ScanRepeater™
NAVIGATION INSTRUMENTS

UNIVERSAL NMEA to STEP/SYNCHRO Converter & Drive Unit

Model SR03-01 Mk2

Save Time and Money

when you need to exchange your old gyrocompass.

With SR03-01 Mk2 there is no need to buy new repeaters and it is not required to reconfigure or replace; ARPA Radars, Autopilots etc. In addition you will save time and money on installation and cabling.

- *SR03-01 Mk2 converts serial NMEA HEADING data to Synchro signals (both Phase & Reference) and drives up to 12 Mechanical Synchro Repeaters.*
- *SR03-01 Mk2 converts serial NMEA HEADING data to Step-by-Step signals and drives up to 12 Mechanical 6 step per degree Repeaters.*
- *SR03-01 Mk2 has an approved HEADING MONITORING & ALARM function between Heading No. 1 and Heading No. 2.*
- *SR03-01 Mk2 connects to 24V DC Mains Power and generates all required Step & Synchro internally.*

scandinavian micro systems™

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Fort Lauderdale, FL - USA • Kolbotn (Oslo) - Norway • Hyderabad, AP - India

SR03-01Mk2

Universal NMEA to Step/Synchro Converter & Drive Unit

SR03-01Mk2 is a Universal NMEA to Step/Synchro Converter Unit for driving any type of Mechanical Repeater.

SR03-01Mk2 converts NMEA HEADING data to Step-by-Step or Synchro Signals and drives 12 Mechanical Step or Synchro Repeaters.

SR03-01Mk2 has a built-in and Approved Heading Monitoring Function with "Compass Compare Alarm". This function compares HEADING Input #1 and HEADING Input #2 and generates an Alarm if the difference exceeds the adjustable alarm-limit.

SR03-01Mk2 requires a 24V DC Power Source and NMEA HEADING Input signal(s). All other signals such as Phase and Reference Signals for driving Mechanical Repeaters are generated internally with the Correct voltages, Frequency and Gear-Ratio.

SR03-01Mk2 can also be used for driving Mechanical Speed Display Units and Mechanical Wind Indicators.

This ScanRepeater™ is a 3rd generation Lehmkuhl Repeater Unit; Built on 25 years of experience with units such as LR22 & LR40

POWER REQUIREMENTS

24V DC, +30%, -10%, 16 Amps.

PHYSICAL SPECIFICATION

Temp (operational): -15 deg C / +55 deg C
Physical Protection: IP23

HEADING INPUT

SR03-01 has two (2) NMEA input ports for receiving High Speed Heading Data.

Heading #1 and Heading #2, both meets IEC 61162-1 and IEC 61162-2.

HEADING MONITORING

A Heading Monitoring function, between Heading #1 and Heading #2 is included and Approved to ISO 11674 reg. 4.3.11.5.

This is also part of the Switchover Procedure and used if the Primary Heading fails.

If the Compass Compare function is activated there will be an alarm as soon as the difference between Heading #1 and Heading #2 is greater than a pre-set value.

The default pre-set Compass Compare value is 5 deg., but can be edited from 1 to 20 deg.

SWITCH-OVER

SR03-01 will always use Heading # 1 (Primary Heading), but can switch to the Heading # 2 (Secondary Heading), if Primary Heading fails or has an alarm.

The user is required to confirm the switch-over manually.

A separate Remote Control & Alarm Unit is available so this can be done from the Bridge. (Ask for SR03-03).

The Heading input selected is always used to generate the Synchro Output signal and it is also re-transmitted to the "outside world" as serial data in the NMEA format.

SR03-01 has a signal output for controlling a Switch-Over Relay.

PHASE-SYNCHORNIZING two UNITS

In some Navy applications it might be required to drive 1X & 36X repeaters with the same Reference Signal.

SR03-01Mk2 accepts an external Reference signal from another SR03-01Mk2 or form a Central Reference Source; Allowing you to Phase-Synchronize the Synchro Signals (Ref & Phase) of one or more SR03-01Mk2 units with other Synchro Signals onboard.

AUTO RECOVER

SR03-01 has Flash Memory & Battery Backup to retain critical information in case power is lost.

When Power is restored, the unit will automatically be configured correctly and align the Repeaters to the correct Heading

STEP-by-STEP OUPUT

From the Front-Panel Menu you can select ***Step-by-Step (6 step per degree) Output or Anschütz GyroStar (MicroStep) Output.***

For Normal 6 step per degree systems, you can select 24, 35, 50 or 70 Volt DC, and you can connect the Repeaters for ***Positive Ref*** or ***Negative Ref***.

SYNCHRO OUPUT

From the Front-Panel Menu you can select ***Synchro Output*** for driving any Mechanical Synchro Repeater, operating with any Voltage, Frequency or Gear Ratio (1X, 36X, 90X or 360X).

ALARM FUNCTIONS

SR03-01 has several alarm detection modes, the most important are:

- Missing/faulty Serial Data input
- Input Protocol Error
- Output Over-Load
- Lost Output Signals
- Internal Temperature is too high

ALARM DISPLAY - REPORTING

Alarms are displayed and reported as follows:

- The Main Control Panel has an LCD display that shows the alarm status and cause. In addition there is an Alarm Buzzer and a blinking Red Light and Re-Set Button.
- A dedicated Relay Contact output, with a Normally Closed (NC) and a Normally Open (NO) Relay Contact
- One full duplex RS422 serial data alarm channel, using NMEA $--ALR, and $--ACK sentences.
- A Remote Control Unit, SR03-03, is available. It can be console mounted on the Bridge and will display the SR03-01 status and Alarms.

SIGNAL PROCESSING

SR03-01 has a soft start control when the Synchro signals are engaged.

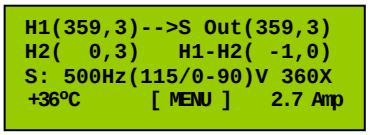
It also has a built in load test that will detect if a Mechanical Repeater is stuck and give a Warning (non-critical alarm).

SR03-01 employs various filtering techniques to achieve smooth rotation of the Mechanical Repeaters with a minimal heading delay.

CONTROL PANEL

The SR03-01 has a built in Control & Alarm Panel for easy Programming and Set-Up and includes an Alarm Buzzer and a Synchro Output ON/OFF button.

The LCD Display shows Unit Status, Alarms, Input Current and Temperature inside the unit.



Typical Status Display

In case of an alarm the relevant error information will be shown in the LCD display and the separate Red Alarm Lamp will be flashing and an audible Buzzer will sound.

SPECIAL 24V AC LAMP OUTPUT

A special 24V AC Lamp output signal can be connected for driving the light bulbs on certain Yokogawa Repeaters.

REMOTE CONTROL UNIT (SR03-03)

An optional Remote Control Unit; Model SR03-03 can be connected to the unit via a dedicated RS422 port.

With the SR03-03, the SR03-01 can be monitored from the Bridge and a manual Switch-over from Heading # 1 to Heading #2 can be performed in case of a Primary Heading failure.

APPROVALS

Approved by Det Norske Veritas:

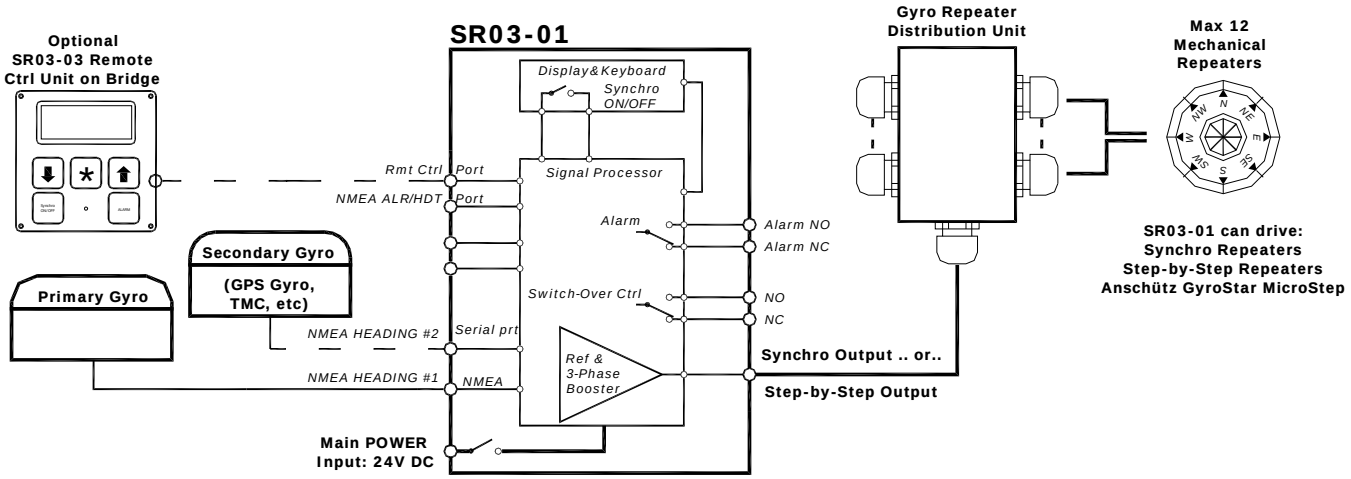
TYPE EXAMINED PRODUCT
Certificate No. A-11195

Tested and found to comply with

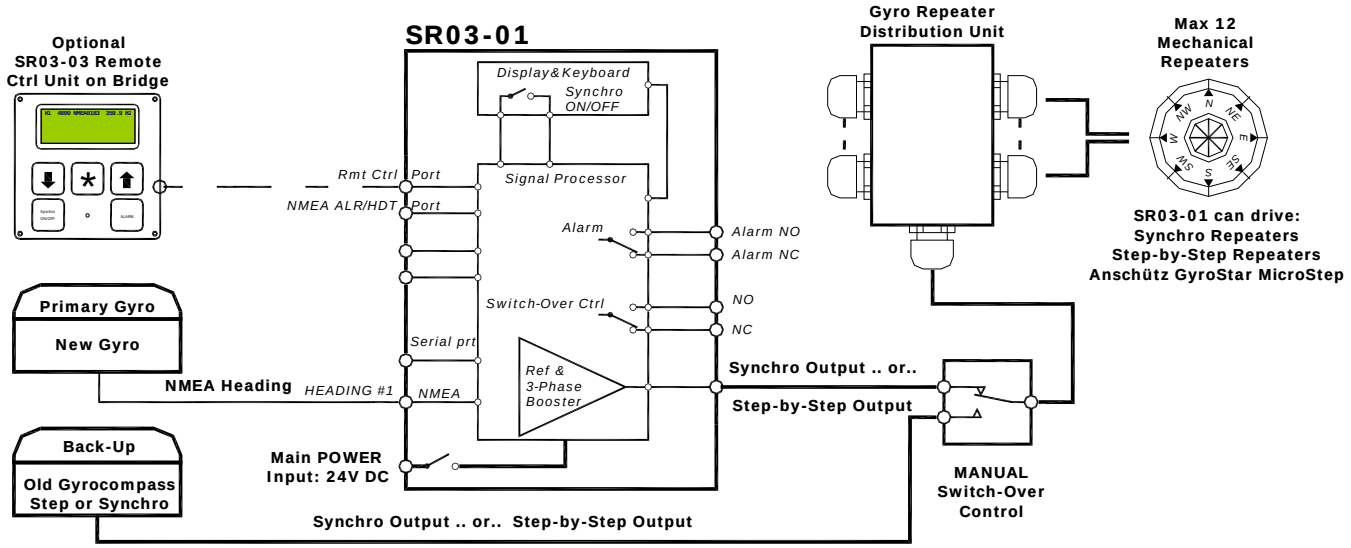
IMO Res. A694(17)
IEC 60945 Ed. 4 2002-08,
IEC 61162-1 Ed 3.0 (2007)
IEC 61162-2 Ed 1.0 (1998-09) (High Speed)
ISO 11674 reg. 4.3.11.5 (Heading Monitoring)

SR03-01Mk2

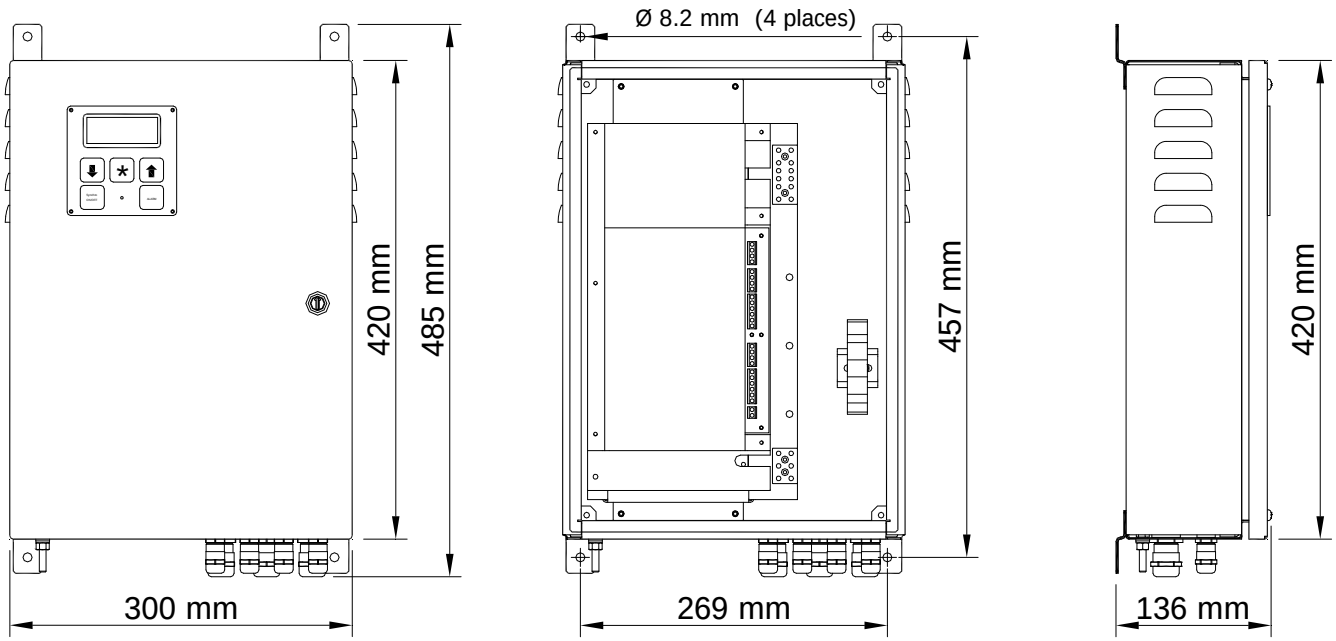
Universal NMEA to Step/Synchro Converter & Drive Unit



SYSTEM DIAGRAM: SR03-01 with Optional Secondary Gyro & Remote Control Unit



SYSTEM DIAGRAM: New Gyro with SR03-01 and Old Gyro as Spare & Remote Control Unit.



MECHNICAL LAYOUT & MOUNTING DIMENSIONS - for mounting use: M8 Bolts/ Screws

SR03-01Mk2

Universal NMEA to Step/Synchro Converter & Drive Unit

MAIN Technical Specification	
Supply Voltage	24 VDC (18 – 32 VDC), Max 16 Amp
Synchro Voltages	Ref: 1-110 V / Phase: 0-1 …. 0-90 V
Synchro Frequencies	50 / 60 / 400 / 500 Hz
Power Consumption	Max 40 - 250 W, depending on load
Tested and Approved to	IEC 60945
Environmental Specification	
Environmental	Operating: - 15 °C to + 55 °C
	Storage: - 20 °C to + 70 °C
Physical Specification	
Physical Enclosure	Aluminum Enclosure / IP 23
Physical Net Size	W x H x D: 300 x 420 x133 mm.
Physical Max Size	W x H x D: 300 x 483 x136.5 mm.
Physical Mounting	Use 4 x M8 Bolts.
Mounting DIM	Center-to-Center 269 mm x 457 mm
Net / Gross Weight	9,0 kg / 10.0 kg
Physical SERIAL DATA Ports	
Heading 1 port	IEC 61162-1, IEC 61162-2
Heading 2 port	IEC 61162-1, IEC 61162-2
Remote Control Unit	Full Duplex RS422, RX+ & RX- (Opto-isolated) + TX+ & TX- RS422 Driver.
Centralized Alarm Monitoring (CAM)	Full Duplex RS422, RX+ & RX- (Opto-isolated) + TX+ & TX- RS422 Driver.
HEADING Data INPUT Formats / Protocols	
NMEA sentences	$-THS, $-HDT, $-HDG, $-HDM, $PPLAN
Anschütz	ST20/22 Course-Bus protocol
Tokimec / Robertson	RGC11 protocol
Lehmkuhl / Robertson	SKR80 / LR22 / LR40 protocol
BAUD RATE on each Port is individually selectable	
Baud Rates	4800, 9600, 19200 & 38400 b/sec
Heading IN Refresh Rate	1 time per sec – to max 50 times per sec.
NEMA OUTPUT / HEADING Data OUTPUT	
NMEA sentence	$HEHDT, x.x, T,*h<CR><LF>
Heading OUT Refresh Rate	10/sec (4800/9600/19200), 50/sec (38400) (High Speed NMEA)
ALARM OUTPUT RELAY	
Relay Alarm Outputs	2 x 1 Amp Relay Contacts (NO / NC)
ALARM COMMUNICATION Control	
Serial Alarm - NMEA	RS422 Full Duplex $--ALR, and $--ACK

STEP-by-STEP OUTPUT SPECIFICATION	
STEP Reference	Positive or Negative Reference (R+ or R-)
6 STEP per degree	S1, S2, S3; 24V, 35, 50, 70 VDC step
Follow UP (ROT)	Max. 20 deg / sec
Angular Accuracy	1/6 degree (less that 0.02 deg phase jitter).
Step Signal Load	Max 150W (approx 12 Mechanical Repeaters)

SYNCHRO OUTPUT SPECIFICATION	
Synchro Reference	R1, R2: Adjustable from 1V to 110V AC
Synchro Phases	S1, S2, S3: Adjustable from 0-1 to 0-90 VAC
Synchro Frequency	Select: 50Hz, 60 Hz, 400Hz, or 500 Hz
Synchro ROT	Max. 20 deg / sec
Synchro Load	Max 150W (approx 12 Mechanical Repeaters)
Angular Accuracy	1X Accuracy: Better than +/- 0.4 deg (Typ +/- 0.2)
24V AC LAMP-DRIVE CIRCUIT	
24 V AC Lap Voltage Max LOAD: 60 W *Special connetion*	A special Lamp voltage is available for driving the light in some Mechanical Repeaters (Typical Yokogawa/ Hokushin Repeaters

SYNCHRO Pre-PROGRAMMED Combinations

Mfg	*Gear*	*Freq. Hz*	*Ref / Phase Volt*
---	36/90/360X	50	50V / 0...20 V
---	36/90/360X	60	60V / 0...24 V
---	36/90/360X	50	50V / 0...68 V
---	36/90/360X	60	60V / 0...82 V
---	1/36/90/360X	50	96V / 0.. 75 V
---	1/36/90/360X	60	115 V / 0..90 V
---	1/36/90/360X	400	115 V / 0..90 V
---	36/90/360X	500	115 V / 0..52 V
Synchro Speed Repeater	***-10 to +90 knots***	***400***	***115 V / 0..90 V***

Typical Selection by Synchro Manufacturers

Mfg	*Gear*	*Freq. Hz*	*Ref / Phase Volt*
AMUR	360X	500 Hz	115V (0 to 52V)
AMUR	360X	60 Hz	115V (0 to 52V)
Anschütz	360X	50/60 Hz	50/ 60 (0 to 20/24)
Hokushin	360X	50/60 Hz	50/ 60 (0 to 68/82)
	Separate 24VAC is provided for light in repeaters		
Kurs	360X	50/60 Hz	115V (0 to 52V)
Microtecnica	360X	50/60 or400 Hz	96/115 (0 to 75/90)
Microtecnica DC	**360X**	**50/60 Hz**	**96/115 (0 to 75/90)**
Plath	360X	50/60 Hz	50/ 60 (0 to 68/82)
Sperry	360X	50/60 Hz	96/115 (0 to 75/90)
Tokimec	360X	50/60 Hz	96/115 (0 to 75/90)
Tokimec	**90X**	50/60 Hz	96/115 (0 to 75/90)
Yokogawa	360X	50/60 Hz	96/115 (0 to 75/90)
Yokogawa DC	**360X**	**50/60 Hz**	**96/115 (0 to 75/90)**

STEP-by-STEP Pre-PROGRAMMED Combinations

Mfg	*Gear*	*Freq. Hz*	*Reference*
--	6 step / deg	DC	24VDC (+REF or –REF)
	6 step / deg	DC	35VDC (+REF or –REF)
	6 step / deg	DC	50VDC (+REF or –REF)
	6 step / deg	DC	70VDC (+REF or –REF)
Anschütz St14 (GyroStar)	*MicroStep*	DC	+/- 12V DC step signals

DEALER INFORMATION: