ISSN NO : 2770-0003
Date of Publication : 17-12-2021

# Analysis Of Moving Electromagnetic Screen Devices

**Boltaev Otabek Tashmuhammatovich,**
**Akhmedova Firuza Anvarovna,**
**Nafasov Nabijon Otabek ugli**
Tashkent State Transport University (Tashkent, Uzbekistan)

**Annotation:** The article discusses the analysis of moving electromagnetic screen motion converters, functional converters, computational converters, compensating converters. Further studies have also shown that devices can be used to analyze hypersensitivity due to their relatively low sensitivity, accuracy of static characteristics, and narrow line area, based on the need to focus on the development of moving screen devices with a wide range of accuracy and static characteristics.

**Keywords:** moving screen, shift converter, speed converter, functional converter, universal converter, multiplier.

Measure the true values of one or more controlled or controlled quantities in any automatic control and management systems and the converters required to convert these values to the signal transmitted through the control channel.

Movable electromagnetic screens and scattered parametric devices in automatic technological devices, electronically controlled machines, it has been widely used since the 1930s as a simple and high-reliability device in automatic lines, information and measurement processing centers, process control systems and automation of technological complexes. These devices have been extensively studied by leading scientists. For control systems to perform their functions perfectly and reliably, this system must be equipped with movable electromagnetic display devices.

Operation of technological devices in automatic control mode in systems using a moving electromagnetic screen device, high measurement accuracy, processing of measured data and interaction of software and computing devices in automation are ensured.

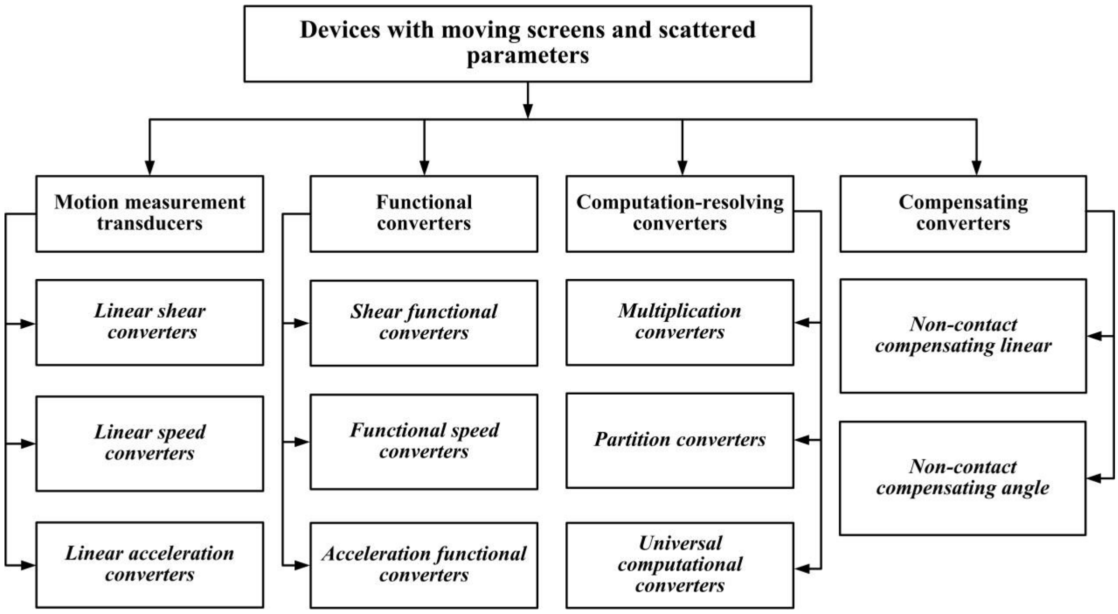
The following requirements apply to devices with movable electromagnetic screens and scattered parameters:

- operation with high dynamic accuracy (the resulting signal has minimal distortion);
- high static accuracy;
- high reliability in different conditions;
- production in small size and weight;
- sufficiently high sensitivity coefficient;
- the output signal must have sufficient power.

Depending on the function performed by the moving electromagnetic screen and scattered parametric devices, they are mainly considered as motion converters, functional converters, computational converters, compensating converters (Fig. 1).

Movable electromagnetic screens and scattered parametric motion transducers are mainly manufactured to convert shifts in the range of 1 micrometer to 20 mm to electrical magnitude.

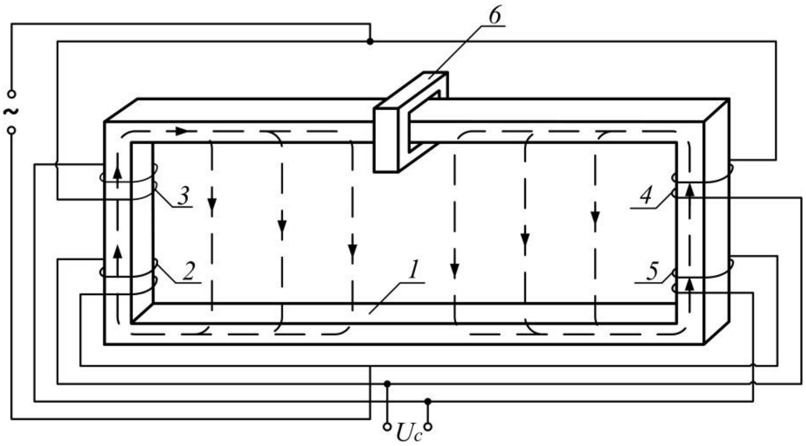
Below, motion converters are considered as multiple devices.




1- picture. Classification of devices with moving electromagnetic screens and scattered parameters

***Linear shear converters*** (Figure 2). One of the most widely used linear shear converters in control-measurement technique is Improved by O.V. Tarkhanov, 1 magnetic conductor of this converter is made in the form of "O" and on its opposite shoulders are placed 2, 3 and 4, 5 coils connected in the form of a bridge circuit.

Bundles located on the same bases (2, 3 and 4, 5) form the corresponding directional currents, and bundles located on different bases (2,4 and 3,5) form currents in opposite directions.



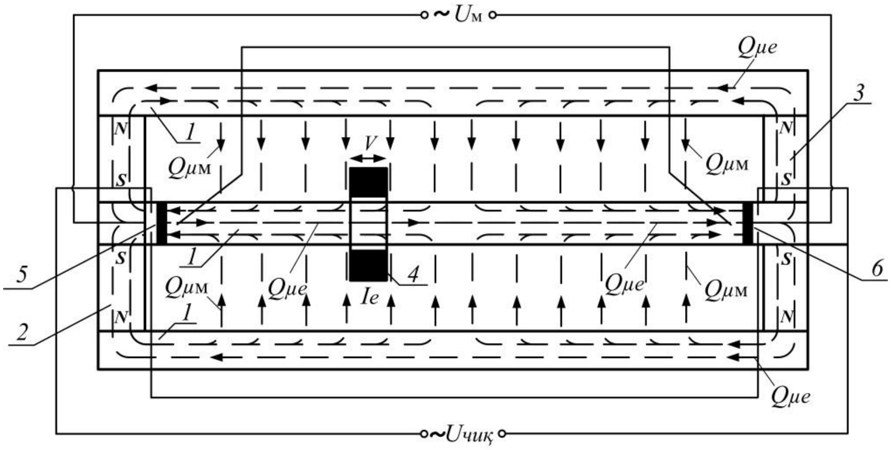

2- picture. Linear shear converter: 1- “O” shaped magnetic conductor; 2-3- and 4- 5-stalks; 6-electromagnetic screen.

When the moving electromagnetic screen 6 is located in the middle of the magnetic conductor, the magnetic resistances of the magnetic flux pathway occurring in windings 2, 3, and 4, 5 are mutually equal. As a result, the parts of the magnetic conductor where the windings are located are equally saturated and the windings have the same total resistance at the output of the converter $U_c$ the signal will not be available. As the electromagnetic screen moves to the right, the inductance of 2, 3 coils increases, while the inductance of 4, 5 coils decreases. As a result, the balance of the bridge circuit is disturbed and is proportional to the screen shift at the output of the converter $U_c$ an alarm is generated. When the moving electromagnetic screen moves from the middle position to the left, the switch is at the output $U_c$ the signal changes its phase to 1800.

ISSN NO : 2770-0003
Date of Publication : 17-12-2021

***Linear speed converters*** (Figure 3). One of the linear velocity converters used in the field of measurement techniques is M.F. Improved by Zaripov, according to which this converter differs from other speed converters by high measurement accuracy and versatility (the ability to obtain variable or constant voltage from the output part).

On the sides of this converter are placed 2 and 3 permanent magnets, 1 magnetic conductor made in the shape of “E”, placed in the transverse air gaps of the inner rod, consists of 5 and 6 Hall elements connected in series and opposite and having the possibility of receiving a useful signal from the output part.




3- picture. Linear speed converter: 1- magnetic conductor; 2 and 3 - permanent magnets; 4- moving electromagnetic screen; 5 and 6 - Hall elements.

The 2 and 3 permanent magnets between the rods form a permanent induction. The moving screen is in position 4 at the neutral point and the 5 and 6 Hall elements $U_{м}$ when connected to an alternating voltage source $Q_{\mu м}$ under the influence of a current magnetic field, a Hall voltage of the same value is generated in these Hall elements. The sum of the voltages at the output of the converter as the hall elements are connected in series and opposite to each other $U_{чиқ}$ is equal to zero.

When the moving screen moves away from the neutral point 4, it is proportional to the speed of movement of the screen under the influence of the source voltage $I_{e}$ a current is formed. The moving screen is connected along a magnetic conductor rod $Q_{\mu e}$ generates a magnetic flux. In this case, the magnetic flux on one side of the middle rod is added to the main magnetic flux $(Q_{\mu м} + Q_{\mu e})$, the second part is subtracted $(Q_{\mu м} - Q_{\mu e})$. As a result, the output of the Hall elements varies in proportion to the sliding speed of the screen $U_{чиқ}$ voltage is generated.

Hall elements are connected to a DC power supply to obtain a constant voltage proportional to the sliding speed of the moving screen from the output of the converter. Linear acceleration transducers (Figure 4).

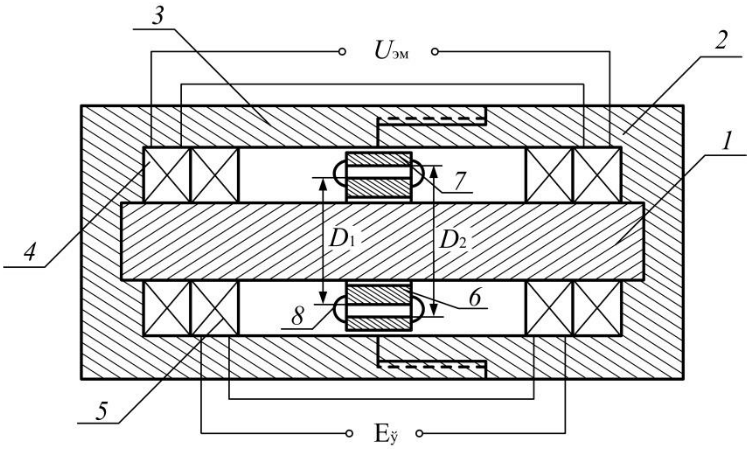
***Linear acceleration transducers*** used to study objects in motion has been studied and improved by M.F. Zaripov, O.V. Tarkhanov and V.I. Khmelnitsky and is widely used in instrumentation to measure the acceleration of moving objects. The converter consists of 2, 3 coaxial magnetic conductors with 4 excitation and 5 measuring coils placed on the sides.

The inner cylindrical ferromagnetic conductor 1 is equipped with two 6 and 7 moving screens connected to each other by 8 elastic elements.

When accelerators are affected by the moving screens 6, 7 of the converter, they move along a cylindrical ferromagnetic conductor 1. The resulting transducer is proportional to the acceleration in the measuring rings $E_{ў}$ EYUK occurs.

Since the masses of the screens placed in the ferromagnetic core are the same and the resistances are different, the value of the electromagnetic forces acting on them will also be different. As a result, the screens move from one axis to another and the elastic element is deformed.

ISSN NO : 2770-0003
Date of Publication : 17-12-2021




4- picture. Linear acceleration converter: 1 - internal cylindrical ferromagnetic conductor; 2,3 - coaxial magnetic conductor; 4 - excitation cap; 5 - measuring cup; 6.7 - moving screen; 8 - elastic element.

The moments that occur under the action of acceleration, an elastic element, and electromagnetic forces interact to create a fading vibration process, resulting in a further increase in the dynamic accuracy of the converter.

Movable electromagnetic display and scattered parametric functional converters are used in the functional imaging of shifts from 5 mm to 100 mm and speeds from 1 to 200 m/s.

Displacement functional converters are widely used in computational techniques as non-contact functional devices with an EMF output whose amplitude value does not change and whose phase changes in proportion to the displacement of the moving part.

*Functional speed converters* are widely used in information-measurement and computational techniques.

Acceleration functional converters are incorporated into contactless functional devices and are widely used in the field of computing.

*Computation-resolving converters* are used to process received signals in electrical and mechanical methods very quickly and with high accuracy.

Multipliers will be designed to receive an output signal by multiplying the input signal by a certain coefficient.

*The splitting devices* will be designed to mutually multiply and divide the two quantities given in the form of a shift, as well as to receive the output signal as EYuK.

Universal computational converters. These converters are widely used as functional modeling devices in automation and computing.

*Compensating converters* are widely used in contactless measurement and measurement techniques of alternating and alternating current in electrified railway power supply systems.

*Non-contact compensating linear* displacement converters belong to the measurement technique and are used in non-contact measurement of direct currents.

*Non-contact compensating angle* displacement converters. In most of the angular displacement compensating transducers, the use of linear displacement converters complicates the kinematic structure of this device.

Therefore, in order to reduce kinematic errors, angle-shifting moving screen contactless compensating converters have been developed.

*The transformers considered* are widely used in various fields of computational and measurement techniques. Further study of the magnetic systems of these converters, their analysis,

One of the most pressing issues today is the selection of the most optimal option for *the calculation of electrical and magnetic parameters* and the identification of deficiencies and the development of measures to eliminate the identified deficiencies.

During the analysis of these devices, it was found that they have relatively low sensitivity, accuracy of static characteristics, and a narrow linear field. Further research should therefore focus on the development of moving screen devices with high sensitivity, accuracy, and a wide linear range of static characteristics.

ISSN NO : 2770-0003
Date of Publication : 17-12-2021

**List of used references:**

1. Amirov S.F., Boltayev O.T., Akhmedova F.A. Calculation of Magnetic Chains with 1Mobile Screens // International Journal of Advanced Research in Science Engineering and Technology. India. - №6, Issue 5, May 2019 - pp. 9243-9245.
2. Amirov S.F., Boltaev O.T., Axmedova F.A. New created mathematical models of movable screens and a scatter parameter converters // Jour of Adv Research in Dynamical & Control Systems, Vol. 12, Special Issue-02, 2020. pp. 122-126.
3. Амиров С.Ф., Болтаев О.Т. и др. Исследование магнитных цепей новых преобразователей усилий. Автоматизация. Современные технологии. 2020. Т. 74. № 1. С. 24-26.
4. Boltaev O., Ahmedova F., Nurxonov B.R. Classification of magnetic chains with moving electromagnetic screens//Internauka. 2021. № 27-2 (203). P. 55-57.
5. Фрайден Дж. Современные датчики. Справочник. Серия: Мир электроники. – Москва: Техносфера, 2005. – 592 с.

6.Абдуллаев Я.Р. Теория магнитных систем с электромагнитными экранами.– М.: Наука, 2000. – 268 с.

7. А.с. № 454483. Акселерометр/ М.Ф. Зарипов, В.И. Хмельницкий, Ю.М. Цирульников, О.В. Тарханов, М.Кл. G 01р 15/08. - Опубл. 25.12.1974, Бюллетень изобретений, №47.
8. А.с. № 430322. Датчик линейной скорости/ М.Ф. Зарипов, Ю.М. Цирульников, О.В. Тарханов и др., М.Кл. G 01р 3/50. - Опубл. 30.05.1974, Бюллетень изобретений, №20.
9. Khasanov Nurmukhammad. Organizing and carrying out military-patriotic education in educational institutions of the republic of Uzbekistan. INTERNATIONAL ENGINEERING JOURNAL FOR RESEARCH & DEVELOPMENT. Vol. 5 No. Conference (2020): ICDSIIL-20
10. KHASANOV NURMUKHAMMAD. USING OF INTERACTIVE METHODS IN MOTHERLAND LESSONS. СТУДЕНЧЕСКИЙ. Учредители: Общество с ограниченной ответственностью "Сибирская академическая книга" eISSN: 2541-9412
11. Khasanov Nurmukhammad Khaydarali Ugli. FACTORS OF EDUCATING YOUNG PEOPLE IN THE SPIRIT OF PATRIOTISM. INTERNATIONAL JOURNAL ON HUMAN COMPUTING STUDIES. Volume: 03 Issue: 4 |Jun 2021.
12. Khasanov Nurmukhammad Khaydarali Ugli. THE IMPORTANCE OF MILITARY WILL IN THE PROCESS OF TRAINING OF RESERVE OFFICERS. Academicia Globe: Inderscience Research. Vol. 2 No. 04 (2021): academiascience.
13. Nurmukhammad, Khasanov. "Patriotism is a sign of spiritual maturity." ACADEMICIA: An International Multidisciplinary Research Journal 10.7 (2020): 585-588.
14. KHASANOV NURMUKHAMMAD KHAYDARALI UGLI. "The Role of Family, Community and Education in the Development of Patriotic Spirit in Youth." JournalNX 7.1: 311-314.
15. KHASANOV NURMUKHAMMAD KHAYDARALI. "Patriotism is a Holy Duty of the Uzbekistan Youth." JournalNX 6.07: 281-283.
16. KHASANOV NURMUKHAMMAD KHAYDARALI UGLI. PATRIOTISM IS A HOLY DUTY OF THE UZBEKISTAN YOUTH. JournalNX- A Multidisciplinary Peer Reviewed Journal ISSN No: 2581 - 4230 VOLUME 6, ISSUE 7, July -2020