

¹Nina DANIŠOVÁ, ²Jozef MAJERÍK

SENSORIC SYSTEM FOR IDENTIFICATION OF JAWS IN THE JAW BUFFER AND INTELLIGENT FIXTURE

¹ INSTITUTE OF PRODUCTION SYSTEMS AND APPLIED MECHANICS, FACULTY OF MATERIALS SCIENCE AND TECHNOLOGY IN TRNAVA, SLOVAK UNIVERSITY OF TECHNOLOGY IN BRATISLAVA, SLOVAKIA

² DEPARTMENT OF ENGINEERING TECHNOLOGY AND MATERIALS, FACULTY OF SPECIAL TECHNOLOGY, ALEXANDER DUBCEK UNIVERSITY IN TRENCIN, SLOVAKIA

ABSTRACT: In this contribution is presented a complex buffer design of fixture system, which is situated in the workplace of Cartesian robot and is used for clamping parts. Fixture equipment is consisted from pairs of jaws and is situated in the jaws buffer. The Cartesian robot is one of the intelligent manufacturing and assembly cell subsystem. This manufacturing cell is situated at the Institute of Production System and Applied Mechanics. The buffer design of fixture system is going out intelligent manufacturing systems and bionic manufacturing system knowledge.

KEYWORDS: system, diagram, mechanics, manufacturing, jaw, types

❖ INTRODUCTION

Complexity of intelligent assembly and production systems is characterized mostly by their structure, element connection and system environment. For function of intelligent production and assembly systems is necessary to receive a number of visual, acoustic and tactile information.

In the intelligent assembly and production is necessary to identify and prepare the information mostly about function of basic technical devices (robots, assembly, production assistant devices), about controlling and blocking functions. Realization of these functions checking is provided by sensoric systems. At the technical praxis are termed the sensoric systems as "monitoring systems".

❖ SENSOR SUGGESTION OF FIXTURE SYSTEM

At the fixture system was needed to resolve following sensors placement by required activities:

- check of clamping jaws presence,
- check of part in the fixture presence,
- check of jaws end position,
- check of clamping power size,
- check of jaws at the buffer,

SENSORS DESIGN FOR CHECK OF CLAMPING JAWS PRESENCE IN THE FIXTURE

Exchange of jaws is realized through flanges connection with pins at the pneumatic fixture. Flanges are fixed at the individual parts through screws. Pins are used at flanges connection for assurance of exact position by exchange.

For the fixture was resolved sensors, which are assured check of clamping jaws presence at the fixture. At the flanges connection are designed mechanic pressure sensors - electrical microswitch with number S-3-BE-SW. Microswitch is located at flutes of flanges and are fixed through screws or glue. Advantages of used sensors are reliability, ease, low price. Microswitch is ideal for applications, where are required size and weight.

SENSORS DESIGN FOR CHECK OF PARTS PRESENCE IN THE FIXTURE

Check of parts presence in the fixture is needed that pneumatic fixture could to clamp concrete part. For presence part check in the fixture is used reflex optic sensor of type: SOEG-RTH-M18-PS-K-2L. Reflex optic sensor is located on the side through assembly pad on the mount. The mount is glued to fixture. Reflex sensors work through light output comparison. These sensors compare set value with actual value of output. The part is located between clamping jaws, optical jet is broken and light output will be lower. The sensor evaluates output difference of light jet and send signal to control unit. Reflex optical sensors can scan various complex parts, but only to distance by type used sensor.

SENSORS SUGGESTION OF BASIC POSITION CHECK

Check of jaws position has to work for location of part to fixture. If jaws are open in basic position, parts are can put to fixture. The drive of clamping fixture is assured through double actions-pneumatic actuators. The position of these pneumatic actuators is possible to scan with different

approach sensors types. Magnetic sensors are located in flute on sides of fixture and fixed through screw. Sensors check clamped part in jaws or position of open jaws. Advantages of clamping jaws sensor are: immediate alert, simple handling, simple location on the side of fixture, electronic regulation of switching points, high precision scanning.

SENSORS DESIGN FOR CHECK OF CLAMPING POWER

Clamped part cannot release during work. High clamping power provide sufficient rigidity of fixture clamping. Pressure sensors are used for scanning of clamping force size today. Pneumatic fixture has a working pressure from 0.1 to 0.7 MPa. This pressure is for using of pressure sensor optimal. For check of clamping forces is used pressure sensor of type PSE510-M5. Pressure sensor

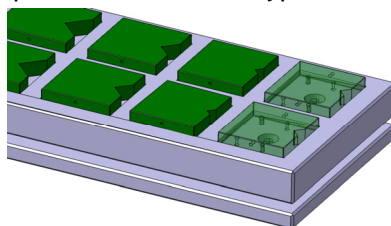


Figure 2: Jaw buffer

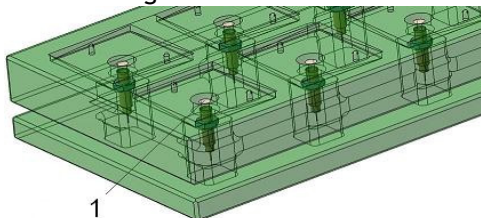


Figure 3: Sensor placements suggestion for check of jaws (1- Suggested sensor)

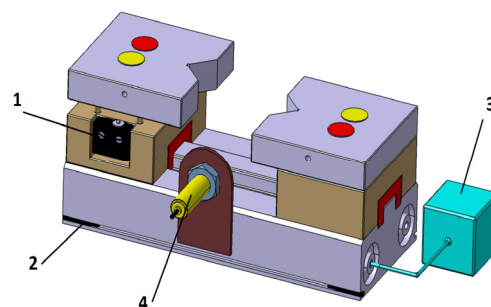


Figure1: Fixing of pressure sensor to fixture 1 - Microswitch S-3-BE-SW, 2 - Magnetic sensor, 3 - pressure sensor PSE510-M5, 4 - reflex optic sensor SOEG-RTH-M18-PS-K-2L

has on the clamping side thread and is fixed at the pneumatic fixture in an axis of pneumatic actuators. His diagnostics can evaluate interruption of contact between sensor and control unit, high pressure or high current. On the Figure 1 is possible to see of pressure sensor fixing to fixture. Advantages of pressure sensor are: simple assembly, strong structure, evaluation of clamping force size.

SENSOR SUGGESTION FOR JAWS PRESENCE AT THE JAWS BUFFER

Different types of jaws are situated at the intelligent manufacturing- assembly cell.

Individual jaw types are used for rotational and non rotational parts, which will to production at the intelligent manufacturing - assembly cell. Inductive sensors - ASIEN - M8NB-PO-K-L are designed for jaw buffers. These sensors ensure presence check of jaws at the jaws buffer. On the Figure 2 is situated jaws buffer, which is located at the intelligent manufacturing - assembly cell. On the Figure 3 is possible to see sensors designed for presence check of jaws at the buffer

❖ CONCLUSIONS

Design of sensor system for fixture is going out of intelligent manufacturing systems knowledge. Individual sensors were suggested for each device at the workplace of Cartesian robot on the basis requirements for intelligent systems.

Intelligent manufacturing systems as systems of new generation are gradually loaded in to the mechanical production, when they are removing human operation out of production process and they also short production times.

❖ REFERENCES

- [1.] KOŠTÁL, P. MUDRIKOVÁ, A. KERAK, P.: Clamping fixture for new paradigms of manufacturing. In: Annals of DAAAM and Proceedings of DAAAM Symposium. - ISSN 1726-9679. - Vol. 21, No 1. Annals of DAAAM for 2010 & Proceedings of the 21st International DAAAM Symposium "Intelligent Manufacturing & Automation: Focus on Interdisciplinary Solutions" 20-23rd October 2010, Zadar, Croatia. - Vienna : DAAAM International Vienna, 2010. - ISBN 978-3-901509-73-5, s. 0361-0362
- [2.] MUDRIKOVÁ, A. KOŠTÁL, P. MATUŠOVÁ, M.: Building of a production system program control laboratory. In: Annals of DAAAM and Proceedings of DAAAM Symposium. - ISSN 1726-9679. - Vol. 20, No. 1 Annals of DAAAM for 2009 & Proceedings of the 20th international DAAAM symposium "Intelligent manufacturing & automation: Focus on theory, practice and education" 25 - 28th November 2009, Vienna, Austria. - Vienna : DAAAM International Vienna, 2009. - ISBN 978-3-901509-70-4, s. 0603-0604
- [3.] HORVÁTH, Š. MUDRIKOVÁ, A.: PPS Systems exploitation in area of production system. In: AMO Conference. - ISSN 1313-4264. - 10. International conference, 27 - 29 June 2010 AMO 10, 27 June - 01 July 2010 CEEPUS (2010), s. 1-6



ANNALS OF FACULTY ENGINEERING HUNEDOARA
– INTERNATIONAL JOURNAL OF ENGINEERING

copyright © University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei, 331128, Hunedoara,
ROMANIA

<http://annals.fih.upt.ro>