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Mitutoyo Quality

Mini-Printer Equipped with Data Logging Function
Digimatic Mini-Processor DP-1VA LOGGER

Small Tool Instruments and Data Management

Bulletin No. 2287

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Digimatic Mini-Processor
DP-1VA LOGGER

Digimatic data-logging processor delivers outstanding performance

Using real-time measurement data directly from a Digimatic-output measuring tool, the high performance DP-1VA LOGGER performs complex statistical calculations such as those needed for Xbar-R control charts, histograms and D-charts.

The data logger function also allows storage of up to 1,000 pieces of data in memory, and batch transfer of stored data to an Excel-format inspection certificate, etc., by connecting to a PC with a USB cable. The DP-1VA LOGGER is the result of the pursuit of excellent portability and flexibility in the 2-way power supply system, and provides significant potential for efficiency improvements in the quality control function.

d2

"d2" is the generic name for Mitutoyo Digimatic output compatible with up to 8 digits of I/O data.

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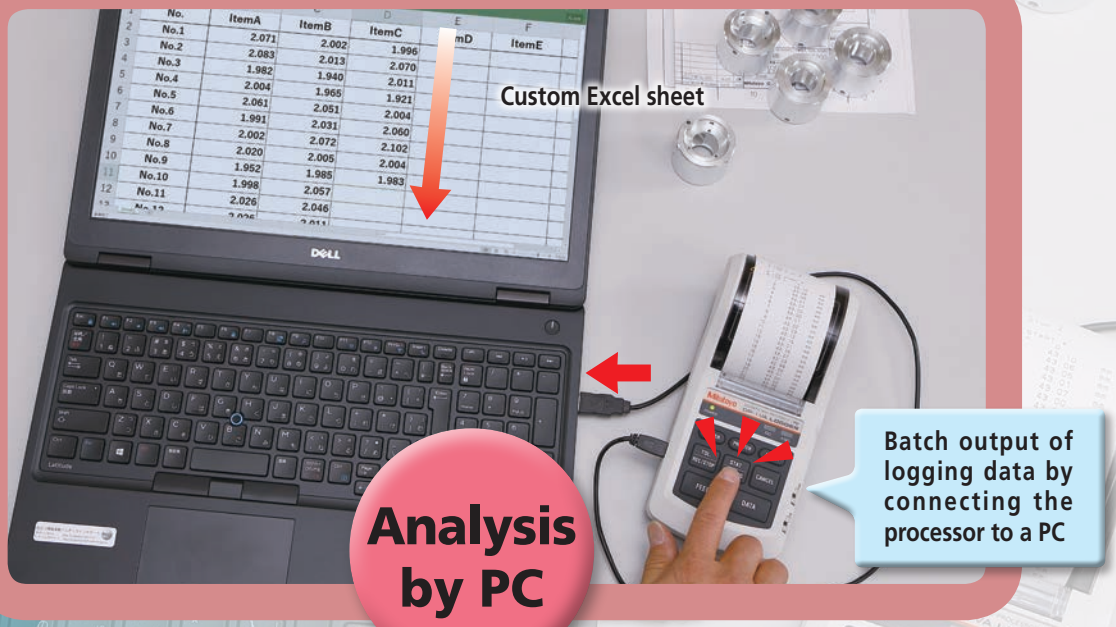
Data input to a custom inspection sheet created by Mitutoyo-specific application software or Excel



Analysis by PC

The combination of USB-ITPAK V2.1 and MeasurLink allows the processor to register/automate the Excel input procedure and display statistical processing results such as a control chart in real time.

Transfer

Equipped with the data logger function able to store up to 1000 pieces of measurement data.

Measurement and storage at site

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Clock function

Allows printing of CE year, month, day, hour and minute.

GO/±NG judgment lamps

–NG: Indicates measurement result is smaller than the lower limit
GO: Indicates measurement result is within the tolerance limits
+NG: Indicates measurement result is larger than the upper limit
Five sets of GO/±NG judgments can be set.

USB micro-connector

Allows transmission of measurement data to Excel, etc., by connecting the processor to a PC with a USB cable (option). (Both real-time data transmission upon measurement and batch transmission of logging data are possible.)

Large and easy-to-operate keys

[POWER] key
Press to turn power on/off.

[PRINTER] key
Press to turn on/off the print function for measurement and data logging.

[CLEAR] key
Press to clear all measurement data.

[TOL.|REC/STOP] key
Press briefly to enter/exit the setting mode for limit data (upper/lower tolerance).
Press longer to start/stop data logging.

[CANCEL] key
Press to cancel the most recently input measurement data.
Press longer than 10 seconds to reset hardware, clear measurement data/log data, and initialize the current date and time.

[FEED] key
Press and hold to feed printer paper.

[STAT.|OUT LOG] key
Press to perform statistical calculation based on all input measurement data and create a histogram by printing calculation results. Press longer than usual to print and USB-output log data.

[DATA] key
Executes data output.

48m printer paper
(highly-durable thermosensitive paper)

Excellent environmental resistance allows prolonged storage.
- Standard characters: About 10,000 lines per roll
- Enlarged characters: About 7,000 lines per roll

One-touch paper loading

Thermosensitive paper:
Standard accessory (1 roll)
- Order No. **09EAA082**

2-way power system

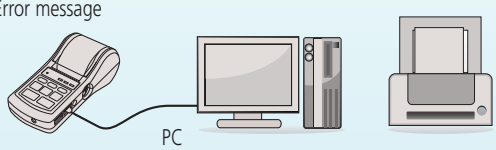
Allows the AC adapter (standard accessory) and AA alkaline batteries (LR6) or nickel-metal-hydride batteries to be used.
The battery compartment is located at the rear of the main unit.

Data output connector

Outputs measurement data and GO/±NG judgment results in RS-232C format at TTL voltage levels.

Output via RS-232C

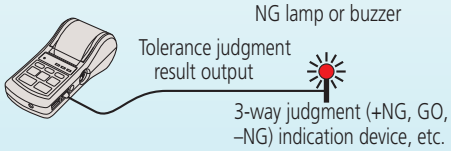
Data description
- Measurement data
- Error message



PC
Note: Appropriate communication software is required separately.

RS-232C output cable (optional accessory)
- Cable for PC with D-SUB 9-pin connector
- Cable length 1m • Order No. **09EAA084**

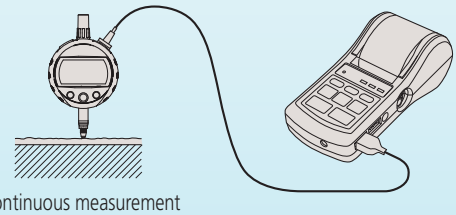
GO/NG judgment result output (open collector output)



RS-232C output cable (optional accessory)
- 10P terminal for discrete wiring
- Cable length 2m • Order No. **965516**

Timer input

Data from a measuring tool can be automatically input at a certain interval (0.25 sec, 1 sec, 5 sec, 30 sec, 1 min, 30 min, 60 min), allowing automatic recording and logging of measurement data.



Continuous measurement

Data input connector

Connects a cable from a Digimatic measuring tool.

Foot switch connector

Connects the foot switch (option) for executing data output in place of the DATA switch.

Strap attachment

Example of printout

MODE1

Various statistical calculations are executed using all input data. If the tolerance limits have been set, GO/±NG judgment and histogram creation are also enabled.

```
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DP-1VA LOGGER
 * MODE 1 *

DATE 2018/ 2/15
TIME 12: 4

 * LOG =      0
 * LOG STOP *

*LIMIT DATA   1*
LSL          19.11     mm
USL          21.00     mm
TOL           1.89     mm

     1       20.14     mm
     2       20.16     mm
     3       19.68     mm
     4       19.77     mm
     5       20.27     mm
     6       20.28     mm
     7       19.31     mm
     8       19.64     mm
     9       19.93     mm
    10       19.30     mm
    11       19.56     mm
~~~~~~~~~~~~~~~~~~~~~~~~~~~~
    19       20.01     mm
    20       20.06     mm
    21       20.05     mm
    22       19.21     mm
    23       19.78     mm
    24       20.18     mm
    25       19.49     mm
    26       20.31     mm
    27       20.49     mm
▲   28       21.06     mm
▼   29       18.99     mm
    30       20.82     mm

PART NO.:
DATE 2018/ 2/15
TIME 12: 8

NAME:
* RESULT *
N                30
MAX          21.06     mm
MIN          18.99     mm
R             2.07     mm
X̄            19.9550    mm
σn            0.4501    mm
σn-1          0.4578    mm

-NG              1
+NG              1
P             6.667     %
Cp            0.688
Cpk           0.615

 * HISTOGRAM *
LSL          19.11     mm
USL          21.00     mm
TOL           1.89     mm

 DIV         10

-NG     1 |□
LSL
A       1 |□
B       2 |□□
C       3 |□□□
D       5 |□□□□□
E       6 |□□□□□□
F       5 |□□□□□
G       3 |□□□
H       2 |□□
I       1 |□
J       0 |
USL
+NG     1 |□

 □=     1

A        19.1100 mm ~
B        19.2990 mm ~
C        19.4880 mm ~
D        19.6770 mm ~
E        19.8660 mm ~
F        20.0550 mm ~
G        20.2440 mm ~
H        20.4330 mm ~
I        20.6220 mm ~
J        20.8110 mm ~
         21.0000 mm ~
```

MODE2

In addition to the MODE1 function, measurements within the tolerance limits are printed out as a D chart*. This chart allows you to identify the trend of variations in measurement data.

* D chart stands for Displacement chart.

```
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DP-1VA LOGGER
 * MODE 2 *

DATE 2018/ 2/17
TIME 14:36

 * LOG =      0
 * LOG STOP *

*LIMIT MODE*
*LIMIT DATA   1*
*NO LIMIT DATA*
LIMIT1        27.22     mm

LIMIT2        28.27     mm

*NEW LIMIT DATA*
*LIMIT DATA   1*
DATE 2018/ 2/17
TIME 14:37

LSL           27.22     mm
USL           28.27     mm
TOL            1.05     mm

                 L    C    U
   28.08mm |
   27.87mm |
   28.14mm |
   28.01mm |
   27.72mm |
   27.41mm |
   26.97mm ◀
   27.12mm ◀
   27.72mm |
   27.58mm |
 10
   27.82mm |
   28.14mm |
   28.22mm |
   28.45mm |             ▶
   28.45mm |             ▶
   28.00mm |

PART NO.:
DATE 2018/ 2/17
TIME 14:38

NAME:
* RESULT *
N                 16
MAX          28.45     mm
MIN          26.97     mm
R             1.48     mm
X̄            27.8563    mm
σn            0.4134    mm
σn-1          0.4270    mm
```

MODE3

Only input of data automatically enables calculation processing of complex control limit values as well as calculation for creating an Xbaar-R control chart.

```
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DP-1VA LOGGER
 * MODE 3 *

DATE 2018/ 2/17
TIME 14:40

 * LOG =      0
 * LOG STOP *

SUB GR. NO.    1
     1       25.33     mm
     2       26.77     mm
     3       28.82     mm
     4       25.70     mm
     5       27.41     mm
     6       23.84     mm
     7       26.57     mm

X̄            26.3486    mm
R             4.98     mm
PART NO.:
DATE 2018/ 2/17
TIME 14:40

NAME:

SUB GR. NO.    2
     1       27.77     mm
     2       27.13     mm
     3       27.98     mm
     4       27.64     mm
     5       27.90     mm
     6       26.86     mm
     7       28.85     mm

X̄            27.7329    mm
R             1.99     mm
PART NO.:
DATE 2018/ 2/17
TIME 14:40

NAME:

*CONTROL LIMIT*
DATE 2018/ 2/17
TIME 14:40
NO.OF SUB GR.     2
SAMPLE SIZE       7
X̿            27.0407    mm
X̄-UCL        28.5009    mm
X̄-LCL        25.5805    mm
R̄             3.4850    mm
R̄-UCL         6.7051    mm
R̄-LCL         0.2649    mm
```

Example of batch printing log data

In OUT LOG Setting 1

```
 * OUT LOG START *
 * LOG =    10

DATE 2018/ 2/15

10:16:32        37.20 mm
10:16:44 ▲      38.64 mm
10:16:59        37.22 mm
10:17: 8        37.27 mm
10:17:56 ▼      36.96 mm
10:18:41        37.66 mm
10:19:16        37.70 mm
10:19:47 ▲      37.80 mm
10:20:17        37.29 mm
10:20:43        37.04 mm

 * OUT LOG END *
```

This setting allows printout of measurement time, measurement value, and GO/±NG judgment result.

In OUTLOG Setting 2

```
 * OUT LOG START *
 * LOG =    10

DATE 2018/ 2/15

  1          20.41      mm
  2 ▼        20.37      mm
  3          22.05      mm
  4 ▲        22.31      mm
  5 ▲        22.19      mm
  6          20.66      mm
  7 ▼        20.13      mm
  8          21.29      mm
  9          21.58      mm
 10          22.03      mm

 * OUT LOG END *
```

This setting allows printout of data number, measurement value, and GO/±NG judgment result.

In OUTLOG Setting 3

```
 * OUT LOG START *
 * LOG =    10
   1 2018/ 2/15  10:28:28
          21.00 mm
   2 2018/ 2/15  10:28:31
          20.10 mm
   3 2018/ 2/15  10:28:33
          19.60 mm
   4 2018/ 2/15  10:28:37
▼         19.03 mm
   5 2018/ 2/15  10:29:29
          20.55 mm
   6 2018/ 2/15  10:29:42
▲         21.07 mm
   7 2018/ 2/15  10:29:47
▲         21.29 mm
   8 2018/ 2/15  10:29:56
          19.72 mm
   9 2018/ 2/15  10:30: 5
▼         19.05 mm
  10 2018/ 2/15  10:30: 7
          20.00 mm

 * OUT LOG END *
```

This setting allows printout of data number, measurement date and time, and GO/±NG judgment result.

Statistical calculation data

MODE0

GO/±NG judgment

MODE1, 2

- N: Number of pieces of data
- MAX: Maximum value
- MIN: Minimum value
- R: Range
- $\bar{X}$: Mean value
- σn: Standard deviation of a population (N)
- σn-1: Sample standard deviation (N-1)
- -NG: For the number of pieces of data smaller than the lower limit
- +NG: For the number of pieces of data larger than the upper limit
- P: Percentage of rejects
- Cp: Maximum process capability potential
- Cpk: Actual process capability achieved

MODE3

- N: Number of pieces of data
- MAX: Maximum value
- MIN: Minimum value
- n: Number of subgroups (up to 10)
- $\bar{X}$: Mean value in a subgroup
- R: Range of a subgroup
- $\bar{\bar{X}}$: Mean value
- $\bar{X}$-UCL: Upper control limit
- $\bar{X}$-LCL: Lower control limit
- $\bar{R}$: Center (R control)
- R-UCL: Upper control limit (R control)
- R-LCL: Lower control limit (R control)

SPECIFICATIONS

Order No.	**264-505**[*1]
Data input	Digimatic input, Digimatic 2 input, RS-232C input (specific to Mitutoyo KA counter)
Printing method	Thermal line printer
Character specification	Total number of dots: 384 dots/line Dot size: 8 dots/mm
Printing speed	0.8s per line (6.5mm/s)
Printing paper[*2]	High durability thermo-sensitive paper Width 58mm x length 48m
Power supply	2-way power supply system 1. 100-240V 50/60Hz AC adapter (6V, 2A) 2. AA alkaline battery (LR6) or nickel-metal-hydride battery (NiMH Size AA) 4 pieces (Manganese dioxide batteries are not usable.)
Battery life[*3]	About 10,000 lines (if data is printed once every 5 seconds using 1,600mA NiMH batteries at 20ºC)
Data processing capacity	MODE0: 100,000 pieces of data MODE1, MODE2: 9,999 pieces of data MODE3: Sample size 10 x 9999 subgroups = 99,990 pieces of data GO/±NG judgment (five sets can be defined)
Tolerance judgment	Five sets can be set.
Measurement data logging (storage)	Up to 1,000 pieces
Input timer	0.25s, 1s, 5s, 30s, 1 min, 30min, 60min
Output	USB output RS-232C data output at TTL levels GO/±NG judgment result output (–NG, GO, +NG)
Clock accuracy	Maximum time difference per month: ±2 minutes
Operating temperature	0 to 45ºC (using AC adapter) 10 to 45ºC (using battery)
Storage temperature	-10 to 50ºC
Mass	390g (main unit)
External dimensions	94 (W) x 201 (D) x 75.2 (H) mm
Standard accessories	AC adapter : 06AEG180, printing paper (one roll), strap, user's manual
Optional accessories	1. USB cable (A-microB) : 06AFZ050 (1m) 2. RS-232C output cable: 09EAA084 (1m, D-SUB 9 pin) 3. GO ±NG judgment cable: 965516 (2m, 10 pin terinal/separate) 4. Foot switch: 937179T (2m)
Consumable items	Printing paper (10 rolls)

*1: To denote your AC line voltage add the following suffixes. A for North America, D for Europe, E for UK, K for Korea, DC for China, B for Oceania without AC adapter and no suffix is required for Japan.
*2: The printer paper has excellent environmental and chemical resistance, but it has limitations in durability due to thermosensitivity. If recorded paper is stored for more than 5 years, or used as a public document, it is recommended to make a more durable copy.
*3: The battery life quoted is not a guaranteed value, but only a typical value.

264-505 DP-1VA LOGGER

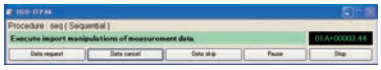
■ USB cable (A-microB) (optional)
06AFZ050

■ Foot switch (optional)
937179T

Measurement Data Collection Software (optional)

Excel-specific Measurement Data Collection Software USB-ITPAK V2.1 (06AFM386)

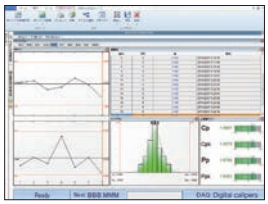
This software allows efficiency improvements in inspection tasks that include repetitive work by automating input operations to Excel.



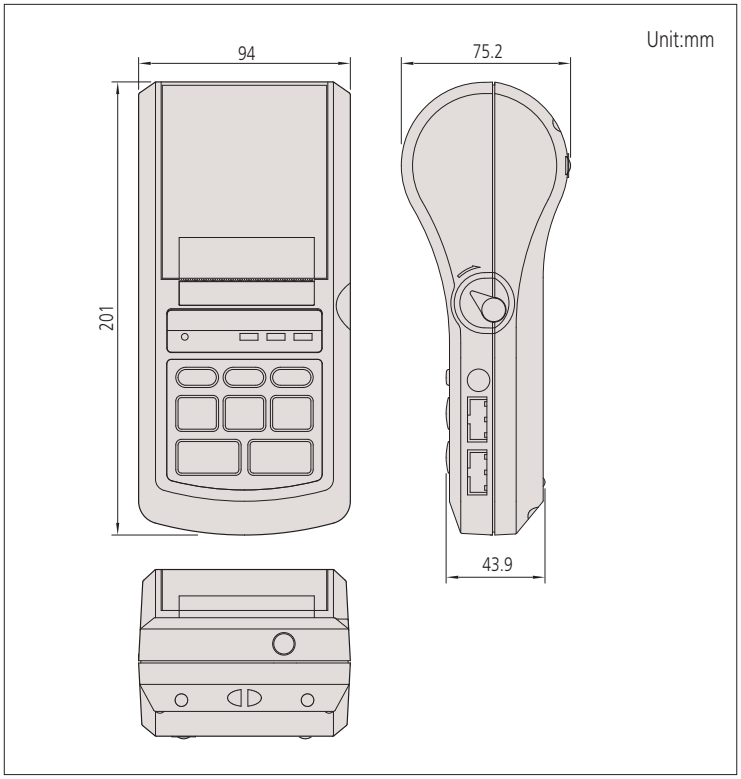
	A	B	C	D	E	F
1	Setting	1	2	3	4	5
2	Dimension X	10.025	10.033	9.964	10.031	10.046
3	Dimension Y	9.982	10.017	10.008	9.996	10.027

Measurement Data Collection/Statistical Analysis Software MeasurLink Real-Time Standard (64AAB606)

This software visualizes statistical processing such as a control chart and process capability index in real time, thus achieving "Quality Visualization".



DIMENSIONS



Coordinate Measuring Machines

Vision Measuring Systems

Form Measurement

Optical Measuring

Sensor Systems

Test Equipment and Seismometers

Digital Scale and DRO Systems

Small Tool Instruments and Data Management

Whatever your challenges are, Mitutoyo supports you from start to finish.

Mitutoyo is not only a manufacturer of top quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed by comprehensive services that ensure your staff can make the very best use of the investment.

Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.

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www.mitutoyo.com

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