

Blue light sensor in the packaging industry

Transnova RUF employs subminiature sensor with blue light LED

Photoelectric proximity switches are required in a packaging line for plastic bottles to check that the grippers have actually picked up bottles. As there is only limited space for installation close to the gripper, the application demands extremely small sensors, able to provide reliable, reproducible results despite a difficult detection angle. A subminiature sensor from SensoPart's F10 range, with a blue LED emitter, has proven to be by far the most reliable solution.

Automation solution for gripper systems

Transnova Ruf in Ansbach, Bavaria develops and manufactures a large variety of customised packaging machines – from top-loading and sidelading machines to picking systems, palletisers and complete turnkey packaging lines. A machine is currently being assembled for the filling and packaging of plastic bottles for a cosmetics manufacturer.

The bottles, made of different coloured, transparent or opaque (non-transparent) plastic, are picked up and transported by grippers at two different stages of the process: the first gripping device (fig. 2a) grips a row of twelve bottles on a conveyor belt simultaneously and carries them to a different point from where they will be transported to the packaging area by a second gripper system with six individual grippers (2 x 3 bottles, fig. 2b). A photoelectric proximity switch is assigned to each individual gripper to check that the respective bottle has actually been picked up.

The challenge: a standard solution did not fit the task

As installation space was limited, Transnova Ruf opted for a subminiature proximity switch from SensoPart's F10 range. Measuring just 21 x 14 x 8 mm³, they could easily fit in the machine. Field tests then had to be carried out to find the sensor version best suited to this application. "The standard solution for this type of application would normally involve fitting the proximity switches in the centre of the gripper so that they look down vertically on to the bottle lid", declared Thomas Buchner, sales representative at SensoPart. "However, this option was ruled out



Fig. 1: The F10 Bluelight subminiature sensor reliably detects the black, shiny bottle lid even at a difficult angle and with strong vibrations.

by the customer for safety reasons as he did not want to place the sensors too close to the moving gripper components." As a result, all the sensors were installed at an angle to the top edge of the bottle body (fig. 3).

The field tests which were run in collaboration with SensoPart, revealed that LED red light sensors were not sufficiently reliable in this application. Although the sensors did in fact detect the

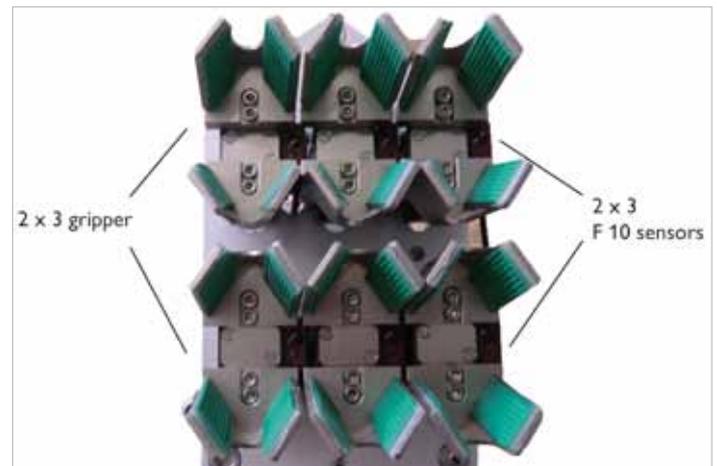
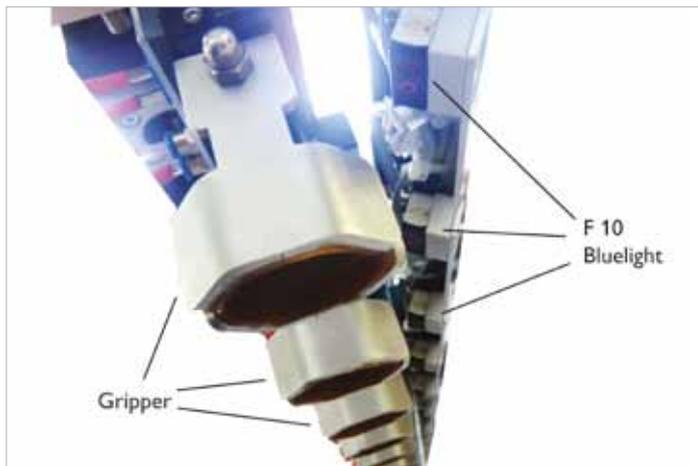


Fig. 2a/b: Both gripping devices contain 12 or 6 individual grippers, each of which is watched by a photoelectric proximity switch. (Note: these photos still show standard photoelectric proximity switches with a red LED which were installed for field tests.)

top edge of the bottle, the bottles are subjected to strong vibrations during transport and are not always gripped at the same height. Errors then occurred if the light spot slipped off the edge of the bottle. The detection angle also proved to be too problematic as the remitted light was insufficient for reliable detection, particularly with transparent bottles.

The solution: blue light instead of red

A modified setup with sensors pointing at the bottle lid instead of the bottle body brought no significant improvement; the black, shiny lid also remitted insufficient light at the given angle as much of the light was reflected away from the shiny lid surface. “Fortunately, our F 10 range offers a wide variety of sensors, so we can always find something suitable, however difficult the task”, reports Thomas Buchner. The final choice was a special version developed for poorly reflective surfaces: the F 10 Bluelight (fig. 4). This sensor which is equipped with a blue LED emitter rather than a red one, is usually used in the solar industry where it de-

tects dark blue to black solar cells which also reflect hardly any light back to the sensor.

As hoped, the blue light switch demonstrated reliable switching behaviour irrespective of any reflections and vibrations, despite being at an angle of approx. 60° to the detection surface. It was installed at a distance of 20 to 25 mm from the top of the lid. This leaves sufficient safety reserve as the F 10 Bluelight has a maximum operating range of 30 mm. High-performance background suppression, a standard feature of all F 10 photoelectric proximity switches, also reliably excludes any false detection on empty gripper jaws – should they have not picked up a bottle. The proximity switches are mounted with the aid of dovetail mounting brackets, enabling subsequent vertical adjustment within a range of ± 10° – a comfortable and time-saving solution which has proved its worth in very cramped spaces.

Transnova Ruf is not only extremely satisfied with this automati-



Fig. 3: The sensors are positioned at an angle of approx. 60° and a scanning distance of 20-25 mm.



Fig. 4a/b: The F 10 Bluelight photoelectric proximity switch was designed especially for poorly reflective objects such as solar cells.

on solution but also values the competent support provided by the Sensopart team during field tests. Thanks to the positive test results, all 18 grippers on the packaging line are equipped with the F 10 Bluelight.



F 10 Bluelight Features

- Sub-miniature sensor with blue transmission LED and precise fixed background suppression
- Reliable switching behaviour with strongly light-absorbing objects, e.g. solar wafers
- Reliable operation without reflector – even with critical surfaces
- Tamper-proof sensor design – no misalignment possible
- Simple mounting and adjustment through innovative dovetail clamp mounting
- Several connection variations: M5 plug, pigtail cable with M8 connector or cable
- Robust, fibre-glass reinforced plastic housing (IP 67) with Ecolab certification

Further information

About Edale hit <http://www.transnova-ruf.de/>

About SensoPart Industriesensorik GmbH

The German sensor manufacturer SensoPart develops, produces and sells sensors for industrial applications and has a subsidiary in Burton on Trent for the UK market. The main focus is on optoelectronic sensors, particularly laser sensors, which are used in so many industrial applications, and high-performance vision sensors for the detection of objects, colours or data matrix codes.

The past years have been marked by a strong growth in turnover and the regular launch of new, innovative products. SensoPart has received several distinctions for its work and has been awarded the German Sensor Application Prize several times.

Further information can be found online under: <http://www.sensopart.com>

Graphics: Edale, SensoPart

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