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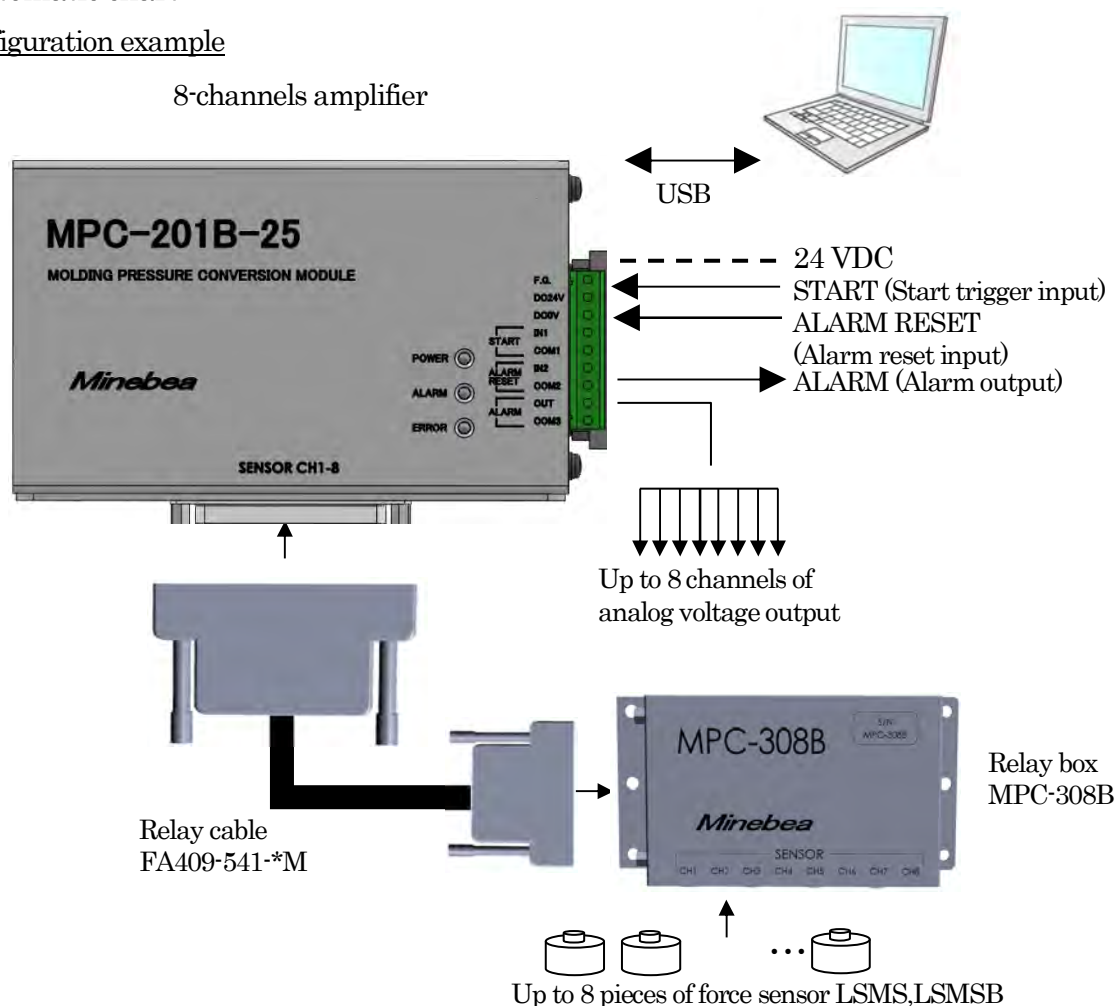# Specifications

Molding Pressure Conversion Module
Amplifier

1. General

This is a digital conversion module of (8) channels input that measures the resin pressure in the metal mold of the injection molding machine. The pressure is watched on the condition set beforehand, and the result is output as an alarm signal. Moreover, the pressure waveform converted into the analog voltage can be transmitted to the molding machine. In addition, the real-time pressure waveform   display, save, read-out, analysis and various set can be provided by using the application software for the personal computer.

1-1. Systematic chart

Configuration example

8-channels amplifier

USB

24 VDC
START (Start trigger input)
ALARM RESET
(Alarm reset input)
ALARM (Alarm output)

Up to 8 channels of
analog voltage output

MPC-308B

Relay box
MPC-308B

Relay cable
FA409-541-*M

Up to 8 pieces of force sensor LSMS,LSMSB

 *This unit can be also used by connecting the relay box MPC-308,MRB-304-BI and MRB-304-CV.

1-2. Outline of system function

- Pressure measurement, Alarm judgement result output, Analog voltage output
- Real-time pressure waveform disply, analysis, statistics, save and print by a special application.
- Various setting and writing/reading out of sensor sensitivity by the special application.

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Specifications

MPC-201B-25	
Spec. No.EN382201B-25B	2/13

2. Specifications

2-1. Specifications for analog input

- Bridge power supply — DC5V±0.25 V within 20 mA per 1 channel
- Applicable transducer — Strain gage based transducer (350 Ω, 1 unit/channel)
  LSMS-S06 Series, LSMSB Series
  * The model of 2 000.0 N or more (200K, 500K, 1T and 3T) corresponds since ROM Ver. 1.200.
- Numbers of input points — Up to 8 channels
- Input range — -0.1 mV/V ~ 0.8 mV/V
- Zero adjustment range — Zero set function can be adjusted in the range from -0.1 mV/V to 0.7 mV/V.
- Accuracy — ±2.0 %F.S.
- Sampling interval — 10 ms for each channel
  (Changeable to 0.5 ms, 1 ms, 2 ms, 5 ms, 20 ms or 50 ms.)
  * Limited to 10 ms, 20 ms, 50 ms at the long time measurement
- A/D internal resolution — 16 bit
- Analog filter — Approx. 500 Hz

2-2. Specification for analog output

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

2-3. Specification for digital

- Measuring range — 0 MPa ~ 999.99 MPa (Conversion value from pressure receiving area)
- Unit — MPa
- Status LED — POWER, ALARM, ERROR

2-4. Specifications for setting

- EEPROM   Measurement condition set, Alarm function set
- RAM   Zero set data, Measuring mode (Overlay / Continuous)

2-5. Measurement condition set

- Sensor set   Rated capacity, rated output and pressure receiving area.
- Measuring time set   Up to 120 s, Up to 600 s at the long time measurement
                            * The long time measurement corresponds since ROM Ver. 1.220.
- Start trigger input set   Selectable from rising up and falling down.
                            Effective only once at the pulse width of 50 ms or more.
- Start trigger input delay time set
                            0.0 s ~ 25.0 s
- Peak over eject (POE) detection time set
                            Start time: 0.00 s ~ 600.00 s,
                            Finish time: 0.00 s ~ 600.00 s
                            *121 seconds or more is available only in the long time measurement

2-6. Alarm function set

- Effective/Invalid set of channel
                            Selectable from effective and invalid of alarm watch of each channel.
- Watch frame condition set Selectable from effective and invalid in system 1 ~ 3 of each channel.
                            Area watch, Peak watch, Watch at (t) second later and Watch at the peak arrival time.
                            Pressure : Lower limit 0.00 ~ 200.00 MPa
                                        Upper limit 0.00 ~ 200.00 MPa
                            Time :   Start 0.00 ~ 600.00 s
                                        Finish 0.00 ~ 600.00 s
                            *121 seconds or more is available only in the long time measurement
                            * The area watch can be set in system 1 and system 3.
                            * [Watch at (t) second later] and [Watch at the peak arrival time] cannot
                               be set in two or more systems.
- Integral value condition set
                            Selectable from effective and invalid of each channel.
                            Integral value watch and peak arrival integral value watch
                            Integral value: Lower limit 0.00 = 120 000.00 MPa・s,
                                            Upper limit 0.00 = 120 000.00 MPa・s,
- Alarm output set   Selectable from rising up and falling down.
- Alarm reset input time set Selectable from effective and invalid of time control.
                            Time setting when effective: 1.0 s ~ 25.0 s
- Alarm reset input set   Selectable from effective and invalid of alarm reset input.
                            Signal setting when effective: Selectable from rising up and falling down.

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# Specifications

| MPC-201B-25 |
| --- |
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2-7. External control function

• External control input signal
      Start trigger input   Start measurement
      Alarm reset input   Reset the alarm output condition
      *Above is level input, and effective once at the pulse width of 50 ms or more.

• Equivalent circuit of external control input

Approx.24 VDC

10 kΩ

0.047μF   Non voltage contact input

INPUT1, 2

1 kΩ   COM1, 2
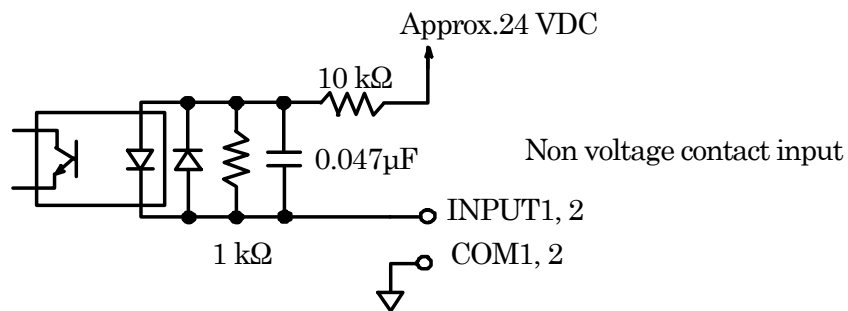
* The internal circuit is insulated by photocoupler.

• External control output signal
      Alarm output   Output the judgement result on various alarm condition.

• Equivalent circuit of external control output

OUTPUT

NPN open collector output

COM3
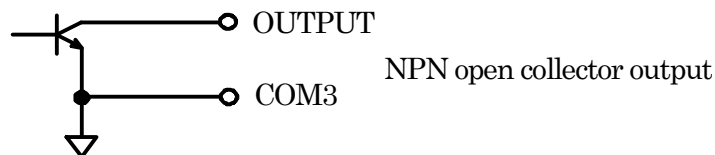
Rated open collector V_{CE} = 35 VDC max.、 I_c = 100 mADC max.
      * The internal circuit is insulated by photocoupler.

2-8. USB interface

• Specification   Conformed to USB Specification 2.0/1.1
• Output connector   Mini-USB B-type connector (Female)
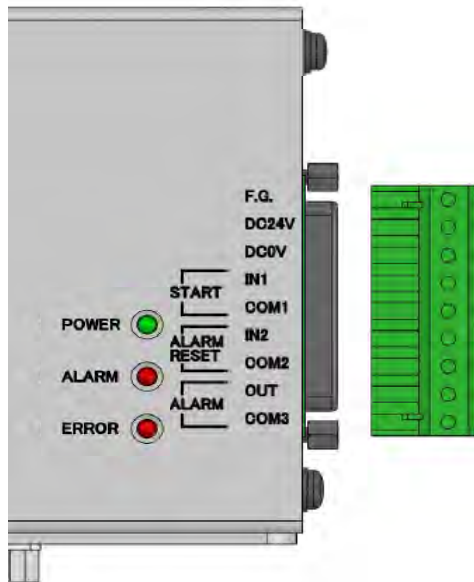* Installation of the attached special driver software for PC is required.

2-9. Connector configuration

• Power supply and external control I/O

Signal name	Contents
F.G.	Frame ground
24 VDC	Power supply 24 VDC
0 VDC	Power supply 0 VDC
IN1	Start trigger input
COM1	Signal ground
IN2	Alarm reset input
COM2	Signal ground
OUT	Alarm output
COM3	Signal ground

*Attached applicable plug : XW4B-09C1-H1 (made by OMRON.)
*COM1 and COM2 are common internally, and COM3 is separated.

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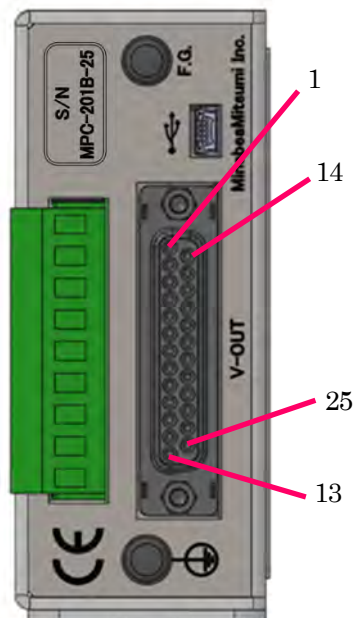
Pin No.	Signal name	Pin No.	Signal name
1	N.C.		
2	N.C.	14	N.C.
3	N.C.	15	N.C.
4	N.C.	16	N.C.
5	N.C.	17	N.C.
6	+OUT8	18	-OUT8
7	+OUT7	19	-OUT7
8	+OUT6	20	-OUT6
9	+OUT5	21	-OUT5
10	+OUT4	22	-OUT4
11	+OUT3	23	-OUT3
12	+OUT2	24	-OUT2
13	+OUT1	25	-OUT1

* Attached applicable plug: Main DB-25PF-N, Cover DB-C8-J10-F4-1R (made by JAE.)
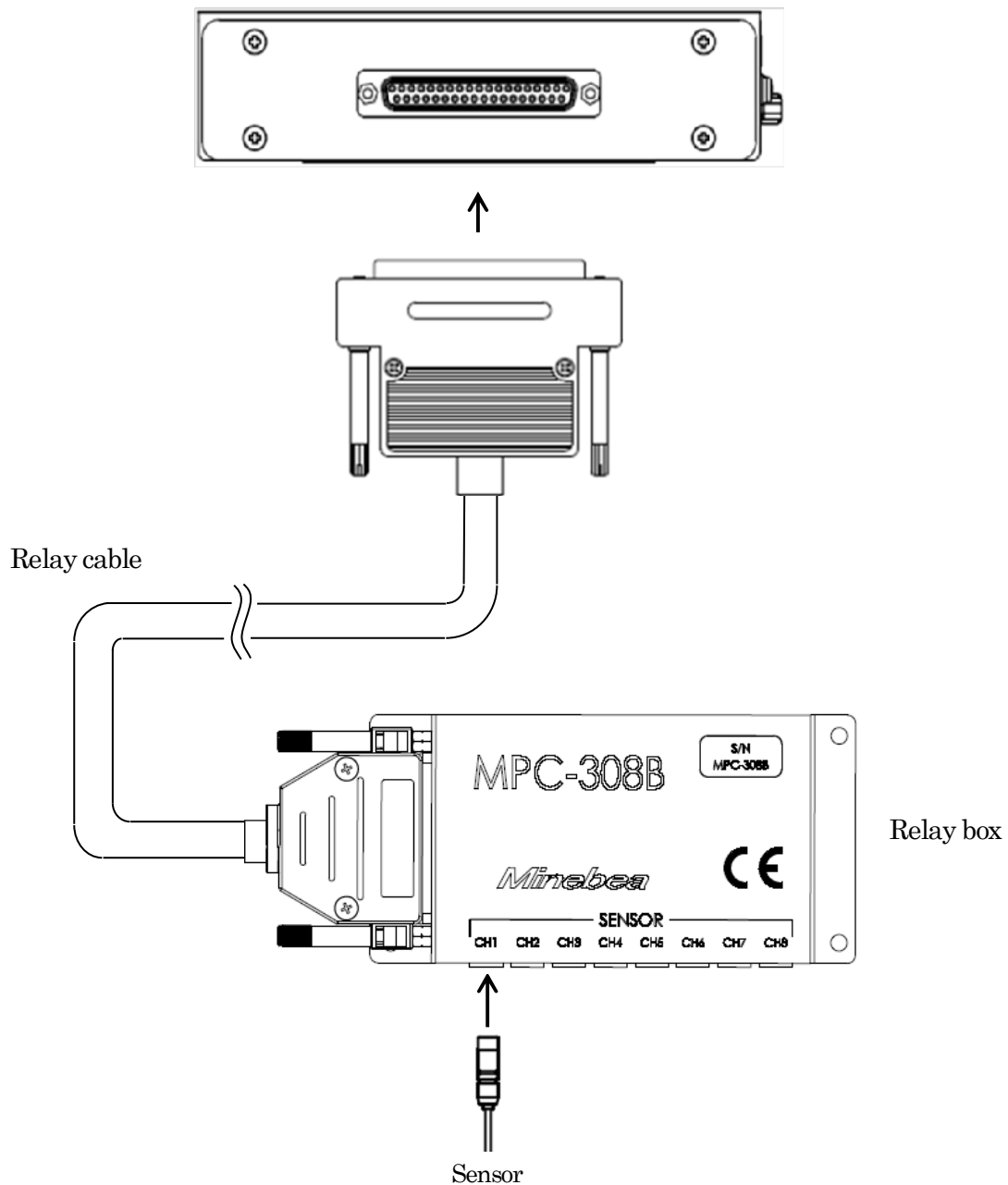* The engagement fixation stand screw is inch screw.

2-10. Connection of sensor and relay box

Relay cable

MPC-308B

Relay box

SENSOR
CH1 CH2 CH3 CH4 CH5 CH6 CH7 CH8

Sensor

・To connect the relay box MPC-308B (with MPC-201B-25) ,MRB-304-BI and MRB-304-CV, use the relay cable FA409-541-*M.
・Insert the plug of sensor into relay box.
*To connect the relay box MPC-308 (with MPC-201B-25), use the D-sub connector of directly connected cable.

Specifications

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Spec. No.EN382201B-25B 　　7/13

2-11. Various function (Special application software: MIP-D-02)

2-11-1. System requirement

Personal computer　　　PC/AT compatible unit

OS :	Windows 7, 8, 8.1, 10
CPU :	2 GHz or more
RAM :	4.0 GB or more
HDD :	1 GB or more of empty capacity in hard disk is required.
USB port :	1 port is required.
CD-ROM drive :	Required.
Mouse or substitute :	Required.
Keyboard :	Required.

Monitor　　　　　　　Resolution 1 280 x 768 or more
Color printer　　　　　Required in printing

* This software doesn't guarantee operation with all personal computers.

2-11-2. Waveform display function

- Real-time waveform display
- Overlay waveform display
- Trend display (Peak pressre, Integral value or Protruding pressure)
- Display channel selection
- Waveform expansion
- Alarm watch frame display
- Graph scale automatic adjustment
  (Real-time waveform display, Overlay waveform display, Trend display)

2-11-3. Measurement processing function

- Sequential waveforms (This waveform draws continuously regardless of the measurement time.)
  Zero set: When the acquisition of sequential waveforms begins. , Manual.
- Overlay waveform (This draws in the waveform of each shot repeatedly.
  Zero set: This draws by the start trigger input.
- Reference waveform registration
- Peak pressure, Integral value and Current pressure display (Select two from three)
- Counter of shot number (Total shot number, OK shot number and NG shot number)

2-11-4. Measurement condition setting function

- Set of channel name
- Set of sensor
- Set of sampling interval
- Set of measurement time
- Set of start trigger input
- Set of start trigger input delay time
- Set of start trigger input interrupt (since ROM Ver. 1.014)
- Set of pressure detection range of peak over eject.
- Set of overlay display frequency
- Set of analog voltage output (Selectable from effective, invalid or scaling)

* During the measurement, the above mentioned condition setting cannot be changed. Only inspection is possible.

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2-11-5. Data storing function
- The numerical data saving
  (Save the same CSV type file for peak pressure, integral value, peak over eject pressure, alarm judgement result, etc., in every date.)
- Save the overlay waveform data.
  (Save the sampling data as the CSV type file in every shot, or NG shot and the one before and after.)
- Save the alarm history (Save the numeric data of the waveform where the alarm is generated.
  * This saving function of numeric data, waveform data and alarm history are changeable between effective and invalid.
- Save the screen copy of condition setting.

2-11-6. ALARM function
- Image display
- Effective or invalid of alarm judgement. (by each channel)
- Alarm reset input condition set
- Alarm output timing set (since ROM Ver. 1.014)
- Alarm output condition set (Time and external input signal)

2-11-7. Alarm judgement function
- Area watching frame judgement (Pressure value: Upper limit and lower limit, Time: Start and finish)
- Peak watching fram judgement (Pressure value: Upper limit and lower limit, Time: Start and finish)
- Watch at [t] second later (Pressure value: Upper limit and lower limit, Time: [t] second later)
- Watch of arrival time to peak (Time: Start and Finish)
- Watch of integral value (Integral value: Upper limit and lower limit)
- Watch of peak arrival integral value (Integral value: Upper limit and lower limit)

2-11-8. Data Processing function
- Reading out waveform data
- Calculation of pressure value of specified time
- Calculation of integral value in the specified time range.
- Drawing of horizon in specified pressure value

2-11-9. Check function
- ROM version check
- Monitoring function (Display the output value [mV/V] from sensor.)
- External control I/O operational check
- Analog output voltage check
- ERROR LED confirmation (since ROM Ver. 1.014)

2-11-10. Other function
- Statistical process (The average value, the maximum value, the minimum value and the standard deviation of the measurement of each channel are calculated.
- Screen printing capability
- Password function (Prohibit changing of the setting for condition setting screen and stored place of data.)
- Threshold value setting of drive free space (since ROM Ver. 1.200).

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3. General Specification

- Operating temperature/humidity range

Temperature	-10 ℃ ~ 50 ℃
Humidity	85 %RH or less (Non Condensing)

- Stored temperature range -20 ℃ ~ 60 ℃
- Vibration resistance   10 ~ 55 Hz double amplitude 1.5 mm
  2 hours for each direction of X, Y or Z.
- Power supply
  Power supply voltage 24 VDC (Available variable range 20.4 VDC ~ 27.6 VDC)
  Power consumption   Approx. 6.5 W (at 24 VDC)
- Outline dimensions   (W)160 mm x (H)98 mm x (D)40 mm (Excludes protruding parts.)
- Weight   Approx. 800 g

4. Accessories

- USB cable 2.0 m   1 piece
- Ferrite core   1 piece (to be attached to USB cable.)
- Plug for power supply and external control I/O
  1 piece (XW4B-09C1-H1)
- Plug for analog voltage output
  1 piece (Main body: DB-25PF-N, Cover: DB-C8-J10-F4-1R)
- CD-ROM   1 piece
- Instruction manual   1 pad

*Special application (MIP-D-02) and the driver software are supplied to CD-ROM.

Specifications

MPC-201B-25
Spec. No.EN382201B-25B   10/13

5. Options

5-1. Relay box

5-1-1. MPC-308B

- Model   MPC-308B
- Operating temperature/humidity range

  Temperature   0 ℃ ～ 70 ℃
  (When magnet is not used. 0 ℃ ～ 100 ℃)
  Humidity   85 %RH or less (Non Condensing)
- Stored temperature range

  -10 ℃ ～ 70 ℃(When magnet is not used. -10 ℃ ～ 100 ℃)
- ibration resistance   10 ～ 55 Hz double amplitude 1.5 mm
  2 hours for each direction of X, Y or Z.
- Outline dimensions   (W) 120 mm x (H) 60 mm x (D) 35.4 mm (Excludes protruding parts.)
- Weight   Approx. 300 g (Include magnet.)
- Material of case   SUS430
- Applicable transducer   LSMS-S06 Series, LSMSB Series
- Applicable Amplifier   MPC-201-25、MPC-201B-25

5-1-2. MRB-304-BI

- Operating temperature/humidity range

  Temperature   0 ℃ ～ 100 ℃
  Humidity   85 %RH or less (Non Condensing)
- Stored temperature range

  -10 ℃ ～ 100 ℃
- Vibration resistance   10 ～ 55 Hz double amplitude 1.5 mm
  2 hours for each direction of X, Y or Z.
- Outline dimensions   (W)98mm x (H)14.8 mm x (D)39.1 mm (Excludes protruding parts.)
- Weight   Approx. 80 g
- Material of case   SUS304
- Applicable transducer   LSMS-S06, LSMSB series
- Applicable amplifier   MPC-201-25、MPC-201B-25

5-1-3. MRB-304-CV

- Operating temperature/humidity range

  Temperature   0 ℃ ～ 100 ℃
  Humidity   85 %RH or less (Non Condensing)
- Stored temperature range

  -10 ℃ ～ 100 ℃
- Vibration resistance   10 ～ 55 Hz double amplitude 1.5 mm
  2 hours for each direction of X, Y or Z.
- Outline dimensions   (W)121.6 mm x (H)17.2 mm x (D)70.9 mm (Excludes protruding parts.)
- Weight   Approx. 210 g
- Material of case   SUS304
- Applicable transducer   LSMS-S06, LSMSB series
- Applicable amplifier   MPC-201-25、MPC-201B-25

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Specifications

5-2.　Relay cable

- Model　　　　　　　　FA409-541-2M　　　(Cable length　2m)
　　　　　　　　　　　　FA409-541-5M　　　(Cable length　5m)
　　　　　　　　　　　　FA409-541-10M　　(Cable length　10m)
- Operating temperature/humidity range
　　　　　　　　　　　　Temperature　　　　0 ℃ 〜 100 ℃
　　　　　　　　　　　　(Connector on amplifier side　0 ℃〜50 ℃)
　　　　　　　　　　　　Humidity　　　　　85 %RH or less (Non Condensing)
- Stored temperature range
　　　　　　　　　　　0 ℃ 〜 50 ℃
　　　　　　　　　　　　(Because operation temperature range of the connector on amplifier side is up to 50℃.)
- Cable outer diameter　　Approx. 8.3mm
- Minimam bending radius　50mm

5-3. Analog voltage output cable

- Model　　　　　　　　FA409-476
- Cable length　　　　　2.5 m
- Operating temperature/humidity range
　　　　　　　　　　　　Temperature　　　　0 ℃ 〜 50 ℃
　　　　　　　　　　　　Humidity　　　　　85 %RH or less (Non Condensing)
- Stored temperature range　0 ℃ 〜 50 ℃
- Cable outer diameter　　Approx. 9.0mm
- Minimam bending radius　54mm

5-4. External control I/O cable

- Model　　　　　　　　FA409-477
- Cable length　　　　　2.5 m
- Operating temperature/humidity range
　　　　　　　　　　　　Temperature　　　　0 ℃ 〜 50 ℃
　　　　　　　　　　　　Humidity　　　　　85 %RH or less (Non Condensing)
- Stored temperature range　0 ℃ 〜 50 ℃
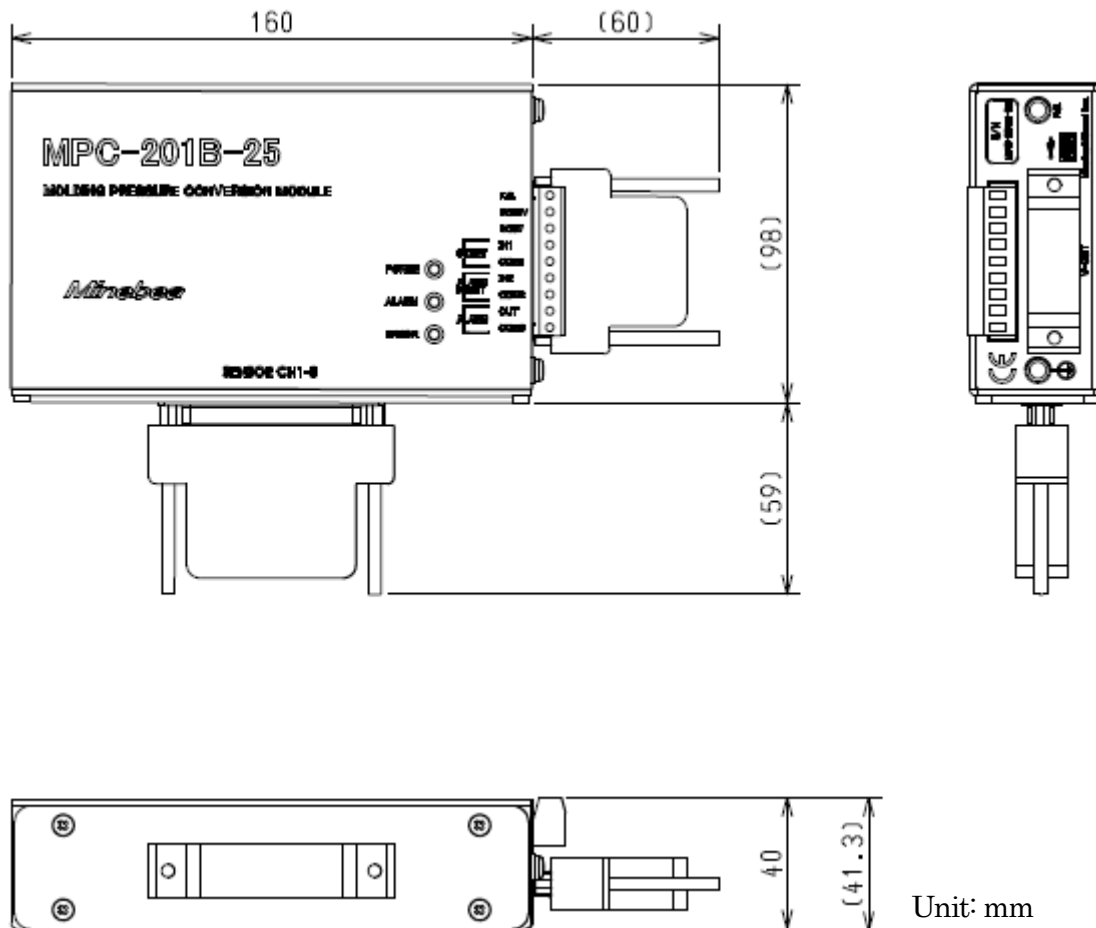- Cable outer diameter　　Approx. 7.3mm
- Minimam bending radius　44mm

6. Outline dimensions

- Main body MPC-201B-25

Unit: mm

*This unit can mount on the metal surface with the magnet.

7. Conformity standard

This instrument has suited the following standard.

EN61326-1:2013

[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,

7-1. Power supply

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

7-2. Cable

- Use the shielded cable other than the power cable.
- Mount the provided ferrite core to USB cable as shown in [5-2-4. USB connection] of the instruction manual of this instrument.

7-3. Shield processing

- Connect the shield cable of I/O with the protective ground terminal.
- Connect the shield cable of V-OUT with F.G. terminal.
- Ground the shield of the opposite side of the I/O cable and the V-OUT cable. (Both ends grounding)

7-4. Grounding

- The ground of this instrument shall apply the individual ground by using the protective ground terminal.

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