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DEK®

A **DOVER** COMPANY

www.dek.com

Horizon iX Printing Platform

More Choice and Value for a Future-Proof Productivity Advantage

Horizon iX from DEK

Extreme modularity lets you go as far as you need, and further when you want.

The DEK Horizon iX platform offers you absolute freedom of choice to configure your screen printer exactly the way you need it. You start with an impressive array of features as standard then, to optimise performance and value, you choose from an extensive range of options.
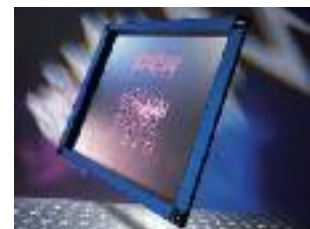
Options that offer speed improvements, enhanced yields, intelligent board support and comprehensive service plans. These let you precisely match your Horizon iX to your process needs and budget. Then we give you more choice that future-proofs your investment. Any options you don't need for today's production, you can add tomorrow to enhance yield and throughput, and to extend the life of your Horizon iX to deliver the lowest cost of ownership. The result is value-driven performance from a technology leader.

Untouchable Productivity as Standard

The Horizon iX platform takes the pressure of modern production in its stride – from low-volume, specialist projects to high-speed, high-volume assembly – delivering maximum productivity through fast and faultless performance all the way.

All Horizon iX platforms benefit from DEK's robust chassis technology, featuring optimised one-piece construction for exceptional rigidity and mechanical integrity, which is the foundation of the Industry Gold Standard 6-Sigma machine alignment capability of greater than 2 Cpk @ +/-12.5 microns.

In addition, every Horizon iX incorporates DEK's Instinctiv™ V9 next-generation touch-screen user interface as standard. Instinctiv V9 presents graphical, menu-based controls for easy, error-free operation and is the powerhouse behind an extensive array of Productivity Tool options designed to enhance throughput and yield. Instinctiv V9 now features expanded language support which includes Chinese, Korean, Japanese, Czech, French, German, and English.

Frameless VectorGuard® Stencil Foil

ProFlow® enclosed print head technology

ProActiv

Cyclone Understencil Cleaner

Far-reaching *Knowhow*

No other printer manufacturer comes close to matching DEK's process knowledge and applications expertise. Our global technology leadership means we know how to help you optimise your performance to deliver exceptionally low cost of ownership and maximum investment value.

And no-one offers such a comprehensive print process solution that includes superior technologies, board support tooling, screen and stencil manufacturing knowhow and Process Support Products. Award-winning innovations like frameless VectorGuard® stencil foils, Cyclone understencil cleaner, ProActiv improving solder paste transfer efficiency and ProFlow® enclosed print head technologies keep DEK at the industry's pioneering forefront. That's an imperative advantage for progressive manufacturers, and one that adds value far beyond the platform performance by maximising utilisation, yield and productivity.

"" DEK customers can expect more from their equipment and their screen printing partner. ""

Excellence in Manufacturing

All DEK screen printers are designed and built in our modern, efficient, ISO9000-accredited manufacturing sites in the UK and Asia, augmented by a worldwide network of screens and stencil production hubs supported by a Class 10,000 clean room.

As a pioneer of lean manufacturing in the advanced capital equipment sector, we've shown just how much more DEK customers can expect from their equipment and their screen printing partner: greater responsiveness, shorter lead times, hassle-free custom requirements, unparalleled expertise, consistent reliability, wide-ranging process capability, a drive for continuous improvement, a commitment to the industry's lowest cost of ownership and ultimately the most choice, best value and greatest return on investment.

When we say Process Capability…

Don't be misled… all Cpk figures quoted for DEK printers, which are statistical measures of process capability that relate to accuracy and repeatability, are always referenced to the full print process capability. With other vendors you may find this is not the case.

Many quote for first-alignment capability only – it's a more favourable figure for the datasheet, but one that won't give you a true picture in real factory floor production.

Ball Placement

Shenzhen Facility

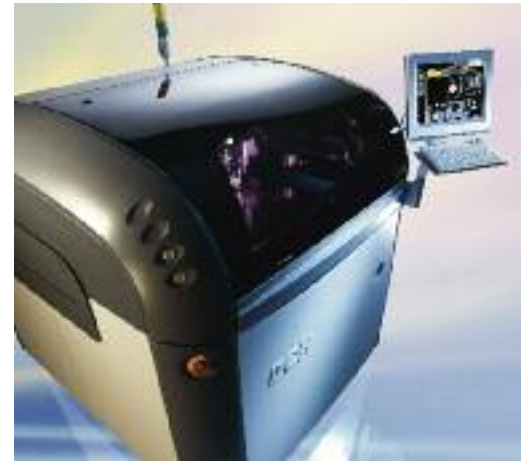# Getting the most from your Horizon iX platform is effortless

To get exactly what you need, you must have choice. And choice is at the core of the flexible Horizon iX platform.

Opting for Horizon iX is an easy choice. The flexibility and rapid changeover capabilities of the platform are perfect for a diverse and detailed range of assembly challenges, from fast turn prototyping and short production runs to volume manufacturing at high speed. Its versatility enables easy re-deployment to handle a variety of substrate materials including PCBs, glass, ceramics and green tape. As for assembly technologies, Horizon iX is equally at home printing ultra fine pitch 01005 and CSP patterns or pin-in-paste features for intrusive reflow as it is mass imaging conventional package pinouts.

The key to getting the most from Horizon iX is choosing the specification and options that deliver the productivity you want – and we've made that an easy choice too. Because Horizon iX is a future proof platform, tomorrow takes care of itself. Simply specify the facilities you need today from an extensive range of productivity tools. Then throughput and yield enhancing options can be field retrofitted whenever you need to increase productivity.

> " To get exactly what you need, you must have choice. "

Outstanding performance from the outset

Take the base Horizon iX platform configuration with no added options and you already get exceptional performance and value, whichever way you measure it. Standard fit resources deliver a level of precision that guarantees Industry Gold Standard 6-Sigma performance on every Horizon iX printer of greater than 2 Cpk machine alignment capability @ +/-12.5 microns, and greater than 2 Cpk process alignment capability @ +/-25 microns or better.

All Horizon iX's are powered by DEK's award-winning Instinctiv™ V9 user interface giving you easy and familiar operation to get productive fast. Since Horizon iX delivers cycle time options ranging from twelve seconds to seven seconds with DEK's High Throughput Conveyer, reducing to an impressive four seconds in a dual-lane Rapid Transport Conveyor (RTC) configuration - Instinctiv V9 expertly supports these capabilities, serving as the powerhouse at the core of your platform. That means you can integrate any or all of the productivity tools you select to immediately increase throughput or yield. Or both.
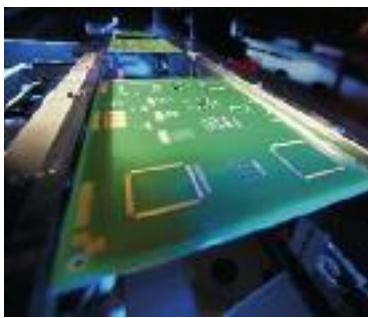
We know that time is money because time is a key component of productivity. That's why Horizon iX's time-critical standard features include an initial setup time of less than ten minutes, so you can get productive fast and deliver output that really counts at the end of a shift or production run. Changeover to a new product coming on stream is even faster; it takes less than two minutes to cease one production run, upload a new program, change the stencil, replenish consumables and start manufacturing a different product. That's perfect for high mix environments and is essential in maximising equipment utilisation that

translates directly to productivity and value of ownership.

Once you're up and running, a base Horizon 03iX configuration delivers a minimum core cycle time of just twelve seconds. Features included as standard are full size stencil frame capability of 29 x 29 inches, an active printing area of 20 x 20 inches, a tooling table ready to accept board support options, and a flat-panel touch screen interface. All these facilities are integrated by a robust bus-based Intelligent Scalable Control Area Network (ISCAN) for reliable and responsive machine control.

Future-Proofed Productivity

The key components of profitability in pre-placement screen printing are throughput and yield. With Horizon iX, there are options to consider that can impact your productivity potential. Everything can be field retrofitted in the future if you need more performance.

High Throughput Conveyor (HTC)

DEK's High Throughput Conveyor (HTC) is an advanced transport system that drives one board into the print area while moving the printed board downstream as a simultaneous operation to maximise throughput and knock a second off the core cycle time.

Horizon iX features a Fixed Chase as standard, equipped to accept a limited number of regular frame sizes. You can use adaptors for other sizes of stencils frames but a better way is to choose the Adjustable Stencil Mount option.

Adjustable Stencil Mount is a highly flexible means of securing the stencil into the Horizon iX platform, and especially assists with productivity in high mix assembly environments that feature frequent product changeovers.

With the Rapid Transit Conveyor (RTC), customers are able to overcome the physical limitations governing the time taken to transport boards into and out of the machine. Developed utilising the benefits of DEK's ISCAN™ Intelligent Scalable Control Area Network infrastructure, DEK's RTC supports the complex motor control signalling required by stepper motor technology, further enhancing manufacturers' throughput advantage.

By using Dual Lane configuration, two productivity-focused Horizon iX platforms for front printing and rear pass-through, manufacturers will ease line-out, eliminate ancillary handling equipment and enhance floor utilisation. Featuring a repeatable core cycle time of just four seconds, Horizon iX Dual Lane RTC supports true continuous printing, regardless of other process variables.

> **" Horizon iX's versatility sets productivity standards from prototyping to high-volume assembly. "**

How fast do you want to go?

Some of the Horizon iX platform's Productivity Tool options are designed purely for speed. Not only is throughput a key component of productivity, it has a significant bearing on overall cost of ownership: the faster you can go, the more output you can deliver, and the greater the financial return on your equipment investment.

Horizon iX offers two Speed-Up Module options to boost throughput, giving you the power to harness more performance at an incremental cost, exactly when you want it.

Speed is nothing without control

Control is a byword for Horizon iX performance. With 2 Cpk production performance and 6-Sigma alignment capability of +/-12.5 microns at machine level and +/-25 microns or better for process alignment capability you get control even at full seven-second core cycle times and can expect excellent yields. But there are many variables in the print process that need to stay in control. If any of these drift, yield suffers – which is why speed is nothing without control. It's also why a raft of Horizon iX Productivity Tool options focus expressly on enhancing yields, to translate the platform's repeatable accuracy and speed potential into maximum productive output.

The first steps for yield improvement lie with vision systems. Horizon iX offers camera options for alignment, detailed inspection and rapid post-print verification.

HawkEye is an automatic print verification technology which can be configured to assess 100% of printed boards and gives a rapid go/no-go indication for each, meaning that faulty boards can now be automatically isolated in real time. The HawkEye verification routine rapidly scans the board as a series of stripes and collects a tightly defined set of monochrome image data.
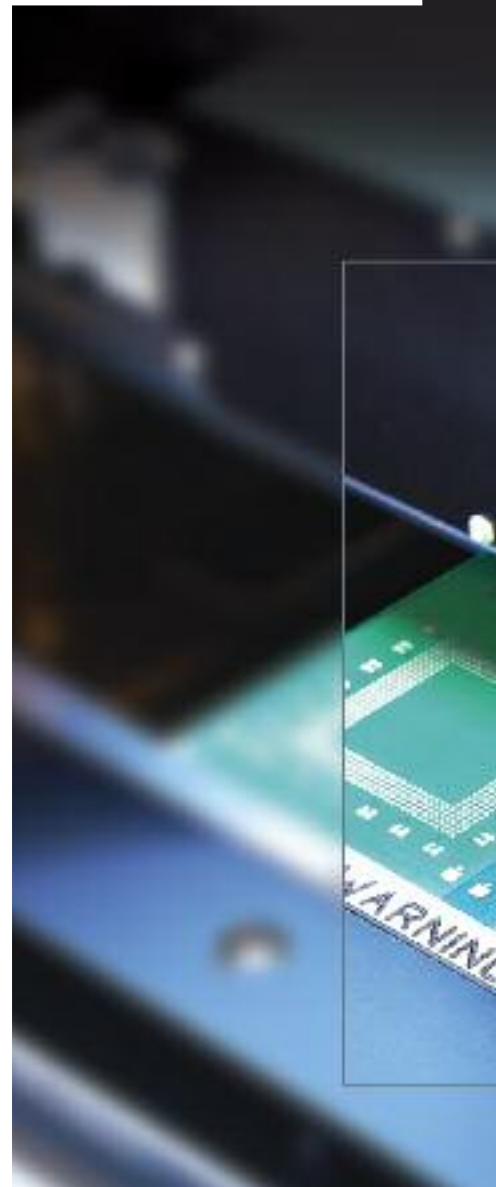
Taking inspection a stage further reveals

DEK's award-winning HawkEye® post-print verification options – fast and powerful vision tools designed to inspect every board passing through your Horizon iX at the line beat rate. Here again you have a choice: select HawkEye® 750 for post-print paste-on-pad inspection of critical board areas.
Or choose HawkEye® 1700 to get four-times the field of view, which lets you inspect more of the board for absolute print quality certainty
at full speed, which maximises yield with no throughput penalty.

Instinctiv™ V9 2D Inspection

> " Horizon iX Productivity Tools translate repeatable accuracy and speed potential into maximum productive output. "

2Di, a yield-enhancing inspection tool, optimises cycle and print quality even further. Its detailed scrutiny, coupled with trend analysis functions, prevents your process moving out of control. This safeguards yields and eliminates potential stoppages by highlighting the need for stencil cleaning or paste replenishment to maintain throughput.

Optimising performance with ProDEK

DEK's ProDEK next generation closed loop communication system tool operates between the DEK screen printer and solder paste inspection machine; identifying possible faults to assure high quality output levels to even the most demanding of tolerance parameters.

This proactive defect prevention capability offers an on-the-fly, failsafe way of correcting print offsets, delivers process optimisation without manual intervention and assures high quality outputs and increased yield.

Instinctiv V9 User Interface

Extending Flexibility

Our market-leading Horizon iX continues to raise the performance stakes with the addition of the DEK Paste Height Roll Monitor. Designed to eliminate defects and improve end-of-line yield this simple to use tool delivers a new level of process control.
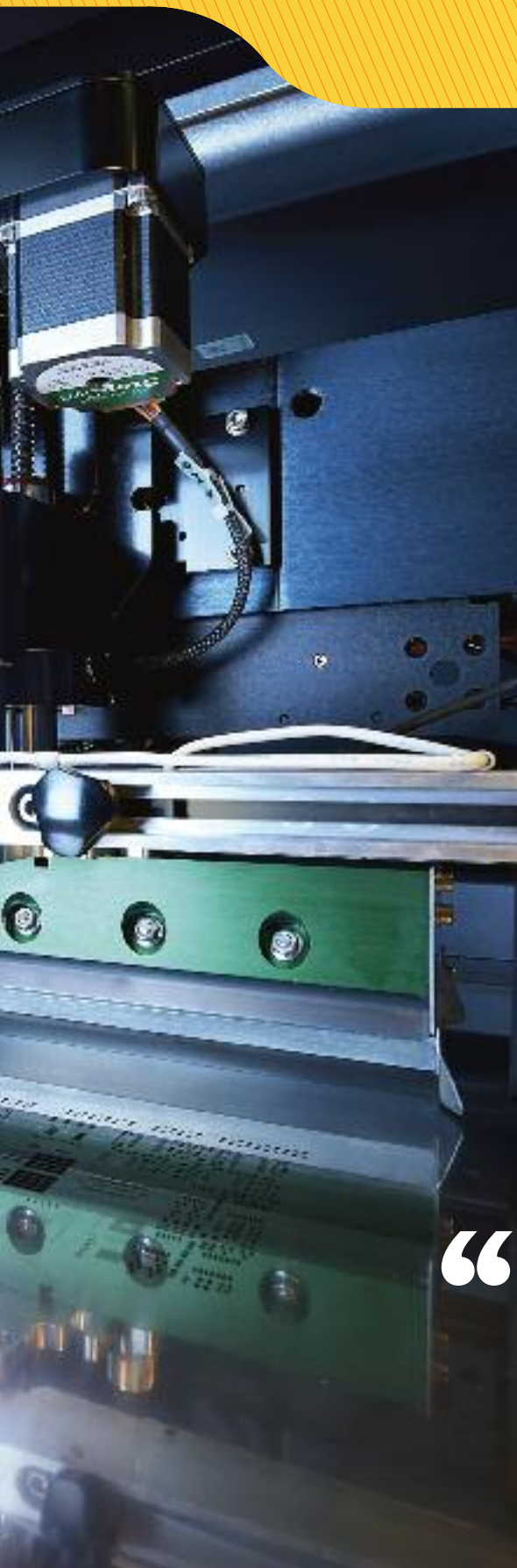
Drawing a laser 'light curtain' to monitor the height of the paste roll, the PHRM detects the presence of solder paste and issues a warning should levels run low. With that notification the paste dispenser can automatically deposit paste or the printer can be programmed to stop and await manual replenishment.

Integrated on-board Dispensing

Supporting further enhancements in the dispensing process, DEK's Stinger dramatically enhances machine capability by enabling a dispensing process on board the printing system – saving valuable floor space and reducing equipment costs for maximum return on investment.

Integrated into the screen printer alongside the machine's vision system, Stinger operates just as an in-line dispenser would, just more effectively. In doing so it enables rapid product change and replenishment without system cleaning. And that helps eliminate production errors and streamline dispensing performance.
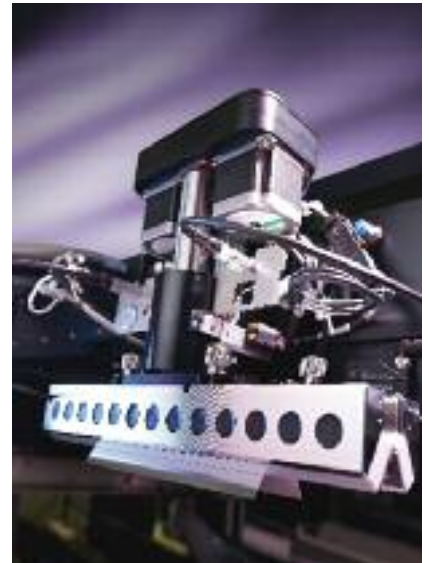
ProActiv
breaks through

To complete the performance picture, DEK's award-winning ProActiv technology has literally rewritten the productivity rule-book.

By extending the print process window to a level that enables consistent printing of small apertures for 0.3mm CSPs and 01005 passives, this breakthrough technology solves the challenges of miniaturisation and higher board densities.

When activated, ProActiv energises the solder paste in contact with the squeegee blade. It's a unique action known as 'shear thinning' that instantly makes the paste more compliant without altering its composition. This process increases the aperture fill to transform solder paste transfer efficiency, delivering immediate improvements in quality, yield and throughput – even with today's subassemblies.

Further benefits include the dramatic reduction in stencil cleaning frequency contributing to increased throughput, and improved stencil and squeegee blade life through less squeegee blade to stencil friction.

The result is dramatically lower production costs and unprecedented paste transfer efficiency.

> " This simple to use tool delivers a new level of process control. "

More productivity choices

Horizon iX throughput enhancement doesn't stop with Speed-Up Module options, and ring-fencing yield is not the sole preserve of inspection tools. From understencil cleaning, to print verification, automatic board support and enclosed head printing, DEK delivers the most comprehensive range of Productivity Improvement Products.

While you may have some print processes today that don't require cleaning cycles, effective cleaning is often critical to assuring consistently high output in others. Here Horizon iX offers you two automated understencil cleaning options: DEK's Blue cleaner and the multi-award-winning Cyclone. Both are controlled by the InstinctivTM V9 productivity powerhouse, and both can be invoked automatically by feedback from other yield- enhancing tools, such as HawkEye®.

Cyclone's five-stage cleaning head effortlessly increases the active cleaning area. It performs faster, taking just two passes, while still deploying wet, dry and vacuum resources. This reduces cleaning rates by half, and does so using half the cleaning roll fabric to keep costs in control.

Cyclone also uses a DEK cassette-based cleaning roll which dramatically reduces the time needed to change cleaning fabric consumables from many minutes to less than thirty seconds. It's another innovation that reduces downtime to help raise productivity.

Pushing this productivity advantage even further, DEK has engineered a wide range of quality fabric and other cleaning materials to optimise your process performance at every level.

From pre-saturated wipes, through understencil cleaning rolls and chemistry to squeegees, spatulas and the unique Magna-print adjustable squeegee blade holder and paste deflector system, our Process Support Products are manufactured to the highest possible standards to boosting your line productivity and reduce your risks.

> " Award-winning innovations enhance yield and throughput for maximum productivity. "
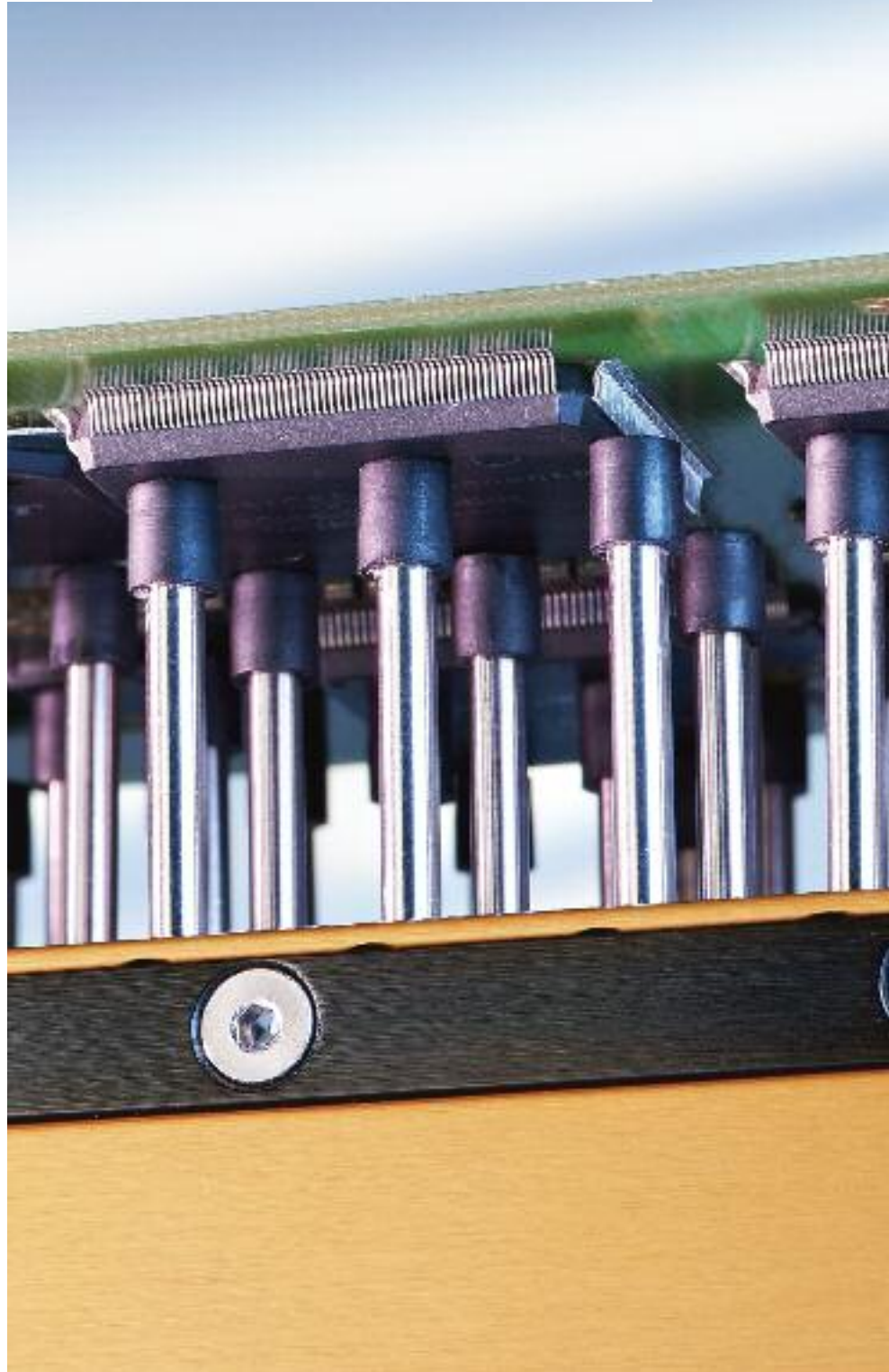
Supporting roles

All Horizon iX platforms come with a tooling table as standard, which is ready to accept either custom board support technology or DEK's ultra-flexible HD Grid-Lok® tooling. Effective underside support keeps your boards flat, helping to maintain precise paste-on-pad volumes and reduce paste smearing.

Custom tooling is ideal for production runs where a support plate is precision machined to provide optimum support beneath your boards while catering for underside components or routed areas. Custom tooling can be produced in-house or within days through DEK's global fast-turn service directly from Gerber data. The choice is yours.

HD Grid-Lok is the ideal solution for high-mix manufacturing, where product changeovers are frequent. The system uses a high density array of electro-pneumatically actuated pins that rise automatically and conform immediately to the underside topography of any board. HD Grid-Lok is instantly and automatically reconfigurable, completely free of operator dependency, and is the industry's fastest tooling support solution taking less than twenty seconds to set up. So as well as keeping yields high through optimum board-wide support, HD Grid-Lok also improves output levels in high product mix assembly environments.

Your productivity advantage

For over a decade, our ProFlow® enclosed print head technology has been delivering outstanding process improvement. It was the industry's first enclosed print head solution, and remains pre- eminent today thanks to continuous improvement.

ProFlow's patented dual-chamber contains many of the process variables that can affect yield, such as on-stencil paste life and paste conditioning, and its advanced technology allows print stroke speeds up to five times faster than conventional squeegees

Extending our leadership, and you advantage, are the latest in the ProFlow DirEKt Imaging product range, the DEK ProFlow Evolution Tx and ATx. The Proflow Tx system is ideally suited for low viscosity material applications including SMT glue printing via Pumprint ™ stencils or traditional stencils, such as Flux, inks, enzymes, and others. Whereas the ProFlow ATx is ideally suited for non-Newtonian higher viscosity material applications,

including SMT paste printing, ProFlow ATx brings greater stability to these challenging processes, including intrusive printing (pin in paste).

Smooth assembly set-up and product changeover

To safeguard yields and smooth the initial assembly set-up and product changeover processes, Horizon iX offers one more advanced automation solution. Auto Stencil Load is designed to remove operator dependency and completely eliminate the possibility of alignment errors for ongoing productivity into the future.

Close edge printing

And finally, if you need substrate clamping without compromise, look no further than DEK's Over Top Snuggers (OTS) technology. Securing printed circuit boards firmly in place ready for processing, this flexible technology is designed to ensure high quality printing for enhanced end-of-line yield. Enabling close edge printing, and by optimising edge printed paste deposits, this process substantially enhances yield potential. Automatic adjustments for variations in board thickness, and for out-of-parallel boards complete its productivity enhancing feature-set.

> " Horizon iX is chosen by OEMs and the manufacturing services community worldwide. "

A global service & support infrastructure second to none

DEK provides incomparable support services delivered by experienced engineers and screen printing experts. Our global reach means we are located conveniently close to you for rapid on-site support and comprehensive training wherever in the world you manufacture. And even closer to you through 24/7 online access to the DEK Knowledge Base. The help-desk is active across all world time-zones, 24 hours a day, working with you and tracking your problem until it is resolved.

Horizon iX's advanced productivity options are backed by sophisticated supporting technologies for ongoing peace-of-mind. In addition to the powerhouse that is the next-generation Instinctiv™ V9 machine user interface, Horizon iX's advanced capabilities are further reinforced by ISCAN Intelligent Scalable Control Area Network. A fast, light and robust internal bus-based communications system, ISCAN replaces conventional wiring looms to deliver responsive and intelligent platform control and remote integration for the ultimate in process support.

Horizon iX is also fully compatible with a comprehensive range of high-quality Process Support Products including precision stencils and screens designed and manufactured in-house by DEK, custom tooling, cleaning wipes and swabs, understencil cleaner fabric rolls, and general printer and work area cleaning solvents. All are orderable online for 24-hour response and near-instantaneous despatch to any global location.

Committed to lowest cost of ownership

Whole life service and dependability is the means to secure the low ownership costs for your Horizon iX platform and the best return on your capital investment. One part of that is maximising utilisation by reducing stoppages and downtime to keep the printer productive. Another is driving up throughput and yields to deliver more end-of-line output – and Horizon iX offers a wealth of Productivity Tool options to let you choose when to do this and how best to achieve it. Yet another is keeping the Horizon iX in top-performing condition, which is where DEK warranties and service plans come in.

All Horizon iX platforms benefit from a 12-month warranty that covers parts and labour, subject to our appropriate use terms. You can choose warranty options to extend that cover to 24, 36 or 60 months from delivery.

Our 'As New' service plan is just that. The agreement provides whole-life support for the platform and includes annual maintenance visits that upgrade your Horizon iX to the latest 'as new' specification.
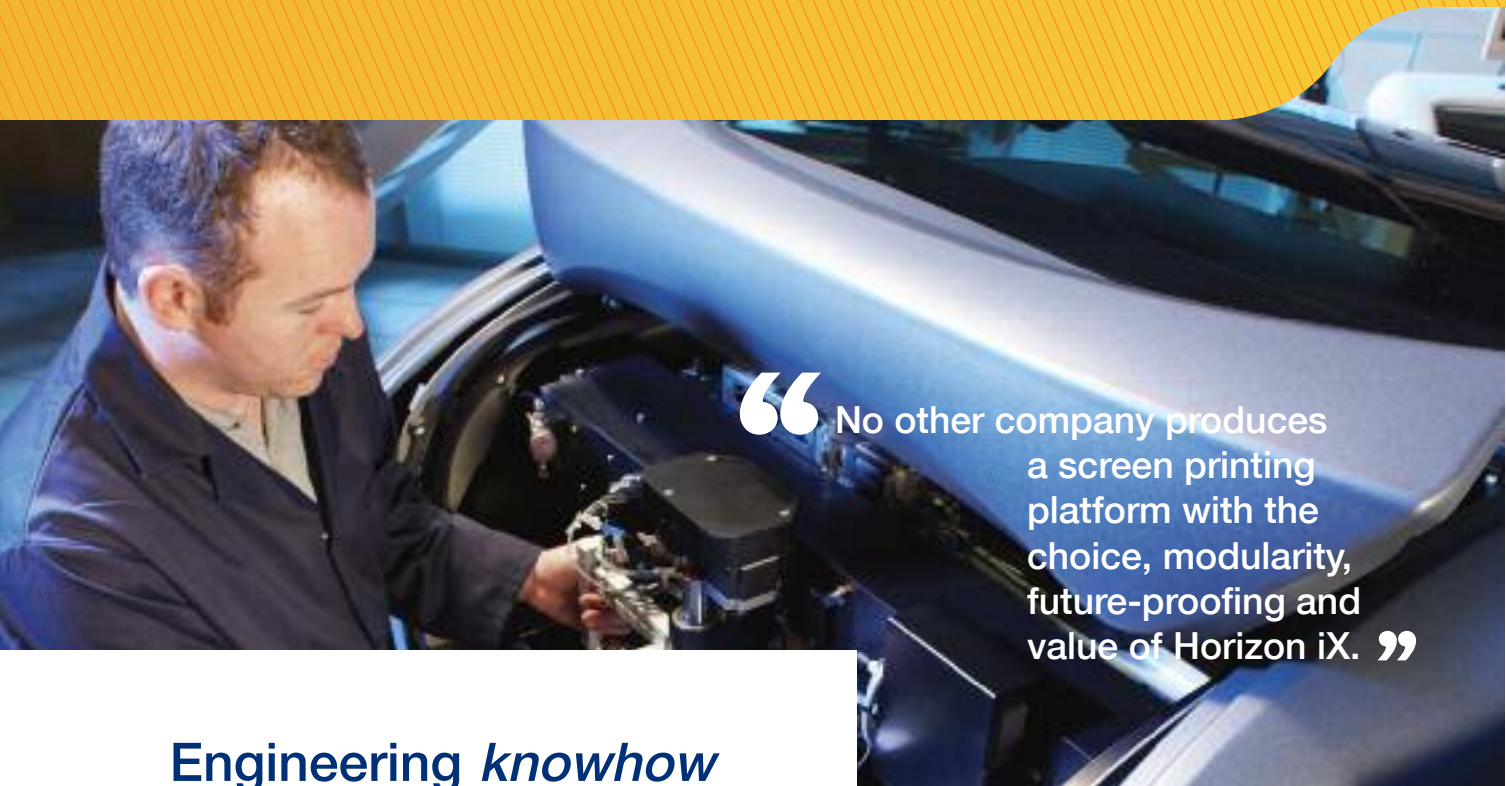That ensures throughput and yield capabilities are maintained or even improved. The result is that you continue to be productive and extract maximum value from your initial future-proofed Horizon iX investment.

And that's the point of Horizon iX's inherent future proofing. Almost all the Productivity Tool choices open to you today can also be fitted later. Imagine the scale of the returns you could realise by being able to run your Horizon iX efficiently for longer – possibly years longer – than your original project demanded. In this flexible and scalable way, DEK is committed to delivering the lowest costs in the industry over the operational life of the Horizon iX platform.

" DEK is committed to delivering the lowest costs in the industry over the operational life of the Horizon iX platform. "

> " No other company produces a screen printing platform with the choice, modularity, future-proofing and value of Horizon iX. "

Engineering *knowhow*

As a technology-focused company serving a high-tech industry, we understand that our customers know good engineering when they see it. That's why we are totally committed to maintaining a world-class engineering team, as well as partnering with the world's leading experts in industry, universities and research organisations.

DEK's engineering teams are active throughout the Americas, Europe and Asia, studying emerging challenges and developing production-ready solutions ahead of the curve, supported by advanced technical centres on all three continents.

Process Engineering & Applications Excellence

DEK is the only total screen printing solutions partner, delivering not only equipment platforms but also knowledge and support. Our expertise ensures you utilise advanced production equipment to its maximum potential. New Product Introduction (NPI), Process audit, process optimisation and process characterisation services are tailored to your needs, and provide a complete benchmarking and continuous improvement resource.

No other company has the expertise, resources and sheer range of competencies to help you establish new frontiers, quickly perfect advanced processes, and to keep your production operating continuously at the highest levels of productivity. And no other company produces a screen printing platform with the choice, modularity, future proofing and value of Horizon iX.

Pre-configured Performance Platforms

Feature	03iX	APiX	01iX	iX DL	iX DL RTC
Process alignment capability 2 Cpk @ +/- 25 microns 6-Sigma	○				
Process alignment capability 2 Cpk @ +/- 20 microns 6-Sigma		○	○	○	○
Machine alignment capability 2 Cpk @ +/- 12.5 microns 6-Sigma	○	○	○	○	○
Cycle time 12 seconds	○				
Cycle time 10 seconds	■				
Cycle time 8 seconds	■	○	○	○	
Cycle time 7 seconds (with HTC)	■	■	■		
Cycle time 4 seconds					○
ISCAN Intelligent Scalable Control Area Network	○	○	○	○	○
Instinctiv™ V9 user interface	○	○	○	○	○
Full size stencil frame capacity	○	○	○	○	○
Standard board size capability	○	○	○	○	
Standard tooling table	○	○	○	○	○
Colour TFT touch screen, keyboard and trackball	○	○	○	○	○
DEK standard 1-year warranty	○	○	○	○	○
Semi-auto stencil load	■				
Auto stencil load	■	○	○	○	○
Long board capability	■	■	■	■	

Future-proofed productivity options

Feature	03iX	APiX	01iX	iX DL	iX DL RTC
Adjustable Stencil Mount (ASM)	■	■	■	■	■
High Throughput Conveyor (HTC)	■	■	■		
Over Top Snuggers (OTS)	■	■	■		■
Rapid Transit Conveyor (RTC)				■	○
Paste Roll Height Monitor (PRHM)	■	■	■	■	■
ProActiv	■	■	■	■	■
Stinger	■	■	■		
Paste Dispenser	■	■	■	■	■
Foiless board clamps	■	■	■	■	■
Grid-Lok® automatic tooling	■	■	■	■	
HD Grid-Lok® automatic tooling	■	■	■	■	
Cyclone understencil cleaner	■	■	○	○	○
DEK Blue understencil cleaner	■	○	■	■	■
ProFlow® DirEKt imaging	■	■	■	■	■
2Di inspection	■	■	■	■	■
HawkEye® 750	■	■			
HawkEye® 1700	■	■	○	○	○
HawkEye® Bridging	■	■	■	■	
ProDEK Closed Loop	■	■	■		
Verification & Traceability	■	■	■	■	■

Semiconductor options

Feature	03iX	APiX	01iX	iX DL	iX DL RTC
DirEKt ball placement		■	■	■	■
Wafer Transport Solution	■	■	■		
Roll Bar Squeegee	■	■	■		

○ Standard fit　■ Options

Find Out More

To discover how the advanced Horizon iX technologies and capabilities can help you boost productivity, contact your nearest DEK representative directly or go to **www.dek.com/horizonix**