

Digimatic Gage Counter EC-101D

User's Manual
No. 99MBC089A1
SERIES No. 542

1. Safety Precautions

To ensure operator safety, use the instrument in conformance with the directions and specifications given in this manual.

2. Foreword

To obtain the highest performance and the longest service life from your Counter, carefully read this User's Manual thoroughly prior to setup and operation. After reading this manual, keep it near the Counter for quick reference. Be sure to follow the precautions below.

3. Conformance to EC Directives

This unit conforms to the following EC directives:
Standard: EN61326:1997+A1:1998 +A2:2001 +A3:2003
Immunity test requirement: Annex A
Emission limit: Class B

4. Precautions on Use

- WARNING**
- Neither remove the cover nor disassemble this unit. Doing so may expose personnel to electric shock or result in damage or fire to this unit due to a short circuit caused by metal chippings or dust.
 - Note the warning labels on the top surface of this unit.
 - This unit is a precision instrument. Do not bump or apply excessive force to any part of this unit when setting it up or operating it.
 - Use this unit in an environment where the temperature is between 0 and 40°C. Temperature variations should be minimized so that there is no condensation.
 - Avoid operating this unit in the following places:
 - Where it will be exposed to cutting chips and oil, dirt, dust, or significant vibrations.
 - Where it will be exposed to direct sunlight.
 - Near high-voltage/large current power equipment

5. Warranty

If the Mitutoyo Digimatic Gage Counter (EC-101D) should prove defective in workmanship or material, within one year from the date of purchase, it will be repaired or replaced, at our option, free of charge upon its prepaid return. For further information, contact your dealer or local Mitutoyo sales office.

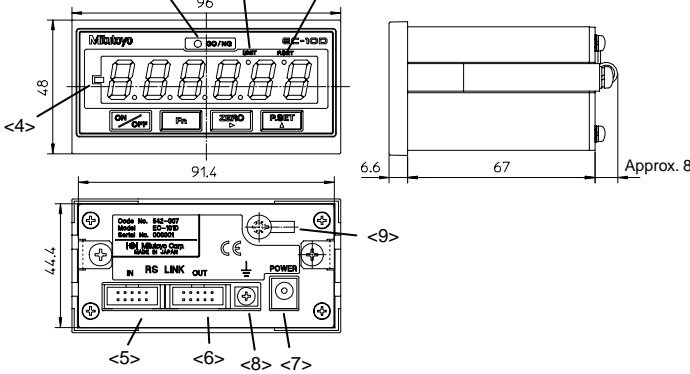
6. Overview

The EC counter is a small counter conforming to the DIN size (96 × 48) that allows for easy installation or incorporation. The EC counter features a tolerance judgment or SDP output function. Gages with a Digimatic output can be connected to.

Main features

| | |
|----------------------|---|
| Key function | Presetting, zerosetting, tolerance limit setting |
| Tolerancing function | 3-stage tolerance limits |
| Output function | Tolerancing output or Digimatic (switched by parameter) |
| Input function | Presetting hold (during tolerance mode) |

7. Appearance



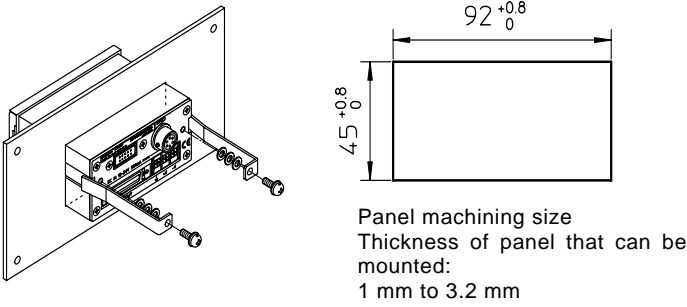
8. Setup

8.1 Installation

8.1.1 Mounting counter on panel

After removing the fixing metals of the counter, insert the counter unit in the panel from the front side and fix the counter from the rear side of the panel using the fixing metals. Use the required number of washers included with the EC-101D that are appropriate for the thickness of the panel.

| | | | | |
|----------------------|------------|------------|------------|------------|
| Panel thickness (mm) | 1.0 to 1.3 | 1.4 to 1.7 | 1.8 to 2.5 | 2.5 to 3.2 |
| Number of washers | 0 | 1 | 2 | 3 |



8.1.2 Attaching rubber feet

When setting the counter on the desk, adhere the rubber feet included with the counter to the bottom of the unit case.

CAUTION

Once the rubber feet have been adhered, the counter cannot be mounted to the panel.

8.2 Connecting connectors

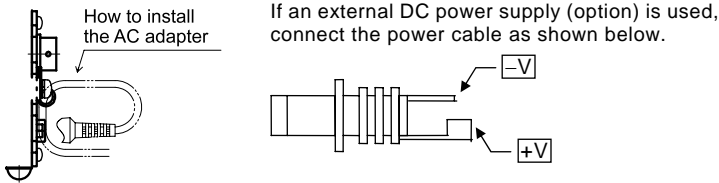


Be sure to disconnect the AC adapter plug before connecting connectors.

CAUTION

- Connect the linear gage to the INPUT connector.
- Connect the grounding wire to the grounding terminal.
- Connect the cable to the OUT connector. The user must supply the cable.
- Connect the AC adapter.

Use the cord clamp to connect the AC adapter.



CAUTION

Watch the following when using the EC-101D.

- Do not route the power cable and gage cable with other power lines through the same piping.
- Use a shielded cable with a length of 3 m or less for the OUTPUT cable.
- Be sure to ground the counter.
- Clamp all cables to the counter body.

- <1> Tolerance limit indicator
<2> P. SET indicator
<3> UNIT indicator (flashes when the HOLD signal is input)
<4> Sign
<5> Gage input connector
<6> I/O connector
<7> AC adapter input
<8> Grounding terminal
<9> Cord clamp

8.3 Setting parameters

Set the counter parameters so they are appropriate for the gage to be connected. Perform required settings such as switching between the tolerance and Digimatic output.

Parameter list

| No. | Parameter Name | Setting | Initial Setting |
|----------|---|--|-----------------|
| 00 | Parameter mode selection To set parameters, select 1. | 0: Reference 1: Modification (Settings other than 0 and 1 are prohibited.) | 0 |
| 10 *1 | User parameter clear Initializes the user parameters. | 1: Initialization | 0 |
| 11 | Count direction selection | When the spindle is pushed in: 0: + count 1: – count | 0 |
| 12 | Gage type setup | 0: INC (LGS) 1: ABS (LGD, IDC, SD, etc.) 2: Multiple units connected *4 | 1 |
| 14 | Startup mode | 0: At startup "-----" display 1: 0.000 | 0 |
| 15 *1 | mm/inch unit system display selection Not initialized by user parameter clear. (Inch = 1/25.4 mm) | 0: mm 1: Inch 5/100,000 reads *2 2: Inch 1/10,000 reads *2 3: mm (when 1/100,000 inch gage connected) | 0 |
| 16 | Calculation with constant | 0: None 1: x2 2: x10 3: Arbitrary *3 | 0 |
| 17 | Least significant digit blank | 0: Display all digits 1: Least significant digit blank | 0 |
| 20 | Digimatic output/tolerance output switch | 0: Tolerancing output 1: Digimatic output | 1 |
| 29 *5 | SDP equipment with digimatic input wait | 0: No wait 1: 200 ms wait 2: 400 ms wait | 0 |
| 35 | Key protect Malfunction is prevented. | 0: Normal 1: Disable key input | 0 |

- *1. If this parameter is cleared, the preset value and tolerance limits are cleared.
*2. When the inch type gage is connected, the minimum reading is the resolution of the gage.
*3. For how to set the constant, refer to 10.
*4. The display speed can be changed.
When the Multi Unit is connected, set P. No. 12 = 2 and P. No. 29 = 1. Do not set the SELECT switch of the Multi Unit to "EX".
*5. An error can occur when a special gage is connected. In such cases, set P. No. 29 to 1 or 2.

1) Parameter setting procedure

| | Key Operation | Corresponding Display/Output |
|---|--|--|
| 1 | Turn the counter on. | The counter enters the count standby status. |
| 2 | Press the [P.SET] key while holding down the [Fn] key to set the parameter mode. | Displays the first parameter No. 00. (The flashing digit can be modified.) Parameter No. Set value |
| 3 | Press [P.SET] to set the set value to 1. | [P.SET] |
| 4 | Press [Fn] to advance the parameter number. | Press [Fn] twice. The current setting parameter 11 will flash. |

| | Key Operation | Corresponding Display/Output |
|---|---|--|
| 5 | Press [P.SET] to set the desired value. | [P.SET] |
| 6 | Press [Fn] to secure the setting and move to the next parameter number. | [Fn] |
| 7 | Repeat steps 3 and 4 for required times. | |
| 8 | Press [P.SET] while holding down [Fn]. | The counter returns to the count display mode to display a counter value under the set parameters. |

Note

Unless parameter No. 00 is set to 1, no parameters can be changed.

9. Setting Parameters

9.1 Turning on the AC adapter power supply

| | Procedure | Key Operation/ Corresponding Display |
|---|--|---|
| 1 | Turn the counter on. The counter enters the count standby status. | |
| 2 | Press [P.SET] to return to the count display. | [P.SET] |

9.2 Zero setting, presetting, and error resetting

Use the [ZERO] or [P.SET] key to set the origin.
By presetting the [P.SET] key, the preset value can be changed (refer to 9.4) and the origin (0 at factory setting) to the arbitrary value.

| | Procedure | Key Operation/ Corresponding Display |
|---|-------------------------|---|
| 1 | | When counter value is 1.000 |
| 2 | Press [P.SET] or [ZERO] | [P.SET] |

*If an error occurs, press the preset key to reset the error.

Note

- The preset count of the effective zero for the gage type (ABS) is 1 million times.
- After the error has been released, all of the decimal points flash for approximately 8 seconds.

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9.3 Setting preset value and tolerance limits

Always set the preset value and tolerance limits in this order. (The flashing portions are indicated in gray in the following diagram.)

1) Setting preset value and tolerance limits

| | | Key Operation and Corresponding Display/Output |
|---|---|--|
| 1 | Set the counter to the normal count status. | |
| 2 | Press [Fn] to enter the setup mode. The preset indicator flashes and the preset value previously set is shown. | |
| 3 | When [ZERO] is pressed, the most significant digit will flash. | |
| 4 | Press [P.SET] to change the displayed value. The most significant digit can be set with a minus sign. MSD: 0 → 9 → -0 → -9 → 0 | |
| 5 | Press [ZERO] to move the flashing digit. | |
| 6 | Press [P.SET] to change the displayed value. | |
| 7 | Press [Fn] to complete the presetting of values. After this, proceed to inputting the lower tolerance limit. When the tolerance indicator lights orange, the displayed value is the previously set value. | |
| 8 | Follow the procedures in 3 to 7 above to set the tolerance limit. | |
| | Press [Fn] to input the upper tolerance limit. When the tolerance indicator lights red, the displayed value is the previously set value. | |
| 9 | Press [Fn] to complete setting and return to the count status. | |

Note

- Press [P.SET] to perform presetting.
- Setting tolerance values other than lower limit ≤ upper limit results in an error. In this case, press [P.SET] to set the values again.

2) Tolerance judgment result

When tolerance limits have been set, the tolerance is judged in three steps as shown in the table below.

| | Tolerance Indicator | I/O Output |
|---|---------------------|------------|
| Measurement < Lower limit | Orange | -NG |
| Lower limit ≤ Measurement ≤ Upper limit | Green | GO |
| Upper limit < Measurement | Red | +NG |

9.4 ON/OFF

Follow the procedure below to turn the counter display on or off. (If the gage or I/O cable is connected, disconnect the AC adapter.)

| | Description | Key Operation/ Corresponding Display |
|---|---|--------------------------------------|
| 1 | Count status | |
| 2 | Press [ON/OFF] to turn the display off. | |
| | Press [ON/OFF] again to turn the display on. The display at this time is as follows according to the gage type. (ABS mode) When the value is OFF. (INC mode) Display value such as ID | |

10. Setting Arbitrary Constant

| | Description | Key Operation/ Corresponding Display |
|---|---|---|
| 1 | Press the [P.SET] key while holding down the [Fn] key. | The first parameter 00 is displayed. |
| 2 | Press [P.SET] twice to set the set value to 2. | |
| 3 | Press [Fn] and then the set constant is displayed. | |
| 4 | Set the value following the same procedure as for presetting. | |
| 5 | Press [P.SET] while holding down [Fn]. | The display returns to the counter value. Set value range: ±9.9999 |

* When the arbitrary constant is set, the decimal point flashes.

11. Backup Memory Function

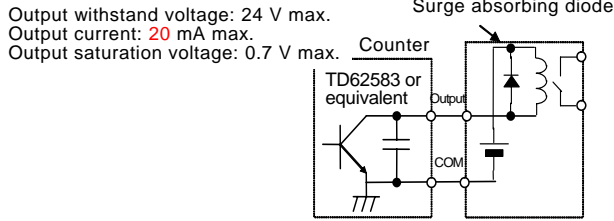
The following data is retained even if the power is turned off.

| | |
|--|-------------------------------|
| Parameters, preset value, tolerance limits | Retained |
| Counter value | Retained only during ABS mode |

12. I/O Connector Terminal Function

12.1 Output circuit

Operation: The transistor is turned on when the input is low. (Open collector)

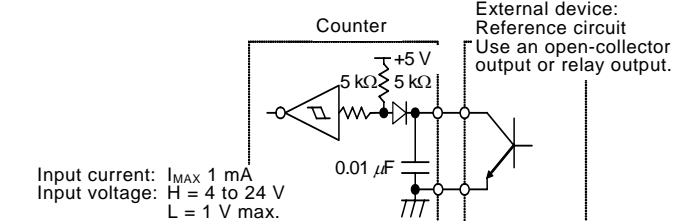


Note

Use a surge absorbing diode or a relay with a built-in surge absorber when using a relay to protect the output circuit.

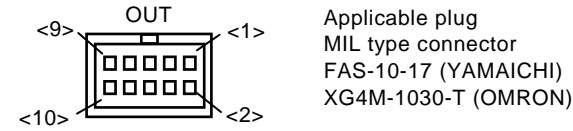
12.2 Input circuit

Operation: An input is valid when it is low.



12.3 Pin assignment

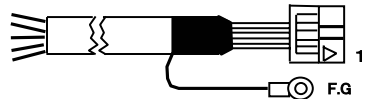
Tolerance output mode



1) During tolerance judgment mode

| Pin No. | I/O | Name | Function | Option I/O cable color |
|---------|-----|-------|--|------------------------|
| 1 | | COM | Internally connected to GND | Brown /black |
| 2 | O | +NG | Tolerance output: The corresponding output terminal is low. When an error is displayed | Brown/red |
| 3 | O | GO | | Yellow/black |
| 4 | O | -NG | | Yellow/red |
| 5 | I | HOLD | HOLD input | Green/black |
| 6 | I | P.SET | Preset input (error cancel) | Green/red |
| | | | No connection for other than above | |

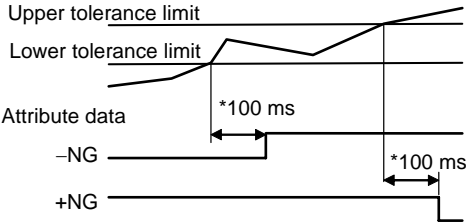
* The pin functions are different during the Digimatic output mode. After setting the output mode, connect the cable.
* One end of the I/O cable is not bunched and requires processing by users. Connect the F.G line to the grounding terminal of the counter. Connect the F.G terminal (with green solderless terminal) of the cable to the earth terminal of the counter.



I/O cable (option)

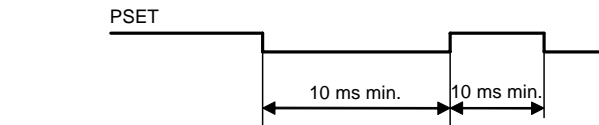
13. Timing Chart

1) Tolerance output



* The time varies depending on the gage (the above value shows a case of LGD).

2) External preset HOLD



An input is active low: 1 = "H", 0 = "L"

14. Error Display

| Display | Cause | Resetting Method |
|---------------|--|--|
| "----" lights | Count standby status at power on or instantaneous power interruption | Press [P.SET]. The power supply needs to be checked for an instantaneous power interruption. |
| Error10 | Abnormal power voltage | Connect to the rated power supply. |
| Error30 | The counter value is 8 digits or more. | Change the present value and press [P.SET]. |
| Error40 | Abnormal gage | Press [P.SET] and check for correct gage connection. |
| F**** | The counter value is 6 digits or more. | Change the preset value. |
| Error90 | Tolerance limit setup error | Press [P.SET] and input tolerance limit again. |
| Error95 | Key protection | Set P. No. 35 to 0. |

Note

- During tolerance output, ±NG is low.
- If an error occurs during parameters, preset values, or tolerance limit settings, an error is displayed after the counter has returned to the count status. However, the error is immediately output to the external output device.

15. Specifications

| | |
|---------------------------------|---|
| Code No. | 542-007 |
| Model | EC-101D |
| Number of display axes | One axis |
| Power supply | +9 V to +12 V (400 mA max.) |
| Power consumption | 4.8 VA |
| Operating temperature | 0 to 40°C (20 to 80% RH with no condensation) |
| Storage temperature | -10 to 50°C (20 to 80% RH with no condensation) |
| External dimensions (W × D × H) | 96 × 84.6 × 48 mm |
| Mass | 220 g |

16. Standard Accessories

| Order No. | Part Name | Quantity |
|-----------|---------------------------------------|----------|
| - | Washer (plain washer: nominal dia. 4) | 6 |
| - | Rubber feet | 4 |
| 526688 | AC adapter (AD908N) | 1 |
| 99MBC089J | User's Manual (this document) | 1 |
| | Warranty card | 1 |

17. Optional Accessories (Separate Order)

| Order No. | Part Name |
|-----------|---|
| 936937 | Connecting cable for Digimatic mini processor (1 m) |
| 965014 | Connecting cable for Digimatic mini processor (2 m) |
| 214938 | PJ-2 (DC plug) |
| C162-155 | I/O cable (2 m) |