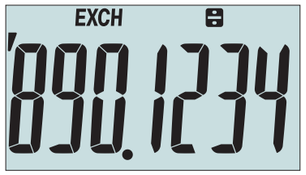
## Excellent durability and functionality for demanding work requirements — Heavy Duty Calculators

### Extra Large Display

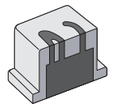



Actual size

### Heavy Duty Durable Keys

Keys are produced by injecting plastic of two different colours. Key markings are plastic, which means they do not wear or fade with use.

**Excluding the M/EX, TAX+ and TAX− keys.*



Key cross-section

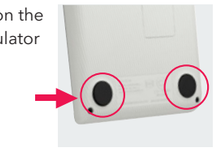
### Key Layout and Key Cap Shape

Keys are ergonomically shaped and configured to match natural finger movements.

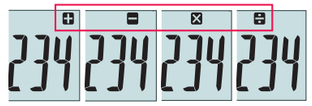
### Solar & Battery

### Large Rubber Feet

Large rubber feet on the bottom of the calculator keep it from slipping during operation.



### Function Command Signs




### Silent Touch Keys

Keys are specially designed for silent operation when compared to previous Casio calculators to help maintain a more pleasant working environment.

### Three-Key Rollover

Key operations are stored in a buffer, so that nothing is lost even during high-speed input.

### Compact Desk Type

JE-12E-WE

JE-12E-BK

### Desktop Type

DE-12E-WE

DE-12E-BK

| | JE-12E-WE | JE-12E-BK | DE-12E-WE | DE-12E-BK |
|---|---|---|---|---|
| No. of digits | 12 | 12 | 12 | 12 |
| Independent memory | ● | ● | ● | ● |
| Grand total (GT) | ● | ● | ● | ● |
| Tax calculation | ● | ● | ● | ● |
| Currency exchange function | ● | ● | ● | ● |
| Profit margin percent | ● | ● | ● | ● |
| Square root (√) | ● | ● | ● | ● |
| Constant calculation | ● | ● | ● | ● |
| Shift key ▶ | ● | ● | ● | ● |
| Sign change (+/-) | ● | ● | ● | ● |
| Rounding down/Rounding | ● | ● | ● | ● |
| Rounding up | – | – | ● | ● |
| ADD2 | ● | ● | ● | ● |
| Key rollover | ● | ● | ● | ● |
| 00 key | ● | ● | ● | ● |
| 3-digit comma markers | ● | ● | ● | ● |
| Auto power off | ● | ● | ● | ● |
| Power supply | Solar & battery (CR2025 x1) | Solar & battery (CR2025 x1) | Solar & battery (CR2025 x1) | Solar & battery (CR2025 x1) |
| Battery life* | Approx. 7 years | Approx. 7 years | Approx. 7 years | Approx. 7 years |
| Size (mm): D x W x H | 177.5 x 111 x 24.4 | 177.5 x 111 x 24.4 | 188 x 140 x 35 | 188 x 140 x 35 |
| Approximate weight (g) incl. battery | 210 | 210 | 295 | 295 |

**1 hour use per day*

CASIO COMPUTER CO., LTD.
Tokyo, Japan



https://www.casio.com/select-country-region/

CASIO

3°

# 3° makes all the difference

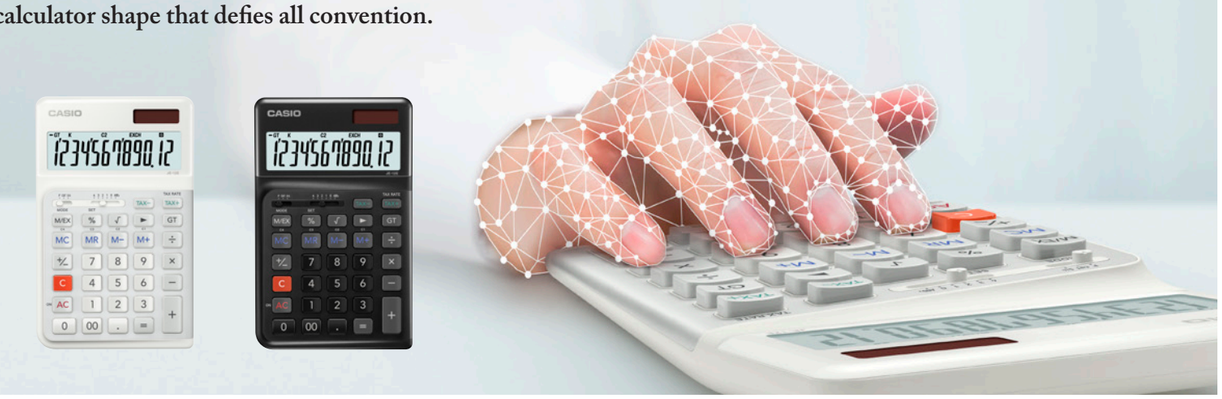
## Ergonomics × Calculator

ERGONOMIC STEP KEYS

For more details

# Easy key input with the right hand

How could we design a calculator that would make key input with three to five fingers of the right hand easier than ever before? This was the question that guided our research into exactly what happens to the hand and fingers when people use a calculator. Working with a specialized institute, we devoted ourselves to re-envisioning a calculator that was, in fact, already highly optimized. After plenty of trial and error, we settled upon a totally new calculator shape that defies all convention.

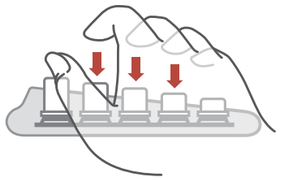



## ERGONOMIC STEP KEYS

Sloping the keypad surface 3° ensures a comfortable fit with the fingers of the right hand. Arranging the keys themselves in an un-sloped step configuration keeps the keystroke direction vertical. This all-new structure makes key input with a natural hand position easy.

**Point 1**

Calculator is used with right hand angled



**Point 2**

Keystroke direction stays vertical

**Ergonomically designed for right hand users: The keypad is configured in an innovative staircase design, with a 3° inclination from right to left side. Compared to conventional desk calculators, this innovative keypad design causes less torsion of the underarm and rotation of the hand wrist, as it adapts to the natural finger and hand posture. The staircase key shape enables perfect vertical keystrokes and thus eases the key typing, lessens burden and helps avoiding Repetitive Strain Injuries (RSI). This reduces the muscle activity on these 3 muscles: the pronator teres muscle, the extensor carpi radialis muscle and the flexor carpi radialis muscle.**

### Person-centered, friendly design

Generous use of curves gives a soft, rounded look to the calculator. The shape delivers a pleasant, comfortable touch.

Curvature to smooth out the difference in heights due to the sloped keypad surface creates a fresh, new shape that still feels fitting for a calculator.

Asymmetrical design, including more compact rounding of the corners on the right side and off-center placement of the aluminum panel, creates a unique look.

Ripple-patterned grooves on the back of the case offer a good grip from any direction. Ease of use was the priority even for parts that no one sees.

**Kanako Kimura**
Hardware Section
Products Strategy Department
Education Business Unit
Casio Computer Co., Ltd.

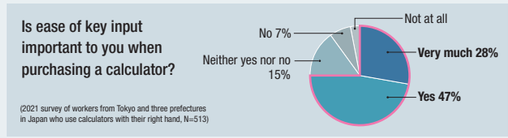
Ergonomic Calculator Development Story

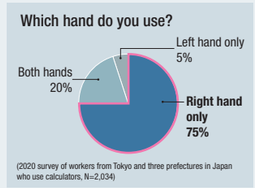
# All for Users Who Value Easy Key Input

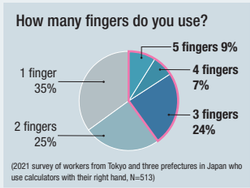
The development of the Ergonomic Calculator was driven by feedback from calculator users, detailed research, and repeated experiments. Read on for the story.

**Shunsuke Oka**
Design Department
Watches & Wearables
Casio Computer Co., Ltd.

## Fact: 75% of calculator users value ease of key input when purchasing a calculator



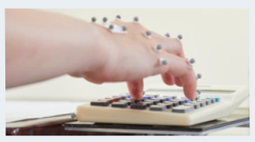




** Contracted survey conductor: ASMARQ Co., Ltd.; Survey method: Internet research*

What is it that users are looking for in a calculator? A survey revealed that 75% valued ease of key input when purchasing a calculator. Thus began the project to develop a calculator that would deliver even better operability for heavy users who press the keys with three to five fingers of their right hand.

In an age when there are many calculator apps available, users still value the easier key input of a physical calculator. The Casio Heavy Duty Calculator line had already been favorably received. So, the mission of this new project was to come up with a new way to deliver ease of use.

## Thorough analysis of what happens to the hand and fingers, done with a specialized institute



**Motion capture cameras, 3D force sensors, etc., were used to capture data.**

- Movements and positions of hands and fingers
- Direction in which keys are pressed

Kanako Kimura wanted to add an objective approach to the subjective and intuitive evaluations, in order to unlock the secret of easy key input. Casio worked with Japan's National Institute of Advanced Industrial Science and Technology to analyze what happens to the hand and fingers when people use a calculator.

**This product incorporates the results of the joint research with the National Institute of Advanced Industrial Science and Technology.*

We didn't want to just create another new product, so we really thought about what should change, and what should not. Looking back to the very first Casio calculator, the 14-A, I studied the original design intentions. I even interviewed some of the developers. All this was before we started the research with AIST.

## Sloping the keypad surface, but not the keys themselves: Repeated testing led to the Ergonomic Step Keys

Further experiments revealed that the keystroke direction always stayed vertical, even if the calculator was sloped. This is the secret of the Ergonomic Step Keys, which have been kept vertical even though the keypad surface is sloped.

## A person-centered, friendly design with a soft, rounded overall look

Illustrations were used to review the calculator's image, and mockups to assess its 3D form. The number of design possibilities was too vast to describe here.

After Shunsuke Oka was briefed on the basic concept, he started working on the product design. At first, he thought about giving it a more angular look, resembling a gaming mouse, but eventually he arrived at the soft, rounded design.

When the request first came in, I was excited to get to work on a drastically different concept than the conventional calculator. I finally settled on a "person-friendly" design, based on the phrase: "Making the calculator fit the person, not the person fit the calculator." I used curves to create a design with a soft, rounded look.