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DOPPLER SONAR

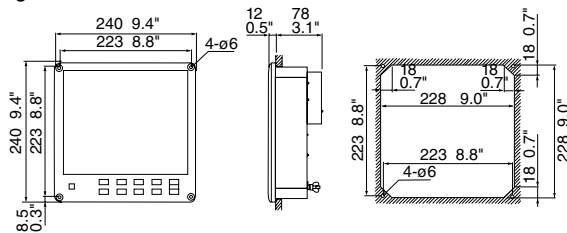
DS-60



DISPLAY UNIT

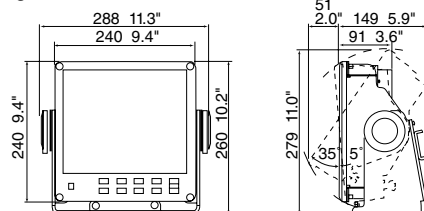
DS-600 (Flush mount)

2.1 kg 4.62 lb



DS-600 (with an optional bracket)

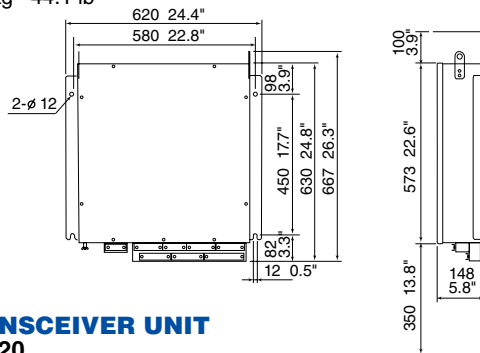
3.3 kg 7.28 lb



DISTRIBUTION BOX

DS-610

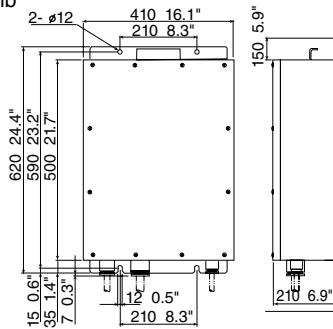
20.0 kg 44.1 lb



TRANSCIVER UNIT

DS-620

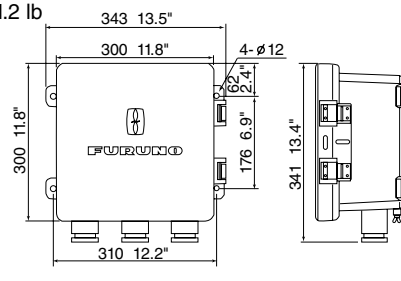
19.0 kg 41.9 lb



WATERPROOF BOX (Option)

DS-605

9.6 kg 21.2 lb



TRANSDUCER / TRANSDUCER TANK

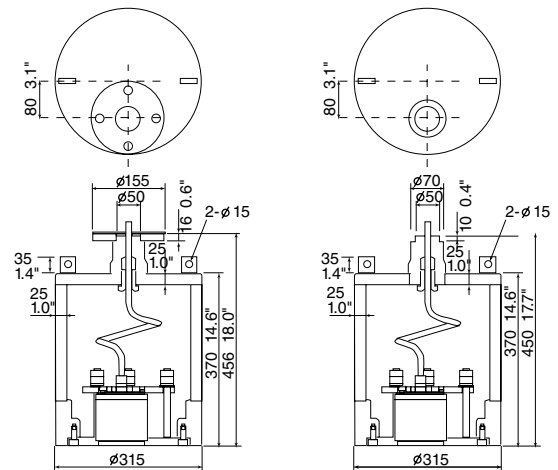
DS-630 / DS-660

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

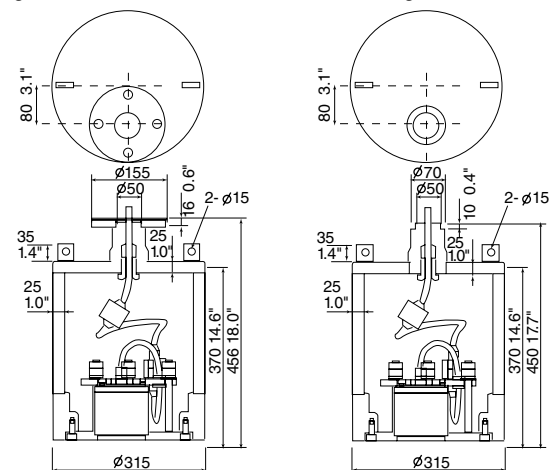
DS-631 / DS-660

installation with a flange

*100.0 kg 220.5 lb

installation without a flange

*96.0 kg 211.6 lb

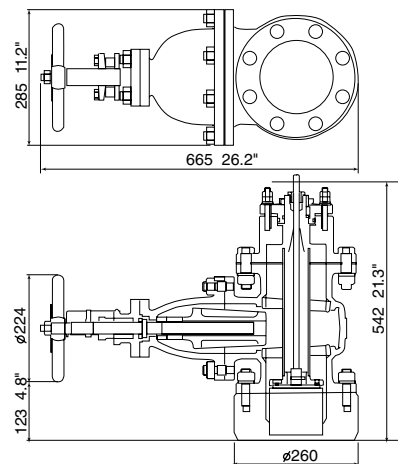


*Weight of transducer tank

GATE VALVE

DS-661

120.0 kg 264.5 lb



SPECIFICATIONS

MEASUREMENT RANGE OF SHIP'S SPEED

Fore-Aft	-10.0 to 40.0 kn
Port-Starboard	-9.9 to 9.9 kn

MEASUREMENT DEPTH

Speed over ground	1 to 200 m below hull bottom
Speed through water	0.5 to 25 m below hull bottom

ACCURACY

Ground-tracking (Ship's speed: less than 1 kn)	±0.01 m/s, whichever is greater
Ground-tracking (Ship's speed: more than 1 kn)	±1.0 % or ±0.1 kn, whichever is greater
Water-tracking	±1.0 % or ±0.1 kn, whichever is greater
Port-Starboard at stern	±1.0 % or ±0.04 kn, whichever is greater

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

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

POWER SUPPLY

100-240 VAC

ENVIRONMENT

Temperature	
Main Display	-25°C to +55°C
Other Units	-15°C to +55°C
Waterproofing	
Main Display	Front: IP56 Back: IP22
Distribution Box	IP22
Tranceiver Unit/Junction Box	IP44
Transducer/Transducer Tank/Gate Valve	IP68

EQUIPMENT LIST

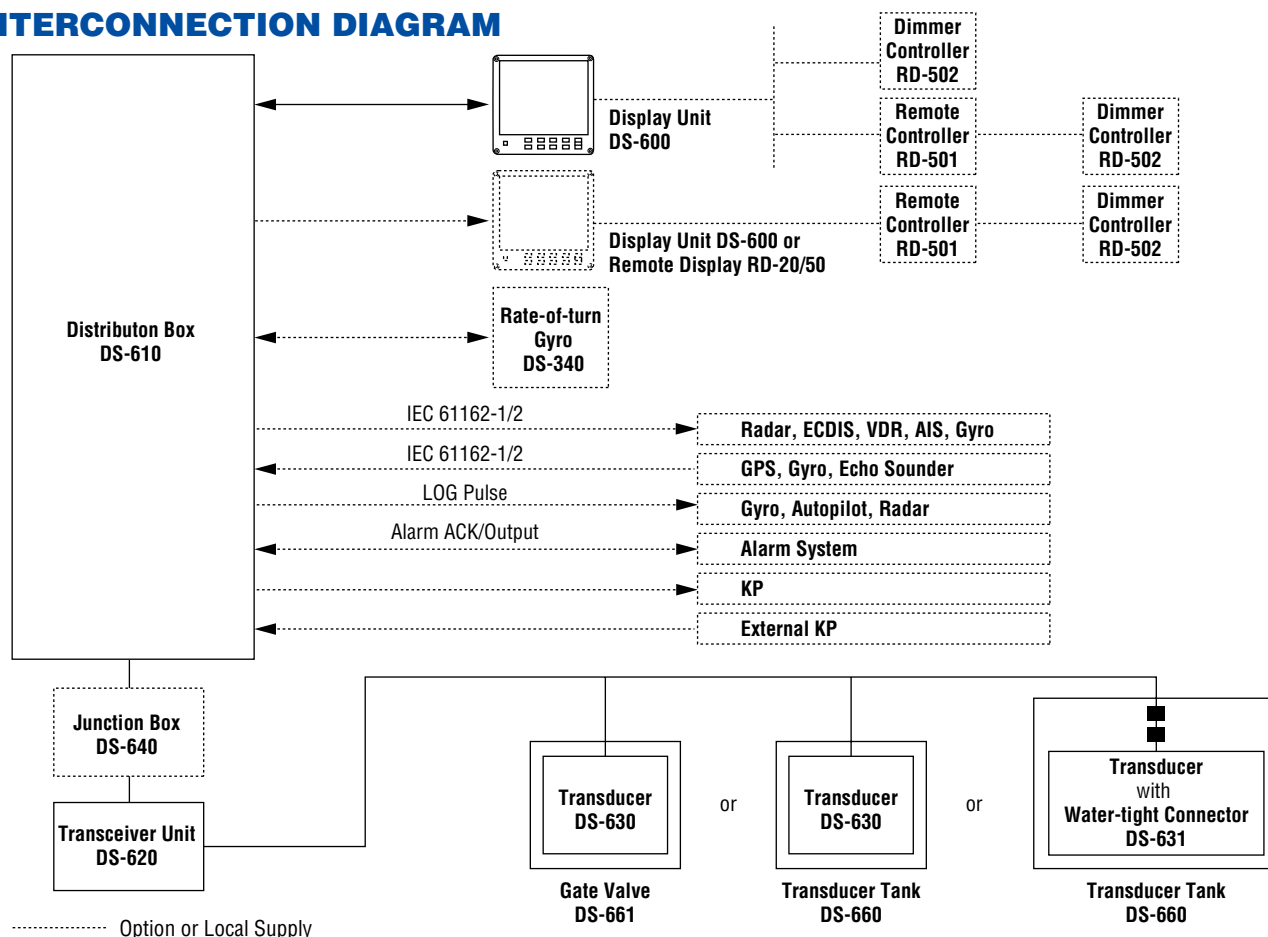
Standard

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
Remote Controller	RD-501
Dimmer Controller	RD-502
Bracket (for Display Unit DS-600)	
Flange (for Transducer Tank DS-660)	

INTERCONNECTION DIAGRAM



NAV Data

Status of echoes in last 3 minutes.

Green: ground tracking

Blue: water tracking

Background color: no echo

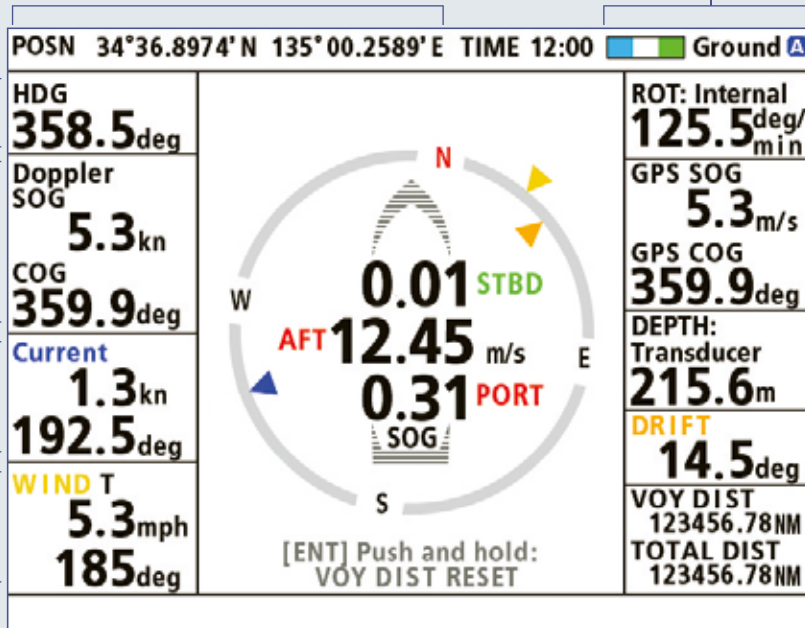
Speed tracking mode

-Ground

-Water

-A (Auto)

Position

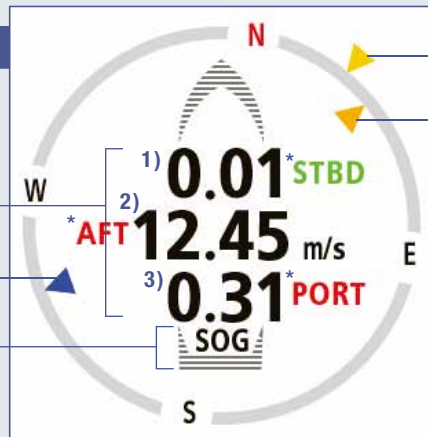


3-axis speed display

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

Current direction
(flowing to)

Speed mode
(SOG or STW)



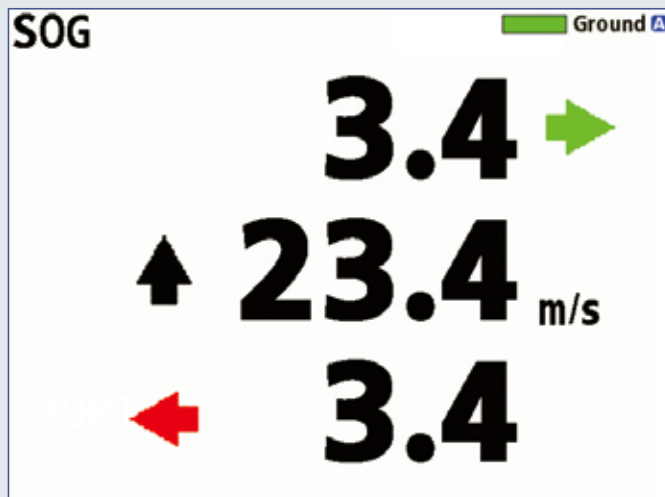
Wind angle

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
→ ← ↑ ↓

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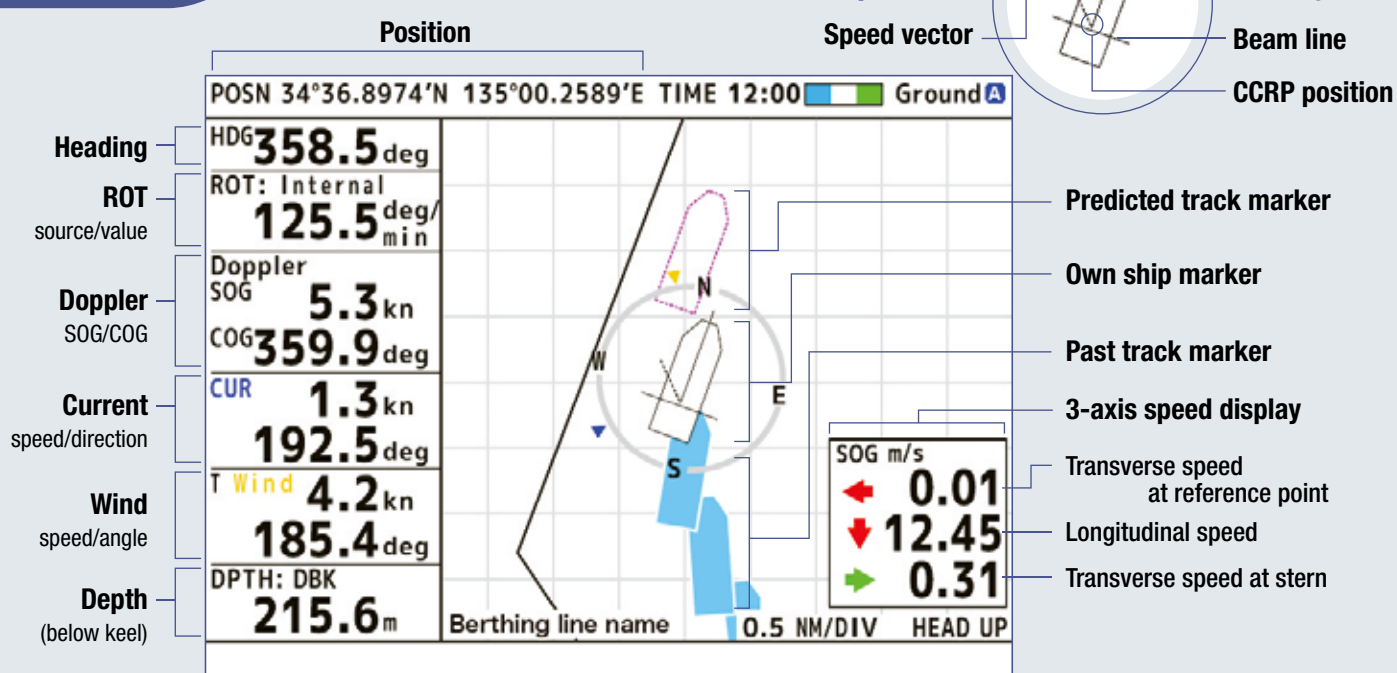
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- ▶ Full compliance with IMO MSC.36(63), MSC.96(72), A.694(17) and A.824(19), required for the vessels of 50,000 GT and greater
- ▶ Delivers high precision measurement required for berthing and docking maneuvers
- ▶ 3-beam transmission reduces the 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



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-axes 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), 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.

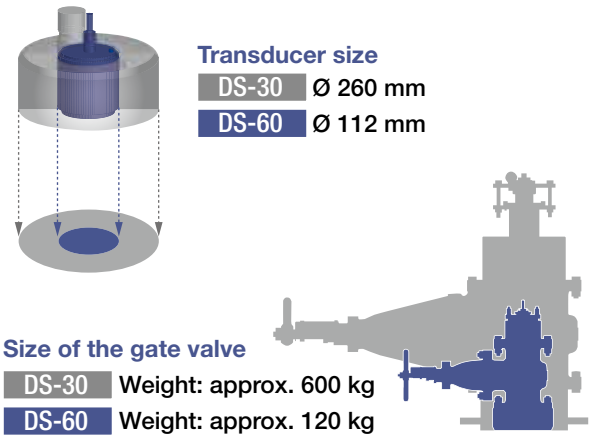
The DS-60 provides accurate information of ship's speed over a wide range. Speeds are detected relative to the ground or water for both fore-aft and port-starboard directions. The measurement capability at dead slow speed is vital for precise docking of huge tankers to oil loading/unloading facilities, 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 alphanumerics and graphics. It offers three display modes: 3-axes 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 inaccuracy	Ship's speed (less than 1 kn) : ±0.01 m/s, whichever is greater Ship's speed (more than 1 kn) : ±1.0 % or ±0.1 kn, whichever is greater	
Water tracking inaccuracy	±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