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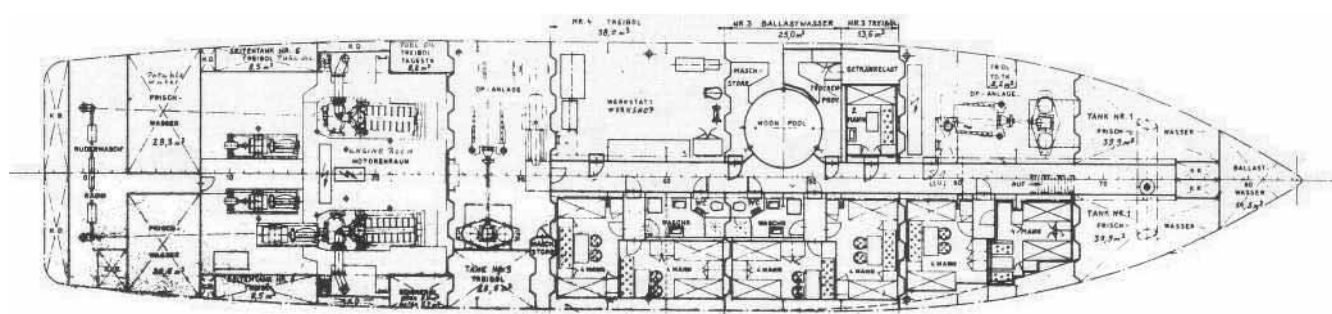
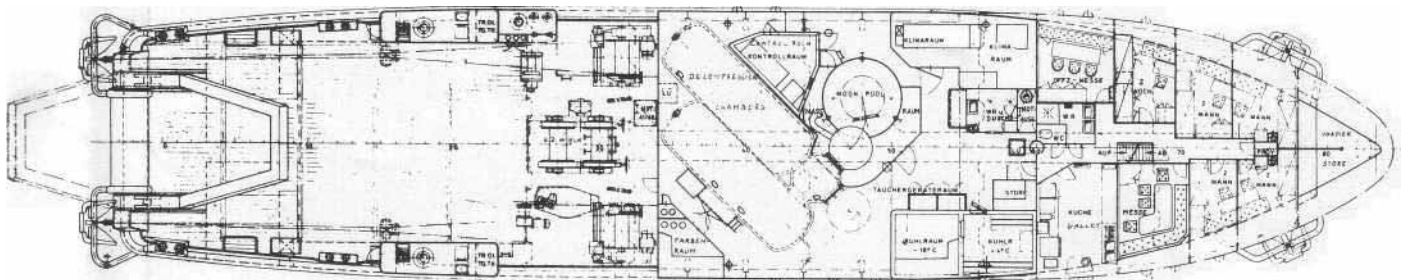
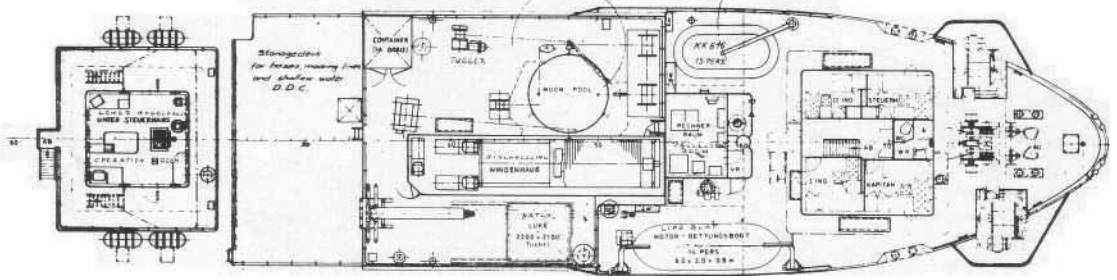
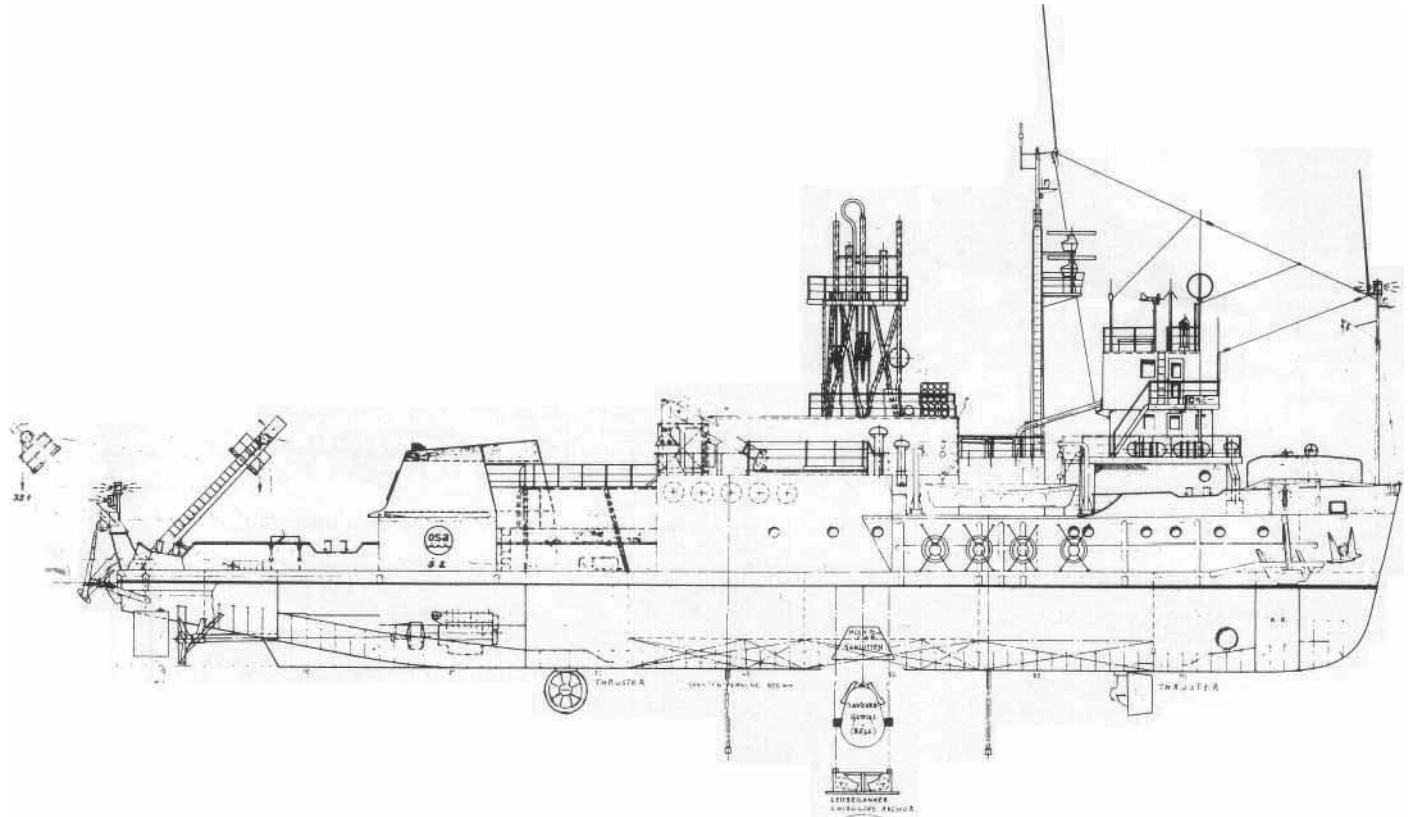
# DEEP DIVING SUPPORT VESSEL OSA S2 KATTENTURM

Offshore Supply Association Limited



Outline Specifications

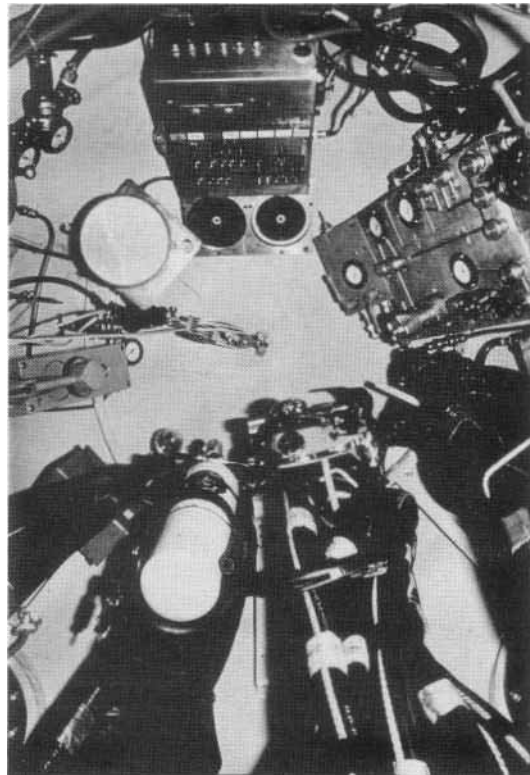
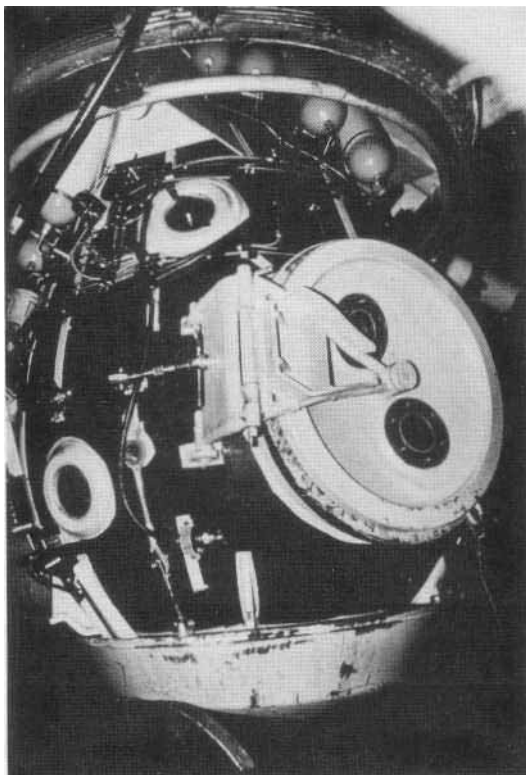
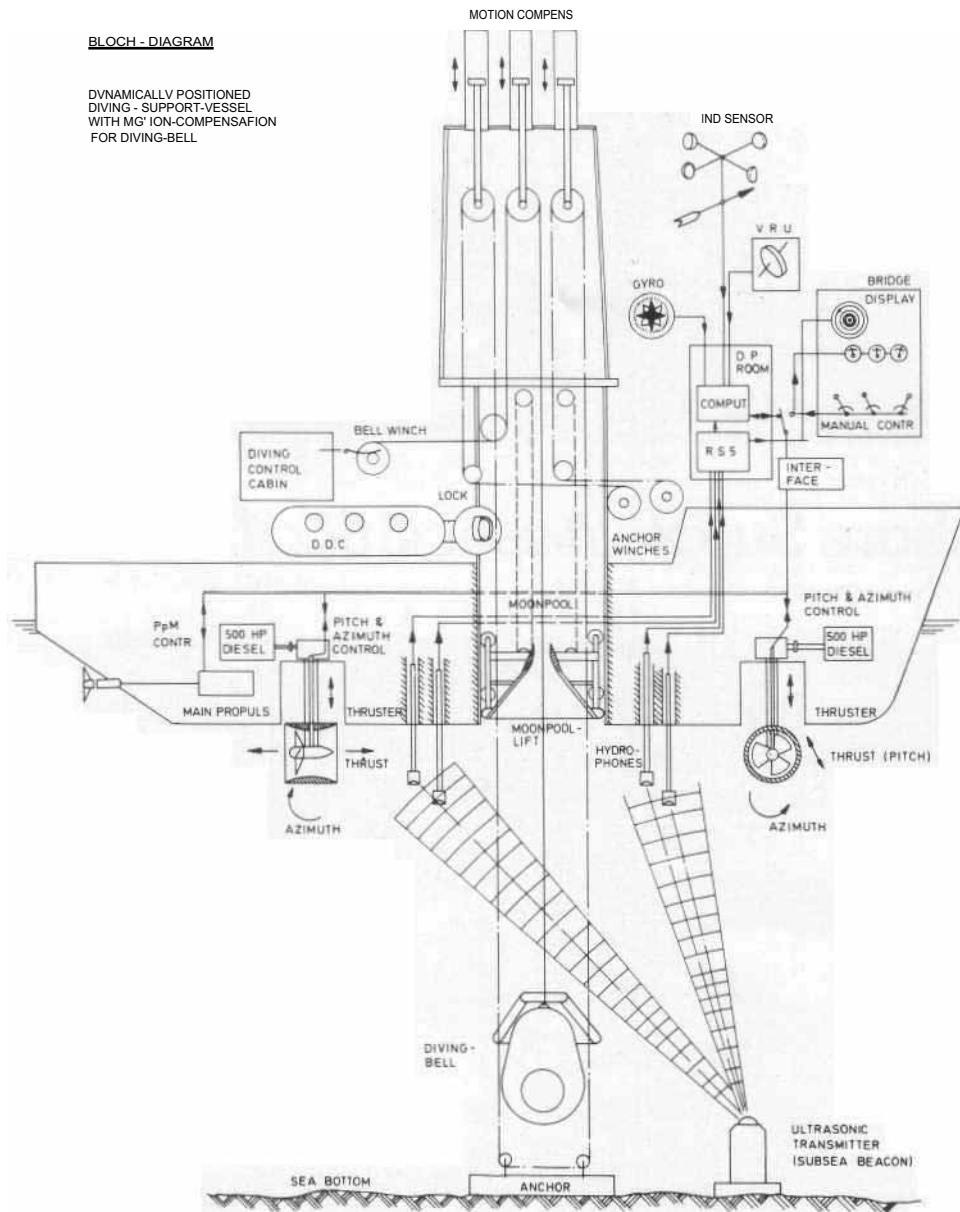
# DEEP DIVING SUPPORT VESSEL

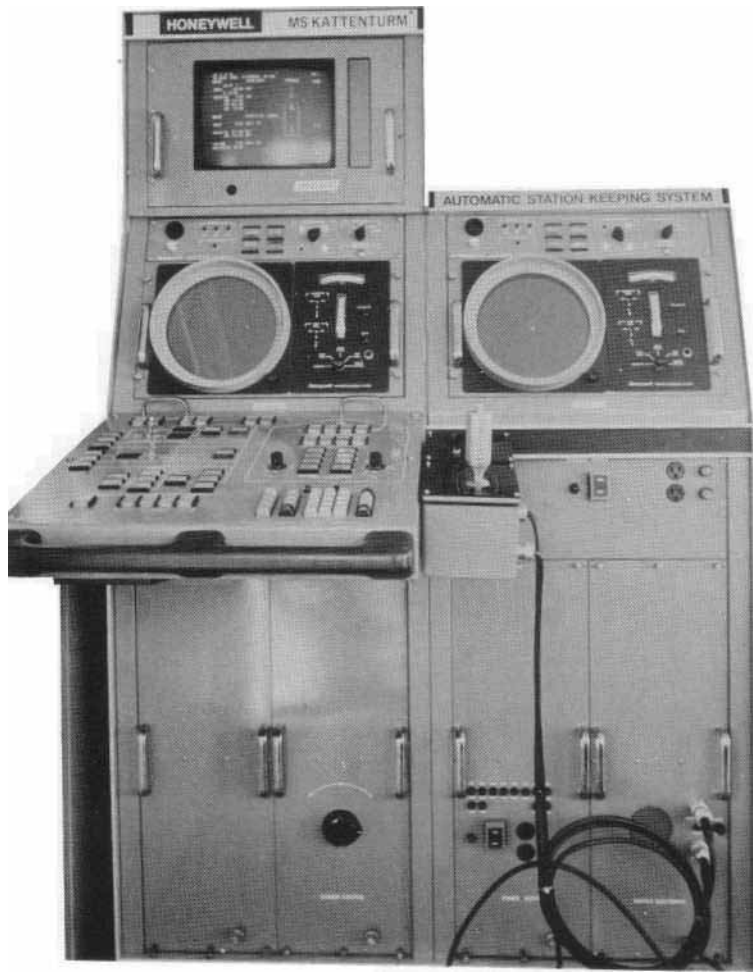


# OSA S2 KATTENTURM

## BLOCH - DIAGRAM

DYNAMICALLY POSITIONED  
DIVING - SUPPORT-VESSEL  
WITH MG' ION-COMPENSATION  
FOR DIVING-BELL



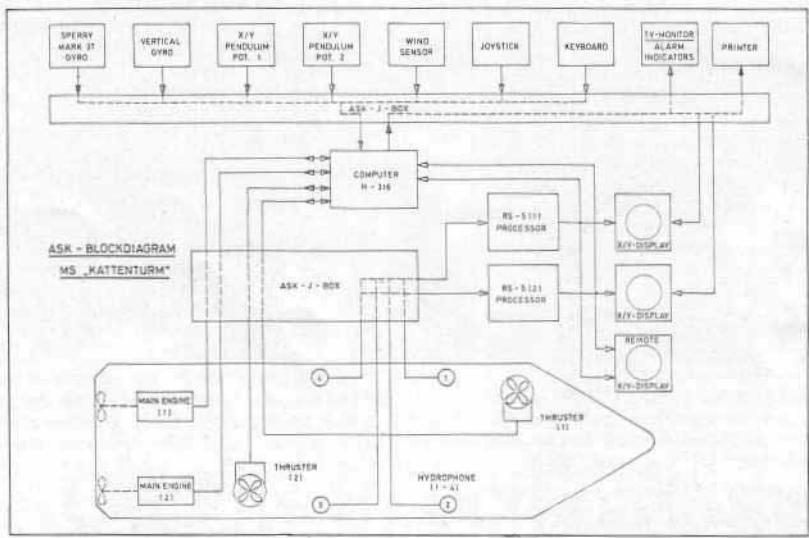


**AUTOMATIC STATION KEEPING SYSTEM (ASK)**

The vessel is equipped with a Honeywell Automatic Station Keeping System (ASK) which incorporates the Honeywell H316 computer. This unit accepts input information from the multi-channel sub-sea beacon via the through-hull hydrophones, wind sensor and gyro compass to determine and control Optimum direction and thrust from the two thrusters and two main engines (if required) for accurate position keeping. A visual display unit and manual override with joystick control together with print out facilities that provide full details an position, wind speed and compass heading are located an the DP control bridge.

The major advantages are:

- Ease of establishing a given position
- High accuracy, independent of depth and environmental conditions
- No risk of fouling pipelines, manifolds, well heads, jacket legs, etc.



M.V. "KATTENTURM"

DESCRIPTION OF THE DIVING SYSTEM

The main components of the system are:

- 1) Two decompression chambers  
max. working pressure: 435 p.s.i.  
inside diameter: 85.2 in. (216,4 cm)  
length: 291.3 in. (739,9 cm)  
door diameter: 31.5 in. (80.0 cm)

Designed to accommodate 6 divers each DDC under pressure equipped with 6 bunks, table, 2 settees, shower and toilet. DDC's are air-conditioned with humidity control and odour absorption. Video monitors and communicators equipped with helium and unscramblers are installed.

- 2) Transfer lock:  
The transfer lock links the two DDC's with the diving bell and the rescue bell.  
Chain: 74.0 in. (188 cm)  
Door Ø: 31.5 in. (80 cm)

Medical lock and life support systems for 6 divers are fitted.

Connection of diving bell and rescue bell is made with the aid of hydraulically operated clamps.

- 3) Diving Bell:  
Egg-shaped lower dia.: 70.5 in (179.07 cm)  
upper dia.: 51.8 in (131.57 cm)  
height: 98.4 in (249.94 cm)  
Max. working depth: 1,000ft (305 m)  
Observation dives: 1,500ft (457 m)  
Inside Testing pressure: 900 p.s.i.

Designed to accommodate 4 divers with required life support systems. Equipped with medical lock, ballast with inside release, gas storage tanks (total filling volume 1200 cu.ft. at 200 bars), hot water heating, emergency telephone, 4 seats, hot water and gas supply from surface power supply and communication through a coaxial cable which is spun into the main cable, emergency power by attached trickle charge batteries, 9 outside lights 100W each, bottom entrance with hydraulic operation of bottom door from inside, cable clamps (hydraulically operated from inside) to secure. The power supply and communication system mainly consists of: (a) 4 individual diver headsets with connection to the control room via helium unscrambler, (b) audio communication bell - control room (c) TV cameras observing inside of bell and bottom entrance. Monitor in control room. (d) TV camera in control room with monitor bell (e) power supply to bell 20 KVA via coaxial cable. (f) environmental data control transmitted from the diving bell to the control room giving inside pressure, diving depth, oxygen partial pressure, gas reserves, humidity, CO<sub>2</sub>.

Breathing gases for divers are supplied in a closed circuit by circulation through a compressor mounted to the bell, resulting in considerable savings of helium.

- 4) Salvage capsule (not supplied as yet):  
max. working pressure: 435 p.s.i.  
diameter: 70.9 in 180 cm

To accommodate 6 divers under pressure. Life support systems are fitted accordingly for 300 man hours.

- 5) Breathing gas system:  
4 large helium storage tanks with 1320 gallons each at 2,900 p.s.i.  
Standardised shore connection for helium (W21.80 c 1/14").  
1 large tank for compressed air (as above).  
3 Bauer compressors each 1307 cu.ft./hr. at 2,900 p.s.i.  
Filters for oil, CO<sub>2</sub>, and moisture absorption.  
Breathing bag system for reclamation of helium during decompression.  
Total gas system is rigidly piped and concentrated into a gas terminal.

- 6) Two Atlas Copco compressors for shallow dives having a capacity each of 200 cu.ft./min. a 200 p.s.i.

- 7) Control room (air conditioned):  
Audio and video communication to bell, DDC's, wheelhouse, moonpool area, remote control of bell handling systems and motion compensation, control and analysis of breathing gases, environmental control of DDC's.

- 8) Bell handling System:

Working Method

The following procedure is followed when the bell is launched:

- a) The guideline anchor which, during the vessel's transfer trip, is hanging under the moonpool (for partial closure of same) is lowered to the sea bed by two guidelines.
- b) Motion compensation of the guideline is switched on.
- c) Divers enter the diving bell through the lock.
- d) Diving bell to be disconnected from the lock by opening remote controlled hydraulic clamps.
- e) Diving bell, which is now standing on a hydraulically operated arm, is swung over the moonpool. In this position the bell is secured on the arm by hydraulically operated securing clamps.  
Diving bell is connected to the guidelines.  
Moonpool car closes over the top cone of the bell and hydraulically clamped to it. Bell is lifted from the arm by the moonpool car and arm is turned to clear moonpool I.
- h) Bell is lowered by the moonpool car through the moonpool and released from the moonpool car.
- i) Bell is lowered by the main cable to the required depth.
- j) Motion compensated bell is switched on and bell is clamped to the guidelines. Divers can now leave the bell through the bottom door.

Components of the bell handling System:

General: All mechanical parts of the handling system are designed to withstand additional vertical as well as horizontal acceleration in the range of 1 g.

- a) Guideline Winch: pull 2 x 5 to/2 x 2.5 to at 15m/30m per min.  
Guidelines: diam. 18mm length 500m each

Winch is remote controlled from control house. Winch pays out automatically in case vessel should drift or motion compensation should reach the limits.

- b) Main cable winch: pull 10/5 tons about 15 m/30 m per min.

Adjustable constant pull is also possible.

Main cable: dia. 29.2mm length 500m (with coaxial core, breaking load 38 tons).

Main cable is reeled on the drum (dia. 1870mm) in one layer only. Accurate length meter for the cable is fitted. Winch is remote controlled from control house. Winch pays out automatically in case vessel should drift or motion compensation should reach its limits.

- c) Bell arm:

Bell arm transfers bell from moonpool to the lock entrance. The arm is equipped with a turn-table for proper adjustment of the marking position. When the bell is standing on the turn-table it is secured by hydraulic clamps. All functions as described above are hydraulic and operated from the control room.

- d) Moonpool Car

The moonpool car guides the bell through the moonpool. During this Operation the bell is rigidly connected to the moonpool car. Under the ship's bottom the bell is heaved into a cone and then hydraulically clamped to the car. Shock absorbers are fitted. The car itself runs on rails and is fitted by a tackle guided onto a winch. All functions are hydraulic and remote controlled from the control room.

- e) Motion Compensators:

Main cable and guidelines are heave compensated. Maximum compensation height is 18ft. The system mainly consists of 3 compensation cylinders and 2 accumulators with gas storage tanks working as adjustable springs. Extension length of the cylinders: 9ft. Cables are guided over extra large diameter sheaves. Electronic sensors indicate the Position of each sheave on the control room board, in addition winches pay out or in automatically when extension of the cylinders reach max./min. positions. Main cable compensation can be hydraulically linked to guideline compensator if required, thus compensating the bell also when it is hanging free.

- f) Hose Winches

2 hose winches, one for hot water and one for gas supply of the bell, are fitted. (Hoses: inner dia. 1 3mm, outer dia. 28mm, length 500 m each.) Winches are working on adjustable constant power in conjunction with the main cable.

# DEEP DIVING SUPPORT VESSE

## OSA S2

### KATTENTURM

#### OWNERS

DDG - HANSA, Bremen/V.T.G., Hamburg

#### BUILDERS

Rolandwerft Bremen, conversion by Elsflether Werft Ag., Elsfleth, W. Germany.

#### COMMISSIONING

June 1976

#### GENERAL

Vessel built to German Lloyd's Class + 100 A4 (K) (E) for worldwide operations and especially re-designed as surface support vessel for divers.

The function is to afford facilities for diving activities in water depths of up to 1,000 ft (305 metres) and observation in 1,500 ft (458 metres) water depths for inspection and maintenance of subsea structures, pipe lines, drill rigs, SBM's, hydro couples, etc.

#### PRINCIPAL DIMENSIONS

Length overall	176.55ft (53.81 m)
Moulded breadth	36.09ft (11.00 m)
Moulded depth	13.12ft (4.00 m)
Draught loaded	11.09ft (3.38 m)
Gross tonnage	155.90
Net registered tonnage	482.90
Call Sign	DEHU

#### ACCOMMODATION

Officers	4 single-berth cabins
Crew	5 two-berth cabins
Divers and charterer's personnel	6 four-berth cabins 2 two-berth Cabins

#### AIR CONDITIONING

The vessel is fully air-conditioned for hot and cold climates

#### NAVIGATIONAL EQUIPMENT

Includes 2 radars, Direction Finder, Autopilot, Giro compass, 2 Echographs, SSB Radio, 2 VHF telephones, VHF hand sets and talk-back facilities from the bridge to all key points of the vessel.

A Marine Automatic Plotter is used as display unit in conjunction with DECCA navigator to provide direct and continuous position fixing upon a specially prepared chart simultaneously recording on the chart the track made good.

#### PROPULSION

Main Engines  
Two MAN V8V 16/18T diesel engines are fitted giving a total of 1,908 BHP continuous rating and 2,099 BHP maximum rating.

#### THRUSTERS

Two diesel driven 580/600hp thrusters. 360 degree rotatable and retractable with controllable pitch propellers in Kort-Nozzles are installed.

One transverse type bow thrust unit driven by an electric motor with an output of 120 BHP giving a maximum thrust of 2860 lbs is fitted.

#### AUXILIARIES

Generators	driven by separate engines and producing
2 x 75 KVA	230/400 volt AC 50 cycles
1 x 100 KVA	230/400 volt AC 50 cycles
2 x 115 KVA (Diving Equipment)	230/400 volt AC50 cycles

#### ANCHORS AND CABLES

Conventional anchor system  
Two bow anchors of 2,430 lbs each with 740ft of 1/4" dia. steel chain cable are installed.

#### FOUR-POINT MOORING SYSTEM

Vessel is equipped with a four-point mooring system consisting of two 4,740 lbs bow anchors each with 1,970ft of 1/4" dia. steel wire and two 4,740 lbs Stern anchors each with 3,280ft of 1/4" dia. steel wire. The anchors are designed for high holding power.

#### WINCHES

Heavy duty winch  
Hydraulic double drum heavy duty winch is fitted on the maindeck:  
Dimensions of drums: Dia 700/1,360 x 1300mm width  
Capacity of drums: 1,312ft of 1" dia. steel wire  
Performance: 88,000 lbs at 25ft./min.  
44,000 lbs at 50ft./m in.

#### TENSION WINCH

An air driven constant tension winch is fitted capable of 17,640lbs pull.

Dimension of drum	325/765mm dia. x 61 Omm length
Capacity of drum:	1245 ft of 5/8" dia. wire
Performance:	176401bs at 92ft./min.

#### TUGGER WINCHES

2 tugger winches are fitted each capable of 11,000lbs at 33ft./min.

#### A-FRAME

An 77,000lbs hydraulic A-Frame (McGregor) is installed on the stern for handling of mini-submarines, equipment, etc., and assisting in underwater work. The A-Frame is capable of lifting 26,500lbs in the swinging mode.

#### HYDRAULIC CRANE

A telescope hydraulic crane is mounted on top of the diving compartment capable of handling, amongst others, the rescue bell.

Performance:	12,780lbs at 15.1 ft radius
	10,3601bs at 21.3ft radius
	5,950lbs at 27.9ft radius
	3,9701bs at 34.5ft radius

#### DERRICK

A 2,200lbs. SWL derrick is installed to assist in lowering and recovery of material to/from the divers through the moonpool.

#### WORKSHOP

A workshop for a large variety of repair works is provided containing a lathe, drilling machine, grinding machine, welding equipment, instrument control test panel, etc.

#### STORAGE DECK

In addition to the main deck storage deck of 17ft length and 39ft width is provided for storage of various equipment.

#### SPEED AND CONSUMPTION

Cruising speed:	about 10 knots
Consumption:	approx. 71 US galls/hr

## Offshore Supply Association Limited

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