

OMRON

H7CC-A□

Digital Counter

EN

INSTRUCTION MANUAL

Thank you for purchasing the OMRON Product.

To ensure the safe application of the Product, read this manual carefully before using the Product and always keep it close at hand when the Product is in use.

OMRON Corporation

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5639664-5B (Side-A)

For details, refer to the latest datasheet.

Suitability for Use

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the product.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used. Know and observe all prohibitions of use applicable to this product.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

See also Product catalog for Warranty and Limitation of Liability.

SAFETY PRECAUTIONS

Keys to Warning Symbols

CAUTION

Indicates a potentially hazardous situation which, if not avoided, is likely to result in minor or moderate injury or in property damage.

CAUTION

Do not allow pieces of metal, wire clippings, or fine metallic shavings or fillings from installation to enter the product. Doing so may occasionally result in electric shock, fire, or malfunction.

Minor injury due to explosion may occasionally occur. Do not use the Counter where subject to flammable or explosive gas.

Fire may occasionally occur. Tighten the terminal screws to the rated torque.

H7CC terminals and P3GA-11/P3G-08 Socket terminals: 6.55 to 7.97 lb-in (0.74 to 0.90 N·m)

P2CF Socket terminals: 4.4 lb-in (0.5 N·m)

Minor injury due to electric shock may occasionally occur. Do not touch any of the terminals while power is being supplied. Be sure to mount the terminal cover after wiring.

The life expectancy of the output relay varies considerably according to its usage. Use the output relay within its rated load and electrical life expectancy. If the output relay is used beyond its life expectancy, its contacts may become fused or there may be a risk of fire. Also, be sure that the load current does not exceed the rated load current and when using a heater, be sure to use a thermal switch in the load circuit.

Minor electric shock, fire, or malfunction may occasionally occur. Do not disassemble, modify, or repair the Counter or touch internal components.

Precautions for Safe Use

1) When mounting the Counter to a panel, tighten the two mounting screws alternately, a little at a time, so as to keep them at an equal tightness. If the panel screws are tightened unequally, water may enter the panel.

2) Store the Counter at the specified temperature. If the Counter has been stored at a temperature of less than -10°C, allow the Counter to stand at room temperature for at least 3 hours before use.

3) Mounting the Counter side-by-side may reduce the life expectancies of internal components.

4) Use the Counter within the specified ranges for the ambient operating temperature and humidity.

5) Do not use or store the product in the following locations:

- Locations subject to sudden or extreme changes in temperature.
- Locations where high humidity may result in condensation.
- Locations with excessive vibration or shock.
- Locations subject to water.
- Locations subject to oil.
- Locations prone to icing.
- Locations subject to exposure chemicals.
- Locations subject to bugs and small animals.

6) Do not use this Counter in dusty environments, in locations where corrosive gasses are present, or in locations subject to direct sunlight.

7) Install the Counter well away from any sources of static electricity, such as pipes transporting molding materials, powders, or liquids.

8) Internal elements may be destroyed if a voltage outside the rated voltage range is applied.

9) Be sure that polarity is correct when wiring the terminals.

10) Separate the Counter from sources of noise, such as devices with input signals from power lines carrying noise, and wiring for I/O signals.

11) Do not connect more than two crimp terminals to the same terminal.

12) Up to two wires of the same size and type can be inserted into a single terminals.

13) Use the specified wires for wiring.

- Applicable Wires: AWG 18 to AWG 22, solid or twisted, copper

14) Install a switch or circuit breaker that allows the operator to immediately turn OFF the power, and label it to clearly indicate its function.

15) When the Counter is operated with no-voltage input (NPN input), approximately 14 V is output from the input terminals. Use a sensor that contains a diode.

16) Use a switch, relay, or other contact so that the rated power supply voltage will be reached within 0.1 second. If the power supply voltage is not reached quickly enough, the Counter may malfunction or outputs may be unstable.

17) Use a switch, relay, or other contact to turn the power supply OFF instantaneously. Outputs may malfunction and memory errors may occur if the power supply voltage is decreased gradually.

18) When changing the set value during operation, because the H7CC uses a constant read-in system, output will turn ON if the set value is equal to the present value.

19) If the set value and present value are both 0, the output will turn ON for the default setting. The output will turn OFF during a reset operation.

20) Do not use organic solvents (such as paint thinners or benzene), strong alkali, or strong acids. They will damage the external finish.

21) Confirm that indications are working normally, including the backlight LEDs, and LCD. The indicator LEDs, LCD, and resin parts may deteriorate more quickly depending on the application environment, preventing normal indications. Periodic inspection and replacement are required.

22) The waterproof packing may deteriorate, shrink, or harden depending on the application environment. Periodic inspection and replacement are required.

Precautions for Correct Use

1) Read this manual carefully before using the product.

2) An inrush current of approx. 10 A will flow for a short time when the power supply is turned ON. If the capacity of the power supply is not sufficient, the Counter may not start. Be sure to use a power supply with sufficient capacity.

3) Make sure the power supply voltage and loads are within the specifications and ratings for the product.

4) To allow for the startup time of peripheral devices (e.g., sensors), start Counter timing operation 200 ms to 290 ms after turning ON the power. The input signal will not be accepted before 200 to 290 ms has elapsed.

5) The input signal will not be accepted after 5 to 1005 ms has elapsed from when the power supply is turned OFF.

6) Inrush current generated by turning ON or OFF the power supply may deteriorate contacts on the power supply circuit. Turn ON or OFF to a device with the rated current of more than 10 A.

7) The capacity of the external power supply is 100 mA at 12 V.

- When using a 24 VAC/12 to 48 VDC power supply, reduce the load with the power supply voltage, as shown in the diagram (DC power supplies only) on the right.

8) If the prescale value setting is incorrect, a counting error will occur. Check that the settings are correct before using this function.

9) Make sure that all settings are appropriate for the application. Unexpected operation resulting in property damage or accidents may occur if the settings are not appropriate.

10) Do not leave the Counter for long periods at a high temperature with output current in the ON state. Doing so may result in the premature deterioration of internal components (e.g., electrolytic capacitors). Do not install the product close contact with the heating element.

11) Non-volatile memory is used as backup memory when the power is interrupted. The write life of the non-volatile memory is 100,000 writes. The non-volatile memory is written when the power is turned OFF or when switching from function setting mode or configuration selection mode to run mode.

12) Dispose of the product according to local ordinances as they apply.

13) Attach the front panel when using the Counter. The latches in the middle of each of four sides secure the front panel to the main body. To remove the panel, widen the four latches and pull the panel toward you. To mount the panel, fit all four latches correctly into the slots on the main body.

14) Do not use because it may be damaged inside the product when the product fail by mistake.

15) Confirm the wiring the input and output terminals correctly before power is supplied.

16) Do not use the product near radio wave receivers. Doing so may cause incoming radio wave interference.

17) Do not use in a circuit with the waveform is distorted. The error will increase due to the influence of the distorted waveform.

18) Install product so that the load doesn't span the product body.

Load current (mA)

Power supply voltage (VDC)

100

20

0

10.8

15

Mounting and Panel-cutout Dimensions Diagram

Mounting Dimensions (Unit: mm)

Front panel dimensions are the same for all models.

Surface Mounting

H7CC-A11□/A8□

103.2

100.9

P2CF-8 (E) P2CF-11 (E) (order separately)

Front-connecting Socket

* These dimensions vary with the type of DIN track (reference value).

Flush Mounting

H7CC-A8/A8D/A11/A11S/A11D/A11SD

Y92S-P6 (order separately) Waterproof Packing

Panel

Y92F-30 (order separately) Flush Mounting Adapter

51

7.5

89.9

P3GA-11/P3G-08 (order separately) Back-connecting Socket

H7CC-A/A-AS/A-D/ASD/A-W/AWS/AWD/A-ASD/AU/AUD

Y92S-P6 (provided) Waterproof Packing

Panel

Y92F-30 (provided) Flush Mounting Adapter

51

7.5

57.5

Panel-cutout Dimensions Diagram (Unit: mm)

Standard panel cutout is shown in the following diagram. (conforms to DIN 43700)

A space of 15 mm or greater (a panel cut-out distance of 60 mm or greater) is recommended towards the Adapter's hook side to enable easier mounting work.

1. The thickness of a mounting panel should be 1 to 5 mm.

2. It is possible to mount Timers side-by-side. (But only towards the non-hook side.)

3. If the products are mounted side by side, water resistance will be lost.

n Units mounted side-by-side

A=(48n-2.5)±1

Package Contents

• Digital Counter

• Instruction manual (this document)

• Mounting Adapter, Waterproof Packing, Terminal Cover (except H7CC-A11□/A8□)

Ratings (Specifications)

Power supply voltage

100 to 240 VAC, 50/60 Hz

12 to 48 VDC/24 VAC, 50/60 Hz

85% to 110% of rated supply voltage (12 to 48 VDC: 90% to 110%)

Power consumption

Approx. 6.8 VA at 100 to 240 VAC

Approx. 3.5 VAC/3.3 W at 24 VDC to 48 VDC

Operating temperature range

-10 to 55°C (-10 to 50°C if Counters are mounted side by side) (with no icing or condensation)

Storage temperature range

-25 to 70°C (with no icing or condensation)

Operating humidity range

25% to 85%

Altitude

2,000 m max.

Recommended fuse

12A, 250 VAC, time-lag, low-breaking capacity

Weight

Approx. 130 g (main unit only)

Installation environment

Over-voltage category II, pollution degree 2, indoor use only (IEC 61010-1)

Input method

No-voltage input

ON impedance: 1 kΩ max. (Leakage current: 12 mA when 0.1).

ON residual voltage: 3 V max., OFF impedance: 100 kΩ min.

Voltage input

High (logic) level: 4.5 to 30 VDC, Low (logic) level: 0 to 2 VDC (Input resistance: approx. 4.7 kΩ)

No-voltage (NPN) input/voltage (PNP) input (switchable)

Control output

Contact output

250 VAC, 3 A (resistive load) 30 VDC, 3 A (resistive load)

Open collector

30 VDC max., 100 mA max.

Residual voltage

1.5 VDC max. (Effective value: Approx. 1 VDC)

Leakage current

0.1 mA max.

Electrical life of relay

100,000 operations (at an ambient temperature of 23°C)

Mechanical life of relay

10,000,000 operations (at an ambient temperature of 23°C)

External power supply

12 VDC 100 mA

Degree of protection

IEC IP66

Individual mounting: Degree of protection on the front panel of the Counter conforms when all of the following conditions are satisfied:

- The Y92S-P6 waterproof packing and Y92F-30 mounting adapter are used with the Counter. Use only these parts for replacement.

UL Standards and CSA Standards

Notice to Users of the H7CC in the USA and Canada

Please use the following installation information instead of the general information in the instruction manuals in order to use the product under certified conditions of UL and CSA when the product is installed in the USA or Canada. These conditions are required by NFPA 70, National Electrical Code in the USA and the Canadian Electrical Code, Part I in Canada and may vary from information given in the product manuals or safety precautions.

• Installation in a Panel

H7CC is normally installed on a flat surface in an operation panel. Use a Type 1 Enclosure for the operation panel.

• Environment

Surrounding Air Temperature: -10 to 40°C

• Accessories (Order Separately)

Track Mounting/ Front Connecting Socket

11-pin

11-pin, finger-safe type

8-pin

8-pin, finger-safe type

P2CF-11

P2CF-11-E

P2CF-08

P2CF-08-E

Nomenclature

8. Set Value Display (Sub-display) (Character height: 6 mm, green)

9. Hold Display (yellow)

● Operation Key

10. UP Keys (UP1 to UP6) (UP1: 1, 2, 3, 4, 5 and 6 from right to left)

11. DOWN Keys (DW1 to DW6) (DW1: 1, 2, 3, 4, 5 and 6 from right to left)

12. Reset operation (UP6+DW6) (Press UP6 and DW6 keys simultaneously for at least one second. When the reset operation is successful, all status indicators will flash. If you stop pressing the keys within one second, Reset operation will be invalid. Be sure to press UP6 and DW6 keys simultaneously during Reset operation. If you press only UP6 or DW6 key, the set value will change.)

13. Mode operation (UP1+UP3 or DW1+DW3) (Used to switch mode and setting items. Press UP1 and UP3, or DW1 and DW3 keys simultaneously for at least two seconds to switch to Function Setting Mode. When Mode operation is successful, UP1 and UP3, or DW1 and DW3 keys status indicators will flash. If you stop pressing the keys within two seconds, Mode operation will be invalid.)

14. Status indicator

<When Run mode is selected.>

• When the indicator display mode is on, the LED indicator shows the percentage of the count value from 0 to 100%.

• When the indicator display mode is all off or all, the LEDs are all off or all lit.

Note: When you press the UP key or the DOWN key, the indicator display or all-lit display goes off, and the LED indicator of the pressed key lights up or blinks.

<When Function Setting Mode is selected>

• The LED indicators at the settable key positions will light.

Operating Procedures

Step1

The H7CC is a Counter that contains more than one functional counter.

When using the Counter in any modes other than the default modes listed in Table 2, use the following chart to enter configuration selection mode and then refer to Table 1 and set the functions that are suitable to the application.

Power ON

UP1+UP6 or DW1+DW6 (2 s min.)

Run mode

UP1+UP6 or DW1+DW6 (2 s min.)

Configuration selection mode

Funct ILnE

Select the function from Table 1 using the UP1 or DW1 Key.

Table 1 Configuration Selection Mode Settings

Display	Function
ILnE	1-stage preset counter
2ILnE	2-stage preset counter
ΣILnE	Total and preset counter
bILnE	Batch counter
dILnE	Dual counter
ΣnE	Twin counter
ILnE	Tachometer

Note: The modes that can be selected depend on the model. (Refer to Table 2.)

Table 2 Default Modes and Selectable Functions

Model	Default mode	Selectable mode
H7CC-AW	2-stage preset counter	Any mode
H7CC-AU	1-stage preset counter	Any mode
Other models	1-stage preset counter	1-stage preset or total preset counter only

Operation as a Counter (1-stage Preset Counter, 2-stage Preset Counter, Total and Preset Counter, Batch Counter, Dual Counter, or Twin Counter)

Step2

Note: Refer to the datasheet for detailed parameter settings.

● Change from RUN Mode to Function Setting Mode.

● Set the parameters using the UP Key or DOWN Key.

The characters displayed in reverse video are the default settings.

Power ON

UP1+UP3 or DW1+DW3 (2 s min.)

Run mode

UP1+UP3 or DW1+DW3 (2 s min.)

Function setting mode

UP1+UP3 or DW1+DW3 (2 s min.)

UP1+UP3 or DW1+DW3 (2 s min.)

UP1+UP3 or DW1+DW3 (2 s min.)

● Set the parameters using the UP Key or DOWN Key.

The characters displayed in reverse video are the default settings.

Operation as a Tachometer

Step2

Note: Refer to the datasheet for detailed parameter settings.

● Change from RUN Mode to Function Setting Mode.

Power ON

UP1+UP3 or DW1+DW3 (2 s min.)

Run mode

UP1+UP3 or DW1+DW3 (2 s min.)

Function setting mode

UP1+UP3 or DW1+DW3 (2 s min.)

UP1+UP3 or DW1+DW3 (2 s min.)

UP1+UP3 or DW1+DW3 (2 s min.)

● Set the parameters using the UP Key or DOWN Key.

The characters displayed in reverse video are the default settings.

Function setting mode

Display

Parameter name

Set value

Comments

ILnE

Input mode *1

02 dōn, Ud-R, Ud-b, Ud-Ĉ, Ud-d, Ud-E, Ud-F

Displayed only when Twin Counter Mode is not selected. UP, dōn, Ud-d, Ud-E, Ud-F: Displayed for output modes other than P-2, d, Ĉ, and H only.

ōUēn

Output mode

0 F, Ĉ, r, P, 9, R, P-2, d, Ĉ, H

H is displayed only for 2-stage modes. P-2, d, Ĉ, or H is displayed only when H7AN compatible function is dFF or the input mode is Ud-R, Ud-b or Ud-Ĉ.

ōĈēn

Output time *2

00 ħ to 9999

Displayed only when the output mode is Ĉ, r, P-1, P, 9, R, or P-2. Unit: second

ōnēS

Counting speed

00H 5 5PHz

ĈFēĈ

Reset input signal width

00nS nS

dP

Decimal point position

Not displayed when H7AN compatible function is ON.

P5ēĈ

Prescale value

000 ħ to 9999

Not displayed when H7AN compatible function is ON.

Ĉndē

NPN/PNP input mode

00ē PnP

ĈēĈē

Absolute value setting/preset value setting

00ē dFē

Σē-Ĥ

Set value upper limit

ħ to 999999

Pē-Ĥ

Forecast setting upper limit

ħ to 999999

bē-Ĥ

Batch set value upper limit

ħ to 999999

ōUēĈ

OUT allocation change

0FF dōn

Displayed only when 2-stage preset counter, Batch counter, or Twin counter is selected for H7CC-□W(U)□.

ēYēĈ

Key protect level

0P-1, ēP-2, ēP-3, ēP-4, ēP-5, ēP-6, ēP-7

● Models other than "□W(U)□" Models

ōē-Ĉ

Output inversion

0nē n-Ĉ

bMUP

Memory back up

0nē dFF

H7Ĥn

H7AN compatible function

0FF dōn

When it is ON, the count will shift from 0 to 999999. Disable the H7AN compatible function when replacing from the H7CX, or H7CX-N.

Ĉndē

Indicator display mode

0ē RLēF, RLēĈ

ōnēR

Output 1 (OUT1) ON count alarm set value

0 to 9999

× 1,000

ōnēĈ

Output ON count monitor value

The monitored value is only displayed. It cannot be set. × 1,000

ōē-Ĉ

Total run time alarm set value

00 to 9999

Unit: year

ōē-Ĉ

Total run time monitor value

The Total run time monitor value is only displayed. It cannot be set.

ēēē

Software version

The software version is only displayed. It cannot be set.

● "□W(U)□" Models

ōē-Ĉ

Output 1 inversion

0nē n-Ĉ

ōē-Ĉ

Output 2 inversion

0nē n-Ĉ

bMUP

Memory back up

0nē dFF

H7Ĥn

H7AN compatible function

0FF dōn

When it is ON, the count will shift from 0 to 999999. Disable the H7AN compatible function when replacing from the H7CX, or H7CX-N.

Ĉndē

Indicator display mode

0ē RLēF, RLēĈ

ōnēR

Output 1 (OUT1) ON count alarm set value

0 to 9999

× 1,000

ōnēĈ

Output 1 (OUT1) ON count monitor value

The monitored value is only displayed. It cannot be set. × 1,000

ōē-Ĉ

Output 2 (OUT2) ON count alarm set value

0 to 9999

Unit: year

ōē-Ĉ

Output 2 (OUT2) ON count monitor value

The Total run time monitor value is only displayed. It cannot be set.

ēēē

Software version

The software version is only displayed. It cannot be set.

*1: When using Dual Counter operation

ĈRLn

Dual count calculating mode

00ē Sub

The subtraction counter (sub) is displayed only when the output mode is P-2, d, Ĉ, or H.

*2: Set each digit using the individual UP and DOWN Keys for the following configuration selection modes.

● 2-stage Preset Counter

ōēnē2

One-shot output 2 time

00 ħ to 9999

Displayed only when the output mode is Ĉ, r, P-1, P, 9, R, or P-2. Unit: second

ōēnē1

One-shot output 1 time

00ē 00 ħ to 9999

Displayed for output modes other than d, Ĉ, and H. Hōēd cannot be set when the output mode is P-2.

● Batch Counter

ōēnē2

One-shot output 2 time

00 ħ to 9999

Displayed only when the output mode is Ĉ, r, P-1, P, 9, R, or P-2. Unit: second

● Twin Counter

ōēnē2

One-shot output 2 time

00 ħ to 9999

Displayed only when the output mode is Ĉ, r, P-1, P, 9, R, or R. Unit: second

ōēnē1

One-shot output 1 time

00 ħ to 9999

Displayed only when the output mode is Ĉ, r, P-1, P, 9, R, or R. Unit: second

Displays and Settings in Run Mode

1-stage preset counter

Present value

123456

Set value

234567

2-stage preset counter

Forecast Value Setting

Present value

123456

Set value

280000

Absolute Value Setting

Present value

123456

Set value 1

200000

Present value

123456

Set value 2

280000

Total and preset counter

Present value

123456

Set value

234567

Total count value

345678

Batch counter

Present value

18

Set value

24

Batch Count Value

613

Batch Count Set Value

1000

Dual counter

Dual count value

987654

Dual count set value

994500

CP1 present value

352400

CP2 present value

12 635200

Twin counter

Present value 1

123000

Set value 1

200000

Present value 2

456000

Set value 2

500000

Tachometer

Measurement value (Not displayed when the input mode is F2.)

228000

Measurement value

228000

Comparison value 1

228000

Measurement value

228000

Comparison value 2

228000

Input Connections

No-voltage Inputs (NPN Inputs)

Open Collector

PLC Sensor

Note: Operate with transistor ON

Voltage Output

Sensor

Note: Operate with transistor ON

Contact Input

Note: Operate with relay ON

Voltage Inputs (PNP Inputs)

No-contact input (NPN Transistor)

Sensor

Note: Operate with transistor OFF

No-contact input (PNP Transistor)

Sensor

Note: Operate with transistor ON

Contact Input

Note: Operate with relay ON

When an inductive load is connected to the H7CC.

The diode connected to the collector of the output transistor is used to absorb inverted voltage that is generated when an inductive load is connected to the H7CC.

Power for load

Inductive load

Counter

Power for load

Key-protect Switch Settings

When the key-protect switch is ON, ON (enable) individual key operations can be disabled to prevent setting errors according to the key protect levels (KP-1 to KP-7) shown in the following table.

Note: Key protect levels are set in function setting mode.

Level

Mode change

Display switch in the run mode

Reset operation

UP/DOWN Key

KP-1 (default setting)

Invalid

Valid

Valid

Valid

Valid

KP-2

Invalid

Valid

Invalid

Valid

Invalid

KP-3

Invalid

Valid

Valid

Valid

Invalid

KP-4

Invalid

Valid

Valid

Invalid

Invalid

KP-5

Invalid

Invalid

Invalid

Invalid

Invalid

KP-6

Invalid

Invalid

Invalid

Valid

Valid

KP-7

Invalid

Invalid

Invalid

Invalid

Valid

* Changing mode to configuration selection mode or function setting mode.

Self-diagnostic Functions

The following displays will appear if an error occurs.

Main display

Sub-display

Description

Output status

Correction method

Set value after reset

----- *4

No change

Present value underflow *2

No change

Either perform Reset operation or turn ON the reset input. *5

No change

FFFF *4

No change

Present value overflow *3

No change

Either perform Reset operation or turn ON the reset input. *5

No change

ē1

Not lit

CPU error

OFF

Either perform Reset operation or reset the power supply.

No change

ē2

Not lit

Memory error (RAM)

OFF

Turn ON the power again.

No change

ē2

Sub

Memory error (non-volatile memory) *1

OFF

Reset operation

Factory setting

PPLē *7

No change

Total run time or Output ON count has reached the maintenance forecast.

No change

Reset operation *6

No change

*1. This includes times when the life of the non-volatile memory has expired.

*2. This occurs if the present value or total count value falls below -99999.

*3. This occurs in the following conditions if the present value (i.e., measurement value) exceeds 9999999.

- For Output Modes K-2, D, Ĉ, or H
- Dual counter or tachometer operation is used.

*4. Display flashes. (L-second cycle)

*5. This does not apply when tachometer operation is used.

*6. This is displayed if the alarm set value for either of the two outputs is exceeded if a model with two outputs is used.

*7. The normal display and PPLē will appear alternately.

When Reset operation is performed, PPLē will no longer be displayed even if the alarm set value is exceeded. (Monitoring is possible, however, because the Counter will continue without clearing the total run time and the output ON count.)

If the power supply is turned OFF after the PPLē display is turned OFF by Reset operation, PPLē will be displayed again. In order to prevent the display even after the power supply is turned OFF, change the alarm set value to equal to or greater than the count value, or change the alarm set value to 0 to be invalid.

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