

# Navigational Echo Sounders & Speed Logs



# SKIPPER

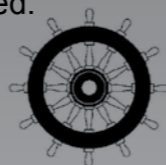
Version 1.19

SKIPPER was established as a brand in 1973 by SIMRAD. In 1984 SKIPPER became an independent Norwegian owned company, and started to convert from a trading to a production company.

Today more than 90 % of all products are produced by SKIPPER.

SKIPPER is situated in Oslo, Norway, in modern facilities with production, training, warehouse and office at the same location. This makes SKIPPER a flexible and reliable supplier of navigational electronics.

SKIPPER Electronics AS is ISO 9001:2008 certified, and all the navigational electronics is IMO Wheelmarked.



SKIPPER Electronics AS manufactures marine electronics for the merchant fleet as well as for fishing and navy purposes. Our design is based on experience, research and traditions.

Our products are known worldwide for reliability, quality, sophistication and good value for money.



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## SKIPPER GDS101



The SKIPPER GDS101 is one of the markets most sold Navigational Echo Sounder. The Echo Sounder graphics are continuously shown on the LCD along with relevant navigational details. External connectors are provided for printer, VGA and NMEA in/output.

### Highlighted features as:

- NMEA 0183
- 38, 50 and 200 kHz transducer options
- Colour LCD 10.4" display
- Alarm functions
- Memory functions
- IMO Wheelmark

The SKIPPER GDS101 contains history memory that stores depth, time and other available navigation data continuously for the preceding 24 hours. This and current information can also be printed in hard copy.

The GDS101 has 3 transducer connections as standard with resonant frequencies of 38, 50 and 200 kHz. Only one can be shown on the display at a time, by choosing the corresponding transducer in the menu. A wide range of transducers are available to fit vessel requirements.

All IMO requirements are met or exceeded and most standard interfaces are available.

### Specifications for the GDS101 (Part no. EN101C-SA):

<b>Power Supply</b>	AC: 115 V/ 230 V 50/60 Hz. DC: 20-32 V Auto Switch over	<b>Outputs</b>	Trigger and bottom-pulses
<b>Power Consumption</b>	50 W at 24 V, 70 W at 115 V or 230 V		Alarm relays/NMEA Alarm
<b>Display</b>	Night/Day (10.4") Colour LCD screen with adjustable back-light		Analogue 4-20 mA, and 0-10 V for depth
<b>Mounting Dimensions</b>	300 x 320 mm		Detected video
<b>Printer</b>	External printer		NMEA 0183
<b>Memory</b>	24 Hour storage.		External VGA
<b>Ranges</b>	Selectable from 0-1600 m	<b>Inputs</b>	Printer
<b>Measuring Accuracy</b>	Error less than 1 %		100/200 pulse input for speed
<b>Frequencies</b>	Standard, 38, 50 and 200 kHz, selectable from keyboard. (Other freq. on request)	<b>Languages</b>	NMEA 0183 for speed, position, heading and time
<b>Output power</b>	Up to 1 kW, adjustable		English, French, German, Spanish, Russian, Norwegian
<b>Depth alarms</b>	Deep and shallow water alarms	<b>Options</b>	Remote depth indicators
<b>Calendar / Clock</b>	Year-month-day / Hours-min. 24 hour system		Remote keyboard. Printer
		<b>Classification</b>	Made to IMO performance standard
		<b>Service</b>	Available in most major harbours, world-wide through extensive dealer network

## SKIPPER GDS102



The SKIPPER GDS102 is a dual channel Navigation Echo Sounder with a large, colour LCD display. The Echo Sounder graphics are continuously shown on the LCD along with relevant navigational details. External connectors are provided for printer, VGA and NMEA in/output.

### Highlighted features as:

- NMEA 0183
- Transducers between 10-49 kHz and 50-265 kHz can be connected.
- Colour LCD 10,4" display
- Two frequencies can be simultaneously shown on the display
- Alarm functions
- Memory functions
- IMO Wheelmark

The SKIPPER GDS102 includes history memory storing depth, time and other available navigation data continuously for the preceding 24 hours. Information can also be printed in hard copy.

GDS102 is prepared for connection of 1 or 2 transducers with a resonant frequency in the range of 10-265 kHz. A wide range of transducers are available to fit the vessels requirements. This includes both high and low frequencies, for depth recordings towards 5000 m!

### Specifications for the GDS102 (Part no. EN102C-SA):

<b>Power Supply</b>	AC: 115 V/230 V 50/60 Hz DC: 20-32 V Auto Switch over	<b>Calendar / Clock</b>	Year-month-day / Hours-min. 24 hour system	
<b>Power Consumption</b>	50 W at 24 V, 70 W at 115 V or 230 V	<b>Outputs</b>	Analogue 4-20 mA, and 0-10 V for depth	
<b>Display</b>	Night/Day (10.4") Colour LCD screen with adjustable backlight		NMEA 0183	
<b>Mounting Dimensions</b>	300 x 320 mm		Alarm relays/NMEA Alarm	
<b>Printer</b>	External printer		External VGA	
<b>Memory</b>	24 Hour storage	<b>Inputs</b>	Printer	
<b>Ranges</b>	Selectable from 0-5000 m		NMEA 0183 for speed, position, heading and time	
<b>Measuring Accuracy</b>	Error less than 1 %.	<b>Languages</b>	English, French, German, Spanish, Russian, Norwegian	
<b>Frequencies:</b>		<b>Option</b>	Remote depth indicators	
<b>Channel 1</b>	From 50 kHz to 265 kHz, 1 kHz step	<b>Classification</b>	Remote keyboard. Printer	
<b>Channel 2</b>	From 10 kHz to 50 kHz, 1 kHz step		Made to IMO performance standard	
<b>Output power</b>	Up to 2 kW, adjustable		<b>Service</b>	Available in most major harbours, world-wide through extensive dealer network
<b>Depth alarms</b>	Deep and shallow water alarms			

# Transducer and sensor location

## SKIPPER IR 301 Digital Depth Repeater



The SKIPPER IR 301 is a remote depth indicator using NMEA signals. It gives accurate digital depth indication based on signals from the SKIPPER ED165, GDS101 or GDS102 Echo Sounders. SKIPPER IR 301 can also be used with Echo Sounders from other manufacturers, when these have NMEA 0183 output.

**Highlighted features are:**

- Depth indication
- Alarms
- Shows position of transducer in use
- Bracket or panel mounting

GDS101: The IR 301 will indicate the position of selected transducer

GDS102: The IR 301 will indicate position of primary channel

Brightness is adjusted on the front panel, or from a remote dimmer control.

**Specifications for the IR 301 (Part no. ENIR301-SA):**

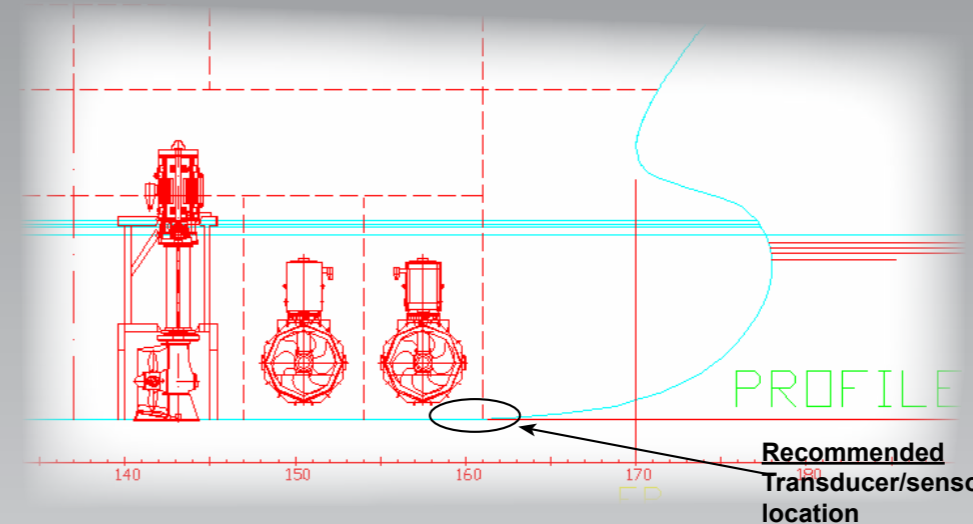
Power Supply	DC: 10-40 V
Power Consumption	3 W
Display	7 segment. 20 x 11 mm digital readout.
Mounting Dimensions	124 x 124 mm cut out for panel mounting. Bracket mounting included.
Front plate	144 x 144 mm to DIN standard
Depth	59 mm
Weight cabinet	1 kg
Outputs	1 x NMEA 0183
Inputs	NMEA 0183
	Remote dimmer input (Part no. IR30DIM)
Classification	IP 56
Service	Available in most major harbours, world-wide through extensive dealer network.

### Echo Sounder transducer location

There is always uncertainty in placing the transducer in the vessel. SKIPPER products have several different mounting options; Tank (Ice protected, aluminium and steel), Sea Valve for single and double bottom. Ice protection for Sea Valve is also available.

Feel free to contact SKIPPER for a recommendation for the transducer placement.

When installing two different transducers, we recommend to install the high frequency transducer (200 kHz) aft in the vessel and the lower frequency transducer (50 kHz) in the forward part of the vessel. The aft transducer will normally work only at low speeds due to aeration.



The mounting position of these different Tanks or Sea Valves are usually the same. The most important parameter is to place the transducer in a position where there is a minimum amount of aeration in the waterflow passing the hull of the ship in the full speed range of the vessel. The transducer should therefore be mounted on a flat, horizontal surface on to the hull, as low as possible, and preferably in the front of the ship, where the forward transom is reaching down to the water level (see figure).

The result of the placement of the transducer can only be recommended, and it is not possible to guarantee the correct position, even on vessels of the same design from the same yard.

It is always recommended to place the transducer in a dry compartment, for easier maintenance of the sensor, especially when mounted in Sea Valve.

In some cases there may be an option to place a special hull fitting for the transducer in order to avoid the air bubbles.

### Speed Log sensor location:

The same basic rules are true when mounting the sensor for Doppler Speed Logs. Air bubbles should be avoided.

The sensor placement for the EML is not that critical because this sensor uses the electromagnetic field in order to measure the speed of the vessel. However EML should be placed away from any object that can interfere with a linear water flow.

It is never recommended to place Speed Log sensors aft in any vessels.

When installing both Echo Sounder transducer and Speed Log sensor, place the Speed Log sensor forward of the Echo Sounder transducer when using a Doppler Speed Log. The distance between the Echo Sounder Transducer and the Speed Log Sensor should be minimum 2 m.

# Transducers for Echo Sounders



## 24 kHz Transducers (ETN024T and ETN024G)



The 24 kHz transducer is a ceramic type. It has a beam angle of 20 degrees, and a 40 m cable length. The fittings for the ETN024T transducer is ETNSTCLF (Steel Tank) or ETNSTCILF (Ice Tank). When using a Sea Valve (SB-200-SA) the correct transducer part no. is ETN024G. The transducer includes a junction box and mounting materials.



## 38 kHz Transducers (ETN038T and ETN038G)



The 38 kHz ceramic transducer has a beam angle of 16 degrees, and a 40 m cable length. The ETN038T can be mounted in the ETNSTCLF (Steel Tank) or ETNSTCILF (Ice Tank). The ETN038G transducer can be mounted in the SB-200 (Sea Valve). The transducer includes a junction box and mounting materials.



## 50 kHz Transducers



The 50 kHz ceramic transducer has a beam angle of 33 degrees. There is a choice of two different cable length with the 50 kHz transducer, namely 25 and 40 m.



Transducer	Cable length (m)	Beam (degrees)	Installed in
ETN024T	40	20	ETNSTCLF
ETN024G	40	20	SB-200-SA
ETN038T	40	16	ETNSTCLF
ETN038G	40	16	SB-200-SA
ETN050T	25	33	ETNST and ETNSTC
ETN050XT	40	33	ETNST and ETNSTC
ETN050G	25	33	SB-100-SA, SB-100-SB, DB-100-SA and DB-100-SB Sea Valves.
ETN050XG	40	33	SB-100-SA, SB-100-SB, DB-100-SA and DB-100-SB Sea Valves
ETN050BEL	25	33	ETNSLJB Sea Valve (No junction box included) and ETNSTCI
ETN050BELX	40	33	ETNSLJB Sea Valve (No junction box included) and ETNSTCI
ETN050TA	25	33	ETNALC Aluminium Tank
ETN050XTA	40	33	ETNALC Aluminium Tank

The transducer includes a junction box and mounting materials.

## 200 kHz Transducers



The 200 kHz ceramic transducer has a beam angle of 6 or 10 degrees depending whether, it is 100 mm (6 degrees) or 50 mm (10 degrees) in diameter.

There is a choice of two different cable lengths (25 and 40 m) and two different diameters (5 cm and 10 cm) with the 200 kHz transducer:

ETN200S(X)T



ETN200S(X)G

Transducer	Cable length (m)	Beam (degrees)	Diameter (cm)	Installed in
ETN200T	25	6	10	ETNST and ETNSTC
ETN200XT	40	6	10	ETNST and ETNSTC
ETN200ST	25	10	5	ETNST and ETNSTC
ETN200SXT	40	10	5	ETNST and ETNSTC
ETN200SG	25	10	5	SB-100-SA, SB-100-SB, DB-100-SA and DB-100-SB Sea Valves
ETN200SXG	40	10	5	SB-100-SA, SB-100-SB, DB-100-SA and DB-100-SB Sea Valves
ETN200FS	25	10	5	ETNSLJB Sea Valve (No junction box included) and ETNSTCI Ice protected Tank
ETN200FSX	40	10	5	ETNSLJB Sea Valve (No junction box included) and ETNSTCI Ice protected Tank
ETN200STA	25	10	5	ETNALC Aluminium Tank
ETN200SXTA	40	10	5	ETNALC Aluminium Tank

The transducer normally includes a junction box and mounting materials.



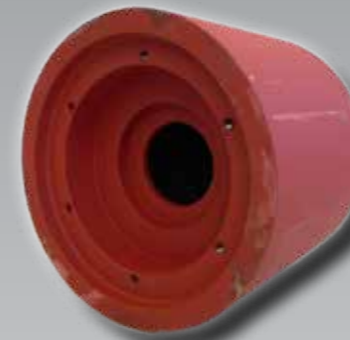
ETN200(X)T

## Sea Valves and Tanks for Echo Sounders

The bottom parts are needed in order to fit the transducers into the hull of the ship. The bottom parts delivered by SKIPPER are approved by Det Norske Veritas (DNV) and Germanischer Lloyds (GL) as standard. It is also possible to get approval by other classification authorities on request.

SKIPPER always recommends to install the transducers into Sea Valves. It is then much easier to change the transducer, and to maintain and clean the transducers regularly without entering any dry-dock or using divers. The installation of a tank will require installation of cable pipes above load water line. This is time consuming, costly, and, when everything is taken into consideration, normally the installation of Sea Valve will often be the cheapest option for installation.

### Standard Tank (ETNST)



Our standard tank is delivered with a special red coating in order to protect the tank during transport and storing. The tank is made of durable approved steel in order to withstand the harsh environment it is exposed for.

There are several transducers that fits into this tank. Please see the section for transducers.



**Combo Tank (ETNSTC)**

The Combo Tank is similar to the Standard Tank, the difference being a flange that is installed inside in order to fit various transducers and sensors. The red coating is the same as for standard tank as well as the steel.



**Ice protected Tank (ETNSTCI)**



The ice protected tank is, as described by the name, made in order to protect the transducer from ice in arctic sea waters, or ships likely to “beach” the vessel, like landgoing military vessels. The tank is similar to the Combo Tank, the difference being an “acoustic see through” plate placed in front of the transducer. The tank is filled with water and the cable pipe extended above the load water line as well as for the Standard and Combo Tanks.

The ice protected tanks include all the fittings for the transducers and a junction box in order to extend the cable.

This tank is required for the NAUT-OSV class if a Sea Valve is not used.

**Aluminium Combo Tank (ETNALC)**

The Aluminium Combo Tank is made in order to fit the 50 and 200 kHz transducer, together with our speed log sensors. This tank is ideal for mounting in aluminium hulls or to be moulded into composite hulls. The aluminium tank is not DNV certified and will need to be approved with the hull after installation.



**100 mm Sea Valve for single bottom (SB-100-SA)**



The SB-100-SA is the 100 mm bronze Sea Valve for SKIPPER transducers. Watertight cable piping is not needed for the cabling when using Sea Valves. The Sea Valve is delivered complete and partly assembled for shipment. A 0.5 m extension tube is delivered with the Sea Valve in order to lower the transducer into the Sea Valve, and keep it in correct position.

**100 mm Sea Valve for double bottom (DB-100-SA)**

If the ship comes with double bottom, or the valve needs to be moved away from the hull, the DB-100-SA is needed. This is a special designed Sea Valve for double hull configuration. As seen on the illustration, it is delivered with a flange that needs to be welded on the outer hull. The Sea Valve is installed inside of the inner hull, and is connected with the flange by use of a intermediate pipe (yard supply because of difference in interhull distance).



**100 mm Sea Valve for single bottom (SB-100-SB) Recommended!**



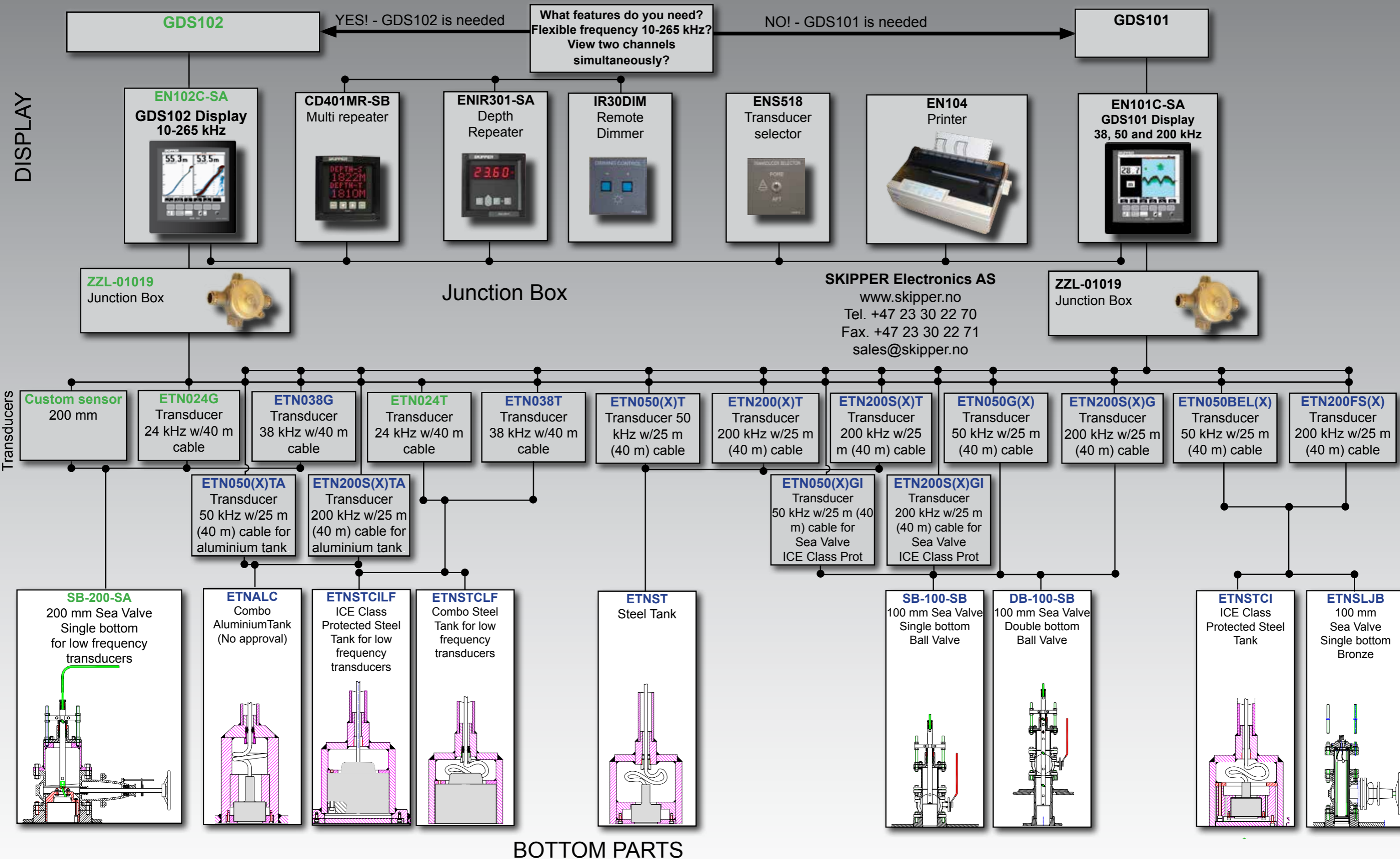
The SB-100-SB is an alternative to the SB-100-SA. The difference being that the SB-100-SB is a Ball Valve with a lever to close the valve. It is also made of stainless steel. Some confined spaces will make SB-100-SA or SB-100-SB version more suitable. Please contact SKIPPER for details in space needed for each separate Sea Valve, or visit [www.skipper.no](http://www.skipper.no) for download of installation manuals.

**100 mm Sea Valve for double bottom (DB-100-SB) Recommended!**

The DB-100-SB is the Ball Valve in stainless steel to be installed in a double hull configuration. As standard SKIPPER deliver 2 x 0.5 m and 1 x 1 m extension pipe to lower the transducer into the Ball Valve. Extra extension pipes are available on request.



# Echo Sounder Systems and Options





## SKIPPER DL2 Dual axis Doppler Speed Log



The SKIPPER DL2 are our newest range of Doppler Speed Logs. It works with the doppler principle STW in two axis and SOG in two axis. The DL2 can be mounted using several options, such as Sea Valve for double bottom and Sea Valve for single bottom.

It contains features as:

- Water track of speed in two axis (STW)
- Bottom track of speed in two axis (SOG)
- Sea temperature
- Wheelmark
- On screen diagnostics
- Logging functions
- LAN integration
- Touch display



## SKIPPER DL21 Dual and Single axis Doppler Speed Log



The SKIPPER DL21 are our newest range of Doppler Speed Logs. It works with the doppler principle with STW in one axis and SOG in two axis. The DL21 can be mounted using several options, such as Sea Valve for double bottom and Sea Valve for single bottom. Designed according to IMO resolution MSC334(90) with one sensor/hull mounting and one electronic unit.

It contains features as:

- Water track of speed in one axis (STW)
- Water track of speed in two axis (STW)
- Bottom track of speed in two axis (SOG)
- Two separate speed logs in one sensor
- Sea temperature
- Wheelmark
- On screen diagnostics
- Logging functions
- LAN integration and touch display



### Specifications for the DL2:

	DL2	UNITS		
Primary Frequency	540	kHz	Outputs	- 4 x NMEA 0183 2 x LAN
Speed range (lon/tra)	+/-50	knots		- 4 x Aux (pulse , alarm etc)
Bottom lock	1-120+	meters		- Alarm (Meets all current requirements for INS/ OSV)
Water track (from)	2	meters	Inputs	LAN, NMEA x2, Aux (user selectable)
Aft transversal speed	opt.		<b>Accepted NMEA formats</b>	
Pulse output power (rms)	30	Watts	<b>Inputs</b>	
Accuracy (better than)	0.2 or 2% (Opt. 0.1 or 1%) whatever greater	knots	Gyro	ROT, HDT
Tilt accuracy	<2	deg	GPS	GLL, GGA, RMC, VTG, ZDA
Temperature accuracy	<1	°C	<b>Outputs</b>	
<b>Mounting</b>			Speed	VBW and VHW
Sea Valves	Single bottom, Double bottom		Distance	VLW
Housing			Others	MTW (temp), ALR and ALF (alarm), DDC
JB70D2	DIN mountable Housing NMEA, LAN, Digital IO (Pulse alarms etc.) USB, SD Flash, 2 transducer connections, power connections		Power Supply	AC 115 - 230 V 50/60 Hz, DC, 24 V
Display	Flush mount 9.0" Touch panel or/ and Flush mount 9.0" Touch panel PC with LAN connection		Power Consumption	Max. 60 W
Sensors	DL2SXX sensor (100mm)			
Speed alarms	High and low speed limits			
Clock	- internal or From NMEA			

### Specifications for the DL21:

	DL2	DL1	UNITS			
Primary Frequency	540	715	kHz	Speed alarms	High and low speed limits	
Speed range (lon/tra)	+/-50	+/-50	knots	Clock	- internal or From NMEA	
Bottom lock	1-120+	NA	meters	Outputs	- 4 x NMEA 0183 4 x NMEA 0183	
Water track (from)	2	2	meters		2 x LAN 1 x LAN	
Aft transversal speed	opt.	NA			- 4 x Aux (pulse , alarm etc) 3 x Aux (pulse, alarm etc)	
Pulse output power (rms)	30	8W	Watts		- Alarm (Meets all current requirements for INS/ OSV) - Alarm	
Accuracy (better than)	0.2 or 2% whatever greater	0.2 or 2%	knots	Inputs	LAN, NMEA x2, Aux (user selectable) LAN, NMEA x2, Aux (user selectable)	
Tilt accuracy	<2	<2	deg	<b>Accepted NMEA formats</b>		
Temperature accuracy	<1	<1	°C	<b>Inputs</b>		
<b>Mounting</b>					Gyro	ROT, HDT
Sea Valves	Single bottom, Double bottom				GPS	GLL, GGA, RMC, VTG, ZDA
Housing					<b>Outputs</b>	
JB70D21	DIN mountable Housing NMEA, LAN, Digital IO (Pulse alarms etc.) USB, SD Flash, 2 transducer connections, power connections				Speed	VBW and VHW
Display	Flush mount 9.0" Touch panel with LAN connection and 144x144 DOT Matrix display for DL1				Distance	VLW
Sensors	DL21S (combined but electrically isolated DL2 -SOG/STW and DL1-STW) (100mm) or Separate DL2SXX sensor (100mm) and DL1SXX sensor (60mm)				Others	MTW (temp), ALR and ALF (alarm), DDC
	<b>DL2</b>	<b>DL1</b>			Power Supply	AC 115 - 230 V 50/60 Hz, DC, 24 V
					Power Consumption	Max. 60 W

**SKIPPER DL850 270 kHz Dual axis Doppler Speed Log**



The SKIPPER DL850 270 kHz is our Dual axis Doppler Speed Log. It works with the doppler principle with both SOG and STW. The 270 kHz frequency gives the possibility of tracking bottom speed down to at least 150 m. The DL850 270 kHz can be mounted using several options, such as Sea Valve for double bottom and in tank.

**It contains features as:**

- Bottom track of speed
- Water track of speed
- Depth readout
- Sea temperature
- Wheelmark
- On screen diagnostics
- Logging functions
- Dual axis as standard, three axis (Docking) as option

**Specifications for the DL850 270 kHz:**

	DL850-270	Units	Outputs
Primary frequency	270	kHz	- 2 x NMEA 0183
Speed range (longitudinal/transversal)	+/-40	knots	- 3 x 0-10 V or 4-20 mA Analogue
Bottom lock	1-200	meters	- 3 x contact closure (pulse)
Water track (from)	2	meters	- Alarm (Relay)
Aft transversal speed	Optional - in Docking version		- VGA additional screen
Pulse output power (rms)	100	Watt (Tranceiver unit)	<b>Inputs</b>
Accuracy	<0.2 or 2 %	knots	- 2 NMEA 0183 (OPTO Isolated)
Echo Sounder			<b>Accepted NMEA formats</b>
Range	200	meters	<b>Inputs:</b>
Frequency	270	kHz	Gyro: ROT, HDT
Max output power	100	Watt (Tranceiver unit)	GPS: GLL, GGA, RMC, VTG
Accuracy error	<1	%	Echo: DPT, DBS, DBT, DBK
Temperature accuracy error	<1	°C	<b>Outputs:</b>
Mounting			Speed: VBW, VHW, VTG
Sea Valve:			Distance: VLW
Single bottom	Yes		Depth: DPT, DBS, DBT, DBK
Double bottom	Yes		Others: MTW (temp), ALR (alarm)
Steel tank	Yes		<b>Power Supply</b>
Aluminium tank	Yes		AC: 115/230 V 50/60 Hz
Depth alarms	Deep and shallow limits		DC: 20 -32 V, Auto switch over
Speed alarms	High and low speed limits		<b>Power Consumption</b>
Clock	- Year-month-day/Hour-min. (taken from GPS if available)		Max. 100 W
			<b>Display</b>
			Night/Day (10.4") Colour LCD screen with adjustable backlight.
			<b>Memory</b>
			Compact Flash - For retaining operational settings and diagnostic data
			<b>Language</b>
			English
			<b>Accessories</b>
			IR300 Speed (with aft speed), Dimming Control
			CD401MR Multi repeater
			CD401LR Speed repeater
			<b>Classification</b>
			IMO

**SKIPPER DL1 and DL1 Multi Single axis Doppler Speed Log**



The SKIPPER DL1 and DL1 Multi are our newest Doppler Speed Logs. It works with the doppler principle with STW in one axis. The DL1 can be mounted using several options, such as Sea Valve for double bottom and in tank.

**It contains features as:**

- Water track of speed
- Sea temperature
- Wheelmark
- On screen diagnostics
- Logging functions
- Single axis

**Specifications for the DL1 and DL1 Multi:**

	DL1	Units		
Primary frequency	715	kHz	Power Supply	Dimming DDC
Speed range (longitudinal/transversal)	+/-50	knots	Power Consumption	AC: 115/230 V 50/60 Hz
Water track (from)	2	meters	Display	DC: 24V
Accuracy	<0.2 or 2%	knots	Accessories	Max. 30 W
Mounting			IR300 Speed (with aft speed), Dimming Control	28X30 led's
Sea Valve:			CD401MR Multi repeater	
Single bottom	Yes		CD401LR Speed repeater	
Double bottom	Yes		Classification	MED-B/IMO
Steel tank	Yes		Weight cabinet	2.5 kg
Aluminium tank	Yes		Standard cable length for display	10 m (Unlimited on DL1 Multi)
Speed alarms	High and low speed limits		Standard cable length for sensor	40 m
Clock	- Year-month-day/Hour-min. (taken from GPS if available)		Mounting dimensions for cabinet	124x124 mm Bracket or panel mounting, (144x144 mm front)
Outputs	- 2 x NMEA 0183 (4 on DL1 Multi)		IP grade	22
	- 2 x contact closure (pulse) (3 on DL1 Multi)			
	- Alarm (Relay)			
	- LAN (On DL1 Multi)			
Inputs	- 1 NMEA 0183 (OPTO Isolated)			
	- External Dimming			
Accepted NMEA formats				
Outputs:				
	Speed: VBW AND VHW			
	Distance: VLW			
	Others: MTW (temp), ALR and ALF (alarm)			

### SKIPPER EML224 Dual Axis Electromagnetic Speed Log



The SKIPPER EML224 is SKIPPERs most sold Electromagnetic Speed Log. It is a dual axis Speed Log using the electro-magnetic principle, providing longitudinal and transversal ship speed relative to sea water. The EML224 gives accurate navigation parameters, measured as they happen, and the data is presented in a logical, user friendly way.

**Highlighted features as:**

- Speed through water in dual axis
- Sea temperature
- Fully automated settings
- Easy setup and diagnostics.
- NMEA 0183
- IMO Wheelmarked

**Specifications for the EML224:**

	<b>EML224</b>	Units	Inputs	- 2 NMEA 0183 (OPTO Isolated)
<b>Number of Axis</b>	2		<b>Accepted NMEA formats</b>	
<b>Speed range Long</b>	±40	knots	<b>Outputs:</b>	
<b>Speed range Trans</b>	±40	knots		Speed: VBW, VHW
<b>Water track (from)</b>	0	meter		Distance: VLW
<b>Accuracy (better than)</b>	0.2 or 2 %	knots		Others: MTW (temp), ALR (alarm)
<b>Temperature Accuracy error</b>	< 1	°C	<b>Power Supply</b>	AC: 115/230 V 50/60 Hz. DC: 24 V, Auto switch over
<b>Mounting Dimensions</b>	300 x 320 mm		<b>Power Consumption</b>	Max. 100 W
<b>Front plate</b>	320 x 340 mm		<b>Display</b>	Night/Day (10.4") Colour LCD screen with adjustable backlight.
<b>Depth</b>	165 mm		<b>Language:</b>	English
<b>Weight cabinet</b>	10 kg		<b>Accessories:</b>	IR300 Speed repeater Dimming control CD401MR Multi repeater CD401LR Speed repeater
<b>Mounting</b>			<b>Classification:</b>	IMO
<b>Sea Valve:</b>			<b>Service:</b>	Available in most major harbours, world-wide through extensive dealer network.
<b>Single bottom</b>	Yes			
<b>Double bottom</b>	Yes			
<b>Tank:</b>				
<b>Steel</b>	Yes			
<b>Aluminium</b>	Yes			
<b>Alarms</b>	- High and low speed limits - Power failure			
<b>Outputs</b>	- 2 x NMEA 0183 - 3 x contact closure (pulse) - Alarm (Relay) - VGA additional screen - 3 x 0-10 V or 4-20 mA Analogue			

### SKIPPER EML224 Compact, Single and Dual axis Electromagnetic Speed Log



The SKIPPER EML224 Compact is the newest electromagnetic Speed Log. The difference from the EML224 is that the operator unit (display) is smaller. The EML224 Compact is available in single or dual axis, making it more flexible depending on customers needs and demands.

**Highlighted features as:**

- NMEA 0183
- Compact display (144 x 144 mm)
- Alarm functions
- IMO Wheelmarked
- Speed through water in 1 or 2 axis
- Fully automated settings
- Support software for easy setup and diagnostics

**Specifications for the EML224 Compact:**

<b>Log</b>	<b>EML124 Compact</b>	<b>EML224 Compact</b>	<b>Units</b>	<b>Aluminium</b>	Yes	Yes
<b>Number of Axis</b>	1	2		<b>Speed alarms</b>	- High and low speed limits - Power failure - Sensor failure	
<b>Speed range Longitudinal</b>	±40	±40	knots	<b>Outputs</b>	- 2 x NMEA 0183 - 1 x contact closure (pulse) - Alarm (Relay) - Fitness	
<b>Speed range Transversal</b>		±40	knots	<b>Inputs</b>	- 1 NMEA 0183 - External dimming (pulse)	
<b>Water track (from)</b>	0	0	meter	<b>Accepted NMEA formats</b>		
<b>Accuracy (better than)</b>	0.2 or 2 %	0.2 or 2 %	knots	<b>Outputs:</b>		
<b>Temperature Accuracy error</b>	< 1	< 1	°C	<b>Speed</b>	VBW, VHW	
<b>Mounting Dimensions</b>	124 x 124 mm. Cut out panel mounting. Brackets are included			<b>Distance</b>	VLW	
<b>Front plate</b>	144 x 144 mm			<b>Others</b>	MTW (temp)	
<b>Depth</b>	59 mm			<b>Power Supply</b>	AC: 115/230 V 50/60 Hz. (Electronic unit) DC: 20-32 V, Auto switch over.	
<b>Weight cabinet</b>	1 kg			<b>Power Consumption</b>	Max. 30 W	
<b>Standard cable length</b>	10 m (max 20 m)			<b>Display</b>	28 x 30 pixle alphanumeric LEDs (red) with dimming.	
<b>Mounting</b>				<b>Language</b>	English	
<b>Sea Valve:</b>				<b>Service</b>	Available in most major harbours, world-wide through extensive dealer network	
<b>Single bottom</b>	Yes	Yes				
<b>Double bottom</b>	Yes	Yes				
<b>Tank:</b>						
<b>Steel</b>	Yes	Yes				

### SKIPPER IR300 Digital Speed Repeater



The SKIPPER IR300 is a remote speed indicator for NMEA signals. It is designed for use with SKIPPER DL850 and EML224. It may also be used with Speed Logs from other manufacturers, when these have an NMEA 0183 output.

**Highlighted features as:**

- Speed indicator
- Alarms - Speed alarm
- Trip counter
- Distance counter
- One, two or three axis indication
- Bracket or panel mounting

**Specifications for the IR300:**

<b>Power Supply</b>	DC: 10-40 V
<b>Power Consumption</b>	3 W at 24 V
<b>Display</b>	2 lines with 7 segments 20 x 11 mm 1 line with 7 segments 13 x 7 mm
<b>Display outputs</b>	Speed over ground (bottom track) - Longitudinal - Transversal fore - Transversal aft (Docking) Speed through water (water track) - Longitudinal - Transversal fore - Transversal aft (docking) Distance travelled through water - Trip - Total
<b>Mounting Dimensions</b>	124 x 124 mm. Cut out for panel mounting. Brackets are included
<b>Front plate</b>	144 x 144 mm to DIN standard

<b>Depth</b>	59 mm
<b>Weight cabinet</b>	1 kg
<b>Protection</b>	IP 56
<b>Outputs</b>	1 x NMEA 0183
<b>Inputs</b>	1 x NMEA 0183 - VBW for speed - VLW for distance travelled Remote dimmer input
<b>Classification</b>	Made acc. to IMO performance standard
<b>Language</b>	English
<b>Service</b>	Available in most major harbours, world-wide through extensive dealer network

### SKIPPER CD401 LR Digital Speed Repeater



The SKIPPER CD401 LR is a remote speed indicator for NMEA signals. It is designed for use with SKIPPER DL850 and EML224. It may also be used with Speed Logs from other manufacturers, when these have an NMEA 0183 output.

**Highlighted features as:**

- Speed indicator
- Trip counter
- Distance counter
- One, two or three axis indication
- Bracket or panel mounting

**Specifications for the CD401 LR:**

<b>Power Supply</b>	DC: 19-36 V
<b>Power Consumption</b>	3 W at 24 V
<b>Display</b>	3 lines with LED
<b>Display outputs</b>	Speed over ground (bottom track) - Longitudinal - Transversal fore - Transversal aft (docking) Speed through water (water track) - Longitudinal - Transversal fore - Transversal aft (docking) Distance travelled through water - Trip - Total
<b>Mounting Dimensions</b>	124 x 124 mm. Cut out for panel mounting. Brackets are included
<b>Front plate</b>	144 x 144 mm
<b>Depth</b>	59 mm
<b>Weight cabinet</b>	1 kg
<b>Protection</b>	IP 56

<b>Outputs</b>	2 x NMEA 0183
<b>Inputs</b>	1 x NMEA 0183 protocols - VHW for speed - VLW for distance travelled - VBW for speed - MTW for temp Remote dimmer input
<b>Classification</b>	Made acc. to IMO performance standard
<b>Service</b>	Available in most major harbours, world-wide through extensive dealer network

## CD401MR Multi repeater



The SKIPPER CD401MR is a remote multi repeater for NMEA signals. It is designed for use with SKIPPER products together with products from other manufacturers, when these have an NMEA 0183 output.

### Highlighted Features:

- Depth below surface, keel and transducer
- Speed over ground and through water (longitudinal, transverse, aft and relative)
- Distance, total/trip for both ground and water
- Heading, true, magnetic and relative
- Rotation, rate of turn and direction
- Wind speed and direction (true, magnetic and relative)
- Temperature in water and air
- Drive, RPM, propeller pitch and rudder position
- Clock UTC, local time and expected time of arrival (ETA)
- Current, true and relative

The SKIPPER CD401MR multi repeater repeats information about several essential information needed on a vessel. The operator may select between the information needed by use of the display, and could even customize the information shown. Brightness is adjusted on the front panel, or from a remote dimmer control and NMEA.

<b>Power Supply</b>	DC: 24 V DC (19-36)	<b>Weight cabinet</b>	1 kg
<b>Power Consumption</b>	30 W at 24 V	<b>Protection</b>	IP 56
		<b>Outputs</b>	1 x NMEA 0183
<b>Display</b>	Up to 4 lines with LED	<b>Inputs</b>	1 x NMEA 0183 protocols
<b>Display outputs</b>	<b>Depth</b> – below surface, keel and transducer		Remote dimmer input
	<b>Speed</b> – over ground and through water (longitudinal, transverse, aft and relative)		* Depth: DPT, DBK, DBT, DBS
	<b>Distance</b> – total/trip for both ground and water		* Speed: VBW, VTG, VHW
	<b>Heading</b> - true, magnetic and relative		* Distance: VLW
	<b>Wind</b> - speed and direction (true, magnetic and relative)		* Heading: VTG, VHW, THS, HDT, HDM, HDG
	<b>Temperature</b> – water and air		* Rotation: ROT
	<b>Drive</b> – RPM, propeller pitch and rudder position		* Pitch and Roll: XDR
	<b>Clock</b> – UTC, local time and ETA		* Wind: MWV, VWR, VWT, MWD
<b>Current - true and relative</b>	* Temperature: MTA, MTW, MDA		
<b>Mounting Dimensions</b>	124 x 124 mm. Cut out for panel mounting. Brackets are included.	* Drive: RPM, RSA	
<b>Front plate</b>	144 x 144 mm to DIN standard	* Clock: ZTG, ZDA, GGA, RMC	
<b>Depth</b>	59 mm	* Auxillary: User defined.	
		* Current: IIVDR, PSKPVDR	
		* Display Dimming: DDC	
		<b>Protection</b>	IP 56
		<b>Classification</b>	Made acc. to IMO performance standard
		<b>Service</b>	Available in most major harbours, world-wide through extensive dealer network

SKIPPER manufacture all the Sensors to the SKIPPER Speed Logs. SKIPPER manufacture two different Speed Log families, Doppler Speed Logs and Electromagnetic Speed Logs. The Doppler Speed Log consists of three versions based on the frequencies; 715 kHz, 540 kHz and 270 kHz.

### DL2 Doppler Speed Log Sensor



The DL2 sensor consists of 3 ceramic transducers for measuring speed and 1 sensor measuring temperature. This sensor can be installed in a variety of bottom mountings.

There are one option for the cable, 40 m. This Doppler sensor gives speed through water (STW) and speed over ground (SOG) in two axis.

Part no.	Cable length (m)	Installed in
DL2SG-SA	40	SB-100-SA, SB-100-SB, DB-100-SA, DB-100-SB. 100 mm Sea Valve
DL2SE-SA	40	ETNSLB 100 mm Sea Valve (Retrofit)

### DL21 Doppler Speed Log Sensor

The DL21 sensor consist of a sensor housing with six ceramic transducers angled at 30°. The two systems are electrically isolated (SOG+STW 2-axis and STW 1-axis). Two separate temperature sensors measure water temperature.

Depth is calculated from slanted beams. The sensor is delivered with a 40 m cable as standard. The sensor can be installed in Sea Valve, for double and single bottom configurations.

Part No.	Cable length (m)	Installed in
DL21SG-SA	40	SB-100-SA, SB-100-SB, DB-100-SA, DB-100-SB. 100 mm Sea Valve
DL21SE-SA	40	ETNSLB 100 mm Sea Valve (Retrofit)



### DL1 Doppler Speed Log Sensor

The DL1 sensor consists of 2 ceramic transducers for measuring speed and 1 sensor measuring temperature. This sensor can be installed in a variety of bottom mountings.

Standard cable length is 40 m, and the cable can be cut or extended with the junction box (JB12). This Doppler sensor gives speed through water.

Part no.	Cable length (m)	Installed in
DL1SG-SA	40	SB-60-SA and DB-60-SA
DL1ST-SA	40	ETNSTCL
DL1STA-SA	40	ETNALC
DL1SN-SA	40	Retrofit to Simrad NL-Log
DL1SS-SA	40	Retrofit to Sagem Log
DL1SX-SD	40	Retrofit to PCSV60
DL1SDB-SA	40	SB-100-SA, SB-100-SB, DB-100-SA and DB-100-SB. 100 mm Sea Valve



DL1S

### EML224 Electromagnetic Speed Log Sensor

The EML224 sensor is moulded and comes with a 40 m cable as standard. This sensor can be mounted in a Tank or Sea Valve for double and single bottom.

Other retrofit adapters are available on request.



EML224SG-SD



EML224ST-SD

Sensor	Cable length (m)	Installed in
EML224SG-SD	40	SB-60-SA and DB-60-SA. 60 mm Sea Valve
EML224ST-SD	40	ETNSTCL Combo Steel Tank
EML224STA-SD	40	ETNALC Aluminium Tank
EML224SX-SD	40	PCSV60 60 mm Sea Valve (Retrofit)
EML224SN-SD	40	SIMRAD NL Log Sea Valve or Tank installation (Retrofit)
EML224SDB-SD	40	SB-100-SA, SB-100-SB, DB-100-SA and DB-100-SB. 100 mm Sea Valve
EML224SS-SD	40	LOG SENSOR FOR SAGEM Fittings EML, 40mtr ungrounded (Retrofit)

### DL850 270 kHz Doppler Speed Log Sensor

The 270 kHz sensor consist of a moulded sensor housing with three ceramic transducers angled at 30°. The depth is calculated and can not be directly read out. The sensor is delivered with a 40 m cable as standard. The sensor can be installed in tank or Sea Valve, for double and single bottom configurations.

Sensor	Part No.	Cable length (m)	Installed in
Sensor 270 kHz	DL850S27E-SB	40	ETNSLB 100 mm Sea Valve (Retrofit)
Sensor 270 kHz	DL850S27G-SB	40	SB-100-SA, SB-100-SB, DB-100-SA, DB-100-SB. 100 mm Sea Valve
Sensor 270 kHz	DL850S27TA-SB	40	ETNALC Aluminium Tank
Sensor 270 kHz	DL850S27T-SB	40	ETNSTC Combo Steel Tank



DL850S27G-SB



# Sea Valves and Tanks for Speed Logs

The hull fittings are needed in order to fit the sensors into the hull of the ship. The bottom parts delivered by SKIPPER are approved by Det Norske Veritas (DNV). Approval by other classification authorities are available on requests.

SKIPPER always recommend to install the sensors into Sea Valves. It is much easier to change the sensor, and to maintain and clean the sensors regularly without entering any drydock or using divers. The installation of a Tank will require installation of cable pipes above load water line. This is time consuming, costly, and, when everything is taken into consideration, the installation of Sea Valve will often be the cheapest option for installation.

## Combo Tank (ETNSTCL)



The Combo Tank is specially made for SKIPPER's Speed Logs, DL850 270 kHz and the EML224 Speed Logs. The red coating as well as the steel alloy is the same for standard tank (ETNST). Tanks for Speed Logs have a mounting direction, and need to be installed correctly (please see the installation manual).

## Aluminium Combo Tank (ETNALG)

The Aluminium Combo Tank is also specially made for SKIPPER's Speed Logs. Please note that the aluminium tank needs to be certified with the hull of the vessel after installation.



## 60 mm Sea Valve for single bottom (SB-60-SA)



SKIPPER 60 mm Sea Valve is manufactured for the EML Speed Logs. It is made in stainless steel, and the Ball Valve is operated with a lever. Because of the small size, it is easy to fit into small spaces at the bottom of the vessel.

The SB-60-SA is delivered with a 0.5 m extension tube in order to mount the SKIPPER EML sensor.

## 60 mm Sea Valve for double bottom (DB-60-SA)

If the vessel is constructed with a double bottom, or the valve needs to be moved away from the hull, the correct solution is the DB-60-SA. As seen on the figure, this Sea Valve is delivered with an extra flange to be installed in the outer hull of the vessel. The interhull distance is different for each hull setup, so the piping between the outer and the inner hull is yard supply and need to be welded between the outer hull flange and the inner hull flange. Please see the installation manual for further information on the installation procedure. For use with SKIPPER EML Speed Logs only.



The DB-60-SA is delivered with 1 m and 0.5 m extension tubes. Extra extension tubes are available on request.



## 100 mm Sea Valve for single bottom (SB-100-SB) Recommended!

The SB-100-SB is an alternative to the SB-100-SA, the difference is that the SB-100-SB has a Ball Valve with a lever to close the valve instead of the screw operation of the SB-100-SA valve and it is made in stainless steel.

Difference in space in the installation location would require the choice between the SB-100-SA and the SB-100-SB. Please contact SKIPPER for details in space needed or visit [www.skipper.no](http://www.skipper.no) for downloads of installation manuals and installation videos.

## 100 mm Sea Valve for double bottom (DB-100-SB) Recommended!

The DB-100-SB is our Sea Valve in stainless steel to be installed in a double bottom configuration. 2 x 0.5 m and 1 x 1 m extension pipe to lower the transducer in the Sea Valve are delivered as standard together with the Sea Valve. Extra extension pipe is available on request.



# ETT985 Tester



Depth: 6 cm  
Weight: 728 g



A simple to use, reliable and accurate tester for most Echo Sounders. Preprogrammed with factory tests for Transducers, Echo Sounders and NMEA ports. This unit can be used in a stand-alone mode, or using a connection to a PC to give accurate results and even print/save a status report, this unit eliminates uncertainty of whether a failure is in the Transducer or in the Echo Sounder. An expensive mistake if you get it wrong!

**Features:**

**Tester for Transducer of frequencies from 10 kHz to 1 MHz**

**Just the tester:**

- Impedance, resistance and phase
- Detection of resonant point and impedance at resonance
- Preprogrammed integrity tests for SKIPPER transducers (and others)

**With software:**

- Graph of impedance, conductance, phase and susceptance
- Detection of resonance, anti-resonance, bandwidth and factory limit check
- Save to .xls format and/or print out for service reports
- Add your own transducer checks and limits (saved in tester for later use)

**Simulator for SKIPPER and other continuous wave Echo Sounders**

**Just the tester:**

- Detect and measure pulses, frequency, strength, Vpp, width and period
- Generate return pulses with fixed or tracking format, at depth up to 999.9 m
- Simulate fish in the water column

**With software:**

- Check results against factory settings or preset default values
- Add your own Echo Sounder values and checks

**NMEA tester**

**Just the tester:**

- Monitor NMEA lines, loop back signals from devices, send standard formats for GPS, gyro, Echo Sounders, Speed Logs etc.
- Use the unit as a NMEA to RS232 converter or to USB with included converter

**With software:**

- Insert your own NMEA parameters (can be saved)



# DGR360 Digital Gyro Repeater



DGR360 is a digital gyro repeater that displays the Heading Angle in the LED 7 segment display and indicates the direction of turn with 30 dual colour surrounding LEDs, changing from green to red depending on the direction of turn.

**Highlighted features:**

- Digital gyro repeater
- Heading angle
- HDT/THS signals
- Bracket or panel mounting

The DGR360 will display Heading Angle given by the Heading message from a gyro or other equipment (NMEA 0183) and indicate "Direction of Turn" by calculating change in heading based on the HDT/THS input and the time between each message.

The dimming may be controlled by pressing the dimming key or by using an external dimming key.

**Specifications:**

<b>Power Supply</b>	DC: 20-32 V	<b>Protection</b>	IP 56
<b>Power Consumption</b>	2 W at 24 V	<b>Outputs</b>	NMEA 0183
<b>Display</b>	1 line with 7 segments 30 x 20 mm	<b>Inputs</b>	NMEA 0183 protocols Sentence: \$--HDT, \$--THS Remote dimmer input, pulse.
<b>Display outputs</b>	Heading (HDT, THS) from gyro compass or other HDT/THS devices Analogue indication of turn direction speed (red/green LEDs)	<b>Classification</b>	IEC 60945/2002. Approved up to IMO Standards.
<b>Standard cable length</b>	2 m	<b>Service</b>	Available in most major harbours, world-wide through extensive dealer network.
<b>Compass safe distance</b>	85 cm		
<b>Mounting Dimensions</b>	190 x 158 mm. Cut out for panel mounting. Brackets are included.		
<b>Front plate</b>	220 x 170 mm		
<b>Depth</b>	63 mm		
<b>Weight cabinet</b>	2 kg		



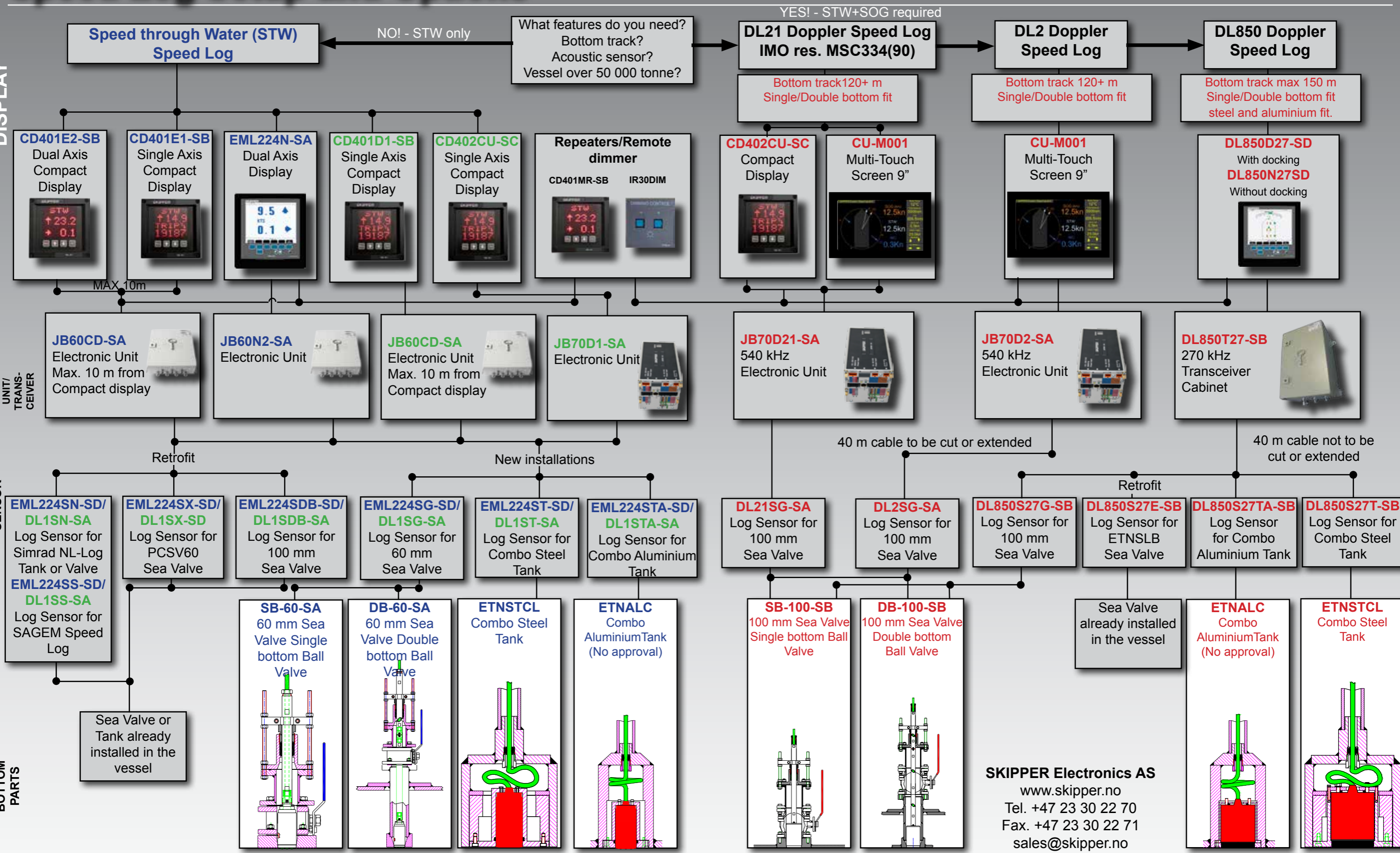
# Speed Log Setup and Options

DISPLAY

ELECTRONIC UNIT/ TRANS-CEIVER

SENSOR

BOTTOM PARTS



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 sales@skipper.no

## Quality Standards

An excellent quality is important for SKIPPER and will always be our main target. SKIPPER is continuously improving the quality of the existing products and all new products in the pipeline. It is important not only that the products leave SKIPPER in good condition, but also that the quality of the products remain excellent throughout its lifetime.

SKIPPER Electronics AS is approved with the standards as listed below:

- ISO 9001:2008
- IMO wheelmark (Med D)

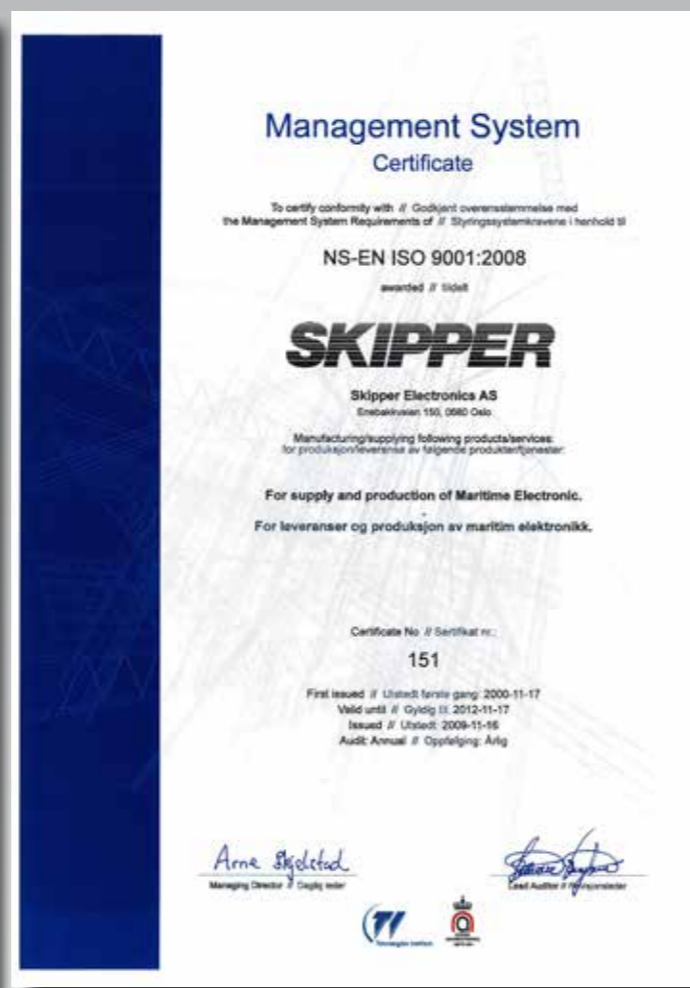
All our Steel Tanks and Sea Valves are DNV approved. Approvals from other authorities can be provided on request.

SKIPPER Electronics lays emphasis on the importance of a world wide service/support coverage. We have therefore established service hubs throughout the world. These service hubs keep all our main spare parts, to reduce the freight time for your service. A full list of all the spare parts they keep can be found on SKIPPER web pages.

There are also several other service/support/dealers throughout the world, capable of service and support on all SKIPPER products. For a full list of all the service/support and dealers please go to [www.skipper.no](http://www.skipper.no). SKIPPER schedules annual training for all its service/support/dealers, and even hold train a trainer courses in order to keep all up to date on SKIPPER Navigational Echo Sounders and Speed Logs.

SKIPPER have several means of support, including our web portal [www.skipper.no](http://www.skipper.no) with service bulletins, downloadable manuals, catalogues, brochures, and drawings and also a forum to get information not covered in manuals.

SKIPPER Electronics is also available for support/service on [support@skipper.no](mailto:support@skipper.no), and on phone no. +47 23 30 22 70.



SKIPPER service hubs



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[www.skipper.no](http://www.skipper.no)



# SKIPPER

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