Synchro transmitter and receiver pdf

Definition: Synchro is a type of converter that converts the angular position of the shaft into an electrical signal. It is used as an error detector and as a turning point sensor. The error occurs in the system due to incorrect hatching. The transmitter and transformer control are the two main parts of synchronization. Synchros Systems Types synchronous system has two types. They are a control type synchronization. The torque transmission synchronization type. Synchros Type Torque This type of synchros has a small torque output, and therefore they are used to run a very light load as a pointer. The Synchro control type is used to drive heavy loads. The synchronization system for synchronization management is used to detect errors in positional control systems. Their systems consist of two units. They Synchro transmitter Synchro synchro receiver always works with these two parts. A detailed explanation of the synchro transmitter and receiver is below. Synchro transmitter - Their design is similar to a three-thum alterator. The steel sator is made of steel to reduce iron loss. The stator slots for housing three phases of winding. The axis of the stator winding is kept on 120o separate from each other. The AC voltage is applied to the transmitter rotor and is expressed as Where Vr - r.ms.value of the rotor qc voltage - the frequency of the stator winding coil is connected in the star. The synchro rotor is a dumbbell in shape, and the concentric wound coil on it. The construction feature of the synchronization is shown in the picture below. Consider the voltage applied to the transmitter's rotor, as shown in the picture above. The voltage applied to the rotor induces magnetized current and alternating flow along its axis. The tension is induced by the stator winding due to the mutual induction between the rotor and the stator flow. The flow, bound in the windings of the stator, is equal to the slant of the corner between the rotor and the stator. The tension is induced into the winding stethor. Let vs1, Vs2, Vs3 be the voltage generated in the S1, S2 and S3 winding stetors, respectively. The image below shows the position of the rotor of the synchronous transmitter. The rotor axis makes the angle θr relative to the winding of the S2 stator. The image below shows three terminals winding the stent: a variation of the axis of the centrifier terminal relative to the rotor. When the angle of the rotor becomes zero, the maximum current is made in stator S2 foldings. The zero position of the rotor is used as a reference to determine the angular position of the rotor. The transmitter is released by the control transformer winding stator, which is shown in the image above. The current of the same and leak through the transmitter and control the synchro transformer. Because of the circulating current, the flow is set between the air gap flow of the control transformer. The flow axis of the control transformer and transmitter is aligned in the same position. The voltage generated by the rotor of the control transformer is equal to the angle between the transmitter's rotors and the controller. The tension is given as Where φ - an angular shift between the rotor a column of the transmitter and the controller. Φ - 90o axis between the transmitter rotor and the control transformer perpendicular to each other. The image above shows the zero position of the transmitter and receiver rotor. Consider the position of the rotor and the transmitter changes in the same direction. The angle θR deflects the transmitter's rotor, and the dispatcher's angle θC. The total angular separation between the rotors is Φ (90o - θR and θC) The strain of the Rotary Terminal Transformer Synchro is given as a slight angular shift between their rotor position given as a sin (θR θR - θC) - (θR - θC) When replacing the value of the angular displacement in the equation (1) we get a synchronous transmitter and control together for the signal. The voltage equation shown above is equal to that of the transformer rotor shaft and control transmitter. The error signal is applied to the differential amplifier, which gives input to the servo. The gear gear rotates the control transformer rotor Figure above shows the output of the synchro error detector which modulated the signal. The modulate wave above showed the innumerable between the position of the rotor and the carrier wave. Where Ks is the error detector. This article is about the transformer. For other purposes, see Synchro. The scheme of synchrony-transducer. The full circle represents the rotor. Solid bars represent the cores of the windings next to them. The power of the rotor is connected by slip rings and brushes presented by circles at the ends of the rotor winding. As shown, the rotor causes an equal voltage of 120 and 240 winding, and there is no voltage in 0 winding. Vex does not have to be connected to the overall lead of the stator star windings. A simple two-sync system. Synchronic (also known as selsyn and other brand names) is, in fact, a transformer whose primary connection can be changed by physically changing the relative orientation of the two windings. Synchro is often used to measure the angle of a rotating machine, such as an antenna platform. In its overall physical design, it is very similar to an electric motor. The primary winding of the transformer, fixed on the rotor, is excited that by using electromagnetic induction, causes voltages to appear between Y-bound secondary windings fixed at 120 degrees to each other on the sizer. The voltage is measured and used to determine the angle of the rotor relative to the stator. An image of a synchronous transmitter using synchronous systems were first used in the Control System of the Panama Canal in the early 1900s to transfer lock gates and valve stem positions, as well as water levels to control desks. A look at the description of the connection of the synchronized transmitter of the Fire Control System, developed during World War II, widely used synchros, to transmit angular information from guns and sights to the analog fire control computer, as well as to transfer the desired position of the gun back to the location of the gun. Early systems simply moved the indicator dials, but with the advent of amplidin, as well as motor powerful hydraulic servos, the fire control system could directly control the positions of heavy guns. Smaller synchrons are still used for remote drive of indicator sensors and as turning points sensors for aircraft control surfaces where the reliability of these durable devices is required. Digital devices, such as the rotating encoder, have replaced synchronization in most other applications. Selsyn engines were widely used in film equipment to synchronize film cameras and recording equipment, before the advent of crystal oscillators and microelectronics. Large synchronicity was used on naval ships, such as destroyers, to control the steering mechanism from the wheel on the bridge. There are two types of synchronous systems: torque systems and control systems. In the torque system, synchro will provide low power of mechanical power enough to dissolve the pointing device, actuate a sensitive switch or move light loads without increasing power. Simply put, the torque synchronization system is the system in which the transmitted signal does the job. In such a system, the accuracy of one degree is achievable. In the control system, synchro will provide voltage to convert to torque through an amplifier and servo. Control type synchronizations are used in applications that require large torques or high accuracy, such as subsequent links and servo error detectors, and automatic control systems (such as an autopilot system). Simply put, a control synchronization system is a system in which the transmitted signal controls the energy source that does the job. Very often, one system performs both torque and control functions. Individual units are designed to be used in torque systems or management. Some torque blocks can be used as control units, but control units cannot replace torque units. The Synchro A synchro functional categories will fall into one of eight functional categories. These are: Torque transmitter (TX) Entrance: Entrance: are located mechanically or manually with the information transmitted. Exit: An electric exit from the stent, identifying the position of the rotor supplied to the torque receiver, the torque differential transmitter, or the torque differential receiver, or the torque differential receiver. Control transmitter (CX) Entry: just like TX. Exit: The electric output is the same as the TX, but comes on transformer control or differential transmitter control. Torque differential transmitter (TDX) Entry: TX output applied to the stator; rotor, located in accordance with the number of TX data that needs to be changed. Exit: An electric output from the rotor (representing an angle equal to the algebraic amount or difference in the angle of the rotor position and angular data from TX) supplied to torque receivers, another TDX or a torque differential receiver. Control of the differential transmitter (CDX) Entry: just like TDX, but the data provided by CX. Exit: same as TDX, but only comes on transformer control or other CDX. Torque Receiver (TR) Entry: Electrical angular position data from TX or TDX comes in stator. Exit: The rotor takes a position determined by the electric input supplied. Torque differential receiver (TDR) Entry: Electrical data supplied from two TX, two TDX or one TX and one TDX (one connected to the rotor and one connected to the stent). Exit: The rotor accepts a position equal to the algebraic amount or the difference between two corner entrances. Transformer Control (CT) Entry: Electrical data from CX or CDX is applied to the stator. The rotor is positioned mechanically or manually. Exit: Electrical output from the rotor (proportionate to the sinus difference between the angular position of the rotor and the electric input angle. , synchros resemble engines, in that there is a rotor, a stethor, and a shaft. Usually slip rings and brushes connect the rotor with external power. The shaft of the synchronized transmitter rotates the mechanism that sends the information, while the shaft of the synchronization receiver rotates the dial or controls a light mechanical load. One- and three-piece units are common to use, and will follow the rotation of others when connected properly. One transmitter can rotate multiple receivers; If torque is a factor, the transmitter should be physically larger to source the extra current. In the movie lock system, a large motor-driven distributor can drive up to 20 machines, sound meters of footage and projectors. Synchros, designed for terrestrial use, are usually operated on 50 or 60 hertz (the frequency of the network in most countries), while for marine or aviation use, usually run at 400 hertz (frequency on board an electric generator controlled by engines). engines). Phase units have five wires: two to excite winding (usually line voltage) and three for output/input. These three buses on the other synchros in the system, and provide power and information to align the ramparts of all receivers. Synchronous transmitters and receivers should be powered by the same branch, so to speak; Network arousal sources must be consistent with the voltage and phase. The safest approach is to bus five or six lines from transmitters and receivers at a common point. Different types of selsins used in interconnected systems have different output voltages. In all cases, the three-thresh systems will handle more energy and work a little more smoothly. Excitement is often 208/240 v 3-phase power network. Many synchros work at 30 to 60 V V VOD as well. Synchronic transmitters are as described, but 50 and 60-Hz synchronous receivers require rotary shock absorbers to keep their shafts from oscillating with it (as with dials) or lightly loaded in high-precision applications. Another type of receiver, called the Control Transformer (CT), is part of the servo position, which includes a servo amplifier and a servo engine. The engine is directed to the CT rotor, and when the transmitter's rotor moves, the servo turns the CT rotor and mechanical load to match the new position. CTs have high-speed stents and draw much less current than conventional synchronization receivers when incorrectly positioned. Synchronous transmitters can also transmit synchronicity to digital converters that provide a digital representation of the angle of the shaft. Synchro variants of the so-called wiper synchronization use rotary transformers (which do not have magnetic interaction with a conventional rotor and stent) to feed the power of the rotor. These transformers have stationary primaries and rotating second. The secondary is somewhat similar to the coil of the wound with magnetic wire, the coil axis concentric with the rotor axis. The coil is the core of the secondary winding, its flanks are poles, and its connection does not change much depending on the position of the rotor. The primary winding is similar, surrounded by a magnetic core, and its final pieces look like thick washers. The holes in these final pieces are aligned with the rotating secondary poles. For high accuracy in fire control cannon and aerospace operations, so-called multi-stage synchronous data links have been used. For example, two-step communication had two transmitters, one of them rotated for one turn over the full range (such as a gun bearing), while the other rotated one turn for every 10 degrees of bearing. The latter was called 36-step synchronization. Of course, the train gears were made accordingly. At the receiver, channel 1X's error magnitude determined whether use a fast channel. A small 1X error meant that the 36x channel data was unambiguous. Once the servo receiver has settled, the fine canal usually retains control. Control. very important applications, three high-speed synchronous systems were used. So-called multi-speed synchronists have stents with many poles, so their output voltage goes through several cycles for a single physical revolution. For two high-speed systems, they do not require switching between shafts. Differential synchronizations are another category. They have three lead rotors and stents, as described above, and can be transmitters or receivers. The differential transmitter is connected between the synchronized transmitter and the receiver, and the position of its shaft adds (or subtract from, depending on the definition) the angle determined by the transmitter. The differential receiver is connected between the two transmitters and shows the amount (or difference, again, as defined) between the positions of the shaft of the two transmitters. There are synchro-like devices called transulators, somewhat like differential synchronic, but with three lead rotors and four lead stenters. The determination is similar to synchro, but has a stator with four leads, winding up being 90 degrees apart physically instead of 120 degrees. Its rotor can be synchronous or have two sets of windings 90 degrees apart. Although a pair of solvers could theoretically work as a pair of synchros, the permite used for calculations. A special T-connected transformer composition invented by Scott T with interfaces between permission formats and synchronous data; It was invented to connect the two-posicial accompatic power with three-factor power, but can also be used for accurate use. See also Amplidyne Rotary encoder Resolver RVDT Notes and Goethals, George W (1916). Panama Canal; Engineering treatise. A series of documents covering the technical problems associated with the construction of the Panama Canal - geology, climatology, municipal engineering; Dredging, hydraulics, power plants, etc., prepared by engineers and other professionals in charge of various industries and presented at the International Engineering Congress, San Francisco, California. New York: McGraw Hill. Naval munitions and artillery, Volume 1, 1957, U.S. Navy leadership, Chapter 10. MIL-HDBK-225A, Synchros. Description and Operation, March 25, 1991, Department of the Navy, Washington, D.C., Pages 1-2. MIL-HDBK-225A, Synchros. Description and Operation, March 25, 1991, Department of the Navy, Washington, D.C., Table 1, page 82. Links to AC Devices, Upson Previews, A.R.; Batchelor, J.H. (1978) (1965). A handbook on synchro-engineering. Beckenham: Muirhead Wazztric components. 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