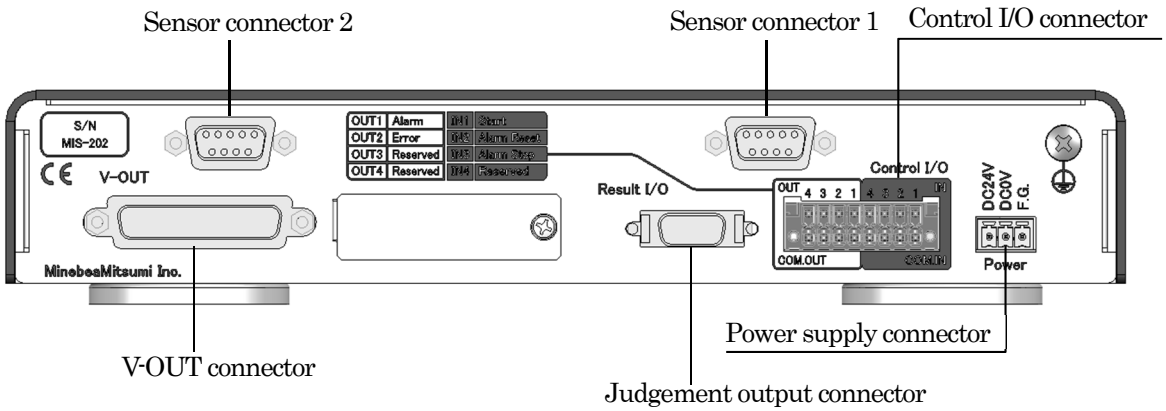
- USB connector (USB memory)
  USB A type
- Modbus connector



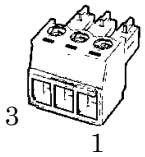
Pin No.	Signal name	Description
1	SG	Signal ground
2	RX-	Differential input -
3	RX+	Differential input +
4	TX-	Differential output -
5	TX+	Differential output +
6	F.G.	Frame ground

※ Plug: Screw type terminal block (as an accessory)

8-2. Rear panel



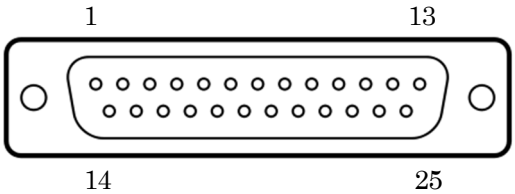
• Power supply connector



Pin No.	Signal name	Description
1	F.G.	Frame ground
2	0 VDC	Power supply 0 VDC
3	24 VDC	Power supply 24 VDC

※ Plug: Screw type terminal block (as an accessory)

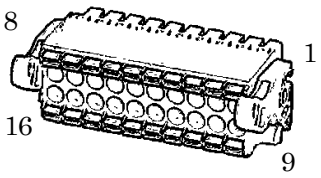
• Analog voltage output connector (V-OUT)
D-sub 25 pin (male at cable side)



Pin No.	Signal name	Pin No.	Signal name
1	N.C.		
2	N.C.	14	N.C.
3	N.C.	15	N.C.
4	N.C.	16	N.C.
5	N.C.	17	N.C.
6	+OUT8	18	-OUT8
7	+OUT7	19	-OUT7
8	+OUT6	20	-OUT6
9	+OUT5	21	-OUT5
10	+OUT4	22	-OUT4
11	+OUT3	23	-OUT3
12	+OUT2	24	-OUT2
13	+OUT1	25	-OUT1

Specifications

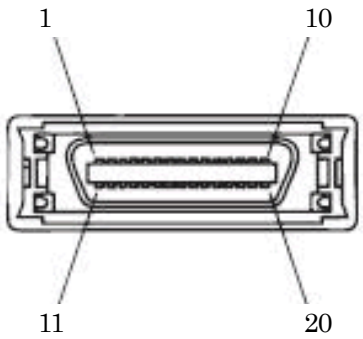
• Control I/O connector



※ Plug: Spring type terminal block (Accessory)

Pin No.	Signal	Sign	Description
1	START	IN1	Start input signal
2	ALARM RESET	IN2	Alarm reset input signal
3	ALARM STOP	IN3	Alarm stop input signal
4	RESERVE	IN4	N/C
5	ALARM	OUT1	Alarm output signal
6	ERROR	OUT2	Error output signal
7	RESERVE	OUT3	N/C
8	RESERVE	OUT4	N/C
9	COM_IN1	COM_IN1	IN1 COM
10	COM_IN2	COM_IN2	IN2 COM
11	COM_IN3	COM_IN3	IN3 COM
12	COM_IN4	COM_IN4	IN4 COM
13	COM_OUT1	COM_O1	OUT1 COM
14	COM_OUT2	COM_O2	OUT2 COM
15	COM_OUT3	COM_O3	OUT3 COM
16	COM_OUT4	COM_O4	OUT4 COM

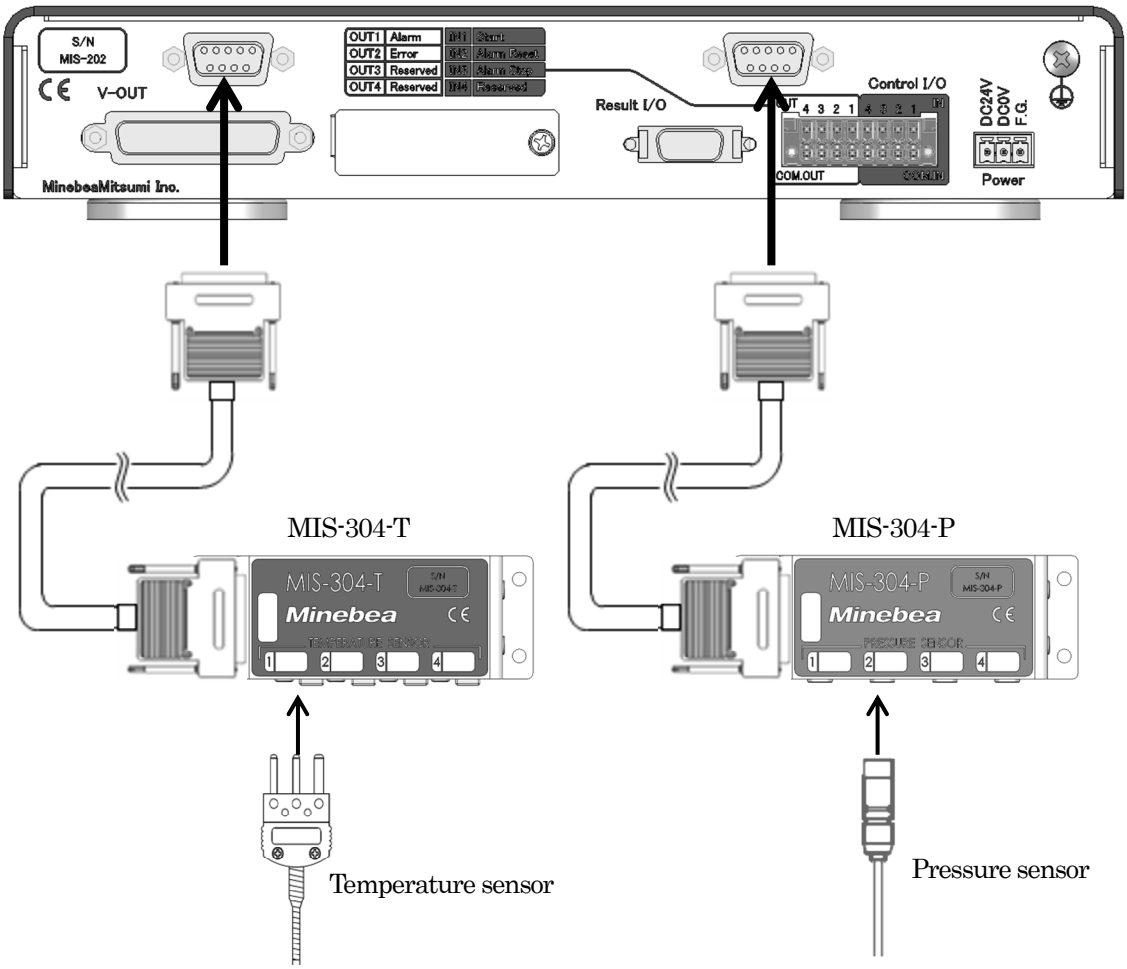
• Judgement output connector
MDR connector 20 pins (at cable side)



Pin No.	Signal Name	Pin No.	Signal name
1	CH1_ALM	11	CH6_ALM
2	COM_O1	12	COM_O6
3	CH2_ALM	13	CH7_ALM
4	COM_O2	14	COM_O7
5	CH3_ALM	15	CH8_ALM
6	COM_O3	16	COM_O8
7	CH4_ALM	17	ALM_RST
8	COM_O4	18	COM_IN1
9	CH5_ALM	19	N.C.
10	COM_O5	20	N.C

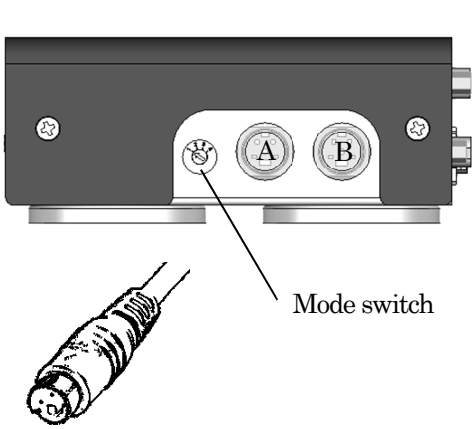
• Sensor and relay box connection

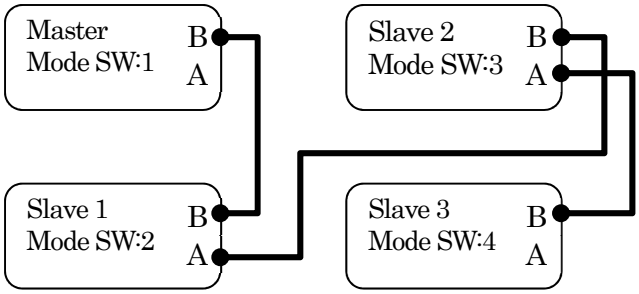
※ Case MIS-202-PT (Pressure 4 channels and temperature 4 channels)



8-3. Side panel

• Connector A/B for increasing channel





※ Exclusive optional cable [Cable for channel increase] is required.

※ Set wiring and the mode switch of each amplifier as shown in the above.

9. Measurement application: MIS-Anest

9-1. System operating requirement

Personal computer

Operating system:	Windows® 10, 11
CPU:	2 GHz or Higher (Multi-core composition is recommended)
RAM:	Windows 10 : 4.0 GB or more Windows 11 : 8.0 GB or more
HDD:	At least 2 GB of free space
USB port:	One port corresponding to USB2.0 is indispensable.
Mouse or substitute:	Must
Keyboard:	Must
Monitor:	Resolution 1 366 × 768 or more
CD-ROM drive:	Indispensable in installing

※ The above-mentioned specification doesn't guarantee operation with all personal computers.

※ OS versions that are no longer supported by the OS manufacturer are not covered by the guarantee.

9-2. Display function

- Real time waveform display
- Waveform display that has been aquired
- Trend display (Peak, Integral, Protruding)
- Selection of display channel
- Alarm monitoring fram display
- Display of measurement history
- Event log
- Continuance condition inspection

9-3. Window layout

- Standard
  (Real time, Aquired graph, Trend (Peak), Control panel, Real time value, Measurement history)
- Simple (Measurement history, Control panel, Real time graph)
- Overlay display
- Save arbitrary layout to presets 1 and 2.

9-4. Measurement processing function

- Continuous waveform (It continuous draws regardless of the measurement time.)
  Zero set: Manual, when it begins to acquire continuous wave form.
- Trigger waveform (Drawing that overlays the waveform of each shot.)
  Zero set: Execute it by start trigger signal
- Template display
- Real time value (Peak and present valuej)
- Counter of shot (Total shots, OK shots, NG shots)

9-5. Measuring condition set function

- Channel name
- Sensor conditino
- Sampling interval
- Measuring time set
- Change of start trigger signal
- Delay time of start trigger
- Start trigger interrupt
- Protruding detecting range
- Acquired waveform sidplay time set
- Analog voltage output set (Valid, Invalid and Scaling)

※The above condition settings, including measurement (data capture), can be viewed and changed. However, if change the condition settings during measurement (data capture), the measurement will stop.

9-6. Data saving function

- Numeric data
  The peak value, the integral value, the peak value at protruding and the alarm judgment result etc. are saved as CSV type file by the same form every date (year, month and date).
- Waveform data
  All shot or NG shot, back and forth shot of sampling data are saved as CSV type file.
- Alarm history (The wavy numerical data where the alarm is generated is saved.

※ Valid/invalid of the saving function of numeric data, waveform data and alarm history can be changed.

- Condition setting

9-7. Alarm function

- Image display
- Valid/Invalid of alarm judgement by each channel.
- Clear condition setting of alarm output
- Alarm output time setting
- Alarm clear condition setting (Time and external input signal)

9-8. Alarm judgement function

- Area monitoring frame judgement (Pressure: Upper and lower limit, Time: Start and Finish)
- Peak monitoring frame judgement (Pressure: Upper and lower limit, Time: Start and Finish)
- Monitoring of t second later (Pressure: Upper and lower limit, Time: t second later)
- Peak arrival time monitoring (Time: Start and Finish)
- Integral value monitoring (Integral value: Upper and lower limit)
- Peak arrival integral value monitoring Integral value: Upper and lower limit)

9-8-1. Data processing function

- Read out waveform data
- Specified time value calcuration
- Specified time range calcuration
- Drawing the horizontal line of specified pressure value

9-9. Maintenance function

- Confirm version information
- Monitoring function
  (Output mV/V value of pressure sensor, Output mV/V value of temperature [℃].)
- I/O test ((external control input/output operation confirmation)
- Analog output test (voltage output of 0 VDC, 5 VDC and 10VDC)
- Fine adjustment of Analog output fine adjustment)
- Confirmation of information on ERROR LED.

9-10. Others

- Statistical work (Calculate average, maximum, minimum and standard diviation)
- Password function (Prohibit the change of condition setting screen and data saving address.)
- Threshhold setting of storage drive free space
- Language switch (Japanese, Englishs, Chinese and Korean)
- Time setting (for time stamp of data to be saved to USB memory)

10. General specifications

10-1. System amplifier

- Operating temperature range: -10℃ ~ 50 ℃
- Operating humidity range: 85 %RH or less (Non condensing)
- Stored temperature range: -20℃ ~ 60℃
- Vibration resistance: 10 Hz ~ 150 Hz, Acceleration 2 G constantly for 2 hours of each X, Y, Z direction.
- Power supply voltage: 24 VDC (Available valiable range 20.4 VDC ~ 27.6 VDC)
- Power consumption: 16.5 W or less (at 24 VDC)
- Outline dimensions: (W) 257 mm × (H) 116.2 mm × (D) 48.6 mm (Excludes protruding parts)
- Weight: Approx. 900 g

10-2. Relay box for pressure sensor

- Operating temperature range: 0℃ ~ 70℃
0℃ ~ 100℃ (without using magnet)
- Operating humidity range: 85 %RH or less (Non condensing)
- Stored temperature range: -10℃ ~ 70℃
-10℃ ~ 100℃ (without using magnet)
- Vibration resistance: 10 Hz ～ 55 Hz
Double amplitude 1.5 mm for 2 hours of each X, Y, Z direction)
- Outline dimensions: (W) 111.6 mm × (H) 40 mm × (D) 40.4 mm (Excludes protruding parts)
- Weight: Approx. 190 g

10-3. Relay cable for pressure sensor

- Operating temperature range: 0℃ ~ 100℃
- Operating humidity range: 85 %RH or less (Non condensing)
- Stored temperature range: 0℃ ~ 50℃
- Cable diameter: Approx. 6.2 mm
- Minimum bending radiou: 50 mm

10-4. Relay box for temperature sensor

- Operating temperature range: 0℃ ~ 70℃
0℃ ~ 100℃ (without using magnet)
- Operating humidity range: 85 %RH or less (Non condensing)
- Stored temperature range: -10℃~ 70℃
-10℃ ~ 100℃ (without using magnet)
- Vibration resistance: 10 Hz ~ 55 Hz
Double amplitude 1.5 mm for 2 hours of each X, Y, Z direction)
- Outline dimensions: (W) 111.6 mm × (H) 40 mm × (D) 40.4 mm (Excludes protruding parts)
- Weight: Approx. 220 g

10-5. Relay cable for temperature sensor

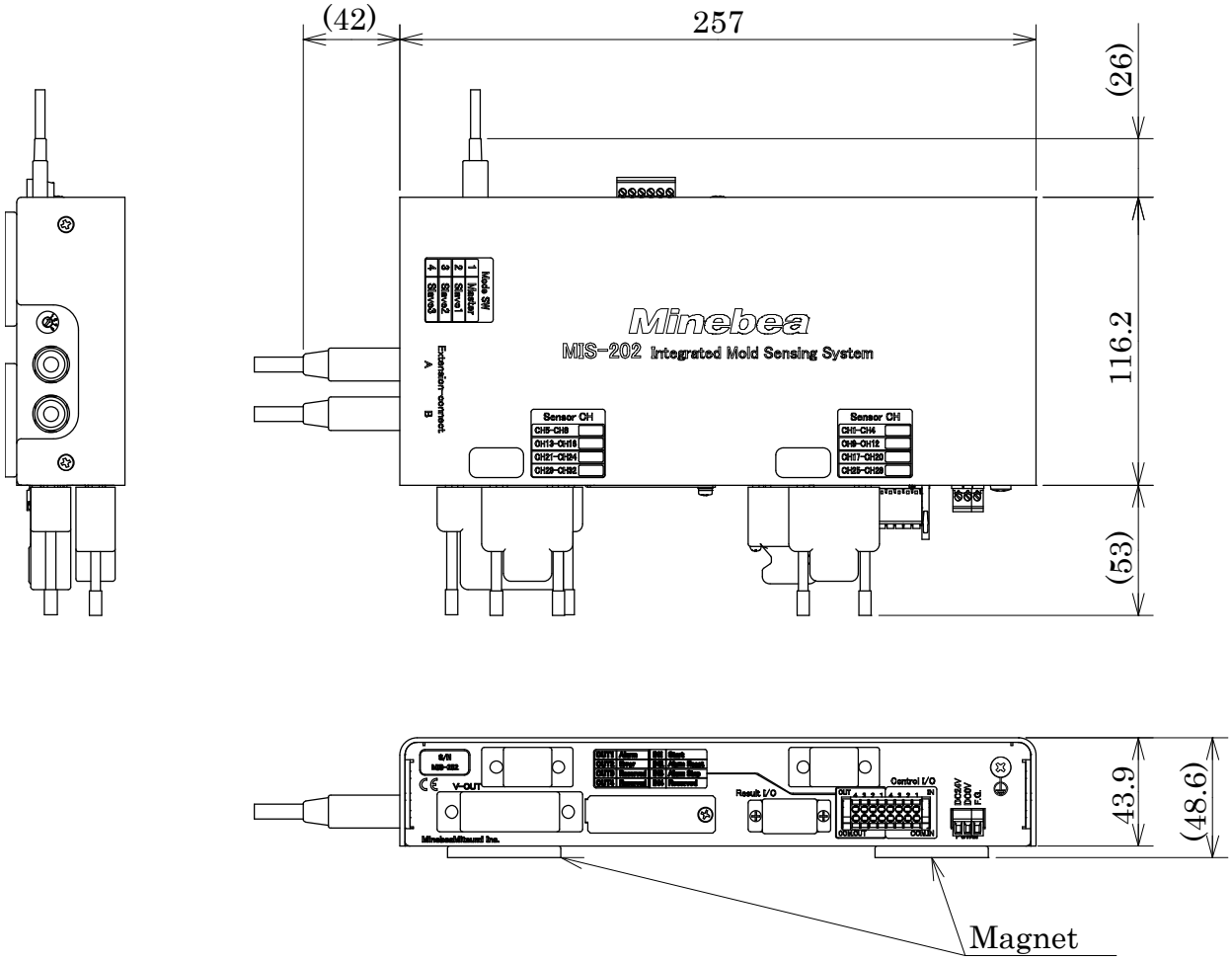
- Operating temperature range 0℃ ~ 100℃
- Operating humidity range 85 %RH or less (Non condensing)
- Stored temperature range 0℃ ~ 50℃
- Cable diameter Approx. 8.8 mm
- Minimum bending radiou Fixed part: 70 mm, Moving part: 100 mm

11. Accessories of system amplifier

- USB cable (2.0 m) 1 piece
- Power supply plug 1 piece
- Control I/O plug 1 piece
- Modbus plug 1 piece
- CD-ROM 1 piece
  (Measurement application MIS-Anest, Driver, File conversion software)
- Instruction manual 1 pad

12. Outline dimensions

• Amplifier MIS-202-PT/PP

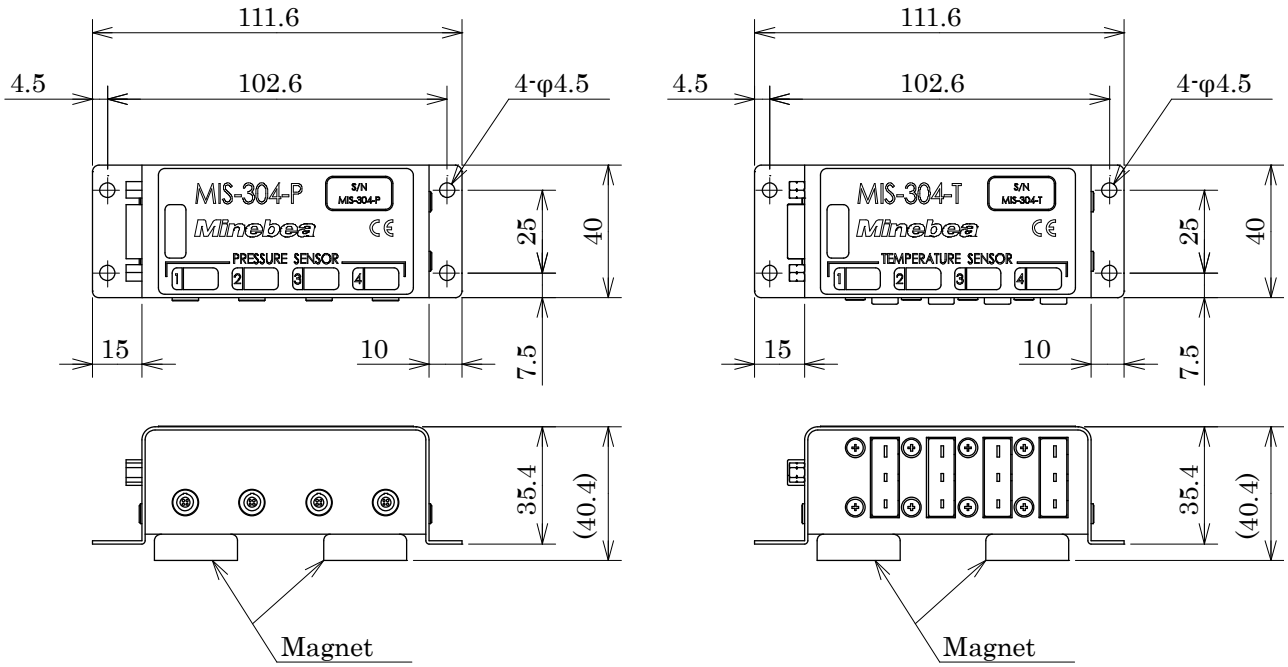


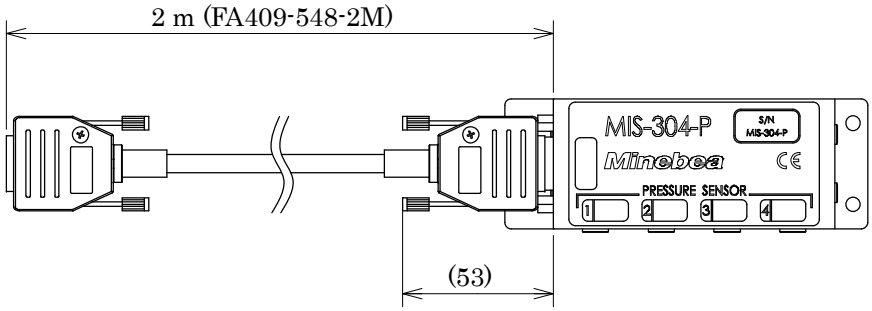
Unit: mm

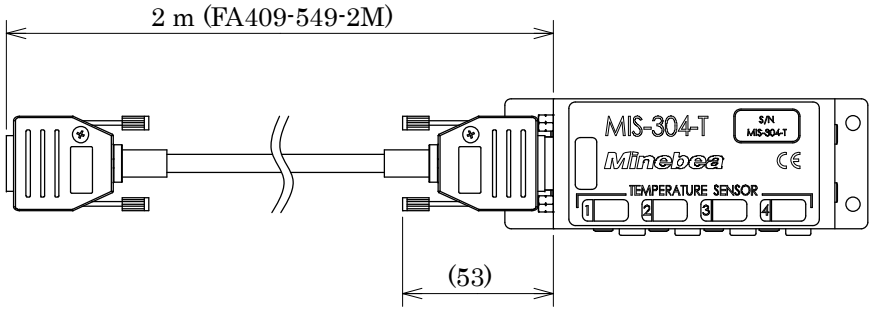
※ Available to install with the magnet on a metallic side.

Specifications

• Rela box MIS-304-P, MIS-304-T







Unit: mm

※ Available to install with the magnet on a metallic side.

※ Detach the magnet when you fix the device by the screw.

13. Conformity standard

- This instrument has suited the following standard.
  EN61326-1:2021
  [Electrical equipment for measurement, control, and laboratory use - EMC requirements]
  [Immunity test requirements for equipment intended for use in industrial locations]

  RoHS compliant

The using conditions to suit this instrument to the above are as follows,

13-1. Power supply

- The power supply of 24 VDC must use [CE applied product].

13-2. Cable

- Use the shielded cable for all connections.
- Use the attached USB cable.
- Use the exclusive optional cable for channel increase, a judgement output and V-OUT cable.

13-3. Shielding process

- Connect the shielded cable for control I/O with the protective ground terminal in the rear panel.
- Connect the shield cable of power supply with F.G. terminal of connector.
- Ground the shield of the opposite side of all the calbe. (Both ends grounding)

13-4. Grounding

- The ground of this instrument shall apply the individual ground by using the protective ground terminal. Ground the slave device when the channel is increased similarly.

※ Specifications and outline dimensions and so on which have printed may subject to change for the purpose of improvement without notice.