



# UV inkjet for membrane switch graphic overlays

Discover the power of UV inkjet

**FUJIFILM**

## The state of play

Inkjet is now an established, well-regarded and extensively used technology for many printing applications in the industrial sector. In some instances it has replaced screen printing technology. In others, it complements it. And sometimes, for instance when very large volumes need to be produced, screen printing may still be the economical choice.

## Printing membrane switch graphic overlays (MSGOs)

From talking to businesses that produce MSGOs, we know that balancing long runs, short runs, re-prints and samples can be a challenge. Many MSGOs require re-prints and variations. Samples often need to be created to win more business. For long runs that require vast numbers of the same design screen printing may, for the time being, be the best solution. However, inkjet technology is now so advanced, and the quality so impressive, that it's an economical addition to many print production lines – especially if you're having to juggle different run lengths.



## About inkjet: state-of-the-art printheads

At the heart of an inkjet system is the printhead. In a machine suitable for MSGOs, the printheads feature drop-on-demand piezoelectric technology. This means that precisely measured miniscule droplets of ink can be rapidly squeezed out of the printheads using electrical pulses. When this technology was introduced, it meant that for the first time, inkjet printers could deposit inks that previously were only used in screen printing – such as UV inks.

## About inkjet: UV inks

A key factor in the growth of inkjet for many applications has been the ability to print with UV-curing inks – a technology that was pioneered by Fujifilm. UV inkjet is a fast-growing technology, set to dominate many markets – and gain a strong foothold in MSGO production – with its incredible productivity, quality and versatility. The key features of good UV inkjet inks are:

**Colour.** A wide colour gamut is critical to enable a printer to accurately reproduce colours in the print. Graphics also need to be vibrant for visual appeal and impact.

**Reliability.** Inks must jet reliably, printing high-quality work for long periods with minimal intervention.

**Consistency.** Inks must be totally consistent, producing the same high-quality images and colours in every print and between every manufactured batch.

**Performance.** Inks must be durable, with properties such as light-fastness and physical adhesion tailored to the specific application of the finished print. The UV inks used in MSGOs are highly flexible, which means prints can withstand an impressive number of actuations.

**Economy.** Inks must allow print companies to run their operations in an efficient and cost-effective manner, providing their customers with high-quality print at a reasonable price.

# The technology is ready and waiting... but how can you use it to your advantage?

Whether your business produces the entire membrane switch, or just the printed overlay component, there are a few challenges that you may be facing using only screen printing. Here's how UV inkjet can answer those challenges and contribute to an efficient and economical print production line.

The challenges	How UV inkjet can meet the challenges
<b>Pre-press setup time.</b> Preparing individual screens is a time-intensive task. You may have to stretch the mesh and prepare it, coat it, expose it and wash it – often multiple times per job.	There are no pre-press processes with an inkjet system other than ensuring the media is installed correctly and the image optimised and sent to the machine. This greatly reduces setup time.
<b>Print time.</b> As well as the time needed for pre-press setup, the actual print time using screen printing can be slowed down for many reasons, including human error.	Inkjet printing requires minimal manual intervention. This mitigates potential delays during the actual printing process. You'll know roughly how long a job will take when you hit the print button.
<b>Space.</b> Screen printing takes up a lot of space. Adding an extra screen setup would require a significantly larger workspace. And solvent drying tunnels can be huge.	The inkjet process requires just one machine with a much smaller footprint. Adding an inkjet printer would be much more space efficient than adding more screen equipment. Chances are, you already have a corner big enough.
<b>Short runs.</b> On smaller jobs, the unit price is inevitably higher. That's because pre-press setup requires the same time and resources on a short run as it would on a longer run.	Short runs and reprints can be created at the push of a button, with no pre-press setup required. If you still operate a screen press, this can continue on long-run jobs while you use inkjet for short runs.
<b>Samples.</b> Winning business, more often than not, means printing samples. Yet you're faced with the same problem as you are on a short run. The pre-press process takes time – possibly up to 8 hours – and can knock a whole screen line out of action when it can be doing other jobs. To make up for this use of resources, you may currently be charging for your samples.	With an inkjet system, you can instantaneously print samples. Without having to commit resources to creating a screen-printed sample, you can offer samples for free, give them out more readily, and potentially win more business as a result. You can also create multiple options.
<b>Production bottleneck.</b> Depending on your production setup, you may be finding that there's a bottleneck at the overlay printing stage. The other layers of the membrane switch may be ready and waiting for integration. But because screen printing the overlays takes longer, especially when multiple colours are needed, putting everything together is delayed.	The speed at which you can print overlays with inkjet means there will be no bottleneck. You can line up the prints in advance, and get ahead on other jobs. You can also set the machine to run and use the spare manpower in other areas of production.

<p><b>Additional prints and variations.</b> Many jobs require additional prints after the main job. Accommodating these small runs and ensuring colours are matched can be a challenge.</p>	<p>With inkjet, you'll have no problem matching colours for reprints. And there's no need to archive screens, which saves space. Variations can be made digitally, and printed at the press of a button, without the need to create an entirely new set of screens.</p>
<p><b>Colour matching.</b> The repeatability of screen colours can be a major challenge. Many MSGO printers rely on swatch cards to mix and match their screen inks. Creating exact brand spot colours can also be a challenge for this reason. It's also very time consuming and impacts on regular production jobs.</p>	<p>An inkjet system means colour matching is controlled digitally. You can recreate the same colour, time and time again with no additional preparation time.</p>
<p><b>Human error.</b> If a screen is damaged in the printing process, the time to create a replacement can stall production. Other errors can also impede production.</p>	<p>There's very little room for human error using an inkjet system. If the digital files are accurate, all you have to do is hit the print button and see consistent results, time and time again. You can even walk away and let the machine print unattended.</p>
<p><b>Production time.</b> The time it takes to produce MSGOs using screen inevitably ties up the production line, so that no other jobs can be started. However, lead times are constantly reducing, putting pressure on screen production.</p>	<p>With a complementary inkjet system, you can select some jobs to be printed digitally, and some via screen, generating much higher productivity. Or, you could switch entirely to digital. Either way, you'll streamline your production process, reduce lead times, and open up the opportunity to take on more work.</p>

## The added benefits of UV inkjet printing

Not only can UV inkjet solve many of the problems you may face with printing MSGOs, either by replacing screen printing or complementing it, inkjet technology comes with many additional benefits that can bring value to your business.

**Design capabilities.** Unlike screen printing, with inkjet you can create complex graphics such as gradients and photographic images. This expands the possibilities for customers and may inspire them to be more adventurous with their designs.

**Greener.** Inkjet produces far less chemical waste. There are no additional chemicals involved in the process.

**Power consumption.** Inkjet consumes significantly less power. There's no need to power equipment such as film processors and tunnel driers. There's just one machine that does the entire job.

**Water wastage.** Screen printing uses a lot of water. By eliminating or reducing the process of having to wash and reclaim screens, you'll be kinder on the environment and save money on water bills.

**Cleaner.** UV inkjet printing produces no mess. It's cleaner, generates less heat and less dust.

**Labour costs.** It takes very little labour to set an inkjet printer to run and it can print a job entirely unattended. Which means you could reduce shifts and make cost savings.

**Take on more work.** With your resources freed up, and reduced production time, you may be able to take on more work.

**Roll-fed or flatbed.** A number of inkjet systems give you the option of using roll-fed or rigid media. Depending on your requirements, you can select which one is most suitable. Some machines even allow you to interchange, from job to job – which could be useful if you print other products besides MSGOs.

**Material waste.** Screens have a lifespan and don't last forever; they will eventually need to be discarded. Even the process of making screens can generate material waste. UV inkjet generates no such waste.

## How does UV inkjet and screen compare?

From speaking to our customers and testing our own equipment, we've calculated the estimated costs of running a screen system only, a screen system combined with an inkjet printer, and inkjet only. Here we've looked at our Acuity LED UV 1600 roll-fed printer along with a Sericol screen printing process – on a 6-colour and white job, printed on A4, with a run length of 100.

	Screen print only	Acuity LED 1600 inkjet printer + screen print white	Acuity LED 1600 inkjet printer only
Number of screens	7	1	0
End-to-end screen making cost (€)	105	15	0
Ink cost (€)	5.58	27.60	26.80
Labour cost (at 20€ per hour)	220	82	50
<b>Cost per copy (€)</b>	<b>3.33</b>	<b>1.99*</b>	<b>1.00*</b>

\* includes printer depreciation over 5 years

## Screen and UV inkjet working together

At Fujifilm, we help our customers by looking at their unique requirements and production line. We know there's no one-size-fits-all solution for print companies. And because our heritage, as Sericol, is in screen printing, we'll often promote screen as the best solution in many instances. But we're also leading the market with inkjet technology and specialty inks. So we also know when inkjet may be the best option. We can help you consider the benefits of both technologies; perhaps a combination of the two would best work for you.

# Case study

A combination of screen and inkjet may be the best solution for many businesses. Or, like Elitronik in Turkey, switching entirely to UV inkjet may be the way to go. Since investing in an Acuity LED 1600 inkjet system and stopping their screen line, Elitronik has seen their turnover treble.

## Background

Elitronik owner, Müge Elif Özaslan, had 11 years experience with another producer before setting up her own company 5 years ago. Based in Turkey, Elitronik have the capacity to make the entire membrane switch, including electronics and printed overlays. They service the health and fitness, medical, and general industrial industries, with Bosch and Mercedes as major clients.

## The challenges

Elitronik found that their entire production of membrane switch graphic overlays was getting bottlenecked at the overlay printing stage. Many of their jobs require 8+ colours, with some as many as 17 colours. With each colour requiring a separate screen, and the pre-press processes involved with screen printing, the lead-time to deliver a job was long. On a typical 2000 piece run, the customer would expect their job to be delivered in sections. That meant printing 200 pieces with each screen, which would then be cleaned and racked before being used again. The total turnaround time for a job like this, using screen printing, would be 7-10 days.

An added problem was supplying samples and short runs to other customers, whilst in the middle of larger jobs. The setup involved in preparing screens for a sample was not only labour intensive, it would mean the screen equipment couldn't be used on longer jobs while the sample was being created. This resulted in a loss of productivity.

## Problem solving

With inkjet, Elitronik discovered they could ease the bottleneck at the overlay printing stage of their production line. They could print multiple-colour overlays instantaneously. And having considered both roll-fed and flatbed technologies, they saw the benefit in being able to let a roll-fed machine print unattended, even overnight.

Whilst speed and productivity were obvious benefits of inkjet, finding a system that produced quality that rivalled screen printing was going to be key, so they could still deliver impressive results to their customers.

## The solution

Not only did the Fujifilm Acuity LED 1600 meet Elitronik's expectations in terms of production speed, they found that the quality of print exceeded their expectations. So much so, that they have now closed their screen production line and will soon be investing in a second Acuity LED 1600.

The Acuity LED 1600 features advanced industrial printheads, takes roll media as well as rigid sheets, prints impressive whites which can be used as backgrounds on overlays, and produces vibrant, near-photographic quality images. It takes up less space, consumes far less energy and produces minimal waste. Inks are UV-cured instantly, so prints can be stacked and used straight away.

## The results

Elitronik now print all of their membrane switch graphic overlays with their Acuity LED 1600. Since switching entirely to inkjet, turnover has trebled. Müge can be more selective about the jobs she takes on and has also noted the following benefits:

- Shifts have been cut from 3 shifts to 1
- There are reduced errors caused by worker fatigue
- Production time for a typical job has reduced from 7-10 days to less than 3
- They can produce the whole job in one go or in sections, depending on a customer's needs
- Samples, short runs and reprints are no problem in terms of colour matching
- Production conditions are better – the process is cleaner and there's less heat and dust
- They don't have to charge for samples
- They can tender for more jobs and they win more jobs
- They're taking on more jobs from existing clients

# Why could LED UV be a smart choice?

## **LED UV technology**

LED UV lamps use a fraction of the energy of conventional curing systems, produce no wasted heat and are safe to work with. LEDs produce very little heat, which means they can work with heat-sensitive media such as thin films.

## **Easy installation**

As there is no wasted heat, VOCs or ozone, the printer can be installed in any production environment without dedicated extraction.

## **Prints are immediately dry**

LED UV cures the ink instantly so there is no need to wait for the print to dry before finishing or shipping.

## **Low maintenance**

LED UV inkjet requires minimal daily maintenance.

## **Fast startup**

LED UV requires no lamp warm-up time, so printing can start immediately.

## **Robust build, reliable production**

Acuity LED printers are built for continuous printing and some owners even run them 24/7. Fujifilm Dimatix printheads are both precise and fast, and have a track record of long life in print production.



# We offer a range of UV inkjet systems suitable for printing membrane switch graphic overlays

Whether you're interested in a roll-fed or flatbed machine, UV LED-cured or conventional UV inks, looking to replace screen printing or simply complement it: we're here to help you find your ideal inkjet solution.

## Acuity LED 1600 series

The latest generation of this successful LED UV hybrid printer is now even faster and more versatile. Powered by Fujifilm's leading printhead and ink technologies, this is a reliable production machine built to deliver exceptional results.

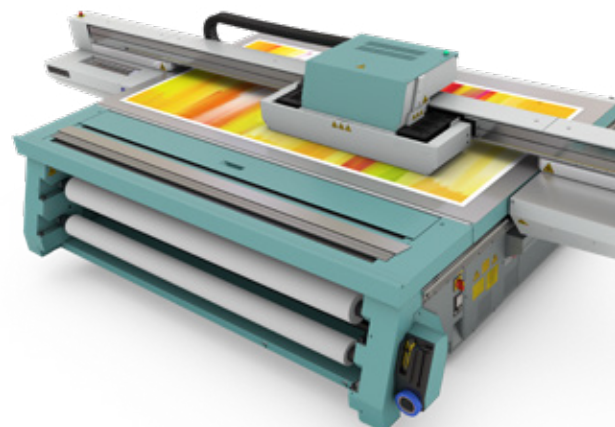
- Fujifilm Dimatix Q-class industrial printheads
- Fujifilm Uvijet LL up to eight colour ink set to meet a broad range of application needs
- Low energy consumption, long life LED lamps (up to 10,000 hours)
- Excellent ink coverage with strong, vibrant colours
- Print roll media and rigid sheets



## Acuity Select series

Delivering near photographic quality images across a diverse range of creative applications, Acuity Select printers deliver superb performance, and are truly affordable with a range of investment and upgrade options.

- Dedicated flatbed design, with roll media option
- High-resolution printheads
- 4, 6 or 8 colour channels (upgradable)
- Powerful instant curing UV system
- Compact footprint



# Why Fujifilm?

## About us

Our portfolio of technology, skills and experience is vast. We were the first to develop UV inks and have been supplying screen inks to this market for 30 years. We're well known in the MSGO market because of our heritage in screen printing.

## Our heritage

Sericol is a name synonymous with high-quality screen printing products. Since becoming part of Fujifilm in 2005, we have built on our expertise in inks and combined it with a commitment to developing world-class, market-leading inkjet technology.

Our experience, vision and solution-based systems are helping businesses meet the demands of an ever-changing market and are steering print through the digital age. And because we have an unrivalled heritage and expertise in screen and inkjet technologies, we can offer fair and informed recommendations to our customers.

## In-house expertise

Our exceptional knowledge of chemistry comes from our years of experience and the many experts we have in house. Our team comprises industrial chemists who are experts in solvent inks, UV inks, water-based inks, conventional UV inkjet inks, and LED-cured UV inkjet inks. We also have in-house expertise in film technology, which means we have the knowledge to ensure our inks are totally optimised for film substrates.

## Our relationship with key film suppliers

Not only do we have in-house film expertise, we have strong, longstanding relationships with widely used film suppliers. Major suppliers endorse our inks for their quality and durability in many applications.

## Future development

We continue to supply and support the screen market – and can recommend new, cost-effective, high-quality solutions to meet the many challenges print companies face. Inkjet is one of these solutions, and many of our existing and new customers are reaping the benefits of this advanced, digital technology.

## Get in touch

Thanks for reading our guide. If you have questions or would like to find out more about Fujifilm's inkjet printing solutions, please contact us:

Use the contact us form on:

**[www.inkjetoverlays.com](http://www.inkjetoverlays.com)**

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