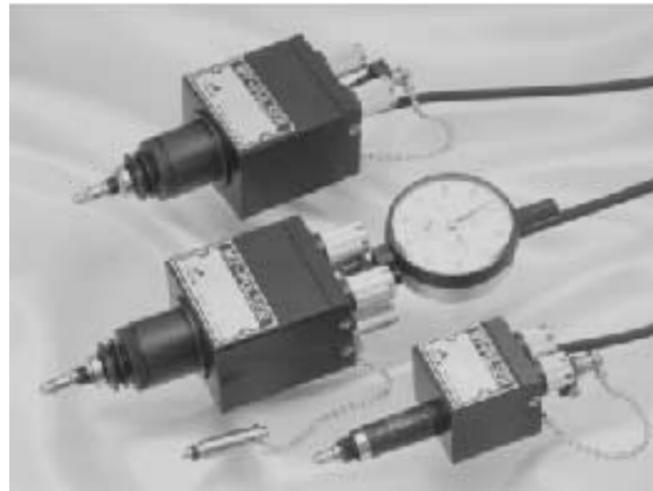


Durability and reliability are high in adverse environments. PAT.PEND
 Jointly developed with TOYOTA MOTOR CORPORATION in 1976.
 Proven in severe environments of automobile production lines including coolants, chips, dust, and vibration.



Adaptable to adverse environments. (IP67)

Having good dustproof, waterproof and coolant-resistant properties, it is best suited for automated and unattended automobile production lines, etc., in adverse environments. The reliability is higher than signal gauges, and the cost is lower than electric micrometers.

No amplifier is required.

There is no drift due to changes in temperature, noise, and lapses in time. Direct input to a sequencer (PC) or NC can be made. The electric circuits are simple, and handling is easy.

Handling and maintenance are simple.

It features excellent operability and high rigidity with larger knobs than MINI-PULSER's.

Improvements in efficiency, labor savings and inspection automation can be planned.

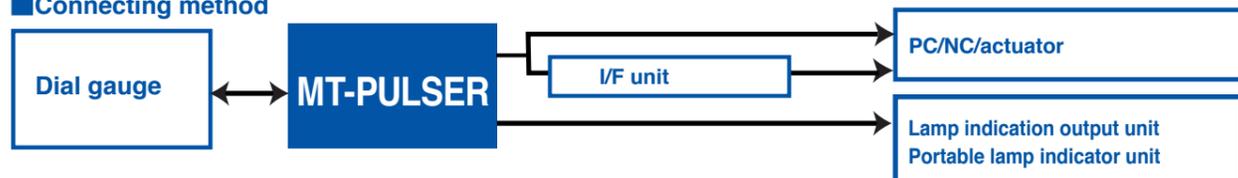
By connecting with a lamp indicator unit, pass/fail judgment can easily be made by anyone.

By connecting with a lamp indication output unit, contact signals can be output for automation.

Points in selection between MT-PULSER and MINI-PULSER

	MT-PULSER	MINI-PULSER
Working environment	Suitable for severe production lines including chips, coolants, and vibration.	Production lines out of chips and excessive coolant (P.4)
Number of signal points	2, 4, 8, 11	2, 4
Contact structure	Normally closed (NC)	Normally open (NO)
Plunger bearing	Metal bearing, bearing	Metal bearing
Stroke	4.5, 10mm	4mm
Size	Large	Small
Solidness	Solid	Delicate
Signal point setting knob	Large (easy to handle)	Small (hard to handle depending on the working locations)
Dial gauge installation	Upward only	Upward and downward (Some cannot be installed.)
Price	Higher-priced than MINI-PULSER	Low-priced

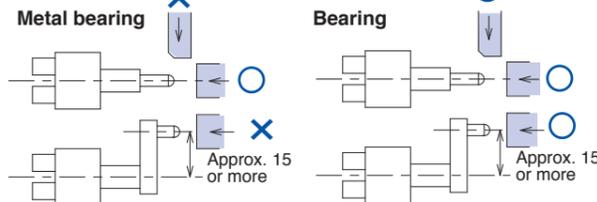
Connecting method



Supplement : By mounting an I/F unit (contact protection circuit), high reliability can be ensured in production lines under bad working conditions. The lamp indication output unit incorporates an I/F unit (contact protection circuit).

Mechanical specifications	
Signal points	2 points/4 points/8 points/11 points
Signal point repeatability (in the same direction)	0.0015mm Contact speed in dynamic measurement: 50 - 200mm/min. (Response speed of machine control system: Within 0.5ms)
Plunger operation	Normally extruded, metal bearing, bearing
Stroke (signal setting range)	4.5mm±0.5 2 points/4 points: 4mm±0.5, 8 points/11 points: 10mm±0.5
Measuring signal indication	With LED lamp (Normally lit, and goes out during operation.)
Life of contact	3,000,000 times (at contact rating), durability 20G
Cord	3m oil-resistant, without connector
Working temperature range	-10°C~80°C

How to apply to detecting bodies



Electrical specifications	
Contact configuration	Open at free time (NO contact)
Contact rating	12 - 24V DC, 20mA (max.), recommended value 10mA, resistance load
Insulation resistance	10MΩ or more, 250V DC between each terminal and case
Withstand voltage	1100V AC, 50/60Hz for 1 min. between each terminal and case

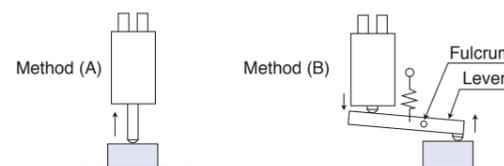
! If the sensor is connected directly to 24V DC power supply, the LED will be damaged. For LED protection, current limiting resistance is always necessary. If no current limiting resistance has been installed, install the attached resistance parts. The LED forward voltage is approx. 2V. Each signal requires external resistance. Resistance value=(Power supply voltage - LED forward voltage) ÷ Current

Supplement : Contact switches may cause slight chattering when the contacts are opened/closed regardless of the presence or absence of a snap action mechanism. In the case of dynamic measurement, take the first signal.

Signal setting methods

- 1) In ordinary cases**
 - Set the upper limit master and lower limit master, and raise the measuring condition.
 - Turn the signal setting screws corresponding to the upper limit master and lower limit master, and stop at points where the LED lamps change between ON and OFF. When the sensor head contact is off, the LED goes out, and when the contact is on, the lamp lights. Slowly turn the signal setting screws near the changing points. Since there is some play, better accuracy can be obtained by setting in the same direction of the change in work: ON to OFF or OFF to ON.
- 2) When an indication output unit is used**

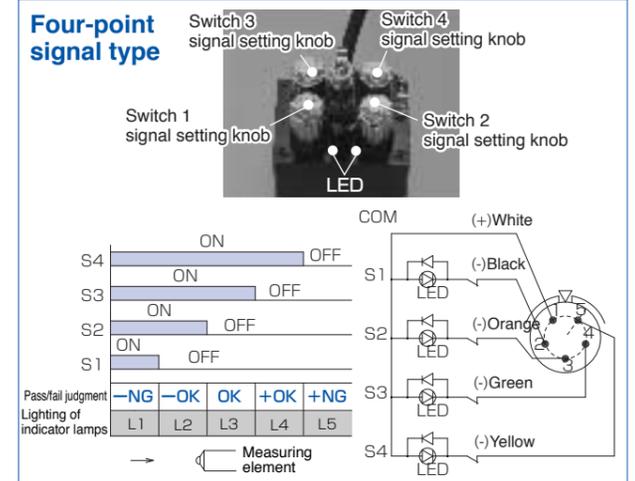
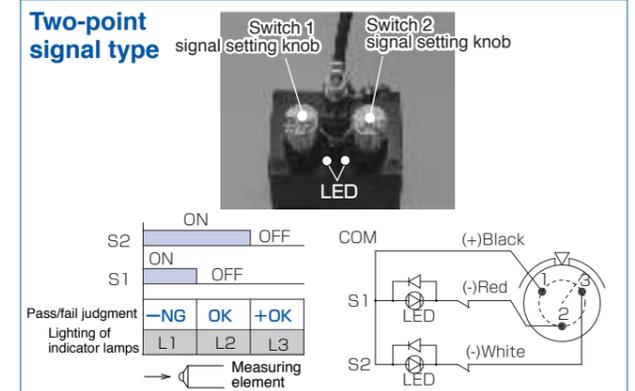
By the [Method (A)] in the following example, S1, S2 and all other switches are off in a idle condition, and as the measuring element is pushed up, they change from off to on one by one according to signal settings. If the settings are not sequential, lamp indication is not made properly. Conversely, by the [Method (B)], all switches are on at first, and they change from on to off one by one.



Application of MINI-PULSER

Number of signal points	Detecting positions	Automatic discrimination of dimensions	Applicable places
2	2 positions	3 classes (-NG, OK, +NG)	Automatic and semi-automatic testing machines, automatic sorting machines
4	4 positions	5 classes (-NG, -OK, OK, +OK, +NG)	Automatic and semi-automatic processing machines, various inspection machines, automatic assembly machines, CNC processing machines, robots, consumer-oriented machines

Movements of the measuring element, operating environment of switches, and circuit diagrams



3) When a dial gauge is mounted

- The following can be performed by mounting a dial gauge to the φ8 gauge holder of the MINI-PULSER.
- Correction of signal setting errors
 - Setting by using work with known dimensions instead of limit masters
- Setting**
- Set work with known dimensions, and bring the measuring head into a measuring condition.
 - Set the scale of the dial gauge to zero, and remove the work.
 - Move the end element one way, and stop where the scale of the dial gauge has changed by the error between the work and limit masters, and set signals. (P.15)
- Supplement :** It is convenient to use a signal point checker for small movements of the end element. (P.15)

Structural principle

The incorporated touch sensors are normally closed (NC) (b contact). The touch sensors change from closed to open (ON → OFF) when they are pushed by the anvil (cemented carbide) according to the movements of the measuring element.

