DAIKIN	**WATER COOLED SELF-CONTAINED AIR-CONDITIONER**
INSTALLATION, OPERATION, MAINTENANCE	**IOM NO:** O-WCP16-MAY23-3

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Issue: O-WCP16-MAY23-3

IMPORTANT!

READ BEFORE PROCEEDING!

GENERAL SAFETY GUIDELINES

This equipment is a relatively complicated apparatus. During installation, operation maintenance or service, individuals may be exposed to certain components or conditions including, but not limited to: refrigerants, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized operating/service personnel. It is expected that these individuals possess independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood this document and any referenced materials. This individual shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question.

SAFETY SYMBOLS

The following symbols are used in this document to alert the reader to specific situations:

DANGER

Indicates a possible hazardous situation which will result death or serious injury if proper care is not taken

WARNING

Indicates a potentially hazardous situation which will result in possible injuries or damage to equipment if proper care is not taken

CAUTION

Identifies a hazard which could lead to damage to the machine, damage to other equipment and/or environmental pollution if proper care is not taken or instructions are not followed.

NOTE

Highlights additional information useful to the technician in completing the work being performed properly.

DISPOSAL REQUIREMENT

Your equipment is marked with this symbol. This means that electrical and electronic products shall not be mixed with unsorted household waste. Do not try to dismantle the equipment yourself: the dismantling of the refrigeration system, treatment of the refrigerant, of oil and of other parts must be done by a qualified installer in accordance with relevant local and national legislation. Refrigeration equipment must be treated at a specialized treatment facility for re-use, recycling, and recovery.
By ensuring this product is disposed of correctly, you will help to prevent potential negative consequences for the environment and human health.

Batteries must be removed from the controller and disposed of separately in accordance with relevant local and national legislation.

CHANGEABILITY OF THIS DOCUMENT

In complying with Daikin' policy for continuous product improvement, the information contained in this document is subject to change without notice. Daikin makes no commitment to update or provide current information automatically to the manual owner. Updated manuals, if applicable, can be obtained by contacting the nearest Daikin Service office.

Operating/service personnel maintain responsibility for the applicability of these documents to the equipment. If there is any question regarding the applicability of these documents, the technician should verify whether the equipment has been modified and if current literature is available from the owner of the equipment prior to performing any work on the equipment.

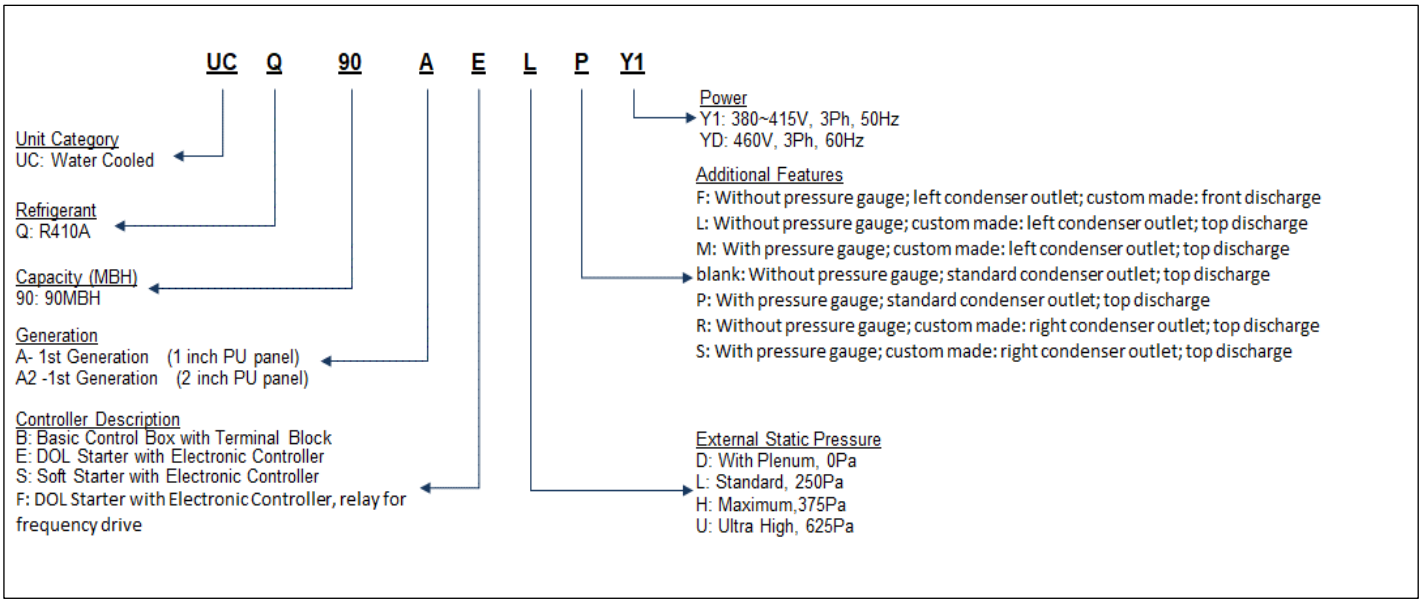
Table of Contents

1.0 INTRODUCTION

This manual applies to Water-Cooled Self-Contained Units, Models UCQ60 to UCQ940. This manual provides specific instructions for installation, owner maintenance, and troubleshooting.

Due to continuous product improvement and enhancements, the information provided is subject to change without notice.

1.1 NOMENCLATURE



1.2 DESCRIPTION OF UNIT

The water-cooled self-contained air conditioner is the ultimate solution addressing the energy efficiency, reliability, indoor air quality, and sound concerns for commercial, industrial and institutional buildings. Daikin offers a simple system design, increases system redundancy by providing individual air conditioning systems per floor, lowers maintenance costs, eases operation and maintenance, and provides the lowest life cycle cost available. Based on these features, the self-contained unit has surpassed the traditional chillers, air handlers and rooftop systems and is now the system of choice.

Models UCQ60 to UCQ940 are factory assembled, refrigerant charged and tested water-cooled packaged air conditioning units designed for ducted or free blow applications.

Each unit contains:

- Single or multiples hermetic scroll compressors
- Water cooled condensers
- Single or multi-circuit evaporator
- Thermal expansion valves
- Interconnecting refrigerant piping
- Double inlet centrifugal supply fan
- Belt driven
- Fan motor
- R29 or G3 Filters
- All necessary operating and required safety controls to operate the unit.

All rigging, installation, power, and control wiring external to the unit, and condenser water and condensate piping are under the responsibility of the installer.

2.0 INSTALLATION

The unit is designed for indoor installation only. The installation of this unit must conform to local building codes and/or regulations. The unit shall be operated according to the limit specified in ***Table 1.***

Table 1: Unit Operating Limit

POWER SUPPLY CHARACTERISTICS	MAXIMUM WORKING PRESSURE (UNIT)		SAFETY PRESSURE SWITCH		CONDENSER TEST PRESSURE	
	Low Side	High Side	Low Side Pressure, psig (barG) (auto reset)	High Side Pressure, psig (barG) (manual reset)	Water Side	Refrigerant Side
	Max. psig (barG)	Max. psig (barG)			Max. psig (barG)	Max. psig (barG)
380-415V/3Ph/50Hz (+/-10%)	363 (25)	480 (33)	Cut out 50 (3.5), cut in 100 (6.9)	cut out 480 (33), reset 350 (24)	350 (24)	600 (41)

2.1 UNIT INSPECTION

Upon receiving the unit, it should be inspected immediately for possible damage which may have occurred during transit. If damage is evident, it should be noted on the carrier's freight bill. A written request for inspection by the carrier's agent should be made at once.

2.2 LOCATION AND CLEARANCES

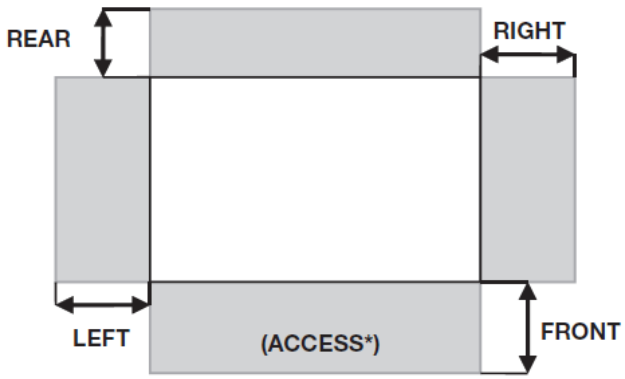
The following guidelines should be used to select a suitable location for the unit installation:

• Verify the floor or foundation is levelled. Failure to level the unit properly could result in condensate management problems, such as stagnant water inside the unit.

• For installation, service and maintenance access, minimum clearances required by local, state, or national codes should be followed. Clearance is required to allow room for filter access, mechanical cleaning of the condenser tubes, access to expansion valves and other control components and to allow for possible fan shaft or compressor removal. Additional clearance should be considered for component replacement such as condenser, evaporator and supply fan. Even though there is no vertical clearance specification listed, clearance above the unit may be an advantage during change out of any of the above components.

Table 2: Minimum Installation Clearance

Side	Distance
FRONT	1000
LEFT	800
RIGHT	800
REAR	800



3.0 RIGGING AND UNIT HANDLING

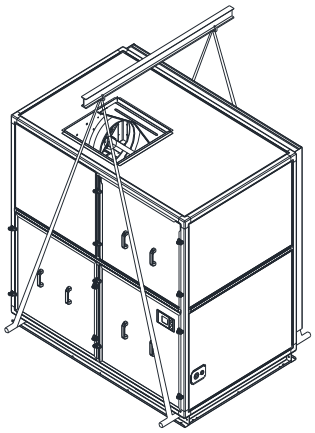
Units are shipped with a protective covering, which should remain in place while the unit is being moved to its final location. Unit weights are listed in ***Table 3***.

CAUTION

Refer to unit shipping weight for crane selection for rigging. Failure to fulfill the requirement might lead to hazardous.

Table 3: Unit Weight

MODEL	SHIPPING WEIGHT, KG	OPERATING WEIGHT, KG
UCQ60A*D	175	177
UCQ90A*D	261	265
UCQ140A*D	441	448
UCQ180A*D	495	501
UCQ60A*L	160	162
UCQ90A*L	241	245
UCQ140A*L	416	423
UCQ180A*L	470	476
UCQ240A*L	558	566
UCQ280A*L	657	667
UCQ320A*L	728	736
UCQ360A*L	857	866
UCQ400A*L	1201	1218
UCQ520A*L	1269	1289
UCQ570A*L	1300	1314
UCQ710A*L	1608	1633
UCQ870A*L	1940	1970
UCQ940A*L	2145	2178
UCQ60A2*L	176	179
UCQ90A2*L	261	264
UCQ140A2*L	441	448
UCQ180A2*L	495	502
UCQ240A2*L	582	590
UCQ280A2*L	682	692
UCQ320A2*L	756	764
UCQ360A2*L	888	897
UCQ400A2*L	1240	1257
UCQ520A2*L	1308	1328
UCQ570A2*L	1341	1355
UCQ710A2*L	1652	1677
UCQ870A2*L	1985	2015
UCQ940A2*L	2193	2226



The following guidelines should be used to select a suitable location for the unit lifting:

1. Determine the approximate center of gravity for lifting safety, before lifting the unit.
2. Always test-lift the unit to determine the exact unit balance and stability before hoisting it to the installation location.
3. Ensure that all rigging and lifting equipment is operated by qualified personnel.
4. Ensure the rigging equipment and material have the required capacity for the job and that all items are in good condition.
5. Ensure the lifting straps, cables, or chains which are used are clear the sides and corner edges of the unit. Else, damage to the unit may occur.

4.0 ACCOUSTICAL CONSIDERATION

- With any mechanical system, a certain amount of vibration and noise is generated. To ensure successful installation of these units, factory has provided the internal vibration isolators for compressors.
- If additional vibration isolation is desired, neoprene is recommended under 4 corners of unit.
- Care must be exercised to isolate the unit and piping from walls and ceiling.
- Besides vibration, which is transmitted by conduction, radiated noise must also be addressed. Compressors dan fans generate noise and could radiate to the occupied space.
- The most common approach to reducing this possibility is to locate the units in the least sensitive areas. This could be near stairs, elevators, or lavatories.
- Good acoustical practices should be employed when designing the wall between the machine room and the occupied space. All openings around doors should be sealed. The return air opening must be acoustically treated.
- Noise will also be carried through the fan and supply ductwork to the occupied space. When the sound attenuation package is required, you should consider installing sound attenuation in the supply ductwork.

5.0 UNIT DATA

Table 4: Specifications

Item	Model		UCQ60A*D	UCQ60A*L UCQ60A2*L	UCQ90A*D	UCQ90A*L UCQ90A2*L	UCQ140A*D	UCQ140A*L UCQ140A2*L	UCQ180A*D	UCQ180A*L UCQ180A2*L	UCQ240A*L UCQ240A2*L
Capacity	Cooling	kW	16.9		25.6		38.8		51		68
		MBH	58		87		133		174		232
	Air Flow	cfm	1800		2700		4500		5400		7000
Dimension	Length for PU 1in (2in)	mm	1068 (1118)		1410 (1460)		1486 (1536)		1486 (1536)		1576 (1626)
	Width for PU 1in (2in)	mm	570 (620)		570 (620)		765 (815)		765 (815)		1179 (1229)
	Height for PU 1in (2in)	mm	2055	1755 (1805)	2114	1814 (1864)	2453	2153 (2203)	2670	2370 (2420)	1768 (1818)
Ref.	Precharge (R410A)	kg	2		2.8		5.1		6		13.3
Compressor	Type		Hermetic Scroll								
	Power Supply	V/Ph/Hz	380-415/3/50								
	Quantity		1		1		1		1		1
Condenser	Type		Tube in Tube								Shell & Tube
	Water Connection	BSPT (female)	1-1/4"								2-1/2"
	Water Flow	m^3/h	3.6		5		8.1		10.8		13.6
	Pressure drop	kPa	10		16		12		16		13
Fan Blower	Type		Centrifugal DWDI Forward Curve								
	Drive		Belt Drive								
	Pulley size	mm	SPZ 106	SPZ 90			SPZ 150		SPZ 160	SPZ 140	SPA 190
	Qty		1		1		1		1		1
	Design speed	RPM	1197	1566	1332	1610	760	1057	712	960	944
Fan Motor	Motor (Qty)	HP	1.5HP	2HP		3HP		4HP	3HP	4HP	7.5HP
	Pulley size	mm	SPZ 90	SPZ 100	SPZ 85	SPZ 100	SPZ 80	SPZ 112	SPZ 80	SPZ 95	SPA 125
Evaporator Coil	Hairpin & Fins (Type)		3/8" OD (Inner Groove) & Corrugated Aluminium Bare								
	Condensate Drain Size *in same side of condenser inlet/outlet		1-1/4" male thread (1 side)				1-1/4" male thread (2 side)				1-1/4" male thread (1 side)
	Refrigerant Control		TXV (fix orifice & external equalisation)								
	Rows/ Fins per Inch		3/14		4/14		3/14		4/14		3/14
Return Air Filter	Material & Thickness		G3 & 25mm (nominal)								
	Nominal Size (Qty)	mm	961 X 518 (1)		1301 X 518 (1)		1377 X 677 (1)		1377 X 894 (1)		595 X 595 (4) 290 X 595 (2)

Table 4: … Continued

Item	Model		UCQ280A*L UCQ280A2*L	UCQ320A*L UCQ320A2*L	UCQ360A*L UCQ360A2*L	UCQ400A*L UCQ400A2*L	UCQ520A*L UCQ520A2*L	UCQ570A*L UCQ570A2*L	UCQ710A*L UCQ710A2*L	UCQ870A*L UCQ870A2*L	UCQ940A*L UCQ940A2*L
Capacity	Cooling	kW	83.4	92	104.6	117.4	152.1	166.5	205.4	252.7	273
		MBH	285	314	356.9	400.5	518.9	568.3	700.7	862.2	931.4
	Air Flow	cfm	8900	11000	11800	12800	14500	15500	21300	26700	28400
Dimension	Length for PU 1in (2in)	mm	1576 (1626)	1859 (1909)	1859 (1909)	2691 (2741)	2691 (2741)	2691 (2741)	3281 (3331)	3281 (3331)	3391 (3441)
	Width for PU 1in (2in)	mm	1179 (1229)	1284 (1334)	1284 (1334)	1584 (1634)	1584 (1634)	1584 (1634)	1584 (1634)	1584 (1634)	1584 (1634)
	Height for PU 1in (2in)	mm	1921 (1971)	1798 (1848)	2204 (2254)	1909 (1959)	1909 (1959)	2112 (2162)	1927 (1977)	2118 (2168)	2133 (2183)
Ref.	Precharge (R410A)	kg	14.3	2x9.4	2x9.5	3x6.0	3x7.0	2x17.0	3x9.4	3x11.5	4x9.4
Compressor	Type		Hermetic Scroll								
	Power Supply	V/Ph/Hz	380-415/3/50								
	Quantity		1	2	2	3	3	2	3	3	4
Condenser	Type		Shell & Tube			Tube in Tube		Shell & Tube	Tube in Tube		
	Water Connection	BSPT (female)	3"	2-1/2"	2-1/2"						
	Water Flow	m^3/h	15.9	18.7	20.4	24.4	30.6	33.5	40.9	49.9	54.5
	Pressure drop	kPa	13	16	23	12	12	34	13	15	16
Fan Blower	Type		Centrifugal DWDI Forward Curve								
	Drive		Belt Drive								
	Pulley size	mm	SPA 236	SPA 224		SPA 250	SPA 315	SPA 400	SPA 224	SPA 355	SPA 315
	Qty		1	1	1	1	1	1	2	2	2
	Design speed	RPM	817	843	843	801	834	657	862	823	834
Fan Motor	Motor (Qty)	HP	7.5HP	10HP	15HP(1)				10HP(2)	15HP(2)	
	Pulley size	mm	SPA 132			SPA 140	SPA 180		SPA 140	SPA 200	SPA 180
Evaporator Coil	Hairpin & Fins (Type)		3/8" OD (Inner Groove) & Corrugated Aluminium Bare			1/2" OD (Bare) & & Corrugated Aluminium Bare					
	Condensate Drain Size *in same side of condenser inlet/outlet		1-1/4" male thread (1 side)			1-1/4" male thread (2 side)		1-1/4" male thread (1 side)	1-1/4" male thread (2 side)		
	Refrigerant Control		TXV (fix orifice & external equalisation)								
	Rows/ Fins per Inch		3/14	3/14	3/14	3/14	4/14	4/14	4/14	4/14	4/14
Return Air Filter	Material & Thickness		G3 & 25mm (nominal)								
	Nominal Size (Qty)	mm	595 X 595 (4)	595 X 595 (6)	595 X 595 (9)	595 X 595 (8)	595 X 595 (8)	595 X 595 (12)	595 X 595 (10)	595 X 595 (15)	480 X 595 (20)
			290 X 595 (2)	295 X 595 (3)		420 X 595 (4)	420 X 595 (4)		420 X 595 (5)		480 X 350 (4)

Note: Cooling capacity based on nominal air inlet temperature of 26.7^{0}C DB/19.4^{0}C WB and condenser water temperature 30^{0}C In/ 35^{0}C Out.

Table 5: Performance Table

Model	ON COIL		WATER OUTLET TEMPERATURE (^{0}C)									SOUND	
	Dry Bulb (^{0}C)	Wet Bulb (^{0}C)	21			35			40			Rated at ESP 250Pa	
			Total Cooling Capacity (MBH)	Sensible Capacity (MBH)	Total Power Input (kW)	Total Cooling Capacity (MBH)	Sensible Capacity (MBH)	Total Power Input (kW)	Total Cooling Capacity (MBH)	Sensible Capacity (MBH)	Total Power Input (kW)	SPL dB(A) 1m	SPLw dB(A)
UCQ0060	21	15	55.0	38.3	3.63	50.1	36.2	4.45	46.6	34.0	4.98	70	81
	26.7	19.4	61.4	41.3	3.75	57.7	38.9	4.55	55.1	39.2	5.10		
	32	23	67.8	44.3	3.80	61.2	41.8	4.70	59.0	41.0	5.20		
UCQ0090	21	15	82.4	60.3	5.69	75.0	55.0	6.80	70.8	52.9	7.66	71	83
	26.7	19.4	92.7	62.4	5.80	87.2	59.9	6.94	83.2	58.5	7.60		
	32	23	104.6	69.4	5.90	94.3	65.0	7.00	89.2	63.4	7.47		
UCQ0140	21	15	129.0	94.6	8.45	117.5	93.7	10.30	107.2	88.3	11.27	71	85
	26.7	19.4	140.9	100.2	8.50	132.5	94.9	10.41	126.5	98.2	11.40		
	32	23	158.2	108.9	8.63	142.6	103.0	10.50	138.8	101.9	11.50		
UCQ0180	21	15	168.9	119.5	11.07	153.8	113.4	13.20	144.4	107.8	14.73	73	87
	26.7	19.4	184.9	126.8	11.20	173.9	119.5	13.35	166.0	119.8	14.80		
	32	23	204.9	136.3	11.32	184.7	126.8	13.53	181.3	126.3	14.90		
UCQ0240	21	15	215.8	151.9	14.82	196.5	145.4	18.10	188.2	141.4	19.56	67	89
	26.7	19.4	246.6	165.6	14.96	231.9	157.8	18.16	221.3	158.8	19.72		
	32	23	285.3	182.6	15.12	257.3	173.6	18.30	252.6	172.9	19.75		
UCQ0280	21	15	271.3	195.2	16.28	247.0	185.1	20.00	232.2	177.0	21.32	68	88
	26.7	19.4	302.8	210.9	16.43	284.7	197.5	19.95	271.7	199.0	21.50		
	32	23	336.3	226.7	16.72	303.2	211.6	20.20	305.2	215.6	21.74		
UCQ0320	21	15	296.7	213.7	20.86	270.2	202.5	25.63	241.2	180.7	28.74	70	89
	26.7	19.4	333.9	232.6	21.24	314.0	213.9	25.78	299.6	219.4	28.75		
	32	23	397.3	266.5	21.61	358.2	250.0	25.82	337.2	234.8	28.76		
UCQ0360	21	15	341.5	249.7	23.98	311.1	233.1	29.46	291.2	225.6	31.79	68	90
	26.7	19.4	379.6	264.4	24.63	356.9	254.1	29.91	340.6	249.5	32.48		
	32	23	449.3	303.4	24.90	405.1	282.7	29.95	386.8	280.0	32.50		
UCQ0400	21	15	384.0	281.2	27.3	349.7	262.0	33.1	318.1	243.9	36.0	79	99
	26.7	19.4	425.8	296.7	27.3	400.5	285.9	33.1	382.2	279.9	36.0		
	32	23	492.3	343.4	27.5	443.9	309.8	33.2	434.0	314.1	36.0		

Table 5: …Continued

Model	ON COIL		WATER OUTLET TEMPERATURE (^{0}C)									SOUND	
	Dry Bulb (^{0}C)	Wet Bulb (^{0}C)	21			35			40			Rated at ESP 250Pa	
			Total Cooling Capacity (MBH)	Sensible Capacity (MBH)	Total Power Input (kW)	Total Cooling Capacity (MBH)	Sensible Capacity (MBH)	Total Power Input (kW)	Total Cooling Capacity (MBH)	Sensible Capacity (MBH)	Total Power Input (kW)	SPL dB(A) 1m	SPLw dB(A)
UCQ0520	21	15	496.5	371.4	35.0	452.2	346.7	43.0	423.3	335.6	46.4	80	99
	26.7	19.4	551.8	393.4	35.9	518.9	377.9	43.6	495.2	371.1	47.4		
	32	23	653.2	451.3	36.3	588.9	420.5	43.7	562.3	416.6	47.4		
UCQ0570	21	15	535.5	378.5	34.7	487.7	365.5	42.6	455.6	341.7	49.7	77	95
	26.7	19.4	604.3	421.0	36.2	568.3	389.8	44.0	542.3	397.1	49.7		
	32	23	706.0	473.6	36.3	636.6	444.3	44.1	629.7	442.3	49.8		
UCQ0710	21	15	670.5	515.2	46.2	610.6	481.0	56.7	571.6	465.6	61.2	79	99
	26.7	19.4	745.1	545.6	47.4	700.7	524.3	57.6	668.7	514.7	62.5		
	32	23	882.0	626.1	47.9	795.2	583.4	57.6	759.2	577.8	62.6		
UCQ0870	21	15	825.0	633.4	56.8	751.4	591.3	69.7	703.3	572.4	75.3	80	100
	26.7	19.4	916.8	670.8	58.3	862.2	644.5	70.8	822.8	632.8	76.9		
	32	23	1085.2	769.7	59.0	978.5	717.2	70.9	934.2	710.4	76.9		
UCQ0940	21	15	891.3	680.6	61.0	811.7	635.5	74.9	759.8	615.1	80.8	84	98
	26.7	19.4	990.4	720.9	62.6	931.4	692.7	76.1	888.9	680.0	82.6		
	32	23	1172.4	827.2	63.3	1057.1	770.7	76.2	1009.2	763.4	82.6		

1. MBH to kW = MBH/3.412
2. EER = Total Cooling Capacity (MBH)/ Total Power Input (kW)

Note:

1. Cooling capacity based on nominal air flow rate under given conditions and water temperature difference 5 ^{0}C.
2. Direct interpolation is allowed but extrapolation is not recommended.

5.1 UNIT DIMENSION

Figure 1: Outline UCQ60A*D/L

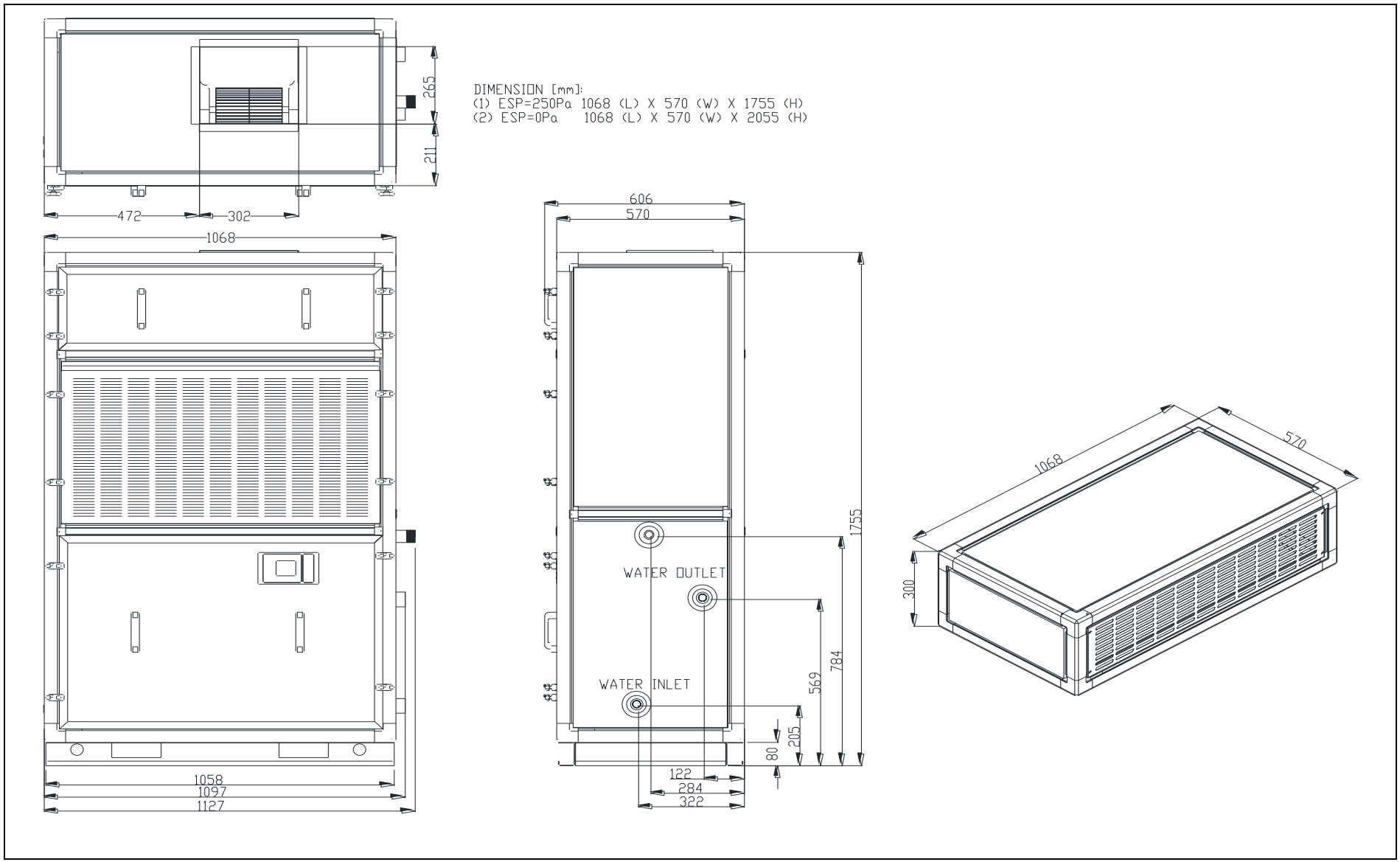


Figure 2: Outline UCQ90A*D/L

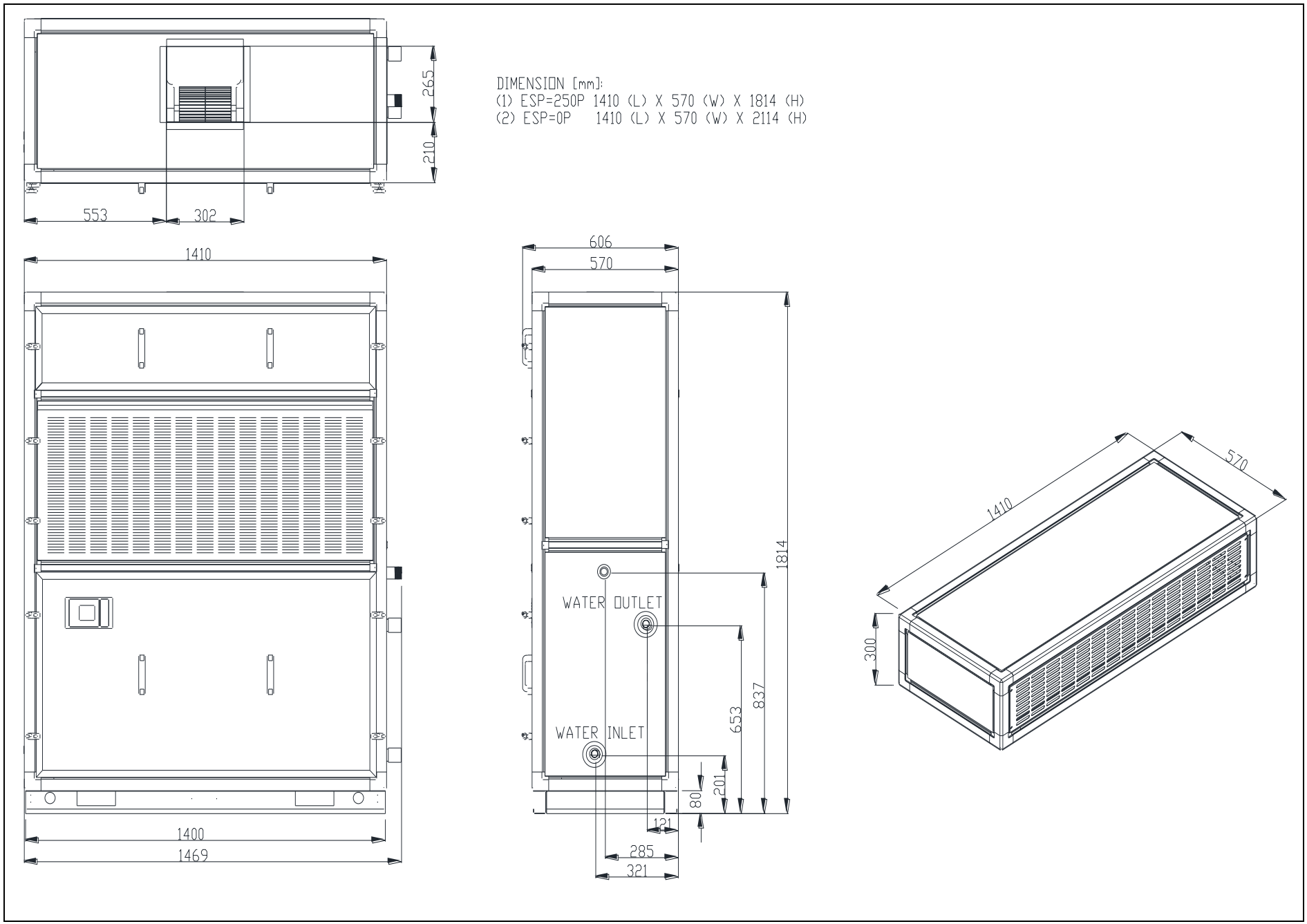


Figure 3: Outline UCQ140A*D/L

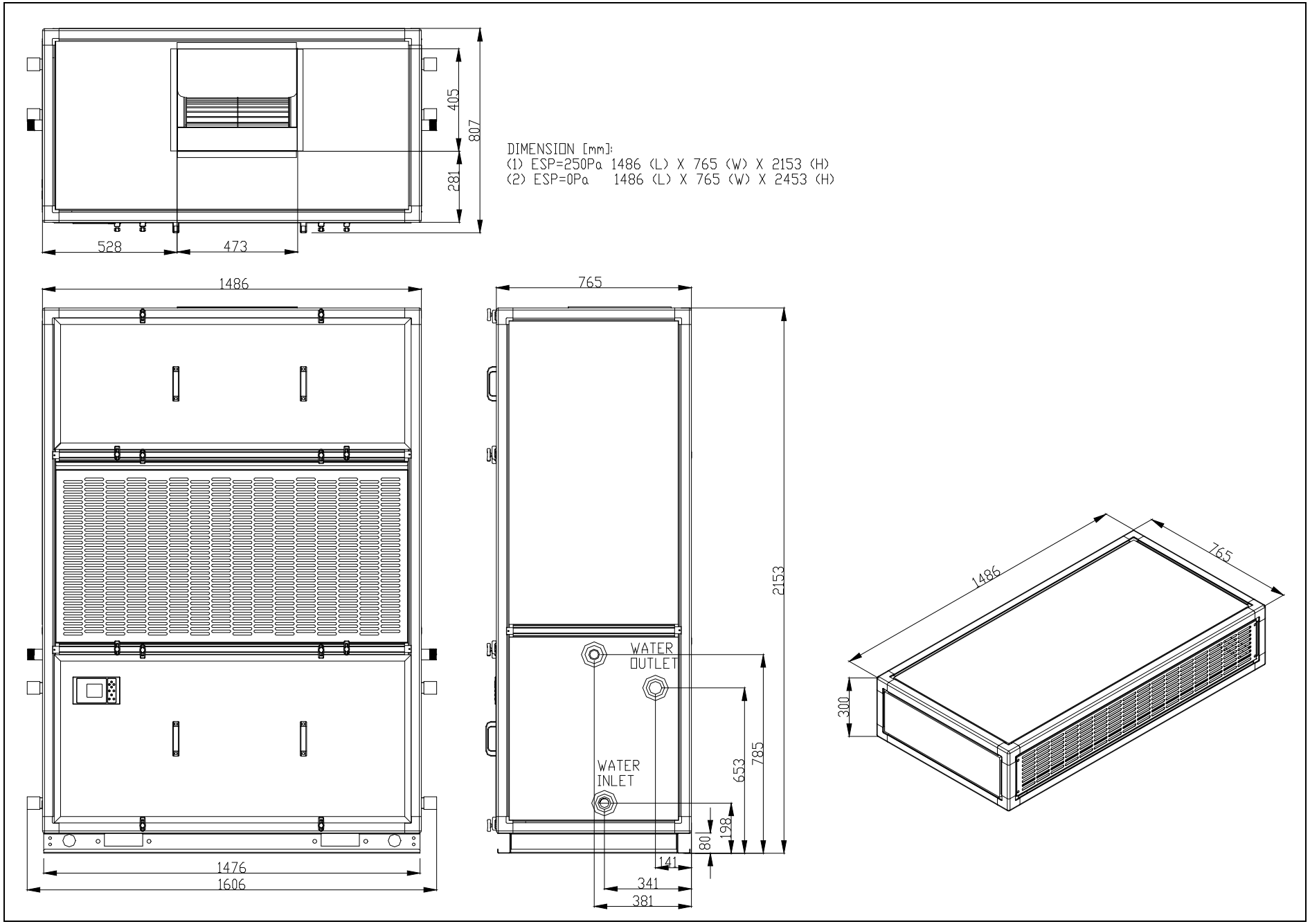


Figure 4: Outline UCQ180A*D/L

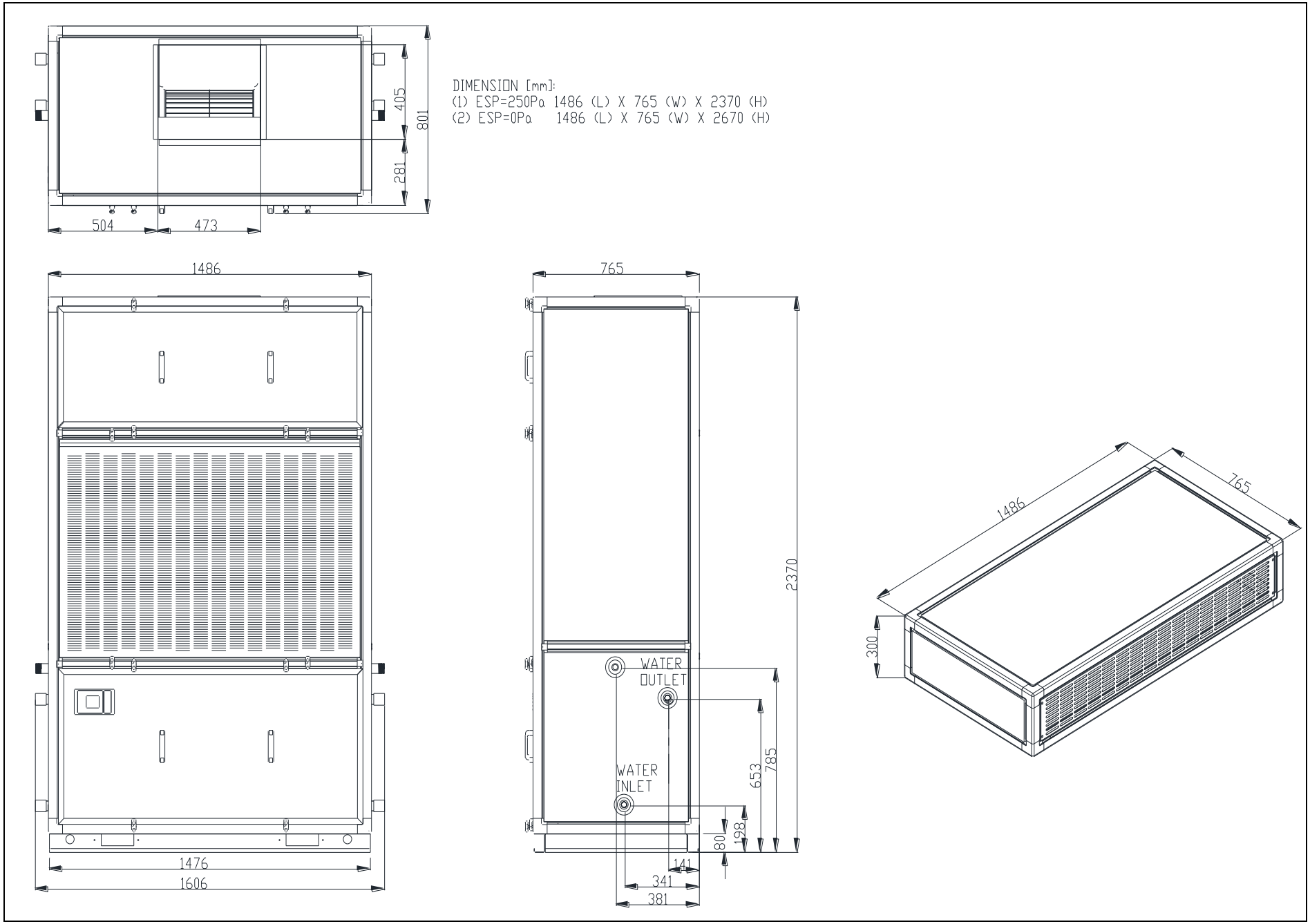


Figure 5: Outline UCQ240A*L

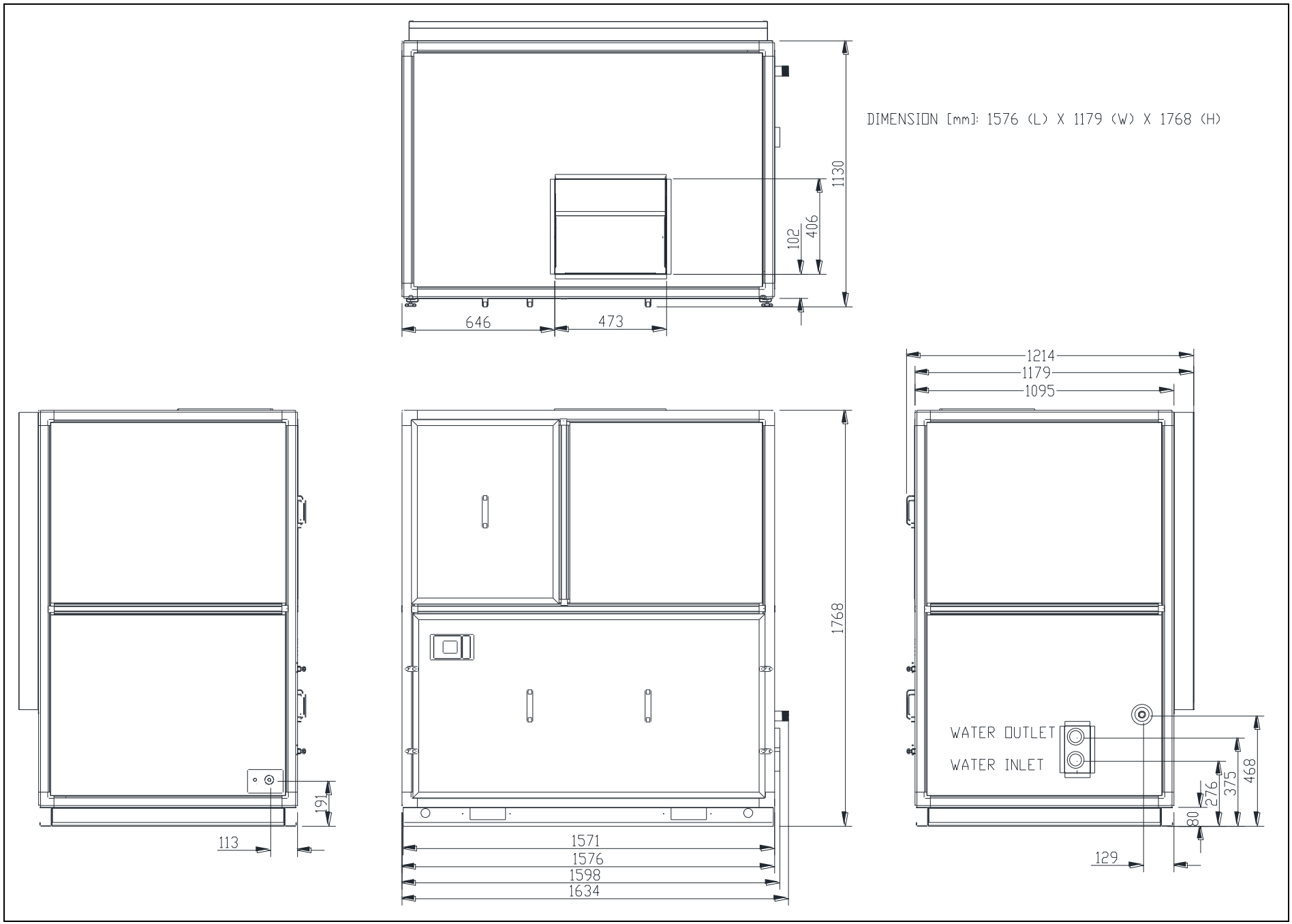


Figure 6: Outline UCQ280A*L

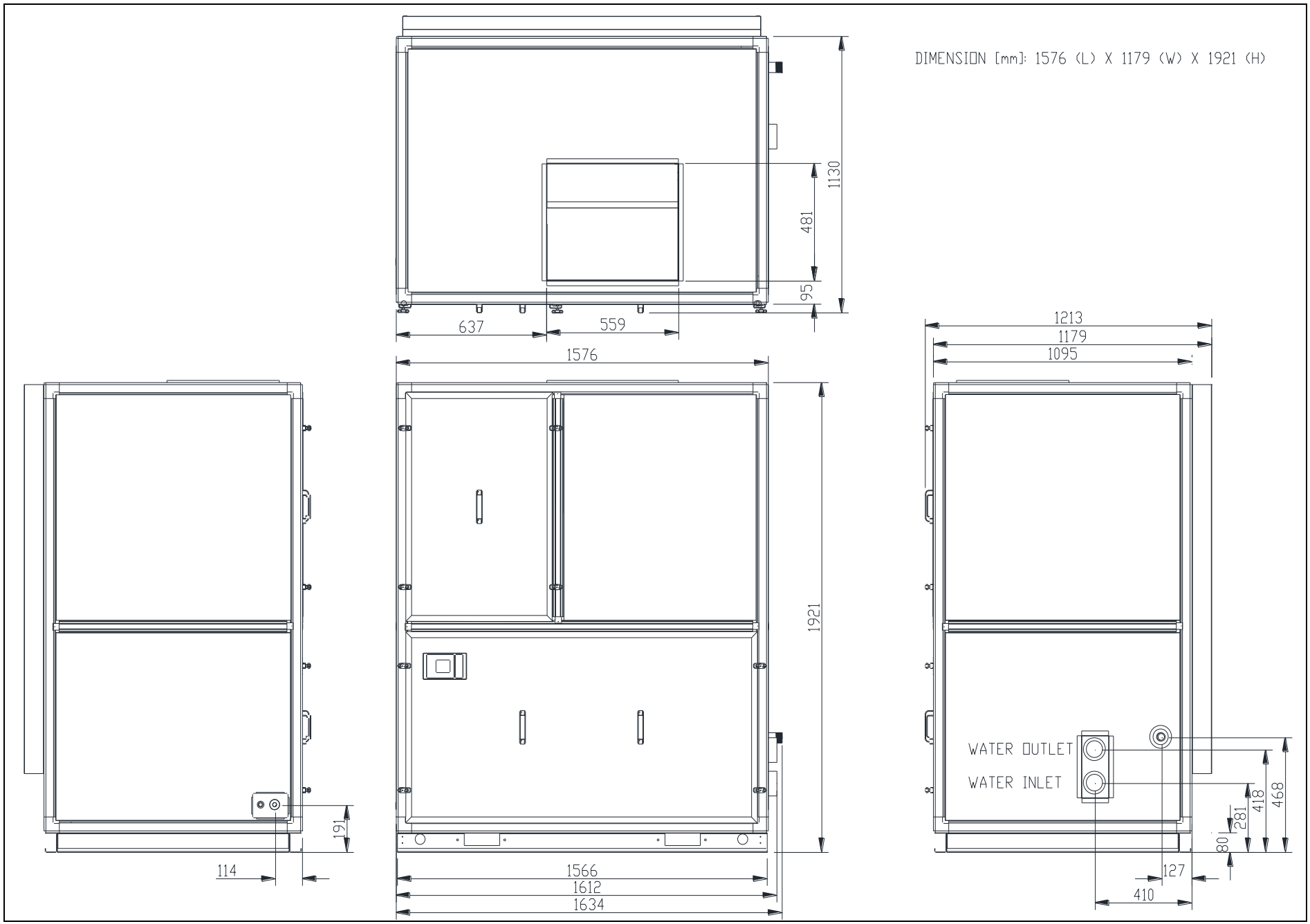


Figure 7: Outline UCQ320A*L

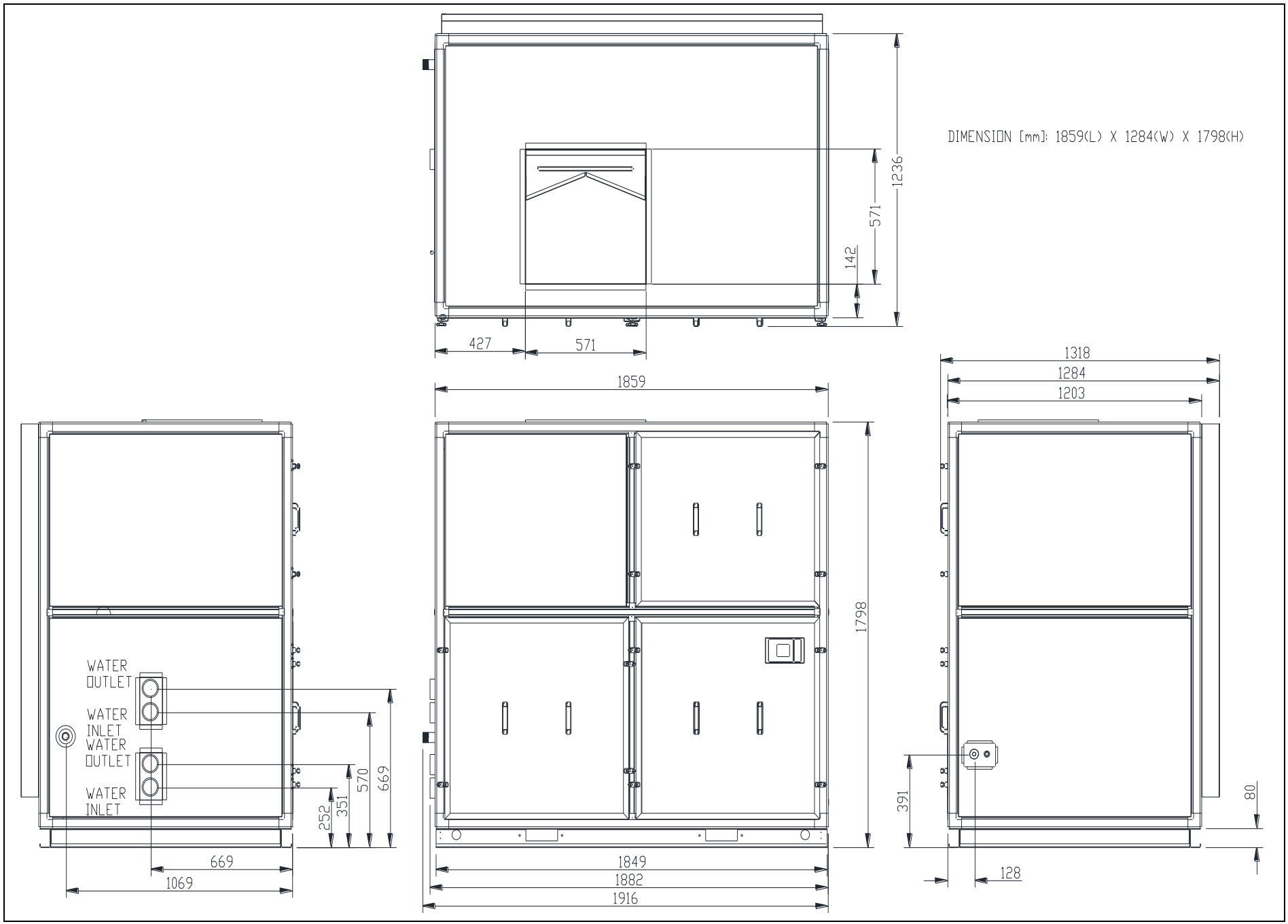


Figure 8: Outline UCQ360A*L

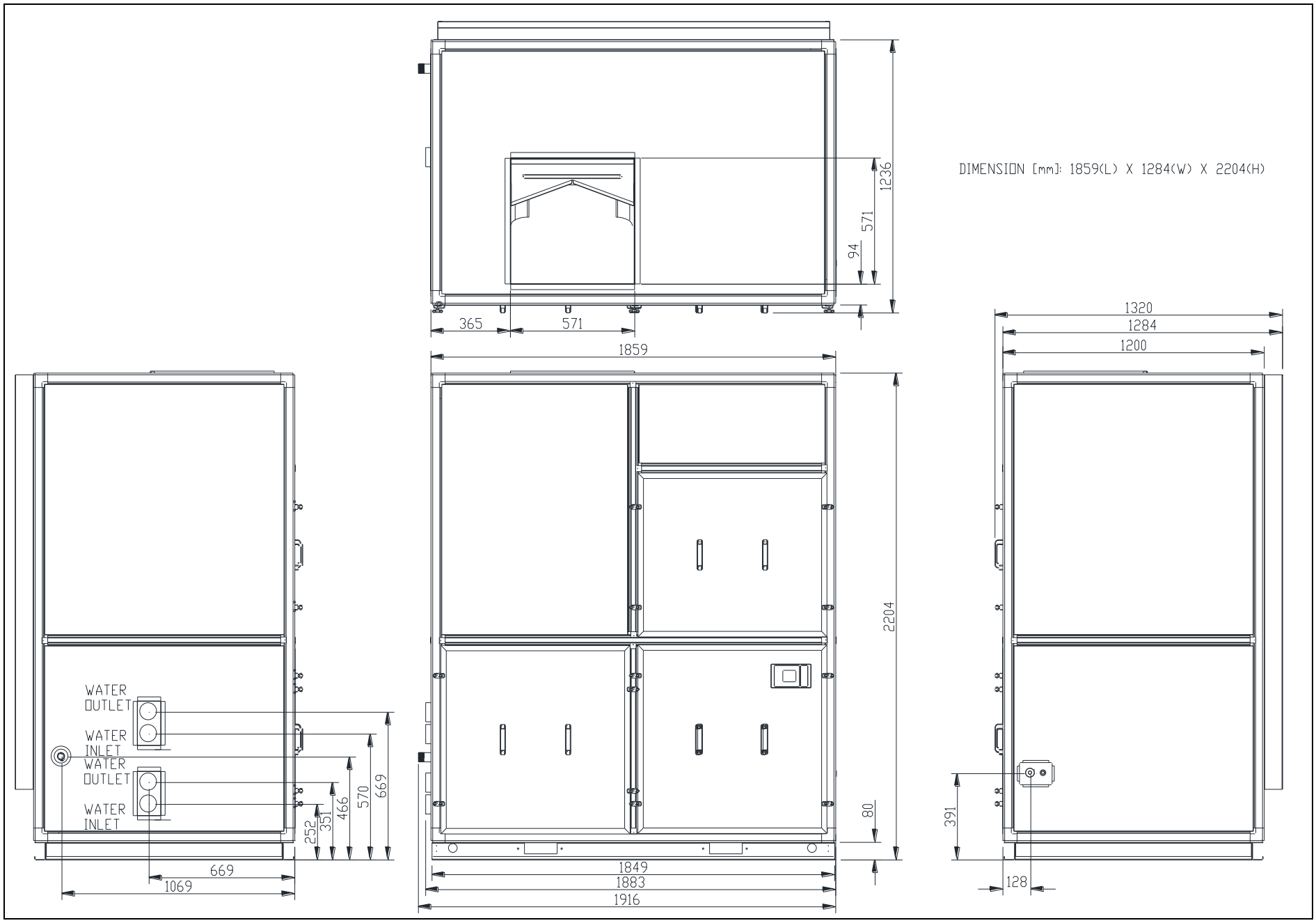


Figure 9: Outline UCQ400/520A*L

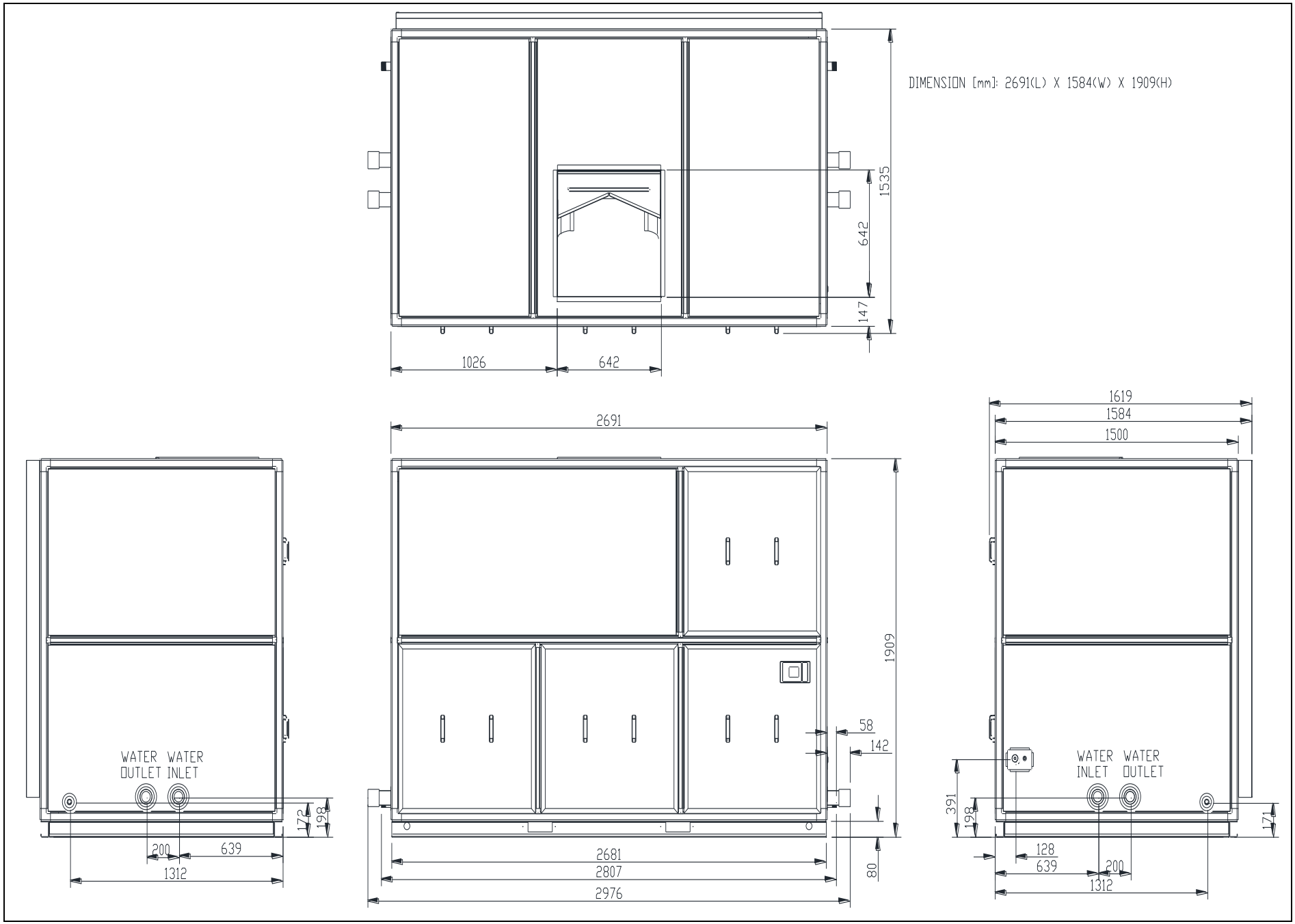


Figure 10: Outline UCQ570A*L

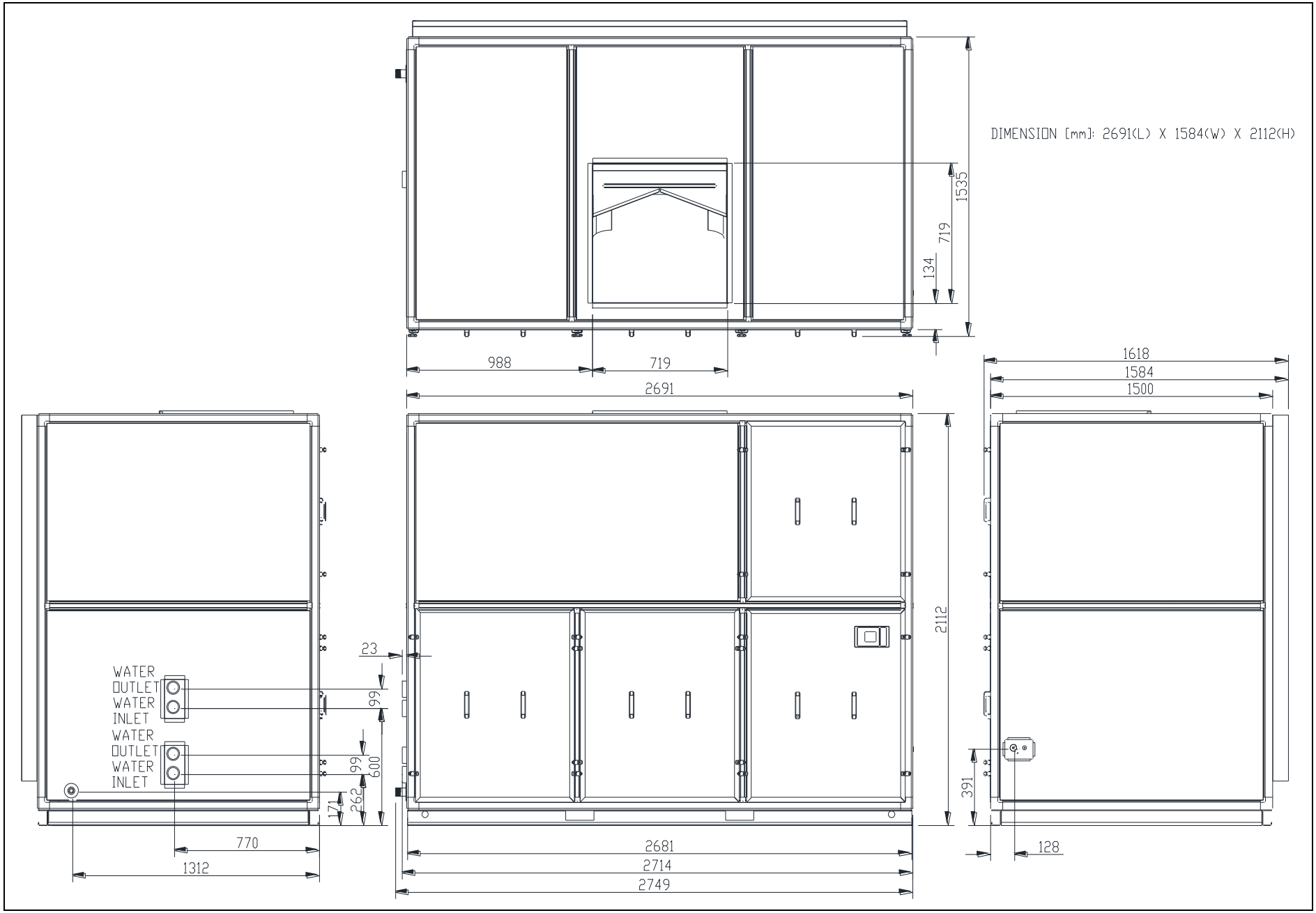


Figure 11: Outline UCQ710A*L

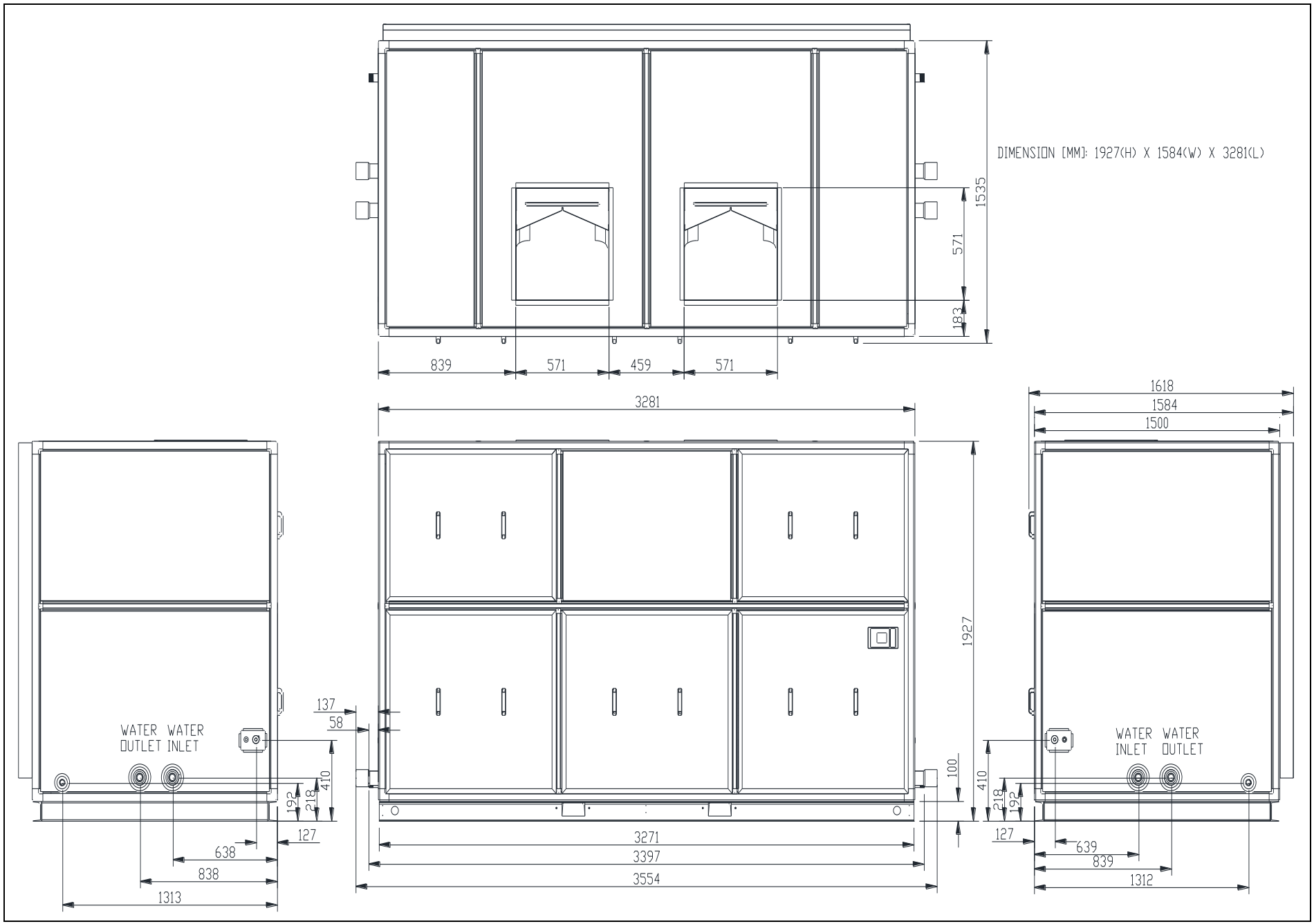


Figure 12: Outline UCQ870A*L

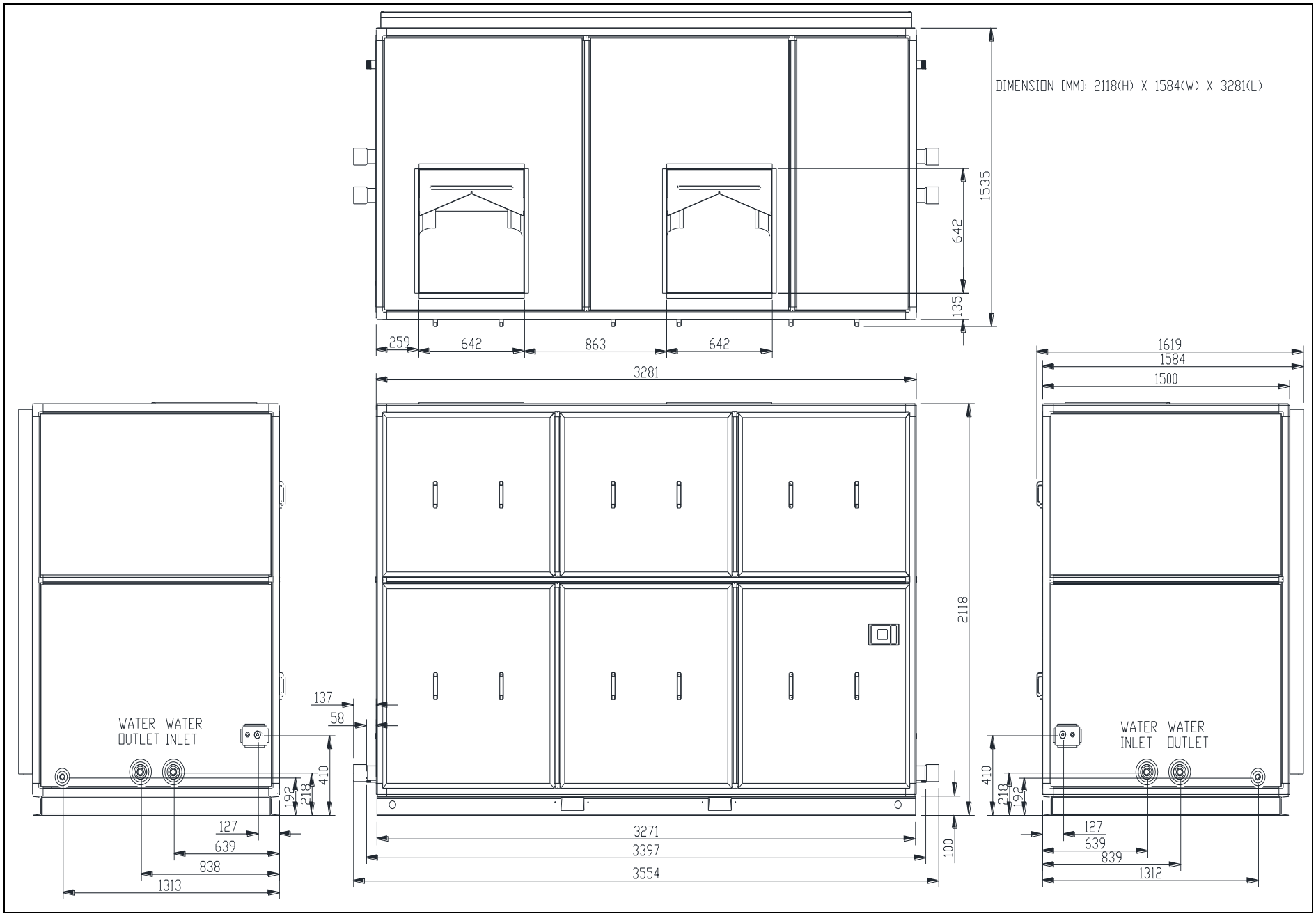
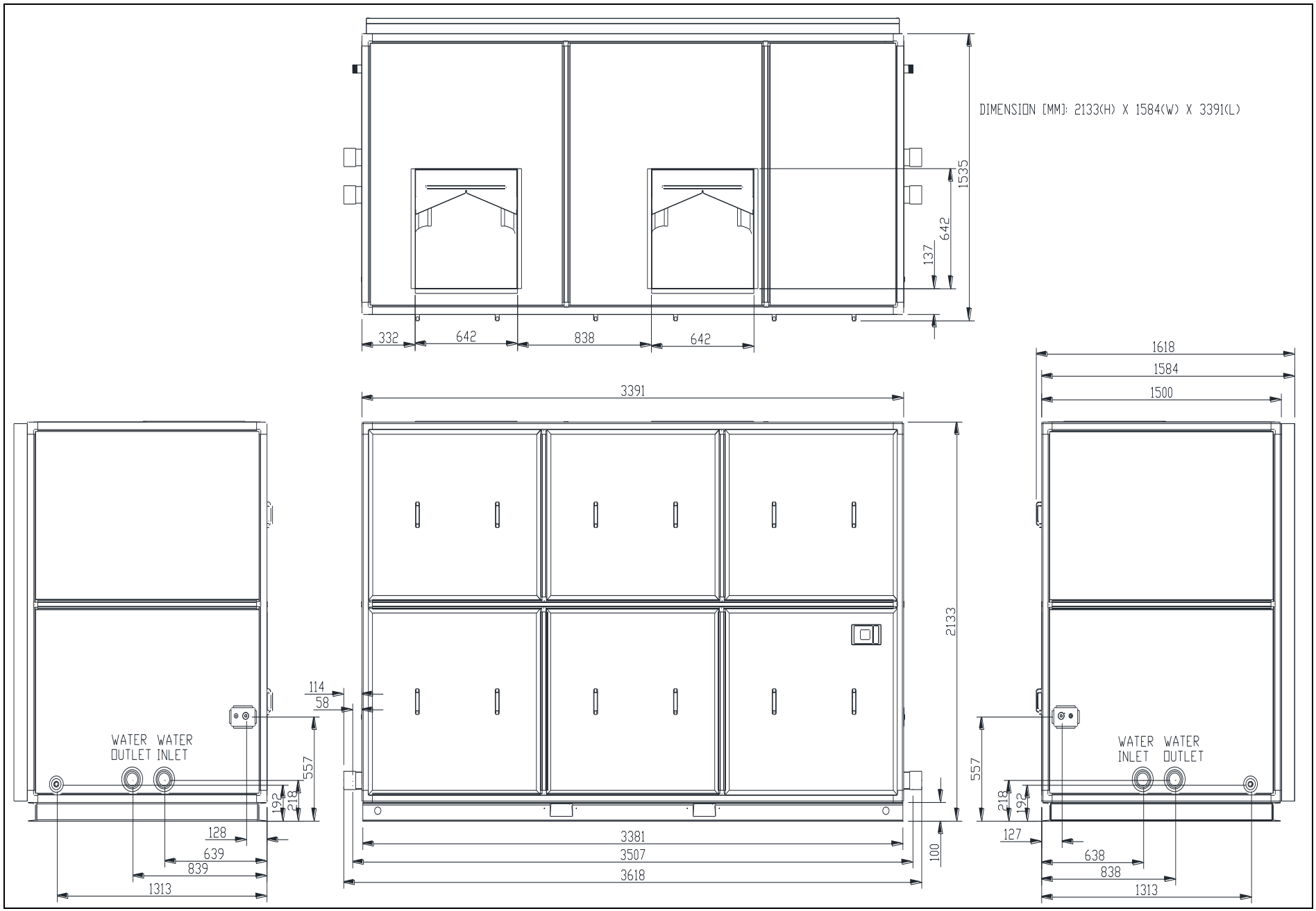


Figure 13: Outline UCQ940A*L



5.2 DUCTING

Supply Air

For connection of supply ductwork directly to the unit, a duct collar must be mounted at the unit outlet. When connecting ductwork to the unit, a canvas type connecting collar is recommended.

If a field fabricated plenum is used, canvas type connectors are recommended at the duct connection to the plenum.

Units are also available with a factory provided discharge plenum. Supply duct connections to the plenum opening(s) should include a canvas type connector.

Return Air

The unit is designed for "free air returns". The minimum returns air temperature is 55°F (12.8°C). The equipment room serves as the return air plenum.

If the return air is ducted to the unit, a flex connection must be supplied. Insulation for the return duct is recommended. Only return air should be ducted to the unit. Outside air should not be brought into the return area.

Insulation

Insulate ductwork that passes through unconditioned space during cooling. Insulation should include a vapour barrier to prevent absorption of moisture.

NOTE

Ducted units should never be operated without the ductwork connected on the supply side. Failure to obey will result in fan motor overloaded.

5.3 WATER PIPING

General

Due to the variety of piping practices, it is advisable to follow the recommendations of local authorities. They can supply the installer with the proper building and safety codes required for a safe and proper installation. The water piping should be installed with a minimum number of bends and elevation changes for best performance. Piping should contain below components:

- Vibration eliminators to reduce vibration and noise transmission to the building.
- Shutoff valves to isolate the unit from the piping system during unit servicing.
- Manual or automatic air vent valves at the high points of the system.
- Some means of maintaining adequate system water pressure (e.g., expansion tank or regulating valve).
- Temperature and pressure indicators located at the unit to aid in servicing.
- A strainer to remove foreign matter from the water before it enters the pump. It should be placed far enough upstream to prevent cavitation at the pump inlet (consult pump manufacturer for recommendations). The use of a strainer will prolong pump life and help maintain system performance.
- A strainer with a #30 mesh or more finer to remove foreign matter from the water before it enters the unit.
- Size piping to minimize system pressure drop.
- All piping must be supported independent of the unit.
- To aid in service the unit should have a union in the water inlet and outlet water lines.

Condenser Water Piping

- All internal condenser water piping is completed factory assembled.
- Field piping should be connected to the pipes that are stubbed out at the panels. Supply water must be connected to the factory piping as indicated by the markings on the unit.

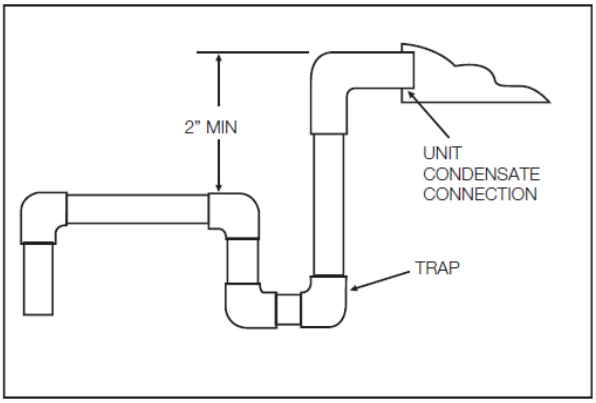
Condensate Drain Connections

- The condensate drain connection is located on the drain pan that forms the partition between the coil and condensing section.
- The condensate line should be pitched away from the unit with a minimum slop of 1/8" per foot.
- The drain pan and the trap should be kept clean through periodic cleaning. A clean-out should be installed, as standard, as part of the trap assembly to aid in cleaning.

Condensate Drain Insulation

The drainpipe should be insulated where condensation will cause water to drip. It should be trap as shown in *Figure 14*.

Figure 14: Condensate Drain Trap



5.4 FILTERS

Standard filters are with nominal thickness 1-inch R29 or G3. The filters are factory installed at the evaporator coil air inlet. Filters must always be installed ahead of the evaporator coil. The filters must be kept clean and replaced with the same size and type as shipped with the unit. Dirty filters will reduce the capacity of the unit and may result in frosted coils and trigger protection which shutdown the system.

NOTE

The unit should never be operated for any length of time without the proper filters installed in the unit

5.5 SUPPLY AIR BLOWER ADJUSTMENT

The RPM of the supply air blower will depend on the required CFM, the unit accessories and the static resistances of both the supply and the return air duct systems. With this information, the RPM for the supply air blower can be determined from fan performance curves.

Knowing the required blower RPM and the blower motor horsepower, the supply air motor and pulley can be determined. When the supply air blower motor is operating, adjust the resistances in both the supply and the return duct systems to balance the air distribution throughout the conditioned space.

The standard unit is provided with a fan outlet collar for connection of supply ductwork. It is recommended that a straight duct having the same dimensions as the fan outlet be used. This duct should be at least 3 equivalent duct diameters in length prior to installing any elbows or transition. See the following ***Table 6*** for the minimum length of straight duct required for particular unit.

Insulate duct work that passes through unconditioned space during cooling. Insulation should include a vapor barrier to prevent absorption of moisture.

Table 6: Minimum Straight Duct Length

Model	Fan Supply Size (mm) x Qty of Blower	Duct Size (mm)		Minimum Length for Straight Duct (mm)
		A	B	
UCQ60	229x1	262	298	763
UCQ90	229x1	262	298	763
UCQ140	381x1	404	471	1191
UCQ180	381x1	404	471	1191
UCQ240	381x1	404	471	1191
UCQ280	457x1	478	557	1409
UCQ320	450x1	569	569	2026
UCQ360	450x1	569	569	2174
UCQ400	500x1	638	638	2103
UCQ520	500x1	638	638	2382
UCQ570	560x1	715	715	2272
UCQ710	450x2	569	569	3923
UCQ870	500x2	638	638	4386
UCQ940	500x2	638	638	4665

5.6 FAN CURVE

- Performance certified is for Installation type B - free inlet, ducted outlet. Performance ratings do not include the effects of appurtenances (accessories). Power rating kW does not include transmission losses.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301. Values shown are for inlet Lwi (A) sound power levels for installation type B - free inlet, ducted outlet.

Figure 15: Fan Curve KAT 9-9

Model: UCQ60/UCQ90

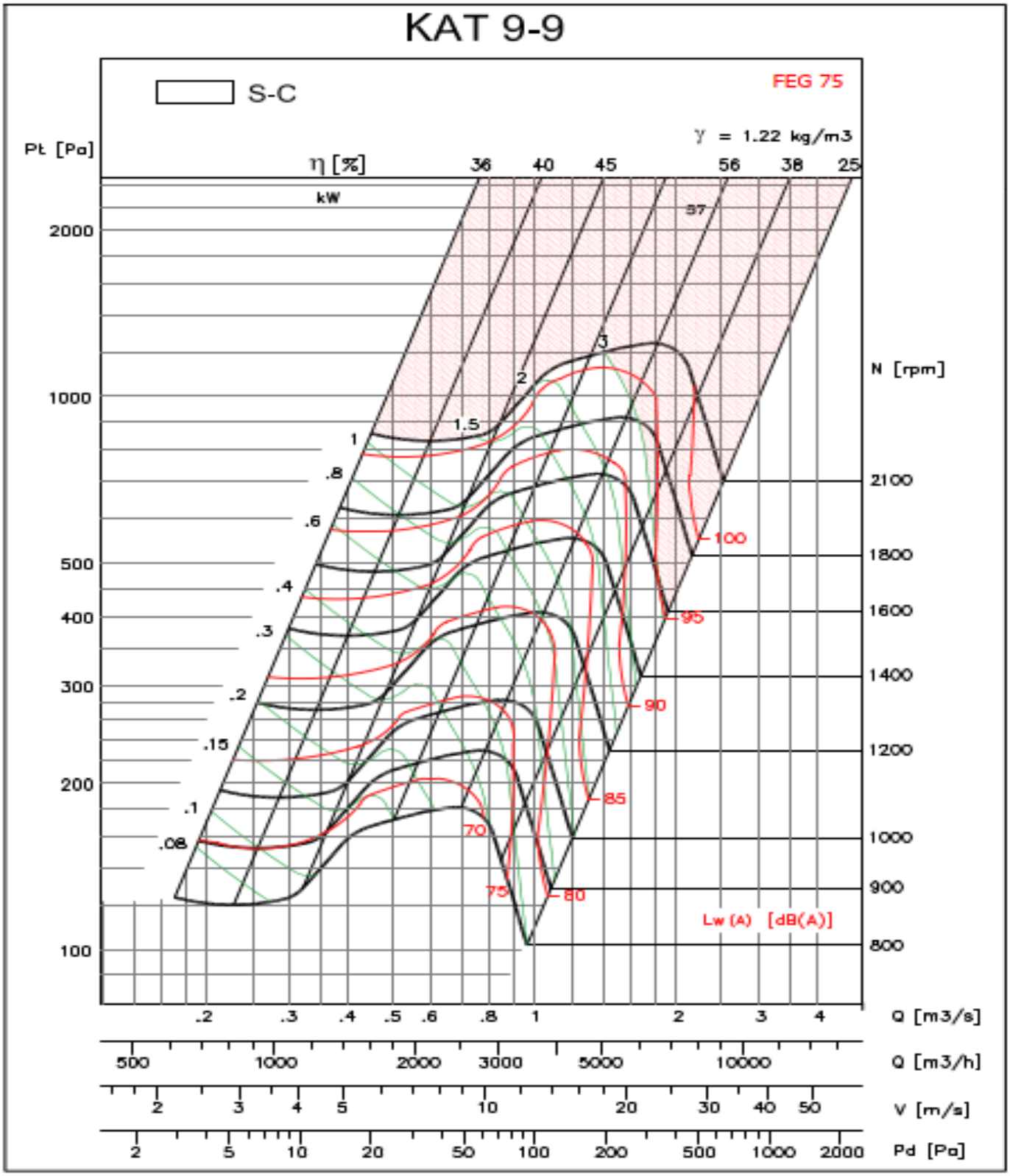


Figure 16: Fan Curve KAT 15-15

Model: UCQ140/ UCQ180/ UCQ240

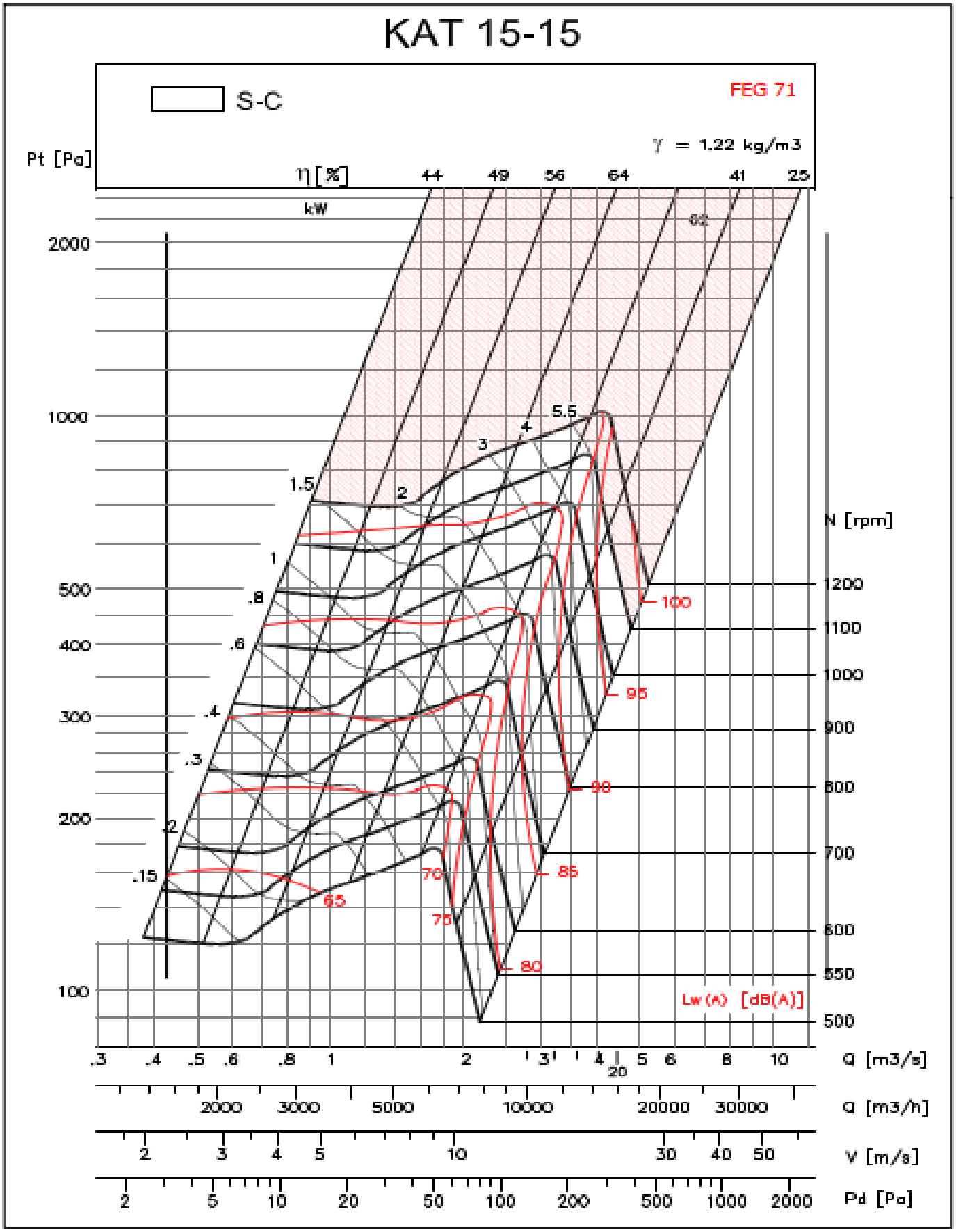


Figure 17: Fan Curve KAT 18-18

Model: UCQ280

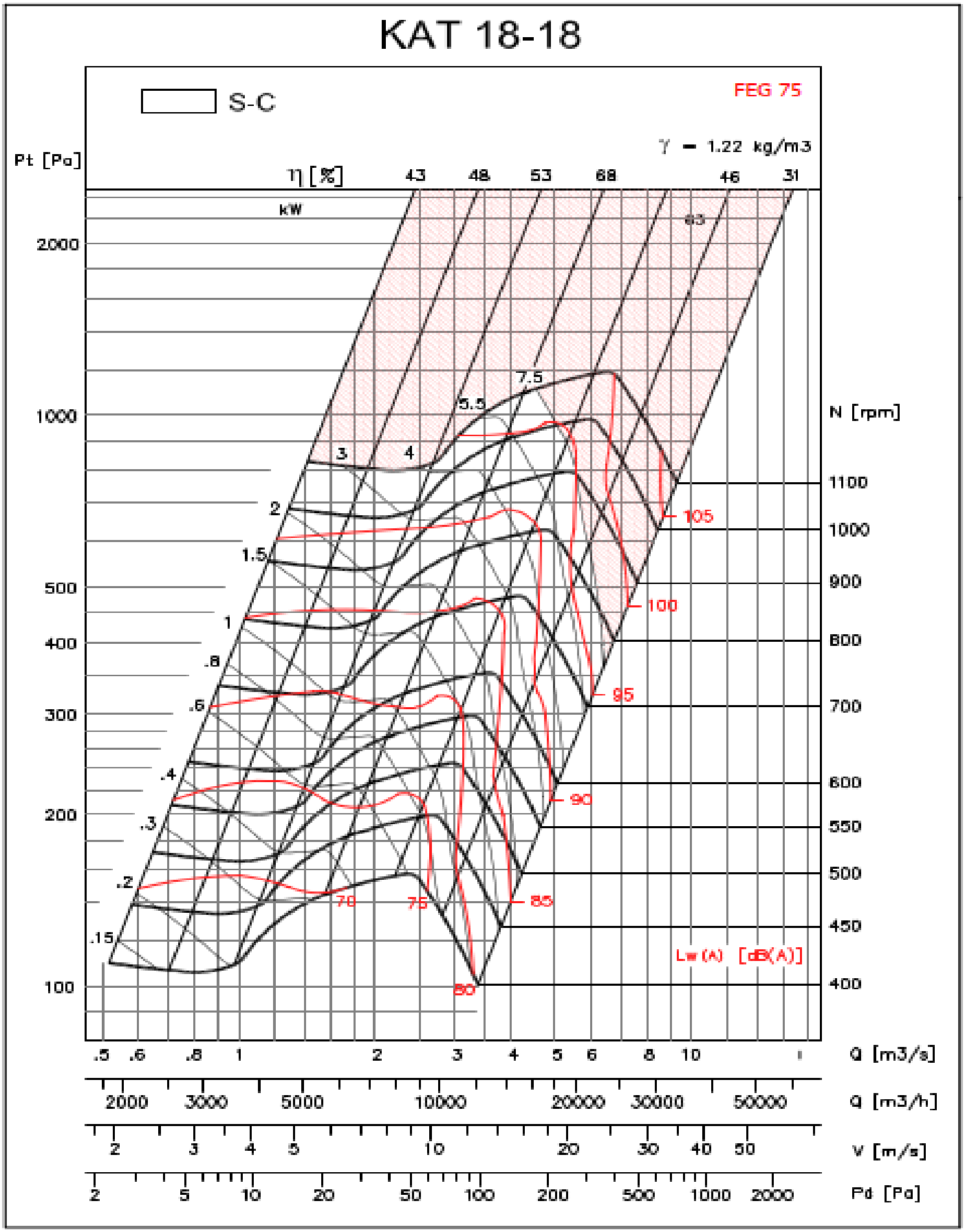


Figure 18: Fan Curve FDA-450

Model: UCQ320/ UCQ360/ UCQ710

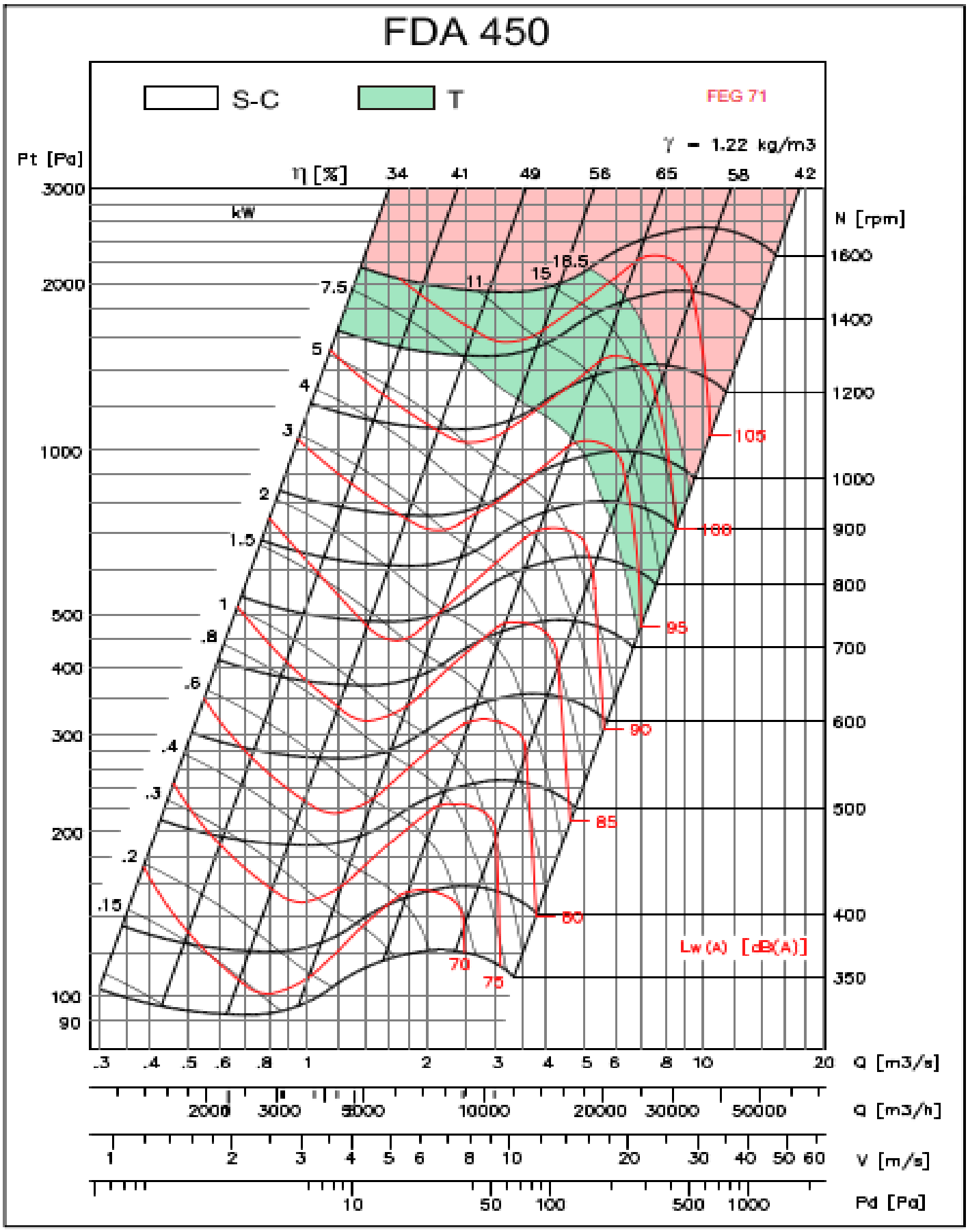


Figure 19: Fan Curve FDA-500

Model: UCQ400/ UCQ520/ UCQ870/ UCQ940

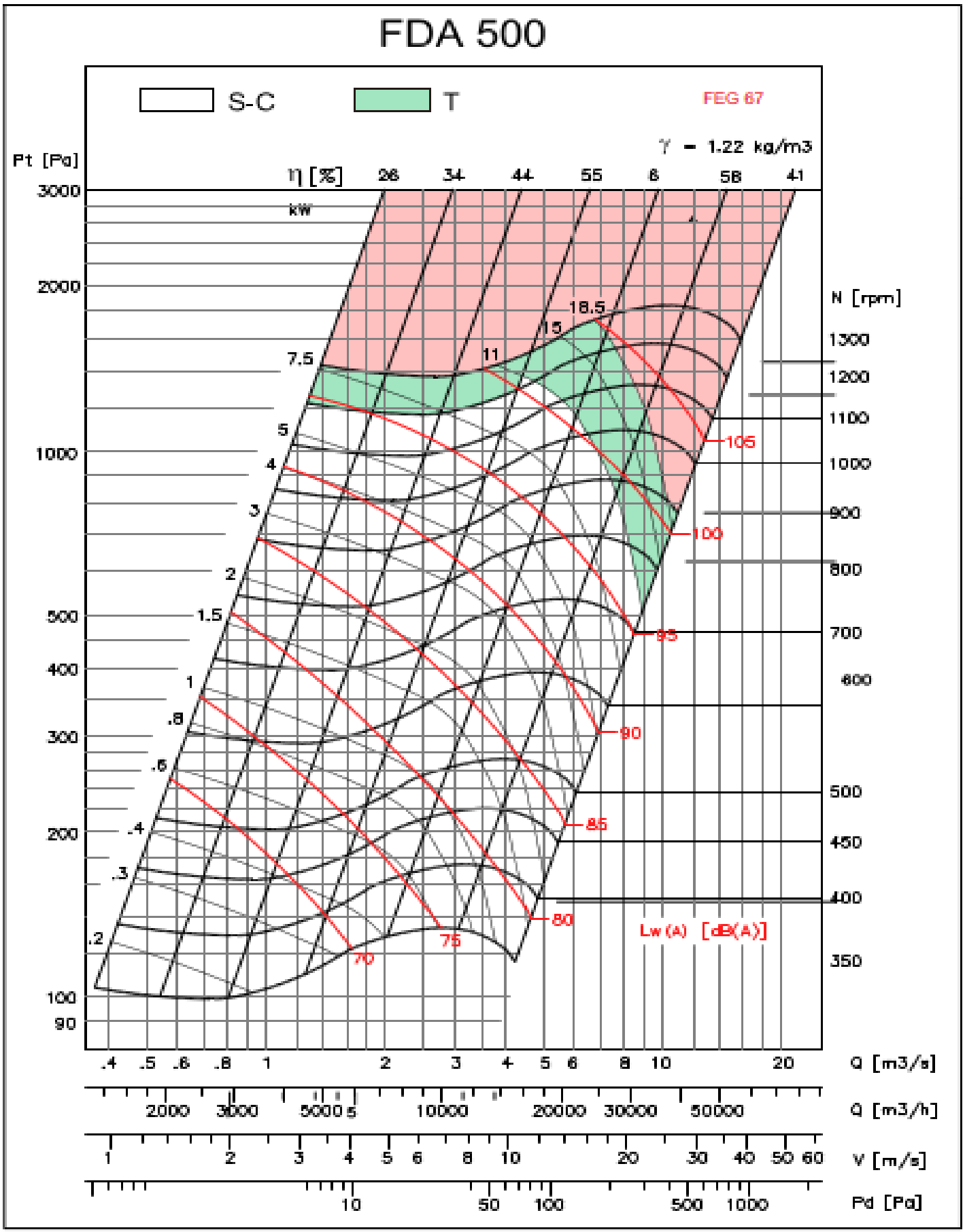
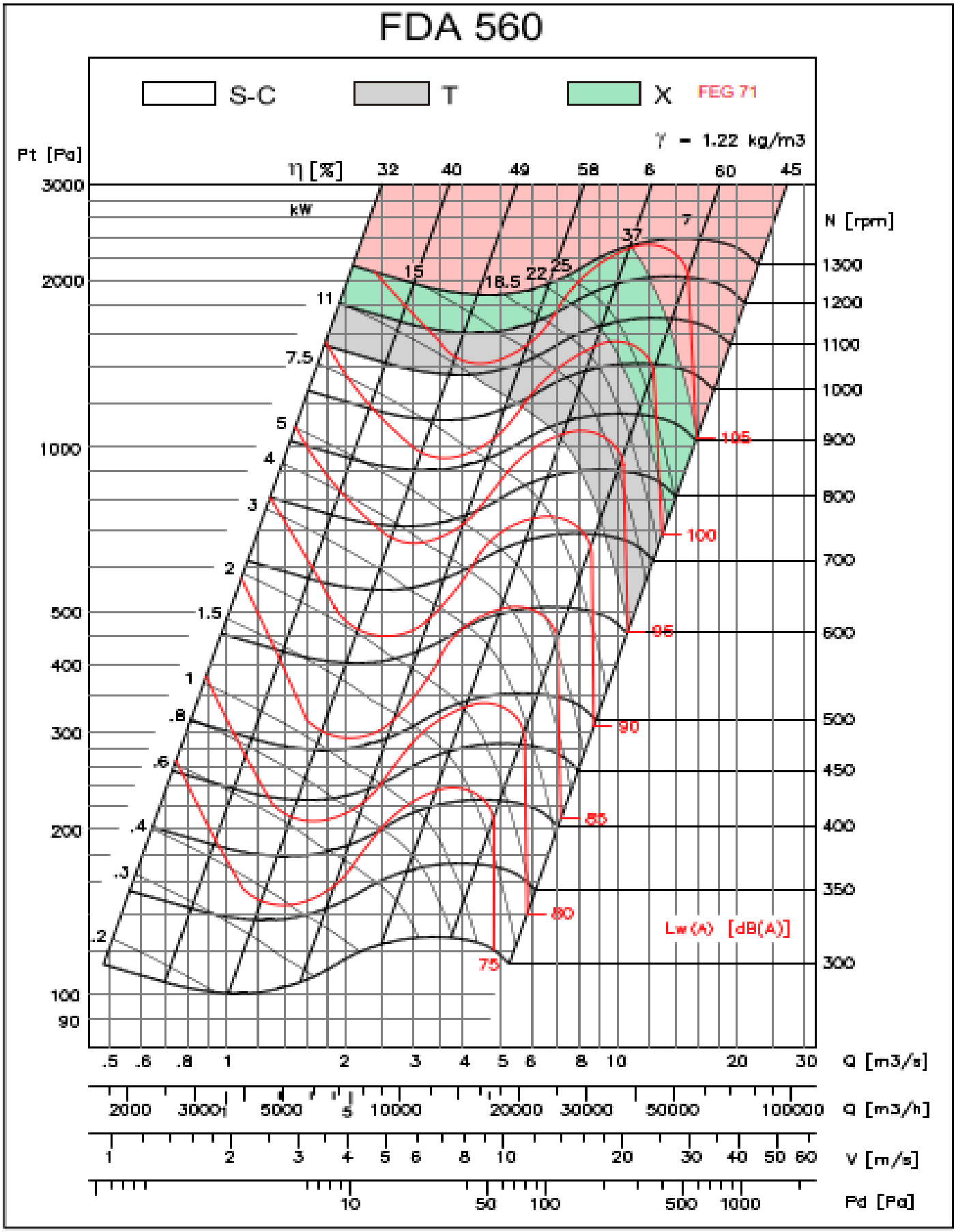


Figure 20: Fan Curve FDA-560

Model: UCQ570



6.0 ELECTRICAL CONNECTION

Before performing any service/maintenance work on the unit, ensure that the power supply is switched off. Failure to do so may result in serious injury or death.

Install electrical wiring in accordance with the National Electric Code and / or local regulations. A fused disconnect switch must be used in a separate circuit from the main power panel. The switch should be reasonably close to the unit for convenience in servicing.

Field and elementary wiring diagrams associated with the units are shown in this manual. The electrical data is shown in the wiring diagrams.

The unit with DOL starter control specification is designed for single power source connection. No separate supply is required for the controls. The units are supplied for use on 380-415V-3Ph-50Hz and the control voltage for the control panel operation is 220-240V-1Ph-50Hz.

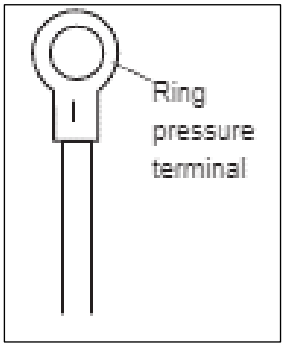
The unit must not be restarted within 3 minutes after shutting down.

Make sure that the unit is properly grounded by checking the tightness of the earthing connection. Each system contains factory mounted, wired, adjusted, and tested controls which are required to operate and protect the unit.

The control system includes compressor and fan overload protection, phase protection, high- and low-pressure cutouts to guard against compressor damage due to high discharge pressure and refrigerant leakage.

Separate power cables as much as possible from the probe and digital input cables to avoid possible electromagnetic disturbance. Never run power cables and signal cables in the same conduits.

- All wires must be firmly connected.
- All wires must not touch the refrigerant piping, compressor, or any moving parts of the fan motor.
- Make sure no external pressure is applied to the terminal connectors and wires.
- Use ring pressure terminal for connecting earth wire to the grounding screw inside the control box. Connect the power supply wires by matching to the indication on terminal block. (Refer to the wiring diagram on the unit).
- Use the correct screwdriver for terminal screws tightening. Unsuitable screwdrivers can damage the screw head.
- Over tightening can damage the terminal screws.



The figures shown in ***Table 7*** are for information purposes only. They should be checked and selected to comply with the local/national codes of regulations. This is also subject to the type of installation and conductors used.

Table 7: Wire and Fuse/Circuit Breaker Selection

Model	Compressor				Fan Motor			Power Supply		
	LRA (A)	RC (A)	MOC (A)	Qty	FLA (A)	HP	Qty	(V-Ph-Hz)	MCA (A)	MOCP (A)
UCQ60A*D	64	6.4	11.8	1	2.7	1.5	1	380~415V -3 Ph -50Hz	17	29
UCQ90A*D	101	9.8	16.2	1	3.5	2	1		24	40
UCQ140A*D	147	15.8	28	1	4.8	3	1		40	68
UCQ180A*D	197	20.7	36	1	4.8	3	1		50	86
UCQ060A*L	64	6.4	11.8	1	3.5	2	1		18	30
UCQ090A*L	101	9.8	16.2	1	4.8	3	1		25	41
UCQ140A*L	147	15.8	28	1	6.3	4	1		41	69
UCQ180A*L	197	20.7	36	1	6.3	4	1		51	87
UCQ240A*L	215	24.9	49	1	10.7	7.5	1		72	121
UCQ280A*L	260	31	56	1	10.7	7.5	1		81	137
UCQ320A*L	158	16.7	31	2	14.2	10	1		84	115
UCQ360A*L	197	20.7	36	2	20.5	15	1		102	138
UCQ400A*L	147	15.8	28	3	20.5	15	1		112	140
UCQ520A*L	197	20.7	36	3	20.5	15	1		138	174
UCQ570A*L	260	31	56	2	20.5	15	1		147	203
UCQ710A*L	215	24.9	49	3	14.2	10	2		188	237
UCQ870A*L	260	31	56	3	20.5	15	2		223	279
UCQ940A*L	215	24.9	49	4	20.5	15	2		249	298

MOC: Maximum Operating Current for Individual Compressor

LRA: Locked Rotor Current for Individual Compressor

RC: Rated Current for Individual Compressor

FLA: Full Load Current for Individual Fan Motor

HP: Horsepower

MCA: Minimum Circuit Amps

MOCP: Maximum Over Current Protection

Formula:

1. MCA = (1.25*MOC compressor 1 + (Qty of compressor – 1)* MOC compressor + (Qty of fan)* FLA of fan
2. MOCP = (2.25* MOC compressor 1 + (Qty of compressor – 1)* MOC compressor + (Qty of fan)* FLA of fan

Phase Sequence for Correct Compression

NOTICE

Scroll compressors require proper phase sequence to secure correct rotation direction and therefore compression. The phase sequence must be secured between network to the compressor.

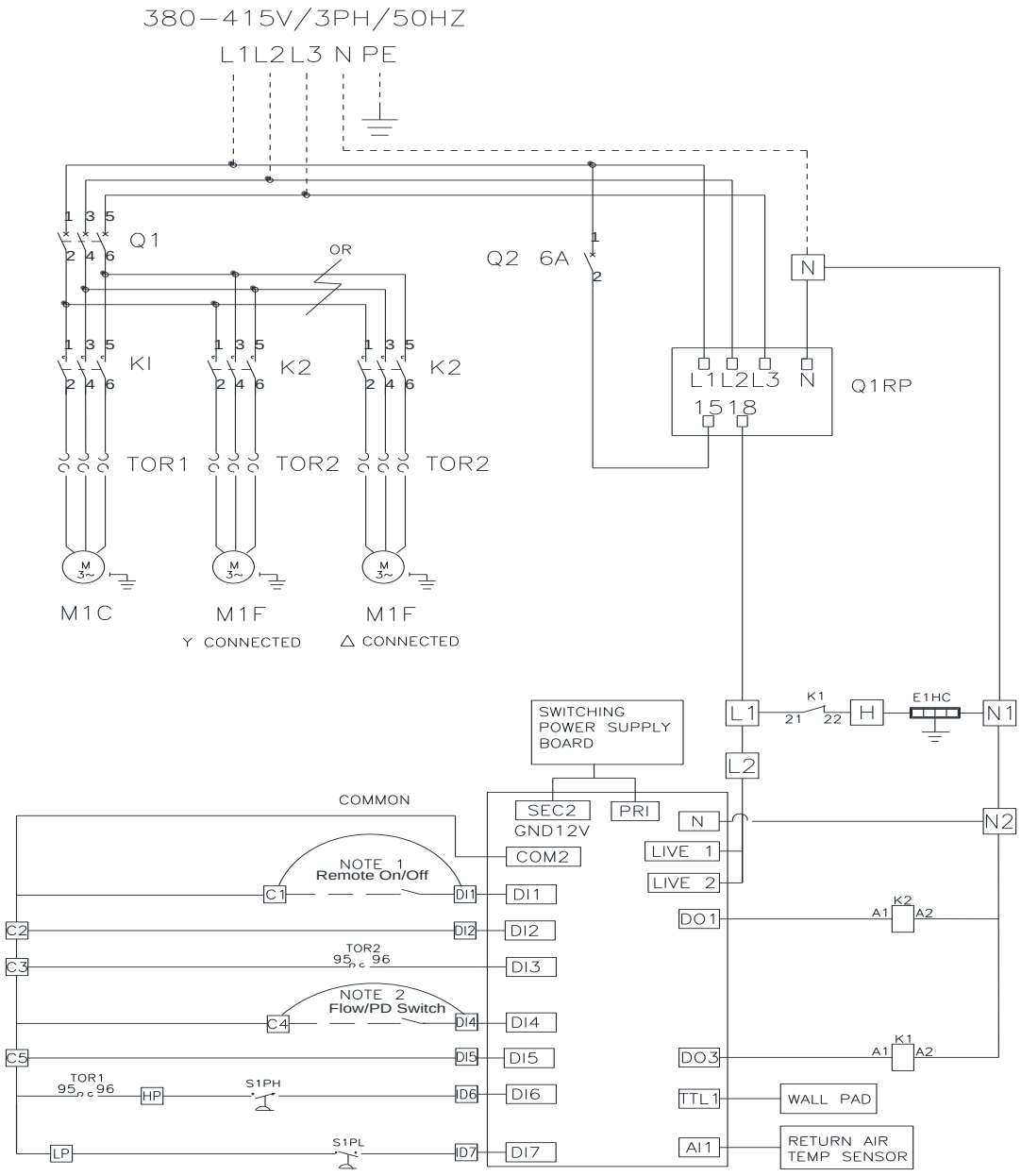
Correct Fan Motor Rotation

NOTICE

Verify correct rotation of fan motor by ensuring cold air discharged from unit. Swap any two live wires on the incoming supply to the fan contactors if fan motor reverse direction.

6.1 WIRING DIAGRAM DOL STARTER

Figure 21: UCQ60AE; UCQ90AE; UCQ140AE; UCQ180AE



LEGEND:

E1HC: COMPRESSOR HEATER
K1: COMPRESSOR RUN CONTACTOR
K2: FAN LINE CONTACTOR
M1C: COMPRESSOR
M1F: FAN
Q1: MOTOR CIRCUIT BREAKER 3P
Q1RP: PHASE PROTECTOR
Q2: MOTOR CIRCUIT BREAKER 1P
S1PL: LOW PRESSURE SWITCH
S1PH: HIGH PRESSURE SWITCH
TOR1: COMPRESSOR OVERLOAD RELAY
TOR2: FAN OVERLOAD RELAY
----- FIELD WIRING
——— FACTORY WIRED

NOTE:

1. JUMPER IS REMOVED FOR UNIT CONNECTED WITH REMOTE ON/OFF.
2. JUMPER IS REMOVED FOR UNIT CONNECTED WITH FLOW SWITCH.
3. SETTING FOR VARIES EXTERNAL STATIC PRESSURE.

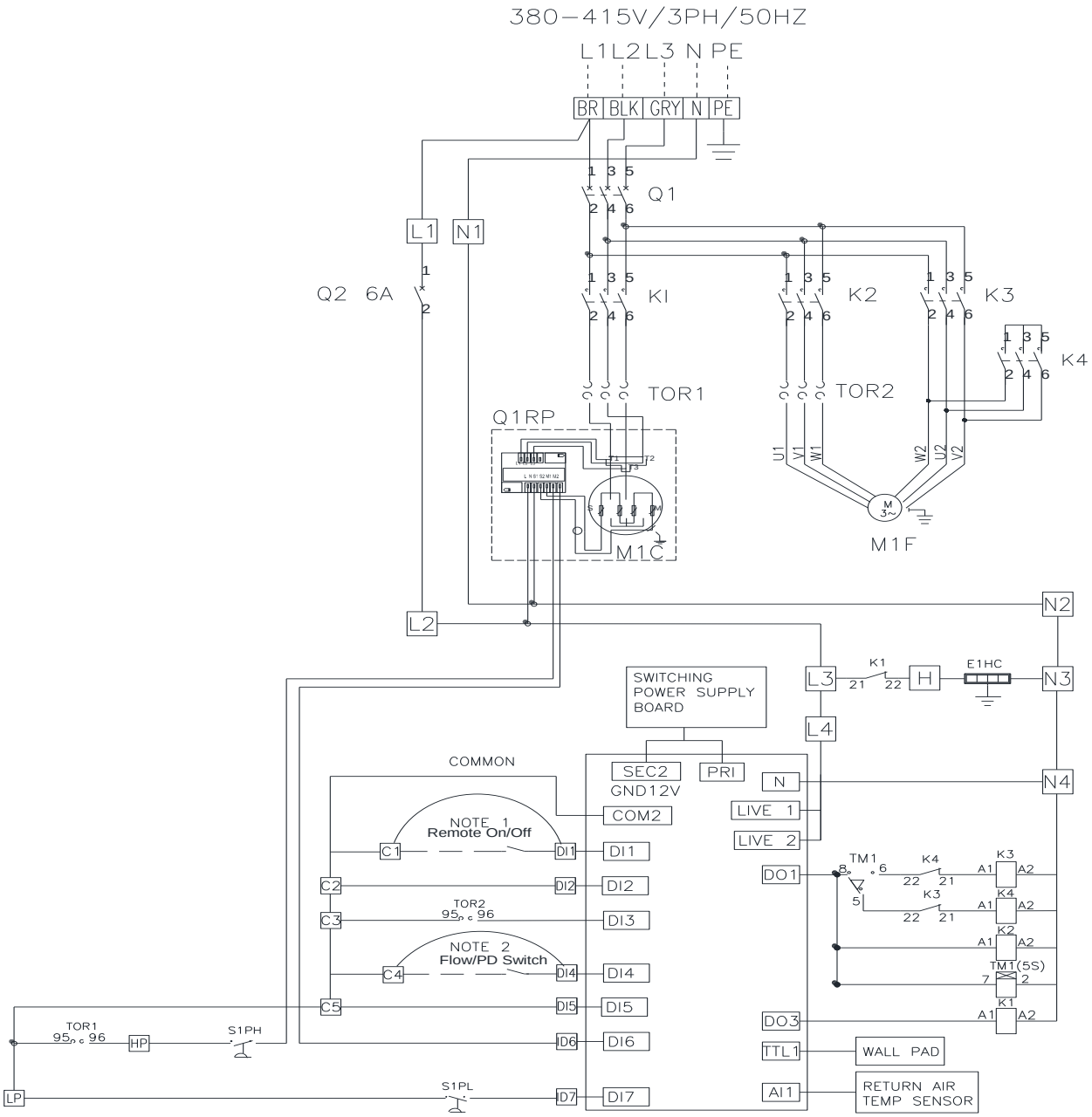
(A)

MODEL	OVERLOAD SETTING (A)		
	COMPRESSOR	FAN (0Pa)	FAN (250Pa)
60MBH	7.7	2.5 (Y)	3.4 (Y)
90MBH	12.5	3.4 (Y)	4.8 (Y)
140MBH	19.0	4.8 (Y)	6.3 (△)
180MBH	25.0	4.8 (Y)	6.3 (△)

(B)

MODEL	PCB DIP SWITCH SETTING								JUMPER
	1	2	3	4	5	6	7	8	AI8
60~180MBH	ON	ON	ON	ON	ON	ON	OFF	OFF	YES

Figure 22: UCQ240AE; UCQ280AE



LEGEND:

E1HC: COMPRESSOR HEATER
K1: COMPRESSOR RUN CONTACTOR
K2: FAN LINE CONTACTOR
K3: FAN DELTA CONTACTOR
K4: FAN STAR CONTACTOR
M1C: COMPRESSOR
M1F: FAN
Q1: MOTOR CIRCUIT BREAKER 3P
Q1RP: COMPRESSOR BUILT IN PROTECTOR
Q2: MOTOR CIRCUIT BREAKER 1P
S1PL: LOW PRESSURE SWITCH
S1PH: HIGH PRESSURE SWITCH
TM1: TIME DELAY
TOR1: COMPRESSOR OVERLOAD RELAY
TOR2: FAN OVERLOAD RELAY
----- FIELD WIRING
——— FACTORY WIRED

NOTE:

1. JUMPER IS REMOVED FOR UNIT CONNECTED WITH REMOTE ON/OFF.
2. JUMPER IS REMOVED FOR UNIT CONNECTED WITH FLOW SWITCH.

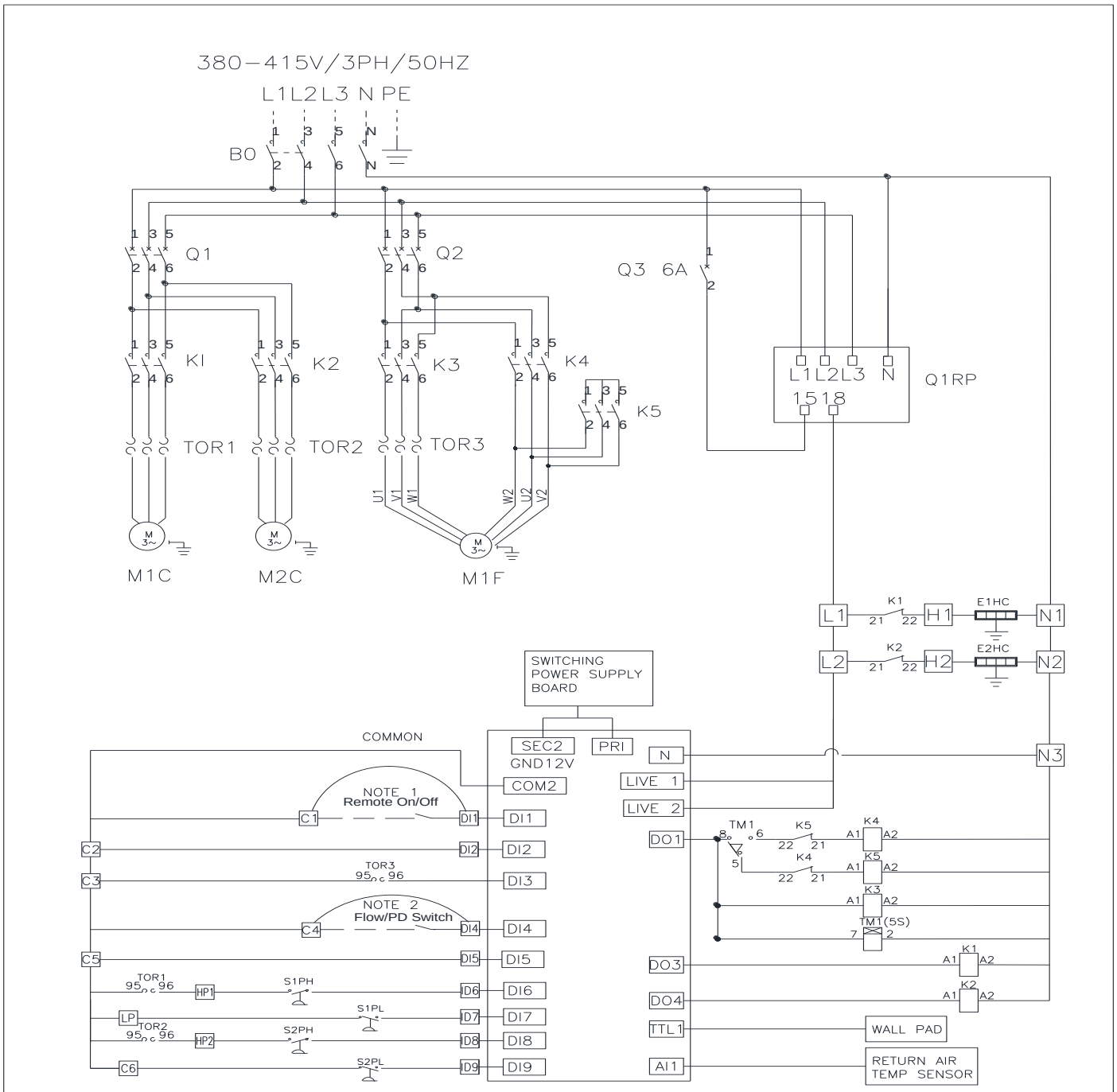
(A)

MODEL	OVERLOAD SETTING (A)	
	COMPRESSOR	FAN (250Pa)
240MBH	29.8	10.7 (△)
280MBH	37.2	10.7 (△)

(B)

MODEL	PCB DIP SWITCH SETTING								JUMPER
	1	2	3	4	5	6	7	8	AI8
240~280MBH	ON	ON	ON	ON	ON	ON	OFF	OFF	YES

Figure 23: UCQ320AE; UCQ360AE



LEGEND:

B0:	ISOLATOR SWITCH	Q1RP:	PHASE PROTECTOR
E1HC/E2HC:	COMPRESSOR HEATER	Q3:	MOTOR CIRCUIT BREAKER 1P
K1/K2:	COMPRESSOR RUN CONTACTOR	S1PL/S2PL:	LOW PRESSURE SWITCH
K3:	FAN LINE CONTACTOR	S1PH/S2PH:	HIGH PRESSURE SWITCH
K4:	FAN DELTA CONTACTOR	TM1:	TIME DELAY
K5:	FAN STAR CONTACTOR	TOR1/TOR2:	COMPRESSOR OVERLOAD RELAY
M1C/M2C:	COMPRESSOR	TOR3:	FAN OVERLOAD RELAY
M1F:	FAN	-----	FIELD WIRING
Q1/Q2:	MOTOR CIRCUIT BREAKER 3P	____	FACTORY WIRED

NOTE:

1. JUMPER IS REMOVED FOR UNIT CONNECTED WITH REMOTE ON/OFF.
2. JUMPER IS REMOVED FOR UNIT CONNECTED WITH FLOW SWITCH.

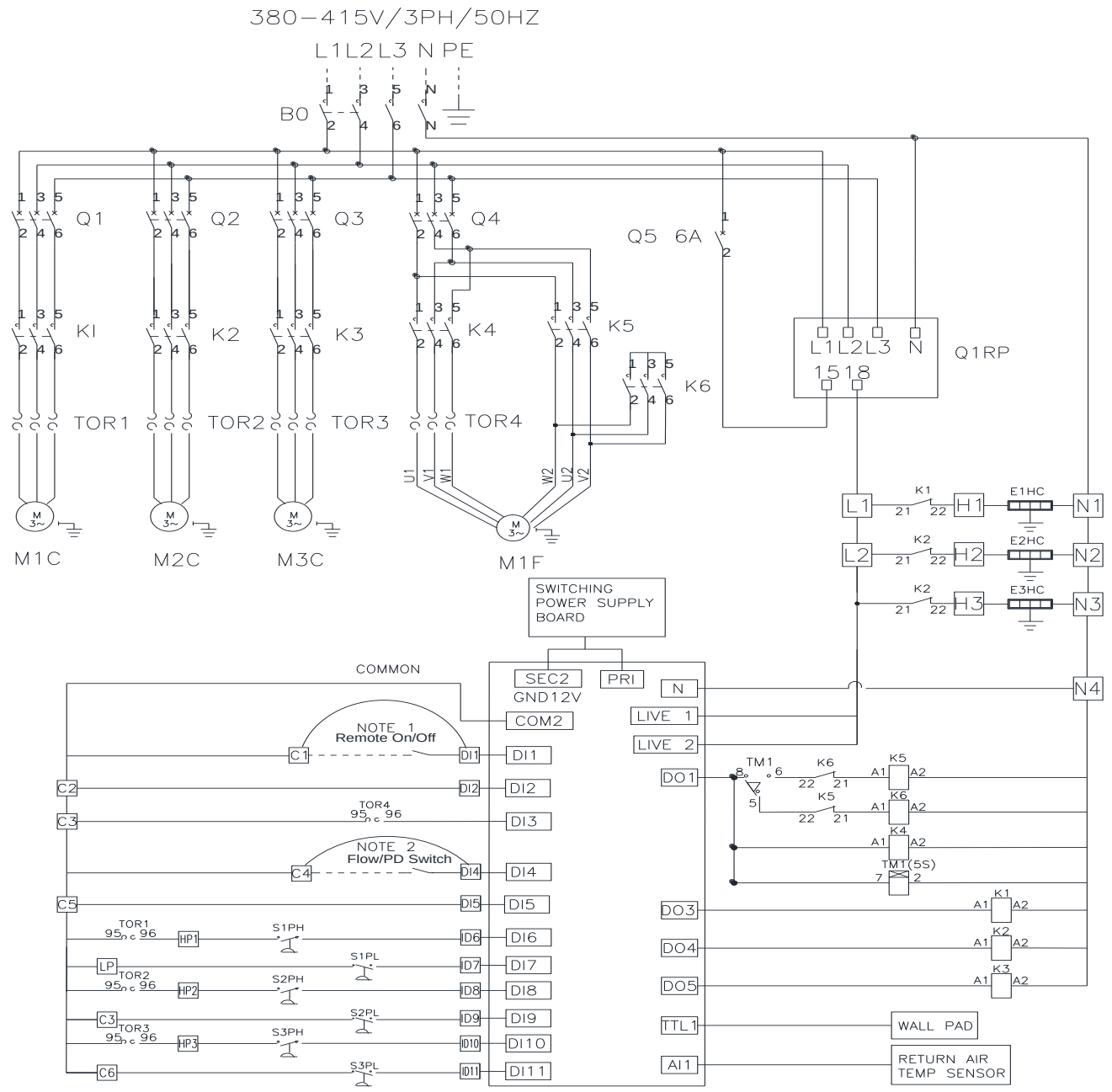
(A)

MODEL	OVERLOAD SETTING (A)	
	COMPRESSOR	FAN (250Pa)
320MBH	20.1	14.2 (△)
360MBH	25.0	20.5 (△)

(B)

MODEL	PCB DIP SWITCH SETTING								JUMPER
	1	2	3	4	5	6	7	8	AI8
320~360MBH	ON	ON	ON	ON	ON	ON	OFF	OFF	NO

Figure 24: UCQ400AE; UCQ520AE



LEGEND:

B0:	ISOLATOR SWITCH	Q1RP:	PHASE PROTECTOR
E1HC/E2HC/E3HC:	COMPRESSOR HEATER	Q5:	MOTOR CIRCUIT BREAKER 1P
K1/K2/K3:	COMPRESSOR RUN CONTACTOR	S1PL/S2PL/S3PL:	LOW PRESSURE SWITCH
K4:	FAN LINE CONTACTOR	S1PH/S2PH/S3PH:	HIGH PRESSURE SWITCH
K5:	FAN DELTA CONTACTOR	TM1:	TIME DELAY
K6:	FAN STAR CONTACTOR	TOR1/TOR2/TOR3:	COMPRESSOR OVERLOAD RELAY
M1C/M2C/M3C:	COMPRESSOR	TOR4:	FAN OVERLOAD RELAY
M1F:	FAN	- - - - -	FIELD WIRING
Q1/Q2/Q3/Q4:	MOTOR CIRCUIT BREAKER 3P	———	FACTORY WIRED

NOTE:

1. JUMPER IS REMOVED FOR UNIT CONNECTED WITH REMOTE ON/OFF.
2. JUMPER IS REMOVED FOR UNIT CONNECTED WITH FLOW SWITCH.

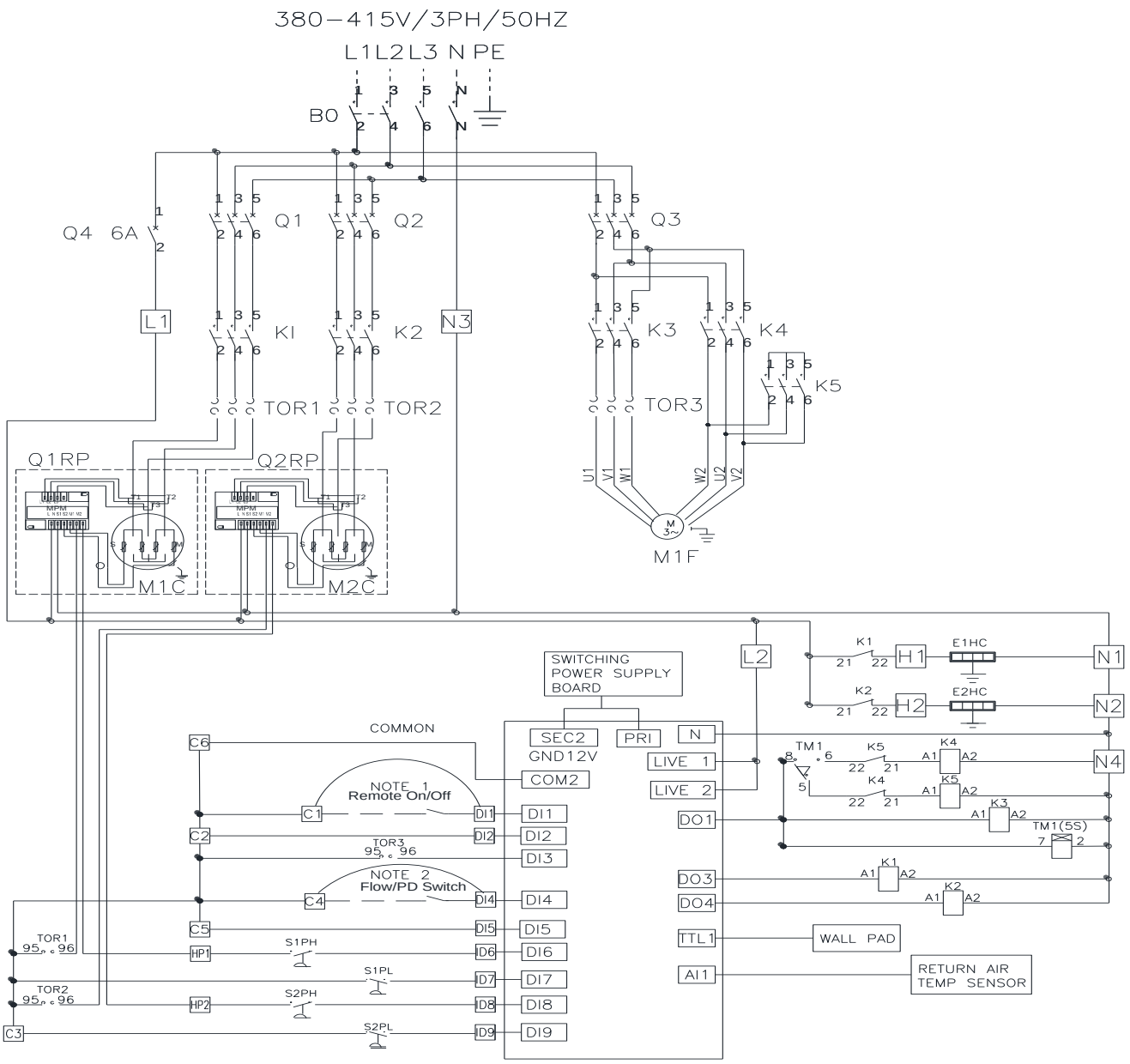
(A)

MODEL	OVERLOAD SETTING (A)	
	COMPRESSOR	FAN (250Pa)
400MBH	19.0	20.5 (Δ)
520MBH	25.0	20.5 (Δ)

(B)

MODEL	PCB DIP SWITCH SETTING								JUMPER
	1	2	3	4	5	6	7	8	AI8
400~520MBH	ON	OFF	ON	ON	ON	ON	OFF	OFF	NO

Figure 25: UCQ570AE



LEGEND:

B0:	ISOLATOR SWITCH	Q1RP/Q2RP:	COMPRESSOR BUILT IN PROTECTOR
E1HC/E2HC:	COMPRESSOR HEATER	Q4:	MOTOR CIRCUIT BREAKER 1P
K1/K2:	COMPRESSOR RUN CONTACTOR	S1PL/S2PL:	LOW PRESSURE SWITCH
K3:	FAN LINE CONTACTOR	S1PH/S2PH:	HIGH PRESSURE SWITCH
K4:	FAN DELTA CONTACTOR	TM1:	TIME DELAY
K5:	FAN STAR CONTACTOR	TOR1/TOR2:	COMPRESSOR OVERLOAD RELAY
M1C/M2C:	COMPRESSOR	TOR3:	FAN OVERLOAD RELAY
M1F:	FAN	-----	FIELD WIRING
Q1/Q2/Q3:	MOTOR CIRCUIT BREAKER 3P	———	FACTORY WIRED

NOTE:

1. JUMPER IS REMOVED FOR UNIT CONNECTED WITH REMOTE ON/OFF.
2. JUMPER IS REMOVED FOR UNIT CONNECTED WITH FLOW SWITCH.

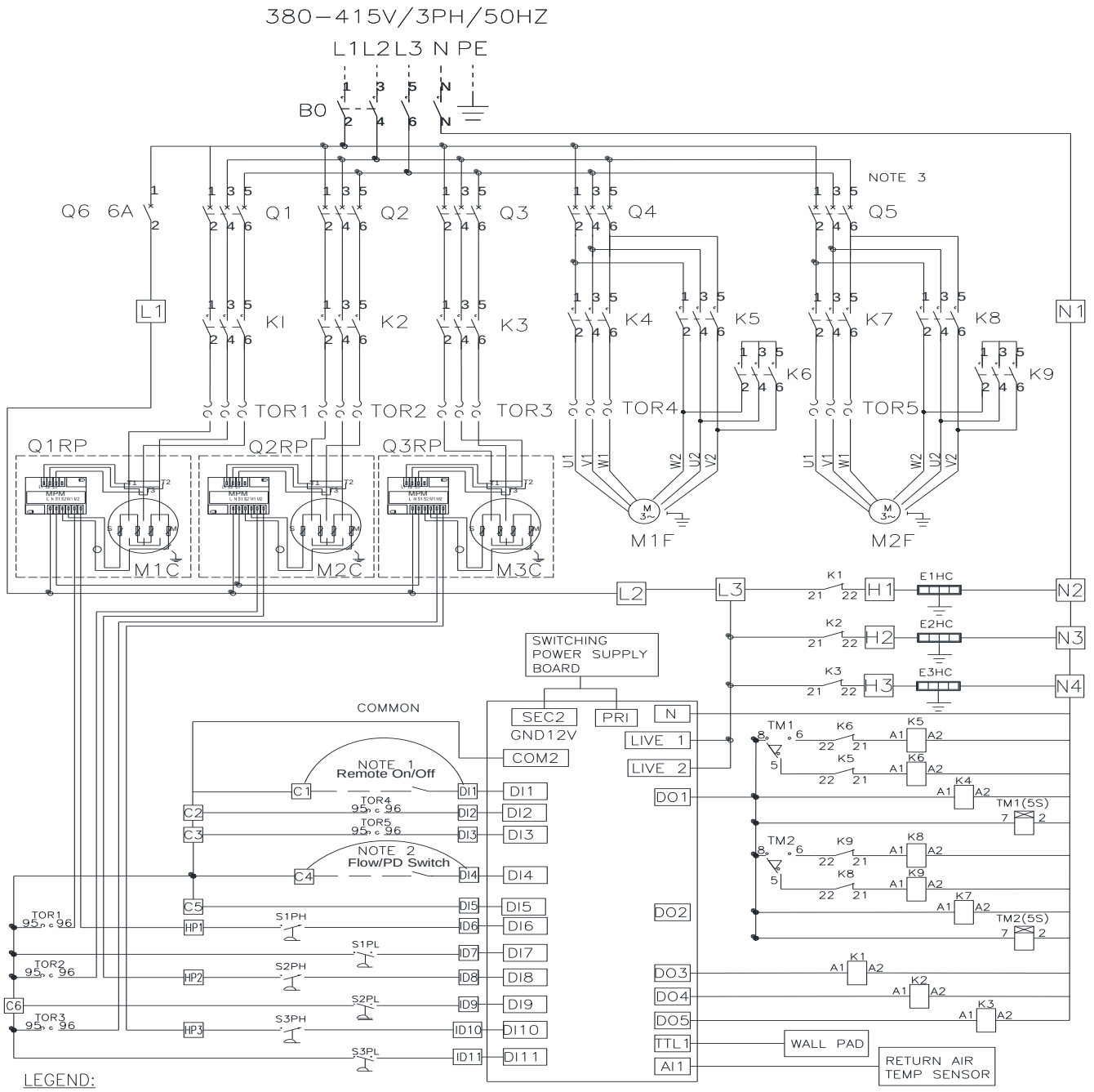
(A)

MODEL	OVERLOAD SETTING (A)	
	COMPRESSOR	FAN (250Pa)
570MBH	37.2	20.5 (△)

(B)

MODEL	PCB DIP SWITCH SETTING								JUMPER
	1	2	3	4	5	6	7	8	AI8
570MBH	ON	ON	ON	ON	ON	ON	OFF	OFF	NO

Figure 26: UCQ710AE; UCQ870AE



LEGEND:

B0:	ISOLATOR SWITCH
E1HC/E2HC/E3HC:	COMPRESSOR HEATER
K1/K2/K3:	COMPRESSOR RUN CONTACTOR
K4/K7:	FAN LINE CONTACTOR
K5/K8:	FAN DELTA CONTACTOR
K6/K9:	FAN STAR CONTACTOR
M1C/M2C/M3C:	COMPRESSOR
M1F/M2F:	FAN
Q1/Q2/Q3/Q4/Q5:	MOTOR CIRCUIT BREAKER 3P
Q1RP/Q2RP/Q3RP:	COMPRESSOR BUILT IN PROTECTOR
Q6:	MOTOR CIRCUIT BREAKER 1P
S1PL/S2PL/S3PL:	LOW PRESSURE SWITCH
S1PH/S2PH/S3PH:	HIGH PRESSURE SWITCH
TM1/TM2:	TIME DELAY
TOR1/TOR2/TOR3:	COMPRESSOR OVERLOAD RELAY
TOR4/TOR5:	FAN OVERLOAD RELAY
- - - - -	FIELD WIRING
———	FACTORY WIRED

NOTE:

1. JUMPER IS REMOVED FOR UNIT CONNECTED WITH REMOTE ON/OFF.
2. JUMPER IS REMOVED FOR UNIT CONNECTED WITH FLOW SWITCH.
3. FOR MODEL 710MBH: INCOMING WIRE ON TERMINAL 3 & 5 OF Q5 IS SWAPPED.

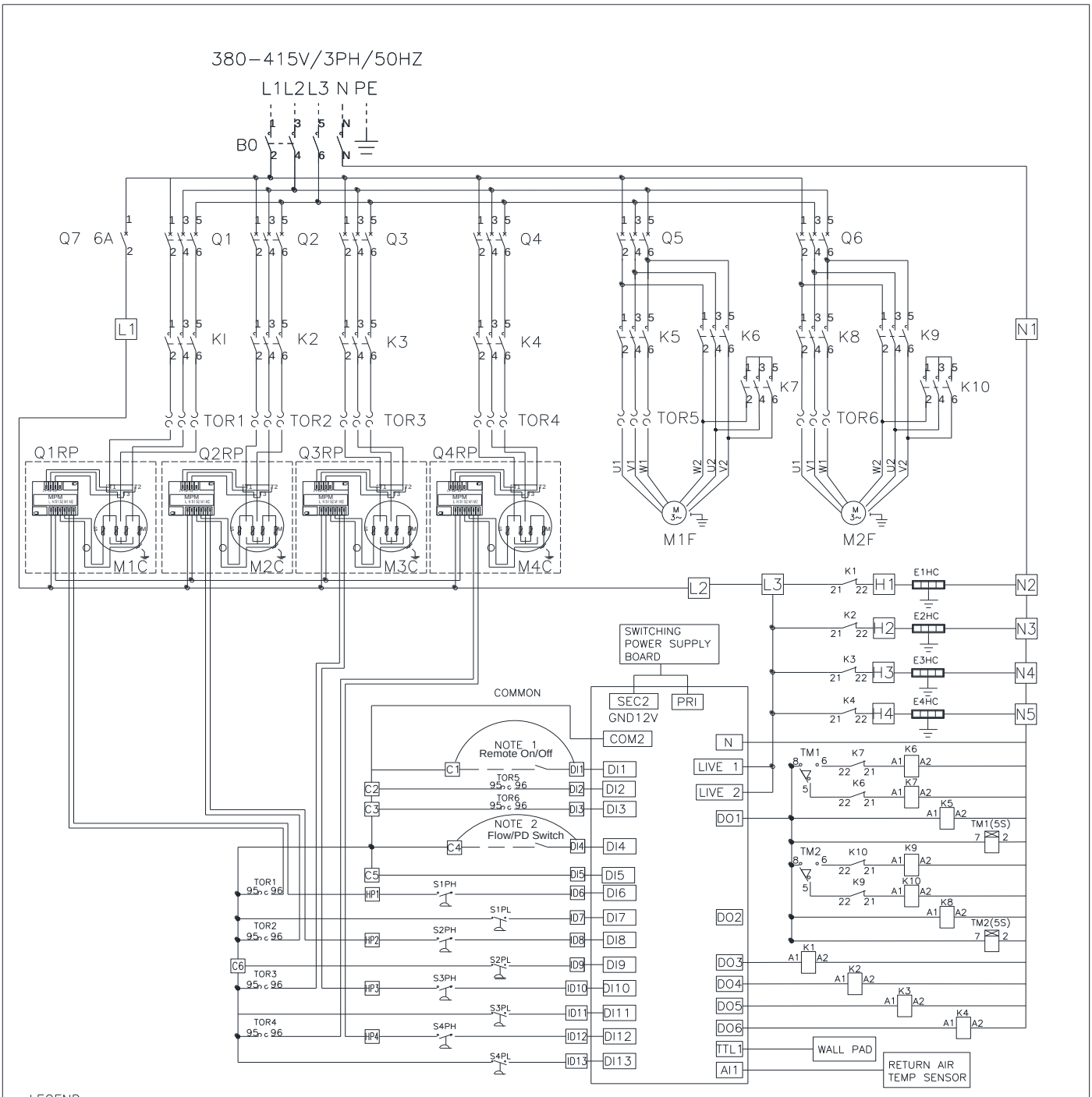
(A)

MODEL	OVERLOAD SETTING (A)	
	COMPRESSOR	FAN (250Pa)
710MBH	29.8	14.2 (Δ)
870MBH	37.2	20.5 (Δ)

(B)

MODEL	PCB DIP SWITCH SETTING								JUMPER
	1	2	3	4	5	6	7	8	AI8
710/870MBH	ON	OFF	ON	ON	ON	ON	OFF	OFF	NO

Figure 27: UCQ940AE



LEGEND:

B0:	ISOLATOR SWITCH	Q1RP/Q2RP/Q3RP/Q4RP:	COMPRESSOR BUILT IN PROTECTOR
E1HC/E2HC/E3HC/E4HC:	COMPRESSOR HEATER	Q7:	MOTOR CIRCUIT BREAKER 1P
K1/K2/K3/K4:	COMPRESSOR RUN CONTACTOR	S1PL/S2PL/S3PL/S4PL:	LOW PRESSURE SWITCH
K5/K8:	FAN LINE CONTACTOR	S1PH/S2PH/S3PH/S4PH:	HIGH PRESSURE SWITCH
K6/K9:	FAN DELTA CONTACTOR	TM1/TM2:	TIME DELAY
K7/K10:	FAN STAR CONTACTOR	TOR1/TOR2/TOR3/TOR4:	COMPRESSOR OVERLOAD RELAY
M1C/M2C/M3C/M4C:	COMPRESSOR	TOR5/TOR6:	FAN OVERLOAD RELAY
M1F/M2F:	FAN	-----	FIELD WIRING
Q1/Q2/Q3/Q4/Q5/Q6:	MOTOR CIRCUIT BREAKER 3P	———	FACTORY WIRED

NOTE:

1. JUMPER IS REMOVED FOR UNIT CONNECTED WITH REMOTE ON/OFF.
2. JUMPER IS REMOVED FOR UNIT CONNECTED WITH FLOW SWITCH.

(A)

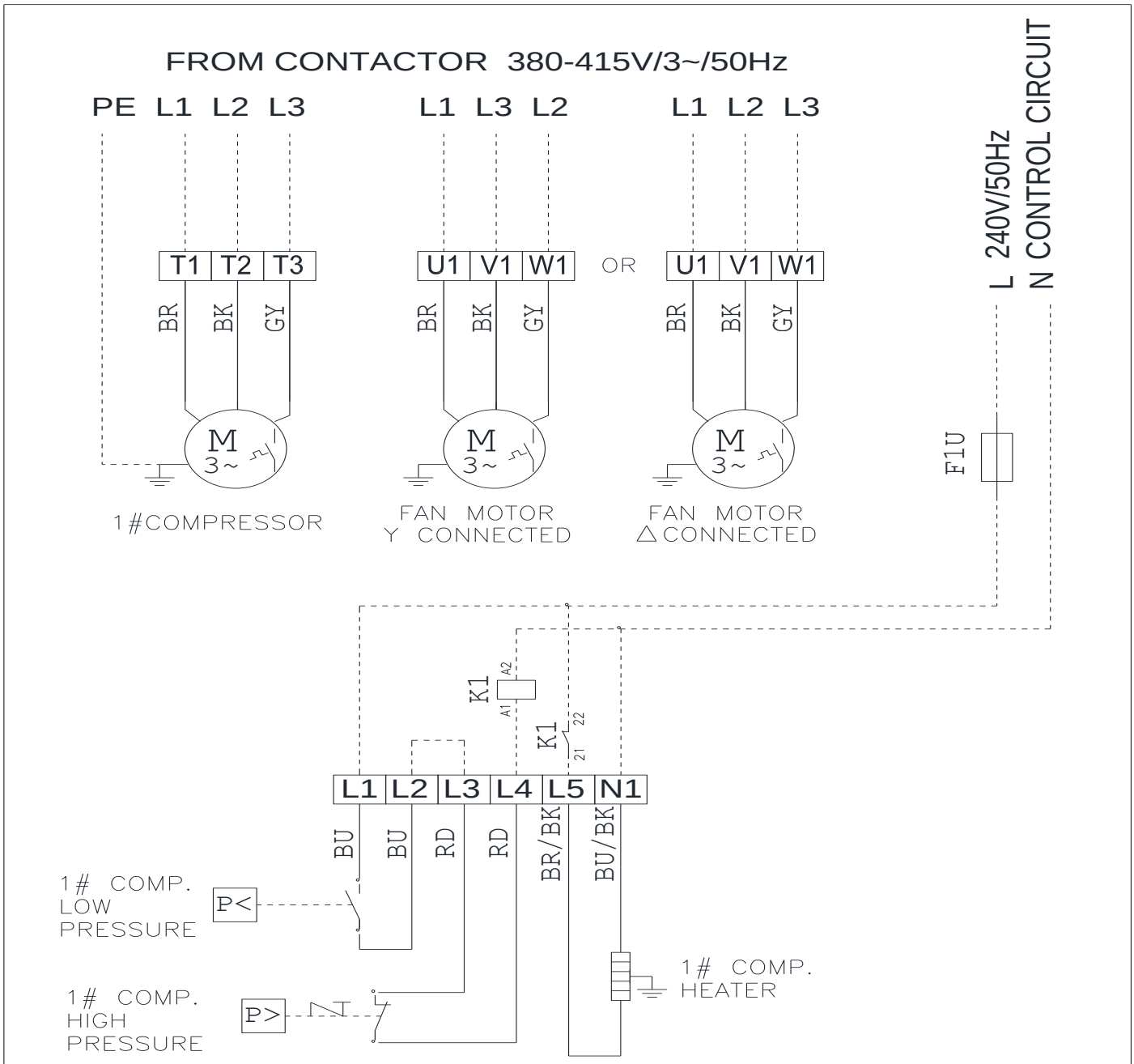
MODEL	OVERLOAD SETTING (A)	
	COMPRESSOR	FAN (250Pa)
940MBH	29.8	20.5 (Δ)

(B)

MODEL	PCB DIP SWITCH SETTING								JUMPER
	1	2	3	4	5	6	7	8	AI8
940MBH	ON	OFF	OFF	ON	ON	ON	OFF	OFF	NO

6.2 WIRING DIAGRAM BASIC CONTROL BOX

Figure 28: UCQ60AB; UCQ90AB; UCQ140AB; UCQ180AB

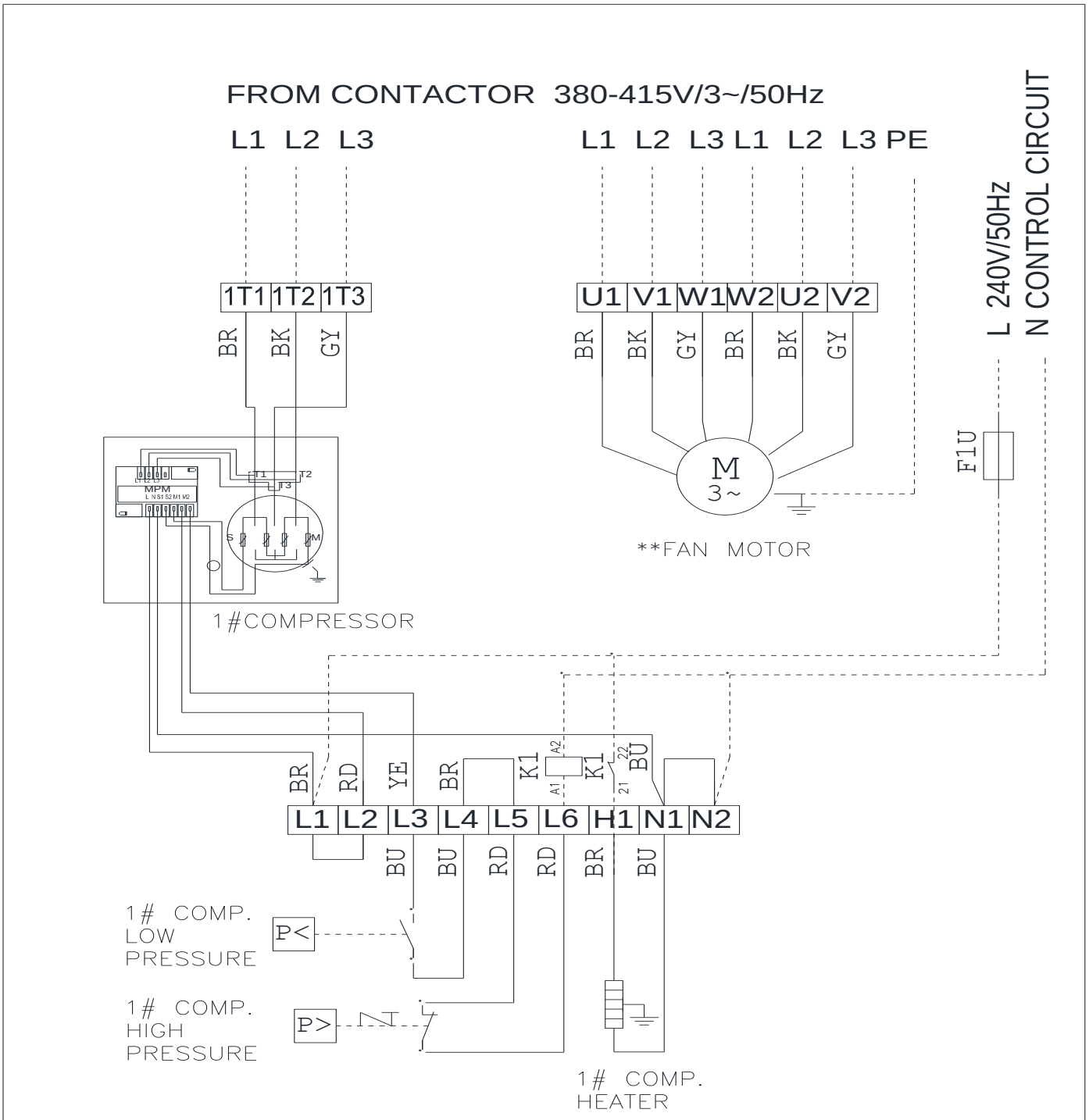


NOTE:

1) FOR SIZING OF ELECTRICAL COMPONENT, REFER PRODUCT NAMEPLATE FOR RATED CURRENT & MAXIMUM OPERATING CURRENT.
2) K1: CONTACTOR; FIU: FUSE (NOT SUPPLIED)
3) MOTOR CONNECTION AS DEFAULTED ON MOTOR NAMEPLATE.
4) RECOMMENDED OVERLOAD SETTING FOR VARIES EXTERNAL STATIC PRESSURE.

MODEL	OVERLOAD SETTING (A)		
	COMPRESSOR	FAN (0Pa)	FAN (250Pa)
60MBH	7.7	2.5 (Y)	3.4 (Y)
90MBH	12.5	3.4 (Y)	4.8 (Y)
140MBH	19.0	4.8 (Y)	6.3 (△)
180MBH	25.0	4.8 (Y)	6.3 (△)

Figure 29: UCQ240AB; UCQ280AB

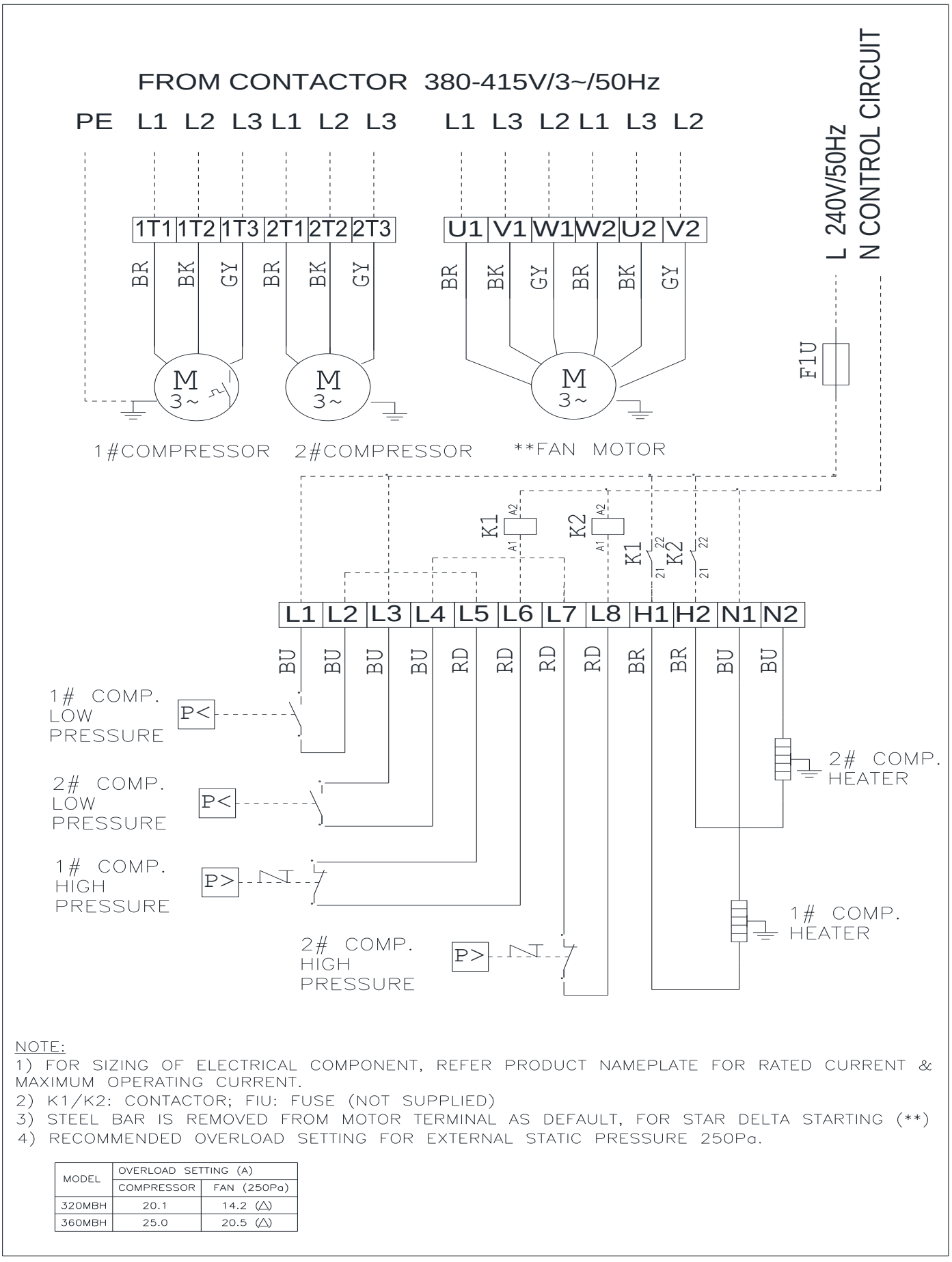


NOTE:

1) FOR SIZING OF ELECTRICAL COMPONENT, REFER PRODUCT NAMEPLATE FOR RATED CURRENT & MAXIMUM OPERATING CURRENT.
2) K1: CONTACTOR; FIU: FUSE (NOT SUPPLIED)
3) STEEL BAR IS REMOVED FROM MOTOR TERMINAL AS DEFAULT, FOR STAR DELTA STARTING (**)
4) RECOMMENDED OVERLOAD SETTING FOR EXTERNAL STATIC PRESSURE 250Pa.

MODEL	OVERLOAD SETTING (A)	
	COMPRESSOR	FAN (250Pa)
240MBH	29.8	10.7 (△)
280MBH	37.2	10.7 (△)

Figure 30: UCQ320AB; UCQ360AB

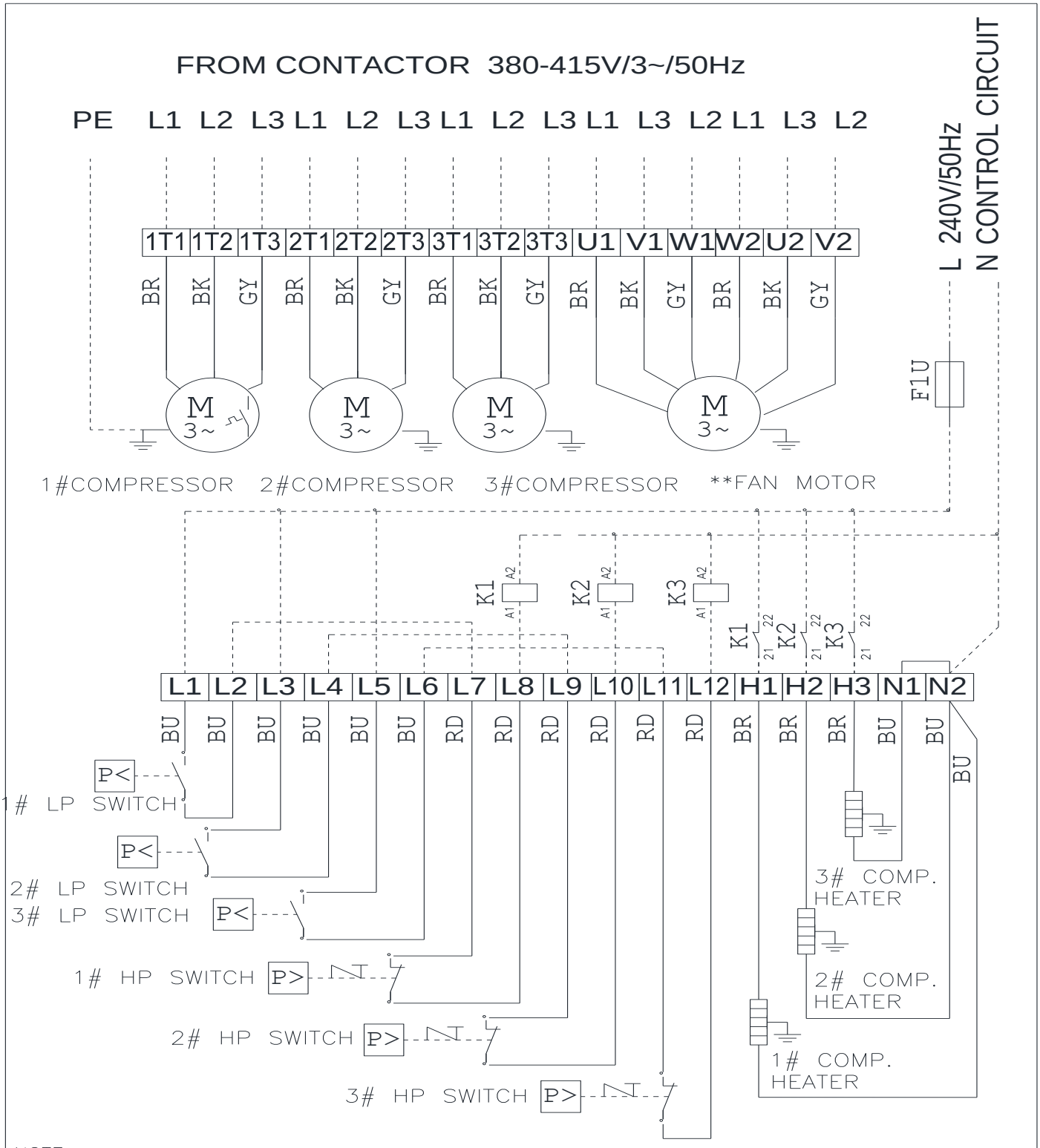


NOTE:

1) FOR SIZING OF ELECTRICAL COMPONENT, REFER PRODUCT NAMEPLATE FOR RATED CURRENT & MAXIMUM OPERATING CURRENT.
2) K1/K2: CONTACTOR; FIU: FUSE (NOT SUPPLIED)
3) STEEL BAR IS REMOVED FROM MOTOR TERMINAL AS DEFAULT, FOR STAR DELTA STARTING (**)
4) RECOMMENDED OVERLOAD SETTING FOR EXTERNAL STATIC PRESSURE 250Pa.

MODEL	OVERLOAD SETTING (A)	
	COMPRESSOR	FAN (250Pa)
320MBH	20.1	14.2 (△)
360MBH	25.0	20.5 (△)

Figure 31: UCQ400AB; UCQ520AB

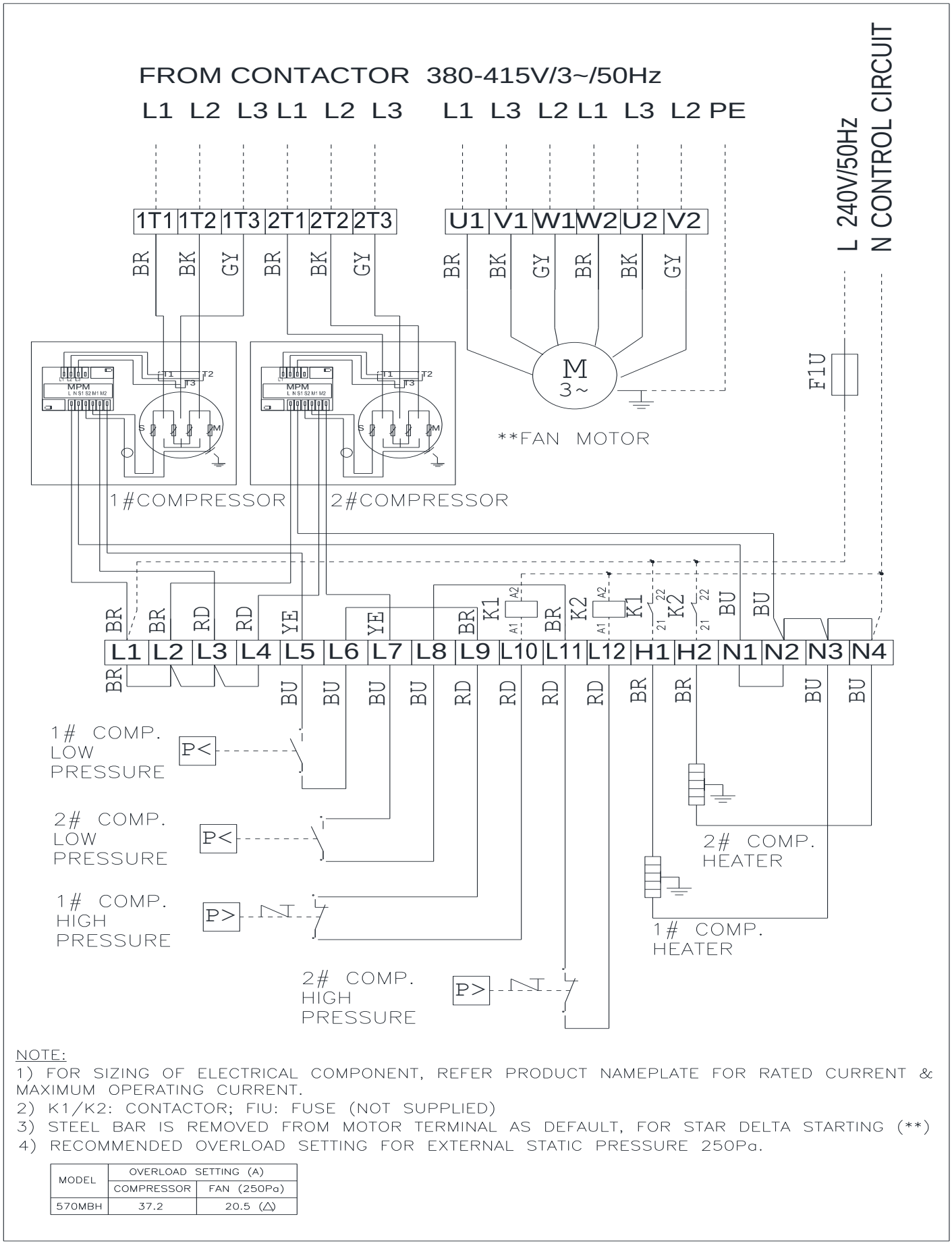


NOTE:

1) FOR SIZING OF ELECTRICAL COMPONENT, REFER PRODUCT NAMEPLATE FOR RATED CURRENT & MAXIMUM OPERATING CURRENT.
2) K1/K2/K3: CONTACTOR; FIU: FUSE (NOT SUPPLIED)
3) STEEL BAR IS REMOVED FROM MOTOR TERMINAL AS DEFAULT, FOR STAR DELTA STARTING (**)
4) RECOMMENDED OVERLOAD SETTING FOR EXTERNAL STATIC PRESSURE 250Pa.

MODEL	OVERLOAD SETTING (A)	
	COMPRESSOR	FAN (250Pa)
400MBH	19.0	20.5 (△)
520MBH	25.0	20.5 (△)

Figure 32: UCQ570AB

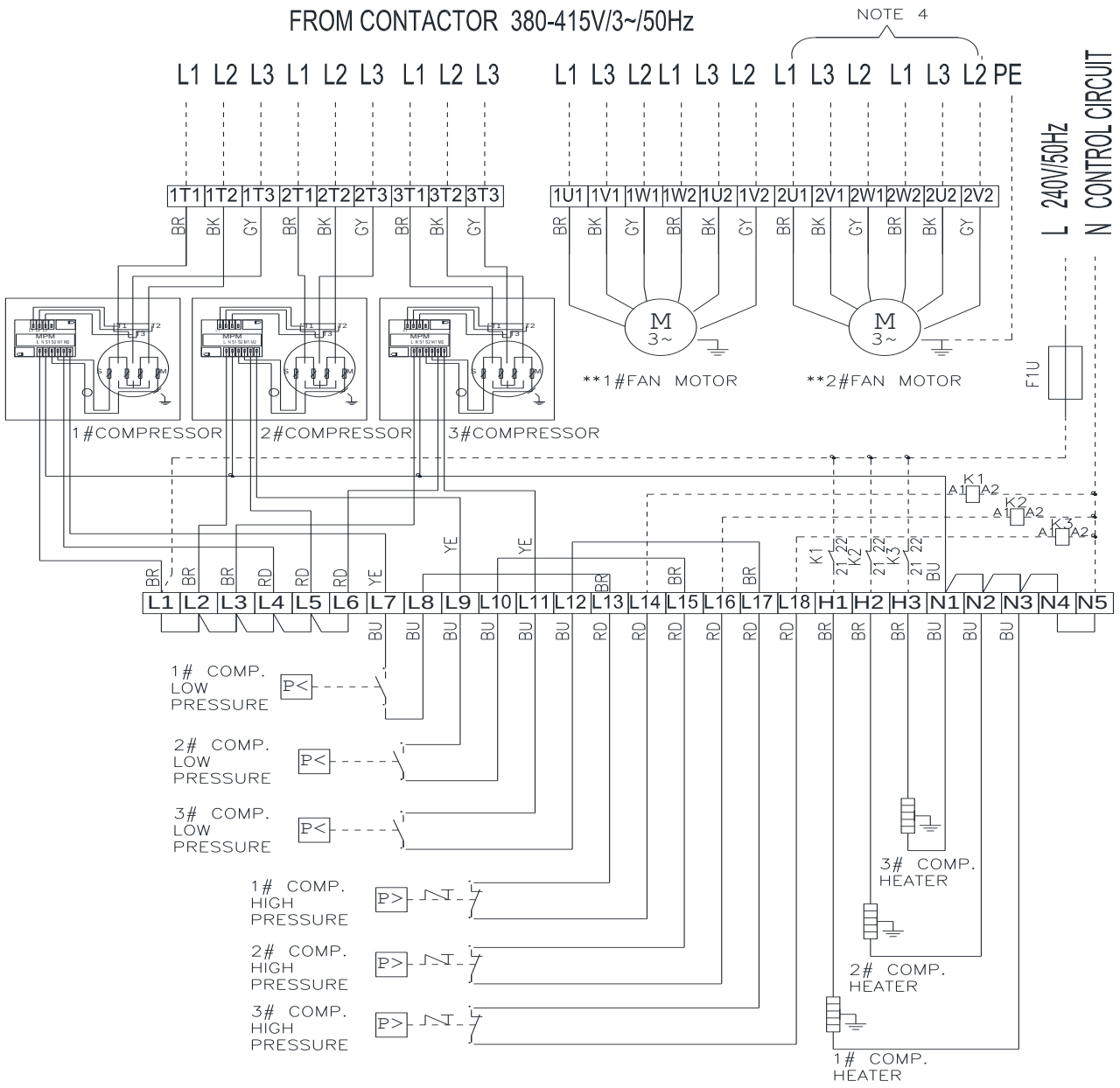


NOTE:

1) FOR SIZING OF ELECTRICAL COMPONENT, REFER PRODUCT NAMEPLATE FOR RATED CURRENT & MAXIMUM OPERATING CURRENT.
2) K1/K2: CONTACTOR; FIU: FUSE (NOT SUPPLIED)
3) STEEL BAR IS REMOVED FROM MOTOR TERMINAL AS DEFAULT, FOR STAR DELTA STARTING (**)
4) RECOMMENDED OVERLOAD SETTING FOR EXTERNAL STATIC PRESSURE 250Pa.

MODEL	OVERLOAD SETTING (A)	
	COMPRESSOR	FAN (250Pa)
570MBH	37.2	20.5 (△)

Figure 33: UCQ710AB; UCQ870AB

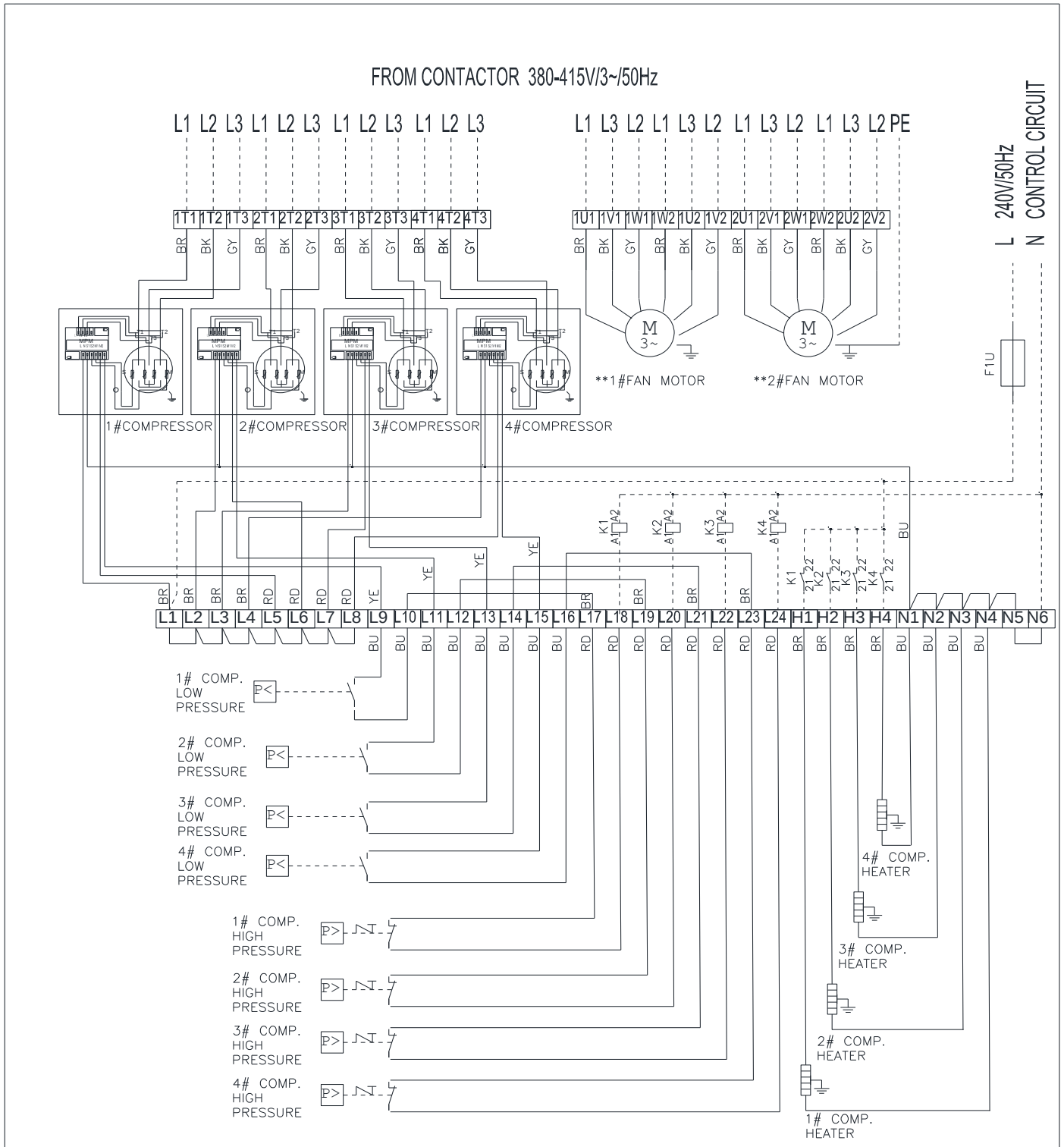


NOTE:

1) FOR SIZING OF ELECTRICAL COMPONENT, REFER PRODUCT NAMEPLATE FOR RATED CURRENT & MAXIMUM OPERATING CURRENT.
2) K1/K2/K3: CONTACTOR; FIU: FUSE (NOT SUPPLIED)
3) STEEL BAR IS REMOVED FROM MOTOR TERMINAL AS DEFAULT, FOR STAR DELTA STARTING (**)
4) FOR MODEL 710MBH, INCOMING WIRE FROM MOTOR CONTACTOR L2 & L3 IS SWAP FOR CORRECT MOTOR ROTATION.
5) RECOMMENDED OVERLOAD SETTING FOR EXTERNAL STATIC PRESSURE 250Pa.

MODEL	OVERLOAD SETTING (A)	
	COMPRESSOR	FAN (250Pa)
710MBH	29.8	14.2 (△)
870MBH	37.2	20.5 (△)

Figure 34: UCQ940AB



NOTE:

1) FOR SIZING OF ELECTRICAL COMPONENT, REFER PRODUCT NAMEPLATE FOR RATED CURRENT & MAXIMUM OPERATING CURRENT.
2) K1/K2/K3/K4: CONTACTOR; FIU: FUSE (NOT SUPPLIED)
3) STEEL BAR IS REMOVED FROM MOTOR TERMINAL AS DEFAULT, FOR STAR DELTA STARTING (**)
4) RECOMMENDED OVERLOAD SETTING FOR EXTERNAL STATIC PRESSURE 250Pa.

MODEL	OVERLOAD SETTING (A)	
	COMPRESSOR	FAN (250Pa)
940MBH	29.8	20.5 (△)

7.0 COMMISIONING

PRE-STARTUP REQUIREMENTS

1. Inspect the unit for shipping or installation damage.
2. Verify the unit is completely and properly installed with ductwork connected. Verify that all construction debris is removed and filters are clean.
3. With all electrical disconnects open, check all electrical connections to be sure they are tight.
4. Visually check for refrigerant piping leaks.
5. The compressor oil level should be maintained so that the oil level is visible in the sight glass. The oil level can only be ascertained when the compressor is running in stabilized conditions, ensuring there is no liquid refrigerant in the lower shell of the compressor. The oil level should be between ¼ and ¾ of the sight glass with compressor running. At shutdown, the oil level can fall to the bottom limit of the oil sight glass.
6. Visually inspect field wiring (power and control). Wiring must meet local codes.
7. Check the tightness of setscrews in bearings, drives, and fan wheels.
8. Verify the supply fan rotates freely. Verify proper drive alignment of the supply fan.
9. Verify the unit condenser water connections and condensate drain connections have been piped and closed the end which not been used.
10. Verify that all mechanical and electrical inspections have been completed per local codes.
11. Make sure the trap for the main evaporator drain pan has been primed by pouring water in the pan until water exits the condensate drain line.
12. Connect wiring for water flow switch or remote switch by removing the jumper wire on the desired terminal (refer wiring diagram on the unit).
13. Apply 3-phase power to the unit and verify that it falls within the specified voltage range.
14. Check for voltage imbalance. Voltage imbalance should not exceed 2% of the average voltage.

- Do not bypass the high- or low-pressure switch during unit operation.
- Do not bypass compressor and fan overload protector.
- The crankcase heater must be turned on a minimum of 12 hours prior to start the compressor.
- The crankcase heater must be always energized when the unit is not running.

CRANKCASE HEATERS

The purpose of the crankcase heater is to prevent the migration of refrigerant to the crankcase during shutdown, to assure proper lubrication on the compressor during start-up.

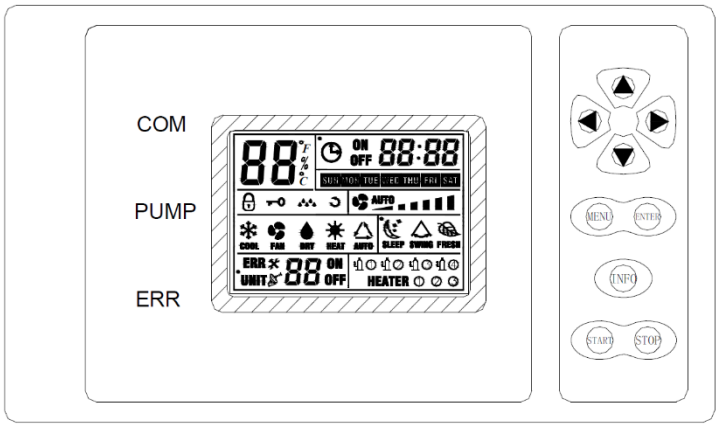
The heater is interlocked with the compressor contactor and is not controlled directly by the controller. When the compressor is OFF, a normally closed auxiliary contact on the compressor contactor closes the circuit and energize the crankcase heater.

INITIAL START-UP

After all the other preceding checks have been completed and the operator has familiarized himself with the sequence of operation for the unit and all options provided, the unit can be put in operation. Proceed as follows:

1. Energize cooling tower water pump and tower fans. Set the water flow rate according to the design value.
2. Turn ON the MCB/MCCB (MCB single pole for control circuit, MCB three poles for power supply for three phase motor) and press button “START” on the unit LCD wall pad.

Figure 35: LCD Wall Pad Display



3. If no abnormal noise or adverse conditions exist allow the unit to run. If these conditions do exist, turn off the unit and investigate possible causes by taking below steps:

I. Check for correct power phasing to unit. Correct rotation on scroll compressor can be determined by a drop in suction pressure and a rise in discharge pressure when the compressor is energized. **To reverse the rotation on a three-phase scroll compressor, simply swap connection of any two of the three compressor phases at the power supply terminal and recheck operating pressures.** Running the compressor for a short period of time in reverse direction will have no negative impact but prolonged running in reverse direction may cause premature failure.

- ***UCQ60/90/140/180/320/360/400/520*E is supplied with external Supply Monitoring Device factory preset: UV 90%, OV 5%, On Delay 1 Second, Off Delay 5 Second (Fixed).***
- ***UCQ240/280/570/710/870/940, the motor protection module comes preinstalled within the compressor terminal box. The module had been terminated at the control box of unit.***

II. ii) Check for correct direction for air discharge (only apply to blower motor changed to opposite direction from original position). Simply swap any two of the three wires at the power supply inlet to fan contactor terminal. Incorrect wiring or blower rotation may trigger the fan overload protector.

III. iii) Check for belt tensioning

4. Once the unit is run normal, take an air flow measurement in the straight duct off the unit discharge using a pitot tube. This measurement should be taken about three quarters (3/4) of the way down the straight duct off the fan, just before any transition or elbow. If a condition of low or high air flow exists, a pulley change may be required.

Once it is ascertained that the air quantity leaving the unit is according to the design CFM, the thermostats should be set to the desired space temperature. The system should now function as designed.

8.0 MAINTENANCE

A planned program of regularly scheduled maintenance will return dividends by averting possible costly and unexpected periods of down time. It is the responsibility of the owner to provide the necessary maintenance for the unit. If a system failure occurs due to improper maintenance during the warranty period, Daikin will not be liable for costs incurred to return the unit to satisfactory operation.

PERIODIC MAINTENANCE – MONTHLY

Filters

Check the cleanliness of the filters and replace or clean as required.

Compressors

Oil Level Check

The oil level can only be ascertained when the compressor is running in stabilized conditions, to ensure that there is no liquid refrigerant in the lower shell of the compressor. When the compressor is running in stabilized conditions, the oil level must be between 1/4 and 3/4 of the oil sight glass. *Note: at shutdown, the oil level can fall to the bottom limit of the oil sight glass.*

PERIODIC MAINTENANCE – MONTHLY TO THREE MONTHS

Cleanliness

Inspect the drain pans for sludge and foreign material. Clean if required.

Drive Package

Figure 36: Drive alignment

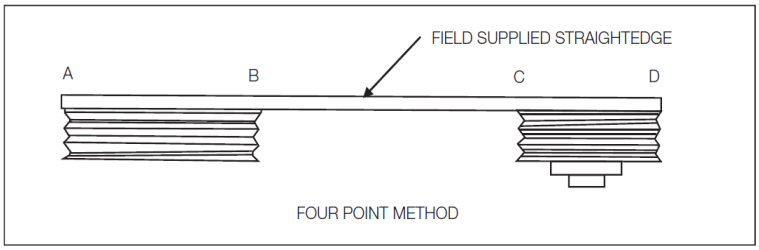
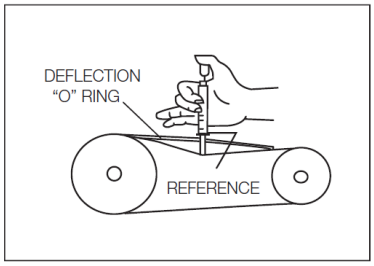
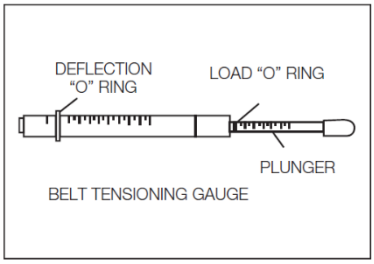


Figure 37: Belt tensioning adjustment





CAUTION

Do not over tighten the belts or the bearings may become damaged. The best tension for a belt drive is the lowest tension at which the belts will not slip under the highest required load. Refer ***Table 8 and Table 9*** for belt tensioning guide specification.

BELT TENSIONING

Table 8: Deflection for Different Pulleys and Belts Sizes

C-C Distance (mm)			Deflection (mm)
100	to	169	2
170	to	239	3
240	to	299	4
300	to	369	5
370	to	439	6
440	to	499	7
500	to	599	8

Table 9: Force for Different Pulleys and Belts Sizes

Pulley Type	Setting Force to Deflect Belt 15mm per Meter of Span		
	Small Pulley Datum Diameter (mm)	1.3 x Basic Setting Force (kgf)	
		Minimum	Maximum
SPZ	63	1.2	1.7
	67	1.3	1.9
	71	1.5	2.0
	75	1.5	2.1
	80	1.6	2.3
	85	1.7	2.4
	90	1.9	2.5
	95	1.9	2.7
	100	2.0	2.8
	106	2.1	2.9
	112	2.1	2.9
	118	2.2	3.0
	125	2.3	3.0
	132	2.3	3.1
SPA	90	1.9	2.7
	95	2.1	2.9
	100	2.3	3.0
	106	2.5	3.2
	112	2.7	3.4
	118	2.8	3.7
	125	2.9	4.0
	132	3.0	4.1
	140	3.2	4.2
	150	3.3	4.4
	160	3.4	4.6
	170	3.6	4.8
	180	3.7	5.0
	190	3.8	5.2

PERIODIC MAINTENANCE – YEARLY

Entire Unit Inspection

In addition to the checks listed in this section, periodic overall inspections of the unit should be accomplished to ensure proper equipment operation. Items such as loose hardware, component operation, refrigerant leaks, unusual noises, etc. should be investigated and corrected immediately.

Water Treatment

Water shall be treated in fortnightly basis,

1 To Prevent Scaling and Depositions
(Scale/deposits will decrease heat transfer and increase energy usage)

2 To Inhibit Corrosion
(Corrosion will shorten the life of the equipment)

3 To Control Microbiological Growth
(Microbiological activity will cause system blockages and potential health hazards)

4 To Disperse and Fluidize Suspend Matters
(Suspended matters will cause system blockages, decrease heat transfer, and increase energy usage)

5 To Control Legionnaire's Pneumophila.
(Legionnaire's disease will cause health hazards)

Table 10: Parameter for Condenser Water Treatment Control

Parameter	Limits	Action
pH	7.0 – 9.0	Bleed to reduce
TDS	<800 ppm as $CaCo^3$	Bleed off to control
Total Alkalinity	<300 ppm as $CaCo^3$	Bleed off to control
Chloride	<120 ppm as CL	Bleed off to control
Fe value	<2.5 ppm	Add CWT 3753 to control
Total Hardness	<300 ppm as $CaCo^3$	Bleed off to control

SPECIAL PRECAUTIONS WHEN DEALING WITH R410A UNIT

- R410A is a new HFC refrigerant which does not damage the ozone layer. The working pressure of this new refrigerant is 1.6 times higher than conventional refrigerant (R22), thus proper installation/servicing is essential.
- Never use refrigerant other than R410A in an air conditioner which is designed to operate with R410A.
- POE or PVE oil is used as lubricant for R410A compressor, which is different from the mineral oil used for R22 compressor. During servicing, extra precaution must be taken not to expose the R410A system too long to moist air. Residual POE or PVE oil in the piping and components can absorb moisture from the air.
- Use tools and materials exclusively for refrigerant R410A. Tools exclusively for R410A are manifold valve, charging hose, pressure gauge, gas leak detector, flare tools, torque wrench, vacuum pump and refrigerant cylinder.
- If the refrigerant gas leakage occurs during installation/servicing, be sure to ventilate fully. If the refrigerant gas contacts with fire, a poisonous gas may occur.

Table 11: Trouble Shooting

PROBLEM	POSSIBLE CAUSE	ACTION
LACK OF COOLING EFECT	1. Faulty compressor or lack of compression.	1. Check discharge pressure for compression. Inspect compressor and replace if necessary.
	2. Temperature of air entering evaporator too high.	2. Reduce load to design KW value.
	3. Fouled condenser and/or evaporator tube surface.	3. Inspect surface and clean.
	4. Low refrigerant charge.	4. Repair refrigerant leak, add refrigerant.
	5. Thermal expansion valve out of adjustment or erratic.	5. Adjust superheat or replace power element.
	6. Improper air flow through evaporator.	6. Determine flow and adjust correctly belt tension.
	7. Room thermostat not operating properly.	7. Inspect thermostat and replace if necessary.
TRIPPING OF COMPRESSOR(S)	**A. DUE TO LOW PRESSURE CUT OUT**	
	1. Reduced air flow through evaporator.	1. Inspect surface & clean, check evaporator fan drive
	2 Low refrigerant charge.	2. Repair refrigerant leak, add refrigerant.
	3. Broken expansion valve.	3. Replace expansion valve.
	4. Restricted refrigerant line.	4. Determine the cause of restriction and repair.
	5. Faulty low pressure cut-out.	5. Replace.
	B. DUE TO HIGH PRESSURE CUT-OUT	
	1. Air in refrigeration system.	1. Re-evacuate refrigeration system and charge with new refrigerant.
	2. Excess refrigerant charge.	2. Bleed off excess refrigerant.
	3. Faulty high-pressure cut-out.	5. Replace.
	C. DUE TO COMPRESSOR OVERLOAD TRIPPING	
	1. Compressor over-current, under voltage or single phasing.	1. Check electrical supply, contactors, wiring, and rectify fault.
	2. Excessive discharge pressure.	2. See section B above.
	3. Compressor over-heating due to low refrigerant.	3. Check refrigerant charge (fix leak), top up refrigerant if necessary.
	4. Compressor motor has a winding shorted.	4. Replace compressor.
	5. Liquid refrigerant in compressor causing valve plate damage and lack of compression.	5. Check that crankcase heater is functioning properly.
	6. Defective overload protector.	6. Replace protector.
EXCESSIVE BELT "SCREAM" WHEN FAN(S) START UP	1. Slipping belts.	1a. Apply belt dressing/belt tensioning.
		1b. Adjust belt tension correctly.

9.0 LCD WALLPAD

Controller with wall pad is only available for unit come with DOL starter with electronic controller.

Parameter Setting

Press MENU key on the main screen will activate the system to enter into the desired submenu according to the sequence of Set Temp → Mode setting → RTC setting → On timer setting → Off timer setting → Set Temp. Upon completion of parameter settings, press ENTER key to exit.

Details of operation are as follow:

1) Set temp

Press MENU key once in cool or heat mode to enter into this submenu. Temperature display section will flash the temp setting of the current mode. Press ▲ or ▼ key to adjust the set temperature. Upon completion of editing, press ENTER key to exit.

2) Mode

Press MENU key twice to enter into this submenu. Mode display section will flash the current mode setting. Press ▲ or ▼ key to change the mode setting. Upon completion of editing, press ENTER key to exit.

3) RTC

Press MENU key three times to enter into this submenu with symbol flashing. Press ▲ or ▼ key once will increase or decrease the RTC setting in 1 minute incremental. Hold ▲ or ▼ key for 3 sec will change the RTC setting in 1 hour incremental. Press ◄ or ► key to change day of week setting. Upon completion of editing, press ENTER key to exit.

4) On timer

Press MENU key four times to enter into this submenu with ON symbol flashing. If on timer for the current day is empty, timer display area shows --:--. Press ▲ or ▼ key once will activate the timer. Once the timer is activated, press ▲ or ▼ key once will increase or decrease the timer setting in 1 minute incremental. Hold ▲ or ▼ key for 3 sec will change the timer setting in 1 hour incremental. Press ◄ or ► key to change day of week the timer to be programmed. Press INFO key to cancel the timer setting. Upon completion of editing, press ENTER key to exit.

Should there be on timer being programmed symbol will light up. Should there be on timer available for the current day waiting for execution, ON symbol will light up.

5) Off timer

Press MENU key five times to enter into this submenu with OFF symbol flashing. If off timer for the current day is empty, timer display area shows --:--. Press ▲ or ▼ key once will activate the timer. Once the timer is activated, press ▲ or ▼ key once will increase or decrease the timer setting in 1 minute incremental. Hold ▲ or ▼ key for 3 sec will change the timer setting in 1 hour incremental. Press ◄ or ► key to change day of week the timer to be programmed. Press INFO key to cancel the timer setting. Upon completion of editing, press ENTER key to exit.

Should there be off timer being programmed symbol will light up. Should there be off timer available for the current day waiting for execution, OFF symbol will light up.

6) Key lock

Press MENU and ENTER keys on the main menu for 3 sec to activate this function with symbol light up. Follow the same sequence to exit key lock. In key lock mode, user is allowed to access to On/Off key only.

7) Information

Press INFO key on the main menu for information browsing. Press ▲ or ▼ key to select the required information as follow:

Temp display section	Timer display section	Remarks
C0	Main board DIP switch setting	Display position 1-8 [correspond to bit7-bit0] in hexadecimal format.
C1	Room temperature	AD1 temp on main board

8) Remote on/off

If the remote on/off input is opened, **rOFF** will be shown on the timer display section. Main board will go into standby mode even if the wall pad is at on status.

9) Communication indication

Communication LED will flash at regular speed if the communication between wall pad and main board is healthy.

10) Time shortening test mode

Within 1min upon power ON, press and hold MENU and ◄ for 3 seconds will enter time shortening test mode.

11) Error code display

Backlight colour will turn to red when there is any system failure. EER light will turn on and error display section will show the relevant error code as follow:

Table 12: Error Code

Error code	Remarks
1	Not applicable
2	Indoor fan 1 or 2 overload relay tripped [manual reset]
3	Flow switch failure [manual reset]
4	Water pump failure [manual reset]
5	Comp 1 high pressure or overload relay tripped [manual reset]
6	Comp 1 low pressure [manual reset]
7	Comp 2 high pressure or overload relay tripped [manual reset]
8	Comp 2 low pressure [manual reset]
9	Comp 3 high pressure or overload relay tripped [manual reset]
10	Comp 3 low pressure [manual reset]
11	Comp 4 high pressure or overload relay tripped [manual reset]
12	Comp 4 low pressure [manual reset]
13	Heater 1 failure [manual reset]
14	Heater 2 failure [manual reset]
15	Heater 3 failure [manual reset]
16	Room sensor failure [auto reset]
17	Inlet water sensor failure [auto reset]
18	Outlet water sensor failure [auto reset]
19	Indoor coil 1 sensor failure [auto reset]
20	Indoor coil 2 sensor failure [auto reset]
21	Indoor coil 3 sensor failure [auto reset]
22	Indoor coil 4 sensor failure [auto reset]
23	Water temp too low [manual reset or off system reset]
24	Temp differential failure [manual reset or off system reset]
25	Indoor coil 1 anti freeze[auto reset]
26	Indoor coil 2 anti freeze[auto reset]
27	Indoor coil 3 anti freeze[auto reset]
28	Indoor coil 4 anti freeze[auto reset]

Manual reset: When there is failure occurred, press MENU and ▼ key for 3 seconds to clear the errors.

NOTE

The battery provided together with the controller is required to be installed inside the controller to maintain the RTC operation upon power failure.

Issue: O-WCP16-MAY23-3