PAPER NAME

24.National Preceeding of MEMS_23.pdf

WORD COUNT

1295 Words

CHARACTER COUNT

7352 Characters

PAGE COUNT

4 Pages

FILE SIZE

722.3KB

SUBMISSION DATE

May 1, 2023 10:59 AM GMT+8

REPORT DATE

May 1, 2023 11:00 AM GMT+8

7% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

- 7% Internet database
- 0% Publications database
- Crossref database
- Crossref Posted Content database
- 0% Submitted Works database

Excluded from Similarity Report

- Bibliographic material
- Quoted material
- Cited material
- Small Matches (Less then 20 words)
- Manually excluded sources

The Function ZW Series Displacement Sensors for EtherCAT with Compact Sensor Heads- Sysmac® Automation Platform™ -

Badaruddin Anwar*
Student Bridging Course National Kaohsiung University of Applied Science
badaruddinanwar@yahoo.co.id

Keywords: Sensor, Ethercat, compact sensor heads

Abstract. The Excess ZW Series Displacement Sensors for EtherCAT with Compact Sensor Heads- Sysmac® Automation Platform™, Omron further expands the Sysmac lineup with the addition of new confocal fiber displacement sensors with EtherCAT interfaces to the ZW series released in February 2012. Connection with controllers and drive devices, such as servomotors, via ultra-high-speed open network EtherCAT enables flexible, high-speed machine control. The features of existing ZW series sensors that make them highly-suited to integration into devices have been retained including the following three important features; Ultra-compact and ultra-lightweight sensor head: 24 x 24 x 64 mm and only 105g, Sensor heads with low impact on operating environment: no noise or heat generation, Stable measurement from the same mounting position even for different materials. ZW series confocal fiber displacement sensors is controllers with EtherCAT and sensor heads (2 models with measuring distances of 7 mm and 30 mm). Ultra-compact sensor heads with measuring distances of 7 mm and 30 mm will also be released to enhance the sensor head lineup which currently features 20-mm and 40-mm models. With high-speed digital output through EtherCAT, it is possible to achieve a continuous output with a constant period as short as 500µs - eight times faster than Omron's previous models. This sensor head achieves separation for stable measurement of surface displacement of glass sheets as thin as 75µµm while boasting a compact size.

Introduction

The Sysmac automation platform*1 launch in July 2011, Omron further expands the Sysmac lineup with the addition of new confocal fiber displacement sensors with EtherCAT interfaces to the ZW series released in February 2012. Connection with controllers and drive devices, such as servomotors, via ultra-high-speed open network EtherCAT enables flexible, high-speed machine control. The Sysmac automation platform has reduced the need for wiring work and has enabled centralized management with one single EtherCAT network allowing connection of the NJ series machine automation controller with vision sensors, AC servomotors/drivers, inverters, and I/O terminals. The addition of the ZW series confocal fiber displacement sensors to the Sysmac automation platform makes machine construction more convenient than ever.

Theoretical Background

1. **The features of existing ZW series sensors that make them highly-suited to integration into devices have been retained including the following three important features:**
    - Ultra-compact and ultra-lightweight sensor head: 24 x 24 x 64 mm and only 105g
    - Sensor heads with low impact on operating environment: no noise or heat generation
    - Stable measurement from the same mounting position even for different materials
2. **The linking of height information and position coordinates helps to improve system productivity**
   EtherCAT can be used to connect to servo drives or encoder input slaves to quickly get the position coordinates and ZW displacement. The height information and XY position coordinates can be easily linked, which increases processing precision in machine control applications and facilitates

maintenance in the inspection applications, such as helping to isolate errors or carrying out alignment-drift monitoring management.

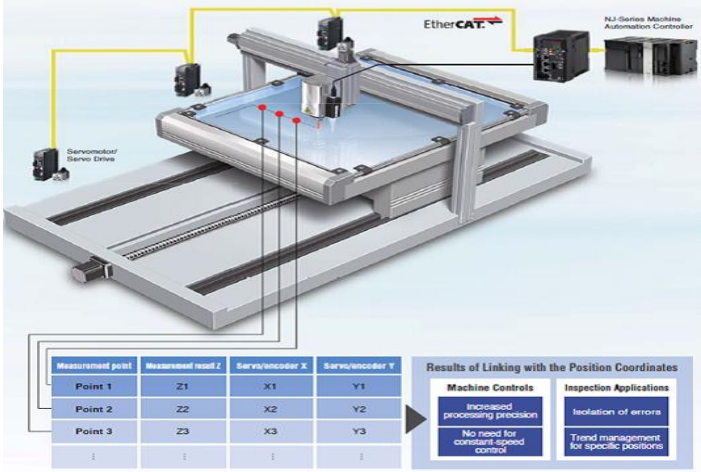

Fig 1. Information Coordinat Position

3. **Shorter machine take times with high-speed digital outputs.** Response times for measurement commands when using the kind of Ethernet or RS-232C generally used for digital (serial) outputs of displacement sensors are both inconsistent and slow, making them unsuitable for real-time control. With high-speed digital output through EtherCAT, it is possible to achieve a continuous output with a constant period as short as 500µs - eight times faster than Omron's previous models. Digital communications also provides great immunity to noise and this solves common problems with analog output methods, such as the inability to support long-distance transmissions and noise countermeasures.

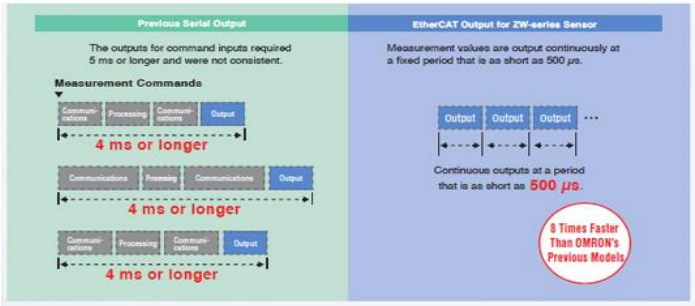

Fig 2. Output Measurement

4. **Improved measurement resolution for multipoint measurement applications** The high speed and concurrency provided by EtherCAT enable high-precision multipoint measurements with multiple sensors for displacement sensor applications. More than one sensor can perform synchronous measurements of the distance from the sensor to the target surface and the thickness of wide objects such as sheets of metal and glass by eliminating the previous time error in measurements between different sensors.

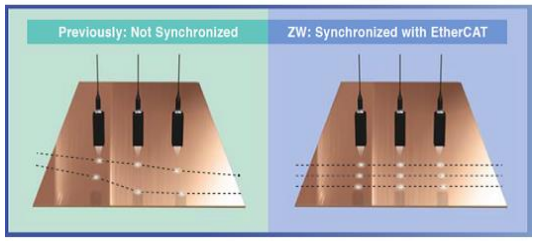

Fig 3. Measurement Resolution

5. **Tracing, adjustment, and simulation of machine movement.**

Sysmac Studio enables development, testing, and adjustment of devices connected via EtherCAT. The entire range of actions from sensing to motion control can be visually represented on screen and this reduces the man-hours required to set up systems and identify problems. There are also offline functions to debug signal control programming. It is also possible to simulate machine operation before actual installation onsite.

Fig 4. Tracing, adjustment, and simulation of machine movement

* As of November 2012, version 1.04 of Sysmac Studio does not have setting functions for the ZW-series Displacement Sensor and will be upgraded soon.

6. **Sensor head providing stable measurement of the thickness of thin sheets of glass**
The newly-released sensor head with a measuring distance of 7 mm can stably measure the thickness of thin sheets of glass, a feat not easily achieved with conventional compact sensor heads. To measure transparent glass, light waves received from the front and back surfaces of the glass must first be separated. This sensor head achieves separation for stable measurement of surface displacement of glass sheets as thin as 75µµm while boasting a compact size.

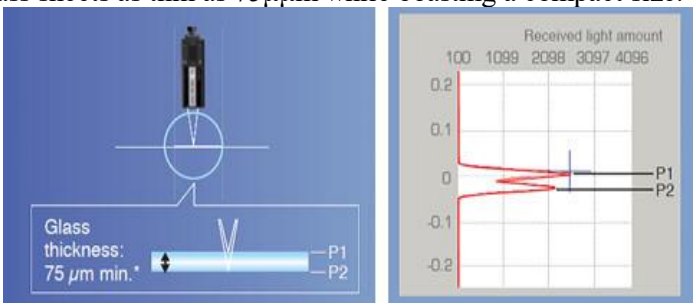

Fig 5. Sensor Head Providing Stable Measurement

ZW series confocal fiber displacement sensors is controllers with EtherCAT and sensor heads (2 models with measuring distances of 7 mm and 30 mm).

Tabel 1. Sensor Of Data

Sensor Controllers with EtherCAT		
	ZW-CE10T (New)	**ZW-CE15T (New)**
Input/Output type	NPN	PNP
External interface	EtherCAT, Ethernet , EtherNet/IPTM, RS-232C, Analog output, Parallel I/O	
Measurement cycle	500µs to 10ms	
Filtering	Median/average/differentiation/high pass/low pass/band pass	
Outputs	Scaling/various hold values/zero reset/logging for a measured value	
Number of configurable banks	Max. 8 banks	

Sensor Heads				
	ZW-S07 (New)	**ZW-S20**	**ZW-S30 (New)**	**ZW-S40**
Measuring range	7±0.3mm	20±1mm	30±3mm	40±6mm
Spot diameter	18 µm dia.	40 µm dia.	60 µm dia.	80 µm dia.
Static resolution	0.25µm	0.25µm	0.25µm	0.25µm
Linearity	±0.8µm	±1.2µm	±4.5µm	±7.0µm
External Dimensions	24mm x 24mm x 64mm			
Weight	Approx. 105 g			

Discussion

The newly-released sensor head with a measuring distance of 7 mm can stably measure the thickness of thin sheets of glass, a feat not easily achieved with conventional compact sensor heads, Sensor heads with low impact on operating environment: no noise or heat generation, Stable measurement from the same mounting position even for different materials.

Conclusion

ZW series confocal fiber displacement sensors is controllers with EtherCAT and sensor heads (2 models with measuring distances of 7 mm and 30 mm). Ultra-compact sensor heads with measuring distances of 7 mm and 30 mm will also be released to enhance the sensor head lineup which currently features 20-mm and 40-mm models. With high-speed digital output through EtherCAT, it is possible to achieve a continuous output with a constant period as short as 500µs - eight times faster than Omron's previous models. This sensor head achieves separation for stable measurement of surface displacement of glass sheets as thin as 75µµm while boasting a compact size.

Reference

1. http://www.omron.com/ retrieved January 13th, 2013.
2. http://www.newequipment.com/Main/Products.aspx?search=%E2%80%A2Sysmac%C2%AE%20is%20a%20trademark%20or%20registered%20trademark%20of%20OMRON%20Corporation%20in%20Japan%20and%20other%20countries%20for%20OMRON%20factory%20automation%20products. retrieved March 4th, 2013
3. http://www.omron.com/ retrieved January 12th, 2013. Headquartered in Kyoto, Japan, OMRON Corporation is a global leader in the field of automation. Established in 1933

7% Overall Similarity

Top sources found in the following databases:

- 7% Internet database
- Crossref database
- 0% Submitted Works database
- 0% Publications database
- Crossref Posted Content database

TOP SOURCES

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	**meterforsale.com** Internet	5%
2	**(3-18-16) http://202.232.86.230/products/family/3120/lineup.html** Internet	2%

Excluded from Similarity Report

- Bibliographic material
- Cited material
- Manually excluded sources
- Quoted material
- Small Matches (Less then 20 words)

EXCLUDED SOURCES

eprints.polsri.ac.id Internet	**91%**
omron.com Internet	**88%**
azosensors.com Internet	**24%**
ethercat.org Internet	**8%**