

FURUNO

DOPPLER SONAR



Model:
DS-60

FURUNO Doppler sonar DS-60 provides accurate, real-time information of ship's motion and water speed for safe berthing and docking operations

DOPPLER SONAR DS-60



The DS-60 is a precision, 3-axis Doppler Sonar designed to output the required information for berthing and docking operation of vessels. It complies with IMO MSC.36(63), MSC.96(72), MSC.302(87), A.694(17) and A.824(19), designed for the vessels of 50,000 GT and greater, such as container vessels, VLCC and other tankers.

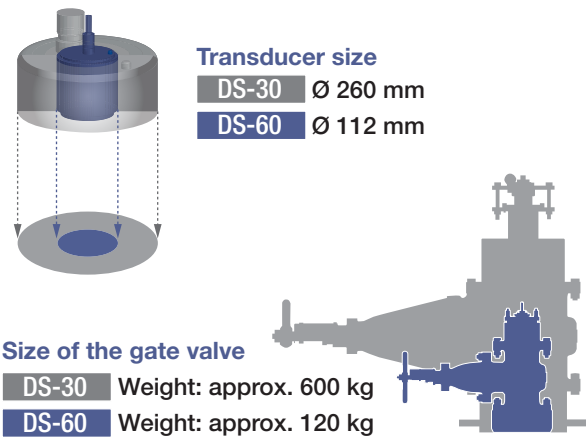
The DS-60 provides accurate information of ship's speed over a wide range. Speeds are detected relative to the ground or water for both fore-aft and port-starboard directions. The measurement capability at dead slow speed is vital for precise docking of huge tankers to oil loading/unloading facilities, as well as safe navigation in narrow channels or straits. Operation at high speed assists economical cruising in open seas.

While retaining the measurement accuracy of the DS-30, the DS-60 provides a greatly downsized transducer unit. This means that the time for installation and space required for installation will be reduced. The compact, high-frequency transducer measures ship's longitudinal (fore-aft) and transverse (port-starboard) speed, as well as water speed and direction under the hull.

The 8.4-inch color LCD display shows information in both alphanumeric and graphics. It offers three display modes: 3-axis speed, berthing and NAV data. The modes can be switched with the optional remote controller. For wing installation, IP56 waterproof box for the display is available (optional supply).

Comparison between DS-30 and DS-60

Thanks to the development of the new compact transducer, the size of the gate valve has been greatly downsized. This facilitates space-saving installation, and reduces the time for installation.

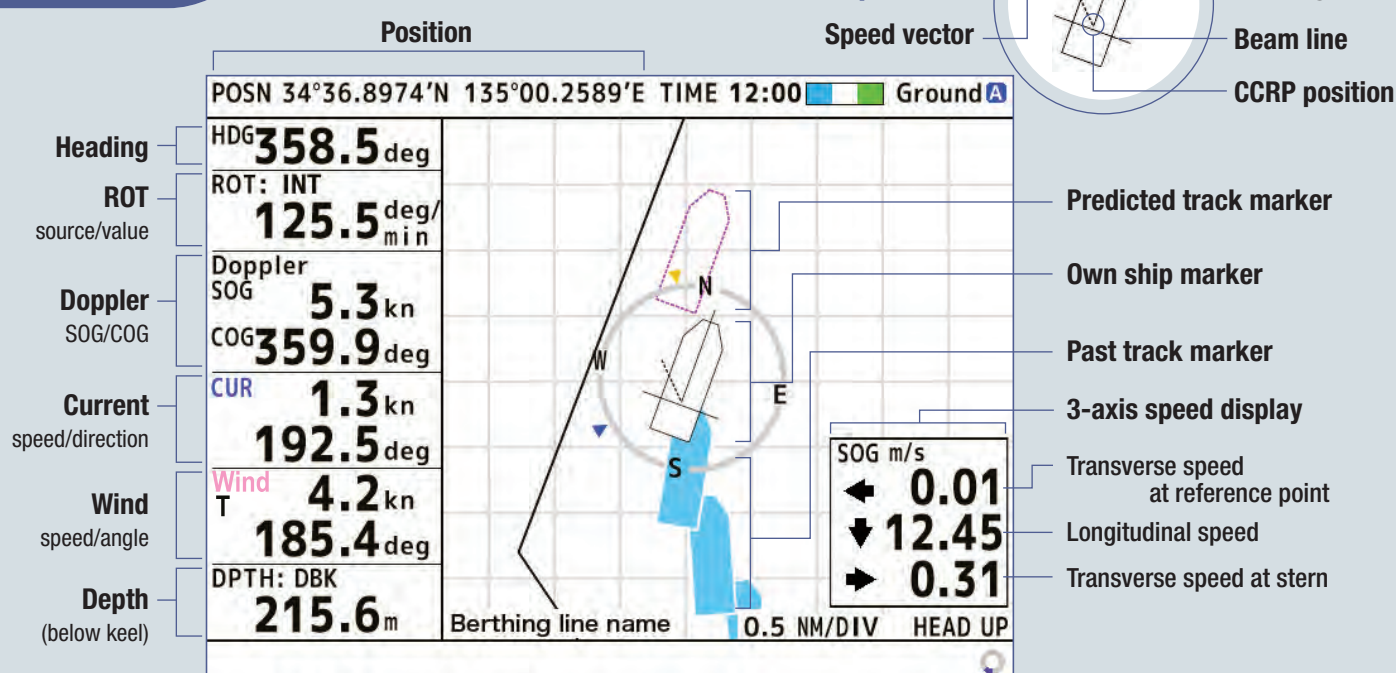


	DS-60	DS-30
Ground tracking accuracy	Ship's speed (at low speed) : ±2.0 % or ±0.02 kn, whichever is greater Ship's speed (at high speed) : ±1.0 % or ±0.1 kn, whichever is greater	
Water speed accuracy	±1.0 % or ±0.1 kn, whichever is greater	
Depth range	1-200 m	
Transducer diameter	Ø112	Ø260
Gate Valve diameter	Ø125	Ø326
Gate Valve weight	120 kg	600 kg



- Full compliance with IMO MSC.36(63), MSC.96(72), MSC.302(87), A.694(17) and A.824(19), required for the vessels of 50,000 GT and greater
- Delivers high precision measurement required for berthing and docking maneuvers
- 3-beam transmission reduces the effects of vessel's pitch and roll in order to output precision measurements
- Ground-tracking speed measurement range of up to 200 m
- Workload for installation has been greatly reduced thanks to its compact transducer unit
- 8.4-inch color LCD display gives high-legibility, real-time information in both graphics and alphanumerics
- Remote controller and dimmer controller available (optional supply)
- Waterproof box for the display for wing installation (optional supply)
- Additional remote display can be selected from color LCD (DS-600/RD-50) and red LED display (RD-20)
- Water-tight connector available for the transducer (selectable upon purchase order)

Berthing



NAV Data

Status of echoes in last 3 minutes.

Green: ground tracking

Blue: water tracking

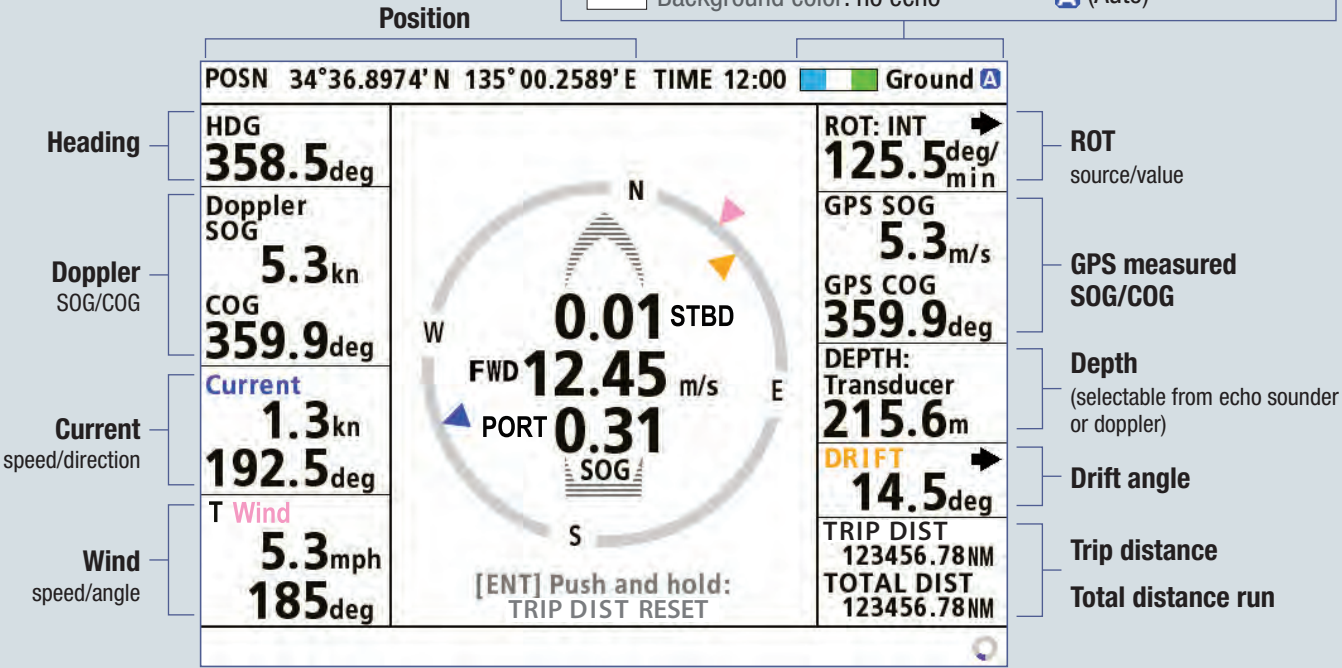
Background color: no echo

Speed tracking mode

-Ground

-Water

-A (Auto)

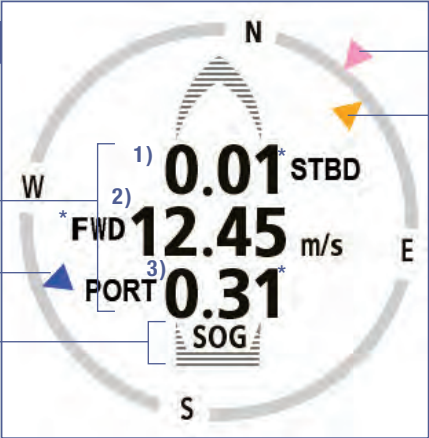


3-axis speed display

- 1) Transverse speed at reference point
- 2) Longitudinal speed
- 3) Transverse speed at stern

Current direction (flowing to)

Speed mode (SOG or STW)



Wind angle

Drift angle

* Direction indicator

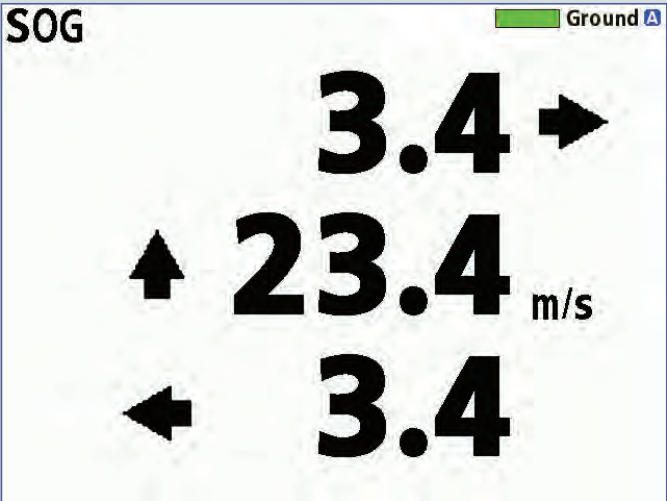
STBD

PORT

FWD

AFT

3-axis speed



Transverse speed at reference point

Longitudinal speed

Transverse speed at stern

* Direction indicator

STBD

PORT

FWD

AFT

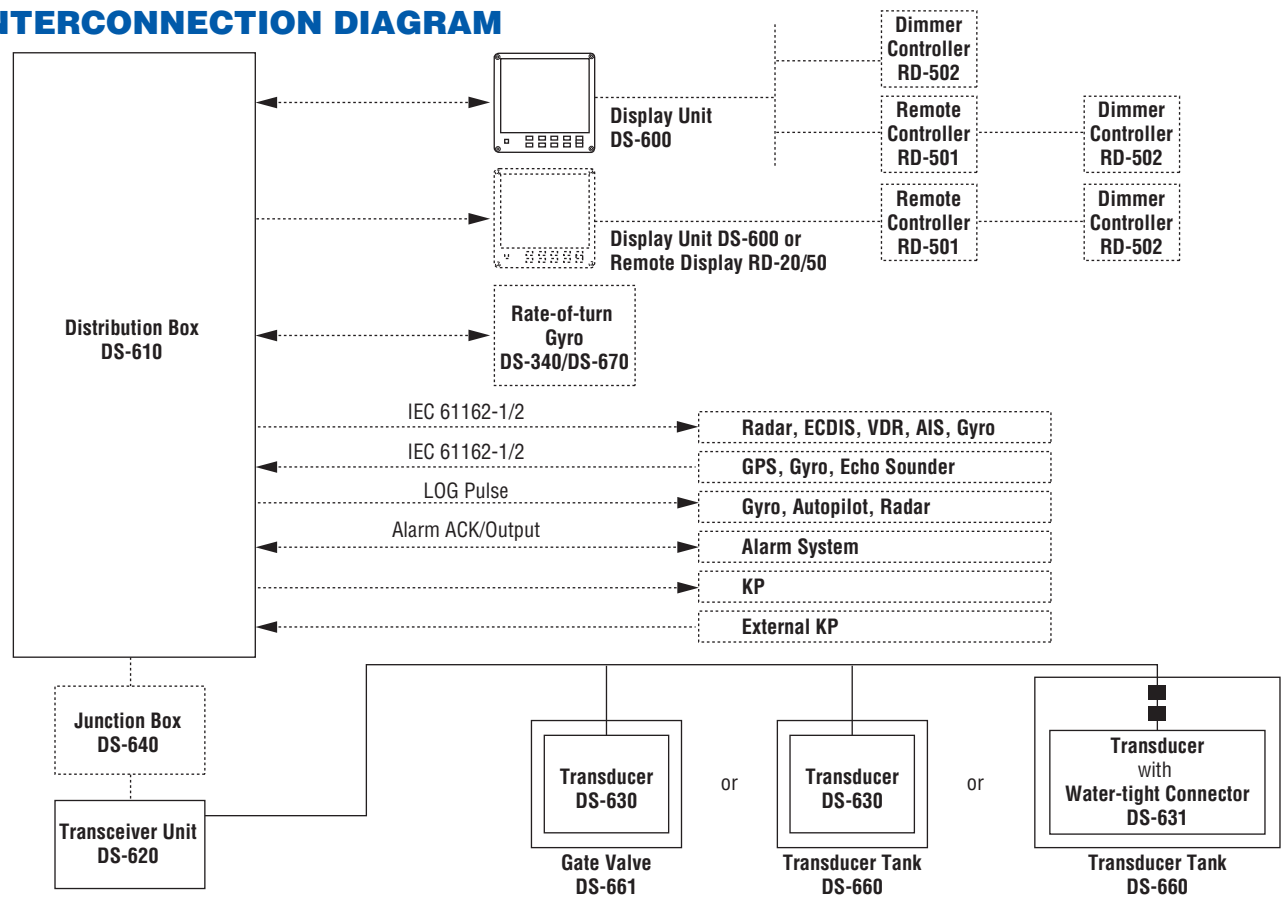
SPECIFICATIONS

PRODUCT NAME	DOPPLER SONAR	POWER SUPPLY	100-240 VAC
MEASUREMENT RANGE OF SHIP'S SPEED		ENVIRONMENT	
Fore-Aft	-10.0 to 40.0 kn	Temperature	
Port-Starboard	-9.9 to 9.9 kn	Main Display	-25°C to +55°C
		Other Units	-15°C to +55°C
MEASUREMENT DEPTH		Waterproofing	
Speed over ground	1 to 200 m below hull bottom	Main Display	Front: IP56 Back: IP22
Speed through water	0.5 to 25 m below hull bottom	Distribution Box	IP22
ACCURACY		Tranceiver Unit/Junction Box	IP44
Ground-speed (at low speed)	±2.0 % or ±0.02 kn, whichever is greater	Transducer/Transducer Tank/Gate Valve	IP68
Ground-speed (at high speed)	±1.0 % or ±0.1 kn, whichever is greater		
Water-speed	±1.0 % or ±0.1 kn, whichever is greater		
Port-Starboard at stern	±1.0 % or ±0.08 kn, whichever is greater*		
	*when using the Rate Gyro (DS-340/DS-670)		
INPUT/OUTPUT SIGNALS			
INPUT			
IEC 61162	3		
Alarm ACK	1		
INPUT SENTENCES (IEC 61162)	ZDA, GLL, GGA, RMC, VTG, HDT, HDG, ROT, DBT, DPT, MWV, THS, GNS, HBT, ACK, ACM, ACN		
OUTPUT			
Output Ports (IEC 61162)	5		
LOG Pulse	4		
Analog	5		
Alarm output	4		
MAIN DISPLAY			
Screen Size	640 x 480 (VGA)		
TRANSDUCER			
Ultrasonic Frequency	320 kHz		
Number of Beams	3		

EQUIPMENT LIST

Standard		
1 Display Unit	DS-600	1 unit
2 Distribution Box	DS-610	1 unit
3 Transceiver Unit	DS-620	1 unit
4 Transducer Unit (Choose from 3 choices below)		1 unit
1. Transducer (DS-630) and Gate Valve (DS-661)		
2. Transducer (DS-630) and Transducer Tank (DS-660)		
3. Transducer with Water-tight Connector (DS-631) and Transducer Tank (DS-660)		
5 Installation Material and Spare Parts		1 set
Option		
Display Unit (as a sub display)	DS-600	
Junction Box	DS-640	
Waterproof Box (for Display Unit DS-600)	DS-605	
Rate-of-turn Gyro	DS-340/DS-670	
Remote Controller	RD-501	
Dimmer Controller	RD-502	
Bracket (for Display Unit DS-600)		
Flange (for Transducer Tank DS-660)		

INTERCONNECTION DIAGRAM

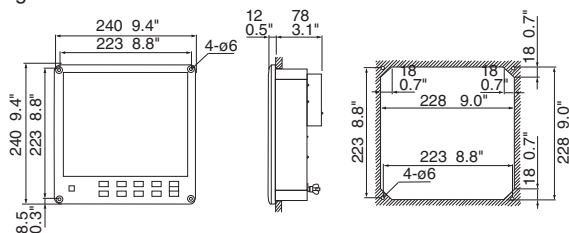


----- Option or Local Supply *Cable length between Transceiver Unit and Transducer is selectable from 30, 40, 50 and 60 m.

DISPLAY UNIT

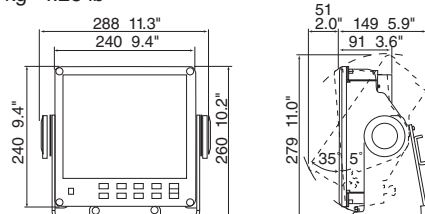
DS-600 (Flush mount)

2.1 kg 4.62 lb



DS-600 (with an optional bracket)

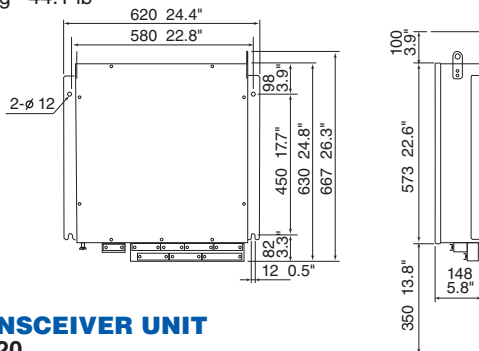
3.3 kg 7.28 lb



DISTRIBUTION BOX

DS-610

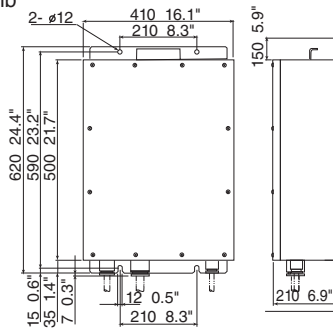
20.0 kg 44.1 lb



TRANSCIVER UNIT

DS-620

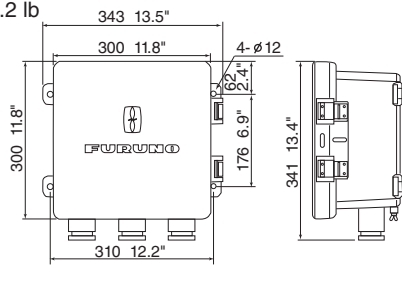
19.0 kg 41.9 lb



WATERPROOF BOX (Option)

DS-605

9.6 kg 21.2 lb



TRANSDUCER / TRANSDUCER TANK

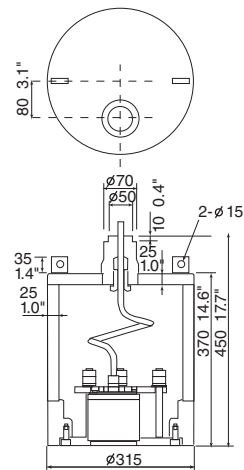
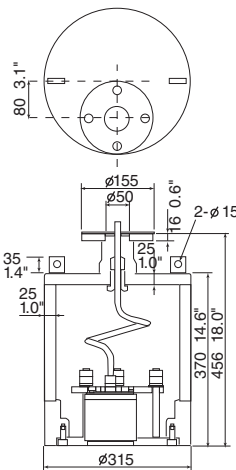
DS-630 / DS-660

installation with a flange

*100.0 kg 220.5 lb

installation without a flange

*96.0 kg 211.6 lb



*Weight of transducer tank

TRANSDUCER WITH WATER-TIGHT CONNECTOR / TRANSDUCER TANK

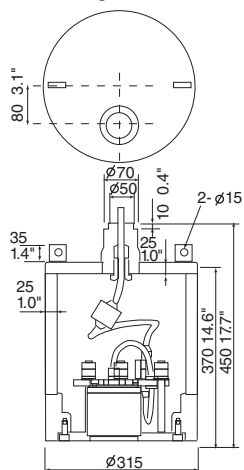
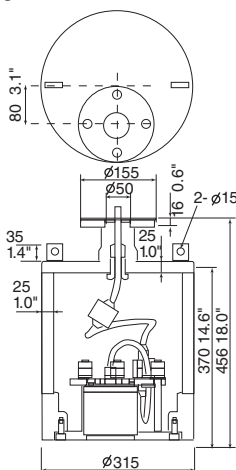
DS-631 / DS-660

installation with a flange

*100.0 kg 220.5 lb

installation without a flange

*96.0 kg 211.6 lb

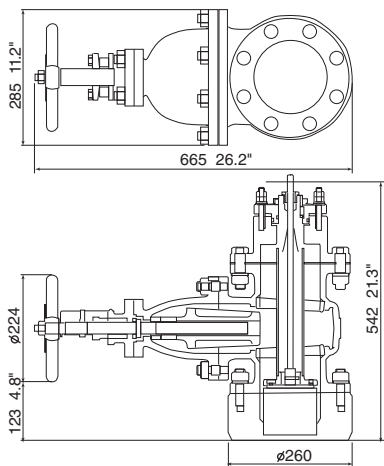


*Weight of transducer tank

GATE VALVE

DS-661

120.0 kg 264.5 lb



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