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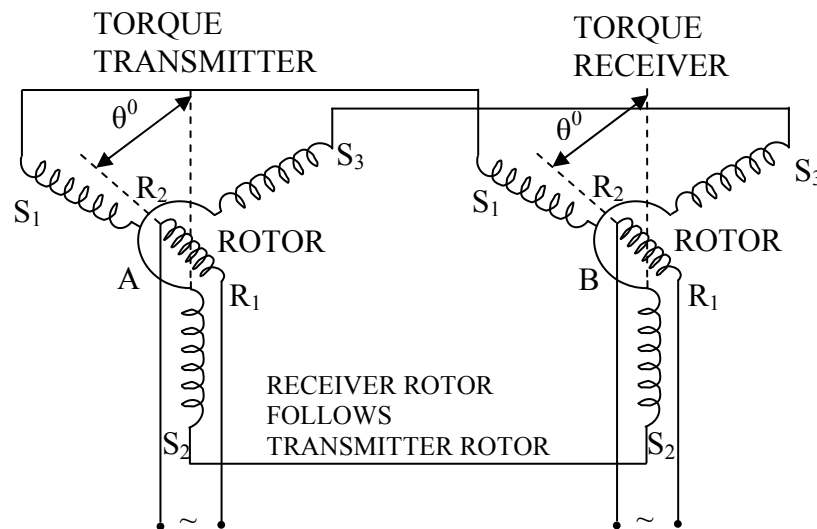
SYNCHRO

There are different types of Synchros of which APM manufactures the “Torque Synchros”, type APM-23TRX5. These are electromechanical devices resembling electric motors. Functionally, they resemble transformers whose primary to secondary magnetic couplings may be varied by physically changing the relative orientation of the two windings. By their inherent physical properties and mechanical & electrical designs, synchros make possible the accurate transmission and reproduction to a remote location of any data or information which can be converted to angular rotation.



CONSTRUCTION & WORKING:

Synchro is essentially a transformer, in which the coupling between the windings may be varied by rotating one winding. The fixed winding is wound in the iron slots of the laminated iron stack called stator, while the rotating winding is wound on a laminated iron stack, mounted on a shaft, forming the rotor. A Synchro transmitter consists of a single phase rotor magnetically coupled to a 3-phase Y-connected stator. When an ac voltage is applied to the rotor, voltages are induced in each of the stator phases. These induced voltages vary directly, as the sine of the angle between the actual rotor position and a zero reference position.



When the three stator leads of the transmitter 'A' are connected to the Y-connected stator of a second synchro 'B', these voltages produce a resultant stator field in the second synchro, having the same angular orientation with respect to its zero reference as the transmitter rotor. When the second synchro, 'B' has its single phase rotor winding connected to the same power supply that energizes the transmitter rotor, the rotor aligns itself to the same angle as the transmitter rotor. The synchro, 'B' is called a receiver. The transmitter and receiver are generally identical in construction.

PRINCIPLE APPLICATION:

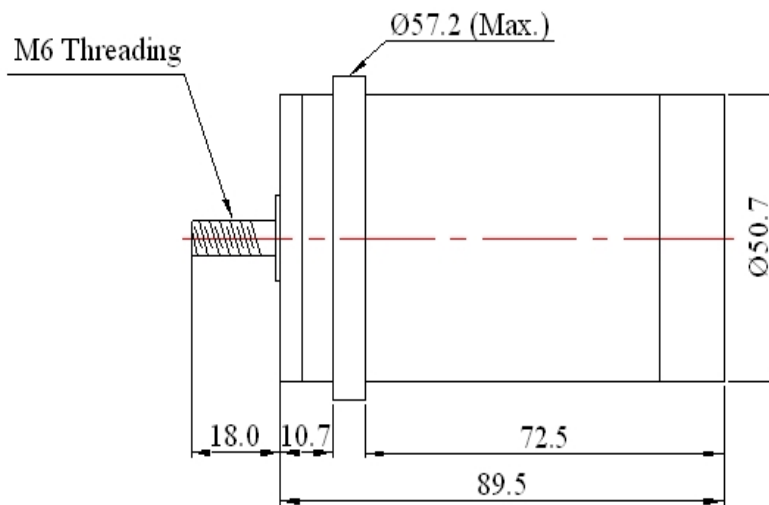
Torque Synchro System for remote indication will meet the demand for a simple, robust, and accurate method of transmitting functional information to a remote observation point. The receiver is connected only electrically to the transmitter and can be remotely located. With proper cables the distance between the transmitter and receiver can be as far as 5 KM. Pointer mounted on the receiver shaft will smoothly follow the motion of the transmitter shaft.

ADVANTAGES:

1. Sometimes more than one receiver can be driven from one transmitter for remote indication at more than one place.
2. Transmission is self synchronizing, i.e., the receiver rotor will align itself to the correct position as soon as power is switched on.
3. Neither the receiver nor the transmitter have any mechanical stops and can go through any number of revolutions.

ELECTRICAL SPECIFICATIONS:

Function	50 V, 50Hz, Size 23		115 V, 50Hz, Size 23	
	APM-23TRX5		APM-23TRX5	
Primary Voltage (nom)	50 V		115 V	
Primary Current (max)	475 mA		120 mA	
Primary Power (max)	7.2 W		3 W	
Transformation Ratio	0.75-0.81		0.70-0.76	
Electrical Error (max)	12 minutes		12 minutes	
Phase Shift	$(12\pm 3)^0$		$(8\pm 3)^0$	
Receiver Error (max)	90.0 minutes		90.0 minutes	
Torque Gradient (min)	6.0 g-cm/deg.		4.5 g-cm/deg.	
Weight (max)	600 g		600 g	
Impedance Z_{ro}	(Ω)	100-150	950-1350	
	(Deg.)	70-80	78-85	
Impedance Z_{ss}	(Ω)	30-45	170-250	
	(Deg.)	8-13	8-13	
DC Resistance	Rotor (nom)	23 Ω	145 Ω	
	Stator (nom)	35 Ω	180 Ω	

MECHANICAL SPECIFICATIONS:**APPLICATIONS:**

Owing to the simple construction, the torque-synchros provide the equivalent of a flexible mechanical connection between two or more remotely placed shafts and are often used in situations where purely mechanical links fail or are impractical.

1. Remote dial indication of angular position.
2. Remote positioning of low torque mechanisms.