

DOPPLER SONAR



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), 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.

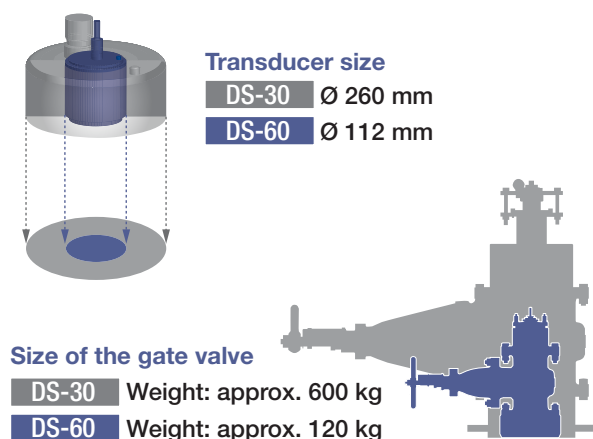
While retaining the measurement accuracy of the DS-30, the DS-60 provides a greatly downsized transducer unit.

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.

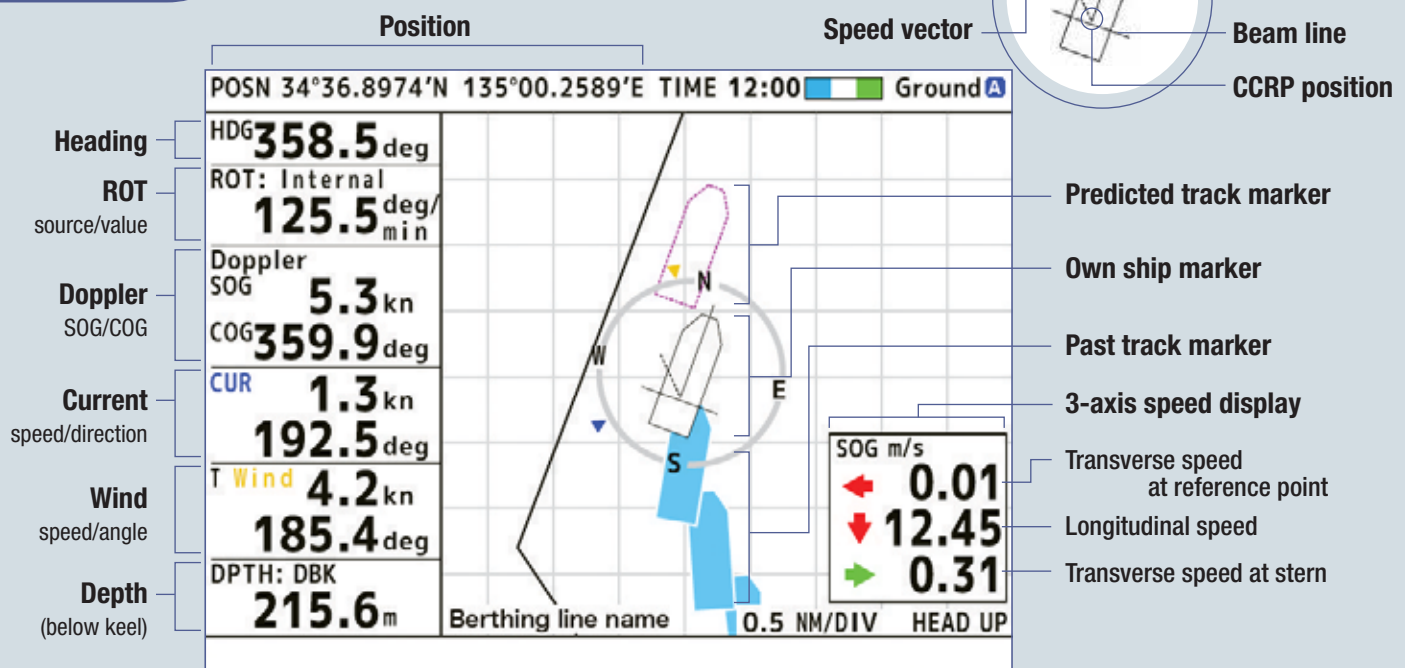


	DS-60	DS-30
Ground tracking inaccuracy	Ship's speed (less than 1 kn): ±0.01 m/s, whichever is greater Ship's speed (more than 1 kn): ±1.0 % or ±0.1 kn, whichever is greater	
Water tracking inaccuracy	±1.0 % or ±0.1 kn, whichever is greater	
Depth range	1-200 m	
Transducer diameter	Ø112	Ø260
Gate Valve diameter	Ø125	Ø326
Gate Valve weight	120 kg	600 kg



- ▶ 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 alphanumeric
- ▶ 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)

Position

POSN 34°36.8974' N 135°00.2589' E TIME 12:00 ■ Ground **A**

Heading

HDG
358.5deg

Doppler
SOG/COG

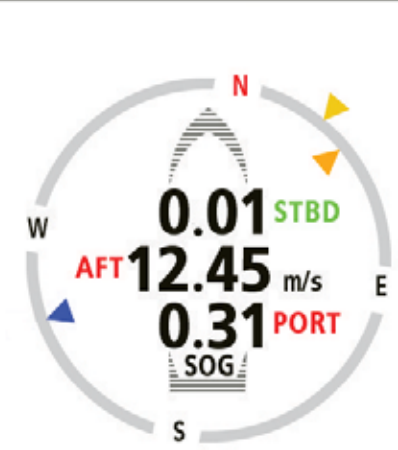
Doppler
SOG
5.3kn
COG
359.9deg

Current
speed/direction

Current
1.3kn
192.5deg

Wind
speed/angle

WIND T
5.3mph
185deg



ROT: Internal
125.5deg/min

ROT
source/value

GPS SOG
5.3m/s
GPS COG
359.9deg

GPS measured
SOG/COG

DEPTH:
Transducer
215.6m

Depth
(selectable from echo sounder or doppler)

DRIFT
14.5deg

Drift angle

VOY DIST
123456.78NM
TOTAL DIST
123456.78NM

Voyage distance
Total distance run

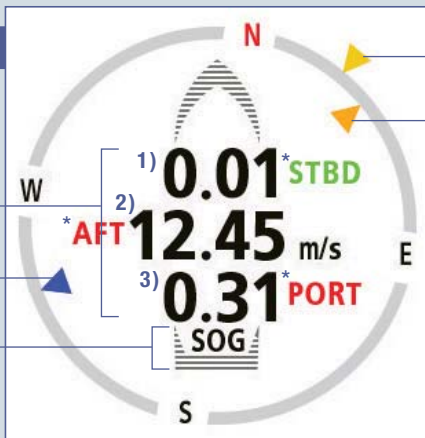
[ENT] Push and hold:
VOY DIST RESET

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

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
 Transceiver Unit/Junction Box IP44
 Transducer/Transducer Tank/Gate Valve IP68

EQUIPMENT LIST

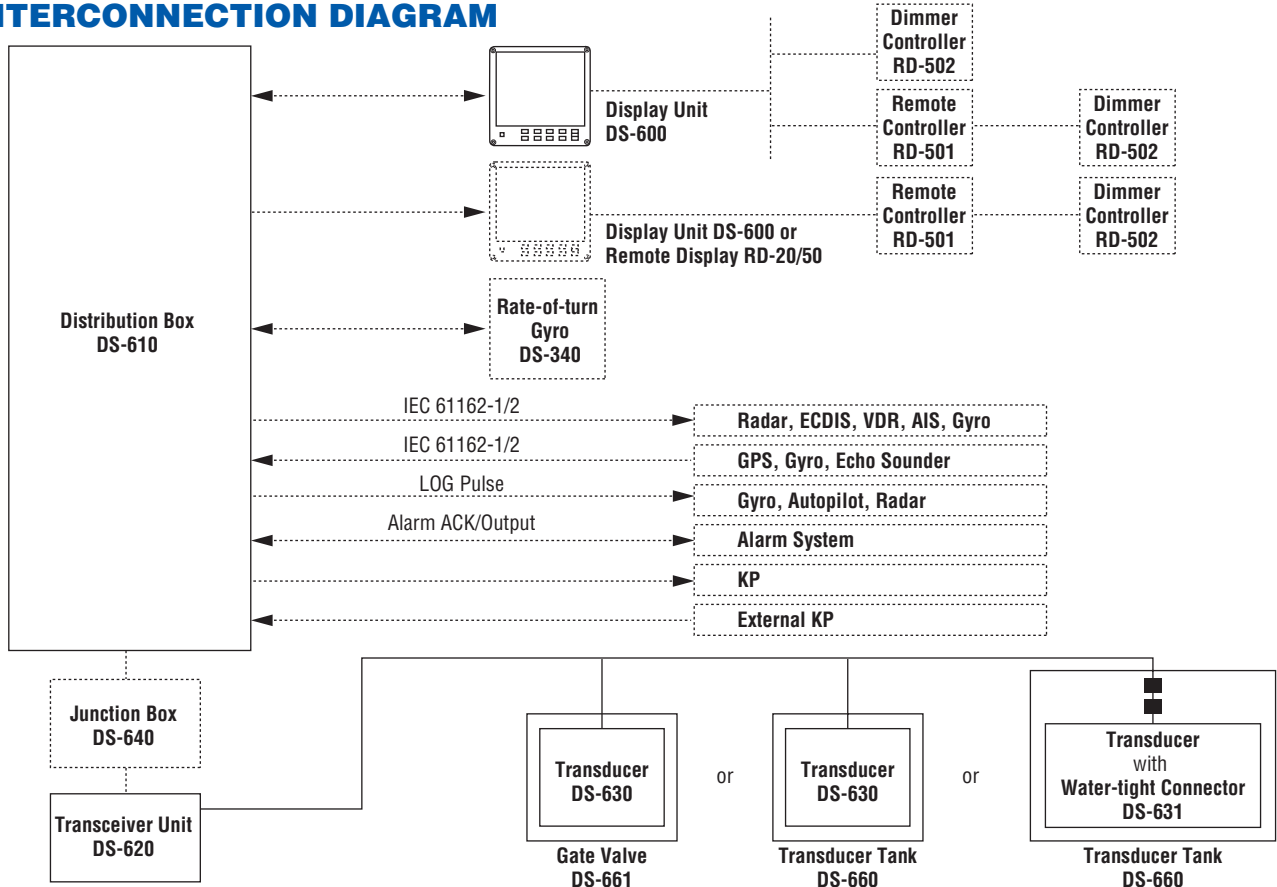
Standard

- | | | |
|--|--------|--------|
| 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



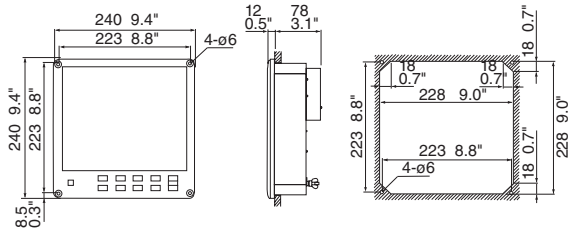
----- Option or Local Supply

*Cable length between Transceiver Unit and Transducer is selectable from 30, 40, 50 and 60 m.

DISPLAY UNIT

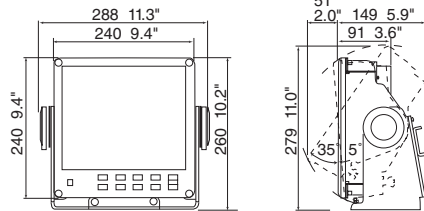
DS-600 (Flush mount)

2.1 kg 4.62 lb



DS-600 (with an optional bracket)

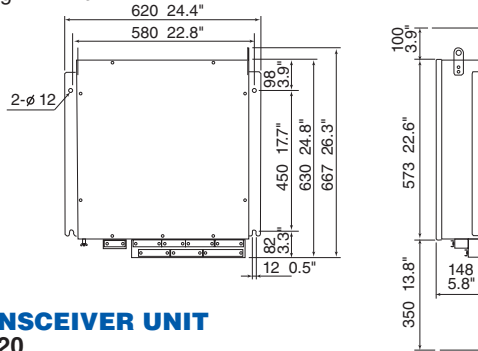
3.3 kg 7.28 lb



DISTRIBUTION BOX

DS-610

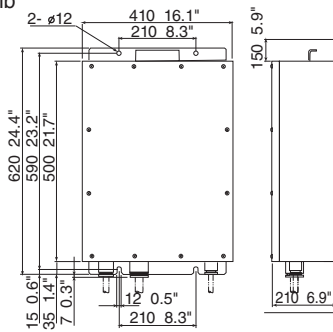
20.0 kg 44.1 lb



TRANSCIVER UNIT

DS-620

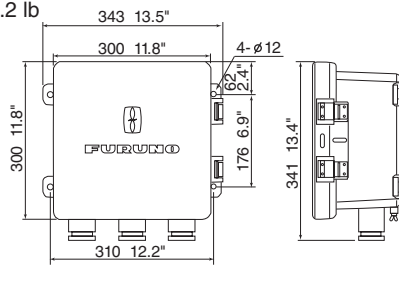
19.0 kg 41.9 lb



WATERPROOF BOX (Option)

DS-605

9.6 kg 21.2 lb

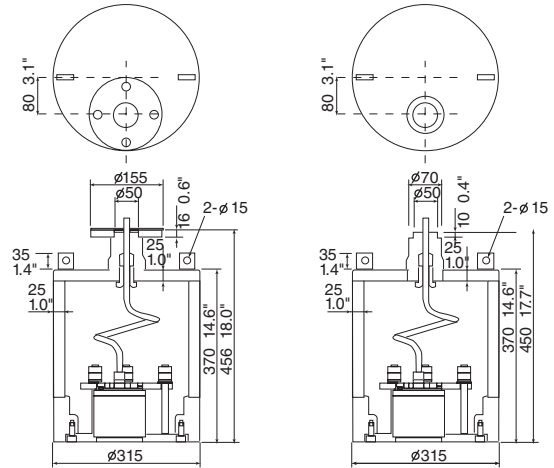


TRANSDUCER / TRANSDUCER TANK

DS-630 / DS-660

installation with a flange
*100.0 kg 220.5 lb

installation without a flange
*96.0 kg 211.6 lb



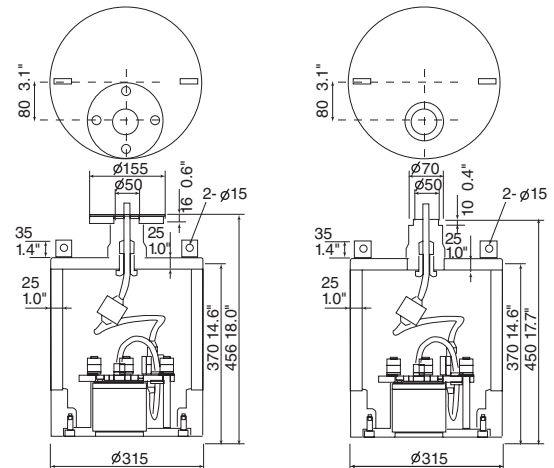
*Weight of transducer tank

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

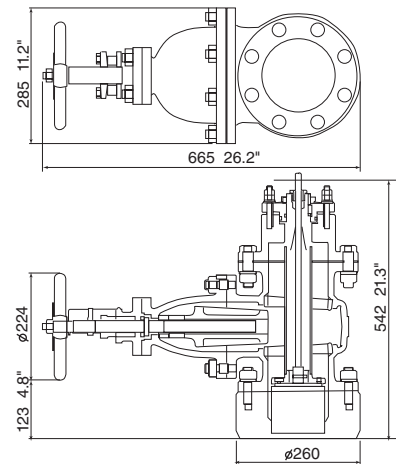


*Weight of transducer tank

GATE VALVE

DS-661

120.0 kg 264.5 lb



All brand and product names are registered trademarks, trademarks or service marks of their respective holders.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

FURUNO ELECTRIC CO., LTD.
Nishinomiya, Hyogo, Japan
www.furuno.com

FURUNO U.S.A., INC.
Camas, Washington, U.S.A.
www.furunousa.com

FURUNO (UK) LIMITED
Havant, Hampshire, U.K.
www.furuno.co.uk

FURUNO NORGE A/S
Ålesund, Norway
www.furuno.no

FURUNO DANMARK A/S
Hvidovre, Denmark
www.furuno.dk

FURUNO SVERIGE AB
Västra Frölunda, Sweden
www.furuno.se

FURUNO FINLAND OY
Espoo, Finland
www.furuno.fi

FURUNO POLSKA Sp. z o.o.
Gdynia, Poland
www.furuno.pl

FURUNO DEUTSCHLAND GmbH
Rellingen, Germany
www.furuno.de

FURUNO FRANCE S.A.S.
Bordeaux-Mérignac, France
www.furuno.fr

FURUNO ESPAÑA S.A.
Madrid, Spain
www.furuno.es

FURUNO ITALIA S.r.l.
Genoa, Italy

FURUNO HELLAS S.A.
Glyfada, Greece
www.furuno.gr

FURUNO (CYPRUS) LTD
Limassol, Cyprus
www.furuno.com.cy

FURUNO EURUS LLC
St. Petersburg, Russian Federation
www.furuno.com.ru

FURUNO SHANGHAI CO., LTD.
Shanghai, China
www.furuno.com/cn

FURUNO KOREA CO., LTD.
Busan, Korea

RICO (PTE) LTD
Singapore
www.rico.com.sg

14073SK Printed in Japan
Catalogue No. M-1547c