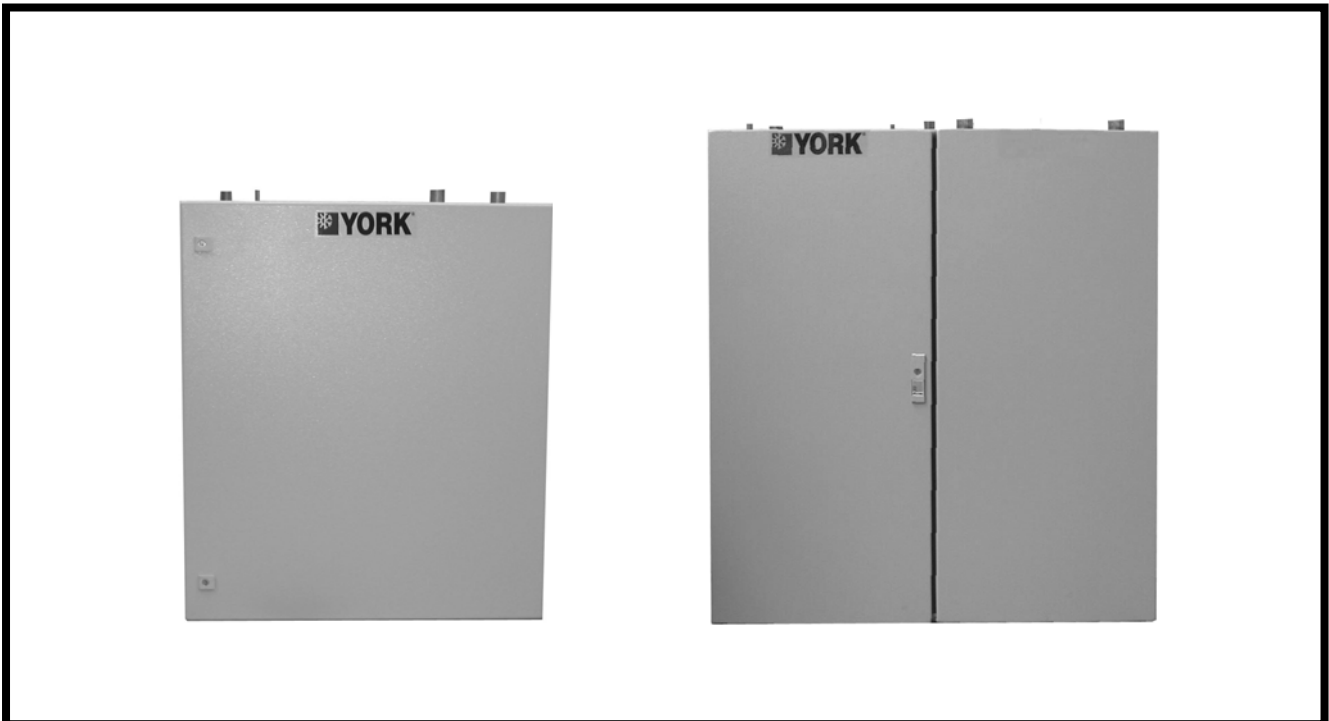




## Transformer box vertical version

# ICOM

INSTALLATION, COMMISSIONING AND OPERATING MANUAL



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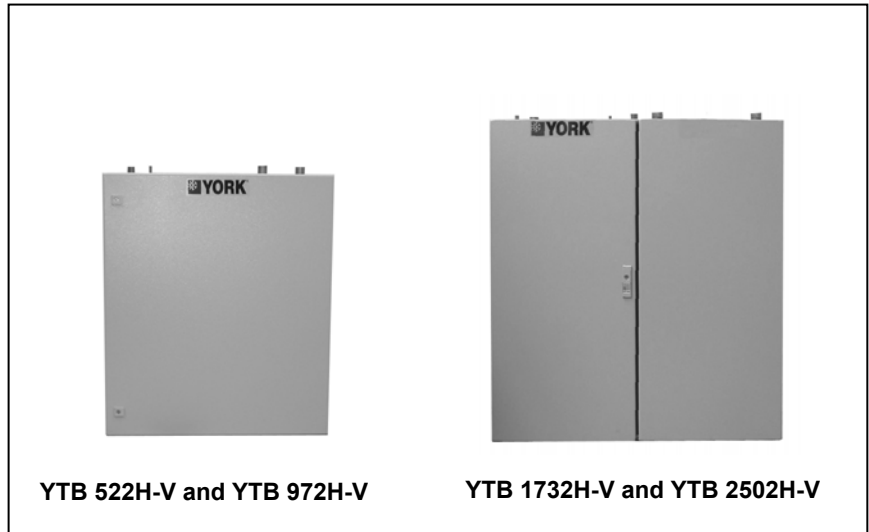
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### AVAILABLE MODELS AND CAPACITIES

Model	YTB	522H-V	972H-V	1732H-V	2502H-V
Cooling capacity	kW	15,0	28,0	50,0	72,0
Heating capacity	kW	16,5	30,5	53,5	76,5

Cooling capacities given for 7°C leaving water temperature.

Heating capacities given for 40°C leaving water temperature.

### SUPPLIER INFORMATION

The HVS-YTB units are manufactured following the highest design and construction standards to ensure high performance and reliability for all air conditioning installations. The system is designed to produce chilled water at a constant leaving water temperature and it is not suitable for applications other than those described in this manual. If the unit is not used correctly or is used for a different purpose without the prior agreement of YORK, operation of the system may be unsafe and outside of its scope.

This manual contains all the information required for correct installation and commissioning of the unit and must be read before attempting to operate or service the unit. Installation, commissioning and maintenance must be performed by trained and qualified staff from YORK or an authorized service center. YORK is not liable for injury or damage resulting from incorrect installation, commissioning or maintenance and / or failure to follow the procedures and instructions of this manual.

## WARRANTY

The unit is supplied finished and tested. The unit warranty will be cancelled if any modification is carried out without prior agreement from YORK.

For the warranty to be valid the following conditions must be satisfied:

- Initial unit start up must be carried out by trained and qualified staff from YORK or an authorized center.
- Maintenance must be carried out by trained and qualified staff.
- Only genuine YORK spare parts must be used.
- All the scheduled maintenance operations must be performed at the specified times.

**IF ANY OF THOSE CONDITIONS ARE NOT SATISFIED THE WARRANTY WILL NOT BE VALID.**

## SAFETY

The installation of the unit must be carried out according to the Machinery Safety Device Directive (98/37/EC), to the Low Voltage Directive (73/23/EEC), to the Electromagnetic Interference Directive (89/31/EEC) and according to the normal technical regulations of the country in question. Do not operate the unit before having observed all the information above.

### WARNING

The unit must be earthed and no installation or maintenance work should be done on the electrical equipment without first of all switching off and isolating the main power supply and any control supply.

### WARNING

The units contain pressurized nitrogen (when delivered) or refrigerant (when installed and filled for operation). Release of gas can be dangerous and cause injuries.

### WARNING

It is the responsibility of the user to check that the unit is suitable for the conditions of use and that installation and regular maintenance is carried out by skilled staff and in accordance to this manual.

### WARNING

The unit must be fitted on supports designed as recommended in this manual. The wrong support can result in injury.

### CAUTION

The system cannot withstand loads or stress from equipment installed beside it, from piping or from building structures. Those loads can cause failure, collapse and injury. Warranty will not apply in such cases.

### CAUTION

Do not burn or throw away the packing material improperly. YORK sends its units in recyclable packing materials and respects the environment.

## EMERGENCY STOPS AND SHUTDOWNS

The black isolator switch on the electrical panel of the YDCC or YDCH unit will shut down the unit when it is switched to off. The unit should be restarted in accordance with this manual.

## ABOUT THIS MANUAL

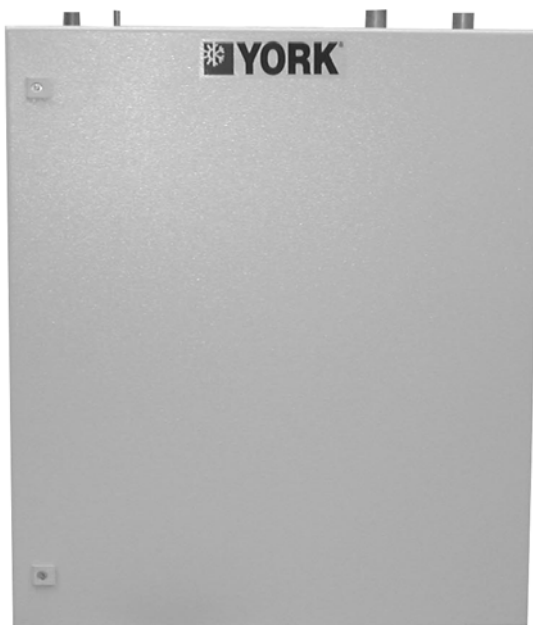
The instructions contained in this manual must be followed. Damage caused by misuse of the unit will not be covered by the warranty. The contents of this manual and any other document supplied with the unit are the property of YORK.

They must not be reproduced, in whole or in part, without the written authorization of YORK.

YORK reserves the right to change the specifications without prior notice.

MODELS

YTB 522H-V and YTB 972H-V



YTB 1732H-V and YTB 2502H-V



**PHYSICAL DATA**

Characteristics	YTB 522H-V	YTB 972H-V	YTB 1732H-V	YTB 2502H-V
Cooling Capacity	15,0 kW	28,0 kW	50,0 kW	72,0 kW
Heating Capacity	16,5 kW	30,5 kW	53,5 kW	76,5 kW
Capacity range	10 - 100%	6 - 100%	4 - 100%	3 - 100%
Water flow - nominal	2150 l/h	4100 l/h	7200 l/h	10350 l/h
Maximum external pressure loss <sup>1)</sup>	81 kPa	67 kPa	67 kPa	64 kPa
Power supply (Volts/Phases)	230/1+N	230/1+N	400/3+N	400/3+N
Power input - nominal	270 W	350 W	1100 W	1100 W
Running current - max.	1,8 A	2,0 A	3,1 A	3,1 A
Number of refrigerant circuits	1	1	2	3
Refrigerant type	R 407C	R 407C	R 407C	R 407C
Sound pressure level at 3 m (free field)	35 dB(A)	35 dB(A)	40 dB(A)	40 dB(A)
<b>Dimensions</b>				
Width	800 mm	800 mm	1000 mm	1000 mm
Depth	300 mm	300 mm	300 mm	300 mm
Height	1000 mm	1000 mm	1200 mm	1200 mm
Weight net	80 kg	95 kg	150 kg	170 kg
Refrigerant pipes - dimensions	12/22 mm	16/28 mm	2x 16/28 mm	3x 16/28 mm
Water pipe connection	Threaded male connection			
Type				
Dimension	1 1/2"	2"	2"	2 1/2"
Max. refrigerant piping length <sup>2)</sup>	20 m	20 m	20 m	20 m
Max. height difference	5 m	5 m	5 m	5 m

- Cooling capacities given for 7 °C leaving water temperature and nominal water flow
- Heating capacities given for 40 °C leaving water temperature and nominal water flow
- Weights of empty unit

<sup>1)</sup> at nominal water flow

<sup>2)</sup> Distance to condensing unit, i.e. max. 20 m per each diameter

**OPERATING LIMITS**

**Max. entering water temperature:**  
 Cooling mode: + 25 °C (continuous operation)  
 Heating mode: + 60 °C (from external heating system)

**Leaving water temperature-set point range:**  
 Cooling mode: + 6 to +20 °C  
 Heating mode: + 30 to +45 °C (automatic switch off at 65°C)

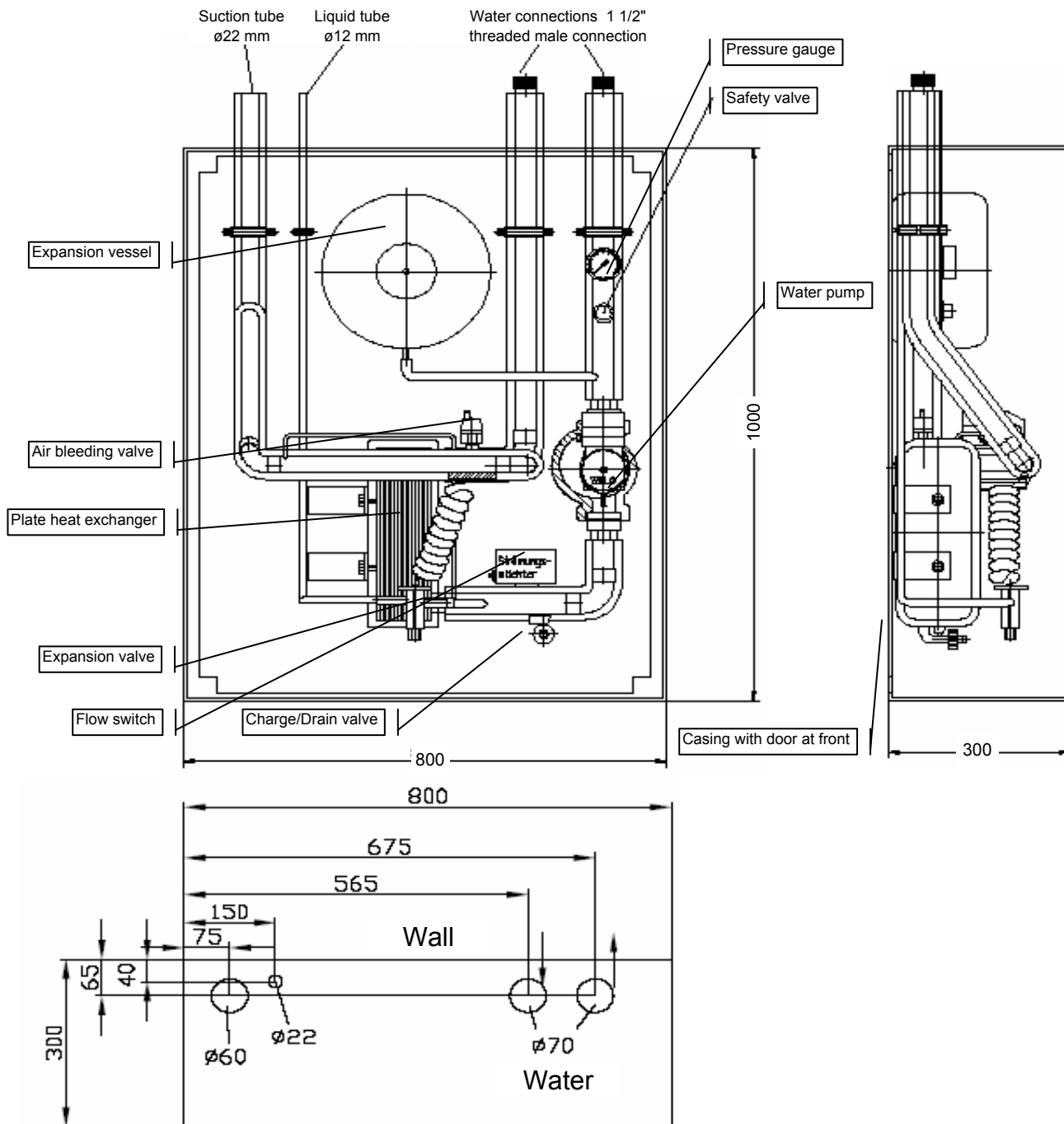
**PRESSURE TABLES**

Available external pressure drops								
Model	YTB_522H		YTB_972H		YTB_1732H		YTB_2502H	
	water flow l/h	available ext. stat. pressure kPa	water flow l/h	available ext. stat. pressure kPa	water flow l/h	available ext. stat. pressure kPa	water flow l/h	available ext. stat. pressure kPa
	1650	90	2800	89	4700	121	6500	122
	1800	88	3000	85	4900	118	6800	117
	1900	86	3200	81	5100	116	7100	113
	2000	84	3400	79	5300	113	7500	110
	2200	81	3600	75	5500	108	8000	102
	2400	79	3800	73	5800	104	8500	93
	2600	73	4000	69	6000	100	9000	85
	2800	69	4200	65	6500	84	9500	78
	3000	63	4400	61	7000	75	10000	70
	3200	58	4600	57	7500	63	10500	67
	3400	54	4800	53	8000	47	11000	54
	3600	44	5000	49	8500	36	11500	42
	3800	36	5200	45			12000	30

 ... Out of scope

### DIMENSIONS AND REFRIGERANT PIPING CONNECTIONS

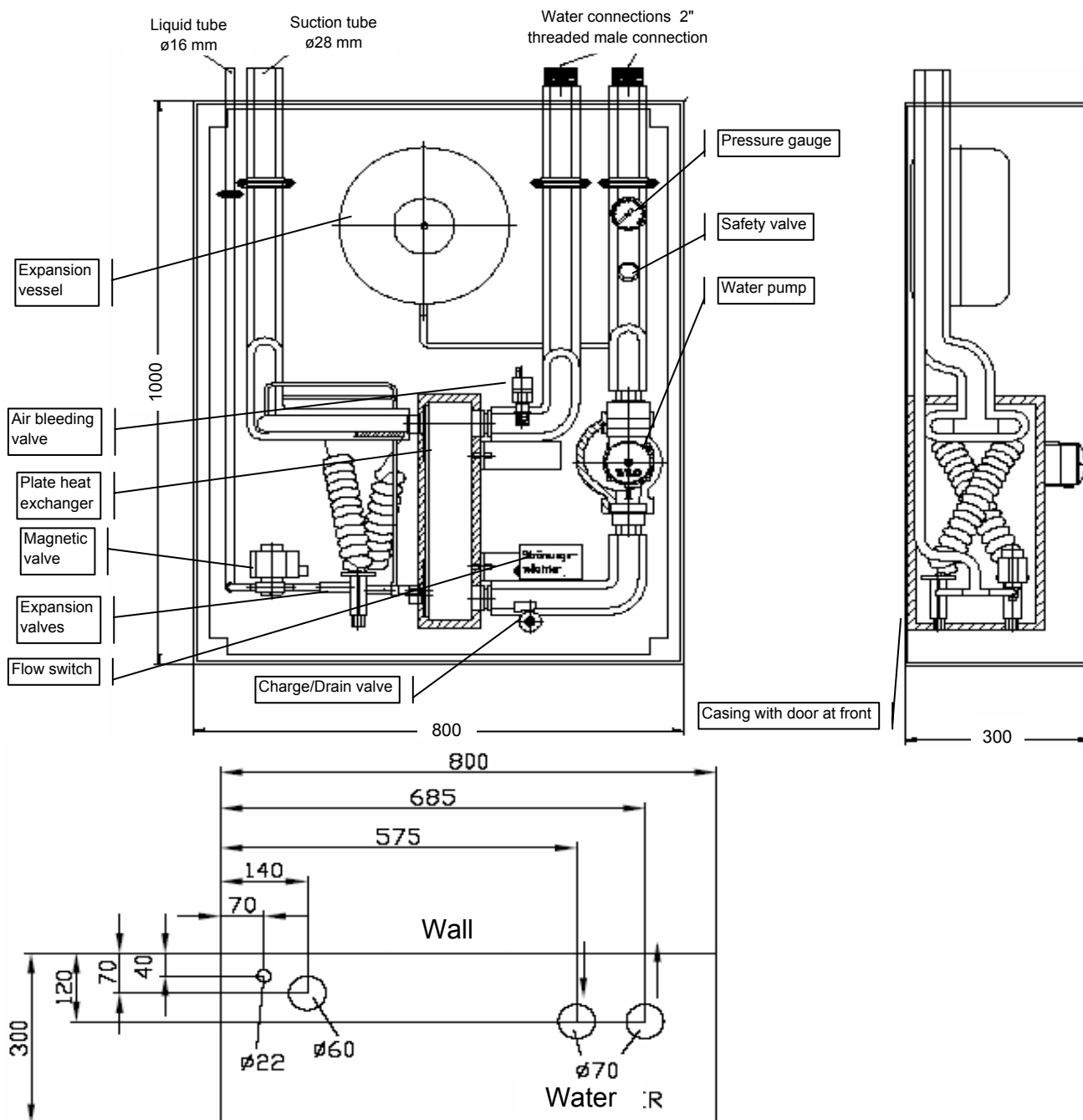
#### YTB\_522H-V



Unit	Water pipe connection	Refrigerant tubing diameter (mm)	Weight kg
YTB_522H-V	1 1/2" threaded male	12 / 22	80

### DIMENSIONS AND REFRIGERANT PIPING CONNECTIONS

#### YTB\_972H-V

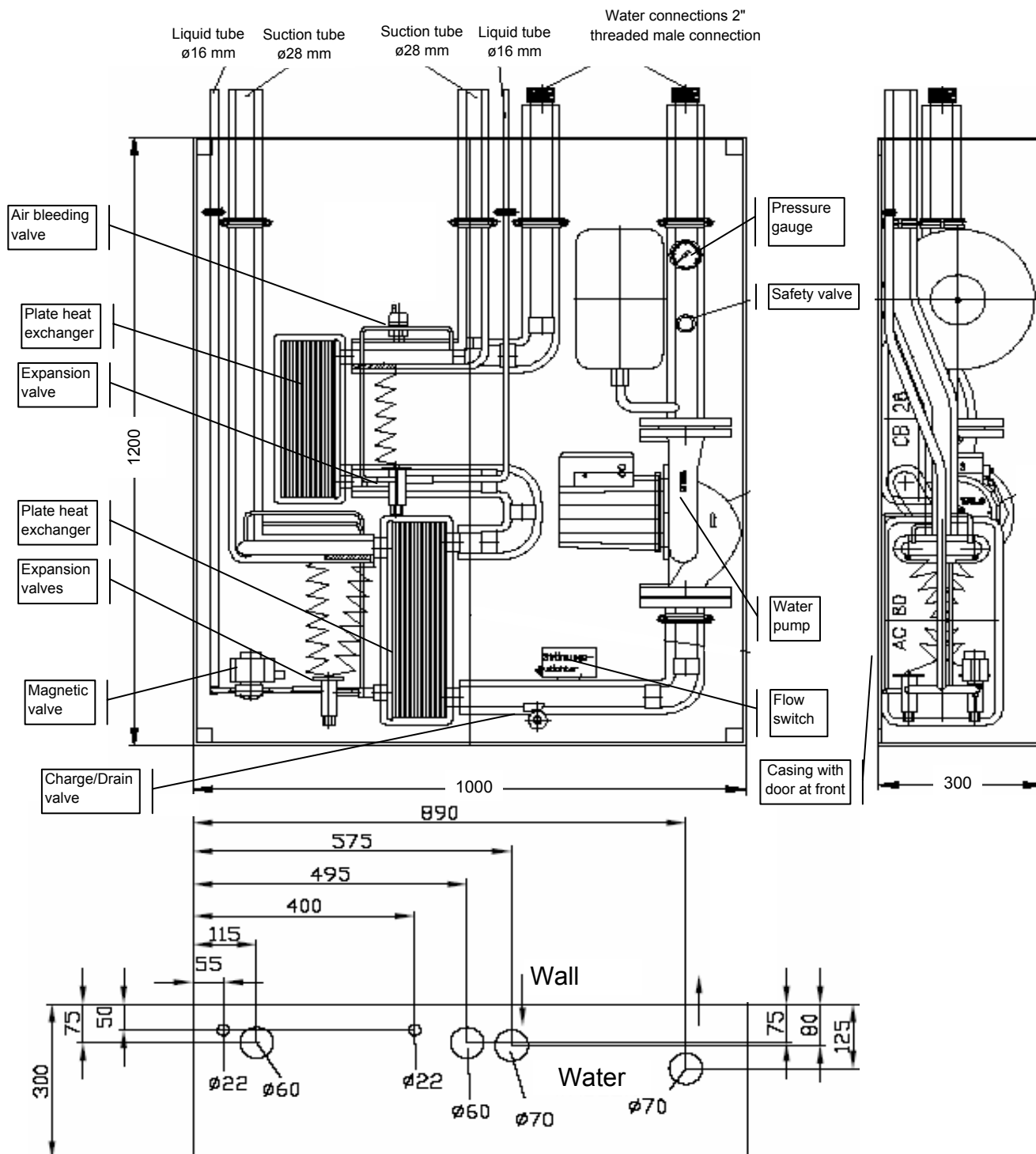


Unit	Water pipe connection	Refrigerant tubing diameter (mm)	Weight kg
YTB_972H-V	2" threaded male	16 / 28	95



### DIMENSIONS AND REFRIGERANT PIPING CONNECTIONS

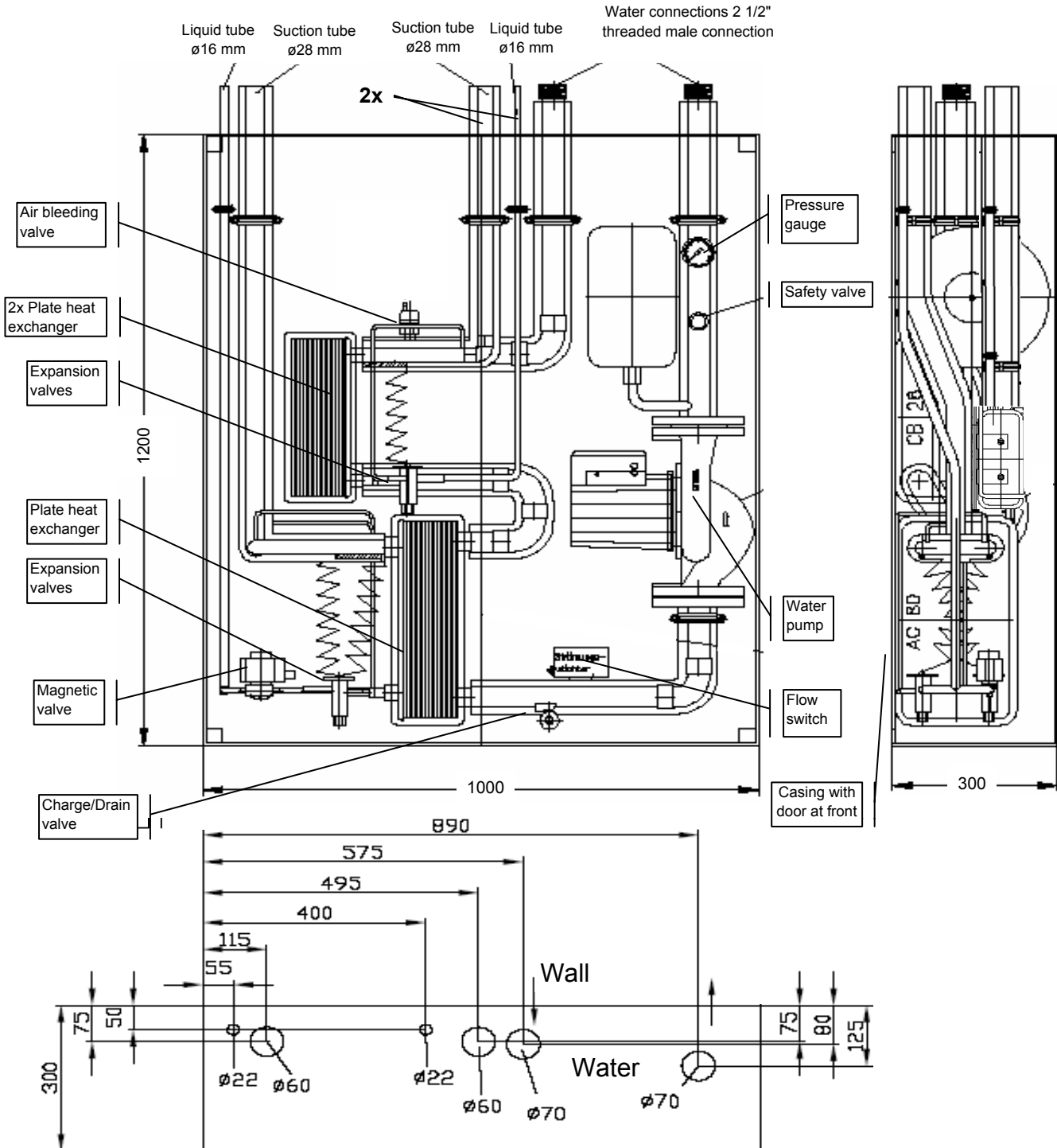
YTB\_1732H-V



Unit	Water pipe connection	Refrigerant tubing diameter (mm)	Weight kg
YTB_1732H-V	2" threaded male	2x 16 / 28	150

### DIMENSIONS AND REFRIGERANT PIPING CONNECTIONS

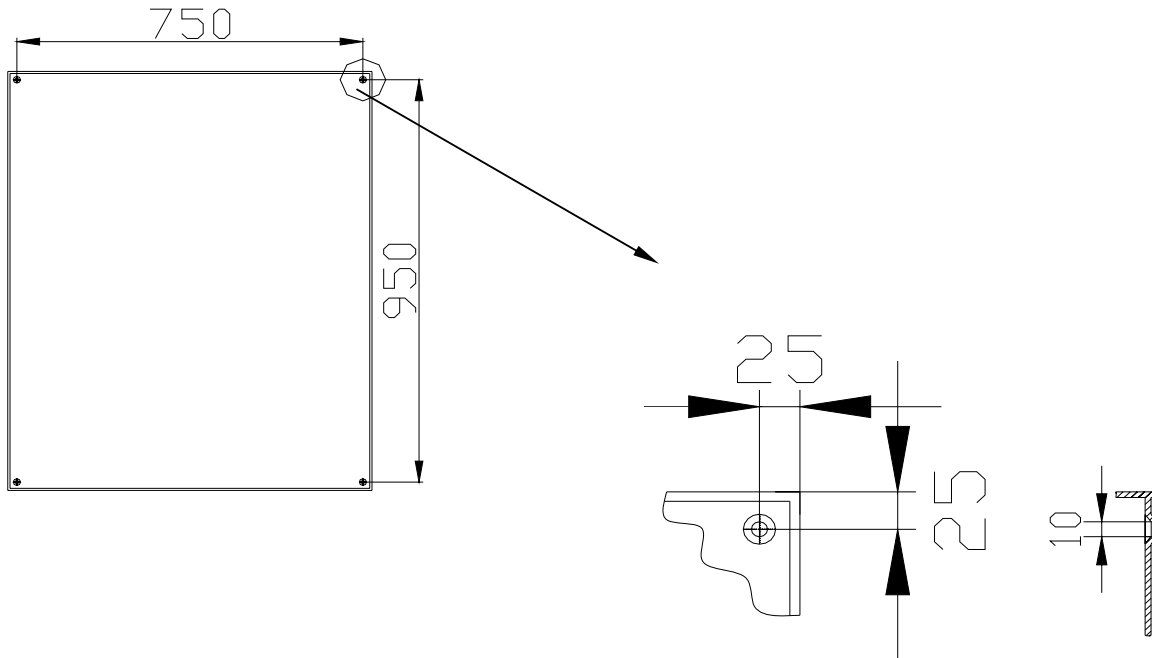
#### YTB\_2502H-V



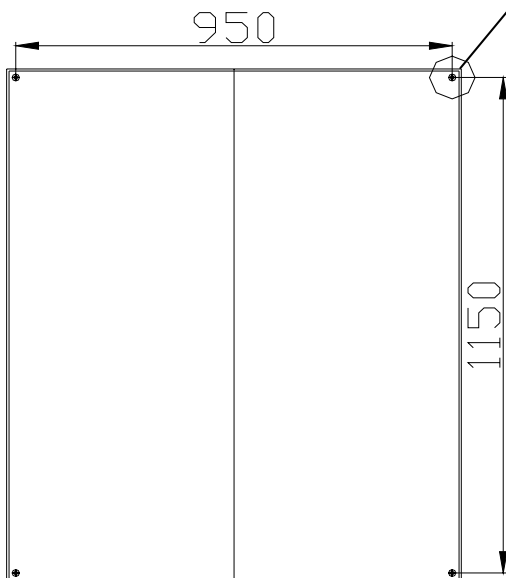
Unit	Water pipe connection	Refrigerant tubing diameter (mm)	Weight kg
YTB_2502H-V	2 1/2" threaded male	3x 16 / 28	170

**MOUNTING**

YTB 522H-V and YTB 972H-V

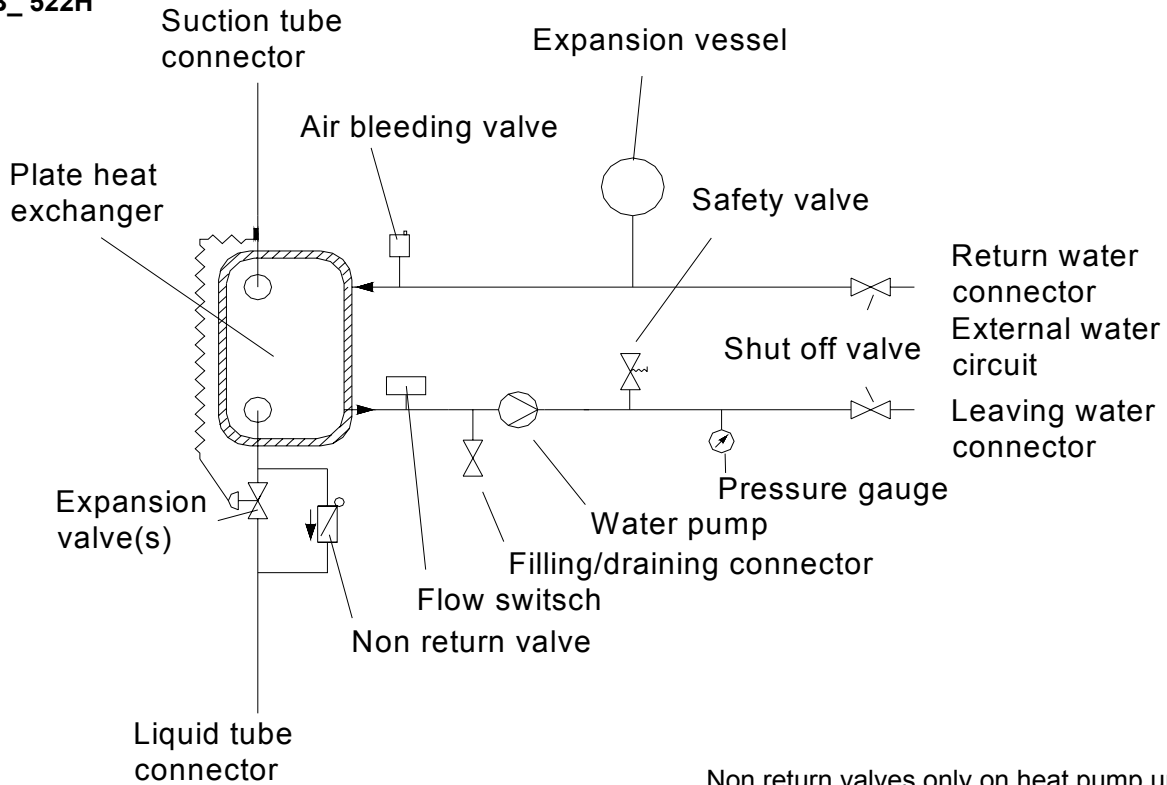


YTB 1732H-V and YTB 2502H-V

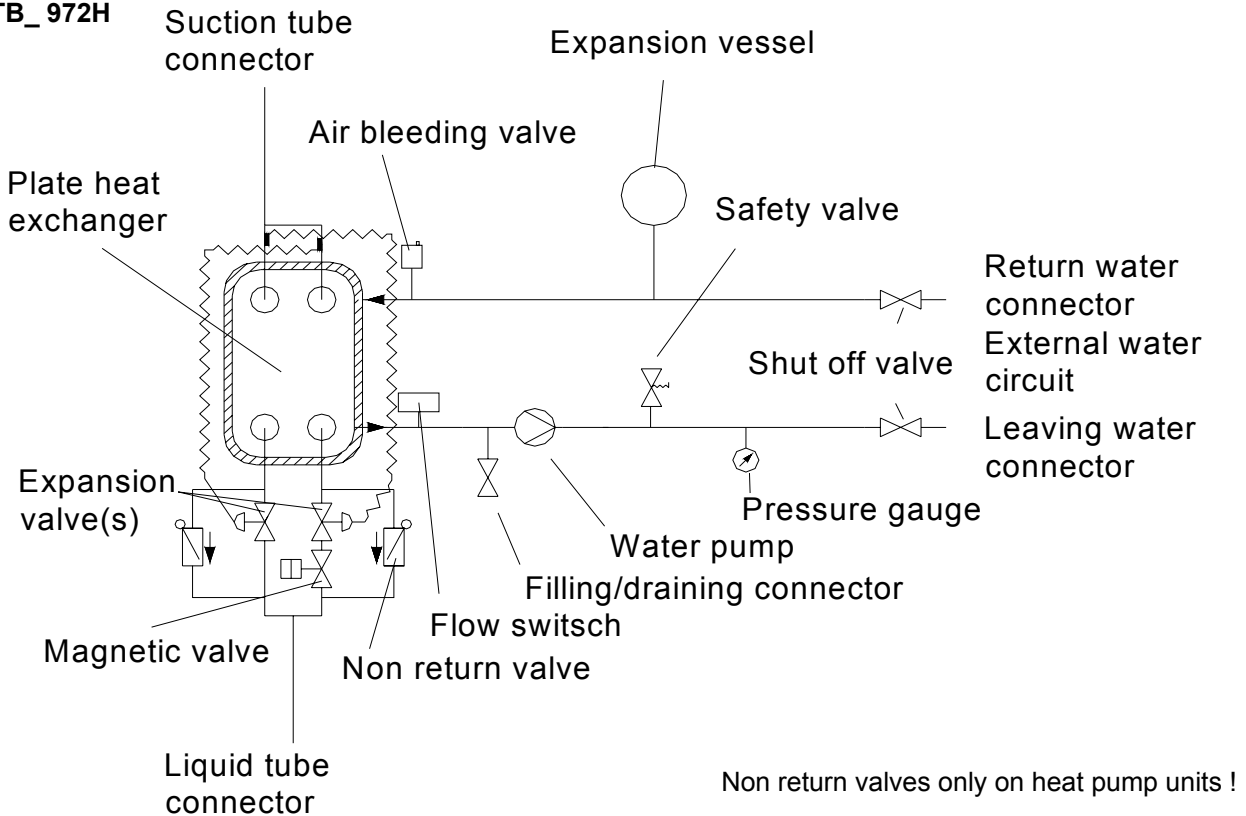


**REFRIGERANT AND WATER CIRCUITS**

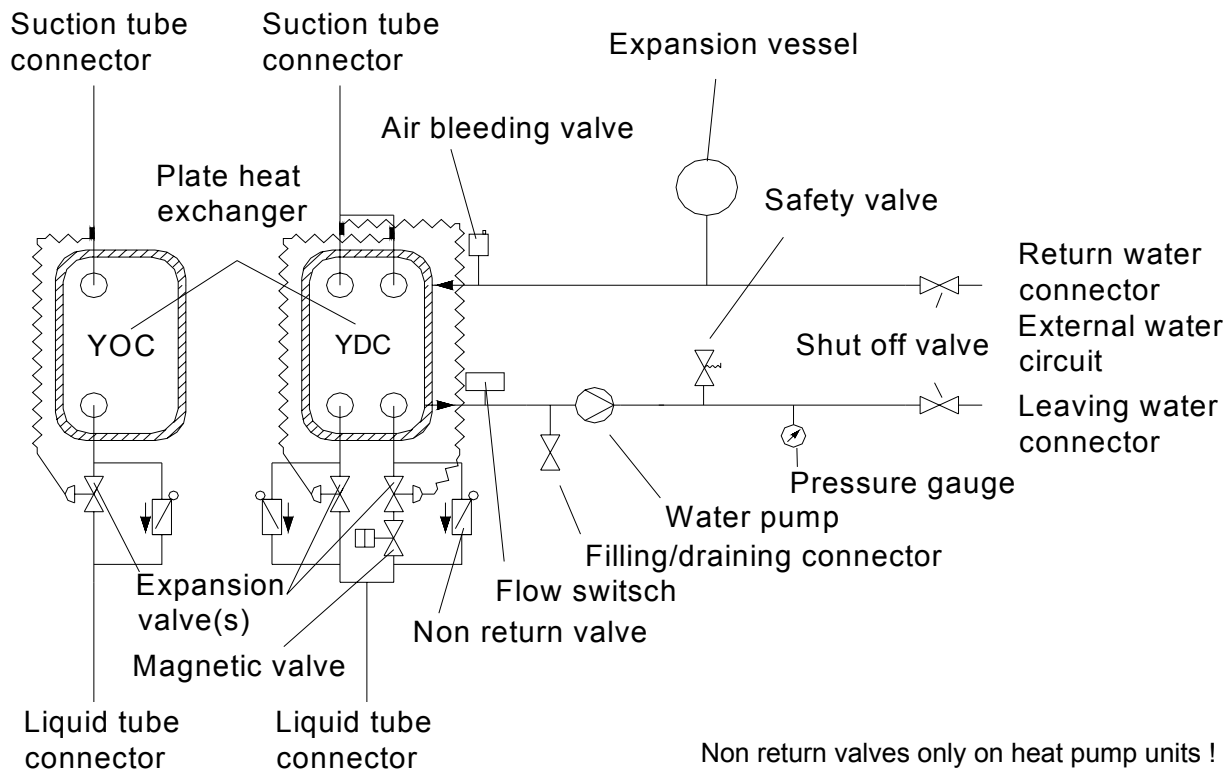
YTB\_522H



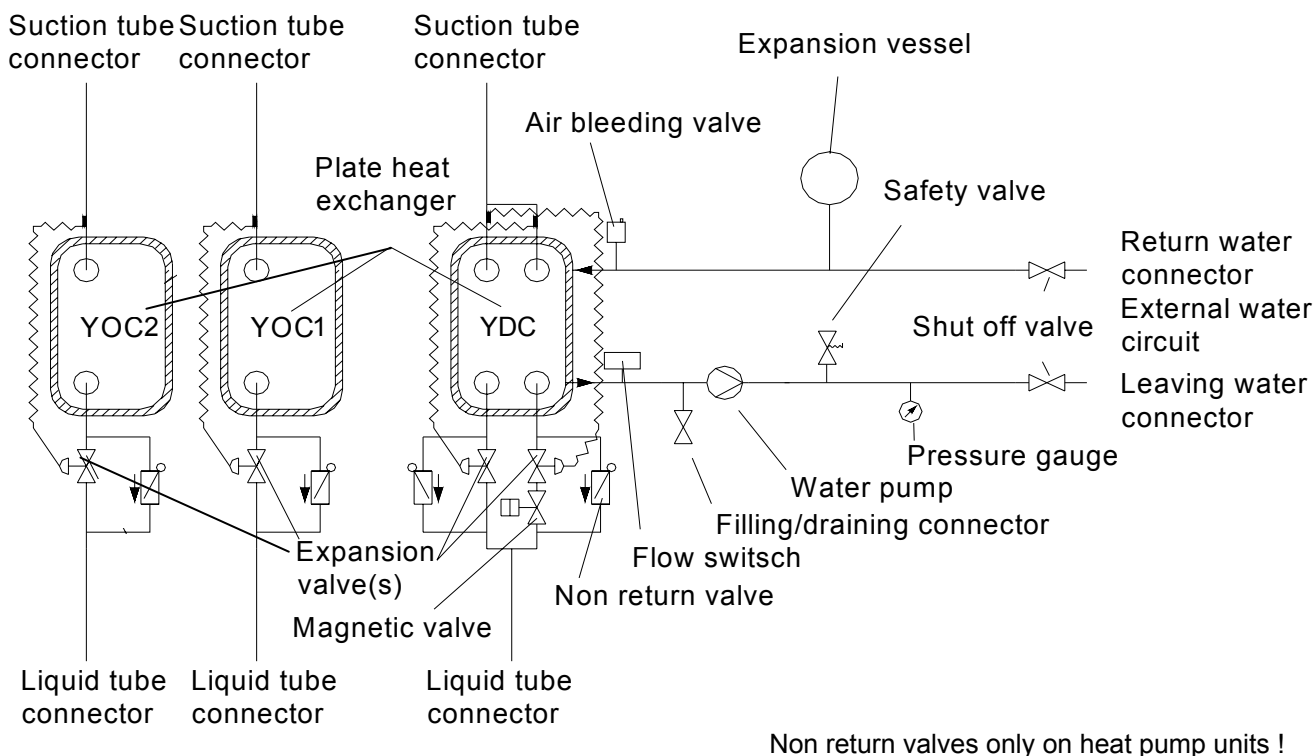
YTB\_972H



**YTB\_1732H**



**YTB\_2502H**



**ELECTRICAL SUPPLY & CONNECTIONS**

**WARNING**



Check that the power supply is off when working on the unit electrical system. The unit must be earthed.

**CAUTION**



It is the installers responsibility to check that the external wiring complies with local safety regulations. YORK International is not responsible for injuries or damage from failure to observe these precautions.

**Electrical supplies**

**The unit complies with regulation EN 60 201-1**

The following connections are required:

- 1 phase + neutral + earth (YTB 522H and YTB 972H)
- 3 phases + neutral + earth (YTB 1732H and YTB 2502H)

Electrical connections

Terminal connection must be made according to the connection diagram supplied with the unit.

**CAUTION**



Before connecting the main supply check that the main voltage is within the range shown in the electrical data.

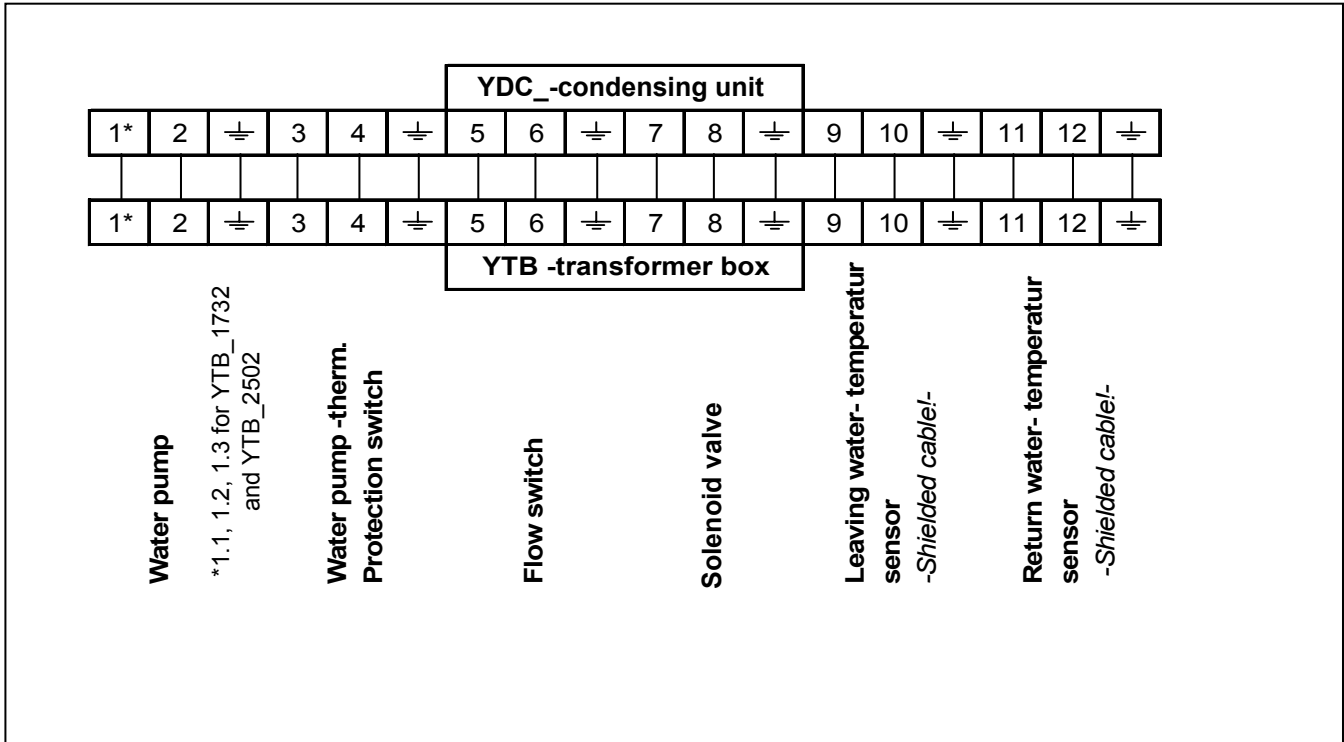
**CAUTION**



Supplying the unit with unbalanced lines will automatically void the warranty.

### ELECTRICAL SUPPLY & CONNECTIONS

Connecting diagram:





# YTB-V Transformer box vertical version

# ICOM

## TRANSPORTATION, HANDLING & STORAGE

The units are pre-charged with nitrogen which has to be replaced by the correct quantity of the refrigerant R407C prior to operation.

### Inspection

The unit should be inspected on receipt for possible damage during the transport. The units are sold ex-works; YORK is not responsible for damages occurring during transportation. Any damage should be noted on the carrier freight bill for further claim to the carrier. If the damage is more than superficial please contact your local YORK organisation for support. YORK does not accept claims for transport damage even when the factory has organized the transport.

### Handling

The unit must be handled with care.  
Before moving the unit check that the installation site is ready for receiving the unit and suitable to withstand the weight of the unit.

### Storage

For safe storage please check the following:

- The refrigerant connections must be closed by a plug
  - Ambient temperature should not be higher than 42°C
  - Store the unit where there is no activity in order to reduce the risk of damage
  - Do not clean the unit with steam
  - Store the unit in a safe place with responsible staff
- We recommend regular inspection of the unit during storage.

## INSTALLATION

### WARNING



**Before installation check that the building structure or the frame bearing the system can withstand the overall weight of the unit and piping. See the weight details in this document.**

- The unit should not be installed where flooding is possible.
- A minimum clearance for servicing must be guaranteed.



## REFRIGERANT TUBING AND CONNECTIONS

When installing the system the refrigerant circuit has to be completely airtight after mounting to ensure there are no leaks.

This will help to obtain maximum performance with minimum consumption, and avoid serious damage to the unit. This is an environmental precaution as well.

### Refrigerant piping materials

Use C1220 type copper tubes for refrigerant piping. Recommended min. wall thickness of the copper tubes is shown in the table below:

Refrigerant copper tubes	
Outer diameter	Wall thickness
28 mm	1,2 mm
22 mm	1,2 mm
16 mm	1,0 mm
12 mm	0,8 mm

### Insulation of refrigerant tubing

To avoid condensed water dripping onto the floor, the suction tube should be adequately insulated. It should be at least 8 mm thick.

### Emptying and dehydrating

Air does not act as refrigerant since it cannot be liquified in the system. Any air and humidity remaining in the system have undesirable effects, as indicated below. Consequently, they should be eliminated completely.

- High pressure increases
- Power consumption increases
- System performance decreases
- Water contained in the circuit could freeze and block the expansion valve
- Water can cause corrosion of certain parts of the circuit, and deterioration of the compressor

### WARNING



Before filling the system check that it is free of sand, stones, rust or other foreign material which could damage the unit. If necessary clean the piping.

### Installation of interconnecting tubing

The length of the interconnecting tubing should be as short as possible.

The maximum admissible distances are those indicated in the section "Physical data" (page 4) in this ICOM.

### Attention



- The ends of the tubing should remain closed during installation.
- Do not work outdoors when it is raining.
- For soldering use low melting point rods with a minimum 5% silver content.
- When welding and as long the tubing is hot, maintain a flow of nitrogen so as to avoid internal rusting and scaling that could cause contamination and obstructions.
- Do not use strippers on copper-copper joints.

### Process

In each circuit:

- 1- Connect a vacuum pump and service pressure gauges.
- 2- Carry out a vacuum of max. 50 Pa absolute pressure.
- 3- Detect leaks.
- 4- Fill refrigerant as indicated in the table below, in accordance with model and size and adjust to actual piping length as indicated in the table as well.
- 5- Make sure that refrigerant load is correct by measuring overheating. In normal conditions, 5-10 K is correct.

### Adjusting refrigerant load

Model	Nominal load	Additional load	Max. length
YDC_522	13,0 kg	120 g/m	20 m
YDC_972	15,0 kg	210 g/m	20 m
YOC_762	13,0 kg	120 g/m	20 m

Nominal load data are given for piping length of 8 m.

### EXTERNAL WATER SYSTEM

#### **WARNING**

Before filling the system check that it is free of sand, stones, rust or other foreign material which could damage the system. If necessary clean the piping.

#### **WARNING**

The water used to fill the installation must be clean and have the correct ph-value. If necessary treat the water to reach the correct ph-value.

The HVS transformer boxes have to be used in combination with HVS condensing units. The system includes all the components necessary for a hydraulic network.

Must be fitted to the system :

- **Air bleeding valve at the highest point of the network**

Recommended to be fitted to the system :

- **A water filter at the inlet of the Transformer box**  
(if not ordered with the system (WF-1))

#### **WARNING**

**The external water hydraulic system must ensure a constant flow rate to the Transformer box.**

#### **IMPORTANT**

**Insulate the pipes by using diffusion proof material to avoid condensation and thermal losses.**

#### **Filling the water circuit**

Connect a hose to the filling/drain connector installed in the transformer box and fill the system.

- Recommended water excess pressure in the system:  
2 bar plus 0,1 bar per m pipe above the pressure gauge  
(in no event higher than 6 bar)

Vent the water circuit completely (switch on the water pump to assist the process).

### COMMISSIONING

#### CAUTION



**A trained member of staff from YORK or authorized YORK service center must start the unit.  
If not the warranty will be void.**

#### Note

The work performed by YORK service staff is limited to commissioning the unit and does not include other work like electrical connection, water connection etc. The installer must perform all other preparatory works.

#### Preliminary checks:



The following operations must be performed before starting the unit and should be completed before commissioning by YORK International staff or authorized staff.

- With master isolating switch off (mounted in YDCC or YDCH), check the supply cable cross section, the ground connection and the electrical terminal clamps are tight.
- Check that the supply voltage is in line with the voltage shown on the name plate of the unit.

Connect the free contacts with the HVS condensing unit and check on the connection diagram.

- Check that the external components (3-way valve for external heating system - optional and other equipment) have been correctly installed as advised by YORK and that the refrigerant and water tubing connections are correct.
- Check that the refrigerant circuit is filled with the correct quantity and that this can pass freely with no leaks or air bubbles.
- Check that the external water circuit is full and the water circulates freely with no leaks or air bubbles.
- Check that the pump direction of rotation is correct (YTB 1772H and YTB 2572H) and allow the water to circulate for at least 12 hours then clean the water filter (if installed).
- **Adjust the system pressure drops in order to get the specified flow rate by adjusting the adjusting valve delivered with the HVS valve kits, starting from the fan coil with the lowest internal pressure drop.**
- Check that the water quality is as specified and that the water is free of air bubbles.

#### Starting

- Check that the external equipment is in working order and that the associated control equipment is correctly calibrated.

#### Performance checks



Check the following:

- Inlet water temperature
- Outlet water temperature
- Temperature difference on the evaporator
- Water excess pressure in the system (Recommended: 2 bar plus 0,1 bar per m pipe above the pressure gauge, in no event higher than 6 bar)
- Water pump current at start up and stable operating conditions

#### Customer Training

Train the end user with the machine operating instructions.

### MAINTENANCE

#### WARNING

Never release refrigerant into the atmosphere when emptying the refrigerant circuit. Suitable equipment must be used. Refrigerant cannot be re-used, it must be returned to the refrigerant manufacturer.

The safety section of this manual must be read carefully before undertaking any maintenance operation on the unit.

#### General Requirement

The system has been designed to work continuously and must be regularly serviced and operated in the limits given in this manual.

It is the responsibility of the owner to provide regular maintenance. Maintenance contracts can be arranged by the YORK Service Centers.

If damage or failure occurs due to incorrect maintenance during the warranty period, the warranty will not apply.

This maintenance section concerns only the standard units and does not cover any modification.

#### Maintenance cycles

Maintenance checks should be carried out in accordance with the maintenance schedule (detailed below) by skilled staff. Any faults or problems found during the checks must be corrected.

#### Maintenance schedule

Operation	Weekly	Monthly	Start of season	End of season
Check evaporator leaving water temperature	X			
Check evaporator pressure drop			X	
Vent the water circuit		X		
Check water pressure in the system		X		X
Check water filter (if installed)			X	
Check remote control (malfunctions, parameters,...)	X			
Check evaporator insulation			X	
Check terminal screws tightness			X	
Clean outside of the unit with soapy water			X	

#### Refrigerant charge

The refrigerant should be charged via the HVS condensing unit(s). A valve is provided for charging the refrigerant at the compressor low pressure side.

An insufficient charge will lead to low performance and maybe to a low pressure alarm which locks the unit.

An excessive charge will raise the condensing pressure increasing electrical consumption and may lead to a high pressure alarm which locks the unit as well.

#### Caution

The refrigerant circuit must be charged. The exact refrigerant weights are given in the table "physical data". Before charging, the circuit must be clean and dry and be under vacuum reaching a maximum absolute pressure of 50 Pa.

#### Thermostatic expansion valve(s)

The units are provided with a thermostatic expansion valve with an external equalizer.

For checking the temperature rise:

Read the evaporating temperature (T<sub>sa</sub>) using gauge connected on the suction side.

Read the effective suction temperature (T<sub>se</sub>) using a contact thermometer on the evaporator outlet fitting.

Temperature rise is given by:  $S = T_{se} - T_{sa}$

The superheating can be adjusted on the thermostatic expansion valve if necessary.

The superheating should be between 5 and 7 K.

## MAINTENANCE

### Plate heat exchanger

Check regularly the temperature difference across the heat exchanger and compare to the evaporating temperature. For an efficient exchange the difference between leaving water temperature and evaporating temperature should not exceed 5 to 7°C. A larger difference indicates that the heat exchanger is dirty and it must be chemically cleaned by an authorized YORK service center.

## TROUBLE SHOOTING

Fault	Probable cause	Remedy
Excessive noise	Vibrating pipes	Secure the pipes
	Noisy water pump	Bearing seized, call YORK service center
Reduced cooling capacity	Dirty external heat exchanger	Purge and clean the water circuit
	Low refrigerant charge	Check leaks, repair and top up the charge
Water temperature control incorrect	Wrong set point	Check set points on the remote controller
	Incorrect temperature difference across the plate evaporator	Check water flow
	Electronic control malfunction	Call YORK service center
Poor water circulation	Air in the circuit	Vent air using the air bleeding valves
	Dirt or deposit in the evaporator	Purge and clean the water circuit
	Dirty water filter (if installed)	Clean the filter
Unit does not work, flow alarm activated	Water circuit fault	Check power circuit and fuses
	Air in the circuit	Vent air using the air bleeding valves
	Flow switch inoperative	Check flow switch
	Water pump malfunction	Check water pump
External heating system does not work	Heating device malfunction	Check external heating system
	Wrong mode setting	Check mode setting on the remote controller
	HVS-Electronic control malfunction	Call YORK service center
	3-way valve malfunction	Check valve position
Fan coil circuit inoperative	Power circuit open	Check power circuit and fuses
	Fan coil short circuit	Check fan coils and fan coil fuse in HVS condensing unit

## DISMANTLING AND DISPOSAL

### WARNING



**Never release refrigerant into the atmosphere when emptying the refrigerant circuit. Suitable equipment must be used. Refrigerant cannot be re-used. It must be returned to the refrigerant supplier.**

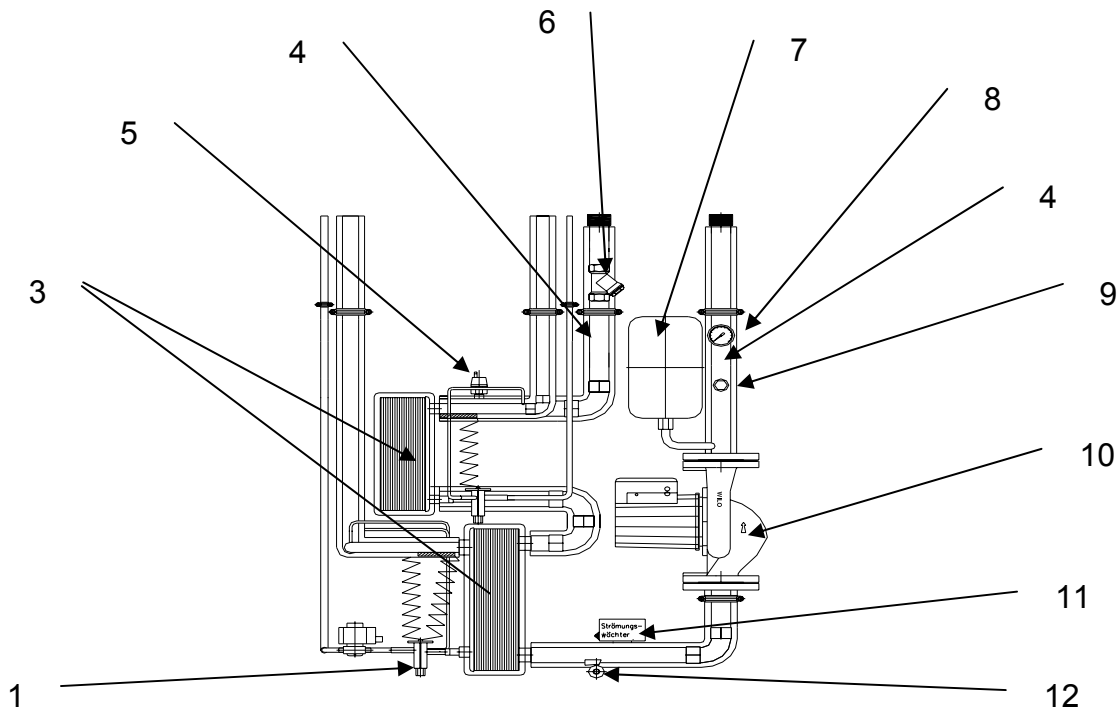
Isolate the electrical supply, main power secure in position off (located in HVS condensing unit), then disconnect the electrical supply, power and control. Remove the refrigerant using a refrigerant reclaim recovery unit. The refrigerant must be returned to the refrigerant supplier for recycling.

After draining the unit can be removed following the instructions about the handling.

Manufacturer reserves the rights to change specifications without prior notice

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**SPARE PART LIST**



Position	YTB 522	YTB 972	YTB 1732	YTB 2502	Designation	Part No
1	X	2X	2X	2X	Expansion valve TX 6-N13	4011011
			X	2X	Expansion valve TX 6-N13	4009801
	HP X				Expansion valve TX 6-N13	4009801
		HP 2X			Expansion valve TX 6-N13	4009801
			HP 3X	HP 4X	Expansion valve TX 6-N13	4009801
2		X	X	X	Solenoid valve 200RB 4 T 4	4000161
3	X				Plate heat-exchanger	4001351
		X			Plate heat-exchanger	4000841
			X	2X	Plate heat-exchanger	4001361
			X	X	Plate heat-exchanger	4000871
	HP X				Plate heat-exchanger	4002591
		HP X			Plate heat-exchanger	4000871
			HP X	HP 2X	Plate heat-exchanger	4002681
			HP X	HP X	Plate heat-exchanger	4002711
4	2X	2X	2X	2X	Temperature sensor A99	7700102
5	X	X	X	X	Air bleeding valve	4007541
6	X				Water filter 1"	7700011
		X			Water filter 6/4"	7700021
			X	X	Water filter 2"	7700031
7	X	X	X	X	Expansion vessel (8l)	4007522
8	X	X	X	X	Pressure gauge	4007552
9	X	X	X	X	Safety valve 6bar	4007532
10	X	X			Water pump	4007461
			X	X	Water pump	4090001
11	X	X	X	X	Flow switch	7700091
12	X	X	X	X	Fill- & drain valve	4007611
	HP X	HP 2X	HP 3X	HP 4X	Non return valve	3849221