

Safety first

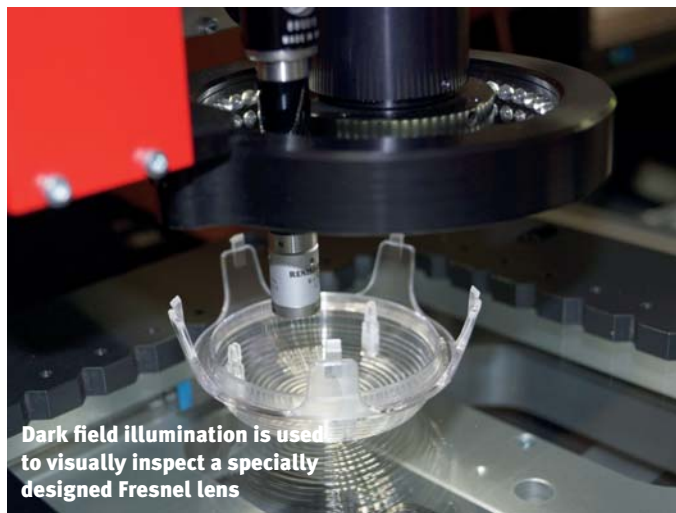
KAC Alarm Company has a global reputation for design innovation and long-term reliability with its life safety products. From its impressive facilities in Redditch, the company manufactures manual call points and evacuation devices used in commercial fire and security systems. As **Solutions** reports, the quality and longevity of these vital products is being verified by a new Starrett AV300 CNC video measuring system.

Over four decades ago a talented engineer, Ron Reid, came up with a new idea for a manual break-glass call point.

To him the previous mechanisms and design solutions were cumbersome and difficult to use under the stress that would undoubtedly be felt if a building was on fire.

He designed a switch that monitored the movement of the glass. The glass itself featured a score line to make it easier to break and a film across it so that it didn't shatter. The design was patented and the idea was enthusiastically received with a British Standard being written around this concept.

Today, KAC produce over 1.5 million manual call points every year on multiple production lines, and the ubiquitous little red boxes – although dependant on application and available in a myriad of colours such as orange or white – can be seen on the walls of buildings across the globe.



Dark field illumination is used to visually inspect a specially designed Fresnel lens

Following its acquisition in 2001, the company became part of the Honeywell Corporation. KAC employs around 150 staff and is integrated into the life safety division of Honeywell, forming part of the fire division. Acquired companies can sometimes lose their brand, however, as head of R&D and engineering Paul Carrington explains, that was not the case. "We have retained the KAC brand because it is strong

and well-established in the marketplace."

Breaking the mould

While PCBs and some components for assembly are purchased outside the company, another interesting feature of KAC is its moulding shop, which operates around the clock and supplies 90% of the plastic components required.

"With a mix of internally produced components and

outsourced supply, we had a requirement for checking and validating parts for existing production components, as well as any new products being introduced," says Mr Carrington. "It was one of the activities that we traditionally outsourced, both the measurement and inspection and the environmental testing of finished products. However, it was having an impact on the JIT philosophy of the business. The leadtimes required to send the parts off, wait for the testing to be completed and analyse

the results was adding up to a significant delay.

A full evaluation of the various measurement solutions available allowed the company to narrow the choice down to just a few, as project engineer Adrian Crawford recalls: "From an equipment point of view we were looking for an optical and a contact probe solution so the combination of both on the Starrett AV300 supplied and supported by optical inspection and metrology specialist, Optimax, provided what we needed. The 300mm measuring range in the X-axis figured highly, along with the ability to accommodate both mould tool inserts and components up to 18kg.

"The standard 12:1 optical zoom was another strong point of the equipment, providing low magnification and large viewing areas for image capture," he continues. "In addition the high magnification option allows for excellent repeatability when making Z-axis non-contact measurements. Illumination

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is the key to robust optical measurement and the ability to create contrast on transparent, black and light absorbing materials is simplified with the dark field multipoint illuminator. The compact architecture of the benchtop AV300 also separated the Starrett product from its competitors as for us the space saving was a factor."

Mixing it up

Plastic moulded parts with 3D features can be probed as well as features accessed that cannot be visualised from above. The combination of the measurement technologies with a small Renishaw TP20 star probe allows KAC to measure parts to a resolution of around 1µm without altering the component position on the measuring stage. Optical measurements can be mixed with contact by loading a probe from a docking rack to complete the inspection process, reducing the need for complex fixtures and alignments.

Mr Carrington adds: "It was not just about the functionality and capability of the equipment – we particularly liked the aftersales service offered by Optimax. The support and post-sales care, as well as the training, was one of the key factors. There was a willingness to manipulate the system software in a way that suited us, with additional modules that Optimax coded and added on to the base software."

Difficult to measure

Optimax's managing director Pete Clements states: "There were some specific applications, such as a number of non-geometric O-ring seals that required freeform measurements to be taken. We added an O-ring button to the software with a macro code specifically for this non-contact measurement task."

KAC offer fully sealed, IP67 rated outdoor products using

O-rings and irregular seals that need to be validated to the design brief. The cross section can be circular or custom shaped and these are notoriously difficult to measure: "Call points can sit dormant for a number of years but when the button is pressed it has to work," Mr Carrington explains. "The only way to ensure that happens is to check the

constituent parts thoroughly.

"Activating a call point is a life safety event so we have to make sure the products we offer the market function correctly. Although we offer a warranty most people expect our products to last a lifetime so we engineer them to last – we have products in the field that are over 30 years old. We know because we still get technical support

questions about them."

Dark Field Illuminator

With a heritage in call points, a few years ago KAC highlighted products for the audio-visual sector such as evacuation beacons and warning devices as a potential new area for the business.

A critically important part for the performance of Visual

Alarm Devices (VADs) is the lens. These moulded parts are produced to meet a new European standard EN54-23 which states a minimum light intensity and volume for the device and have provided new challenges to the whole fire industry.

"The light emitted has to be in a certain pattern and a minimum volume and



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◀ the lens factors highly in this performance criteria," Mr Carrington affirms. "We designed a special Fresnel lens that distributes the light from the LED source. An omnidirectional light output makes the installation easier,

saving time and cost during this phase.

"The lens has been specially designed and developed with an incredible amount of calculation and simulation used to get the performance level required. We want to ensure the lens produced

matches the design intent of the part, or the performance could be detrimentally affected."

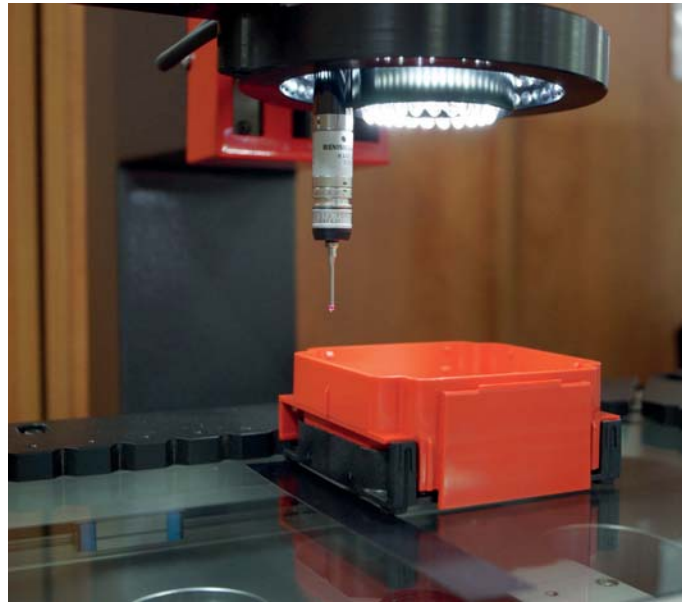
Of course, the lens is translucent so it is difficult to measure. As well as a multi-point incident light ring, the Starrett AV300 is fitted with dark field illumination which creates high contrast across difficult to identify edges and features. "Standard incident white ring lights would travel through a translucent part, such as the lens. By changing to a high incident angle to go across the surface, it creates dark shadow allowing the visualisation of transparent and translucent components," Pete Clements says.

When vision is not enough

Thanks to the Starrett AV300, KAC has the ability to quickly identify and correct failure modes, reacting to any issues



(L-R) Adrian Crawford and Paul Carrington



with component features that are not correct. Moving forward the company will use the measurement capability of the video and contact equipment to validate mould tools, jigs and fixtures and even measurement gauges.

will not be left struggling to find answers to any measurement issues."

The L. S. Starrett Company is a global business, headquartered in Athol, Massachusetts, but with production facilities in North and South America, the UK and China. Starrett optical and video measuring products are supplied exclusively in the UK market by Optimax Imaging, Inspection and Measurement.

Mr Carrington concludes: "We knew a vision only system would not cover everything we do. The Starrett AV300 covers 99% of what we have to measure which is why we wanted the combination of both contact and non-contact sensors. The time savings for the checking and validation of established and new components has been significant, and, working with Optimax has provided us with a feeling of security. We know we

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0.0500	█	Pass	-0.0134
1.00	█	Pass	0.91
0.1000	█	Pass	-0.0115
0.1000	█	Pass	-0.0329
0.1000	█	Pass	-0.0236
0.1000	█	Pass	-0.0352
0.1000	█	Pass	-0.0024
-0.0320	█	Pass	-0.0015
-0.0320	█	Pass	-0.0937
0.1000	█	Pass	-0.1271
0.1000	█	Pass	-0.0010
0.1000	█	Pass	0.0178
0.1000	█	Pass	0.0183

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