

YCSA/YCSA-H 06, 08, 12, 18, 26, 36 Air Cooled Chiller and Heat Pump With R-407C Refrigerant



Ref.: Y-R70097 0206

Technical Information



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Air Cooled Liquid Chillers and Heat Pump

R407-C Refrigerant

Cooling capacities between 6 and 36 kW

The **ECOFRIO™** unit is a high efficiency air cooled chiller and heat pump and is available in 7 versions with cooling capacities of between 6 and 36 kW. The **ECOFRIO™** unit is suitable for air conditioning applications or industrial applications requiring chilled (or hot) water, or glycoled water. The **ECOFRIO™** unit is a very compact unit with one of the smallest footprints on the market. It is available in two versions: a standard **pack** version (with a hydro kit) and a version without the hydro kit, and is designed for easy installation.

The **ECOFRIO™** unit is equipped with a high head pressure pump covering most installation requirements.

Being ecological, the **ECOFRIO™** unit uses **R407C** refrigerant, is highly efficient and includes recyclable packing.

The **ECOFRIO™** unit is also equipped with a user-friendly control - the **ECOCONTROL Plus** control unit, designed by

YORK with the latest technology, and can be connected to an N2Open Protocol communication system (optional), or to a **remote control unit** (optional). It controls leaving and return water temperature. It also allows safe operation of the chiller, extending its service life. The **ECOFRIO™** unit can be installed outdoors, either on the ground or on the roof. The **ECOFRIO™** unit is made of high quality components in compliance with the strictest quality standards (**ISO 9001 certification**).

Nomenclature

YC	YORK chiller
S	Scroll type compressor
A	Product type
08	Cooling capacity in kW
M	Single-phase power supply
T	Three-phase power supply
P	Pack version (hydro kit)
H	Heat pump



Models available and capacities

Cool model	YCSA 06 M and MP	YCSA 08 M and MP	YCSA 08 T and TP	YCSA 12 T and TP	YCSA 18 T and TP	YCSA 26 T and TP	YCSA 36 T and TP
Cooling capacity	6.12	8.3	8.4	12.16	17.2	25.7	35.7

Heat pump model	YCSA-H 06 M and MP	YCSA-H 08 M and MP	YCSA-H 08 T and TP	YCSA-H 12 T and TP	YCSA-H 18 T and TP	YCSA-H 26 T and TP	YCSA H 36 T and TP
Cooling capacity	5.86	8.3	8.4	12.16	18.2	25	36.65
Heating capacity	5.95	8.47	8.8	12.8	19.6	25.2	33.5

Cooling capacities in kW for 7° C leaving water temperature and 35° C ambient temperature.

Heating capacities in kW for 45° C leaving water temperature and 7° C ambient temperature.

Features and advantages

Features	Advantages
R407C refrigerant	Ozone depletion value equal to 0
Minimum dimensions	Minimum installation space
Light weight, single power and control supplies	Easy installation
Horizontal air intake and discharge for YCSA/YCSA-H 06 to 18	Ideal for installing close to a wall or on a terrace
Low height for YCSA/YCSA-H 26 & 36	Ideal for installing on the roof
Factory tested	Operating quality control
Accessible components	Easy and economic maintenance
Main switch	Operator safety
Microprocessor control with visual display of working parameters and alarms	Easy and safe operation
Manufactured to ISO 9001	High quality level
Variable speed fans	Low ambient operation as standard
Hydro kit as standard	Safe, economic and easy to install
Buffer tank as standard	Safe and ideal for installations with short pipe runs
Communications connection	Ideal for building management
Light weight	Ideal for rooftop applications

Easy access



YCSA/YCSA-H 26 & 36 TP



YCSA/YCSA-H 06 & 08 MP

Specifications

Chillers are factory assembled and include all interconnecting refrigerant and wiring pipes ready for field installation. After assembly, the chillers are tested with water. Possible leaks are also checked after the units are charged with refrigerant. These units are made of galvanised steel and have corrosion proof nuts and bolts. The panel can be removed to access internal components. All external galvanised steel parts are painted with oven-dried enamel (RAL 9001).

Compressor

The Scroll type hermetic compressor is protected internally. Starting will be direct on line. The electric sump heater will go on when the compressor is inoperative. The compressor is mounted on antivibratory supports.

Evaporating unit

The evaporating unit is an insulated stainless steel plate heat exchanger. Maximum operating pressure is 30 bar on the refrigerant side, and 6 bar on the water side (relief valve setting). An electric heater and a differential pressure switch are installed as antifreeze protection.

(For the option without the hydro kit, maximum operating pressure on the water side is 10 bar.)

Air cooled condensing unit

The air cooled condensing unit is made of copper tubing, arranged in staggered rows, mechanically expanded inside high efficiency aluminium fins. Maximum operating pressure of the coil is 28 bar (standard unit). For TÜV or other European standards, please see Limits of Use.

This air cooled condensing unit is equipped with a progressive fan speed control to optimise output and allow operating at ambient temperatures of down to -10° C (standard unit, and -18° C with optional low ambient temperature kit).

Each fan is equipped with a galvanised and painted protection grid. The single-phase fans have IP 44 protection.

Electrical and control panel

All electrical and control components are factory installed, connected and tested. The electric box has a door with an interlocking isolator and contains compressor and fan contactors, fuses and electrical protection. Also has IP 44 protection.

ECOCONTROL Plus control unit

This control device is electronic and is protected by a plastic cover. It includes a communication card for B.M.S. (optional) as well as for a wall-mounted remote control unit (optional). This remote control unit is user-friendly and has 3 access levels: user level, maintenance level and factory level with access limited to maintenance personnel only.

Refrigerant circuit

The refrigerant circuit includes the thermostatic valve, high and low pressure switches, a filter dryer, a humidity indicator (sizes 12 to 36), Schrader valves on high and low pressure sides of the cooling circuit, and a service valve (sizes 26 to 36). The refrigerant circuit is factory tested for leaks. The suction line pipes are insulated.

(For heat pump models only) A 4-way valve is installed in the

cooling circuit to reverse the cycle. It will be activated in cooling mode and during the defrost cycle.

The control includes a defrost operation (for heat pump models).

If defrost is required in heating mode, the cycle is reversed and the fans go off at the end of the defrost cycle. On models YCSA/H 26-36, and during the defrost operation, fans are in operation for 5 seconds every 25 seconds to avoid high discharge pressures.

Pack

The chiller includes a **pack** with all components needed for hydro kit operation. This **pack** is found inside the bed frame and does not modify the space occupied by the unit. It includes the following components: buffer tank, centrifugal pump, expansion vessel charged with nitrogen (at 1.5 bar), relief valve (set to 6 bar), water pressure gauge, two air purging valves, filling valve and drain valve.

Pipes and the buffer tank are preinstalled. The water filter is supplied loose for field installation (not inside the chiller). An electric heater protects the buffer tank against freezing.

Accessories and options

Unit without pack

Includes the elements described in the previously mentioned specifications, less the hydro kit. The water circuit includes an air purging valve. Connections are ready for field installation.

Flow switch

A flow switch is supplied for field installation.

Grid

Painted grid to protect the condensing unit, field installation (easy and quick assembly).

Anticorrosion protection of fins

Fins and copper pipes painted with anticorrosion material.

Adapter for side outlets (models YCSA - YCSA H - 06 to 18)

2 M/F elbows and 2 M/M pipes in 1 inch diameter.

Water filter (standard for units with pack, optional for units without pack)

Supplied loose for field installation.

ROCA will not honour the warranty if a water filter has not been installed.

Remote control unit

Wall-mounted remote control unit, display and keyboard with ON/OFF functions, as well as ON/OFF and alarm LEDs. Maximum cable length: 100 metres.

BMS communication

Plug-in RS-485 communication card for building management, protocol N2Open.

Low ambient temperature kit

The unit is equipped with a transducer to measure pressures, and an input converter to control condensing pressure at low ambient temperature.

Physical data, cool only units

Characteristics		YCSA 06 M YCSA 06 MP	YCSA 08 M YCSA 08 MP	YCSA 08 T YCSA 08 TP	YCSA 12 T YCSA 12 TP	YCSA 18 T YCSA 18 TP	YCSA 26 T YCSA 26 TP	YCSA 36 T YCSA 36 TP	
Cooling capacity	kW	6.12	8.3	8.4	12.16	17.2	25.7	35.7	
Power supply	V/ph	230/1	230/1	400/3+N	400/3+N	400/3+N	400/3	400/3	
Compressor consumption	kW	2.13	2.97	2.86	3.33	6.88	8.31	12.46	
Compressor consumption	A	9.3	14.8	6.5	7	13.6	15.7	23.7	
N° of refrigerant circuits		1							
N° of compressors		1							
Compressor type		Scroll							
Oil charge	l	1.00	1.1	1.1	1.36	3.25	3.80	6.60	
Oil type		Polyester ISO32							
Evaporating unit type		Plate							
Nominal water flow	l/h	1052	1428	1445	2092	2958	4420	6140	
N° of fans		1			2				
Fan diameter	mm	450					560		
Total fan consumption	W	130	150	150	280	300	350	570	
Total fan consumption	A	0.66	0.66	0.66	1.32	1.32	1.7	3	
Total air flow	m³/h	3 000	3 300	3 300	6 000	6 600	10 000	10 400	
Refrigerant type		R-407C							
Refrigerant charge	kg	2.4	3.5	3.5	5	4.1	9	11.4	
Sound power level	dB (A)	70	71	71	73	74	78	81	
Sound power level at 5 m	dB (A)	44	45	45	47	48	51	54	
Sound power level at 10 m	dB (A)	40	41	41	43	44	48	51	
Dimensions									
Length	mm	1 180			1 430		1 503		
Width	mm	427			502		904		
Height	mm	914			1 270		1 344		
Water connection, female		1"			1"		1"1/4		
Water filter		1"			1"1/4 (4)		1"1/4	1"1/2 (4)	

Units with hydro kit (version P)

N° of pumps		1						
Available static pressure at nominal flow (without filter) (2)	kPa	60	57	56.5	215.5	192	181	155
Available static pressure at nominal flow (with filter) (3)	kPa	58.5	54	54	210	184	164	150
Pump consumption	W	155	155	155	560	600	750	1070
Pump consumption	A	0.7	0.7	0.7	1.2	1.2	1.4	1.9
Unit water content	l	29	30	30	69	70	118	119
Expansion vessel volume	l	2	2	2	5	5	8	8
Relief valve setting	Bar	6	6	6	6	6	6	6
Max. unit power supply consump.	kW	3.46	4.71	4.43	6.49	9.55	12.8	19
Max. unit power supply consump.	A	15.9	21.7	7	10.8	16.1	22.9	31.1
Start-up current	A	62	101	47	67	99	121.5	177
Weight (1)	kg	125	130	130	185	220	390	400

Units without pack

Start current	A	61	100	46	66	98	120	175
Pressure drop hydraulic circuit	kPa	10	13	13.5	40	36	54	56
Maximum unit power consumption	kW	3.30	4.55	4.27	5.93	8.95	12.05	17.93
Maximum unit power consumption	A	15.2	21	7	9.6	14.9	21.5	29.1
Weight (1)	kg	105	110	110	150	185	330	340

(1) Weight for empty unit. - (2) Available static pressure, Eurovent certification.

(3) Pressure with clean filter. - (4) Supplied with adaptors.

Physical data, heat pump units

Characteristics		YCSA/H 06M	YCSA/H 08M	YCSA/H 08T	YCSA/H 12T	YCSA/H 18T	YCSA/H 26T	YCSA/H 36T
		YCSA/H 06MP	YCSA/H 08MP	YCSA/H 08TP	YCSA/H 12TP	YCSA/H 18TP	YCSA/H 26TP	YCSA/H 36TP
Cooling capacity	kW	5.86	8.3	8.41	12.16	18.2	25	36.7
Heating capacity	kW	5.95	8.47	8.76	12.8	19.6	25.2	33.5
Power supply	V/ph	230/1	230/1	400/3+N	400/3+N	400/3+N	400/3	400/3
Compres. consumption in cooling	kW	1.83	2.97	2.86	3.33	6.94	8.58	12.86
Compres. consumption in heating	kW	1.98	2.91	2.93	3.95	6.67	8.4	12.46
Compres. consumption in cooling	A	9.7	14.84	6.7	7	13.14	16	23.3
Compres. consumption in heating	A	10.1	14.64	6.8	7.8	12.53	15.6	22.2
N° of refrigerant circuits		1						
N° of compressors		1						
Compressor type		Scroll						
Oil charge in litres	l	1.00	1.1	1.1	1.36	3.25	3.80	6.60
Oil type		Polyester ISO32						
Evaporating unit type		Plate						
Nominal flow in cooling	l/h	1 008	1 428	1 447	2 092	3 130	4 300	6 312
N° of fans		1			2			
Fan diameter	mm	450			450		560	
Total fan consumption	W	130	150	150	260	300	350	570
Total fan consumption	A	0.66	0.66	0.66	1.32	1.32	1.7	3
Total air flow	m³/h	3 000	3 300	3 300	6 000	6 600	10 000	10 400
Refrigerant type		R-407C						
Refrigerant charge	kg	3	4	3.1	5.6	5.3	13	14.5
Sound power level	dB (A)	70	71	71	73	74	78	81
Sound power level at 5 m	dB (A)	44	45	45	47	48	51	54
Sound power level at 10 m	dB (A)	40	41	41	43	44	48	51
Dimensions								
Length		1 180			1 430		1 503	
Width	mm	427			502		904	
Height	mm	914			1 270		1 344	
Water connections, female	mm	1"			1"		1"1/4	
Water filter		1"			1"1/4 (4)		1"1/4	1"1/2 (4)

Units with hydro kit (version P)

N° of pumps		1						
Available static pressure at rated flow (without filter) for cooling mode (2)	kPa	61,2	56,5	56,5	215	179	184	152
Available static pressure at rated flow (with filter) for cooling mode (3)	kPa	60	54	54	210	170	168	146
Pump consumption	W	155	155	155	560	600	750	1 070
Pump consumption	A	0.7	0.7	0.7	1.2	1.2	1.4	1.9
Unit water content	l	29	30	30	69	70	118	119
Expansion vessel volume	l	2	2	2	5	5	8	8
Relief valve setting	Bar	6	6	6	6	6	6	6
Max. unit power supply consumption	kW	3.46	4.71	4.43	6.49	9.55	12.8	19
Max. unit power supply consumption	A	15.9	21.7	7	10.8	16.1	22.9	31.1
Start-up current	A	62	101	47	67	99	121.5	177
Weight (1)	kg	135	140	140	200	235	430	440

Units without pack

Start-up current	A	61	100	46	66	98	120	175
Pressure drop hydraulic circuit	kPa	9	14	14	40.5	39.5	51	58
Max. unit power supply consumption	kW	3.3	4.55	4.27	5.93	8.95	12.05	17.93
Max. unit power supply consumption	A	15.2	21	7.0	9.6	14.9	21.5	29.1
Weight (1)	kg	115	120	120	165	200	370	380

(1) Weight for unit empty. - (2) Available static pressure, Eurovent certified. - (3) Pressure given with clean filter. - (4) Supplied with adaptors.

Control unit: ECOCONTROL Plus



The **YORK ECOCONTROL Plus** microprocessor control unit has three access levels: user level, factory level and maintenance level for **YORK** personnel only.

To access the factory and maintenance levels, please contact your **YORK** distributor. The microprocessor controls the leaving or return temperature. The control unit is compact and is attached to the panel.

This control unit sets fan speed in accordance with the condensing temperature in the case of a cool only unit, and in accordance with the ambient temperature in the case of a heat pump unit.

This control unit accesses a communication system (optional). It also allows connecting a wire remote control unit (optional) with ON/OFF functions, cooling/heating mode selection and has two LEDs (ON and alarms).

The screen of this control unit displays alarms, set points, leaving and return temperatures, condensing temperature and, in heat pump units only, the ambient temperature.

The **ECOCONTROL Plus** control unit allows modifying or reading the following.:

- Set point differential (1).
- Control mode (leaving or return water temperature control) (1).
- Compressor timer (1).
- Maximum compressor starts/hours (1).
- Reading of compressor operating hours.
- Condensing temperature set point (1).

- Minimum fan speed (%) (1).
- Maximum fan speed (%) (1).
- Defrost cycle timing (1).
- Defrost cycle ON/OFF temperature values (1).
- Fan mode during defrost cycle (1).
- Antifreeze cut-out (1).
- Antifreeze differential (1).
- Return water high temperature alarm (1).
- Low pressure alarm display (1).
- Flow switch alarm display (1).
- Auxiliary pump delay (1).
- Correction of temperature probe readings (1).
- Automatic reset after a power failure (1).
- Selection of °C or °F (1).
- Minimum cooling set point allowed to user (1).
- Maximum heating set point allowed to user (1).
- N2Open communication address in series (2).
- Analogue input mode: temperature sensor/pressure transducer (2).

(1) Parameters can be changed at maintenance level only.

(2) Parameters can be changed at factory level only.

Limits of use, YCSA (cool only unit)

Leaving water temperature: +6° C to +15° C.

Leaving brine temperature: -5° C to +6° C.

Temperature difference across heat exchanger: 3° C to 7° C.

Maximum air intake temperature: +45° C.

Minimum ambient temperature: -10° C (standard), -18° C low ambient temperature kit (optional).

Limits of use, YCSA-H (heat pump unit)

Cooling mode

Leaving water temperature: +6° C to +15° C.

Leaving brine temperature: -5° C to +6° C.

Temperature difference across heat exchanger: 3° C to 7° C.

Maximum air intake temperature: +45° C.

Minimum ambient temperature: -10° C (standard), -18° C low ambient temperature kit (optional), for YCSA-H 12 to 36 models only.

Heating mode

Leaving water temperature: +30° C to +50° C.

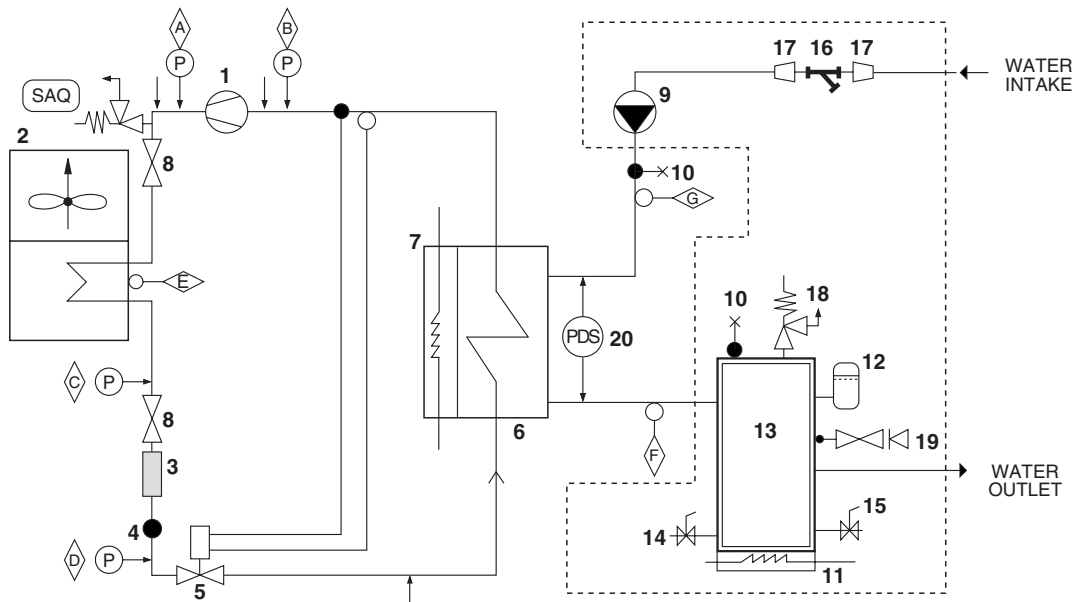
Ambient temperature: -5° C to +20° C.

Temperature difference across heat exchanger: 3° C to 7° C.

Maximum air intake temperature: 0° C with maximum leaving water temperature at 50° C.

Minimum air intake temperature: -5° C with maximum leaving water temperature at 45° C.

Operation, cooling and hydraulic diagram, cool only unit



SAFETY / CONTROL DEVICE

- A** High pressure switch
- B** Low pressure switch
- C** Pressure transducer port (sizes 06-08, 26-36)
- D** Pressure transducer port (sizes 12-18)
- E** Condensing unit temperature sensor (fan speed setting and display)
- F** Water outlet temperature sensor (antifreeze, setting and display)
- G** Water intake temperature sensor (setting and display)

COMPONENTS

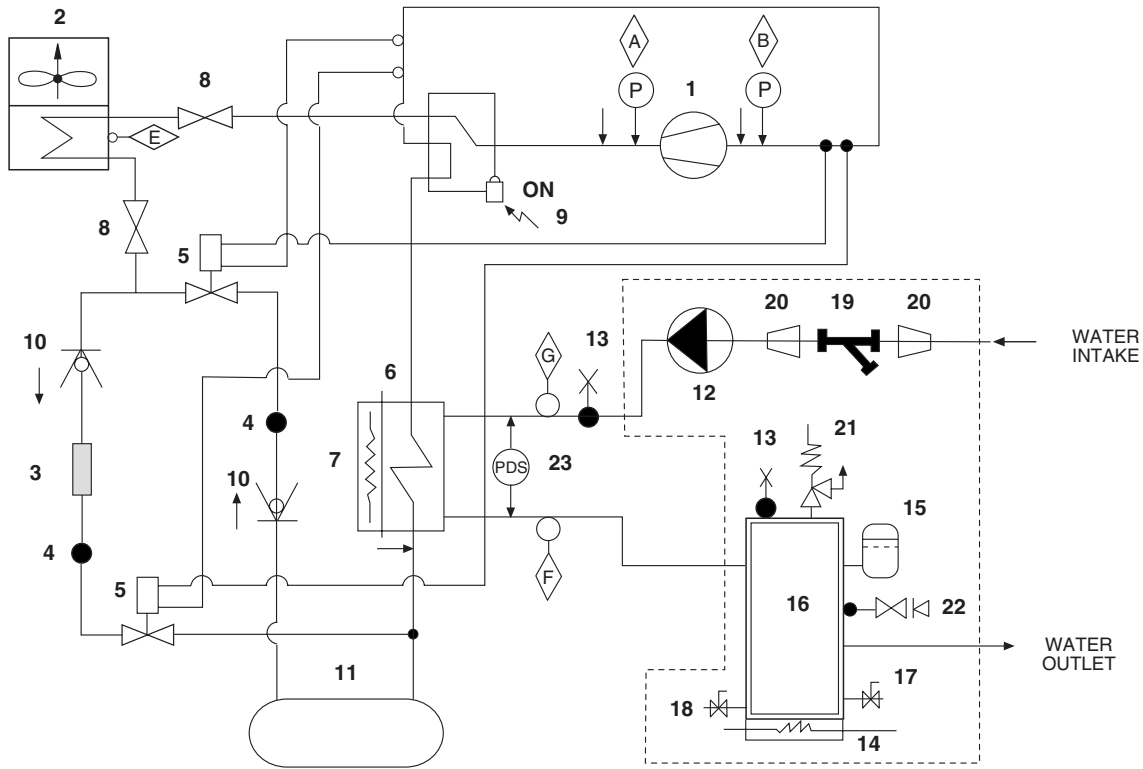
- 1** Compressor
- 2** Air cooled condenser
- 3** Filter dryer
- 4** Sight glass (sizes 12-18-26-36 only)
- 5** Expansion valve
- 6** Heat exchanger
- 7** Exchanger antifreeze heater
- 8** Globe valve (sizes 26-36 only)
- 9** Water pump
- 10** Manual air vent
- 11** Water tank antifreeze heater
- 12** Expansion vessel

- 13** Water tank
- 14** Charge valve
- 15** Drain valve
- 16** Water filter (not inside the unit)
- 17** Adapters (sizes 18, 36 not inside the unit)
- 18** Safety valve
- 19** Pressure gauge
- 20** Pressure differential switch
- Pipe connection with Shrader valve
- For units with hydro kit only

Heat exchange between the heat transfer liquid (water or glycol water) and the refrigerant takes place in the plate heat exchanger. Water is cooled, and refrigerant is evaporated and reheated. Then the Scroll type compressor condenses the refrigerant (gas) until the condensing pressure is reached, and the refrigerant goes to the air cooled condensing unit. In the air cooled condensing unit, heat is exchanged between

the air and the refrigerant. The air is heated and evacuated from the chiller (heat rejection). The refrigerant is condensed and sub-cooled. Then the refrigerant (liquid) goes on to the expansion valve, where it is expanded until the evaporating pressure is reached, at which time it goes to the evaporating unit to start a new cooling cycle.

Operation, cooling and hydraulic diagram, heat pump unit YCSA-H



SAFETY / CONTROL DEVICE

- A** High pressure switch
- B** Low pressure switch
- E** Condensing unit temperature sensor (fan speed setting and display)
- F** Water outlet temperature sensor (antifreeze, setting and display)
- G** Water intake temperature sensor (setting and display)

COMPONENTS

- 1** Compressor
- 2** Air cooled condenser
- 3** Filter dryer
- 4** Sight glass (sizes 12-18-26-36 only)
- 5** Expansion valve
- 6** Heat exchanger
- 7** Exchanger antifreeze heater
- 8** Globe valve (sizes 26-36 only)
- 9** 4-way valve
- 10** Check valve
- 11** Liquid receiver
- 12** Water pump
- 13** Manual air vent
- 14** Water tank antifreeze heater
- 15** Expansion vessel
- 16** Water tank
- 17** Charge valve
- 18** Drain valve
- 19** Water filter (not inside the unit)
- 20** Adapters (sizes 18 and 36 not inside the unit)
- 21** Safety valve
- 22** Water pressure gauge
- 23** Pressure differential switch

—→ Pipe connection with Shradler valve

----- For units with hydro kit only

Cooling cycle

The 4-way valve is activated. Heat exchange takes place between the heat transfer liquid (water or glycoled water) and the refrigerant in the plate heat exchanger. Water is cooled, and refrigerant is evaporated and reheated. Then the Scroll type compressor condenses the refrigerant (gas) until the condensing pressure is reached, and the refrigerant goes to the air cooled condensing unit. In the air cooled condensing unit, heat is exchanged between the air and the refrigerant. The air is heated and evacuated from the chiller (heat rejection). The refrigerant is condensed and sub-cooled. Then the refrigerant (liquid) goes on to the expansion valve, where it is expanded until the evaporating pressure is reached, at which time it goes to the evaporating unit to start a new cooling cycle.

Heating cycle

The cycle is reversed to heating mode. The 4-way valve is not activated. The condensing unit becomes the evaporating unit, and the evaporating unit becomes the condensing unit. The water in the heat exchanger is heated.

Defrost

When probe ST3 detects a temperature below 0.5° C (factory set point), the cycle is reversed. The defrost cycle is activated for a maximum of 4 minutes. If, during this period of time, the temperature rises above +6° C, the defrost cycle is discontinued.

On models 26-36 and during the defrost cycle, fans run at maximum speed for 5 seconds, every 25 seconds.

Table 1. Cooling capacities YCSA 6-36

YCSA model	Leaving water temp. °C	Outdoor ambient temperature °C DB (80% RH)													
		25		30		32		35		40		43		45	
		Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW
6M	5	6.52	2.05	6.06	2.19	5.94	2.26	5.81	2.38	5.26	2.53	5.02	2.68	4.65	2.76
	6	6.66	2.07	6.30	2.23	6.16	2.29	5.93	2.40	5.44	2.57	5.14	2.71	4.90	2.79
	7	6.86	2.09	6.50	2.25	6.35	2.31	6.12	2.42	5.61	2.62	5.30	2.74	5.14	2.83
	8	7.01	2.13	6.65	2.29	6.49	2.36	6.26	2.46	5.74	2.66	5.42	2.78	5.29	2.87
	10	7.32	2.21	6.94	2.37	6.78	2.44	6.54	2.55	5.99	2.75	5.67	2.88		
	12	7.62	2.29	7.22	2.46	7.06	2.53	6.81	2.64	6.24	2.85				
	15	8.06	2.42	7.64	2.60	7.47	2.67	7.21	2.79						
8M	5	8.84	2.76	8.22	2.95	8.05	3.06	7.89	3.22	7.14	3.43	6.81	3.64	6.31	3.76
	6	9.03	2.79	8.55	3.01	8.35	3.11	8.05	3.25	7.38	3.49	6.98	3.69	6.64	3.80
	7	9.31	2.82	8.81	3.04	8.61	3.13	8.30	3.28	7.61	3.55	7.19	3.72	6.97	3.85
	8	9.51	2.87	9.02	3.10	8.80	3.19	8.49	3.34	7.78	3.62	7.36	3.79	7.18	3.90
	10	9.93	2.98	9.41	3.22	9.19	3.31	8.86	3.47	8.13	3.75	7.69	3.92		
	12	10.34	3.10	9.80	3.33	9.57	3.44	9.23	3.59	8.47	3.88				
	15	10.93	3.28	10.37	3.53	10.13	3.63	9.77	3.79						
8T	5	8.95	2.67	8.32	2.85	8.15	2.96	7.98	3.11	7.22	3.31	6.89	3.51	6.38	3.63
	6	9.14	2.70	8.65	2.91	8.45	3.00	8.15	3.14	7.47	3.37	7.06	3.56	6.72	3.67
	7	9.42	2.73	8.92	2.94	8.71	3.03	8.40	3.17	7.70	3.43	7.28	3.59	7.06	3.71
	8	9.63	2.78	9.13	3.00	8.91	3.09	8.59	3.23	7.88	3.49	7.44	3.66	7.27	3.77
	10	10.05	2.88	9.52	3.11	9.30	3.20	8.97	3.35	8.22	3.62	7.78	3.79		
	12	10.46	2.99	9.91	3.22	9.68	3.32	9.34	3.47	8.57	3.75				
	15	11.07	3.17	10.49	3.41	10.25	3.51	9.89	3.67						
12T	5	12.95	3.57	12.04	3.78	11.80	3.90	11.55	4.08	10.46	4.32	9.97	4.55	9.24	4.68
	6	13.23	3.60	12.53	3.85	12.23	3.95	11.79	4.12	10.81	4.38	10.22	4.61	9.73	4.73
	7	13.63	3.63	12.91	3.88	12.61	3.99	12.16	4.15	11.15	4.46	10.54	4.64	10.21	4.78
	8	13.94	3.69	13.21	3.95	12.90	4.05	12.44	4.22	11.41	4.53	10.78	4.72	10.52	4.85
	10	14.54	3.82	13.78	4.08	13.47	4.18	12.99	4.36	11.91	4.67	11.26	4.87		
	12	15.15	3.94	14.35	4.21	14.02	4.33	13.52	4.50	12.41	4.82				
	15	16.02	4.15	15.19	4.42	14.84	4.54	14.32	4.73						
18T	5	18.32	6.58	17.03	7.02	16.68	7.26	16.34	7.64	14.79	8.12	14.10	8.61	13.07	8.88
	6	18.71	6.64	17.72	7.15	17.31	7.38	16.68	7.71	15.29	8.26	14.46	8.73	13.76	8.98
	7	19.28	6.71	18.27	7.23	17.84	7.44	17.20	7.78	15.77	8.41	14.91	8.80	14.45	9.09
	8	19.71	6.84	18.69	7.37	18.25	7.58	17.59	7.92	16.13	8.56	15.24	8.95	14.88	9.22
	10	20.57	7.09	19.49	7.63	19.05	7.85	18.37	8.21	16.84	8.86	15.93	9.26		
	12	21.43	7.36	20.30	7.91	19.83	8.14	19.13	8.50	17.55	9.17				
	15	22.66	7.78	21.48	8.35	20.99	8.59	20.25	8.97						
26T	5	27.37	7.96	25.44	8.50	24.93	8.79	24.42	9.24	22.10	9.83	21.07	10.41	19.53	10.74
	6	27.95	8.03	26.47	8.65	25.86	8.92	24.92	9.33	22.84	9.99	21.60	10.55	20.56	10.86
	7	28.81	8.12	27.29	8.74	26.65	9.00	25.70	9.41	23.56	10.17	22.28	10.64	21.59	10.99
	8	29.45	8.27	27.92	8.91	27.26	9.17	26.28	9.58	24.11	10.35	22.78	10.83	22.23	11.16
	10	30.74	8.58	29.13	9.23	28.47	9.50	27.45	9.93	25.16	10.71	23.80	11.20		
	12	32.01	8.90	30.33	9.56	29.63	9.85	28.58	10.28	26.22	11.09				
	15	33.86	9.41	32.10	10.09	31.37	10.39	30.26	10.85						
36T	5	38.02	11.92	35.34	12.73	34.63	13.17	33.92	13.85	30.70	14.72	29.27	15.60	27.13	16.09
	6	38.83	12.03	36.77	12.97	35.92	13.37	34.62	13.98	31.73	14.97	30.01	15.81	28.56	16.28
	7	40.02	12.17	37.92	13.10	37.03	13.48	35.70	14.10	32.73	15.24	30.94	15.95	29.99	16.47
	8	40.91	12.40	38.79	13.35	37.87	13.73	36.51	14.36	33.48	15.51	31.64	16.23	30.88	16.72
	10	42.70	12.85	40.46	13.83	39.54	14.23	38.13	14.88	34.96	16.05	33.06	16.78		
	12	44.47	13.33	42.13	14.33	41.16	14.76	39.71	15.41	36.42	16.62				
	15	47.03	14.10	44.59	15.13	43.57	15.57	42.04	16.25						

Δt water side = 5°K. Unit KW = includes compressor, fan and pump consumptions. Deduct pump consumption on units without kit.

Table 2. Cooling capacities YCSA 6-36 (35% ethylene glycol)

YCSA model	Leaving water temp.	Outdoor ambient temperature °C DB (80% RH)													
		25		30		32		35		40		43		45	
		Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW
6M	-5	3.95	1.67	3.73	1.80	3.64	1.85	3.51	1.93	3.22	2.08	3.05	2.17	2.88	2.28
	-4	4.13	1.71	3.91	1.83	3.82	1.88	3.68	1.96	3.37	2.12	3.19	2.22	3.00	2.33
	-2	4.53	1.77	4.29	1.90	4.19	1.96	4.04	2.04	3.70	2.20	3.50	2.31	3.27	2.42
	0	4.96	1.84	4.69	1.98	4.58	2.03	4.41	2.12	4.05	2.29	3.83	2.40	3.55	2.51
	2	5.42	1.91	5.12	2.05	5.00	2.11	4.82	2.20	4.42	2.38	4.18	2.49	3.95	2.59
	4	5.87	1.98	5.55	2.13	5.42	2.19	5.23	2.29	4.79	2.47	4.53	2.59	4.28	2.72
8M	-5	5.35	2.24	5.06	2.41	4.94	2.48	4.76	2.59	4.37	2.81	4.13	2.93	3.90	3.09
	-4	5.61	2.29	5.30	2.46	5.18	2.53	4.99	2.65	4.57	2.87	4.33	3.00	4.07	3.16
	-2	6.15	2.38	5.81	2.56	5.68	2.64	5.47	2.76	5.02	2.98	4.75	3.12	4.44	3.28
	0	6.72	2.47	6.36	2.66	6.21	2.74	5.98	2.87	5.49	3.11	5.19	3.25	4.81	3.40
	2	7.34	2.57	6.95	2.77	6.78	2.85	6.53	2.98	6.00	3.23	5.67	3.38	5.35	3.52
	4	7.96	2.67	7.53	2.87	7.36	2.96	7.09	3.10	6.50	3.35	6.15	3.51	5.81	3.70
8T	-5	5.42	2.17	5.12	2.33	5.00	2.40	4.82	2.51	4.42	2.71	4.18	2.84	3.95	2.98
	-4	5.68	2.21	5.36	2.38	5.24	2.45	5.05	2.56	4.63	2.77	4.38	2.90	4.12	3.06
	-2	6.22	2.30	5.88	2.48	5.75	2.55	5.54	2.66	5.08	2.88	4.80	3.02	4.49	3.17
	0	6.81	2.39	6.44	2.57	6.29	2.65	6.05	2.77	5.56	3.00	5.25	3.14	4.87	3.28
	2	7.43	2.48	7.03	2.67	6.87	2.75	6.61	2.88	6.07	3.12	5.74	3.27	5.42	3.40
	4	8.06	2.58	7.62	2.78	7.44	2.86	7.17	2.99	6.58	3.24	6.22	3.39	5.88	3.57
12T	-5	7.84	2.99	7.41	3.18	7.24	3.25	6.97	3.38	6.40	3.62	6.05	3.76	5.72	3.93
	-4	8.22	3.04	7.77	3.23	7.59	3.31	7.31	3.44	6.70	3.69	6.34	3.83	5.96	4.02
	-2	9.01	3.14	8.52	3.34	8.32	3.43	8.02	3.56	7.36	3.81	6.96	3.97	6.51	4.15
	0	9.85	3.24	9.32	3.46	9.10	3.55	8.76	3.69	8.04	3.95	7.60	4.12	7.05	4.28
	2	10.76	3.35	10.18	3.57	9.94	3.67	9.57	3.81	8.78	4.09	8.31	4.26	7.84	4.42
	4	11.67	3.46	11.03	3.69	10.78	3.79	10.38	3.94	9.53	4.23	9.01	4.41	8.51	4.62
18T	-5	11.09	5.37	10.48	5.77	10.24	5.93	9.86	6.19	9.05	6.68	8.56	6.98	8.08	7.33
	-4	11.62	5.48	10.98	5.88	10.73	6.05	10.34	6.31	9.48	6.82	8.97	7.12	8.43	7.50
	-2	12.74	5.69	12.05	6.11	11.77	6.29	11.34	6.57	10.41	7.09	9.84	7.41	9.20	7.78
	0	13.94	5.91	13.18	6.35	12.87	6.53	12.40	6.82	11.38	7.38	10.75	7.71	9.98	8.06
	2	15.22	6.13	14.39	6.59	14.06	6.78	13.54	7.09	12.43	7.66	11.75	8.01	11.09	8.33
	4	16.51	6.36	15.60	6.83	15.24	7.03	14.69	7.35	13.47	7.95	12.74	8.31	12.04	8.74
26T	-5	16.57	6.50	15.66	6.98	15.30	7.18	14.74	7.49	13.52	8.08	12.79	8.44	12.08	8.87
	-4	17.36	6.63	16.41	7.12	16.03	7.32	15.44	7.64	14.16	8.25	13.40	8.61	12.59	9.08
	-2	19.04	6.88	18.00	7.40	17.59	7.61	16.95	7.94	15.55	8.57	14.70	8.96	13.75	9.41
	0	20.82	7.15	19.70	7.68	19.23	7.90	18.52	8.25	17.00	8.92	16.07	9.33	14.91	9.74
	2	22.74	7.42	21.51	7.97	21.00	8.20	20.23	8.57	18.57	9.27	17.55	9.69	16.58	10.07
	4	24.66	7.69	23.31	8.26	22.78	8.50	21.95	8.89	20.13	9.62	19.04	10.05	17.99	10.57
36T	-5	23.02	9.74	21.75	10.46	21.25	10.75	20.47	11.22	18.77	12.11	17.77	12.64	16.78	13.29
	-4	24.12	9.93	22.80	10.67	22.27	10.96	21.45	11.44	19.68	12.36	18.62	12.91	17.49	13.60
	-2	26.45	10.31	25.01	11.08	24.43	11.40	23.54	11.90	21.60	12.84	20.42	13.43	19.10	14.10
	0	28.93	10.71	27.36	11.50	26.71	11.84	25.73	12.36	23.62	13.37	22.32	13.97	20.71	14.60
	2	31.59	11.12	29.87	11.94	29.18	12.29	28.11	12.84	25.79	13.89	24.38	14.52	23.03	15.10
	4	34.26	11.52	32.38	12.38	31.64	12.74	30.49	13.33	27.96	14.41	26.45	15.06	24.99	15.84

At water side = 5°K. Unit KW = includes compressor, fan and pump consumptions. Deduct pump consumption on units without.

Table 3. Correcting factors for other glycol concentrations

% in weight	Ethylene glycol		Propylene glycol	
	Capacity	Absorbed power	Capacity	Absorbed power
10	1.061	1.025	1.097	1.033
20	1.036	1.015	1.067	1.023
30	1.015	1.005	1.026	1.008
35	1.000	1.000	1.000	1.000
40	0.985	0.995	0.974	0.992
50	0.954	0.985	0.923	0.977

If it is necessary to make a selection with different glycol percentages, correct the capacity and absorbed power values in Table 2 (35% ethylene glycol), multiplying them by the coefficients indicated in Table 3.

Table 4. Cooling capacities YCSA-H 6-36

YCSA-H model	Leaving water temp. °C	Outdoor ambient temperature °C DB (80% RH)													
		25		30		32		35		40		43		45	
		Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW
6M	5	6.24	1.80	5.80	1.92	5.68	1.98	5.57	2.08	5.04	2.21	4.81	2.34	4.45	2.41
	6	6.37	1.82	6.04	1.95	5.90	2.01	5.68	2.10	5.21	2.25	4.93	2.37	4.69	2.44
	7	6.57	1.84	6.22	1.97	6.08	2.03	5.86	2.12	5.37	2.29	5.08	2.39	4.92	2.47
	8	6.72	1.87	6.37	2.01	6.22	2.07	5.99	2.16	5.50	2.33	5.19	2.43	5.07	2.51
	10	7.01	1.94	6.64	2.08	6.49	2.14	6.26	2.24	5.74	2.41	5.43	2.51		
	12	7.30	2.01	6.92	2.15	6.76	2.22	6.52	2.31	5.98	2.49				
	15	7.72	2.12	7.32	2.27	7.15	2.34	6.90	2.44						
8M	5	8.84	2.76	8.22	2.95	8.05	3.06	7.89	3.22	7.14	3.43	6.81	3.64	6.31	3.76
	6	9.03	2.79	8.55	3.01	8.35	3.11	8.05	3.25	7.38	3.49	6.98	3.69	6.64	3.80
	7	9.31	2.82	8.81	3.04	8.61	3.13	8.30	3.28	7.61	3.55	7.19	3.72	6.97	3.85
	8	9.51	2.87	9.02	3.10	8.80	3.19	8.49	3.34	7.78	3.62	7.36	3.79	7.18	3.90
	10	9.93	2.98	9.41	3.22	9.19	3.31	8.86	3.47	8.13	3.75	7.69	3.92		
	12	10.34	3.10	9.80	3.33	9.57	3.44	9.23	3.59	8.47	3.88				
	15	10.93	3.28	10.37	3.53	10.13	3.63	9.77	3.79						
8T	5	8.95	2.67	8.32	2.85	8.15	2.96	7.98	3.11	7.22	3.31	6.89	3.51	6.38	3.63
	6	9.14	2.70	8.65	2.91	8.45	3.00	8.15	3.14	7.47	3.37	7.06	3.56	6.72	3.67
	7	9.42	2.73	8.92	2.94	8.71	3.03	8.40	3.17	7.70	3.43	7.28	3.59	7.06	3.71
	8	9.63	2.78	9.13	3.00	8.91	3.09	8.59	3.23	7.88	3.49	7.44	3.66	7.27	3.77
	10	10.05	2.88	9.52	3.11	9.30	3.20	8.97	3.35	8.22	3.62	7.78	3.79		
	12	10.46	2.99	9.91	3.22	9.68	3.32	9.34	3.47	8.57	3.75				
	15	11.07	3.17	10.49	3.41	10.25	3.51	9.89	3.67						
12T	5	12.95	3.57	12.04	3.78	11.80	3.90	11.55	4.08	10.46	4.32	9.97	4.55	9.24	4.68
	6	13.23	3.60	12.53	3.85	12.23	3.95	11.79	4.12	10.81	4.38	10.22	4.61	9.73	4.73
	7	13.63	3.63	12.91	3.88	12.61	3.99	12.16	4.15	11.15	4.46	10.54	4.64	10.21	4.78
	8	13.94	3.69	13.21	3.95	12.90	4.05	12.44	4.22	11.41	4.53	10.78	4.72	10.52	4.85
	10	14.54	3.82	13.78	4.08	13.47	4.18	12.99	4.36	11.91	4.67	11.26	4.87		
	12	15.15	3.94	14.35	4.21	14.02	4.33	13.52	4.50	12.41	4.82				
	15	16.02	4.15	15.19	4.42	14.84	4.54	14.32	4.73						
18T	5	19.38	6.63	18.02	7.08	17.65	7.32	17.29	7.70	15.65	8.19	14.92	8.67	13.83	8.95
	6	19.79	6.69	18.75	7.21	18.31	7.43	17.65	7.77	16.18	8.33	15.30	8.80	14.56	9.05
	7	20.40	6.76	19.33	7.28	18.88	7.50	18.20	7.84	16.68	8.48	15.77	8.87	15.29	9.16
	8	20.86	6.89	19.78	7.42	19.31	7.64	18.61	7.98	17.07	8.62	16.13	9.02	15.74	9.30
	10	21.77	7.14	20.63	7.69	20.16	7.91	19.44	8.28	17.82	8.93	16.85	9.33		
	12	22.67	7.41	21.48	7.97	20.98	8.21	20.24	8.57	18.57	9.24				
	15	23.98	7.84	22.73	8.41	22.21	8.66	21.43	9.04						
26T	5	26.63	8.18	24.75	8.74	24.25	9.04	23.75	9.51	21.50	10.11	20.50	10.71	19.00	11.05
	6	27.19	8.26	25.75	8.90	25.15	9.18	24.24	9.59	22.22	10.28	21.02	10.86	20.00	11.18
	7	28.03	8.35	26.55	8.99	25.93	9.26	25.00	9.68	22.92	10.47	21.67	10.95	21.00	11.31
	8	28.65	8.51	27.16	9.17	26.52	9.43	25.57	9.86	23.45	10.65	22.15	11.14	21.63	11.48
	10	29.90	8.82	28.33	9.49	27.69	9.77	26.70	10.22	24.48	11.02	23.15	11.53		
	12	31.14	9.15	29.50	9.84	28.82	10.13	27.81	10.58	25.51	11.42				
	15	32.94	9.68	31.22	10.39	30.51	10.69	29.44	11.16						
36T	5	39.03	12.25	36.28	13.09	35.55	13.54	34.82	14.24	31.52	15.14	30.05	16.04	27.85	16.56
	6	39.86	12.37	37.75	13.33	36.87	13.74	35.54	14.37	32.58	15.40	30.81	16.27	29.32	16.75
	7	41.09	12.50	38.92	13.47	38.01	13.87	36.65	14.50	33.60	15.68	31.77	16.41	30.79	16.94
	8	42.00	12.74	39.82	13.73	38.88	14.12	37.48	14.77	34.38	15.95	32.48	16.70	31.70	17.20
	10	43.84	13.21	41.54	14.22	40.60	14.63	39.14	15.31	35.89	16.52	33.94	17.27		
	12	45.65	13.71	43.25	14.74	42.25	15.18	40.76	15.85	37.39	17.10				
	15	48.28	14.50	45.77	15.56	44.73	16.02	43.16	16.72						

Δt water side = 5°K. Unit KW = includes compressor, fan and pump consumptions. Deduct pump consumption on units without kit.

Table 5. Heating capacities YCSA-H 6-36

YCSA-H model	Leaving water temp. °C	Outdoor ambient temperature °C (80% HR)													
		-5		-3		0		5		7		10		15	
		Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW	Cap. KW	Unit KW
6M	30	4.40	1.74	4.75	1.79	5.30	1.87	6.23	2.00	6.63	2.04	7.28	2.12	8.45	2.22
	35	4.22	1.78	4.55	1.84	5.10	1.93	6.02	2.06	6.43	2.12	7.06	2.20	8.22	2.33
	40	4.01	1.82	4.34	1.89	4.88	1.98	5.79	2.13	6.19	2.19	6.83	2.28	7.97	2.44
	45	3.80	1.85	4.13	1.93	4.64	2.03	5.55	2.20	5.95	2.27	6.58	2.37	7.71	2.53
	50					4.40	2.08	5.29	2.26	5.69	2.34	6.30	2.45	7.43	2.64
8M	30	6.26	2.43	6.77	2.52	7.55	2.63	8.88	2.82	9.44	2.89	10.37	2.99	12.02	3.15
	35	6.00	2.50	6.47	2.59	7.25	2.71	8.57	2.91	9.15	2.99	10.04	3.12	11.70	3.31
	40	5.71	2.56	6.18	2.66	6.94	2.80	8.24	3.01	8.81	3.10	9.72	3.24	11.34	3.46
	45	5.40	2.61	5.87	2.71	6.60	2.87	7.90	3.12	8.47	3.22	9.36	3.36	10.97	3.60
	50					6.26	2.94	7.53	3.20	8.10	3.32	8.97	3.48	10.58	3.76
8T	30	6.51	2.45	7.03	2.54	7.84	2.64	9.22	2.84	9.81	2.91	10.77	3.01	12.49	3.17
	35	6.24	2.52	6.73	2.61	7.54	2.73	8.90	2.92	9.51	3.01	10.44	3.13	12.15	3.33
	40	5.93	2.57	6.42	2.68	7.22	2.82	8.56	3.03	9.15	3.12	10.10	3.26	11.78	3.49
	45	5.61	2.62	6.10	2.73	6.86	2.89	8.21	3.13	8.80	3.24	9.73	3.38	11.40	3.63
	50					6.51	2.96	7.82	3.22	8.41	3.35	9.32	3.50	10.99	3.78
12T	30	9.47	3.71	10.23	3.82	11.40	3.97	13.41	4.23	14.27	4.32	15.67	4.46	18.17	4.68
	35	9.07	3.80	9.78	3.92	10.96	4.08	12.95	4.34	13.83	4.46	15.18	4.63	17.68	4.89
	40	8.63	3.87	9.34	4.01	10.50	4.20	12.46	4.49	13.31	4.60	14.69	4.79	17.14	5.10
	45	8.17	3.94	8.88	4.08	9.98	4.30	11.94	4.63	12.80	4.77	14.15	4.96	16.58	5.29
	50					9.47	4.39	11.38	4.75	12.24	4.91	13.56	5.12	15.99	5.50
18T	30	14.49	5.77	15.66	5.97	17.46	6.21	20.54	6.65	21.85	6.81	23.99	7.05	27.82	7.41
	35	13.89	5.93	14.98	6.13	16.78	6.41	19.83	6.85	21.18	7.05	23.24	7.33	27.07	7.77
	40	13.22	6.05	14.31	6.29	16.07	6.61	19.07	7.09	20.39	7.29	22.49	7.61	26.25	8.13
	45	12.50	6.17	13.59	6.41	15.28	6.77	18.29	7.33	19.60	7.57	21.67	7.89	25.38	8.45
	50					14.49	6.93	17.42	7.53	18.74	7.81	20.76	8.17	24.48	8.81
26T	30	18.63	7.24	20.13	7.49	22.45	7.79	26.41	8.34	28.10	8.54	30.85	8.85	35.77	9.30
	35	17.86	7.44	19.26	7.69	21.58	8.04	25.49	8.59	27.23	8.85	29.88	9.20	34.81	9.75
	40	16.99	7.59	18.39	7.89	20.66	8.29	24.52	8.90	26.21	9.15	28.92	9.55	33.74	10.20
	45	16.08	7.74	17.48	8.04	19.65	7.49	23.51	9.20	25.20	9.50	27.83	9.90	32.63	10.61
	50					18.63	8.70	22.40	9.45	24.09	9.80	26.70	10.25	31.48	11.06
36T	30	24.77	10.74	26.76	11.12	29.84	11.56	35.10	12.38	37.35	12.68	41.01	13.13	47.55	13.80
	35	23.75	11.04	25.61	11.41	28.69	11.94	33.89	12.76	36.20	13.13	39.73	13.65	46.27	14.47
	40	22.59	11.26	24.45	11.71	27.47	12.31	32.60	13.20	34.85	13.58	38.44	14.17	44.86	15.14
	45	21.37	11.49	23.23	11.94	26.12	12.61	31.25	13.65	33.50	14.10	37.03	14.70	43.38	15.74
	50					24.77	12.91	29.78	14.03	32.02	14.55	35.49	15.22	41.84	16.41

At water side = 5°K. Unit KW = includes compressor, fan and pump consumptions. Deduct pump consumption on units without kit.

Table 6. Available pressure for the hydraulic circuit, YCSA/YCSA-H 6-36 with kit (With filter fitted)

Model	Flow l/h	Kpa
YCSA/YCSA-H 06 MP	600	67
	800	63
	1 000	60
	1 200	54
	1 400	48
	1 600	40
	1 800	30
	2 000	21
YCSA/YCSA-H 08 MP/TP	800	67
	1 000	64
	1 200	60
	1 400	55
	1 600	50
	1 800	40
	2 000	38
	2 200	30
YCSA/YCSA-H 12 TP	2 400	20
	1 200	280
	1 600	250
	2 000	220
	2 400	180
	2 800	140
	3 200	95
	3 600	45
YCSA/YCSA-H 18 TP	1 700	265
	2 000	250
	2 500	220
	3 000	180
	3 500	135
	4 000	85
	4 500	30
YCSA/YCSA-H 26 TP	2 700	250
	3 000	235
	3 500	310
	4 000	180
	4 500	160
	5 000	125
	5 500	90
	6 000	50
YCSA/YCSA-H 36 TP	3 600	315
	4 000	295
	4 500	270
	5 000	240
	5 500	210
	6 000	170
	6 500	130
	7 000	90
	7 500	40

Table 7. Pressure drop in the hydraulic circuit, YCSA/YCSA-H 6-36 without kit (Without filter fitted)

Model	Flow l/h	Kpa
YCSA/YCSA-H 06 M	600	4.5
	800	6.5
	1 000	9
	1 200	12.5
	1 400	16.5
	1 600	20.5
	1 800	25.5
	2 000	31
YCSA/YCSA-H 08 M/T	800	5
	1 000	7
	1 200	10
	1 400	13
	1 600	16
	1 800	19
	2 000	22
	2 200	26
YCSA/YCSA-H 12 T	2 400	30
	1 200	15
	1 600	25
	2 000	37
	2 400	51
	2 800	67
	3 200	76
	3 600	103
YCSA/YCSA-H 18 T	3 800	115
	1 700	12
	2 000	17
	2 500	26
	3 000	36
	3 500	48
	4 000	60
	4 500	74
	5 000	91
	5 500	108
YCSA/YCSA-H 26 T	5 800	119
	2 700	18
	3 000	24
	3 500	33
	4 000	43
	4 500	56
	5 000	66
	5 500	83
	6 000	95
	6 500	113
	7 000	128
	7 500	145
	8 000	167
	8 500	187
YCSA/YCSA-H 36 T	9 000	210
	9 600	238
	3 600	18
	4 000	24
	4 500	30
	5 000	37
	5 500	44
	6 000	53
	6 500	61
	7 000	71
	7 500	81
	8 000	92
	8 500	104
	9 000	122
	9 500	130
	10 000	144
	10 500	157
	11 000	167
11 500	187	
11 800	197	

Data with water at 10°C. In the case of the use of glycol, apply the correcting factors shown in Tables 5 and 6.

Table 8. Pressure drop filters

1" filter

Flow l/h	600	800	1 000	1 200	1 400	1 600	1 800	2 000	2 200
Kpa	0.6	0.8	1.2	1.7	2.3	3	4	5	6
Flow l/h	2 400	2 600	2 800	3 000	3 200	3 400	3 800	-	-
Kpa	7.2	8.5	9.8	11.2	12.8	14.5	18	-	-

1 1/4" filter

Flow l/h	1 700	2 000	2 500	3 000	3 500	4 000	4 500	5 000	5 500
Kpa	4	4.8	5.4	8	11	14	17.4	21.3	26
Flow l/h	6 000	6 500	7 000	7 500	8 000	8 500	9 000	9 600	-
Kpa	30.3	36.3	41.5	48.3	54	60	66	73	-

1 1/2" filter

Flow l/h	3 600	4 000	4 500	5 000	5 500	6 000	6 500	7 000	7 500
Kpa	1	1.4	2.2	3	4	5	6.2	7.4	8.6
Flow l/h	8 000	8 500	9 000	9 500	10 000	10 500	11 000	11 500	11 800
Kpa	10.2	11.7	13.3	14.9	16.6	18.4	20.2	22.1	23.2

Data with water at 10°C. In the case of the use of glycol, apply the correcting factors shown in Tables 5 and 6.

Sound power spectrum

Models	Frequency (Hz)							dB(A)
	125	250	500	1 000	2 000	4 000	8 000	
YCSA/YCSA-H 06	66.2	70.5	67.7	65.7	60.2	55.1	48.8	70
YCSA/YCSA-H 08	74.0	72.3	67.9	66.1	61.8	56.3	52.3	71
YCSA/YCSA-H 12	79.6	74.3	70.2	67.5	62.7	57.7	51.0	73
YCSA/YCSA-H 18	77.0	72.4	72.9	69.1	63.9	58.2	52.5	74
YCSA/YCSA-H 26	75.6	81.3	75.9	70.8	68.6	63.3	55.7	78
YCSA/YCSA-H 36	84.3	79.5	80.1	75.7	71.0	65.0	59.0	81

Selection guide (YCSA and YCSA-H) Necessary information

The following information is needed to select a YCSA water chiller:

1. Cooling capacity needed.
2. Design cold water input and output temperatures.
3. Design water flow, if any of the temperatures in above point 2 is unknown.
4. Design input temperature of air to air conditioning unit.
Normally, this will be the design ambient temperature of summer air, unless influenced by the situation or other factors.
5. Altitude above sea level.
6. Design gumming coefficient of the evaporating unit.

Note: Points 1, 2 and 3 should be related by means of the following:

$$\text{Cooling capacity kW} = \frac{\text{l/h cold water} \times \text{°C differential}}{860}$$

Selection example

A chiller is required to chill water from 13°C to 7°C, with a cooling capacity 35 kW.

Here are other design conditions:

Ambient air entering the condensing unit	35°C
Gumming coefficient:	0.044 m ² °C/kW
Altitude:	At sea level

Table 9. Gumming coefficients

Evaporating unit		
Gumming coeff. m ² °C/kW	Capacity factor	Comp. absorbed power factor
0.044	1.000	1.000
0.088	0.987	0.995
0.176	0.964	0.985
0.352	0.926	0.962

Table 10. Altitude factors

Altitude (m)	Capacity factor	Comp. absorbed power factor
0	1.000	1.000
600	0.987	1.010
1 200	0.973	1.020
1 800	0.958	1.029
2 400	0.943	1.038

Taking a look at Table 1 we can see that YCSA-36, unit gives an approximate required capacity of 35.7 kW.
As the factors appearing in Table 9 and 10 are not applicable,

conditions will be as follows:

Cooling capacity:	35.7 kW
Power consumed:	14.10 kW
Water temperature:	13°C a 7°C (Δt = 6)

$$\text{Water flow: } \frac{35.7 \times 860}{6} = 5117 \text{ l/h}$$

Available pressure in hydraulic circuit of a unit with kit.
- From Table 6 we infer that the YCSA 36 TP, with a 5 117 l/h, flow, has an available pressure of 233 kPa.

Pressure drop in hydraulic circuit of a unit without kit.
- From Table 7 we infer that the YCSA 36 T, with a 5 117 l/h, flow, has a pressure drop of 38.6 kPa.

Pressure drop in filter.
- From Table 8, 1 1/2" filter, we infer that with a 5 117 l/h flow, said filter has a pressure drop of 3.2 kPa.

YCSA-H selection method

1. Determine the correct size of the YCSA-H unit by selecting a model from Tables 4 and 5 that is closest to the cooling and heating capacities required in the design conditions of the water outlet and air intake temperatures.
2. Apply gumming correcting factors (Table 9) and altitude (Table 10) to the capacity and power values that appear in the corresponding capacity tables in cool and heat. Make sure the corrected capacity is still sufficient for your needs.
3. Using the corrected capacities of the unit, select the design temperature differential, or the flow.
4. Check to make sure that these selections are within the YCSA/YCSA-H operating limits.

YCSA-H selection example

A YCSA-H heat pump operating at a 35°C, ambient temperature should chill water from 13°C to 7°C, with a 34 kW cooling capacity.

A 26 kW heating capacity is required in 0°C design ambient temperature and a hot water output temperature of 45°C.

The gumming coefficient is 0.044 m² °C/kW, with the unit operating at sea level (no corrections).

With a quick glance of capacity tables 4 and 5, we see that a YCSA-H 36 heat pump gives the approximate required capacities:

Cooling capacity	=	36.65 kW
Total unit absorbed power	=	14.50 kW
Cold water temperature	=	13°C a 7°C (Δt:6°C)
Hot and cold water flow	=	5 253 l/h
Heating capacity	=	26.12 kW
Total unit absorbed power in heat mode.	=	12.61 kW
Hot water output temperature	=	45°C
Hot water temp. differential	=	$\frac{29.12 \times 860}{5253} = 4.7^\circ\text{C}$
Thus, hot water return temperature is	=	40.3°C

All valves are within operating limits.

- Available pressure in hydraulic circuit of a unit with kit.
 - From Table 6 we infer that the YCSA-H 36 TP, with a 5 253 l/h flow, has an available pressure of 225 kPa.
- Pressure drop in hydraulic circuit of a unit without kit.
 - From Table 7 we infer that the YCSA-H 36 T, with a 5 253 l/h flow, has a pressure drop of 40 kPa.
- Pressure drop in filter.
 - From Table 8, 1 1/2" filter, we infer that with a 5 253 l/h flow, said filter has a pressure drop of 3.5 kPa.

Selection guide with glycol (cool only units)

Necessary information

The following information is needed to select a YCSA water chiller:

1. Cooling capacity needed.
2. Design cold water/glycol input and output temperatures.
3. Design water/glycol flow.
4. Design input temperature of air to air conditioning unit. Normally, this will be the design ambient temperature of summer air, unless influenced by the situation or other factors.
5. Altitude above sea level.
6. Design gumming coefficient of the evaporating unit.

Note: Points 1, 2 and 3 should be related by means of the following formulae:

$$\text{Cooling capacity (kW)} = \frac{\Delta t \text{ (}^\circ\text{C)} \times \text{Flow (litres/second)}}{\text{Glycol factor}}$$

In which Δt = liquid intake temp. - liquid output temp.

To determine the glycol factor, please see Figure 1 for ethylene glycol, or Figure 3 for propylene glycol. For design output temperature, please see the recommended glycol concentration and the glycol factor in this concentration. This is the minimum concentration to be used for design output temperature. If a greater concentration is required, the glycol factor can be determined by means of Figure 2 on ethylene glycol or Figure 4 on propylene glycol.

Selection method

1. Determine the correct size of chiller by selecting the one that is closest to the capacities required by the design conditions of the glycol outlet and air intake temperatures.
2. Apply the gumming correcting factors that correspond to the gumming coefficient, altitude and glycol concentration, and to the capacity tables. Make sure the corrected capacity is still sufficient for your needs.
3. Using the corrected capacities of the chiller, set the design temperature range, or the flow, to balance the formulae appearing in the "Necessary information" section.
4. Always recheck to make sure these selections are within the design operating limits.

Selection example

Achiller is required to chill ethylene glycol from 1 to -4°C with a capacity of 22 kW.

The following design conditions are applicable:

Gumming coefficient:	0.088m °C/kW
Altitude:	1 200m
Ambient air:	30°C
Concentration of glycol:	30% w/w

For a -4°C, ethylene glycol output, the concentration recommended in Figure 1 is 30%. Therefore, the specified concentration is appropriate.

From Table 2 (capacities with 35% glycol), we infer that a YCSA-36 unit, at the established design conditions, gives a capacity of 22.8 kW and a consumption of 10.67 kW (Table 2).

With the design gumming coefficient, use the capacity correcting factors x 0.987 and power x 0.995 (Table 9).

On design altitude, apply the capacity correcting factors x 0.973 and power x 1.020 (Table 10).

On design glycol concentration, apply the capacity correcting factors x 1.015 and power x 1.005 (Table 3).

Applying these factors to the selection: YCSA-36

$$\text{Capacity} = 22.8 \times 0.987 \times 0.973 \times 1.015 = 22.2 \text{ kW}$$

$$\text{Comp. power} = 10.67 \times 0.995 \times 1.020 \times 1.005 = 10.88 \text{ kW}$$

For the specified glycol concentration and a -4°C output temperature, Figure 3 shows a 0.248 glycol factor. Thus, the flow can be determined with the formula appearing in the "Necessary information" section.

$$22.2 \text{ kW} = \frac{(1 - (-4)) \times \text{Flow (l/s)}}{0.248}$$

$$\text{Flow} = \frac{22.2 \times 0.248}{5} = 1.11 \text{ (l/s) or } 4 \text{ 000 (l/h)}$$

This covers the limits of use.

The evaporating unit pressure drop can be determined by taking the water pressure drop value (Table 7) for a YCSA-36 unit and multiplying it by the correcting factor (see Fig. 5) for a 30% concentration and an average temperature of -1.5°C, that is to say, 1 + (-4)

$$\frac{1 + (-4)}{2} = -1.5$$

$$24 \text{ kPa} \times 1.22 = 29.3 \text{ kPa.}$$

Fig. 1 Recommended ethylene glycol concentrations

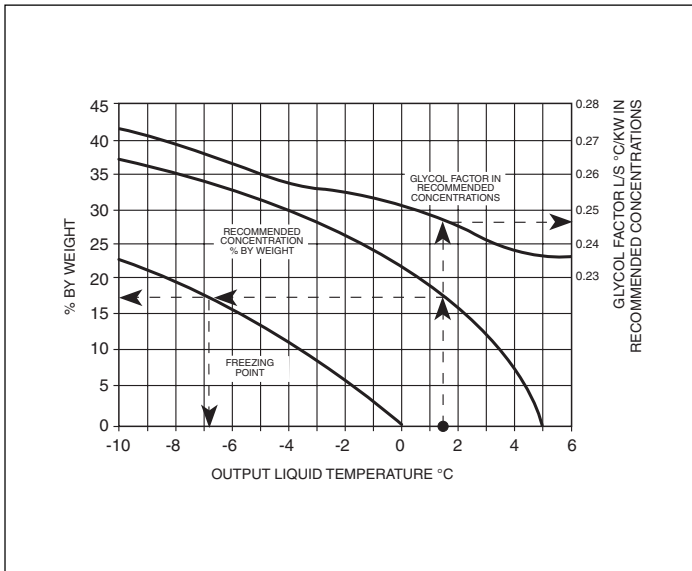


Fig. 4 Propylene glycol in other concentrations

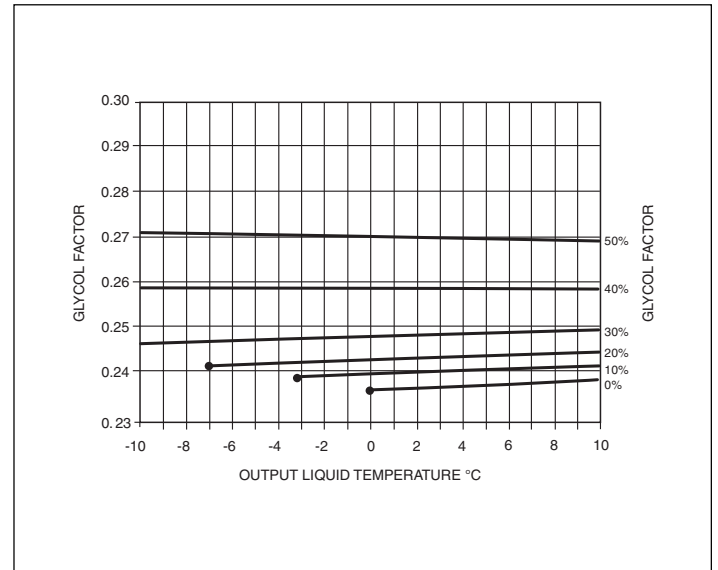


Fig. 2 Ethylene glycol in other concentrations

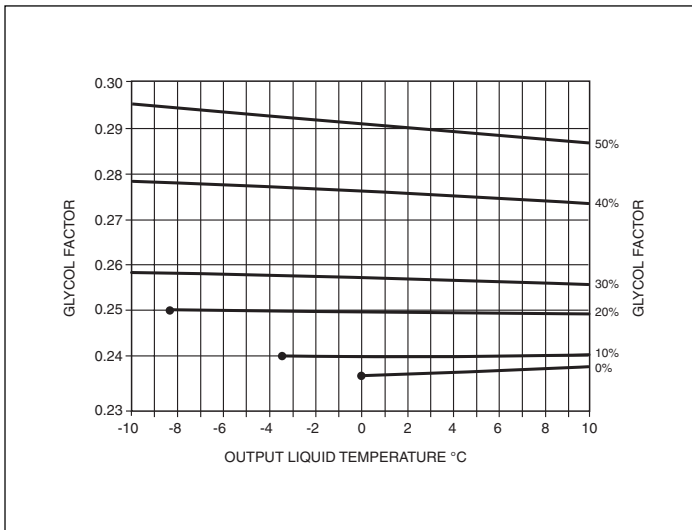


Fig. 5 Ethylene glycol pressure drop correcting factor

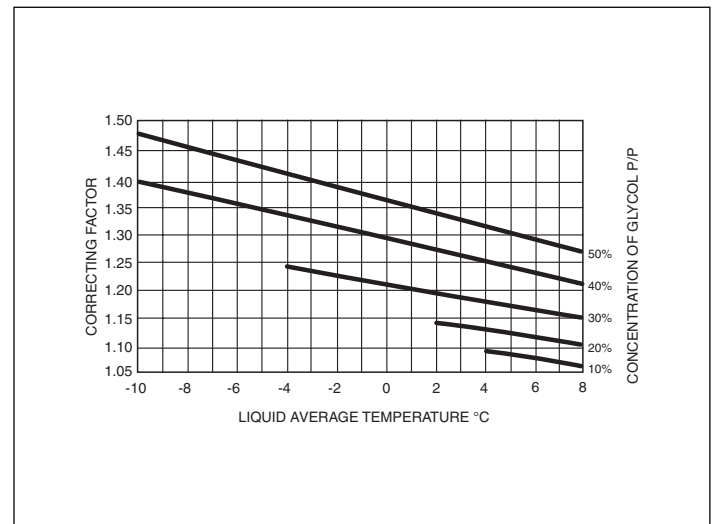


Fig. 3 Recommended propylene glycol concentrations

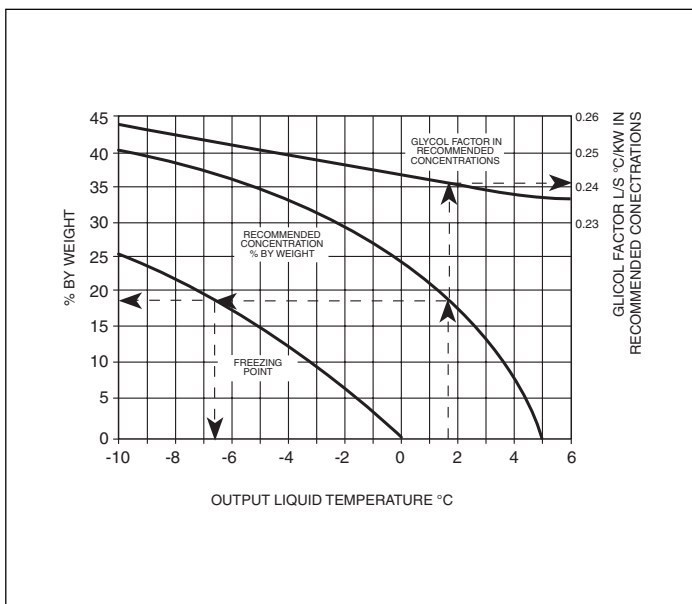
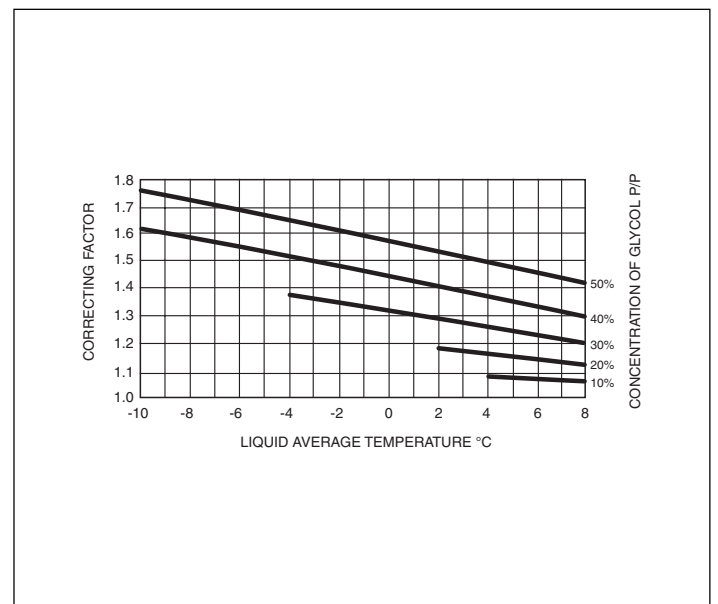
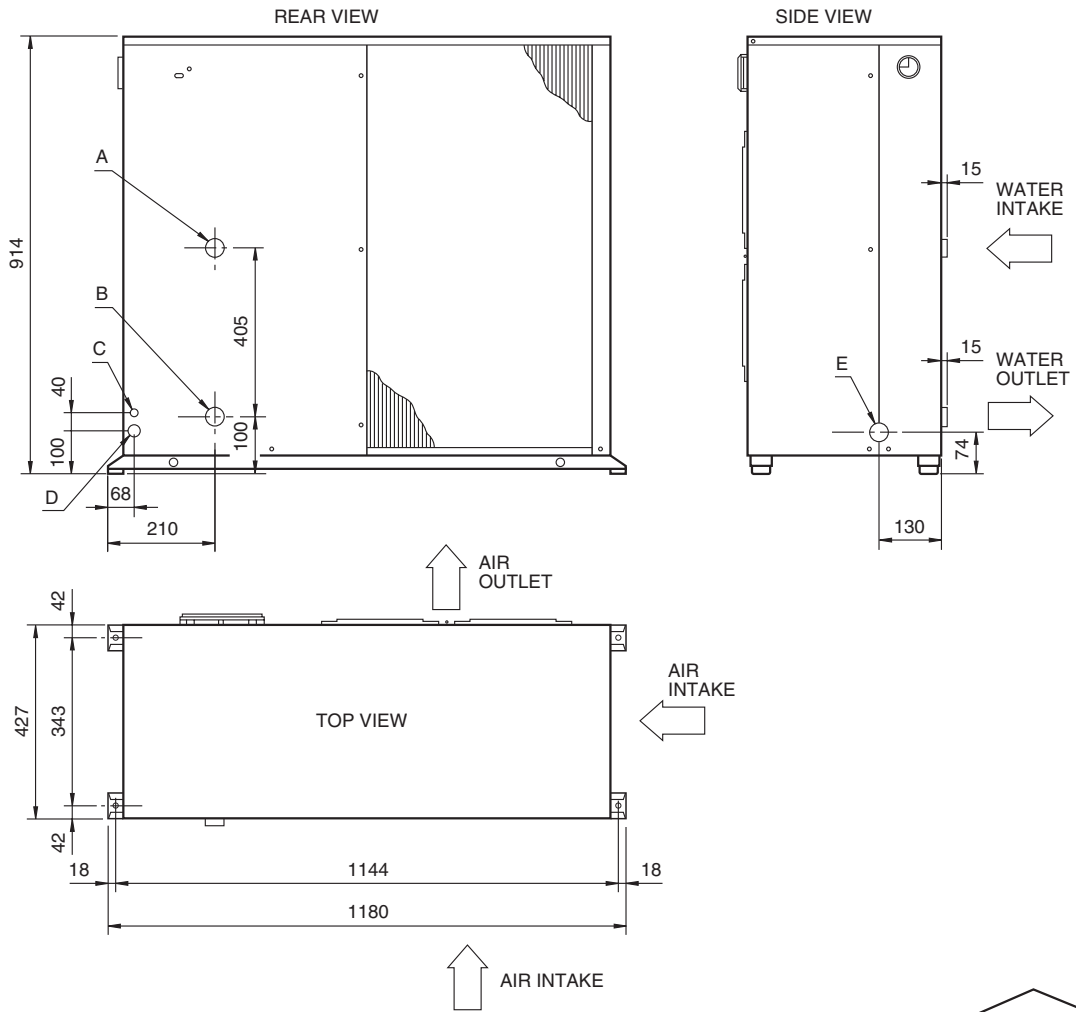


Fig. 6 Propylene glycol pressure drop correcting factor

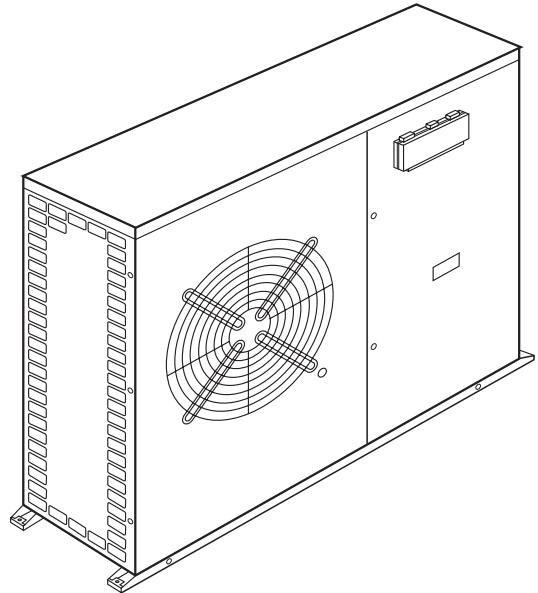
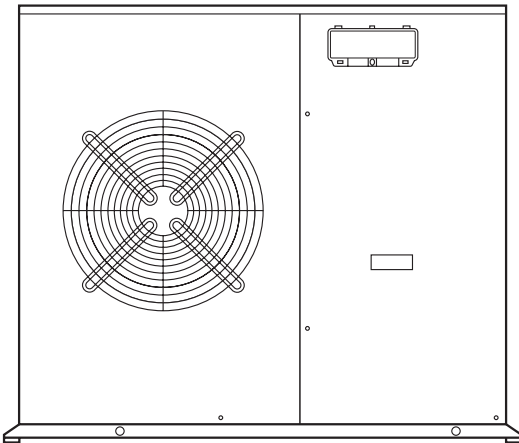


General Dimensions (mm.) and Hydraulic Connections

YCSA/YCSA-H 06-08



FRONT VIEW

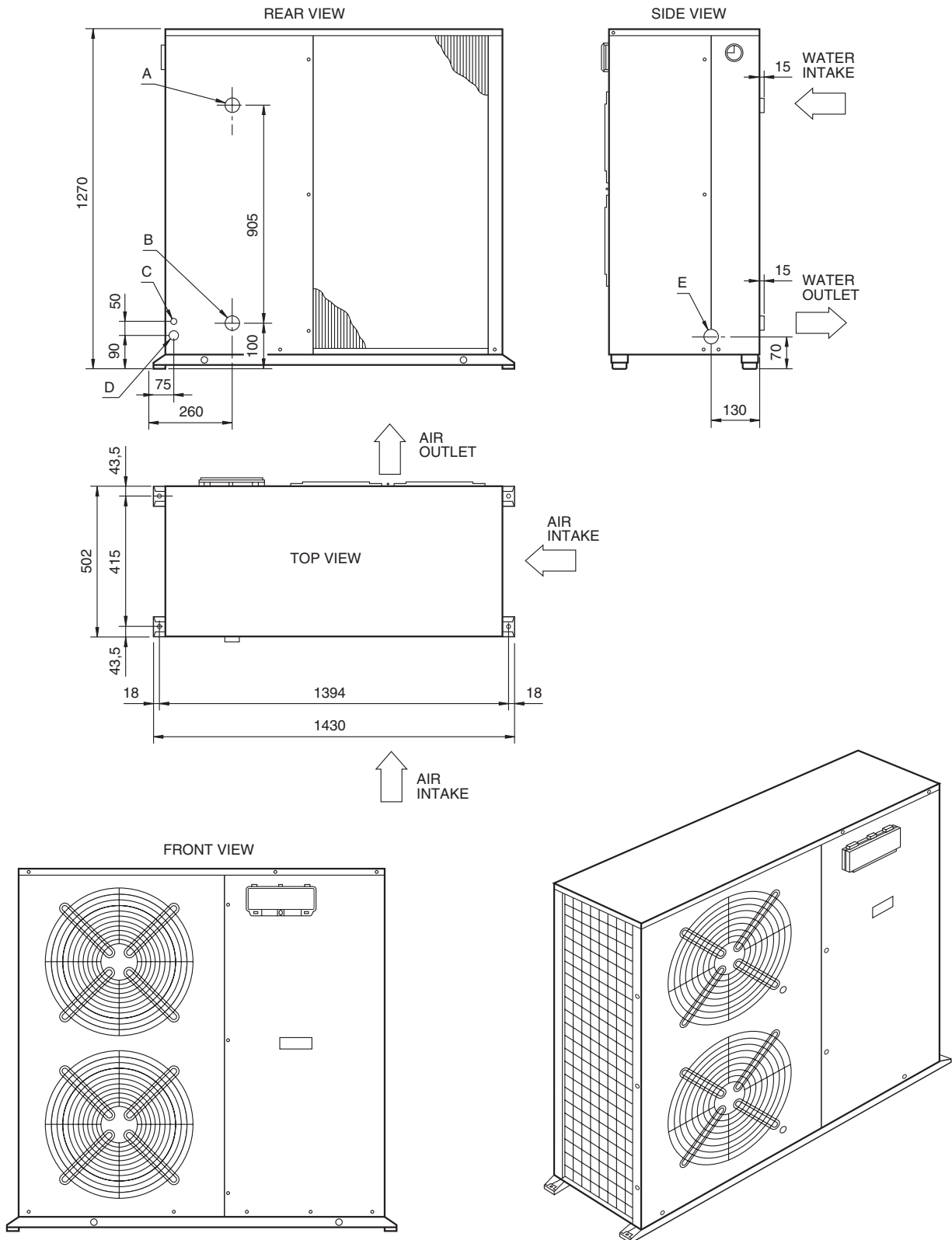


Notes:

- A - Water intake Ø 1" Gas F.
- B - Water outlet Ø 1" Gas F.
- C - Auxiliary lines
- D - Power supply
- E - Water refilling Ø 3/8" Gas F.

General Dimensions (mm.) and Hydraulic Connections

YCSA/YCSA-H 12-18



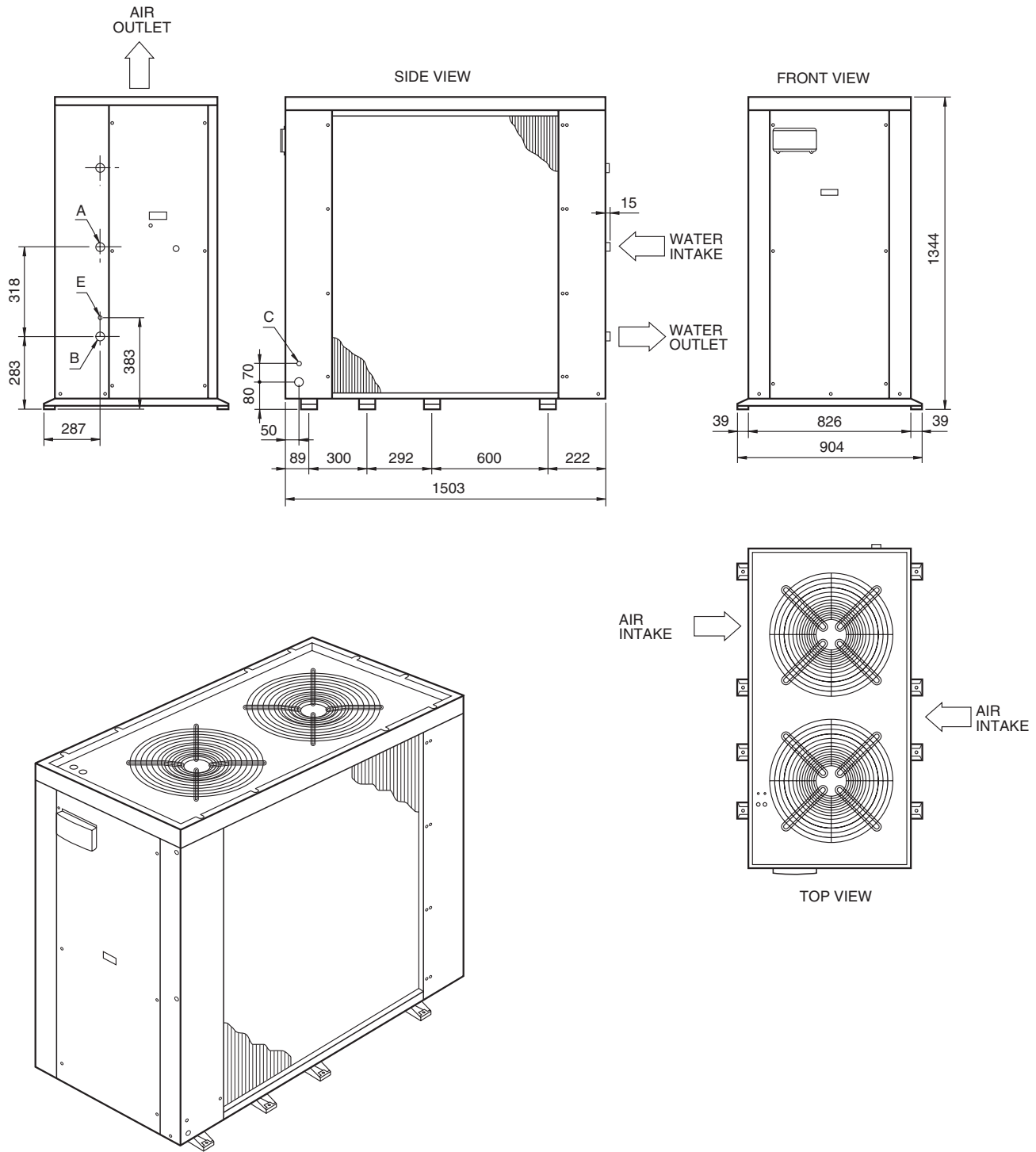
Notes:

- A - Water intake \varnothing 1" Gas F.
- B - Water outlet \varnothing 1" Gas F.
- C - Auxiliary lines
- D - Power supply
- E - Water refilling \varnothing 3/8" Gas F.

For size 18 only: Adapters \varnothing 1" - 1 1/4" Gas M.
Supplied with the unit.

General Dimensions (mm.) and Hydraulic Connections

YCSA/YCSA-H 26-36



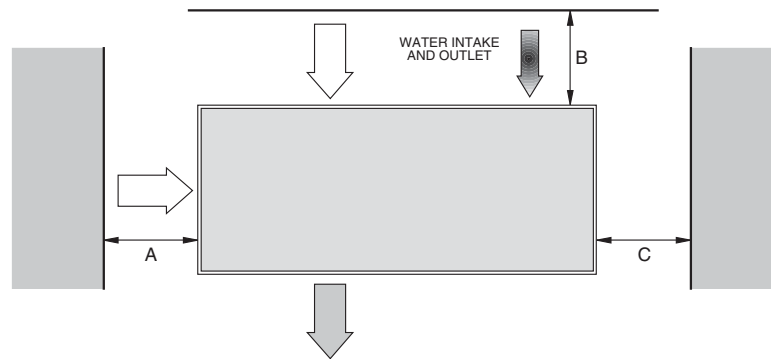
Notes:

- A - Water intake \varnothing 1" Gas F.
- B - Water outlet \varnothing 1" Gas F.
- C - Auxiliary lines
- D - Power supply
- E - Water refilling \varnothing 3/8" Gas F.

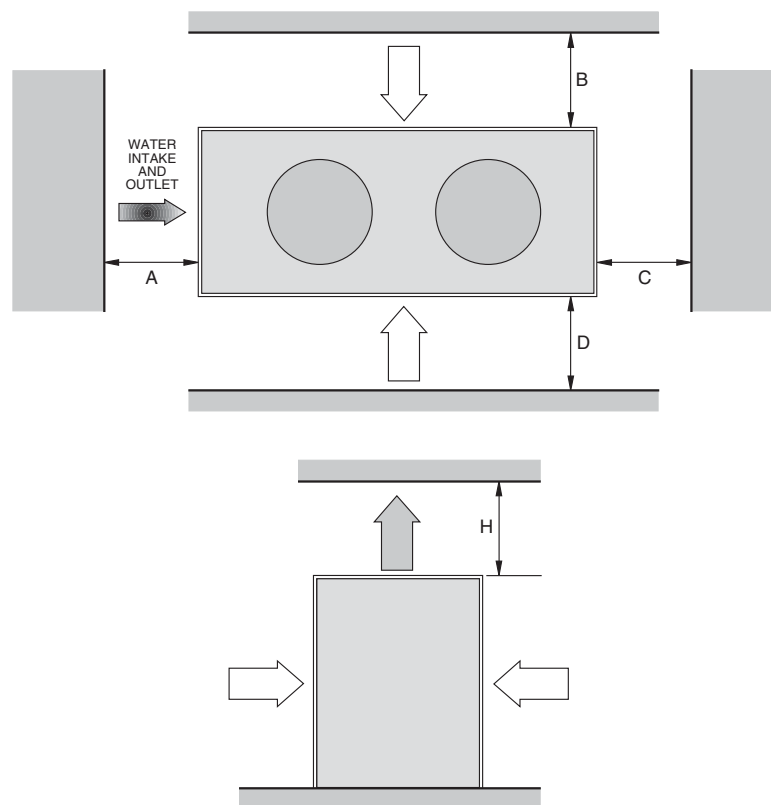
For size 36 only: Adapters \varnothing 1 1/4" - 1 1/2" Gas M.
Supplied with the unit.

Clearance requirements

YCSA/YCSA-H 06-08-12-18



YCSA/YCSA-H 26-36

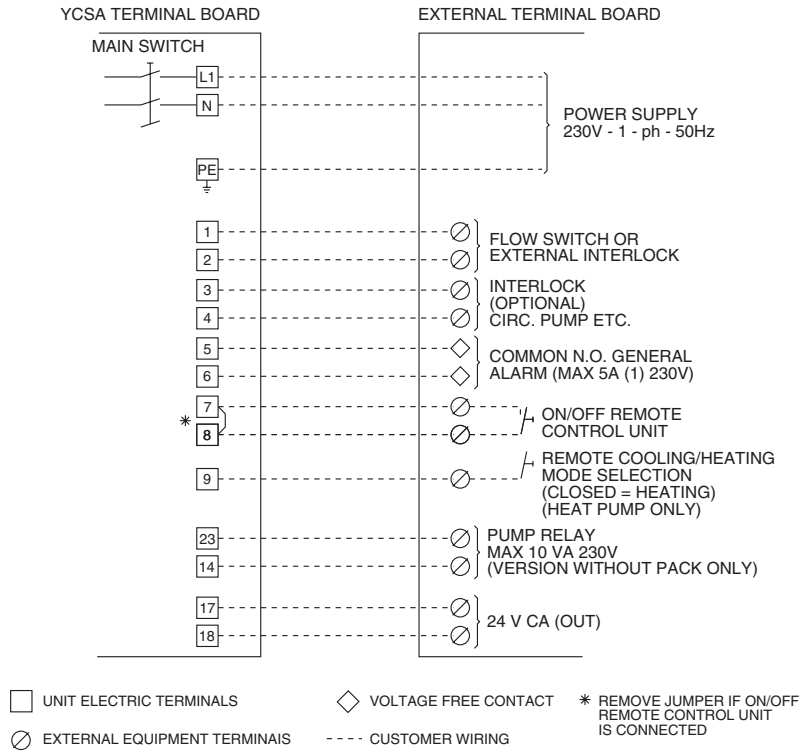


Drawings not scaled

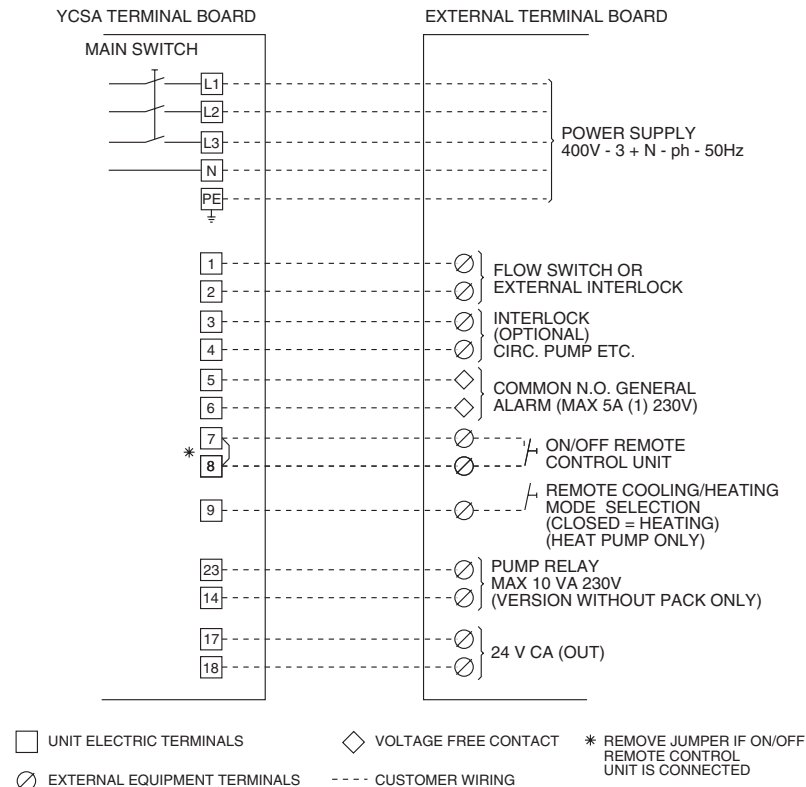
	YCSA/ YCSA-H 06	YCSA/ YCSA-H 08	YCSA/ YCSA-H 12	YCSA/ YCSA-H 18	YCSA/ YCSA-H 26	YCSA/ YCSA-H 26P	YCSA/ YCSA-H 36	YCSA/ YCSA-H 36P
A	200	200	300	300	800	1 600	800	1 600
B	200	200	300	300	800	800	800	800
C	500	500	600	600	1 000	1 000	1 000	1 000
D	-	-	-	-	800	800	800	800
H	-	-	-	-	3 000	3 000	3 000	3 000

Wiring

YCSA/YCSA-H 06-08 M/MP

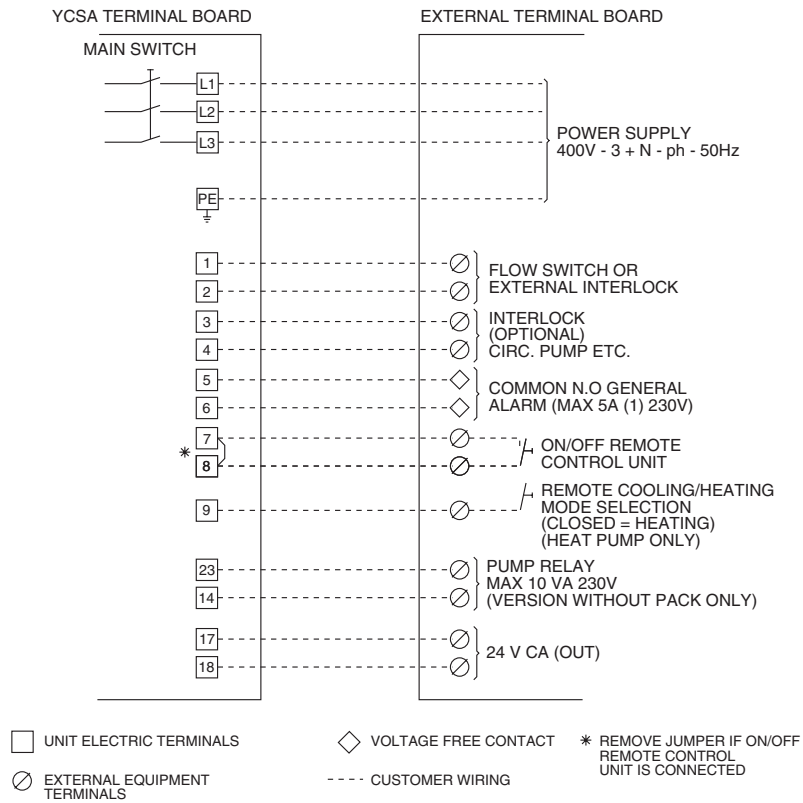


YCSA/YCSA-H 08-12-18T/TP



Wiring

YCSA/YCSA-H 26-36 T/TP


















Wiring diagram legend

AMB	- MICRO BOARD
BMP	- MOTOR PROTECTOR
BCRT	- PROBE INLET WATER TEMPERATURE
BCLT	- PROBE OUTLET WATER TEMPERATURE
BCT	- PROBE CONDENSER TEMPERATURE
BAMB	- PROBE EXTERNAL AIR TEMPERATURE
BFSC	- FAN SPEED CONTROLLER
CD	- CAPACITOR
ECH	- CRANKCASE HEATER
EEH	- EVAPORATOR HEATER
ETH	- WATER TANK HEATER
EX	- A COMPONENT IS EXTERNAL TO CONTROL PANEL
F	- PROTECTION FUSES
K	- AUXILIARY RELAYS
KC	- COMPRESSOR CONTACTOR
KP	- PUMP CONTACTOR
KFOL	- FAN CONTACT TERMIC
KPOL	- WATER PUMPE CONTACT TERMIC
MC	- COMPRESSOR
MF	- FAN
MP	- PUMPE
QCB	- MAIN SWITCH
SHP	- HIGH PRESSURE CUT OUT
SLP	- LOW PRESSURE SWITCH
SDP	- DIFFERENTIAL PRESSURE SWITCH
SDIS - SKP	- KEYPAD DISPLAY
SRO	- REMOTE START/STOP
T	- AUXILIARY TRANSFORMER
XCMTB	- COMPRESSOR MOTOR TERMINAL BLOCK
XP	- CONNECTOR
YRV	- REVERSE VALVE

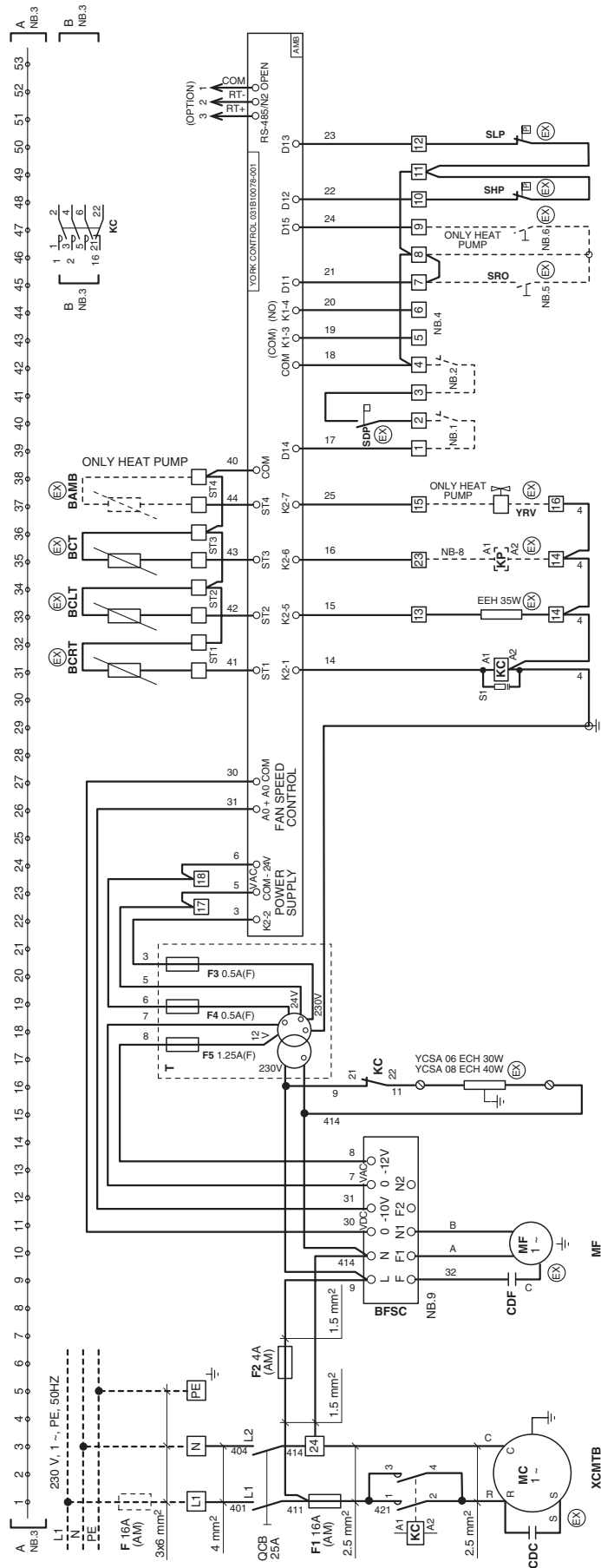
NOTES:

- NB. 1** CONTACT FLOW-SWITCH CONNECT BETWEEN TERMINALS 1-2
- NB. 2** CIRCULATION PUMPE CONTACT CONNECT BETWEEN TERMINALS 3-4
- NB. 3** THE NUMBERS WRITTEN ON COLUMN "B", CLOSE TO THE RELAY CONTACTS, INDICATE THE LINES OF COLUMN "A" ON WHICH VERTICAL THE RELEVANT CONTACTS ARE LOCATED
- NB. 4** FREE TERMINALS FOR THE GENERAL ALARM INDICATION (IMAX5A 230 VAC).
- NB. 5** TERMINALS FOR THE REMOTE START/STOP (REMOVE THE BRIDGE)
- NB. 6** TERMINALS FOR REMOTE COOLING/HEATING MODE SELECTION (CLOSE-HEATING)
- NB. 7** HP CONTACT (1) BLUE, CONTACT (2) BROWN, CONTACT (4) BLACK
- NB. 8** CONTROL WATER PUMPE RELAY (MAX.10VA 230VAC)
- NB. 9** A - BLACK, B - BLUE, C - BROWN

SIMBOLS

	FACTORY WIRING
	WIRING BY OTHERS
	MAIN SWITCH
	CONTACT TERMIC
	SWITCH
	N.O. CONTACT
	N.C. CONTACT
	SURGE SUPPRESSORS RC
	TERMINAL ON STRIP CONNEXION COMPONENTS
	COIL
	FUSIBLE
	SONDE
	RESISTANCE
	TERMINALS BY CUSTOMER
	VALVE

Wiring diagram, YCSA/YCSA-H 06 & 08M



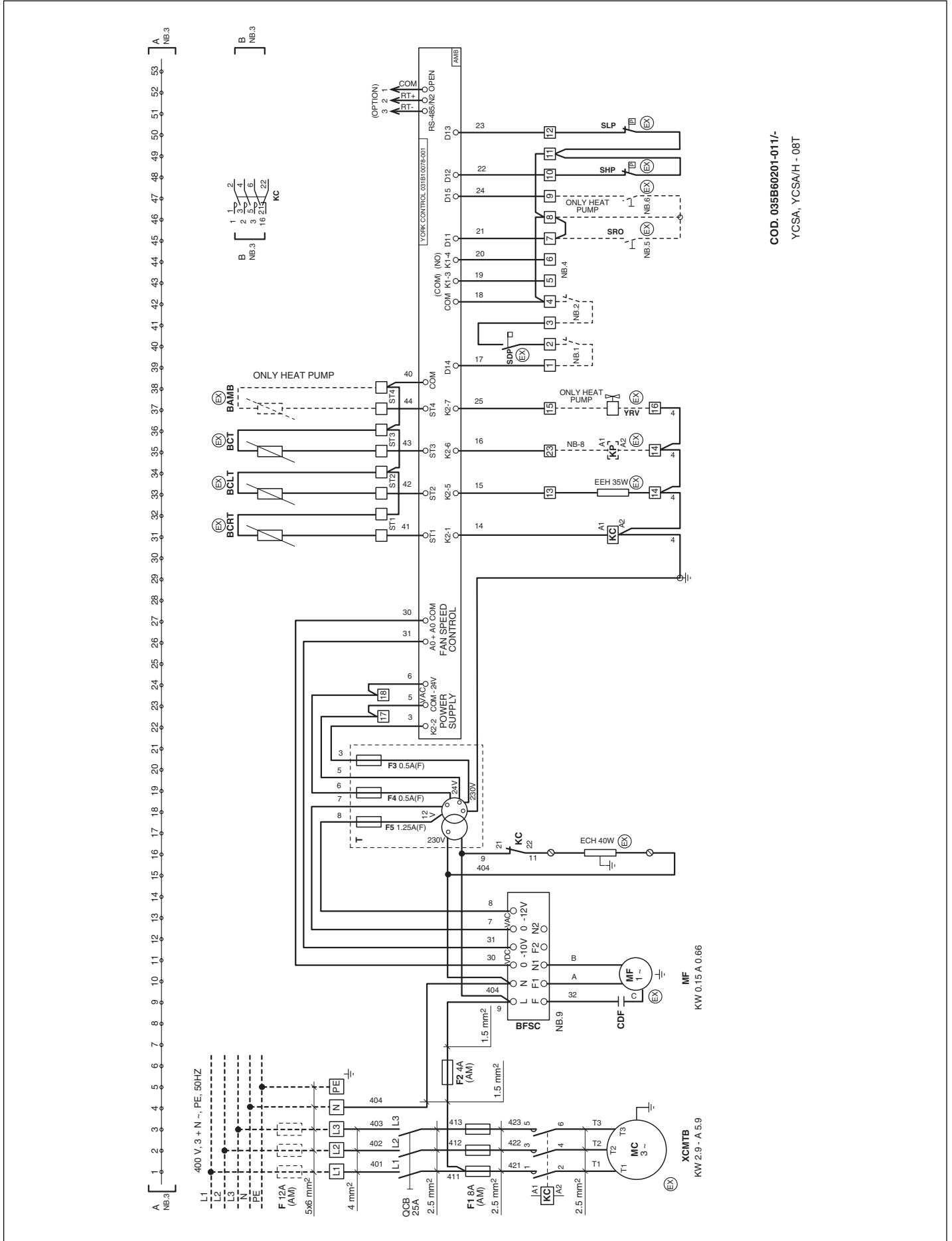
COD. 035B60200-001/-

YCSA, YCSA/H - 06M
YCSA, YCSA/H - 08M

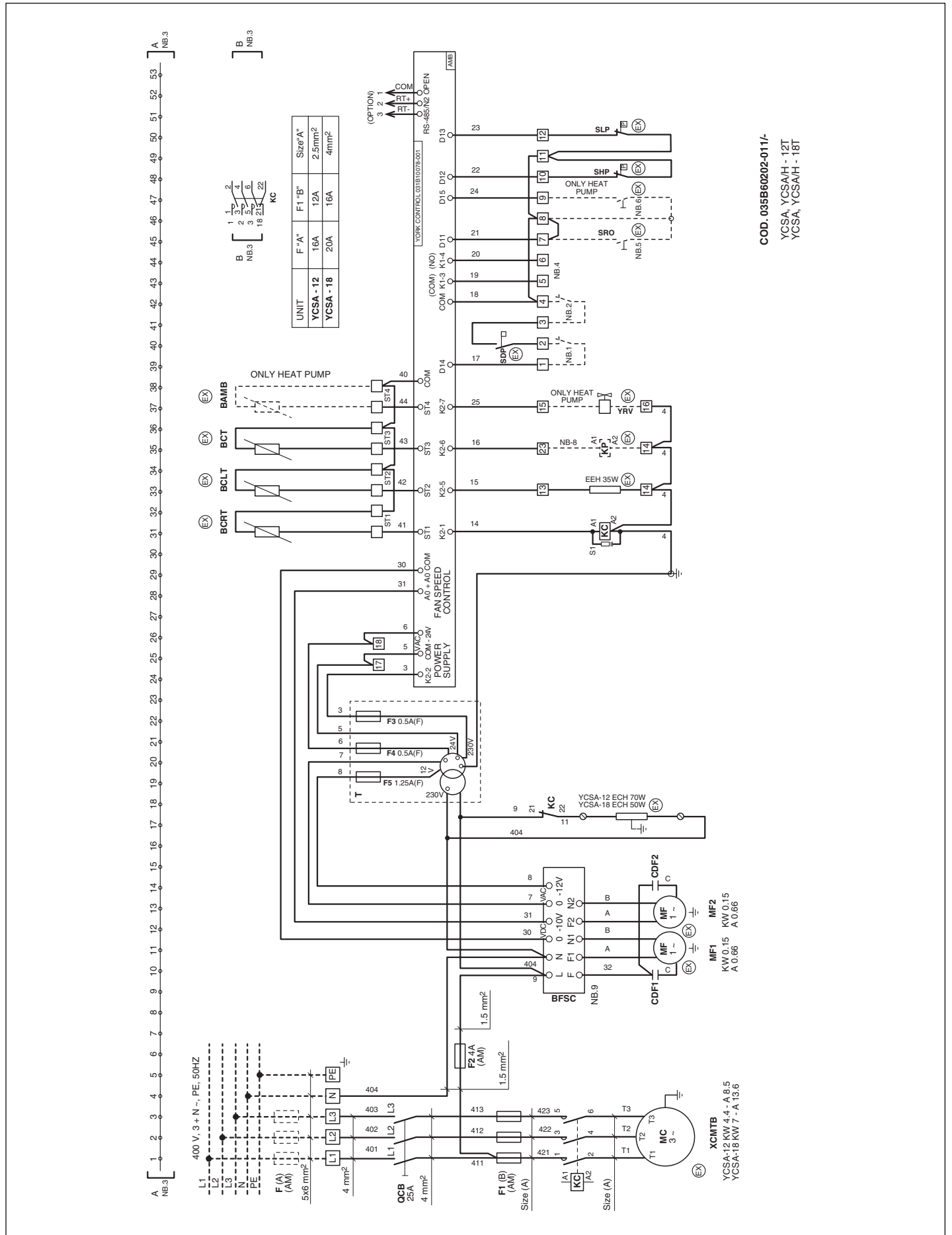
MF
KW 0.15 A 0.66

XCMTB
YCSA 06 KW 2 - A 9.3
YCSA 08 KW 2.9 - A 12.6

Wiring diagram, YCSA/YCSA-H 08T

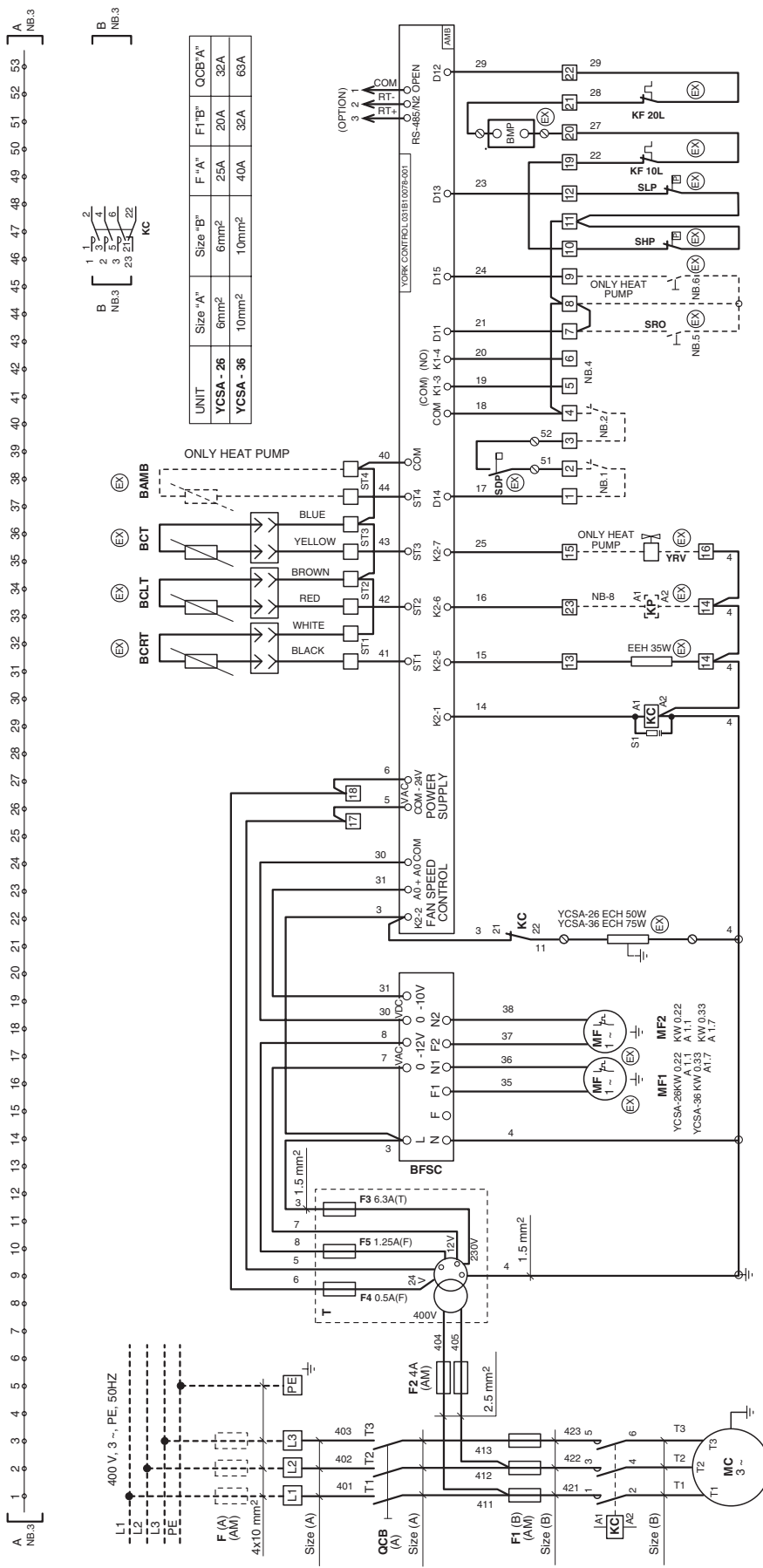


Wiring diagram, YCSA/YCSA-H 12 & 18T



COD. 035B60202-011/-
YCSA, YCSA/H - 12T
YCSA, YCSA/H - 18T

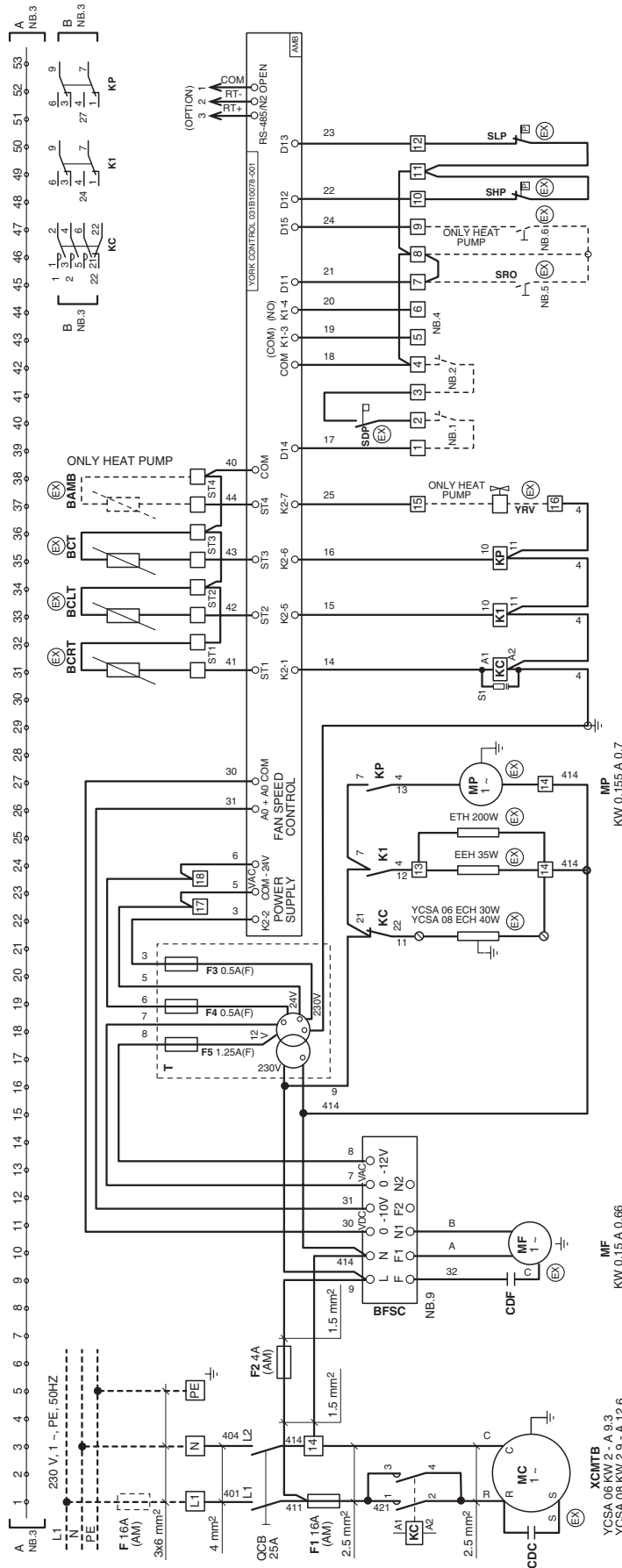
Wiring diagram, YCSA/YCSA-H 26 & 36T



COD. 035B60204-021/-
YCSA, YCSA/H - 26T
YCSA, YCSA/H - 36T

XCMTB
YCSA-26 KW 9.2 - A 15.7
YCSA-36 KW 13.9 - A 23.7

Wiring diagram, YCSA/YCSA-H 06 & 08MP



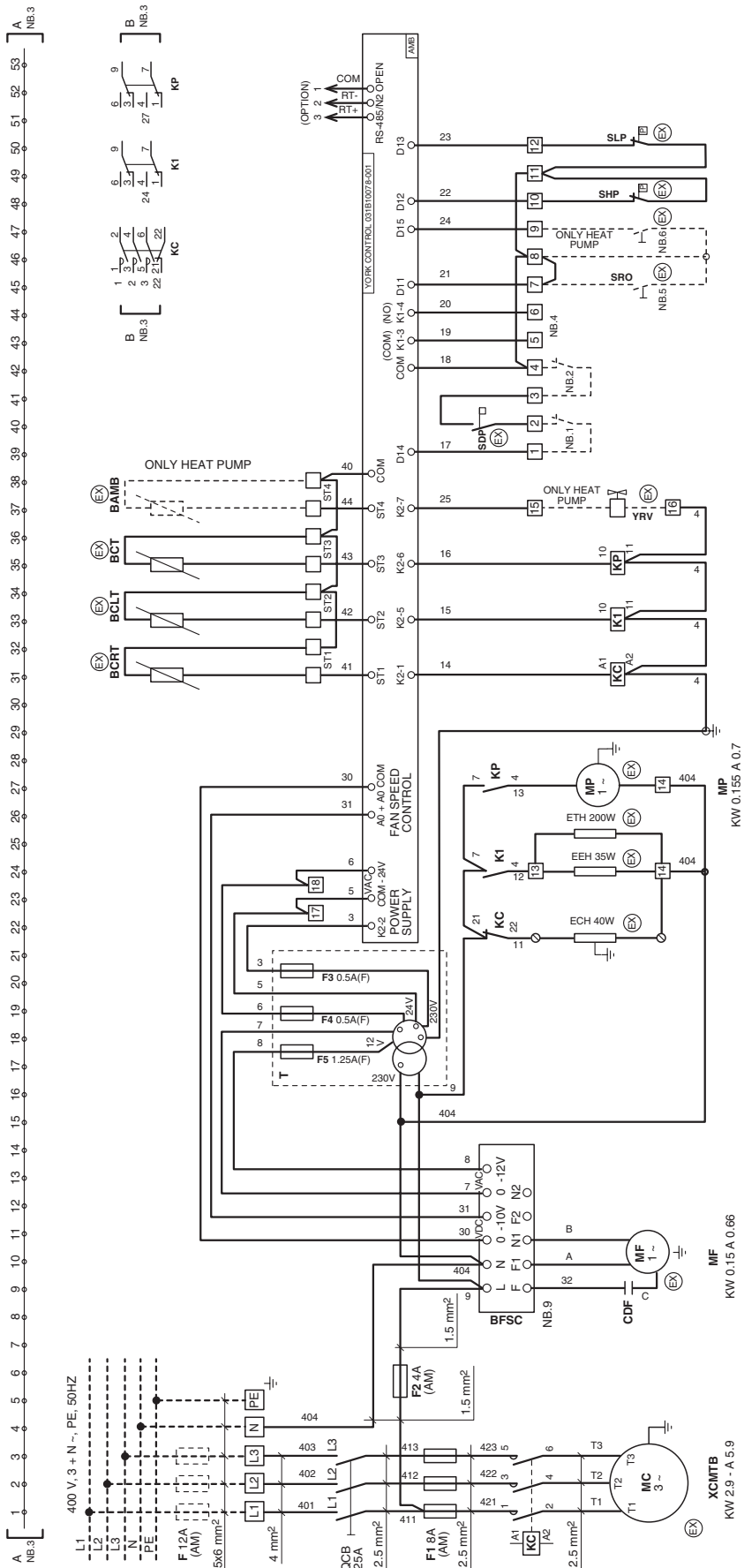
COD. 035B60210-001/-
YCSA, YCSAH - 06MP
YCSA, YCSAH - 08MP

MP
KW 0.155 A 0.7

MF
KW 0.15 A 0.66

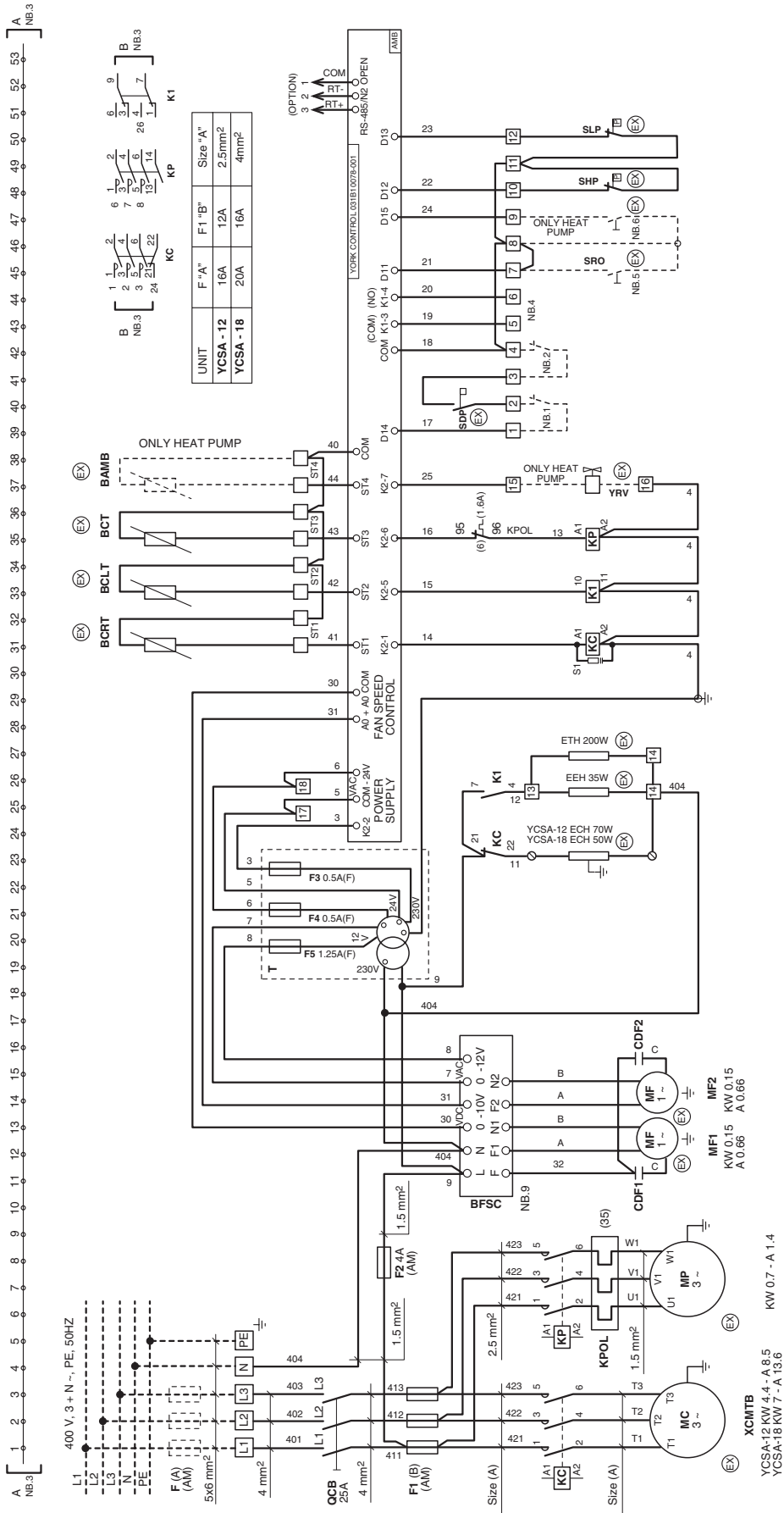
YCSA 06 KW 2 - A 9.3
YCSA 08 KW 2.9 - A 12.6

Wiring diagram, YCSA/YCSA-H 08TP



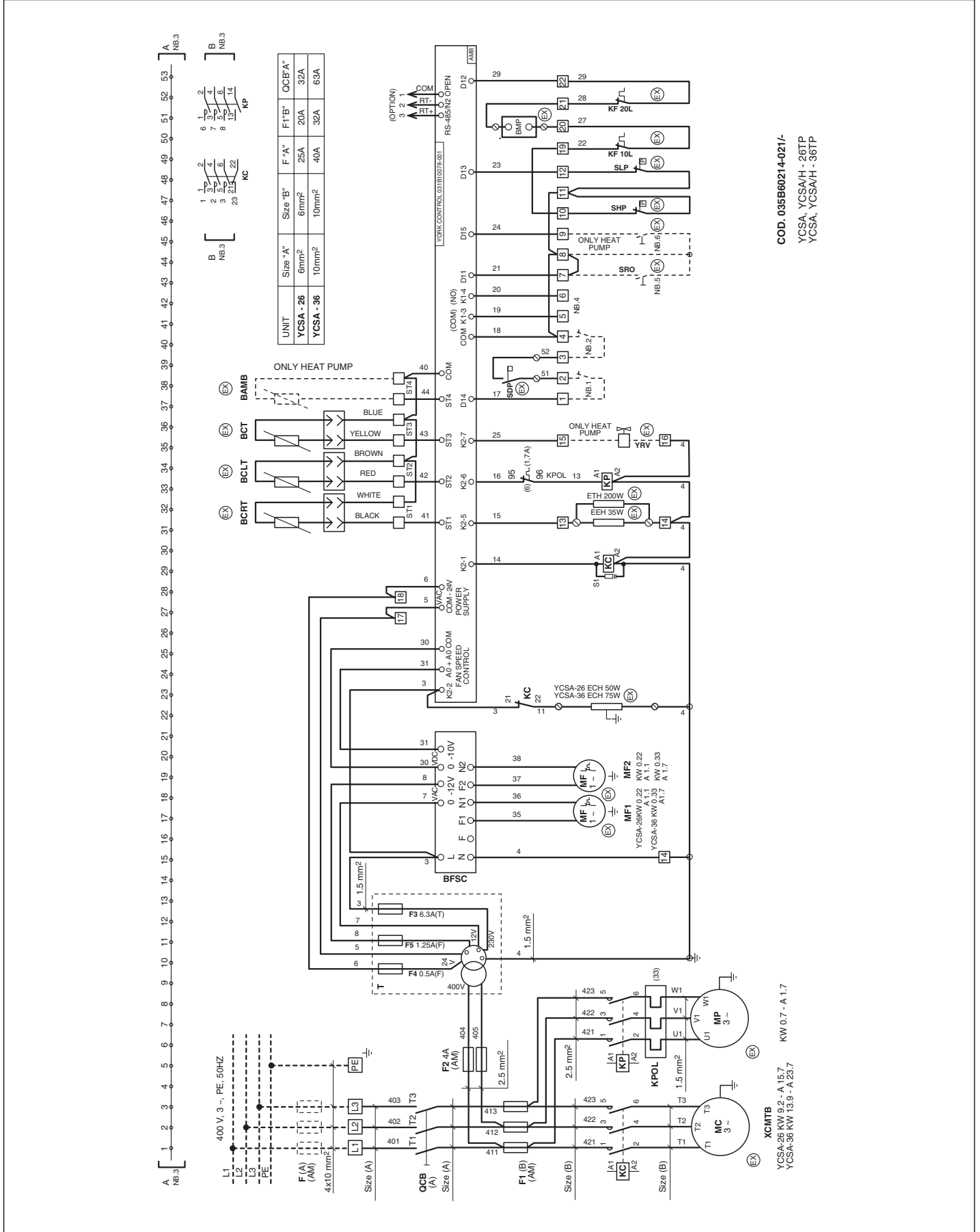
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YCSA, YCSA/H - 08TP

Wiring diagram, YCSA/YCSA-H 12 & 18TP



COD. 035B60212-011/-
YCSA, YCSA/H - 12TP
YCSA, YCSA/H - 18TP

Wiring diagram, YCSA/YCSA-H 26 & 36TP



COD. 035B60214-021/-
YCSA, YCSA/H - 26TP
YCSA, YCSA/H - 36TP

XCMTB
YCSA-26 KW 9,2 - A.15.7
YCSA-36 KW 13,9 - A.23.7
KW 0.7 - A.1.7

All data subject to change without notice.

