



# SYNCHRO TRANSMISSION UNIT KW903-SX4



**The KW903-SX** connects to a gyro or electronic compass. It outputs a synchro transmission with ratios 1:1 to 360:1.

Applications include refitting a ship with a new gyro, whilst retaining the existing repeaters.

The majority of commercial synchro systems are 360:1 or 1 revolution per degree, but a number of other ratios exist such as 9:1, 36:1 and the KW903-SX may be switched to any of 8 ratios.

HEADING INPUT is from NMEA 0183 which modern gyros output as standard. If not then use an interface such as the KW950E or KW991, feeding its NMEA 0183 to the KW903-SX.

## **SYNCHRO OUTPUT.**

The KW903-SX output is generated by digital to analogue conversion with three power amplifiers. The synchro output rotates through 360 states per revolution, except for 180:1 and 360:1 where it is 100 states, with software control of the rotation speed. The ratio is set by DIP switch.

The KW903-SX generates an adjustable synchro voltage of maximum 45 volts line to line, so it will drive Anschutz repeaters (20/24v) and several others of nominal 50 volts. The KW903-SX will not generate 90v signals directly, so order an additional transformer adapter pcb to double the output voltage. The SX provides a reference output of nominal 55 or 110 volts at 50/60 Hz.

The KW903-SX provides a smoother rotation than the KW903-SP, and it interpolates the rotation to 2 decimal places of degrees. Gyros which output heading to more than one decimal place will cause the synchro to rotate very smoothly on the common 36:1 to 360:1 ratios. If the gyro or interface can only provide heading to 0.1 or 1/6<sup>th</sup> of a degree the rotation is bound to move in steps of 0.1 or 1/6<sup>th</sup> of a degree. The software controls the rotation speed to reduce jerk or oscillation of the synchro receiver. The accuracy at 1:1 ratio is not precise enough to replace the main synchro of a gyro compass, because the output is in steps of one degree.

## **SAFETY FEATURES**

The KW903-SX has a relay to operate an external alarm. We recommend that you fit a remote alarm unit of your choice. The KW903-SX can itself detect some faults on the output such as over-current but can not detect all possible fault conditions, and this is an intentional policy to simplify the design. Fit an external alarm such as the KW991 compass comparator or a KW950E to monitor the system.

## **CHECK OF EXISTING REPEATERS**

When replacing an old and worn out gyro it has sometimes been found too late that there are also old and worn out repeaters. Just one stuck repeater can ruin the whole system. One particular make of autopilot has proved very unreliable. You should advise the owner that all repeaters should be mechanically checked, including the synchro brushes. The KW903 setting to work instructions offer advice, but the warranty we give does not include for faulty repeaters.

## **TRANSFORMER ADAPTER.**

The adapter is mounted on the back plate alongside the main unit and connects by a ribbon cable. It doubles the phase voltage output.

## **SPECIFICATION**

**INPUT :** NMEA 0183 heading, magnetic, gyro, or satellite. Typical HEHDT or GPHDT.  
Option for speed input from log, scaling 40 knots per rev.  
May be programmed to accept other NMEA 0183 inputs such as pitch or roll.  
Send us the sentence you wish to use, along with its baud rate, for a quote.

**OUTPUT:** Reference output nominal 50/55v or 100/110v 50/60 Hz at 1.5 Amp.  
Switch selectable.

Synchro phase output adjustable 0 to 40 volts max at 1 Amp per phase.  
Synchro frequency is 50/60Hz, derived directly from the main supply.

Use additional transformer adapter for higher voltages output.  
Synchro output protected against over current.  
Reference is switch selectable nominal 55/110 volts.

Synchro precision 360 values per revolution at most ratios.  
That is 1 degree resolution at 1:1. 1/36<sup>th</sup> degree resolution at 36:1 etc.  
Precision 0.05 degree at 180:1. 0.01 degree at 360:1

**400 Hz OPERATION:** The KW903SX can be used on a 400 Hz supply, to special order.  
It then gives a 400 Hz synchro output.

**ALARM:** Relay energised when ok.  
Closes on power failure.  
Closes if alarm is disabled.  
Pulses when the KW903 detects gyro fault. Fit an external alarm.

**CONTROLS:** Main on/off switch.  
Ratio select DIP switch.  
Ratios 360:1, 180:1, 90:1, 36:1, 30:1, 10:1, 9:1, 1:1.  
Rotation rate and test select rotary switch.

**POWER:** Nominal 110/220 v 50/60 Hz at 600 VA.  
Earth is essential.  
Fused, switched and filtered.  
The filter may trip a domestic residual current breaker RCB.

**HOUSING:** Grey electrical cabinet with door for indoor bulkhead mounting.  
400 x 500 x 150 mm. Vented for convection cooling.

**NOTES:** The picture is the KW903-SX3, but is now replaced by the model SX4.  
Data sheet written and updated 24/10/2006 by Andrew Fairgrieve



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**AMI - GFV MARINE Ltd., Southampton, UK**  
TEL 44 (0) 23 8048 0450 - FAX 44 (0) 23 8048 0451/2  
**Email** – sales@amimarine.net    **Web** - <http://www.amimarine.net>