Futaba

Operation Manual for Mold Open Preamplifier

MPD-200F

Keep this instruction manual carefully so that it can be taken out and read when necessary.

1. SAFETY PRECAUTIONS

(Be sure to read these precautions before using our products.)

Thank you very much for purchasing this product.

This manual is intended to serve as an instruction manual for the MP D200 F, and is intended to provide "safety precautions" for the sensor and the transducer to be used in combination with it.

Before using this product, be sure to read this "Safety Precautions" thoroughly to ensure correct use.

Familiarize yourself with the machine knowledge, safety information, and all precautions before use.

(1) Types of symbols used in this manual and their meanings

Display	Meaning of Display
⚠ **Warning**	In case of mishandling, a hazardous situation may occur and death or serious injury may result.
⚠ **Caution**	In case of mishandling, a hazardous situation may occur and moderate injury or minor injury may be expected, or property damage may be expected.

In the following description, MEL1002 is simply described as "detector" or MPD200F as "transducer".

(2) Application limitation

⚠ **Warning**

This product is not designed or manufactured to be used under life-threatening conditions. Please contact us if you are considering using this product for special applications such as medical equipment, aerospace equipment, nuclear power control systems, or transportation equipment.

(3) Precautions on use

⚠ **Caution**

- ●Do not disassemble, modify or repair the product by your company.
- ●Provide a safety circuit external to the main unit so that the entire system will work on the safe side even in the event of a detector or transducer failure.
- ●Please note that the following may cause electric shock, fire, or malfunction.
  - ・Do not damage, apply excessive stress, place heavy objects on, or pinch the cables.
  - ・Be sure to turn off the power before moving, wiring, or checking the product.
  - ・Be sure to ground the FG terminal of the transducer.
  - ・Never use the transducer where it will be exposed to water, in an atmosphere of corrosive or flammable gases, or near combustible materials.
  - ・Detectors and transducers should be used in the environment described in the specifications and instruction manuals.
  - ・The detector, transducer and extension cable must be used in the specified combination.
- ●The DIP switches inside the transducer are used for our inspection. Do not change the settings.

(4) Storage Precautions

⚠ **Caution**

- ●Do not store the product in locations exposed to rain or water drops or in the presence of harmful gases or liquids.
- ●Store the product in a place that is not exposed to direct sunlight or within the specified temperature and humidity ranges.
- ●If storage has been prolonged, please contact our person in charge.

(5) Transportation

⚠ **Caution**

●Do not apply excessive stress to the cable outlet of the main unit during transportation. Failure to do so may cause an electric shock, fire, failure or malfunction.

(6) Disposal

⚠ **Caution**

●When disposing of the product, treat it as industrial waste.

(7) Installation

⚠ **Caution**

●Please note that the following may cause accidents, electric shock, fire, or malfunction.
・ Do not step on the product or place heavy objects on it.
・ Do not allow foreign objects to enter.
・ Transducers and detectors should be securely fastened using mounting holes or the mounting hardware provided.
・Keep the specified distance between the transducer and the inner surface of the control panel or other equipment.

(8) Wiring

⚠ **Caution**

●Please note that the following may cause accidents, electric shock, fire, or malfunction.
・ Securely connect the transducer connector.
  If the product has an attached terminal cover, be sure to attach the terminal cover to the product.
・ Sensor cables should be kept at least 100 mm away from control lines, main circuits and power lines.
・ Wire correctly and securely.

(9) Operation

⚠ **Caution**

●Please note that the following may cause accidents, electric shock, fire, or malfunction.
・ Do not approach the machine after the momentary power loss is restored, as the machine may restart abruptly.
・ Check that the power specifications are correct.
・ When an error is detected, remove the cause of the error and ensure safety before restarting operation after the error is cleared.

(10) Disclaimer

⚠ **Caution**

●Please note that we are not responsible for any secondary damage induced by malfunction of the delivered product.
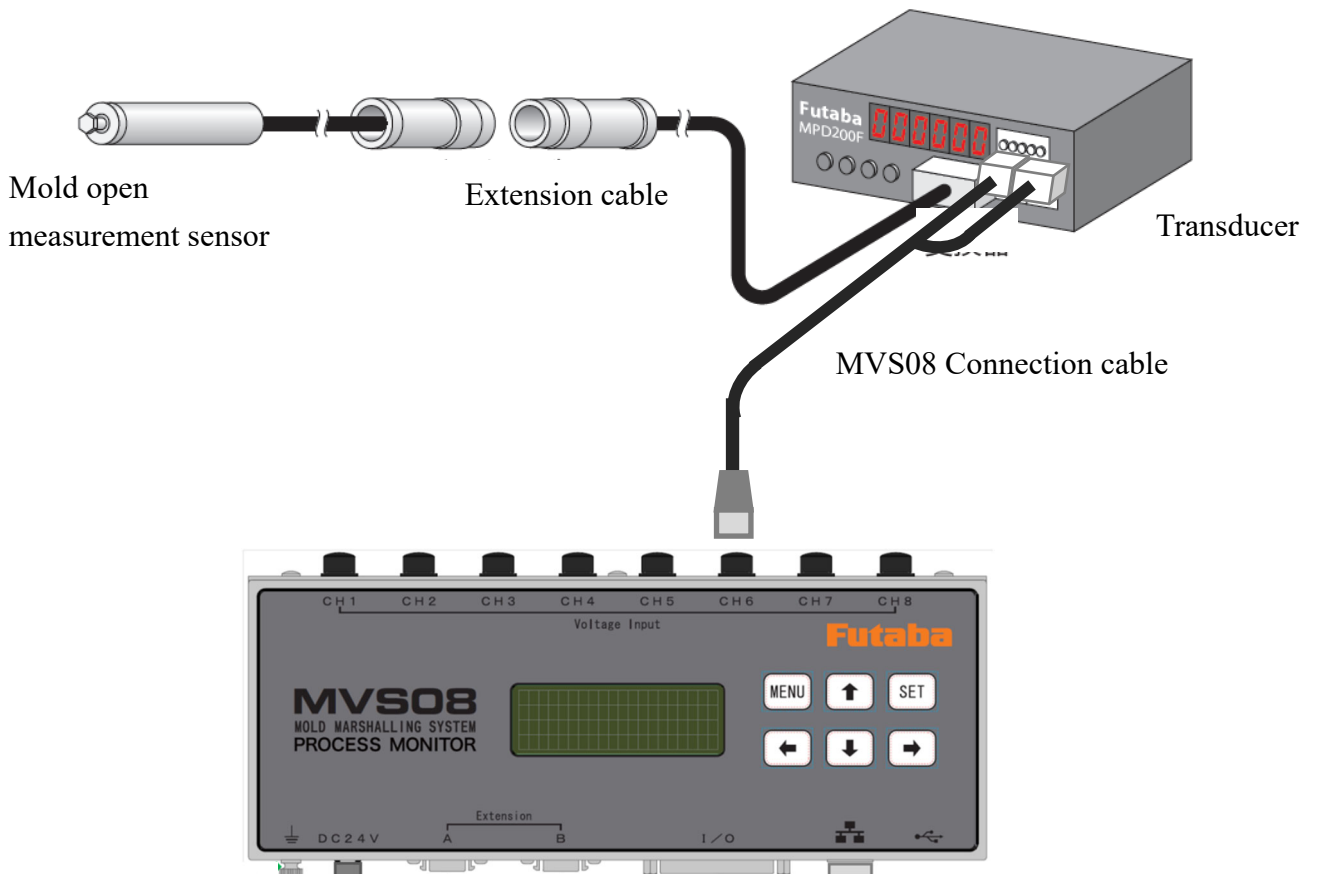
2. Overview

This analog output transducer is connected to a mold open measurement sensor and outputs position data in the form of voltage and current.
For single or multiple pitches only.

# 3. Configuration

[Configuration example]

Injection Molding Monitoring MVS08

4. Specifications

| Product code			MPD200F
Function	Linearity correction (Look Up Table)		Without high-precision correction
Power supply	Power supply voltage		DC+24[V]±10% ripple 100[mV]
	Current consumption		0.25[A] Below (at DC24V)
Detector	Applicable Series Name		MEL,BIC,LIC,WIC,PIC,CIC
	Connection method		By a Molex connector
Analog Output	Voltage	Range	-5～+5[V],-10～+10[V],0～+10[V],0～+5[V]
		Load impedance	10 kΩ or more
	Electric current	Range	4～20[mA],0～20[mA],0～24[mA]
		Load impedance	250 Ω or less
Analog output resolution			16bit
Data update interval			102.4[μs]
Output-Voltage (VOUT) Characteristics			±0.22%FS (without error adjustment) ±0.06%FS (with error adjustment)
Output Current (IOUT) Characteristics			±0.44%FS (without error adjustment) ±0.09%FS (with error adjustment)
I/O	Power supply		DC12～24V±10%
	Input (2 points)		Alarm clear zero setting (ON when connected to N24)
	Output (2 points)		Alarm output/reserve output (200mA [max], open collector)
7Seg display resolution			13-bit FS [1μm unit]
Number of pitches			Multi-pitch possible (up to 7 pitches)
Other functions			ZEROSET, PRESET
Operating temperature range			0°C to +55°C (-25°C to +85°C for storage)
Operating humidity range			35%～85%RH
Insulation resistance			100 MΩ or more (with DC250V insulation resistance meter) Between all charged parts and FG
Connection method			At connector (power supply, output, I/O line)
Mounting method			Screw fixing type, DIN rail mounting
External Dimensions			103 × 106 × 30 mm (Excluding DIN mounting bracket and connector/switch protrusion)
Weight			160[g]

[Direction Definition]

MEL type
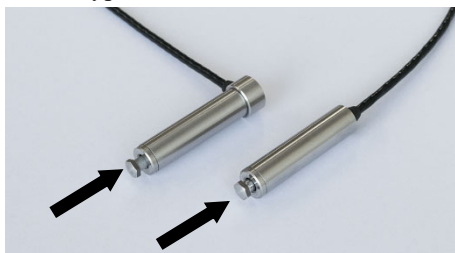
When the sensor axis moves in the direction of the arrow (→), it is in the increasing direction. The direction of increase/decrease can be changed using parameter Cd1004 "Direction of Increase/Decrease of Binary Data".
⇒Refer "8. Parameter List" for details.

5. Connector connection
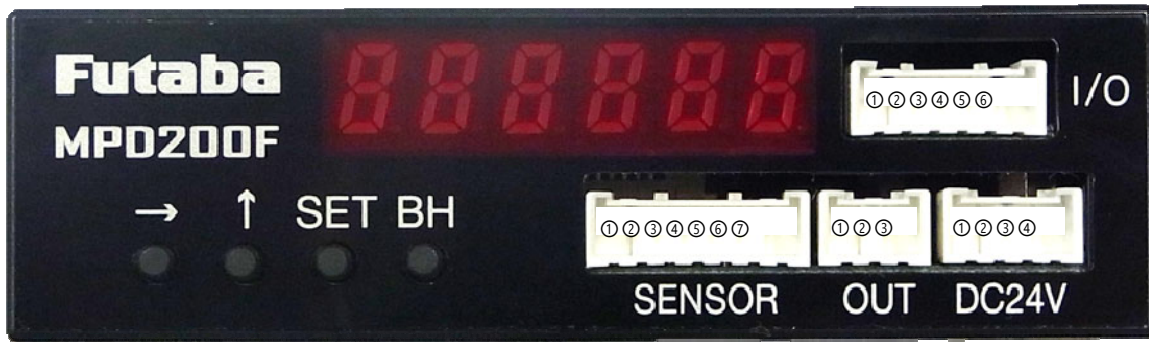
(1)Power supply connector (DC 24 V)

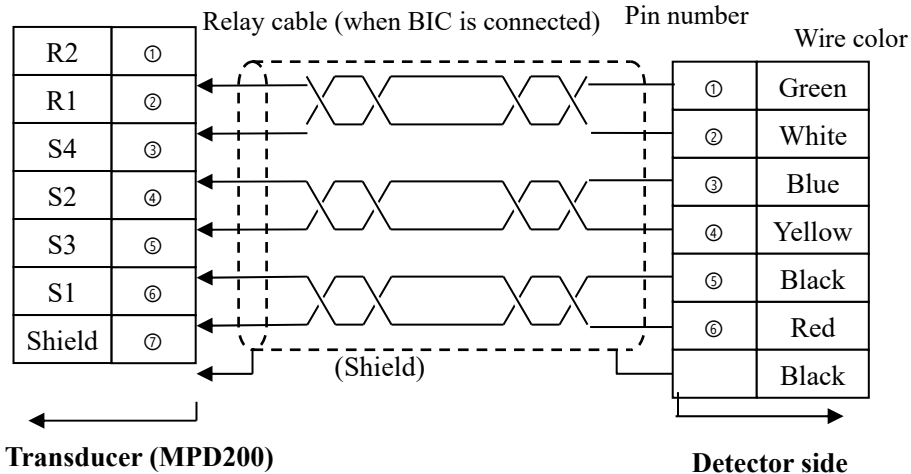   Socket: 51103-400 [Manufactured by Nippon Molex Incorporated]

     Contact 50351-8100 [Manufactured by Nippon Molex Incorporated]

Terminal No.	Terminal name	Name
①	+24V	Power supply (+24V)
②	GND	Power supply (GND)
③	NC	—
④	FG	Frame ground

(2)Detector connector (SENSOR)

     Socket: 51103-700 [Manufactured by Nippon Molex Incorporated]

     Contact 50351-8100 [Manufactured by Nippon Molex Incorporated]

Relay cable (when BIC is connected)　Pin number　Wire color

R2	①	①	Green
R1	②	②	White
S4	③	③	Blue
S2	④	④	Yellow
S3	⑤	⑤	Black
S1	⑥	⑥	Red
Shield	⑦		Black

(Shield)

Transducer (MPD200)　　　　　**Detector side**

(3)Analog output connector (OUT)

     Socket: 51103-300 [Manufactured by Nippon Molex Incorporated]

     Contact 50351-8100 [Manufactured by Nippon Molex Incorporated]

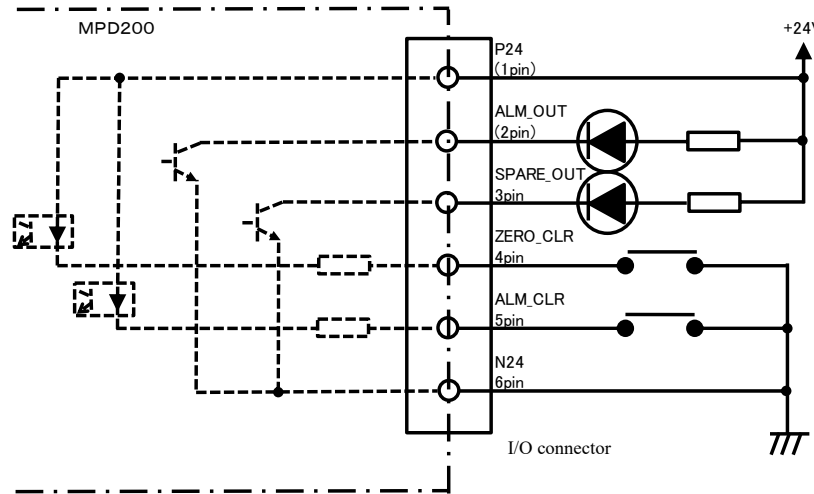| Terminal No.	Terminal name	Name
①	VOUT	Voltage output
②	IOUT	Current output
③	AGND	Analog GND

(4)External input/output connector (I/O)
　　　Socket: 51103-600 [Manufactured by Nippon Molex Incorporated]
　　　Contact 50351-8100 [Manufactured by Nippon Molex Incorporated]

Terminal No.	Terminal name	Name
①	P24	External power supply (+24V)
②	ALM_OUT	Alarm output
③	SPARE_OUT	Spare output
④	ZERO_CLR	Zero clear input
⑤	ALM_CLR	Alarm clear input
⑥	N24	External power supply (GND)

[I/O Connector Connection Example]

6. Parameter setting and display

Current location display
*When power is turned on, current location is displayed
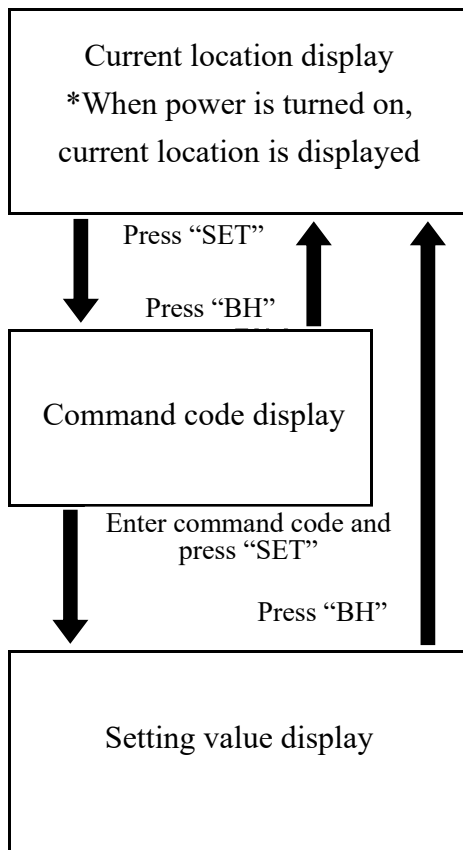
Displays the current value of the detector (in μm)
When an error occurs, the error code is displayed first.
⇒Refer to "10. List of Error Codes" for details of errors.
Press the "SET" key to move to the instruction code display.
Operations other than "SET" and "BH" keys are invalid.
Zero set is executed by holding down the "BH" key for 3 seconds.

Press "SET"

Press "BH"

Command code display

The instruction code is displayed in Cd00000
Input the instruction code using the " ↑ " and "→" keys.
Press "→" key to move the digit (the first digit is the highest digit, the next to the least digit is the fourth digit), and " ↑ " key to change the digit.
⇒The digit that can be changed is indicated by blinking.
⇒Pressing " ↑ " increases the value one by one, but the next digit after 9 is 0, and the digit is not increased (e.g. 08→09→00).
Press "SET" key to move to the setting value display.
⇒When an unused instruction code is input, the display does not shift to the set value display.
Err010" (out-of-range error) is displayed.
Press the "BH" key to move to the current location display.

Enter command code and press "SET"

Press "BH"

Setting value display

Use " ↑ " and "→" keys to enter setting values.
Press "→" key to move the digit (the first digit is the highest digit, the next to the least digit is the fourth digit), and " ↑ " key to change the digit.
⇒The digit that can be changed is indicated by blinking.
⇒Pressing " ↑ " increases the value one by one, but the next digit after 9 is 0, and the digit is not increased (e.g. 08→09→00).
Press "SET" key to move to the setting value display.
Press the "BH" key to move to the current location display.

7. Detector Position-Output Value Relationship

When the multi-pitch setting (Cd2002) is set to 0 (1 pitch), the output changes from minimum to maximum in this 1-pitch width as shown by the thick solid line in the output example below.

At positions beyond one pitch width, the output value shows a saw tooth wave trajectory as shown in Output Example 1. When the number of pitches is set to 2 or more, the output value outside the measurement range is fixed to the minimum or maximum value as shown in Output Example 2.

■Output Example 1: For 1 pitch and 8.192mm absolute pitch (VOUT:-10 to 10V)
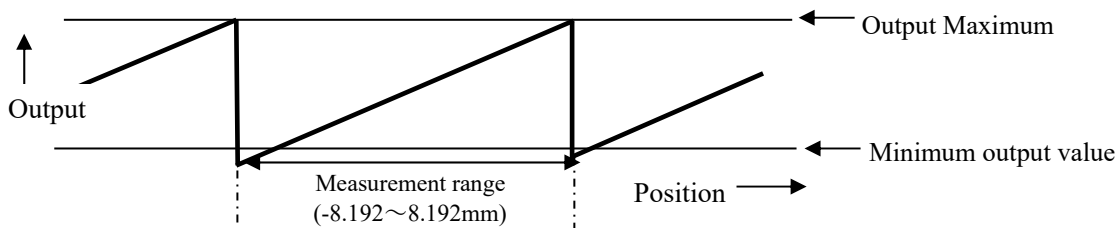
■Output Example 2: For 2 pitches and 8.192mm absolute pitch (VOUT: 0 to 10V)
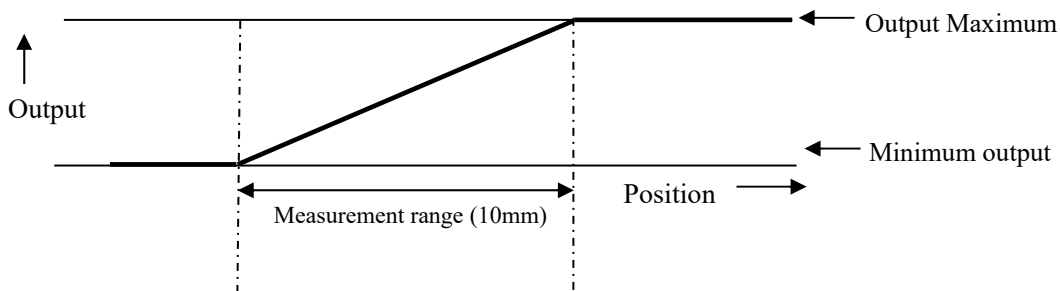
The measurement range (mm) for each set pitch number is shown below.

The graph on the next page shows an example of the detection value (mm) and analog output voltage (V) characteristics for each set pitch number.

The graphs are for an absolute pitch of 8.192mm and an analog output voltage of 0 to 10V.

Pitch	LIC0308 Absolute pitch 8.192mm			LIC0616 Absolute pitch 16.384mm			LIC1632 Absolute pitch 32.768mm		
	Detection range (mm)	Measurement range (mm)	Max. resolution (um)	Detection range (mm)	Measurement range (mm)	Max. resolution (um)	Detection range (mm)	Measurement range (mm)	Max. resolution (um)
1	8.192	8.192	0.125	16.384	16.384	0.250	32.768	32.768	0.500
2	16.384	10.0	0.250	32.768	20.0	0.500	65.536	40.0	1.000
3	24.576	20.0	0.375	49.152	40.0	0.750	98.304	80.0	1.500
4	32.768	30.0	0.500	65.536	60.0	1.000	131.072	120.0	2.000
5	40.960	40.0	0.625	81.920	80.0	1.250	163.840	160.0	2.500
7	57.344	50.0	0.875	114.688	100.0	1.750	229.376	200.0	3.500

ABS mode [pitch number 1].
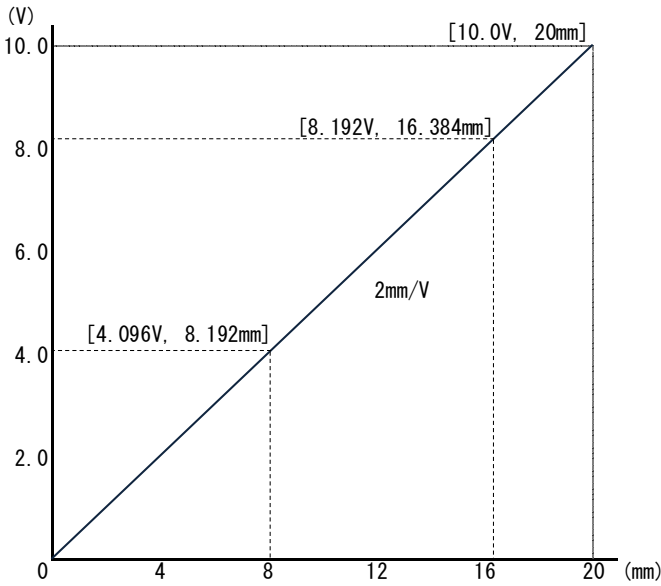 Absolute pitch: 8.192mm (Equivalent to LIC0308)

(V)

10.0	
8.0	
6.0	
4.0	8.192mm/10V = 0.8192mm/V
2.0	

0   2.048   4.096   6.144   8.192 (mm)
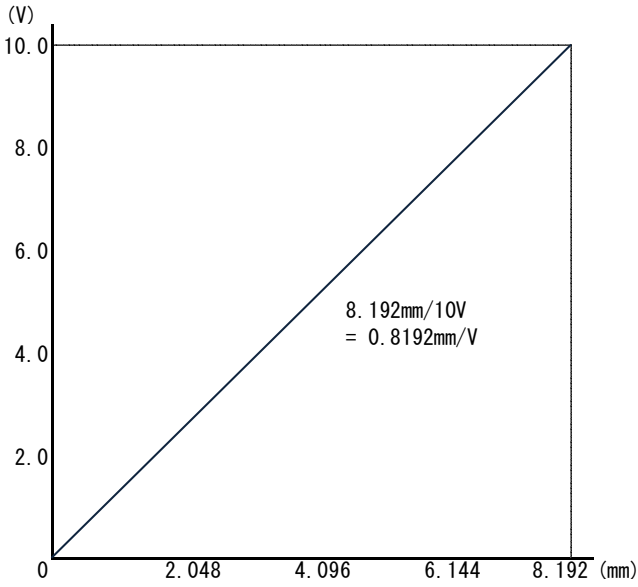
ABS mode [pitch number 2].
  Absolute pitch: 8.192mm (Equivalent to LIC0308)

(V)

[10.0V, 10.0mm]

[8.192V, 8.192mm]

1mm/V

0   2   4   6   8   10 (mm)
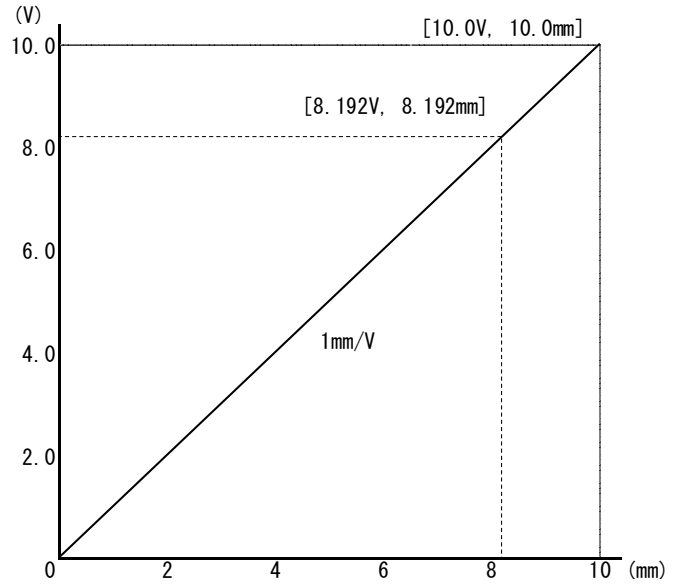
ABS mode [pitch number 3].
  Absolute pitch: 8.192mm (Equivalent to LIC0308)

(V)

[10.0V, 20mm]

[8.192V, 16.384mm]

2mm/V

[4.096V, 8.192mm]

0   4   8   12   16   20 (mm)

ABS mode [pitch number 4].
  Absolute pitch: 8.192mm (Equivalent to LIC0308)

(V)

[10.0V, 30mm]

[8.192V, 24.576mm]

[5.461V, 16.384mm]   3mm/V

[2.731V, 8.192mm]

0   6   12   18   24   30 (mm)
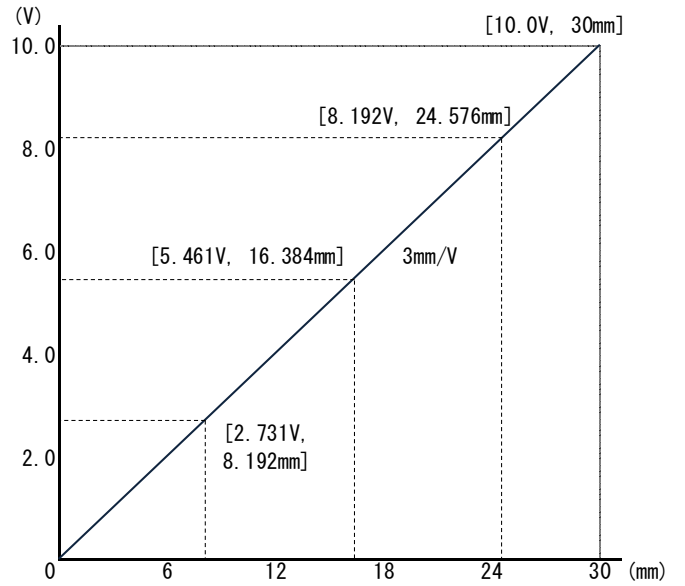
ABS mode [pitch number 5].
  Absolute pitch: 8.192mm (Equivalent to LIC0308)

(V)

[10.0V, 40mm]

[8.192V, 32.768mm]

[6.144V, 24.576mm]   4mm/V

[4.096V, 16.384mm]

[2.048V, 8.192mm]

0   8   16   24   32   40 (mm)
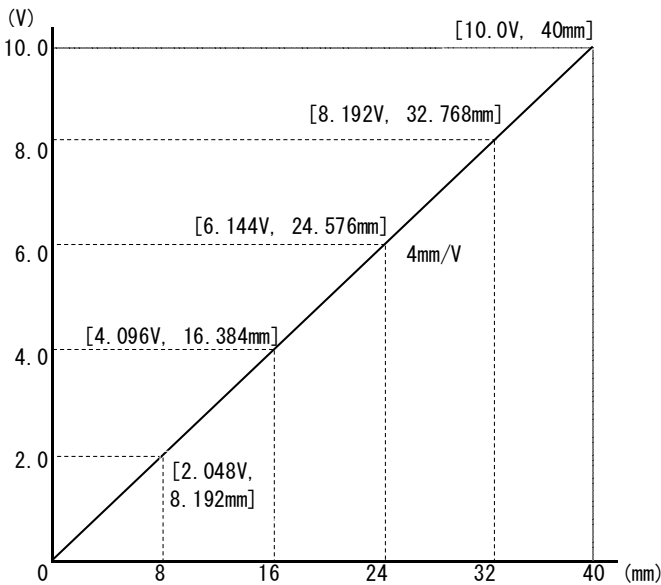
ABS mode [pitch number 7].
  Absolute pitch: 8.192mm (Equivalent to LIC0308)

(V)

[10.0V, 50mm]

[9.830V, 49.152mm]

[8.192V, 40.960mm]

[6.554V, 32.768mm]   5mm/V

[4.915V, 24.576mm]

[3.277V, 16.384mm]

[1.638V, 8.192mm]

0   10   20   30   40   50 (mm)

8
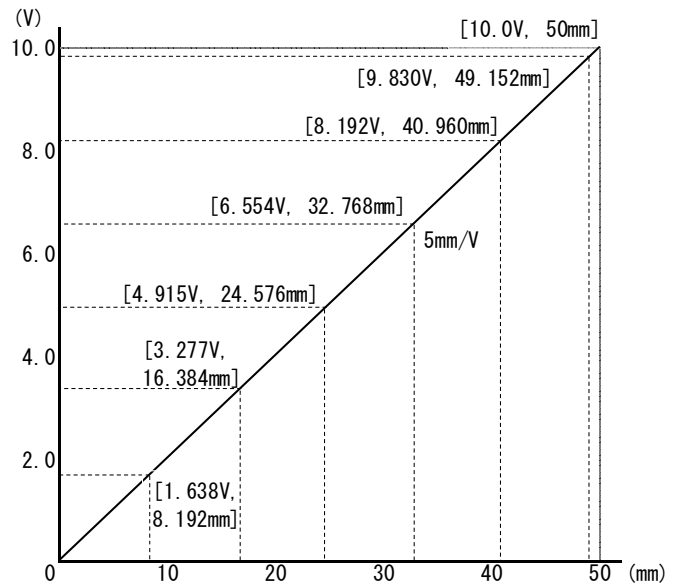
8. Parameter list

Command code	Name	R/W	Default setting	Detection range
Cd0000	Parameter initialization setting	R/W	0	0: No initialization 1: Initialization is performed
Cd1000	Correction origin set	W	—	Press "SET" to execute when Cd1000 is displayed. 7seg LED display becomes "SET
Cd1001	ABS/PRE mode setting	R/W	0	0: ABS mode 1: PRE mode (preset output 1V) 2: PRE mode (preset output 2V) 3: PRE mode (preset output 5V) 4: PRE mode (preset output 8V) 5: PRE mode (preset output 9V) 6: ABS mode (±4.096mm) 7: ABS mode (±2.048mm)
Cd1002	Absolute pitch setting	R/W	0	0: 8.192mm 1: 16.384mm 2: 32.768mm 3: 8.192(special) 4: 16.384mm (special) 5-7: Spare
Cd1004	Binary data increase/decrease direction	R/W	0	0: Normal 1: Inverted
Cd1006	Alarm output display retention	R/W	0	0: Not retain 1: Retain
Cd2000	Medium/High accuracy correction setting	R/W	1	0: Medium precision (average) correction 1: High accuracy correction
Cd2001	Output Data Select	R/W	1	0: No correction 1: With correction 2: Not usable
Cd2002	Multi Pitch Setting	R/W	1	0: Pitch 1 (0μm center output) 1: Pitch 2 (10mm) 2: Pitch 3 (20mm) 3: Pitch 4 (30mm) 4: Pitch 5 (40mm) 5: Pitch 7 (50mm) 6: Pitch 1 (0μm lower limit output) 7: Not used
Cd2003	Analog output VOUT setting	R/W	0	0: 0-10V 1: ±5V 2: ±10V 3: 0-5V
Cd2004	Analog output IOUT setting	R/W	0	0: Not used 1: 4-20mA 2: 0-20mA 3: 0-24mA
Cd2007	High precision correction-less Data selection	R/W	0	0: No data selection 1: Pattern 1 selection 2: Pattern 2 selection 3: Pattern 3 selection 4: Pattern 4 selection 5: Pattern 5 selection 6: Pattern 6 selection 7: Pattern 7 selection
Cd2010	Mode setting	R/W	0	0: Standard mode 1: Shipping inspection mode 2: DAC offset adjustment mode 3: DAC gain adjustment mode 4: Zero set DATA reset 5-15: Spare
Cd3000	DAC Offset Setting	R/W	0	−30000 − +30000
Cd3001	DAC gain setting	R/W	32768	0-65535
Cd4000	Production No.	R/W	0	0-65535
Cd4001	CPU Program Version No.	R	—	0.000-F.FFF
Cd4003	FPGA Program Version No.	R	—	0-31

9. Adjustment function

This transducer is equipped with the adjustment mechanism shown in (1) and (2) below. Please use it as necessary.

(1)DAC offset setting (by command code Cd3000)

Perform fine adjustment of "Min. value" of analog output voltage.

DAC-offset setting is enabled by setting the inspection-mode setting (Cd2010) to "2".

The output-voltage can be adjusted by raising or lowering Cd3000.

Caution After completing the setting, return the test-mode setting (Cd2010) to "2" → "0".

(2)DAC gain setting (by command code Cd3001)

Perform fine adjustment of the "maximum value (= slope)" of the analog output voltage.

DAC-gain setting is enabled by setting the test-mode setting (Cd2010) to "3".
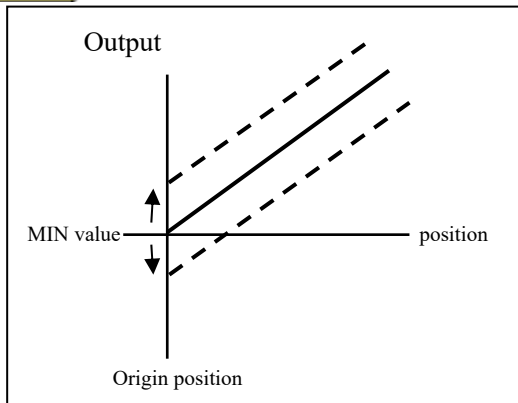
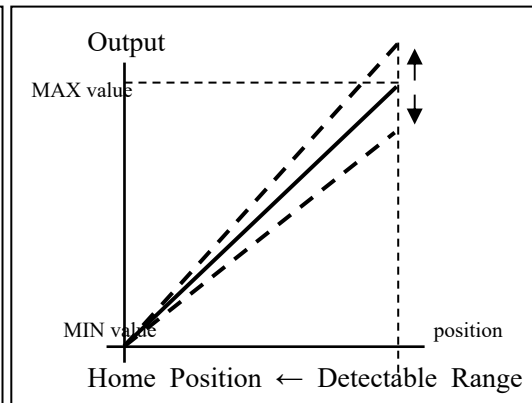The output-voltage can be adjusted by raising or lowering Cd3001.

Caution After completing the setting, return the test-mode setting (Cd2010) to "3" → "0".
To avoid adjustment interaction, set the DAC gain after setting the DAC offset.

(1).   Offset adjustment image   (2).   Gain adjustment image

10. List of Error Codes

Priority	Operation code	Name	Cause of occurrence	Alarm Release Condition
High	Err00E	Flash access error	Flash memory is damaged	Error canceled by button operation.
↑	Err00F	Flash Erase Error	Flash memory is damaged	Error canceled by button operation.
↑	Err010	Error out of setting value range (*2)	Set value out of range is SET.	Set value within the range is SET.
↑	Err001	CNV → PNL Check Sum error	Check Sum judgment result is abnormal.	Check Sum judgment result is normal.
↑	Err002	CNV → PNL Overrun error	The command outside the setting range occurs.	The command will be within the set range.
↑	Err003	PNL → CNV Check Sum error	ALM frame is 03H	ALM frame goes from 03H to 00H
↑	Err004	PNL → CNV Overrun error	The command outside the setting range occurs.	The command will be within the set range.
↑	Err005	DAC Alarm (Overheat error)	DAC overheat error occurs	Returned by resolving alarm
↑	Err006	DAC Alarm (IOUT error)	Open circuit occurs at the IOUT load of the DAC, or a compliance voltage violation occurs (IOUT output voltage is over the upper limit of use).	Returned by resolving alarm
↑	Err007	Disconnection error	Abnormal phase amount and abnormal detection cycle both occur.	Either phase abnormal amount or abnormal detection cycle is resolved.
Low	Err008	Scale error	Either abnormal phase amount or abnormal detection cycle occurs.	Both abnormal phase amount and abnormal detection cycle are resolved.

11. Periodic inspection

It is recommended that the following items be checked regularly to ensure that the product is used in the best condition at all times.

(1) Detector section

Inspection item	Content of inspection	Judgment criteria
Direct current Resistance value	At the detector connector Checking the DC resistance	Within standard value Refer to (1) Detector section in "12. Before requesting repair".
Mounting condition	Installing the Detector	The detector section is firmly fixed.
	Detector wiring	Wiring to the detector section is not broken.

(2) Transducer section

Inspection item	Content of inspection	Judgment criteria
Power supply voltage	Supply voltage check	Refer to "4. Specifications" in the reference value.
Mounting condition	Mounting the Transducer Section	The transducer section is fixed in the switchboard, etc.
	Detector connector	The connectors of the transducer section and detector section are securely connected.
	Analog output connector	Analog output connector of the transducer section and the analog of the host PC or PLC...etc. The input terminals are securely connected.
	Power supply connector	The polarity (+24V, 0V) of the power supply is correct.
		The power supply and FG connection are made securely.
		The FG terminal is securely grounded in the switchboard, etc.
Ambient environment	Temperature	The temperature is within the specified range. Refer to the "4. Specifications" column.
	Humidity	Confirm that the humidity is within the specified range. Refer to the "4. Specifications" column.

12. Before Requesting a Repair

(1)Detector section

If a malfunction of the detection base, such as unstable operation or abnormal output value, is considered,

1. Check the disconnection error indication on the transducer.
2. Measure the DC resistance of the detector at the detector connector.

The resistance value at the time of shipment is as follows.

(e.g.) LIC0308/ [Temperature: 25°C, Cable length: 1m max.]

Pin No.	Signal name	Wire color	Resistance value (Ω)	Remarks
1～2 (A～B)	R2～R1	Green to White	104.0～128.0	In the case of other detectors, the resistance value is different. Please compare with the normal product and check if there is no short or open.
3～4 (C～D)	S4～S2	Blue to Yellow	189.0～231.0	In the case of other detectors, the resistance value is different. Please compare with the normal product and confirm that there is no short or open. The resistance values between 3 and 4 and between 5 and 6 are almost the same.
5～6 (E～F)	S3～S1	Black to Red		

(2)Transducer section

If you suspect a malfunction in the transducer,

1. Check that the connection between the detector and the transducer is correct.
2. Make sure that the power supply and output cable terminals are securely connected to the transmitter terminal block.
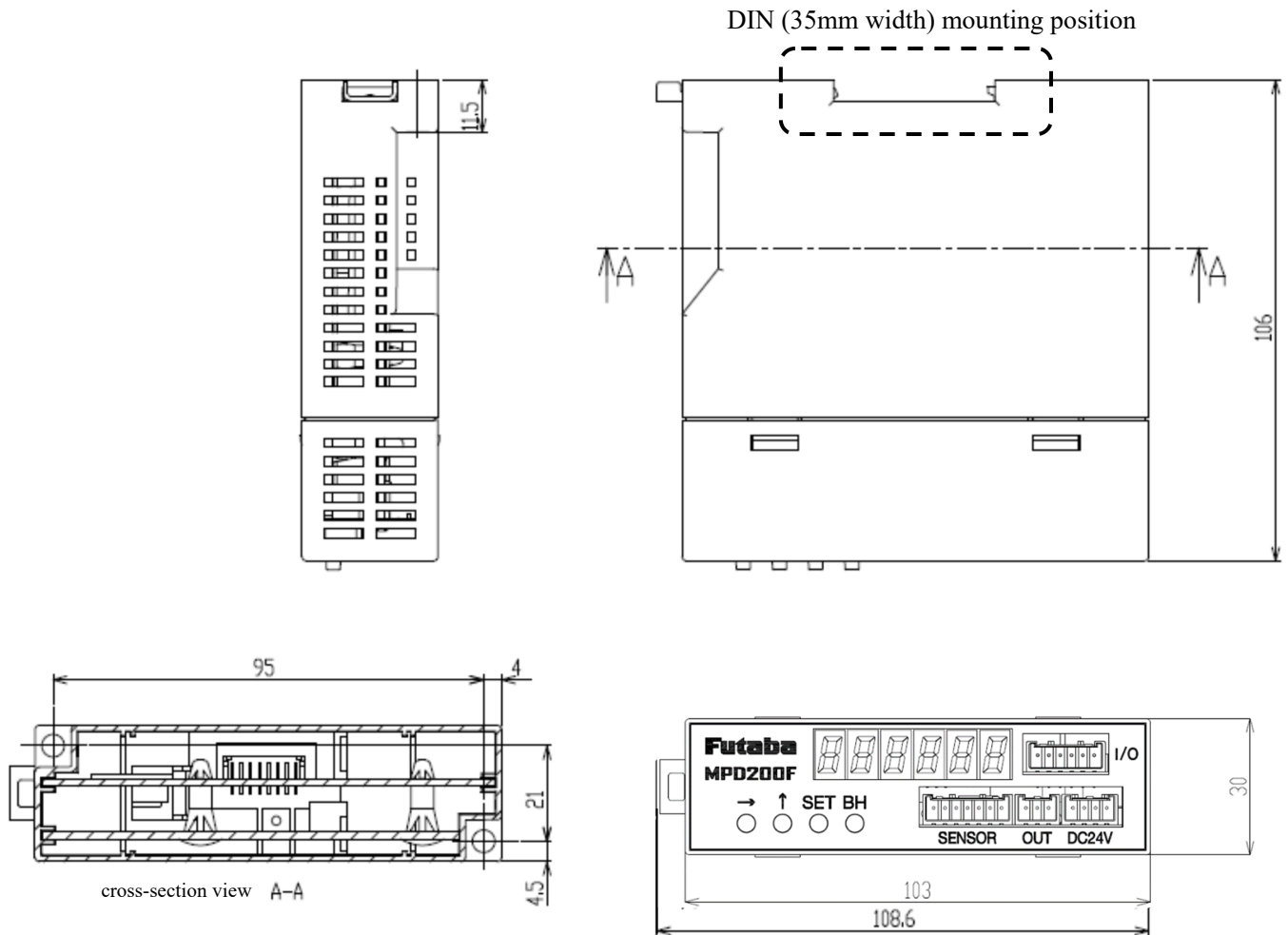
If the condition does not change even with the above work, contact our person in charge.

13. Trouble shooting

	Symptom	Check item	Action
1	No data output or change from transducer MPD200 (Fixed value).	①Make sure that 24VDC is supplied (connected) to the power supply terminal block.	・Connect the power cable to the power terminal correctly.
		②Make sure that 24VDC is not connected in reverse to the power supply terminal block.	・If it is connected in reverse, the transmitter may be damaged. 　Contact our person in charge and replace the transducer.
		③Check that the detector cable connector is connected to the detector input terminal of MPD200.	・Connect the detector cable connector to the detector input terminal. ・If no data is output when the connector is connected, The signal line may be broken. Contact our person in charge and replace the detector.
		④Make sure that the rod for the detector has not been pulled out of the detector.	・Set the rod for the detector to the detector. ・If no data is output even after setting the rod for the detector in the detector, the signal line of the detector may be broken, and contact our person in charge and replace the detector.
		⑤Check that the signal line is normally connected to the voltage output terminal or the current output terminal of the transducer.	・Check the output specifications and connect the signal wires to the output terminals correctly. ・If data is not output even though the signal line is correctly connected to the output terminal, the transducer may be damaged. Contact our person in charge and replace the transducer.
		⑥No data is output from the detector after performing ①~⑤.	・Contact our person in charge.
2	The detector data is not change linearly. (Data is sometimes missing.)	①Check that the detector cable connector is connected to the detector input terminal of MPD200.	・Connect the detector cable connector to the detector input terminal. ・If data is not output even after the connector is connected, the signal line may be disconnected, contact our person in charge and replace the detector.
		②Measure the DC resistance of the detector and confirm that the coil resistance is the specified value.	・If the DC resistance of the detector is greater than the specified value or ∞, the signal line of the detector is disconnected, and the detector should be replaced. If the DC resistance of the detector is smaller than the specified value or 0Ω, the signal line of the detector is short-circuited and the detector should be replaced.
		③Measure the insulation resistance of the detector (DC250V) and confirm that the insulation resistance value is the specified value.	・If the insulation resistance of the detector is lower than the specified value (∞ or $50\,M\Omega$ or more, lower limit $20\,M\Omega$), the detector has insulation failure and should be replaced. However, if the insulation resistance is between $20M\Omega$ and $50M\Omega$, there is a possibility that the insulation resistance will gradually deteriorate. Please be careful.
		④Make sure that the rod for the detector is not broken in the middle.	・Since the rod for the detector may be damaged, return it to our person in charge to confirm whether it is damaged or not.
		⑤Make sure that the rod for the detector is not bent too much.	
		⑥Check that the rod for the detector makes a sound when it is shaken.	
		⑦Check that the screws at the end or the rear end of the rod for the detector are not missing.	
		⑧Check that the signal line is normally connected to the voltage or current output terminal of the transducer.	・Check the output specifications and connect the signal wires to the output terminals correctly. ・If data is not output even though the signal line is correctly connected to the output terminal, the transducer may be damaged. Contact our person in charge and replace the transducer.
		⑨After implementing ①~⑧, the detector data does not change linearly.	・Contact our person in charge.

	Symptom	Check item	Action
3	The error signal is output from the transducer MPD200.	①Check that the detector cable connector is connected to the detector input terminal of the transducer MPD200.	・Connect the detector cable connector to the detector input terminal. ・If an error is output even after the connector is connected, the signal line may be disconnected, contact our person in charge and replace the detector.
		②Measure the DC resistance of the detector and confirm that the coil resistance value is the specified value.	・If the DC resistance of the detector is greater than the specified value or ∞, the signal line of the detector is disconnected and the detector should be replaced. If it is small or 0Ω, the signal line of the detector is short-circuited and the detector should be replaced.
		③Measure the insulation resistance of the detector (DC250V) and confirm that the insulation resistance value is the specified value.	・If the insulation resistance of the detector is lower than the specified value (∞ or 50 MΩ or more, lower limit 20 MΩ), the detector has insulation failure and should be replaced. However, if the insulation resistance is between 20MΩ and 50MΩ, there is a possibility that the insulation resistance will gradually deteriorate. Please be careful.
		④Make sure that the rod for the detector has not been pulled out from the detector.	・Set the rod for the detector to the detector.
		⑤Make sure that the FG terminal of the transducer is grounded.	・Connect the FG terminal of the transducer to the ground terminal.
		⑥Make sure that the rod for the detector is not broken in the middle.	・Since the rod for the detector may be damaged, return it to our person in charge to confirm whether it is damaged or not.
		⑦Make sure that the rod for the detector is not bent too much.	
		⑧Check that the rod for the detector makes a sound when it is shaken.	
		⑨Check that the screws at the end or the rear end of the rod for the detector are not missing.	
		⑩After performing steps①~⑨, an error signal is output.	・Contact our person in charge.
4	The direction of increase or decrease of the detector data is reversed.	①Check that the detector cable connector is connected to the detector input terminal of MPD200.	・If the connector is connected properly but the direction of data increase/decrease is reversed, the wiring in the connector may be wrong, so please contact our person in charge and replace the detector.
		②Check the mounting direction of the detector.	・Check the mounting direction of the detector in the specification sheet or the specification drawing. If it is different, correct it according to the specifications. ・If the detector is installed in the correct direction, it is out of specification, please contact our person in charge.
		③Check the direction of movement of the rod for the detector.	・Check the direction of movement of the rod for the detector in the specification sheet or specification drawing, and if different, correct as specified. ・If the direction of movement of the rod for the detector is correct, it is out of specification, please contact our person in charge.
		④Check the setting of the direction of increase/decrease of binary data (instruction code Cd1004).	・Regarding the setting, make sure that "0" (normal) and "1" (inverted) are appropriate.
		⑤ After implementing ①~③, the direction of increase/decrease of sensor data is reversed.	・Please contact our person in charge

14. External Dimensions

DIN (35mm width) mounting position

11.5

106

95   4

21

4.5

cross-section view   A-A

Futaba
MPD200F

→   ↑ SET BH

SENSOR   OUT   DC24V

I/O

30

103
108.6

15. Warranty

 (1) The warranty period of the delivered products is one year after delivery to the designated location.
　　※The warranty herein refers to the warranty of the delivered product alone and does not guarantee the operation of
　　　your product incorporating the delivered product.

(2) If a failure occurs during the above warranty period due to our responsibility, we will repair the product free of charge.
　　　However, the following cases will be excluded from the scope of warranty.
　　① The fault has been caused by improper condition, environment or use other than those specified in the
　　　specifications.
　　② When actuators (inverters, servo motors, etc.) are used in the ambient environment and adequate noise suppression
　　　measures are not taken.
　　③ Malfunction or damage caused by your company's handling of the product, such as dropping or impact during
　　　transportation (moving) after delivery.
　　④ If the product has been repaired or modified by someone other than our company.
　　⑤ Malfunction or damage due to natural disasters or calamities.