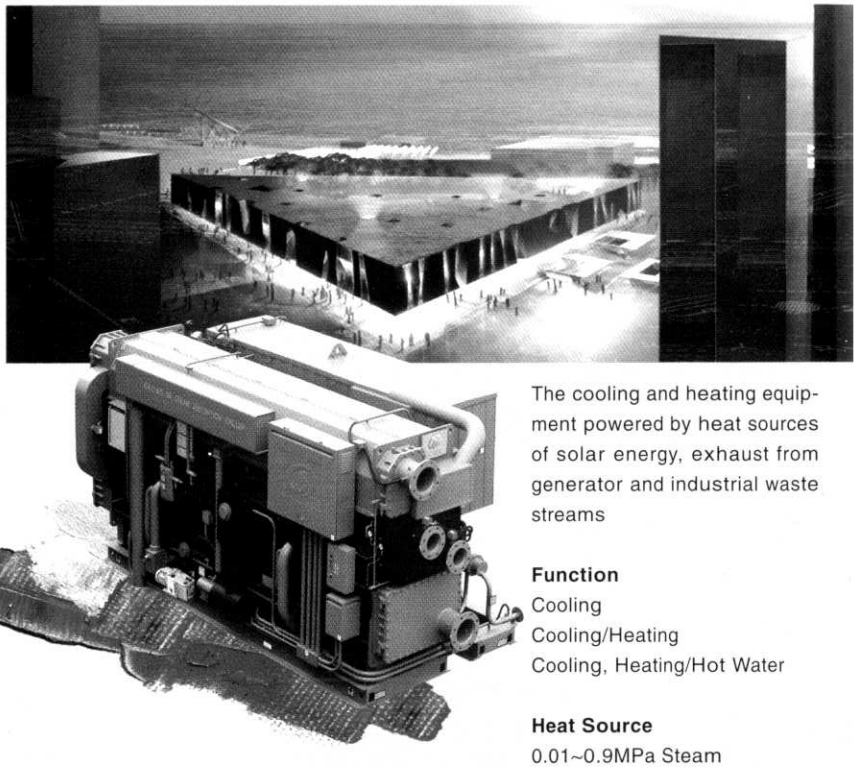
BROAD™ IX ABSORPTION CHILLER

Steam Type
Hot water Type
Exhaust Type
Direct-fired & Steam Type
Direct-fired & Hot Water Type
Direct-fired & Exhaust Type
Direct-fired, Hot water& Exhaust Type



The cooling and heating equipment powered by heat sources of solar energy, exhaust from generator and industrial waste streams

Function
Cooling
Cooling/Heating
Cooling, Heating/Hot Water

Heat Source
0.01~0.9MPa Steam
75~200°C Hot Water
230~600°C Exhaust
Natural Gas, Town Gas, Diesel

Cooling Capacity:
151~23260kW
(43~6614USRT)

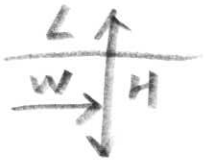
CONTENTS

Product View

Model Selection & Ordering

Specifications

Performance data
Performance curves
P&I diagram
Supply list



Dimensions

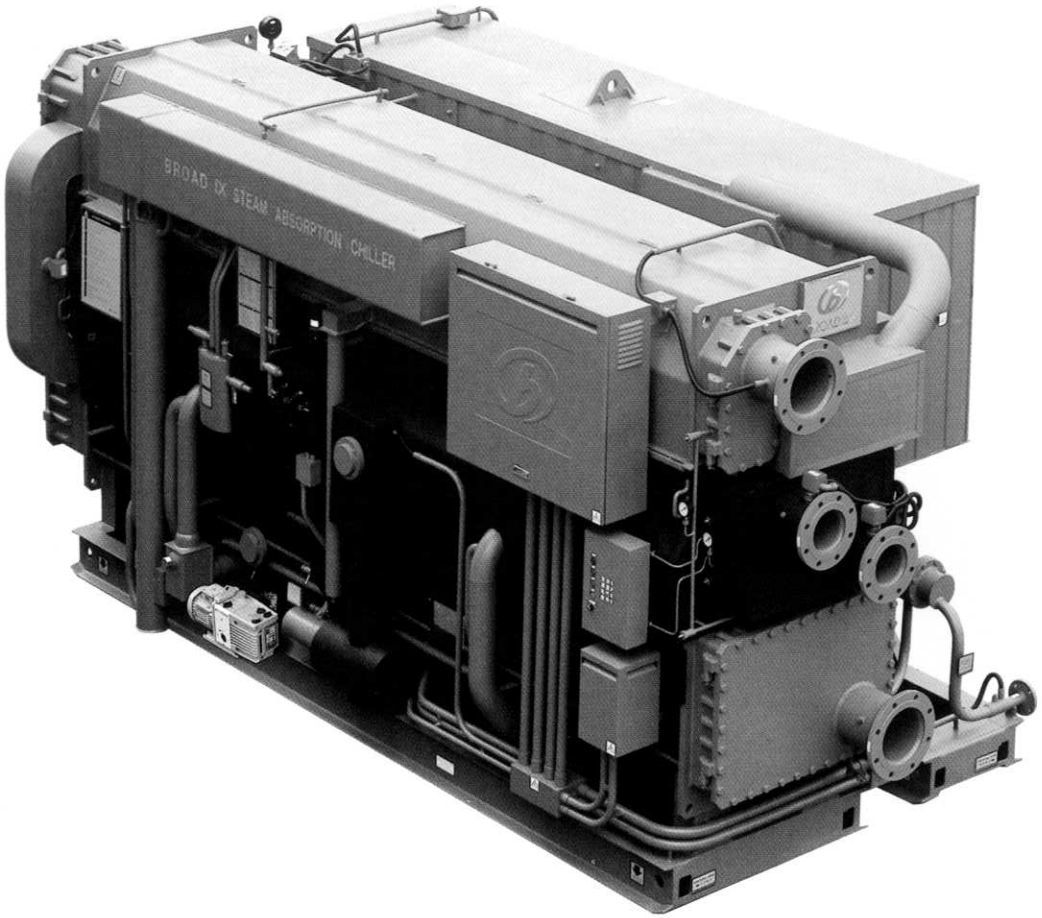
Machine Room Design & Construction Tips

AS LONG AS HEAT SOURCE IS AVAILABLE, WE CAN PROVIDE COOLING

BROAD Absorption Chiller can make use of almost any kind of energy input:

Primary Energy	Heat Equipment	Heat Source	Chiller Type	Function
solar energy	parabolic trough solar collector	⩾ 0.6MPa steam ⩾ 160°C hot water	direct-fired & steam type direct-fired & hot water type	cooling/ heating / hot water
geo-heat (hot spring)	nil	⩾ 75°C hot water	single-stage hot water type	cooling
natural gas	turbine	230°C-350°C exhaust	single-stage exhaust type	cooling/ heating
		⩾ 400°C exhaust	two-stage exhaust type direct-fired & exhaust type	cooling/heating / hot water
light oil	internal combustion engine	⩾ 400°C exhaust ⩾ 90°C jacket water	two-stage exhaust type direct-fired+hot water+exhaust type	cooling/heating / hot water
natural gas coal gas coal bed gas coke-oven gas bio-gas light oil bio-energy	fuel cell thermal power station industrial furnace industrial boiler	⩾ 400°C exhaust ⩾ 0.6MPa steam	two-stage exhaust type two-stage steam type direct-fired & exhaust type	cooling cooling/heating / hot water
garbage	small garbage incinerator	⩾ 400°C exhaust	two-stage exhaust type	cooling/ heating
	garbage incinerator+steam boiler steam turbine	⩾ 0.6MPa steam	two-stage steam type	cooling

Note: 1. The supplementary gas (or diesel) burner can be applied for all two-stage absorption chillers to keep chillers operating when heat source is insufficient or temporarily unavailable.
2. For those heat source data not specified above, whether to use single-stage or two-stage is decided per cooling water temperature and/or chilled water temperature.



The Only Choice

The absorption chiller is the most versatile, dependable, effective and environmentally friendly air conditioning and process cooling technology available today and in the future. This is because absorption chillers use natural refrigerants and are fuel flexible thermally activated systems utilizing clean fossil fuels, bio-fuels, steam, hot water, solar energy or exhaust gas to power the absorption cycle. But, absorption chillers must be designed and manufactured to high quality standards to satisfy customer requirements and achieve their environmental friendliness. Only through responsible use can technology benefit human beings

In the past decade or so, the absorption cooling system, esp. direct-fired absorption cooling systems(the DFA)has emerged from its former obscure reputation, to becoming one of the frequently specified cooling equipment all of the world. If there is one company that has played a decisive role in making all this happen, it is undoubtedly Broad Air Conditioning of China.
The continuous innovation of BROAD product design, construction, control technology, materials science and after-sale service has dramatically changed the understanding of absorption technology that many experts and informed users have, for example absorption technology:

- was once thought to be low in energy efficiency · · · whereas today it has become the most efficient means for cooling and heating!
- was once thought to be of low reliability · · · whereas today the products have achieved zero breakdown during their life-span!
- was once thought to be troublesome to operate · · · whereas today absorption chillers are operator-free all the year round!
- was once thought to be time-consuming and non-standard in model selection, design, installation, commissioning and maintenance · · · whereas today the products are the most transparent applied technologies with the most standardized after-sale service.

Over the past decade, some people thought that the absorption chiller industry was mature and declining and that all absorption chiller manufacturers were the same. More and more people are saying that BROAD is "a company that has revitalized an industry". We are proud of this reputation we have earned.

BROAD has obtained more than 50 absorption chiller patents and some key patents have been registered in dozens of countries which has raised the performance expectation and standards of design for the world's absorption chiller industry. Unfortunately, the absorption chiller industry has not caught up to BROAD's design, construction and high quality standards resulting in more and more gaps in chiller quality and service.

What about those large air conditioning manufacturers that concentrate on making electric chiller products that also make absorption chillers? They make absorption chillers not because of a passion for absorption technology nor for environmental protection but only in case a customer insists on buying one. But BROAD is different. BROAD does not produce electric chillers, not because BROAD is not capable, but because absorption chillers offer a pathway to a sustainable future that cannot be reached with electric air conditioning. The American energy expert Richard Sweetser once observed "if the veins of electric chiller manufacturers are cut, out comes CFCs, but for BROAD out comes liBr solution".

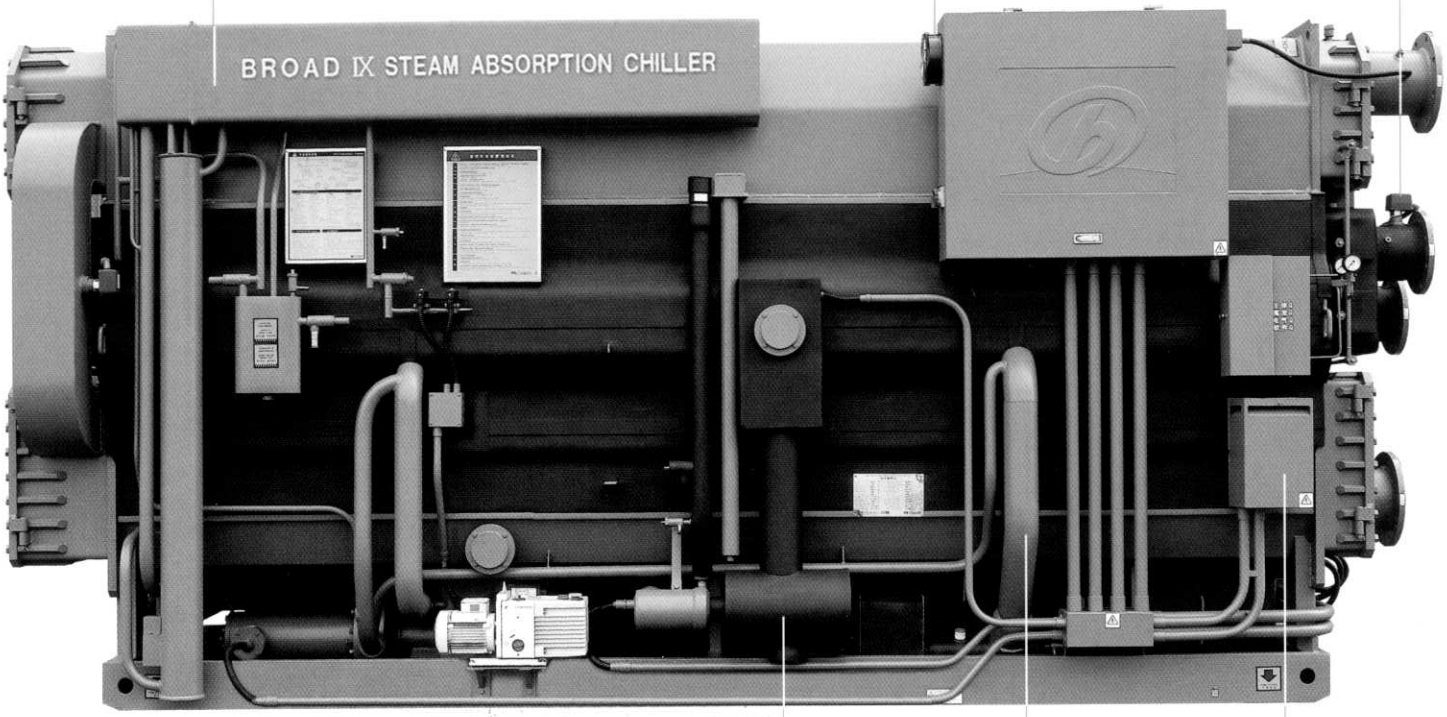
It is a company's focus and values that make the quality difference. We are sure there will be a large disparity in design, construction, features and service of absorption chillers for a long time to come. Central air conditioning is the key equipment for any building involving a large investment; therefore only the best chillers must be selected.

In a word, BROAD has become customers' only choice.

Inline Falling Head Auto Purge System ensures cooling capacity

Temp. controlled fan reduces dusts and ensures the life-span of components

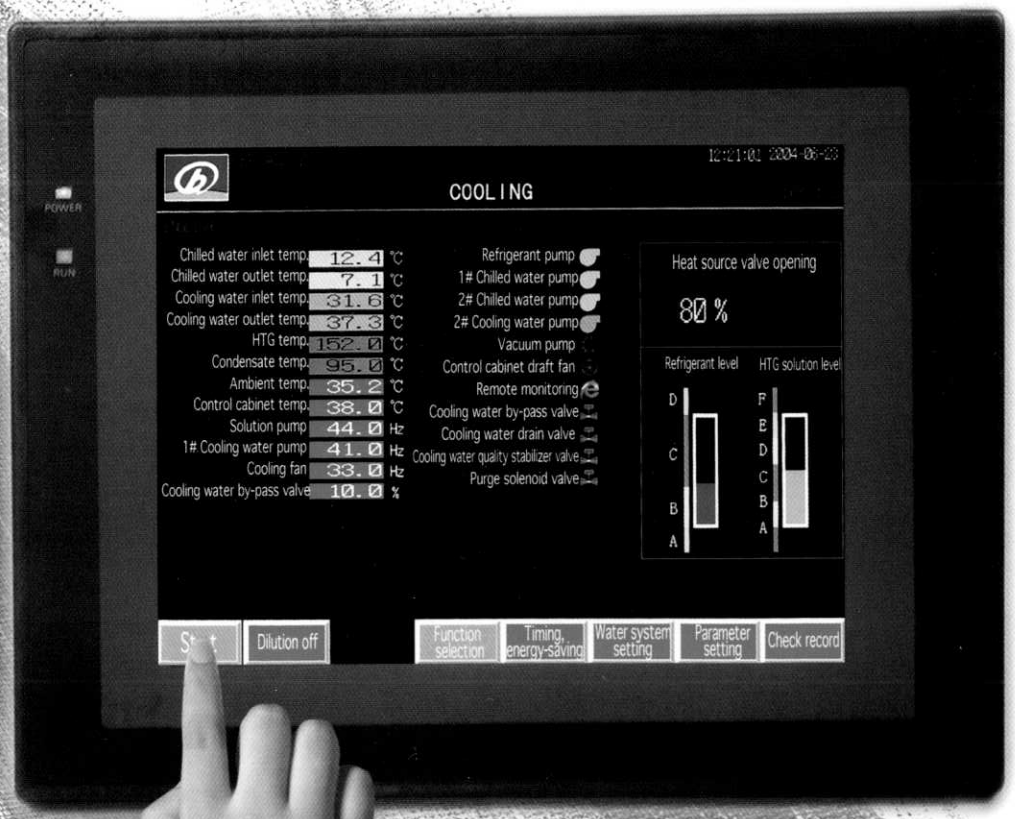
Evaporator 3-level flow control and 3-level temp. control eliminate frozen tubes



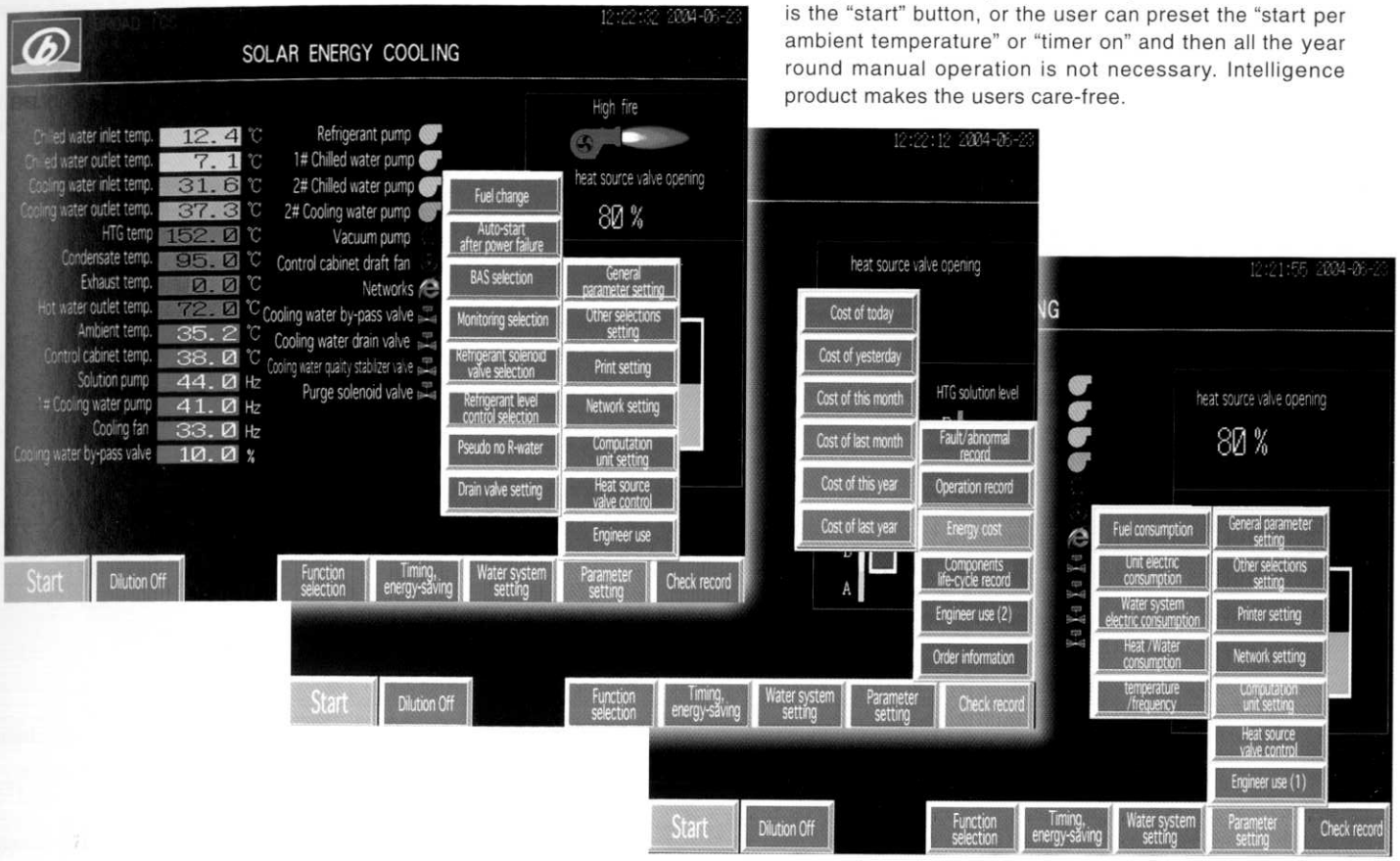
Backwash filter needs no cleaning

Decrystallization of jacket tube eliminates LiBr solution crystallization

Inverter-controlled solution pump adjusts circulation volume accurately



There are many functions on the touch screen, and BROAD engineers will set according to the user's requirements during commissioning. The user only needs to know where is the "start" button, or the user can preset the "start per ambient temperature" or "timer on" and then all the year round manual operation is not necessary. Intelligence product makes the users care-free.



DIFFERENCES BETWEEN BROAD ABSORPTION CHILLERS AND OTHER ABSORPTION CHILLERS

1. Auto anti-crystallization and auto-decrystallization eliminate LiBr solution crystallization.

Solution crystallization had puzzled this industry for 60 years. Other manufacturers have been focusing only on studies of anti-crystallization, but all these anti-crystallization measures cannot prevent crystallization under the abnormal circumstances such as power failure, sensor signal error, low cooling water temp., low chilled water temp., drastic load change, and cannot stop freezing of the refrigerant water during low chilled water temp. (freezing is definitely to result in crystallization). BROAD takes simple and reliable measures like temp. difference detection and auto jacket tube decrystallization to make sure that crystallization can be detected in time and auto decrystallization can be completed within just a few minutes, even after power failure for a long time. It makes crystallation not a fault any longer.

2. Upward nozzle spraying and whole chiller filtration prevent cooling capacity decrease.

Solution nozzles are spraying upward to ensure no clogging. All pump inlets have auto backwash filters to keep the solution clean and to protect canned pumps. In additon, all cooling water inlets and chilled/heating water inlets are equipped with stainless steel filters to ensure no clogging with the chiller and fan coils.

3. Inline falling head auto purge system ensures the cooling capacity and avoids corrosion.

The system uses the height difference between non-condensable inlet chamber and the absorber to purge non-condensable gases. The purging capacity is stable, which is different from traditional ejector based auto-purge devices.

4. 3-level flow switches in evaporator and 3-level temp. sensors eliminate frozen tubes.

Frozen tubes in evaporator can destroy chillers. Frequent frozen tubes had troubled the central air conditioning industry for a long time. Multiple flow switches and temp. sensors are factory-mounted, which ensure no frozen tubes by 100% on the conditions that timely detection is implemented if chilled water is off/low flow/low temp., and cooling water can be off immediately.

5. Information Control System (ICS) ensures continuous operation.

BROAD ICS is designed per "yearly off-site management" and "continuous operation" criteria in developed countries. Besides the regular automatic control functions, ICS is equipped with fuzzy PLC control like sensor fault signal analysis, latent fault detection, parts life-span calculation and mal-operation correction. Moreover, fault with the external system can be reset in a short time. Most importantly, ICS system can conduct important analysis of all faults and realize chiller non-stop from non-key part faults (only 7 faults out of hundreds of malfunctions make a chiller stop, reducing the fault stop rate by 95%). In case any fault or abnormity, timely fault information and repair instruction can be sent to BROAD monitoring center and service engineer through internet to ensure not even one breakdown in the life-span.

6. Plate heat exchanger is 15% min. energy saving.

Crossed corrugated carbon steel sheets are used for solution heat exchanging. After the exchange between the high and low temp. solution, temp. difference is only 3~6℃, while for traditional tube heat exchanger it's around 18~30℃.The application of plate heat exchanger to absorption chiller is a revolution of energy-saving technology.

7. Anti refrigerant overflow avoids the invisible energy waste by 5%~30%.

There are three refrigerant level probes in the chiller, two for on/off of the refrigerant pump and one for anti-overflow. When the combustion (heat input) is too great, the cooling load decreases, chilled water temp. is low or the vacuum condition is not good, the refrigerant water will rise. When the probe detects any overflow, the burner(or heat source valve) will shut down immediately.

If no function like this, the chiller will be always in refrigerant overflow/heating condition.

Since overflow occurs internally at part load, no one had found it for 60 years, which is one of the reasons that why people regard absorption cooling as high energy consumption.

8. Parallel flow and solution separation can be 7%~12% energy-saving.

Diluted solution flows into HTG and LTG separately, the circulation volume decreases by 50%, heat exchange loss decreases by 50%.

HTG and LTG are designed for concentrated solution separation construction which lowers the generator temp. and extends its life span.

9. Inverter-controlled cooling water and low resistance chilled/heating water can be 40%~60% electricity-saving.

The chiller has inverter signal output function for the cooling water pump and cooling fan, which dramatically reduces the electricity consumed by cooling water pump and cooling fan at part load or at low ambient temp. It can also regulate accurately the chilled water outlet temp. The cooling water and chilled/heating water resistance are 20-50% less than those of other absorption chiller manufacturers (50~80% less for low flow rate option), so water pumps can be selected of smaller capacity and with less electricity consumption for operation.

10. Energy saving operation mode with energy cost calculation and on-line energy management.

According to ambient temp., auto adjustment of chilled water outlet temp. and auto on/off can be implemented to avoid energy waste and further comfort. On-line consumption of fuel, electricity, water and cost can be recorded and accumulated for yesterday, today, this month, last month, this year and last year, which is like an accountant. High or low energy consumption can reflect chiller performance. Repair or maintenance can be known beforehand.

Generator of single-stage hot water chiller

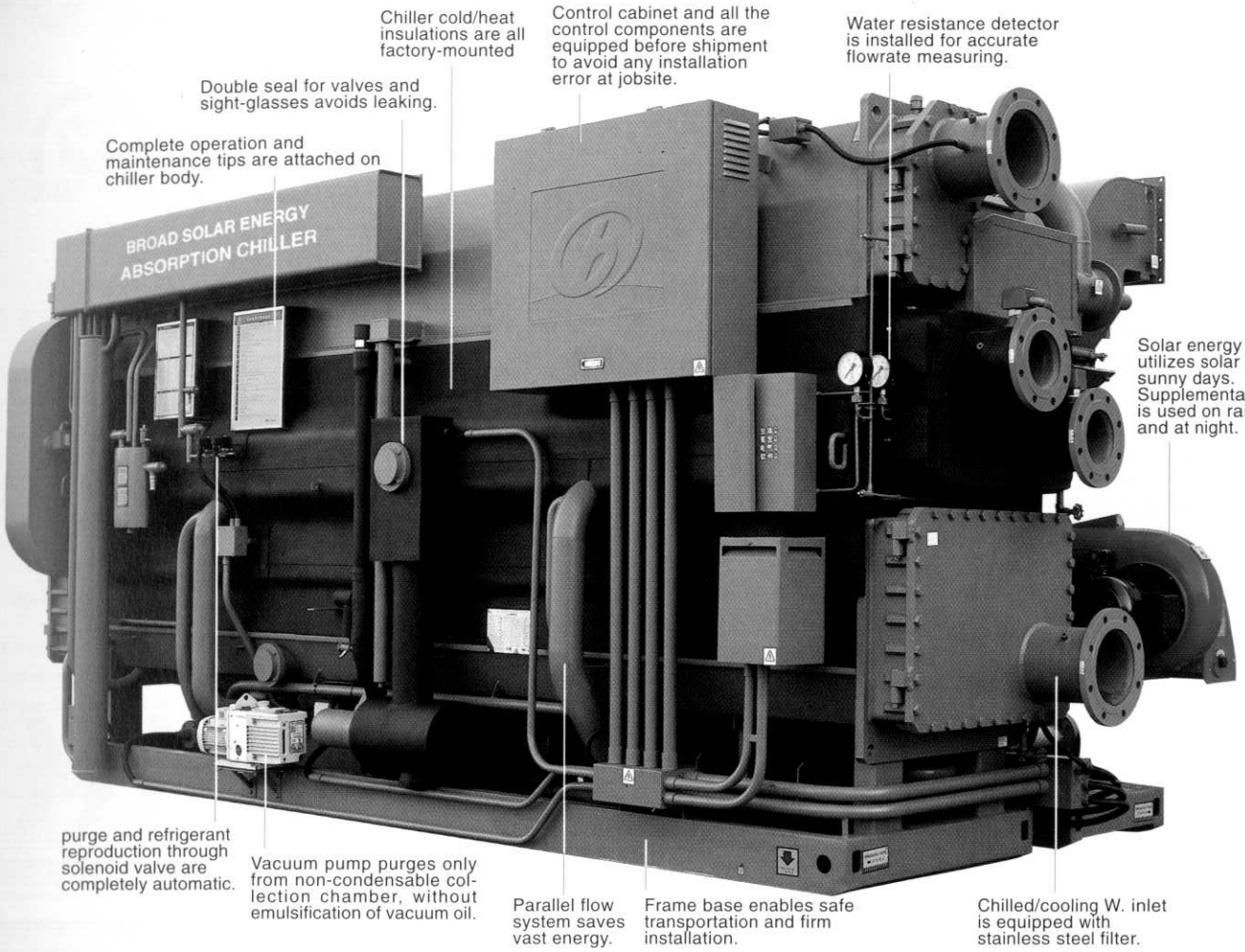
For all BROAD absorption chillers, only different generators are used for different energy sources. The evaporator, absorber, and condenser are the same to ensure all the BROAD chillers are of the same technical level.

Heat source motor valve
PID auto regulation

Pipe connections for large-sized chillers are on the side (marine water box), which is convenient for maintenance

Plate heat exchanger is remarkably energy-saving

Remote Monitoring Center offers 24/7/365 internet monitoring



11. Auto purging system saves labor cost and increases reliability.

Besides the control system that functions auto on/off, timer on and start per ambient temp., solenoid valve for purging and refrigerant reproduction are equipped so that no manual operation is needed, periodic cooling capacity decrease and corrosion can be avoided.

12. Additional function of cooling water control ensures system stability.

① The 3-way motor valve adjusts the cooling water temperature by automatic bypassing water flow to avoid crystallization resulting from too low solution temp. and to achieve a proper cooling water temp. in corresponding to HTG temp., which is relatively low to maximize the COP.
② According to the cooling load, the control system calculates the cooling water evaporation/concentration rate to decide the replacement interval of cooling water. Water is automatically made up after it is drained to ensure water quality and to avoid water waste.
③Water quality stabilizer charge valve (or pump) control interface is provided to automatically add anti-scale & antibacterial chemicals after cooling water replacement ensuring no fouling with the absorber and condenser, and no legionella in cooling tower.
These fuctions not only save the investment on a fulltime operator, but also avoid such accidents as scaling, corrosion, fault stop accidents caused by poor water quality, and the high risk of copper tube corrosion due to chemical descaling.

13. Design for easy installation, maintenance and repair. Nothing in technology is considered trivial.

Complete technical parameters, precise performance curves, diverse energy sources and perfect adaption to environment provide convenience for model selection and also enhance the engineering design.
All control elements are factory-mounted to reduce machine room design cost and field installation cost. Possible designing, installation and commissioning faults are avoided.Water resistance detecting device is equipped to confirm the water flow rate and to judge flow meter tolerance or filter blockade accidents. Factory-mounted heat/cold insulation avoids damage to the chiller caused by field insulation."HTG removable enclosure" is convenient for leakage checking. Design of HTG fire tubes is easy for descaling, leakage checking and repair.Marine water box for large-sized chiller is convenient for tube cleaning and inspection.All valves & sight-glasses are double sealed, not only air-proofing but also convenient for replacement of sealing elements. General easily worn-out parts and sealing materials are used and not changed along with chiller upgrading, which simplifies spare parts management. All the welding seams are convenient for leakage checking and makeup welding, so the chiller can be repaired on jobsite in case of fault occurring. For more than 10 years, not even one BROAD chiller has been destroyed. There will not be a BROAD chiller that will be destroyed less than 20 years.

14. Edge-cutting design fully considers development of customers.

The future upgrade need of the chiller is fully considered. It is convenient to achieve function change, energy source alteration, solar or waste heat utilization, and control system upgrade.

15. Long-term cooperation with world-class suppliers gathering wisdom from all over the world.

Around 90% (in value) of components (including all the electric parts and copper tubes) are sourced from world-class suppliers in Europe, the USA and Japan, and are custom made according to BROAD specifications, and upgraded continuously per innovation requirements of BROAD.

16. International safety certificates break down technological barriers and ensure personal safety.

BROAD has obtained all compulsory safety certificates required in the USA and Europe for complete range of its products, including EMC, LVD, gas directive & PED. All these certificates are issued by world competent bodies in Europe and the USA. So far, BROAD is the only absorption manufacturer in the world who obtained all these certificates.

17. Standardized service, zero fault-stop operation during the whole 20 years life-span.

6-step service quality responsibility system brings the service engineers all over the world into a standardized working procedure and a transparent supervision system. Detailed technical files are established for each chiller and enough spare parts are prepared at factory and local service offices. The chiller is regularly maintained every season and supervised 24/365 through internet to assure zero fault-stop operation during the life-span. Minimized standardized maintenance cost , zero repairing cost and 20 + years' life-span can also be realized.

18. Super packaged system saves greatly the initial investment of customers.

It may seem that BROAD chiller is very expensive. However, it is actually very cheap once you get to know the complete supply list including free-charge items such as: 1. additional cooling W. control function, 2. cooling W. inverter control function, 3. remote monitoring through internet, 4. automatic decystallization, 5. factory-mounted heat/cold insulation, 6. solenoid valves for purging and refrigerant reproduction, 7. programmable terminal (touch screen). The value of these items at least amounts to 20% of a chiller's price.

19. Actual energy saving materializes fast payback

Adopting series of energy saving patent technologies, BROAD absorption chillers save customers' energy cost which equals 10%~20% chiller price, payback becomes very fast.

CERTIFICATE

The TÜV CERT Certification Body of TÜV Anlagentechnik GmbH
Unternehmensgruppe TÜV Rheinland Berlin Brandenburg

certifies in accordance with TÜV CERT procedures that

Broad Air Conditioning

Digital Building, Haidian District, Beijing 100086, P. R. China
Broad Town, Changsha City, Hunan Province 410138, P. R. China

has established and applies a quality management system for

Design, Manufacturing and Sales of LiBr Absorption Chiller/Heater & Vacuum Heating Boiler

An audit was performed, Report No. **79240**
Proof has been furnished that the requirements according to

DIN EN ISO 9001:2000

are fulfilled.
The certificate is valid until **31 March 2006**
Certificate Registration No. **01 100 79240**

TGA-ZM-28-96-00

Cologne, 2003-05-13
First certification 1997

TÜV
TÜV Rheinland Berlin Brandenburg
TÜV CERT Certification Body of TÜV Anlagentechnik GmbH

SGS

Certificate CH00/2038

The management system of

Broad Air Conditioning

Broad Town, Changsha City, Hunan Province 410138
P.R. China

has been assessed and certified as meeting the requirements of

ISO 14001:1996

For the following activities

Design and Manufacture of LiBr Absorption Chiller/Heater & Vacuum Heating Boiler

This certificate is valid from 29 September 2003 until 28 September 2006
Issue 2. Certified since February 2000

Authorised by

SGS Société Générale de Surveillance SA Systems & Services Certification
Technoparkstrasse 1 8005 Zurich Switzerland
t +41 (0)1 445-16-80 f +41 (0)1 445-16-88 www.sgs.com

Page 1 of 1

SWISS CERTIFICATION
Accreditation No. 024

SYSTEM CERTIFICATION ISO 14001 SGS

PRODUCT CERTIFICATION

BROAD is the only absorption manufacturer in the world who has obtained safety certificates in Europe & USA for complete range of its products.

Safety Standards	U.S. UL-296, 726, 795 U.S.ETL: UL-726, 795, ANSI/UL-1995 U.S. ASME EU CE-90/396/EEC (gas directive) EU CE-89/336/EEC (EMC) EU CE-73/23/EEC, 93/68/EEC (LVD) EU CE-97/23/EC (PED)
Environmental Management System Standard	Swiss SGS - ISO14001
Quality Control System	German TÜV -ISO 9001
Technical Standards	U.S. Air-Conditioning & Refrigeration Institute ARI Standard 560-2000 "Absorption Water Chilling and Water Heating Packages" Japanese Industry Standard JIS B 8622 "Absorption Chiller" China National Standard GB/T 18362-2001 "Direct-Fired LiBr Absorption Water Chiller/heater" China National Standard GB 18361-2001 "Safety Requirements of LiBr Absorption Water Chiller/heater"
Environmental Protection Features	$CO/CO_2 \leqslant 0.02\%$ NOx ⩽ 46ppm (O_2=5%)

(Parameters of three standards differ, it's all up to cutomers)

Operating Noise	Model	BZ15~BZ30	BZ40~BZ75	BZ85~BZ200	⩾ BZ250
	dB(A)	⩽ 67	⩽ 68	⩽ 69	⩽ 70

QUALITY SYSTEM CERTIFICATE OF COMPLIANCE

This is to certify that the Quality System of

Broad Air Conditioning Co. Ltd.
Broad Town, Changsha City, Hunan province, 410138,
People's Republic of China

has been assessed by ABS Group Ltd. and found to be in compliance with the requirements set forth by:

The Pressure Equipment Directive EC/97/23

and is authorized to CE mark equipment up to category III under Module H (full quality assurance) and category IV under Module H1, (Full Quality Assurance with design examination and special surveillance of the final assessment).

The quality system is applicable to:
the design and manufacture of LiBr Absorption Chillers

Certificate No: ***0528-2003-007-PED-Q***
Effective Date: ***19 December 2003***
Expiration Date: ***18 December 2006***

J. V. Keys
Manager, PED Program
ABS Group Ltd.

Form: 105-02-P02-A (05/02)

The validity of this certificate is subject to surveillance of the quality system and unexpected visits required by The Pressure Equipment Directive and is contingent on compliance with ABS Group Ltd. General Terms and Conditions which require prompt written notification of significant changes to the quality system, modification to pressure equipment currently manufactured and the introduction of new types of pressure equipment.

The American Society of Mechanical Engineers

CERTIFICATE OF AUTHORIZATION

This certificate accredits the named company as authorized to use the indicated symbol of the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the Code symbol and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this symbol shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY:

BROAD AIR CONDITIONING CO., LTD.
BROAD TOWN, CHANGSHA
HUNAN PROVINCE 410138
PEOPLE'S REPUBLIC OF CHINA

SCOPE:

MANUFACTURE OF PRESSURE VESSELS AT THE ABOVE LOCATION ONLY

AUTHORIZED: **JANUARY 30, 2003**
EXPIRES: **JANUARY 30, 2006**
CERTIFICATE NUMBER: **33,779**

CHAIRMAN OF THE BOILER
AND PRESSURE VESSEL COMMITTEE

DIRECTOR, ACCREDITATION AND CERTIFICATION

1285 Walt Whitman Road
Melville, New York 11747-3081
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(516) 271-6200
FAX No. (516) 271-8259
http://www.ul.com

Underwriters Laboratories Inc.®

a century of public safety est. 1894

CERTIFICATE OF COMPLIANCE

CERTIFICATE NUMBER: **050799**
ISSUE DATE: **03/11/99**

Issued to:

Broad USA LTD
Suite 7929
1 World Trade Center
New York, NY 10048

Report Reference: MH19712, Volume 1

This is to Certify that representative samples of:

Absorption Air Conditioning Equipment, Models BZXXXVIB, BZXXXVIBC, BZXXXVIBS, BZXXXVIC have been investigated by Underwriters Laboratories Inc. in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 795, Commercial-Industrial Gas Heating Equipment
UL 726, Oil-Fired Boiler Assemblies
UL 296, Oil Burners

Only those products bearing the UL Listing Mark should be considered as being covered by UL's Listing and Follow-Up Service

The UL Listing Mark generally includes four elements as follows: the name "Underwriters Laboratories Inc." in various forms and type styles, or abbreviations such as "Und. Lab. Inc." or the symbol "UL in a circle"; the word "Listed"; a control number (may be alphanumeric) assigned by UL; and, the product or category name (product identifier) as indicated in the appropriate UL Directory.

LOOK FOR THE UL LISTING MARK ON THE PRODUCT

Engineer:
Richard Taylor
Senior Engineering Assistant
Underwriters Laboratories Inc.

Reviewer:
Robert DellaValle
Associate Managing Engineer
Underwriters Laboratories Inc.

A not-for-profit organization dedicated to public safety and committed to quality service

Number **E 0750**

CE 0063

CERTIFICATE

GASTEC NV hereby declares that the
Direct Fired Absorption Chiller / Heater, types

BZ10N through BZ500N... (H_1 through H_4)

made by **Broad Air Conditioning,**

in **Changsha, Hunan, China,**

meet the essential requirements as described in the **Directive on appliances burning gaseous fuels (90/396/EEC).**

PIN : 0063BL3603
Report number : 172603
Appliance types : B23

Mentioned products have been approved for Natural gases and LPG for the following countries:

AT	BE	DE
DK	ES	FI
FR	GB	GR
IE	IT	LU
NL	NO	PT
SE	CH	

Apeldoorn, 4 December 2000

dr. L. Noordzij,
President.

GASTEC

GASTEC NV
P.O. Box 137
7300 AC Apeldoorn
The Netherlands
Wilmersdorf 50
7327 AC Apeldoorn

RvC

00/820

ITS Intertek Testing Services
ETL SEMKO

AUTHORIZATION TO MARK

This authorizes the manufacturer to apply the ETL mark to certified products; also to the multiple listee model numbers as listed on the correlation page of the Listing Report where applicable; when made in accordance with the accompanying descriptions and drawings under the conditions set forth in the Certification Agreement herein:

Applicant: Broad Air Conditioning
Broad Town, Changsha, Hunan 410138, China.
Contact: Tan Yong Qiang TEL: (86)731-4086688 FAX: (86)731-4613440

Manufacturer: Broad Air Conditioning
Broad Town, Changsha, Hunan 410138, China.
Contact: Tan Yong Qiang TEL: (86)731-4086688 FAX: (86)731-4613440

Reference Report: 3013849-001

Product Covered: Models BZXXXNA/B (oil-fired activation), BZXXXNBC (combination gas-oil-fired activation), BSXXXN0.8/0.6/0.4 (steam activation) and BZXXXNC (gas-fired activation), absorption chiller-heater assemblies, where XXX is 30, 40, 50, 65, 75, 85, 100, 125, 150, 200, 250, 300 or 400.

Description: The units covered in this report are absorption chiller-heater assemblies used for chilling and heating water for industrial or commercial air handling equipment. Water is used for the refrigerant medium. All refrigerant vessels normally operate under vacuum pressures.
Models with the suffix B, BC or C are equipped with a listed gas, oil or combination gas-oil burner with full modulation. They are provided with proved gas pilot ignition or optional direct spark ignition. They have a guaranteed low fire start of 20 gph or less.
Models with suffix BS are for use with steam from an external source.

Standard(s): Oil-Fired Boiler Assemblies - UL 726
Commercial Industrial Gas Heating Equipment - UL 795

This procedure, with all revisions, etc., is the property of Intertek Testing Services and is intended solely for the guidance of the listee and the representative of Intertek Testing Services, and is not transferable.

Issued by: Intertek Testing Services NA Inc., 24 Groton Avenue Cortland, NY 13045-2014 USA

C ETL US

Authorized by: for William T. Starr, Certification Manager **Date:** 24 April, 2002

Control Number: 3018577

This authorization supersedes our previous authorization of dated 9 April, 01.

Intertek ETL SEMKO

AUTHORIZATION TO MARK

This authorizes the application of the Certification Marks shown below to the Product Covered (also to the multiple listee model identified on the correlation page of the Listing Report where applicable) when made in accordance with the Description and under the conditions set forth in the Certification Agreement and Listing Report:

Applicant: Broad Air Conditioning
Broad Town, Changsha, Hunan 410138, China
Contact: Name: Mr. Tan Yong Qiang Phone: (86) 731-4086688

Manufacturer: Same As Applicant

Party Authorized To Apply Mark: **(Same as Manufacturer)**

Report No.: 3039384-001

Report Issuing Office: Intertek, Columbus Office

Product Covered: Broad N Single-Stage Indirect-Fired absorption chiller-heater assemblies, Model BDXXXNX where XXX is 15, 20, 25, 30, 40, 50, 65, 75, 85, 100, 125, 150, 175, 200, 250, 300, 400, 500, 600, 800, 1000. Models may be followed by other designations associated with the heat source type (Steam Pressure, MPA, or heat source water, outlet/inlet temp. °C, followed by design code, or exhaust inlet temp. °C followed by chilled water temp. outlet/inlet followed by cooling water temp. outlet/inlet followed by a Broad design code.

Description: The product covered in this report is absorption chiller-heater assemblies used for chilling and heating water for industrial or commercial air handling equipment. Water is used for refrigerant medium. All refrigerant vessels operate under vacuum pressures. A Lithium Bromide solution when heated, a strong absorbent of water, absorbs the surrounding vapor continuously and keeps the low pressure condition in the evaporator/absorber vessel. The product is characterized by the solution heat source and is either hot water chiller, a steam chiller or exhaust-fired chiller. Product is intended for indoor installations only.

Standard(s): Standard for Safety Heating And Cooling Equipment (ANSI/UL 1995 second edition, CAN/CSA C22.2 No. 236).

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C ETL US

Authorized by: for William T. Starr, Certification Manager **Date:** 2 Oct., 2003

Control Number: 3018577

This authorization superseded our previous authorization dated 11 Sept., 2003.

Intertek ETL SEMKO

Intertek Testing Services NA Inc.
165 Main Street, Cortland, NY 13045-2995, USA.
Telephone 800-345-3851 or 607-753-6711 Fax 607-756-6699

CERTIFICATE

TÜV

of Conformity

Low Voltage Directive 73/23/EEC
as last amended by EEC Directive 93/68/EEC

Registration No.: AN 2030409 02

Report No.: E 2066055 Z 03

Holder: Broad Air Conditioning
Broad Town
Changsha,
Hunan 410138
P.R. CHINA

Product: KLIMAGERÄT
(Direct-Fired Absorption Chiller/Heater)

Identification: Type Designation : BZxNy series
(refer to the report E 2066055Z03 for detailed list)

Serial No.: Pre-production

This certificate of conformity is based on an evaluation of a sample of the above mentioned product. Technical Report and documentation are at the Licence Holder's disposal. This is to certify that the tested sample is in conformity with all provisions of Annex I of Council Directive 73/23/EEC, in its latest amended version, referred to as the Low Voltage Directive. This certificate does not imply assessment of the series-production of the product and does not permit the use of a TÜV Rheinland mark of conformity. The holder of the certificate is authorized to use this certificate in connection with the EC declaration of conformity according to Annex III of the Directive.

Certification Body

Cologne, 19.09.2000

TÜV Rheinland Product Safety GmbH Zertifizierungsstelle

Dipl.-Ing. Frank Möcking

TÜV Rheinland Product Safety GmbH - Am Grauen Stein - D-51105 Köln

CE The CE marking may be used if all relevant and effective EC Directives are complied with. CE

CERTIFICATE

TÜV

of Conformity

Low Voltage Directive 73/23/EEC
as last amended by EEC Directive 93/68/EEC

Registration No.: AN 50016037 0001

Report No.: 11000298 001

Holder: Broad Air Conditioning
Broad Town
Changsha, Hunan 410138
P.R. China

Product: Klimagerät
(Indirect-Fired Absorption Chiller)

Identification: Type Designation : BS-x series BD-x series
x stands for: 15,20,25,30,40,50,65,75,85,100,125,150,175,200
250,300,400,500,600,800,1000

Serial No.: Pre-production

This certificate of conformity is based on an evaluation of a sample of the above mentioned product. Technical Report and documentation are at the Licence Holder's disposal.This is to certify that the tested sample is in conformity with all revision of Annex I of Council Directive 73/23/EEC, in its latest amended version, referred to as the Low Voltage Directive. This certificate does not imply assessment of the series-production of the product and does not permit the use of a TÜV Rheinland mark of conformity. The holder of the certificate is authorized to use this certificate in connection with the EC declaration of conformity according to Annex III of the Directive.

Certification Body

Cologne, 31.07.2002

TÜV Rheinland Product Safety GmbH Zertifizierungsstelle

Dipl.-Ing. F. Mseking

TÜV Rheinland Product Safety GmbH - Am Grauen Stein - D-51105 Köln

CE The CE marking may be used if all relevant and effective EC Directives are complied with. CE

Competent Body

TÜV Rheinland Product Safety GmbH

TÜV

Am Grauen Stein
D-51105 Köln

accredited by the

Regulierungsbehörde für Telekommunikation und Post

herewith grants a

Certificate of a Competent Body

within the meaning of Paragr. 4 (2) EMC Act respectively Art. 10 (2) of the EMC Council Directive on compliance with the EMC protection requirements

Certificate holder:
Broad Air Conditioning
Broad Town
Changsha,
Hunan 410138
P.R. CHINA

Product: KLIMAGERÄT
(Direct-Fired Absorption Chiller/Heater)

Identification: BZxNy series

as described in the Technical Construction File
P 2030180 as of September 15, 2000

This certificate was issued in accordance with Article 10 (2) of the Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility, implemented in Germany by the "Electromagnetic Compatibility Act of September 18th, 1998 (EMVG, Paragr. 4(2))". This certificate does not testify to compliance with the EMC protection requirements of other laws implementing Directives of the European Community other than Council Directive 89/336/EEC. This certificate relates to the sample submitted for testing or to the technical report.

Registration No.: AV 2030241 02
Reference No.: P 2030180 Z 04 of: 15.09.2000
Cologne, 20.09.2000

Competent Body

TÜV Rheinland Product Safety GmbH Zertifizierungsstelle

Dipl.-Ing. Ralf Meiranke

Competent Body

TÜV Rheinland Product Safety GmbH

TÜV

Am Grauen Stein
D-51105 Köln

accredited by the

Regulierungsbehörde für Telekommunikation und Post

herewith grants a

Certificate of a Competent Body

within the meaning of Paragr. 4(2) EMC Act Respectively Art. 10 (2) of the EMC Council Directive on compliance with the EMC protection requirements

Certificate holder:
Broad Air Conditioning Co., Ltd.
Broad Town
CHANGSHA, HUNAN 410138
P.R. CHINA

Product: Klimagerät
(Indirect-Fired Absorption Chiller/Heater)
Identification: BSxNy1 series
BDxNy2 series

as described in the Technical Construction File
P 2030180 as of March 15, 2002

This certificate was issued in accordance with Article 10 (2) of the Council Directive 89/336/EEC in its latest amended version on the approximation of the laws of the Member States relating to electromagnetic compatibility, implemented in Germany by the "Electromagnetic Compatibility Act of September 18th, 1998 (EMVG, Paragr. 4(2))". This certificate does not testify to compliance with the EMC protection requirements of other laws implementing Directives of the European Community other than Council Directive 89/336/EEC. This certificate relates to the sample submitted for testing or to the technical report.

Registration No.: AV 50011595 0001
Reference No.: 02030180 006 of:19.03.2002
Cologne, 28.03.2002

Competent Body

Dipl.-Phys. J. Iden

TÜV Rheinland Product Safety GmbH Zertifizierungsstelle

THE ABSORPTION PRINCIPLES

When liquid evaporates, it absorbs heat from its surroundings. For example, to spread a drop of alcohol on your hand, you will feel very cool, as the alcohol absorbs heat from your hand. Evaporation is a basic theory to design many refrigeration equipment.

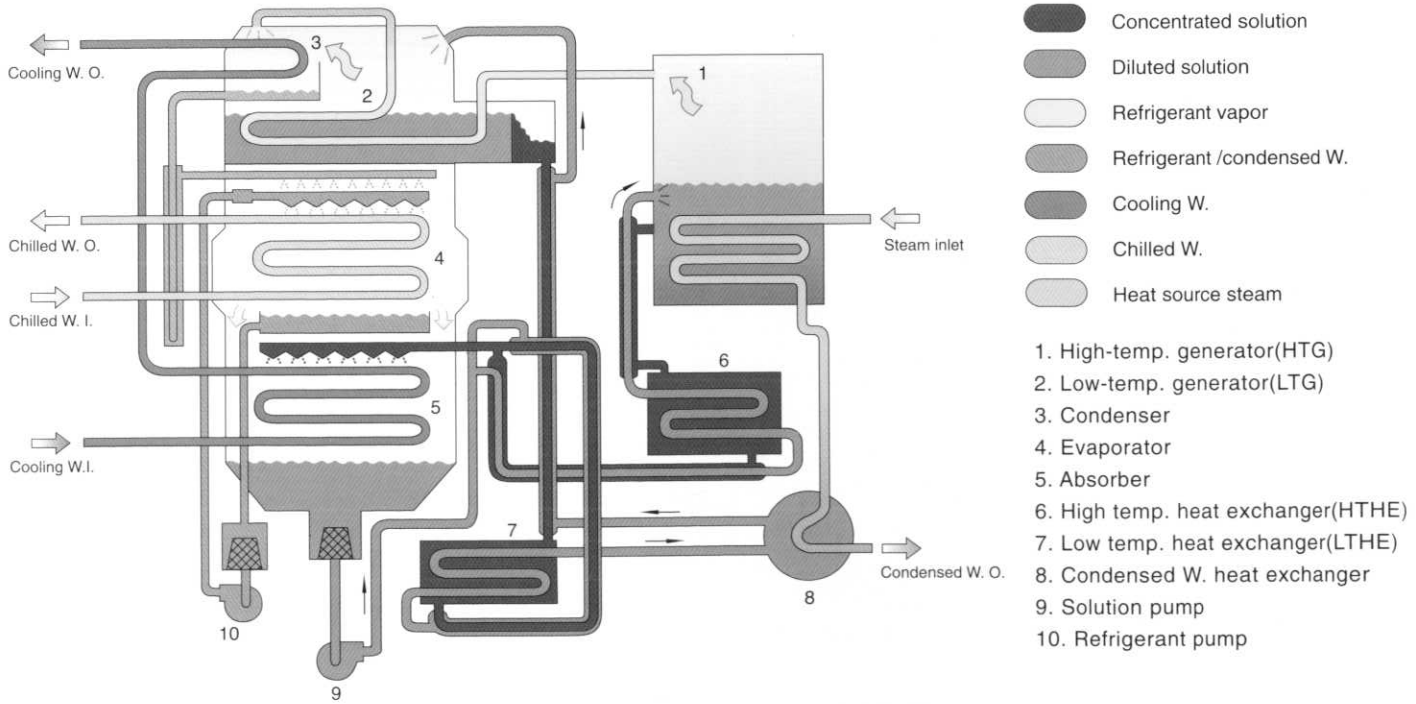
Water evaporates at 100℃ under normal pressure (760 mmHg), but can evaporate at very low temp. under vacuum condition. By creating 6 mmHg pressure condition in an airtight vessel, water can evaporate even at 4℃. The water vapor then migrates to the evaporator and the absorber where the lithium bromide solution (a very strong absorbent of water) absorbs the surrounding vapor continuously & keeps the low pressure condition in the evaporator/absorber vessel.

All absorption chillers are designed as per the theory that water takes away the heat of the air conditioning system as it evaporates under vacuum conditions. The lithium bromide solution absorbs the vapor (transferring the heat of absorption to cooling W.) in a diluted solution which is pumped to a higher pressure where heat (from steam, hot water, exhaust, etc.) is added to re-vaporize the water. The concentrated LiBr solution returns to the absorber and the water vapor to the condenser to begin the process all over again.

In cooling cycle BROAD utilizes a parallel flow to its DFA vs traditional series flow. The advantages lie as follows:

1. Cycling solution volume in HTG is 50% less, chiller starting shortens by 50%, which saves the energy; when the chiller is at part load, HTG temp. rises easily, which reduces fuel consumption by 20%+.
2. Solution in HTG can be stronger, for the pressure in HTG is high, solution will not lead to crystallization easily, and thus, cooling capacity in absorber will be greater. Parallel flow can overcome abnormal conditions like higher cooling W. temp. or scaling copper tubes in absorber.
3. Solution in LTG needn't be that strong so that crystallization can be avoided in LTG. Only in this way can plate heat exchanger be used.

For example: two-stage steam chiller cooling diagram



MODEL SELECTION & ORDERING

Multi-energy selection

1. Please refer to P15 for the details of all kinds of heat sources and corresponding chiller models.
2. If customer chooses solar energy to be heat source, fuel (natural gas or light oil) can be used at night time and in cloudy or raining days, instead of investing a lot on larger solar collector and thermal storage equipment. Thus the investment on solar collector system can be paid back within 3 to 5 years.
3. If customer has existing industrial waste equipment or power generator, the exhaust from them can be utilized. For a new air conditioning system, cogeneration system should be considered to utilize the exhaust in order to reduce energy cost. As the power generation and air conditioning are not needed simultaneously all the time, a back-up heat source (natural gas or light oil) is required for independent operation. The extra investment on utilization of waste heat will be paid back within 3 to 5 years.
4. The optional fuels include natural gas, coal gas and light oil (diesel oil, naphtha and kerosene), the dual fuel type can also be chosen.
5. The products listed in this brochure cover all the heat sources applicable to absorption chiller/heater and every application mode, including a chiller powered by 2 or 3 heat sources.

Heat source selection

Saturated steam pressure should be indicated for a steam chiller. Note: 0.6MPa, 0.7MPa, and 0.8MPa are the standard pressure. But the prices of 0.7MPa and 0.8MPa chillers are lower.
Heat source W. inlet temp. and flowrate (or temp. difference), etc. should be indicated for a hot water chiller.
Please pay attention to changes of steam pressure, heat source W. temp. and flowrate, which will affect the chiller's capacity and COP.
Exhaust data, such as temp., flowrate and composition, etc. should be indicated for an exhausted chiller.
Notice: The higher heat source temp., the higher COP and the lower price as well.

Temp. selection

The higher the chilled W. outlet temp., or the lower the cooling W. inlet temp., or the higher the heat source temp., the higher cooling capacity and COP. Please pay best attention to Performance Curves, which seems complicated but actually is easy to consult. The effect of ambient conditions on cooling capacity and COP can be calculated in 2 minutes. It is a unique mode of BROAD which is both precise and convenient. Concerning the choice of the chilled W. temp., please refer to "How to decide the flowrate".

Flowrate selection

Flowrate requirements must be carefully studied. A large temp. difference and low flowrate can be a good solution to reduce the power consumption of water pumps and investment in pipeline network. To the users with large pipeline radius (for instance district cooling & heating system), low flowrate is of the most importance to raise investment payback ratio and save energy. So besides the chilled W. temp. shown in the performance data, BROAD recommends chilled W. inlet/outlet temp. differences 8℃, 9℃, 10℃ or even 15℃. BROAD can design the water passes specially to meet customer's temp. difference requirement without affecting cooling capacity and COP due to the low flowrate. An example of big temp. difference is as follows:

District cooling	5℃/ 15℃ or 6℃/ 15℃	heating	75℃/ 57℃	
Small radius air conditioning:	cooling 6℃/ 14℃ or 7℃/ 14℃	heating	70℃/ 57℃	

Cooling W. flowrate (a) of BROAD absorption chillers is 30% less than that of traditional chiller. Designer can choose cooling tower of one size larger (the same size required for the high flowrate option) per performance curves. Thus the cooling W. pump size and electrical consumption can be reduced dramatically without increasing size of cooling tower.
Due to lower flowrate and less water resistance, BROAD chillers are 20%~50% electricity saving for water pumps compared with other chillers. Special attention must be paid for pump model selection.

Model selection

If the customers have already decided the load, heat source, chilled W. temp. and cooling W. temp., then they can select the chiller model by marking on the performance curves with color pencil, or the customers can also send the data to BROAD for model selection.

Quantity selection

To decide the quantity to be used, you should take load, load distribution, building function, installation site and economic factors into consideration. Please be noted that the fewer units, the lower initial investment and operation cost (as the chiller's COP will be higher and water system's electric consumption will be lower at part load). You need not consider having back-up units because continuous operation is better for the life-span than intermittent operation.1~2 units are recommended for small and medium sized application and 3 units for big-sized application (at least 2 units are to be selected for continuous operation all year round). BROAD can manufacture the biggest chiller in the world, which enables customers to select fewer units, and all the main shells are shipped as a single-piece delivery which is easy for installation.

Pressure requirement

The rated pressure limit is 0.8MPa for chilled/heating W. and cooling W., 0.81~1.2MPa for high-building type, 3 categories: 1.21~1.6MPa, 1.61~2.0MPa, 2.01~2.4MPa for extra high-building type.
Please calculate the pressure of cooling W. system and chilled/heating W. system separately and specify the information in your order. If system pressure is over 0.8MPa, you can choose high-building type chiller, but we do not easily recommend extra high-building chiller. A solution is to divide the system into several sections instead of choosing high-building type chiller. In this way, you may save the extra cost of initial investment,piping and maintenance cost of a high-building chiller.

Dimension

If limited by access of customers' machine room (or limited by container transportation), you can choose split shipment. The chiller normally will be divided into two pieces as Main Shell and HTG. BROAD technicians will connect 3 pipes at the jobsite. Customers need to prepare welding equipment, nitrogen and provide cooperation.

Control mode

The standard model is equipped with complete automatic control system as well as remote control through internet. Please refer to the P&I diagram for details.
If a building automation system (BAS) has been used, the BAS control interface should be selected optionally. If the BAS interface is not ordered along with the chiller, it can be purchased later.

Contract

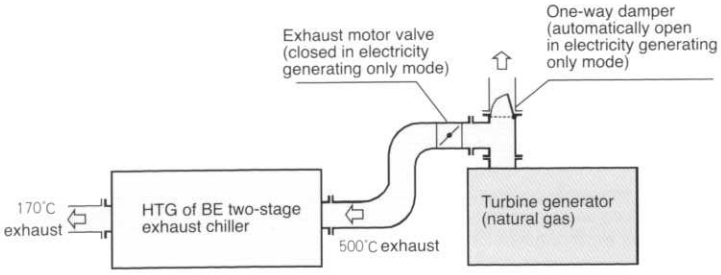
The 9 elements above mentioned should be made sure and clarified in the contract when placing an order. Meanwhile, the model type should be written out strictly according to the "nomenclature". Any negligence might lead to delivery mistakes beyond remedy.
The delivery date is generally 6 months, but for oversized model or special-ordered model, it is 7~9 months. If the specific date can not be decided upon signing the contract, it can be specified 2 months before the contract delivery date by filling in "Delivery Confirmation" .
For technically-complicated model, there must be a "Technical Confirmation" as the attachment of the contract.

HOW TO CHOOSE ENERGY SOURCE FOR AIR CONDITIONING

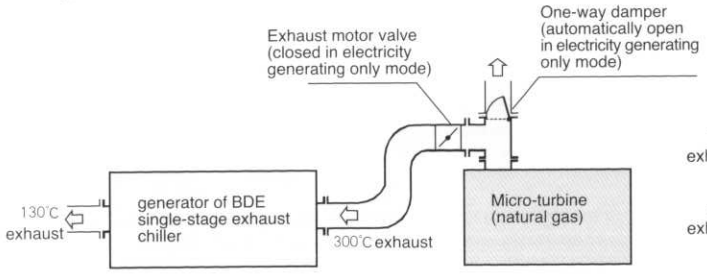
Energy saving is always a topic for the mankind. It benefits the environment, the national economy as well as the customers' investment.
The air conditioning energy consumption costs most in buildings' operation, whereas the selection of proper energy source and the matching air conditioning equipment are the key factors in building investment.
BROAD proposals of energy and air conditioners here are based on the experience from European and American customers, which are very edgy-cutting and practical—high investment payback ratio, mature equipment & system technology.

Example : various kinds of energy-saving systems

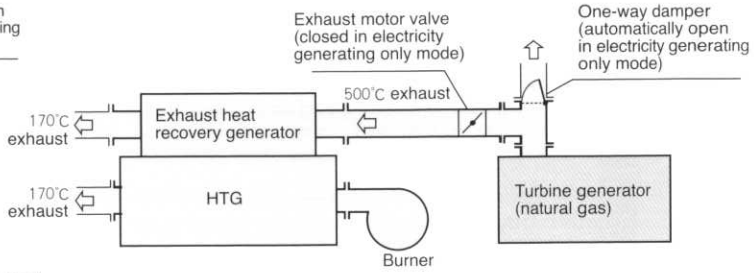
Type 1. System matched with turbine generator (BE series)



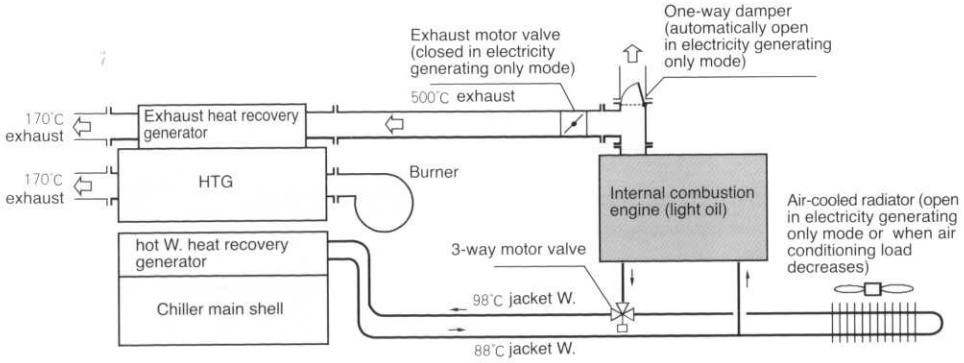
Type 2. System matched with mini-turbine generator(BDE series)



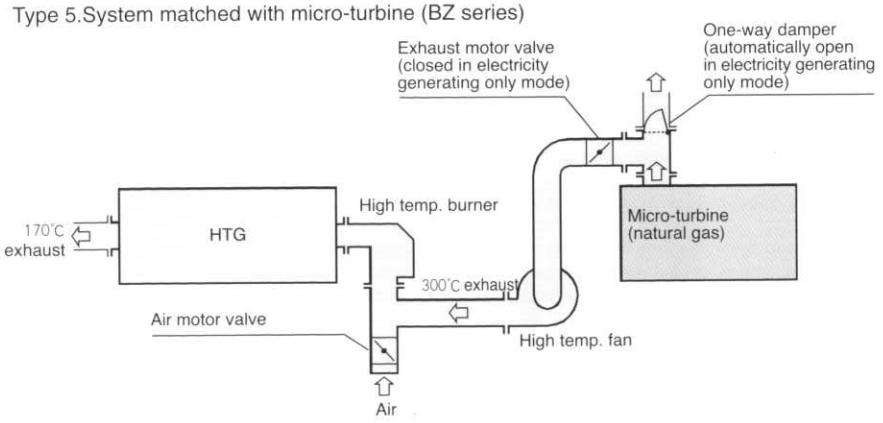
Type 3.System matched with turbine generator (BZE series)



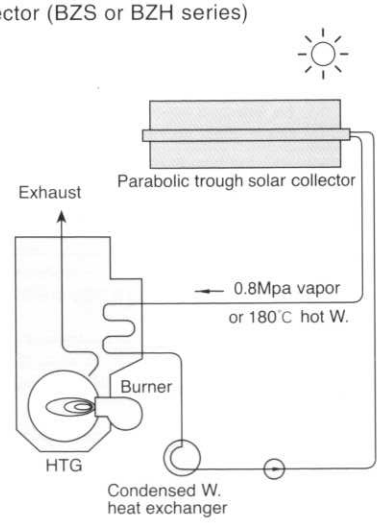
Type 4.System matched with internal combustion engine (BZHE series)



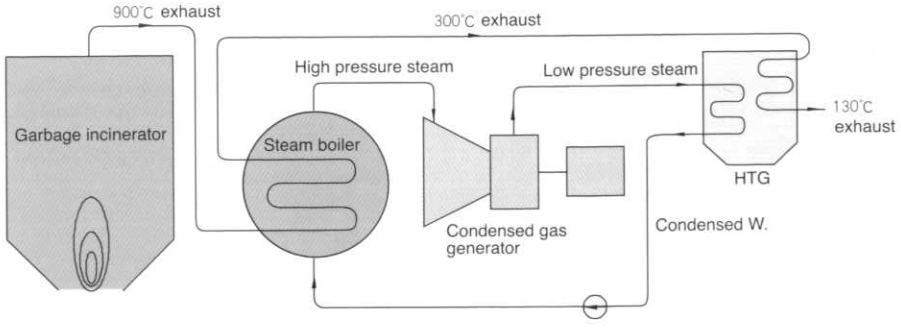
Type 5.System matched with micro-turbine (BZ series)



Type 6.System matched with parabolic trough solar collector (BZS or BZH series)



Type 7.System matched with garbage incinerator (BS or BDE series)



MODEL SELECTION OF ENERGY-SAVING SYSTEM

Type	Objective	Primary Energy	Facilities Matching	Operation Mode & Function	Main Advantages	Disadvantages & Limitations	Energy Efficiency	Investment Factor
1	vast energy-saving (applicable to large building block or district cooling/heating system)	natural gas	1.turbine 2.two-stage exhaust chiller/heater(BE series)	· the generator supplies electricity to buildings or grid · chiller/heater provides cooling/heating utilizing exhaust from power generating	no energy input needed for cooling/heating	power generating and cooling must be simultaneous; if only electricity is needed, the exhaust will not be utilized; if electricity is not needed, there is no energy input.	power generation about 33%, cooling about 64% (exhaust volume 67% X utilization ratio 0.7 XCOP137%=64%)	3
2	power generation and cooling in small scale (<100kW)	natural gas	1.micro-turbine 2.single-stage exhaust chiller/ heater(BDE series)	· the generator supplies electricity to buildings or grid · chiller/heater provides cooling/heating utilizing exhaust from power generating	no energy input needed for cooling/heating	power generating and cooling must be simultaneous; if only electricity is needed, the exhaust will not be utilized; if electricity is not needed, there is no energy input.	power generation about 30%, cooling about 34% (exhaust volume 70% X utilization ratio 0.63 X COP78% =34%)	2.7
3	vast energy-saving & supplying electricity or cooling/heating independently (applicable to large building block or district cooling/ heating system)	natural gas	1.turbine 2.direct-fired & exhaust type (BZE series)	· the generator supplies electricity to buildings or grid · chiller/heater provides cooling/heating utilizing exhaust from power generating · if the generator is off, natural gas can be used for cooling/heating.	No energy input is needed for cooling/ heating during power generating, cooling/heating can be provided during less power generating or no power generating.	high investment and high maintenance cost	about 30% for power generation, about 64% for cooling (for cooling only mode 131%)	3.5
4	areas without natural gas, vast energy-saving	light oil (diesel, kerosene and naphtha)	1.internal combustion engine 2.direct-fired & exhaust and hot water type (BZHE series)	· the generator supplies electricity to buildings and grid; · exhaust/ jacket water for cooling/heating ; · if the generator is off, light oil can be used for cooling/heating.	no energy input is needed for cooling/heating	generator is very noisy and much vibrative; much maintenance needed; short life-span for generator; the exhaust is not as clean as the natural gas.	about 36% for power generation, about 54% for cooling (for cooling only mode 131%)	2.5
5	power supply for chiller and water system, energy-saving and low investment.	natural gas (or light oil)	1.micro-turbine 2.DFA (with high-temp. burner) (BZ series)	the generator provides electricity for chiller/heater, cooling water pump, chilled/ heating water pump, cooling tower, etc. (DFA uses exhaust to replace combustion air, i.e. reburning).	low investment; 100% utilization of the exhaust from the generator.	small capacity for electricity supplying, unable to cover other parts of buildings.	cooling 147% heating 102%	1.3
6	max. energy-saving and environmental friendly.(applicable to all kinds of buildings, from villa to district cooling/heating system)	solar energy; supplementary natural gas (or light oil)	1.parabolic trough solar collector 2.direct-fired & steam type or direct-fired & hot water type (BZS series or BZH series)	· solar collector produces 0.8 MPa steam (or 180°C hot water); · the chiller makes use of solar energy for cooling on sunny days. Natural gas will be used on rainy days and at night.	low operation cost, most environmental friendly (house or parking lot can be built under the space-taking solar collector)	solar collector occupies large spaces; not efficient in places with short sunshine period or heavy air pollution; high investment.	no fuel input needed for cooling on sunny days;cooling by fuel on rainy days and at night: 131% for cooling and 91% for heating	1.7-3
7	energy-saving by making use of urban garbage (applicable to district cooling/ heating system)	garbage	1.garbage incinerator 2.steam boiler 3.steamer generator 4.steam chiller (BS series)	· high pressure steam produced by burning garbage supplies the power to steamer generator. · the chiller heats LiBr with low pressure steam from steamer generator (acting the function of generator condenser as well)	no fuel input is needed for cooling, reducing investment on generator condenser	subject to the amount of garbage	power steam 137%	0.8 power generation from garbage burning not included
8	meeting large heating and small cooling capacity requirement, energy-saving.	natural gas	1.turbine 2.heat recovery boiler 3.two-stage steam chiller (BS series or two-stage hot water BH series)	· the generator supplies electricity to buildings and grid; · heat recovery boiler can turn exhaust into steam or hot water; · steam or hot water is utilized for cooling; · heat recovery boiler can provide heating independently	For customers with large heating requirement, investment in heating facilities can be saved; heat recovery boiler can provide heat indepedently, with simple management.	complicated facilities and high investment	steam cooling 137%	3.8-4.8
9	high steam demand and low cooling demand.	natural gas (light oil or clean coal)	1.steam boiler 2.steam chiller (BS series or BDS series)	steam used for cooling	low investment; simple system	subject to steam supply.	two-stage cooling 137% single-stage cooling 78% (excluding boiler efficiency)	0.8 excluding boiler
10	using existing urban heating system	(heating system)	steam type or hot water type chiller (BS/BDS series or BH/BDH series)	steam (or hot water) used for cooling	low investment, simple system	subject to steam supply.	two-stage cooling 137% single-stage cooling 78%	0.8 excluding heating system
11	low investment; max. flexibility	natural gas (light oil)	DFA (BZ series, refers also to specific brochure)	natural gas (light oil) for cooling/ heating	low investment; simple system; great flexibility	can not use the exhaust and solar energy	cooling 131% heating 91%	1

Notes:
1. The investment factor indicates the investment proportion of each type of project. Data in the above sheet is calculated basing upon DFA (direct-fired type LiBr absorption chiller/heater) with the corresponding cooling tower, cooling W. pump and chilled/heating W. pump.
2. The low pressure exhaust from condensed gas power stations (coal, oil and gas) can be used for cooling, the methods and effects are similar to those of garbage power station (type 7).
3. The exhaust from turbine can be used not only for air conditioning but also for cooling the turbine inlet air, which can improve power generation efficiency (type 1, 3 & 8).
4. We hope the readers can pay best attention to this page! District air condiioning and distributed energy system (small urban power station+heat recovery) are the directions of future urban energy development. The heat recovery absorption chiller which can utilize all kinds of waste heat will be the only choice, while cooling and energy will be the definite choice of mankind to the zero-pollution energy era.

BROAD NOMENCLATURE

Conversion Table

1USRT=3.517kW	1USGal=3.785L
1kcal/h=1.163W	1MPa=6.895psig
1Btu=0.252kcal	1bar=0.1MPa
1MBH=252kcal/h	1klbs=454kg
1ftH_2O=2.989kPa	1m^3=35.3ft^3
1m^3/h=4.4GPM	°F=(°Cx1.8)+32

Code Table

	Code	Type	Notes
Product	BZ	direct-fired absorption chiller/heater	gas,oil
	BS	two-stage steam chiller	steam pressure 0.3~0.9MPa
	BDS	single-stage steam chiller	steam pressure ⩽ 0.2MPa
	BH	two-stage hot water chiller	heat source water temp. 140~200°C
	BDH	single-stage hot water chiller	heat source water temp. 75~120°C
	BE	two-stage exhaust chiller/heater	exhaust inlet temp. ⩾ 400°C
	BDE	single-stage exhaust chiller/heater	exhaust inlet temp.230~350°C
	BZS	direct-fired & steam chiller/heater	gas/oil and 0.3~0.9MPa steam
	BZH	direct-fired & hot W. chiller/heater	gas/oil and 140~200°C hot water
	BZE	direct-fired & exaust chiller/heater	gas/oil and ⩾ 400°C exhaust
	BZHE	direct-fired & exaust & hot W. chiller/heater	gas/ oil, 90~120°C hot water and ⩾ 400°C exhaust
	BZY	BROAD outdoor package DFA	steam type, hot water type exhaust type also available
	BCT	BROAD house gas air con.	gas/ oil
Energy	B	light oil (diesel, kerosene, etc.)	heating value 9700~11000kcal/kg (17446~19704Btu/lb)
	C	high heating value gas(LPG,etc.)	heating value 18000~25000kcal/Nm^3 (2022~2809Btu/ft^3)
	D	medium heating value gas (natural gas,etc.)	heating value 7000~12000kcal/Nm^3 (787~1348Btu/ft^3)
	E	low heating value gas (town gas,etc.)	heating value 3000~5000kcal/Nm^3 (337~562Btu/ft^3)
	0.3~0.9	steam inlet pressure MPa	two-stage
	0.01~0.2	steam inlet pressure MPa	single-stage
	140~200	heat source water temp. °C	two-stage
	75~120	heat source water temp. °C	single-stage
	400~600	high temp. exhaust inlet temp. °C	two-stage
	230~350	low temp. exhaust inlet temp. °C	single-stage
Function	k	cooling-heating type	omitted for cooling-heating-hot water type
	k_2	simultaneous cooling-heating operation (4-pipe system)	
	d	cooling-only type	
	w	cooling-hot water type	
Heating capacity	H_1	HTG enlarged H_1	20% more heating capacity
	H_2	HTG enlarged H_2	40% more heating capacity
	H_3	HTG enlarged H_3	60% more heating capacity
	H_4	HTG enlarged H_4	80% more heating capacity
Water temp.	18~40	cooling W. temp.°C	if the water temp. is the rated data in the catalogue, it will not be indicated in the nomenclature
	3~17	chilled W. temp. °C	
Power	A_1	single-phase 220V 50Hz	China, Europe, India, Iran, etc.
	A_2	single-phase 110V 50Hz	Japan, Brazil, Columbia, etc.
	A_3	single-phase 220V 60Hz	Saudi Arabia, Brazil, Mexico, Peru, etc.
	A_4	single-phase 110V 60Hz	U.S., Japan, Canada, Cuba, etc.
	B_1	three-phase 380V 50Hz	China, Europe, India, Iran, etc.
	B_2	three-phase 415V 50Hz	Malaysia,Singapore,Australia,etc.
	B_3	three-phase 460V 60Hz	U.S., Brazil, Honduras, etc.
	B_4	three-phase 220V 60Hz	U.S., Japan, Canada, Cuba, etc

Note: 1. For those heat source ranges not specified in the energy item, whether to use single-stage or two-stage chiller should be decided per chilled water and cooling water temperature.
2. In the nomenclature, the energy code should be specified; the chilled water and cooling water temperature can be omitted if they are the rated data in the catalogue;the model code can be omitted if it is the same as the cooling capacity.
3. The default power code is A_1 for BCT16, BCT23, indoor units and hot water tanks, and B_1 for all others.
4. Chiller with chilled/cooling W. pressure limit above 0.8MPa is considered high building type. Introduce code "F" for chilled W. and code "M" for cooling W.,then:Fa/Ma indicates >0.8MPa type; Fb/Mb indicates >1.2MPa type; Fc/Mc indicates >1.6MPa type; Fd/Md indicates 2~2.4MPa type.

Examples

1. DFA and Multi-energy DFA

Example 1 (DFA standard)

BZ 150 IX D
- D — Fuel (natural gas)
- IX — BROAD absorption chiller design code
- 150 — Cooling capacity 10^4 kcal/h
- BZ — Product B:BROAD, Z: DFA

Example 2 (DFA special):

BZ150 IXB - 35/28 - 8/15 - 90/80 - 66/50 - H_2 - B_3 - 125
- 125 — Model code (the price is based on this)
- B_3 — Power: (3 Φ 460V 60Hz)
- H_2 — 40% more heating capacity
- 66/50 — Hot W. outlet/inlet temp. °C
- 90/80 — Heating W. outlet/inlet temp. °C
- 8/15 — Chilled W. outlet/inlet temp. °C
- 35/28 — Cooling W. outlet/inlet temp °C

Example 3:(multi-energy DFA BZS type):

BZS125 IX D - 0.8 - d
- d — Cooling-only type
- 0.8 — Steam (0.8MPa)
- D — Fuel (natural gas)

Example 4 (multi-energy DFA BZHE type):

BZHE125 IX D - 500 - 88/98 - k
- k — Cooling-heating type
- 88/98 — Generator jacket W. (outlet/inlet temp. °C)
- 500 — Generator exhaust (500°C)
- D — Fuel (natural gas)

2. Two-stage Steam Chiller

Example 1 (standard)

BS 150 IX 0.6
- 0.6 — Steam inlet pressure (0.6MPa)
- IX — BROAD absorption chiller design code
- 150 — Cooling capacity 10^4 kcal/h
- BS — Product B:BROAD S: two-stage steam chiller

Example 2 (special)

BS150 IX 0.4 - 35/28 - 6/14 - B_2 - 200
- 200 — Model code (the price is based on this)
- B_2 — Power (3 Φ 415V 50Hz)
- 6/14 — Chilled W. outlet/inlet temp.°C
- 35/28 — Cooling W. outlet/inlet temp. °C
- 0.4 — Steam inlet pressure (0.4MPa)

3. Single-stage Steam Chiller

Example 1 (standard)

BDS 150 IX 0.1
- 0.1 — Steam inlet pressure (0.1MPa)
- IX — BROAD absorption chiller design code
- 150 — Cooling capacity 10^4kcal/h
- BDS — Product B: BROAD, DS: single-stage steam chiller

Example 2 (special)

BDS150 IX 0.05 - 35/28 - 10/15 - B_2 - 125
- 125 — Model code (the price is based on this)
- B_2 — Power (3 Φ 415V 50Hz)
- 10/15 — Chilled W. outlet/inlet temp. °C
- 35/28 — Cooling W. outlet/inlet temp. °C
- 0.05 — Steam inlet pressure (0.05MPa)

4.Two-stage Hot Water Chiller

Example 1 (standard)

BH 150 IX 165/180

- 165/180 — Heat source W. outlet/inlet temp. ℃
- IX — BROAD absorption chiller design code.
- 150 — Cooling capacity 10^4kcal/h
- BH — Product B: BROAD, H: two-stage hot water chiller

Example 2 (special):

BH150 IX 150/165 - 36/28 - 6/14 - B_3 - 175

- 175 — Model code (the price is based on this)
- B_3 — Power (3 Φ 460V 60Hz)
- 6/14 — Chilled W. outlet/inlet temp. ℃
- 36/28 — Cooling W. outlet/inlet temp. ℃
- 150/165 — Heat source W. outlet/inlet temp. ℃

5. Single-stage Hot Water Chiller

Example 1 (standard):

BDH 150 IX 105/120

- 105/120 — Heat source W. outlet/inlet temp. ℃
- IX — BROAD absorption chiller design code
- 150 — Cooling capacity 10^4kcal/h
- BDH — Product B: BROAD DH: single-stage hot water chiller

Example 2 (special):

BDH150 IX80/90 - 35/28 - 8/14 - 200

- 200 — Model code (the price is based on this)
- 8/14 — Chilled W. outlet/inlet temp. ℃
- 35/28 — Cooling W. outlet/inlet temp. ℃
- 80/90 — Heat source W. outlet/inlet temp. ℃

6. Two-stage Exhaust Chiller/Heater

Example 1 (standard):

BE 105 IX 500 - 150

- 500 - 150 — Model code (the price is based on this)
- IX — Exhaust inlet temp. ℃
- 105 — BROAD absorption chiller design code
- BE — Cooling capacity 10^4kcal/h
  Product B: BROAD E: two-stage exhaust chiller/heater

Example 2 (special):

BE105 IX400 - 35/28 - 8/14 - k - 125

- 125 — Model code (the price is based on this)
- k — cooling-heating type (without hot W.)
- 8/14 — Chilled W. outlet/inlet temp. ℃
- 35/28 — Cooling W. outlet/inlet temp. ℃
- 400 — Exhaust inlet temp. ℃

7. Single-stage Exhaust Chiller/Heater

Example 1 (standard):

BDE 105 IX 300 - 150

- 300 - 150 — Model code (the price is based on this)
- IX — Exhaust inlet temp. ℃
- 105 — BROAD absorption chiller design code
- BDE — Cooling capacity 10^4kcal/h
  Product B: BROAD DE: single-stage exhaust chiller/heater

Example 2 (special):

BDE125 IX250 - 35/28 - 8/14 - d - B_2 - 150

- 150 — Model code
- B_2 — Power (3 Φ 415V 50Hz)
- d — Cooling-only type
- 8/14 — Chilled outlet/inlet temp. ℃
- 35/28 — Cooling outlet/inlet temp. ℃
- 250 — Exhaust inlet temp. ℃

8. Outdoor Package

Example 1:

BZY 582 IX D - k - H_1

- H_1 — 20% more heating capacity
- k — Cooling-heating type (without hot W.)
- D — Fuel (natural gas)
- IX — BROAD absorption chiller design code.
- 582 — Cooling capacity kW
- BZY — Product
  BZY: BROAD outdoor package DFA

Example 2:

BSY 582 IX 0.6 - B_2

- B_2 — Power (3 Φ 415V 50Hz)
- 0.6 — Steam inlet pressure (0.6 MPa)
- IX — BROAD absorption design code.
- 582 — Cooling capacity kW
- BSY — Product
  BSY: BROAD outdoor package two-stage hot W. chiller
  BDSY: BROAD outdoor package single-stage steam chiller

Example 3:

BHY 582 IX 165/180

- 165/180 — Heat source W. outlet/inlet temp. ℃
- IX — BROAD absorption chiller design code
- 582 — Cooling capacity kW
- BHY — Product
  BHY: BROAD outdoor package two-stage hot W. chiller
  BDHY: BROAD outdoor package single-stage hot W. chiller

Example 4:

BEY 407 IX 500 - d

- d — Cooling only type
- 500 — Exhaust inlet temp. ℃
- IX — BROAD absorption chiller design code
- 407 — Cooling capacity kW
- BEY — Product
  BEY: BROAD outdoor package two-stage exhaust chiller/heater
  BDEY: BROAD outdoor package single-stage exhaust chiller

9. BCT House Gas Air Con.

Example 1 (standard):

BCT 70 D

- D — Fuel (natural gas)
- 70 — Cooling capacity kW
- BCT — Product B: BROAD, C: Comfort, T: Technology

Example 2:

BCT70 B - k - B_2

- B_2 — Power (3 Φ 415V 50Hz)
- k — Cooling-heating type (without hot W.)
- B — Fuel (diesel)

Example 3:

BCT23 B C - A_3

- A_3 — Power (1 Φ 220V 60Hz)
- C — LPG for hot water
- B — Diesel for cooling/heating

10. Indoor Unit

B 12 - A_2

- A_2 — Power (1 Φ 110V 50Hz)
- 12 — Cooling capacity 12=1.2HP
- B — Product B: wall-mounted type
  Indoor unit type:
  B:wall-mounted type
  G:floor standing type
  F:ceiling mounted cassette type
  C: long ceiling mounted cassette type
  L: vertical cabinet type
  R: hot water tank
  N: horizontal type

11. Hot Water Tank

R 200L

- 200L — Capacity (200L)
- R — Product R: hot water tank

℃	℉
0	32.0
1	33.8
2	35.6
3	37.4
4	39.2
5	41.0
6	42.8
7	44.6
8	46.4
9	48.2
10	50.0
11	51.8
12	53.6
13	55.4
14	57.2
15	59.0
16	60.8
17	62.6
18	64.4
19	66.2
20	68.0
21	69.8
22	71.6
23	73.4
24	75.2
25	77.0
26	78.8
27	80.6
28	82.4
29	84.2
30	86.0
31	87.8
32	89.6
33	91.4
34	93.2
35	95.0
36	96.8
37	98.6
38	100.4
39	102.2
40	104
44	111
50	122
57	135
60	140
65	149
70	158
75	167
80	176
85	185
88	190
90	194
95	203
98	208
100	212
105	221
110	230
115	239
120	248
125	257
130	266
135	275
140	284
145	293
150	302
155	311
160	320
165	329
170	338
175	347
180	356
185	365
190	374
200	392
250	482
300	572
350	662
400	752
450	842
500	932
550	1022
600	1112

SPECIFICATIONS

TWO-STAGE STEAM CHILLER

Model	BS	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250
cooling capacity																
	kW	174	233	291	349	465	582	756	872	989	1163	1454	1745	2035	2326	2908
	10^4kcal/h	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250
	USRT	50	66	83	99	132	165	215	248	281	331	413	496	579	661	827
chilled water 7℃/12℃ high flow (A)																
flowrate	m^3/h	30	40	50	60	80	100	130	150	170	200	250	300	350	400	500
pressure drop	kPa	6	6	10	10	10	20	20	25	25	25	46	46	46	46	75
chilled water 7℃/14℃ low flow (B)																
flowrate	m^3/h	21.4	28.6	35.7	42.9	57.1	71.4	92.9	107	121	143	179	214	250	286	357
pressure drop	kPa	3	3	5	5	5	11	11	14	14	14	25	25	25	25	42
cooling water 30℃/37℃ low flow (a)																
flowrate	m^3/h	36.7	49.0	61.1	73.4	97.9	123	159	184	208	245	306	368	429	490	613
pressure drop	kPa	30	30	62	62	62	62	38	50	50	50	50	50	50	50	62
cooling water 32℃/37.5℃ high flow (b)																
flowrate	m^3/h	46.7	62.3	77.8	93.4	125	156	203	234	265	312	390	468	546	624	780
pressure drop	kPa	47	47	97	97	97	97	59	78	78	78	78	78	78	78	97
0.8MPa two-stage steam (BS)																
consumption	kg/h	188	252	313	377	504	630	818	945	1072	1262	1576	1893	2210	2524	3158
power	kW	1.4	1.4	2.5	2.5	2.5	2.5	4.0	4.0	4.3	4.3	6.4	6.4	6.4	8.4	8.8
solution weight	t	0.7	0.8	1.0	1.1	1.3	1.6	1.9	2.2	2.5	3.1	3.8	4.3	5.6	6.6	8.2
unit ship.wt.(with LiBr)	t	3.7	4.0	5.1	5.8	6.4	7.3	8.6	9.4	11.4	12.7	16.0	18.2	21.0	25.0	29.8
unit ship.wt.(without LiBr)	t	/	/	/	2.7	3.6	4.0	4.6	5.0	6.2	7.1	9.0	10.2	11.8	14.0	15.7
operation weight	t	3.9	4.3	5.4	6.2	6.9	7.8	9.3	10.5	12.5	14.0	17.5	19.8	23.0	27.9	32.8
0.6MPa two-stage steam (BS)																
consumption	kg/h	189	253	315	378	506	633	822	949	1076	1267	1583	1901	2219	2535	3171
solution weight	t	0.8	0.9	1.1	1.2	1.5	1.8	2.0	2.3	2.8	3.5	4.0	4.9	6.1	7.4	8.7
unit ship.wt.(with LiBr)	t	3.8	4.2	5.3	6.0	6.7	7.7	8.9	10.1	11.9	13.8	16.8	19.1	22.3	26.8	31.4
operation weight	t	4.0	4.5	5.6	6.4	7.2	8.2	9.6	11.2	13.0	15.1	18.3	20.7	24.3	29.7	34.4

Model	BS	300	400	500	600	800	1000	1200	1600	2000
cooling capacity										
	kW	3489	4652	5815	6978	9304	11630	13956	18608	23260
	10^4kcal/h	300	400	500	600	800	1000	1200	1600	2000
	USRT	992	1323	1653	1984	2646	3307	3968	5291	6614
chilled water 7℃/12℃ high flow (A)										
flowrate	m^3/h	600	800	1000	1200	1600	2000	2400	3200	4000
pressure drop	kPa	77	77	46	46	46	90	46	46	90
chilled water 7℃/14℃ low flow (B)										
flowrate	m^3/h	429	571	714	857	1143	1429	1714	2286	2857
pressure drop	kPa	42	42	25	25	25	49	25	25	49
cooling water 30℃/37℃ low flow (a)										
flowrate	m^3/h	736	881	1226	1472	1963	2452	2943	3925	4904
pressure drop	kPa	62	62	70	70	70	90	70	70	90
cooling water 32℃/37.5℃ high flow (b)										
flowrate	m^3/h	936	1249	1560	1873	2498	3121	3746	4996	6242
pressure drop	kPa	97	97	110	110	110	140	110	110	140
0.8MPa two-stage steam (BS)										
consumption	kg/h	3792	5058	6316	7584	10116	12632	15168	20232	25263
power	kW	8.8	10.3	17.4	17.4	20.4	34.6	34.8	40.8	69.2
solution weight	t	9.2	12.0	14.5	17.2	22.5	28.0	34.4	45.0	56
unit ship.wt.(with LiBr)	t	34.4	/	/	/	/	/	/	/	/
unit ship.wt.(without LiBr)	t	18.5	25	33	37	44	55	37	44	55
operation weight	t	38.0	47.0	61.0	69	86	107	139	173	215
0.6MPa two-stage steam (BS)										
consumption	kg/h	3808	5080	6343	7616	10159	12685	15233	20318	25371
solution wei	t	10.6	13.2	15.8	19.5	24.5	31	39	49	62
unit ship.wt.(with LiBr)	t	36.5	/	/	/	/	/	/	/	/
operation weight	t	40.7	52.2	63.8	73	91	113	147	183	227

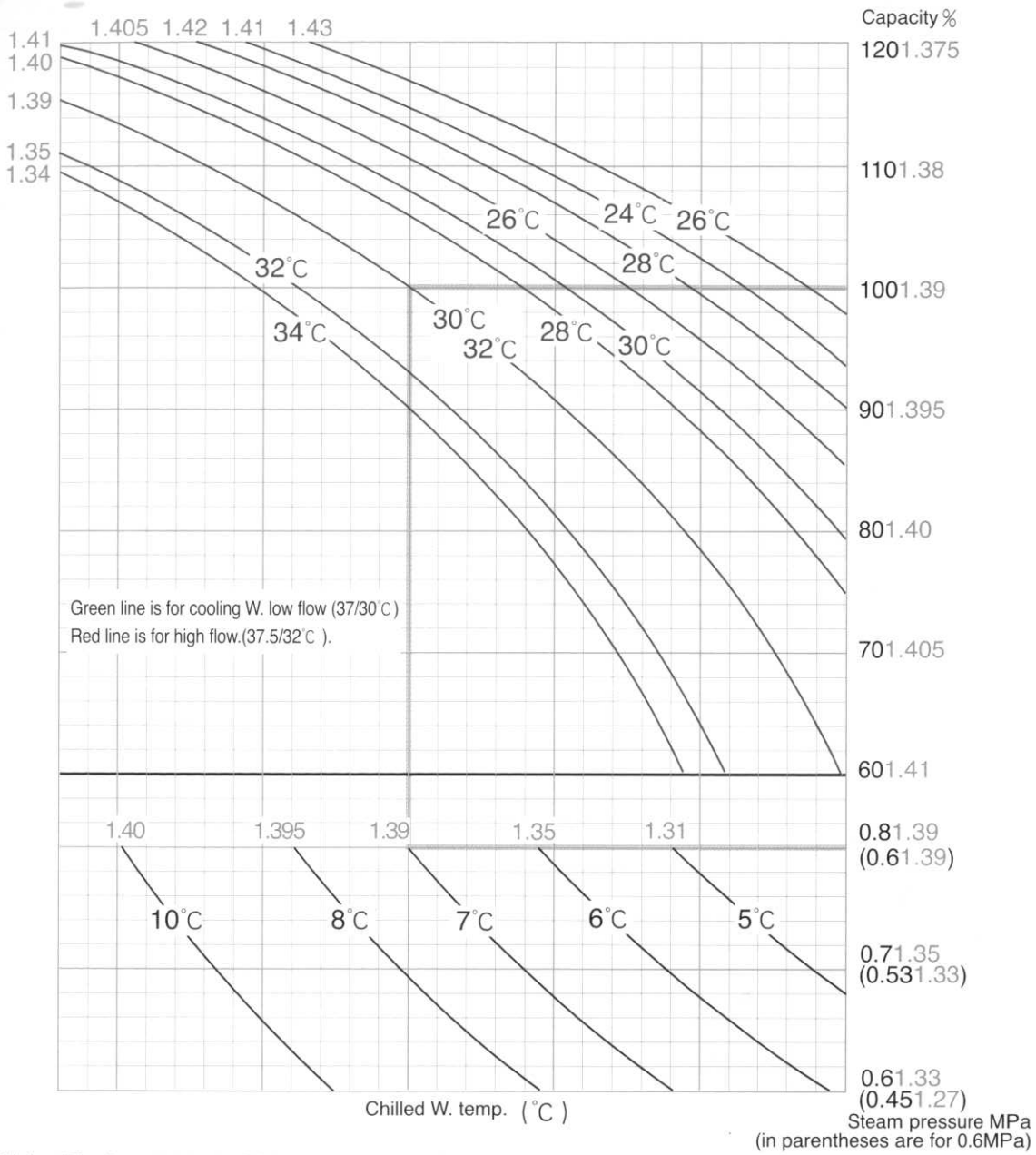
General Conditions:

1. Rated saturated steam pressure: 0.8MPa (or 0.6MPa)
   Rated condensate temperature: 95°C
2. Rated chilled W.outlet/inlet temp.: (A)7°C/12°C (B)7°C/14°C
3. Rated cooling W.outlet/inlet temp.: (a)37°C/30°C (b)37.5°C/32
4. Lowest permitted outlet temp.for chilled water: 5°C
   (except special order)
5. Lowest permitted inlet temp.for cooling water: 10°C
   Lowest inlet temp.in operating: 18°C (no limit if 3-way valve is equipp
6. Steam pressure upper limit is 110%
   than rated steam pressure.
7. Pressure limit for chilled/cooling water: 0.8MPa
   (800kPa) (except special order)
8. Fouling factor for chilled water: 0.086m^2•K/kW
9. LiBr solution concentration:50%.The power and unit ship wei
   demand for 0.6MPa chiller is the same as 0.8MPa chiller.
10. Machine room temperature: 5~43°C,humidity ⩽ 85%
11. Adjustable chilled water flowarate:50~120%
    (according to flowrate A)
12. Adjustable cooling water flowarate:30~140%
    (according to flowrate a)
13. Adjustable load:5~115%
14. Rated COP:1.39(including electricity consumption)

Note: ① (A), (a) is for recommendation.(B), (b) can be selec
without affecting cooling capacity and COP.
②Technical specification is based upon Japanese Indus
Standard JIS B 8622 "Absorption Chiller"

PERFORMANCE CURVES OF TWO-STAGE STEAM CHILLER

Steam/Chilled W./Cooling W./Capacity/COP (model selection)



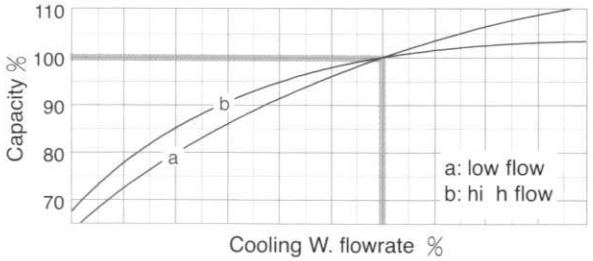
Note: 1. The figure in blue is COP. In calculation, 4 of them will be added and then divided by 4.
2. If 0.6MPa is selected as rated steam pressure in the order, the capacity and COP can reach the same as those of 0.8MPa model, but prices of these two models are different.
3. Illustration of using the curves:
① Known: cooling capacity is 100%, steam pressure 0.7MPa, cooling W. temp. is 28°C; check out chilled W. temp. is 7.5°C, COP is 1.378, i.e. (1.39+1.40+1.33+1.392)/4=1.378
② Known: steam pressure is 0.7MPa, chilled W. temp. is 8°C, cooling W. temp. is 30°C; check out cooling capacity is 103%, COP=1.381
③ Known: cooling capacity is 90%, steam pressure 0.8MPa, chilled water is 6°C; check out cooling water temperature is 30.5°C, COP =1.376
(calculated per cooling water low flow and steam pressure 0.8MPa option)

COP (model selection, operation)

Rated COP:	1.39		
IPLV COP:	1.586 calculation as		
Load	COP	Factor	Result
A 100%	1.390	0.01	0.0139
B 75%	1.604	0.42	0.6737
C 50%	1.654	0.45	0.7443
D 25%	1.287	0.12	0.1544

Note: The integrated part load value (IPLV) reflects chiller's actual COP in operation. The load and calculation formula are based upon ARI Standard 560.

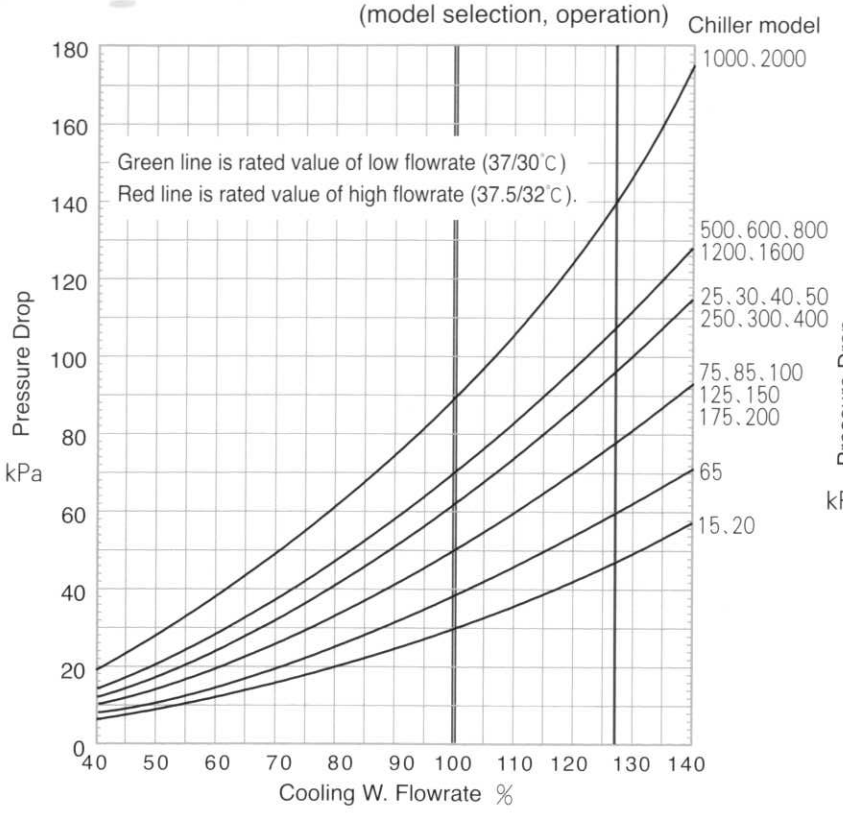
Cooling W. flowrate vs. Capacity
(model selection, operation)



(orange line is the rated value)

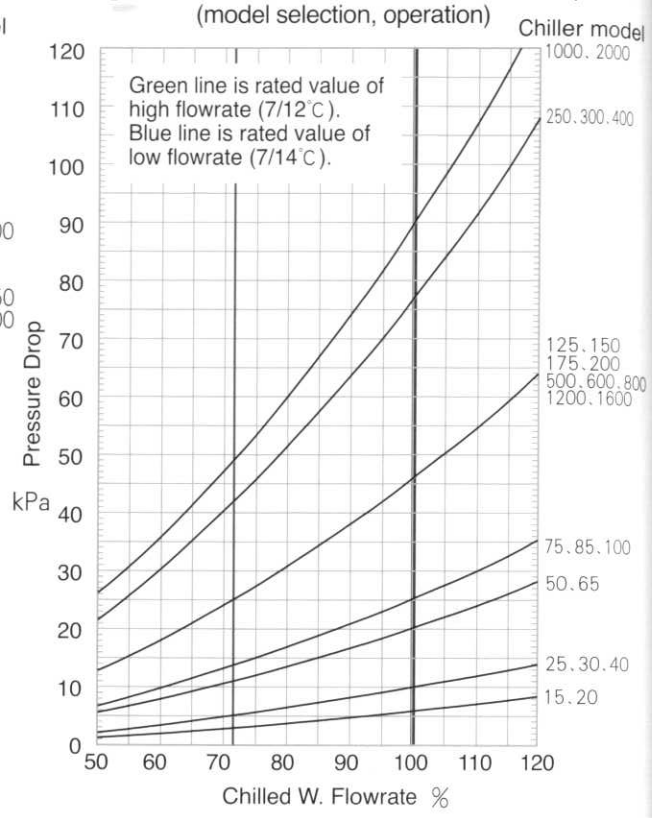
Cooling W. Flowrate vs. Pressure Drop

(model selection, operation)



Chilled W. Flowrate vs. Pressure Drop

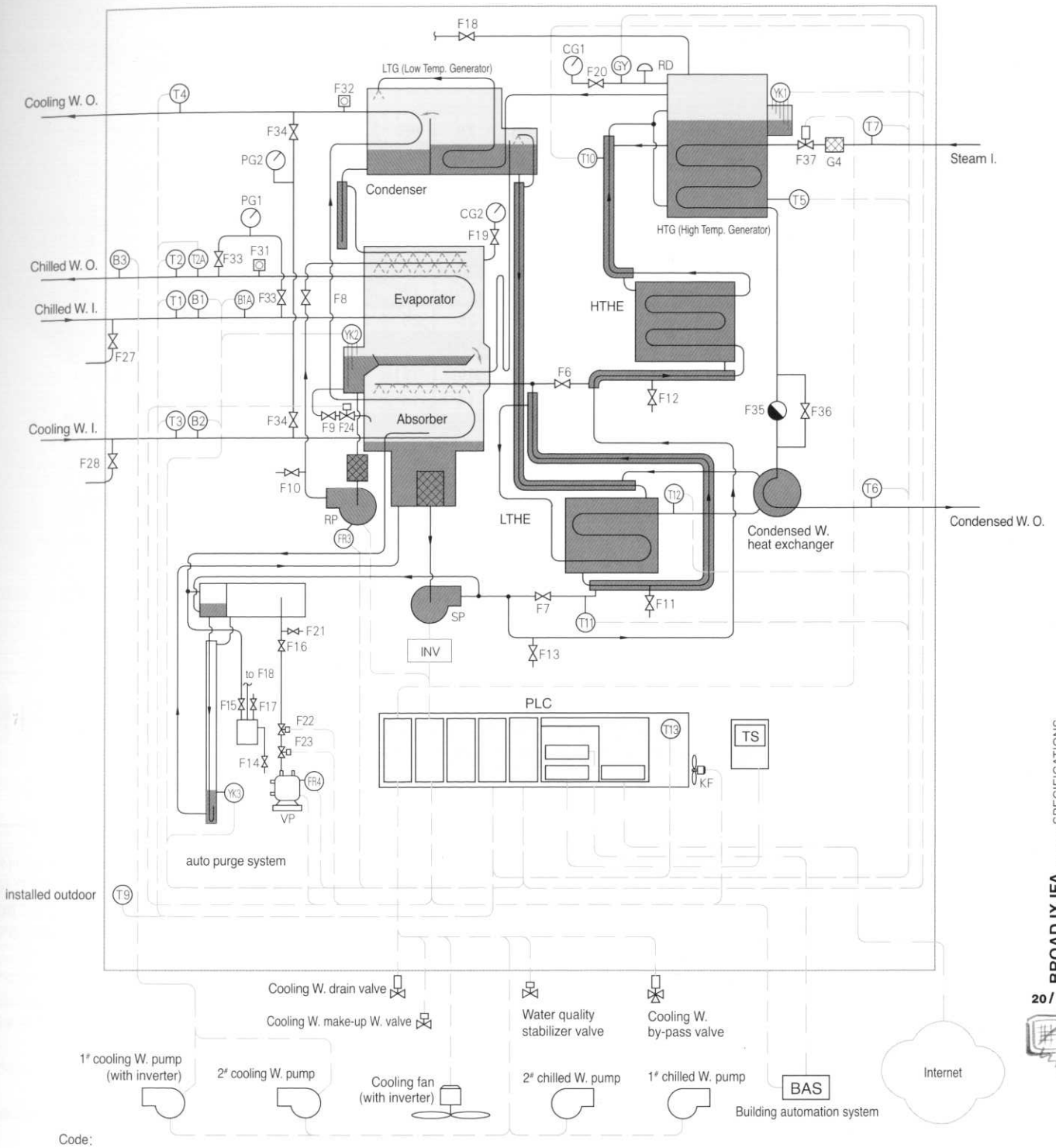
(model selection, operation)



Supply List–Two-stage Steam Chiller

Category	Item	Remark
Main shell	main shell body	includes low temp. generator, condenser, evaporator, absorber, water box,heat/cold insulation, etc..
	low temp. heat exchanger	plate heat exchanger, includes heat insulation.
	canned pumps	includes refrigerant pump and solution pump.
	automatic purge system	includes inline falling head purge system, solenoid valve and vacuum pump.
HTG	HTG shell	includes shell, front/rear steam chamber, base, heat insulation
	high temp. heat exchanger	plate heat exchanger, includes heat insulation
	condensate heat exchanger	tube heat exchanger, includes heat insulation
	steam motor valve	used for steam flowrate regulation to realize automatic modulation of cooling capacity, includes steam filter
Control system	control cabinet	includes PLC, solution pump inverter, refrigerant pump inverter(⩾ 200 model), low voltage parts and control software
	touch screen	for office control of IFA, includes metal enclosure, DC power and typical 30m cable (with an optional length up to 5km). Delivered in separate package.
	back-up switch	for commissioning or maintenance use, installed on the main shell body
	network converter	for remote control through internet, mounted in the control cabinet.
	terminals for exterior system	mounted in the control cabinet for control of chilled water pump, cooling water pump, cooling tower fan, cooling water by-pass valve and water quality stabilizer charge device, etc.
	sensors to be field installed	only one ambient temp. sensor. Others are factory-mounted.
Accessories	spare parts	include sealing elements and a complete set of easily worn-out parts (meet 4-year maintenance requirement)
	special tools	include tools for water box cover assembling/dismantling, descaling tools and maintenance tools.
	documents	include packing list, quality certificate, users' manual, and auxiliary devices' manuals
	toolbox	spare parts, special tools and documents are locked in this stainless steel box before shipment.

P & I DIAGRAM OF TWO-STAGE STEAM CHILLER



Code:

T1	chilled W. inlet temp. sensor	B3	chilled W. flow switch	PG1	pressure gauge	F18	HTG purge valve
T2	chilled W. outlet temp. sensor	GY	pressure control	PG2	pressure gauge	F19	main shell pressure valve
T2A	chilled W. calibrating temp. sensor	YK1	HTG solution level probe	RD	rupture disc	F20	HTG pressure valve
T3	cooling W. inlet temp. sensor	YK2	refrigerant level probe	G4	steam filter	F21	nitrogen charging valve
T4	cooling W. outlet temp. sensor	YK3	non-condensable probe	F6	HTG concentration regulating valve	F22	purge solenoid valve
T5	HTG temp. sensor	FR3	refrigerant pump thermal relay	F7	LTG concentration regulating valve	F23	purge solenoid valve
T6	condensed W. outlet temp. sensor	FR4	vacuum pump thermal relay	F8	refigerant regulating valve	F24	refrigerant solenoid valve
T7	steam intlet temp. sensor	INV	solution pump inverter	F9	refrigerant by-pass valve	F27	chilled W. drain valve
T9	ambient temp. sensor	TS	touch screen	F10	refrigerant sampling valve	F28	cooling W. drain valve
T10	HTG crystallization sensor	PLC	programmable logic controller	F11	LTHE sampling valve	F31	chilled W. vent valve
T11	LTHE diluted solution inlet temp. sensor	KF	control casing draft fan	F12	HTHE sampling valve	F32	cooling W. vent valve
T12	LTG crystallization sensor	RP	refrigerant pump	F13	diluted solution sampling valve	F33	chilled W. pressure valve
T13	control casing temp. sensor	SP	solution pump	F14	main purge valve	F34	cooling W. pressure valve
B1	chilled W. flow switch	VP	vacuum pump	F15	direct purge valve	F35	steam trap
B1A	chilled W. flow switch	CG1	compound gauge	F16	air cannister valve	F36	condensed W. by-pass valve
B2	cooling W. flow switch	CG2	compound gauge	F17	sampling purge valve	F37	steam motor valve

Notes:

1. ☐ BROAD supply scope
2. All the components are installed and commissioned in the factory before shipment except T9.
3. Wire type: —— actuator signal output
   - - - - sensor signal input
   —— —— communication signal

TWO-STAGE HOT WATER CHILLER

Model	BH	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250
cooling capacity																
	kW	174	233	291	349	465	582	756	872	989	1163	1454	1745	2035	2326	2908
	10^4kcal/h	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250
	USRT	50	66	83	99	132	165	215	248	281	331	413	496	579	661	827
chilled water 7℃/12℃ high flow (A)																
flowrate	m^3/h	30	40	50	60	80	100	130	150	170	200	250	300	350	400	500
pressure drop	kPa	6	6	10	10	10	20	20	25	25	25	46	46	46	46	77
chilled water 7℃/ 14℃ low flow (B)																
flowrate	m^3/h	21.4	28.6	35.7	42.9	57.1	71.4	92.9	107	121	143	179	214	250	286	357
pressure drop	kPa	3	3	5	5	5	11	11	14	14	14	25	25	25	25	42
cooling water 30℃/ 37℃ low flow (a)																
flowrate	m^3/h	36.7	49.0	61.1	73.4	97.9	123	159	184	208	245	306	368	429	490	613
pressure drop	kPa	30	30	62	62	62	62	38	50	50	50	50	50	50	50	62
cooling water 32℃/37.5℃ high flow (b)																
flowrate	m^3/h	46.7	62.3	77.8	93.4	125	156	203	234	265	312	390	468	546	624	780
pressure drop	kPa	47	47	97	97	97	97	59	78	78	78	78	78	78	78	97
heat source water	m^3/h	7.6	10.2	12.7	15.3	20.4	25.6	33.2	38.3	43.5	51.2	63.9	76.8	89.7	102	128
power	kW	1.4	1.4	2.5	2.5	2.5	2.5	4.0	4.0	4.3	4.3	6.4	6.4	6.4	8.4	8.8
solution weight	t	0.8	0.9	1.2	1.3	1.5	1.9	2.2	2.5	2.9	3.6	4.2	5.1	6.1	7.4	8.8
unit ship.wt.(with LiBr)	t	3.9	4.6	5.4	6.3	7.0	8.1	9.3	10.5	12.7	13.9	17.2	19.6	23.0	27.0	32.0
unit ship.wt.(without LiBr)	t	/	/	/	2.7	3.6	4.0	4.6	5.0	6.2	7.1	9.0	10.2	11.8	14.0	15.7
operation weight	t	4.2	4.9	5.9	6.9	8.0	9.1	10.3	11.6	13.9	15.2	18.8	21.4	25.0	29.4	35.2

Model	BH	300	400	500	600	800	1000	1200	1600	2000
cooling capacity										
	kW	3489	4652	5815	6978	9304	11630	13956	18608	23260
	10^4kcal/h	300	400	500	600	800	1000	1200	1600	2000
	USRT	992	1323	1653	1984	2646	3307	3968	5291	6614
chilled water 7℃/ 12℃ high flow (A)										
flowrate	m^3/h	600	800	1000	1200	1600	2000	2400	3200	4000
pressure drop	kPa	77	77	46	46	46	90	46	46	90
chilled water 7℃/ 14℃ low flow (B)										
flowrate	m^3/h	429	571	714	857	1143	1429	1714	2286	2857
pressure drop	kPa	42	42	25	25	25	49	25	25	49
cooling water 30℃/ 37℃ low flow (a)										
flowrate	m^3/h	736	981	1226	1472	1963	2452	2943	3925	4904
pressure drop	kPa	62	62	70	70	70	90	70	70	90
cooling water 30℃/ 37.5℃ high flow (b)										
flowrate	m^3/h	936	1249	1560	1873	2498	3121	3746	4996	6242
pressure drop	kPa	97	97	110	110	110	140	110	110	140
heat source water	m^3/h	154	205	256	308	410	512	615	821	1025
power	kW	8.8	10.3	17.4	17.4	20.4	34.6	34.8	40.8	69.2
solution weight	t	10.8	13.7	16.5	21.0	26.0	32.0	42.0	52.0	64.0
unit ship.wt.(with LiBr)	t	37.5	/	/	/	/	/	/	/	/
unit ship.wt.(without LiBr)	t	18.5	25	33	37	44	55	37	44	55
operation weight	t	41.7	54	67	78	95	117	157	191	235

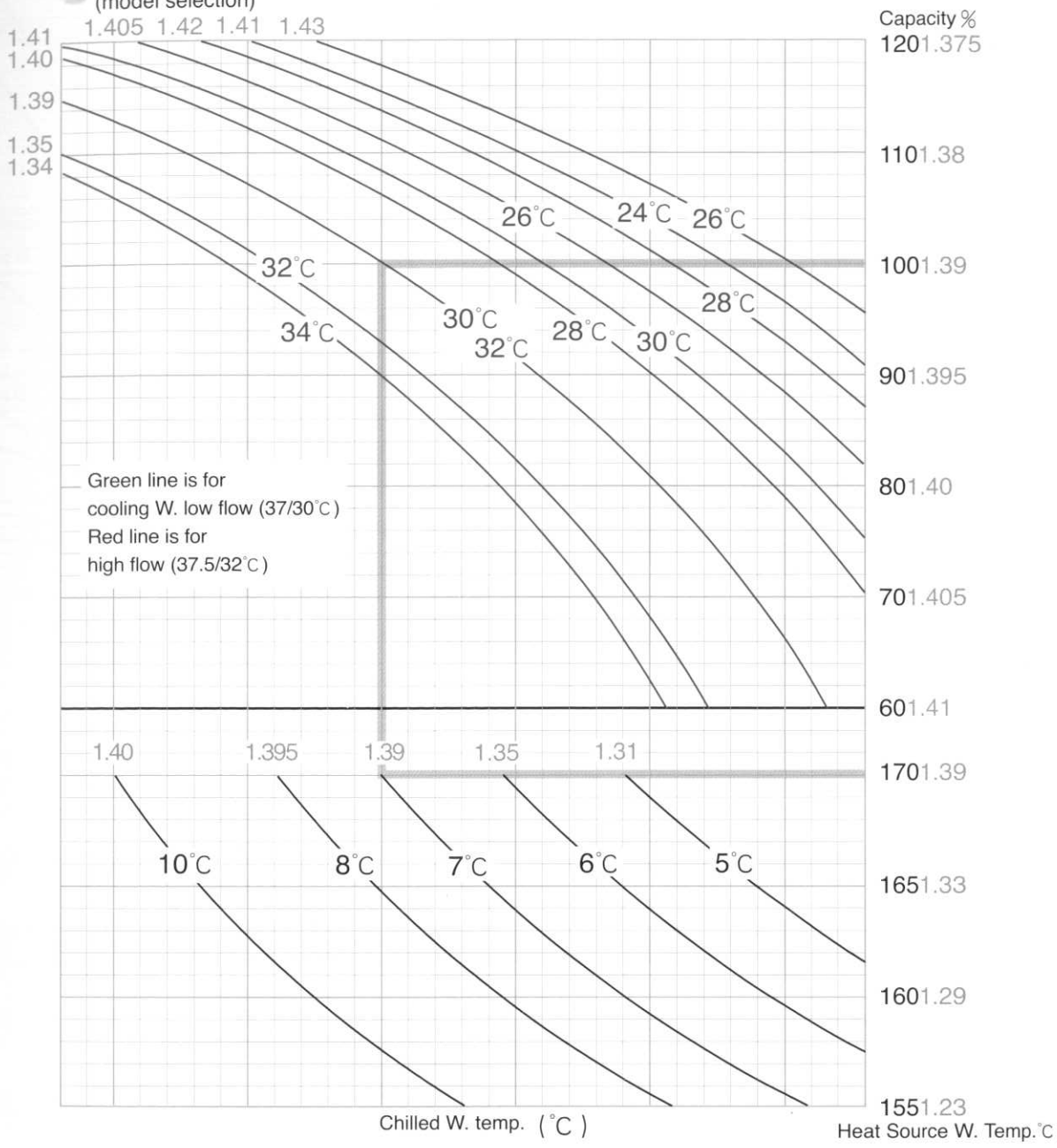
General Conditions:

1.Rated heat source W. outlet/inlet temp.: 155°C/170°C
2.Rated chilled W.outlet/inlet temp.: (A) 7°C/12°C (B) 7°C/14°C
3.Rated cooling W.outlet/inlet temp.: (a) 37°C/30°C (b) 37.5°C/32°
4.Lowest permitted outlet temp.for chilled water: 5°C (except special order)
5.Lowest permitted inlet temp.for cooling water: 10°C
Lowest inlet temp.in operating: 18°C(no limit if 3-way valve is equipped
6.Heat source W.temp.upper limit is 110% than rated heat source W.temp.
7.Pressure limit for chilled/cooling water:0.8MPa(800kPa) (except special order)
8.Fouling factor for chilled/heat source water: 0.086$m^2 \cdot K/kW$
9.LiBr solution concentration:50%
10.Machine room temperature: 5~43°C,humidity ⩽ 85%
11.Adjustable chilled water flowarate:50~120% (according to flowrate A)
12.Adjustable cooling water flowarate:30~140% (according to flowrate a)
13.Adjustable load:5~115%
14.Rated COP:1.39(including electricity consumption)

Note: ① (A)、(a)is for recommendation, (B)、(b) can be selected without affecting cooling capacity and COP.
②Technical specification is based upon Japanese Industrial Standard JIS B 8622"Absorption Chiller"

PERFORMANCE CURVES OF TWO-STAGE HOT WATER CHILLER

Chilled W./cooling W./Heat Source W./Capacity/COP (model selection)



Note: The figure in blue is COP. In calculation, 4 of them will be added and then divided by 4. Example:

① Known: cooling capacity is 100%, heat source temp. 170°C. cooling W. temp. 28°C; check out chilled W. temp. is 6°C, COP is 1.383, i.e. (1.39+1.40+1.35+1.39)/4=1.383

② Known: heat source temp. is 160°C. chilled W. temp. 10°C .cooling W. temp. is 30°C; check out cooling capacity is 104%, COP=1.367

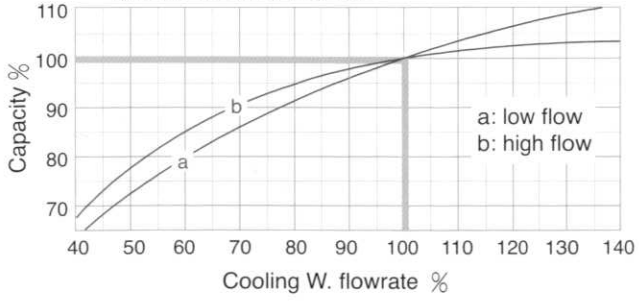
③ Known: cooling capacity is 110%, heat source temp. 170°C. chilled water is 6°C; check out cooling water temperature is 24.5°C, COP =1.382 (calculated per cooling water low flow option).

COP (model selection,operation)

Rated COP:	1.39		
IPLV COP:	1.586 calculation as		
Load	COP	Factor	Result
A 100%	1.390	0.01	0.0139
B 75%	1.604	0.42	0.6737
C 50%	1.654	0.45	0.7443
D 25%	1.287	0.12	0.1544

Note: The integrated part load value (IPLV) reflects chiller's actual COP in operation. The load and calculation formula are based upon ARI Standard 560.

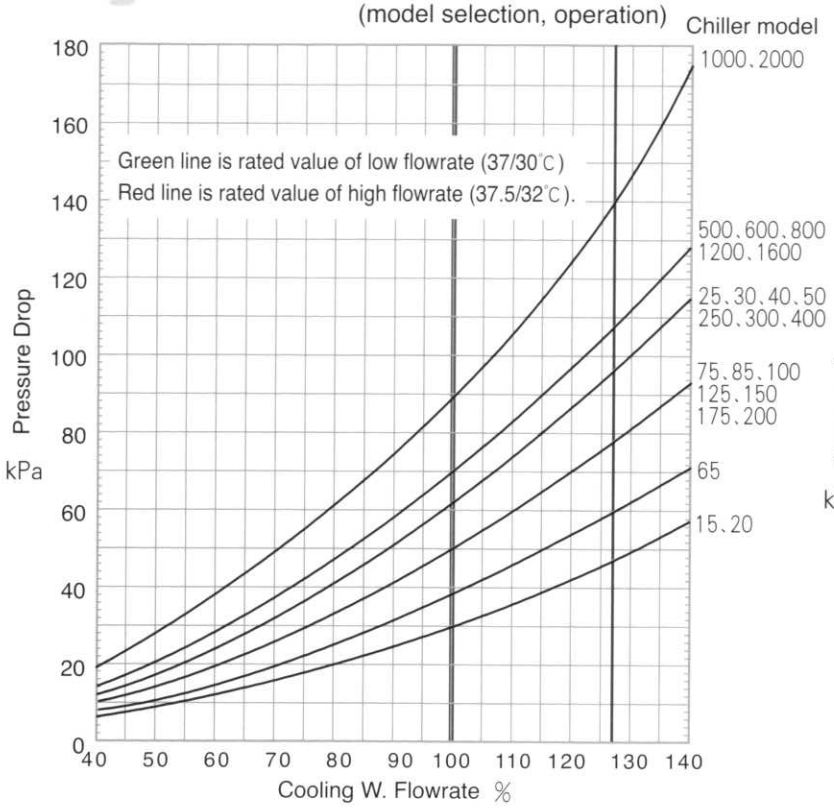
Cooling W. flowrate vs. Capacity (model selection, operation)



(orange line is the rated value)

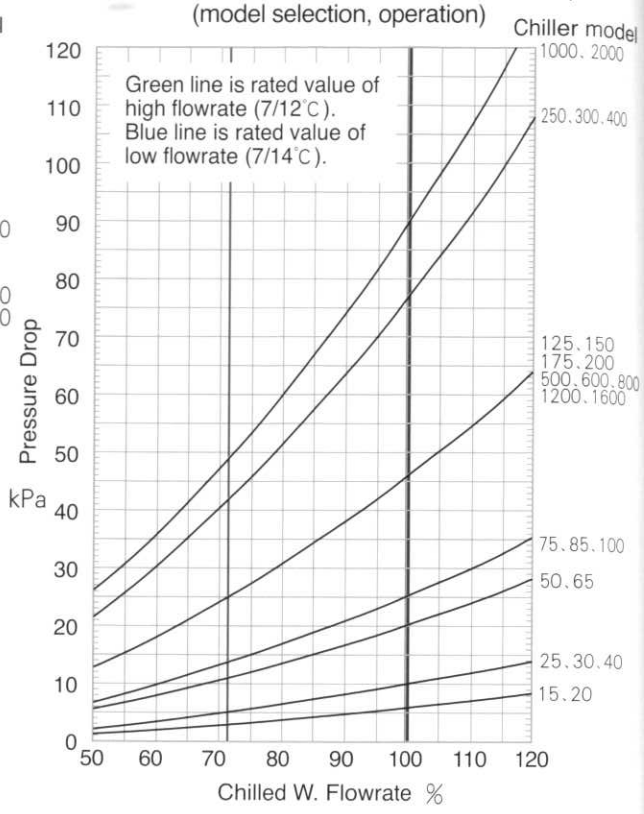
Cooling W. Flowrate vs. Pressure Drop

(model selection, operation)



Chilled W. Flowrate vs. Pressure Drop

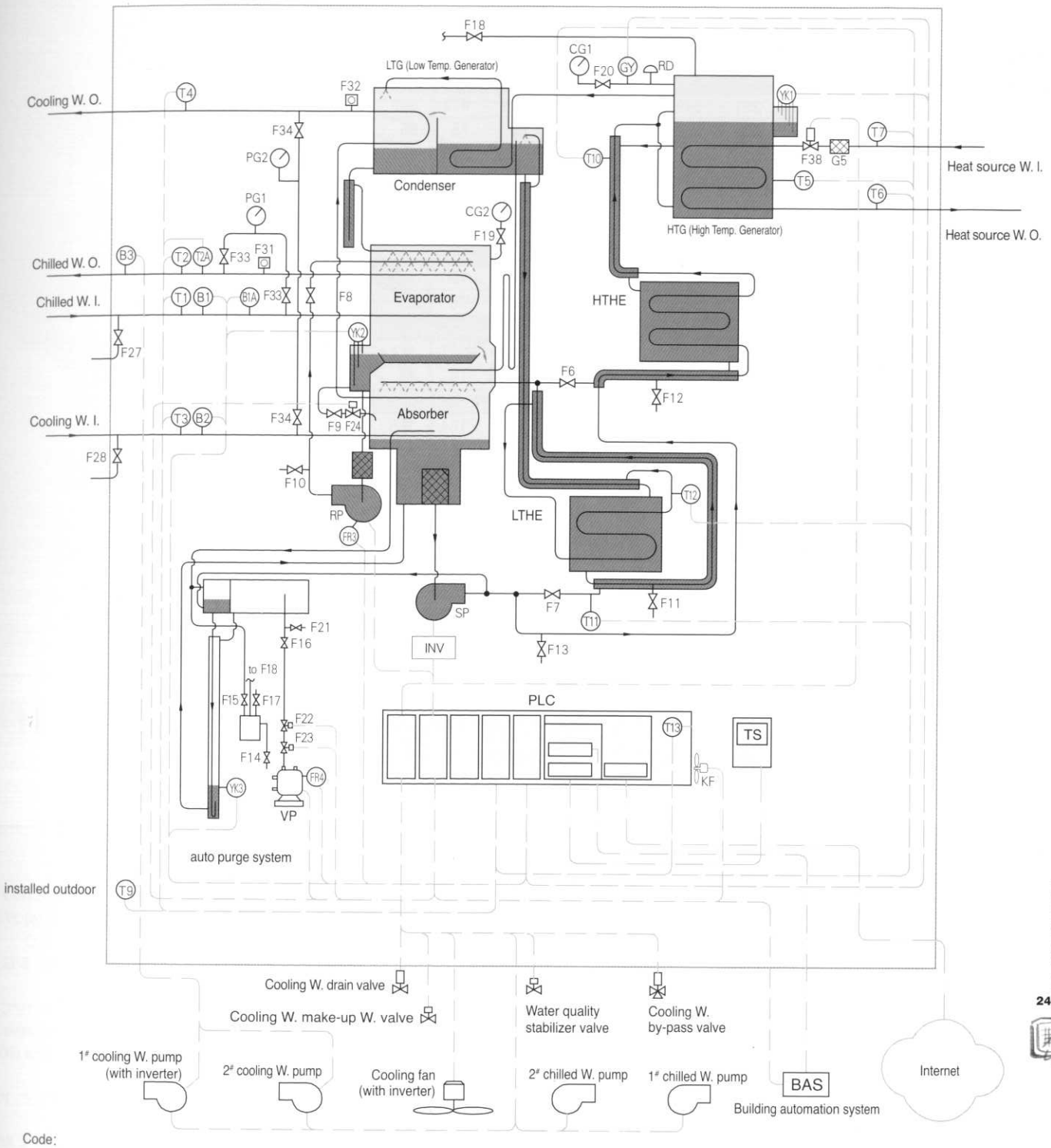
(model selection, operation)



Supply List--Two-Stage Hot Water Chiller

Category	Item	Remark
Main shell	main shell body	includes low temp. generator, condenser, evaporator, absorber, water box,heat/cold insulation, etc..
	low temp. heat exchanger	plate heat exchanger, includes heat insulation.
	canned pumps	includes refrigerant pump and solution pump.
	automatic purge system	includes inline falling head purge system, solenoid valve and vacuum pump.
HTG	HTG shell	includes shell, front/rear water chamber, base, heat insulation
	high temp. heat exchanger	plate heat exchanger, includes heat insulation
	condensate heat exchanger	tube heat exchanger, includes heat insulation
	heat source water motor valve	used for heat source water flowrate regulation to realize automatic regulation of cooling capacity, includes heat source water filter
Control system	control cabinet	includes PLC, solution pump inverter, refrigerant pump inverter(> 200 model), low voltage parts and control software
	touch screen	for office control of IFA, includes metal enclosure, DC power and typical 30m cable (with an optional length up to 5km). Delivered in separate package.
	back-up switch	for commissioning or maintenance use, installed on the main shell body
	network converter	for remote control through internet, mounted in the control cabinet.
	terminals for exterior system	mounted in the control cabinet for control of chilled water pump, cooling water pump, cooling tower fan, cooling water by-pass valve and water quality stabilizer charge device, etc.
	sensors to be field installed	only one ambient temp. sensor. Others are factory-mounted.
Accessories	spare parts	include sealing elements and a complete set of easily worn-out parts (meet 4-year maintenance requirement)
	special tools	include tools for water box cover assembling/dismantling, descaling tools and maintenance tools.
	documents	include packing list, quality certificate, users' manual, and auxiliary devices' manuals
	toolbox	spare parts, special tools and documents are locked in this stainless steel box before shipment.

P & I DIAGRAM OF TWO-STAGE HOT WATER CHILLER



Code:

T1	chilled W. inlet temp. sensor	B3	chilled W. flow switch	PG1	pressure gauge	F18	HTG purge valve
T2	chilled W. outlet temp. sensor	GY	pressure control	PG2	pressure gauge	F19	main shell pressure valve
T2A	chilled W. calibrating temp. sensor	YK1	HTG solution level probe	RD	rupture disc	F20	HTG pressure valve
T3	cooling W. inlet temp. sensor	YK2	refrigerant level probe	G5	heat source W. filter	F21	nitrogen charging valve
T4	cooling W. outlet temp. sensor	YK3	non-condensable probe	F6	HTG concentration regulating valve	F22	purge solenoid valve
T5	HTG temp. sensor	FR3	refrigerant pump thermal relay	F7	LTG concentration regulating valve	F23	purge solenoid valve
T6	heat source W. outlet temp. sensor	FR4	vacuum pump thermal relay	F8	refrigerant regulating valve	F24	refrigerant solenoid valve
T7	heat source W. intlet temp. sensor	INV	solution pump inverter	F9	refrigerant by-pass valve	F27	chilled W. drain valve
T9	ambient temp. sensor	TS	touch screen	F10	refrigerant sampling valve	F28	cooling W. drain valve
T10	HTG crystallization sensor	PLC	programmable logic controller	F11	LTHE sampling valve	F31	chilled W. vent valve
T11	LTHE diluted solution inlet temp. sensor	KF	control casing draft fan	F12	HTHE sampling valve	F32	cooling W. vent valve
T12	LTG crystallization sensor	RP	refrigerant pump	F13	diluted solution sampling valve	F33	chilled W. pressure valve
T13	control casing temp. sensor	SP	solution pump	F14	main purge valve	F34	cooling W. pressure valve
B1	chilled W. flow switch	VP	vacuum pump	F15	direct purge valve	F38	heat source W. motor valve
B1A	chilled W. flow switch	CG1	compound gauge	F16	air cannister valve		
B2	cooling W. flow switch	CG2	compound gauge	F17	sampling purge valve		

Notes: 1. ☐ BROAD supply scope

2. All the components are installed and commissioned in the factory before shipment except T9.

3. Wire type: — — — actuator signal output
— — — sensor signal input
—— —— communication signal

TWO-STAGE EXHAUST CHILLER/HEATER

Model	BE	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250
cooling capacity																
	kW	174	233	291	349	465	582	756	872	989	1163	1454	1745	2035	2326	2908
	10^4kcal/h	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250
	USRT	50	66	83	99	132	165	215	248	281	331	413	496	579	661	827
heating capacity																
	kW	135	179	224	269	358	449	583	672	762	897	1121	1349	1570	1791	2245
	10^4kcal/h	11.6	15.4	19.3	23.1	30.8	38.6	50.1	57.8	65.5	77.1	96.4	116	135	154	193
chilled water 7℃/12℃ high flow (A)																
flowrate	m^3/h	30	40	50	60	80	100	130	150	170	200	250	300	350	400	500
pressure drop	kPa	6	6	10	10	10	20	20	25	25	25	46	46	46	46	77
chilled water 7℃/14℃ low flow (B)																
flowrate	m^3/h	21.4	28.6	35.7	42.9	57.1	71.4	92.9	107	121	143	179	214	250	286	357
pressure drop	kPa	3	3	5	5	5	11	11	14	14	14	25	25	25	25	42
cooling water 37℃/30℃ low flow (a)																
flowrate	m^3/h	36.7	49.0	61.1	73.4	97.9	123	159	184	208	245	306	368	429	490	613
pressure drop	kPa	30	30	62	62	62	62	38	50	50	50	50	50	50	50	62
cooling water 37.5℃/32℃ high flow (b)																
flowrate	m^3/h	46.7	62.3	77.8	93.4	125	156	203	234	265	312	390	468	546	624	780
pressure drop	kPa	47	47	97	97	97	97	59	78	78	78	78	78	78	78	97
heating water																
flowrate	m^3/h	14.5	19.3	24.1	28.9	38.5	48.2	62.6	72.3	81.9	96.4	121	145	169	193	241
pressure drop	kPa	40	40	50	50	50	50	50	70	70	70	70	70	70	70	70
max.exhaust consumption	kg/h	1099	1469	1830	2200	2941	3681	4779	5520	6258	7369	9202	11054	12906	14740	18440
power	kW	1.4	1.4	2.5	2.5	2.5	2.5	4.0	4.0	4.3	4.3	6.4	6.4	6.4	8.4	8.8
solution weight	t	0.9	1.1	1.2	1.5	1.9	2.2	2.4	3.0	3.5	4.1	4.7	5.7	6.8	8.0	10.1
unit ship.wt.(with LiBr)	t	4.2	5.3	6.1	6.7	8.7	9.8	11.2	12.1	14.7	16.9	20.1	23.5	26.5	31.1	37.0
unit ship.wt.(without LiBr)	t	/	/	/	2.7	3.6	4.0	4.6	5.0	6.2	7.1	9.0	10.2	11.8	14.0	15.7
operation weight	t	4.4	5.5	6.4	7.2	9.5	10.7	12.3	13.7	16.6	19.1	23.1	26.7	30.1	34.9	41.0

Model	BE	300	400	500	600	800	1000	1200	1600	2000
cooling capacity										
	kW	3489	4652	5815	6978	9304	11630	13956	18608	23260
	10^4kcal/h	300	400	500	600	800	1000	1200	1600	2000
	USRT	992	1323	1653	1984	2646	3307	3968	5291	661
heating capacity										
	kW	2687	3582	4489	5385	7176	8967	10758	14351	17933
	10^4kcal/h	231	308	386	463	617	771	925	1234	1542
chilled water 7℃/12℃ high flow (A)										
flowrate	m^3/h	600	800	1000	1200	1600	2000	2400	3200	4000
pressure drop	kPa	77	77	46	46	46	90	46	46	90
chilled water 7℃/14℃ low flow (B)										
flowrate	m^3/h	429	571	714	857	1143	1429	1714	2286	2857
pressure drop	kPa	42	42	25	25	25	49	25	25	49
cooling water 37℃/30℃ low flow (a)										
flowrate	m^3/h	736	981	1226	1472	1963	2452	2943	3925	4904
pressure drop	kPa	62	62	70	70	70	90	70	70	90
cooling water 37.5℃/32℃ high flow (b)										
flowrate	m^3/h	936	1249	1560	1873	2498	3121	3746	4996	6242
pressure drop	kPa	97	97	110	110	110	140	110	110	140
heating water										
flowrate	m^3/h	289	385	483	578	771	964	1156	1543	1928
pressure drop	kPa	70	70	70	70	70	70	70	70	70
max.exhaust consumption	kg/h	22143	29537	36881	44288	59076	73764	88578	118148	147530
power	kW	8.8	10.3	17.4	17.4	20.4	34.6	34.8	40.8	69.2
solution weight	t	11.6	15.2	19.8	22.3	27.5	35.2	44.6	55.0	70.4
unit ship.wt.(with LiBr)	t	38.3	/	/	/	/	/	/	/	/
unit ship.wt.(without LiBr)	t	18.8	25	33	37	44	55	37	44	55
operation weight	t	50	61.5	80	90	108	136	181	217	273

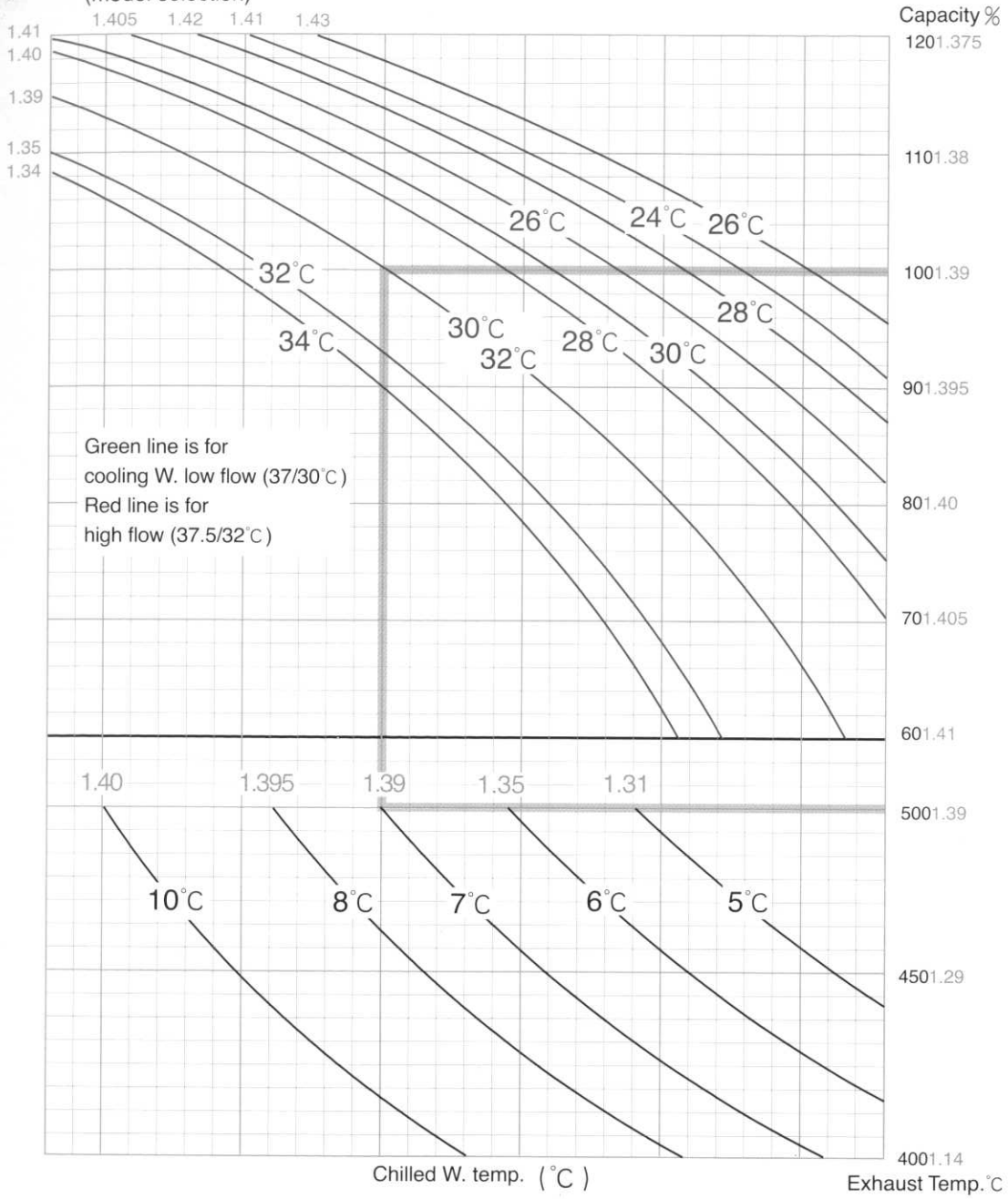
General Conditions:

1. Rated exhaust inlet temperature: 500°C
   Rated exhaust temperature: 170°C
2. Rated chilled W.outlet/inlet temp.: (A) 7°C/12°C (B) 7°C/14°C
3. Rated cooling W.outlet/inlet temp.: (a) 37°C/30°C (b) 37.5°C/32°C
4. Rated heatling W. outlet/inlet temp.: 65°C/ 57°C
5. Lowest permitted outlet temp.for chilled water: 5°C
   (except special order)
6. Lowest permitted inlet temp.for cooling water: 10°C
   Lowest inlet temp.in operating: 18°C (no limit if 3-way valve is equipped
7. Pressure limit for chilled/cooling water: 0.8 MPa (800kPa)
   (except special order)
8. Fouling factor for chilled/heating water: 0.086m^2 · K/kW
9. LiBr solution concentration:50%
10. Machine room temperature: 5 ~ 43°C,humidity ⩽ 85%
11. Adjustable chilled water flowarate:50~120%
    (according to flowrate A)
12. Adjustable cooling water flowarate:30~140%
    (according to flowrate a)
13. Adjustable heating water flowarate: 65~120%
14. Adjustable load: 5~115%
15. Rated COP for cooling: 1.39 (including electricity consumption,excluding 30% exhaust loss)
16. Rated COP for heating: 0.925

Note: ① (A)、(a) is for recommendation,(B)、(b) can be selected without affecting cooling capacity and COP.
② Technical specification is based upon Japanese Industry Standard JIS B 8622 " Absorption Chiller"

PERFORMANCE CURVES OF TWO-STAGE EXHAUST CHILLER/HEATER

Chilled W./Cooling W./Exhaust/Capacity/COP
(model selection)



Note: The figure in blue is COP. In calculation, 4 of them will be added and then divided by 4. Example:

① Known: cooling capacity is 100%, heat source temp. 450°C , cooling W. temp. 28°C ;
check out chilled W. temp. is 7.3°C , COP is 1.368, i.e. (1.39+1.40+1.392+1.29)/4=1.368

② Known: heat source temp. is 500°C . chilled W. temp. 10°C .cooling W. temp. 30°C ;
check out cooling capacity is 112%, COP=1.39

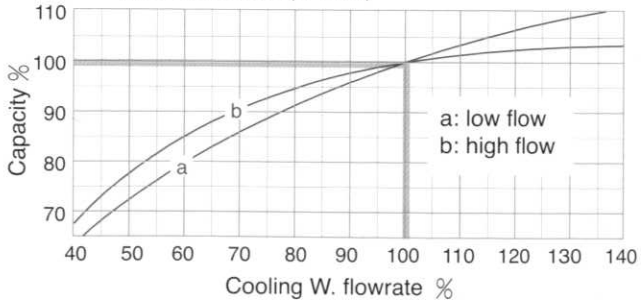
③ Known: cooling capacity is 100%, heat source temp. 400°C . chilled water 8°C ;
check out cooling water temperature is 24.5°C , COP =1.333
(calculated per cooling water low flow option).

COP (model selection, operation)

Rated COP:	1.39		
IPLV COP:	1.586 calculation as		
Load	COP	Factor	Result
A 100%	1.390	0.01	0.0139
B 75 %	1.604	0.42	0.6737
C 50 %	1.654	0.45	0.7443
D 25 %	1.287	0.12	0.1544

Note: The integrated part load value (IPLV) reflects chiller's actual COP in operation. The load and calculation formula are based upon ARI Standard 560.

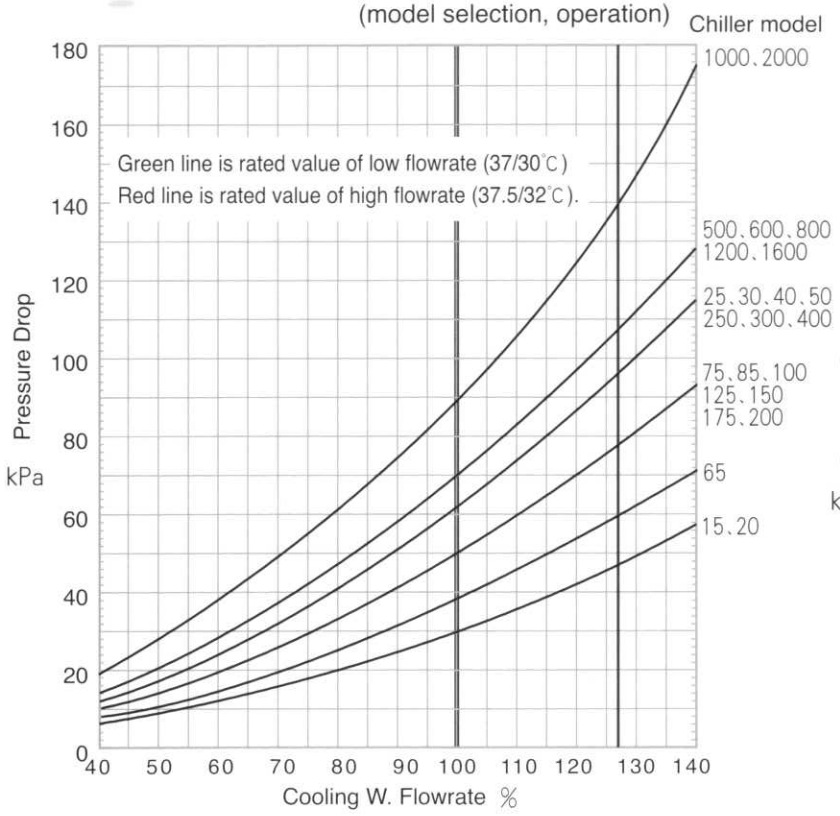
Cooling W. flowrate vs. Capacity
(model selection, operation)



(orange line is the rated value)

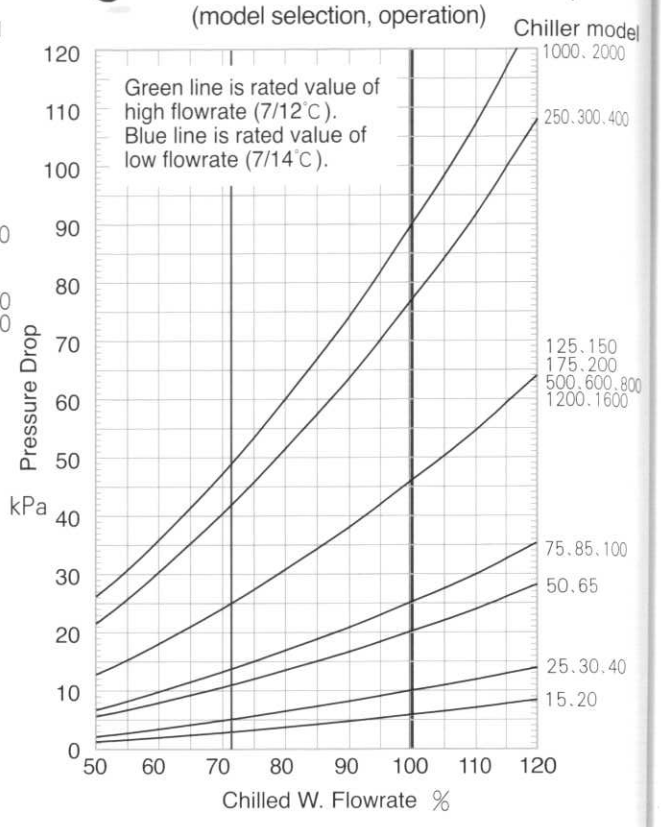
Cooling W. Flowrate vs. Pressure Drop

(model selection, operation)



Chilled W. Flowrate vs. Pressure Drop

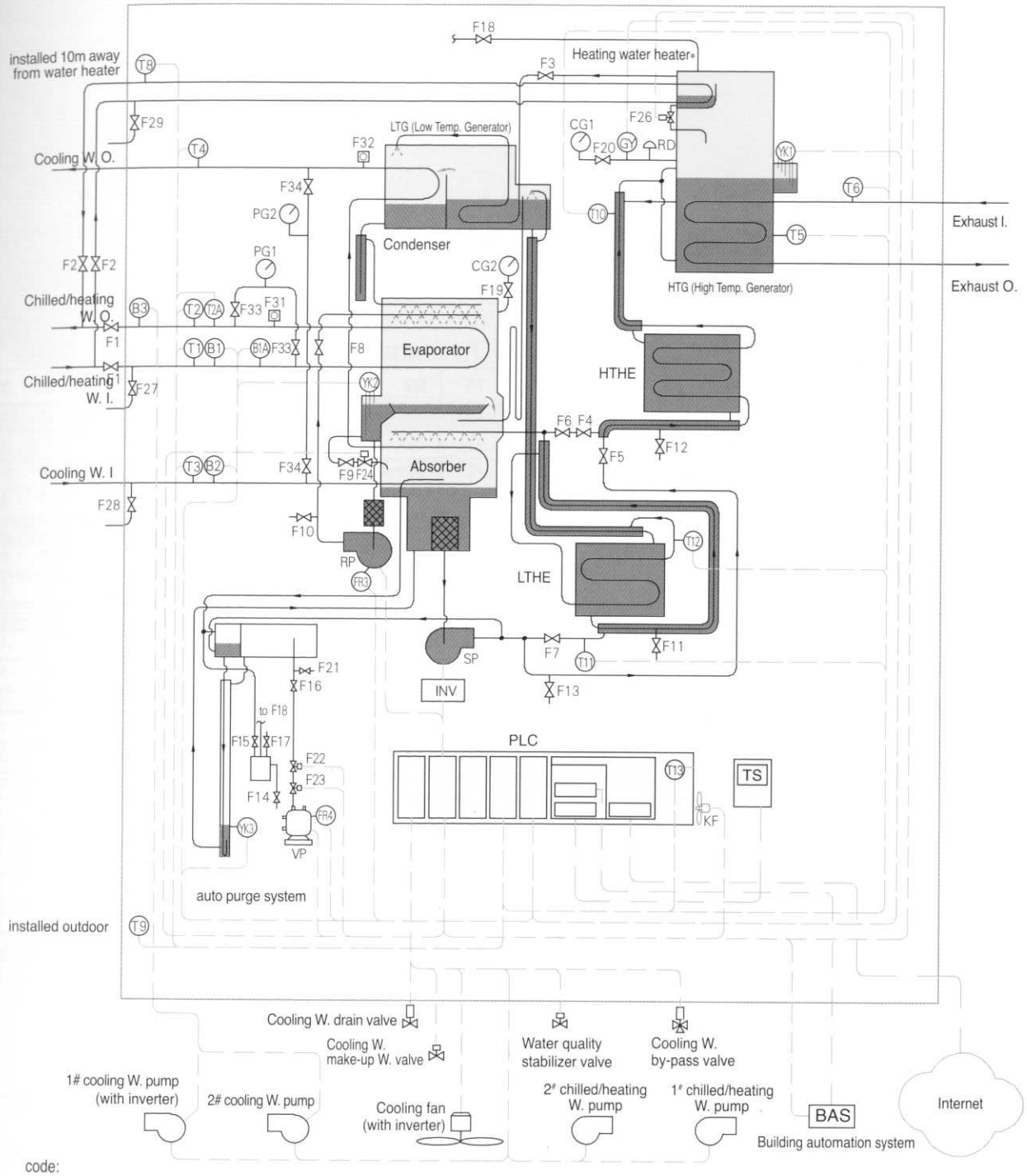
(model selection, operation)



Supply List--Two-Stage Exhaust Chiller/Heater

Category	Item	Remark
Main shell	main shell body	includes low temp. generator, condenser, evaporator, absorber, water box,heat/cold insulation, etc..
	low temp. heat exchanger	plate heat exchanger, includes heat insulation.
	canned pumps	includes refrigerant pump and solution pump.
	automatic purge system	includes inline falling head purge system, solenoid valve and vacuum pump.
HTG	HTG shell	includes shell, front/rear flue chamber, base, heat insulation
	high temp. heat exchanger	plate heat exchanger, includes heat insulation
Control system	control cabinet	includes PLC, solution pump inverter, refrigerant pump inverter(≥ 200 model), low voltage parts and control software
	touch screen	for office control of IFA, includes metal enclosure, DC power and typical 30m cable (with an optional length up to 5km). Delivered in separate package.
	back-up switch	for commissioning or maintenance use, installed on the main shell body
	network converter	for remote control through internet, mounted in the control cabinet.
	terminals for exterior system	mounted in the control cabinet for control of chilled water pump, cooling water pump, cooling tower fan, cooling water by-pass valve and water quality stabilizer charge device, etc.
	sensors to be field installed	one ambient temp. sensor and one heating W. temp. sensor. Others are factory-mounted.
Accessories	spare parts	include sealing elements and a complete set of easily worn-out parts (meet 4-year maintenance requirement)
	special tools	include tools for water box cover assembling/dismantling, descaling tools and maintenance tools.
	documents	include packing list, quality certificate, users' manual, and auxiliary devices' manuals
	toolbox	spare parts, special tools and documents are locked in this stainless steel box before shipment.

P & I DIAGRAM OF TWO-STAGE EXHAUST CHILLER/HEATER



code:

T1	chilled W. inlet temp. sensor	GY	pressure control	RD	rupture disc	F17	sampling purge valve
T2	chilled W. outlet temp. sensor	YK1	HTG solution level probe	F1	chilled W. valve *	F18	HTG purge valve
T2A	chilled W. calibrating temp. sensor	YK2	refrigerant level probe	F2	heating W. valve *	F19	main shell pressure valve
T3	cooling W. inlet temp. sensor	YK3	non-condensable probe	F3	steam valve *	F20	HTG pressure valve
T4	cooling W. outlet temp. sensor	FR3	refrigerant pump thermal relay	F4	concentrated solution valve *	F21	nitrogen charging valve
T5	HTG temp. sensor	FR4	vacuum pump thermal relay	F5	diluted solution valve *	F22	purge solenoid valve
T6	exhaust inlet temp. sensor	INV	solution pump inverter	F6	HTG concentration regulating valve	F23	purge solenoid valve
T8	heating W. outlet temp. sensor *	TS	touch screen	F7	LTG concentration regulating valve	F24	refrigerant solenoid valve
T9	ambient temp. sensor	PLC	programmable logic controller	F8	refigerant regulating valve	F26	heating W. thermostatic valve *
T10	HTG crystallization sensor	KF	control casing draft fan	F9	refrigerant by-pass valve	F27	chilled W. drain valve
T11	LTHE diluted solution inlet temp. sensor	RP	refrigerant pump	F10	refrigerant sampling valve	F28	cooling W. drain valve
T12	LTG crystallization sensor	SP	solution pump	F11	LTHE sampling valve	F29	heating W. drain valve *
T13	control casing temp. sensor	VP	vacuum pump	F12	HTHE sampling valve	F31	chilled W. vent valve
B1	chilled W. flow switch	CG1	compound gauge	F13	diluted solution sampling valve	F32	cooling W. vent valve
B1A	chilled W. flow switch	CG2	compound gauge	F14	main purge valve	F33	chilled W. pressure valve
B2	cooling W. flow switch	PG1	pressure gauge	F15	direct purge valve	F34	cooling W. pressure valve
B3	chilled W. flow switch	PG2	pressure gauge	F16	air cannister valve		

Notes: 1. ☐ BROAD supply scope

2. All the components are installed and commissioned in the factory before shipment except T8 and T9.

3. The components marked "*" are not included in cooling-only type systems.

4. Wire type: — — — actuator signal output
— — — sensor signal input
—— —— communication signal

SINGLE-STAGE STEAM CHILLER

Model	BDS	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250	300
cooling capacity																	
	kW	174	233	291	349	465	582	756	872	989	1163	1454	1745	2035	2326	2908	3489
	10^4kcal/h	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250	300
	USRT	50	66	83	99	132	165	215	248	281	331	413	496	579	661	827	992
chilled wate 7℃/12℃ high flow (A)																	
flowrate	m^3/h	30	40	50	60	80	100	130	150	170	200	250	300	350	400	500	600
pressure drop	kPa	6	6	10	10	10	20	20	25	25	25	46	46	46	46	77	77
chilled water 7℃/14℃ low flow (B)																	
flowrate	m^3/h	21.4	28.6	35.7	42.9	57.1	71.4	92.9	107	121	143	179	214	250	286	357	429
pressure drop	kPa	3	3	5	5	5	11	11	14	14	14	25	25	25	25	42	42
cooling water 37℃/30℃																	
flowrate	m^3/h	48.9	65.2	81.5	97.8	130	163	212	245	277	326	408	489	571	652	815	978
pressure drop	kPa	40	40	83	83	83	83	51	67	67	67	67	67	67	67	83	83
max.steam consumption	kg/h	349	465	581	698	930	1163	1511	1744	1976	2325	2906	3488	4069	4650	5813	6975
power	kW	1.8	1.8	2.2	2.2	2.2	2.2	4.8	4.8	5.0	5.0	6.9	6.9	8.4	8.4	8.7	8.7
solution weight	t	0.7	0.8	0.9	1.1	1.3	1.5	1.8	2.1	2.3	2.8	3.3	3.7	5.2	6.0	6.9	7.5
unit ship.weight	t	3.6	3.9	4.1	4.5	6.0	6.5	7.4	8.1	9.5	11.0	13.3	16.1	18.6	21.5	24.4	29
operation weight	t	3.8	4.2	4.4	4.9	6.6	7.1	8.2	9.4	10.8	12.5	15.8	18.7	21.8	25.0	28.6	33.2

Model	BDS	400	500	600	800	1000	1200	1600	2000
cooling capacity									
	kW	4652	5815	6978	9304	11630	13956	18608	23260
	10^4kcal/h	400	500	600	800	1000	1200	1600	2000
	USRT	1323	1653	1984	2646	3307	3968	5291	6614
chilled wate 7℃/12℃ high flow (A)									
flowrate	m^3/h	800	1000	1200	1600	2000	2400	3200	4000
pressure drop	kPa	77	46	46	46	90	46	46	90
chilled water 7℃/14℃ low flow (B)									
flowrate	m^3/h	571	714	857	1143	1429	1714	2286	2857
pressure drop	kPa	42	25	25	25	49	25	25	49
cooling water 37℃/30℃									
flowrate	m^3/h	1304	1630	1956	2608	3260	3912	5216	6520
pressure drop	kPa	83	94	94	94	121	94	94	121
max.steam consumption	kg/h	9300	11625	13951	18601	23251	27901	37201	46502
power	kW	10.5	13.5	17.2	21.0	27.2	34.4	42.0	54.4
solution weight	t	9.6	11.6	14.3	18.3	23.0	28.6	36.6	46.0
unit ship.weight	t	29	37	44	52	62	44	52	62
operation weight	t	44	55	64	78	95	129	157	191

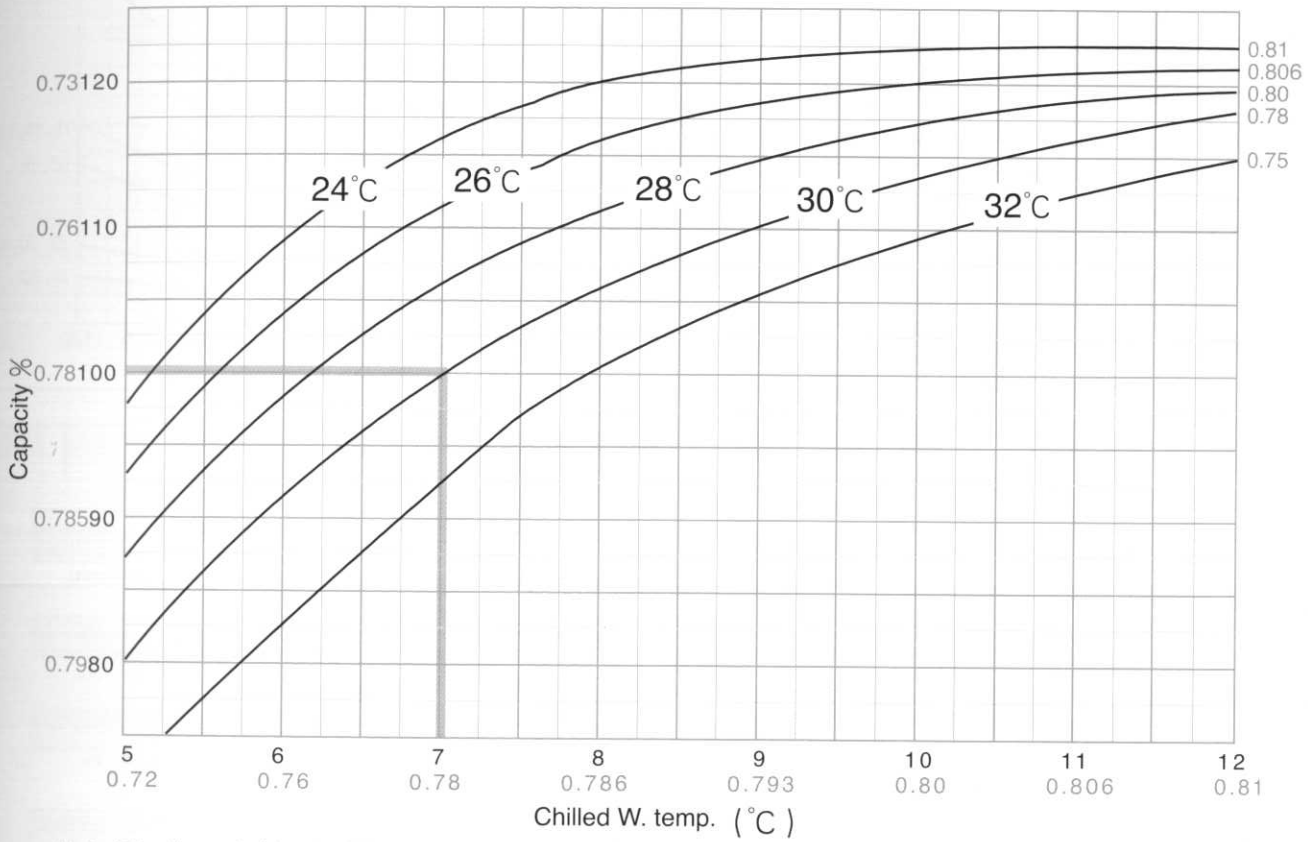
General Conditions:

1. Rated saturated steam pressure: 0.1MPa
   Rated condensate temperature: 95°C
2. Rated chilled W.outlet/inlet temp.: (A)7°C/12°C (B)7°C/14°C
3. Rated cooling W.outlet/inlet temp.: 37°C/30°C
4. Lowest permitted outlet temp.for chilled water: 5°C
   (except special order)
5. Lowest permitted inlet temp.for cooling water: 10°C
   Lowest inlet temp.in operating: 18°C (no limit if 3-way valve is equipped)
6. Pressure limit for chilled/cooling water: 0.8MPa (800kPa)
   (except special order)
7. Fouling factor for chilled water:0.086$m^2 \cdot$ K/kW
8. LiBr solution concentration:50%
9. Machine room temperature: 5~43°C,humidity ⩽ 85%
10. Adjustable chilled water flowarate:50~120%
    (according to flowrate A)
11. Adjustable cooling water flowarate:30~140%
12. Adjustable load:5~115%
13. Rated COP:0.78

Note: ① (A)is for recommendation, (B)can be selected without affecting cooling capacity and COP.
② Technical specification is based upon Japanese Industry Standard JIS B 8622" Absorption Chiller"

PERFORMANCE CURVES OF SINGLE-STAGE STEAM CHILLER

Chilled W./cooling W./Capacity/COP (model selection)



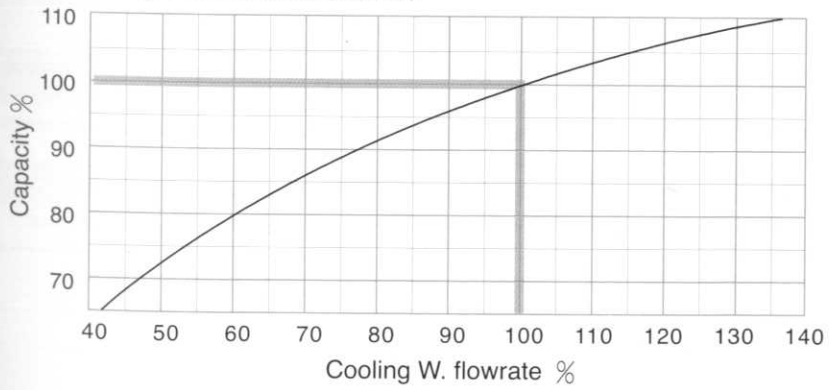
Note: The figure in blue is COP. In calculation, 3 of them will be added and then divided by 3. Example:

① Known: cooling capacity is 100%, cooling W. temp. 28°C ;
check out chilled W. temp. is 6.2°C , COP is 0.782, i.e. (0.78+0.8+0.765)/3=0.782

② Known: chilled W. temp. 10°C .cooling W. temp. 30°C ;
check out cooling capacity is 113%, COP=0.777

③ Known: cooling capacity is 110%, chilled water 7°C ;
check out cooling water temperature is 26.8°C , COP =0.781

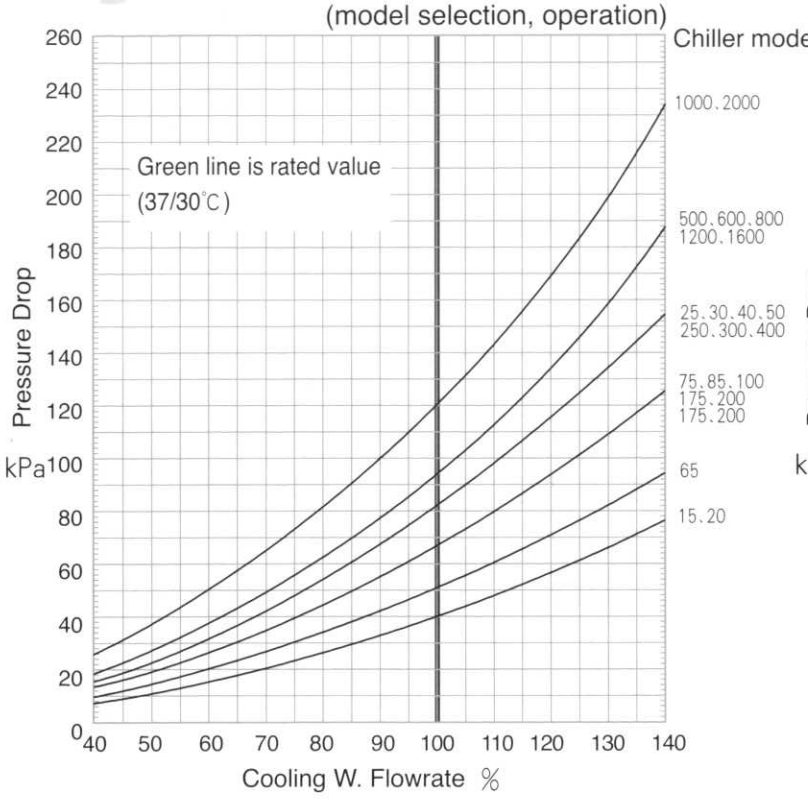
Cooling W. flowrate vs. Capacity
(model selection, operation)



(orange line is the rated value)

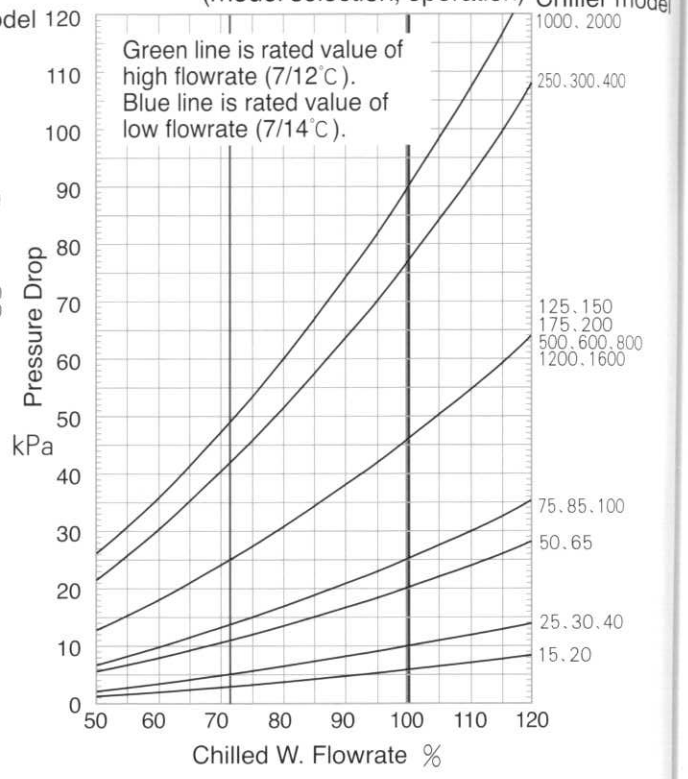
Cooling W. Flowrate vs. Pressure Drop

(model selection, operation)



Chilled W. Flowrate vs. Pressure Drop

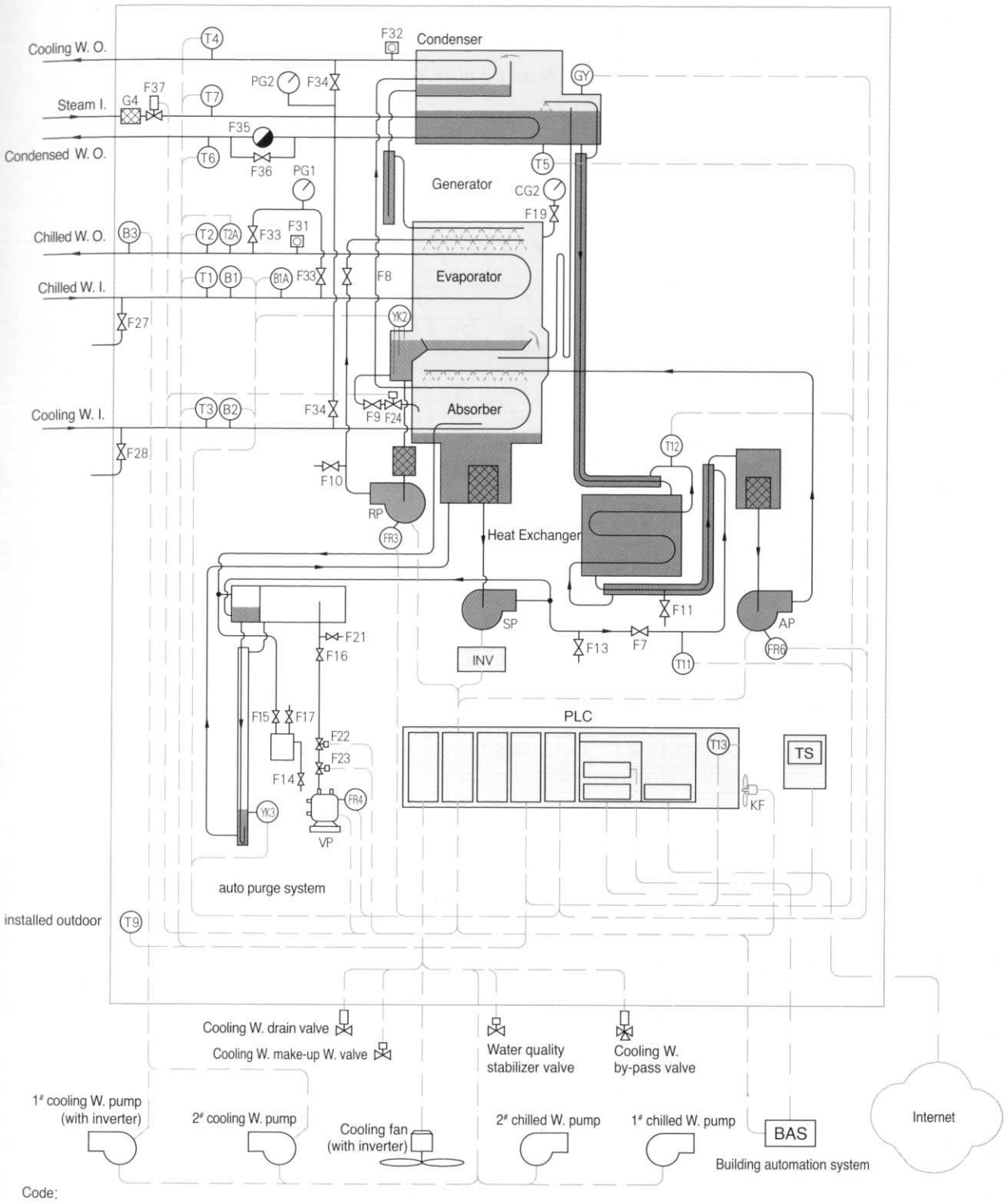
(model selection, operation)



SUPPLY LIST– SINGLE-STAGE STEAM CHILLER

Category	Item	Remark
Unit	main shell body	includes low temp. generator, condenser, evaporator, absorber, water box,heat/cold insulation, etc..
	low temp. heat exchanger	plate heat exchanger, includes heat insulation.
	canned pumps	includes generator pump, refrigerant pump and solution pump.
	automatic purge system	includes inline falling head purge system, solenoid valve and vacuum pump.
	steam motor valve	used for steam flowrate regulation to realize automatic regulation of cool capacity, including steam filter.
Control system	control cabinet	includes PLC, solution pump inverter, refrigerant pump inverter(⩾ 200 model), low voltage parts and control software
	touch screen	for office control of IFA, includes metal enclosure, DC power and typical 30m cable (with an optional length up to 5km). Delivered in separate package.
	back-up switch	for commissioning or maintenance use, installed on the main shell body
	network converter	for remote control through internet, mounted in the control cabinet.
	terminals for exterior system	mounted in the control cabinet for control of chilled water pump, cooling water pump, cooling tower fan, cooling water by-pass valve and water quality stabilizer charge device, etc.
	sensors to be field installed	only one ambient temp. sensor. Others are factory-mounted.
Accessories	spare parts	include sealing elements and a complete set of easily worn-out parts (meet 4-year maintenance requirement)
	special tools	include tools for water box cover assembling/dismantling, descaling tools and maintenance tools.
	documents	include packing list, quality certificate, users' manual, and auxiliary devices' manuals
	toolbox	spare parts, special tools and documents are locked in this stainless steel box before shipment.

P & I DIAGRAM OF SINGLE-STAGE STEAM CHILLER



Code:

T1	chilled W. inlet temp. sensor	B3	chilled W. flow switch	CG2	compound gauge	F19	main shell pressure valve
T2	chilled W. outlet temp. sensor	GY	pressure control	PG1	pressure gauge	F21	nitrogen charging valve
T2A	chilled W. calibrating temp. sensor	YK2	refrigerant level probe	PG2	pressure gauge	F22	purge solenoid valve
T3	cooling W. inlet temp. sensor	YK3	non-condensable probe	G4	steam filter	F23	purge solenoid valve
T4	cooling W. outlet temp. sensor	FR3	refrigerant pump thermal relay	F7	concentration regulating valve	F24	refrigerant solenoid valve
T5	generator temp. sensor	FR4	vacuum pump thermal relay	F8	refrigerant regulating valve	F27	chilled W. drain valve
T6	condensed W. outlet temp. sensor	FR6	absorber pump thermal relay	F9	refrigerant by-pass valve	F28	cooling W. drain valve
T7	steam intlet temp. sensor	INV	solution pump inverter	F10	refrigerant sampling valve	F31	chilled W. vent valve
T9	ambient temp. sensor	TS	touch screen	F11	concentrated solution sampling valve	F32	cooling W. vent valve
T11	exchanger diluted solution inlet temp. sensor	PLC	programmable logic controller	F13	diluted solution sampling valve	F33	chilled W. pressure valve
T12	generator crystallization sensor	KF	control casing draft fan	F14	main purge valve	F34	cooling W. pressure valve
T13	control casing temp. sensor	RP	refrigerant pump	F15	direct purge valve	F35	steam trap
B1	chilled W. flow switch	SP	solution pump	F16	air cannister valve	F36	condensed w. by-pass valve
B1A	chilled W. flow switch	VP	vacuum pump	F17	sampling purge valve	F37	steam motor valve
B2	cooling W. flow switch	AP	absorber pump				

Notes: 1. ☐ BROAD supply scope

2. All the components are installed and commissioned in the factory before shipment except T9.

3. Wire type: — — — actuator signal output
— — — — sensor signal input
— — communication signal

SINGLE-STAGE HOT WATER CHILLER

Model	BDH	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250	300
cooling capacity																	
	kW	151	209	256	302	407	512	663	768	872	1023	1279	1535	1791	2047	2559	3070
	10^4kcal/h	13	18	22	26	35	44	57	66	75	88	110	132	154	176	220	264
	USRT	43	60	73	86	116	145	188	218	248	291	364	436	509	582	727	873
chilled water 7℃/12℃ high flow (A)																	
flowrate	m^3/h	26	36	44	52	70	88	114	132	150	176	220	264	308	352	440	528
pressure drop	kPa	5	5	8	8	8	16	16	20	20	20	36	36	36	36	61	61
chilled water 7℃/14℃ low flow (B)																	
flowrate	m^3/h	19	26	31	37	50	63	81	94	107	126	157	189	220	251	314	377
pressure drop	kPa	3	3	4	4	4	9	9	11	11	11	20	20	20	20	33	33
cooling water 37℃/30℃																	
flowrate	m^3/h	43	60	73	87	117	147	190	220	250	293	367	440	513	587	733	880
pressure drop	kPa	21	31	66	66	66	66	41	54	54	54	54	54	54	54	66	88
heat source W.flowrate	m^3/h	18.1	25.0	30.6	36.1	48.6	61.1	79.2	91.7	104	122	153	183	214	244	306	367
power	kW	1.8	1.8	2.2	2.2	2.2	2.2	4.8	4.8	5.0	5.0	6.9	6.9	8.4	8.4	8.7	8.7
solution weight	t	0.6	0.7	0.8	1.0	1.1	1.4	1.7	1.9	2.1	2.3	2.9	3.7	4.2	4.8	5.8	6.7
unit ship.weight	t	3.7	4.0	4.3	4.7	6.1	6.8	7.9	8.5	10.2	11.9	13.5	17.2	19.5	22.5	25.6	29.2
operation weight	t	3.9	4.3	4.7	5.1	6.7	7.4	8.7	9.8	11.5	13.4	16.0	19.8	22.7	26.0	29.6	35.0

Model	BDH	400	500	600	800	1000	1200	1600	2000
cooling capacity									
	kW	4094	5117	6141	8188	10234	12281	16375	20469
	10^4kcal/h	352	440	528	704	880	1056	1408	1760
	USRT	1164	1455	1746	2328	2910	3492	4656	5820
chilled water 7℃/12℃ high flow (A)									
flowrate	m^3/h	704	880	1056	1408	1760	2112	2816	3520
pressure drop	kPa	61	36	36	36	71	36	36	71
chilled water 7℃/14℃ low flow (B)									
flowrate	m^3/h	503	629	754	1006	1257	1509	2011	2514
pressure drop	kPa	33	20	20	20	39	20	20	39
cooling water 37℃/30℃									
flowrate	m^3/h	1173	1467	1760	2347	2933	3520	4693	5867
pressure drop	kPa	66	78	78	78	100	78	78	100
heat source W.flowrate	m^3/h	489	611	733	978	1222	1467	1955	2444
power	kW	10.5	13.5	17.2	21.0	27.2	34.4	42.0	54.4
solution weight	t	8.5	9.4	11.0	15.0	18.0	22.0	30.0	36.0
unit ship.weight	t	30	39.6	32	38	46	32	38	46
operation weight	t	46.1	59	69	84	101	139	169	203

General Conditions:

1. Rated heat source W. outlet/inlet temp.: 88°C/98°C
2. Rated chilled W.outlet/inlet temp.: (A) 7°C/12°C (B) 7°C/14°C
3. Rated cooling W.outlet/inlet temp.: 37°C/30°C
4. Lowest permitted outlet temp.for chilled water: 5°C (except special order)
5. Lowest permitted inlet temp.for cooling water: 10°C
   Lowest inlet temp.in operating: 18°C (no limit if 3-way valve is equipped)
6. Pressure limit for chilled/cooling water: 08MPa(800kPa) (except special order)
7. Fouling factor for chilled/heat source water:0086m^2 · K/kW
8. LiBr solution concentration:50%
9. Machine room temperature: 5 ~ 43°C,humidity ⩽ 85%
10. Adjustable chilled water flowarate:50~120% (according to flowrate A)
11. Adjustable cooling water flowarate:30~140%
12. Adjustable load:5~115%
13. Rated COP:0.75

Note: ① (A) is for recommendation; (B) can be selected without affecting cooling capacity and COP.
② Technical specification is based upon Japanese Industry Standard JIS B 8622 "Absorption Chiller"

75	200	250	300
731	2047	2559	3070
54	176	220	264
69	582	727	873
18	352	440	528
6	36	61	61
20	251	314	377
9	20	33	33
33	587	733	880
4	54	66	88
24	244	306	367
4	8.4	8.7	8.7
2	4.8	5.8	6.7
15	22.5	25.6	29.2
17	26.0	29.6	35.0

let temp.: 88°C/98°C
7%: (A) 7°C/12°C (B) 7°C/14°C
r: 37°C/30°C
for chilled water: 5°C

cooling water: 10°C
no limit if 3-way valve is equipped)
water: 0.8MPa(800kPa)

ource water:0.086m² · K/kW

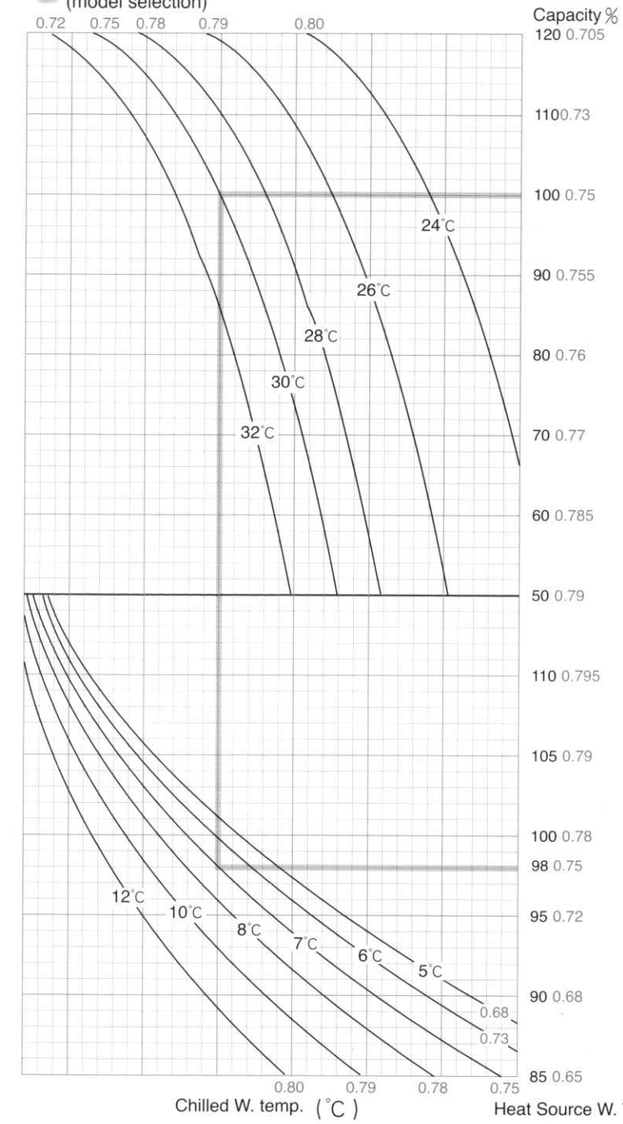
43°C,humidity ≤ 85%
ate:50~120%

ate:30~140%

B) can be selected
pacity and COP.
ased upon Japanese Industry
ption Chiller"

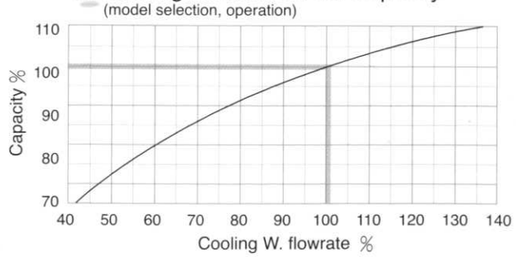
PERFORMANCE CURVES OF SINGLE-STAGE HOT WATER CHILLER

Chilled W./Cooling W./Heat Source W./Capacity/COP (model selection)



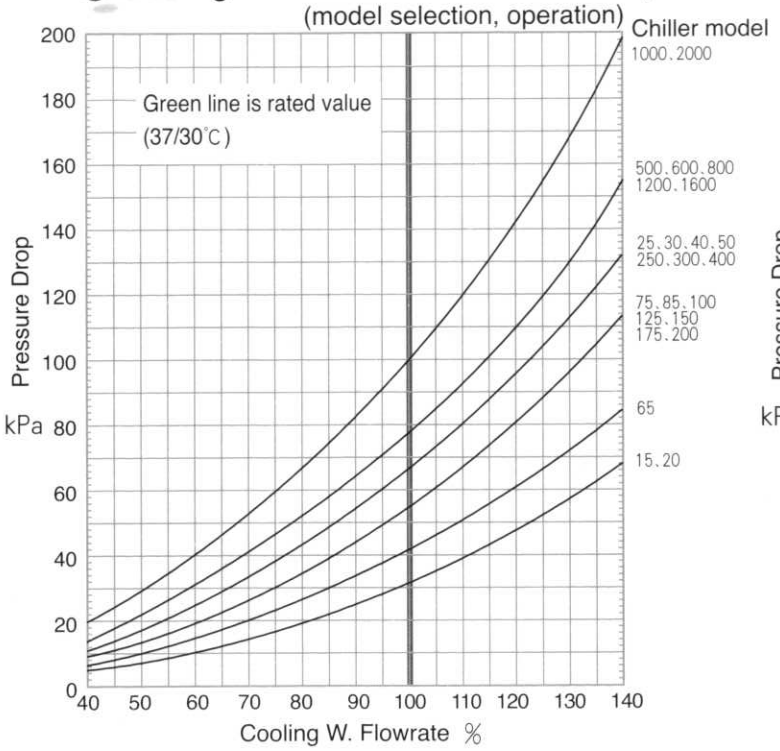
Note: The figure in blue is COP. In calculation, 4 of them will be added and then divided by 4. Example:
① Known: cooling capacity is 100%, heat source temp. 100°C. cooling W. temp. 32°C; check out chilled W. temp. is 7.5°C, COP is 0.754, i.e. (0.75+0.72+0.78+0.765)/4=0.754
② Known: heat source temp. is 95°C. chilled W. temp. 10°C.cooling W. temp. is 30°C; check out cooling capacity is 107%, COP=0.749
③ Known: cooling capacity is 115%, heat source temp. 98°C. chilled water is 7°C; check out cooling water temperature is 27°C, COP =0.751

Cooling W. flowrate vs. Capacity
(model selection, operation)

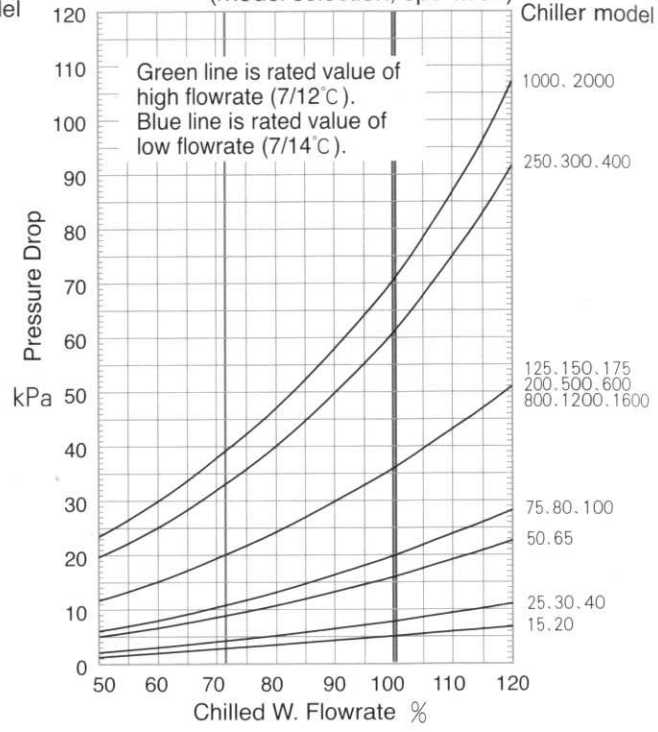


(orange line is the rated value)

Cooling W. Flowrate vs. Pressure Drop
(model selection, operation)



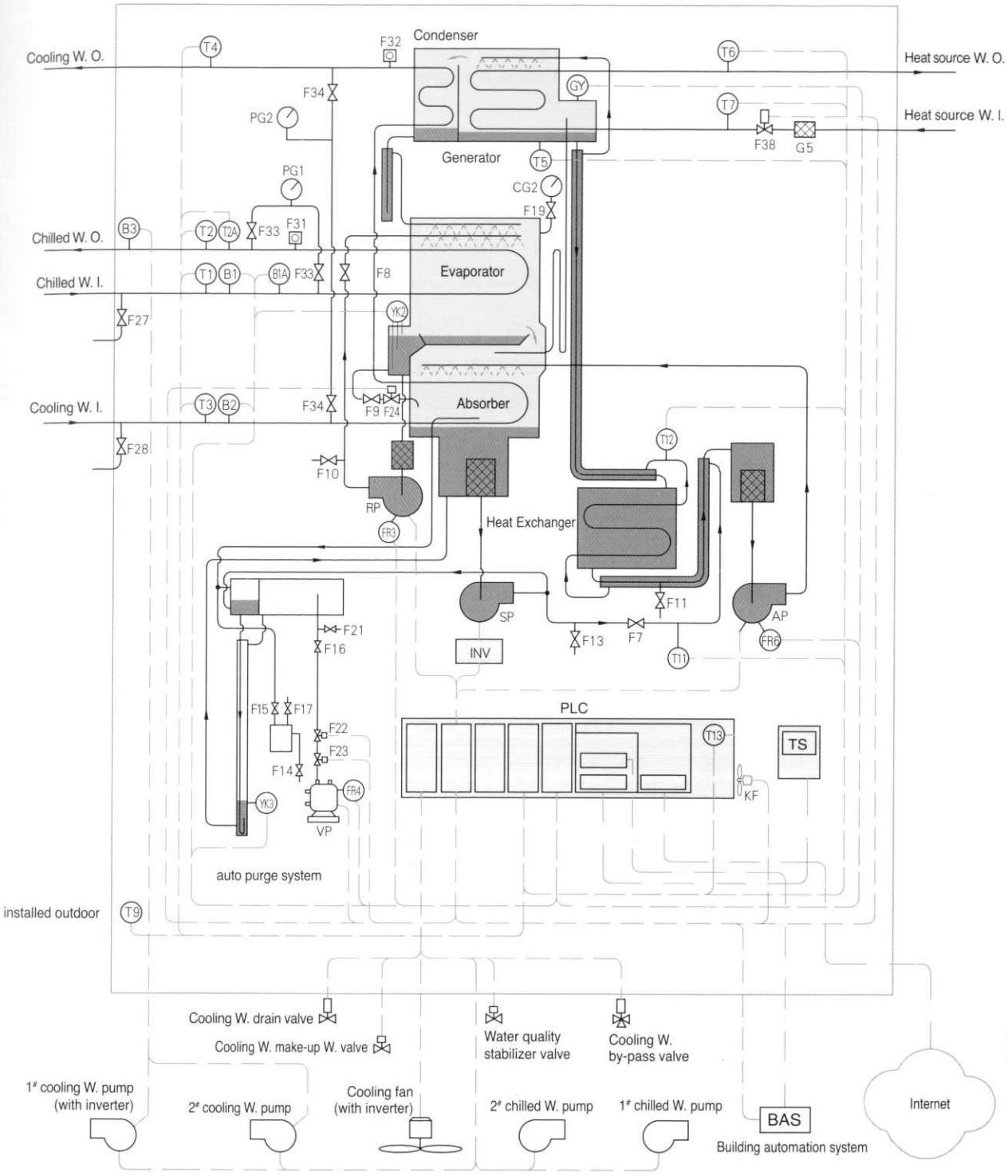
Chilled W. Flowrate vs. Pressure Drop
(model selection, operation)



SUPPLY LIST--SINGLE-STAGE HOT WATER CHILLER

Category	Item	Remark
Unit	main shell body	includes low temp. generator, condenser, evaporator, absorber, water box,heat/cold insulation, etc..
	solution heat exchanger	plate heat exchanger, includes heat insulation.
	canned pumps	includes generator pump, refrigerant pump and solution pump.
	automatic purge system	includes inline falling head purge system, solenoid valve and vacuum pump.
	heat source water motor valve	used for heat source water flowrate regulation to realize automatic modulation of cooling capacity, includes heat source water filter.
Control system	control cabinet	includes PLC, solution pump inverter, refrigerant pump inverter(⩾ 200 model), low voltage parts and control software
	touch screen	for office control of IFA, includes metal enclosure, DC power and typical 30m cable (with an optional length up to 5km). Delivered in separate package.
	back-up switch	for commissioning or maintenance use, installed on the main shell body
	network converter	for remote control through internet, mounted in the control cabinet.
	terminals for exterior system	mounted in the control cabinet for control of chilled water pump, cooling water pump, cooling tower fan, cooling water by-pass valve and water quality stabilizer charge device, etc.
	sensors to be field installed	only one ambient temp. sensor. Others are factory-mounted.
Accessories	spare parts	include sealing elements and a complete set of easily worn-out parts (meet 4-year maintenance requirement)
	special tools	include tools for water box cover assembling/dismantling, descaling tools and maintenance tools.
	documents	include packing list, quality certificate, users' manual, and auxiliary devices' manuals
	toolbox	spare parts, special tools and documents are locked in this stainless steel box before shipment.

P & I DIAGRAM OF SINGLE-STAGE HOT WATER CHILLER



Code:

T1	chilled W. inlet temp. sensor	B2	cooling W. flow switch	VP	vacuum pump	F16	air cannister valve
T2	chilled W. outlet temp. sensor	B3	chilled W. flow switch	AP	absorber pump	F17	sampling purge valve
T2A	chilled W. calibrating temp. sensor	GY	pressure control	CG2	compound gauge	F19	main shell pressure valve
T3	cooling W. inlet temp. sensor	YK2	refrigerant level probe	PG1	pressure gauge	F21	nitrogen charging valve
T4	cooling W. outlet temp. sensor	YK3	non-condensable probe	PG2	pressure gauge	F22	purge solenoid valve
T5	generator temp. sensor	FR3	refrigerant pump thermal relay	G5	heat source W. filter	F23	purge solenoid valve
T6	heat source W. outlet temp. sensor	FR4	vacuum pump thermal relay	F7	concentration regulating valve	F24	refrigerant solenoid valve
T7	heat source W. intlet temp. sensor	FR6	absorber pump thermal relay	F8	refrigerant regulating valve	F27	chilled W. drain valve
T9	ambient temp. sensor	INV	solution pump inverter	F9	refrigerant by-pass valve	F28	cooling W. drain valve
T11	exchanger diluted solution inlet temp. sensor	TS	touch screen	F10	refrigerant sampling valve	F31	chilled W. vent valve
T12	generator crystallization sensor	PLC	programmable logic controller	F11	concentrated solution sampling valve	F32	cooling W. vent valve
T13	control casing temp. sensor	KF	control casing draft fan	F13	diluted solution sampling valve	F33	chilled W. pressure valve
B1	chilled W. flow switch	RP	refrigerant pump	F14	main purge valve	F34	cooling W. pressure valve
B1A	chilled W. flow switch	SP	solution pump	F15	direct purge valve	F38	heat source W. motor valve

Notes: 1. ☐ BROAD supply scope

2. All the components are installed and commissioned in the factory before shipment except T9.

3. Wire type: — — — actuator signal output
— — — sensor signal input
— — communication signal

SINGLE-STAGE EXHAUST CHILLER

Model BDE	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250	300
cooling capacity																
kW	174	233	291	349	465	582	756	872	989	1163	1454	1745	2035	2326	2908	3489
10^4kcal/h	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250	300
USRT	50	66	83	99	132	165	215	248	281	331	413	496	579	661	827	992
chilled water 7℃/12℃high flow (A)																
flowrate m^3/h	30	40	50	60	80	100	130	150	170	200	250	300	350	400	500	600
pressure drop kPa	6	6	10	10	10	20	20	25	25	25	46	46	46	46	77	77
chilled water 7℃/14℃low flow (B)																
flowrate m^3/h	21.4	28.6	35.7	42.9	57.1	71.4	92.9	107	121	143	179	214	250	286	357	429
pressure drop kPa	3	3	5	5	5	11	11	14	14	14	25	25	25	25	42	42
cooling water 37℃/30℃																
flowrate m^3/h	48.9	65.2	81.5	97.8	130	163	212	245	277	326	408	489	571	652	815	978
pressure drop kPa	40	40	83	83	83	83	51	67	67	67	67	67	67	67	83	83
exhaust consumption kg/h	4322	5763	7204	8644	11526	14407	18730	21611	24492	28815	36018	43222	50426	57629	72037	85444
power kW	1.8	1.8	2.2	2.2	2.2	2.2	4.8	4.8	5.0	5.0	6.9	6.9	8.4	8.4	8.7	8.7
solution weight t	0.8	0.9	1.0	1.2	1.4	1.6	2.0	2.3	2.5	3.1	3.7	4.1	5.8	6.5	7.8	8.4
unit ship.weight t	3.9	4.2	4.6	5.1	6.7	7.5	8.2	9.0	10.7	12.3	14.8	18.0	20.0	23.0	28.0	31.9
operation weight t	4.1	4.5	5.0	5.5	7.3	8.1	8.9	10.1	12.0	13.8	17.2	20.5	23.2	26.5	31.8	36.0

Model BDE	400	500	600	800	1000	1200	1600	2000
cooling capacity								
kW	4652	5815	6978	9304	11630	13956	18608	23260
10^4kcal/h	400	500	600	800	1000	1200	1600	2000
USRT	1323	1653	1984	2646	3307	3968	5291	6614
chilled water 7℃/12℃high flow (A)								
flowrate m^3/h	800	1000	1200	1600	2000	2400	3200	4000
pressure drop kPa	77	46	46	46	90	46	46	90
chilled water 7℃/14℃low flow (B)								
flowrate m^3/h	571	714	857	1143	1429	1714	2286	2857
pressure drop kPa	42	25	25	25	49	25	25	49
cooling water 37℃/30℃								
flowrate m^3/h	1304	1630	1956	2608	3260	3912	5216	6520
pressure drop kPa	83	94	94	94	121	94	94	121
exhaust consumption kg/h	115259	144073	172888	230517	288147	345776	461035	576293
power kW	10.5	13.5	17.2	21.0	27.2	34.4	42.0	54.4
solution weight t	11	13.1	15.7	20	25.4	31.4	40	51
unit ship.weight t	22	28	34	40	48	34	40	48
operation weight t	47	59	70	85	103	139	171	207

General Conditions:

1. Rated exhaust inlet temperature: 300°C
   Rated exhaust temperature: 130°C
2. Rated chilled W.outlet/inlet temp.: (A) 7°C/12°C (B) 7°C/14°C
3. Rated cooling W.outlet/inlet temp.: 37°C/30°C
4. Lowest permitted outlet temp.for chilled water: 5°C
   (except special order)
5. Lowest permitted inlet temp.for cooling water: 10°C
   Lowest inlet temp.in operating: 18°C (no limit if 3-way valve is equipped)
6. Pressure limit for chilled/cooling water:0.8 MPa (800kPa)
   (except special order)
7. Fouling factor for chilled water: 0.086m^2 · K/kW
8. LiBr solution concentration:50%
9. Machine room temperature: 5 ~ 43°C,humidity ⩽ 85%
10. Adjustable chilled water flowarate:50~120%
    (according to flowrate A)
11. Adjustable cooling water flowarate:30~140%
12. Adjustable load:5~115%
13. Rated COP:0.78 (excluding 37% exhaust loss)

Note: ① (A) is for recommendation; (B) can be selected without affecting cooling capacity and COP.
② Technical specification is based upon Japanese Industry Standard JIS B 8622 " Absorption Chiller"

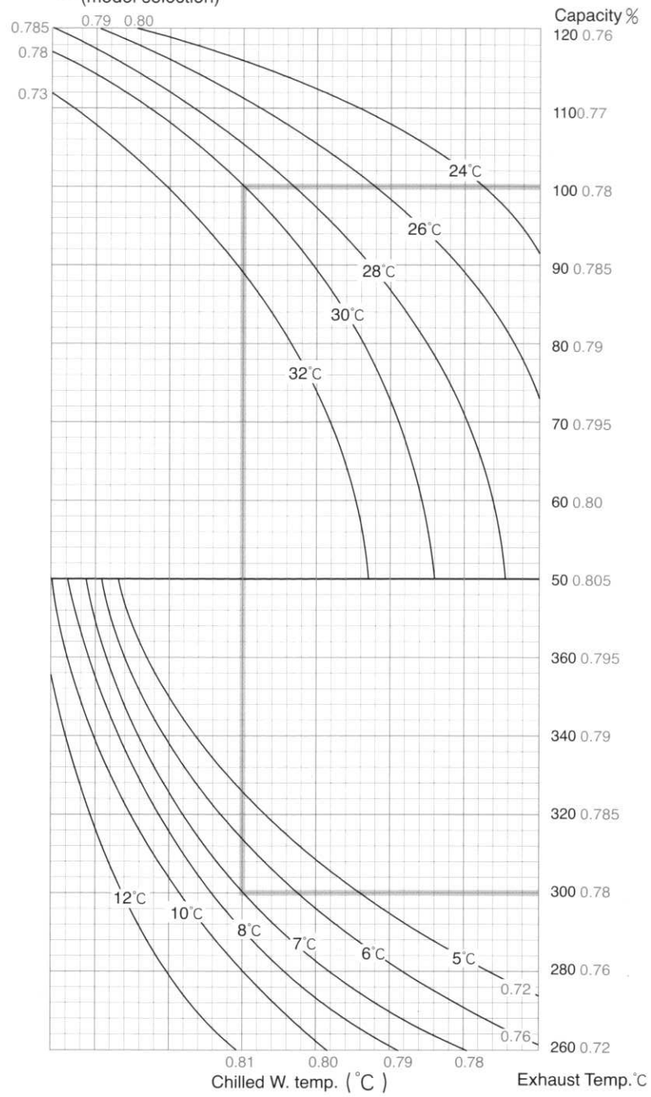
	150	175	200	250	300
	1745	2035	2326	2908	3489
	150	175	200	250	300
	496	579	661	827	992
	300	350	400	500	600
	46	46	46	77	77
	214	250	286	357	429
	25	25	25	42	42
	489	571	652	815	978
	67	67	67	83	83
	43222	50426	57629	72037	85444
	6.9	8.4	8.4	8.7	8.7
	4.1	5.8	6.5	7.8	8.4
	18.0	20.0	23.0	28.0	31.9
	20.5	23.2	26.5	31.8	36.0

Conditions:

- ust inlet temperature: 300°C
- ust temperature: 130°C
- ed W.outlet/inlet temp.: (A) 7°C/12°C (B) 7°C/14°C
- ing W.outlet/inlet temp.: 37°C/30°C
- mitted outlet temp.for chilled water: 5°C
- pecial order)
- mitted inlet temp.for cooling water: 10°C
- temp.in operating: 18°C (no limit if 3-way valve is equipped)
- limit for chilled/cooling water:0.8 MPa (800kPa)
- special order)
- ctor for chilled water: 0.086m² · K/kW
- ion concentration:50%
- room temperature: 5 ~ 43°C,humidity ⩽ 85%
- ble chilled water flowarate:50~120%
- ng to flowrate A)
- ble cooling water flowarate:30~140%
- ble load:5~115%
- COP:0.78 (excluding 37% exhaust loss)
- A) is for recommendation; (B) can be selected
- ithout affecting cooling capacity and COP.
- Technical specification is based upon Japanese Industry Standard JIS B 8622 " Absorption Chiller"

PERFORMANCE CURVES OF SINGLE-STAGE EXHAUST CHILLER

Chilled W./Cooling W./Exhaust/Capacity/COP
(model selection)



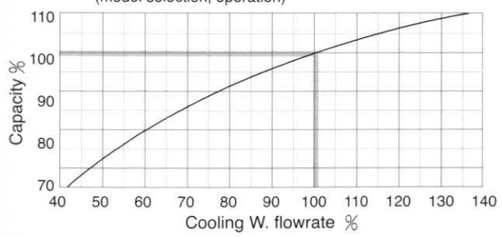
Note: The figure in blue is COP. In calculation, 4 of them will be added and then divided by 4. Example:

① Known: cooling capacity is 100%, heat source temp. 320°C. cooling W. temp. 32°C;
check out chilled W. temp. is 7.8°C, COP is 0.771, i.e. (0.785+0.78+0.73+0.787) /4=0.771

② Known: heat source temp. is 300°C. chilled W. temp. 10°C.cooling W. temp. 30°C;
check out cooling capacity is 107%, COP=0.783

③ Known: cooling capacity is 110%, heat source temp. 360°C. chilled water 7°C;
check out cooling water temperature is 31°C, COP =0.774

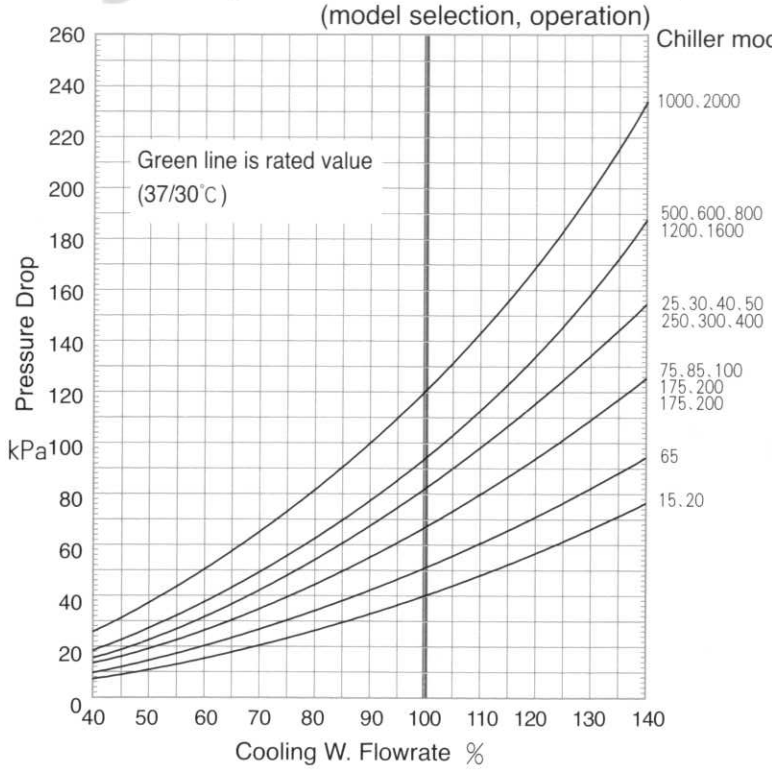
Cooling W. flowrate vs. Capacity
(model selection, operation)



(orange line is the rated value)

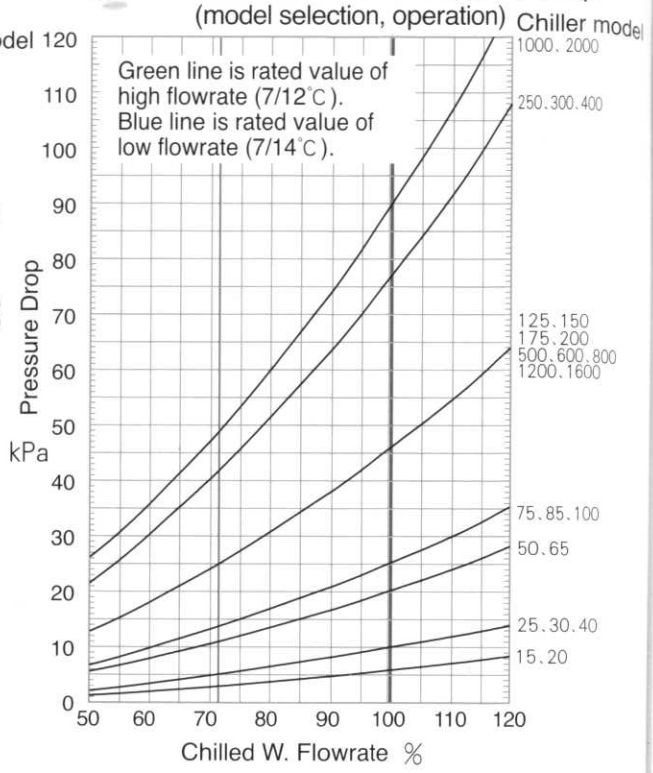
Cooling W. Flowrate vs. Pressure Drop

(model selection, operation)



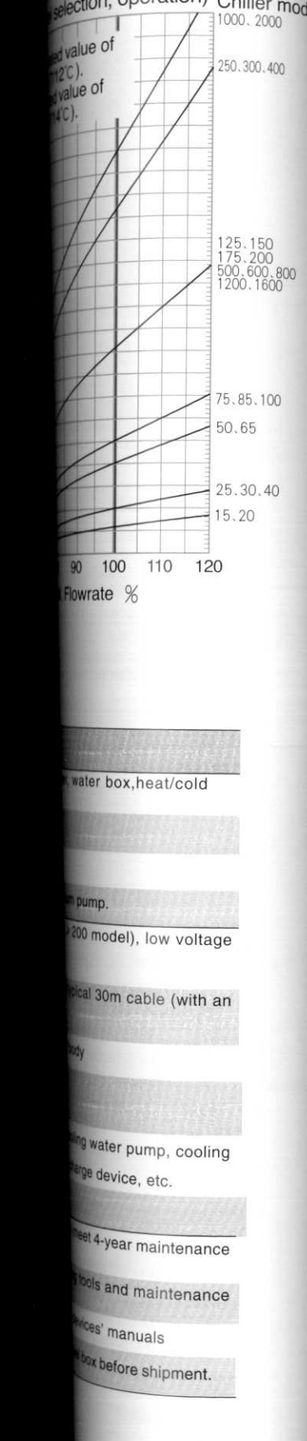
Chilled W. Flowrate vs. Pressure Drop

(model selection, operation)



SUPPLY LIST-- SINGLE-STAGE EXHAUST CHILLER

Category	Item	Remark
Unit	main shell body	includes low temp. generator, condenser, evaporator, absorber, water box,heat/cold insulation, etc..
	solution heat exchanger	plate heat exchanger, includes heat insulation.
	canned pumps	includes generator pump, refrigerant pump and solution pump.
	automatic purge system	includes inline falling head purge system, solenoid valve and vacuum pump.
Control system	control cabinet	includes PLC, solution pump inverter, refrigerant pump inverter(⩾ 200 model), low voltage parts and control software
	touch screen	for office control of IFA, includes metal enclosure, DC power and typical 30m cable (with an optional length up to 5km). Delivered in separate package.
	back-up switch	for commissioning or maintenance use, installed on the main shell body
	network converter	for remote control through internet, mounted in the control cabinet.
	terminals for exterior system	mounted in the control cabinet for control of chilled water pump, cooling water pump, cooling tower fan, cooling water by-pass valve and water quality stabilizer charge device, etc.
	sensors to be field installed	only one ambient temp. sensor. Others are factory-mounted.
Accessories	spare parts	include sealing elements and a complete set of easily worn-out parts (meet 4-year maintenance requirement)
	special tools	include tools for water box cover assembling/dismantling, descaling tools and maintenance tools.
	documents	include packing list, quality certificate, users' manual, and auxiliary devices' manuals
	toolbox	spare parts, special tools and documents are locked in this stainless steel box before shipment.



water box,heat/cold

pump.

200 model), low voltage

ical 30m cable (with an

dy

g water pump, cooling

erge device, etc.

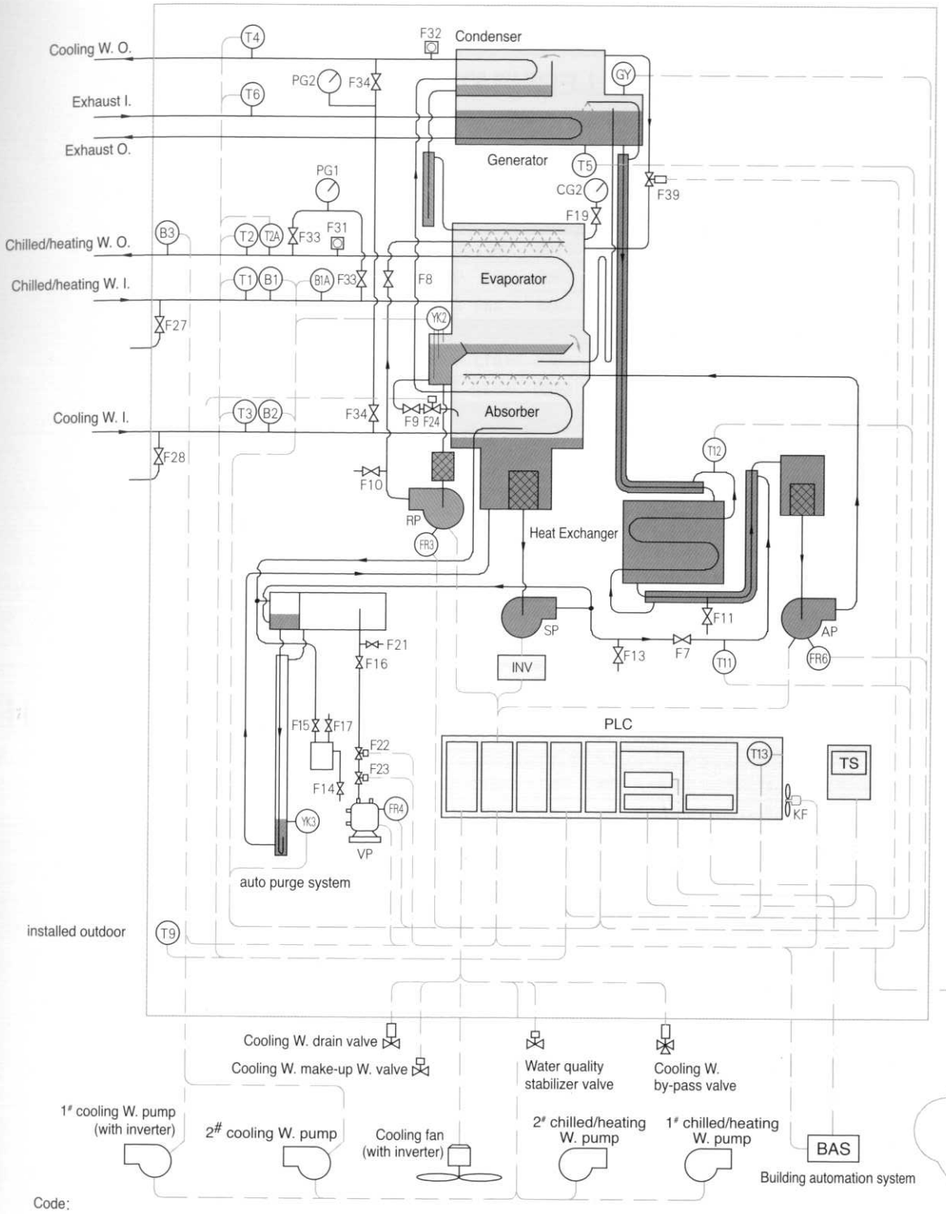
eet 4-year maintenance

tools and maintenance

ices' manuals

box before shipment.

P & I DIAGRAM OF SINGLE-STAGE EXHAUST CHILLER



Code:

T1	chilled/heating W. inlet temp. sensor	B3	chilled W. flow switch	AP	absorber pump	F17	sampling purge valve
T2	chilled/heating W. outlet temp. sensor	GY	pressure control	CG2	compound gauge	F19	main shell pressure valve
T2A	chilled/heating W. calibrating temp. sensor	YK2	refrigerant level probe	PG1	pressure gauge	F21	nitrogen charging valve
T3	cooling W. inlet temp. sensor	YK3	non-condensable probe	PG2	pressure gauge	F22	purge solenoid valve
T4	cooling W. outlet temp. sensor	FR3	refrigerant pump thermal relay	F7	concentration regulating valve	F23	purge solenoid valve
T5	generator temp. sensor	FR4	vacuum pump thermal relay	F8	refrigerant regulating valve	F24	refrigerant solenoid valve
T6	exhaust inlet temp. sensor	FR6	absorber pump thermal relay	F9	refrigerant by-pass valve	F27	chilled W. drain valve
T9	ambient temp. sensor	INV	solution pump inverter	F10	refrigerant sampling valve	F28	cooling W. drain valve
T11	exchanger diluted solution inlet temp. sensor	TS	touch screen	F11	concentrated solution sampling valve	F31	chilled W. vent valve
T12	generator crystallization sensor	PLC	programmable logic controller	F13	diluted solution sampling valve	F32	cooling W. vent valve
T13	control casing temp. sensor	KF	control casing draft fan	F14	main purge valve	F33	chilled W. pressure valve
B1	chilled W. flow switch	RP	refrigerant pump	F15	direct purge valve	F34	cooling W. pressure valve
B1A	chilled W. flow switch	SP	solution pump	F16	air cannister valve	F39	cooling/heating switch valve *
B2	cooling W. flow switch	VP	vacuum pump				

Notes: 1. ☐ BROAD supply scope
2. All the components are installed and commissioned in the factory before shipment except T9.
3. The components marked "*" are not included in cooling-only type systems.
4. Wire type: — — — actuator signal output
— — — sensor signal input
—— —— communication signal

MULTI-ENERGY DIRECT-FIRED CHILLER/HEATER

BZS、BZH、BZE

Model BZS/BZH/BZE	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250
cooling capacity															
kW	174	233	291	349	465	582	756	872	989	1163	1454	1745	2035	2326	2908
10^4kcal/h	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250
USRT	50	66	83	99	132	165	215	248	281	331	413	496	579	661	827
heating capacity															
kW	135	179	224	269	358	449	583	672	762	897	1121	1349	1570	1791	2245
10^4kcal/h	11.6	15.4	19.3	23.1	30.8	38.6	50.1	57.8	65.5	77.1	96.4	116	135	154	193
chilled water 7℃/12 ℃high flow (A)															
flowrate m^3/h	30	40	50	60	80	100	130	150	170	200	250	300	350	400	500
pressure drop kPa	6	6	10	10	10	20	20	25	25	25	46	46	46	46	77
chilled water 7℃/14℃low flow (B)															
flowrate m^3/h	21.4	28.6	35.7	42.9	57.1	71.4	92.9	107	121	143	179	214	250	286	357
pressure drop kPa	3	3	5	5	5	11	11	14	14	14	25	25	25	25	42
cooling water 37℃/30℃low flow (a)															
flowrate m^3/h	36.6	48.9	61.1	73.3	97.9	122	159	184	208	245	306	367	428	489	612
pressure drop kPa	30	30	62	62	62	62	38	50	50	50	50	50	50	50	62
cooling water 37.5℃/32℃high flow (b)															
flowrate m^3/h	46.6	62.3	78.7	93.3	125	156	203	234	265	312	389	467	545	623	779
pressure drop kPa	47	47	97	97	97	97	59	78	78	78	78	78	78	78	97
heating water															
flowrate m^3/h	14.5	19.3	24.1	28.9	38.5	48.3	62.6	72.3	81.9	96.4	121	145	169	193	241
pressure drop kPa	40	40	50	50	50	50	50	70	70	70	70	70	70	70	70
hot water															
flowrate m^3/h	7.2	9.6	12.1	14.4	19.3	24.1	31.3	36.1	40.9	48.2	60.3	72.5	84.4	96.3	121
pressure drop kPa	60	60	70	70	70	70	70	80	80	80	80	80	80	80	80
only direct-fired fuel consumption															
oil(cooling) kg/h	10.6	14.2	17.7	21.3	28.4	35.6	46.3	53.5	60.4	71.2	88.8	107	125	142	178
gas(cooling) 10^4kcal/h	11.1	14.8	18.4	22.1	29.6	37.0	48.2	55.6	62.8	74.0	92.3	111	130	148	185
oil(heating) kg/h	12.0	16.0	20.1	24.0	32.0	40.1	52.1	60.1	68.1	80.1	100	121	140	160	201
gas(heating) 10^4kcal/h	12.5	16.6	20.9	25.0	33.3	41.7	54.2	62.5	70.8	83.4	104	125	146	166	209
direct-fired+180℃heat source W. (BZH)															
heat source W.flowrate m^3/h	7.6	10.2	12.7	15.2	20.4	25.5	33.2	38.4	43.3	51.0	63.6	76.4	89.3	102	128
direct-fired+ 0.8MPa steam (BZS)															
max.steam consumption kg/h	188	251	313	376	503	628	819	946	1068	1258	1569	1884	2201	2514	3148
direct-fired+ 500℃exhaust (BZE)															
exhaust consumption for cooling Kg/h	333	444	556	667	889	1111	1444	1667	1889	2222	2778	3333	3889	4444	5555
exhaust consumption for heating Kg/h	386	514	644	771	1028	1289	1673	1930	2187	2575	3219	3873	4508	5142	6445
rated supp.fuel consumption for cooling 10^4kcal/h	7.7	10.3	12.8	15.4	20.6	25.8	33.6	38.9	43.8	51.7	64.4	77.3	90.4	103	129
rated supp.fuel consumption for heating 10^4kcal/h	8.8	11.7	14.6	17.5	23.3	29.2	37.9	43.7	49.6	58.3	73.0	87.8	102	117	146
power kW	1.6	1.6	2.7	2.7	3.2	3.8	5.4	5.4	6.8	6.8	9.0	10.4	12.9	14.8	15.3
solution weight t	0.9	1.2	1.3	1.6	2.0	2.3	2.5	3.1	3.7	4.3	4.9	6.0	7.1	8.4	10.6
unit ship.wt.(with LiBr) t	4.4	5.3	6.2	7.3	8.7	9.9	11.0	12.1	14.8	16.8	21.4	24.6	27.8	33.2	38.1
unit ship.wt.(without LiBr) t	/	/	/	2.7	3.6	4.0	4.6	5.0	6.2	7.1	9.0	10.2	11.8	14.0	15.7
operation weight t	4.6	5.6	6.5	7.7	9.3	10.5	11.9	13.1	16.0	18.3	23.4	27.1	30.7	36.8	42.2

Model BZS/BZH/BZE		300	400	500	600	800	1000	1200	1600	2000
cooling capacity										
	kW	3489	4652	5815	6978	9304	11630	13956	18608	23260
	10^4kcal/h	300	400	500	600	800	1000	1200	1600	2000
	USRT	992	1323	1653	1984	2646	3307	3968	5291	6614
heating capacity										
	kW	2687	3582	4489	5385	7176	8967	10760	14351	17933
	10^4kcal/h	231	308	386	463	617	771	925	1234	1542
chilled water 7℃/12 ℃high flow (A)										
flowrate	m^3/h	600	800	1000	1200	1600	2000	2400	3200	4000
pressure drop	kPa	77	77	46	46	46	90	46	46	90
chilled water 7℃/14℃low flow (B)										
flowrate	m^3/h	429	571	714	857	1143	1429	1714	2286	2857
pressure drop	kPa	42	42	25	25	25	49	25	25	49
cooling water 37℃/30℃low flow (a)										
flowrate	m^3/h	735	980	1224	1469	1960	2449	2939	3919	4898
pressure drop	kPa	62	62	70	70	70	90	70	70	90
cooling water 37.5℃/32℃high flow (b)										
flowrate	m^3/h	935	1247	1558	1870	2494	3117	3740	4988	6233
pressure drop	kPa	97	97	110	110	110	140	110	110	140
heating water										
flowrate	m^3/h	289	385	483	579	771	964	1156	1543	1928
pressure drop	kPa	70	70	70	70	70	70	70	70	70
hot water										
flowrate	m^3/h	144	193	/	/	/	/	/	/	/
pressure drop	kPa	80	80	/	/	/	/	/	/	/
only direct-fired fuel consumption										
oil(cooling)	kg/h	214	285	356	428	570	712	855	1141	1425
gas(cooling)	10^4kcal/h	222	297	370	445	593	741	889	1186	1482
oil(heating)	kg/h	240	320	401	481	641	801	962	1283	1603
gas(heating)	10^4kcal/h	250	333	417	501	667	834	1000	1334	1667
direct-fired+180℃heat source W. (BZH)										
heat source W.flowrate	m^3/h	153	204	255	307	409	511	613	818	1022
direct-fired+ 0.8MPa steam (BZS)										
max.steam consumption	kg/h	3779	5040	6295	7556	10079	12590	15113	20159	25182
direct-fired+ 500℃exhaust (BZE)										
exhaust consumption for cooling	Kg/h	6666	8888	11111	13333	17777	22221	26665	35554	44442
exhaust consumption for heating	Kg/h	7714	10285	12889	15460	20603	25745	30887	41205	51490
rated supp.fuel consumption for cooling	10^4kcal/h	155	207	259	310	414	577	621	828	1034
rated supp.fuel consumption for heating	10^4kcal/h	175	233	292	350	467	583	700	934	1167
power	kW	17.8	23.8	31.4	35.4	47.4	62.6	71.0	94.8	125
solution weight	t	12.1	15.9	20.7	23.3	28.8	36.8	46.7	57.6	73.6
unit ship.wt.(with LiBr)	t	/	/	/	/	/	/	/	/	/
unit ship.wt.(without LiBr)	t	18.8	25.0	33.0	37.0	44.0	55.0	37.0	44.0	55.0
operation weight	t	51.0	62.7	80.6	91.8	111	140	184	222	280

General Conditions:

1.Rated steam pressure: 0.8MPa,Rated condensate temperature: 95°C
2.Rated heat source W. outlet/inlet temp.: 165°C/180°C
3.Rated exhaust inlet temperature: 500°C
4.Rated chilled W.outlet/inlet temp.: (A)7°C/12°C (B)7°C/14°C
5.Rated cooling W.outlet/inlet temp.: (a)37°C/30°C (b)375°C/32°C
6.Rated heating W.outlet/inlet temp.: 65°C/57°C
7.Rated hot W.outlet/inlet temp.: 60°C/44°C
8.Lowest permitted outlet temp.for chilled water:5°C
(except special order)
9.Lowest permitted inlet temp.for cooling water: 10°C
Lowest inlet temp.in operating: 18°C (no limit if 3-way valve is equipped)
10.Highest permitted outlet temp.for heating/hot water: 95°C
11.Pressure limit for chilled W.,cooling W.,heating W.,hot W,:
08MPa (800kPa)(except special order)
12.Fouling factor for chilled W,heating W,hot W: 0.086m^2 · K/kW
13.Oil consumption is calculated by low heating value: 10400 kcal/kg
14.LiBr solution concentration: 50%
15.Rated exhaust temp.for cooling: 170°C
Rated exhaust temp.for heating: 145°C
16.Machine room temperature: 5 ~ 43℃,humidity ⩽ 85%
17.Adjustable chilled water flowarate: 50~120%
(according to flowrate A)
18.Adjustable cooling water flowarate: 30~140%
(according to flowrate a)
19.Adjustable heating/ hot water flowarate: 65~120%
20.Adjustable load: 5~115%
21.Rated direct-fired cooling COP: 1.34
(including electricity consumption)
Rated indirect-fired cooling COP: 1.39
(including electricity consumption)
22.Rated direct-fired heating COP: 0.925

Note:

① 100% cooling capacity can be achieved with dedicated fuel,steam or heat source water input.
② The cooling/heating capacity is 30% of the rated for exhaust input only.The 30% above capacity is for special order.
③ When steam and heat source water input are insuffcient, the back-up fuel will be auto utilized.
④ (A)、(a) is for recommendation, (B)、(b) can be selected, without affecting cooling capacity and COP.
⑤ Technical specification is based upon Japanese Industry Standard JIS B 8622 "Absorption Chiller"

MULTI-ENERGY DIRECT-FIRED CHILLER/HEATER

direct-fired+hot water+exhaust (BZHE can be combined with engine)

Model BZHE	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250
cooling capacity															
kW	174	233	291	349	465	582	756	872	989	1163	1454	1745	2035	2326	2908
10^4kcal/h	15	20	25	30	40	50	65	75	85	100	125	150	175	200	250
USRT	50	66	83	99	132	165	215	248	281	331	413	496	579	661	827
heating capacity															
kW	135	179	224	269	358	449	583	672	762	897	1121	1349	1570	1791	2245
10^4kcal/h	11.6	15.4	19.3	23.1	30.8	38.6	50.1	57.8	65.5	77.1	96.4	116	135	154	193
chilled water7℃/12℃high flow(A)															
flowrate m^3/h	30	40	50	60	80	100	130	150	170	200	250	300	350	400	500
pressure drop kPa	6	6	10	10	10	20	20	25	25	25	46	46	46	46	77
chilled water7℃/14℃low flow(B)															
flowrate m^3/h	21.4	28.6	35.7	42.9	57.1	71.4	92.9	107	121	143	179	214	250	286	357
pressure drop kPa	3	3	5	5	5	10	10	13	13	13	26	26	26	26	42
cooling water37℃/30℃low flow(a)															
flowrate m^3/h	40.0	53.4	66.6	80.0	107	133	174	200	221	255	289	340	424	509	595
pressure drop kPa	36	36	74	74	74	74	45	60	60	60	60	60	60	60	74
cooling water37.5℃/32℃high flow(b)															
flowrate m^3/h	50.9	67.9	84.8	102	137	171	222	257	290	342	427	513	598	684	855
pressure drop kPa	54	54	108	108	108	108	69	87	87	87	87	87	87	87	108
heating water															
flowrate m^3/h	14.5	19.3	24.1	28.9	38.5	48.3	62.6	72.3	81.9	96.4	121	145	169	193	241
pressure drop kPa	40	40	50	50	50	50	50	70	70	70	70	70	70	70	70
hot water															
flowrate m^3/h	7.2	9.6	12.1	14.4	19.3	24.1	31.3	36.1	40.9	48.2	60.3	72.5	84.4	96.3	121
pressure drop kPa	60	60	70	70	70	70	70	80	80	80	80	80	80	80	80
direct-fired															
oil(cooling) kg/h	10.6	14.2	17.7	21.3	28.4	35.6	46.3	53.5	60.4	71.2	88.8	107	125	142	178
gas(cooling) 10^4kcal/h	11.1	14.8	18.4	22.1	29.6	37.0	48.2	55.6	62.8	74.0	92.3	111	130	148	185
oil(heating) kg/h	12.0	16.0	20.1	24.0	32.0	40.1	52.1	60.1	68.1	80.1	100	121	140	160	201
gas(heating) 10^4kcal/h	12.5	16.6	20.9	25.0	33.3	41.7	54.2	62.5	70.8	83.4	104	125	146	166	209
direct-fired+98℃heat source water+500℃exhaust(BZHE)															
max.exhaust consumption for cooling Kg/h	333	444	556	667	889	1111	1444	1667	1889	2222	2778	3333	3889	4444	5555
max.exhaust consumption for heating kg/h	386	514	644	771	1028	1289	1673	1930	2187	2575	3219	3873	4508	5142	6445
max.heat source W. consumption for heating m^3/h	4.5	6.0	7.4	8.9	11.9	14.9	19.3	22.3	25.3	29.8	37.2	44.6	52.1	59.5	74.4
rated supp.fuel consumption for cooling 10^4kcal/h	5.5	7.3	9.1	10.9	14.7	18.3	23.9	27.7	31.1	36.7	45.7	54.9	64.2	73.4	92.0
rated supp.fuel consumption for heating 10^4kcal/h	8.8	11.7	14.6	17.5	23.3	29.2	37.9	43.7	49.6	58.3	73.0	87.8	102	117	146
power kW	1.6	1.6	2.7	2.7	3.2	3.8	5.4	5.4	6.8	6.8	9.0	10.4	12.9	14.8	15.3
solution weight t	0.9	1.2	1.3	1.6	2.0	2.3	2.5	3.1	3.7	4.3	4.9	6.0	7.1	8.4	10.6
unit ship.wt.(with LiBr) t	4.4	5.3	6.2	7.3	8.7	9.9	11.0	12.1	14.8	16.8	21.4	24.6	27.8	33.2	38.1
unit ship.wt.(without LiBr) t	/	/	/	2.7	3.6	4.0	4.6	5.0	6.2	7.1	9.0	10.2	11.8	14.0	15.7
operation weight t	4.6	5.6	6.5	7.7	9.3	10.5	11.9	13.1	16.0	18.3	23.4	27.1	30.7	36.8	42.2

Model	BZHE	300	400	500	600	800	1000	1200	1600	2000
cooling capacity										
	kW	3489	4652	5815	6978	9304	11630	13956	18608	23260
	10^4kcal/h	300	400	500	600	800	1000	1200	1600	2000
	USRT	992	1323	1653	1984	2646	3307	3968	5291	6614
heating capacity										
	kW	2687	3582	4489	5385	7176	8967	10758	14351	17933
	10^4kcal/h	231	308	386	463	617	771	925	1234	1542
chilled water7℃/12℃ high flow(A)										
flowrate	m^3/h	600	800	1000	1200	1600	2000	2400	3200	4000
pressure drop	kPa	77	77	38	46	46	90	46	46	90
chilled water7℃/14℃ low flow(B)										
flowrate	m^3/h	429	571	714	857	1143	1429	1714	2286	2857
pressure drop	kPa	42	42	21	25	25	50	25	25	50
cooling water37℃/30℃ low flow(a)										
flowrate	m^3/h	801	1069	1335	1602	2137	2670	3205	4274	5341
pressure drop	kPa	74	74	84	84	84	104	84	84	104
cooling water37.5℃/32℃ high flow(b)										
flowrate	m^3/h	1020	1360	1639	2720	2737	3399	4079	5440	6798
pressure drop	kPa	108	108	120	120	120	156	120	120	156
heating water										
flowrate	m^3/h	289	385	483	579	771	964	1156	1543	1928
pressure drop	kPa	70	70	70	70	70	70	70	70	70
hot water										
flowrate	m^3/h	144	193	/	/	/	/	/	/	/
pressure drop	kPa	80	80	/	/	/	/	/	/	/
direct-fired										
oil(cooling)	kg/h	214	285	356	428	570	712	855	1141	1425
gas(cooling)	10^4kcal/h	222	297	370	445	593	741	889	1186	1482
oil(heating)	kg/h	240	320	401	481	641	801	962	1283	1603
gas(heating)	10^4kcal/h	250	333	417	501	667	834	1000	1334	1667
direct-fired+98℃heat source water+500℃exhaust(BZHE)										
max.exhaust consumption for cooling	Kg/h	6666	8888	11111	13333	17777	22221	26665	35554	44442
max.exhaust consumption for heating	kg/h	7714	10285	12889	15460	20603	25745	30887	41205	51490
max.heat source W. consumption for heating	m^3/h	89.3	119	149	179	238	298	357	476	595
rated supp.fuel consumption for cooling	10^4kcal/h	110	147	184	221	295	368	442	589	736
rated supp.fuel consumption for heating	10^4kcal/h	175	233	292	350	467	583	700	934	1167
power	kW	17.8	23.8	31.4	35.4	47.4	62.6	71.0	94.8	125
solution weight	t	12.1	15.9	20.7	23.3	28.8	36.8	46.7	57.6	73.6
unit ship.wt.(with LiBr)	t	/	/	/	/	/	/	/	/	/
unit ship.wt.(without LiBr)	t	18.8	25	33	37	44	55	37	44	55
operation weight	t	51.0	62.7	80.6	91.8	110	140	184	222	281

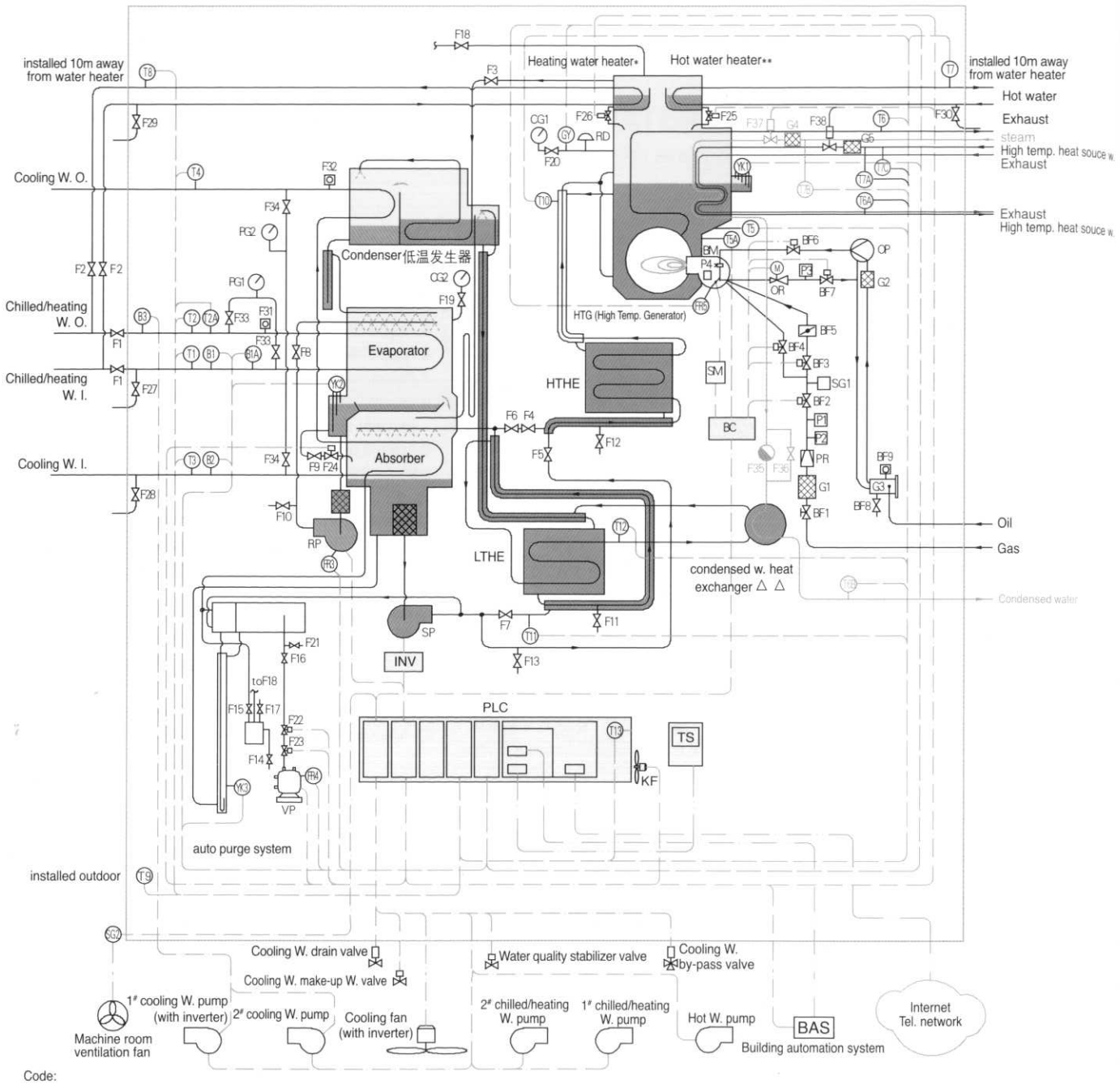
General Conditions:

1.Rated heat source W. outlet/inlet temp.: 88°C/98°C
2.Rated exhaust inlet temperature: 500°C
4.Rated chilled W.outlet/inlet temp.: (A)7°C/12°C (B)7°C/14°C
5.Rated cooling W.outlet/inlet temp.: (a)37°C/30°C (b)37.5°C/32°C
6.Rated heating W.outlet/inlet temp.: 65°C/57°C
7.Rated hot W.outlet/inlet temp.: 60°C/44°C
8.Lowest permitted outlet temp.for chilled water: 5°C
(except special order)
9.Lowest permitted inlet temp.for cooling water: 10°C
Lowest inlet temp.in operating: 18°C (no limit if 3-way valve is equipped)
10.Highest permitted outlet temp.for heating/hot water: 95°C
11.Pressure limit for chilled W.,cooling W.,heating W.,hot W,:
0.8MPa (800kPa) (except special order)
12.Fouling factor for chilled W,heating W,hot W,heat source W:
0.086$m^2 \cdot$ K/kW
13.Oil consumption is calculated by low heating value: 10,400 kcal/ kg
14.LiBr solution concentration: 50%
15.Rated exhaust temp.for cooling: 170°C
Rated exhaust temp.for heating: 145°C
16.Machine room temperature: 5~43°C,humidity ⩽ 85%
17.Adjustable chilled water flowarate: 50~120%
(according to flowrate A)
18.Adjustable cooling water flowarate: 30~140%
(according to flowrate a)
19.Adjustable heating/hot water flowarate: 65~120%
20.Adjustable load: 5~115%
21.Rated direct-fired cooling COP: 1.34
(including electricity consumption)
Rated indirect-fired cooling COP: 1.39
(including electricity consumption)
22.Rated direct-fired heating COP: 0.925

Note: ① (A)、 (a) is for recommendation, (B)(b) can be selected without affecting cooling capacity and COP.
② Technical specification is based upon Japanese Industry Standard JIS B 8622 "Absorption Chiller".

P & I DIAGRAM OF BZS/BZH/BZE

(the green line is BZS,the blue line is BZH and the violet line is BZE)



Code:

T1 chilled W. inlet temp. sensor
T2 chilled W. outlet temp. sensor
T2A chilled W. calibrating temp. sensor
T3 cooling W. inlet temp. sensor
T4 cooling W. outlet temp. sensor
T5 HTG temp. sensor (to PLC)
T5A HTG temp. control (to burner)
T6 exhaust temp. sensor
T6A heat source W. outlet temp. sensor △
T6B condensed W. outlet temp. sensor △ △
T7 hot W. outlet temp. sensor **
T7A heat source W. intlet temp. sensor △
T7B steam inlet temp. sensor △ △
T7C exhaust inlet temp. sensor △ △ △
T8 heating W. outlet temp. sensor *
T9 ambient temp. sensor
T10 HTG crystallization sensor
T11 LTHE diluted solution inlet temp. sensor
T12 LTG crystallization sensor
T13 control casing temp. sensor

B1 chilled W. flow switch
B1A chilled W. flow switch
B2 cooling W. flow switch
B3 chilled W. flow switch
GY pressure control
YK1 HTG solution level probe
YK2 refrigerant level probe
YK3 non-condensable probe
FR3 refrigerant pump thermal relay
FR4 vacuum pump thermal relay
INV solution pump inverter
TS touch screen
PLC programmable logic controller
KF control casing draft fan
RP refrigerant pump
SP solution pump
VP vacuum pump
CG1 compound gauge
CG2 compound gauge
PG1 pressure gauge

PG2 pressure gauge
RD rupture disc
G4 steam filter △ △
G5 heat source W. filter △
F1 chilled W. valve *
F2 heating W. valve *
F3 steam valve *
F4 concentrated solution valve *
F5 diluted solution valve *
F6 HTG concentration regulating valve
F7 LTG concentration regulating valve
F8 refigerant regulating valve
F9 refrigerant by-pass valve
F10 refrigerant sampling valve
F11 LTHE sampling valve
F12 HTHE sampling valve
F13 diluted solution sampling valve
F14 main purge valve
F15 direct purge valve
F16 air cannister valve

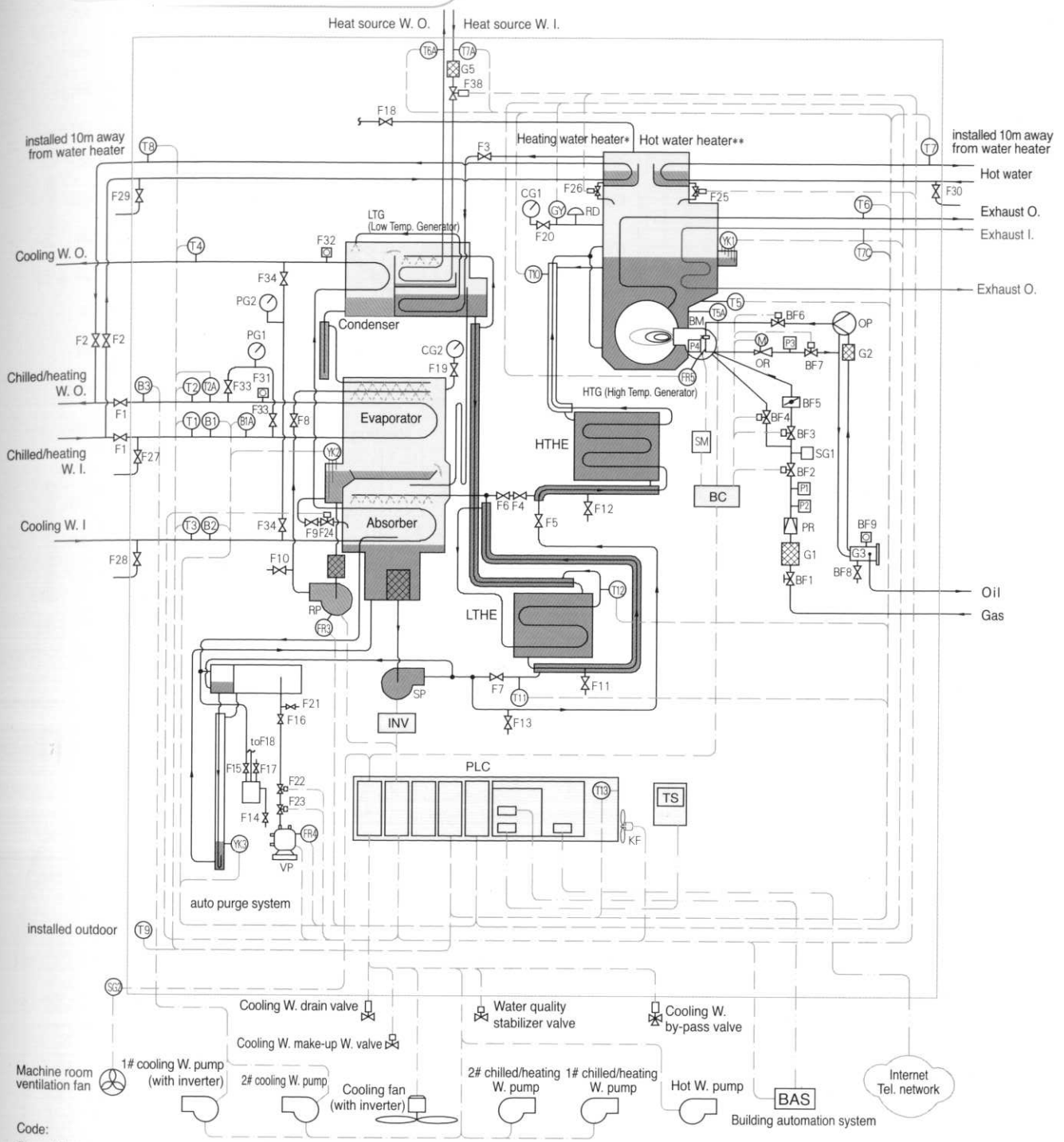
F17 sampling purge valve
F18 HTG purge valve
F19 main shell pressure valve
F20 HTG pressure valve
F21 nitrogen charging valve
F22 purge solenoid valve
F23 purge solenoid valve
F24 refrigerant solenoid valve
F25 hot W. thermostatic valve **
F26 heating W. thermostatic valve **
F27 chilled W. drain valve
F28 cooling W. drain valve
F29 heating W. drain valve *
F30 hot W. drain valve **
F31 chilled W. vent valve
F32 cooling W. vent valve
F33 chilled W. pressure valve
F34 cooling W. pressure valve
F35 steam trap △ △
F36 condensed W. by-pass valve △ △
F37 steam motor valve △ △

F38 heat source W. motor valve △
BM burner
FR5 burner thermal relay
BC burner control
SG1 burner gas leakage detector
SG2 machine room gas leakage detector
BF1 gas ball valve
BF2 main gas solenoid valve
BF3 operation gas solenoid valve
BF4 ignition gas solenoid valve
BF5 gas butterfly valve
P1 gas pressure switch,min
P2 gas pressure switch,max
PR gas pressure regulator
G1 gas filter
BF6 oil solenoid valve
BF7 oil solenoid valve
BF8 oil filter drain valve
BF9 oil filter vent valve
P3 oil pressure switch
OR oil regulator
G2 oil filter
G3 oil filter
OP oil pump
SM air damper servo motor
P4 air pressure switch

notes: 1. ☐ BROAD supply scope

2. All the components are installed and commissioned in the factory before shipment except T7,T8 and T9.
3. The components marked "**" are not included in chilled and heating-only type systems.
   The components marked "*" and "**" are not included in cooling-only type systems.
4. The components marked △ are only suitable for direct-fired & hot water type(BZH);
   The components marked △△ are only suitable for direct-fired & steam type(BZS);
   The components marked △△△ are only suitable for direct-fired & exaust type(BZE).
5. The diagram indicates a dual-fuel chiller,if it is of single-fule,only the related components of oil/gas pipelines are to be provided.
6. Wire type: —— actuator signal output
   —— sensor signal input
   —— communication signal

P & I DIAGRAM OF BZHE



Code:

T1 chilled W. inlet temp. sensor
T2 chilled W. outlet temp. sensor
T2A chilled W. calibrating temp. sensor
T3 cooling W. inlet temp. sensor
T4 cooling W. outlet temp. sensor
T5 HTG temp. sensor (to PLC)
T5A HTG temp. control (to burner)
T6 exhaust temp. sensor
T6A heat source W. outlet temp. sensor
T7 hot W. outlet temp. sensor **
T7A heat source W. intlet temp. sensor
T7C exhaust inlet temp. sensor
T8 heating W. outlet temp. sensor *
T9 ambient temp. sensor
T10 HTG crystallization sensor
T11 LTHE diluted solution inlet temp. sensor
T12 LTG crystallization sensor
T13 control casing temp. sensor
B1 chilled W. flow switch
B1A chilled W. flow switch

B2 cooling W. flow switch
B3 chilled W. flow switch
GY pressure control
YK1 HTG solution level probe
YK2 refrigerant level probe
YK3 non-condensable probe
FR3 refrigerant pump thermal relay
FR4 vacuum pump thermal relay
INV solution pump inverter
TS touch screen
PLC programmable logic controller
KF control casing draft fan
RP refrigerant pump
SP solution pump
VP vacuum pump
CG1 compound gauge
CG2 compound gauge
PG1 pressure gauge
PG2 pressure gauge
RD rupture disc

G5 heat source W. filter
F1 chilled W. valve *
F2 heating W. valve *
F3 steam valve *
F4 concentrated solution valve *
F5 diluted solution valve *
F6 HTG concentration regulating valve
F7 LTG concentration regulating valve
F8 refigerant regulating valve
F9 refrigerant by-pass valve
F10 refrigerant sampling valve
F11 LTHE sampling valve
F12 HTHE sampling valve
F13 diluted solution sampling valve
F14 main purge valve
F15 direct purge valve
F16 air cannister valve
F17 sampling purge valve
F18 HTG purge valve
F19 main shell pressure valve

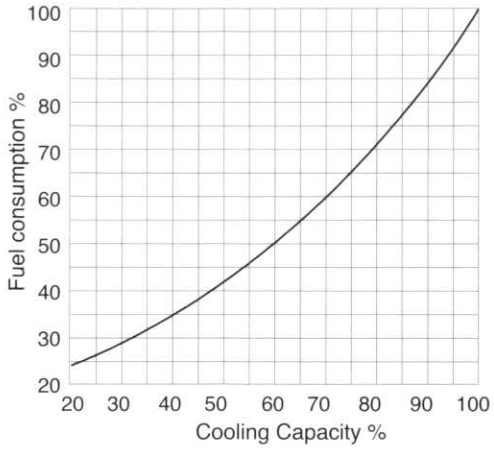
F20 HTG pressure valve
F21 nitrogen charging valve
F22 purge solenoid valve
F23 purge solenoid valve
F24 refrigerant solenoid valve
F25 hot W. thermostatic valve **
F26 heating W. thermostatic valve **
F27 chilled W. drain valve
F28 cooling W. drain valve
F29 heating W. drain valve *
F30 hot W. drain valve **
F31 chilled W. vent valve
F32 cooling W. vent valve
F33 chilled W. pressure valve
F34 cooling W. pressure valve
F38 heat source W. motor valve
BM burner
FR5 burner thermal relay
BC burner control
SG1 burner gas leakage detector

SG2 machine room gas leakage detector
BF1 gas ball valve
BF2 main gas solenoid valve
BF3 operation gas solenoid valve
BF4 ignition gas solenoid valve
BF5 gas butterfly valve
P1 gas pressure switch,min
P2 gas pressure switch,max
PR gas pressure regulator
G1 gas filter
BF6 oil solenoid valve
BF7 oil solenoid valve
BF8 oil filter drain valve
BF9 oil filter vent valve
P3 oil pressure switch
OR oil regulator
G2 oil filter
G3 oil filter
OP oil pump
SM air damper servo motor
P4 air pressure switch

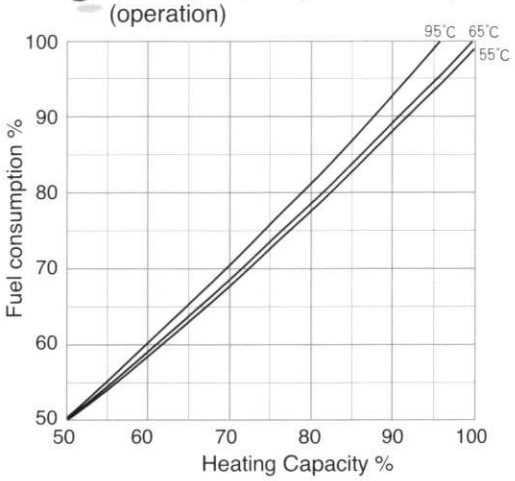
notes: 1. ☐ BROAD supply scope
2. All the components are installed and commissioned in the factory before shipment except T7,T8 and T9.
3. The components marked "**" are not included in chilled and heating-only type systems.
The components marked "*" and "**" are not included in cooling-only type systems.
4. The diagram indicates a dual-fuel chiller,if it is of single-fule,only the related components of oil/gas pipelines are to be provided.
5. Wire type: —— —— —— actuator signal output
—— —— —— sensor signal input
—— —— communication signal

PERFORMANCE CURVES OF BZS,BZH,BZE AND BZHE

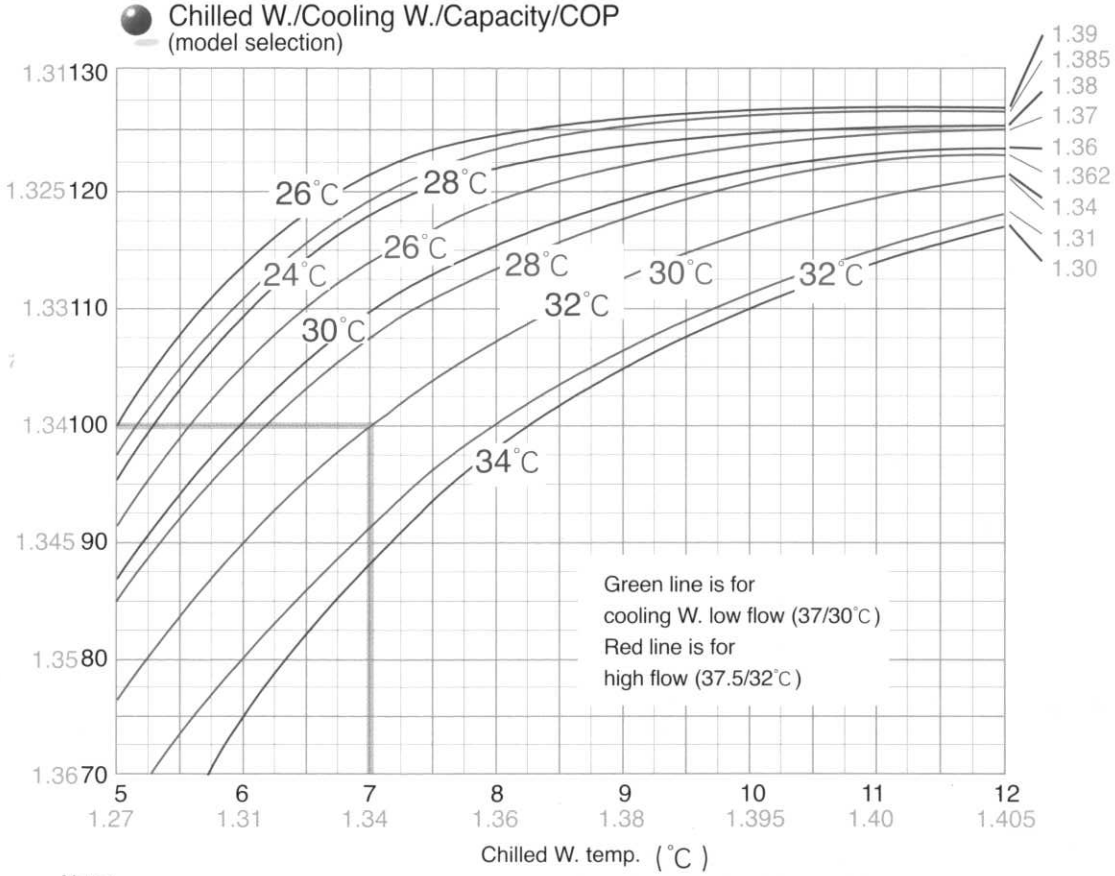
Cooling capacity vs. Fuel input (operation)



Heating capacity vs. Fuel input (operation)



Chilled W./Cooling W./Capacity/COP (model selection)



Note: The figure in blue is COP. In calculation, 3 of them will be added and then divided by 3. Example:

① Known: cooling capacity is 100%, cooling W. temp. 28°C;
check out chilled W. temp. is 6.2°C, COP is 1.338, i.e. (1.34+1.362+1.312)/3=1.338

② Known: chilled W. temp. 10°C.cooling W. temp. 30°C;
check out cooling capacity is 116%, COP=1.354

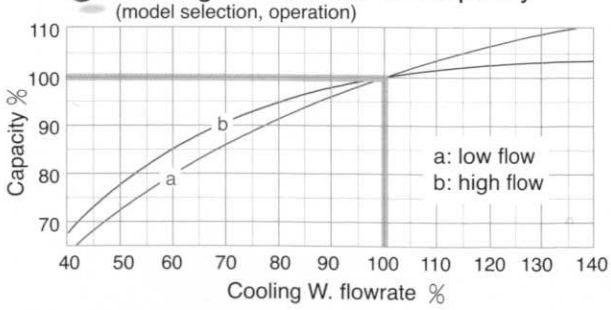
③ Known: cooling capacity is 90%, chilled water 6°C;
check out cooling water temperature is 30°C, COP =1.332
(calculated per cooling water low flow option).

COP (model selection, operation)

Rated COP:	1.34		
IPLV COP:	1.529 calculation as		
Load	COP	Factor	Result
A 100%	1.340	0.01	0.013
B 75%	1.546	0.42	0.649
C 50%	1.595	0.45	0.718
D 25%	1.241	0.12	0.149

Note: The integrated part load value (IPLV) reflects chiller's actual COP in operation. The load and calculation formula are based upon ARI Standard 560.

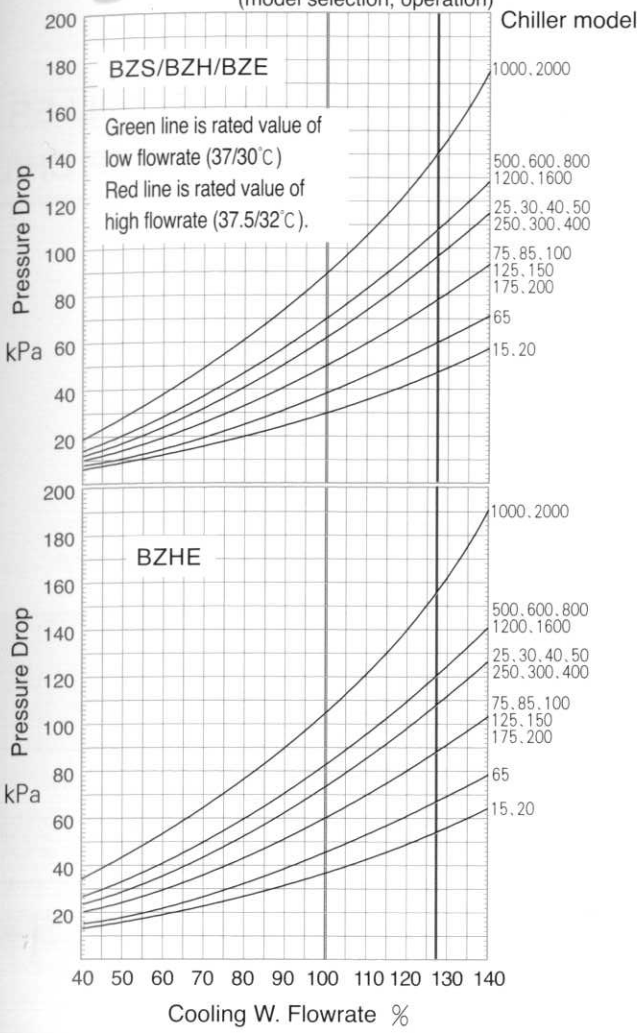
Cooling W. flowrate vs. Capacity (model selection, operation)



(orange line is the rated va

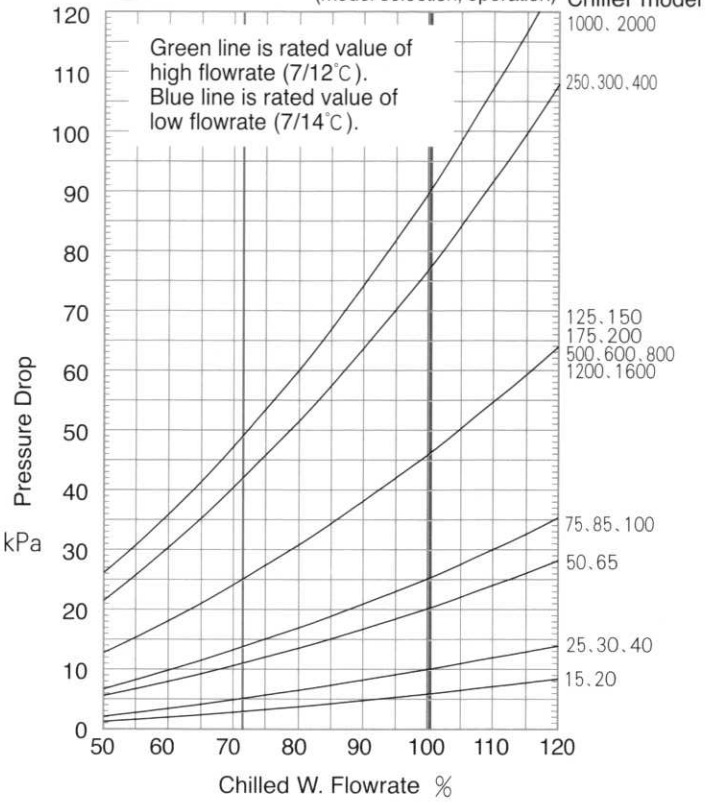
Cooling W. Flowrate vs. Pressure Drop

(model selection, operation)



Chilled W. Flowrate vs. Pressure Drop

(model selection, operation)



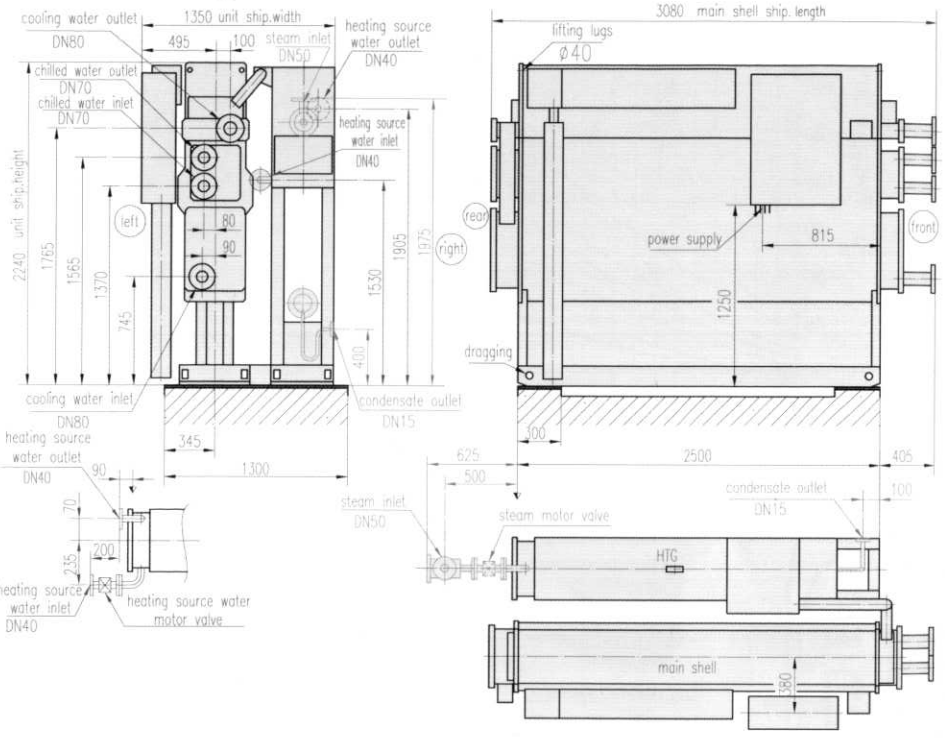
Supply List-- BZS,BZH,BZE and BZHE

Main shell	main shell body	includes low temp. generator, condenser, evaporator, absorber, water box,heat/cold insulation, etc..
	low temp. heat exchanger	plate heat exchanger, includes heat insulation.
	canned pumps	includes refrigerant pump and solution pump.
	automatic purge system	includes inline falling head purge system, solenoid valve and vacuum pump.
	motor valve	to regulate heat source W. flowrate to realize the cooling capacity auto regulation. heat source W. filter included. only for BZHE
HTG	HTG shell	includes shell, front/rear steam chamber, base, heat insulation.
	high temp. heat exchanger	plate heat exchanger, includes heat insulation.
	water heater	for making heating W. hot W. Not for cooling-only type.
	thermostatic valve	2 pieces, used for temp. control of heating W. and hot W. separately.
	enclosure	HTG shell, HTHE and water heater are enclosed for heat insulation.
	burner	whole set of safety device, filters and muffler are included. packing separately and field-mounted by BROAD.
Control system	control cabinet	includes PLC, solution pump inverter, refrigerant pump inverter(⩾ 200 model), low voltage parts and control software
	touch screen	for office control of IFA, includes metal enclosure, DC power and typical 30m cable (with an optional length up to 5km). Delivered in separate package.
	back-up switch	for commissioning or maintenance use, installed on the main shell body
	network converter	for remote control through internet, mounted in the control cabinet.
	terminals for exterior system	mounted in the control cabinet for control of chilled water pump, cooling water pump, cooling tower fan, cooling water by-pass valve and water quality stabilizer charge device, etc.
	sensors to be field installed	only one ambient temp. sensor, one heating W. temp. sensor and one hot W. temp. sensor. Others are factory-mounted.
Accessories	spare parts	include sealing elements and a complete set of easily worn-out parts (meet 4-year maintenance requirement)
	special tools	include tools for water box cover assembling/dismantling, descaling tools and maintenance tools.
	documents	include packing list, quality certificate, users' manual, and auxiliary devices' manuals
	toolbox	spare parts, special tools and documents are locked in this stainless steel box before shipment.

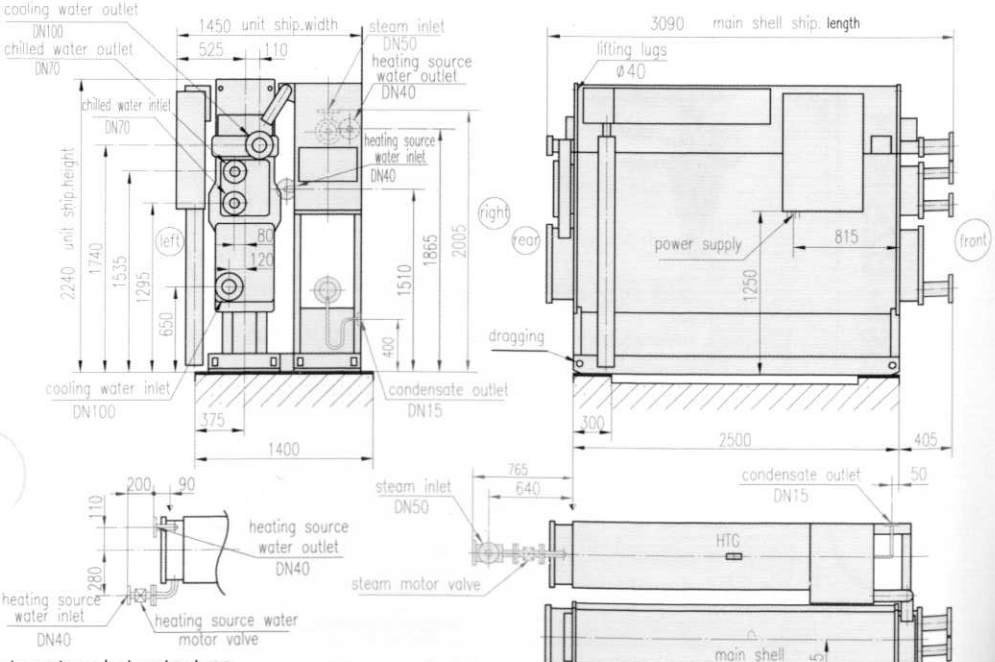
Note: As there are many multi-energy types and their stuctures are different, the above list can not include all and is only for reference. The detailed list will be decided as per the purchase order.

DIMENSIONS

TWO-STAGE STEAM CHILLER
TWO-STAGE HOT WATER CHILLER

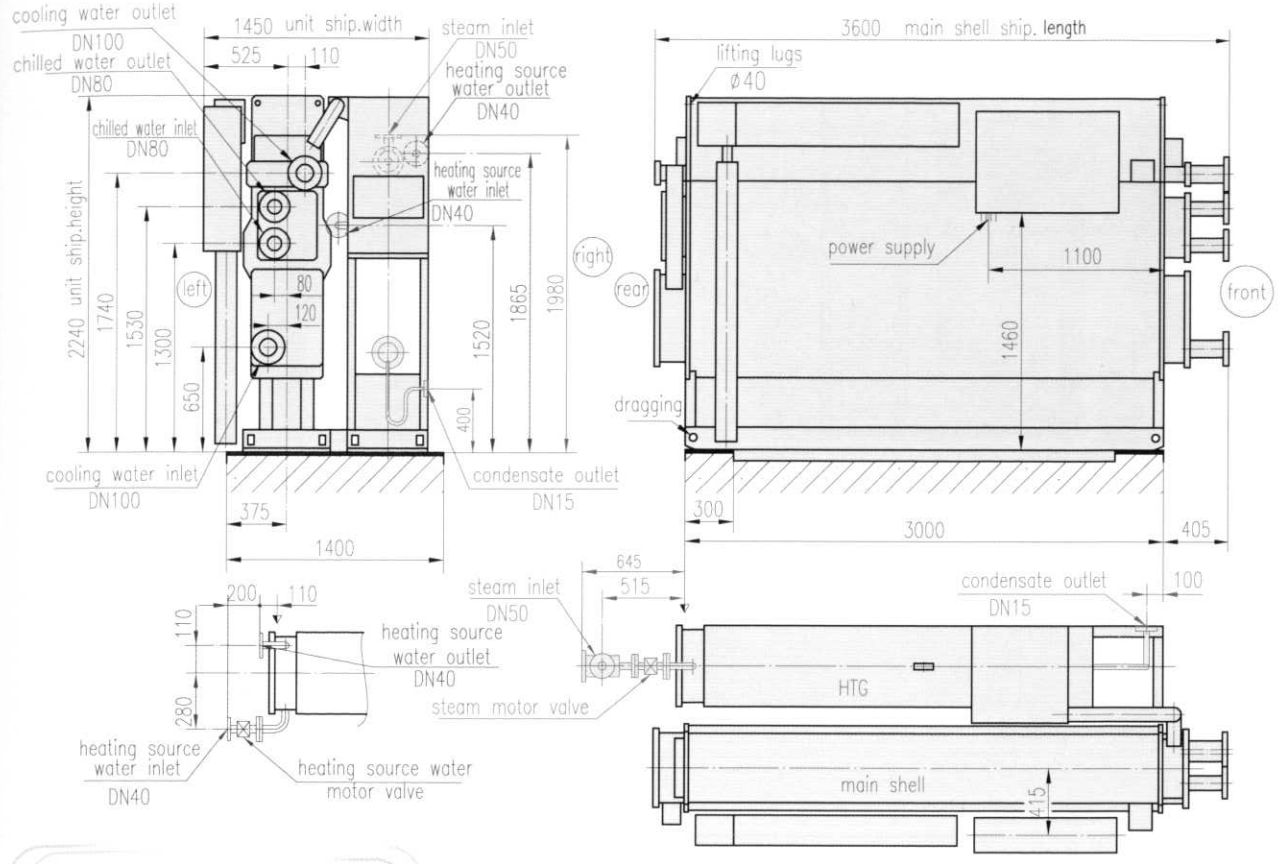


BS/BH15

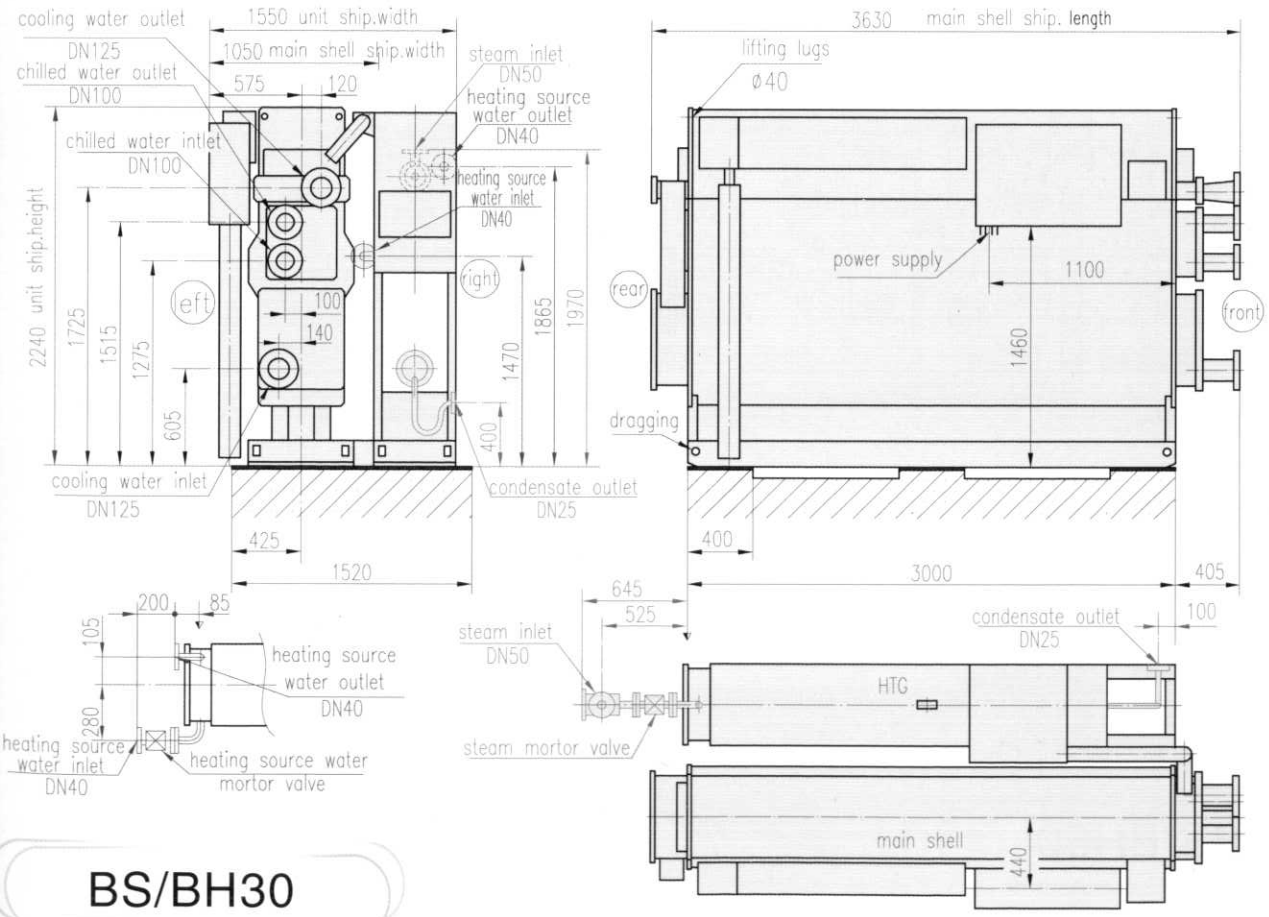


BS/BH20

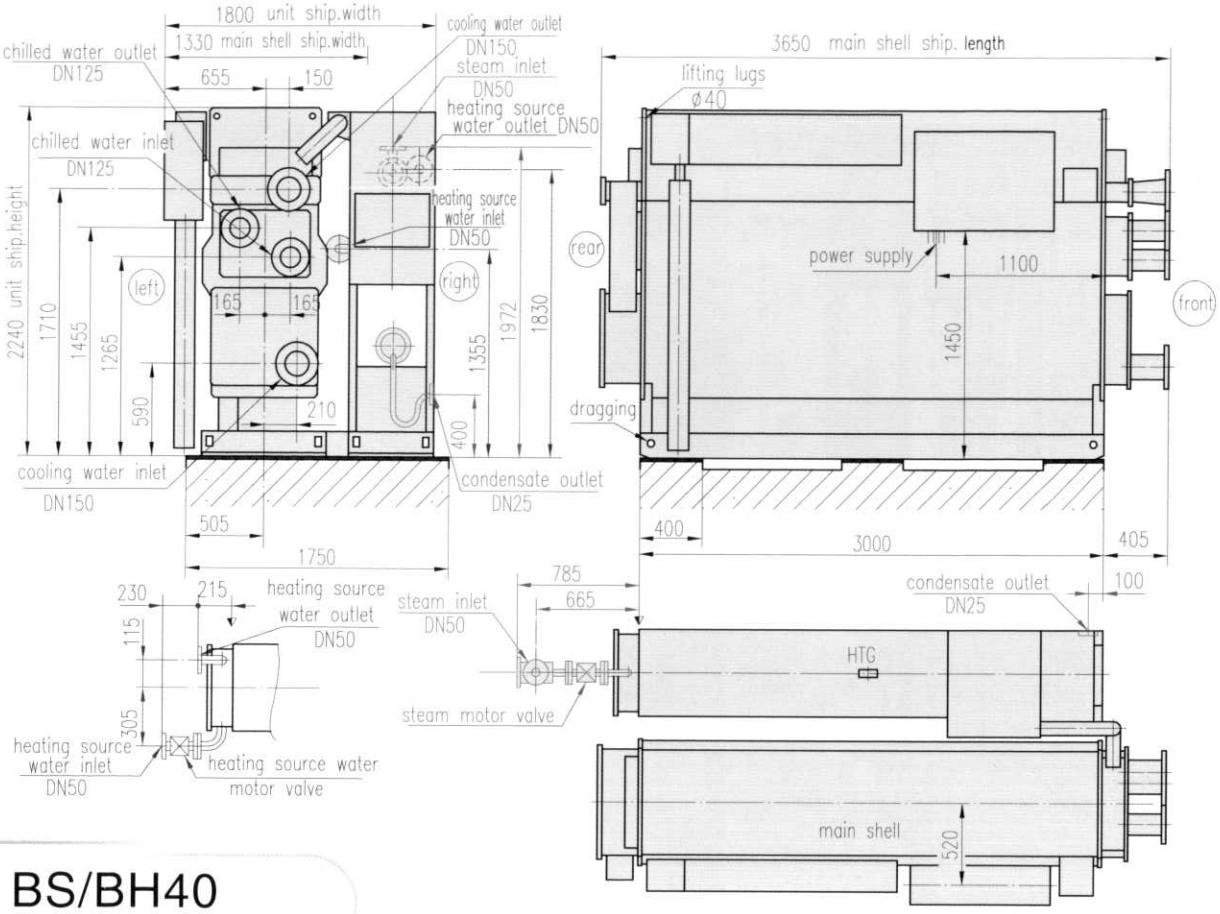
Note:1. Red is for two-stage steam type; blue is for two-stage hot water type.
2. Dimension drawings in CAD format can be downloaded at www.broad.com.
3. Units are in mm. 1in=25.4mm 1ft=304.8mm



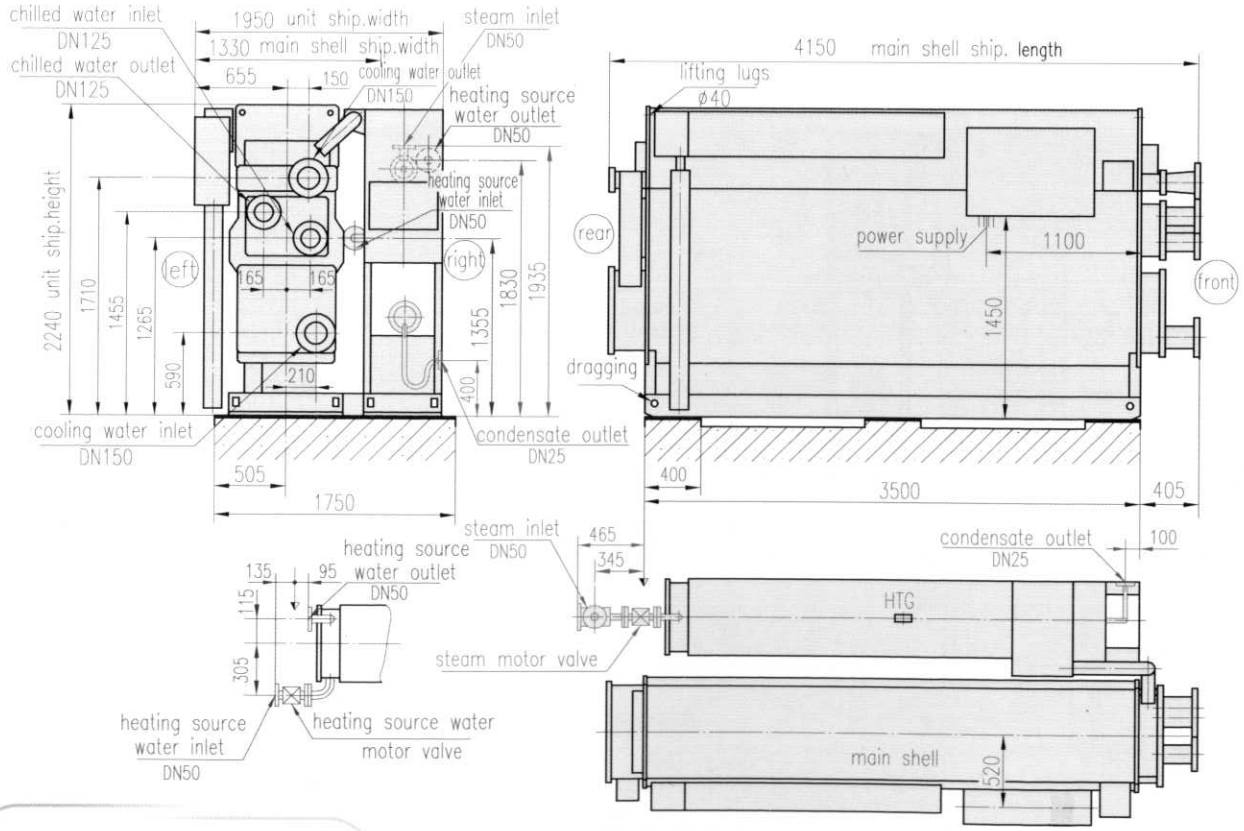
BS/BH25



BS/BH30



BS/BH40

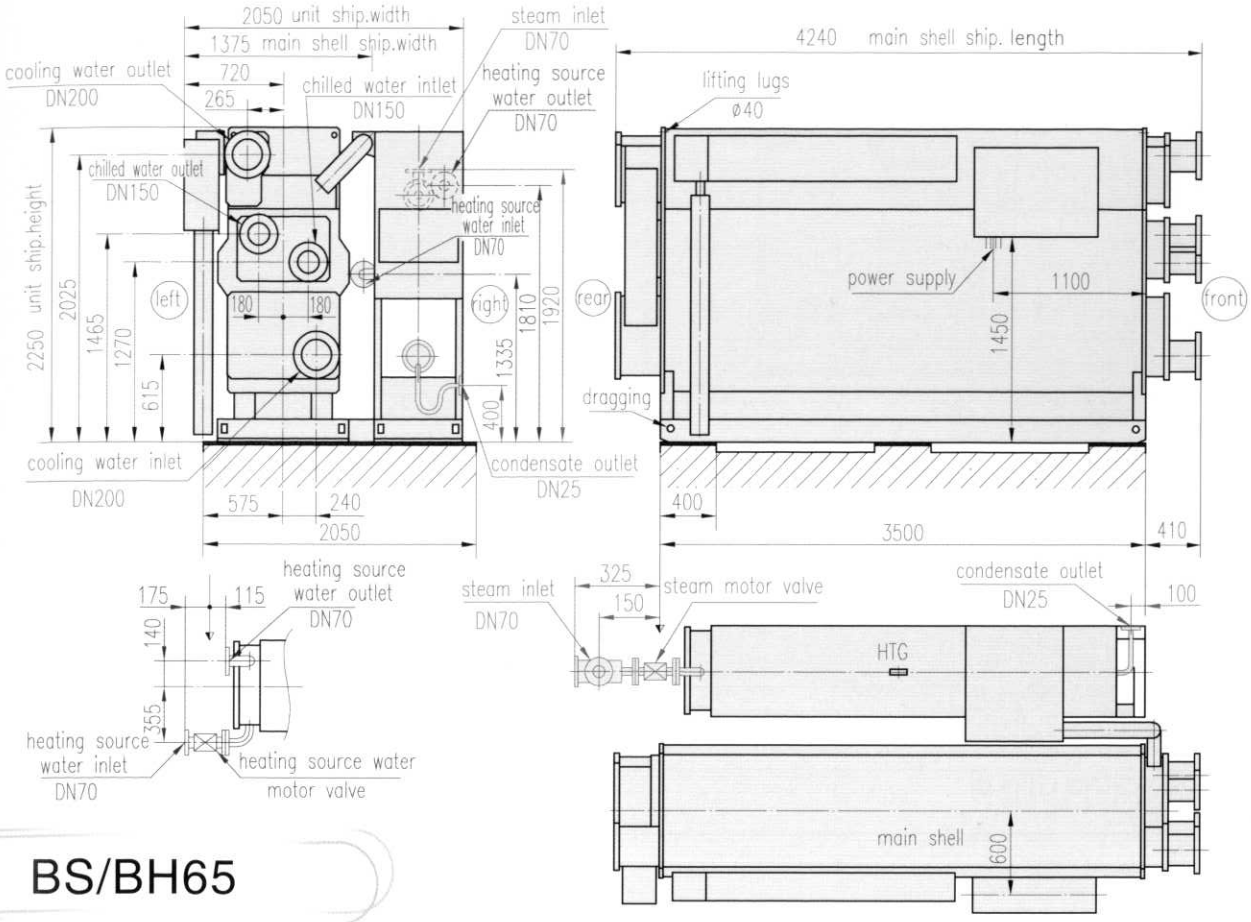


BS/BH50

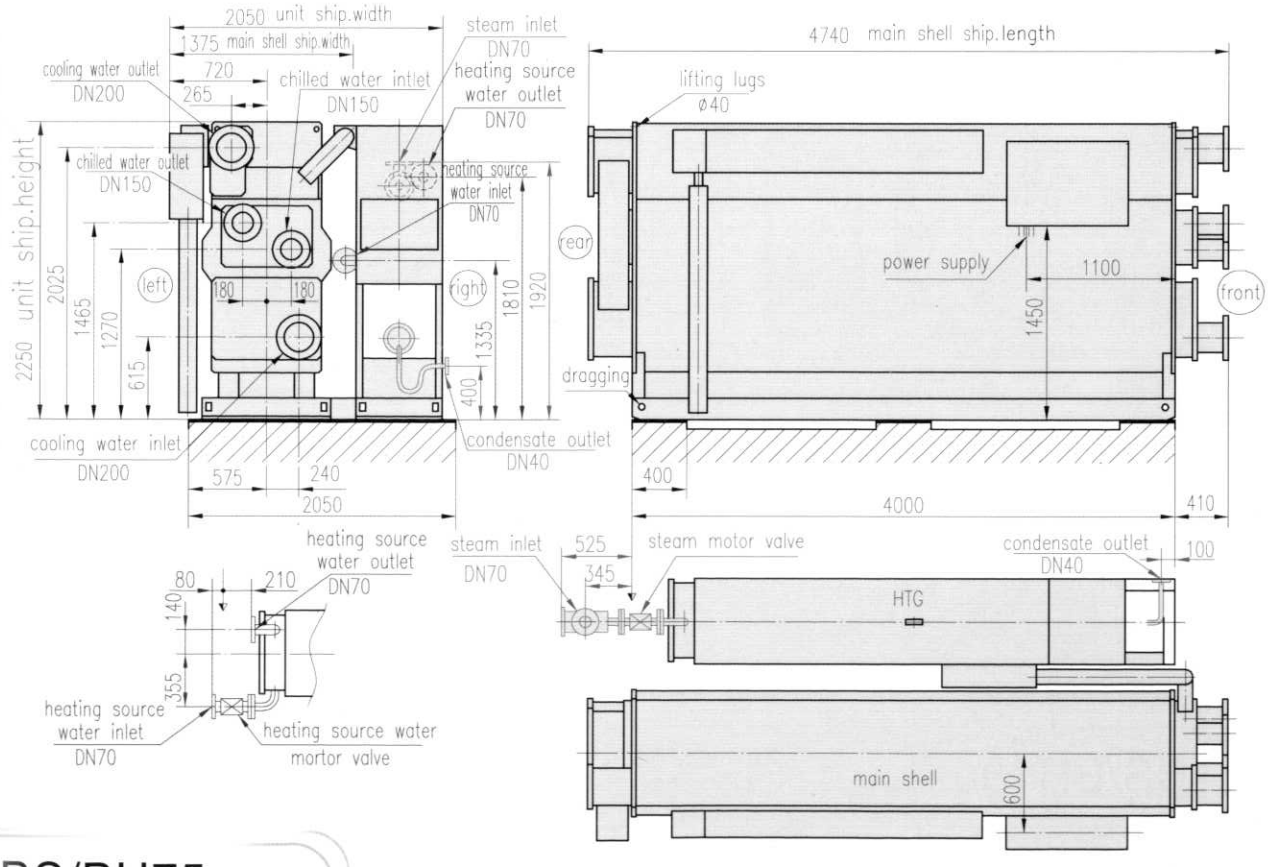
Note:1. Red is for two-stage steam type; blue is for two-stage hot water type.

2. Dimension drawings in CAD format can be downloaded at www.broad.com.

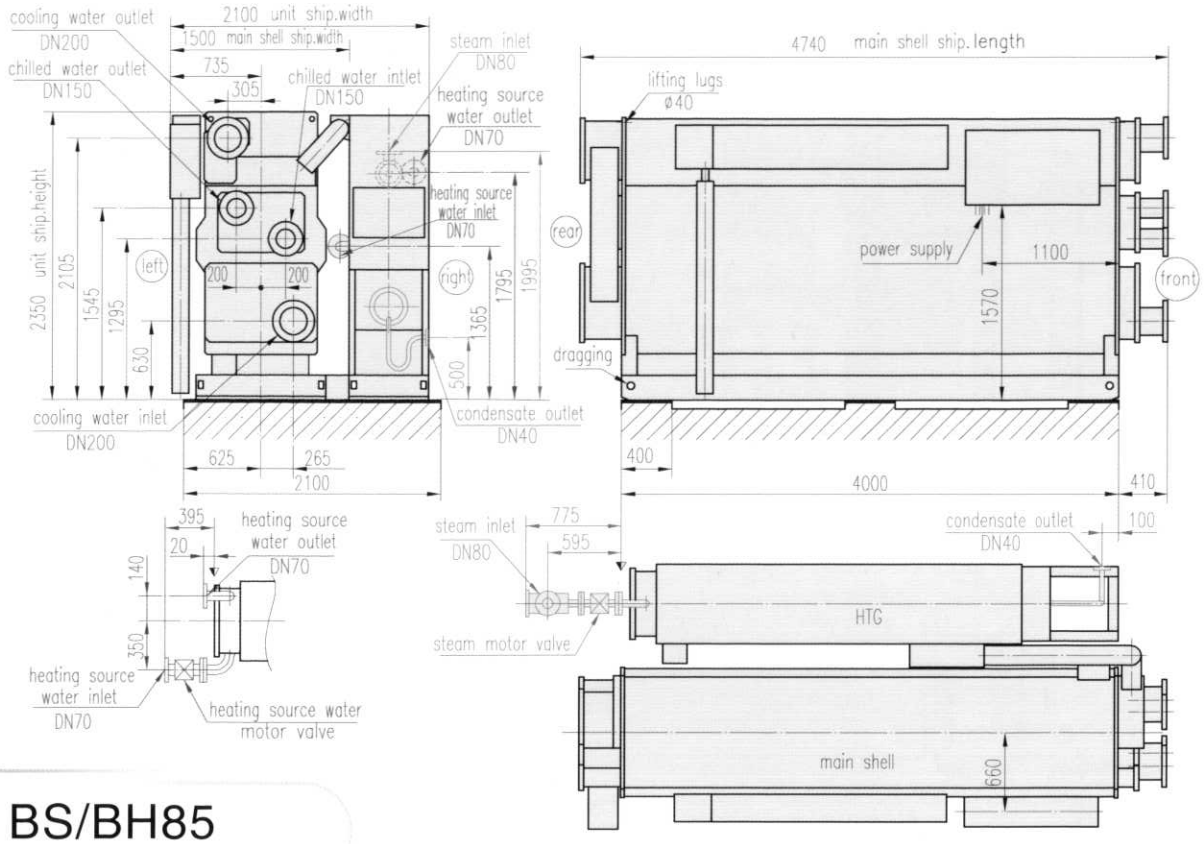
3. Units are in mm. 1in=25.4mm 1ft=304.8mm



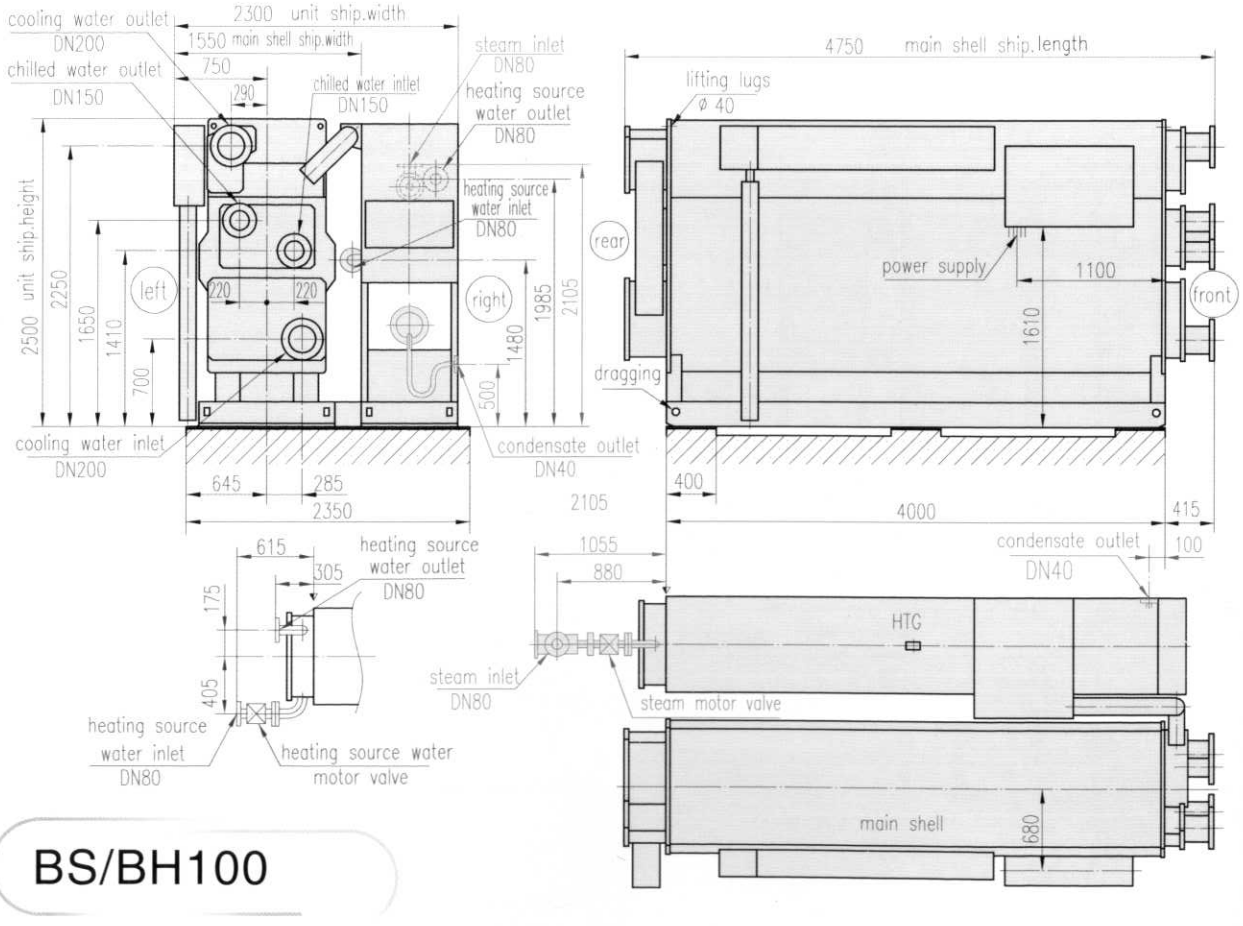
BS/BH65



BS/BH75

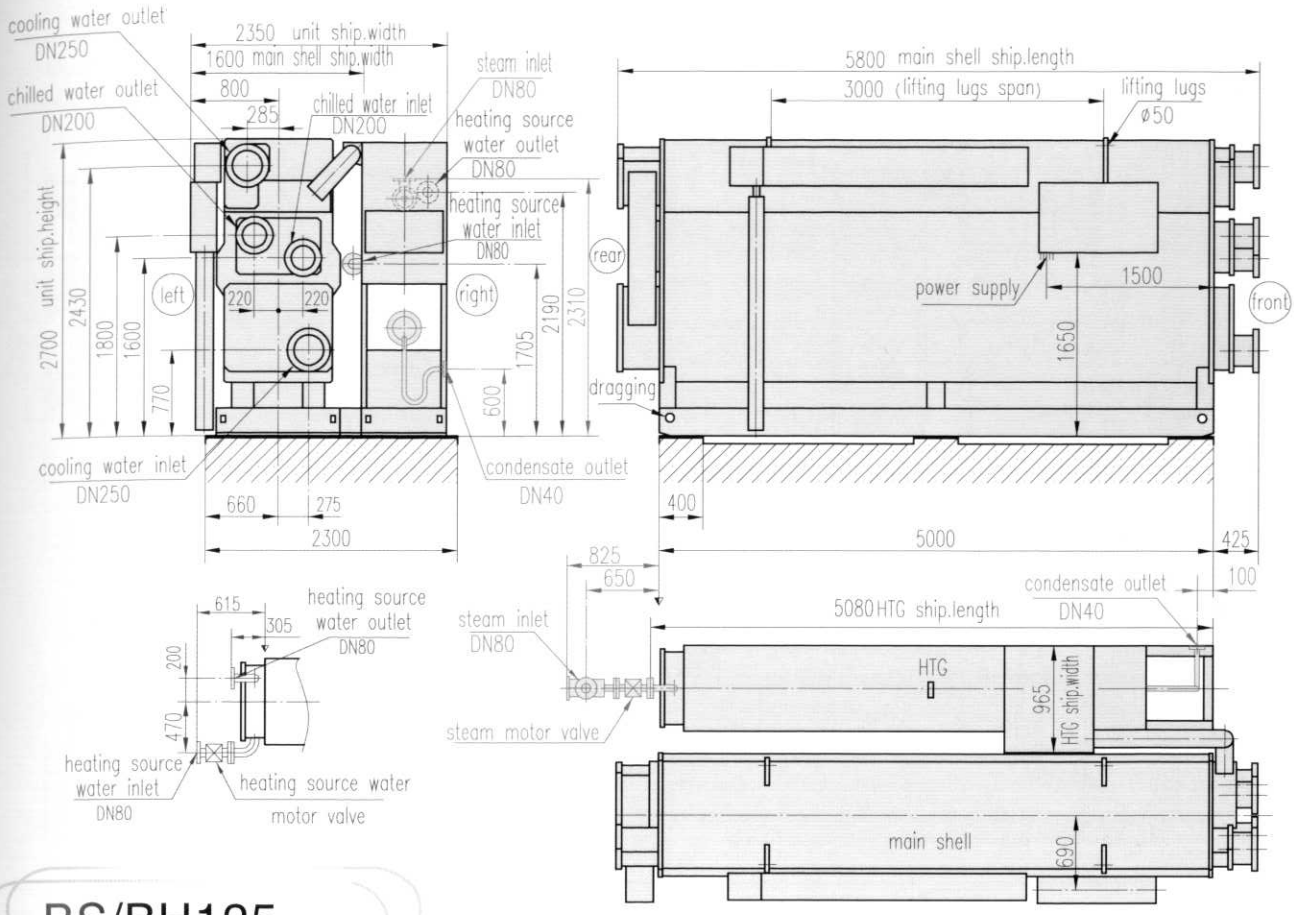


BS/BH85

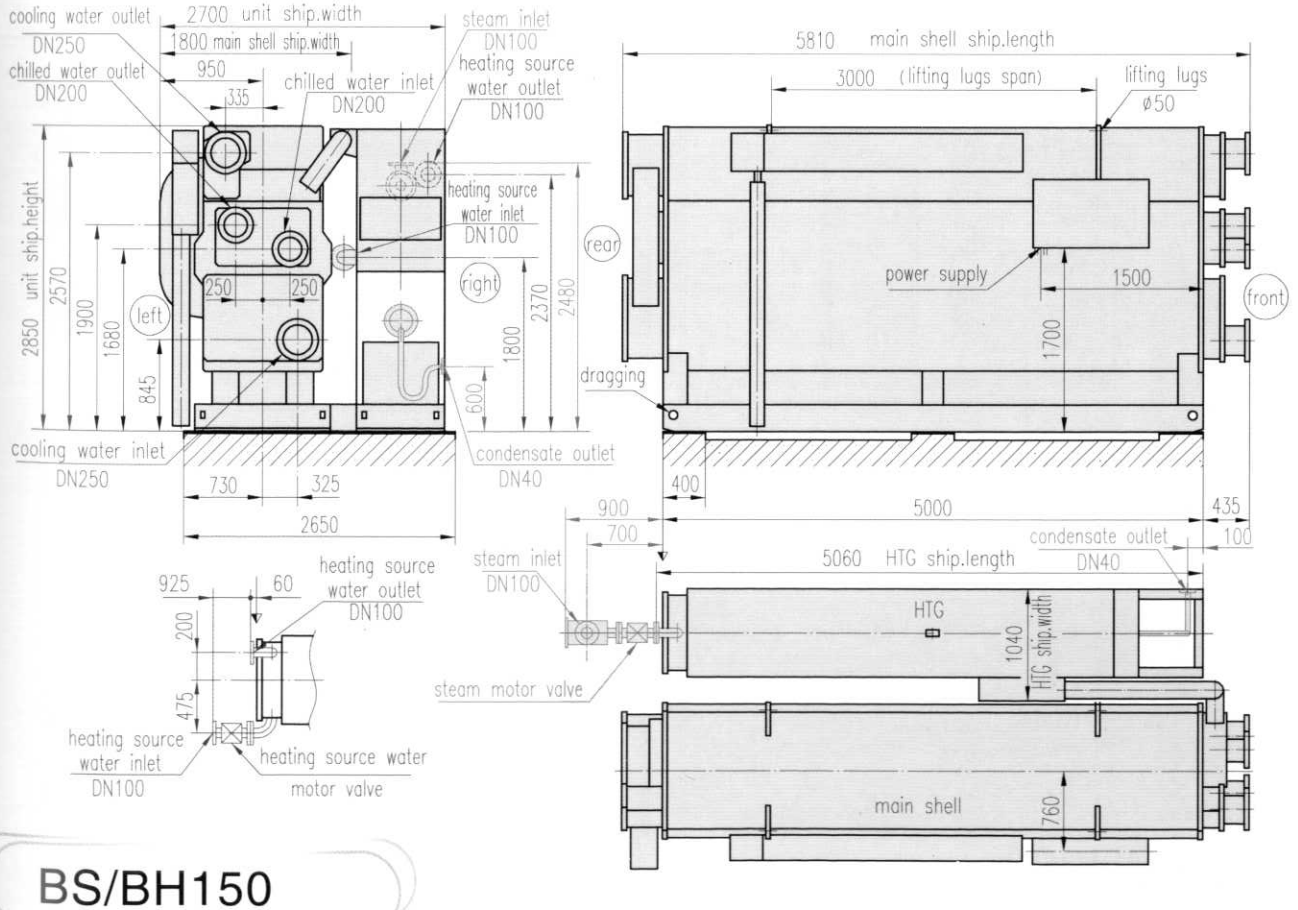


BS/BH100

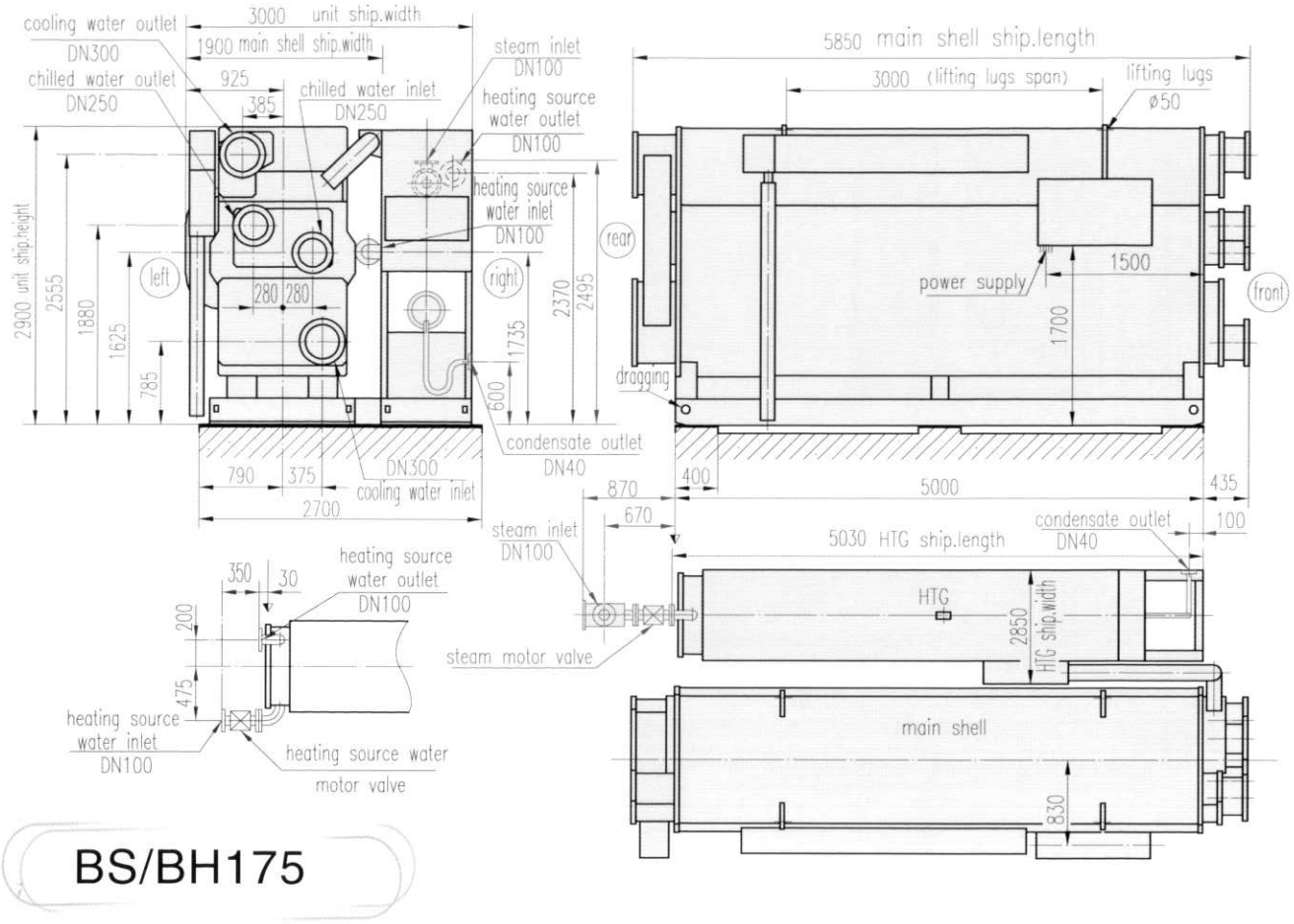
Note:1. Red is for two-stage steam type; blue is for two-stage hot water type.
2. Dimension drawings in CAD format can be downloaded at www.broad.com.
3. Units are in mm. 1in=25.4mm 1ft=304.8mm



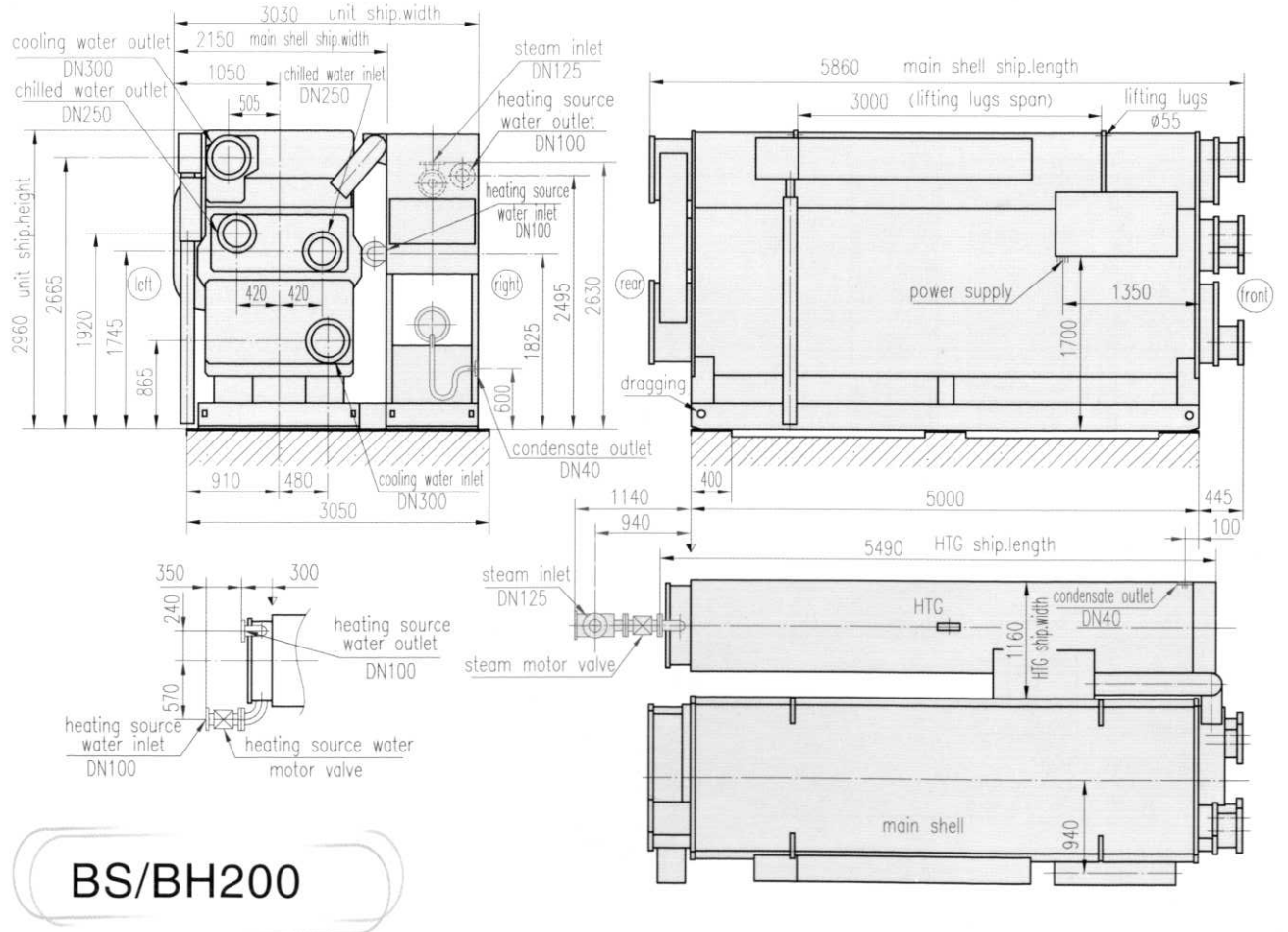
BS/BH125



BS/BH150



BS/BH175

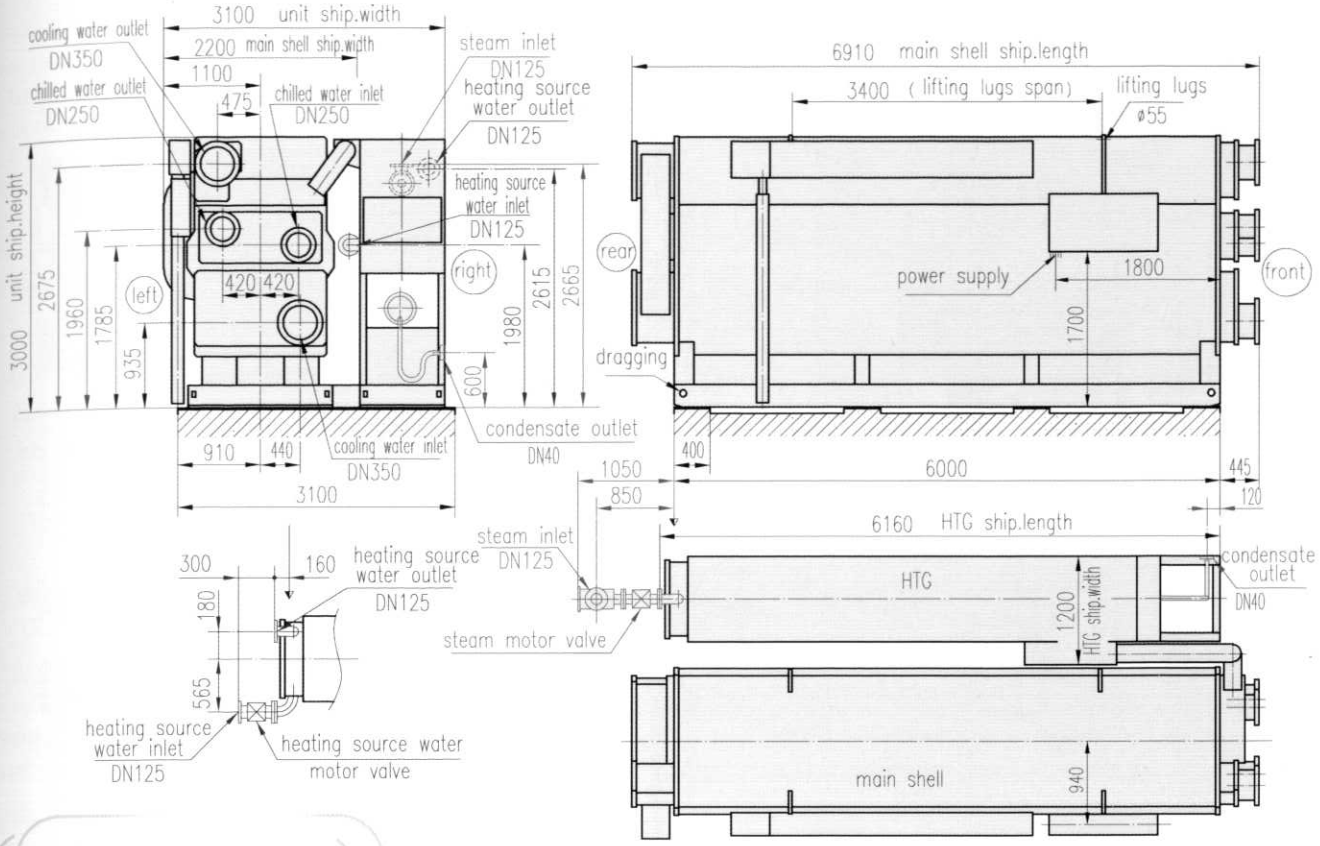


BS/BH200

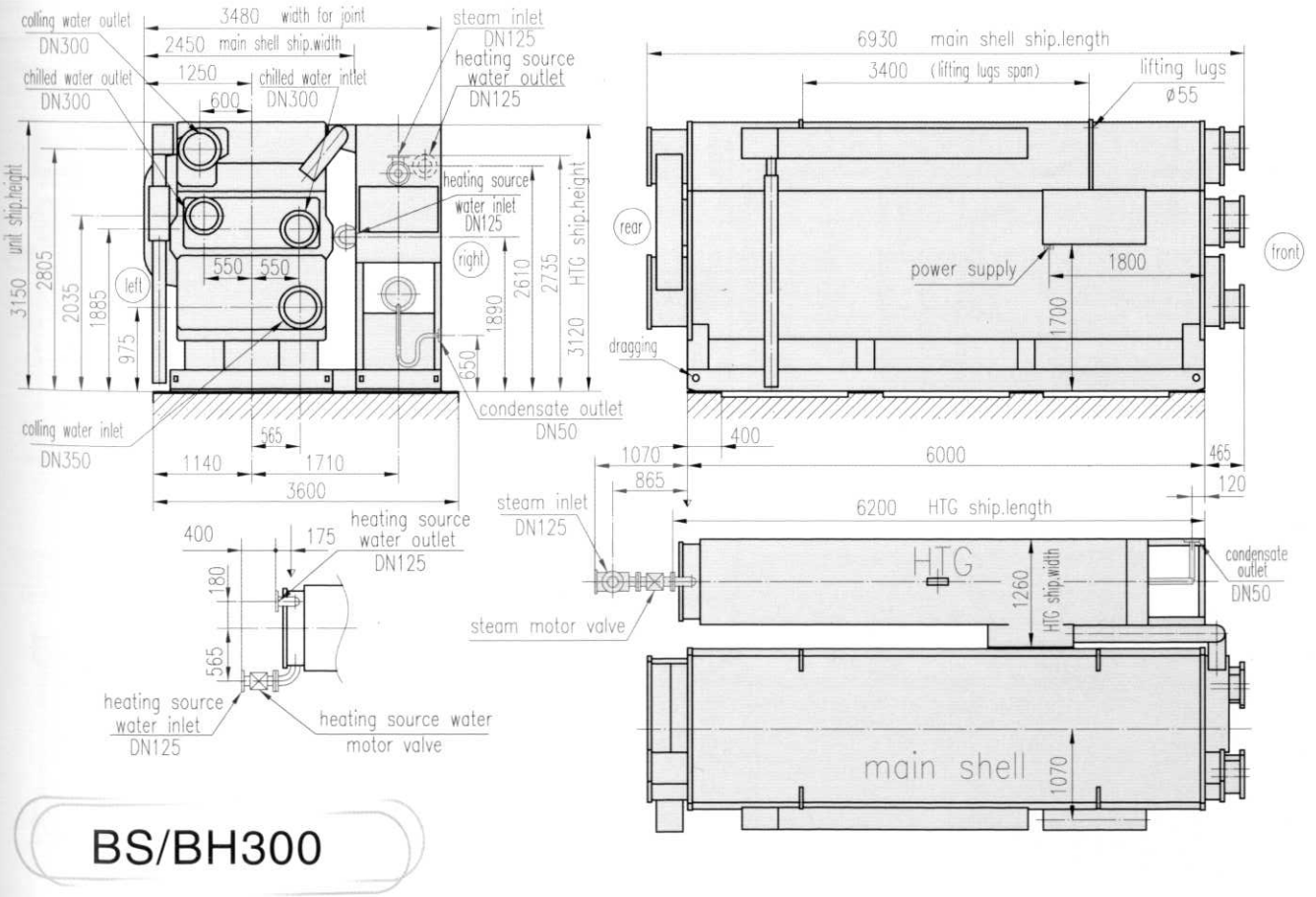
Note:1. Red is for two-stage steam type; blue is for two-stage hot water type.

2. Dimension drawings in CAD format can be downloaded at www.broad.com.

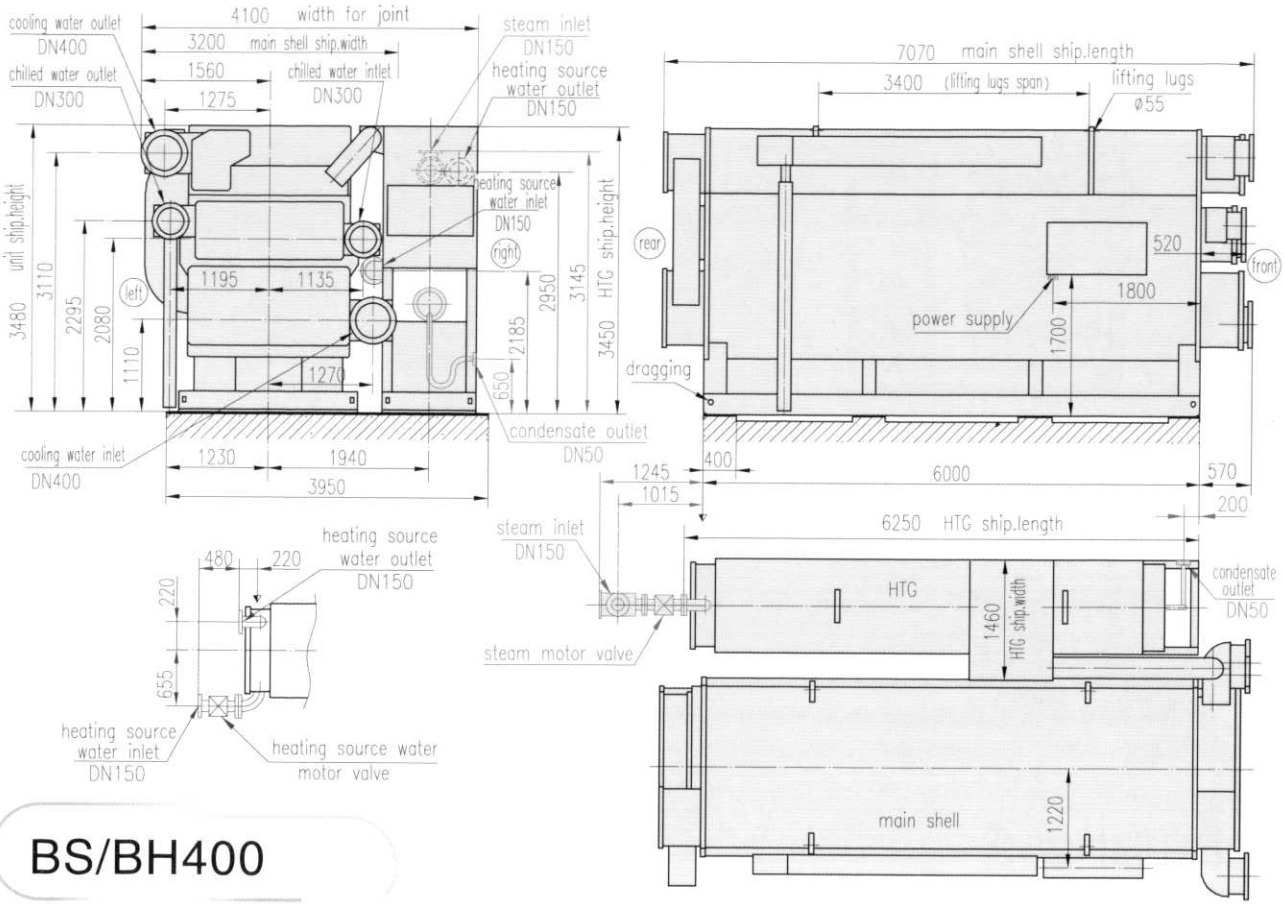
3. Units are in mm. 1in=25.4mm 1ft=304.8mm



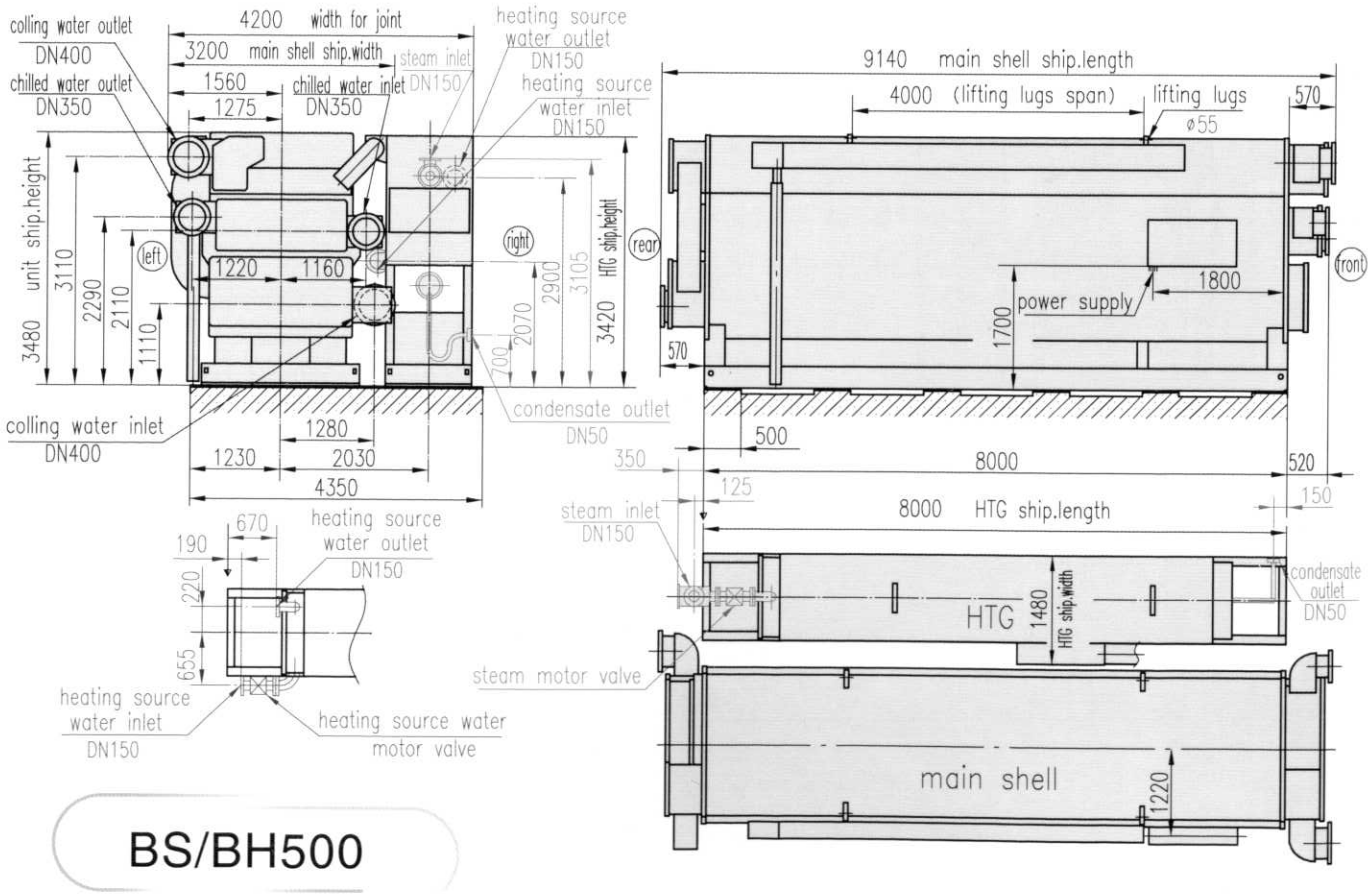
BS/BH250



BS/BH300

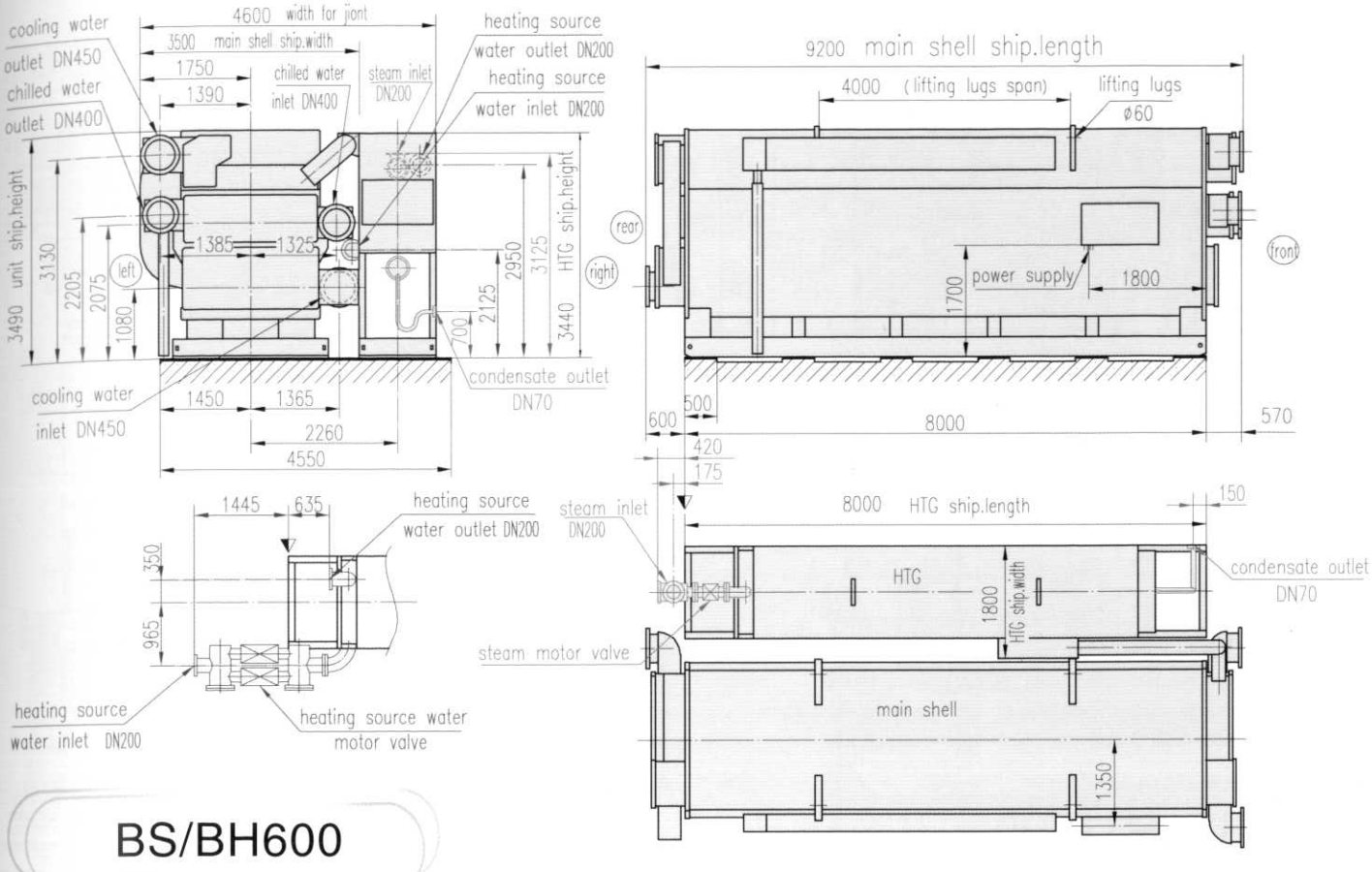


BS/BH400

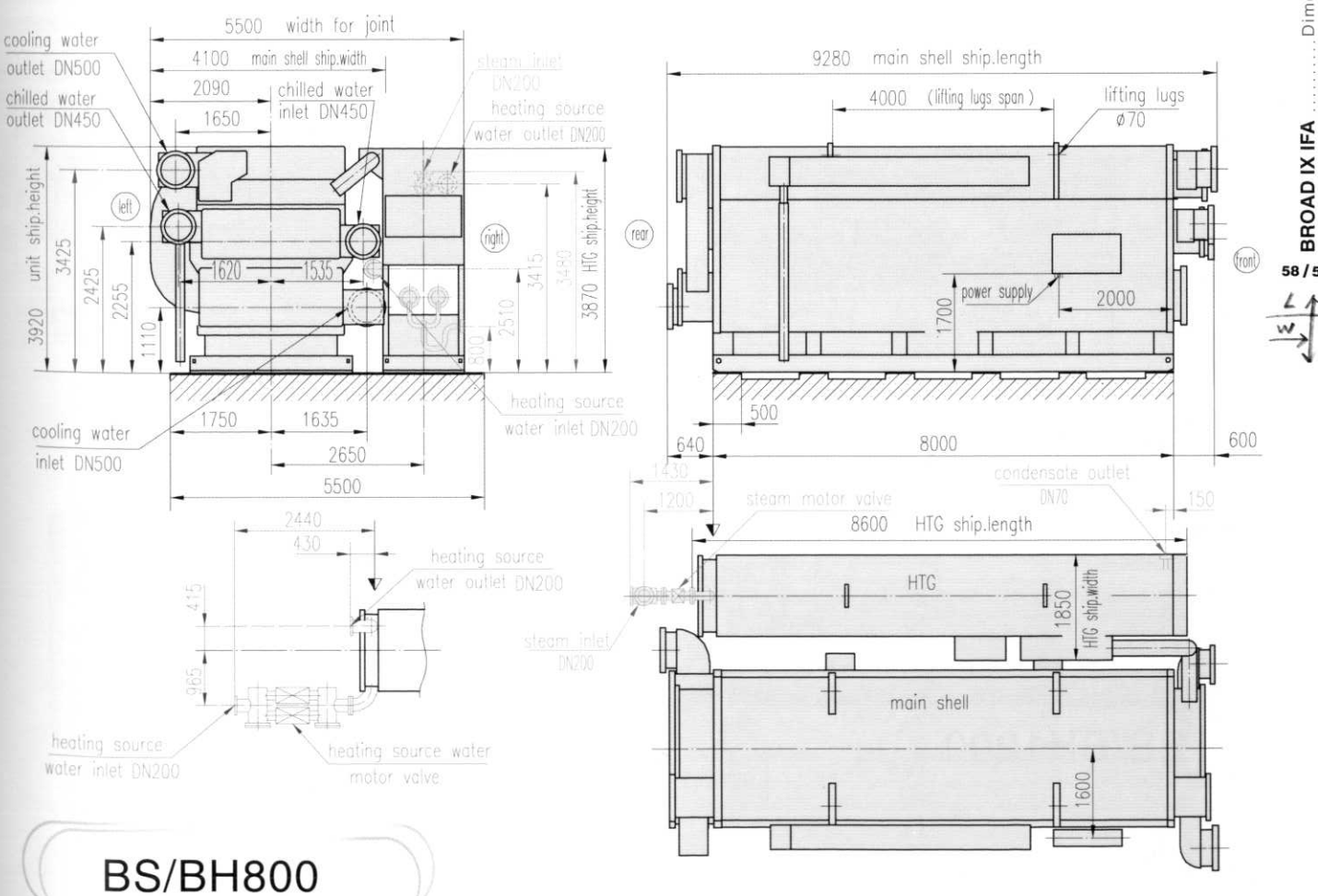


BS/BH500

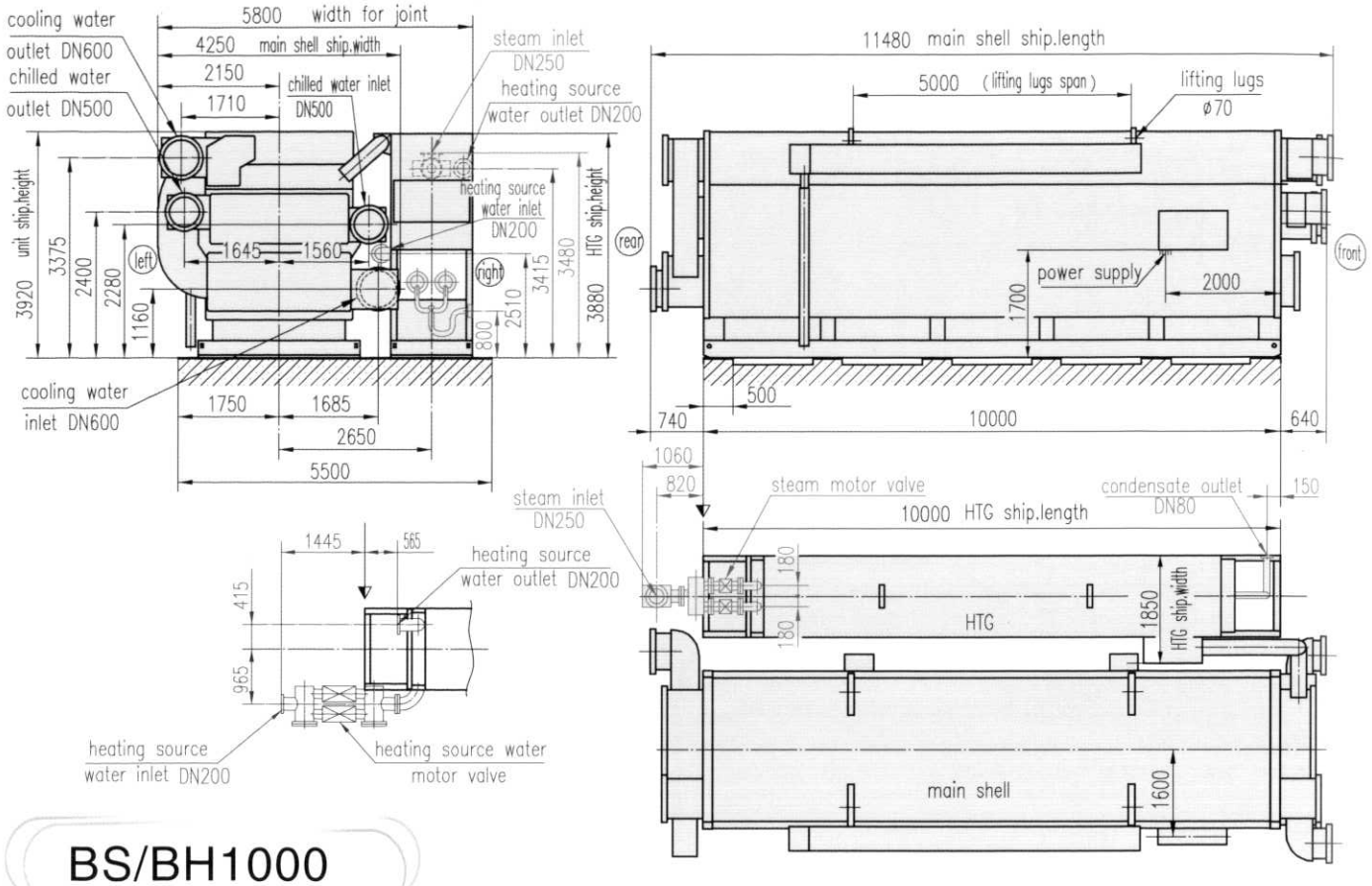
Note:1. Red is for two-stage steam type; blue is for two-stage hot water type.
2. Dimension drawings in CAD format can be downloaded at www.broad.com.
3. Units are in mm. 1in=25.4mm 1ft=304.8mm



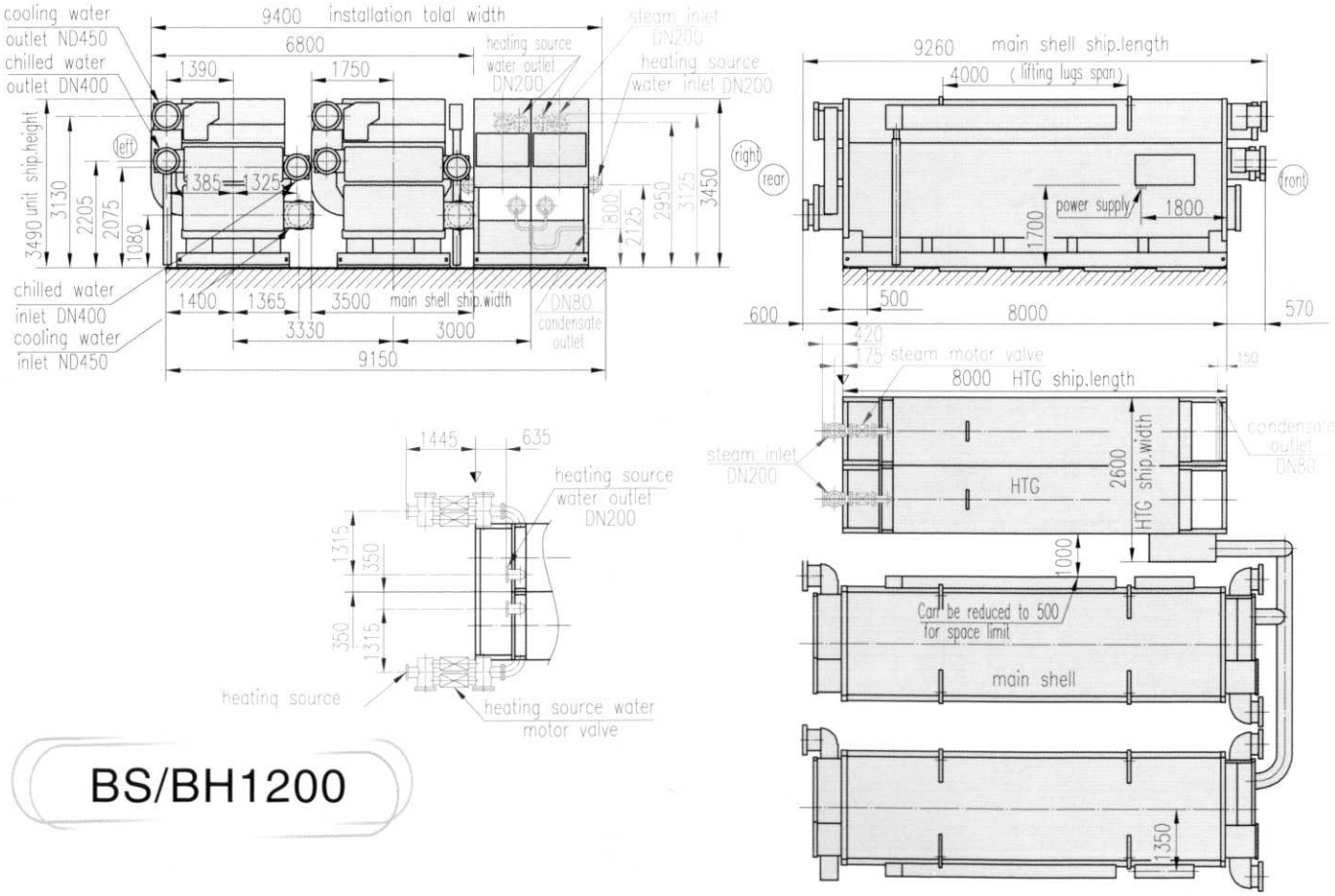
BS/BH600



BS/BH800

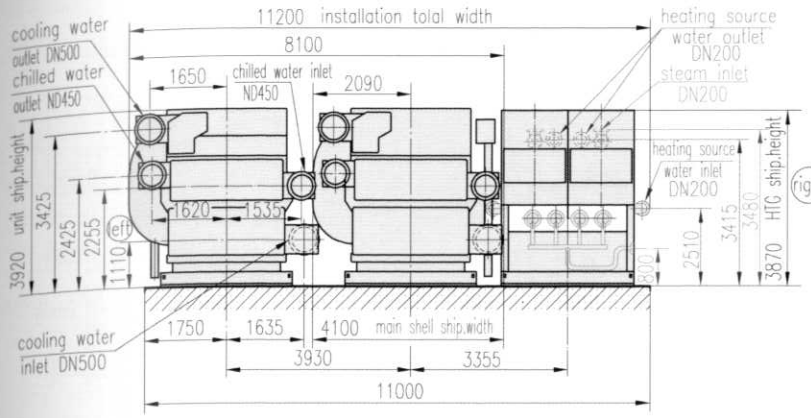


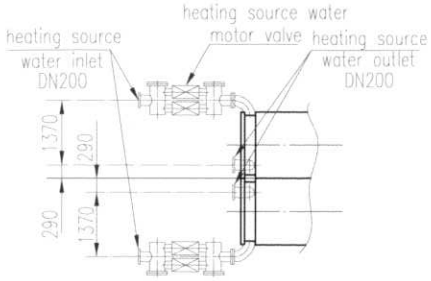
BS/BH1000

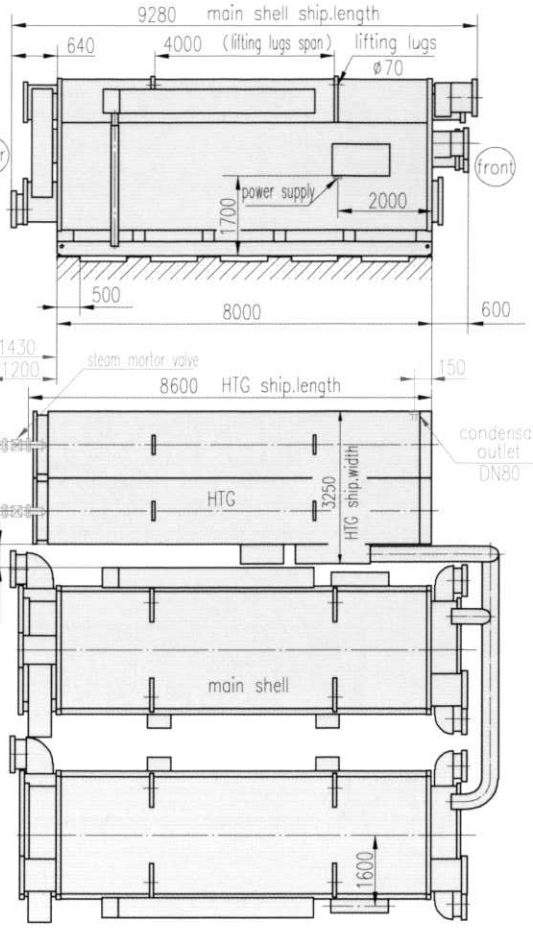


BS/BH1200

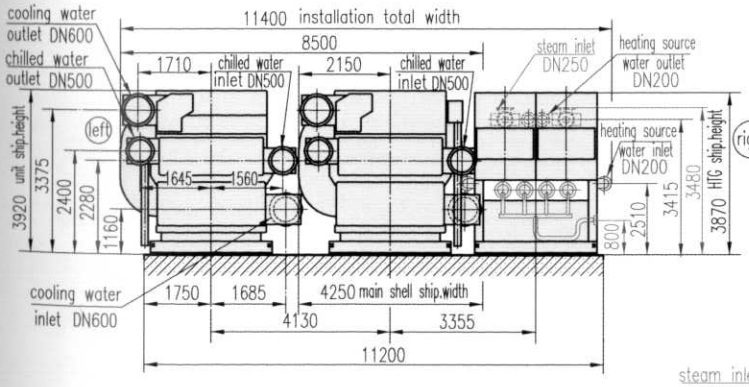
Note:1. Red is for two-stage steam type; blue is for two-stage hot water type.
2. Dimension drawings in CAD format can be downloaded at www.broad.com.
3. Units are in mm. 1in=25.4mm 1ft=304.8mm

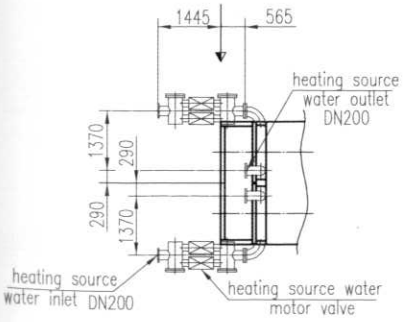


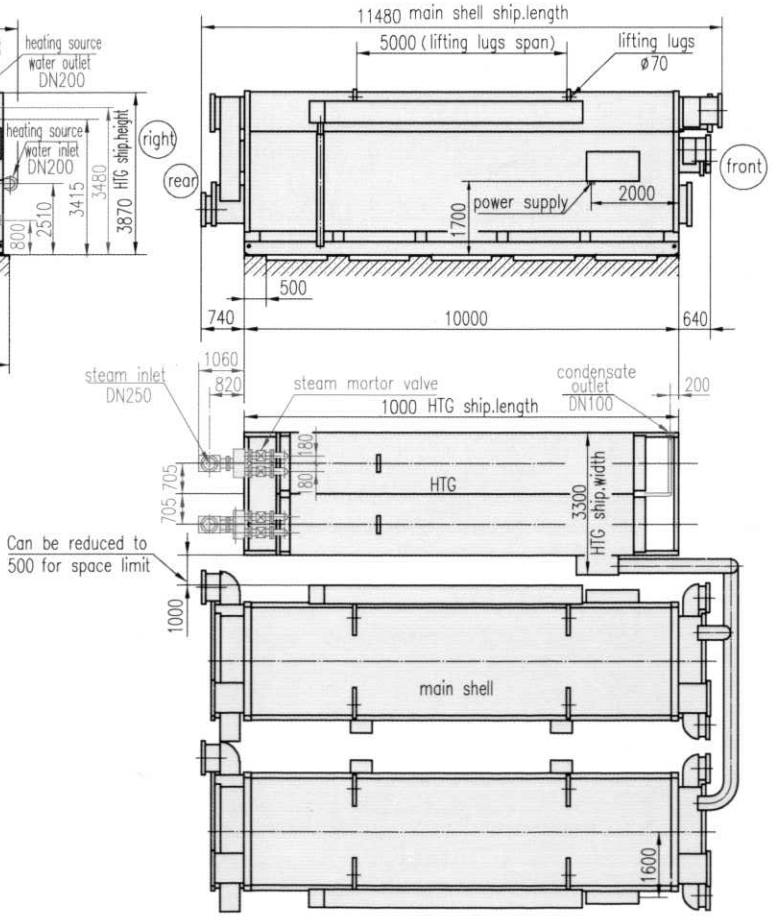




BS/BH1600

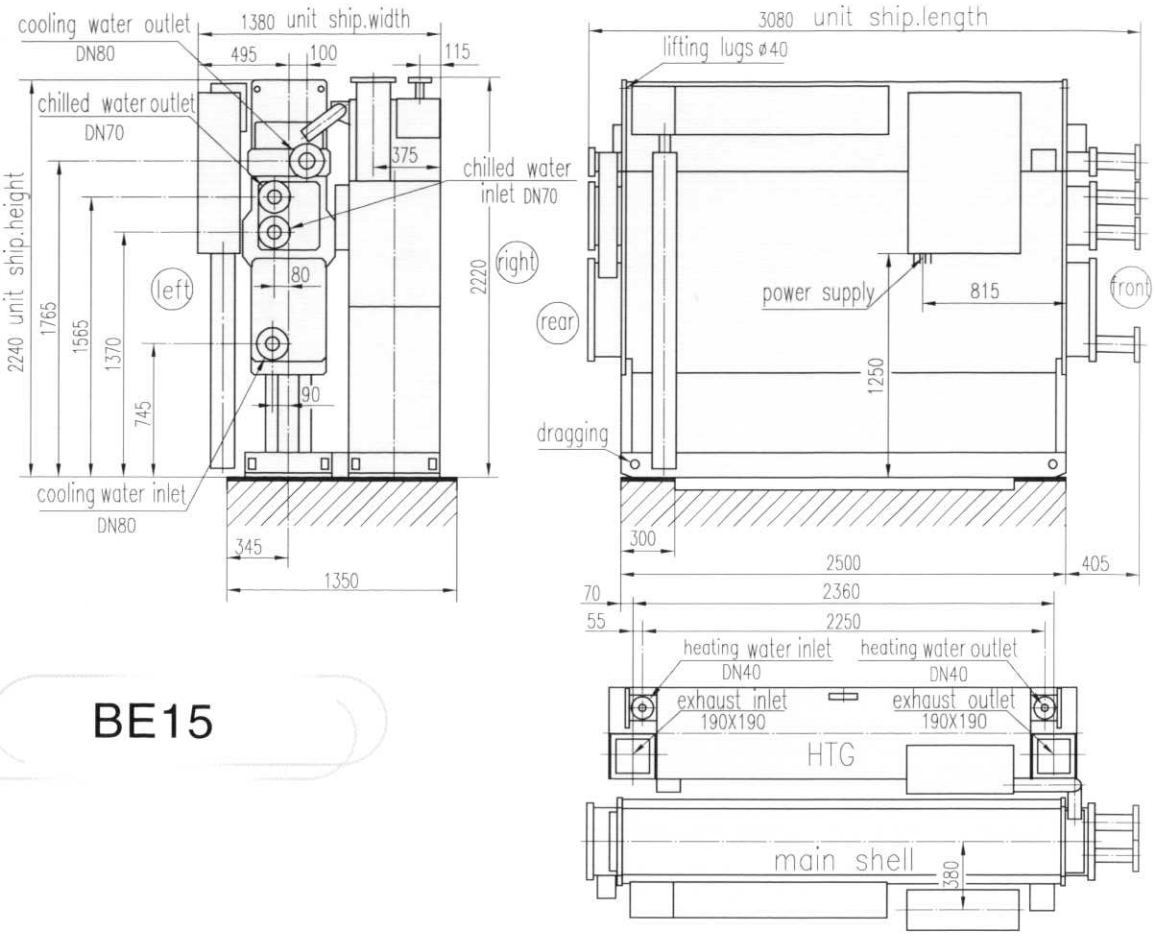




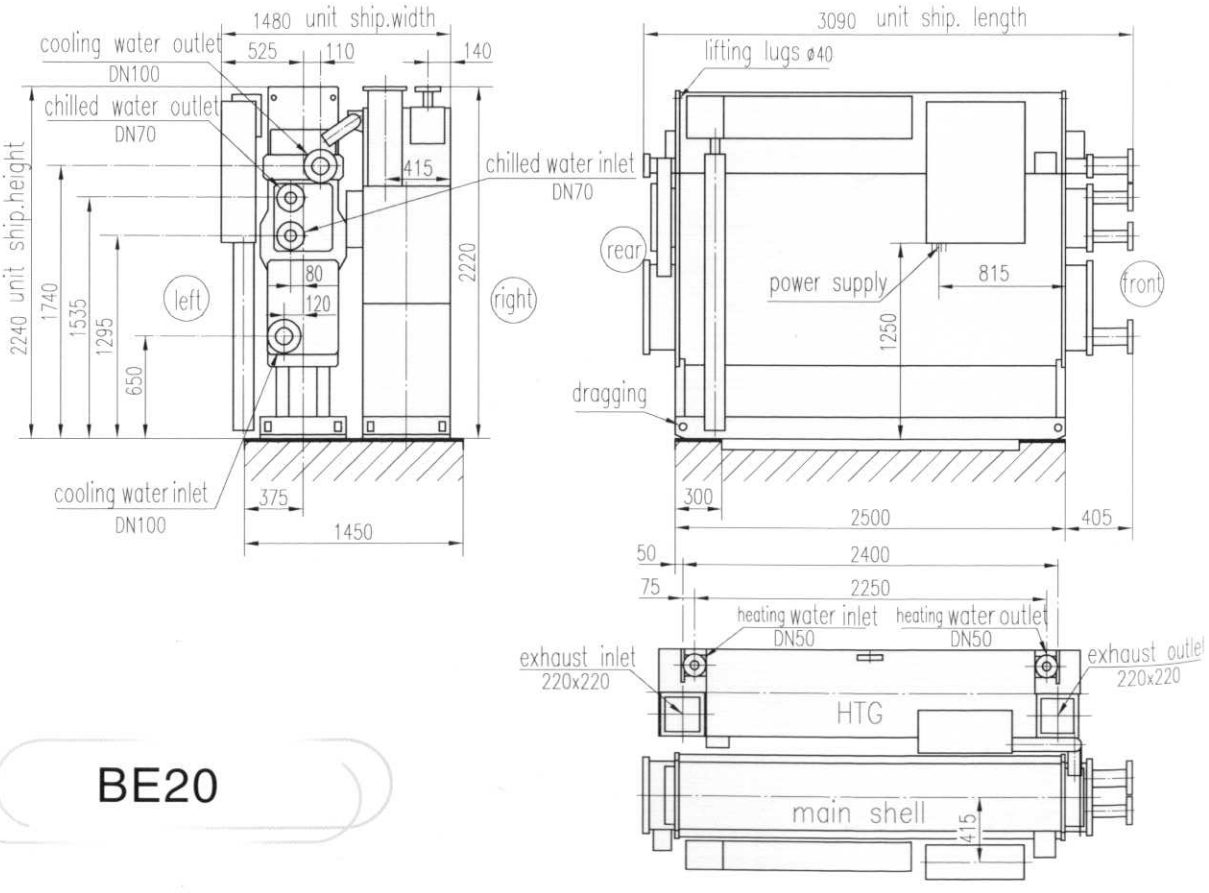


BS/BH2000

TWO-STAGE EXHAUST CHILLER/HEATER

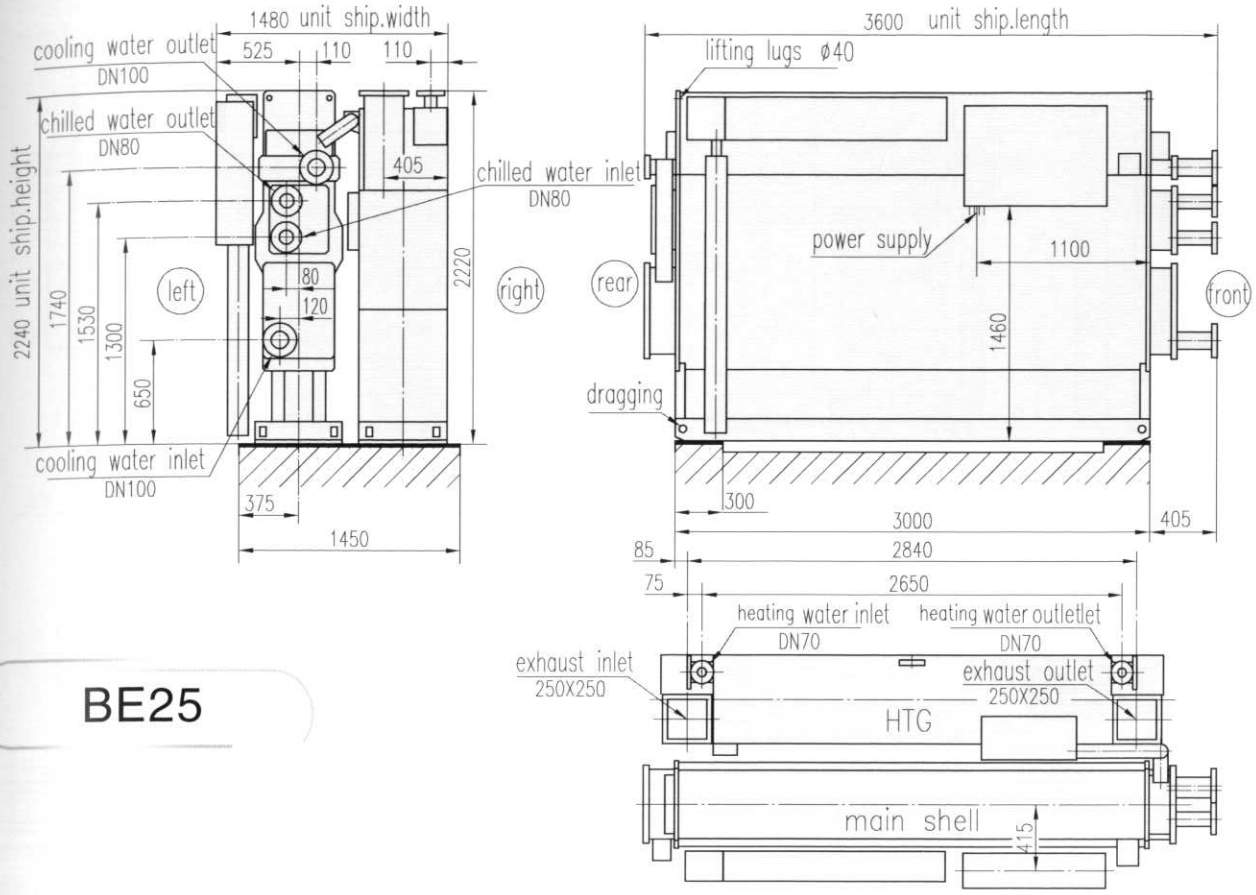


BE15

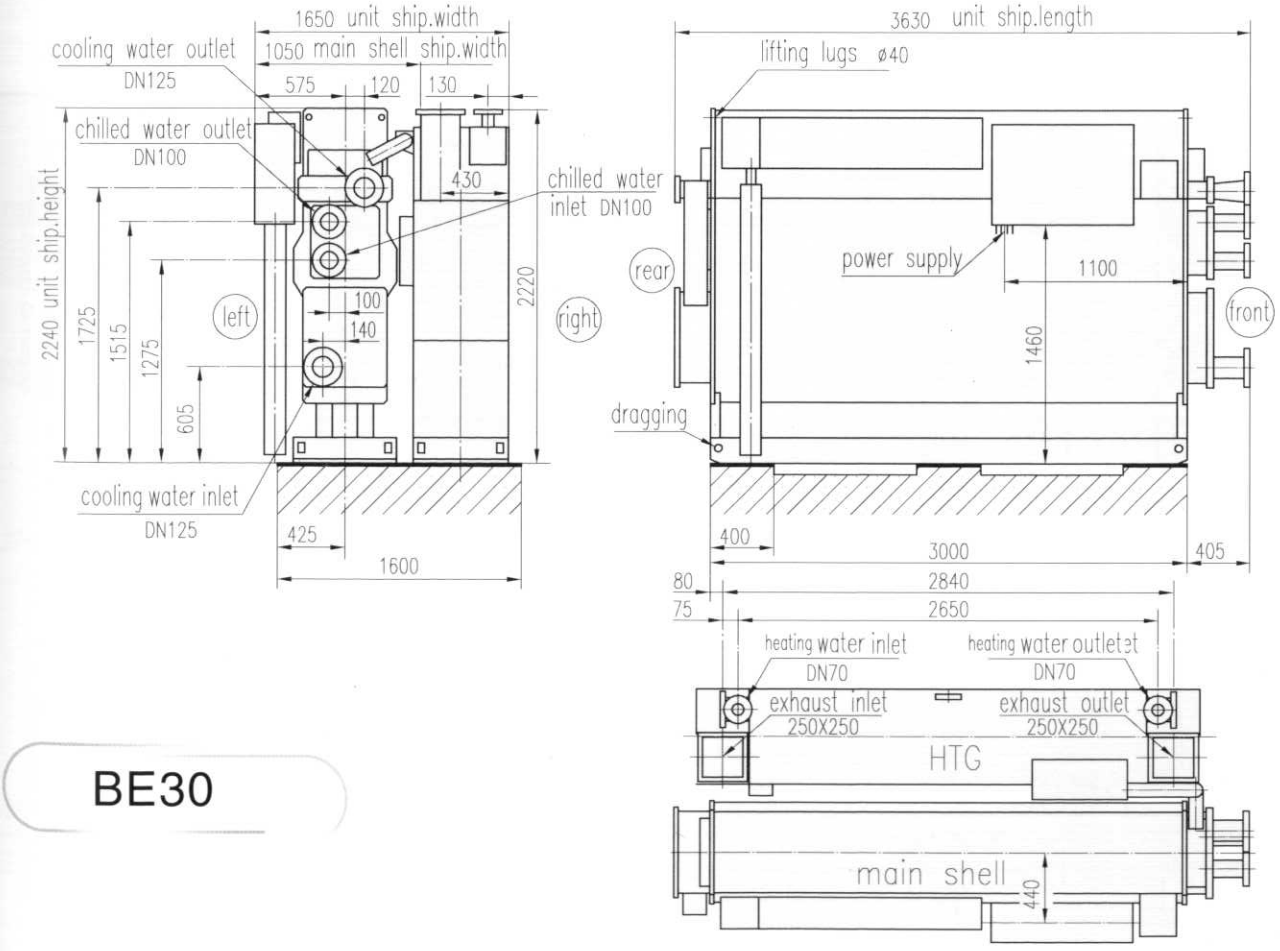


BE20

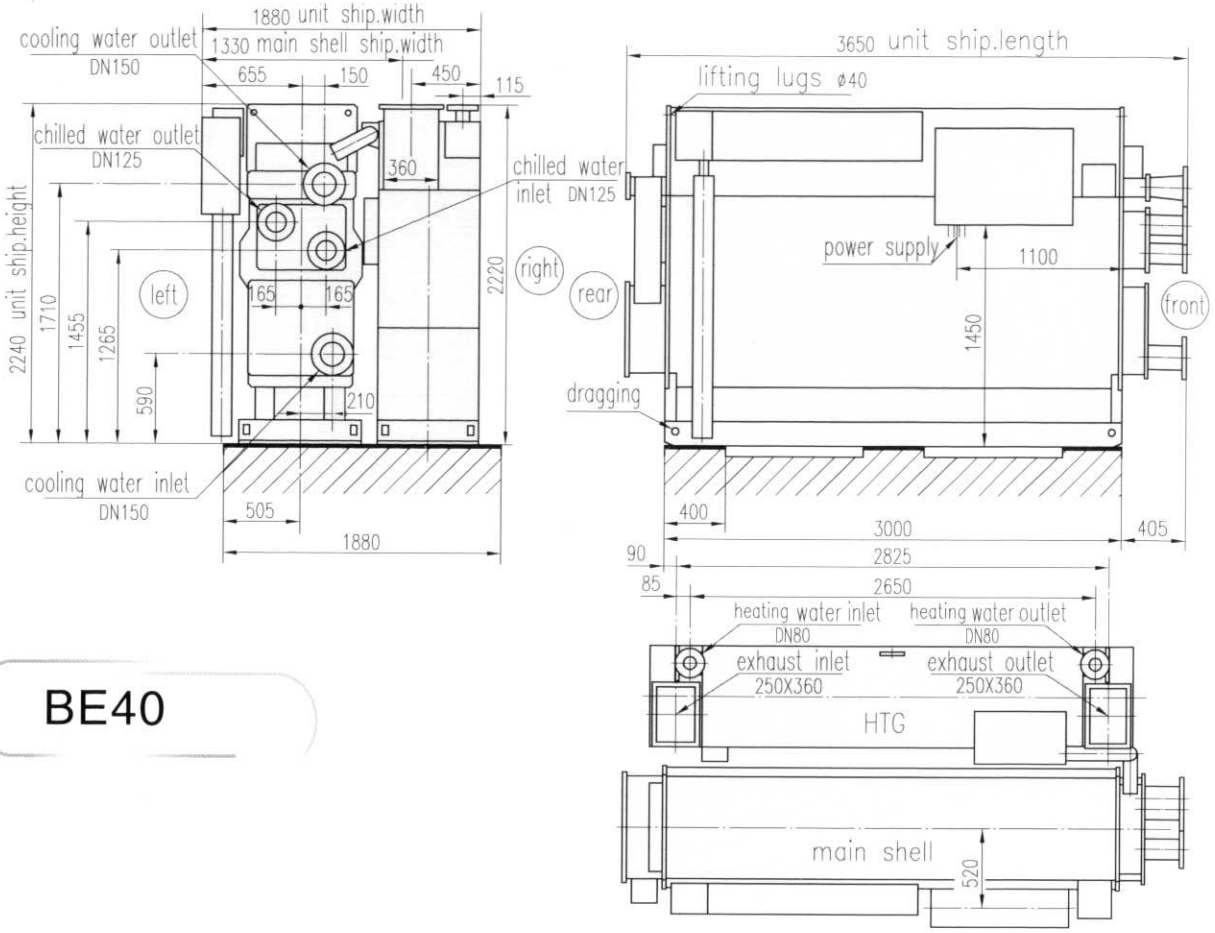
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm


1480 unit ship.width
cooling water outlet
DN100
525
110
110
chilled water outlet
DN80
405
chilled water inlet
DN80
2240 unit ship.height
1740
1530
1300
650
left
right
80
120
2220
cooling water inlet
DN100
375
1450
3600 unit ship.length
lifting lugs ø40
power supply
1100
rear
front
1460
dragging
300
3000
405
85
2840
75
2650
heating water inlet
DN70
heating water outletlet
DN70
exhaust inlet
250X250
exhaust outlet
250X250
HTG
main shell
415

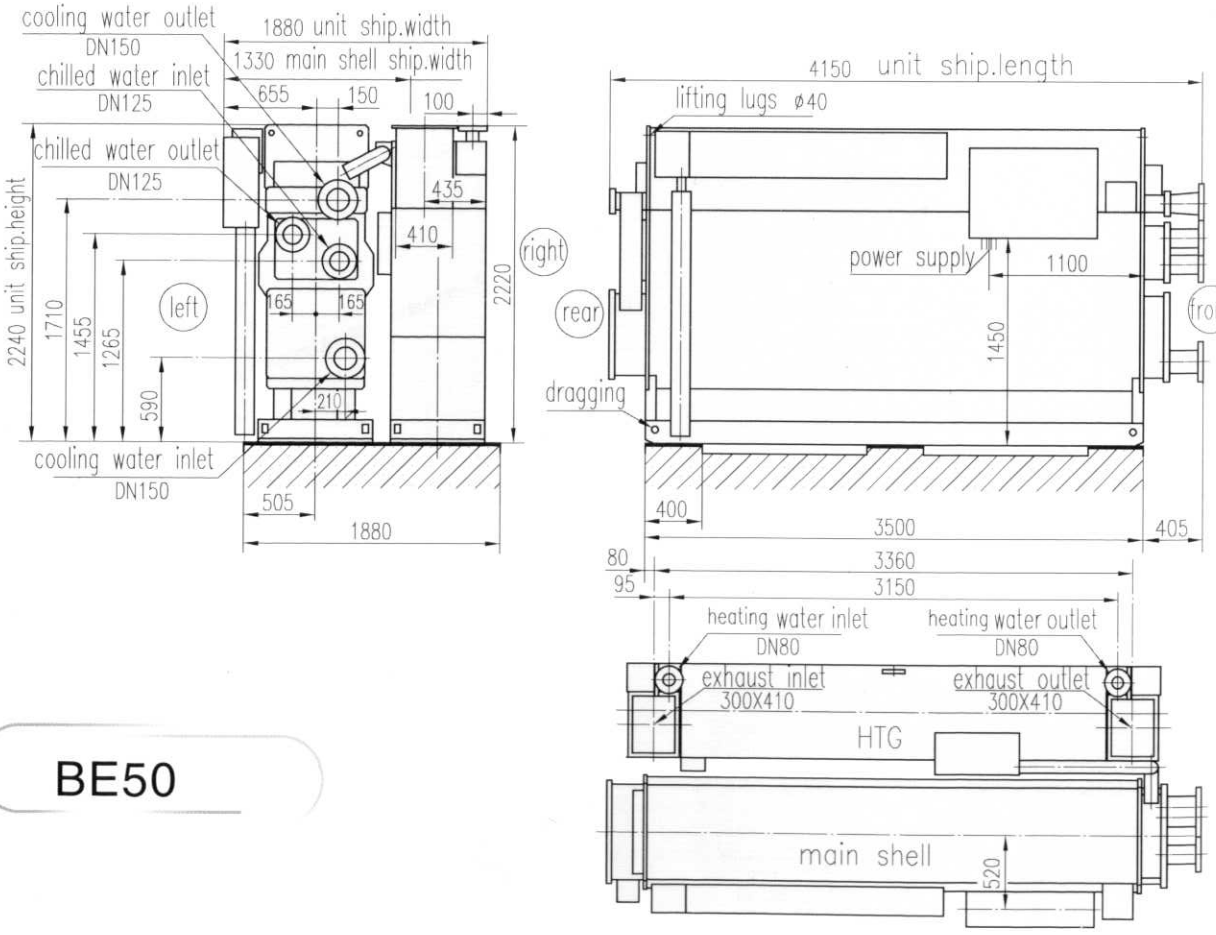
BE25


1650 unit ship.width
cooling water outlet
DN125
1050 main shell ship.width
575
120
130
chilled water outlet
DN100
430
chilled water
inlet DN100
2240 unit ship.height
1725
1515
1275
605
left
right
100
140
2220
cooling water inlet
DN125
425
1600
3630 unit ship.length
lifting lugs ø40
power supply
1100
rear
front
1460
dragging
400
3000
405
80
2840
75
2650
heating water inlet
DN70
heating water outletet
DN70
exhaust inlet
250X250
exhaust outlet
250X250
HTG
main shell
440

BE30

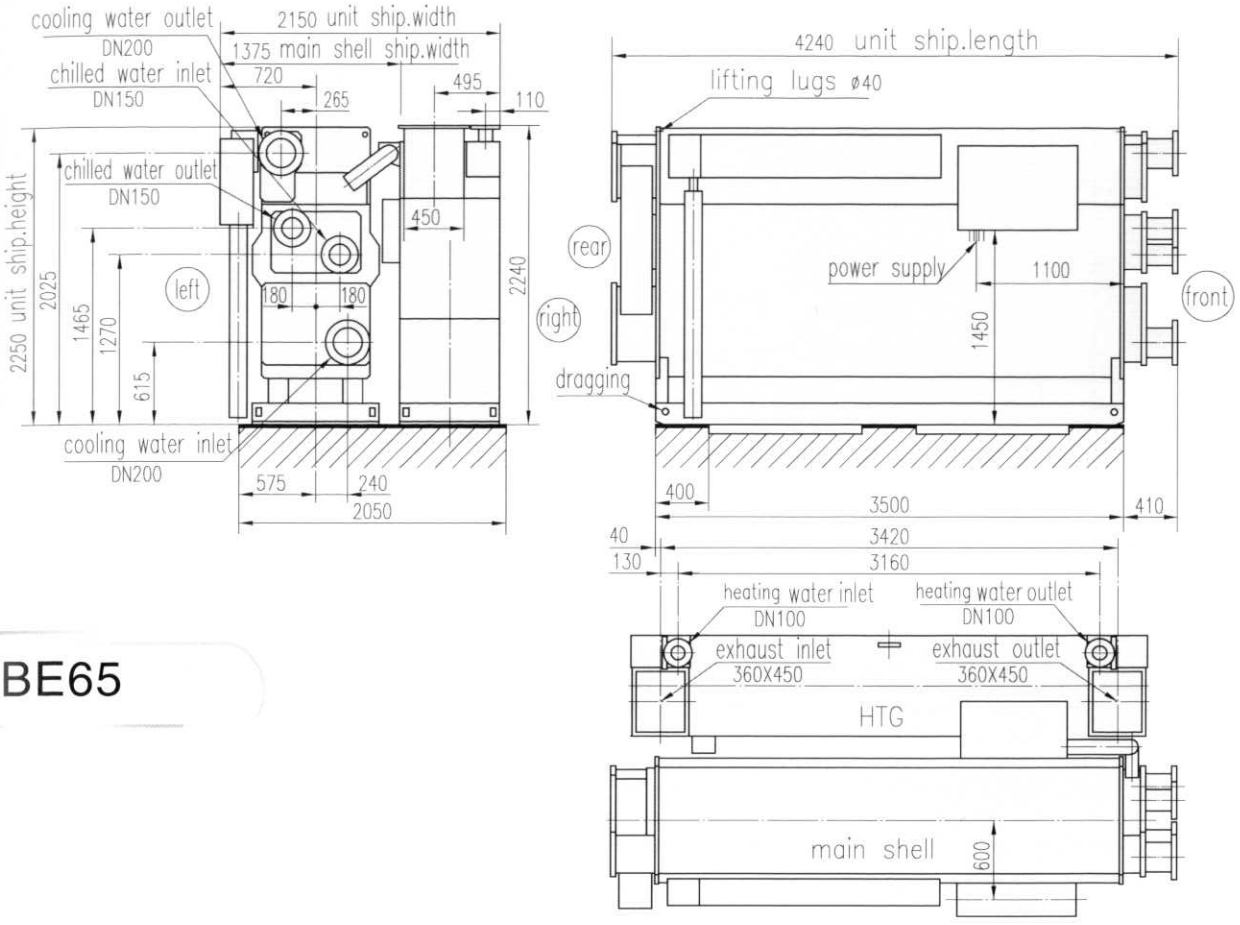


BE40

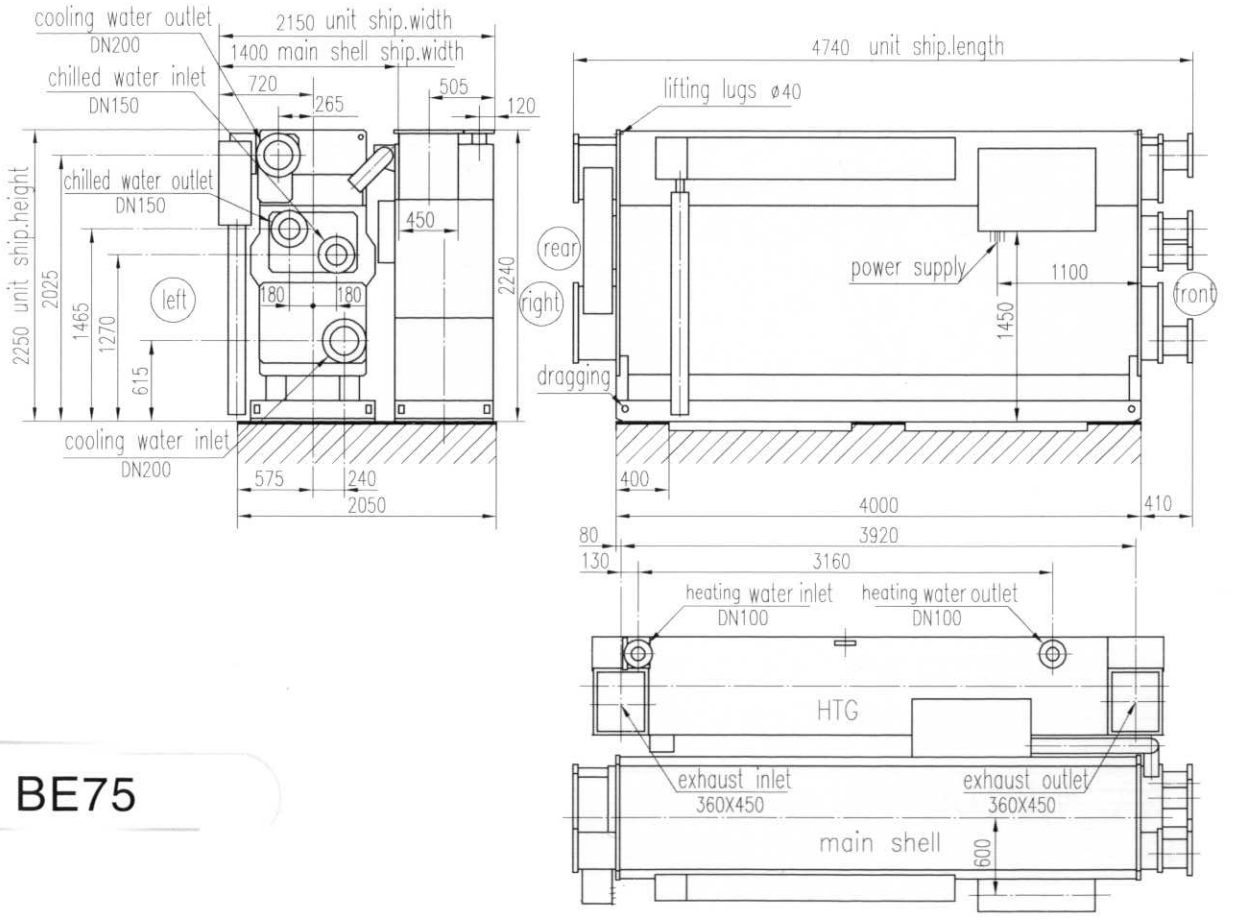


BE50

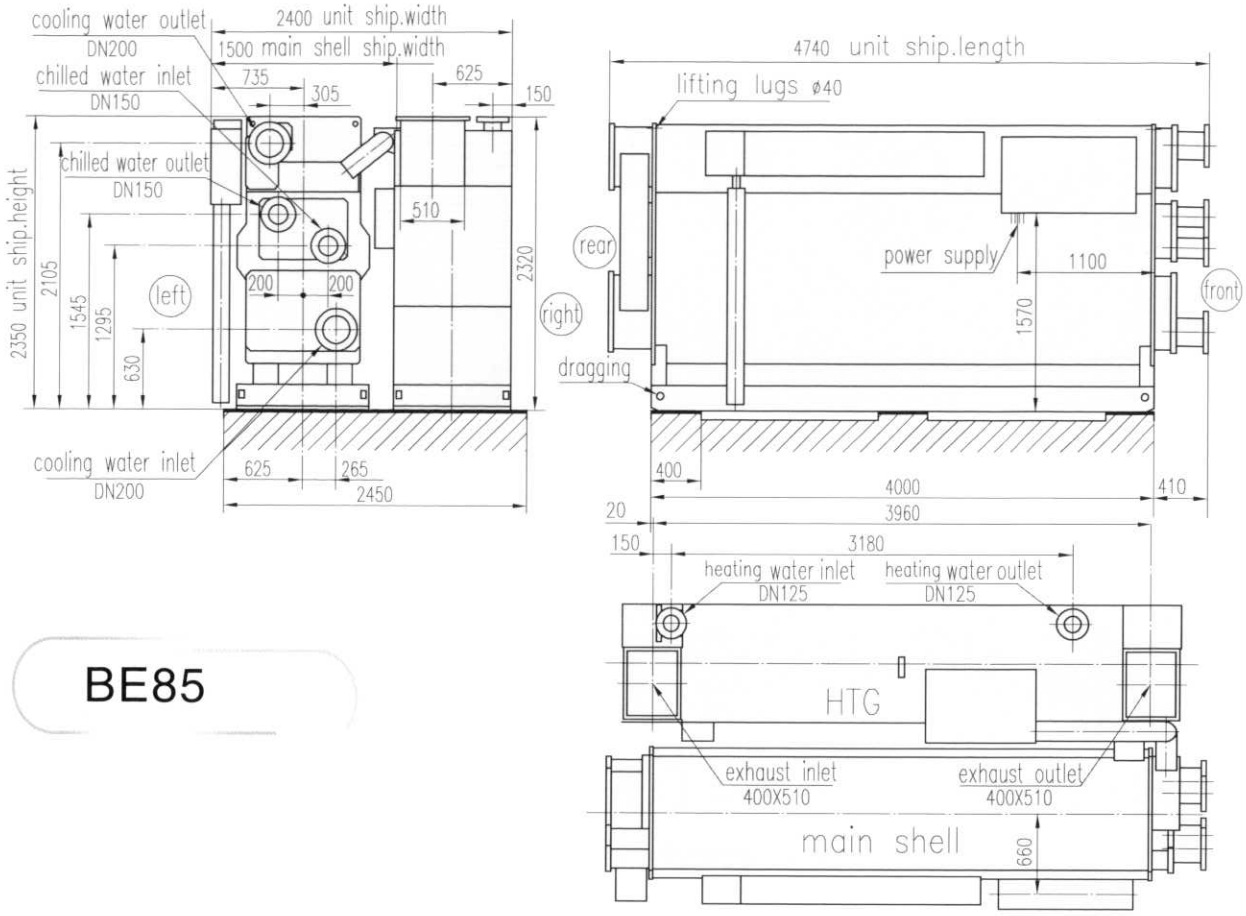
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm


cooling water outlet
DN200
2150 unit ship.width
1375 main shell ship.width
chilled water inlet
DN150
720
265
495
110
chilled water outlet
DN150
450
2250 unit ship.height
2025
1465
1270
615
left
180
180
2240
cooling water inlet
DN200
575
240
2050
4240 unit ship.length
lifting lugs ø40
rear
right
power supply
1100
front
1450
dragging
400
3500
410
40
3420
130
3160
heating water inlet
DN100
heating water outlet
DN100
exhaust inlet
360X450
exhaust outlet
360X450
HTG
main shell
600

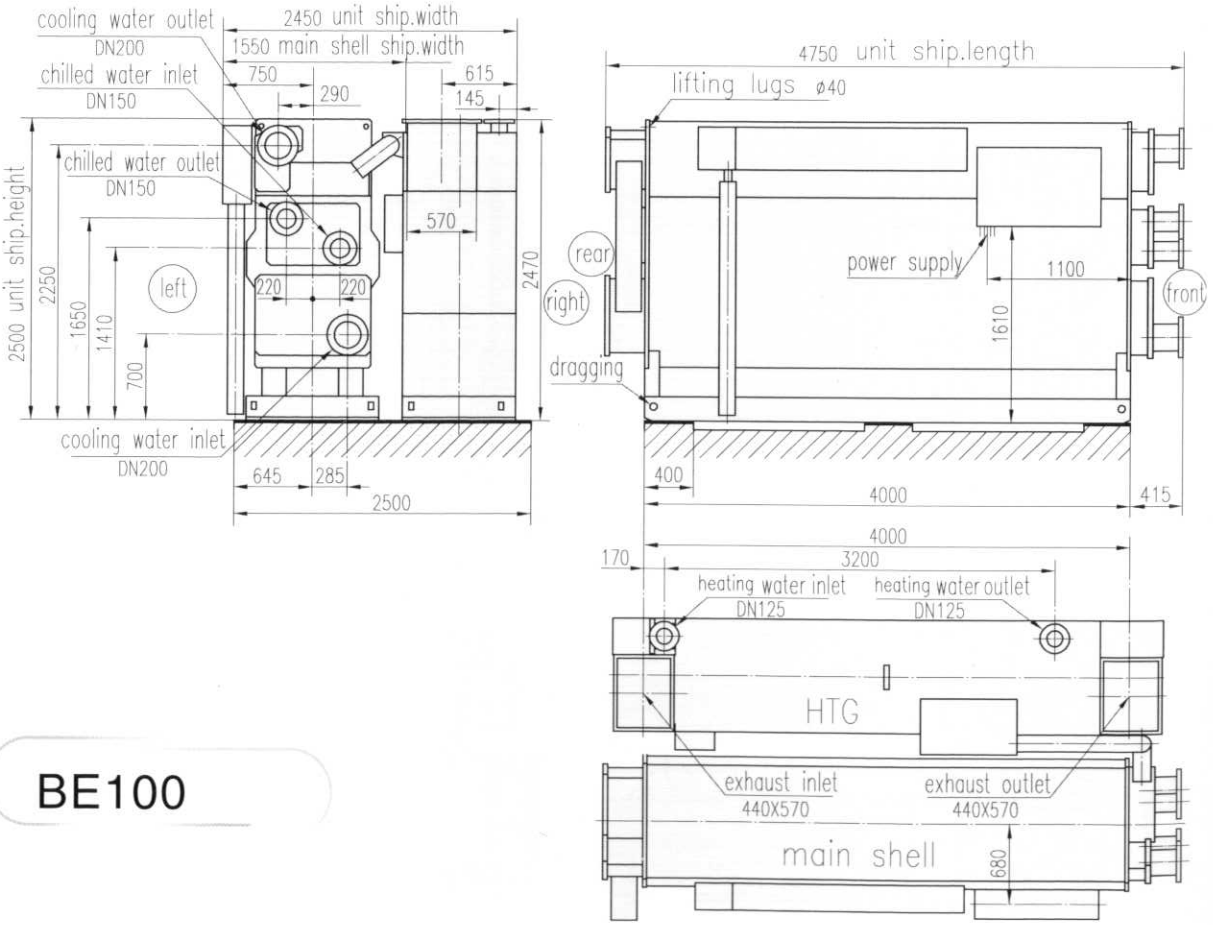
BE65


cooling water outlet
DN200
2150 unit ship.width
1400 main shell ship.width
chilled water inlet
DN150
720
265
505
120
chilled water outlet
DN150
450
2250 unit ship.height
2025
1465
1270
615
left
180
180
2240
cooling water inlet
DN200
575
240
2050
4740 unit ship.length
lifting lugs ø40
rear
right
power supply
1100
front
1450
dragging
400
4000
410
80
3920
130
3160
heating water inlet
DN100
heating water outlet
DN100
HTG
exhaust inlet
360X450
exhaust outlet
360X450
main shell
600

BE75

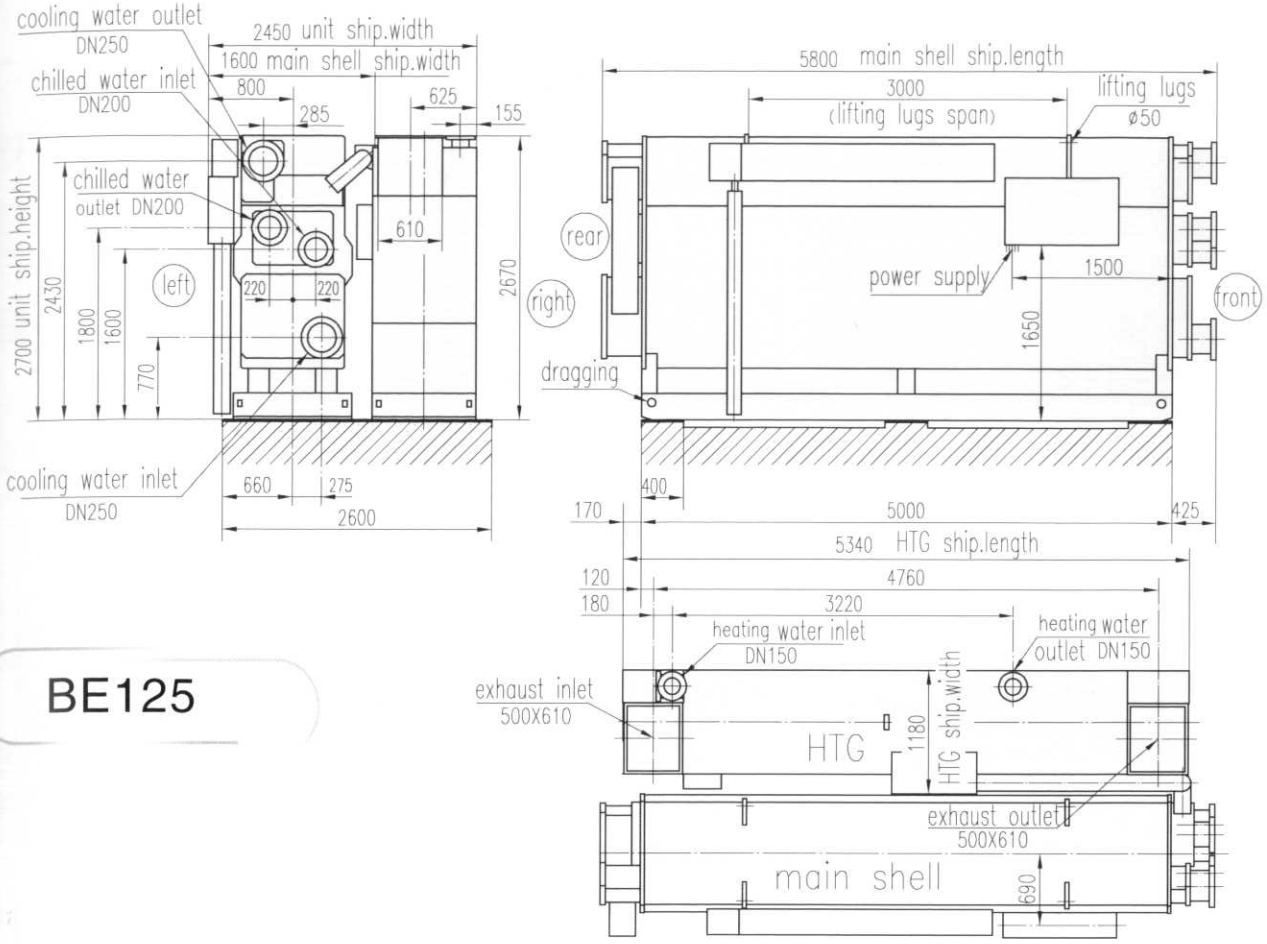


BE85

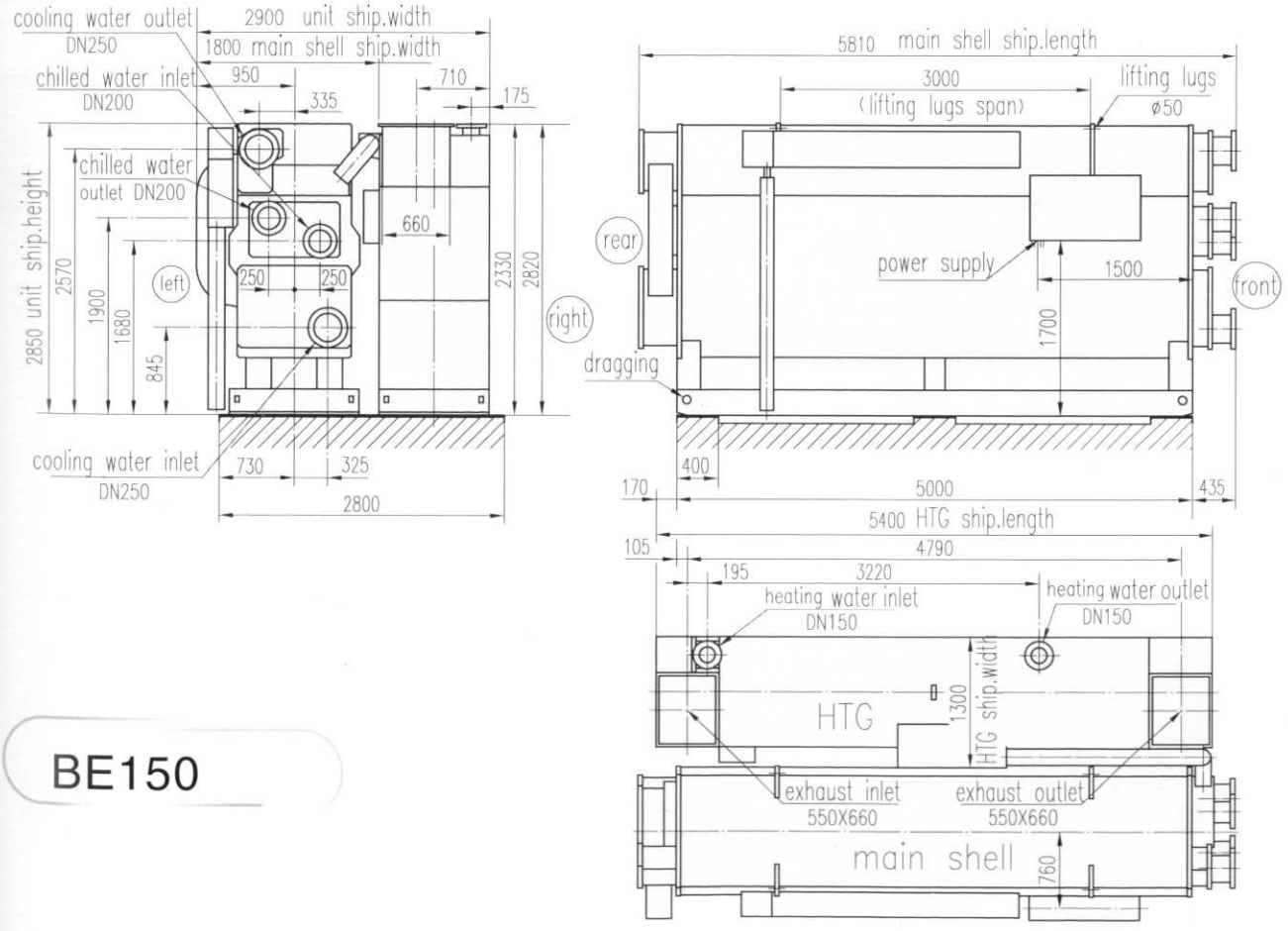


BE100

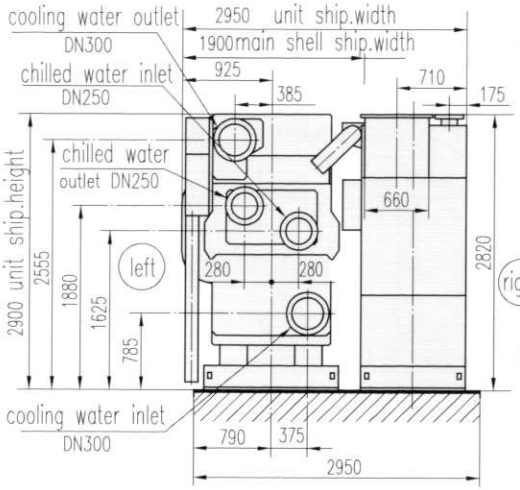
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm

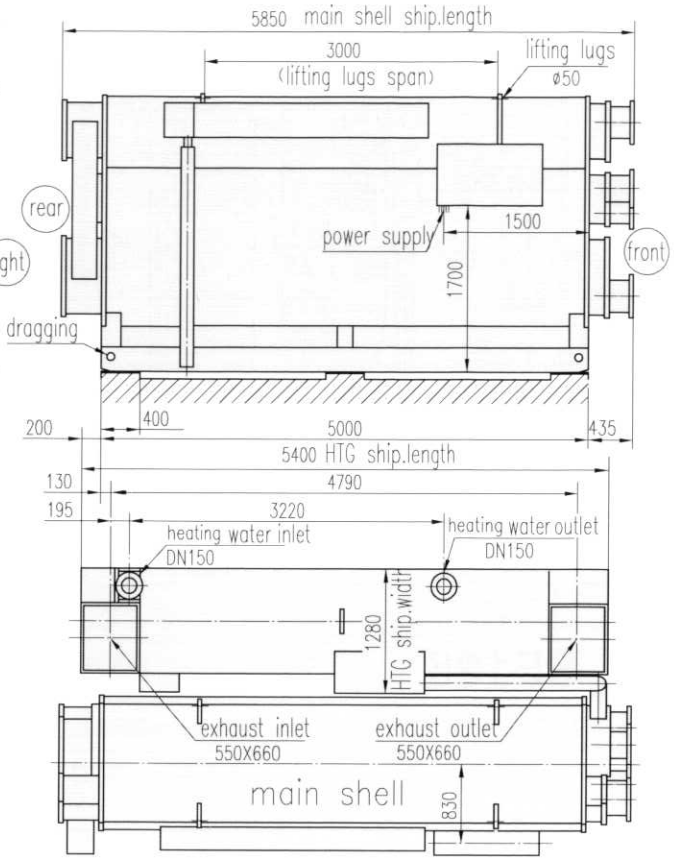

cooling water outlet
DN250
2450 unit ship.width
1600 main shell ship.width
chilled water inlet
DN200
800
285
625
155
chilled water
outlet DN200
610
2700 unit ship.height
2430
1800
1600
770
left
220
220
2670
cooling water inlet
DN250
660
275
2600
5800 main shell ship.length
3000
(lifting lugs span)
lifting lugs
ø50
rear
right
front
power supply
1500
1650
dragging
400
170
5000
425
5340 HTG ship.length
120
180
4760
3220
heating water inlet
DN150
heating water
outlet DN150
exhaust inlet
500X610
HTG
1180
HTG ship.width
exhaust outlet
500X610
main shell
690

BE125

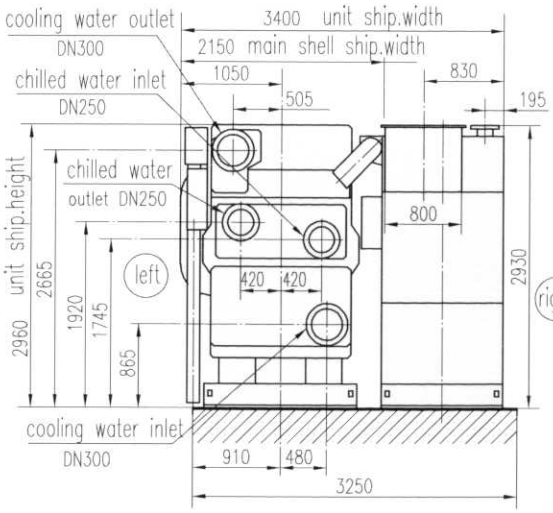

cooling water outlet
DN250
2900 unit ship.width
1800 main shell ship.width
chilled water inlet
DN200
950
335
710
175
chilled water
outlet DN200
660
2850 unit ship.height
2570
1900
1680
845
left
250
250
2330
2820
right
cooling water inlet
DN250
730
325
2800
5810 main shell ship.length
3000
(lifting lugs span)
lifting lugs
ø50
rear
front
power supply
1500
1700
dragging
400
170
5000
435
5400 HTG ship.length
105
4790
195
3220
heating water inlet
DN150
heating water outlet
DN150
HTG
1300
HTG ship.width
exhaust inlet
550X660
exhaust outlet
550X660
main shell
760

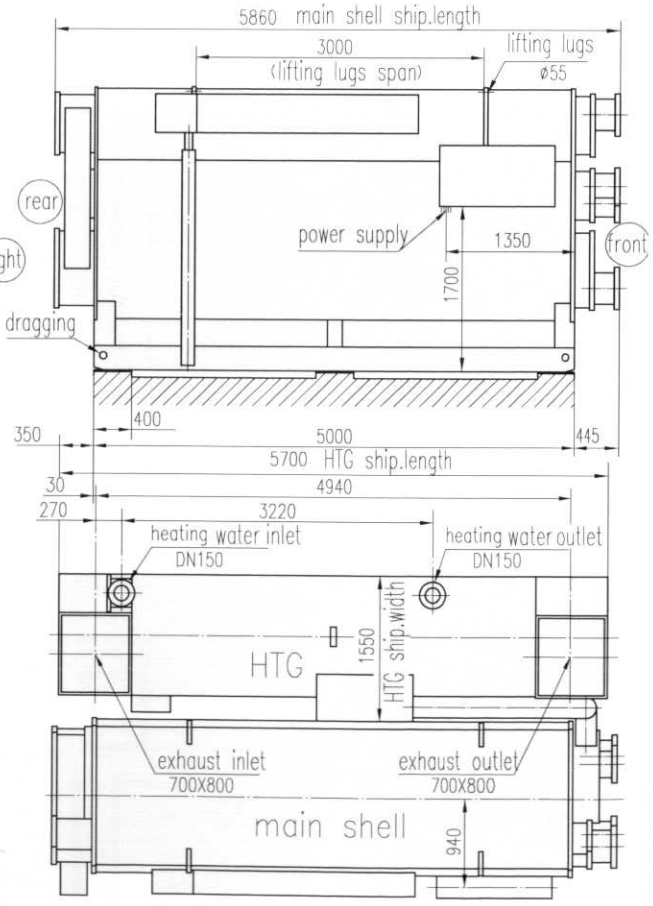
BE150


cooling water outlet
DN300
2950 unit ship.width
1900main shell ship.width
chilled water inlet
DN250
925
385
710
175
chilled water
outlet DN250
660
2900 unit ship.height
2555
1880
1625
785
left
280
280
2820
right
cooling water inlet
DN300
790
375
2950

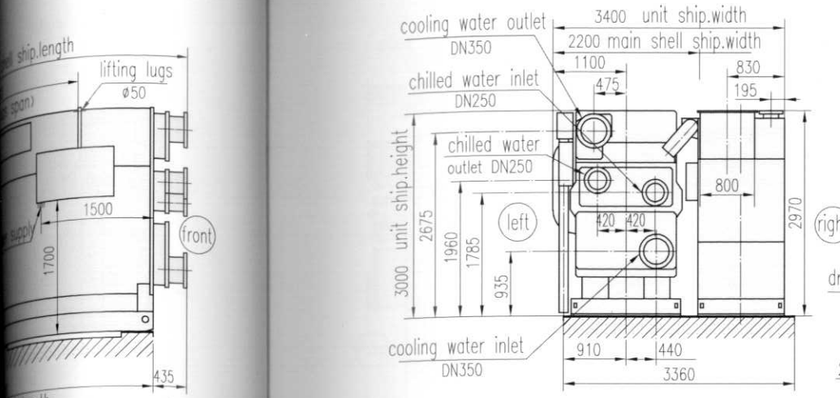

5850 main shell ship.length
3000
(lifting lugs span)
lifting lugs
ø50
rear
power supply
1500
front
1700
dragging
200
400
5000
435
5400 HTG ship.length
130
4790
195
3220
heating water inlet
DN150
heating water outlet
DN150
1280
HTG ship.width
exhaust inlet
550X660
exhaust outlet
550X660
main shell
830

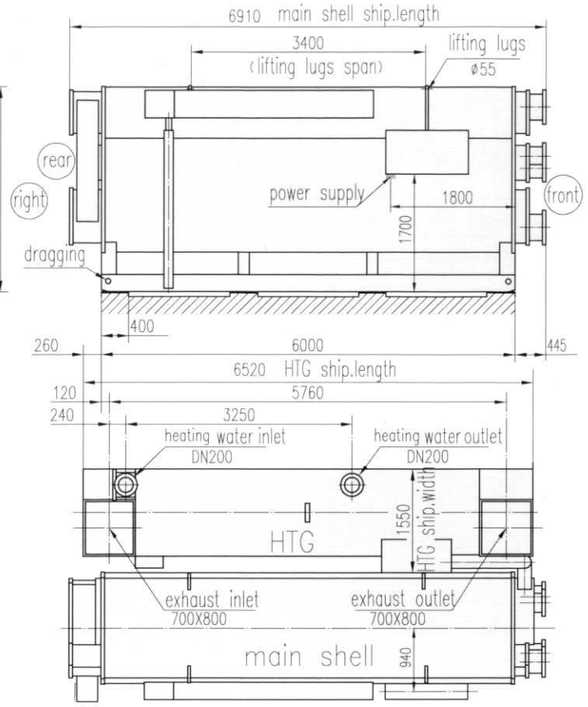
BE175


cooling water outlet
DN300
3400 unit ship.width
2150 main shell ship.width
1050
505
830
195
chilled water inlet
DN250
chilled water
outlet DN250
800
unit ship.height
2665
1920
1745
865
2960
left
420
420
2930
right
cooling water inlet
DN300
910
480
3250

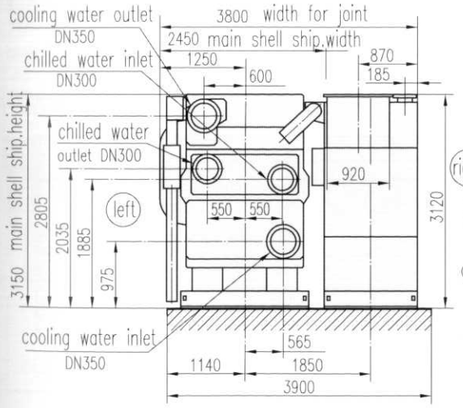

5860 main shell ship.length
3000
(lifting lugs span)
lifting lugs
ø55
rear
power supply
1350
front
1700
dragging
400
350
5000
445
5700 HTG ship.length
30
4940
270
3220
heating water inlet
DN150
heating water outlet
DN150
HTG
1550
HTG ship.width
exhaust inlet
700X800
exhaust outlet
700X800
main shell
940

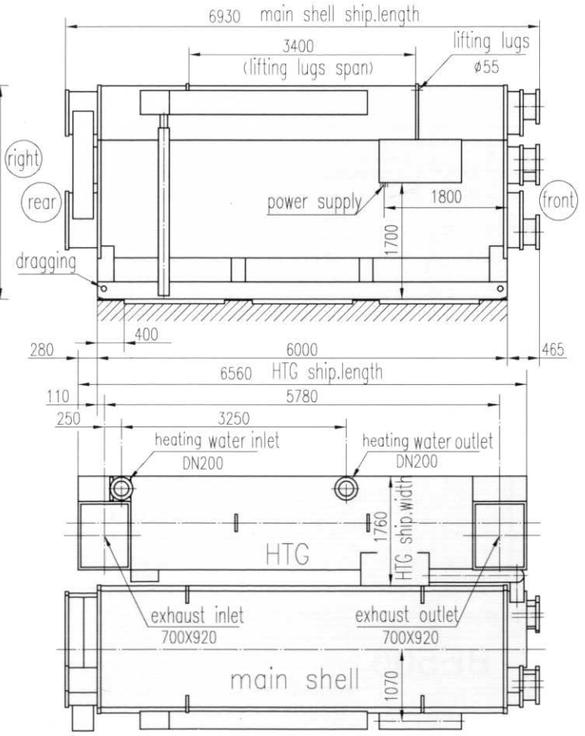
BE200


cooling water outlet
DN350
3400 unit ship.width
2200 main shell ship.width
1100
475
830
195
chilled water inlet
DN250
chilled water
outlet DN250
3000 unit ship.height
2675
1960
1785
935
left
800
420
420
2970
cooling water inlet
DN350
910
440
3360

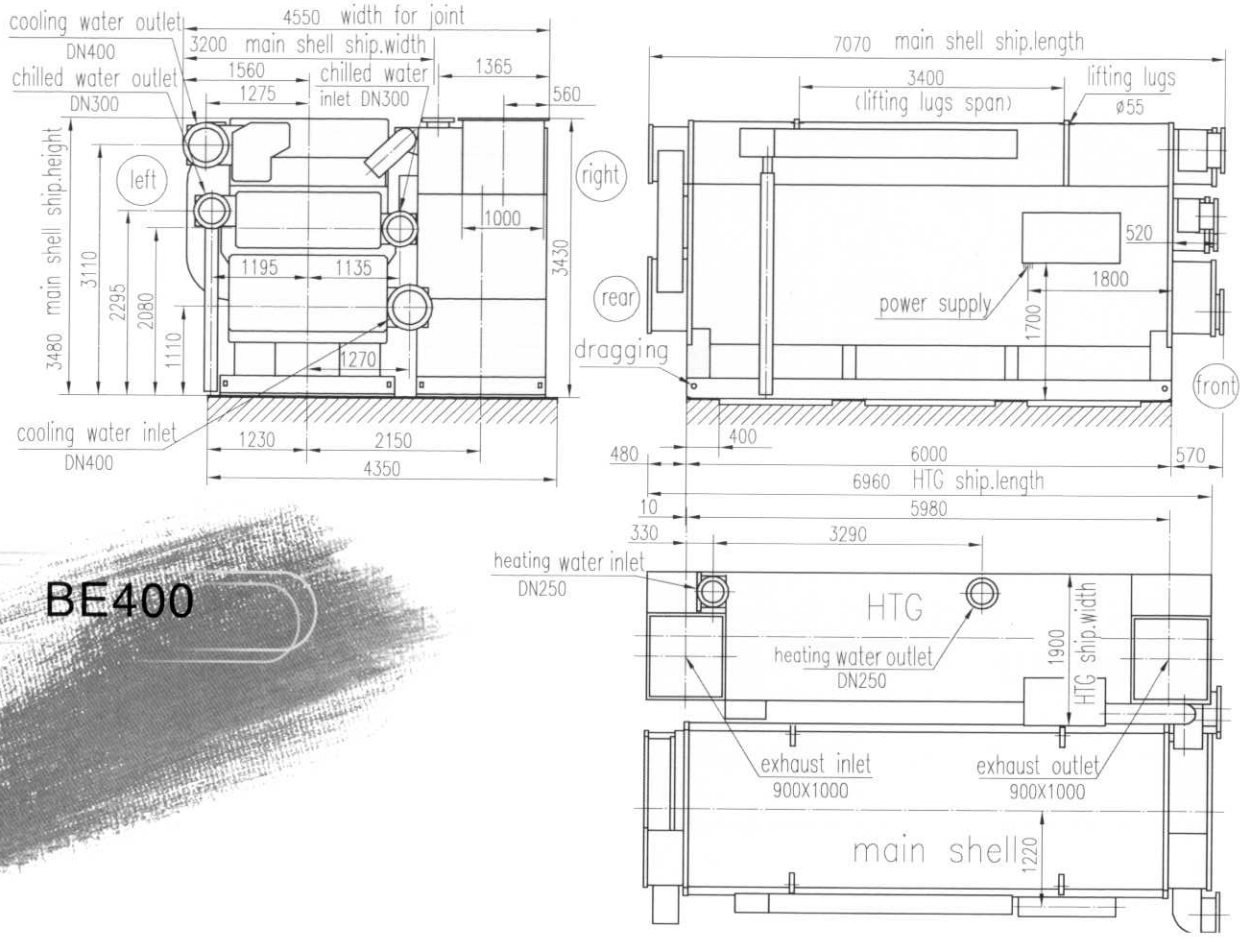

6910 main shell ship.length
3400
(lifting lugs span)
lifting lugs
ø55
rear
right
front
power supply
1800
1700
dragging
400
260
6000
445
6520 HTG ship.length
120
5760
240
3250
heating water inlet
DN200
heating water outlet
DN200
HTG
1550
HTG ship.width
exhaust inlet
700X800
exhaust outlet
700X800
main shell
940

BE250

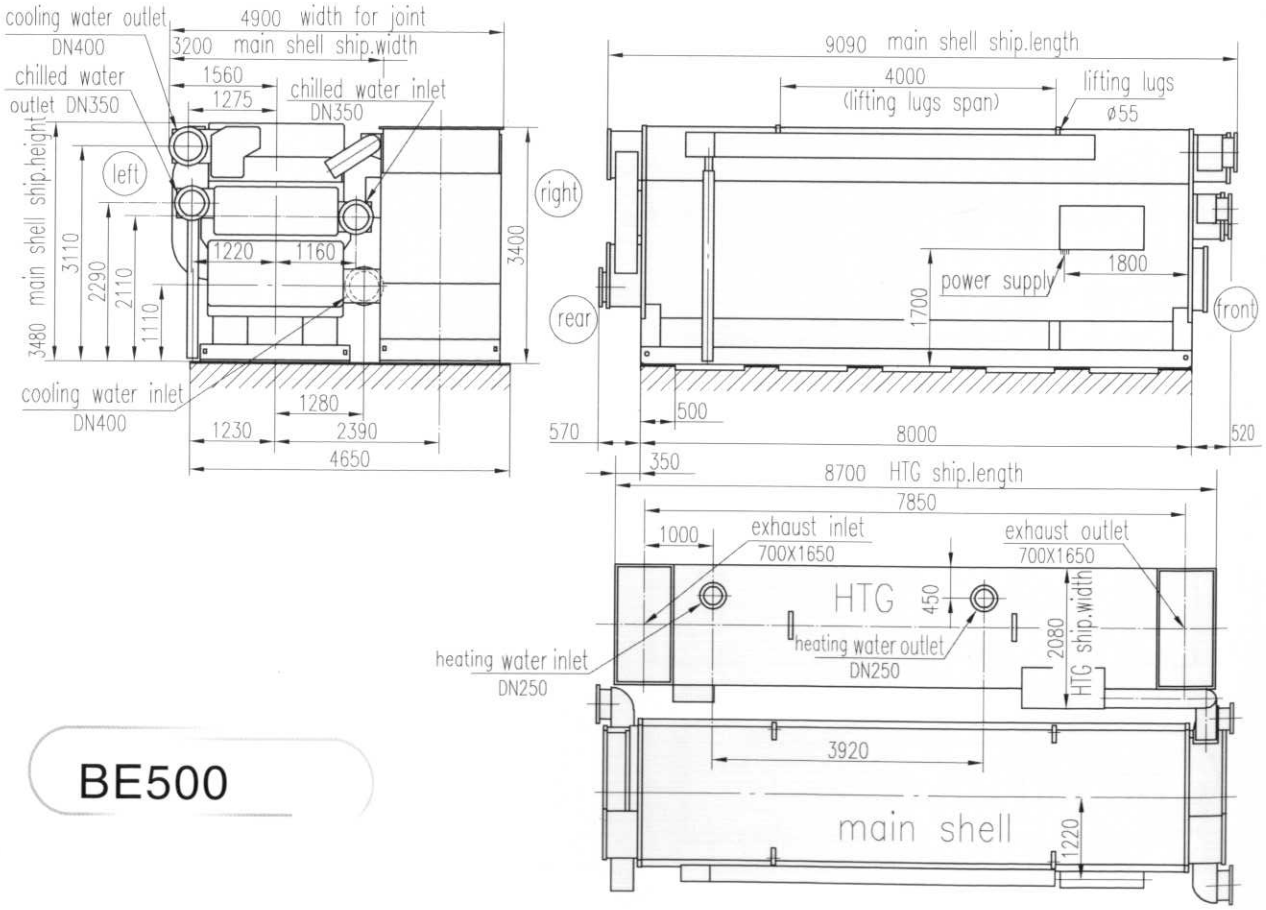

cooling water outlet
DN350
3800 width for joint
2450 main shell ship.width
chilled water inlet
DN300
1250
600
870
185
chilled water
outlet DN300
main shell ship.height
3150
2805
2035
1885
975
left
920
550
550
3120
cooling water inlet
DN350
565
1140
1850
3900


6930 main shell ship.length
3400
(lifting lugs span)
lifting lugs
ø55
right
rear
front
power supply
1800
1700
dragging
400
280
6000
465
6560 HTG ship.length
110
5780
250
3250
heating water inlet
DN200
heating water outlet
DN200
HTG
1760
HTG ship.width
exhaust inlet
700X920
exhaust outlet
700X920
main shell
1070

BE300

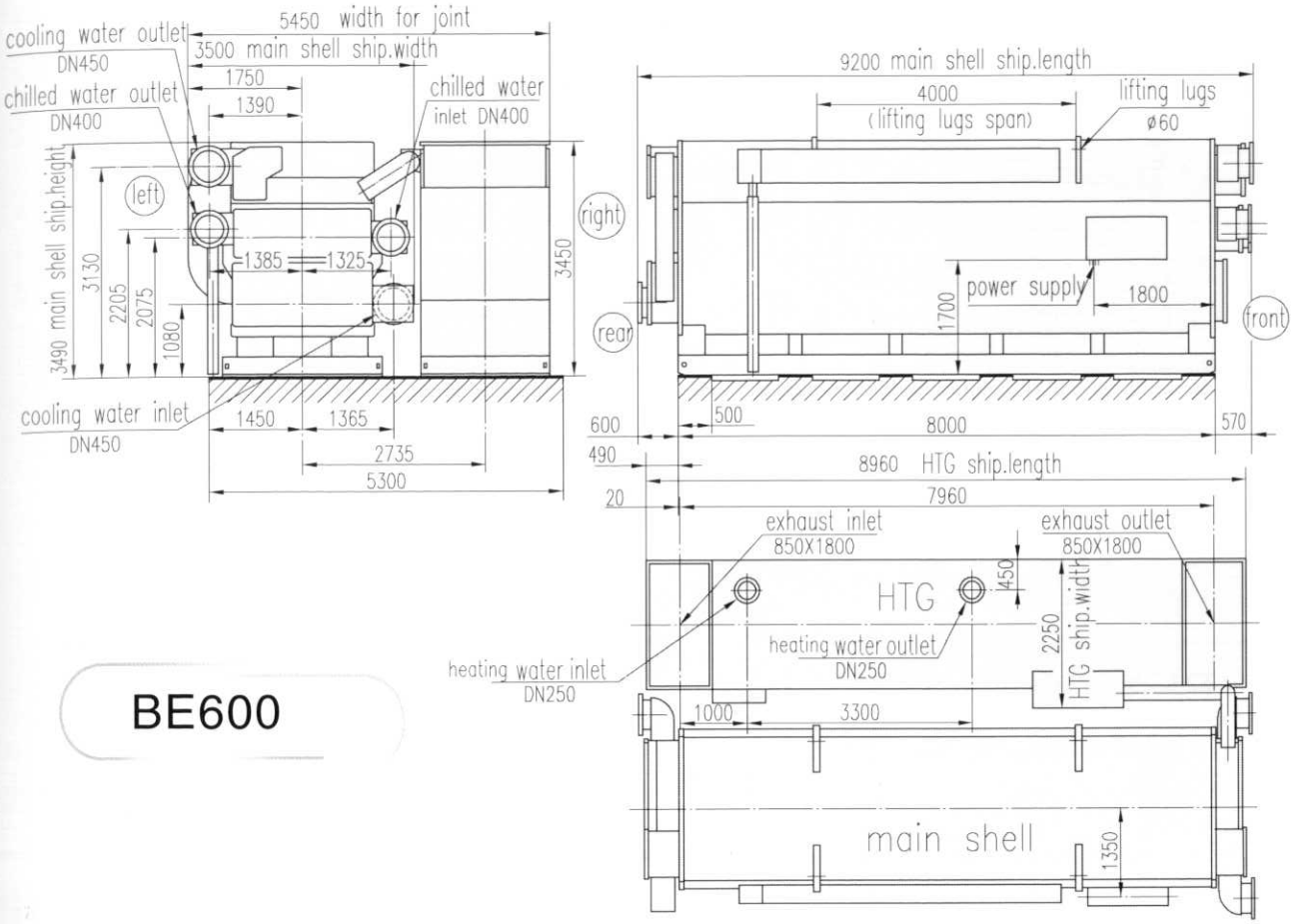


BE400

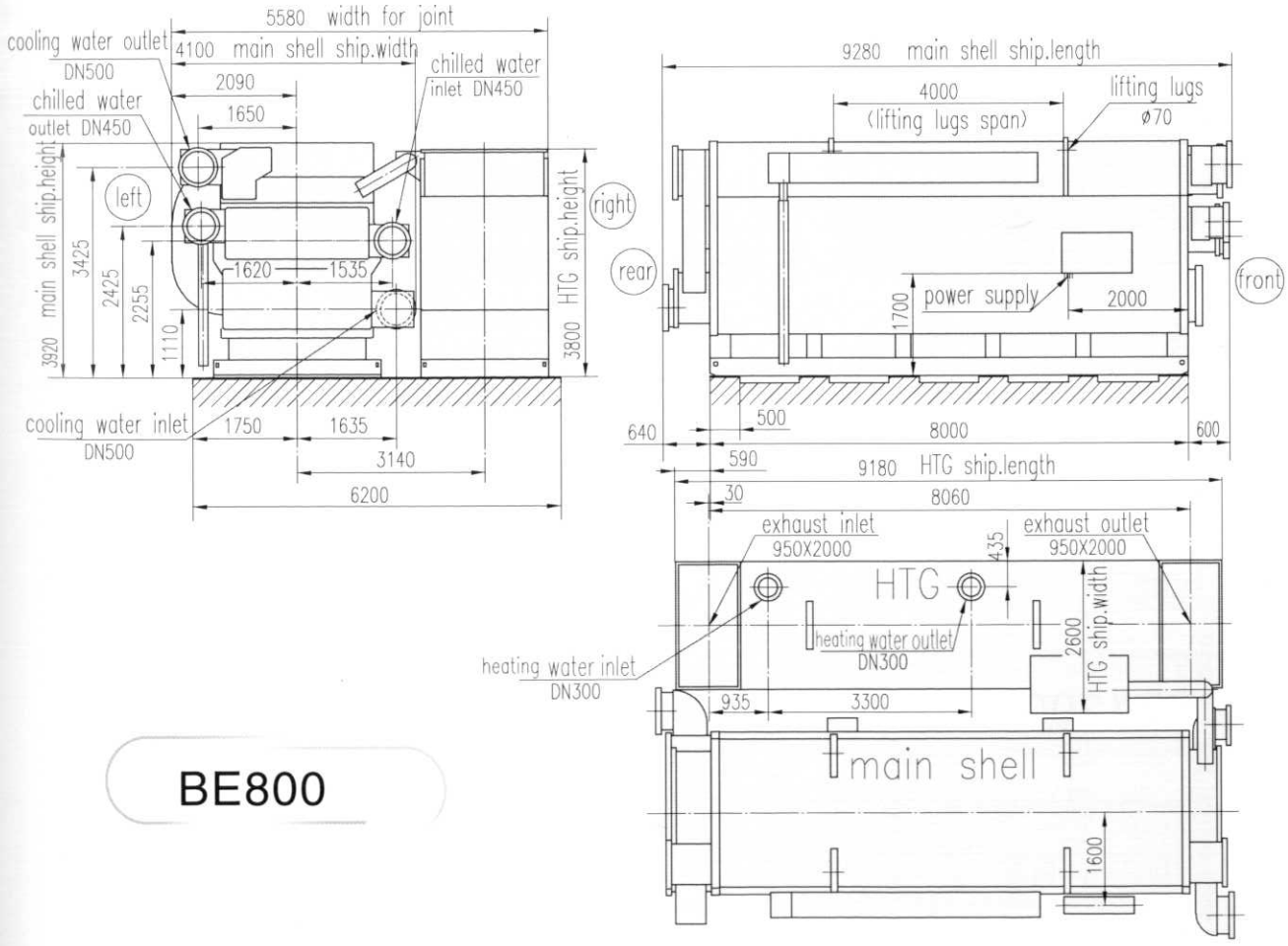


BE500

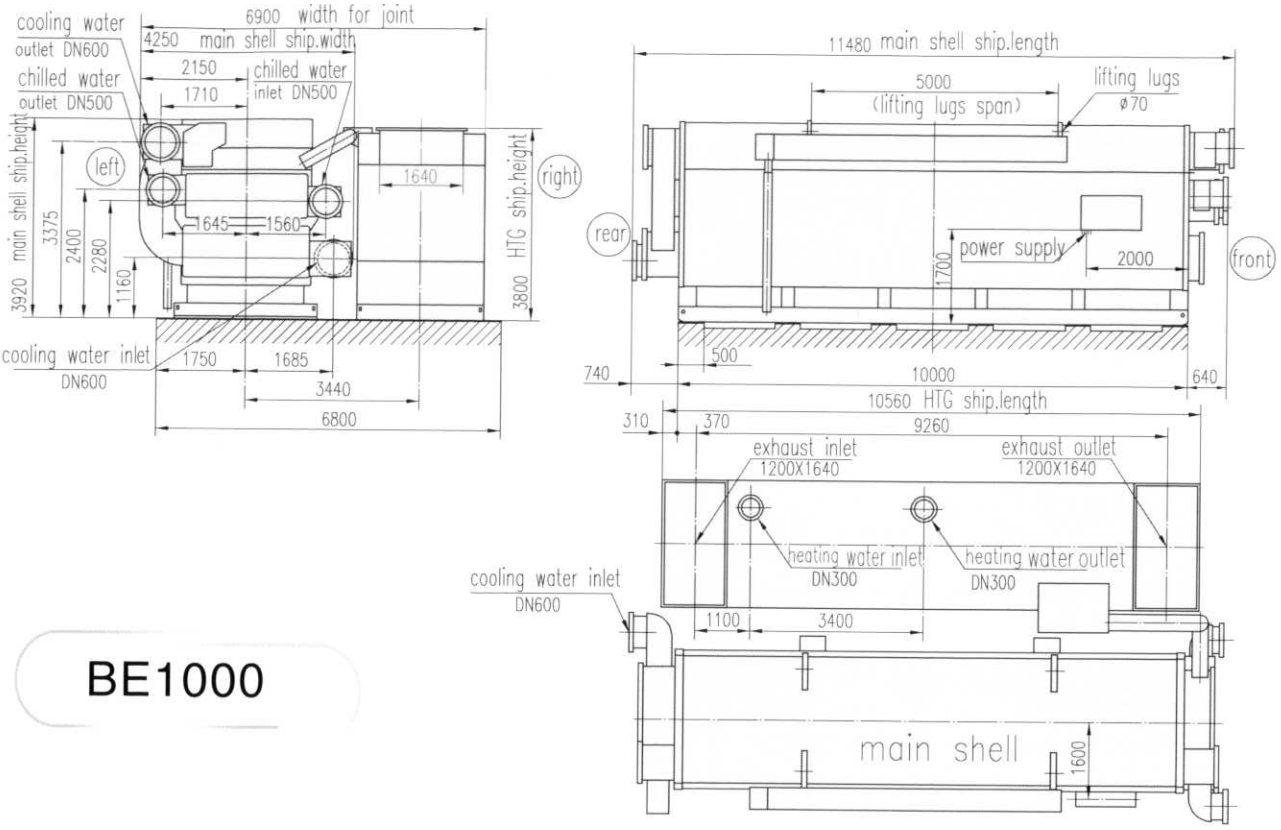
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm


5450 width for joint
cooling water outlet
DN450
3500 main shell ship.width
1750
1390
chilled water outlet
DN400
chilled water
inlet DN400
main shell ship.height
3490
3130
2205
2075
1080
left
right
1385
1325
3450
cooling water inlet
DN450
1450
1365
2735
5300
9200 main shell ship.length
4000
(lifting lugs span)
lifting lugs
ø60
power supply
1800
1700
rear
front
600
500
8000
570
490
8960 HTG ship.length
20
7960
exhaust inlet
850X1800
exhaust outlet
850X1800
HTG
450
2250
HTG ship.width
heating water outlet
DN250
heating water inlet
DN250
1000
3300
main shell
1350

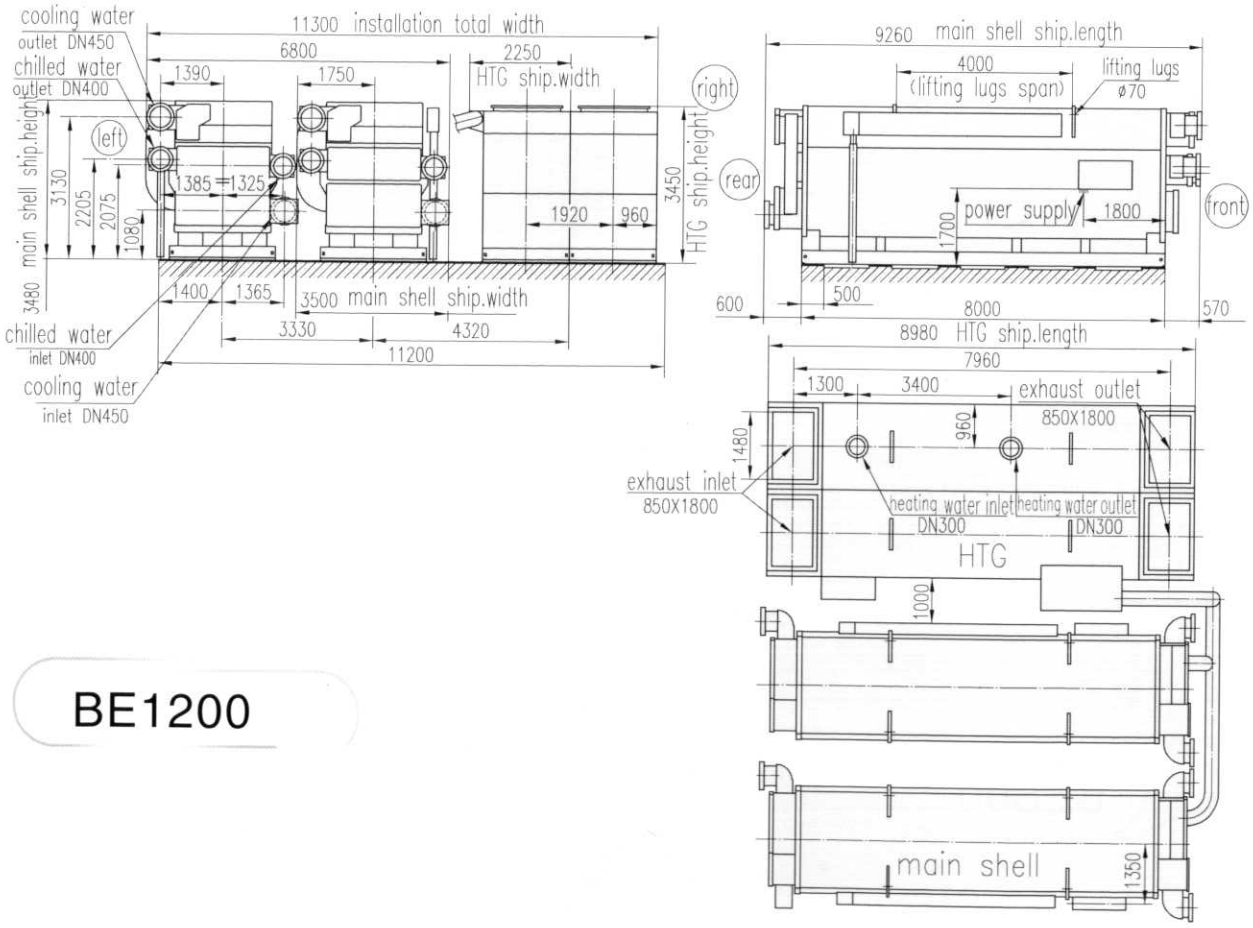
BE600


5580 width for joint
cooling water outlet
DN500
4100 main shell ship.width
2090
1650
chilled water
inlet DN450
chilled water
outlet DN450
main shell ship.height
3920
3425
2425
2255
1110
left
right
HTG ship.height
3800
1620
1535
cooling water inlet
DN500
1750
1635
3140
6200
9280 main shell ship.length
4000
(lifting lugs span)
lifting lugs
ø70
power supply
2000
1700
rear
front
640
500
8000
600
590
9180 HTG ship.length
30
8060
exhaust inlet
950X2000
exhaust outlet
950X2000
435
HTG
2600
HTG ship.width
heating water outlet
DN300
heating water inlet
DN300
935
3300
main shell
1600

BE800

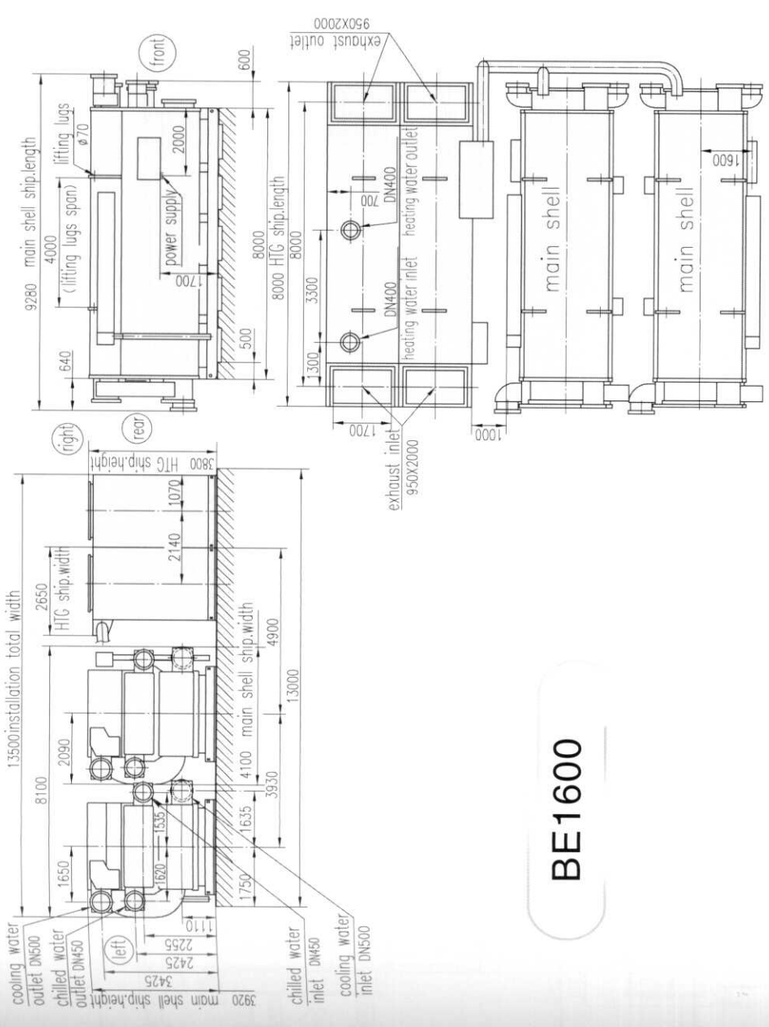


BE1000

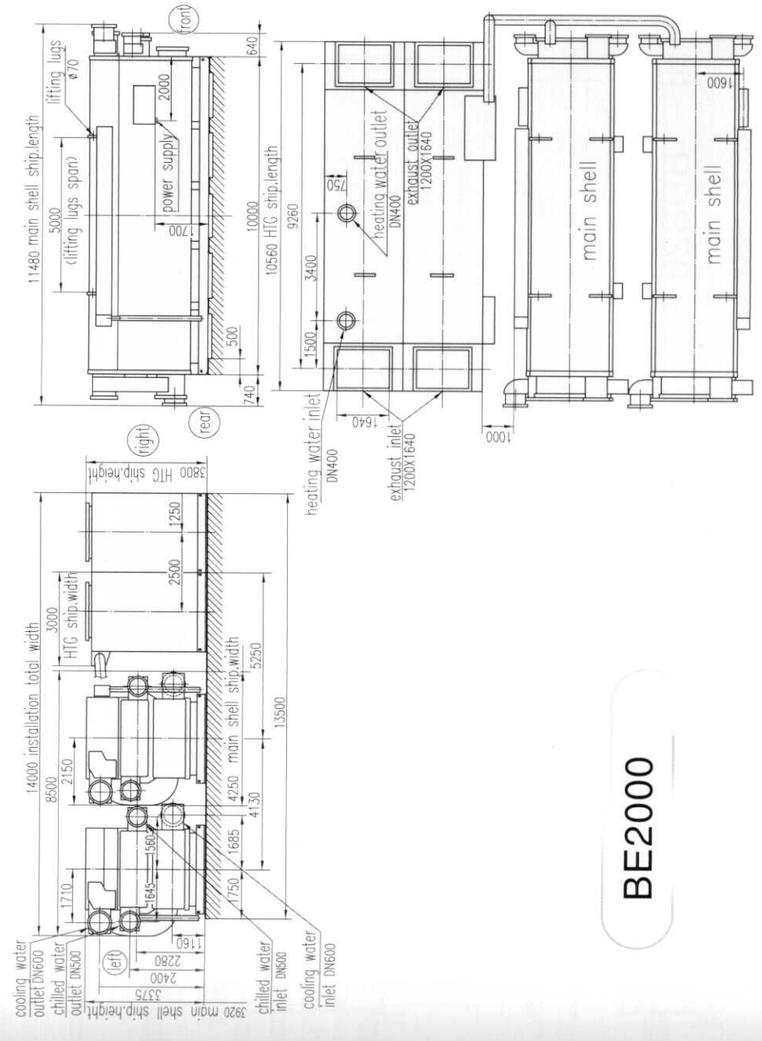


BE1200

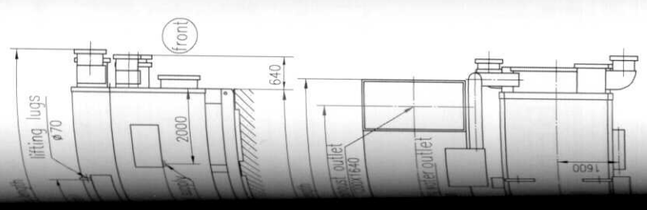
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm

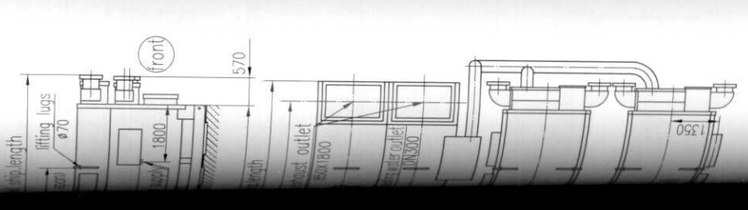


BE1600

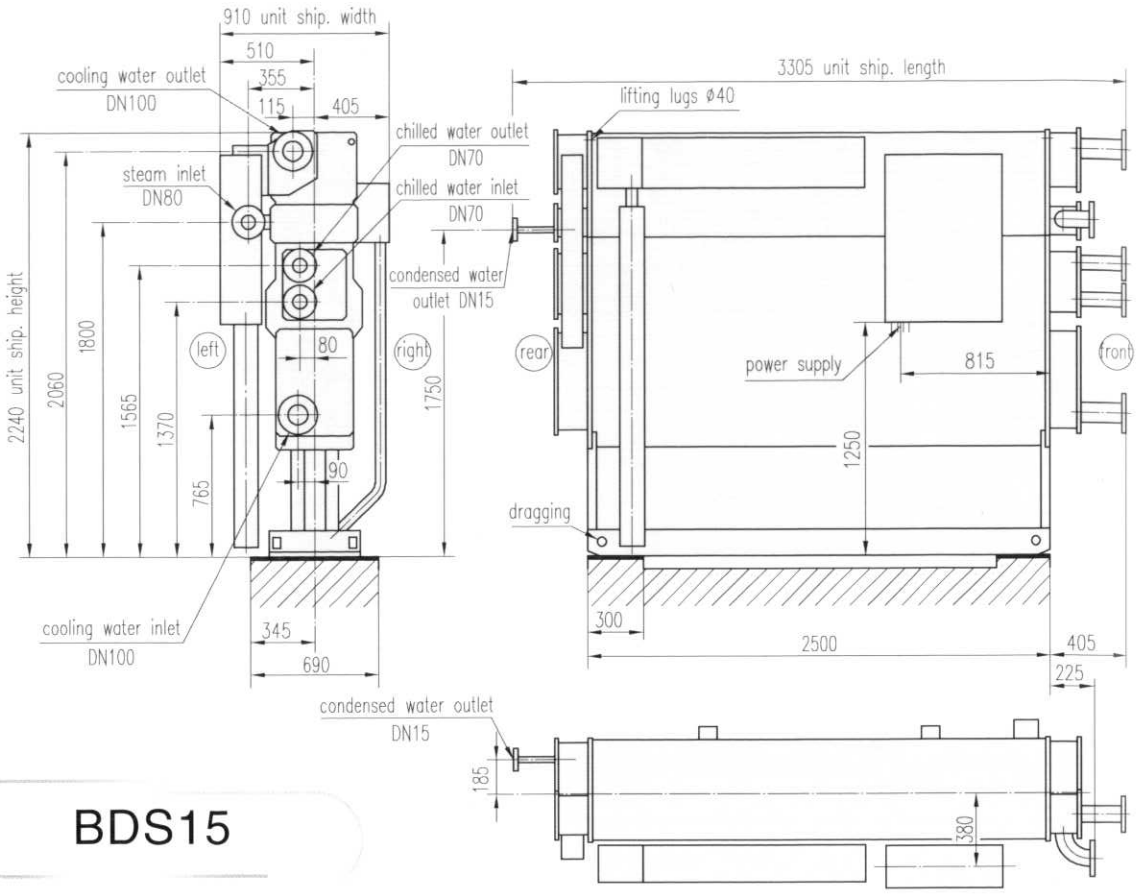


BE2000

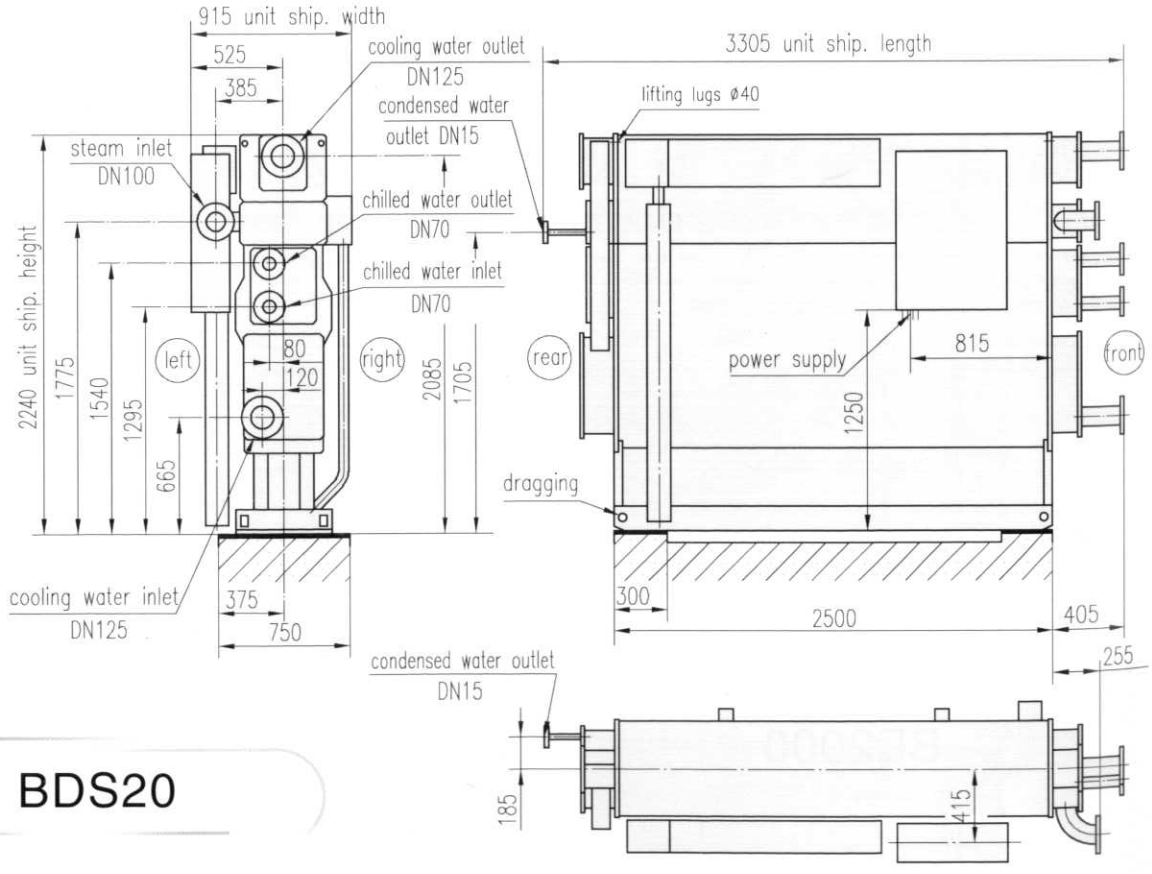




SINGLE-STAGE STEAM CHILLER

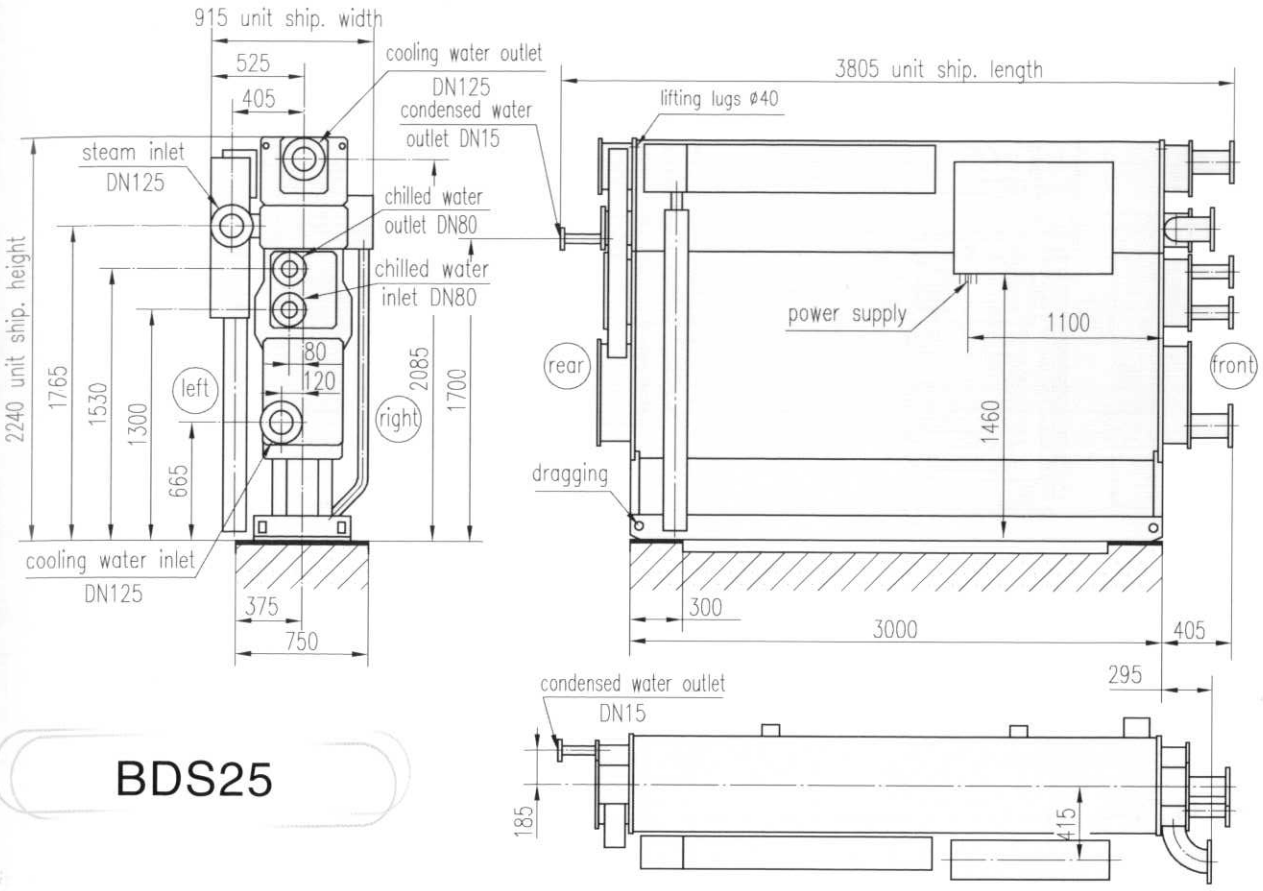


BDS15

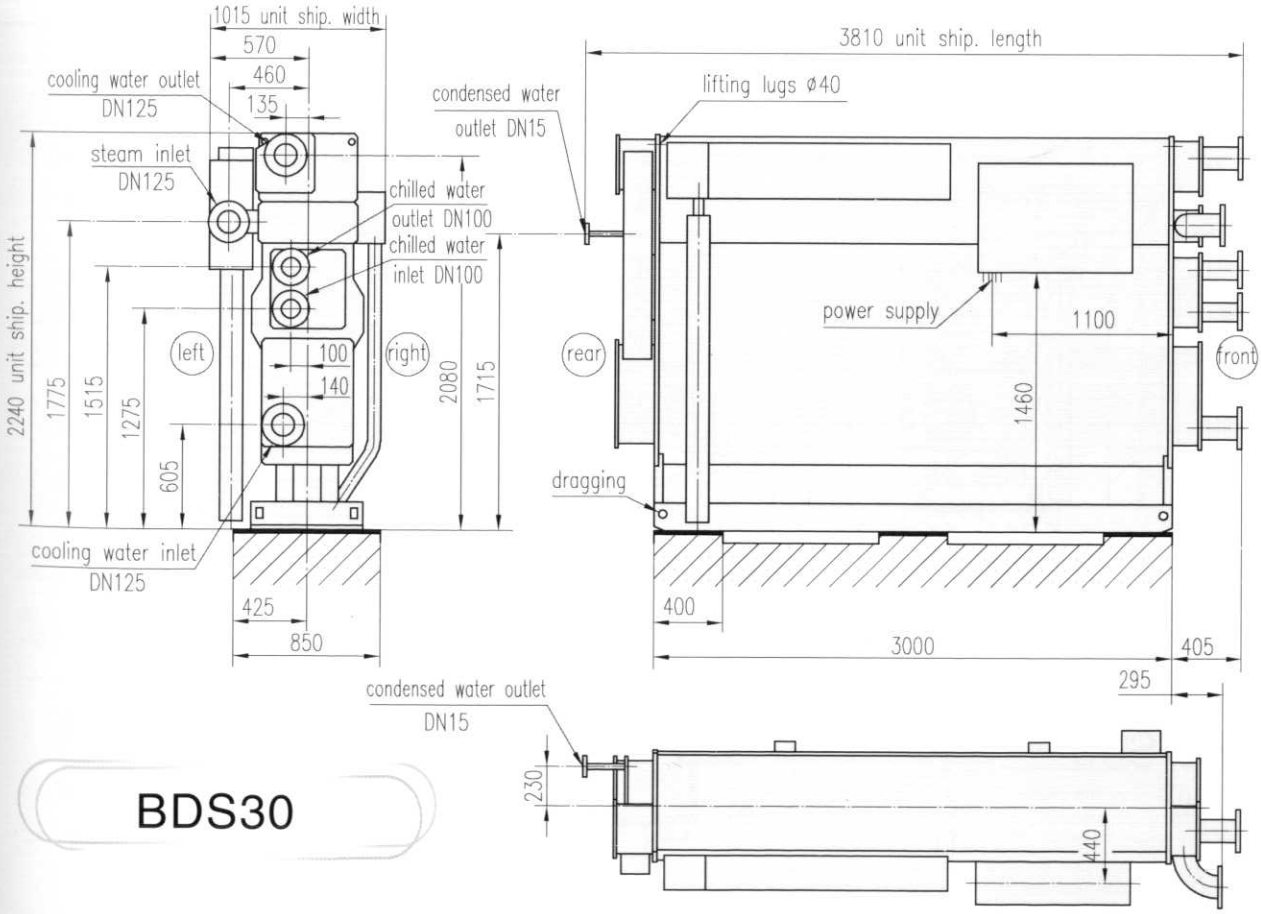


BDS20

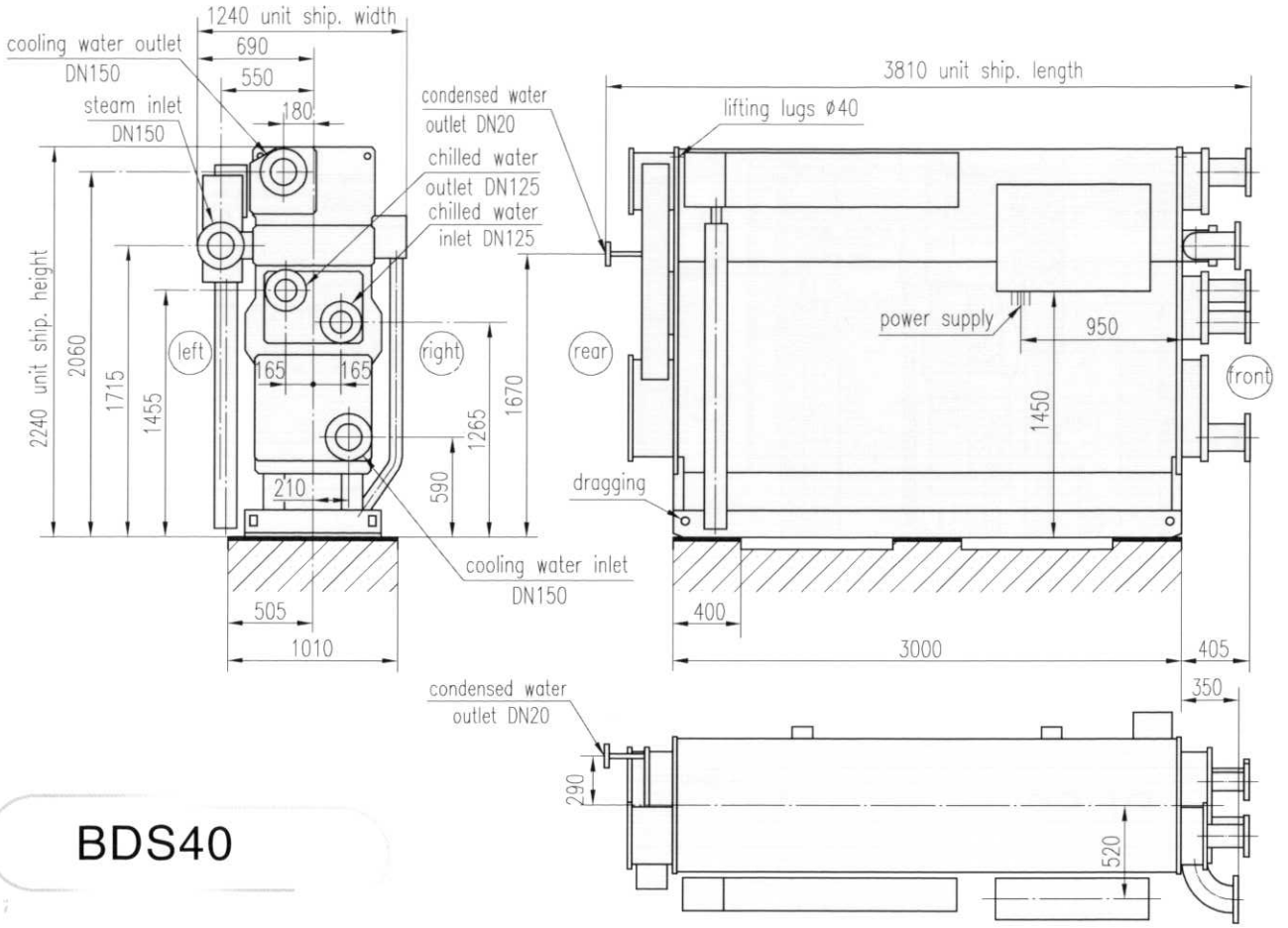
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm


915 unit ship. width
525
405
cooling water outlet
DN125
condensed water
outlet DN15
steam inlet
DN125
chilled water
outlet DN80
chilled water
inlet DN80
2240 unit ship. height
1765
1530
1300
665
80
120
left
right
2085
1700
cooling water inlet
DN125
375
750
3805 unit ship. length
lifting lugs ø40
power supply
1100
rear
front
1460
dragging
300
3000
405
condensed water outlet
DN15
295
185
415

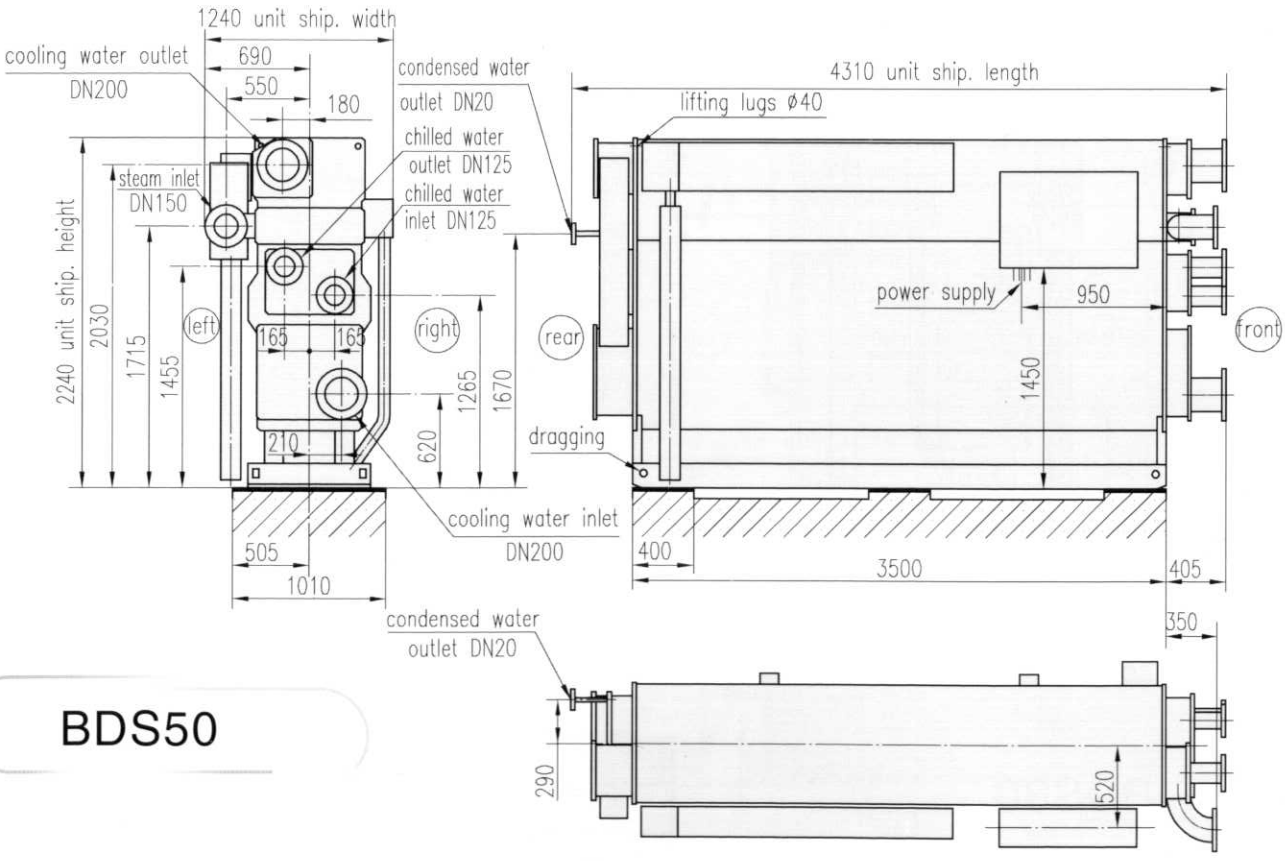
BDS25


1015 unit ship. width
570
460
135
cooling water outlet
DN125
condensed water
outlet DN15
steam inlet
DN125
chilled water
outlet DN100
chilled water
inlet DN100
2240 unit ship. height
1775
1515
1275
605
100
140
left
right
2080
1715
cooling water inlet
DN125
425
850
3810 unit ship. length
lifting lugs ø40
power supply
1100
rear
front
1460
dragging
400
3000
405
295
condensed water outlet
DN15
230
440

BDS30

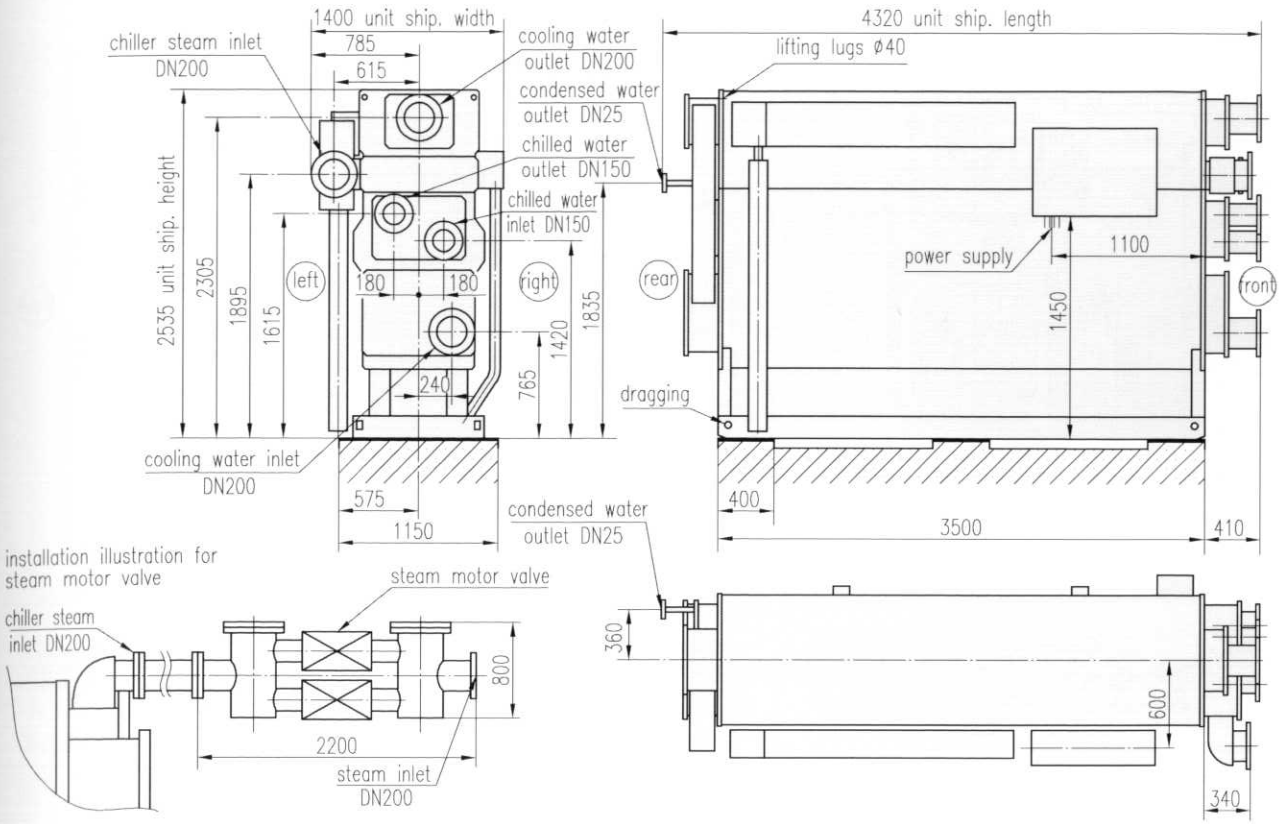


BDS40

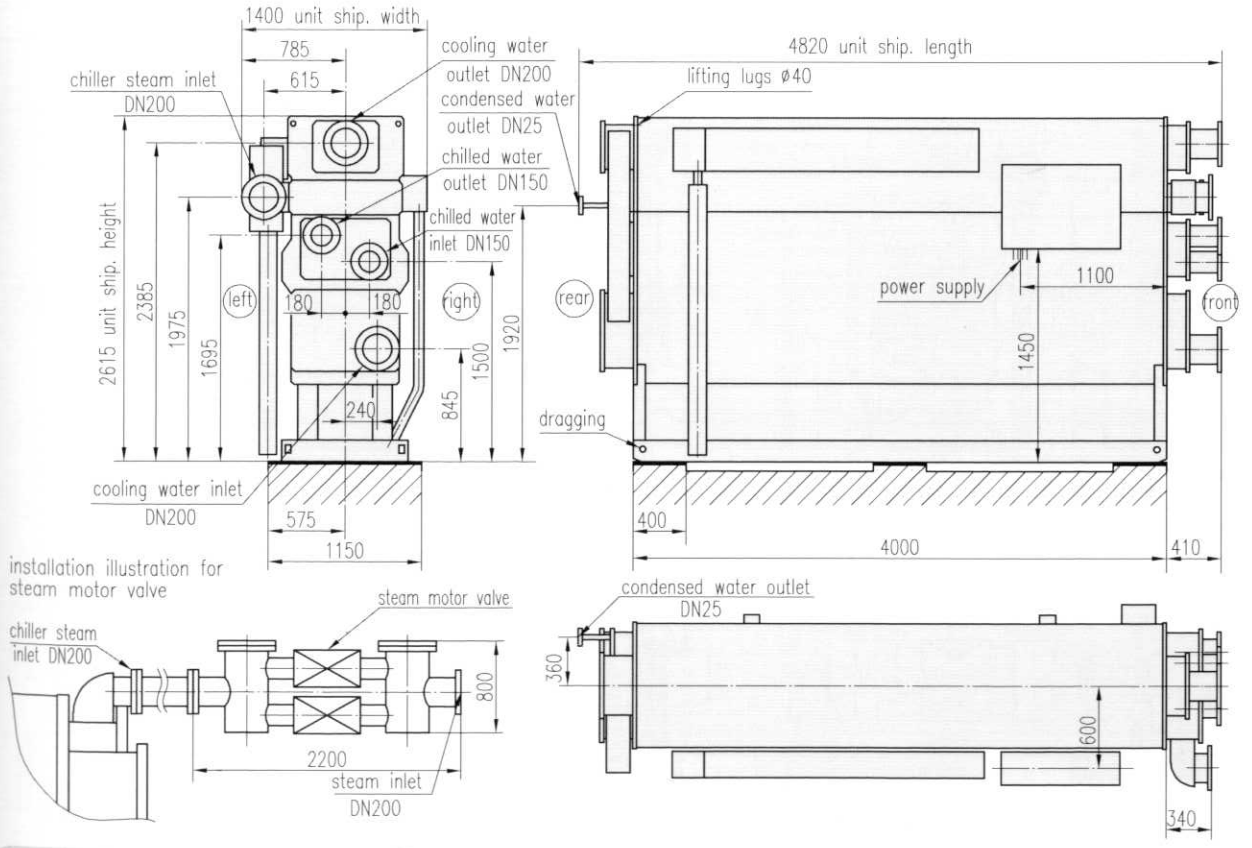


BDS50

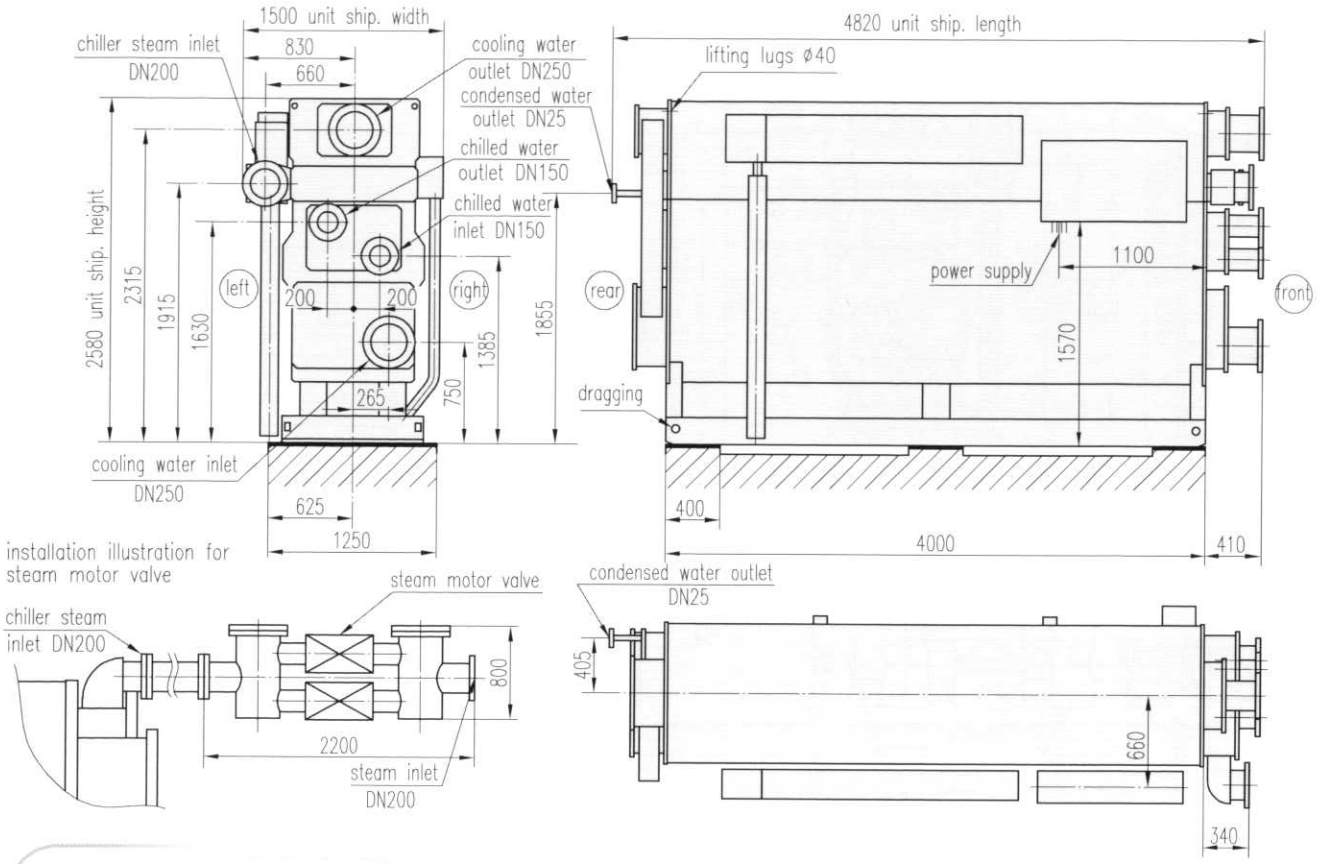
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm


1400 unit ship. width
785
615
chiller steam inlet DN200
cooling water outlet DN200
condensed water outlet DN25
chilled water outlet DN150
chilled water inlet DN150
2535 unit ship. height
2305
1895
1615
left
180
180
right
1835
1420
765
240
cooling water inlet DN200
575
1150
4320 unit ship. length
lifting lugs ø40
power supply
1100
1450
rear
front
dragging
400
3500
410
condensed water outlet DN25
360
600
340
installation illustration for steam motor valve
steam motor valve
chiller steam inlet DN200
800
2200
steam inlet DN200

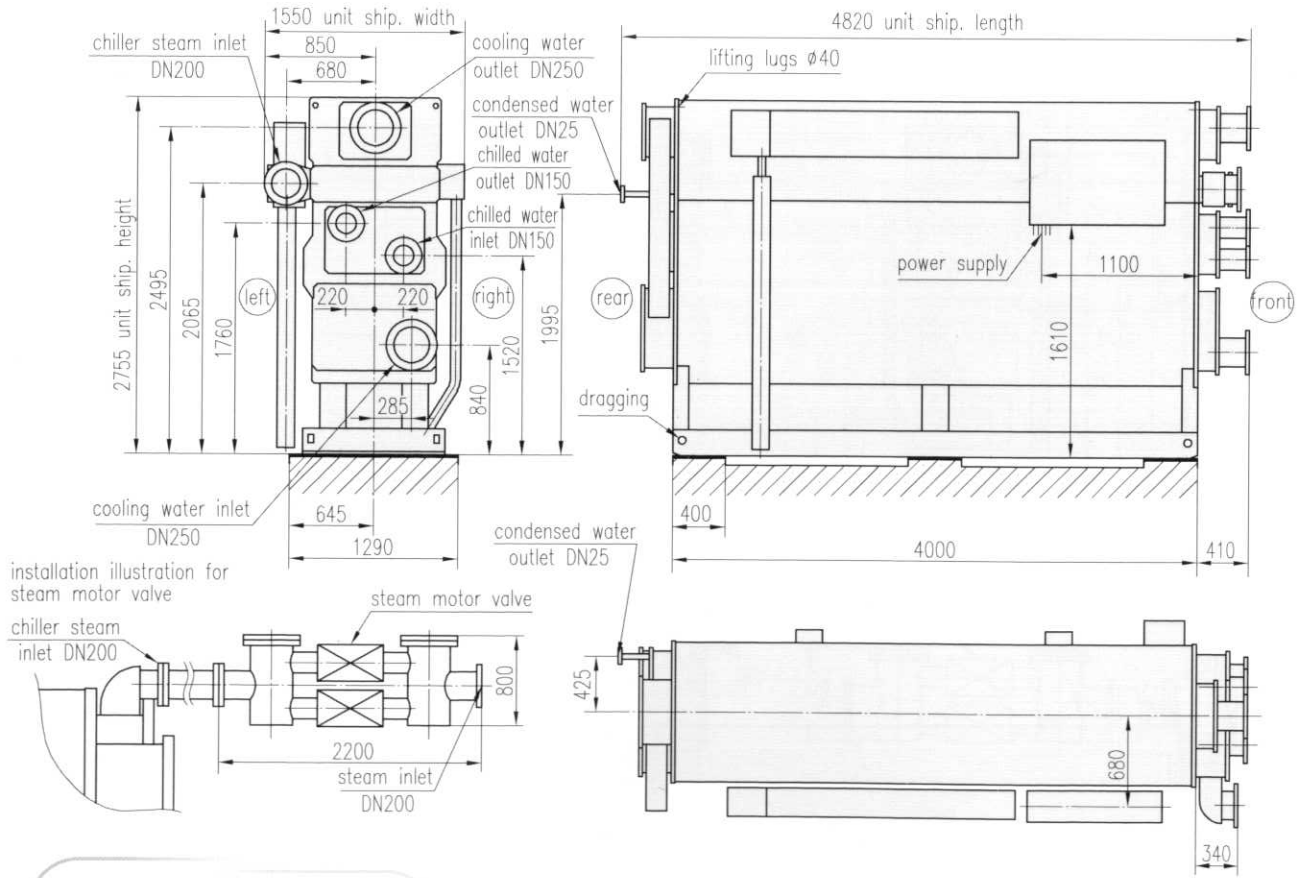
BDS65


1400 unit ship. width
785
615
chiller steam inlet DN200
cooling water outlet DN200
condensed water outlet DN25
chilled water outlet DN150
chilled water inlet DN150
2615 unit ship. height
2385
1975
1695
left
180
180
right
1920
1500
845
240
cooling water inlet DN200
575
1150
4820 unit ship. length
lifting lugs ø40
power supply
1100
1450
rear
front
dragging
400
4000
410
condensed water outlet DN25
360
600
340
installation illustration for steam motor valve
steam motor valve
chiller steam inlet DN200
800
2200
steam inlet DN200

BDS75

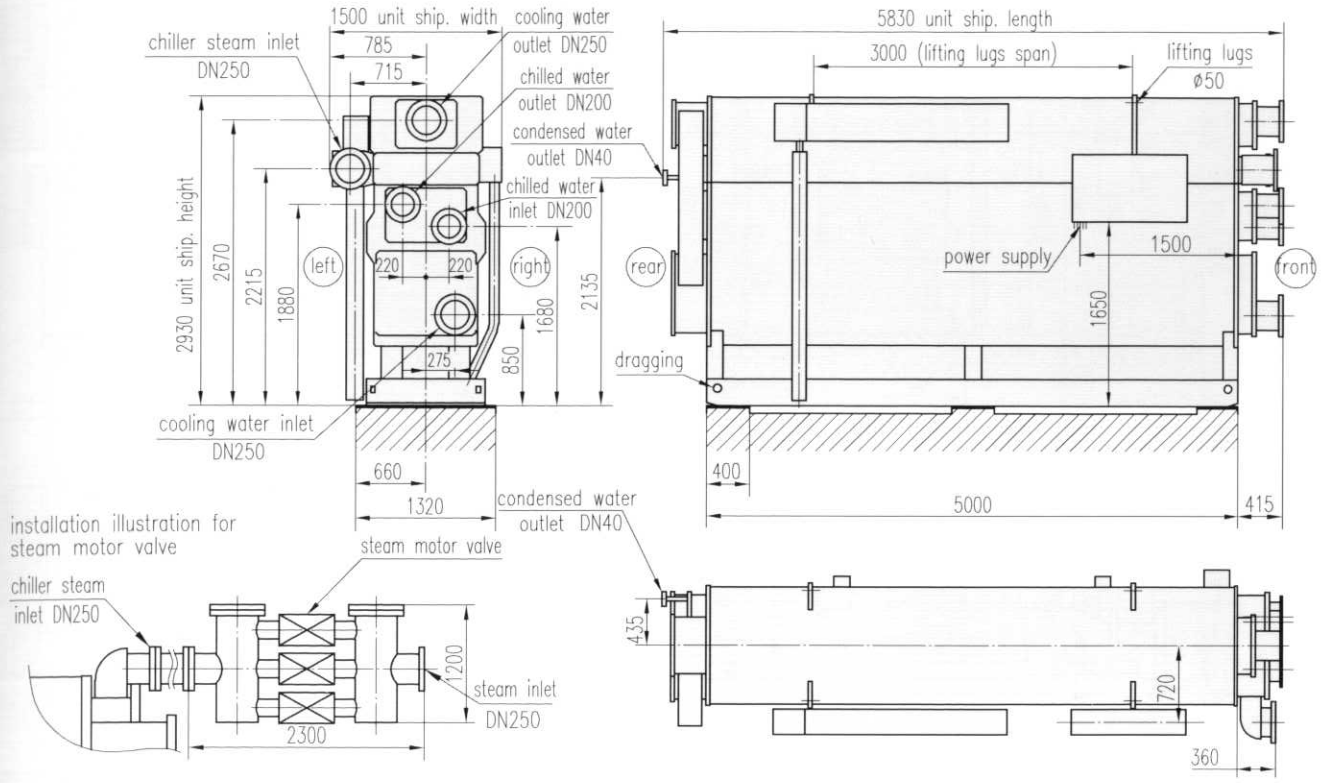


BDS85

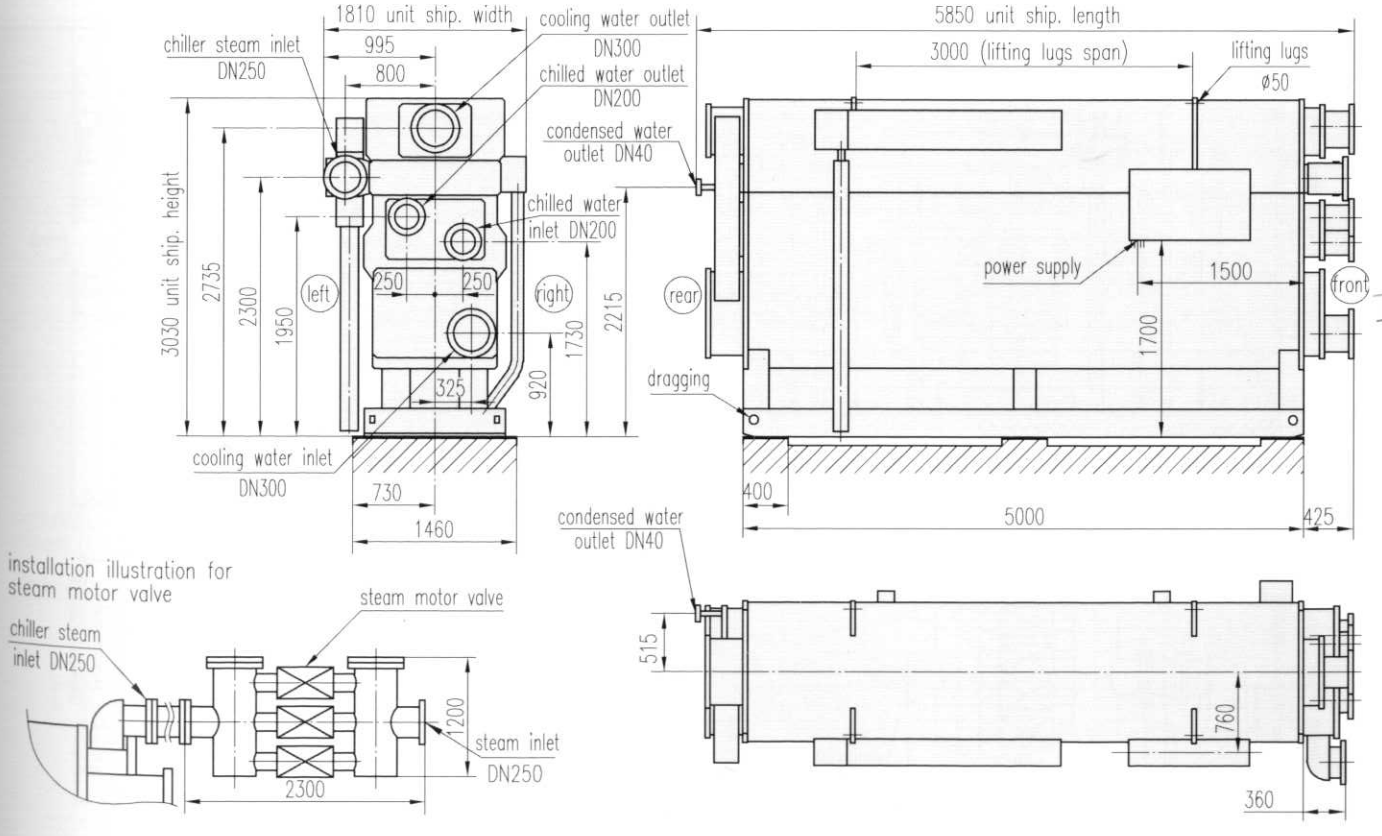


BDS100

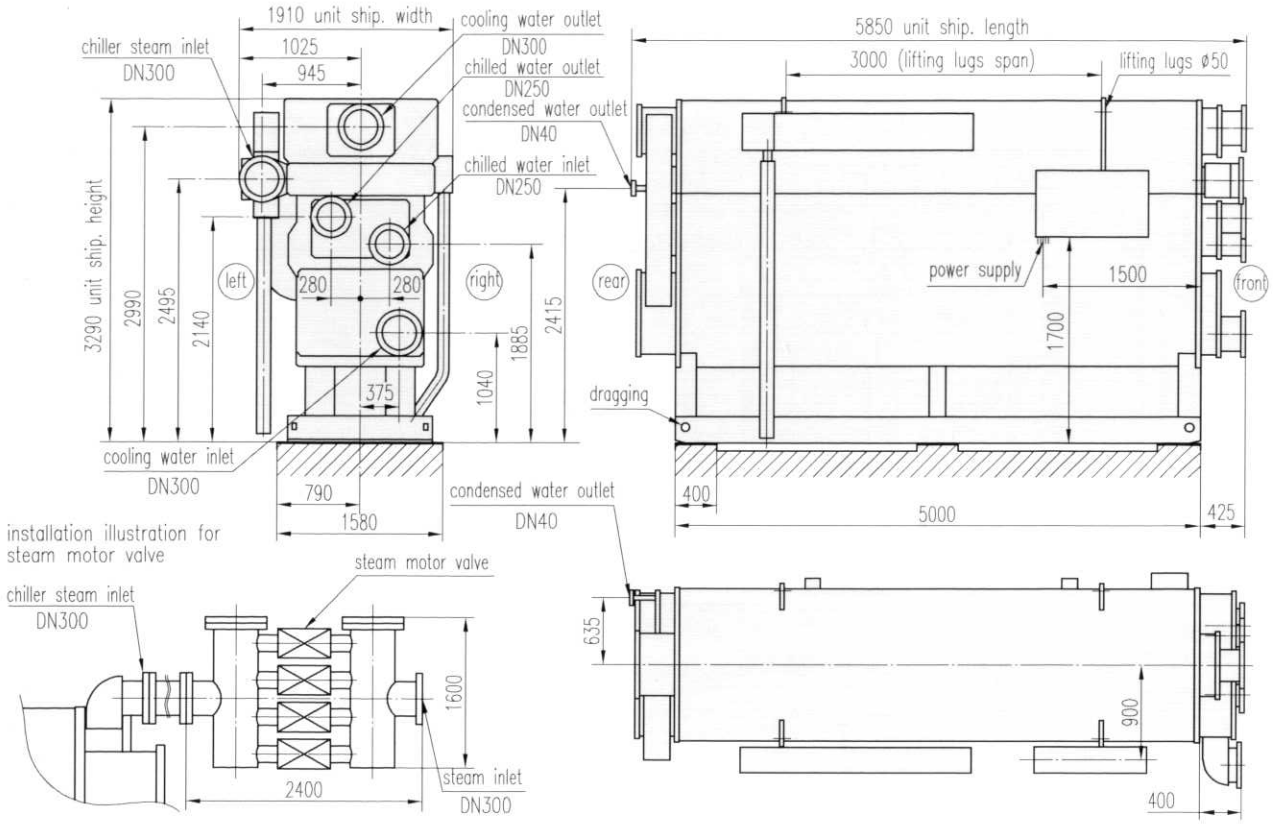
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



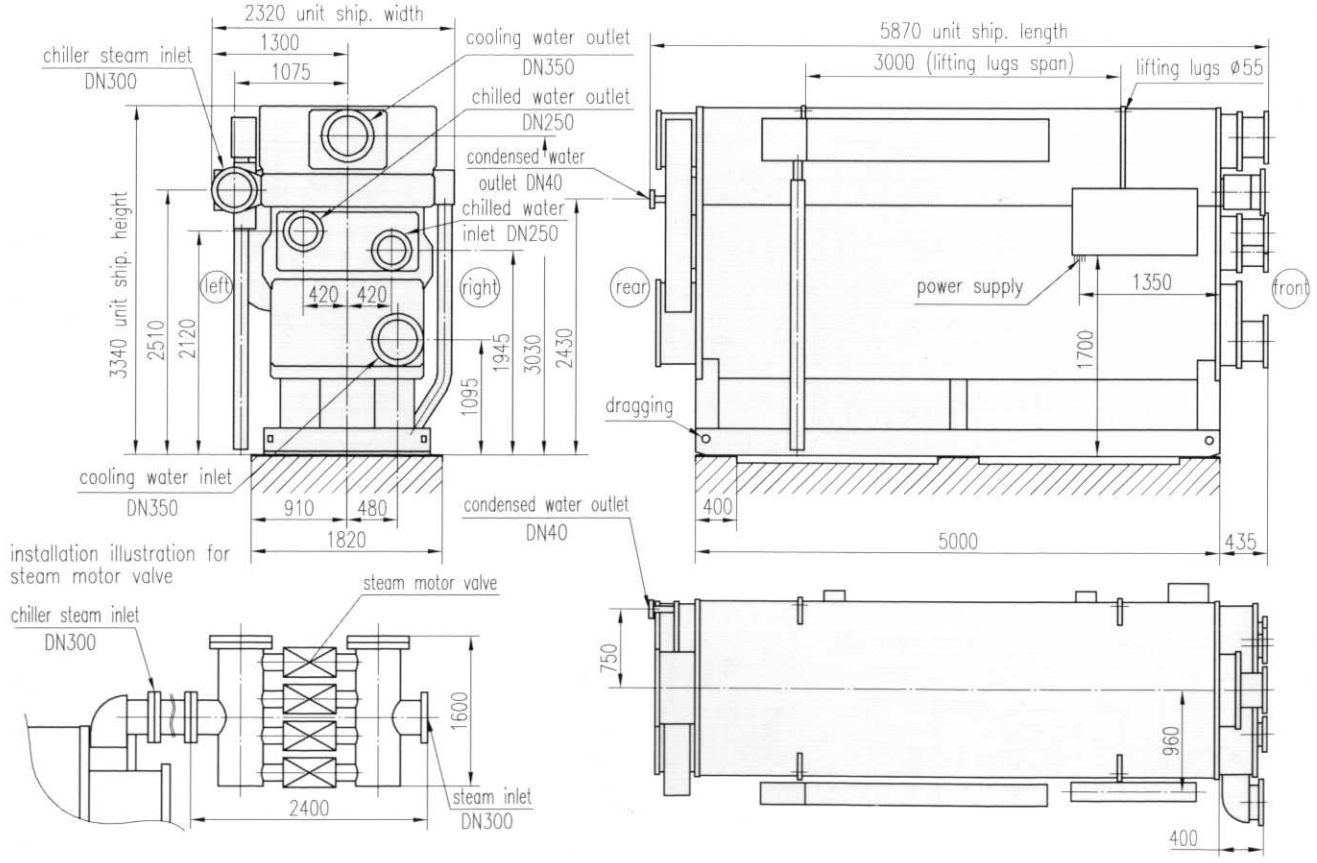
BDS125



BDS150

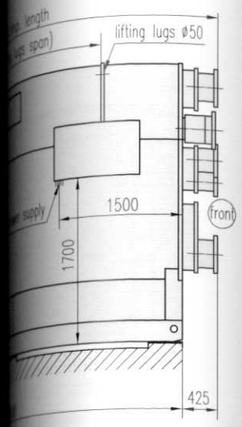


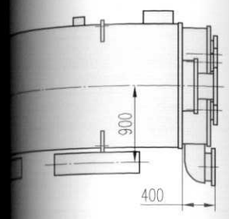
BDS175

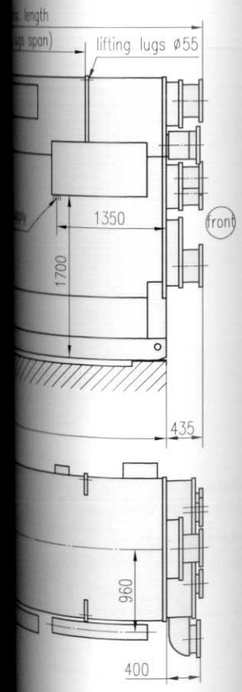


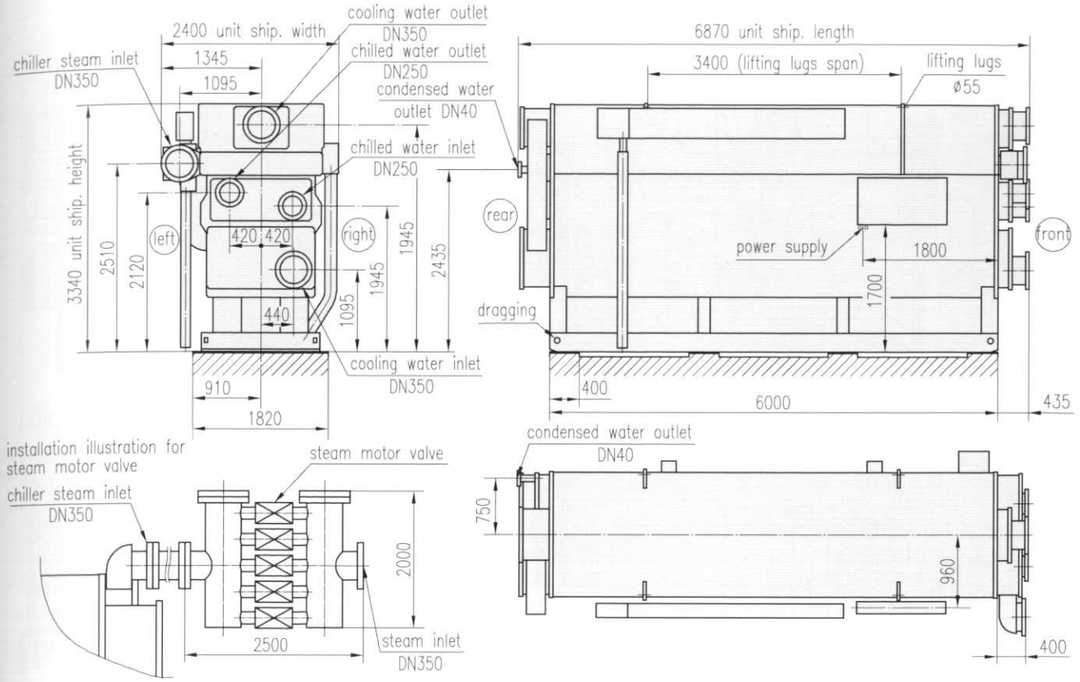
BDS200

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm

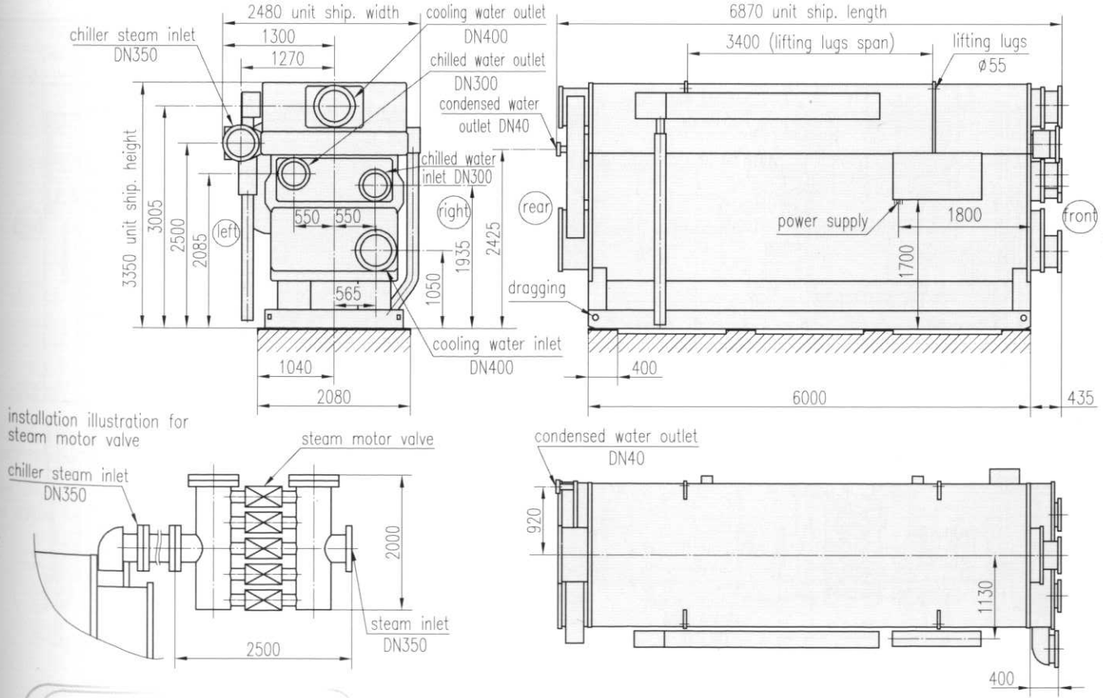




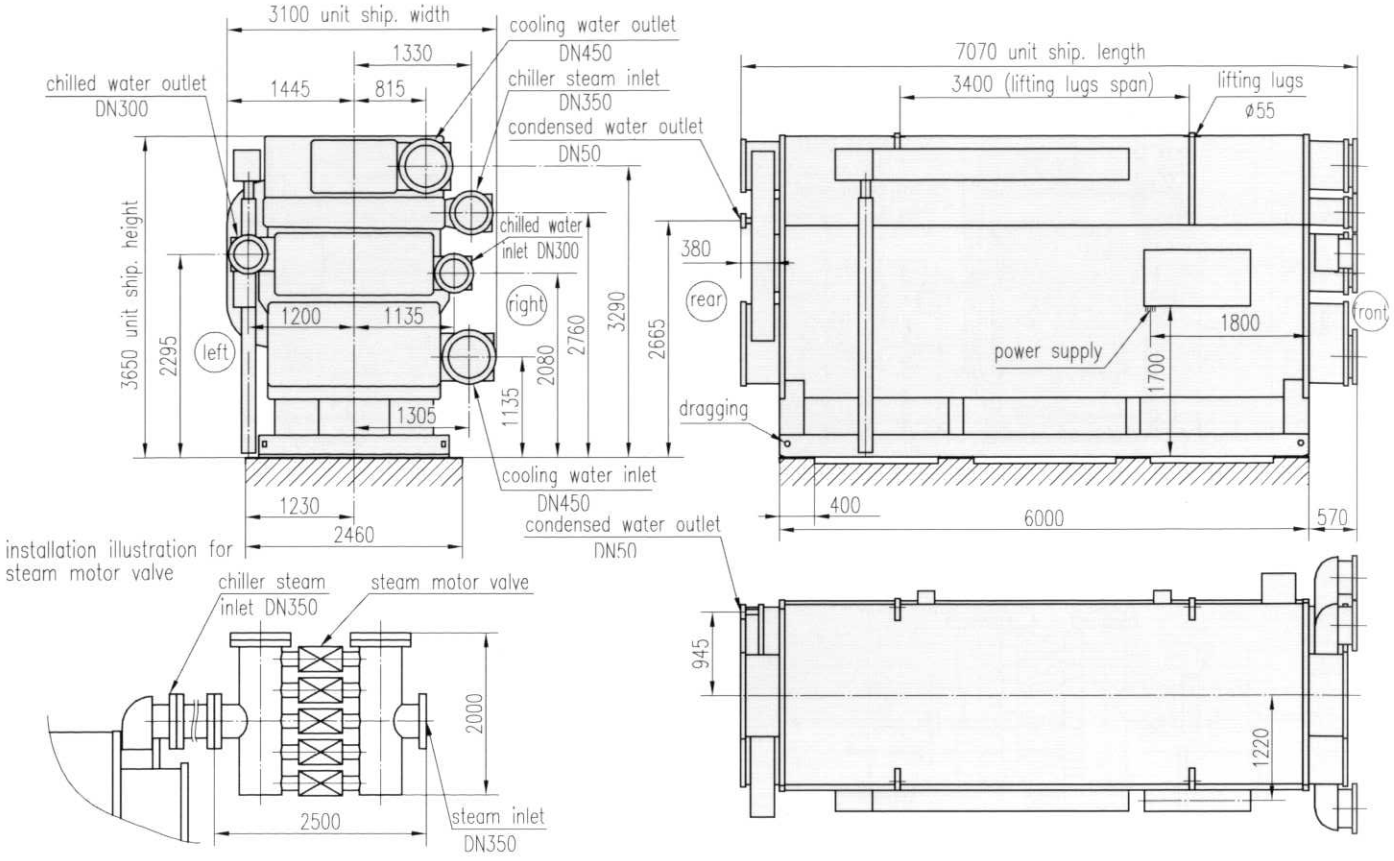




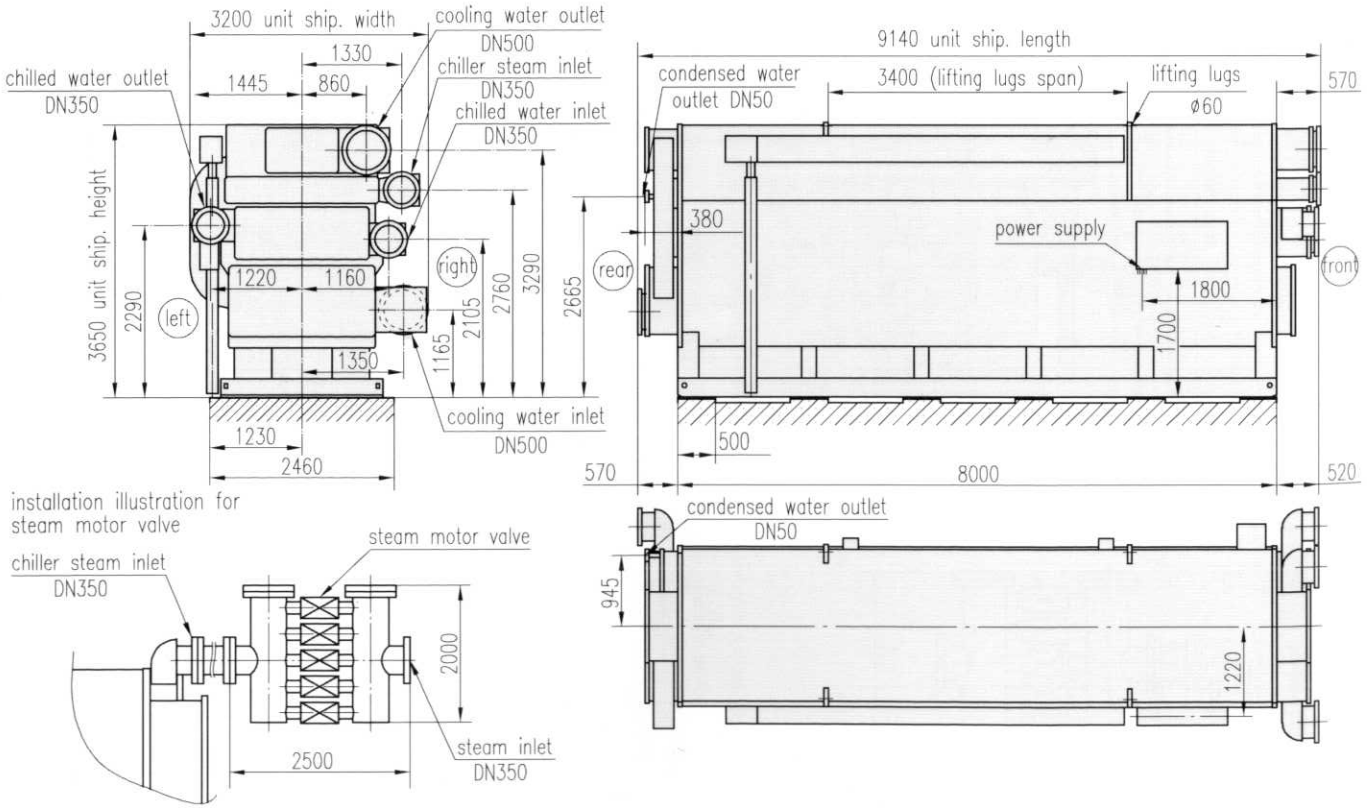
BDS250



BDS300

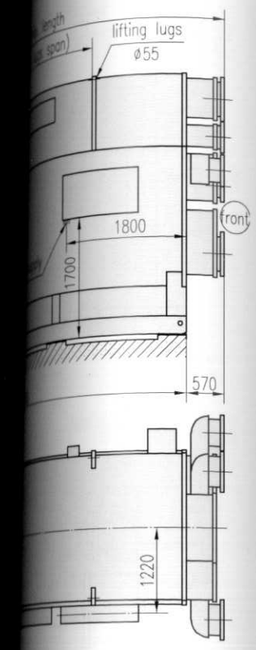


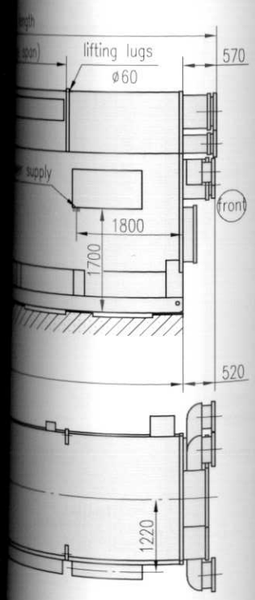
BDS400

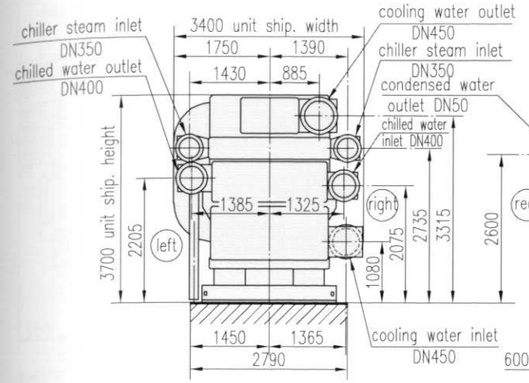


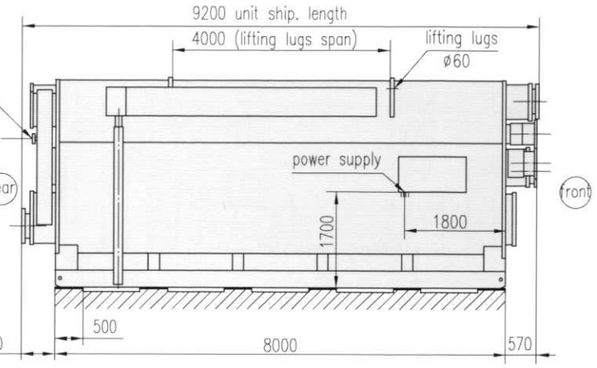
BDS500

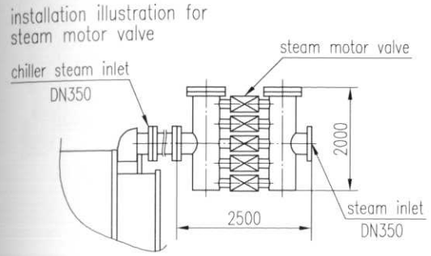
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm

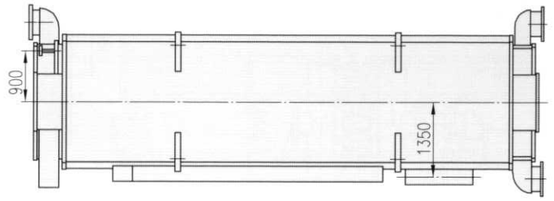




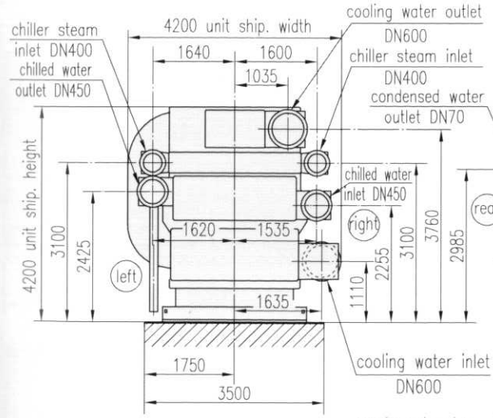


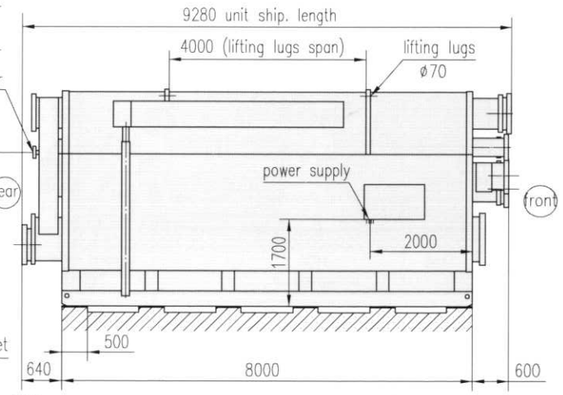


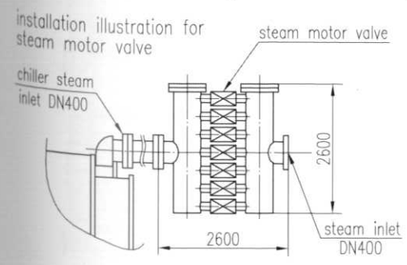


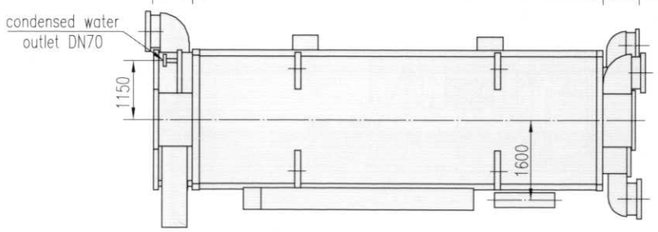


BDS600

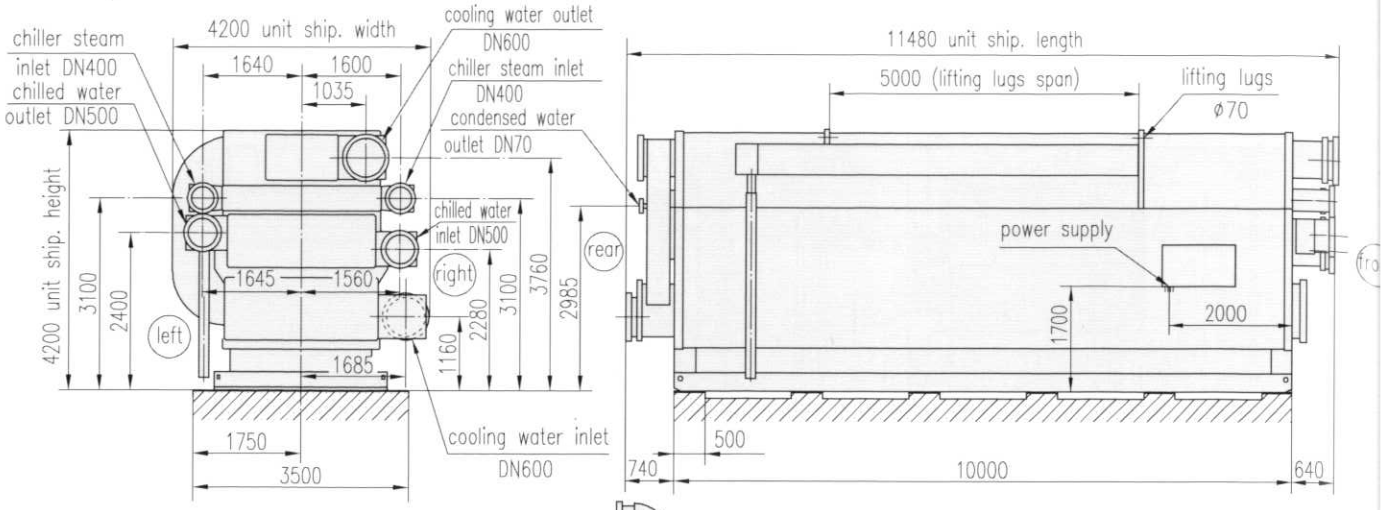


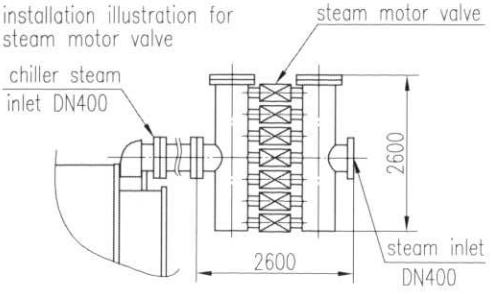




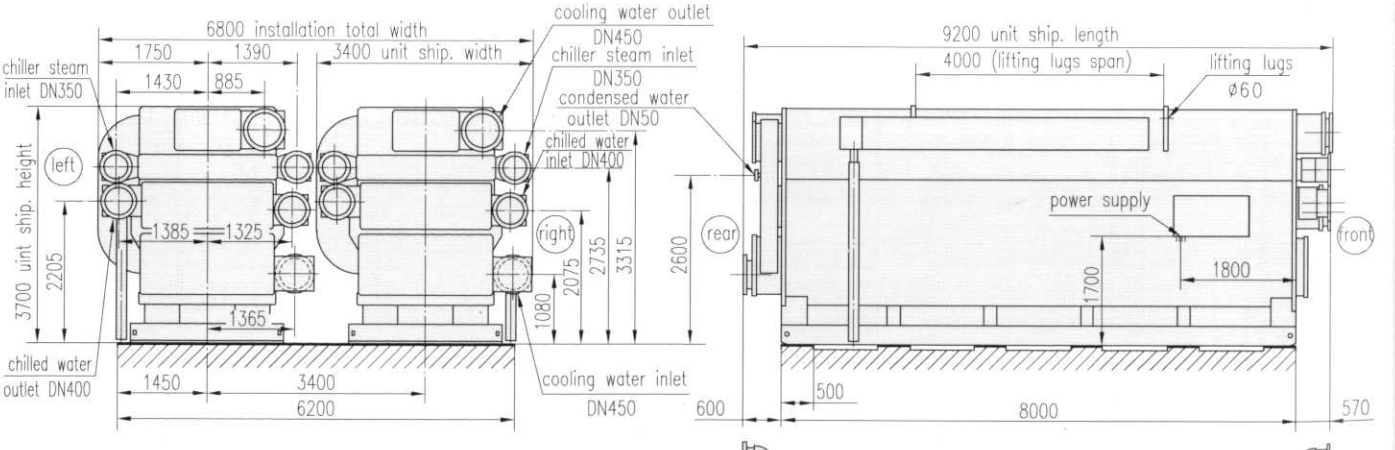


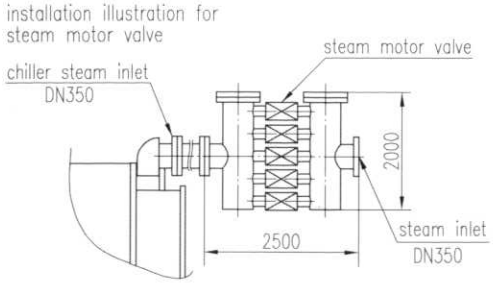
BDS800

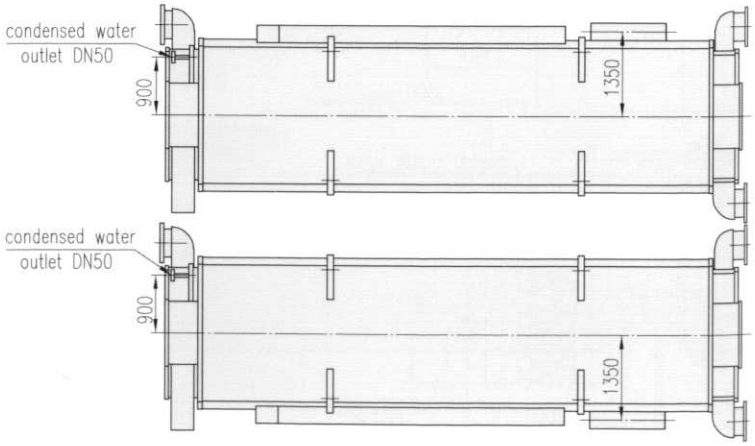




BDS1000

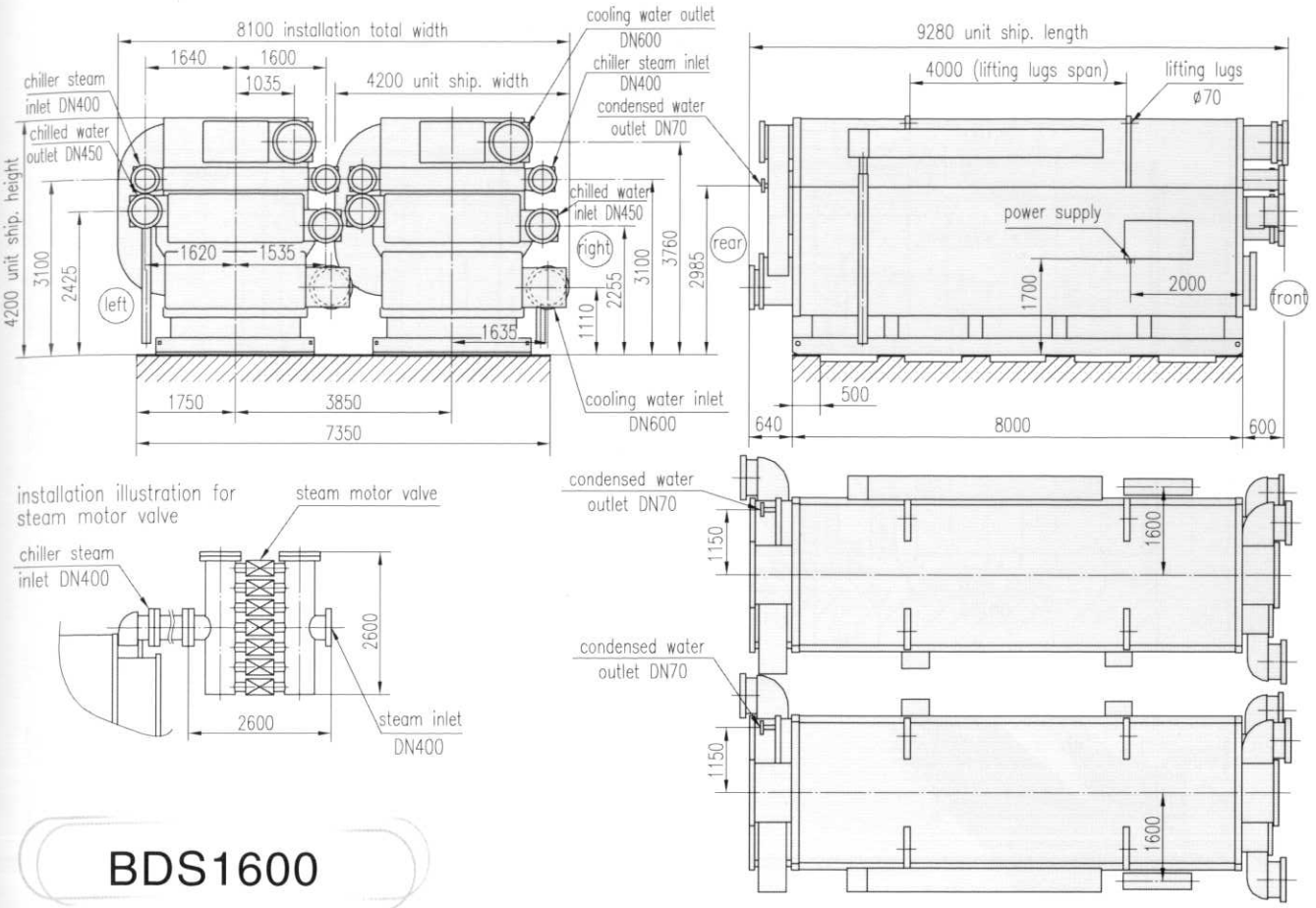




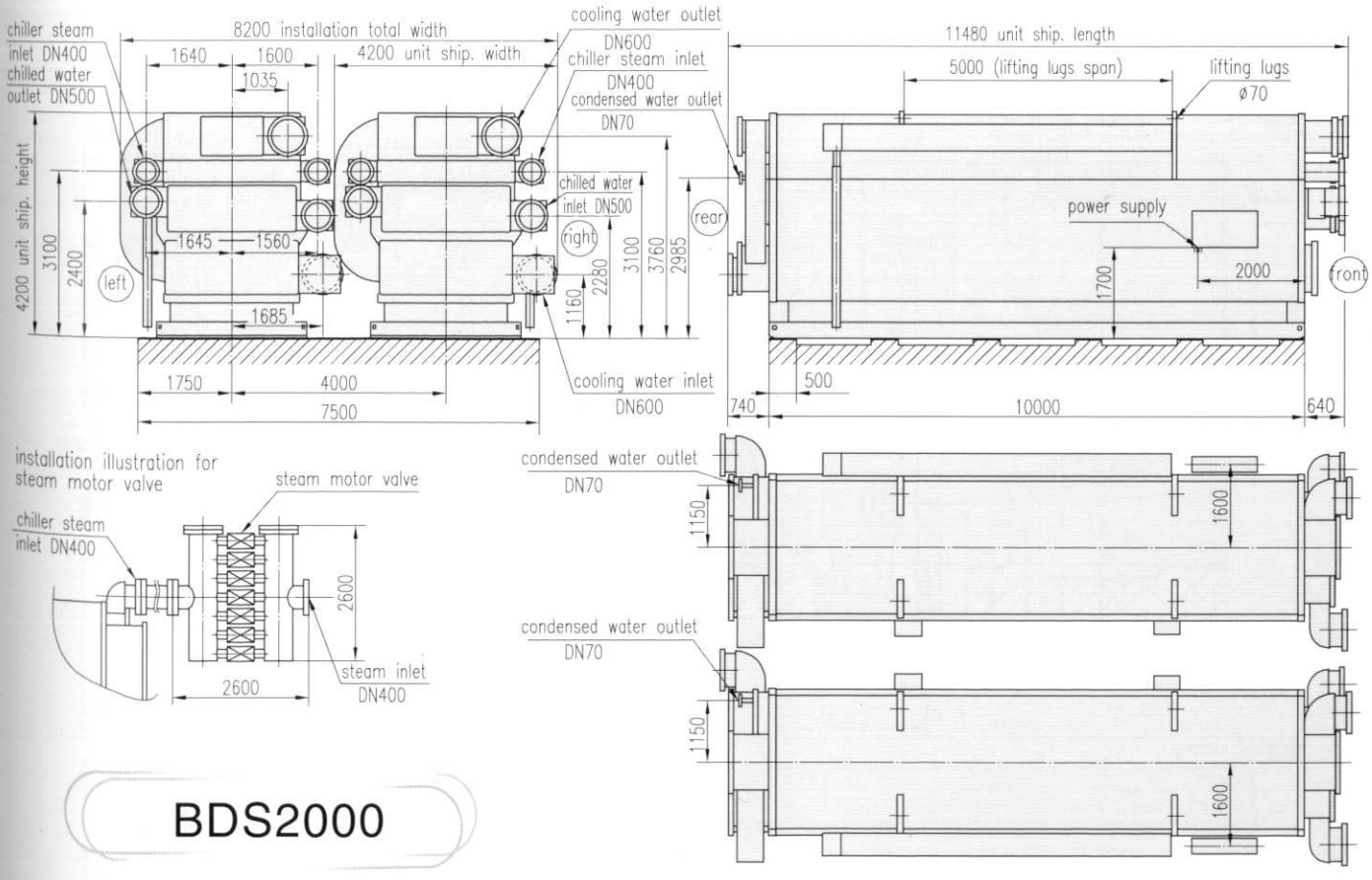


BDS1200

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm

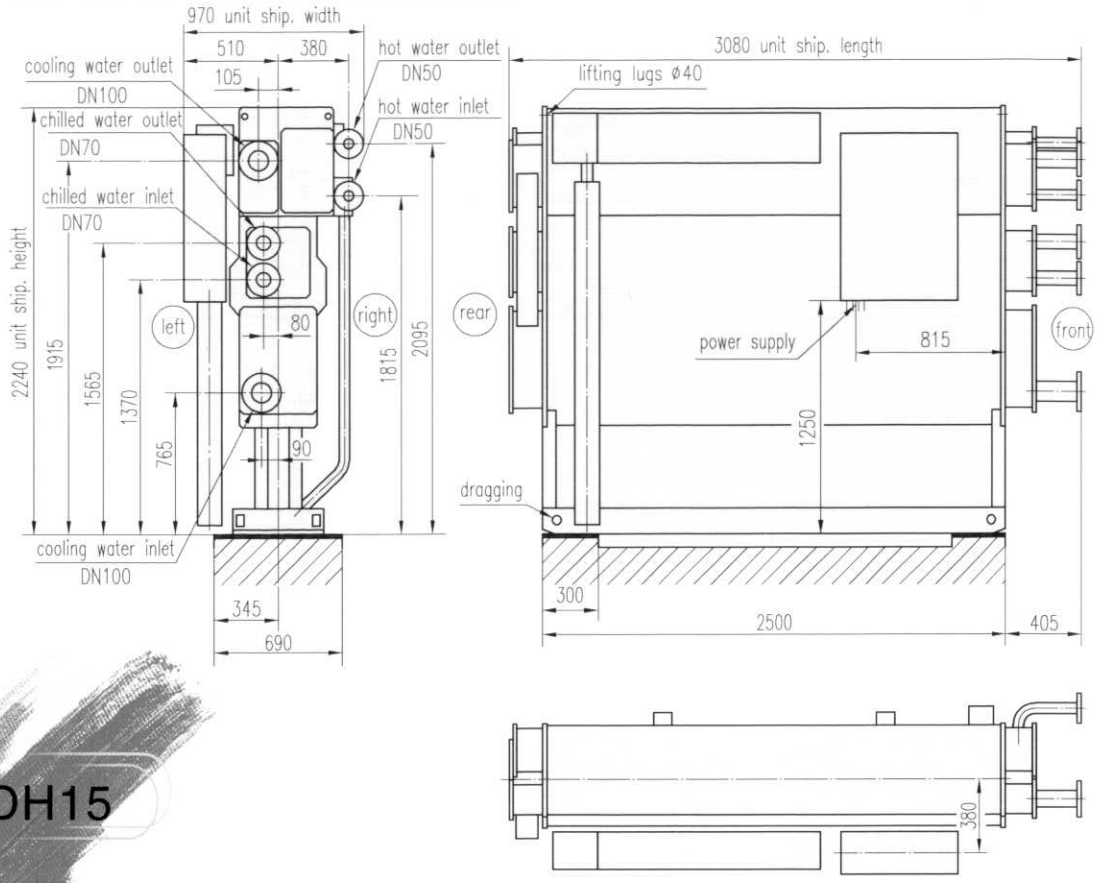


BDS1600

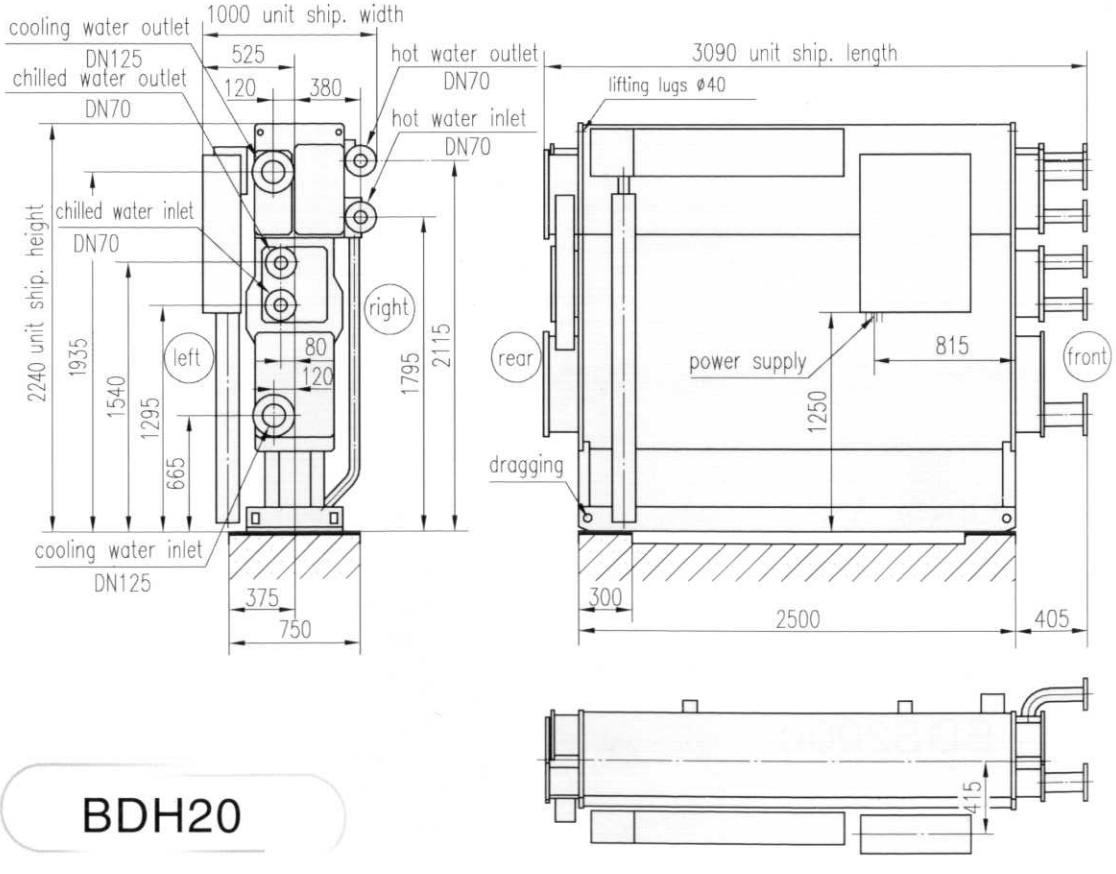


BDS2000

SINGLE-STAGE HOT WATER CHILLER

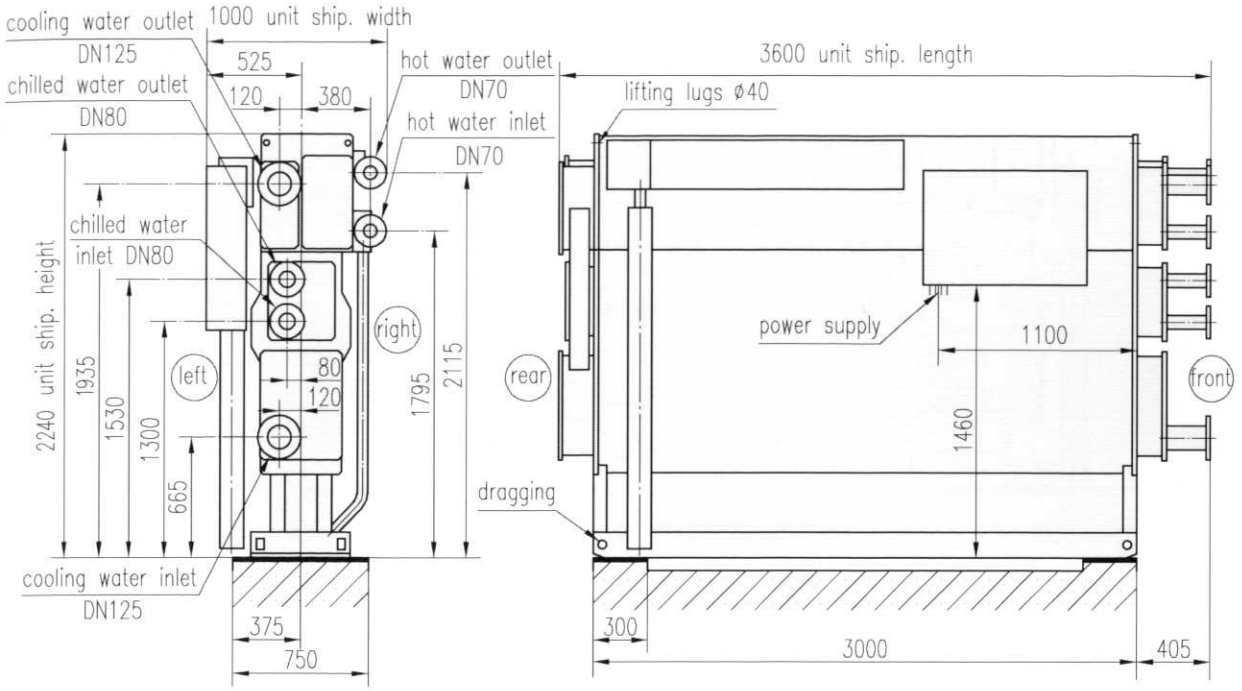


BDH15

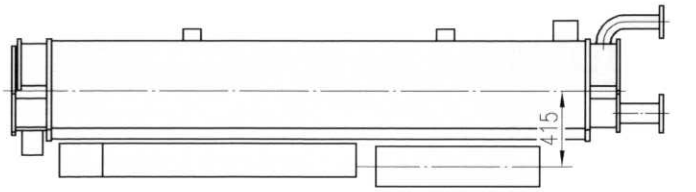


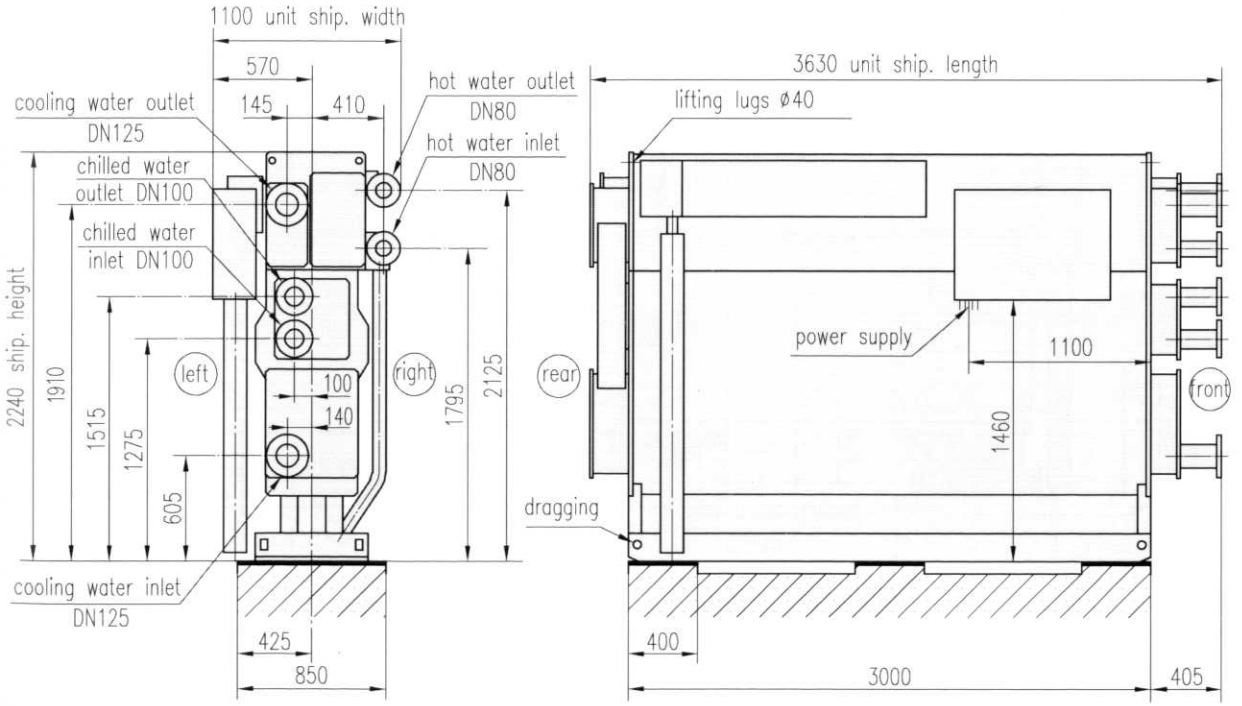
BDH20

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm

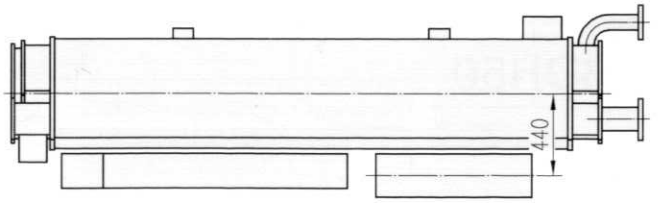

cooling water outlet
DN125
chilled water outlet
DN80
1000 unit ship. width
525
120
380
hot water outlet
DN70
hot water inlet
DN70
3600 unit ship. length
lifting lugs ø40
chilled water
inlet DN80
2240 unit ship. height
1935
1530
1300
665
left
right
80
120
1795
2115
rear
front
power supply
1100
1460
dragging
cooling water inlet
DN125
375
750
300
3000
405

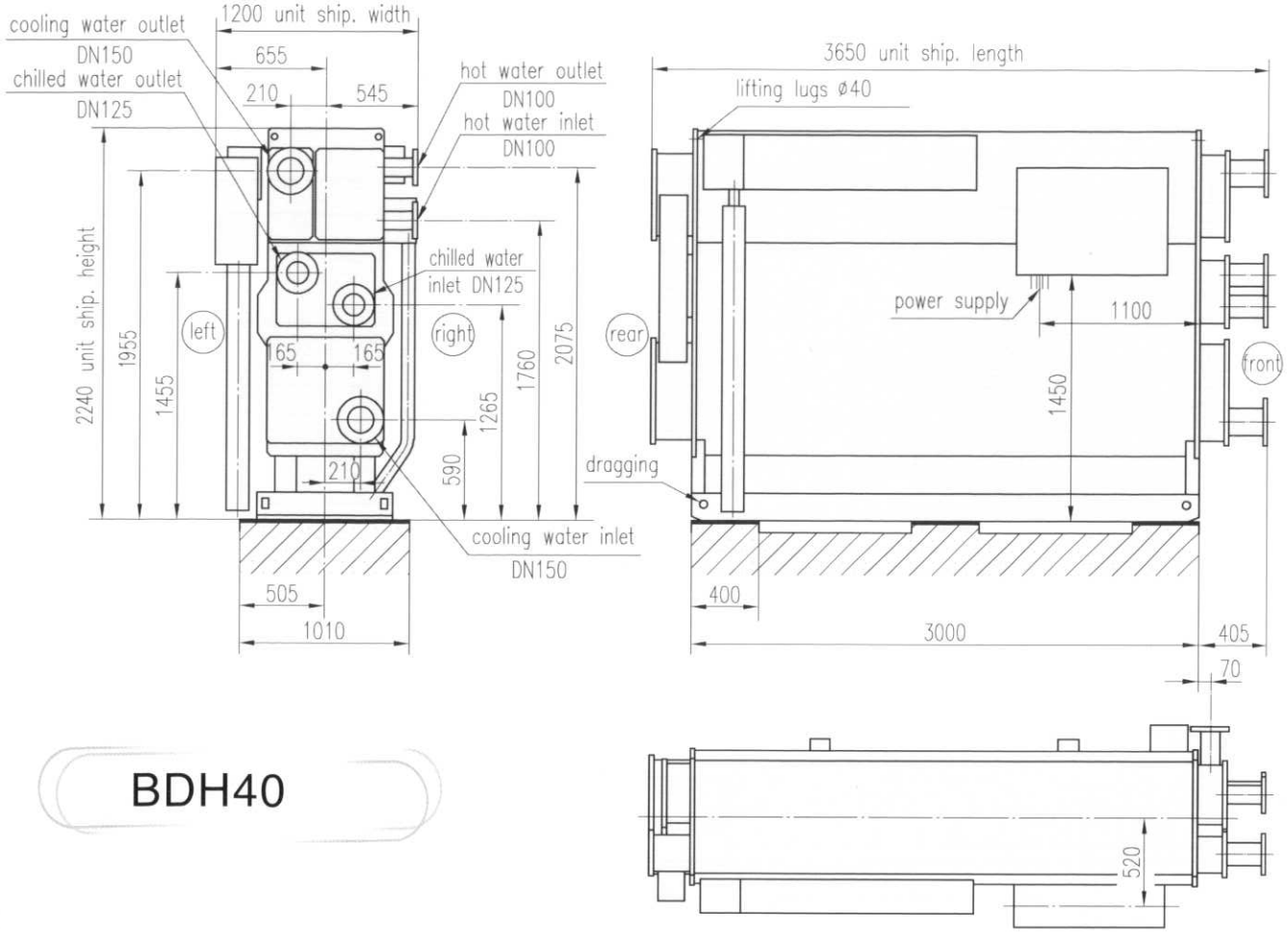
BDH25


415

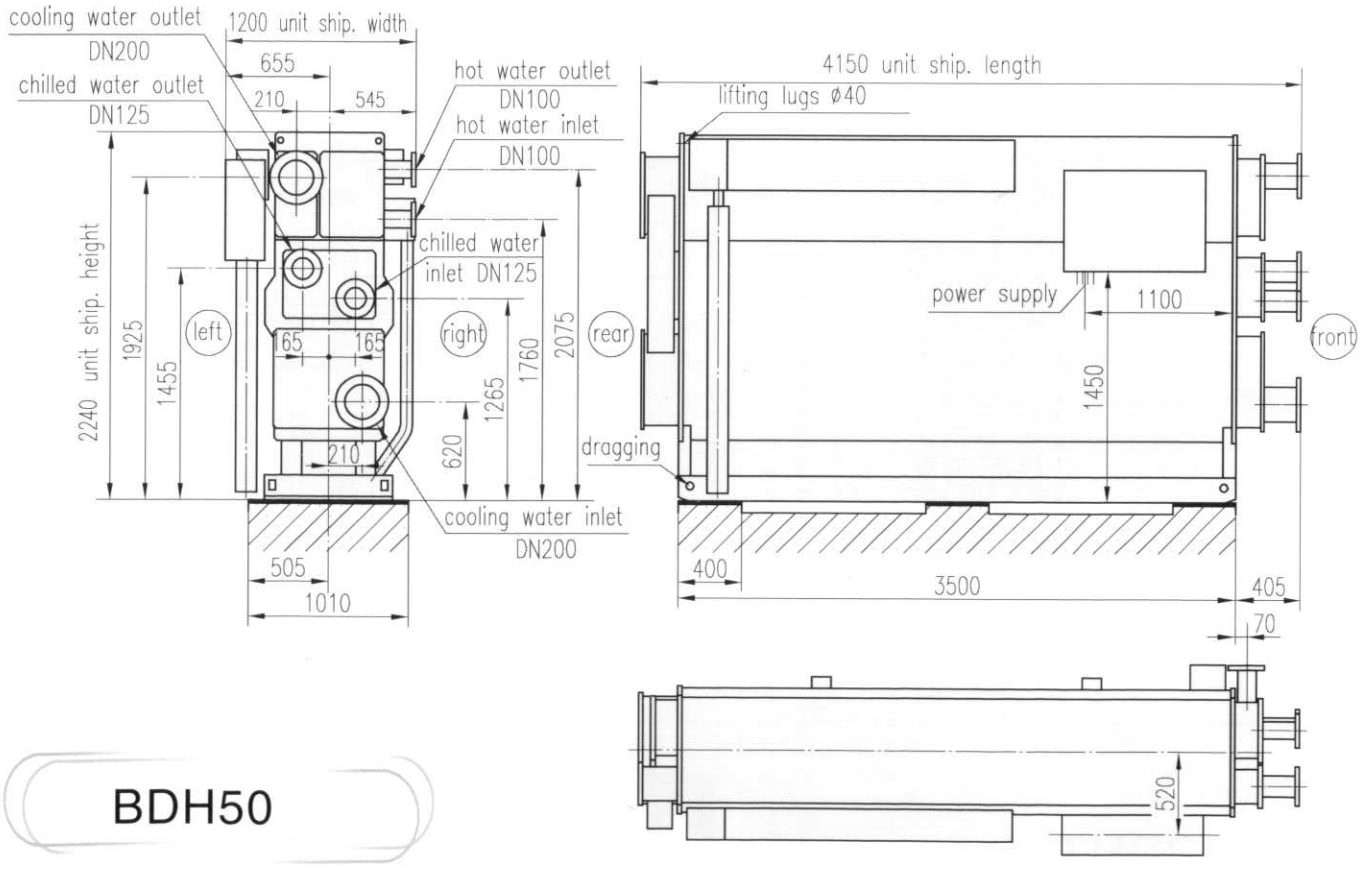

1100 unit ship. width
570
145
410
cooling water outlet
DN125
hot water outlet
DN80
hot water inlet
DN80
3630 unit ship. length
lifting lugs ø40
chilled water
outlet DN100
chilled water
inlet DN100
2240 ship. height
1910
1515
1275
605
left
right
100
140
1795
2125
rear
front
power supply
1100
1460
dragging
cooling water inlet
DN125
425
850
400
3000
405

BDH30


440

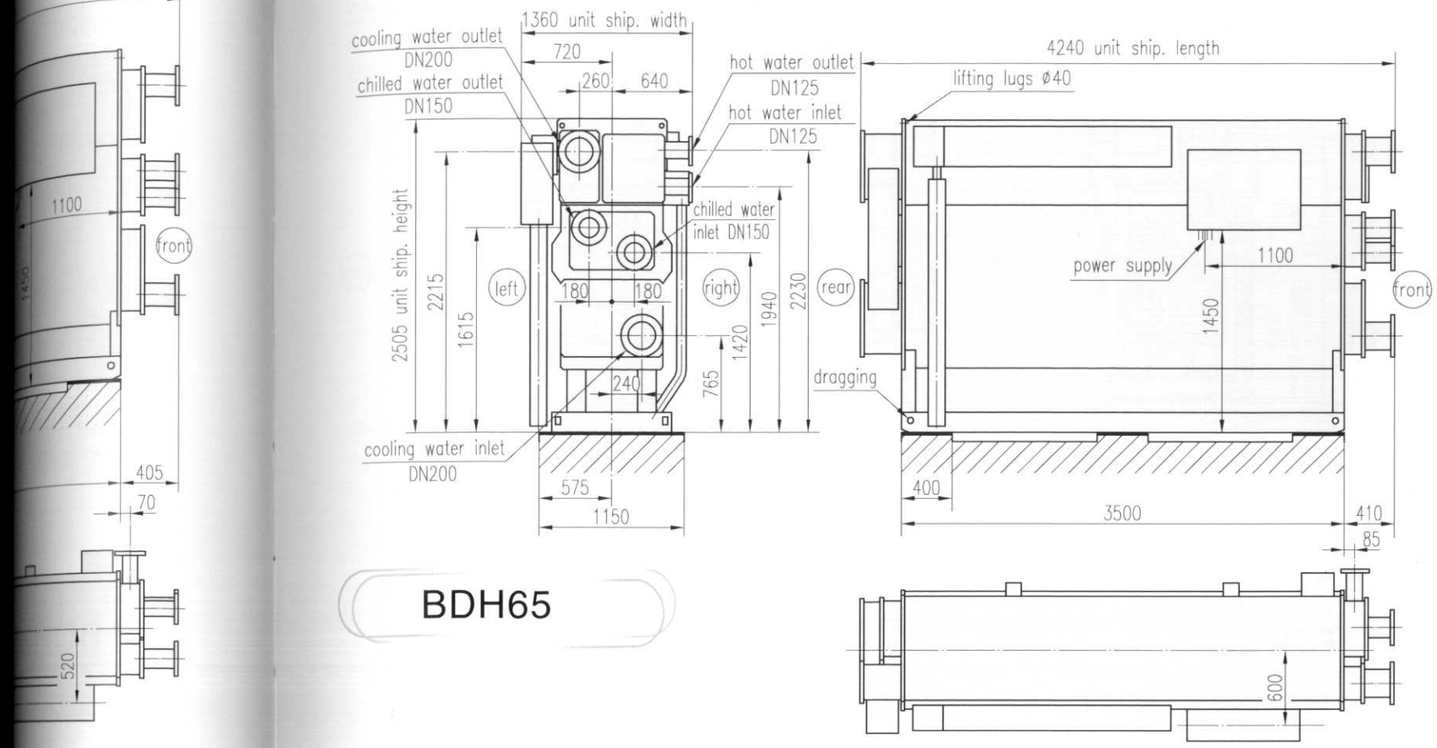


BDH40

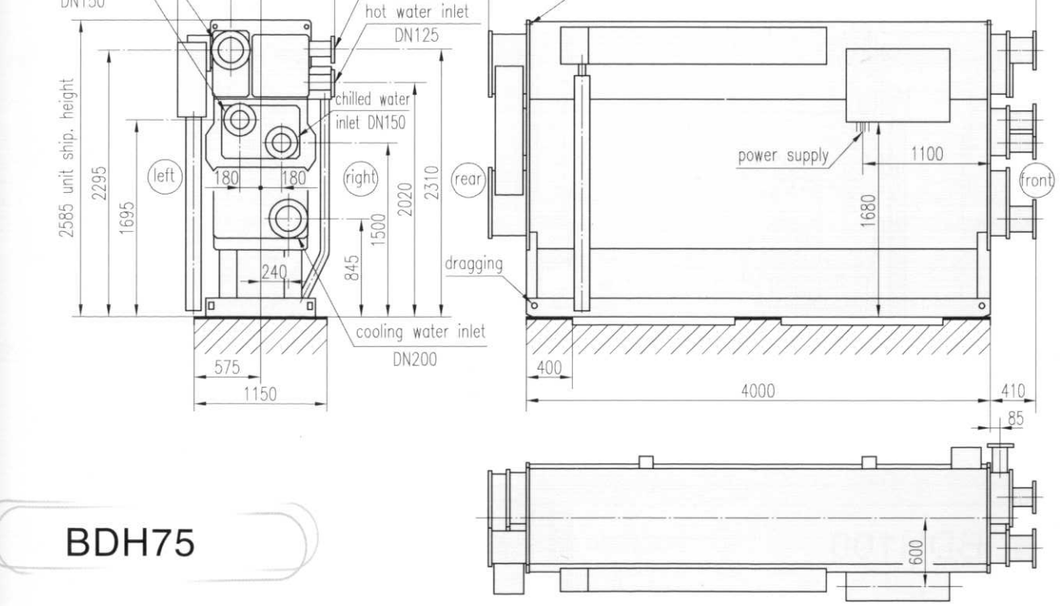


BDH50

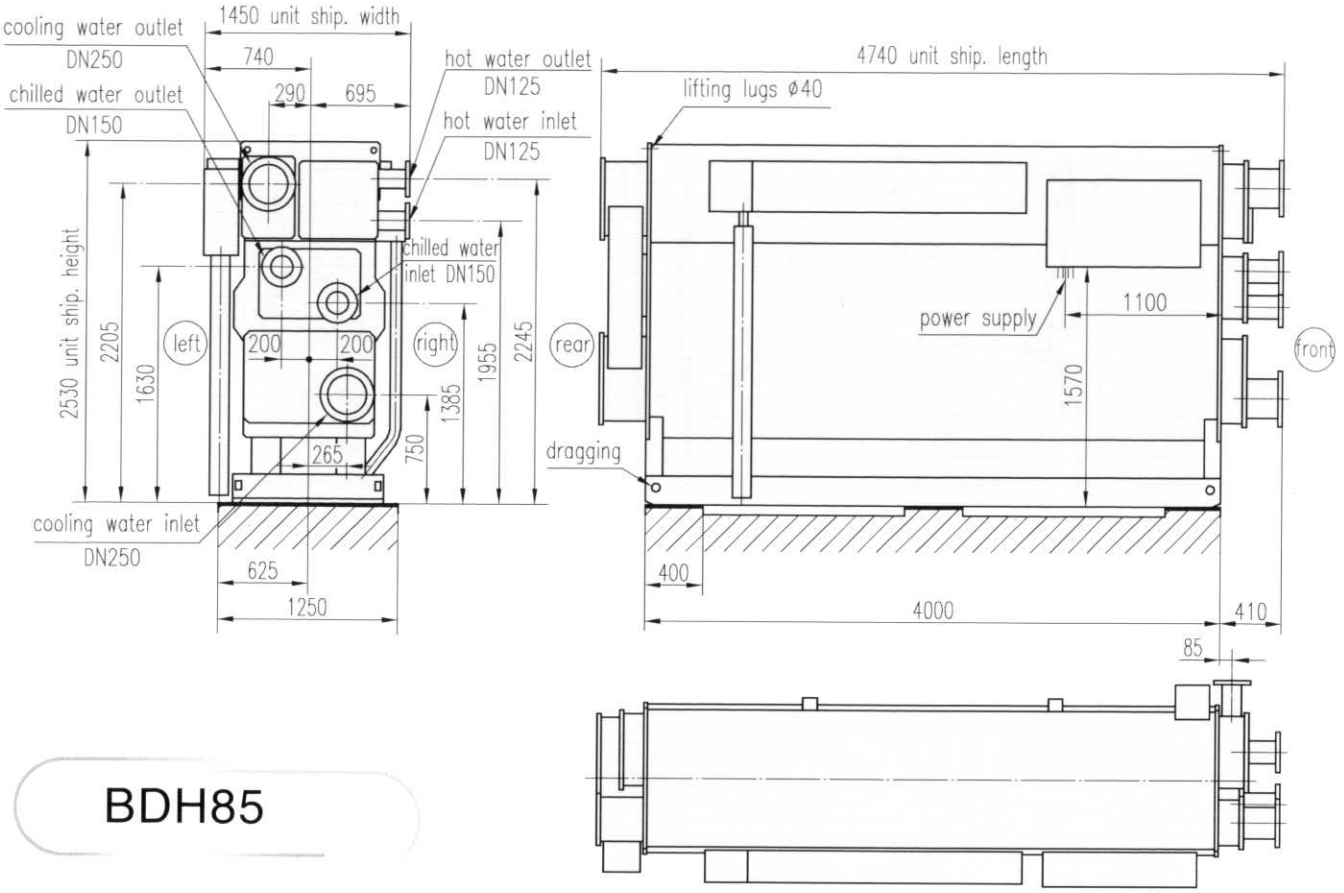
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm


1360 unit ship. width
720
260
640
cooling water outlet
DN200
chilled water outlet
DN150
hot water outlet
DN125
hot water inlet
DN125
chilled water
inlet DN150
2505 unit ship. height
2215
1615
left
180
180
right
2230
1940
1420
765
240
cooling water inlet
DN200
575
1150
4240 unit ship. length
lifting lugs ø40
power supply
1100
1450
rear
front
dragging
400
3500
410
85
600

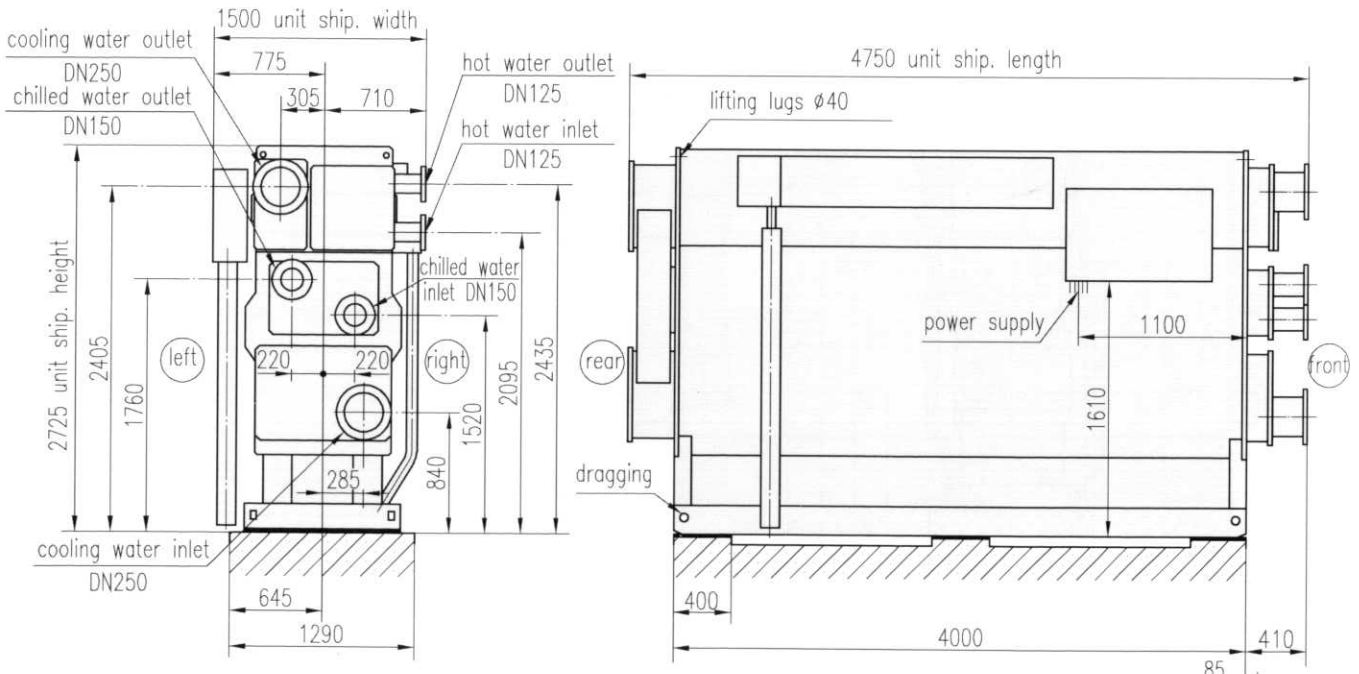
BDH65


cooling water outlet
DN200
1360 unit ship. width
720
260
640
chilled water outlet
DN150
hot water outlet
DN125
hot water inlet
DN125
chilled water
inlet DN150
2585 unit ship. height
2295
1695
left
180
180
right
2310
2020
1500
845
240
cooling water inlet
DN200
575
1150
4740 unit ship. length
lifting lugs ø40
power supply
1100
1680
rear
front
dragging
400
4000
410
85
600

BDH75

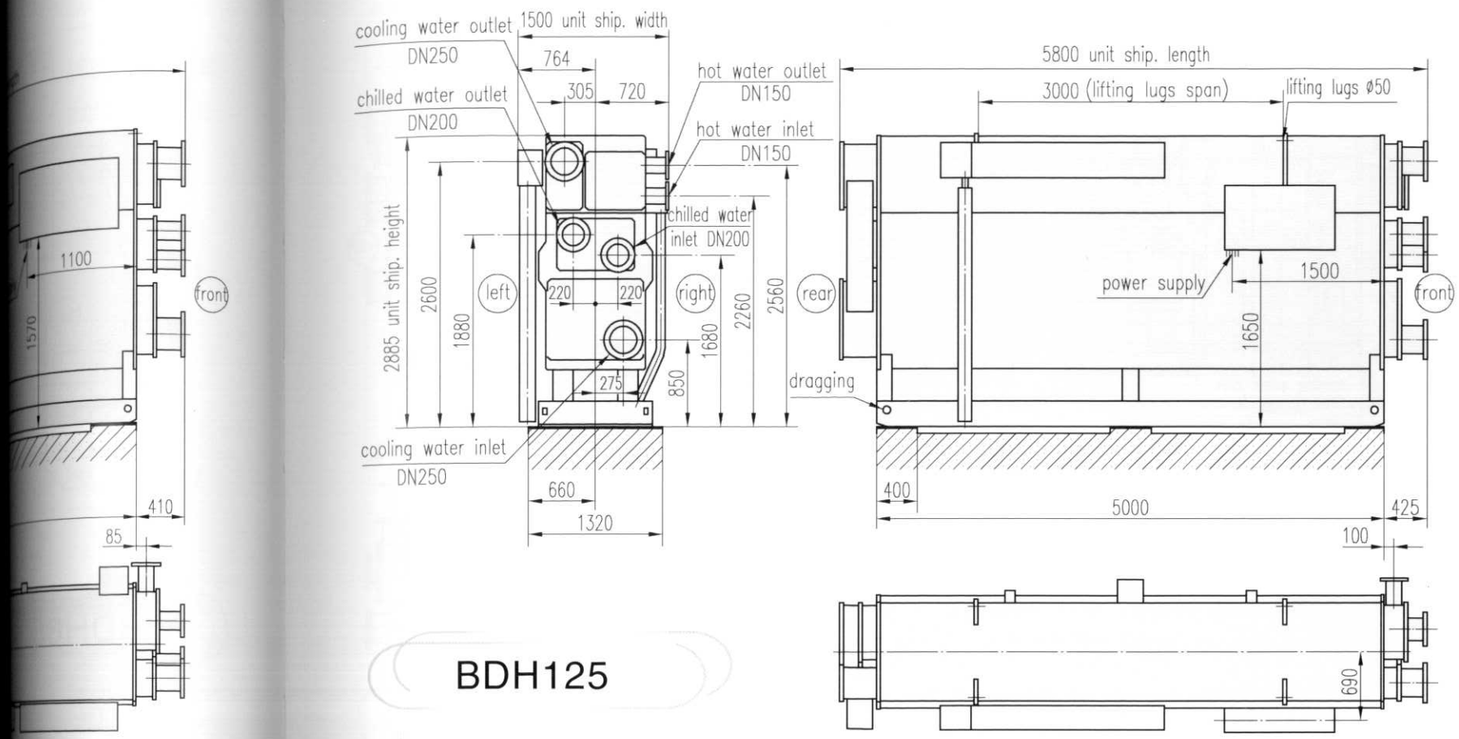


BDH85

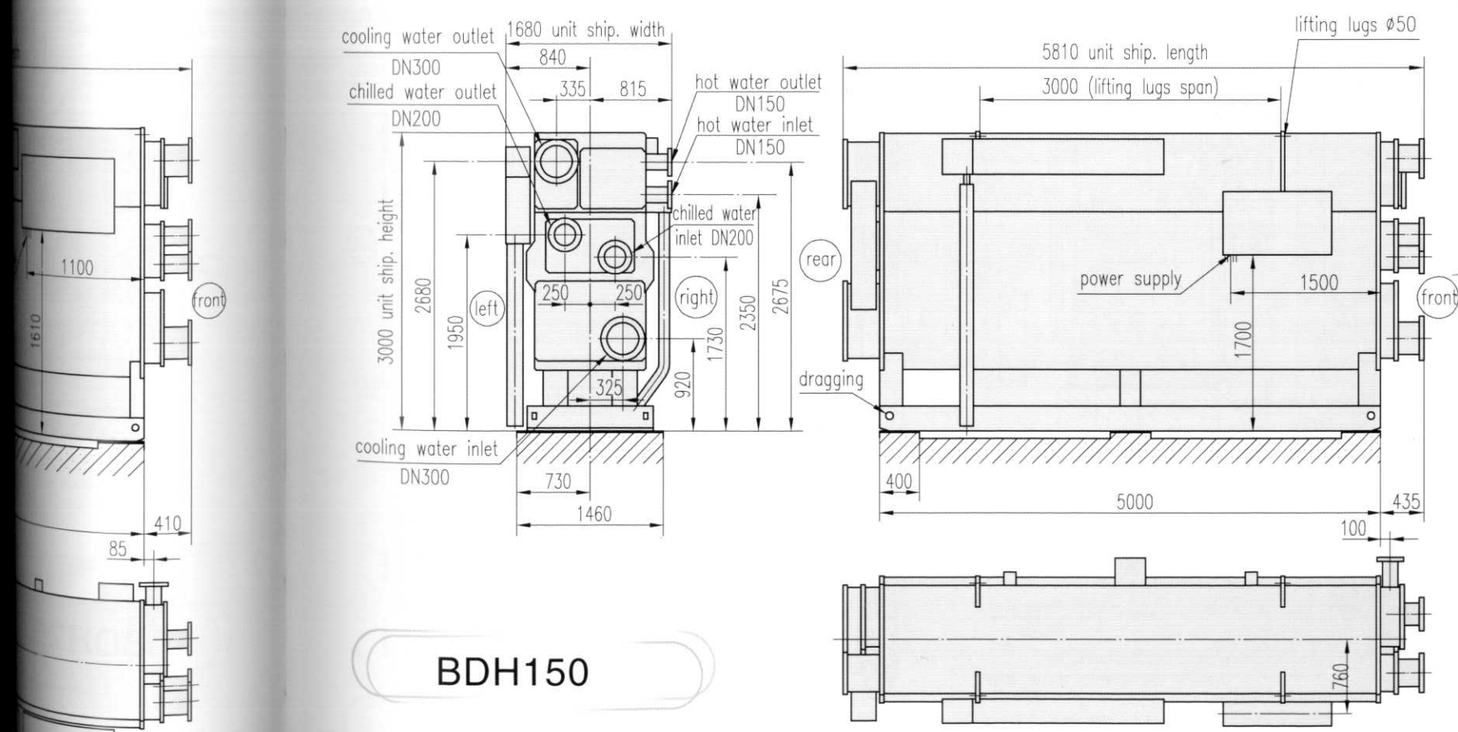


BDH100

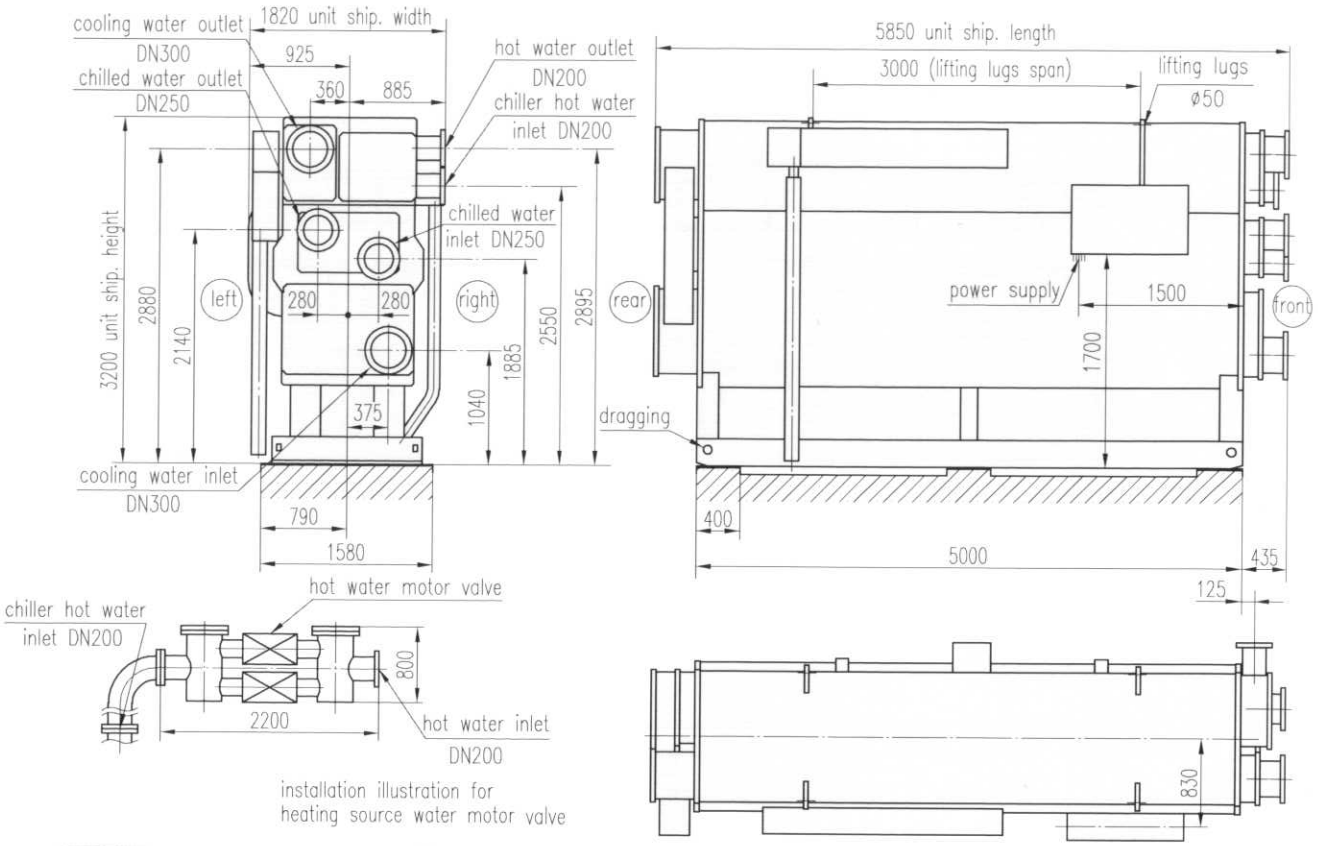
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



BDH125

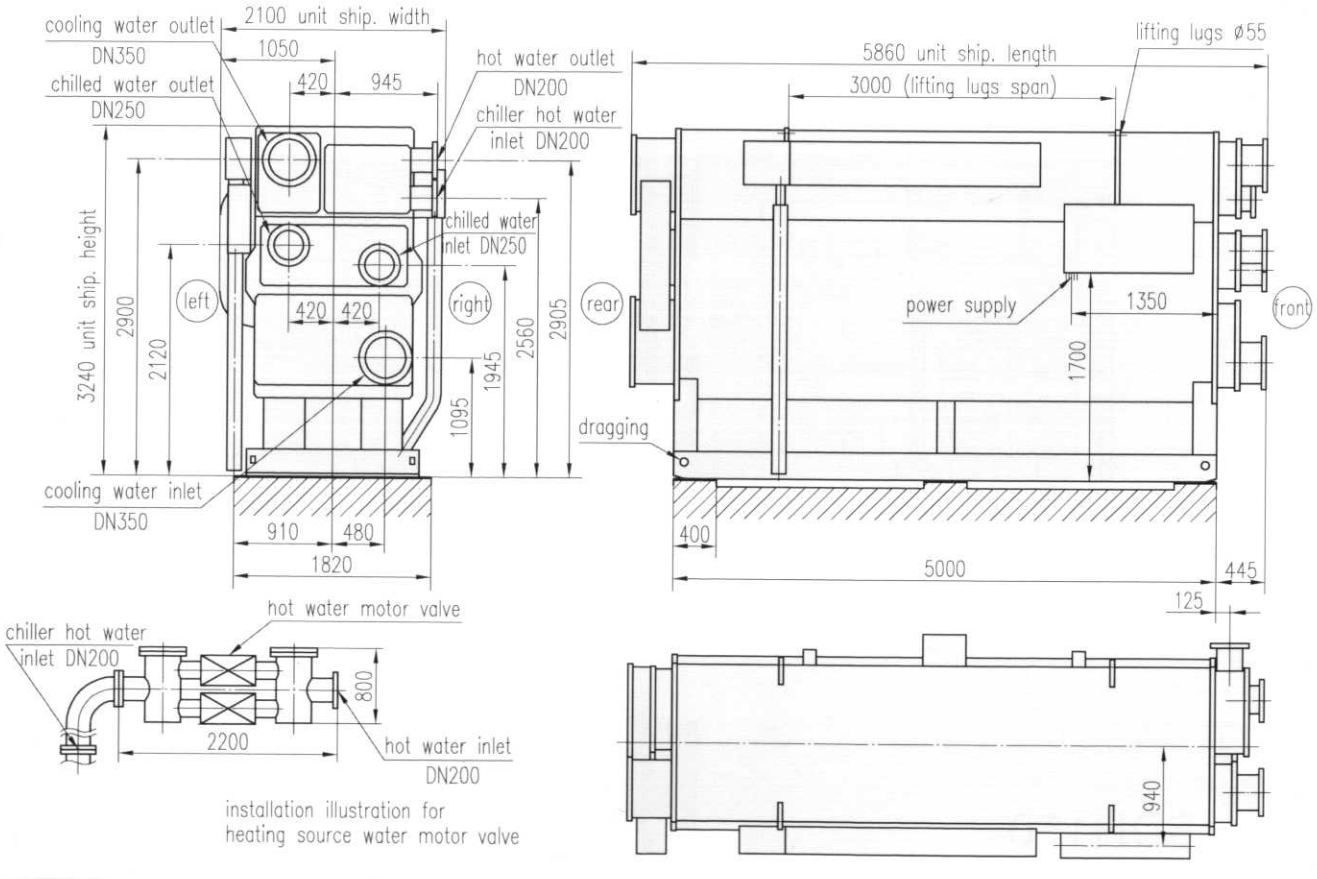


BDH150



installation illustration for
heating source water motor valve

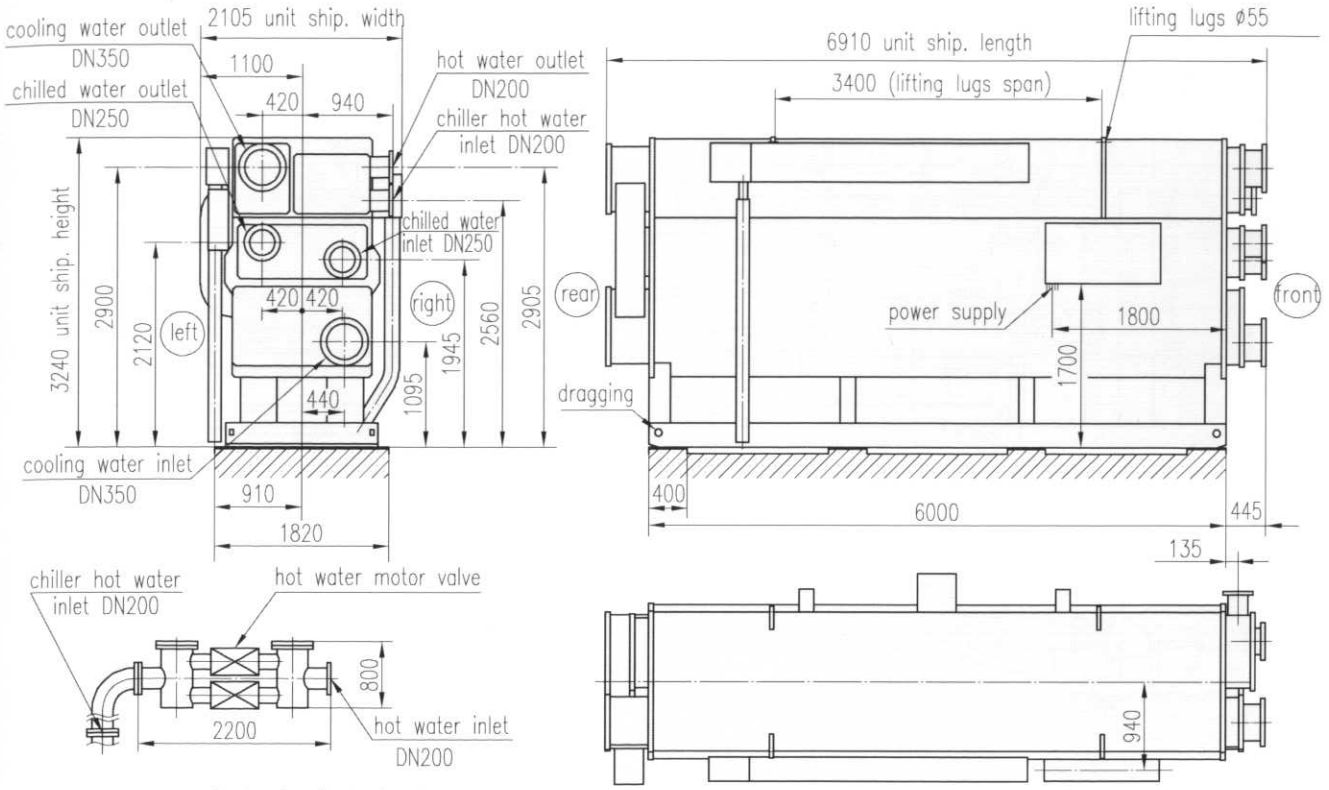
BDH175



installation illustration for
heating source water motor valve

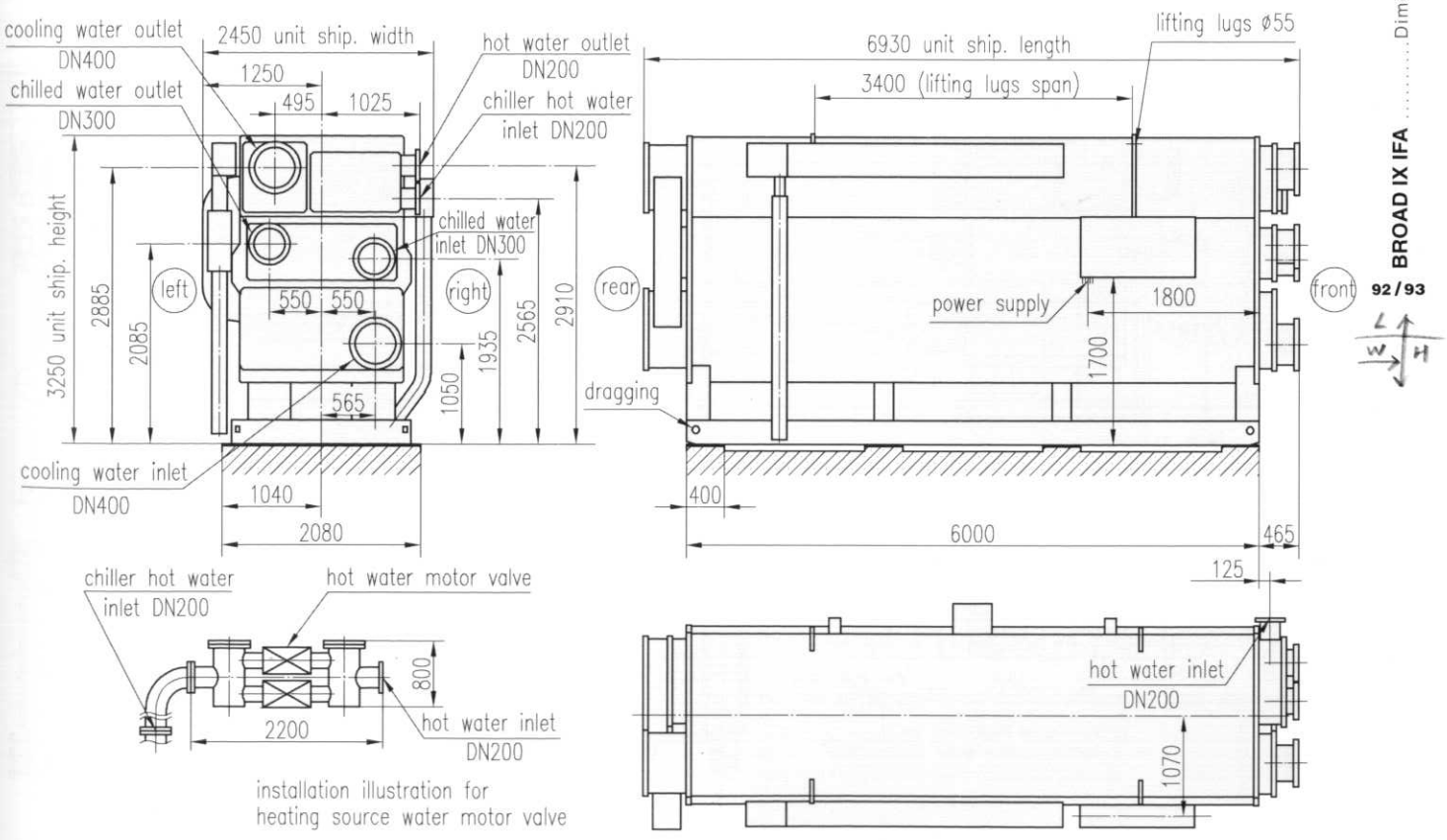
BDH200

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



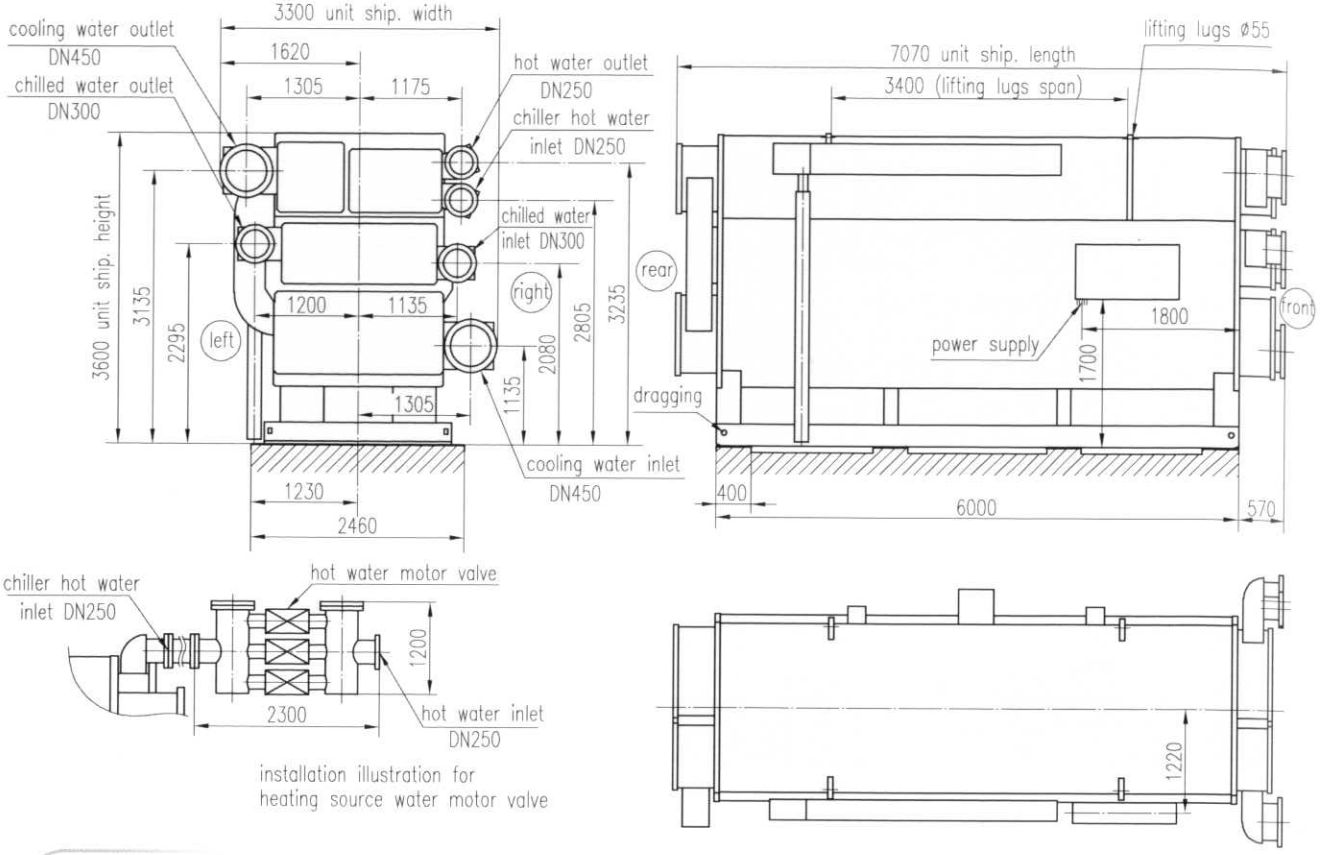
installation illustration for
heating source water motor valve

BDH250



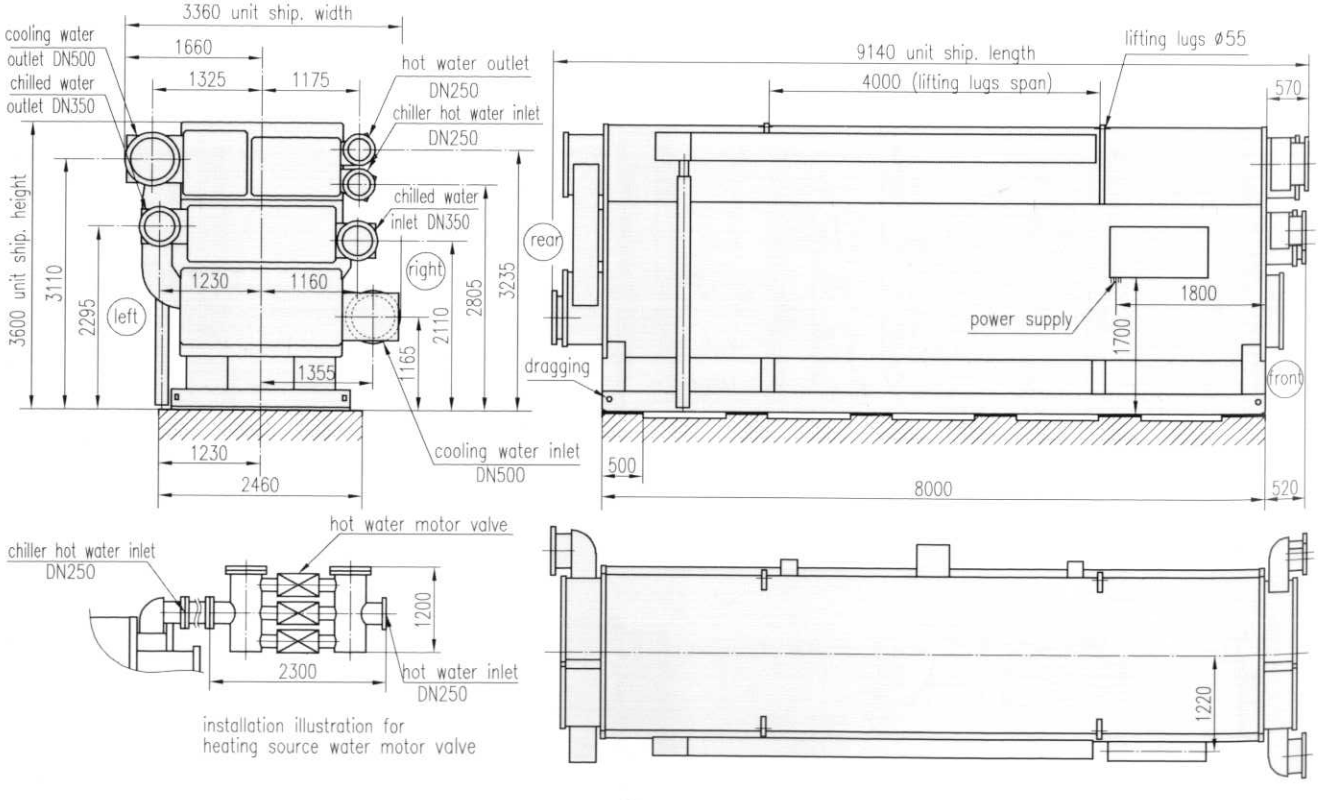
installation illustration for
heating source water motor valve

BDH300



installation illustration for
heating source water motor valve

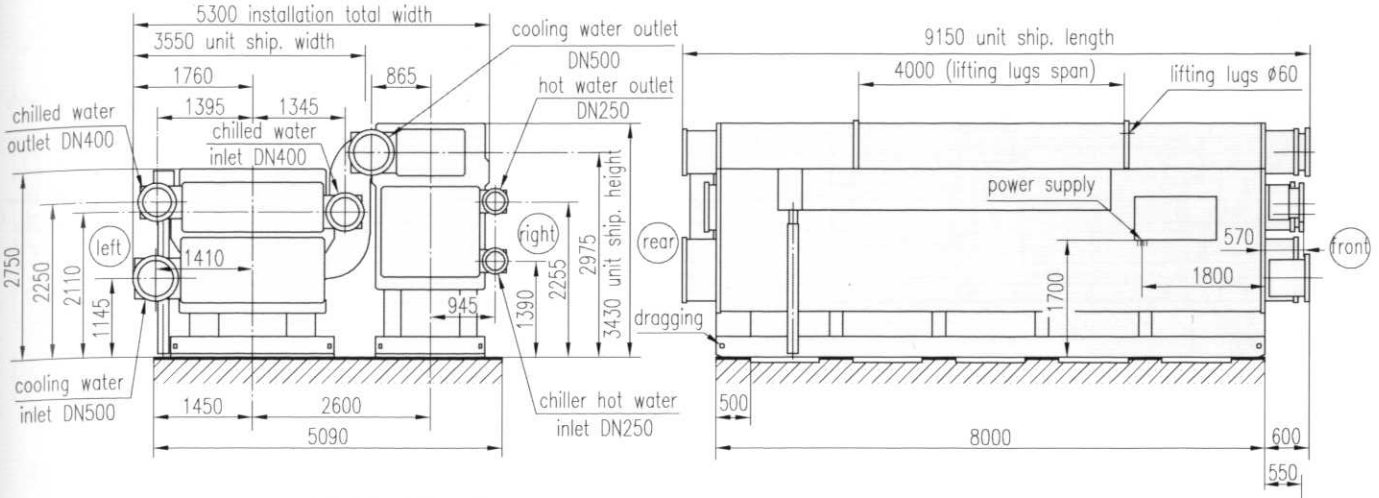
BDH400

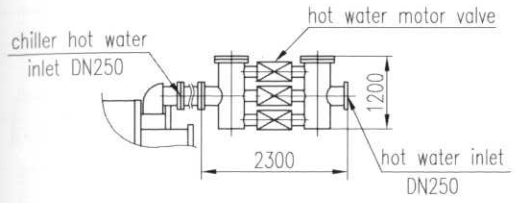


installation illustration for
heating source water motor valve

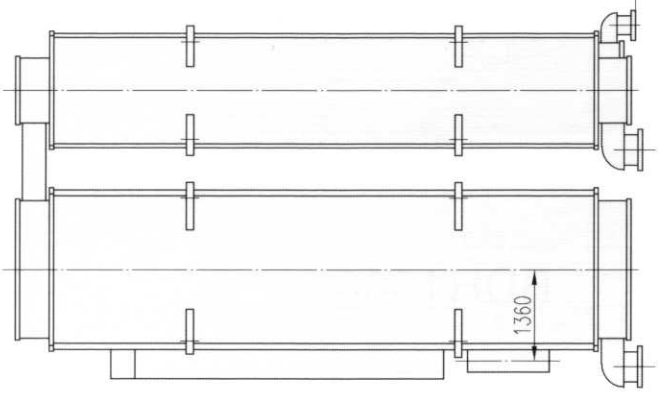
BDH500

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm

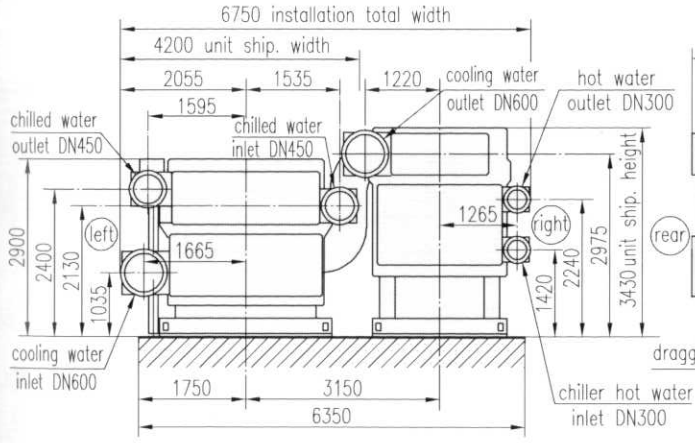


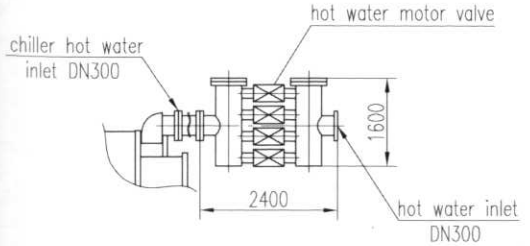


installation illustration for heating source water motor valve

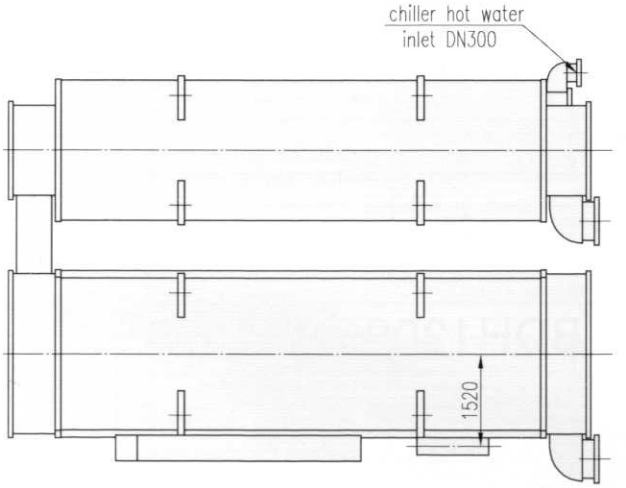


BDH600

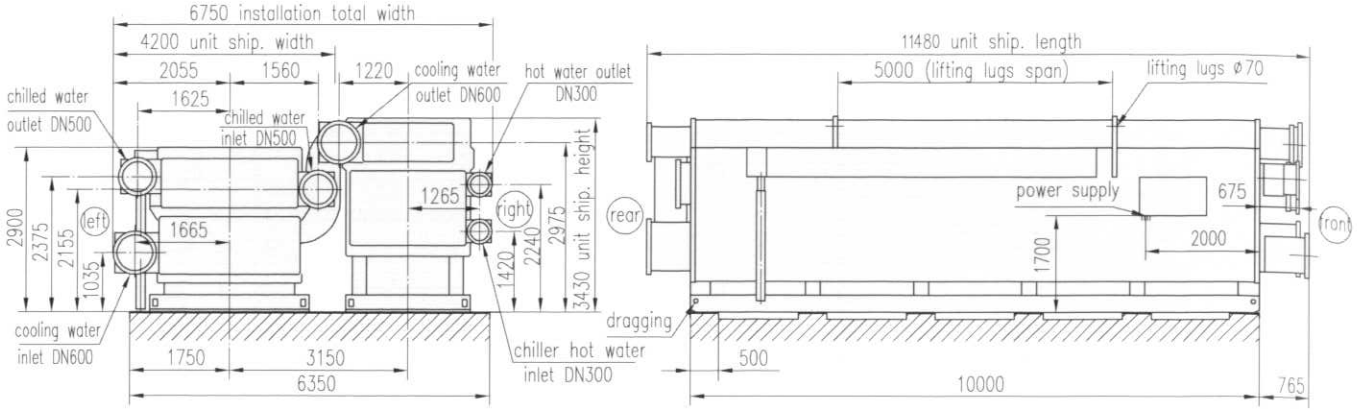


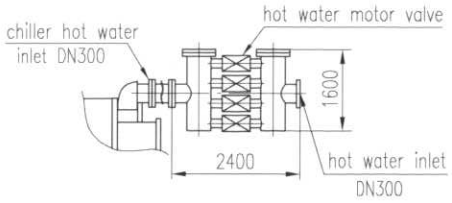


installation illustration for heating source water motor valve

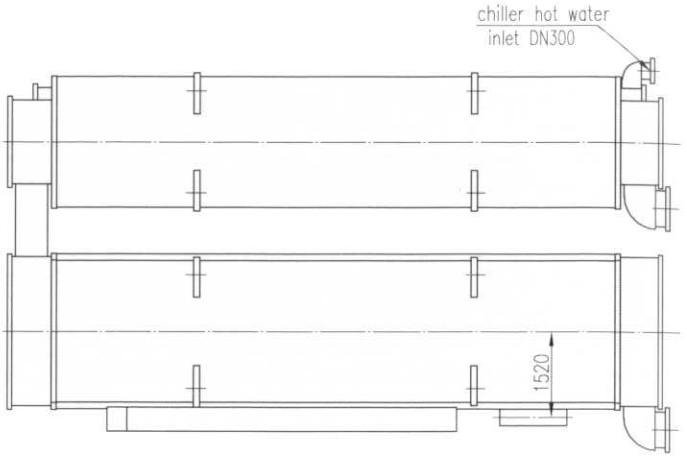


BDH800

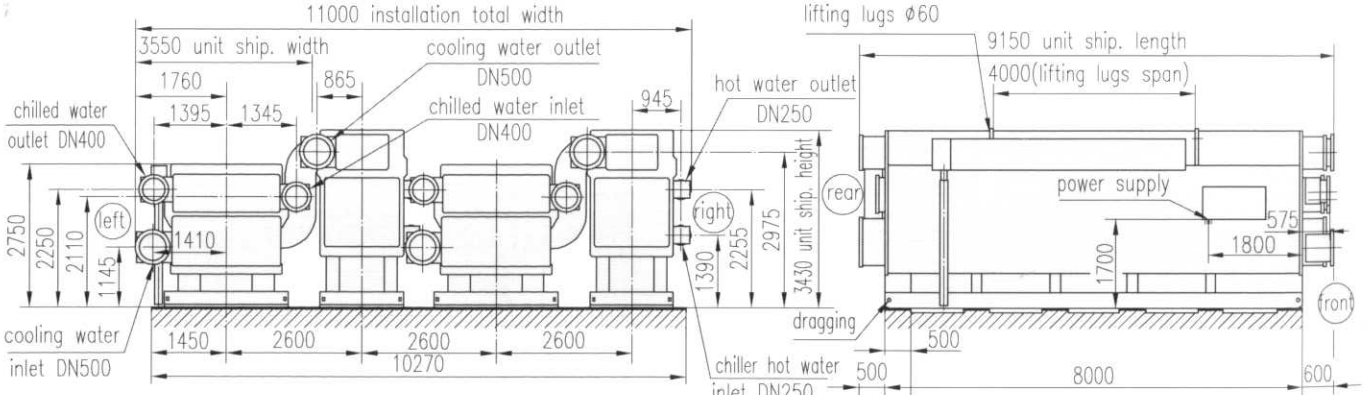


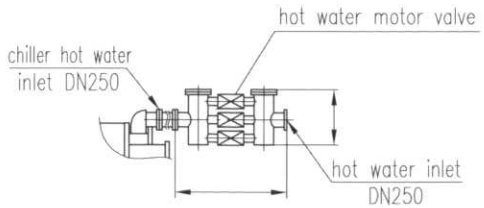


installation illustration for heating source water motor valve

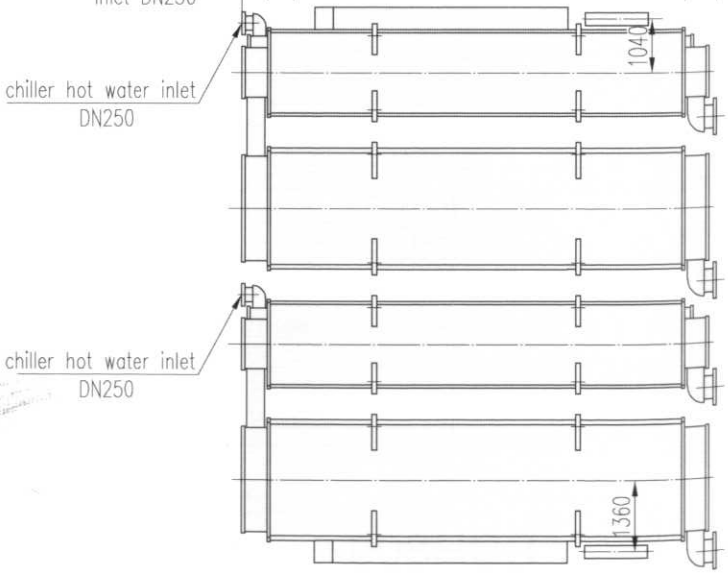


BDH1000



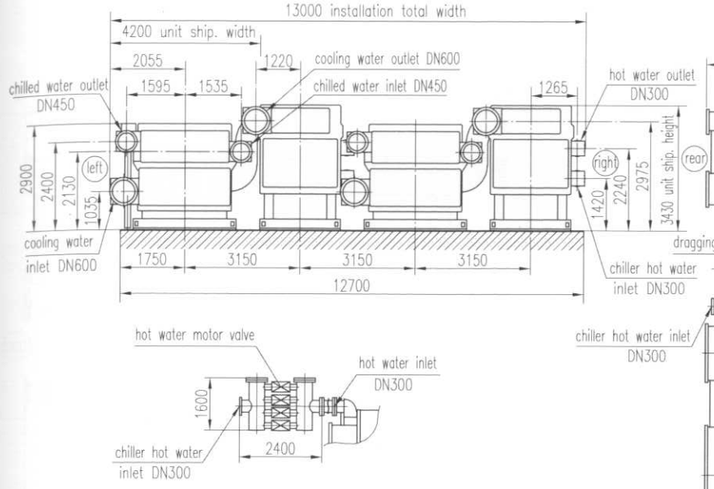


installation illustration for heating source water motor valve



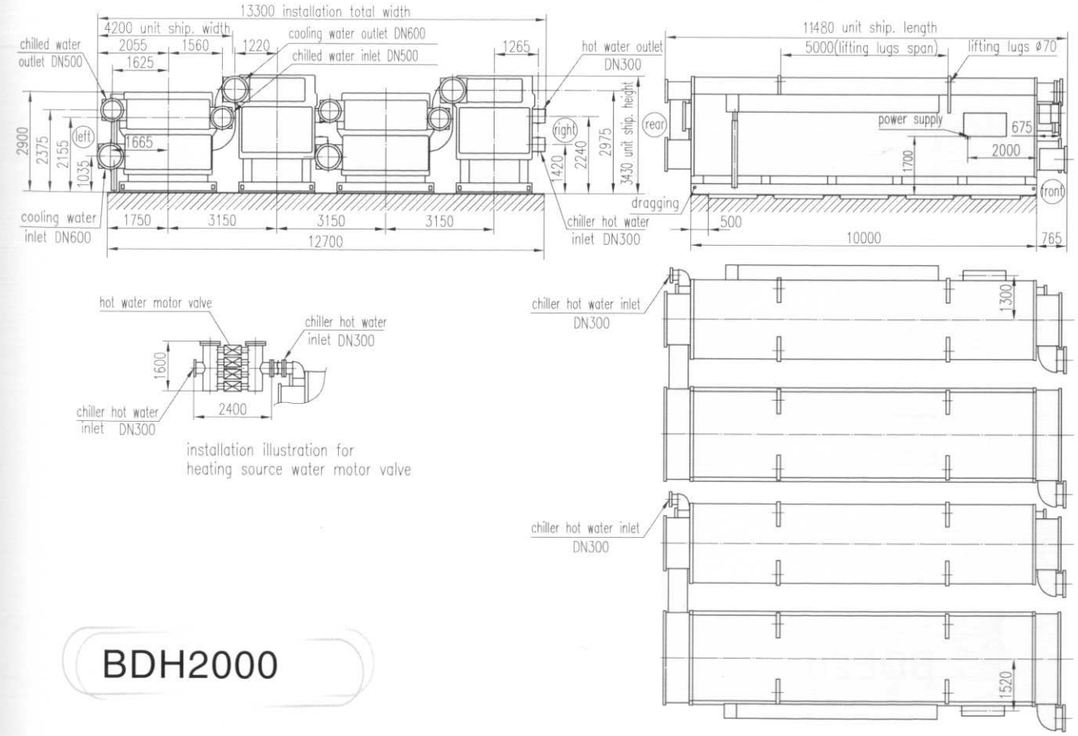
BDH1200

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



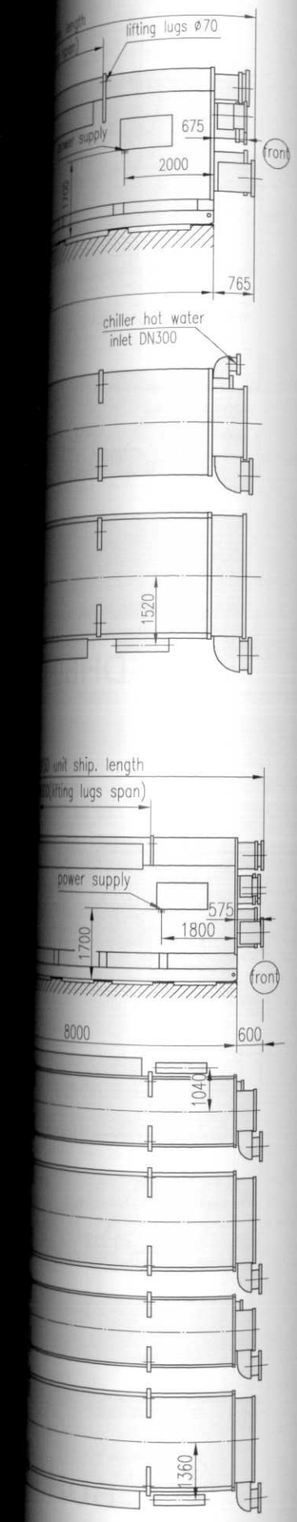
installation illustration for heating source water motor valve

BDH1600

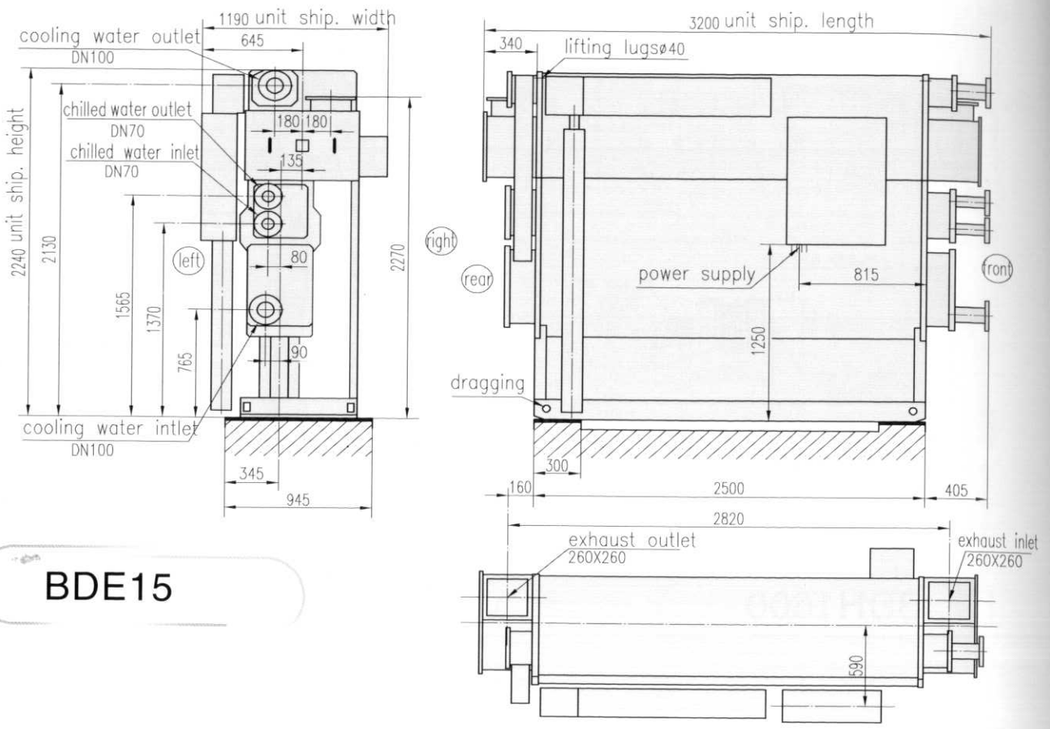


installation illustration for heating source water motor valve

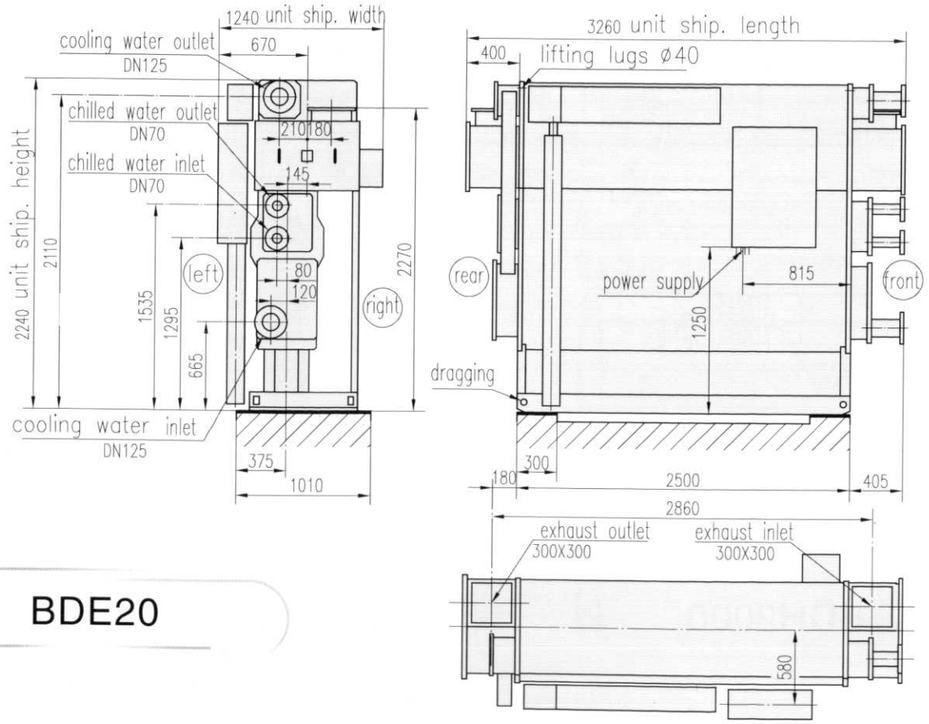
BDH2000



SINGLE-STAGE EXHAUST CHILLER

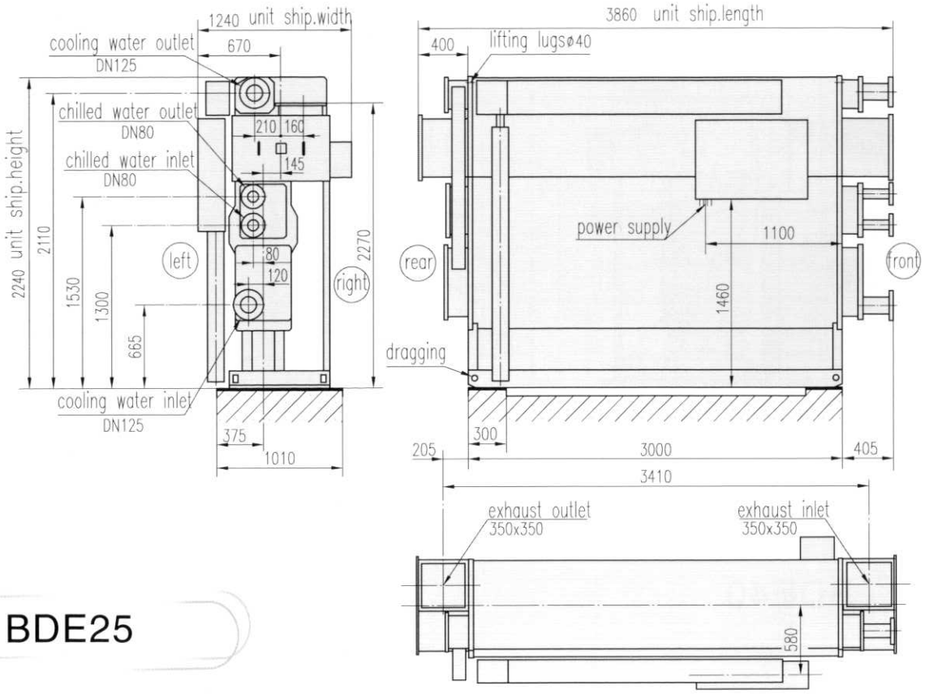


BDE15

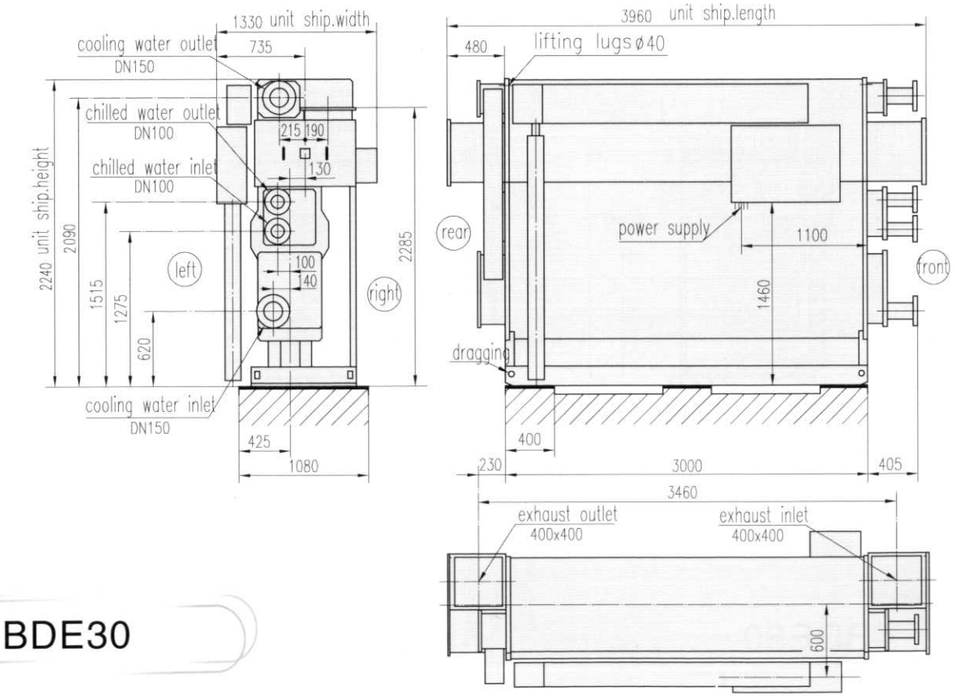


BDE20

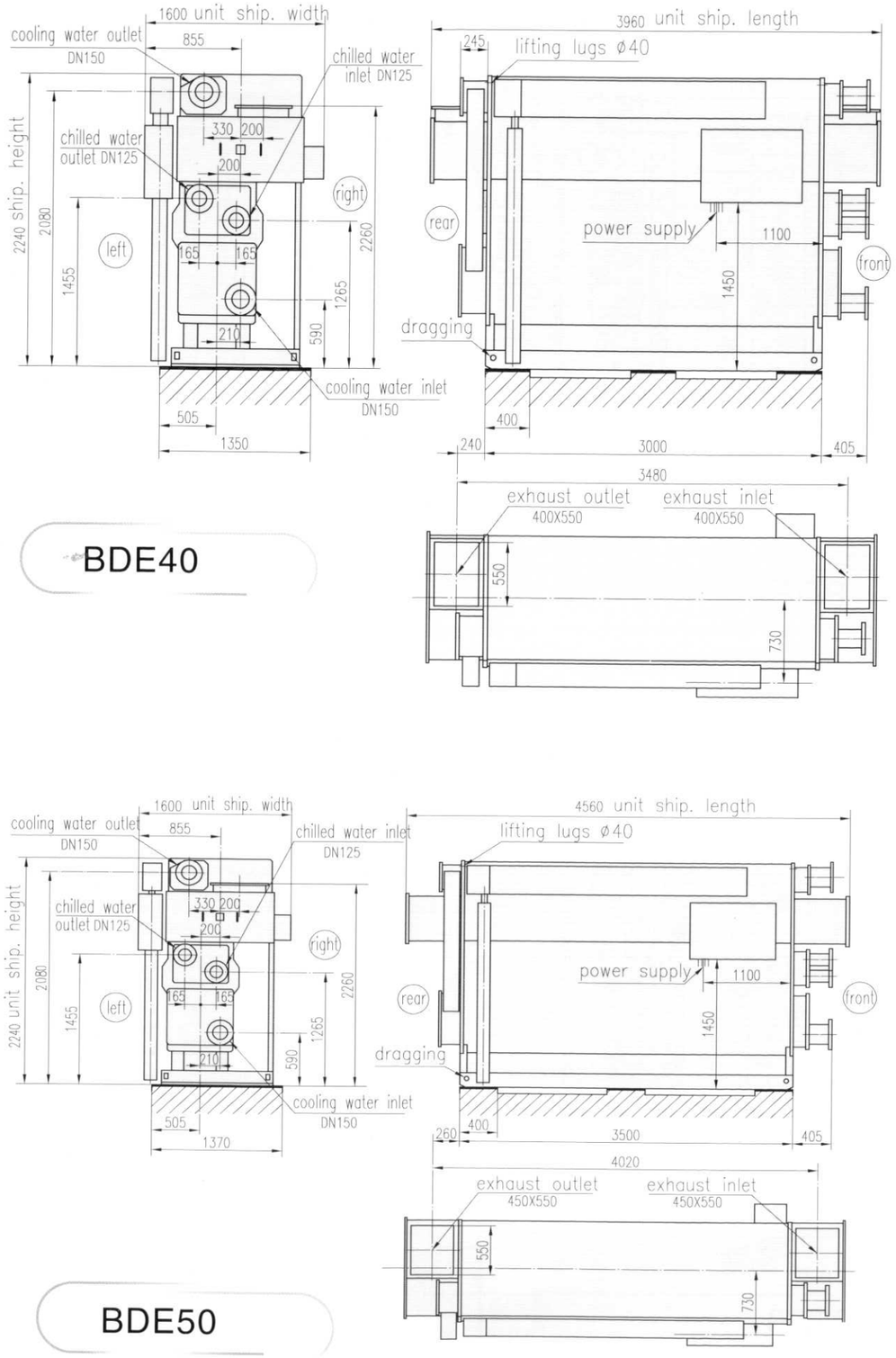
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



BDE25

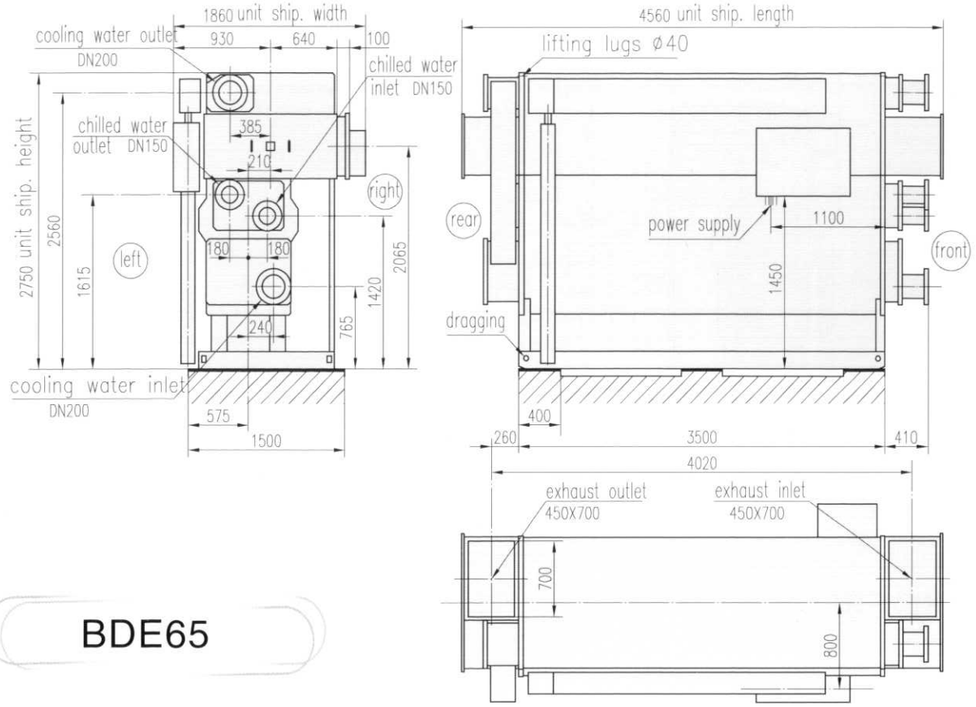


BDE30

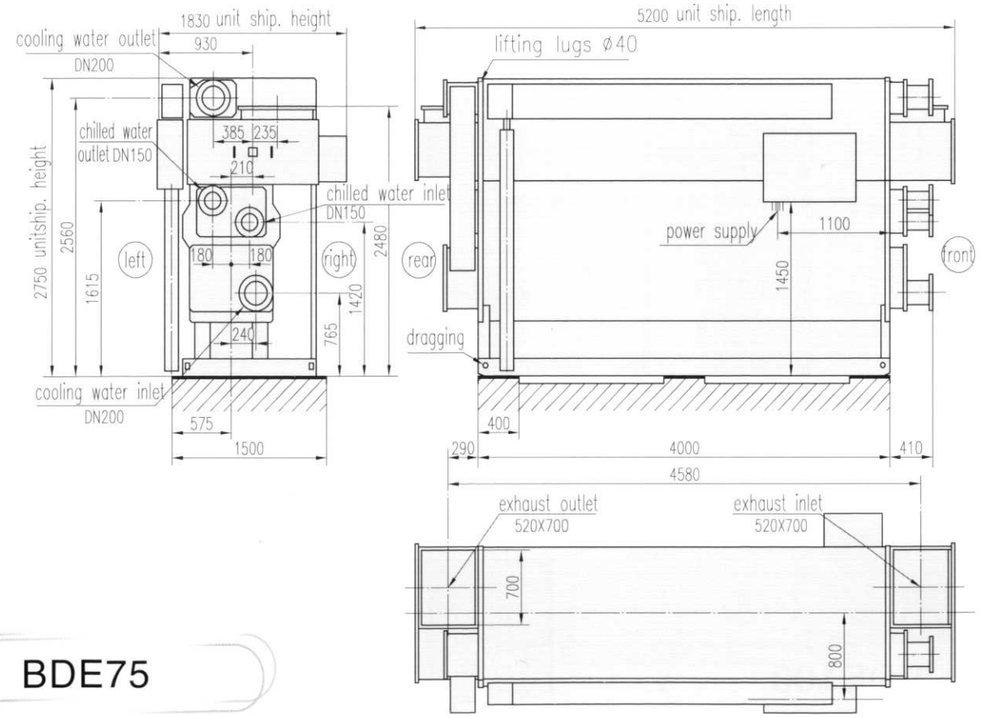


BDE40

BDE50

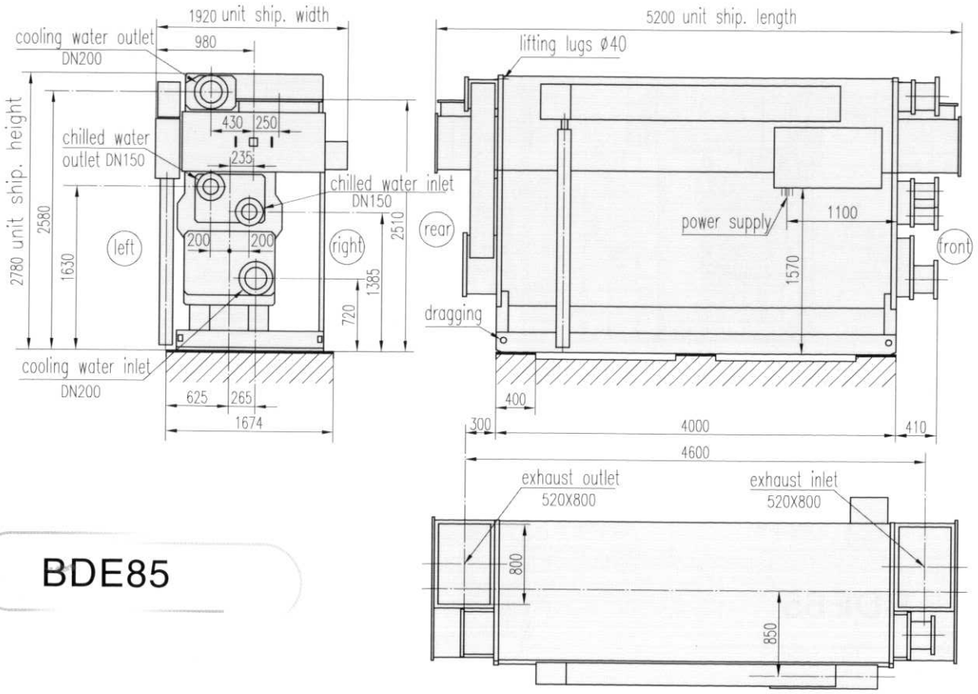


BDE65

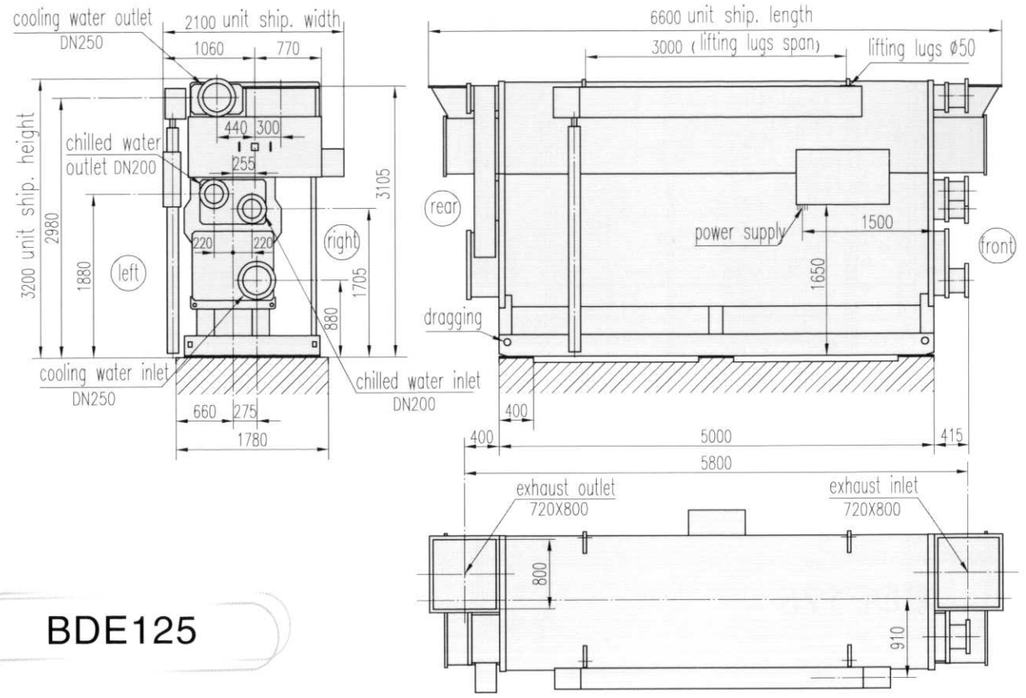


BDE75

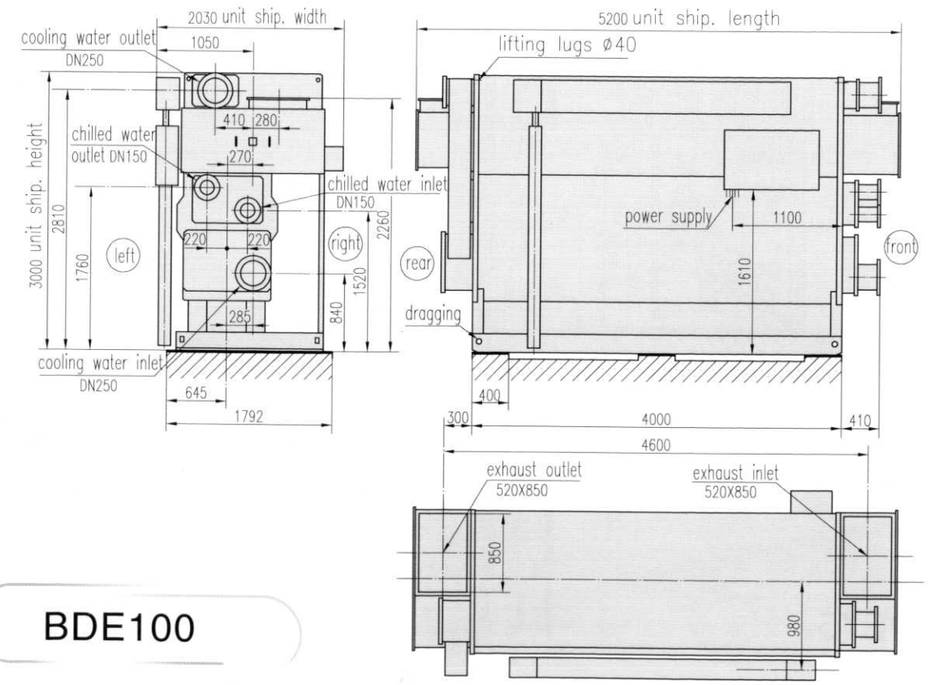
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



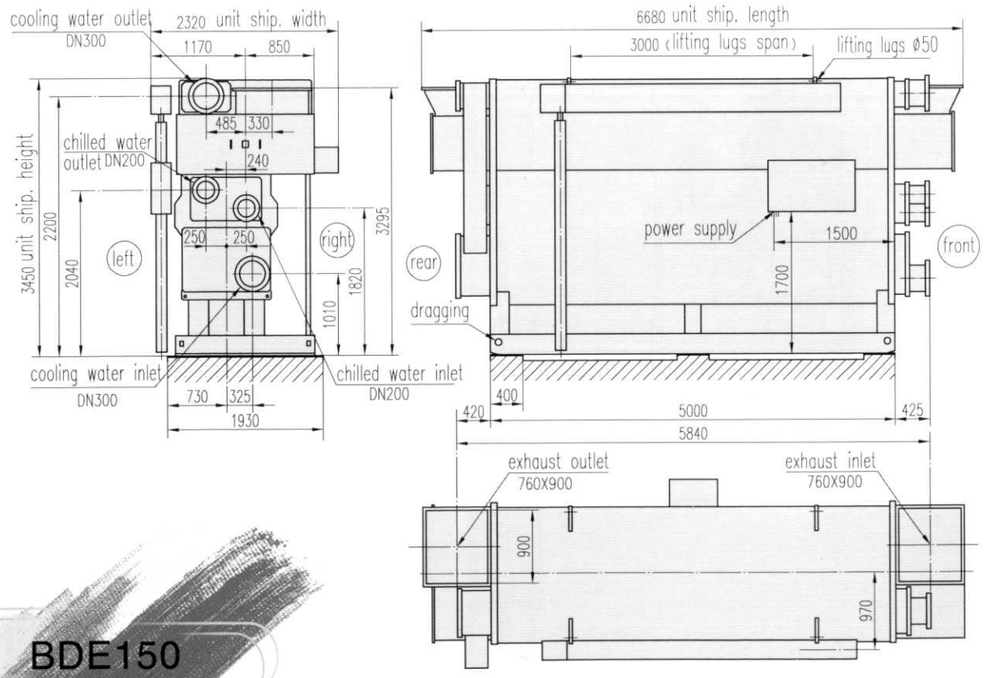
BDE85



BDE125

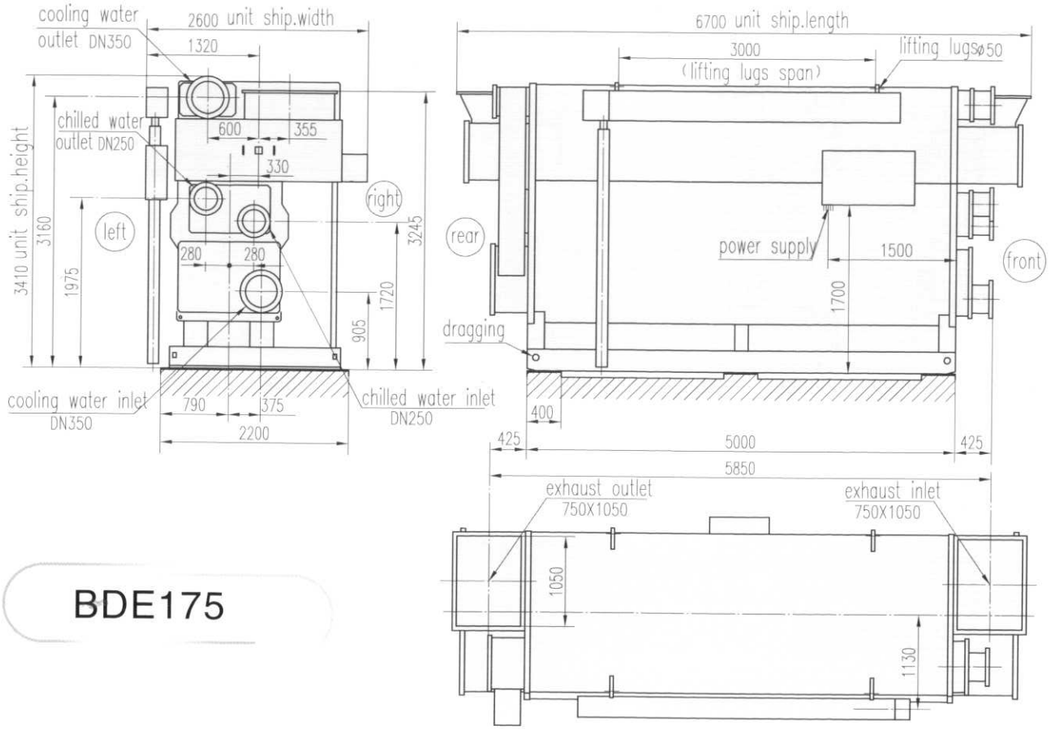


BDE100

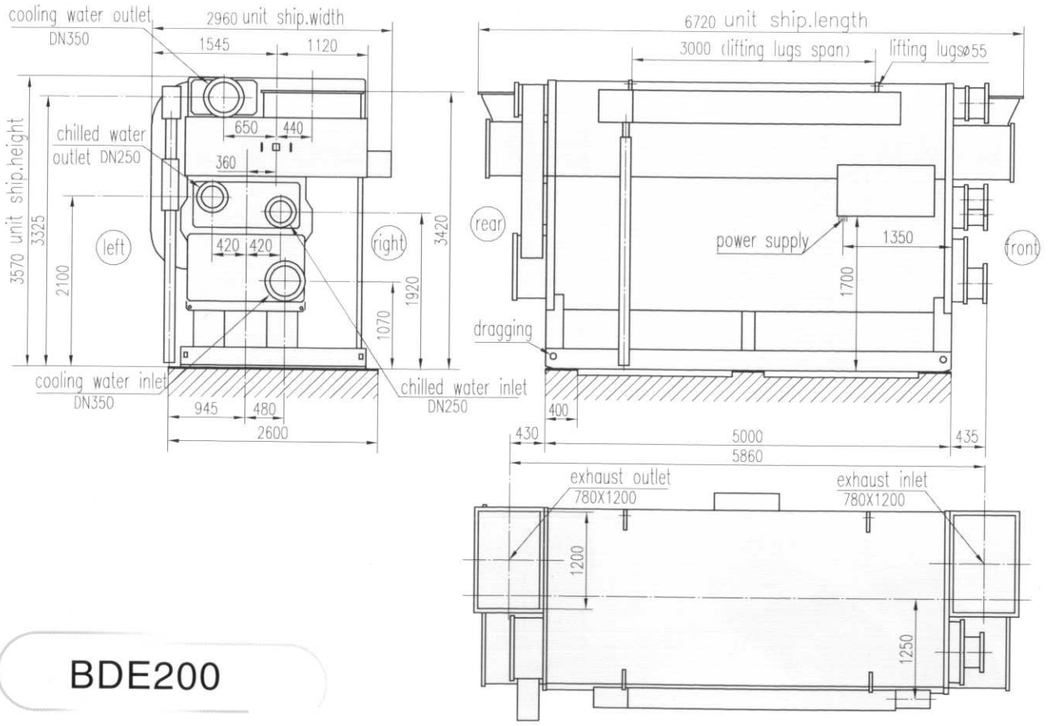


BDE150

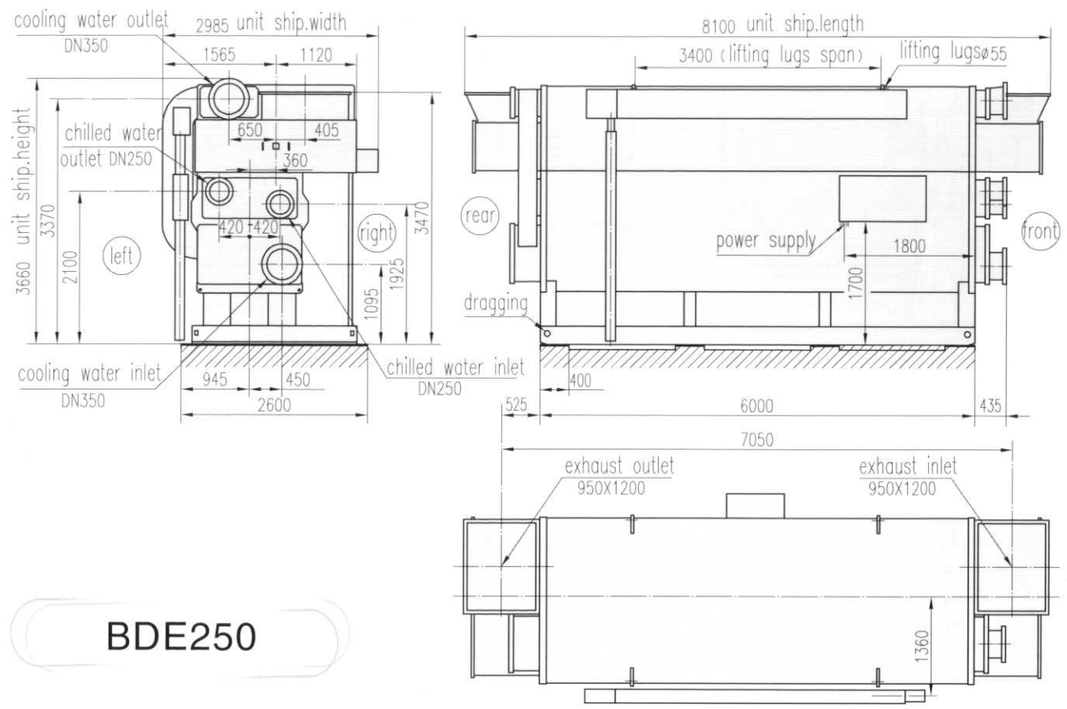
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



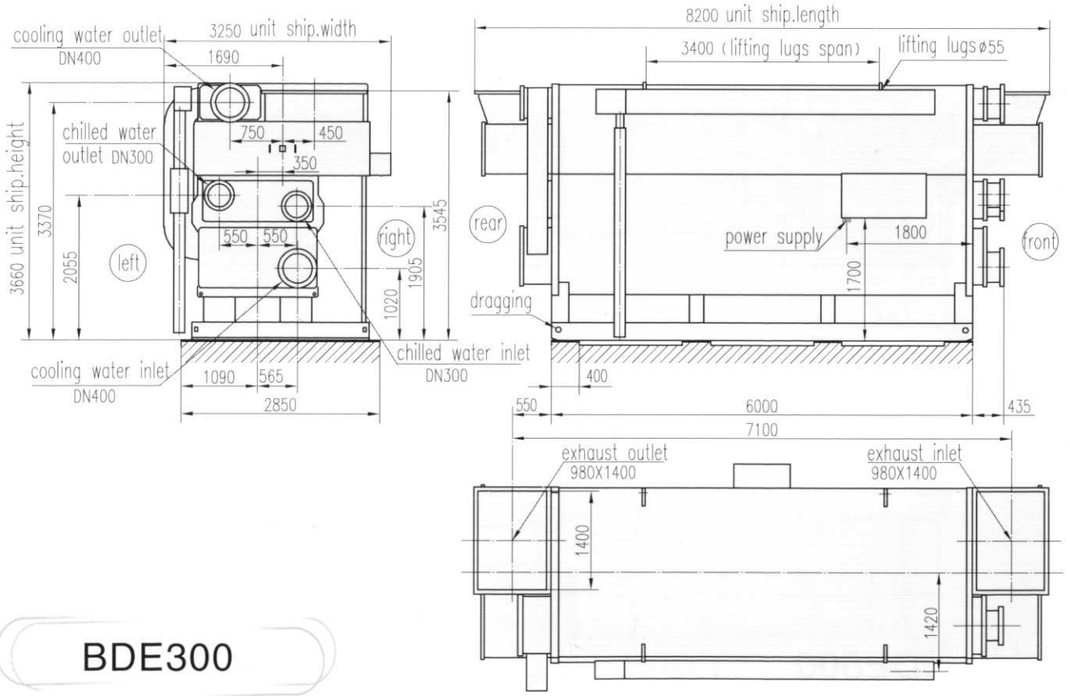
BDE175



BDE200

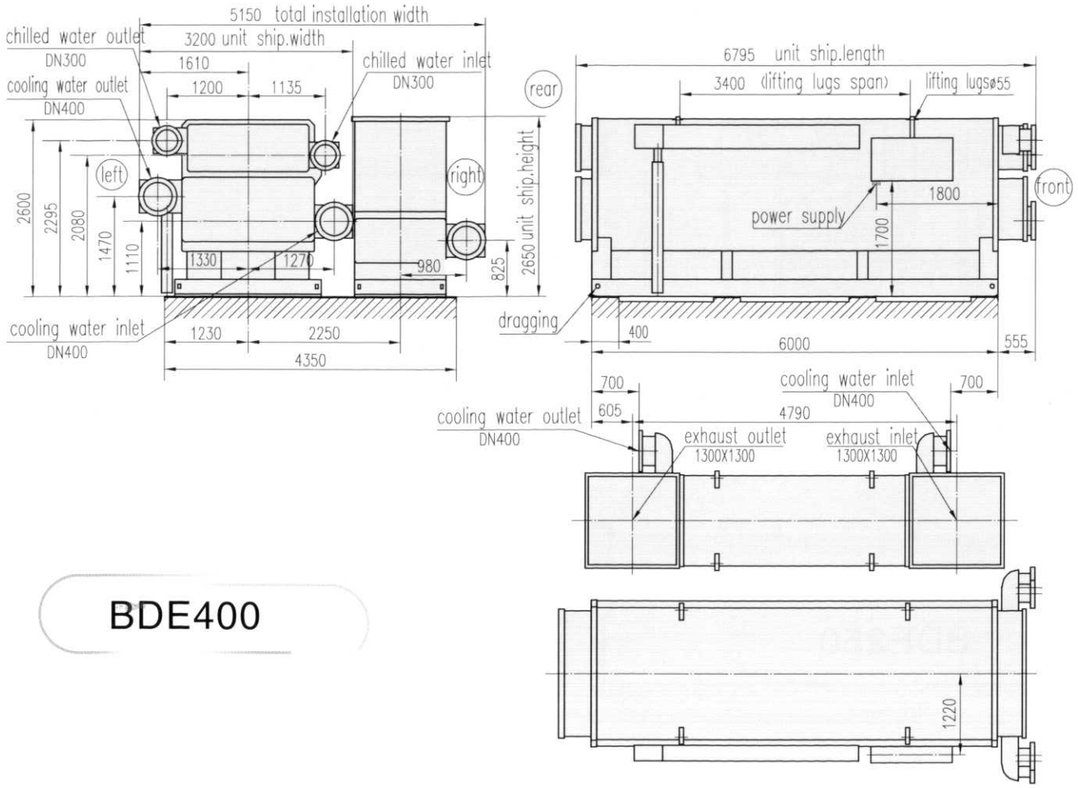


BDE250

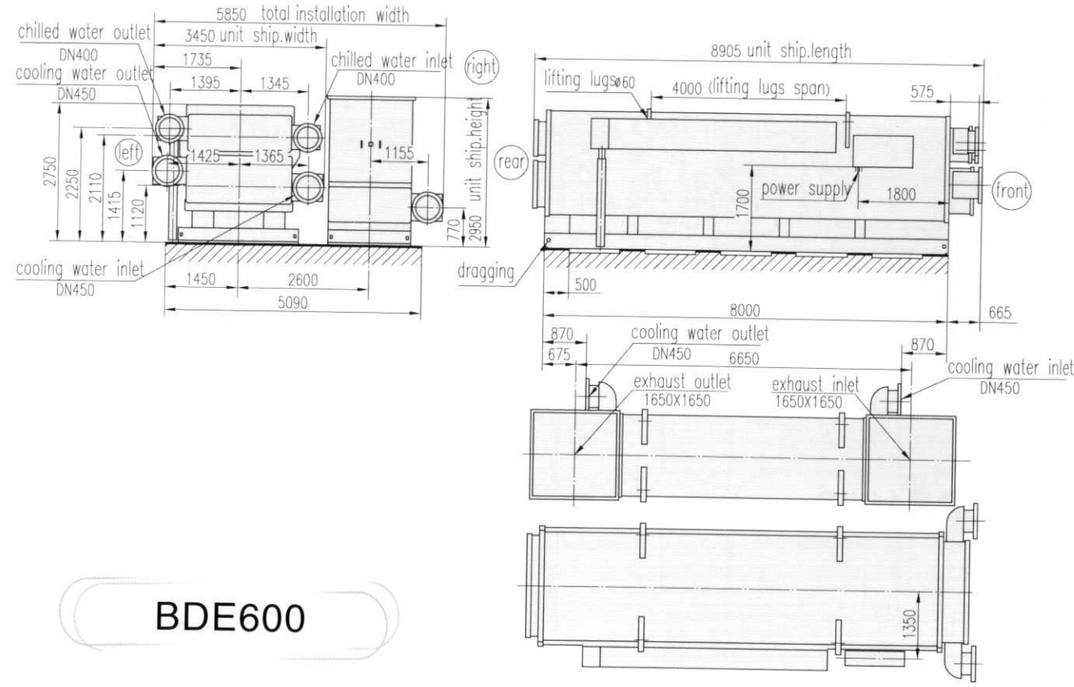


BDE300

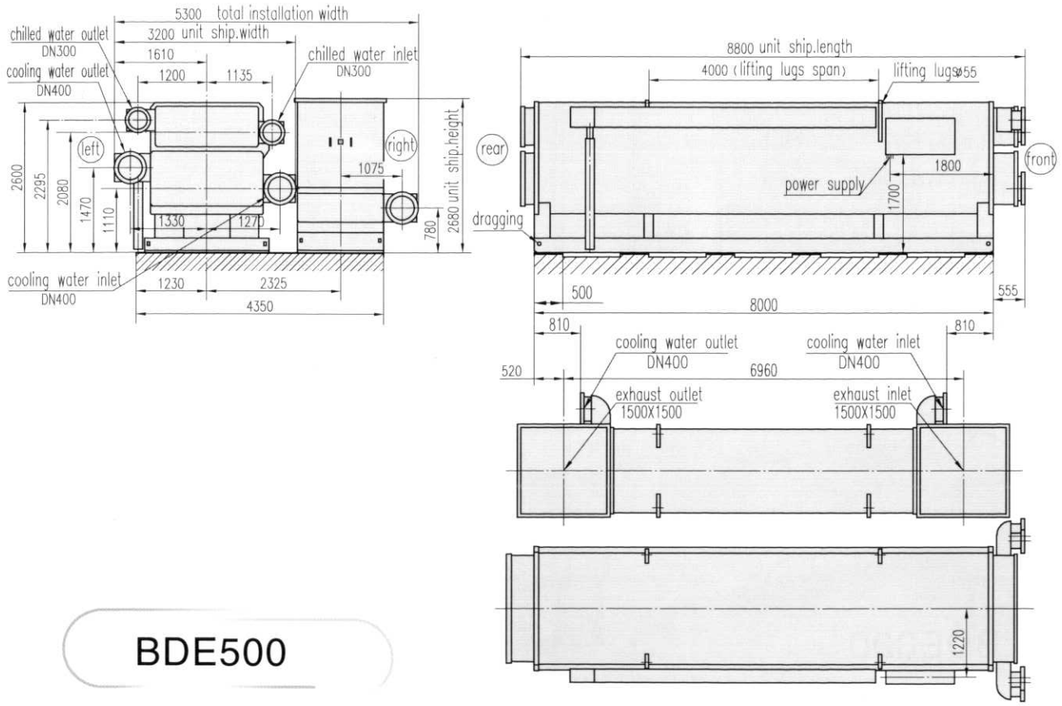
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



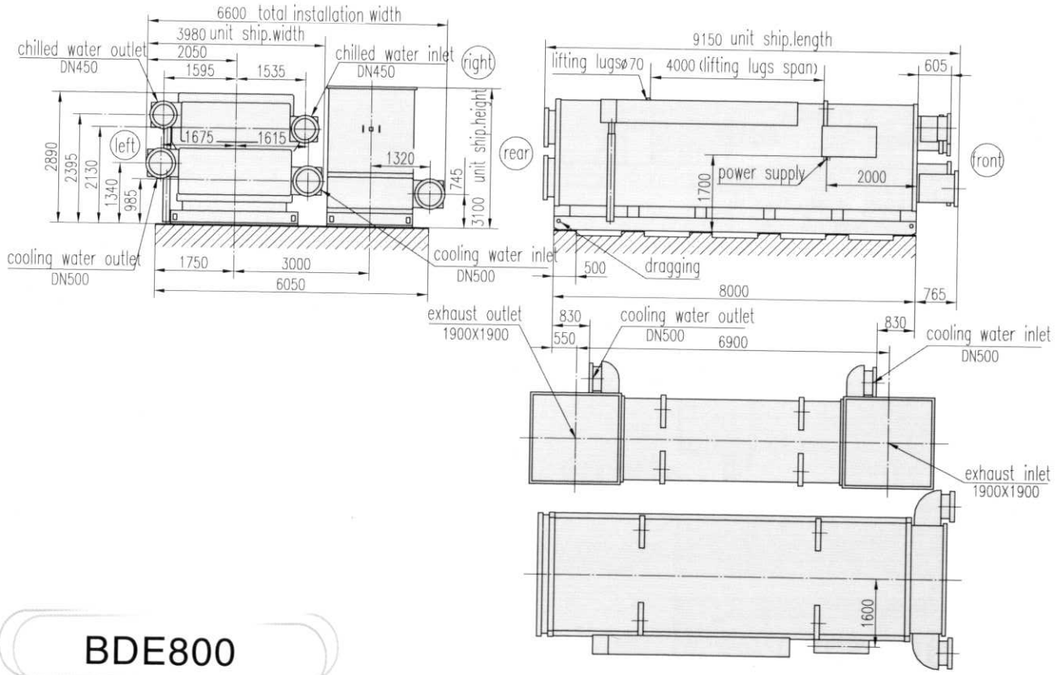
BDE400



BDE600

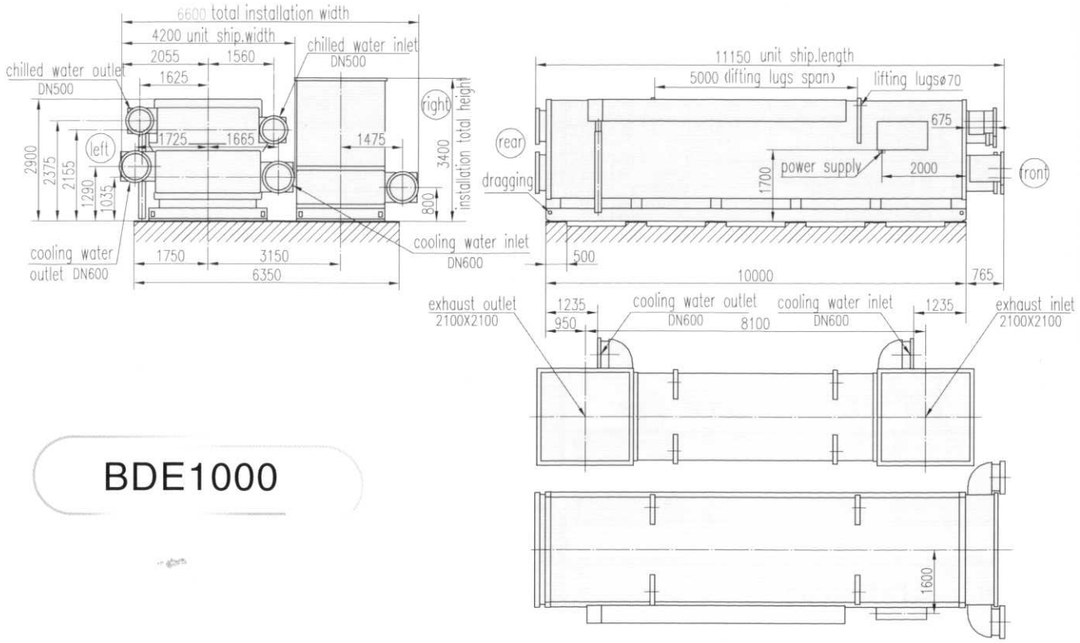


BDE500

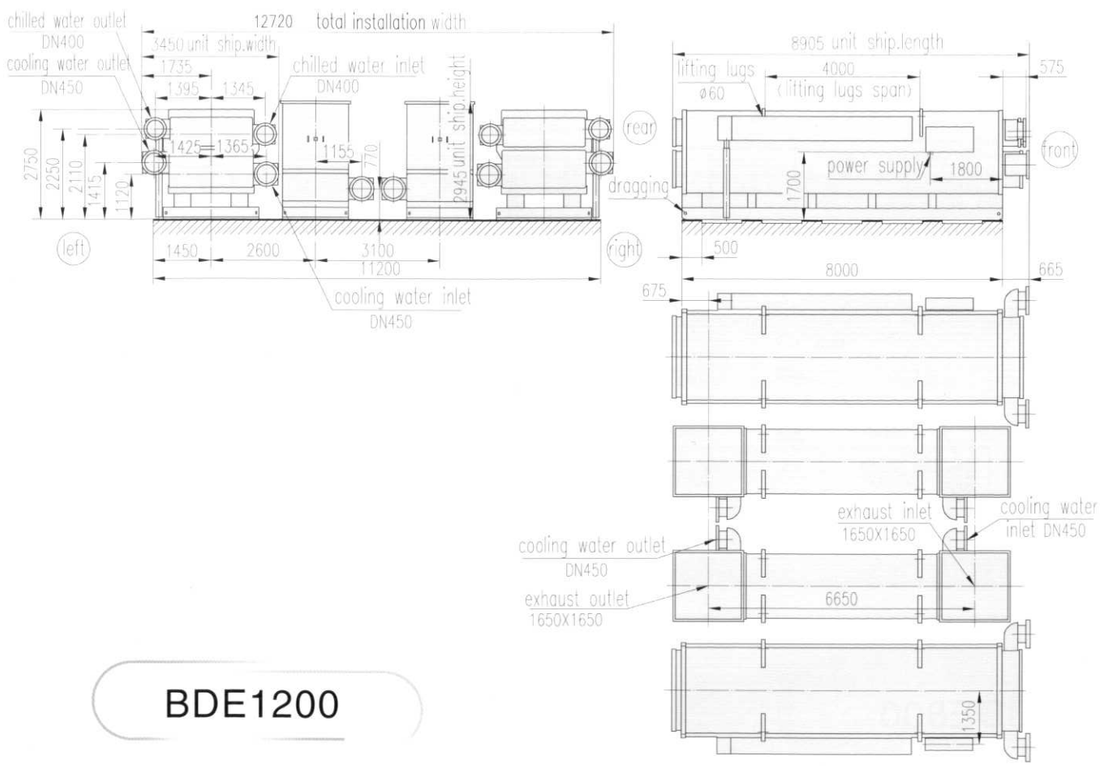


BDE800

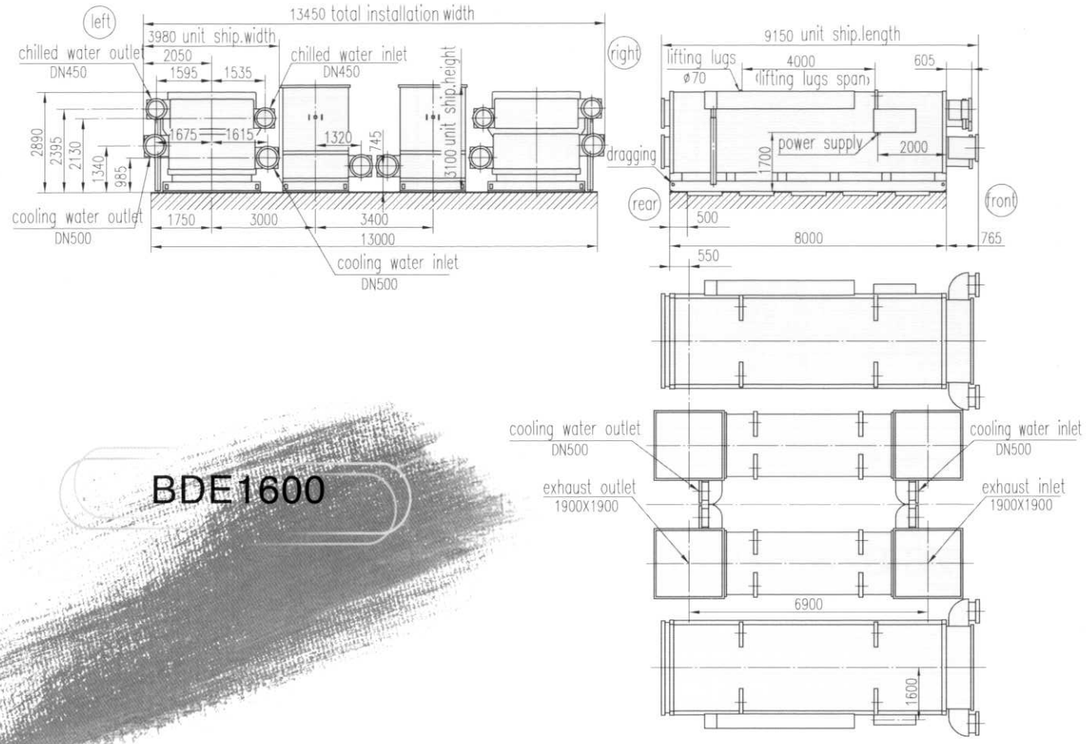
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



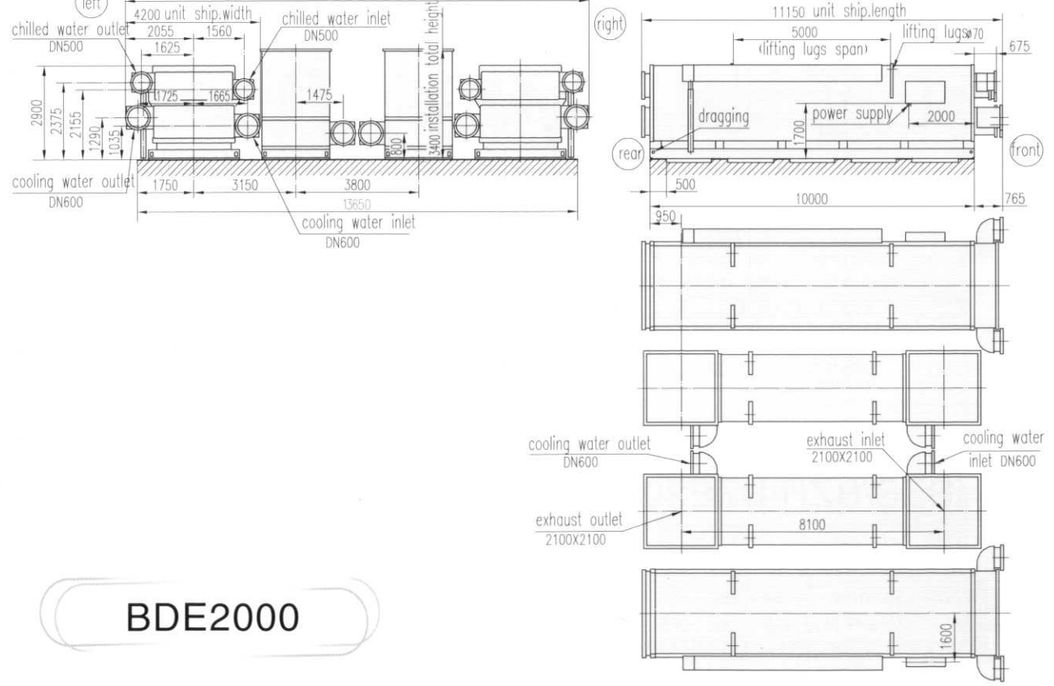
BDE1000



BDE1200



BDE1600

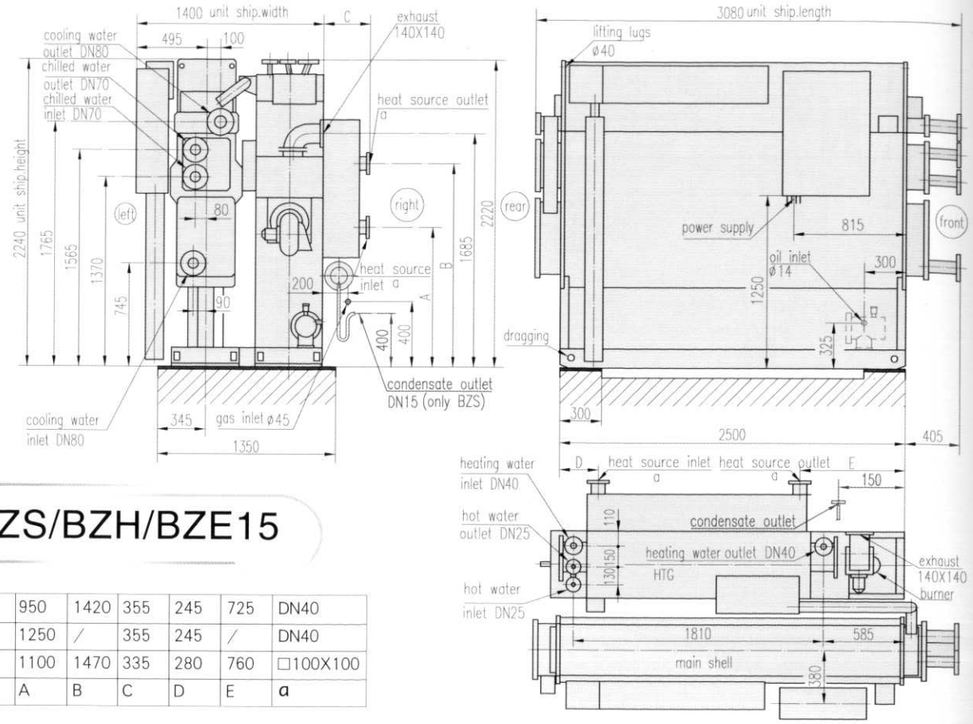


BDE2000

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm

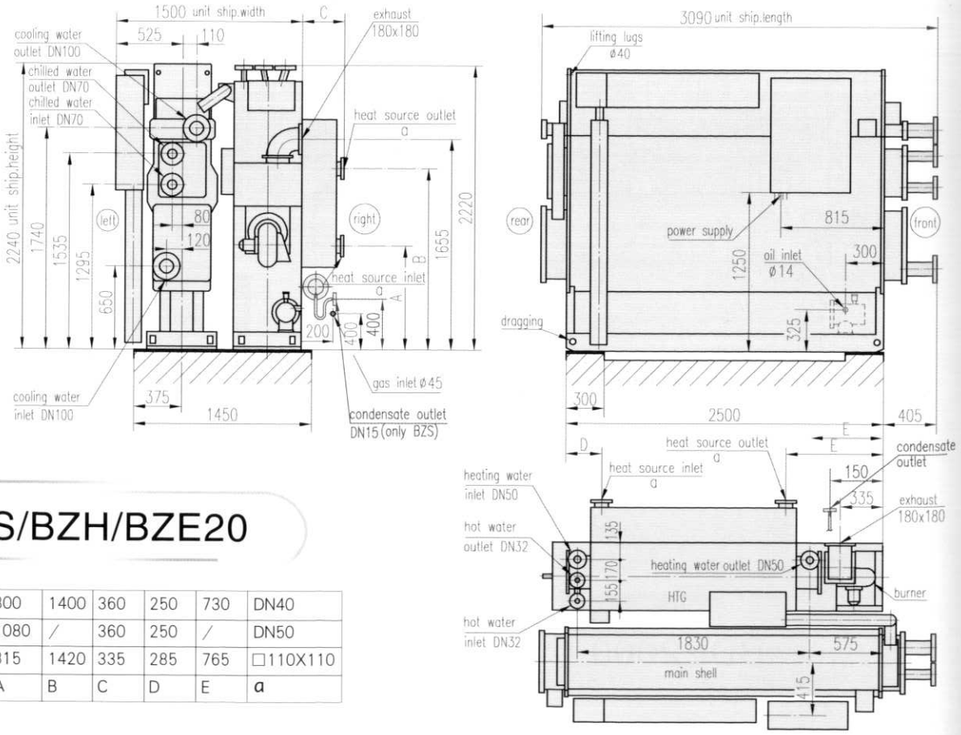
MULTI-ENERGY DIRECT-FIRED CHILLER/HEATER

BZS、BZH、BZE



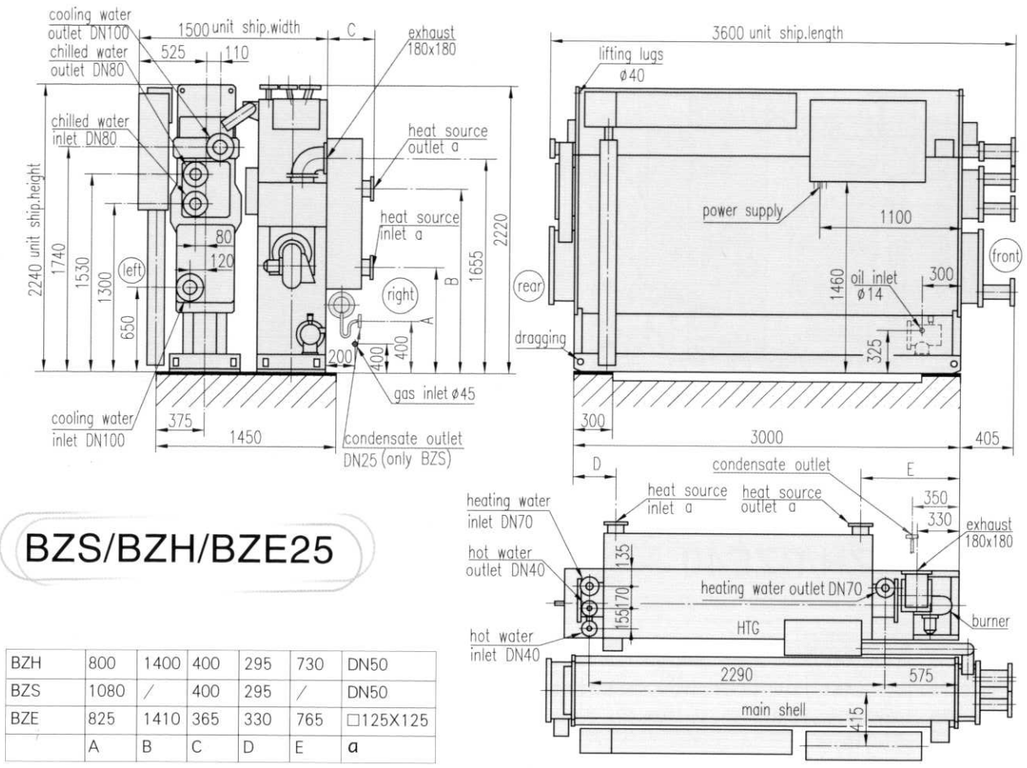
BZS/BZH/BZE15

BZH	950	1420	355	245	725	DN40
BZS	1250	/	355	245	/	DN40
BZE	1100	1470	335	280	760	□100X100
	A	B	C	D	E	a



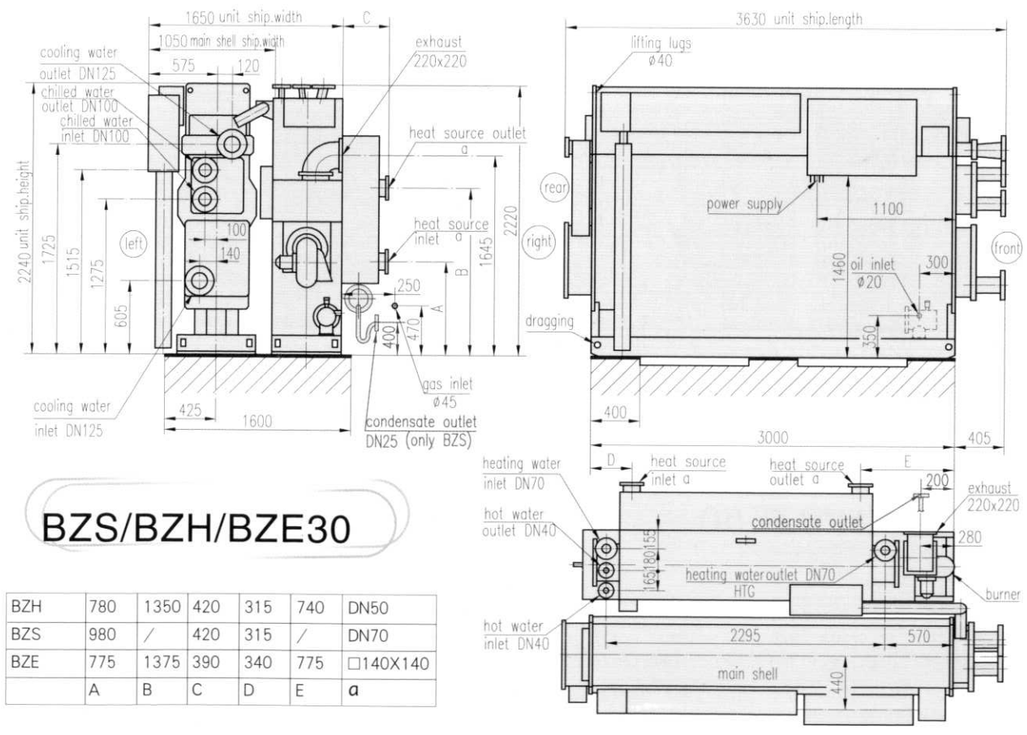
BZS/BZH/BZE20

BZH	800	1400	360	250	730	DN40
BZS	1080	/	360	250	/	DN50
BZE	815	1420	335	285	765	□110X110
	A	B	C	D	E	a



BZS/BZH/BZE25

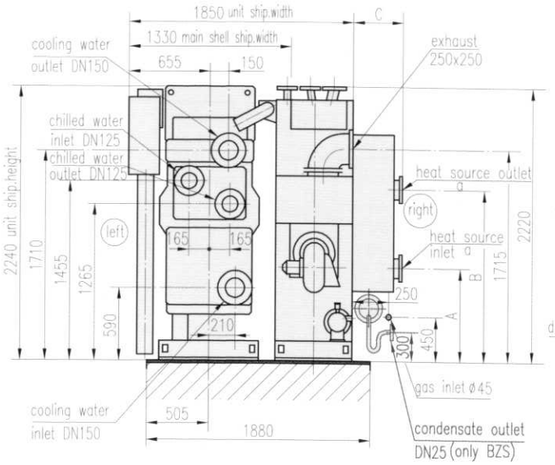
BZH	800	1400	400	295	730	DN50
BZS	1080	/	400	295	/	DN50
BZE	825	1410	365	330	765	□125X125
	A	B	C	D	E	a

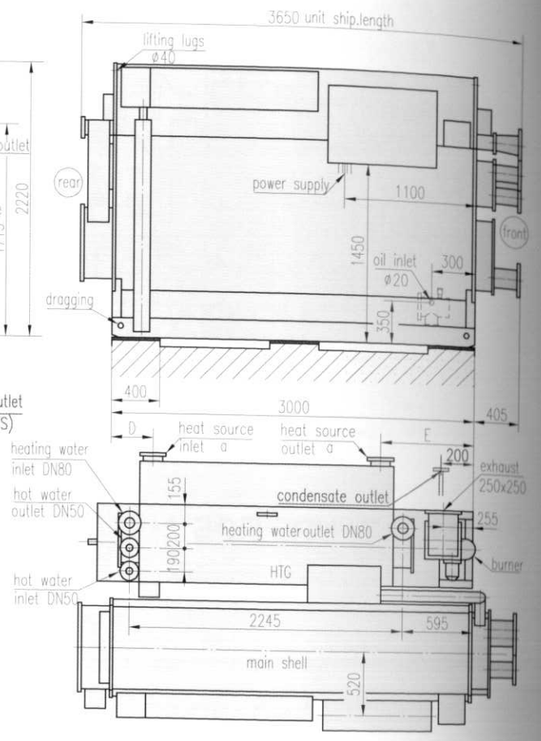


BZS/BZH/BZE30

BZH	780	1350	420	315	740	DN50
BZS	980	/	420	315	/	DN70
BZE	775	1375	390	340	775	□140X140
	A	B	C	D	E	a

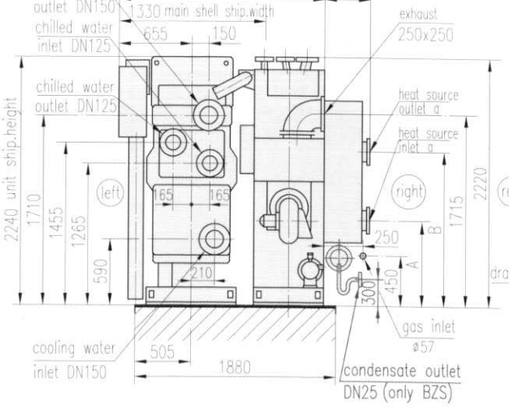
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm

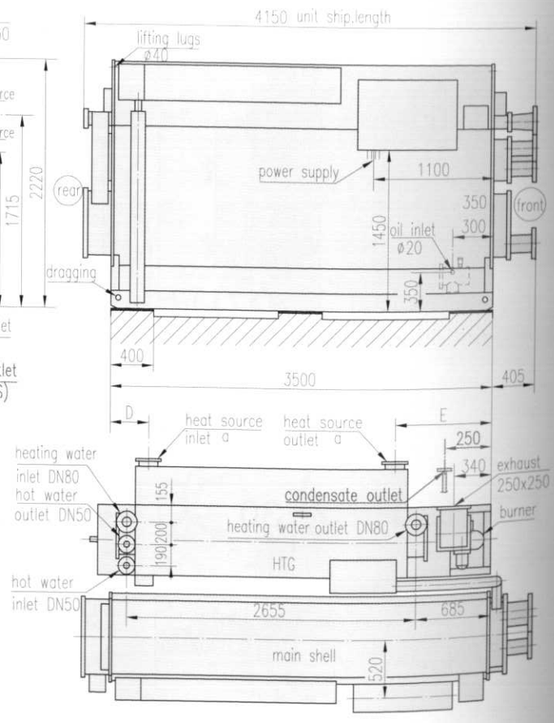




BZS/BZH/BZE40

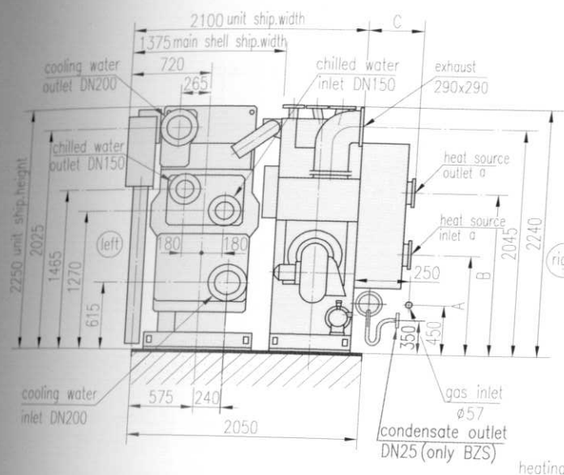
BZH	760	1350	440	315	750	DN70
BZS	1100	/	440	315	/	DN70
BZE	755	1390	415	350	785	□160X160
	A	B	C	D	E	*a*

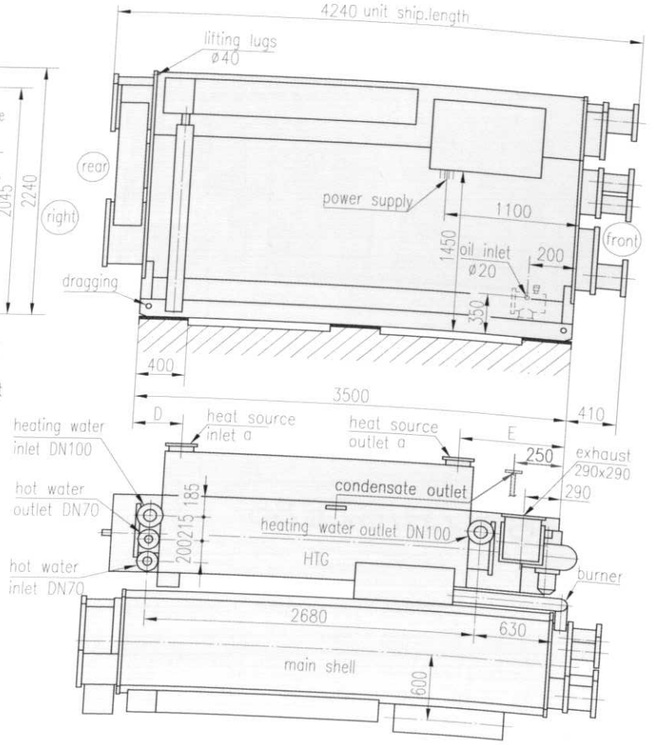




BZS/BZH/BZE50

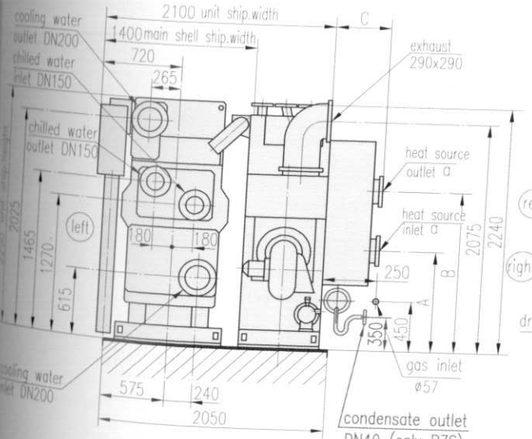
BZH	760	1350	450	325	850	DN70
BZS	1100	/	450	325	/	DN70
BZE	755	1390	420	360	885	□180X180
	A	B	C	D	E	*a*

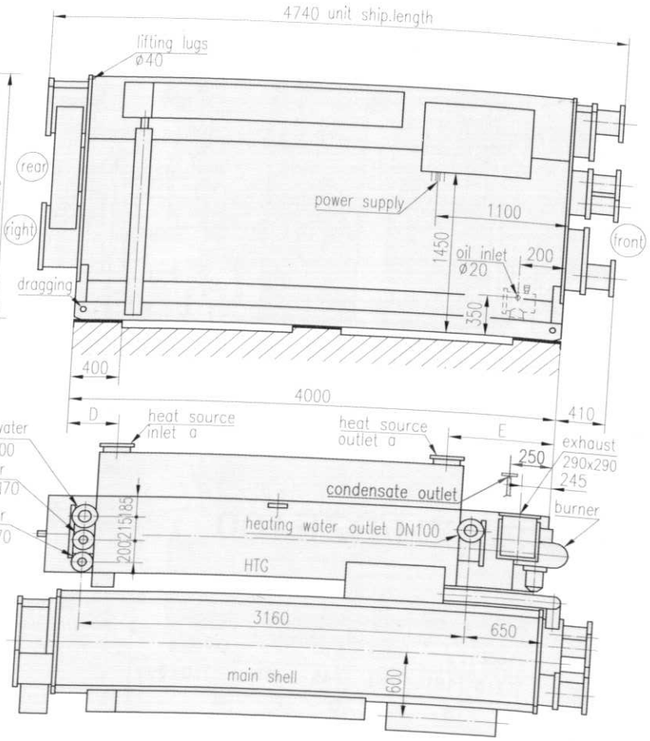




BZS/BZH/BZE65

BZH	900	1180	500	375	820	DN70
BZS	1120	/	500	375	/	DN80
BZE	900	1460	465	410	855	□200X200
	A	B	C	D	E	*a*

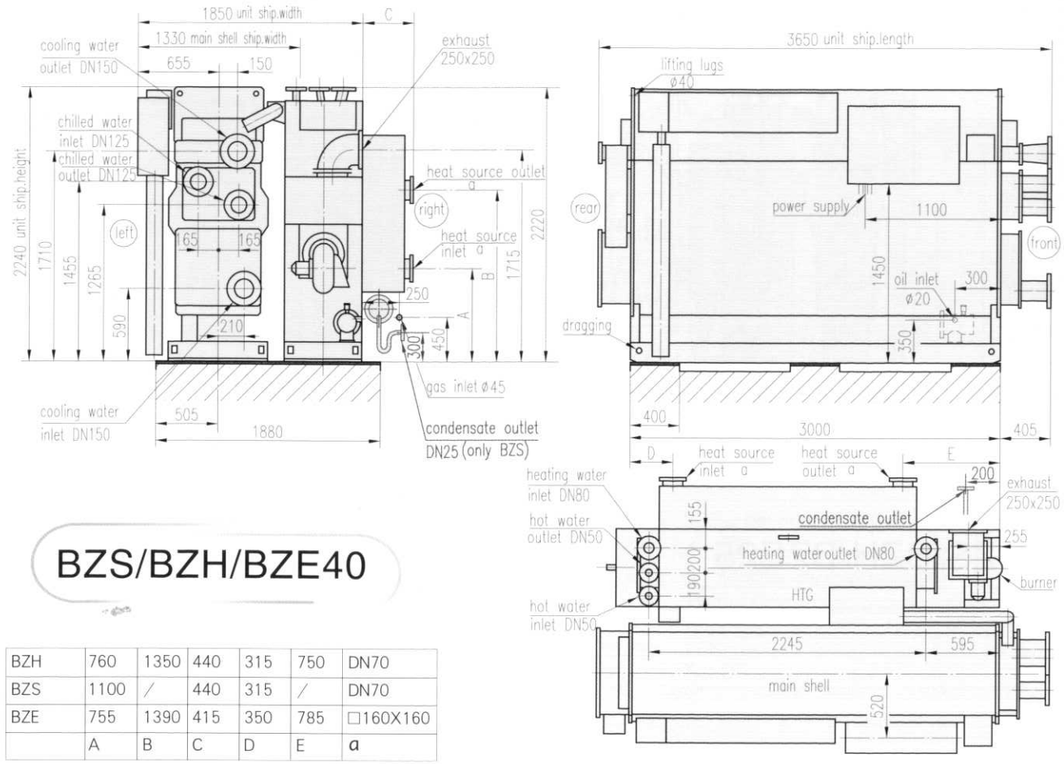




BZS/BZH/BZE75

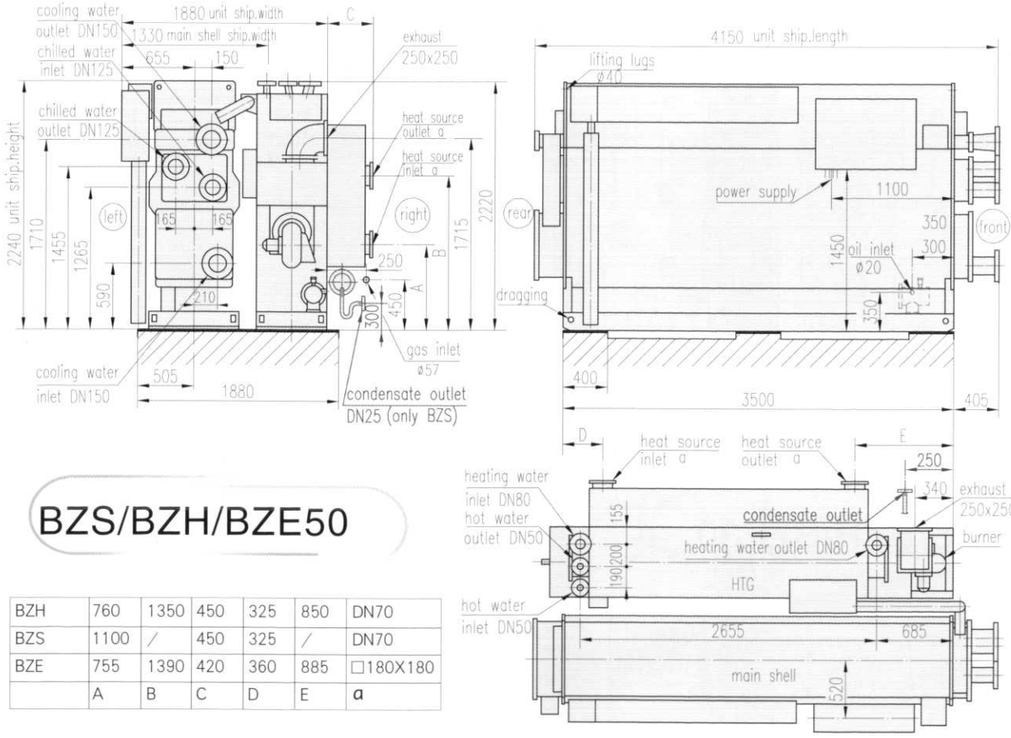
H	900	1170	510	390	850	DN80
S	1120	/	510	390	/	DN80
E	910	1450	475	420	880	□220X220
	A	B	C	D	E	*a*

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



BZS/BZH/BZE40

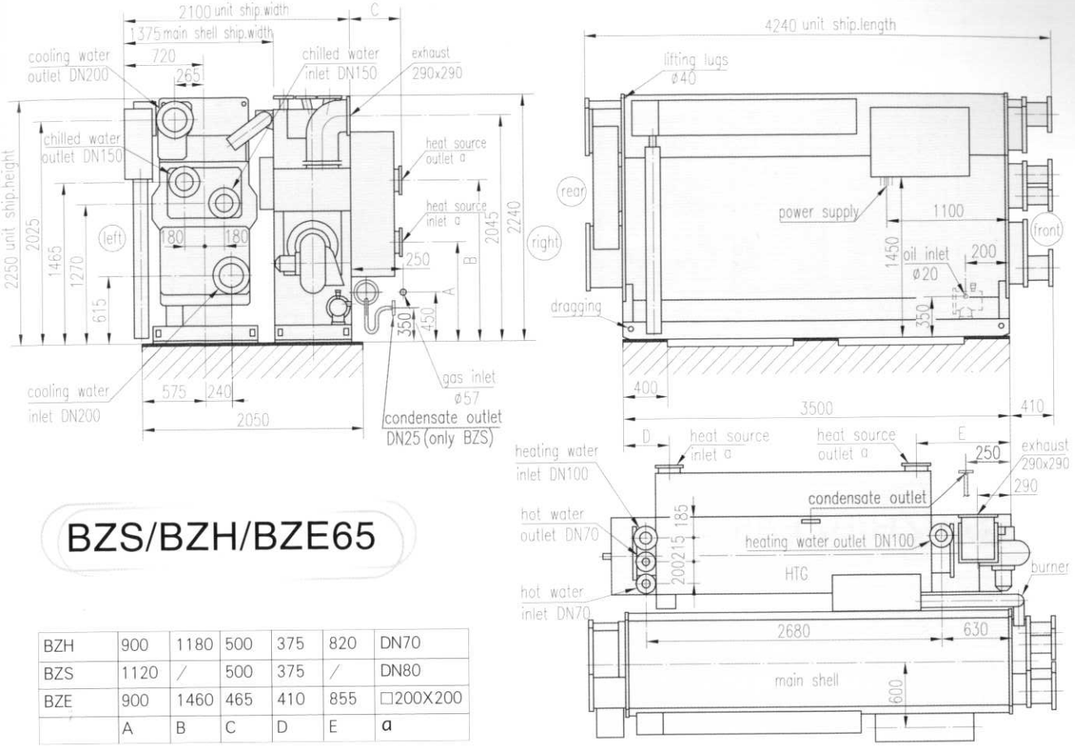
BZH	760	1350	440	315	750	DN70
BZS	1100	/	440	315	/	DN70
BZE	755	1390	415	350	785	□160X160
	A	B	C	D	E	a



BZS/BZH/BZE50

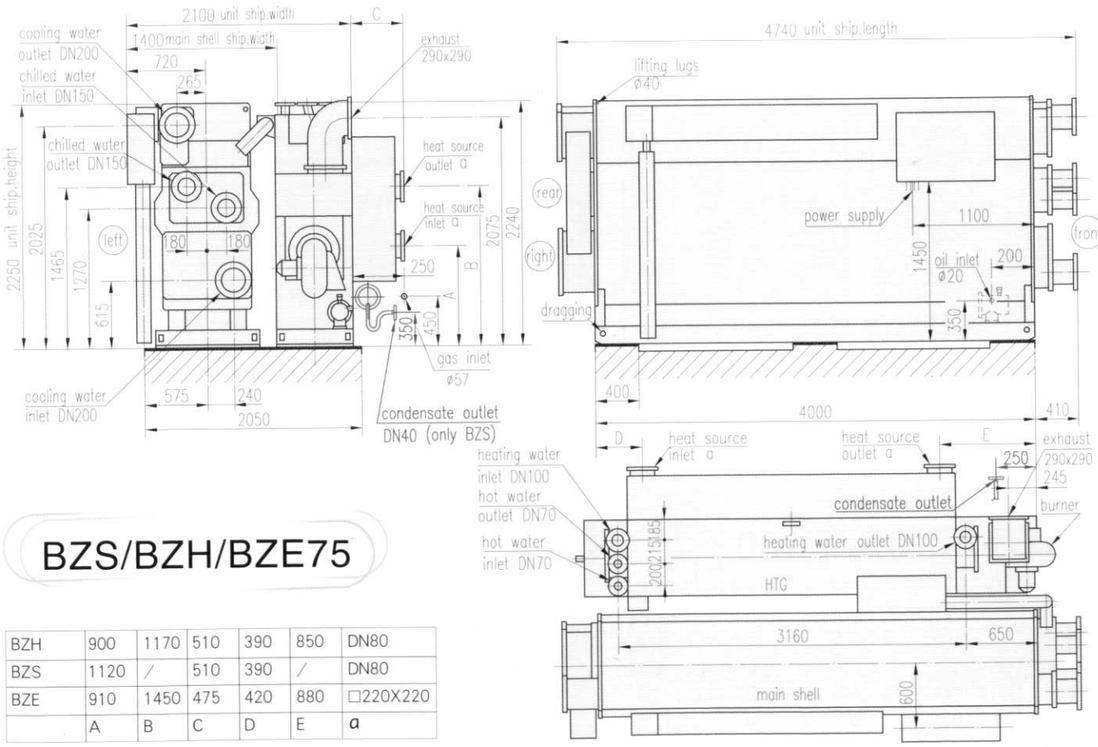
BZH	760	1350	450	325	850	DN70
BZS	1100	/	450	325	/	DN70
BZE	755	1390	420	360	885	□180X180
	A	B	C	D	E	a

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



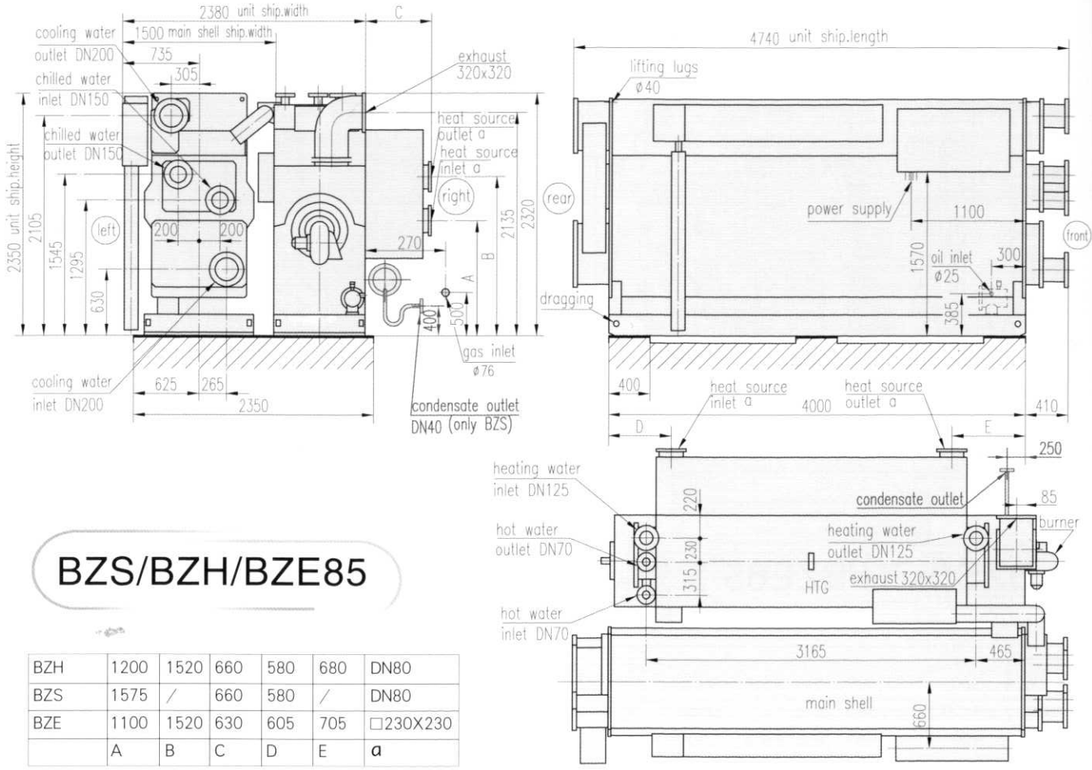
BZS/BZH/BZE65

BZH	900	1180	500	375	820	DN70
BZS	1120	/	500	375	/	DN80
BZE	900	1460	465	410	855	□200X200
	A	B	C	D	E	a



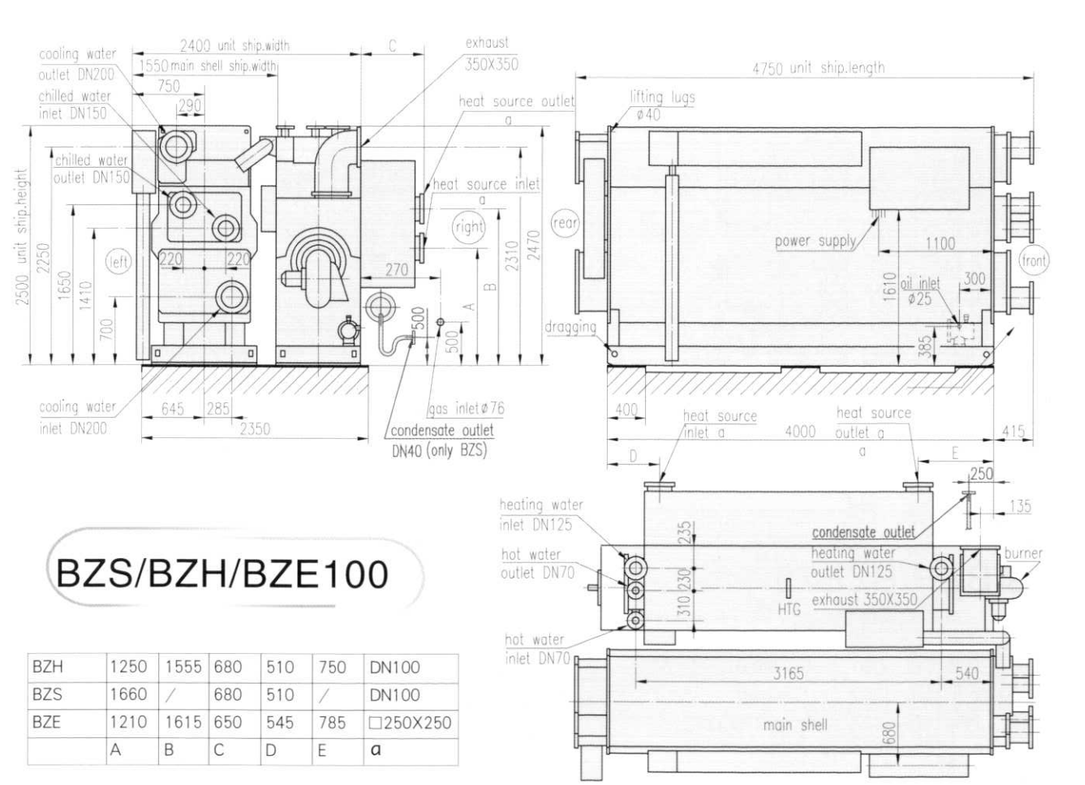
BZS/BZH/BZE75

BZH	900	1170	510	390	850	DN80
BZS	1120	/	510	390	/	DN80
BZE	910	1450	475	420	880	□220X220
	A	B	C	D	E	a



BZS/BZH/BZE85

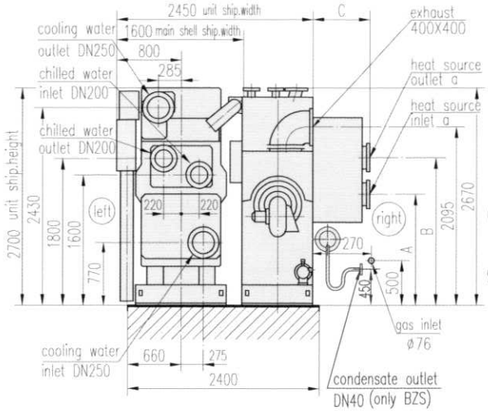
BZH	1200	1520	660	580	680	DN80
BZS	1575	/	660	580	/	DN80
BZE	1100	1520	630	605	705	□230X230
	A	B	C	D	E	*a*



BZS/BZH/BZE100

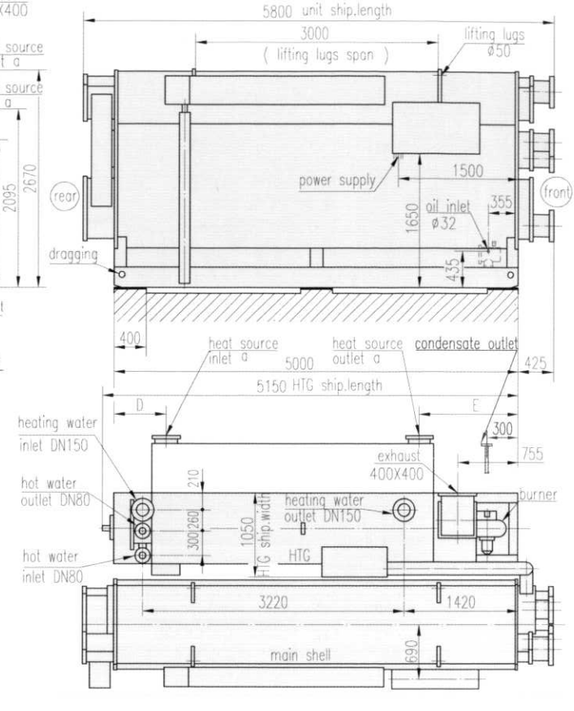
BZH	1250	1555	680	510	750	DN100
BZS	1660	/	680	510	/	DN100
BZE	1210	1615	650	545	785	□250X250
	A	B	C	D	E	*a*

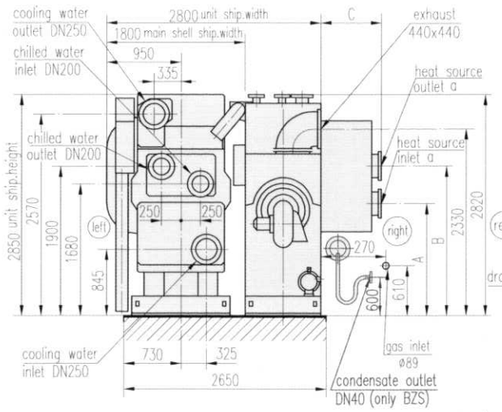
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



BZS/BZH/BZE125

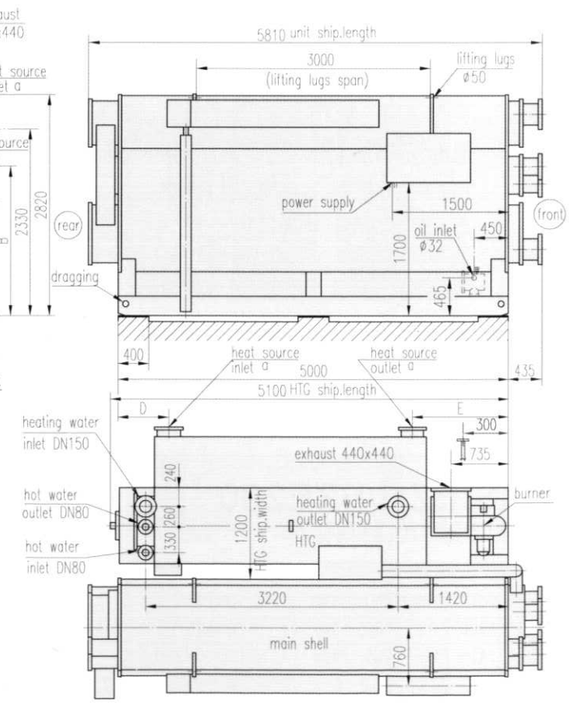
BZH	1250	1755	740	620	1200	DN100
BZS	1820	/	740	620	/	DN100
BZE	1365	1815	700	650	1230	□280X280
	A	B	C	D	E	*a*

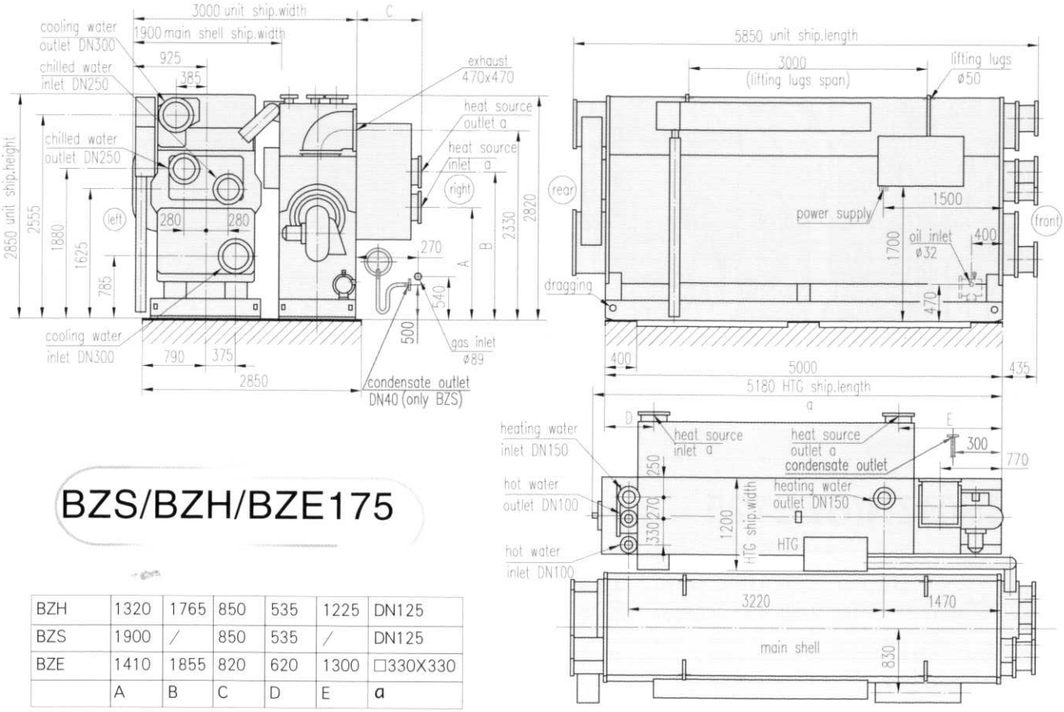




BZS/BZH/BZE150

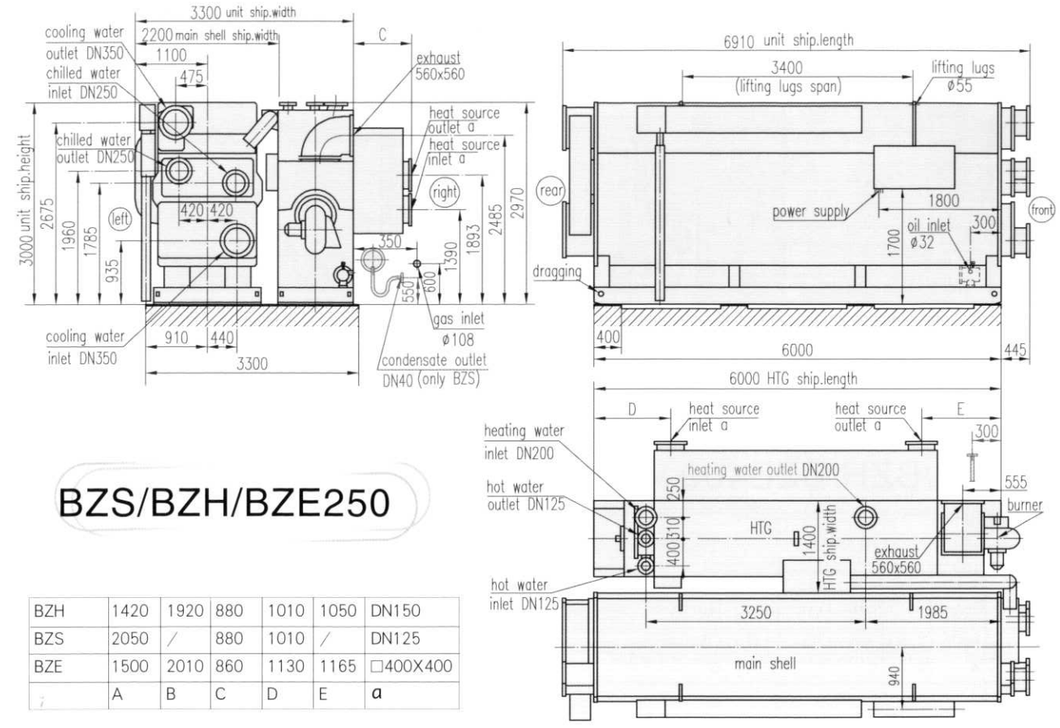
BZH	1300	1755	800	580	1160	DN125
BZS	1860	/	800	580	/	DN100
BZE	1430	1910	775	655	1235	□300X300
	A	B	C	D	E	*a*





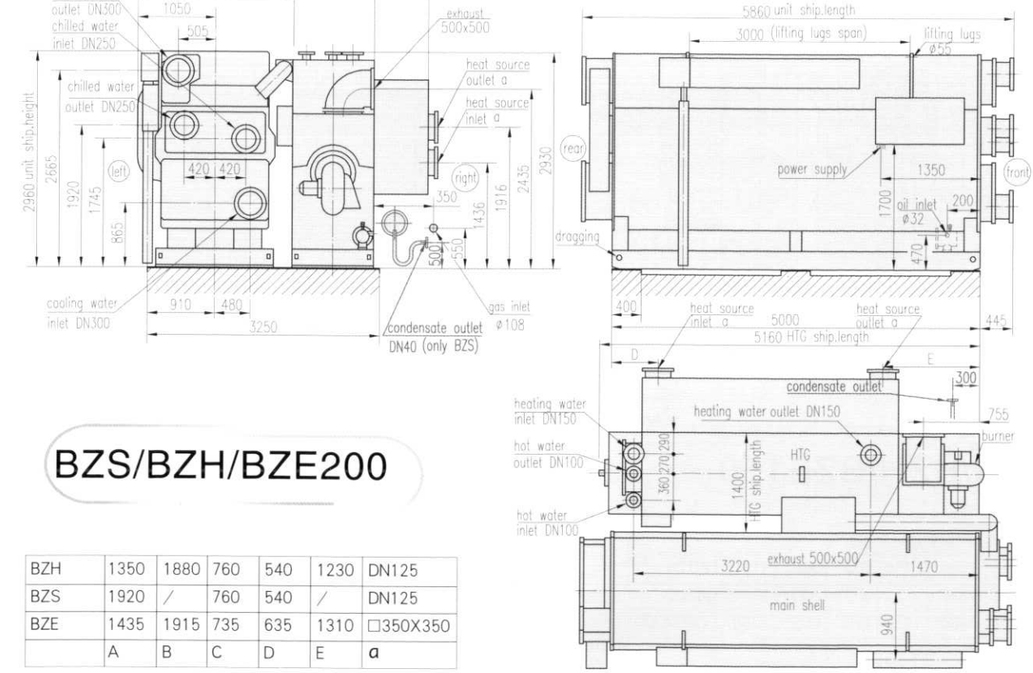
BZS/BZH/BZE175

BZH	1320	1765	850	535	1225	DN125
BZS	1900	/	850	535	/	DN125
BZE	1410	1855	820	620	1300	□330X330
	A	B	C	D	E	*a*



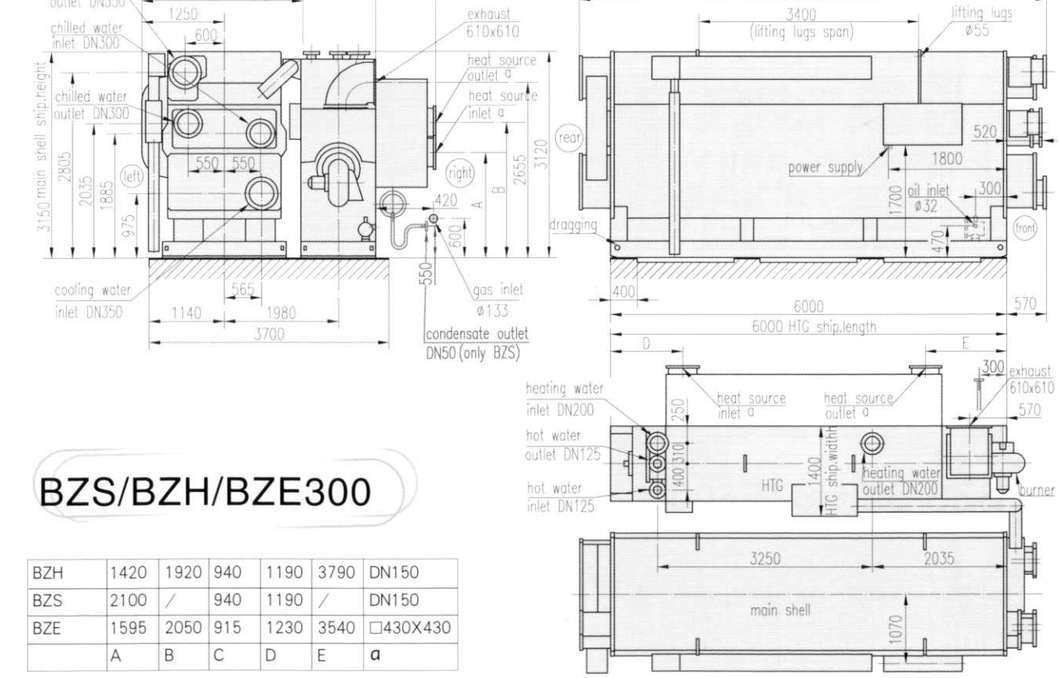
BZS/BZH/BZE250

BZH	1420	1920	880	1010	1050	DN150
BZS	2050	/	880	1010	/	DN125
BZE	1500	2010	860	1130	1165	□400X400
	A	B	C	D	E	*a*



BZS/BZH/BZE200

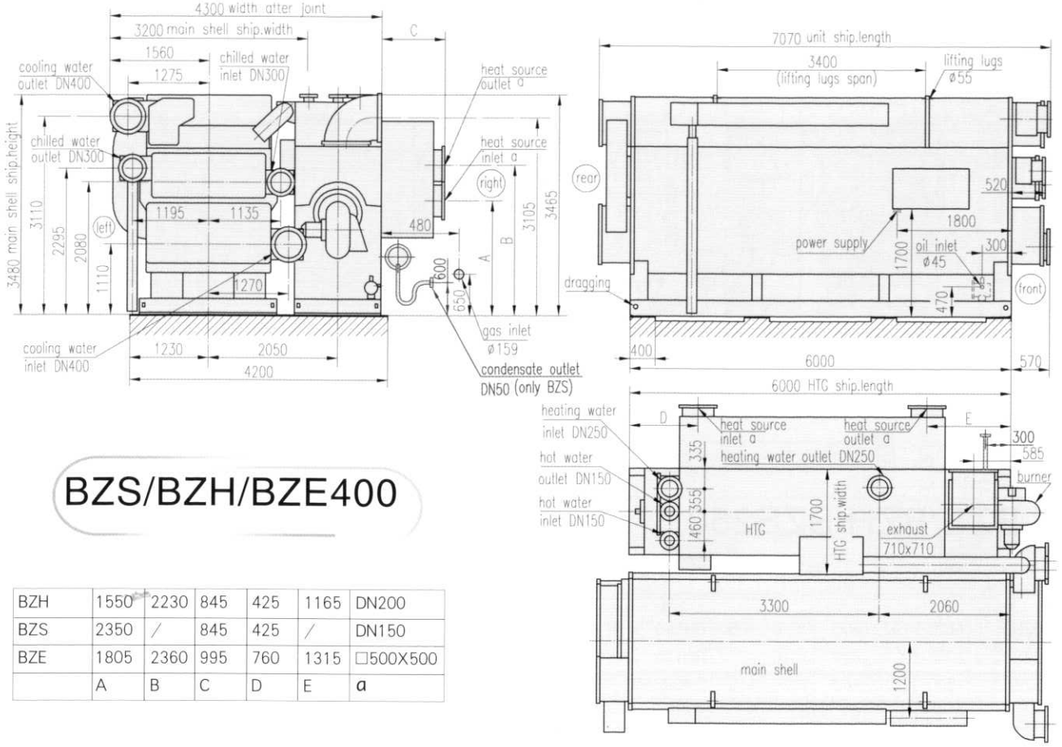
BZH	1350	1880	760	540	1230	DN125
BZS	1920	/	760	540	/	DN125
BZE	1435	1915	735	635	1310	□350X350
	A	B	C	D	E	*a*



BZS/BZH/BZE300

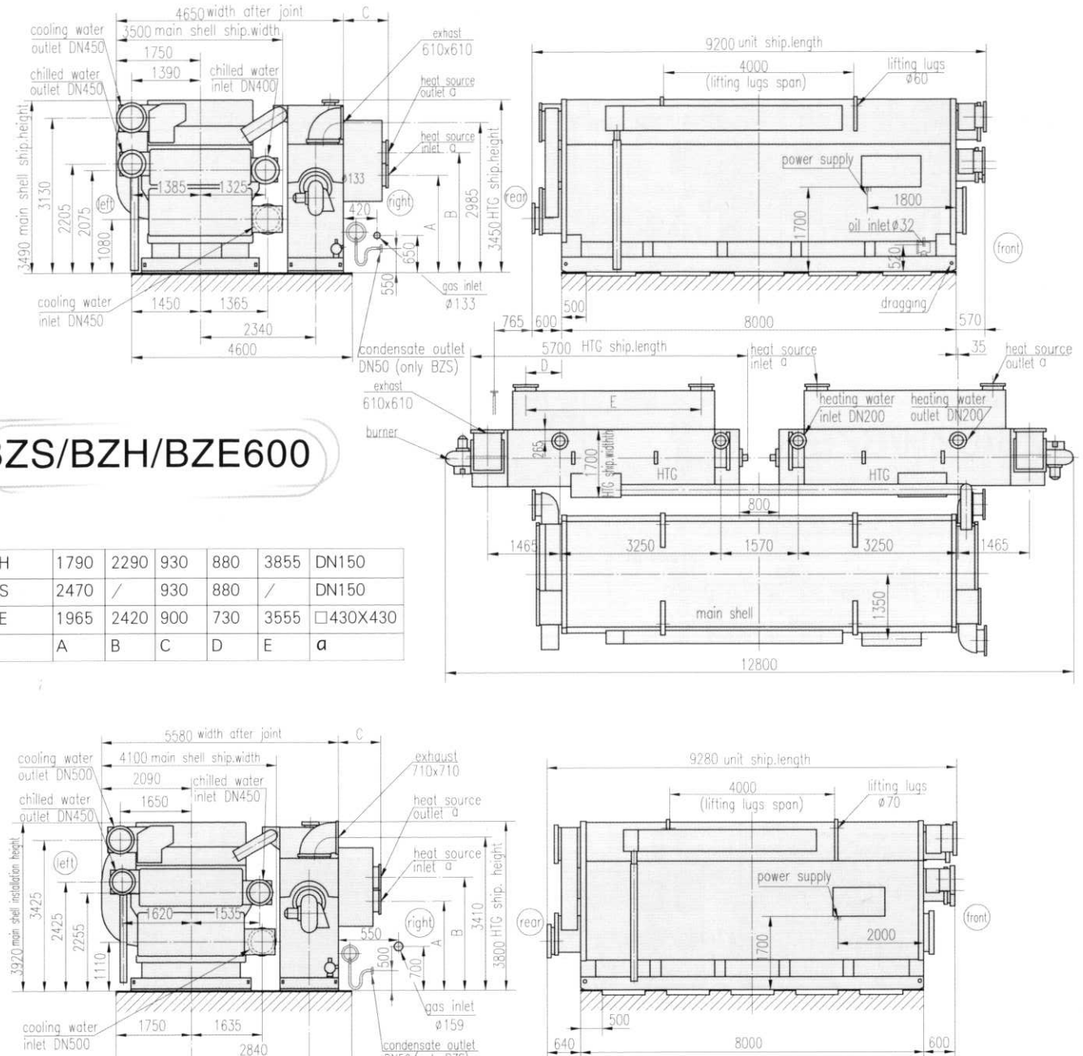
BZH	1420	1920	940	1190	3790	DN150
BZS	2100	/	940	1190	/	DN150
BZE	1595	2050	915	1230	3540	□430X430
	A	B	C	D	E	*a*

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



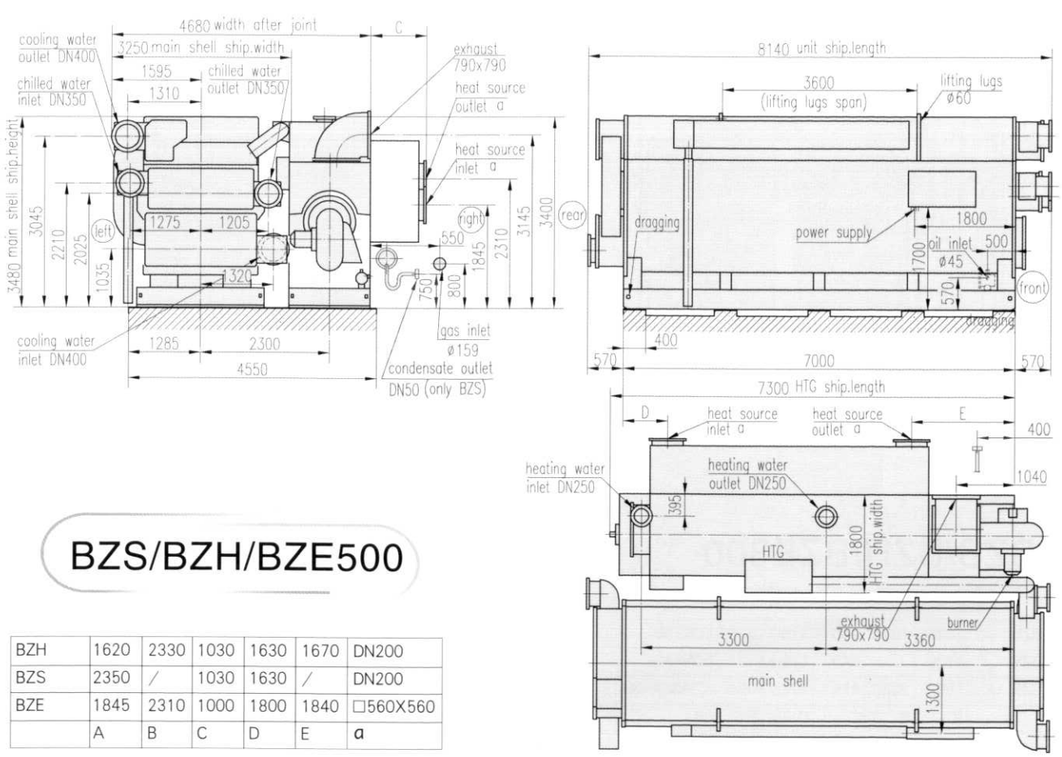
BZS/BZH/BZE400

BZH	1550	2230	845	425	1165	DN200
BZS	2350	/	845	425	/	DN150
BZE	1805	2360	995	760	1315	□500X500
	A	B	C	D	E	*a*



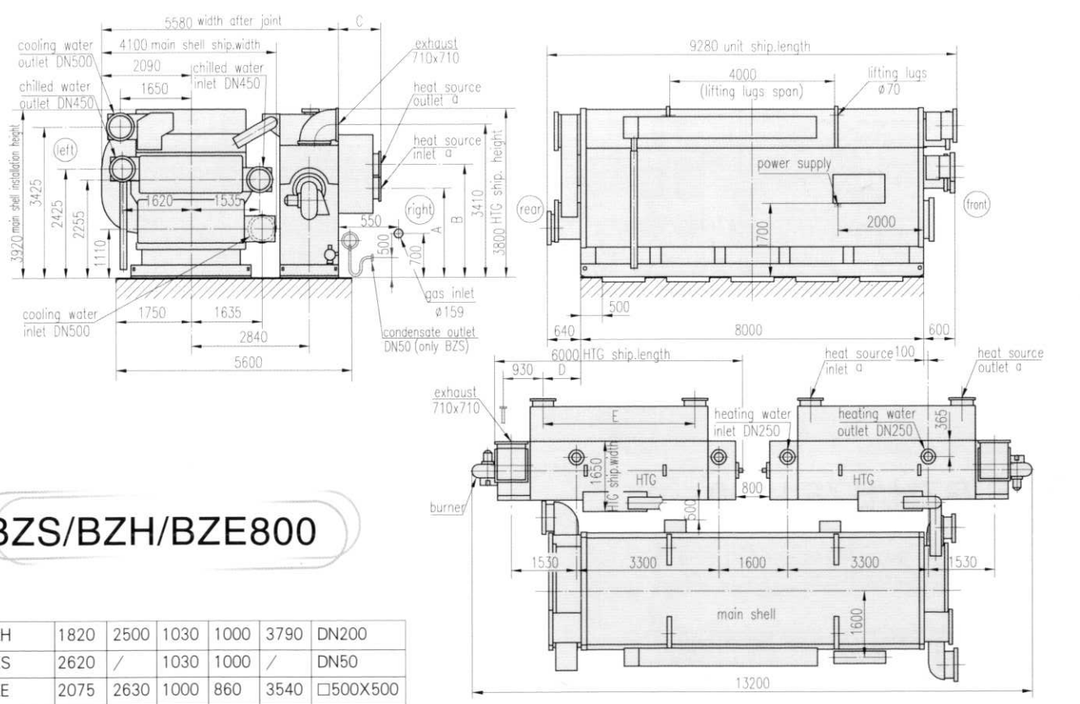
BZS/BZH/BZE600

BZH	1790	2290	930	880	3855	DN150
BZS	2470	/	930	880	/	DN150
BZE	1965	2420	900	730	3555	□430X430
	A	B	C	D	E	*a*



BZS/BZH/BZE500

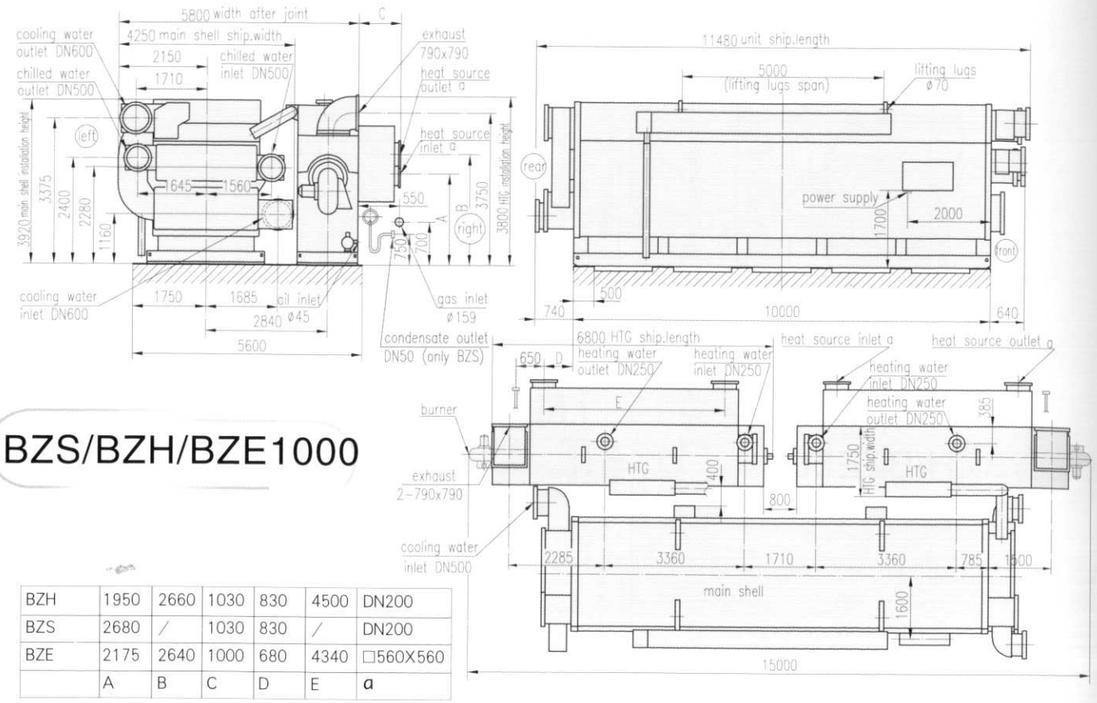
BZH	1620	2330	1030	1630	1670	DN200
BZS	2350	/	1030	1630	/	DN200
BZE	1845	2310	1000	1800	1840	□560X560
	A	B	C	D	E	*a*



BZS/BZH/BZE800

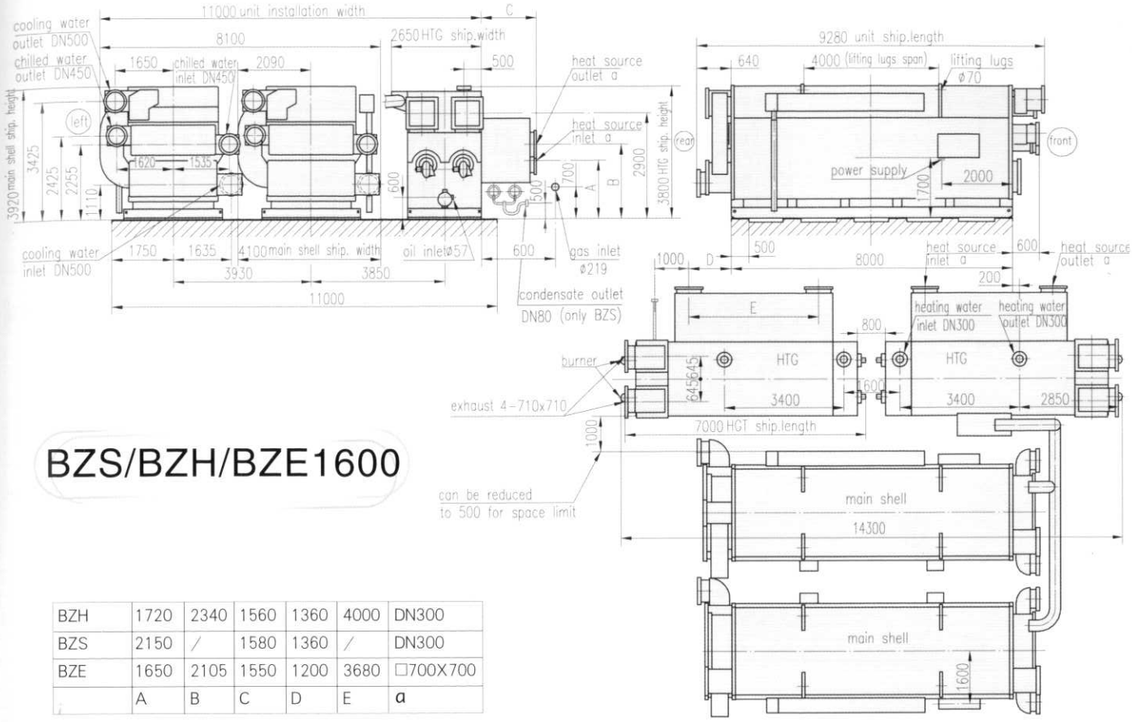
BZH	1820	2500	1030	1000	3790	DN200
BZS	2620	/	1030	1000	/	DN50
BZE	2075	2630	1000	860	3540	□500X500
	A	B	C	D	E	*a*

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



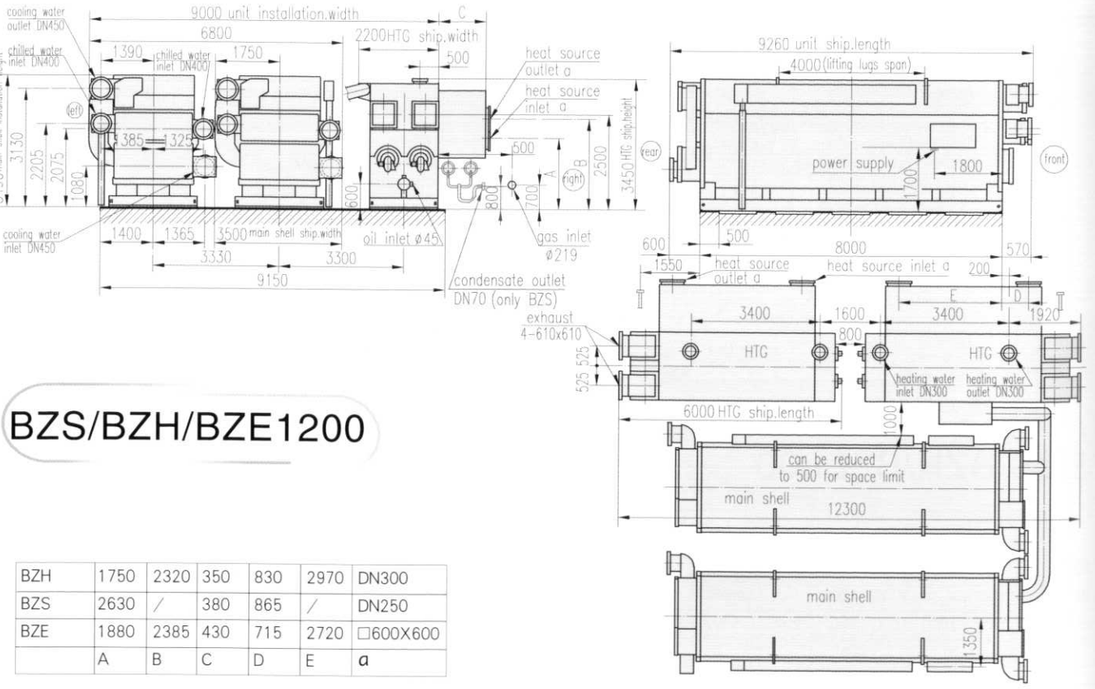
BZS/BZH/BZE1000

BZH	1950	2660	1030	830	4500	DN200
BZS	2680	/	1030	830	/	DN200
BZE	2175	2640	1000	680	4340	□560X560
	A	B	C	D	E	a



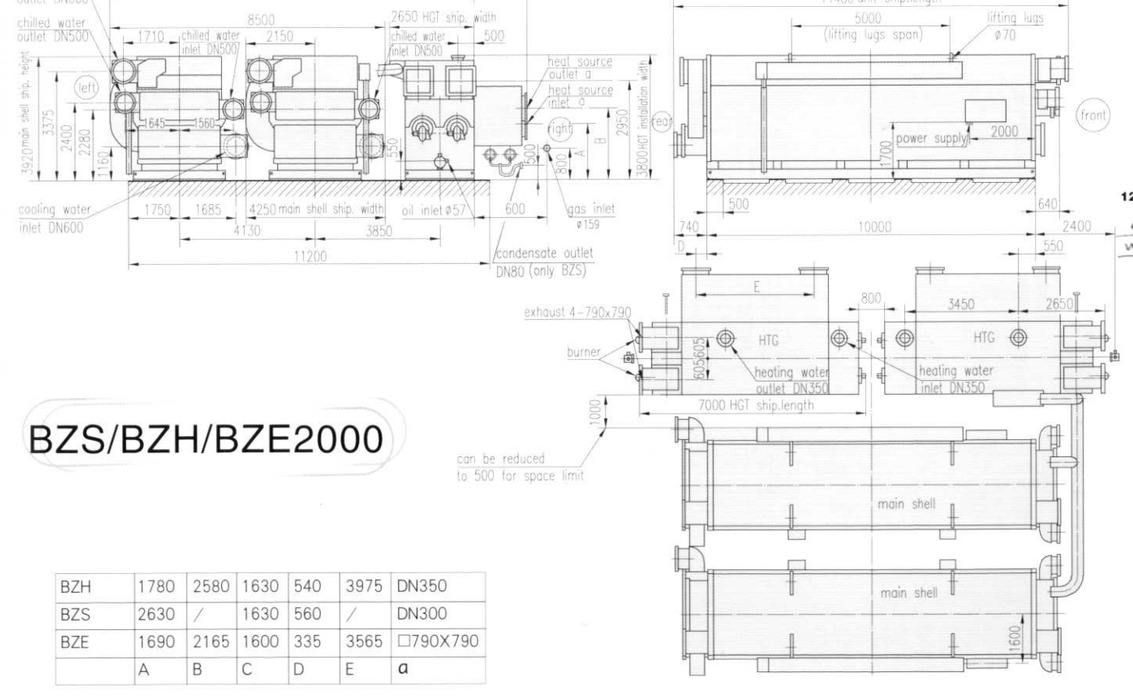
BZS/BZH/BZE1600

BZH	1720	2340	1560	1360	4000	DN300
BZS	2150	/	1580	1360	/	DN300
BZE	1650	2105	1550	1200	3680	□700X700
	A	B	C	D	E	a



BZS/BZH/BZE1200

BZH	1750	2320	350	830	2970	DN300
BZS	2630	/	380	865	/	DN250
BZE	1880	2385	430	715	2720	□600X600
	A	B	C	D	E	a



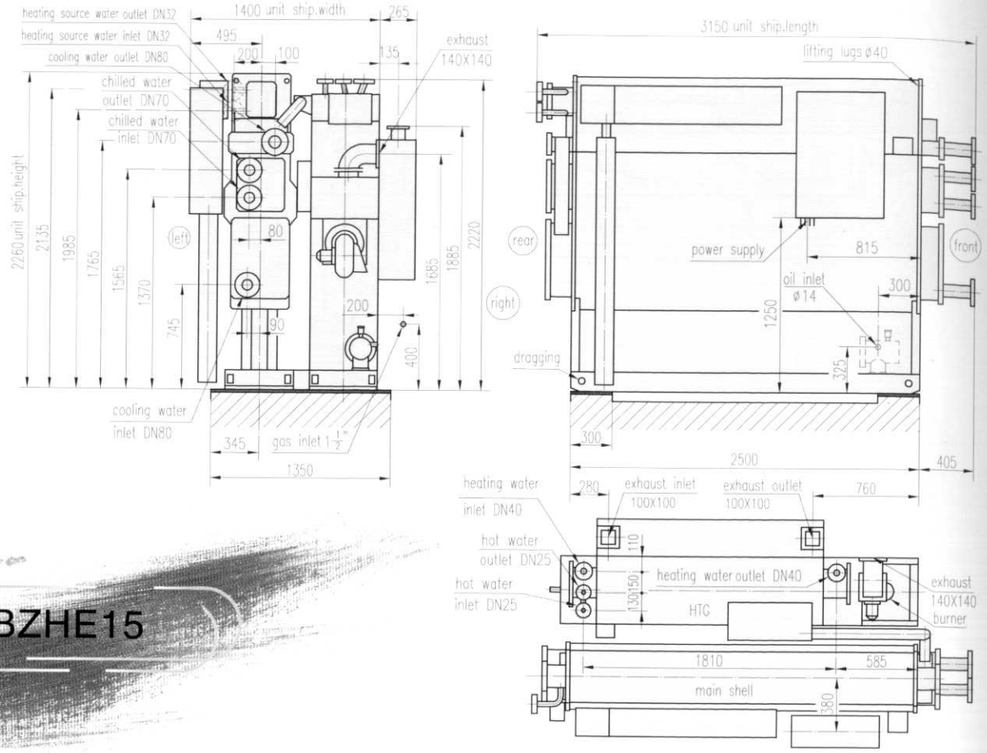
BZS/BZH/BZE2000

BZH	1780	2580	1630	540	3975	DN350
BZS	2630	/	1630	560	/	DN300
BZE	1690	2165	1600	335	3565	□790X790
	A	B	C	D	E	a

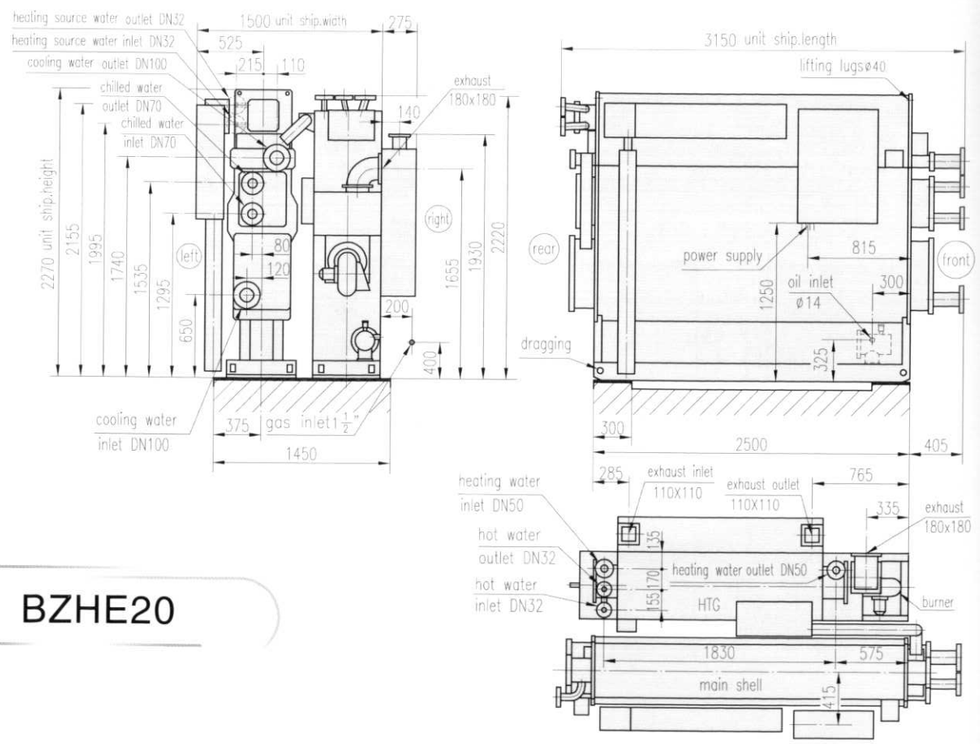
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm

MULTI-ENERGY DIRECT-FIRED CHILLER/HEATER

BZHE



BZHE15



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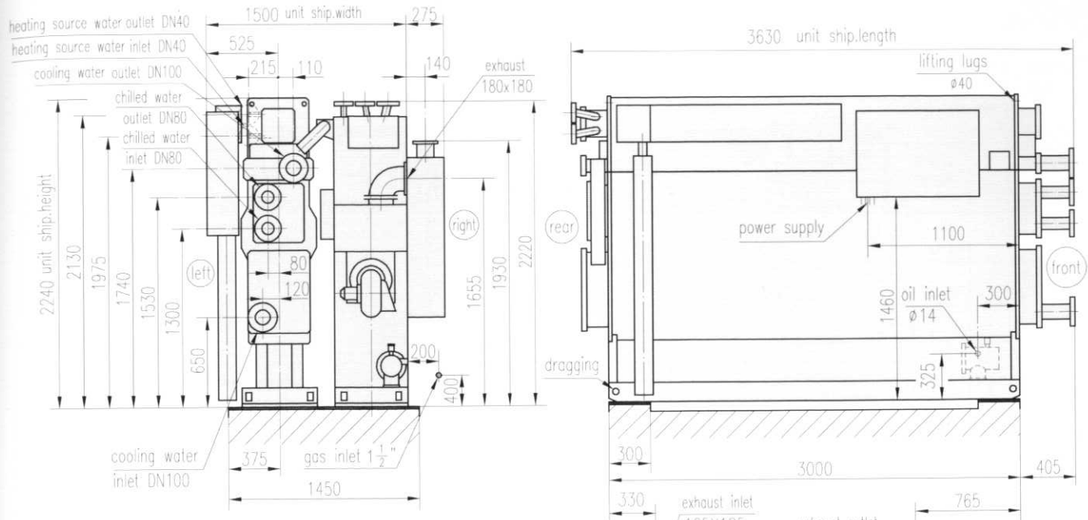
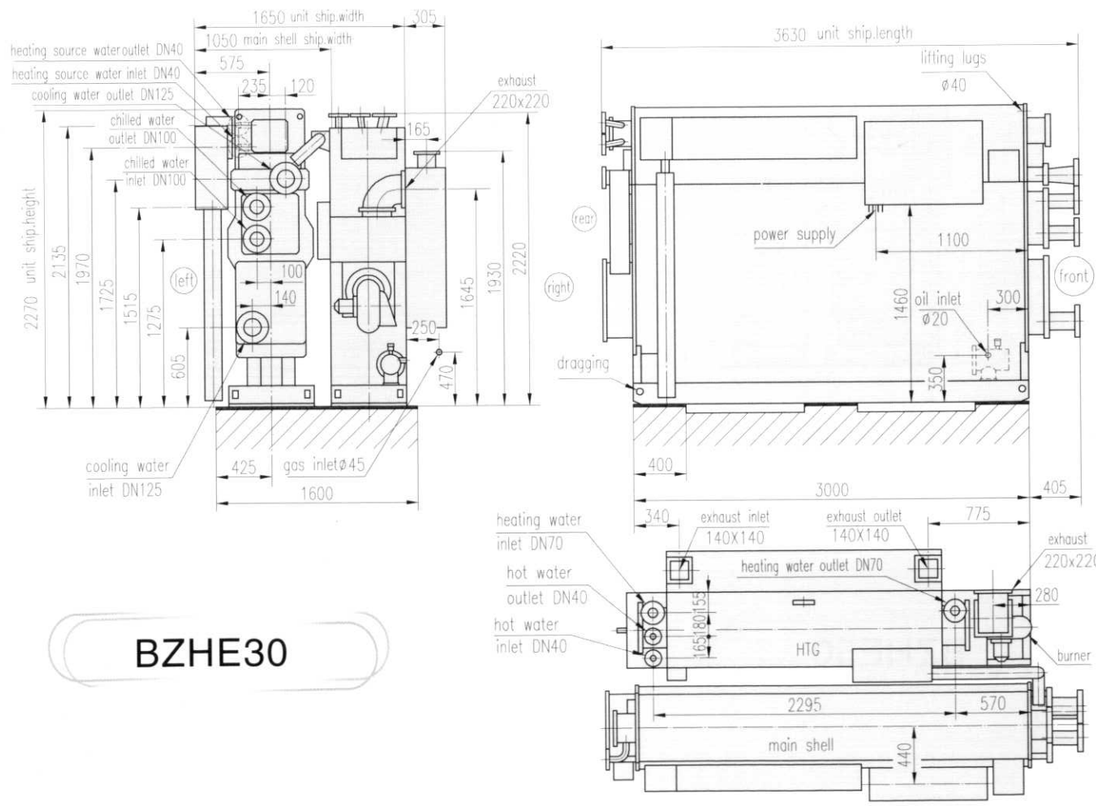
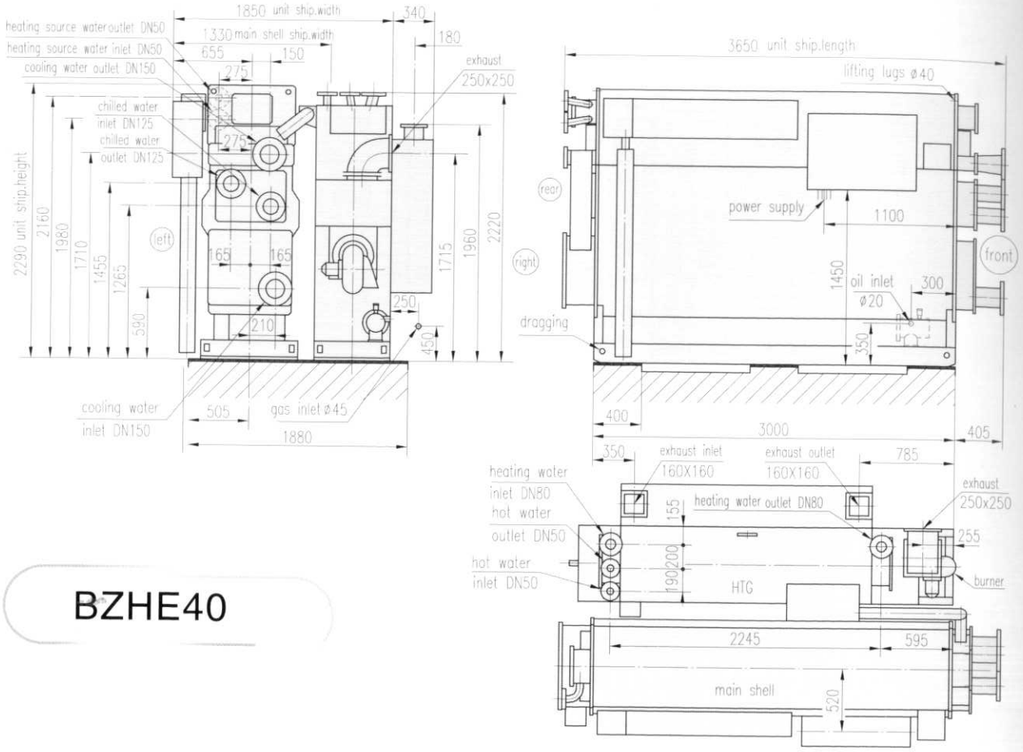


BZHE25



BZHE30

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



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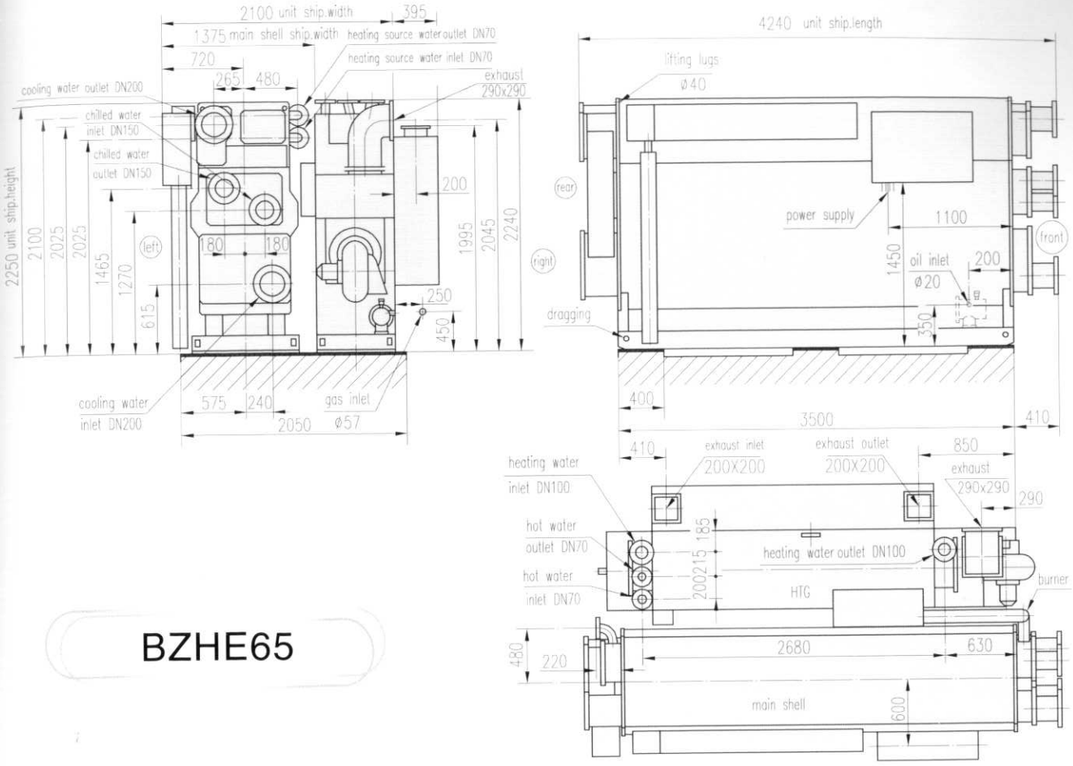

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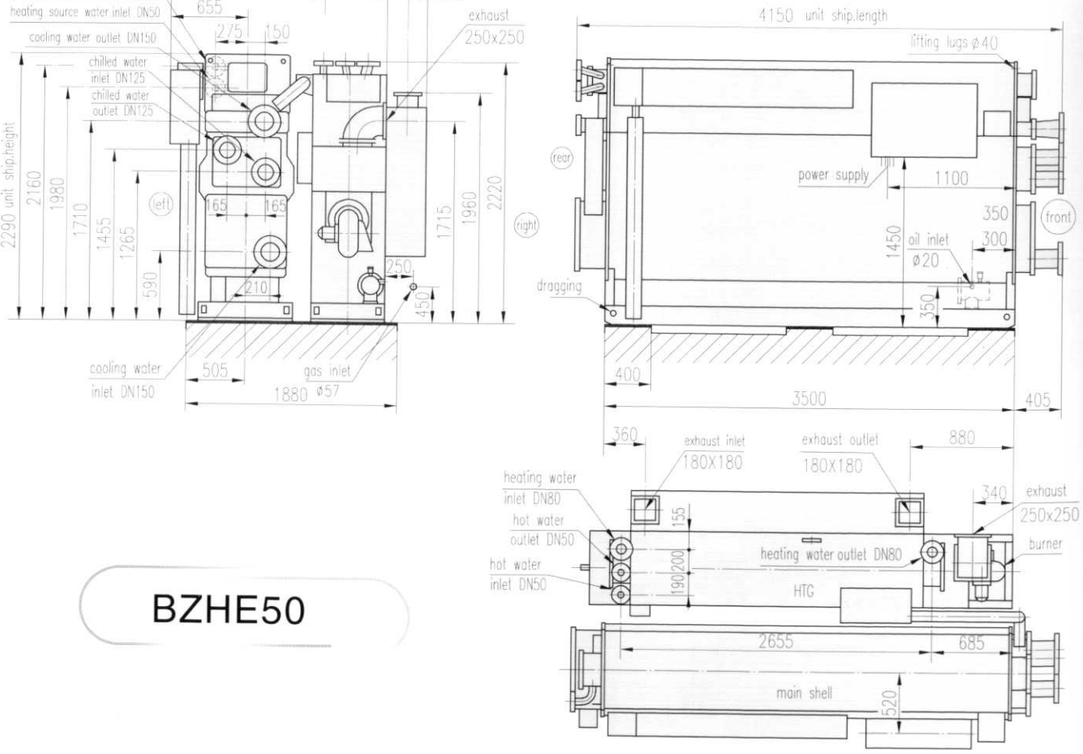

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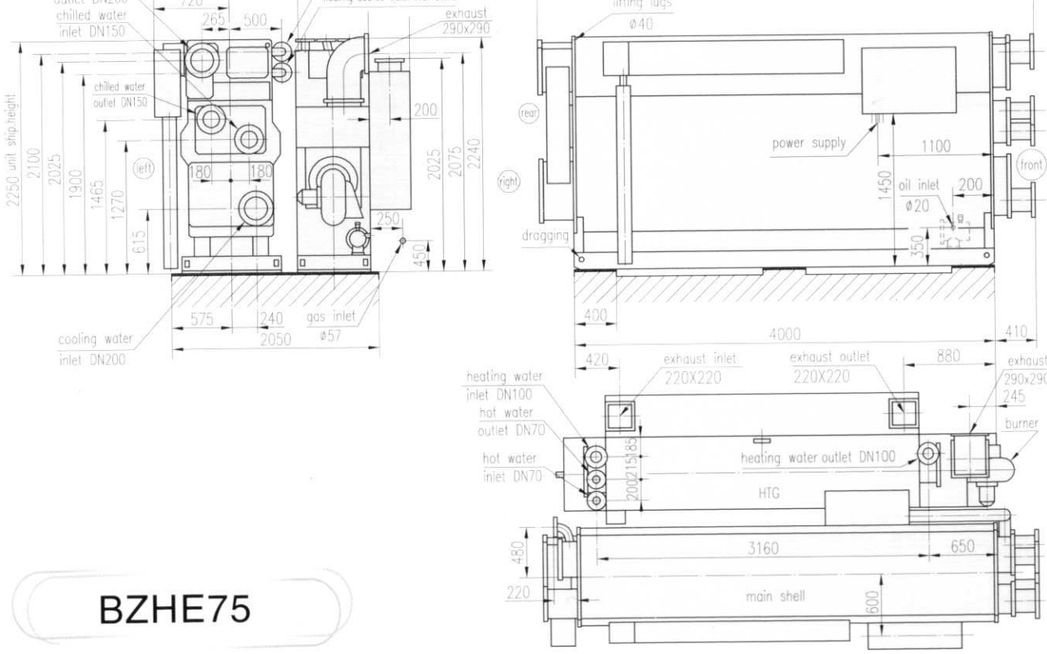
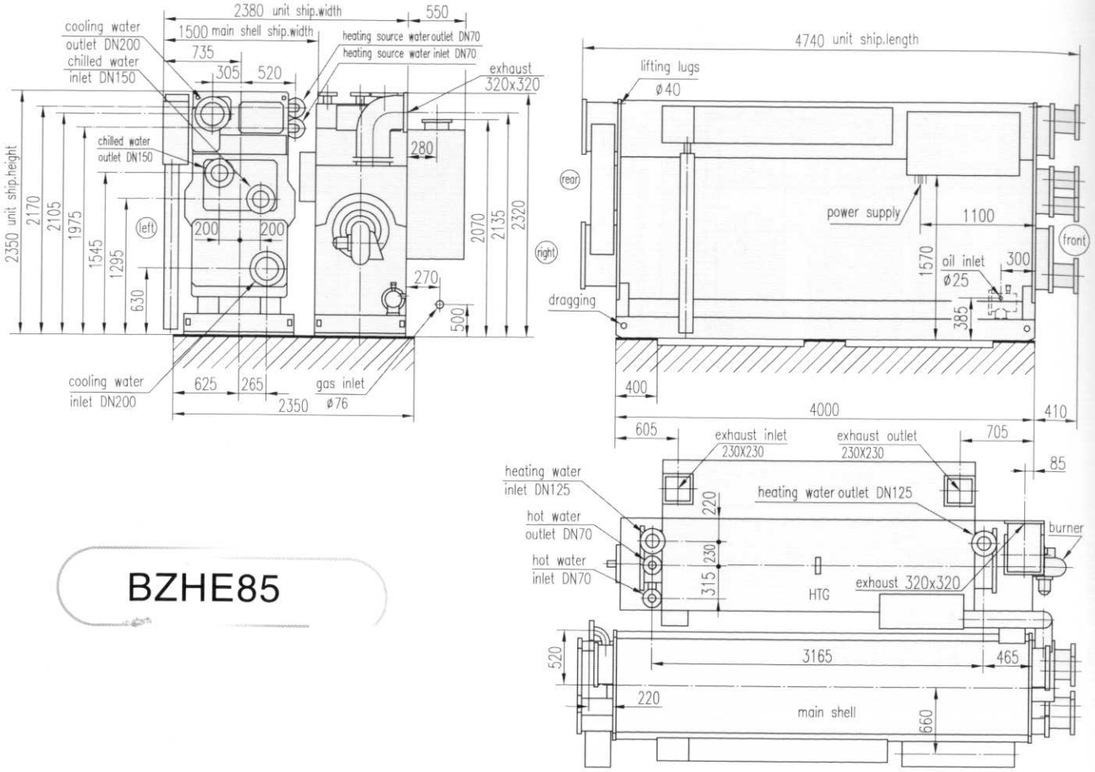


BZHE75

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



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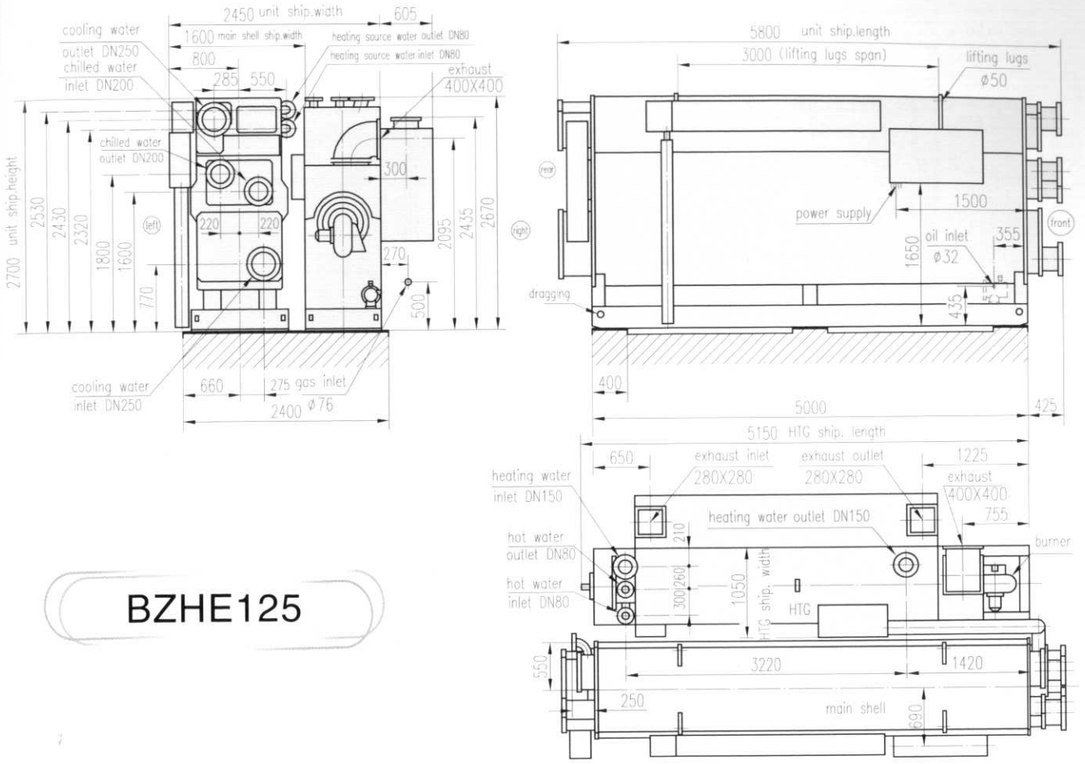

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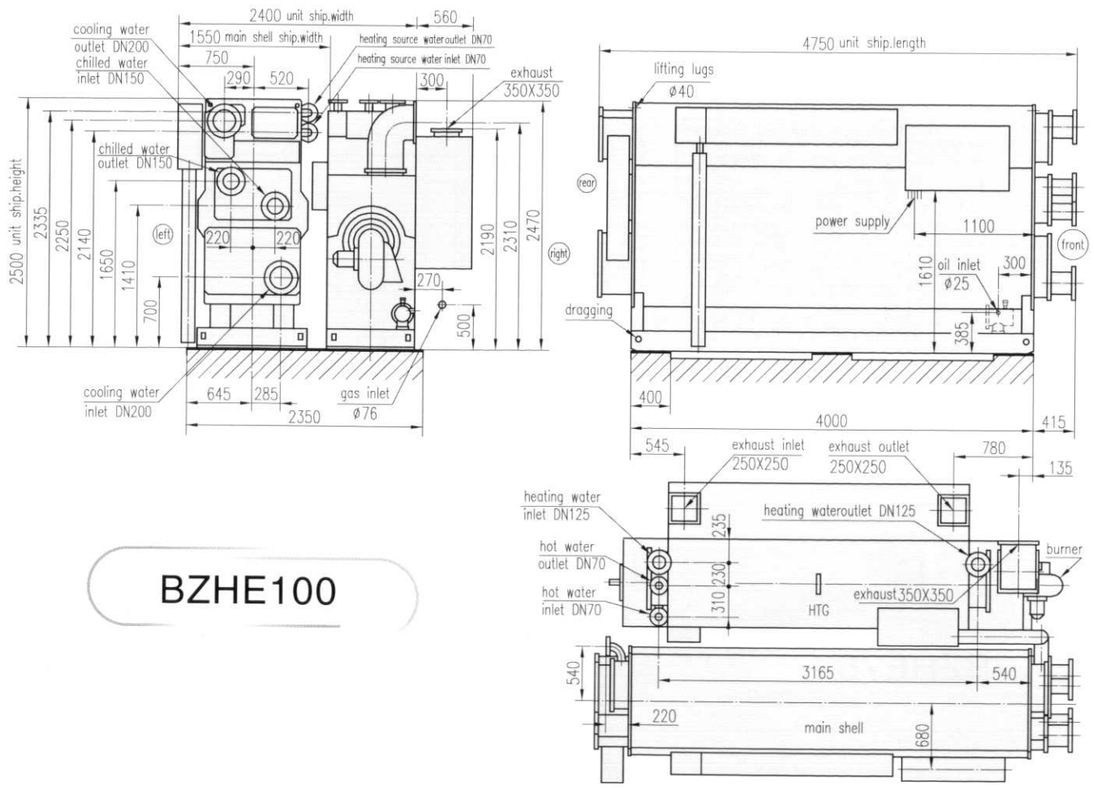
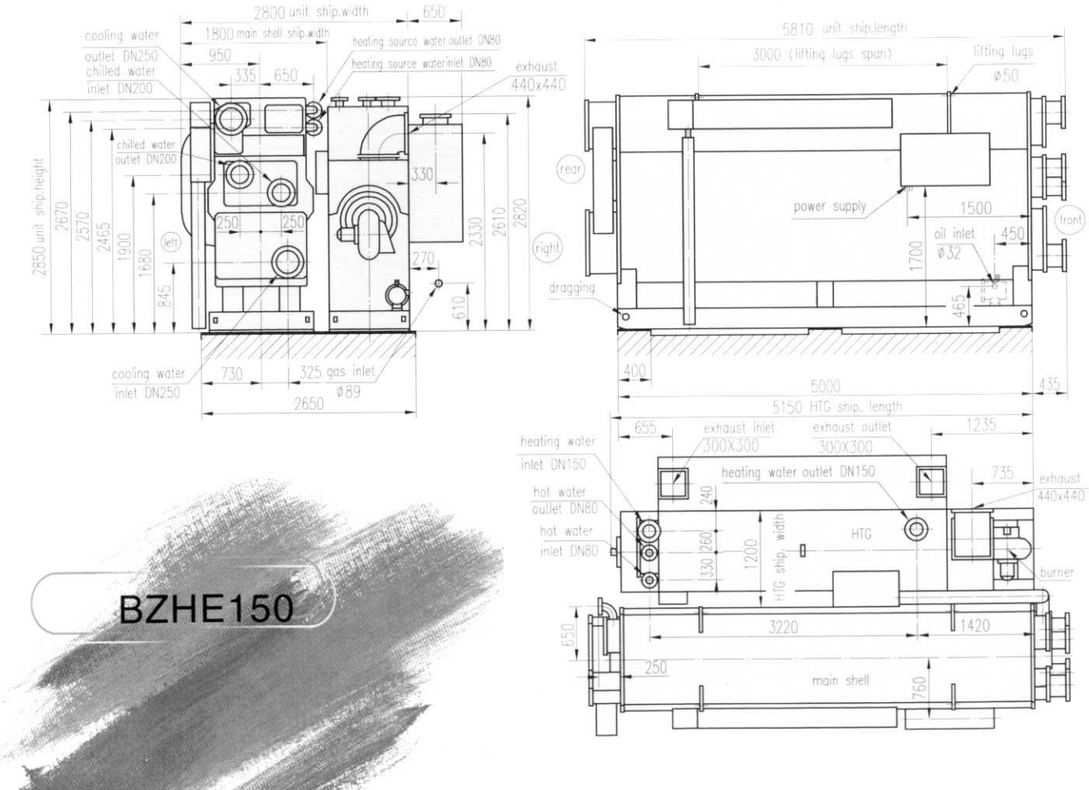
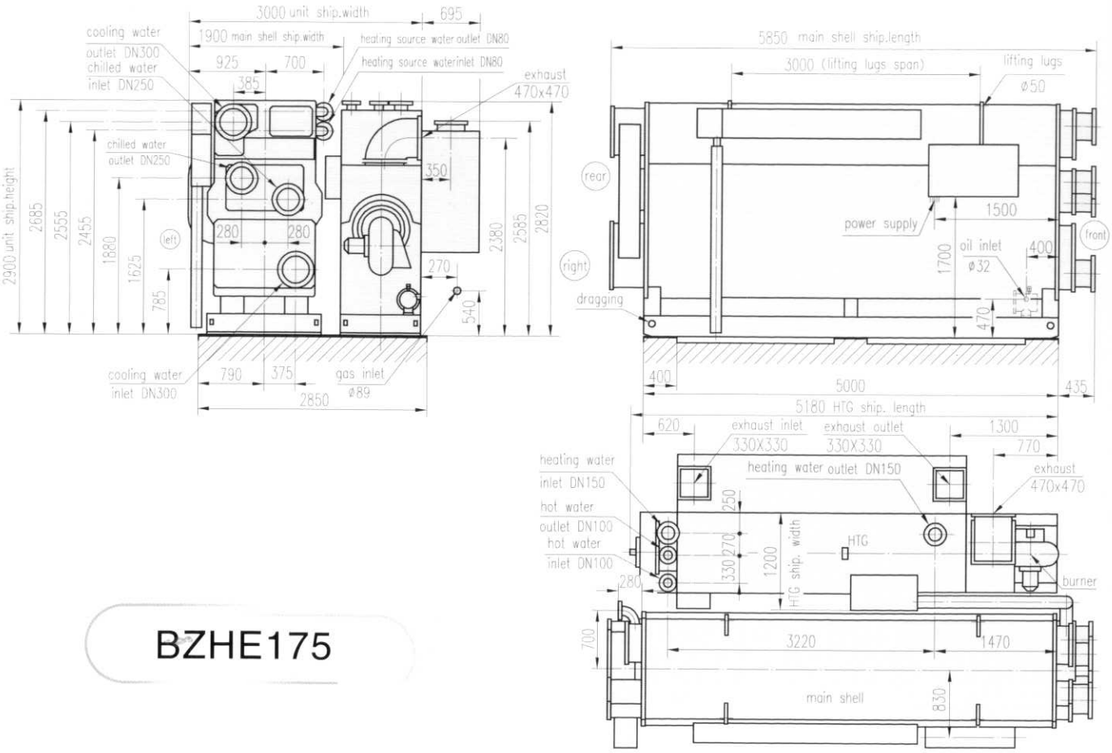


BZHE100



BZHE150

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



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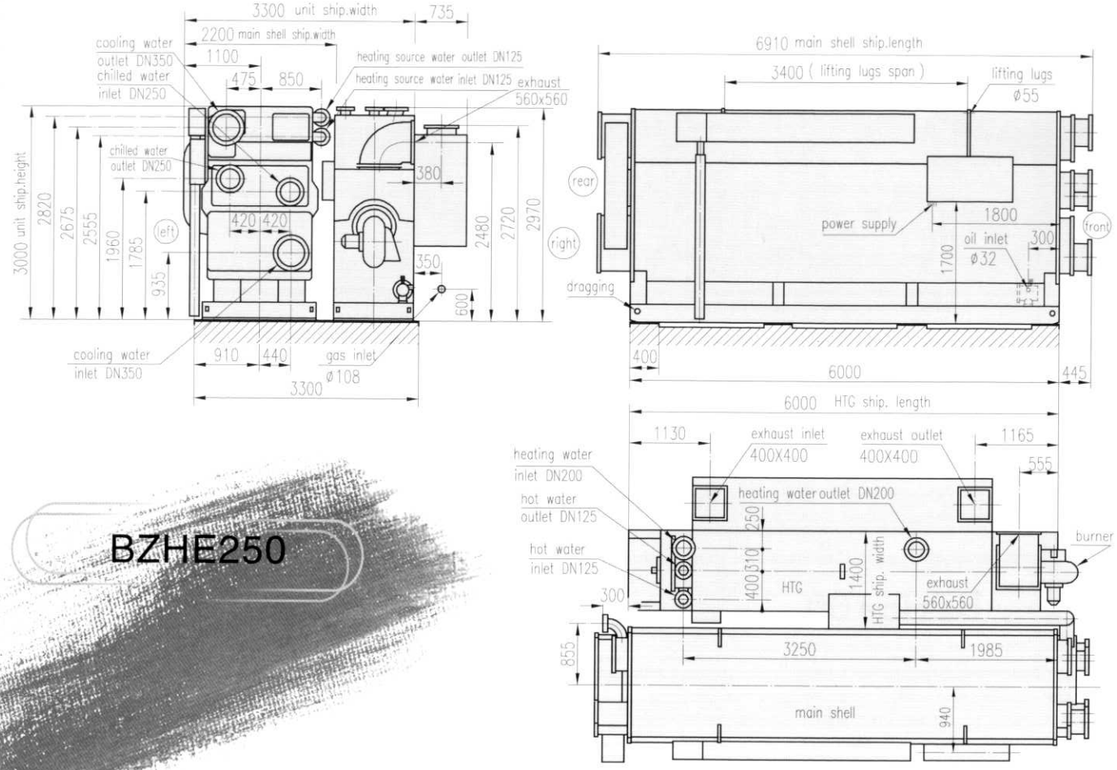

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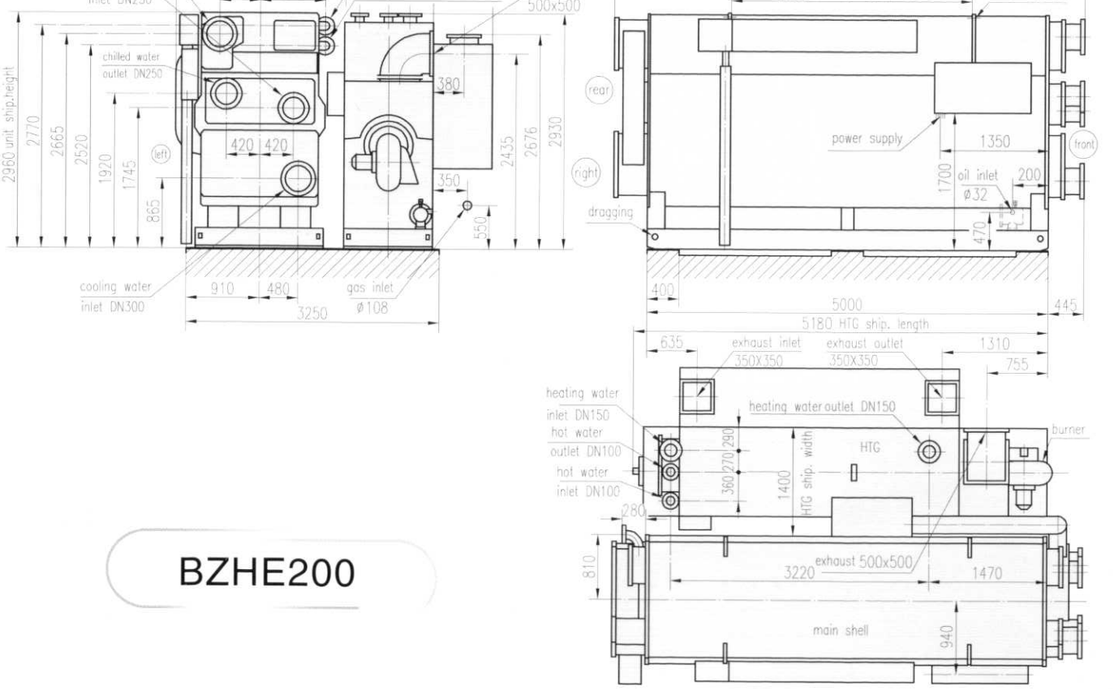

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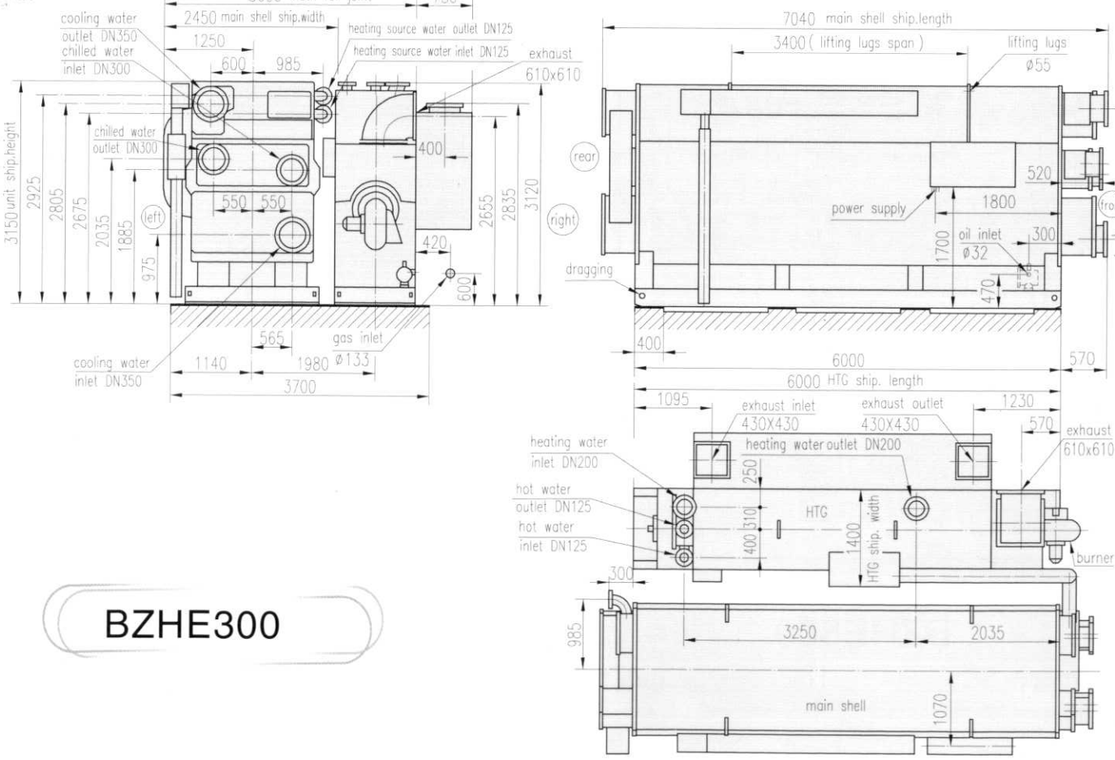
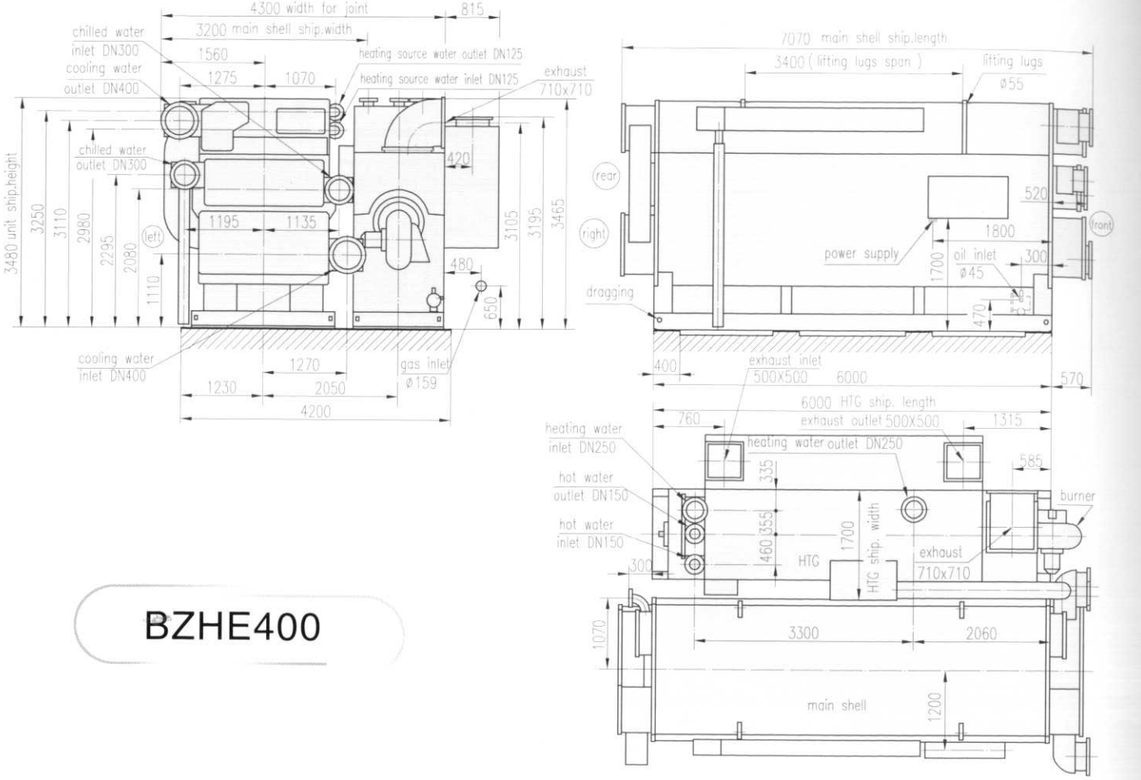


BZHE300

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



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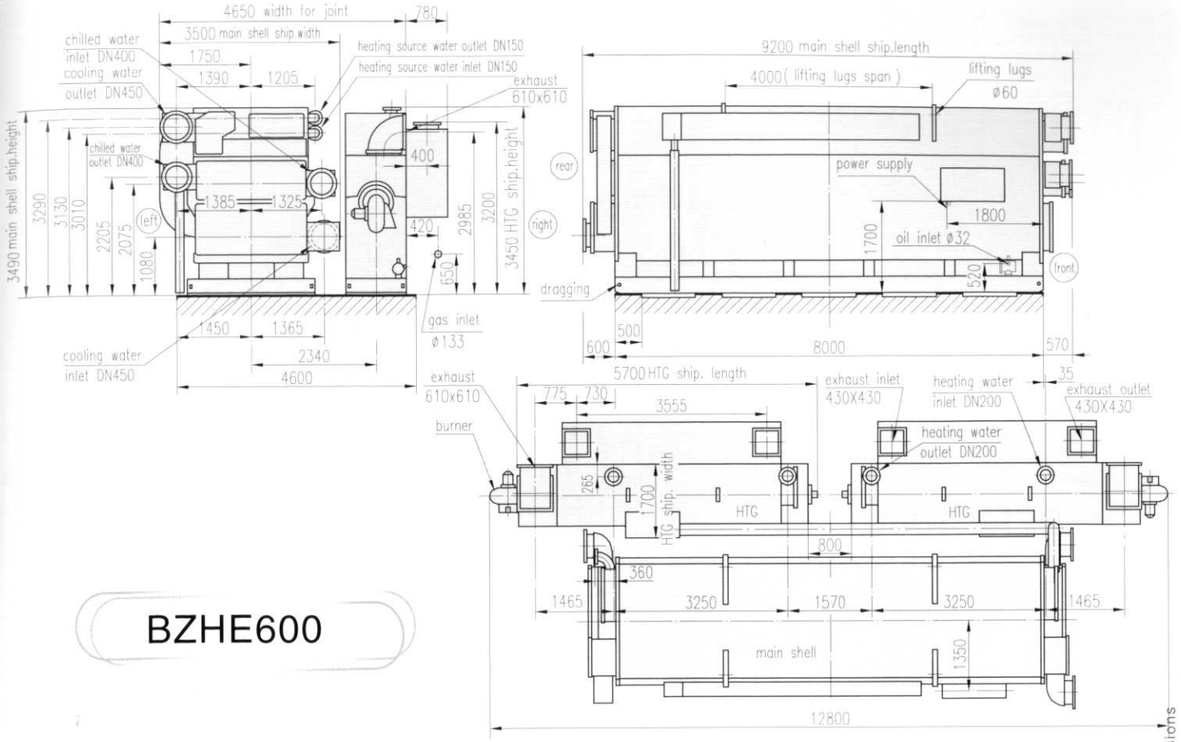

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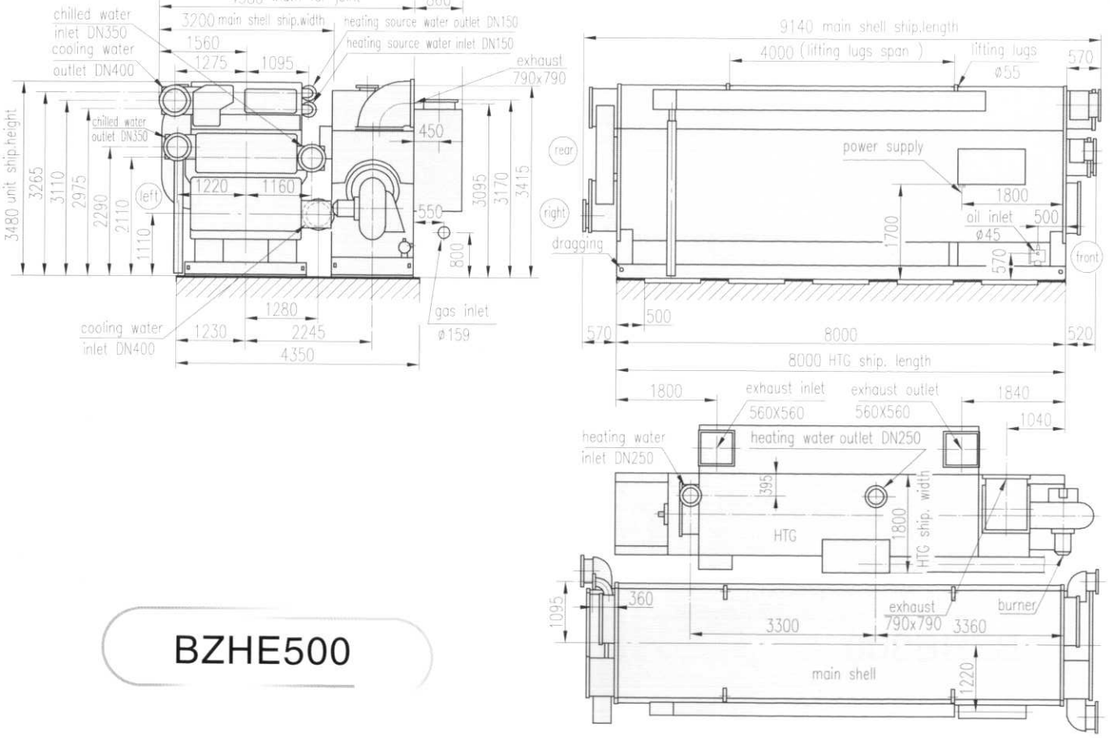

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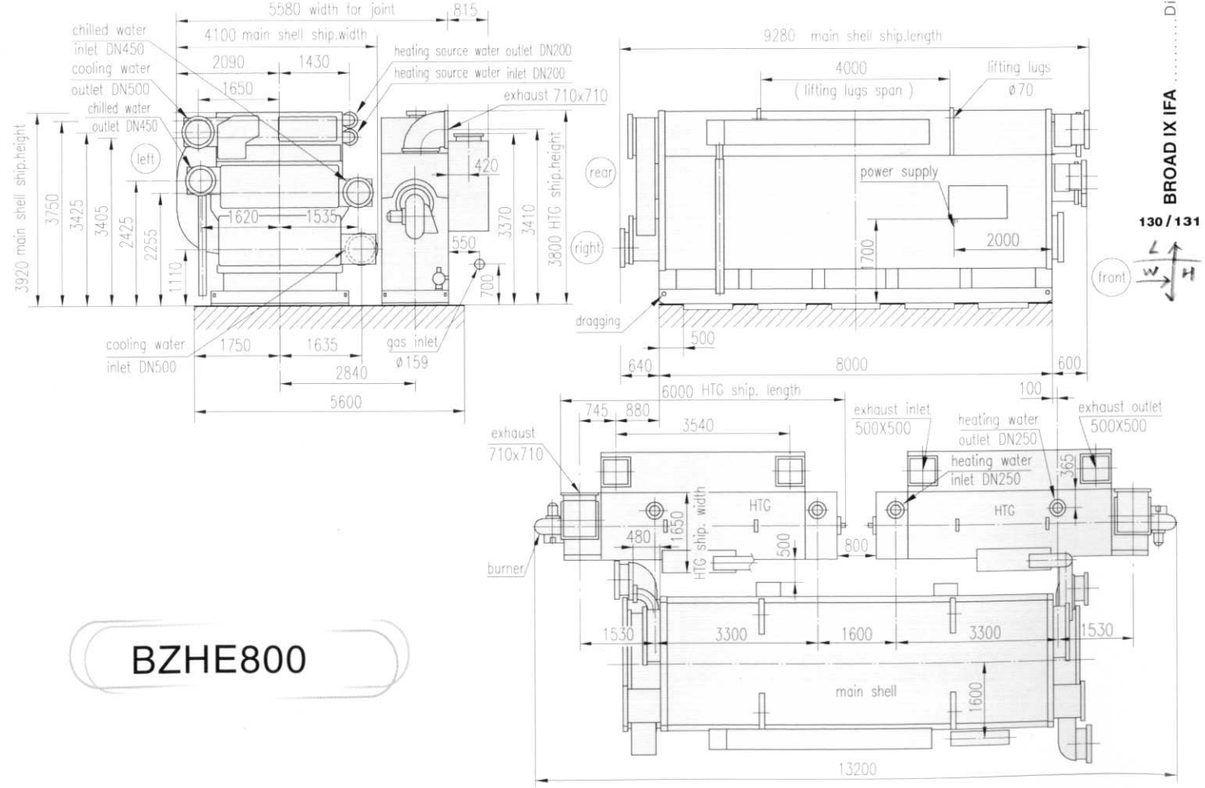
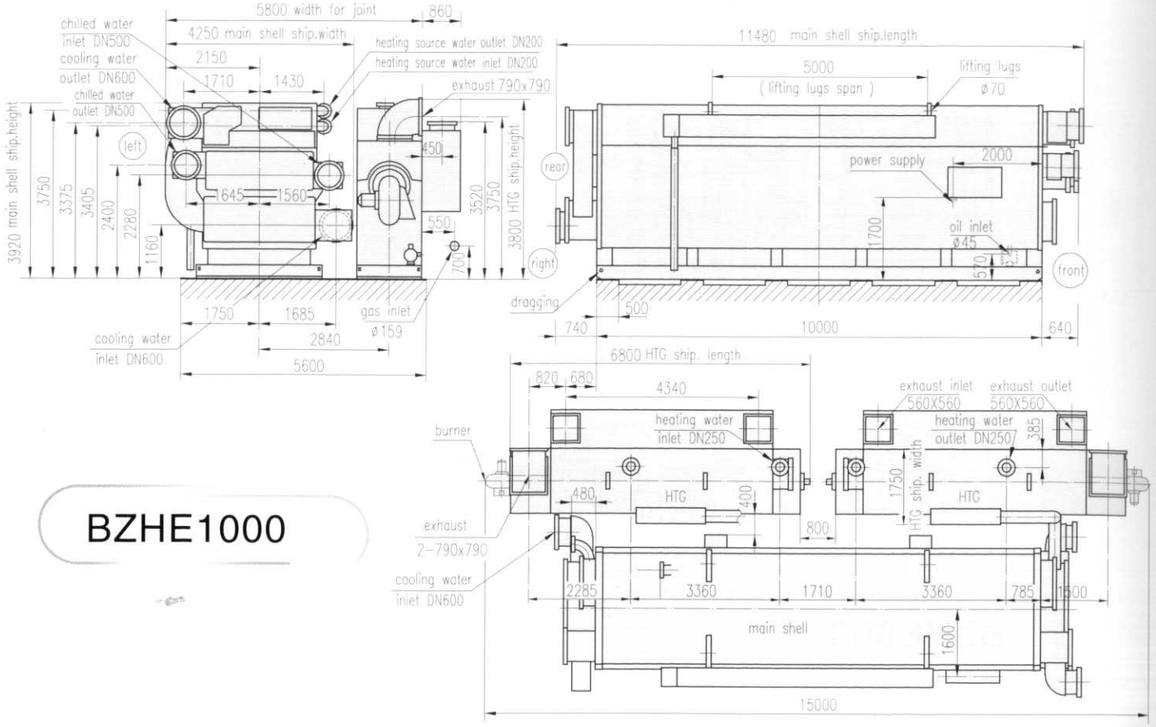
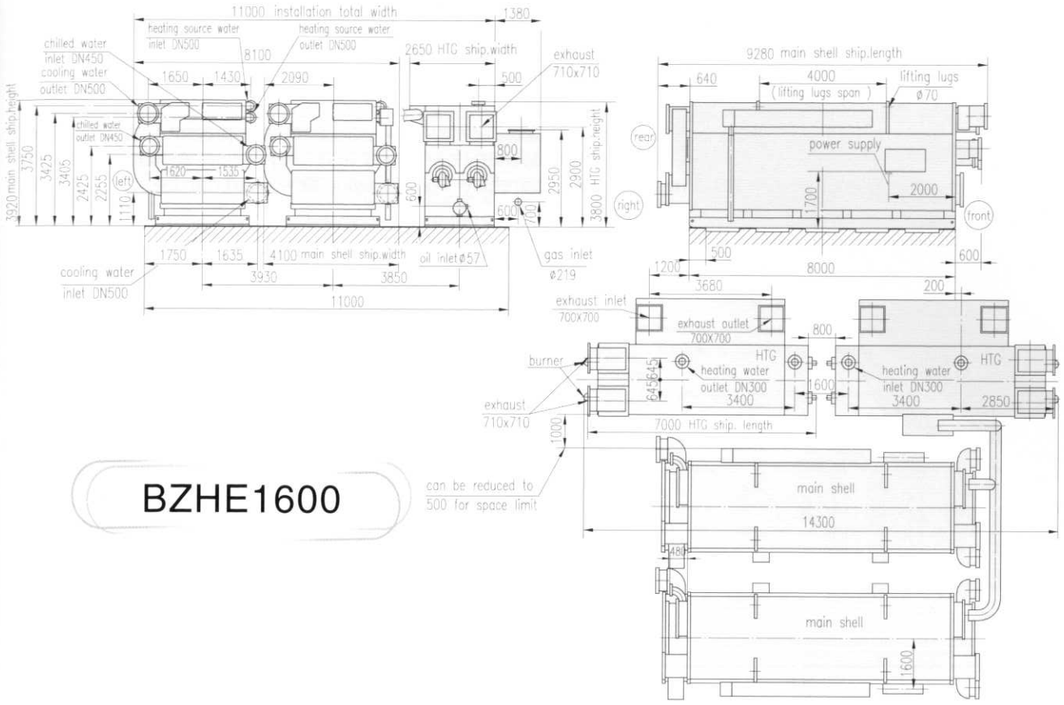


BZHE800

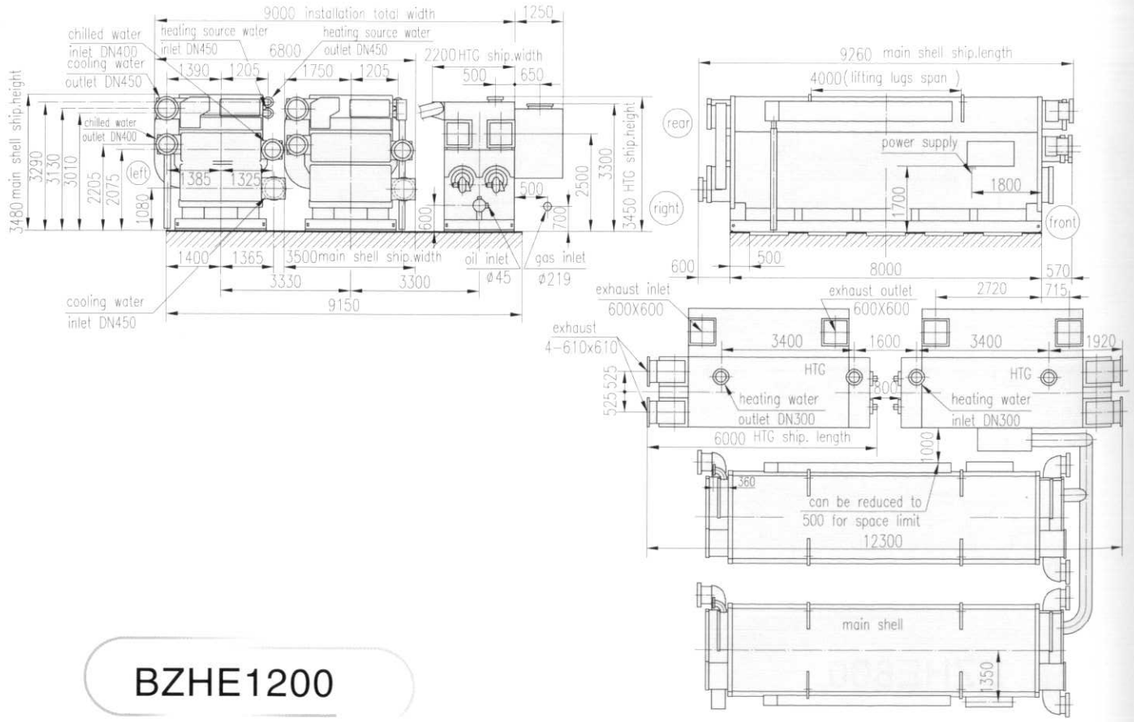
Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm



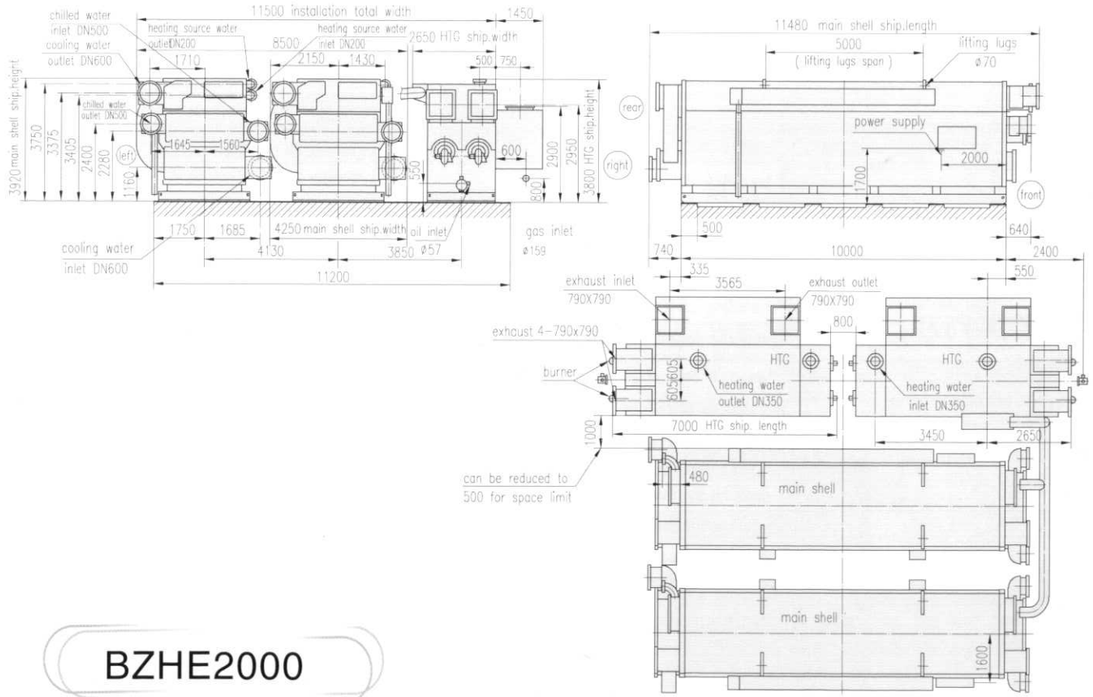
BZHE1000



BZHE1600



BZHE1200



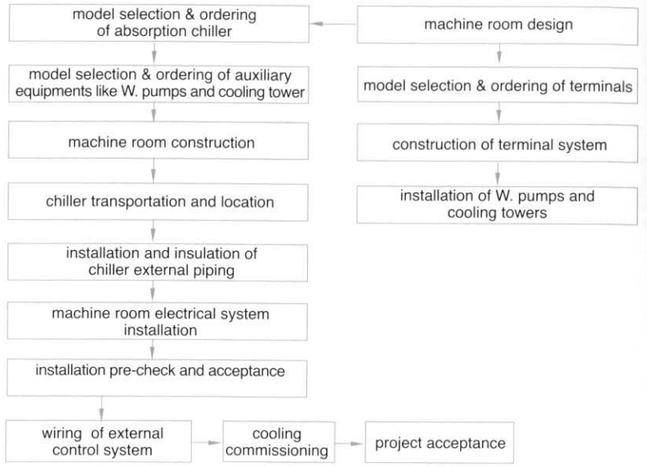
BZHE2000

Note:Dimension drawings in CAD format can be downloaded at www.broad.com. Units are in mm. 1in=25.4mm 1ft=304.8mm

MACHINE ROOM DESIGN & CONSTRUCTION TIPS

BROAD absorption chiller is the cooling source equipment of traditional central air conditioning system. The system design and construction must be in compliance with relevant local codes and regulations.
Construction must comply with relevant local government codes and specifications.
Machine room design & construction is a systematic project which involves various special fields, many personnel and long period. A comprehensive plan must be made carefully. The following flow chart can be consulted for the project planning.

Project flow chart



Delivery / Construction / Installation Scope

	Item	BROAD	Customer	Remarks
chiller	chiller and accessories	✓		refer to Supply List
test	factory test	✓		energy cost for testing to be charged.
	field commissioning	✓		
transportation and location	factory to port		✓	BROAD can arrange transportation on customer's behalf.
	port to jobsite		✓	
	handling on jobsite		✓	
	joint (for split shipment)	✓		welding machine and nitrogen to be provided by customers .
electrical engineering	Touch Screen mounting	✓		cables for remote installation of touch screen to be prepared by customers.
	power supply cable		✓	power cables for terminals in the control cabinet to be prepared by customers.
construction & installation	plinth		✓	
	chiller insulations	✓		factory-mounted
	pipeline system		✓	including water system, heat source system and electrical system
	pipeline insulation		✓	
	anti-freezing system		✓	water anti-freezing treatment is recommended when the ambient temp. is below 5℃.
	cooling water quality control	✓	✓	BROAD provides the control signal interface and software free of charge for:1.cooling water pump inverter control; 2.cooling fan inverter control; 3.by-pass thermastatic valve; 4.water quality stabilizer valve (or pump); 5.water make-up valve; 6. drain valve. users are responsible for the purchase and installation of the above inverters and valves, BROAD is responsible for commissioning.
operation & maintenance	training for users' operator	✓		
	regular maintenance	✓		service contract needs to be signed after the warranty period.

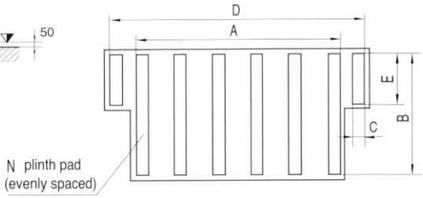
MACHINE ROOM CONSTRUCTION

Location: For chiller's safety operation of little vibration and low noise, a basement, ground, roof or any floor can be choosed as machine room. It is strongly recommended that the machine room be separated from the water pump room. In the case of high building, the machine room should be placed in the middle of the building or on the roof to reduce the pressure on the unit.
Ventilation: Poor ventilation leads to humidity in the machine room and may erode the unit, so ventilation in machine room should be paid attention. Please ventilate the machine room every 4 hours and make up the combustion air. The estimated volume of combustion air should be1.3m³ for every kW fuel.
Drainage: Attention must be paid to the drainage in the machine room:
1. The chiller's foundation must be on a higher level in the machine room.
2. All discharge pipes and overflow pipes must be put above the drainage and be visible.
3. The machine room in basement must be installed above a water pit, which is equipped with an auto level-controlled submerged pump.

Ambient Temperature: Machine room temperature must range from 5℃~43℃. Lower temperature may crack copper tubes and water box when the chiller is shut off; higher temperature may damage electrical components. Thermometer and over temperature alarm must be installed in machine room.
Humidity: Machine room humidity must be lower than 85%. Humidity higher than 85% may impair insulation of electrical components.
Load capacity:
1. The machine room foundation load may be designed as 1.5 times of the operation weight. Make sure that the foundation is level and can sustain the operation weight of the chiller. Otherwise it may twist the chiller, cause the leakage and shorten its life-span.
2. The load of unit evenly distributes on the interface between the frame base rolling steel and the foundation.

Plinth Dimensions:

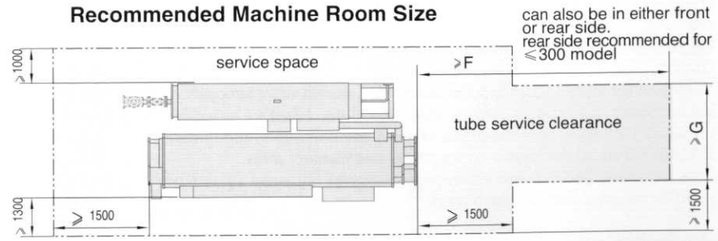
Note: 1. ▽ Level emendation is required, the unevenness should be within 0.3‰.
2. Please refer to the dimension drawing for plinth drawing.



Plinth Dimensions (mm)

Model		15	20	25	30	40	50	65	75	85	100	125	150	175	200	250	300	400	500	600	800	1000	1200	1600	2000
A		2500	2500	3000	3000	3000	3500	3500	4000	4000	4000	5000	5000	5000	5000	6000	6000	6000	8000	8000	8000	10000	8000	8000	10000
B	BS,BH BZS,BZH BZE,BZHE	1350	1450	1450	1600	1850	1850	2050	2050	2350	2350	2400	2650	2850	3200	3250	3500	4200	4550	4600	5600	5600	9100	11000	11200
	BE	1350	1450	1450	1600	1850	1850	2100	2100	2400	2450	2500	2780	2900	3350	3380	3750	4350	4800	5350	6350	6650	11000	13000	14000
	BDS	690	750	750	850	1010	1010	1150	1150	1250	1290	1320	1460	1580	1820	1820	2080	2460	2570	3000	3500	3500	6390	7550	7750
	BDH	690	750	750	850	1010	1010	1150	1150	1250	1290	1320	1460	1580	1820	1820	2080	2460	2570	5090	6550	6550	10000	12700	12700
	BDE	945	1010	1010	1080	1350	1370	1500	1500	1674	1792	1780	1930	2200	2600	2600	2850	4350	4680	5090	6050	6350	11200	13000	13600
C		300	300	300	400	400	400	400	400	400	400	400	400	400	400	400	400	400	500	500	500	500	500	500	500
D	BZS,BZH BZE,BZHE	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	12000	12500	14000	12000	14000	15000
E	BZS,BZH BZE,BZHE	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	1400	1700	1700	2200	2650	2650
N	BZS,BZH BZE,BZHE	2	2	2	3	3	3	3	3	3	3	3	3	3	3	4	4	4	6	8	8	8	8	8	8
	other	2	2	2	3	3	3	3	3	3	3	3	3	3	3	4	4	4	6	6	6	6	6	6	6

Recommended Machine Room Size



Recommended Service Space Requirements (mm)

Model		15	20	25	30	40	50	65	75	85	100	125	150	175	200	250	300	400	500	600	800	1000	1200	1600	2000
F		2300	2300	2700	2700	2700	3200	3200	3700	3700	3700	4500	4500	4500	4500	5500	5500	5500	7000	7000	7000	9000	7000	7000	9000
G	BS,BH BZS,BZH BZHE	1300	1360	1360	1430	1590	1590	1830	1830	1950	2280	2350	2460	2660	2850	2900	3200	3850	3900	3950	4950	5450	9300	11000	11500
	BE BZE,BDS BDH,BDE	600	650	650	700	800	800	900	900	1100	1100	1150	1300	1400	1700	1700	1950	2100	2400	2400	2600	2600	5400	5800	5800

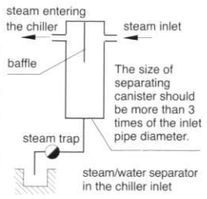
Note: 1. If the machine room is smaller than the above size, please contact BROAD to discuss the solution.
2. F,G is the tubes service clearance which can utilize doors or windows and can also be shared by 2 chillers. The chilled W. & cooling W. pipes should be easily removable.
3. It is recommended the height of the machine room be 500mm higher than chillers.

PIPING SYSTEM

Water System

1. There should be a motorized by-pass valve to regulate the cooling water temperature before the cooling water enters the cooling tower. Water quality stabilizer charge device should be equipped in the cooling water pipe and cooling tower. A motorized drain valve should be mounted at the lowest part of the cooling water system and a water make-up solenoid valve in the pipeline. What users have to do is only to have the motor valves and solenoid valves prepared according to the pipe diameter and wired to the absorption chiller control cabinet, then they will be controlled by BROAD control system.
2. Filters with mesh size of Φ2 ~ Φ4 mm must be equipped at the pipe inlet of all pumps and should be removable easily. If canned pumps are used for chilled/heating water and hot water systems, filters with mesh size ⩽0.6mm (18 mesh-30 mesh) must be equipped at the inlet of pumps, or else pumps will be damaged (solenoid valve should also be equipped with this kind of filter).
3. Soft connector must be installed at inlet/outlet of chilled/cooling water and hot water. The weight of the piping system can never be borne by the chiller.
4. If the static pressure of the piping system is over 40m, the pumps are suggested to be installed at the outlet of chiller so as to reduce the unnecessary pressure borne by the chiller.
5. It is recommended that users adopt one-to-one water system, i.e. one unit matched with one set of chilled/heating water pump, cooling water pump and cooling tower. If limited by conditions, when several chillers share one cooling water system, there should be a motor valve in the cooling outlet of each chiller in order to auto decrystallize and stop the chiller individually.
6. The initial water input of the chilled/heating water system must use soft water. The leakage rate should be less than 10% every year and the leakage can not happen frequently, or else large amount make-up water will cause the fouling in the heat exchange surface in the chiller and terminals.
7. If the cooling tower is installed in the downtown or residential area, the low noise or super low noise should be adopted. The installation site should be far away from heat source, especially should be at least 12m from the chimney, or the chimney should be 2m higher than the top of the cooling tower, or else the exhaust will enter the cooling tower and cause the corrosion to tubes of absorber and condenser of the chiller.
8. The pipeline requirements: The pipeline in front of the chiller (⩽300 model) should be easy to dismantle in order to open the water box cover to clean the heat exchange tube. Any pipeline valve should avoid crossing from the top of the chiller to avoid chiller damage caused by installation, maintenance and valve leakage.
9. A safety valve(a standard boiler valve is recommended)must be placed at the heating/hot water inlet pipe (within the valve position). In case the inlet/outlet valve is closed, and discharge valve is forgotten to be opened, the safety valve can be used to avoid overpressure from chiller being heated. The safety valve must start at 110~130% of the pipe working pressure.
10. Suggestions to reduce pipeline resistance and pump electricity consumption: 1. 3-way piping should be bevelly connected and valves in the circulating pipelines should be butterfly valves or gate valves; 2. Recommended flowrate: <1m/s for pipes under DN80, <1.5m/s for DN100-DN200 pipes, <2m/s for above DN250 pipes.
11. For the construction of heating & hot water pipes, the hot water temperature sensor holder (provided by BROAD attached with the chiller) will be welded on pipes 10m away from the chiller without any damage to the thread. BROAD will install the sensor on the holder and connect wires.
12. It is recommended that secondary heat exchange hot water system be used for the area with very hard water.

Steam System



1. The supply of the steam should be pressure-stable; the upper limit pressure should not be over 110% of the rated pressure. If the pressure may exceed the upper limit, a regulating valve should be equipped in the pipeline.
2. Safety valve should be fixed in the steam inlet pipeline.The protection value is adjusted as 110% ~130% of its working pressure. The safety valve will be connected to outdoor to avoid the over-pressure of the system.
3. The steam/water seperator will be fixed 3m away from the steam outlet. For example, a vertical discharge pipe (the diameter be 2 ~ 5 times bigger than steam pipes) to be installed with the steam trap below to avoid water impacting caused by the steam mixed with water entering the chiller.
4. Condensed water should be able to drain smoothly. Condensed water can be stored in an open condensed water tank installed besides the chiller (covered by 100mm water seal elbow), then pumped back to the boiler by a condensed water pump or steam trap pressurizer.

Gas System

1. A gas leakage alarm (acting value should be set 20% lower than danger value lower limit) must be equipped in machine room and it should be system linkaged with forced fan. Machine room should be well ventilated all the time.
2. Pressure release device should be equipped if gas pressure is higher than 1500mmH_2O. Drain valves should be installed at the lowest part of gas pipes. All connecting pipes must be cleaned and tested for air tightness with 0.4MPa pressure when gas piping system is completed.
3. Buffer tube (with diameter 3~6 times larger than that of the main pipe) must be installed on the main pipe to avoid flameout due to gas low pressure caused by simultaneous start. Manual valve is to be equipped at the bottom of the buffer tube.
4. Customers are required to inform BROAD of the fuel type, heating value and pressure so that a burner can be properly selected and the gas pipe diameter can be notified to customers. Then customers can design filter, flow meter, ball valve, diffuser tube and pressure meter. BROAD is responsible for installation of valves within supply scope. External gas piping system is to be installed by customers to 40inch distance from the burner.
5. The ball valve of BROAD gas valve train should be closed if customers need to test piping pressure so that gas valve train will not be damaged by high pressure.

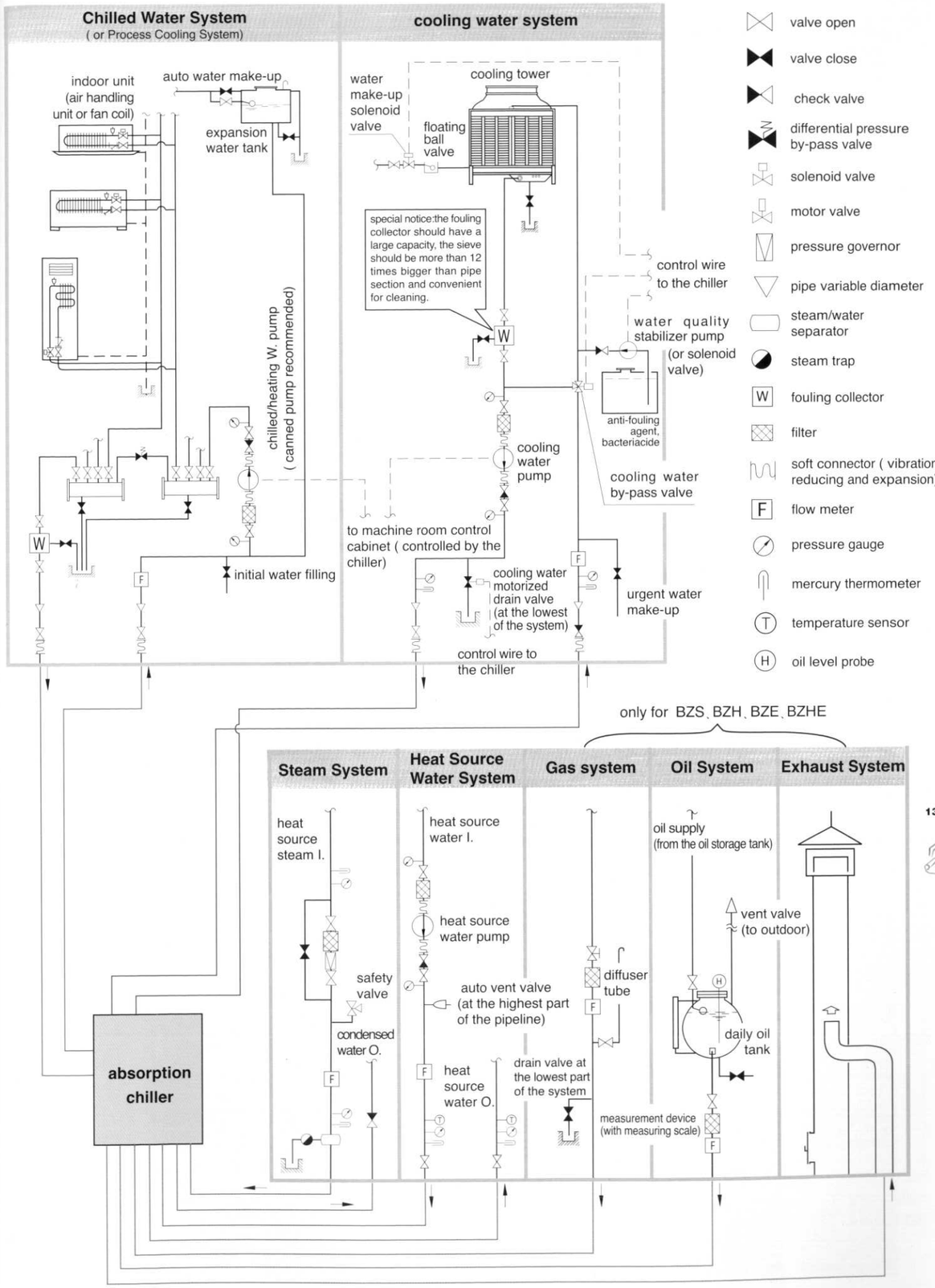
Oil System

1. Oil piping system includes oil storage tank, oil pump, daily oil tank, oil filter and measuring instruments. Oil tank should be equipped with oil check nozzle, air vent (breather valve), oil refill valve, oil level sensor and drain valve. The lowest oil level of daily oil tank must be 0.1m higher than the burner.
2. Oil pipe should be copper pipe or seamless steel pipe and leakage test should be taken at 0.8MPa min.
3. Medium filters (60 mesh) are installed at inlet and outlet of oil storage tank. The filters should have enough cross section to meet the cleaning intervals, it should be convenient for removal and drainage.
4. Oil tank should be equipped with accurate measures so that customers can have the knowledge of exact quantities. Oil measure management is very important, but it is easily neglected.

Exhaust System

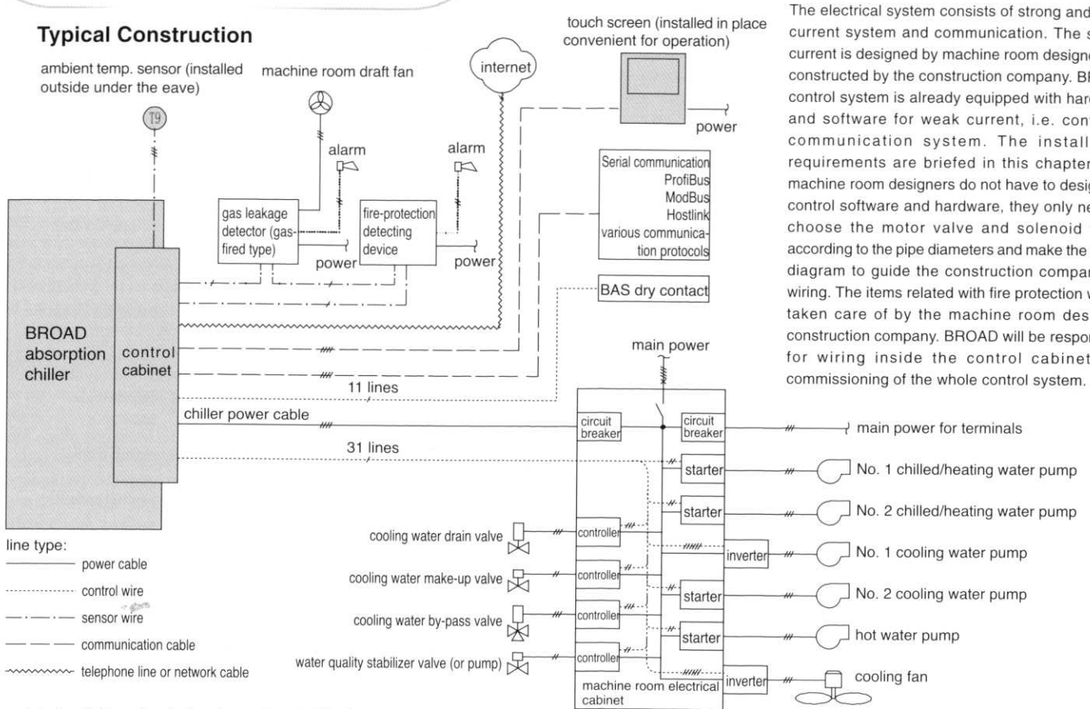
1. It is recommended independent stack be used for each chiller. If chillers have to share a common stack due to space limitation, the shared stack must be inserted and the main stack must be bigger and higher to avoid any interference from one another.
2. If the furnace pressure is not enough to get over the stack resistance, then a high temperature draft fan should be equipped in the exhaust stacks.
3. The exhaust is dependent on the fuel heat input. It is estimated that the exhaust should be 1.3m³ per every kW fuel input. 3 ~ 5m/s flue gas design flowrate in the stack is recommended.
4. Fouling collector installed at flue duct inlet to a chiller prevents the condensate flowing directly into a chiller. The indoor flue duct must be insulation mounted. For high outdoor steel exhaust stack, insulation shall be done to maintain the up force of flue. No insulation is required for low outdoor steel exhaust stack. Try to locate the exhaust stack, insulation shall be done to maintain the up force of flue. No insulation is required for low outdoor steel exhaust stack. Try to locate the exhaust stack as far as possible from the cooling tower or 2m higher than the cooling tower, or flue gas into the cooling tower will damage the chiller.
5. The chiller's rated exhaust temperature is 170℃. However, the insulation material which can withstand 300℃ is recommended. Designing of surrounding fire isolation area must also be based on this temperature.

Special Note: The chilled/heating water, cooling water and fuel pipelines must be equipped with flow meters in order to monitor the cooling capacity and energy efficiency. It is especially beneficial for the energy cost management of the users.



CONTROL SYSTEM

Typical Construction

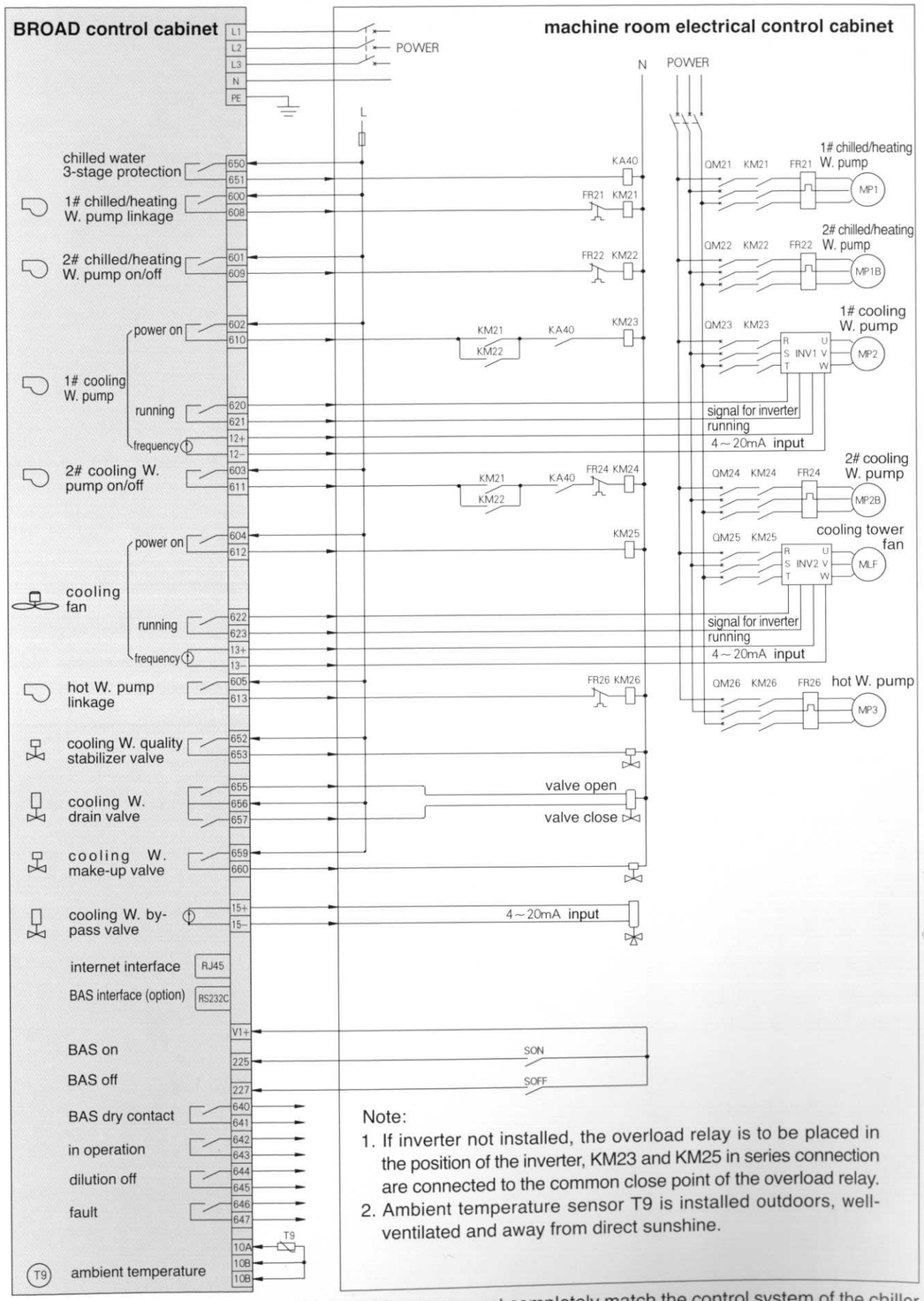


The electrical system consists of strong and weak current system and communication. The strong current is designed by machine room designer and constructed by the construction company. BROAD control system is already equipped with hardware and software for weak current, i.e. control & communication system. The installation requirements are briefed in this chapter. The machine room designers do not have to design the control software and hardware, they only need to choose the motor valve and solenoid valve according to the pipe diameters and make the wiring diagram to guide the construction company for wiring. The items related with fire protection will be taken care of by the machine room design & construction company. BROAD will be responsible for wiring inside the control cabinet and commissioning of the whole control system.

List of Control System Installation

Item	Installation position and requirement	Material	Source	BROAD installation	Customers' installation
power	inside control cabinet	4-core cables	customers	wiring in cabinet	connecting with control cabinet underneath
chiller grounding	resistance ⩽ 10 Ω		customers	wiring	connecting to the chiller's rolling steel
touch screen	anywhere in office (on the wall or desk) room, humidity 20%~85% (no condensate), temperature 0~30℃	5-core shielded cables (standard cable is 30m, special order can be 5000m)	BROAD	wiring	1.providing single-phase power socket 2.laying 5-core shielded cables from touch screen to control cabinet
network monitoring	socket is inside the control cabinet	Internet access	customers	connect in cabinet	connect with control cabinet underneath
chilled water 3rd level protection	connecting to the cooling water pump to control the loop	2 control wires	customers	wiring in cabinet	control wires from cooling water pump to control cabinet
fire protection detecting device	complying with the requirements of fire protection authorities	2 control wires	customers	wiring in cabinet	1.installing and reserving one pair normal close contact 2.control wires connecting with control cabinet (only for BZS, BZH, BZE, BZHE)
gas leakage detector (gas type chiller)	complying with the requirements of fire protection authorities	2 control wires	customers	wiring in cabinet	
BAS interface(optional)	inside control cabinet	control wires	customers	wiring in cabinet	connecting with control cabinet
cooling water pump, cooling fan inverter control	in or near power cabinet, a one-to-one interface is provided	1. an inverter with 4-20mA signal for each 2. 4 control wires and 1 double-twisted shielded cable for each inverter	customers	wiring in cabinet	1.inverter installation & power connecting 2.control wires from inverter to control cabinet
cooling W. draih valve	installed at the bottom of cooling W. pipeline for periodic water discharging	1. motor valve 2. 3-core cable	customers	wiring in cabinet	1.drain valve installation 2.control wires from the drain valve to control cabinet
cooling water make-up valve	cooling tower W. make-up piping system	1. solenoid valve 2. 2-core cable	customers	wiring in cabinet	1.W. make-up valve installation 2.control wires from the water makeup valve to control cabinet underneath
cooling W. by-pass valve	between cooling water outlet / inlet pipe	1.motorized 3-way valve (4-20mA) 2.double-twisted shielded cable	customers	wiring in cabinet	control wires from by-pass valve to control cabinet
cooling W. quality stabilizer charging device	1.pump to be installed in cooling W. pipeline 2.if solenoid valve is adopted then the charging device should be higher than W. level in cooling tower	1. 2 micro-pumps (or solenoid valves) 2. 2 liquid storage buckets 3. 2-core cable	customers	wiring in cabinet	1.W. quality stabilizer charging valve or pump installation 2.control wires to control cabinet
cooling W. pump linkage control	chiller and one cooling W. pump can be linkage controlled	2-core cable	customers	wiring in cabinet	cables connected to control cabinet
chilled/heating W. pump linkage control	chiller and up to two chilled/heating W. pump can be linkage controlled	2-core cable for each water pump	customers	wiring in cabinet	cables connected to control cabinet

EXTERIOR WIRING DIAGRAM



Note: The electrical engineering of the machine room must completely match the control system of the chiller to materialize automation. Otherwise, the advantages, reliability and safety of a chiller can not be achieved. Designers must pay special attention to the electrical system design.

BROAD supply scope Note: Please refer to P&I diagram in previous pages for detailed information of control system.

GUIDE

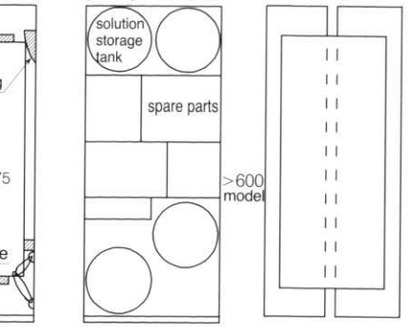
idth ≤ 2.1m can be shipped as single-piece delivery. Other units will be 2~6-piece delivery. If limited by access ered as split shipment or as steel-joint split shipmwnt, i.e. the main shell and HTG are soldered by steel sheet, nen the split-delivered units reach the customers' machine room, customers need to prepare welding equipment, ng jointed by BROAD welders.
t is shipped as single-piece delivery, and packed separately for split shipment or for single-piece delivery with

nd Door to Door which can be chosen by customers. All The delivery will be effected by containers. Please refer for 40' GP (general purpose) container as the base for calculation, freight charges for other containers are

40' HC (high cube)	40' OT (open top)	40' FR (flat rack)	20' GP (general purpose)	20' OT (open top)	20' FR (flat rack)
130%	350%	500%	60%	200%	300%

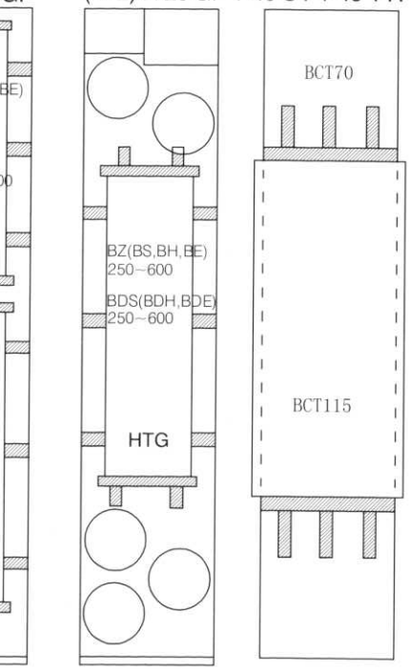
ustration

(3~5) X 20'GP + 4 X 40'FR



GP

(1~2) X 20'GP + 40'OT + 40' FR

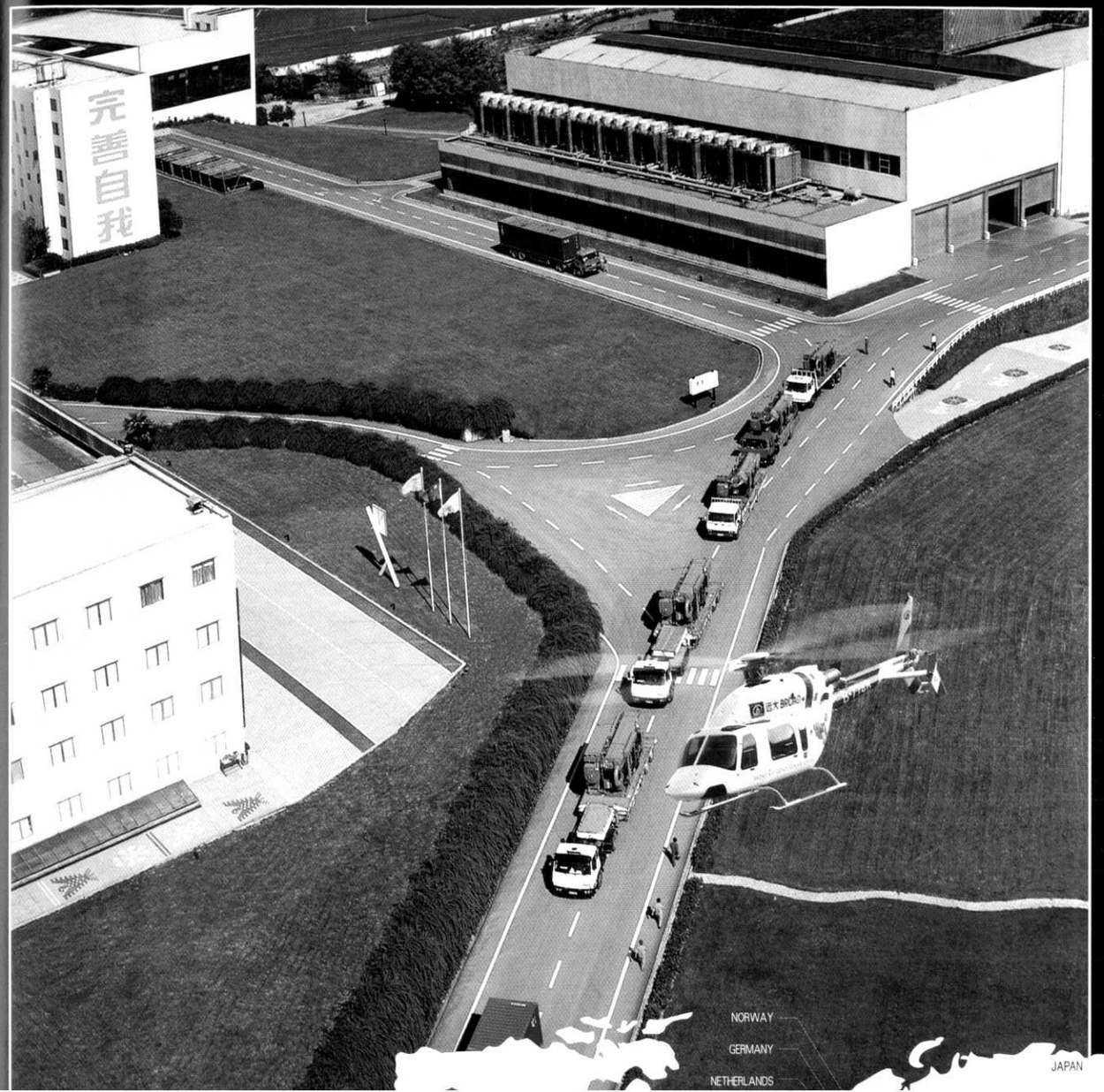


Lifting & Leveling Tips

1. Lifting can only be done by the professional lifting company which is qualified and is insured by insurance companies.
2. The crane must be supported by crossties and firm foundation to prevent it from sinking .Check the crane steel ropes and hooks before lifting to prevent all accidents. The lifting intersection angle must be less than 90°. The chiller must be kept level as much as possible when lifting. It is strictly prohibited to lift the chiller with one single steel rope so as to avoid accidents in case of an imbalance. When the chiller is lifted 20mm to the ground, it should be kept for a little while .Then lift the chiller slowly if everything is OK .
3. The landing of the chiller must be full of care. Crash landing is strictly forbidden! As the unit is a vacuum device, any crash force on the chiller is strictly forbidden!
4. When moving the chiller, only round steels or thick steel tubes can be used as rollers instead of wooden sticks. Only drag the dragging hole on the rolling steel do not place forces on other part of chiller .Lift the unit first with jacks under the rolling steel before rigging. Both sides of HTG and main shell must be lifted simultaneously.
5. Before chiller is located, concrete base must be molded and leveled.Then locate the chiller without anchor bolts. (If there is a strong vibration source or user's special requirement about vibration, it should be stated before ordering). The base should be solid to make sure it will not sink or overload (when installed on the roof).
6. For those more than "2-piece delivery" chillers, HTG and main shell must be matched. Please locate the chiller per the chiller joint drawing provided by BROAD, the joint gap must be <1.5mm.
7. After locating the chiller, please revise carefully leveling and lay thin steel plate where it is uneven to guarantee compact contact between the chiller and base. Take tube sheet as the leveling point and make front/rear and left/right leveling (check level height of every part by lucent tube). It should be leveled within 0.8/1000 both lengthwise and sidewise. Leveling must be done within 2 hours after locating the chiller, otherwise the chiller base will be damaged.
8. The chiller must be located levelly and its steel frame bases must match the plinth, the weight of chiller must be evenly balanced on the plinth. Otherwise, the chiller may be twisted slowly, which will finally result in damage due to leakage.
9. The chiller should be protected by full-time operators during installation. No access to the chiller or valves for unauthorized persons. Valves of the chiller are forbidden to be screwed. If the machine room is under construction, protective measures are needed to avoid damage or dirt to the chiller. Do not scrape the paint or insulation layer.

Everyday BROAD Chillers Are Shipped Worldwide

BROAD chillers have been shipped to dozens of countries and are widely welcome.
BROAD has become No. 1 brand of absorption chiller.



BROAD, established in 1988, is a private enterprise in China with over 1,600 staff members. BROAD is awarded as one of Top 20 - the most respected and admired company in China and also Top 16 - Chinese enterprises with international competition capability. BROAD is also the No. 1 tax payer among Chinese private companies.

340,000 m^2 manufacturing base: BROAD Town, Changsha.

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