



Universal Inkjet Printer
MK-U Series

White Ink – Now Available



The Next Step in Inkjet Printing Technology

Universal Inkjet Printer
MK-U6000



No nozzle clogging
Stable, high quality printing

Easy to use human interface

Field replaceable parts without the need for any tools

Unmatched combination of speed, quality and reliability

Stable operation through efficient design

01 STABLE OPERATION

No clogging or unstable printing

To achieve continuously flawless printed text, we have reformed the monitoring functions and maintenance mechanisms within the head. This enables stable and perfect printed text, regardless of who uses the device.



02 USER-PERFORMED MAINTENANCE

Minimized down time

The ability of anyone on-site to perform maintenance quickly, minimizes line stoppages and reduces running costs. We have created our system so that this kind of impromptu maintenance is possible.



03 EASY OPERATION

Usable by anyone

No matter how advanced a product is, it's meaningless if no one can fully take advantage of its features. We have created an interface that is easy to use, even for first-time operators of the system.



04 INTEGRATED INSPECTION

Easy inspection of printed text

KEYENCE has seen increasing demand for systems that make printing inspection simple. To that end, the printer can be linked to a vision system with just one cable. This system offers peace of mind through a unique combination of stable printing and reliable inspection.



05 PIGMENT WHITE

White Ink

Our new dual circulation system continuously stirs inside the main tank, which provides stable operation without clogging. Additionally, ink inside the cartridges can be dispersed simply by shaking.



01

STABLE OPERATION

The main focus during development was achieving stable operation while maintaining perfectly printed text.

The head's internal status has a major effect on the quality of the printed text and line operation.

The interior of the MK-U head provides functions that protect against environmental conditions and operator error, achieving stable operation under any circumstance.

Auto-shower nozzle

Deflecting electrode plates

Ink particles ejected from the nozzle pass between these two electrode plates, which deflect the particles by an amount matching their charges. If the electrode plates are dirty, they will not be able to accurately control the paths of the ink particles, which leads to unstable text.

Nozzle

Ink particles are created by passing through this small hole approximately $60\ \mu\text{m}$ $2.36\ \text{Mil}$ in size. If small particles of dirt or residual ink affix to the nozzle, it will not be possible to send the ink to the gutter accurately, which leads to unstable text.

One-touch replaceable nozzle

Automatic ink particle optimization sensor

Print position pointer

Gutter

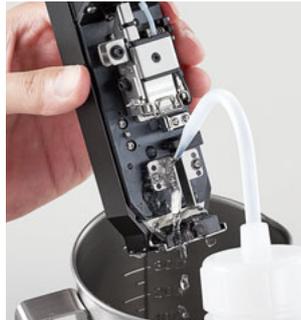
Ink that is not used for printing is collected in this pipe and is reused. If the ink is deflected incorrectly during collection, the ink may splash and unstable text may occur.

Advanced technology that enables stable operation

Efficient self-cleaning

World's first Auto-shower cleaning

Conventional automatic cleaning only used solvent to clean the ink paths. With the newly installed auto-shower function the MK-U is able to clean the ink path, nozzle, electrode plates, and gutter all at once. Therefore, the amount of solvent exposure to operators is reduced.



Conventional head cleaning

Manual cleaning was required to wash off the ink that adhered inside the head.



Auto-shower cleaning

In addition to the cleaning of the ink paths, the key parts of the head are also subject to high-pressure cleaning. This negates the need for manual cleaning.

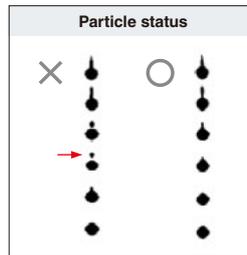
Elimination of unstable printing due to temperature changes

Automatic ink particle optimization

The optimum ink particle status for printing is always fluctuating due to the ambient temperature and ink thickness (viscosity).

The MK-U Series senses the ink particles 10 times per second, which enables it to always maintain the optimum ink particle status.

This maintains perfectly printed text at all times, regardless of the environment.



If the optimum ink particle status is not maintained, the inside of the head becomes dirty and unstable text occurs.

Conventional model (Reactive)

It's necessary to make adjustments for the ink viscosity and temperature of the environment while visually checking the particle status.

- Errors are not noticed until unstable text occurs.
- It's difficult to recognize the optimum status, and making adjustments requires time and effort.

MK-U Series (Proactive)

Ink particles are read and adjustments are automatically made to ensure the optimum particle status.

- ✓ Flawless printed text can always be achieved with minimal time and effort required.

No ink dilution due to cleaning operations

Conditioning tank system

The device is equipped with a specialized tank (the conditioning tank) and a viscosity sensor for use in collecting the solvent after cleaning.

This prevents ink dilution, stabilizing viscosity and therefore maintaining print quality.

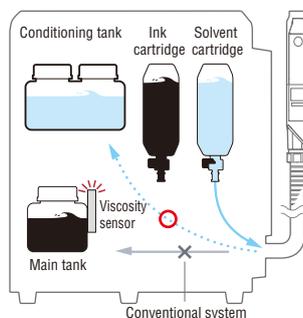
[Three Main Advantages]

Powerful cleaning Cleaning can be performed without any concerns regarding ink dilution.

Dark printed text Ensures dark and distinct printed text.

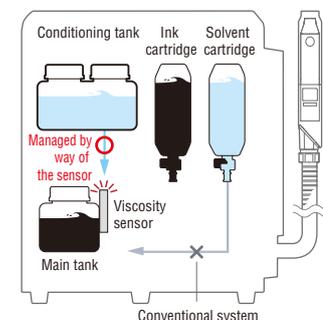
Draining unnecessary Wasteful draining due to ink dilution is prevented. This creates efficient expenditure of consumables.

During automatic cleaning



After automatic cleaning, the solvent is routed directly to the conditioning tank. This alleviates over-dilution of the ink stored in the main tank.

During viscosity management



The ink dilution in the main tank is measured using the viscosity sensor. Based on this reading solvent is supplied to the main tank from the conditioning tank. Nothing is wasted because priority is given to the conditioning tank.

* Not available for MK-U2000/MK-U2000SA/MK-U6000PY/MK-U6000PW



02

USER-PERFORMED MAINTENANCE

Easy maintenance reduces line stoppages to an absolute minimum.

Time spent replacing parts.
 Time spent being unsure about operations.
 Time spent waiting for servicing.
Simplifying maintenance creates great savings in terms of time and cost, increasing productivity.

Replacement of consumable parts requiring no user's manual or tools

Consumable parts such as filters and pumps that require periodic replacements can all be replaced without using a user's manual or tools. The user needs only to follow the illustrated instructions that are outlined in the software, so replacements can be performed easily and accurately even by users who have never performed these operations before.

Maintenance that is easy to understand and perform

Simple on-screen instructions

Maintenance guide

If an error does occur, the solution (workflow) can be viewed on the touch panel.

Since the operation procedure is displayed, incorrect troubleshooting is not possible.

Even for previously unseen errors, accurate maintenance can be performed without requiring additional time or effort.

OprtnFlow

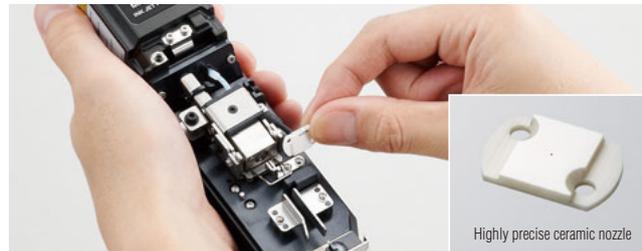
- 1) Execute Auto Shower (Strong) to clean inside the print head.
- 2) Check if solvent axis is in gutter.
Switch corrective actions according to the placement of the solvent axis.
- 3) Dirt that couldn't be removed with Auto Shower may be attached to the nozzle.
Clean inside nozzle and remove dirt in the head.
- 4) Confirm whether ink particles come out of the nozzle.
Switch approach according to whether ink particles come out of the nozzle or not. Press[Next]
- 5) Exercise nozzle replacement and ink axis adjustment.
- 6) Reset the error and restart.
If the error keeps occurring, contact your nearest KEYENCE sales office.

Quick recovery even in the rare event of nozzle clogging

One-touch nozzle replacement

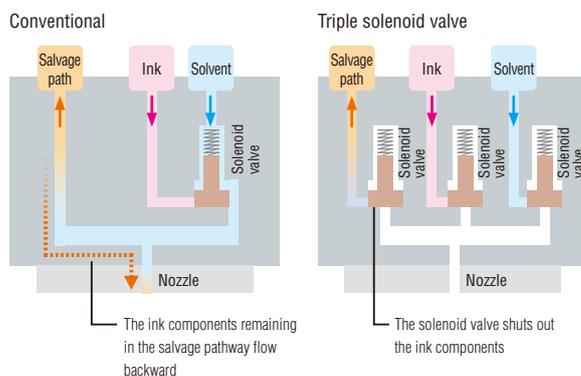
The main cause of problems with inkjet printers is clogging of the nozzle.

With the MK-U Series, the nozzle can be replaced without using any tools. This reduces downtime in the event that a nozzle replacement is required.



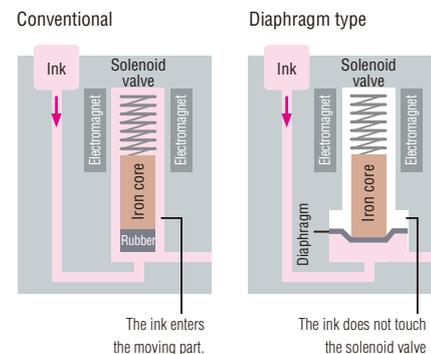
New structure prevents clogging and hardening

“Triple solenoid valve” reduces nozzle clogging



Clogging occurs when ink particles remaining in the salvage path after cleaning move to the surface due to temperature change. A solenoid valve was added to the MK-U's salvage path to block ink particles so that nozzle clogging does not occur.

“Diaphragm” prevents hardening of the solenoid valves



A diaphragm type solenoid valve was introduced to prevent ink from touching the moving part of the solenoid valve. The solenoid valve does not harden even after long-term operation.

03

EASY OPERATION

A touch panel that is easy to use and understand.

Devices with high functionality are difficult to use, and the functionality of simple devices is not sufficient. KEYENCE has designed an intuitive interface that makes all of the system's functionality accessible to the most novice users.



Operation screen

Easily forgettable items, such as the cartridge levels and the remaining life of each part, are displayed in an easy-to-understand manner. This screen displays the internal status of the device at a glance, which provides the user with peace of mind.

Convenient touch panel

The touch panel easily attaches to and detaches from the controller. This makes it easy to perform operations while checking the product.

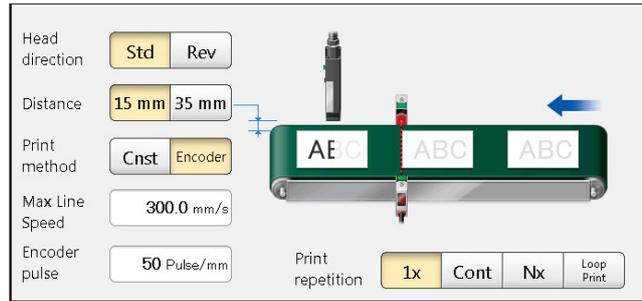


Simple operation

Visually-aided line conditions

Line adjustment

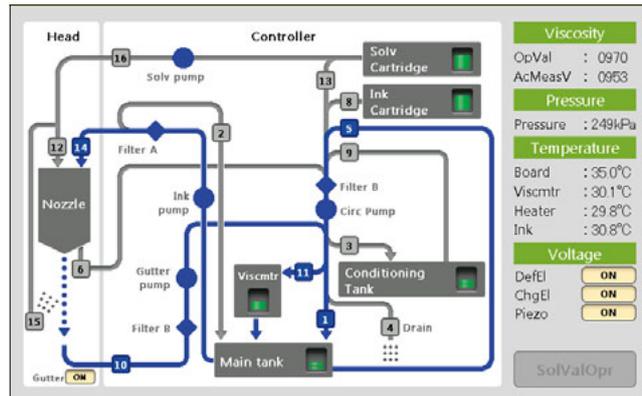
Entering accurate line conditions was one of the most troublesome operations for inkjet printers in the past. Now, our device provides a visual aid of the line so that measurements are easily understood and recorded accurately.



Quick and easy diagnostics

Path check

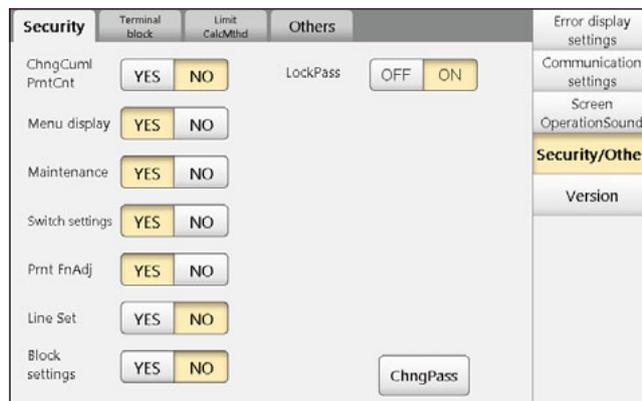
The monitor can be used to check not only the open/closed status of the solenoid valves, but also the optimum ink viscosity for the current temperature. Because sensors are used to check information in real time errors can be detected immediately, which greatly contributes to proactive maintenance.



Easily prevent operator access

Operator lock

Passwords can be used to lock the functions that are not used on a daily basis. This prevents incorrect operations and contributes to reductions in time spent managing the device. This feature is essential in eliminating human error.



04

INTEGRATED INSPECTION

OCR inspection with a single cable

Printing → inspection.
Because KEYENCE has experience with both printers and vision systems, we can provide a system that is both easy to use and reliable.

Self-contained CMOS Laser Sensor
LR-Z Series TRIGGER

Universal Inkjet Printer
MK-U Series PRINT

Trigger sharing

Printing and image capturing can be performed with a single trigger.

Single cable

Simply connect the printer (MK-U) and the vision system (CV-X) with a single LAN cable to enable easy use without any external devices.

Intuitive, Auto-Teaching, Machine Vision System
CV-X Series VERIFY

Screen linking the MK-U and CV-X

The MK-U touch panel displays both the message and the judgment results.



Easy connection with CV-X Series vision systems

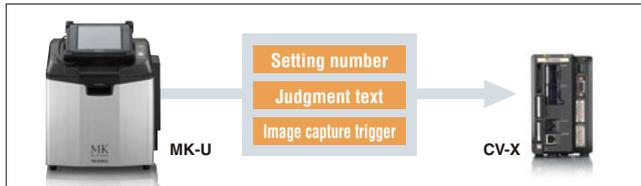
* Not available for MK-U2000/MK-U2000SA

Prevents mistakes when choosing setting

Confirmation of printed text (character recognition)

The MK-U and CV-X can easily be linked just by connecting them with a single LAN cable.

Both the MK-U and CV-X can be operated from the MK-U touch panel. The MK-U is equipped with many useful functions, such as a function that synchronizes the print settings and inspection settings. The OCR dictionary has been prepared in advance with the MK-U's specialized fonts, so no further settings are required after installation. In addition, no external devices are required, so anyone can easily perform inspections of printed text.



When the setting number or message is switched on the MK-U, the inspection settings on the CV-X are also switched automatically.



The MK-U touch panel can be used to perform all CV-X operations. There is no need to prepare a separate monitor.

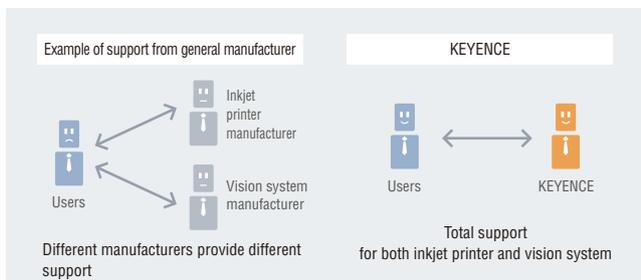


Connecting to the CV-X automatically develops OCR for use with the MK-U. No bothersome dictionary registration is required.

Peace of mind during setup and support

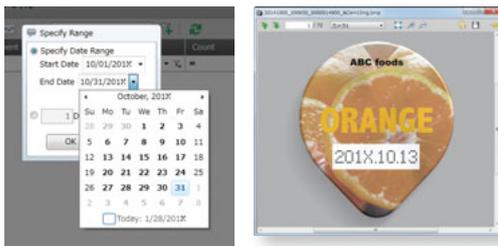
Comprehensive support by a single manufacturer

If a problem occurs during setup or support of an inkjet printer and vision system sold by different manufacturers, it may be unclear where the responsibility lies. As a comprehensive factory automation manufacturer, KEYENCE provides full integration support.



The functions of the vision system improve the quality of inspections

Inspection history can be retained



"VisionDatabase", an exclusive database, makes it possible to save images captured during inspection for a set period. Even when a problem occurs, you can check the inspection results by searching by data or lot number.

Product type differentiation and dirt can be inspected at the same time



The CV-X series can inspect both printed text and defects at the same time.

05

PIGMENT WHITE

No hardening No clogging White ink cartridge

This white pigment ink does not harden or clog, supporting the usability and high maintainability of the MK-U Series.



PVC 600 245M XX0820SD



White pigment ink with no hardening or clogging

Simply shake to disperse for use

Pigment ink that easily disperses

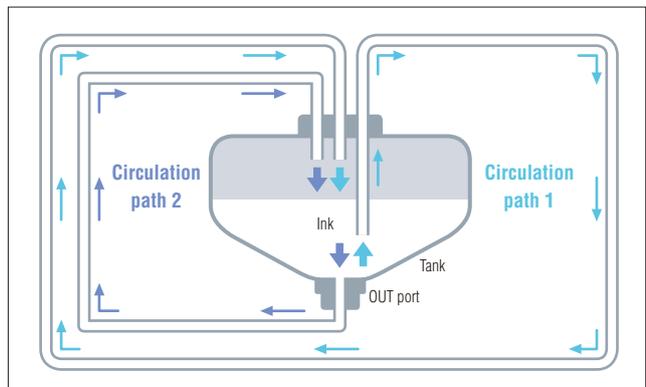
To disperse the ink with conventional inkjet printers, mixing by hand using a stirring rod was required. With the MK-U Series, the ink can easily be dispersed and used by simply shaking the cartridge.



Reduction of ink precipitation during operation

Dual circulation system

The MK-U has a newly designed tank optimized for pigment inks. The dual circulation system reduces precipitation during operation. Inks which disperse easily along with the dual circulation system prevent clogging of the ink path and achieve stable operation.



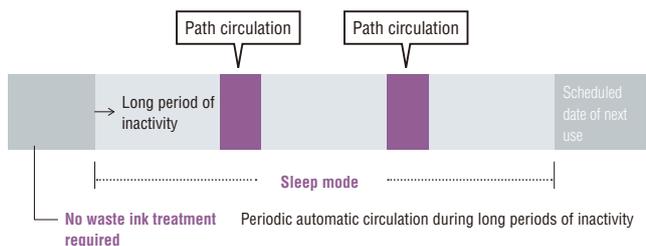
Periodic circulation during long periods of inactivity

Sleep mode function

The device is equipped with a function that performs automatic circulation periodically, even when it is stopped. This prevents precipitation without wasting ink. This sleep mode can prevent nozzle clogging and hardened valves even when standard inks are used.

Sleep mode

By circulating in the ink path regularly, precipitation inside the tank and clogging on the path are prevented.



Features Designed with Working Conditions in Mind

IP55 Rating

The MK-U is IP-55 rated, indicating excellent dustproof and watertight properties. This indicates that the device can even be used confidently in harsh environments. From the heavy moisture of a food packaging facility, to excess oil mist from auto-manufacturing, the MK-U can be operated in multiple environments.



* The print head does not support this ingress protection rating.

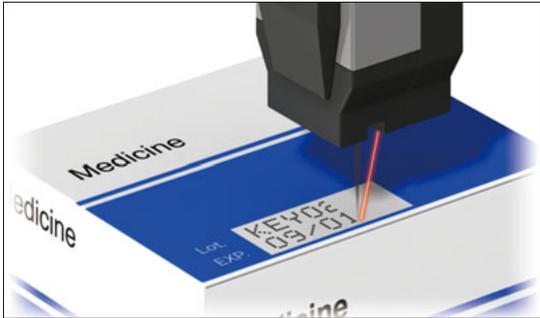
Cartridges

Cartridges are used to replenish the ink and solvent. These cartridges can be used cleanly, without any risk of the user's hands getting dirty. Also, the MK-U is equipped with dedicated sensors that ensure that the ink and solvent are always used to the last drop.



LED pointer

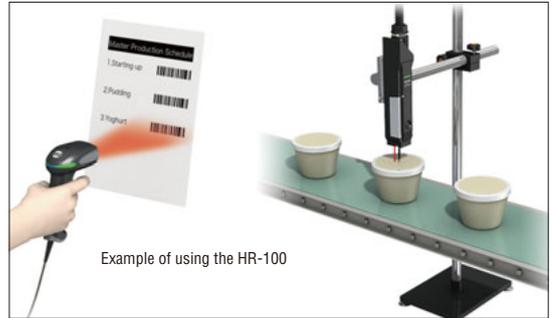
The MK-U is equipped with an LED pointer that indicates the print location. This makes it easy to align the print position on the line. This feature is extremely useful for lines that undergo retooling and/or product changeover.



* Not available for MK-U6100

Direct connection with barcode readers

Registering the barcode of a product in advance makes it possible to easily switch between product types just by reading the barcode. This function prevents human error when handling a large variety of product types.



Example of using the HR-100

Head direction switching

The direction of the head cable can be changed by 90 degrees. This removes the inconvenience in cable routing, and makes it easy to install the device in a wide variety of lines.



Long-distance mode

Printing can be performed with the print head located up to 35 mm 1.38" away from the target. The long-distance mode can be used to reduce variations in character size. This is useful when printing on bags and other workpieces that present varying print distances.



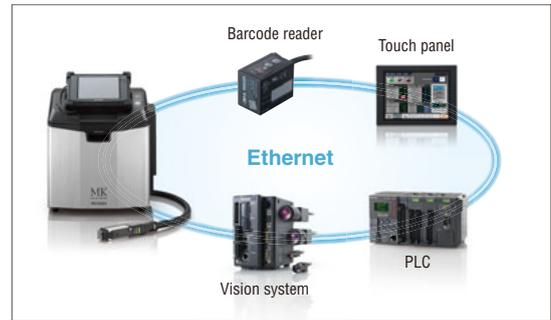
Batch control of multiple units

The MK-U can be used to change the messages on and control multiple units at the same time from a single touch panel. This is useful when printing the same content on both sides of cardboard boxes and in similar situations.



Equipped with Ethernet interface

This feature increases the speed with which peripherals are connected and reduces the amount of wiring required during these connections. It can also be used to operate on-site devices and check messages from a remote location. Time synchronization over the Internet is also supported.



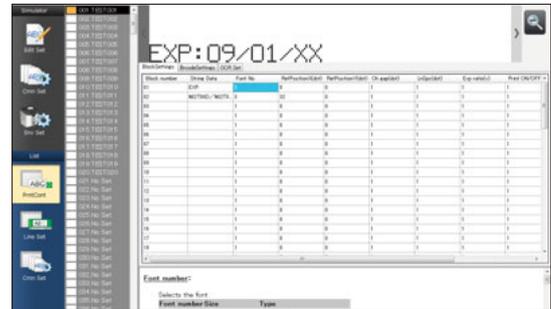
Printer status monitoring software

Establishing an Ethernet connection to the MK-U makes it possible to easily monitor the operating statuses of multiple devices from an office or location that is removed from the site. This provides peace of mind even for automated lines in which no operators are present.

DevGt	DevName	PrintSet No.	PrintSet Title	Print Rep 1	Ink Level	Solv Level
Printable	MK-U6000 No.1	001	1	1	Green	OK
Error	MK-U6000 No.2	002	2	2	Red	✖
Printable	MK-U6000 No.3	003	3	3	Green	OK
Printable	MK-U6000 No.4	004	4	4	Green	OK
Maintenance	MK-U6000 No.5	005	5	5	Yellow	⚠
Stopped	MK-U6000 No.6	006	6	6	Blue	⏸
Wring	MK-U6000 No.7	007	7	7	Orange	⚠

PC setup software

The print settings can be edited and saved from a computer in the same manner as the touch panel. Settings can also be copied to and from spreadsheets, which is extremely useful when creating multiple settings.



Print history management function

The print history includes, what product was printed on, how many products were printed on, and the time and date printing was performed. This function can be used to minimize the cost incurred when constructing systems, and to strengthen traceability.

Maintenance > History information			
Error maintenance	Comm	Print	
Date	Set No.	Title	Print repetition
2014/09/01(Mon) 17:00	008	Product H	980
2014/09/01(Mon) 16:00	007	Product G	769
2014/09/01(Mon) 15:00	006	Product F	898
2014/09/01(Mon) 14:00	005	Product E	674
2014/09/01(Mon) 13:00	004	Product D	966
2014/09/01(Mon) 12:00	003	Product C	565
2014/09/01(Mon) 11:00	002	Product B	454
2014/09/01(Mon) 10:00	001	Product A	533

USB interface

Commercially available USB memory devices can be used. Settings can be backed up and various histories can be saved, which provides storage when expanding lines or reinstating lost data.



Practical Examples

MK-U6000 Series (Normal ink type: Use ink **MK-10**)



MK-U6000PY/PW Series (Yellow ink type: Use ink **MK-30**, White ink type: Use ink **MK-33**)



■ Standard ink **MK-10**

This is a standard type of industrial ink that can be used for general purposes in a variety of industries.

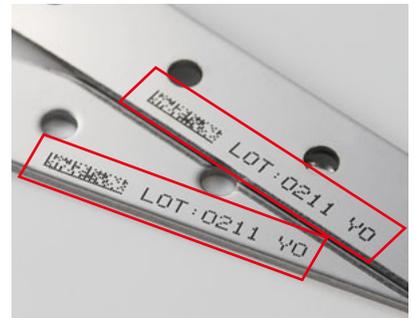
■ White ink **MK-33**

This is a white pigment ink with remarkably improved maintainability. Perfect for those having difficulties managing white ink and inkjet printers.

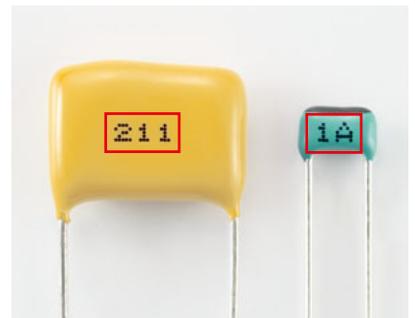
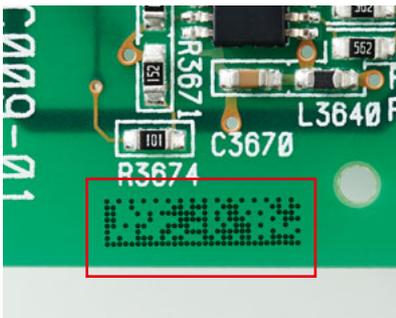
■ Yellow ink **MK-30**

This yellow pigment ink provides clear printing on various dark workpieces, and has relatively high maintainability for a pigment ink. This achieves clear printing on dark coated automotive parts, and resin-molded products.

MK-U6000MF Series (MEK free ink type: Use ink MK-14)



MK-U6100 Series (Small character type: Use ink MK-10)



MEK free ink MK-14

MEK is not included in the ink components, which reduces bothersome smell, and provides an alternative ink for compliance with certain safety standards. Drying speed is remarkably improved compared to conventional alcohol based inks.

Printing examples (actual size)

Standard ink MK-U6000

5 dots	7 dots	9 dots	10 dots	12 dots	14 dots	16 dots	24 dots	32 dots
012345 ABCDEF	012345 ABCDEF	123 ABC	123 ABC	123 ABC	123	123	123	123

Four-line printing

```
BAKED FRESH 製造年月日 20XX.02.08
ON SEP 01 賞味期限 20XX.03.05
BEST IF USED ロット番号 1234567ABC
BY NOV 01 出荷時間 13:41:26
```

Logotype



Unique-characterlanguages

生产年月有效批号
øœš&€ðüÿç¥

Barcode



40 µm 1.57 Mil nozzle (small character type) MK-U6100

5 dots	7 dots	9 dots	10 dots	12 dots	14 dots	16 dots	24 dots	32 dots	Barcode
0123456789	0123456789	0123	0123	0123	0123	0123	0123	0123	

White ink type MK-U6000PW

5 dots	7 dots	9 dots	10 dots	12 dots	14 dots	16 dots	24 dots	32 dots
012345 ABCDEF	012345 ABCDEF	123 ABC	123 ABC	123 ABC	123	123	123	123

Four-line printing

```
BAKED FRESH 製造年月日 20XX.02.08
ON SEP 01 賞味期限 20XX.03.05
BEST IF USED ロット番号 1234567ABC
BY NOV 01 出荷時間 13:41:26
```

Yellow ink type MK-U6000PY

5 dots	7 dots	9 dots	10 dots	12 dots	14 dots	16 dots	24 dots	32 dots
012345 ABCDEF	012345 ABCDEF	123 ABC	123 ABC	123 ABC	123	123	123	123

Four-line printing

```
BAKED FRESH 製造年月日 20XX.02.08
ON SEP 01 賞味期限 20XX.03.05
BEST IF USED ロット番号 1234567ABC
BY NOV 01 出荷時間 13:41:26
```




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www.keyence.com



SAFETY INFORMATION

Please read the instruction manual carefully in order to safely operate any KEYENCE product.

CONTACT YOUR NEAREST OFFICE FOR RELEASE STATUS

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