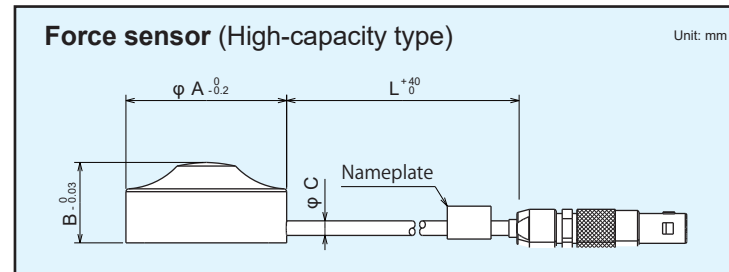
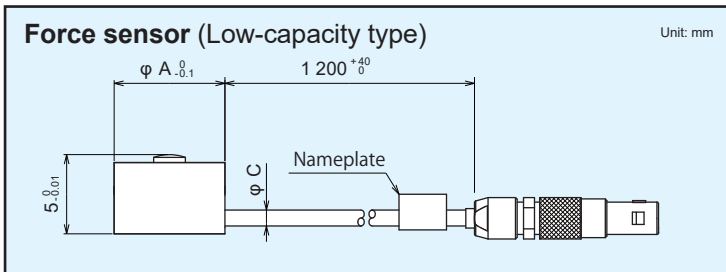
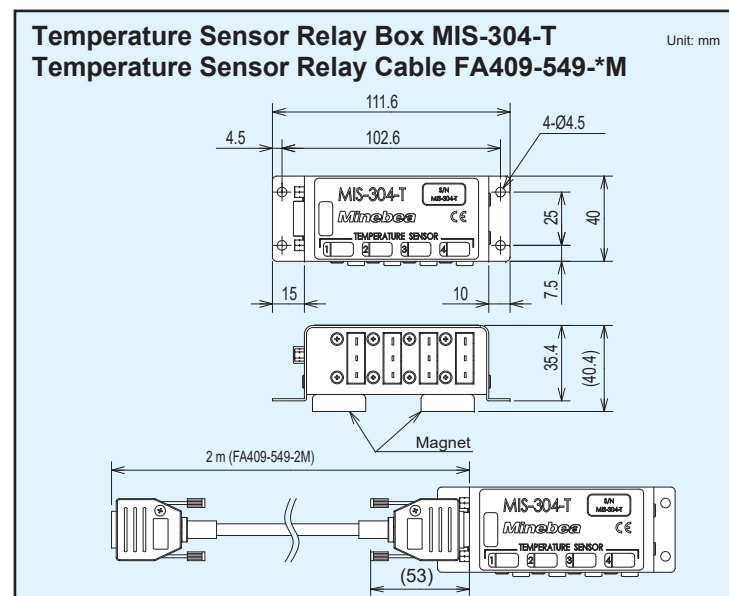
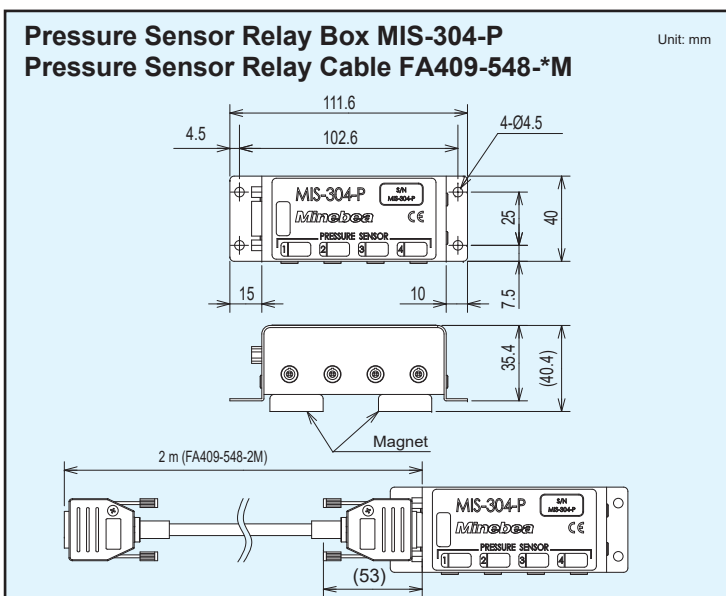


Model	Thermocouple type	Operating temperature	Cable
MMTK-01	K	0 to 400 °C	φ1.5 1200 mm



Model	Rated capacity	φA	φC	Rated displacement (reference values)
LSMS-20K-S06	196.1 N {20 kgf}	7	1	0.003
LSMS-50K-S06	490.3 N {50 kgf}	7	1	0.005
LSMS-100K-S06	980.7 N {100 kgf}	10	1	0.005

Model	Rated capacity	φA	B	φC	L	Rated displacement (reference values)
LSMS-200K-S06	1.961 kN {200 kgf}	10	5.5	1	1 500	0.009
LSMS-500K-S06	4.903 kN {500 kgf}	10	8	1	1 500	0.015
LSMS-1T-S06	9.807 kN {1 tf}	15	9.5	1.8	2 000	0.013
LSMS-3T-S06	29.42 kN {3 tf}	20	16	3.2	2 000	0.036

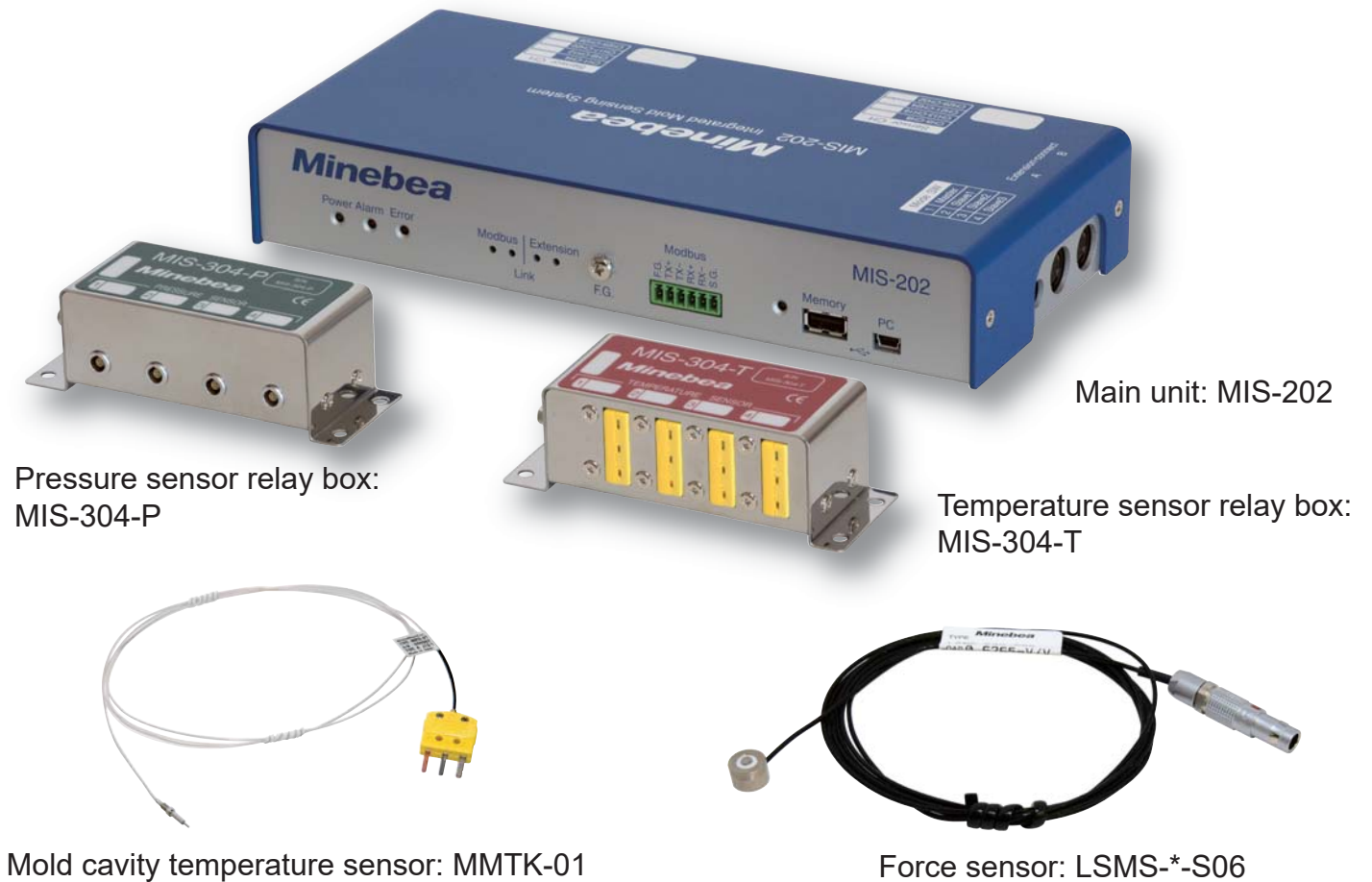


Note for safety

- Always read the "Operating Instruction Manual" thoroughly before use to ensure correct and safe operation.
- Specifications and visual appearances are subject to change without notice due to product improvements.
- The information provided in this catalog is accurate as of October 2019.

Simultaneous Mold Cavity Pressure and Temperature Measurement System for Injection Molding Machines

MIS-202-PT/PP



No need to rely on **guesswork** or **experience!**

Quantifies molding quality

- Measures mold cavity pressure and temperature simultaneously.
- 4 channels each for temperature and pressure can be combined as desired and expanded to 8, 16, 24, or 32 channels.
- Defect assessment output provided for each channel (each cavity).
- Data can be saved to a USB flash drive or output to a network device.
- Long life, high sensitivity, and accurate measurement even at low pressures.

MinebeaMitsumi Inc.

Sensing Device Business Unit

1-1-1, Katase, Fujisawa, Kanagawa, 251-8531 Japan
Tel: 81-466-22-7151 Fax: 81-466-22-1701

URL: <http://www.minebea-mcd.com>

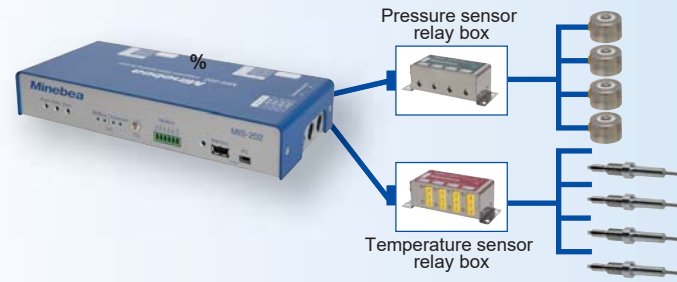
Simultaneous mold cavity pressure and temperature measurement system overview

Despite being key parameters affecting molding quality, the cavity pressure and cavity temperature waveforms were previously regarded as black box quantities. The Simultaneous Mold Cavity Pressure and Temperature Measurement System allows easy, cost-effective measurement, control, and recording of the cavity pressure and temperature waveforms.

System configuration

For measuring cavity pressure and temperature simultaneously:

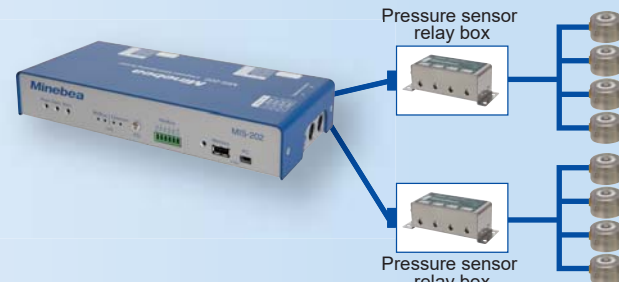
- MIS-202-PT (pressure + temperature measurement)



• 4 channels each can be used for cavity pressure and temperature.

For measuring cavity pressure:

- MIS-202-PP (pressure + pressure measurement)



• 4 channels each can be used for pressure and pressure.

For measuring cavity pressure and temperature or multi-channel cavity pressure measurement:

- MIS-202-PT (pressure + temperature measurement) + MIS-202-PP (pressure + pressure measurement)



Total of up to 4 MIS-202-PT and MIS-202-PP units can be connected.

- For 16-channel cavity pressure measurement: MIS-202-PP + MIS-202-PP
- For 4-channel temperature and 12-channel cavity pressure measurement: MIS-202-PT + MIS-202-PP

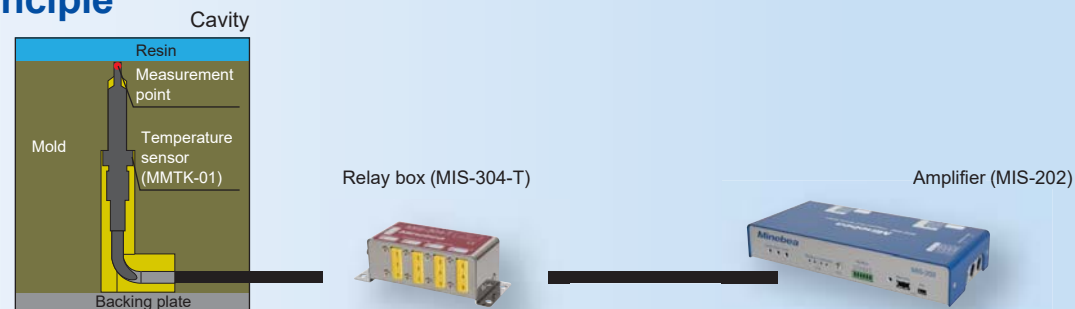
Adoption benefits

- Simultaneous cavity pressure and temperature measurement
- Channel expansion up to 32 channels
- Defect assessment output for each channel (each cavity)
- Data saving to network devices (Modbus)
- Data saving to USB flash drive (without PC connection)

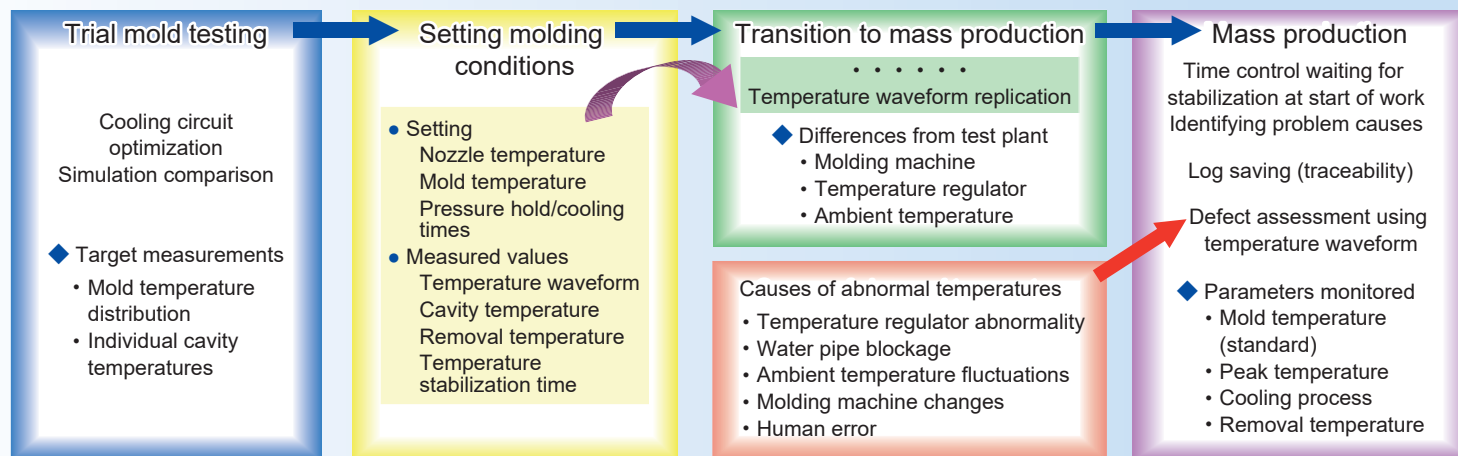
Cavity temperature sensor overview

Uses a thermocouple sensor with the tip exposed close to or inside the cavity to enable dynamic monitoring of temperature variations corresponding to resin behavior. The sensor has a small-sized, 1 mm diameter tip, enabling it to be mounted even in tight target locations.

Measurement principle



Adoption benefits



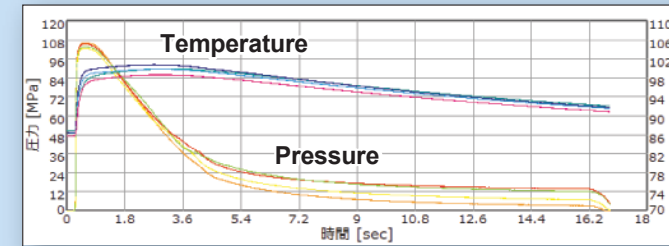
MIS-Anest measurement software

Assists analysis work and report creation with refined ease of use and visibility.

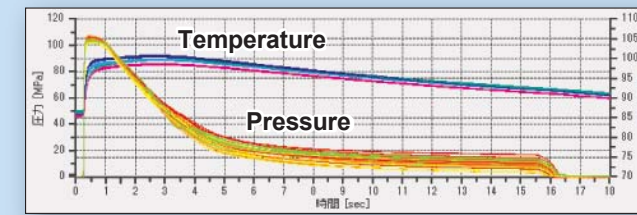
Measurement screen

- Allows real-time pressure and temperature graphs to be checked on the same screen.
- Features "Real-time graph" and "Acquired graph" views.
- Allows image setting using simultaneous waveform and monitoring zone display.
- Overall trend graph display for peak values, integral values, and peak over eject values.

Real-time graph



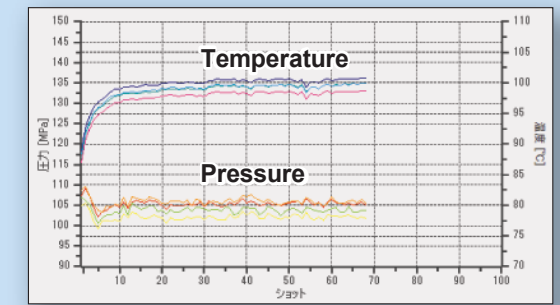
Acquired graph



Other functions

- File output of numerical data such as peak values, integral values, and peak over eject values by date in addition to waveform data for each shot
- Saving of measurement conditions for management as settings files for each mold
- Standard waveforms for each mold can be saved and selected for use in subsequent molding processes.

Trend (Peak value)

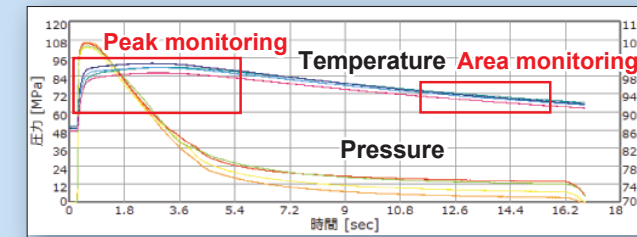


Real-time value (Peak/current value)

Master	Slave1	Slave2	Slave3	ピーク値				
Master	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
ピーク値	105.66	106.25	102.73	103.64	99.96	99.88	100.79	98.68

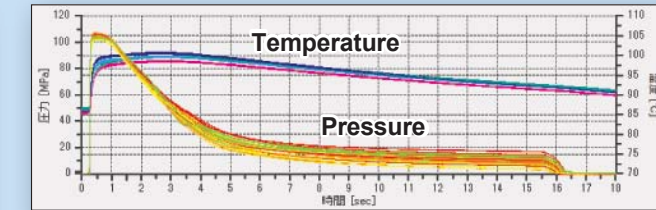
Examples of waveform data usage

Real-time graph



- Defect assessment is possible by setting thresholds (max/min) for output conditions within monitoring zone.

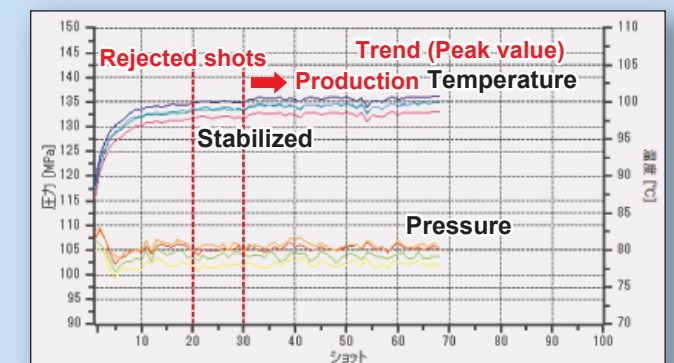
Acquired graph



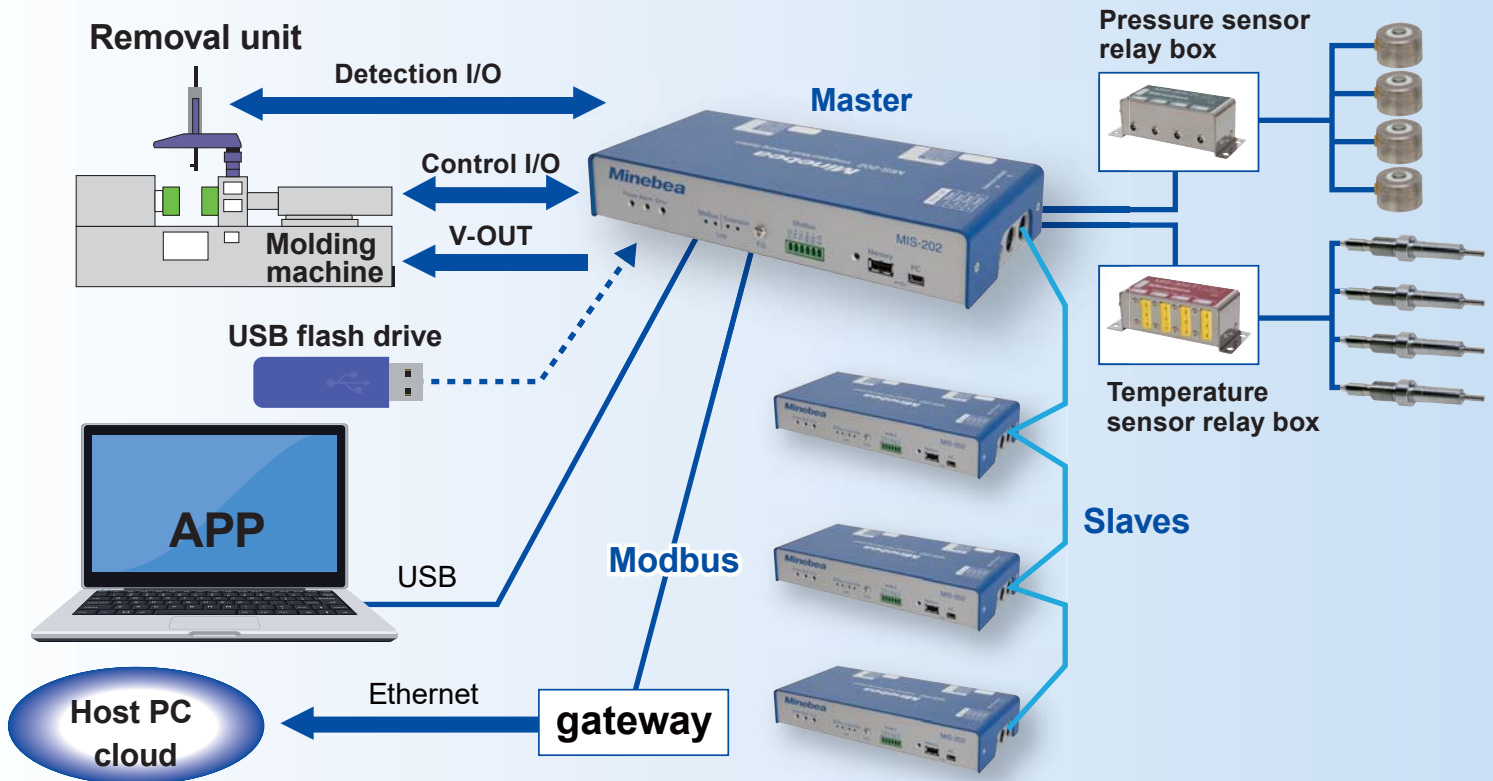
- Behavior can be checked for each molding by overlaying waveforms for each shot.

Examples of temperature sensor waveform usage

- Details that can be determined from waveform
 - The mold temperature is increased by the resin temperature with each shot after molding starts and then stabilizes after around 20 to 30 shots.
- Data is provided from production start until the cavity vicinity temperature stabilizes, allowing quantitative rejected shot management.
- * If the setting is to reject the first 60 shots after starting production, knowing that the mold temperature stabilizes after approximately 20 to 30 shots allows the number of rejected shots to be reduced.



Integrated mold sensing system configuration diagram



Comparison with previous model (MPC-201B-25)

		MPC vs MIS		MIS-202-PT/PP features
		MPC-201B-25	MIS-202-PT/PP	
Channels (max)		8	32	Up to four 8-channel amplifiers can be connected. * Channel expansion up to 32 channels
Temperature measurement		—	○	Four temperature/pressure channels each can be measured with an 8-channel amplifier. * Eight pressure channels can also be selected if temperature is not required.
0 to 10 V analog voltage output		○	○	—
External output	Non-conformance signal for each channel	—	○	Rejection with removal machine is possible for each channel.
Data exporting	PC	○	○	—
	Modbus (serial)	—	○	Connecting Modbus (serial) to a network via an Ethernet converter allows centralized management of big data.
	USB flash drive	—	○	Data (waveforms and numerical data) can be saved without connecting to a PC.
Software	Alarm signal cancel conditions Start signal synchronization	—	○	Alarm signals can be reset on receipt of next start signal with molding machines unable to output alarm reset signals.
	Alarm output on/off	—	○	When starting molding, prevents molding machine stopping due to an alarm if pressure data is outside the monitoring zone upon the occurrence of rejected shots.
Sensing		—	○	Adjusts for measurement errors due to cable resistance in 10 m or longer relay cables used with large or upright molding machines.

Options

Product name	Model	Specifications
Power supply cable	FA409-550	24 V DC cable, 2.5 m
Control I/O cable	FA409-551	2.5 m
Detection I/O cable	FA409-552	2.5 m
V-OUT cable	FA409-553	2.5 m
Channel expansion cable	FA409-554	1.0 m
Modbus cable	FA409-555	1.0 m

* The USB cable is provided with the MIS-202-PT/PP system amplifier.

Specifications

[Integrated mold sensing system MIS-202-PT/PP]

	Pressure sensor input	Temperature sensor input
Applicable sensors	LSMS-*-S06 series: *: 20K/50K/100K/ 200K/500K/1T/3T	K type thermocouple MMTK-01
Number of sensor inputs	8	4
Accuracy	±1.0%F.S.	±0.2%F.S. (at 25 °C ± 5 °C)
Sampling interval	10 ms per channel (can be set to 0.5, 1, 2, 5, 20, 50 ms) * Limited to 10 ms, 20 ms, or 50 ms for long time measurement.	
Analog output	DC 0 V to 10 V	
Power supply specifications	Power supply voltage	DC 24 V (allowable fluctuation range 20.4 V to 27.6 V DC)
	Power consumption	Max. 16.5 W (at 24 V DC)
Environmental resistance	Operating temperature range	-10 °C to 50 °C
	Operating humidity range	Up to 85%RH (no condensation)
	Storage temperature range	-20 °C to 60 °C
	Vibration resistance	2 hours at 10 Hz to 150 Hz, constant 2G acceleration, in X/Y/Z directions respectively
External dimensions (W × H × D)	257 mm × 116.2 mm × 48.6 mm (not including protrusions)	
Weight	Approx. 900 g	
Accessories	<ul style="list-style-type: none"> • USB cable, 2.0 m: × 1 • Power supply plug: × 1 • Control I/O plug: × 1 • Modbus plug: × 1 • CD-ROM: × 1 * MIS-Anest measuring application, driver software, file conversion software • Instruction manual: × 1	

[Pressure Sensor Relay Box MIS-304-P]

[Temperature Sensor Relay Box MIS-304-T]

	Pressure sensor relay box	Temperature sensor relay box
Operating temperature range	0 °C to 70 °C 0 °C to 100 °C (when not using magnets)	
Operating humidity range	Up to 85%RH (no condensation)	
Storage temperature range	-10 °C to 70 °C -10 °C to 100 °C (when not using magnets)	
Vibration resistance	10 Hz to 55 Hz, double amplitude 1.5 mm, 2 hours in each of the directions X/Y/Z	
External dimensions	111.6 mm × 40 mm × 40.4 mm (not including protrusions)	
Weight	Approx. 190 g	Approx. 220 g

[Pressure Sensor Relay Cable FA409-548-*M]

[Temperature Sensor Relay Cable FA409-549-*M]

	Pressure sensor relay cable	Temperature sensor relay cable
Operating temperature range	0 °C to 100 °C	
Operating humidity range	Up to 85%RH (no condensation)	
Storage temperature range	0 °C to 50 °C	
Cable external diameter	Approx. 6.2 mm	Approx. 8.8 mm
Minimum bending radius	50 mm	Fixed section: 70 mm Movable section: 100 mm

[Mold cavity temperature sensor MMTK-01]

Thermocouple type	K
Compatible standards	JIS C 1602-1995 Class 1 (ITS-90)
Tolerance	±1.5 °C
Operating temperature range	Up to 400 °C (sensor) Up to 200 °C (cable, connector)
Storage temperature	Up to 80 °C
Cable	Φ1.5 1200 mm
Connector type	MTP-K-M-ROHS (OMEGA)
Accessories	Sensor fixing spacer Cable fixing tube 5PCS
Options	Dedicated detaching tool (A0H-MMTK-01)