Model H3C adjustable proximity sensor's auto-tuning and visualization of excess gain yields faster adjustment and more reliable operation

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1. Introduction

A proximity sensor is a non-contact switch whose output turns on and off depending on the proximity of metal to the sensor.

For conventional proximity sensors, the operating distance is fixed and the position in which an object is sensed can be adjusted only by rotating the threaded sensor head. With this method, fine-tuning is difficult and positioning takes a long time, the results varying depending on the skill of the worker. Another problem is that, since the LED indicators typically show only whether output is ON or OFF, the exact amount of excess gain after adjustment cannot be checked. To solve these problems, Azbil has developed its model H3C adjustable proximity sensor.

Fig. 1. Model H3C adjustable proximity sensor

2. Product overview

Since the H3C has two outputs, only a single sensor is required in some applications that previously required two sensors. By setting a separate threshold level for each output, the sensing position can be adjusted for each output.

2.1 Specifying sensor settings by IO-Link

This product supports IO-Link, allowing the specification of various settings (threshold levels, etc.) and tuning remotely via communication. In addition, the state of the sensor (total operating hours, oscillation frequency, etc.) can be obtained.

2.2 Tuning

The user can set outputs manually or by using the auto-tuning function. The tuning function includes standard mode, which sets the threshold level for each of the two outputs, and combination mode, which sets the threshold level, operation mode, and switchpoint logic for two outputs simultaneously.

Combination mode, a tuning method newly developed by Azbil, includes 4-point tuning. If four teaching points (T1 to T4) are specified, the threshold levels (S1 and S2) of the two outputs are automatically set between the four points as shown in figure 2, which enables sensing of 4 areas. This tuning method is intended to be used for checking the clamp position of tools mounted on the main spindle of a machining center.

2.3 Setup tool

We have developed a dedicated tool for easy setup of the sensor. The setup tool is a DTM™ (Device Type Manager) application based on FDT® (Field Device Tool) specifications.

With this tool, the user can specify settings, tune the sensor, and check the excess gain. Also, the tool shows the detection level in a graph (figure 3).
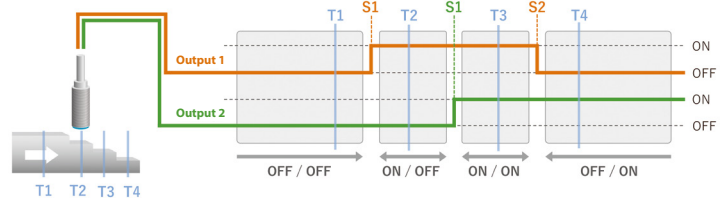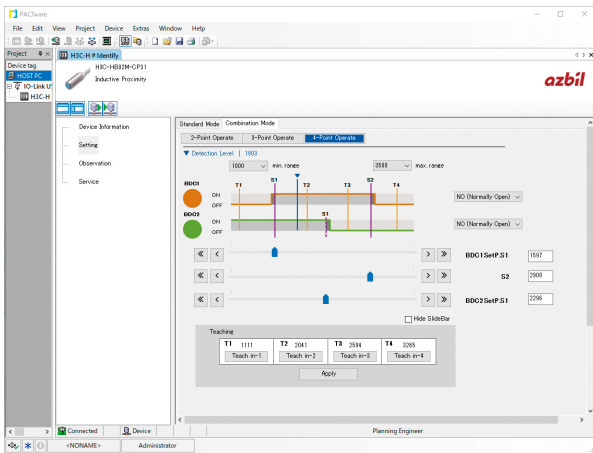

Fig. 2. 4-point tuning

Fig. 3. Setup tool

3. Conclusion

In addition to the 4-point tuning mentioned above, the H3C is equipped with a variety of tuning functions to suit the user's application. Figure 4 gives some application examples.

We believe that the tuning functions of the H3C adjustable proximity sensor and its dedicated setup tool facilitate installation and setup by the user, reduce man-hours, and contribute to the stable operation of equipment by visualization of the excess gain.
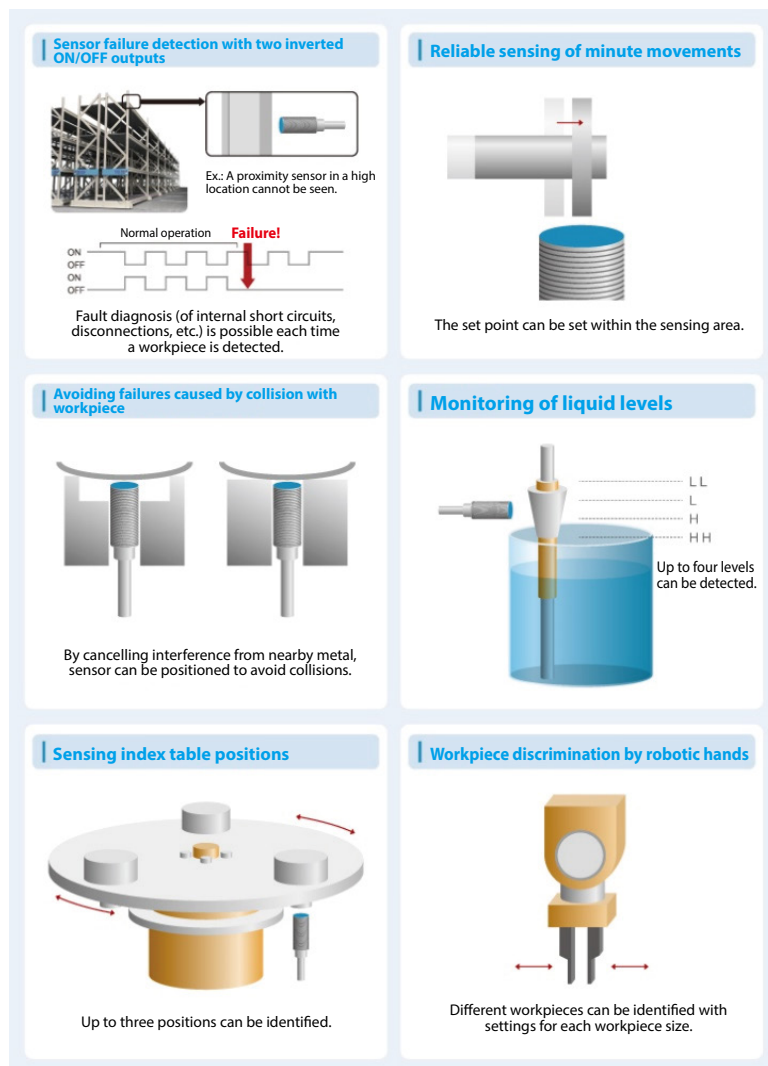

Sensor failure detection with two inverted ON/OFF outputs

Ex.: A proximity sensor in a high location cannot be seen.

Normal operation — Failure!

Fault diagnosis (of internal short circuits, disconnections, etc.) is possible each time a workpiece is detected.

Reliable sensing of minute movements

The set point can be set within the sensing area.

Avoiding failures caused by collision with workpiece

By cancelling interference from nearby metal, sensor can be positioned to avoid collisions.

Monitoring of liquid levels

LL
L
H
HH

Up to four levels can be detected.

Sensing index table positions

Up to three positions can be identified.

Workpiece discrimination by robotic hands

Different workpieces can be identified with settings for each workpiece size.

Fig. 4. Model H3C application example

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