

Operation

Key functions

Key	Function		
	Model 1,2	Mode 3	
		Measurement mode	Calculation mode
CL (CLEAR key)	<ul style="list-style-type: none"> Clears all the data. Always press this key before setting the tolerance limits. 	<ul style="list-style-type: none"> Re-input the data starting from No. 1 of the sub-group. 	<ul style="list-style-type: none"> Clears all the data.
CE (CANCEL key)	<ul style="list-style-type: none"> Cancels the previously entered measured data. 	<ul style="list-style-type: none"> Cancels the previously entered measured data 	<ul style="list-style-type: none"> Cancels the measured data of the sub-group
TOLL LIMIT (LIMIT key)	<ul style="list-style-type: none"> Press this key when you enter into or exit from the setting operation of upper and lower limits. 	<ul style="list-style-type: none"> Stops the measuring operation of the current sub-group and enters the calculation mode. 	<ul style="list-style-type: none"> Enters the measurement for the next sub-group,
STAT (STAT key)	<ul style="list-style-type: none"> Performs statistical analysis with all the data obtained, prints out the calculation results, and generates a histogram 	<ul style="list-style-type: none"> Calculates and prints out the X-bar and R value, then completes the measurement mode and enters the calculation mode 	<ul style="list-style-type: none"> For the sub groups whose data input has been completed, calculation of control limits is carried out and the results are printed
FEED (FEED key)	<ul style="list-style-type: none"> While you hold down this key, the recording paper is fed continuously. 		
DATA (DATA key)	<ul style="list-style-type: none"> Logs data from the measuring unit. 		
PRINTER ON/OFF (PRINTER ON/OFF key)	<ul style="list-style-type: none"> Turns the printer operation ON/OFF. If you press this key while printing, the printing operation will stop at the beginning of the next line. (This applies to data printing only) 		

*The number of measurements used for the sub-group 1 until the [STAT] key is pressed is determined as the sample size.

The [STAT] key operation for sub-group 2 and sub-groups following will be valid only after the specified sample size of data is entered.

Mode selection

The operation mode can be selected with the DIP switches located at the side of the main unit.

– either ON or OFF will do.

SW setting				
Mode				
Mode 1	-	-	OFF	OFF
Mode 2	-	-	OFF	ON
Mode 3	-	-	ON	-

Functions available in each mode

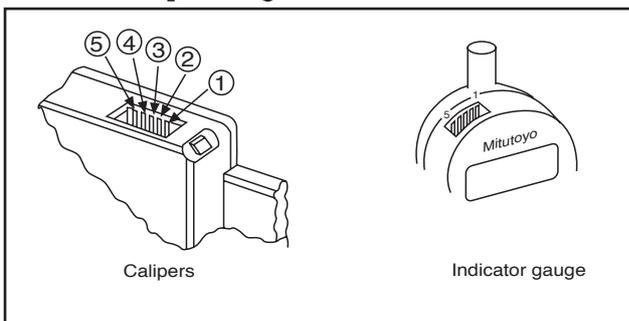
Mode 1	Mode 2	Mode 3
<p>(1) Purpose To record measured data, perform statistical calculation, and generate a histogram.</p>	<p>(1) Purpose To generate a D-chart to graphically represent the displacement of measured data from the centre. In addition, it is possible to record measured data, perform statistical calculations, and generate a histogram.</p>	<p>(1) Purpose By entering the data only, it is possible to calculate the control limit values to be used for generating an X-bar R chart.</p>
<p>a) Setting the limits</p> <ol style="list-style-type: none"> Press the [TOL. LIMIT] key of this unit when you wish to record GO/±NG judgment results or to generate a histogram. If you do not, proceed to the measuring operating. Display one of the upper and lower tolerance limits on the measuring unit's display, then press the [DATA] key of this unit. Display the other tolerance limit on the same display and press the [DATA] key again. When the settings are completed, press the [TOL. LIMIT] key. 		<p>a) Measuring a sub-group Press the [TOL.LIMIT] key when entering the measurement mode. The maximum number of sub-groups is 9999. The sample size for a sub-group can be set from 2 to 10.</p>
<p>b) Measurement Logging and recording of the measured data starts in any of the following cases: the [DATA] key of this unit is pressed, timer signals are input, this unit receives data request commands via the RS-232C interface, or the data output switch of the measuring unit is pressed. At the same time, a GO/±NG judgment is carried out and the results will be displayed and output as follows.</p> <ul style="list-style-type: none"> ▲ ... Exceeding the upper limit ▼ ... Exceeding the lower limit 	<p>b) Measurement Logging and recording of the measured data and D-chart starts in any of the following cases; the [DATA] key of this unit is pressed, timer signals are input, this unit received a data request command via the RS-232C interface, or the data output switch of the measuring unit is pressed. At the same time, a GO/±NG judgment is carried out and the results will be displayed and output as follows.</p> <ul style="list-style-type: none"> ▲ ... Exceeding the upper limit ▼ ... Exceeding the lower limit 	<p>b) Measurement Logging and recording of the measured data starts in any of the following cases: the [DATA] key of this unit is pressed, timer signals are input, this unit received a data request command via the RS-232C interface, or the data output switch of the measuring unit is pressed.</p>
<p>Note: Even if you switch over between Mode 1 and Mode 2 during the measuring operation, the previously obtained data and limit values are not erased.</p>		<p>c) Statistical calculation</p> <ol style="list-style-type: none"> Pressing the [STAT] key in the measurement mode will start printing the X-bar and R calculation results for the specified sub-group Pressing this key in the calculation mode will start calculating the control limits and print out the results.
<p>c) Statistical calculation Pressing the [STAT] key will start the statistical calculation for the measured data obtained to that point, and record the calculation results or generate a histogram.</p>		

Data cable cross reference table				Data cable RS stock no. 574-315 (manf. part no. 905 338)	Data cable RS stock no. 574-309 (manf. part no. 937 387)
Digital instrument	RS stock no.	Manf. part no.			
Caliper	150mm	432-025	500-171-U	x	
	200mm	374-109	500-172-U	x	
	300mm	574-359	500-323	x	
Micrometer	0-1in/0-25mm	572-038	293-795		x
	1-2in/25-50mm	574-321	293-722		x
	2-3in/50-75mm	574-337	293-723		x
	0-6in/0-150mm	574-343	340-711		x
Depth micrometer	0-6in/0-150mm	266-2745	543-601-5	x	

Data output specification

Caliper and indicator gauge

1. Connector pin assignment



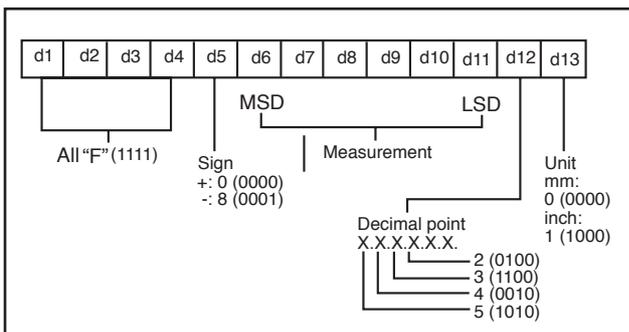
Pin no.	Signal name	I/O	Function
1	GND	-	Signal ground
2*2	DATA	O	Measurement data
3*2	CK	O	Clock for data transmission
4	RD	O	Ready for data transmission
5*2	REQ	I	Request for data transmission

*1 Open drain: -0.3 to +7.0v, 400µA (max.)

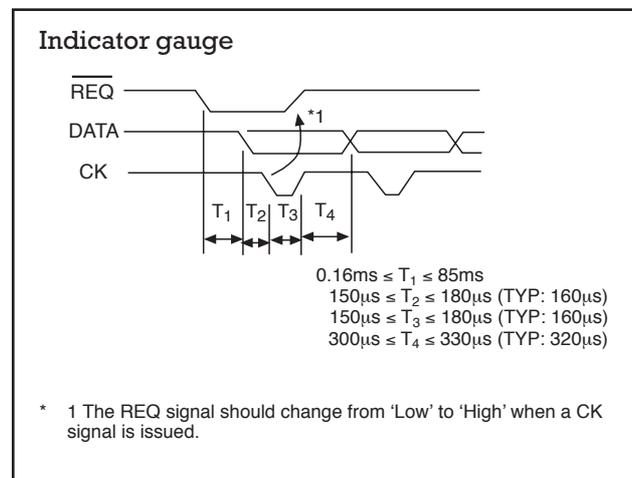
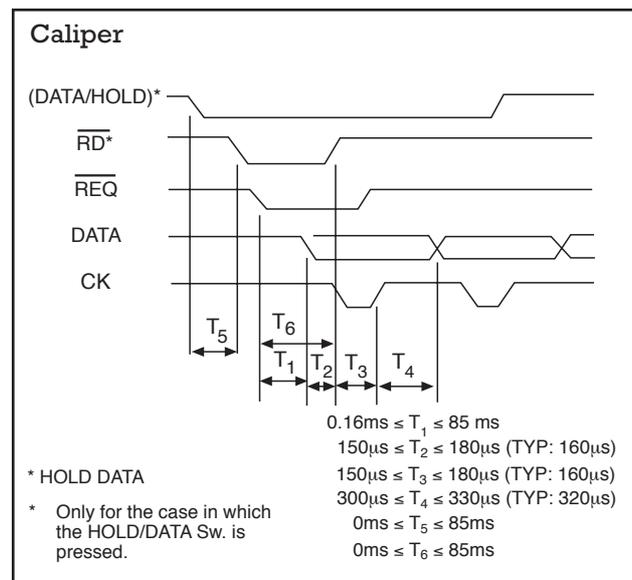
*2 C-MOS, pull-up to V_{DD} (1.55V)

2. Output data format

A single piece of measurement data consist of 13 digits (d1 to d13). Each digit consists of 4 bits. Data is bit-serially transmitted via pin number 2, from the LSB (2⁰) to the MSB (2³), from d1 to d13.

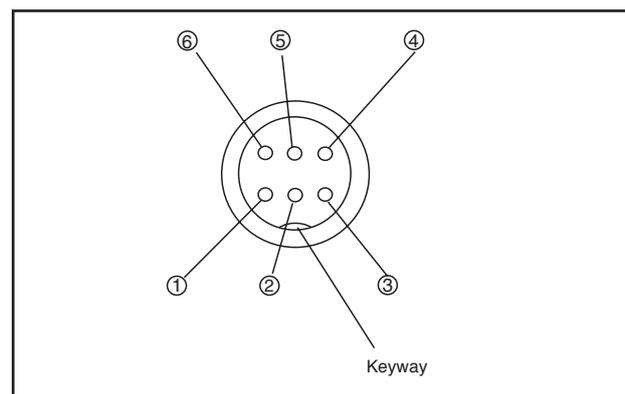


3. Timing charts



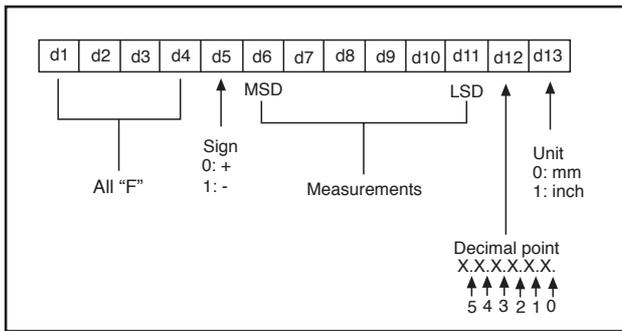
Micrometers and type 1 indicator gauge

1. Connector pin assignment



Pin no.	Name	Description
1	GND	Signal ground
2	DATA	Measurement data
3	CK	Clock signal
4	NC	No-connection
5	REQ	Request for data output
6	NC	No-connection

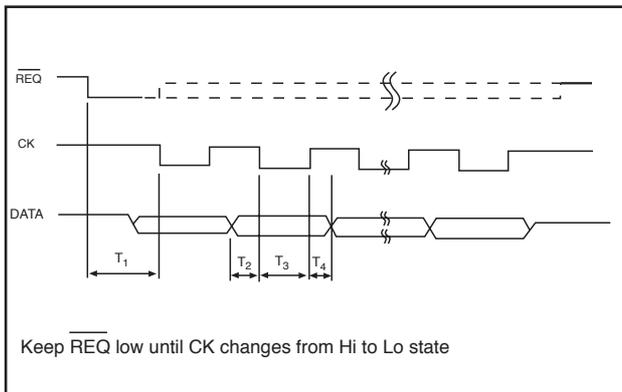
2. Output data format



A single piece of measurement data consists of 13 digits (d1 to d13) each digit consists of 4 bits.

Data is bit serially transmitted via pin 2 from the LSB (2⁰) to the MSB (2³) from d1 to d13.

3. Timing chart



Micrometer

- T1 < 67.42ms
- T2 > 125µs
- T3 > 125µs
- T4 > 250µs

Indicator gauge

- 200ms < T1 < 2 sec
- 200µs < T2 < 400µs
- 500µs < T3 < 1000µs
- 200µs < T4 < 400µs

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