ESIE07-04

Service Manual

EWAD650-C18BJYNN
EWAD550-C12BJYNN/Q
EWAD650-C21BJYNN/A
EWAD600-C10BJYNN/Z

Air-cooled chillers and heat recovery chillers

Table of Contents

1 Introduction

Part 1 System Outline

1 General Outline

Part 2 Functional Description

1 Operation Range

2 The Digital Controller

3 Functional Control

Part 3 Troubleshooting

1 Overview of Fault Indications and Safeties

2 Checking the Inputs and Outputs

3 Procedure for Software Upload/Download

4 Procedure to Protect Compressor in Case of Frozen Evaporator

5 Procedure to Clear the Refrigerant Circuit in Case of Frozen Evaporators

6 Procedure for the Changing and Configuration of the Display

7 Procedure for the Changing and Configuration of the PCO² (“I/O Board”)

8 Procedure for the Changing of the Electronic Expansion Valve Driver

9 Procedure for the Changing and Configuration of the Expansion I/O Board (Optional)ì

10 Manual Upload or Download Control Test Procedure

11 Troubleshooting Chart

12 Prestart System Checklist

Part 4 Commissioning and Test Run

1 Pre-Test Run Checks

Part 5
Maintenance

1 Maintenance

1 Introduction

1.1 About This Manual

Target group

This service manual is intended for and should only be used by qualified engineers.

Purpose of this manual

This service manual contains all the information you need to carry out the necessary repair and maintenance tasks for the EWAD650-C18BJYNN, EWAD550-C12BJYNN/Q, EWAD650-C21BJYNN/A and EWAD600-C10BJYNN/Z.

4 different lines

EWAD-BJYNN line is available with two different efficiencies in order to satisfy every kind of requirements. Acoustic flexibilty down to 65 dBA thanks to different noise level versions:

- **Standard efficiency** with COP up to 3.15 (nominal conditions and only compressor power input).
  - EWAD-BJYNN (standard noise – 79.0 / 80.0 dBA) with low noise option OPRN and OPLN.
  - EWAD-BJYNN/Q (super quiet – 65.0 / 66.5 dBA)
- **High efficiency** with COP up to 3.70 (nominal conditions and only compressor power input).
  - EWAD-BJYNN/A (standard noise – 79.0 / 80.0 dBA) with low noise option OPRN and OPLN.
  - EWAD-BJYNN/Z (super quiet – 65.0 / 66.5 dBA)

OPRN-option

Standard version with additional base frame for compressors and oil separators installed on rubber isolators to eliminate the vibrations. Discharge flexible pipes and condenser fans rotating at fixed low speed.

OPLN-option

The main components are the same of the OPRN version (same cooling capacity) but to reduce the sound level the compressors, the oil seperators and delivery and suction pipes are located inside a cabinet which is sound insulated with highly absorbent acoustic material. Discharge flexible pipes and condenser fans rotating at fixed low speed are supplied as standard.

/Q and /Z

The main components are the same of the OPRN version (same cooling capacity) but to reduce the sound level the compressors, the oil seperators and delivery and suction pipes are located inside a cabinet which is sound insulated with highly absorbent acoustic material. Discharge flexible pipes and condenser fans rotating at extremely low speed and fan speed control device are supplied as standard.

1.2 Nomenclature

EWA	D	600	BJ	YN	N	****	/Z

Machine type
ERA: Air cooled condensing unit
EWW: Water cooled packaged water chiller
EWL: Remote condenser water chiller
EWA: Air cooled chiller, cooling only
EWY: Air cooled chiller, heatpump
EWC: Air cooled chiller, cooling only with centrifugal fan
EWT: Air cooled chiller, cooling only with heat recovery

Refrigerant
D: R-134a
P: R-407C
Q: R-410A

Capacity class in kW (cooling)
Always 3-digit code
Cap < 50 kW: not round: example: 37 kW => **037**
50 < Cap < 999 kW: round 0/5: 536 kW => **535**
Cap > 999 kW use C-symbol (C=100): example: 2578 kW => **C26**

Model series
first character : letter A, B, : major modification
second character : letter A,B,... : minor modification DENV
letter J-W : minor modification New Series

Voltage

V1:	~	/ 220 - 240 V	/ 50 Hz
V3:	1~	/ 230 V	/ 50 Hz
T1:	3~	/ 230 V	/ 50 Hz
W1:	3N~	/ 400 V	/ 50 Hz
Y1:	3~	/ 380-415 V	/ 50 Hz
YN:	3~	/ 400 V	/ 50 Hz

Hydraulic module/Heat recovery version/Pump & electrical options (Consult Selection software)
N: No Hydraulic components
M: Modular
A-V: Combination of specific options

Option code (Consult Selection software)
****: 4 digits

Option regarding efficiency version, sound version
/H: High ambient version
/A: High efficiency version
/Q: Super silent version
/Z: High efficiency and Super silent version

Part 1
System Outline

Introduction

This part contains an outline of all the relevant elements in the EWAD650-C18BJYNN, EWAD550-C12BJYNN/Q, EWAD650-C21BJYNN/A and EWAD600-C10BJYNN/Z installation.

What is in this part?

This part contains the following chapters:

1 General Outline

1.1 What Is in This Chapter?

Introduction

This chapter contains the following information:

- Technical specifications
- Electrical specifications
- Correction factors
- Outlook drawings: Outlook, dimensions, installation and service space.

Overview

This chapter contains the following topics:

1

1

1.2 Technical Specifications: EWAD-BJYNN

Technical specifications

The table below contains the technical specifications.

Model		**EWAD-BJYNN**				
Unit size		**650**	**700**	**750**	**850**	**900**
Cooling capacity (1)	kW	640	700	761	817	886
Power input (1)	kW	217	233	253	270	282
COP		2.94	3.01	3.01	3.03	3.15
Screw compressors	N°	2	2	2	2	2
Refrigerant circuits	N°	2	2	2	2	2
Refrigerant charge R-134a	kg	97	104	114	124	124
Oil charge	kg	40	40	40	40	40
Min % of capacity reduction	%	12.5	12.5	12.5	12.5	12.5
Condenser fans						
No. of fans / nominal power fan	kW	9/1.7	10/1.7	11/1.7	12/1.7	12/1.7
Fan speed	rpm	860	860	860	860	860
Diameter	mm	800	800	800	800	800
Total air flow	m3/s	47.5	52.8	58.1	63.3	64.5
Evaporator						
Evaporators / water volume	N°/l	1/254	1/254	1/246	1/246	1/246
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	168.3	168.3	168.3	168.3	168.3
Condenser coil						
Coil type		Lanced fins - internally spiral wound tubes				
Weight and dimensions						
Standard unit shipping weight	kg	4910	4990	5256	5480	5580
Standard unit operating weight	kg	5130	5200	5520	5734	5834
Unit length	mm	5310	5310	6210	6210	6210
Unit width	mm	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520

Model		**EWAD-BJYNN**					
Unit size		**Note (2)**	**950**	**C10**	**C11**	**C12**	**C13**
Cooling capacity (1)	kW		988	1057	1109	1166	1226
Power input (1)	kW		334	345	369	386	404
COP			2.96	3.06	3.01	3.02	3.04
Screw compressors	N°		3	3	3	3	3
Refrigerant circuits	N°		3	3	3	3	3
Refrigerant charge R-134a	kg		144	160	164	180	186
Oil charge	kg		60	60	60	60	60
Min % of capacity reduction	%		8.3	8.3	8.3	8.3	8.3
Condenser fans							
No. of fans / nominal power fan	kW		14/1.7	16/1.7	16/1.7	18/1.7	18/1.7
Fan speed	rpm		860	860	860	860	860
Diameter	mm		800	800	800	800	800
Total air flow	m3/s		73.9	86.0	84.5	89.7	95.0
Evaporator							
Evaporators / water volume	N°/l		1/415	1/415	1/402	1/402	1/402
Max operating pressure	bar		10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm		219.1	219.1	219.1	219.1	219.1
Condenser coil							
Coil type		Lanced fins - internally spiral wound tubes					

Model		**EWAD-BJYNN**					
Unit size		**Note (2)**	**950**	**C10**	**C11**	**C12**	**C13**
Weight and dimensions							
Standard unit shipping weight	kg		7550	7830	7830	8420	8420
Standard unit operating weight	kg		7970	8250	8250	8830	8830
Unit length	mm		7400	8270	8270	9200	9200
Unit width	mm		2230	2230	2230	2230	2230
Unit height	mm		2520	2520	2520	2520	2520

Notes:

(1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 35°C air ambient temp.
Power input is for compressor only.

(2) For cooling capacity in the middle of 886kW and 988kW, select EWAD-BJYNN/A unit.

Model		**EWAD-BJYNN**				
Unit size		**C14**	**Note (2)**	**C15**	**C16**	**C18**
Cooling capacity (1)	kW	1322		1520	1641	1772
Power input (1)	kW	421		503	539	564
COP		3.14		3.02	3.05	3.15
Screw compressors	N°	3		4	4	4
Refrigerant circuits	N°	3		4	4	4
Refrigerant charge R-134a	kg	186		236	256	256
Oil charge	kg	60		80	80	80
Min % of capacity reduction	%	8.3		6.25	6.25	6.25
Condenser fans						
No. of fans / nominal power fan	kW	18/1.7		22/1.7	24/1.7	24/1.7
Fan speed	rpm	860		860	860	860
Diameter	mm	800		800	800	800
Total air flow	m3/s	96.7		116.1	126.7	129
Evaporator						
Evaporators / water volume	N°/l	1/402		2/254+246	2/246+246	2/246+246
Max operating pressure	bar	10.5		10.5	10.5	10.5
Water connection diameter	mm	219.1		168.3	168.3	168.3
Condenser coil						
Coil type		Lanced fins - internally spiral wound tubes				
Weight and dimensions						
Standard unit shipping weight	kg	8570		9552	10632	10832
Standard unit operating weight	kg	8980		10024	11140	11340
Unit length	mm	9200		11000	11900	11900
Unit width	mm	2230		2230	2230	2230
Unit height	mm	2520		2520	2520	2520

Notes:

(1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 35°C air ambient temp.
Power input is for compressor only.

(2) For cooling capacity in the middle of 1322kW and 1520kW, select EWAD-BJYNN/A unit.

1

1.3 Technical Specifications: EWAD-BJYNN with OPRN

Technical specifications

The table below contains the technical specifications.

Model		EWAD-BJYNN with OPRN				
Unit size		**650**	**700**	**750**	**850**	**900**
Cooling capacity (1)	kW	606	670	730	784	868
Power input (1)	kW	235	250	269	289	305
COP		2.58	2.68	2.71	2.71	2.84
Screw compressors	N°	2	2	2	2	2
Refrigerant circuits	N°	2	2	2	2	2
Refrigerant charge R-134a	kg	97	104	114	124	128
Oil charge	kg	40	40	40	40	40
Min % of capacity reduction	%	12.5	12.5	12.5	12.5	12.5
Condenser fans						
No. of fans / nominal power fan	kW	9/1	10/1	11/1	12/1	12/1
Fan speed	rpm	680	680	680	680	680
Diameter	mm	800	800	800	800	800
Total air flow	m3/s	36.4	40.5	44.5	48.6	48.6
Evaporator						
Evaporators / water volume	N°/l	1/254	1/254	1/246	1/246	1/246
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	168.3	168.3	168.3	168.3	168.3
Condenser coil						
Coil type		Lanced fins - internally spiral wound tubes				
Weight and dimensions						
Standard unit shipping weight	kg	4910	4990	5256	5480	5580
Standard unit operating weight	kg	5130	5200	5520	5734	5834
Unit length	mm	5310	5310	6210	6210	6210
Unit width	mm	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520

Model		EWAD-BJYNN with OPRN					
Unit size		**Note (2)**	**950**	**C10**	**C11**	**C12**	**C13**
Cooling capacity (1)	kW		945	1016	1062	1116	1175
Power input (1)	kW		360	371	395	414	432
COP			2.63	2.74	2.69	2.70	2.72
Screw compressors	N°		3	3	3	3	3
Refrigerant circuits	N°		3	3	3	3	3
Refrigerant charge R-134a	kg		149	160	160	180	186
Oil charge	kg		60	60	60	60	60
Min % of capacity reduction	%		8.3%	8.3%	8.3%	8.3%	8.3
Condenser fans							
No. of fans / nominal power fan	kW		14/1	16/1	16/1	18/1	18/1
Fan speed	rpm		680	680	680	680	680
Diameter	mm		800	800	800	800	800
Total air flow	m3/s		56.7	66.0	64.8	68.8	72.9
Evaporator							
Evaporators / water volume	N°/l		1/415	1/415	1/402	1/402	1/402
Max operating pressure	bar		10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm		219.1	219.1	219.1	219.1	219.1
Condenser coil							
Coil type		Lanced fins - internally spiral wound tubes					

1

Model		EWAD-BJYNN with OPRN					
Unit size		Note (2)	950	C10	C11	C12	C13
Weight and dimensions							
Standard unit shipping weight	kg		7550	7830	7830	8420	8420
Standard unit operating weight	kg		7970	8250	8250	8830	8830
Unit length	mm		7400	8270	8270	9200	9200
Unit width	mm		2230	2230	2230	2230	2230
Unit height	mm		2520	2520	2520	2520	2520

Notes:

(1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 35°C air ambient temp.
Power input is for compressor only.

(2) For cooling capacity in the middle of 868kW and 945kW, select EWAD-BJYNN/A unit.

Model		EWAD-BJYNN with OPRN				
Unit size		C14	Note (2)	C15	C16	C18
Cooling capacity (1)	kW	1296		1457	1553	1735
Power input (1)	kW	456		546	573	610
COP		2.84		2.67	2.71	2.84
Screw compressors	N°	3		4	4	4
Refrigerant circuits	N°	3		4	4	4
Refrigerant charge R-134a	kg	186		228	248	248
Oil charge	kg	60		80	80	80
Min % of capacity reduction	%	8.3		6.25	6.25	6.25
Condenser fans						
No. of fans / nominal power fan	kW	18/1		22/1	24/1	24/1
Fan speed	rpm	680		680	680	680
Diameter	mm	800		800	800	800
Total air flow	m3/s	73.6		89.0	97.1	98.0
Evaporator						
Evaporators / water volume	N°/l	1/402		2/254+246	2/246+246	2/246+246
Max operating pressure	bar	10.5		10.5	10.5	10.5
Water connection diameter	mm	219.1		168.3	168.3	168.3
Condenser coil						
Coil type		Lanced fins - internally spiral wound tubes				
Weight and dimensions						
Standard unit shipping weight	kg	8570		9552	10632	10832
Standard unit operating weight	kg	8980		10024	11140	11340
Unit length	mm	9200		11000	11900	11900
Unit width	mm	2230		2230	2230	2230
Unit height	mm	2520		2520	2520	2520

Notes:

(1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 35°C air ambient temp.
Power input is for compressor only.

(2) For cooling capacity in the middle of 1296kW and 1457kW, select EWAD-BJYNN/A unit.

1

1.4 Technical Specifications: EWAD-BJYNN with OPLN

Technical specifications

The table below contains the technical specifications.

Model		EWAD-BJYNN with OPLN				
Unit size		**650**	**700**	**750**	**850**	**900**
Cooling capacity (1)	kW	606	670	730	784	868
Power input (1)	kW	235	250	269	289	305
COP		2.58	2.68	2.71	2.71	2.84
Screw compressors	N°	2	2	2	2	2
Refrigerant circuits	N°	2	2	2	2	2
Refrigerant charge R-134a	kg	97	104	114	124	128
Oil charge	kg	40	40	40	40	40
Min % of capacity reduction	%	12.5	12.5	12.5	12.5	12.5
Condenser fans						
No. of fans / nominal power fan	kW	9/1	10/1	11/1	12/1	12/1
Fan speed	rpm	680	680	680	680	680
Diameter	mm	800	800	800	800	800
Total air flow	m3/s	36.4	40.5	44.5	48.6	48.6
Evaporator						
Evaporators / water volume	N°/l	1/254	1/254	1/246	1/246	1/246
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	168.3	168.3	168.3	168.3	168.3
Condenser coil						
Coil type		Lanced fins - internally spiral wound tubes				
Weight and dimensions						
Standard unit shipping weight	kg	5150	5230	5496	5720	5820
Standard unit operating weight	kg	5370	5440	5760	5974	6074
Unit length	mm	5310	5310	6210	6210	6210
Unit width	mm	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520

Model		EWAD-BJYNN with OPLN					
Unit size		**Note (2)**	**950**	**C10**	**C11**	**C12**	**C13**
Cooling capacity (1)	kW		945	1016	1062	1116	1175
Power input (1)	kW		360	371	395	414	432
COP			2.63	2.74	2.69	2.70	2.72
Screw compressors	N°		3	3	3	3	3
Refrigerant circuits	N°		3	3	3	3	3
Refrigerant charge R-134a	kg		149	160	160	180	186
Oil charge	kg		60	60	60	60	60
Min % of capacity reduction	%		8.3	8.3	8.3	8.3	8.3
Condenser fans							
No. of fans / nominal power fan	kW		14/1	16/1	16/1	18/1	18/1
Fan speed	rpm		680	680	680	680	680
Diameter	mm		800	800	800	800	800
Total air flow	m3/s		56.7	66.0	64.8	68.8	72.9
Evaporator							
Evaporators / water volume	N°/l		1/415	1/415	1/402	1/402	1/402
Max operating pressure	bar		10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm		219.1	219.1	219.1	219.1	219.1
Condenser coil							
Coil type		Lanced fins - internally spiral wound tubes					

1

Model		EWAD-BJYNN with OPLN					
Unit size		**Note (2)**	**950**	**C10**	**C11**	**C12**	**C13**
Weight and dimensions							
Standard unit shipping weight	kg		7910	8190	8190	8780	8930
Standard unit operating weight	kg		8330	8610	8610	9190	9340
Unit length	mm		7400	8270	8270	9200	9200
Unit width	mm		2230	2230	2230	2230	2230
Unit height	mm		2520	2520	2520	2520	2520

Notes:

(1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 35°C air ambient temp.
Power input is for compressor only.

(2) For cooling capacity in the middle of 868kW and 945kW, select EWAD-BJYNN/A unit.

Model		EWAD-BJYNN with OPLN				
Unit size		**C14**	**Note (2)**	**C15**	**C16**	**C18**
Cooling capacity (1)	kW	1296		1457	1553	1735
Power input (1)	kW	456		546	573	610
COP		2.84		2.67	2.71	2.84
Screw compressors	N°	3		4	4	4
Refrigerant circuits	N°	3		4	4	4
Refrigerant charge R-134a	kg	186		228	248	248
Oil charge	kg	60		80	80	80
Min % of capacity reduction	%	8.3		6.25	6.25	6.25
Condenser fans						
No. of fans / nominal power fan	kW	18/1		22/1	24/1	24/1
Fan speed	rpm	680		680	680	680
Diameter	mm	800		800	800	800
Total air flow	m3/s	73.6		89.0	97.1	98.0
Evaporator						
Evaporators / water volume	N°/l	1/402		2/254+246	2/246+246	2/246+246
Max operating pressure	bar	10.5		10.5	10.5	10.5
Water connection diameter	mm	219.1		168.3	168.3	168.3
Condenser coil						
Coil type		Lanced fins - internally spiral wound tubes				
Weight and dimensions						
Standard unit shipping weight	kg	9080		10032	11112	11312
Standard unit operating weight	kg	9490		10504	11620	11820
Unit length	mm	9200		11000	11900	11900
Unit width	mm	2230		2230	2230	2230
Unit height	mm	2520		2520	2520	2520

Notes:

(1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 35°C air ambient temp.
Power input is for compressor only.

(2) For cooling capacity in the middle of 1296kW and 1457kW, select EWAD-BJYNN/A unit.

1.5 Technical Specifications: EWAD BJYNN/Q

Technical specifications

The table below contains the technical specifications.

Model		EWAD-BJYNN/Q					
Unit size		**550**	**600**	**650**	**700**	**750**	**800**
Cooling capacity (1)	kW	539	597	650	709	759	812
Cooling capacity (1)	kW	539	597	650	709	759	812
Power input (1)	kW	229	246	262	285	307	340
COP		2.35	2.43	2.48	2.48	2.47	2.39
Screw compressors	N°	2	2	2	2	2	3
Refrigerant circuits	N°	2	2	2	2	2	3
Refrigerant charge R-134a	kg	104	114	124	132	140	160
Oil charge	kg	40	40	40	40	40	60
Min % of capacity reduction	%	12.5	12.5	12.5	12.5	12.5	8.3
Condenser fans							
No. of fans / nominal power fan	kW	10/0.3	11/0.3	12/0.3	13/0.3	14/0.3	16/0.3
Fan speed	rpm	500	500	500	500	500	500
Diameter	mm	800	800	800	800	800	800
Total air flow	m3/s	25.6	28.2	30.8	33.3	35.9	42.1
Evaporator							
Evaporators / water volume	N°/l	1/261	1/254	1/254	1/246	1/246	1/424
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	168.3	168.3	168.3	168.3	168.3	219.1
Condenser coil							
Coil type		Lanced fins - internally spiral wound tubes					
Weight and dimensions							
Standard unit shipping weight	kg	5230	5445	5659	5900	6030	8190
Standard unit operating weight	kg	5440	5650	5864	6150	6280	8610
Unit length	mm	5310	6210	6210	7110	7110	8300
Unit width	mm	2230	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520	2520

Model		EWAD-BJYNN/Q					
Unit size		**850**	**900**	**950**	**C10**	**C11**	**C12**
Cooling capacity (1)	kW	869	921	974	1055	1086	1152
Power input (1)	kW	361	377	393	406	438	449
COP		2.41	2.45	2.48	2.60	2.48	2.57
Screw compressors	N°	3	3	3	3	3	3
Refrigerant circuits	N°	3	3	3	3	3	3
Refrigerant charge R-134a	kg	160	180	186	199	202	215
Oil charge	kg	60	60	60	60	60	60
Min % of capacity reduction	%	8.3	8.3	8.3	8.3	8.3	8.3
Condenser fans							
No. of fans / nominal power fan	kW	16/0.3	18/0.3	18/0.3	20/0.3	20/0.3	22/0.3
Fan speed	rpm	500	500	500	500	500	500
Diameter	mm	800	800	800	800	800	800
Total air flow	m3/s	41.0	43.6	46.1	51.3	51.3	56.4
Evaporator							
Evaporators / water volume	N°/l	1/415	1/415	1/415	1/402	1/402	1/402
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	219.1	219.1	219.1	219.1	219.1	219.1

Model		EWAD-BJYNN/Q					
Unit size		**850**	**900**	**950**	**C10**	**C11**	**C12**
Condenser coil							
Coil type		Lanced fins - internally spiral wound tubes					
Weight and dimensions							
Standard unit shipping weight	kg	8190	8725	8725	9310	9310	9750
Standard unit operating weight	kg	8610	9150	9150	9720	9720	10160
Unit length	mm	8300	9200	9200	10100	10100	11000
Unit width	mm	2230	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520	2520

Note:

(1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 32°C air ambient temp.
Power input is for compressor only.

1

1.6 Technical Specifications: EWAD-BJYNN/A

Technical specifications

The table below contains the technical specifications.

Model		**EWAD-BJYNN/A**					
Unit size		**650**	**700**	**800**	**850**	**900**	**950**
Cooling capacity (1)	kW	667	723	800	855	903	926
Power input (1)	kW	204	217	237	255	268	260
COP		3.27	3.33	3.38	3.36	3.37	3.57
Screw compressors	N°	2	2	2	2	2	2
Refrigerant circuits	N°	2	2	2	2	2	2
Refrigerant charge R-134a	kg	114	124	128	132	132	144
Oil charge	kg	40	40	40	40	40	40
Min % of capacity reduction	%	12.5	12.5	12.5	12.5	12.5	12.5
Condenser fans							
No. of fans / nominal power fan	kW	11/1.7	12/1.7	13/1.7	14/1.7	14/1.7	16/1.7
Fan speed	rpm	860	860	860	860	860	860
Diameter	mm	800	800	800	800	800	800
Total air flow	m3/s	58.1	63.3	68.6	73.9	75.2	86.0
Evaporator							
Evaporators / water volume	N°/l	1/254	1/254	1/246	1/246	1/246	1/244
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	168.3	168.3	168.3	168.3	168.3	168.3
Condenser coil							
Coil type		Lanced fins - internally spiral wound tubes					
Weight and dimensions							
Standard unit shipping weight	kg	5205	5419	5660	5790	5890	6333
Standard unit operating weight	kg	5410	5624	5910	6040	6140	6589
Unit length	mm	6210	6210	7110	7110	7110	8300
Unit width	mm	2230	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520	2520

Model		**EWAD-BJYNN/A**						
Unit size		**C10**	**C11**	**C12**	**C13**	**C14**	**C15**	**C16**
Cooling capacity (1)	kW	974	1038	1094	1177	1222	1282	1354
Power input (1)	kW	267	312	325	343	365	378	396
COP		3.65	3.33	3.37	3.43	3.35	3.40	3.42
Screw compressors	N°	2	3	3	3	3	3	3
Refrigerant circuits	N°	2	3	3	3	3	3	3
Refrigerant charge R-134a	kg	144	180	186	196	194	204	204
Oil charge	kg	40	60	60	60	60	60	60
Min % of capacity reduction	%	12.5	8.3	8.3	8.3	8.3	8.3	8.3
Condenser fans								
No. of fans / nominal power fan	kW	16/1.7	18/1.7	18/1.7	20/1.7	20/1.7	22/1.7	22/1.7
Fan speed	rpm	860	860	860	860	860	860	860
Diameter	mm	800	800	800	800	800	800	800
Total air flow	m3/s	86.0	100.6	95.0	105.6	105.6	116.1	118.3
Evaporator								
Evaporators / water volume	N°/l	1/392	1/415	1/415	1/402	1/402	1/402	1/402
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	219.1	219.1	219.1	219.1	219.1	219.1	219.1

1

Model		EWAD-BJYNN/A						
Unit size		**C10**	**C11**	**C12**	**C13**	**C14**	**C15**	**C16**
Condenser coil								
Coil type		Lanced fins - internally spiral wound tubes						
Weight and dimensions								
Standard unit shipping weight	kg	6563	8420	8420	8950	8950	9390	9540
Standard unit operating weight	kg	6967	8830	8830	9360	9360	9800	9950
Unit length	mm	8300	9200	9200	10100	10100	11000	11000
Unit width	mm	2230	2230	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520	2520	2520

Note:

(1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 35°C air ambient temp.
Power input is for compressor only.

Model		EWAD-BJYNN/A				
Unit size		**C17**	**C18**	**C19**	**C20**	**C21**
Cooling capacity (1)	kW	1430	1557	1710	1806	1920
Power input (1)	kW	386	476	510	536	555
COP		3.70	3.27	3.35	3.37	3.46
Screw compressors	N°	3	4	4	4	4
Refrigerant circuits	N°	3	4	4	4	4
Refrigerant charge R-134a	kg	232	256	264	264	264
Oil charge	kg	60	80	80	80	80
Min % of capacity reduction	%	8.3	6.25	6.25	6.25	6.25
Condenser fans						
No. of fans / nominal power fan	kW	26/1.7	26/1.7	28/1.7	28/1.7	28/1.7
Fan speed	rpm	860	860	860	860	860
Diameter	mm	800	800	800	800	800
Total air flow	m3/s	140	137.2	147.8	150.5	150.5
Evaporator						
Evaporators / water volume	N°/l	1/533	2/254+246	2/246+246	2/246+246	2/392+392
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	219.1	168.3	168.3	168.3	219.1
Condenser coil						
Coil type		Lanced fins - internally spiral wound tubes				
Weight and dimensions						
Standard unit shipping weight	kg	10355	10960	11168	11368	12144
Standard unit operating weight	kg	10931	11420	11678	11878	13036
Unit length	mm	12800	12800	13670	13670	13670
Unit width	mm	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520

Note:

(1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 35°C air ambient temp.Power input is for compressor only.

1

1.7 Technical Specifications: EWAD-BJYNN/A with OPRN

Technical specifications

The table below contains the technical specifications.

Model		EWAD-BJYNN/A with OPRN					
Unit size		**650**	**700**	**800**	**850**	**900**	**950**
Cooling capacity (1)	kW	640	703	769	822	881	907
Power input (1)	kW	216	232	254	271	286	275
COP		2.97	3.02	3.03	3.04	3.08	3.30
Screw compressors	N°	2	2	2	2	2	2
Refrigerant circuits	N°	2	2	2	2	2	2
Refrigerant charge R-134a	kg	114	124	128	132	132	144
Oil charge	kg	40	40	40	40	40	40
Min % of capacity reduction	%	12.5	12.5	12.5	12.5	12.5	12.5
Condenser fans							
No. of fans / nominal power fan	kW	11/1	12/1	13/1	14/1	14/1	16/1
Fan speed	rpm	680	680	680	680	680	680
Diameter	mm	800	800	800	800	800	800
Total air flow	m3/s	44.5	48.6	52.6	56.7	57.2	65.4
Evaporator							
Evaporators / water volume	N°/l	1/254	1/254	1/246	1/246	1/246	1/244
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	168.3	168.3	168.3	168.3	168.3	168.3
Condenser coil							
Coil type		Lanced fins - internally spiral wound tubes					
Weight and dimensions							
Standard unit shipping weight	kg	5205	5419	5660	5790	5890	6333
Standard unit operating weight	kg	5410	5624	5910	6040	6140	6589
Unit length	mm	6210	6210	7110	7110	7110	8300
Unit width	mm	2230	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520	2520

Model		EWAD-BJYNN/A with OPRN						
Unit size		**C10**	**C11**	**C12**	**C13**	**C14**	**C15**	**C16**
Cooling capacity (1)	kW	953	998	1053	1135	1177	1238	1323
Power input (1)	kW	283	332	347	362	389	402	421
COP		3.36	3.00	3.03	3.14	3.03	3.08	3.14
Screw compressors	N°	2	3	3	3	3	3	3
Refrigerant circuits	N°	2	3	3	3	3	3	3
Refrigerant charge R-134a	kg	144	180	186	196	194	204	204
Oil charge	kg	40	60	60	60	60	60	60
Min % of capacity reduction	%	12.5	8.3	8.3	8.3	8.3	8.3	8.3
Condenser fans								
No. of fans / nominal power fan	kW	16/1	18/1	18/1	20/1	20/1	22/1	22/1
Fan speed	rpm	680	680	680	680	680	680	680
Diameter	mm	800	800	800	800	800	800	800
Total air flow	m3/s	65.4	77.1	72.8	80.9	80.9	89.0	89.9
Evaporator								
Evaporators / water volume	N°/l	1/392	1/415	1/415	1/402	1/402	1/402	1/402
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	219.1	219.1	219.1	219.1	219.1	219.1	219.1
Condenser coil								
Coil type		Lanced fins - internally spiral wound tubes						

1

Model		EWAD-BJYNN/A with OPRN						
Unit size		**C10**	**C11**	**C12**	**C13**	**C14**	**C15**	**C16**
Weight and dimensions								
Standard unit shipping weight	kg	6563	8420	8420	8950	8950	9390	9540
Standard unit operating weight	kg	6967	8830	8830	9360	9360	9800	9950
Unit length	mm	8300	9200	9200	10100	10100	11000	11000
Unit width	mm	2230	2230	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520	2520	2520

Note: (1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 35°C air ambient temp.Power input is for compressor only.

Model		EWAD-BJYNN/A with OPRN				
Unit size		**C17**	**C18**	**C19**	**C20**	**C21**
Cooling capacity (1)	kW	1401	1512	1618	1762	1871
Power input (1)	kW	408	501	541	572	594
COP		3.44	3.02	2.99	3.08	3.15
Screw compressors	N°	3	4	4	4	4
Refrigerant circuits	N°	3	4	4	4	4
Refrigerant charge R-134a	kg	232	256	264	264	264
Oil charge	kg	60	80	80	80	80
Min % of capacity reduction	%	8.3	6.25	6.25	6.25	6.25
Condenser fans						
No. of fans / nominal power fan	kW	26/1	26/1	28/1	28/1	28/1
Fan speed	rpm	680	680	680	680	680
Diameter	mm	800	800	800	800	800
Total air flow	m3/s	106.3	105.2	113.3	114.4	114.4
Evaporator						
Evaporators / water volume	N°/l	1/533	2/254+246	2/246+246	2/246+246	2/392+392
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	219.1	168.3	168.3	168.3	219.1
Condenser coil						
Coil type		Lanced fins - internally spiral wound tubes				
Weight and dimensions						
Standard unit shipping weight	kg	10355	10960	11168	11368	12144
Standard unit operating weight	kg	10931	11420	11678	11878	13036
Unit length	mm	12800	12800	13670	13670	13670
Unit width	mm	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520

Note: (1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 35°C air ambient temp.Power input is for compressor only.

1

1.8 Technical Specifications: EWAD-BJYNN/A with OPLN

Technical specifications

The table below contains the technical specifications.

Model		**EWAD-BJYNN/A with OPLN**					
Unit size		**650**	**700**	**800**	**850**	**900**	**950**
Cooling capacity (1)	kW	640	703	769	822	881	907
Power input (1)	kW	216	232	254	271	286	275
COP		2.97	3.02	3.03	3.04	3.08	3.30
Screw compressors	N°	2	2	2	2	2	2
Refrigerant circuits	N°	2	2	2	2	2	2
Refrigerant charge R-134a	kg	114	124	128	132	132	144
Oil charge	kg	40	40	40	40	40	40
Min % of capacity reduction	%	12.5	12.5	12.5	12.5	12.5	12.5
Condenser fans							
No. of fans / nominal power fan	kW	11/1	12/1	13/1	14/1	14/1	16/1
Fan speed	rpm	680	680	680	680	680	680
Diameter	mm	800	800	800	800	800	800
Total air flow	m3/s	44.5	48.6	52.6	56.7	57.2	65.4
Evaporator							
Evaporators / water volume	N°/l	1/254	1/254	1/246	1/246	1/246	1/244
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	168.3	168.3	168.3	168.3	168.3	168.3
Condenser coil							
Coil type		Lanced fins - internally spiral wound tubes					
Weight and dimensions							
Standard unit shipping weight	kg	5445	5659	5900	6030	6130	6573
Standard unit operating weight	kg	5650	5864	6150	6280	6380	6829
Unit length	mm	6210	6210	7110	7110	7110	8300
Unit width	mm	2230	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520	2520

Model		**EWAD-BJYNN/A with OPLN**						
Unit size		**C10**	**C11**	**C12**	**C13**	**C14**	**C15**	**C16**
Cooling capacity (1)	kW	953	998	1053	1135	1177	1238	1323
Power input (1)	kW	283	332	347	362	389	402	421
COP		3.36	3.00	3.03	3.14	3.03	3.08	3.14
Screw compressors	N°	2	3	3	3	3	3	3
Refrigerant circuits	N°	2	3	3	3	3	3	3
Refrigerant charge R-134a	kg	144	180	186	196	194	204	204
Oil charge	kg	40	60	60	60	60	60	60
Min % of capacity reduction	%	12.5	8.3	8.3	8.3	8.3	8.3	8.3
Condenser fans								
No. of fans / nominal power fan	kW	16/1	18/1	18/1	20/1	20/1	22/1	22/1
Fan speed	rpm	680	680	680	680	680	680	680
Diameter	mm	800	800	800	800	800	800	800
Total air flow	m3/s	65.4	77.1	72.8	80.9	80.9	89.0	89.9
Evaporator								
Evaporators / water volume	N°/l	1/392	1/415	1/415	1/402	1/402	1/402	1/402
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	219.1	219.1	219.1	219.1	219.1	219.1	219.1
Condenser coil								
Coil type		Lanced fins - internally spiral wound tubes						

Model		EWAD-BJYNN/A with OPLN						
Unit size		**C10**	**C11**	**C12**	**C13**	**C14**	**C15**	**C16**
Weight and dimensions								
Standard unit shipping weight	kg	6803	8780	8780	9310	9310	9750	9900
Standard unit operating weight	kg	7207	9190	9190	9720	9720	10160	10310
Unit length	mm	8300	9200	9200	10100	10100	11000	11000
Unit width	mm	2230	2230	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520	2520	2520

Note: (1) Cooling capacity and power input are based on 12/7°C entering/leaving water temp. and 35°C air ambient temp.
Power input is for compressor only.

Model		EWAD-BJYNN/A with OPLN				
Unit size		**C17**	**C18**	**C19**	**C20**	**C21**
Cooling capacity (1)	kW	1401	1512	1618	1762	1871
Power input (1)	kW	408	501	541	572	594
COP		3.44	3.02	2.99	3.08	3.15
Screw compressors	N°	3	4	4	4	4
Refrigerant circuits	N°	3	4	4	4	4
Refrigerant charge R-134a	kg	232	256	264	264	264
Oil charge	kg	60	80	80	80	80
Min % of capacity reduction	%	8.3	6.25	6.25	6.25	6,25
Condenser fans						
No. of fans / nominal power fan	kW	26/1	26/1	28/1	28/1	28/1
Fan speed	rpm	680	680	680	680	680
Diameter	mm	800	800	800	800	800
Total air flow	m3/s	106.3	105.2	113.3	114.4	114.4
Evaporator						
Evaporators / water volume	N°/l	1/533	2/254+246	2/246+246	2/246+246	2/392+392
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	219.1	168.3	168.3	168.3	219.1
Condenser coil						
Coil type		Lanced fins - internally spiral wound tubes				
Weight and dimensions						
Standard unit shipping weight	kg	10715	11440	11648	11848	12624
Standard unit operating weight	kg	11291	11900	12158	12358	13516
Unit length	mm	12800	12800	13670	13670	13670
Unit width	mm	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520

Note: (1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 35°C air ambient temp.
Power input is for compressor only.

1.9 Technical Specifications: EWAD-BJYNN/Z

Technical specifications

The table below contains the technical specifications.

Model		**EWAD-BJYNN/Z**						
Unit size		**600**	**650**	**700**	**850**	**900**	**950**	**C10**
Cooling capacity (1)	kW	569	631	668	840	914	953	1013
Power input (1)	kW	216	237	264	323	336	361	361
COP		2,64	2,66	2,53	2,61	2,72	2,64	2,80
Screw compressors	No.	2	2	2	3	3	3	3
Refrigerant circuits	No.	2	2	2	3	3	3	3
Refrigerant charge R-134a	kg	124	128	132	186	196	194	204
Oil charge	kg	40	40	40	60	60	60	60
Min % of capacity reduction	%	12.5	12.5	12.5	8.3	8.3	8.3	8,3
Condenser fans								
No. of fans / nominal power fan	kW	12/0.3	13/0.3	14/0.3	18/0.3	20/0.3	20/0.3	22/0.3
Fan speed	rpm	500	500	500	500	500	500	500
Diameter	mm	800	800	800	800	800	800	800
Total air flow	m3/s	30.8	33.3	35.9	46.1	51.3	51.3	56.4
Evaporator								
Evaporators / water volume	No./l	1/254	1/246	1/246	1/415	1/402	1/402	1/402
Max operating pressure	bar	10.5	10.5	10.5	10.5	10.5	10.5	10.5
Water connection diameter	mm	168.3	168.3	168.3	219.1	219.1	219.1	219.1
Condenser coil								
Coil type		Lanced fins - internally spiral wound tubes						
Weight and dimensions								
Standard unit shipping weight	kg	5659	5900	6030	8725	9310	9310	9750
Standard unit operating weight	kg	5864	6150	6280	9150	9720	9720	10160
Unit length	mm	6210	7110	7110	9200	10100	10100	11000
Unit width	mm	2230	2230	2230	2230	2230	2230	2230
Unit height	mm	2520	2520	2520	2520	2520	2520	2520

Note

(1) Cooling capacity and power input are based on 12/7 °C entering/leaving water temp. and 35°C air ambient temp.Power input is for compressor only.

1.10 Electrical Specifications: EWAD-BJYNN

1

Electrical specifications

The tabel below contains the electrical specifications

Model		EWAD-BJYNN			
Unit size		**650**	**700**	**750**	**850**
Standard voltage (1)		400 V - 3f - 50 Hz			
Nominal unit current (2)	A	414	436	471	502
Max compressor current (3)	A	435	460	501	542
Fans current	A	36	40	44	48
Max unit current (3)	A	471	500	545	590
Max unit inrush current (4)	A	814	834	838	867
Max unit current for wires sizing (5)	A	530	582	625	668

Model		EWAD-BJYNN				
Unit size		**900**	**950**	**C10**	**C11**	**C12**
Standard voltage (1)		400 V - 3f - 50 Hz				
Nominal unit current (2)	A	497	632	658	688	726
Max compressor current (3)	A	548	664	687	730	773
Fans current	A	48	56	64	64	72
Max unit current (3)	A	596	720	751	794	845
Max unit inrush current (4)	A	867	998	1022	1022	1055
Max unit current for wires sizing (5)	A	668	821	877	916	963

Model		EWAD-BJYNN				
Unit size		**C13**	**C14**	**C15**	**C16**	**C18**
Standard voltage (1)		400 V - 3ph - 50 Hz				
Nominal unit current (2)	A	756	744	938	1004	994
Max compressor current (3)	A	816	820	1002	1084	1096
Fans current	A	72	72	88	96	96
Max unit current (3)	A	888	892	1090	1180	1192
Max unit inrush current (4)	A	1079	1079	1284	1292	1292
Max unit current for wires sizing (5)	A	1002	1002	1250	1336	1336

Notes:

(1) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.

(2) Nominal current is based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current is based on: 14/9 °C entering/leaving evaporator water temperature and 44°C ambient temp.

(4) Inrush current of biggest compressor + 75 % of nominal absorbed current of the other compressor + fans current.

(5) Compressor FLA + fans current.

1

1.11 Electrical Specifications: EWAD-BJYNN with OPRN

Electrical specifications

The tabel below contains the electrical specifications

Model		**EWAD-BJYNN with OPRN**			
Unit size		**650**	**700**	**750**	**850**
Standard voltage (1)		400 V - 3f - 50 Hz			
Nominal unit current (2)	A	416	438	474	510
Max compressor current (3)	A	443	470	504	538
Fans current	A	18	20	22	24
Max unit current (3)	A	461	490	526	562
Max unit inrush current (4)	A	797	815	817	846
Max unit current for wires sizing (5)	A	512	562	603	644

Model		**EWAD-BJYNN with OPRN**				
Unit size		**900**	**950**	**C10**	**C11**	**C12**
Standard voltage (1)		400 V - 3f - 50 Hz				
Nominal unit current (2)	A	508	638	662	701	733
Max compressor current (3)	A	549	678	705	739	773
Fans current	A	24	28	32	32	34
Max unit current (3)	A	573	706	737	771	807
Max unit inrush current (4)	A	846	971	992	992	1021
Max unit current for wires sizing (5)	A	644	793	845	884	925

Model		**EWAD-BJYNN with OPRN**				
Unit size		**C13**	**C14**	**C15**	**C16**	**C18**
Standard voltage (1)		400 V - 3f - 50 Hz				
Nominal unit current (2)	A	765	760	948	1020	1016
Max compressor current (3)	A	807	821	1008	1076	1097
Fans current	A	36	36	44	48	48
Max unit current (3)	A	843	857	1052	1124	1145
Max unit inrush current (4)	A	1050	1050	1249	1253	1253
Max unit current for wires sizing (5)	A	966	966	1206	1288	1288

Notes:

(1) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.

(2) Nominal current is based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current is based on: 14/9 °C entering/leaving evaporator water temperature and 40°C ambient temp.

(4) Inrush current of biggest compressor + 75 % of nominal absorbed current of the other compressor + fans current.

(5) Compressor FLA + fans current.

1.12 Electrical Specifications EWAD-BJIYNN with OPLN

Electrical specifications

The table below contains the electrical specifications.

Model		EWAD-BJYNN with OPLN			
Unit size		**650**	**700**	**750**	**850**
Standard voltage (1)		400 V - 3f - 50 Hz			
Nominal unit current (2)	A	416	438	474	510
Max compressor current (3)	A	443	470	504	538
Fans current	A	18	20	22	24
Max unit current (3)	A	461	490	526	562
Max unit inrush current (4)	A	797	815	817	846
Max unit current for wires sizing (5)	A	512	562	603	644

Model		EWAD-BJYNN with OPLN				
Unit size		**900**	**950**	**C10**	**C11**	**C12**
Standard voltage (1)		400 V - 3f - 50 Hz				
Nominal unit current (2)	A	508	638	662	701	733
Max compressor current (3)	A	549	678	705	739	773
Fans current	A	24	28	32	32	34
Max unit current (3)	A	573	706	737	771	807
Max unit inrush current (4)	A	846	971	992	992	1021
Max unit current for wires sizing (5)	A	644	793	845	884	925

Model		EWAD-BJYNN with OPLN				
Unit size		**C13**	**C14**	**C15**	**C16**	**C18**
Standard voltage (1)		400 V - 3f - 50 Hz				
Nominal unit current (2)	A	765	760	948	1020	1016
Max compressor current (3)	A	807	821	1008	1076	1097
Fans current	A	36	36	44	48	48
Max unit current (3)	A	843	857	1052	1124	1145
Max unit inrush current (4)	A	1050	1050	1249	1253	1253
Max unit current for wires sizing (5)	A	966	966	1206	1288	1288

Notes:

(1) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.

(2) Nominal current is based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current is based on: 14/9 °C entering/leaving evaporator water temperature and 40°C ambient temp.

(4) Inrush current of biggest compressor + 75 % of nominal absorbed current of the other compressor + fans current.

(5) Compressor FLA + fans current.

1

1.13 Electrical Specifications: EWAD-BJYNN/Q

Electrical specifications

The table below contains the electrical specifications.

Model		**EWAD-BJYNN/Q**					
Unit size		**550**	**600**	**650**	**700**	**750**	**800**
Standard voltage (1)		400 V - 3f - 50 Hz					
Nominal unit current (2)	A	414	439	468	512	556	605
Max compressor current (3)	A	440	473	506	558	610	660
Fans current	A	10	11	12	13	14	16
Max unit current (3)	A	450	484	518	571	624	676
Max unit inrush current (4)	A	796	797	819	820	854	958
Max unit current for wires sizing (5)	A	456	505	554	594	634	685

Model		**EWAD-BJYNN/Q**					
Unit size		**850**	**900**	**950**	**C10**	**C11**	**C12**
Standard voltage (1)		400 V - 3f - 50 Hz					
Nominal unit current (2)	A	640	666	702	733	791	818
Max compressor current (3)	A	693	726	759	811	863	895
Fans current	A	16	18	18	20	20	22
Max unit current (3)	A	709	744	777	831	883	917
Max unit inrush current (4)	A	958	980	1000	1002	1035	1070
Max unit current for wires sizing (5)	A	733	783	831	872	911	952

Notes:

(1) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.

(2) Nominal current is based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current is based on: 14/9 °C entering/leaving evaporator water temperature and 40°C ambient temp.

(4) Inrush current of biggest compressor + 75 % of nominal absorbed current of the other compressor + fans current.

(5) Compressor FLA + fans current.

1.14 Electrical Specifications: EWAD-BJYNN/A

Electrical specifications

The table below contains the electrical specifications

Model		EWAD-BJYNN/A				
Unit size		**650**	**700**	**800**	**850**	**900**
Standard voltage (1)		400 V - 3f - 50 Hz				
Nominal unit current (2)	A	412	434	464	494	485
Max compressor current (3)	A	442	468	511	554	547
Fans current	A	44	48	52	56	56
Max unit current (3)	A	486	516	563	610	603
Max unit inrush current (4)	A	821	842	846	872	872
Max unit current for wires sizing (5)	A	538	590	633	676	676

Model		EWAD-BJYNN/A					
Unit size		**950**	**C10**	**C11**	**C12**	**C13**	**C14**
Standard voltage (1)		400 V - 3f - 50 Hz					
Nominal unit current (2)	A	480	491	631	651	686	713
Max compressor current (3)	A	532	545	670	696	742	788
Fans current	A	64	64	72	72	80	80
Max unit current (3)	A	596	609	742	768	822	868
Max unit inrush current (4)	A	872	872	1012	1029	1037	1059
Max unit current for wires sizing (5)	A	684	684	837	885	932	971

Model		EWAD-BJYNN/A						
Unit size		**C15**	**C16**	**C17**	**C18**	**C19**	**C20**	**C21**
Standard voltage (1)		400 V - 3f - 50 Hz						
Nominal unit current (2)	A	748	722	723	928	988	970	998
Max compressor current (3)	A	834	810	791	1022	1108	1095	1130
Fans current	A	88	88	104	104	112	112	112
Max unit current (3)	A	922	898	895	1126	1220	1207	1242
Max unit inrush current (4)	A	1090	1090	1090	1291	1299	1299	1299
Max unit current for wires sizing (5)	A	1018	1018	1034	1266	1352	1352	1352

Notes:

(1) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.

(2) Nominal current is based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current is based on: 14/9 °C entering/leaving evaporator water temperature and 48°C ambient temp.

(4) Inrush current of biggest compressor + 75 % of nominal absorbed current of the other compressor + fans current.

(5) Compressor FLA + fans current.

1

1.15 Electrical Specifications: EWAD-BJYNN/A with OPRN

Electrical specifications

The table below contains the electrical specifications

Model		**EWAD-BJYNN/A with OPRN**				
Unit size		**650**	**700**	**800**	**850**	**900**
Standard voltage (1)		400 V - 3f - 50 Hz				
Nominal unit current (2)	A	403	428	459	490	484
Max compressor current (3)	A	443	470	510	550	547
Fans current	A	22	24	26	28	28
Max unit current (3)	A	465	494	536	578	575
Max unit inrush current (4)	A	796	815	817	843	843
Max unit current for wires sizing (5)	A	516	566	607	648	648

Model		**EWAD-BJYNN/A with OPRN**					
Unit size		**950**	**C10**	**C11**	**C12**	**C13**	**C14**
Standard voltage (1)		400 V - 3f - 50 Hz					
Nominal unit current (2)	A	472	484	614	633	669	705
Max compressor current (3)	A	528	543	678	705	745	785
Fans current	A	32	32	36	36	40	40
Max unit current (3)	A	560	575	714	741	785	825
Max unit inrush current (4)	A	843	843	971	988	992	1015
Max unit current for wires sizing (5)	A	652	652	801	849	892	931

Model		**EWAD-BJYNN/A with OPRN**						
Unit size		**C15**	**C16**	**C17**	**C18**	**C19**	**C20**	**C21**
Standard voltage (1)		400 V - 3ph - 50 Hz						
Nominal unit current (2)	A	729	716	704	918	980	967	1000
Max compressor current (3)	A	825	807	783	1020	1100	1094	1116
Fans current	A	44	44	52	52	56	56	56
Max unit current (3)	A	869	851	835	1072	1156	1150	1172
Max unit inrush current (4)	A	1043	1043	1043	1234	1238	1238	1238
Max unit current for wires sizing (5)	A	974	974	982	1214	1296	1296	1296

Notes:

(1) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.

(2) Nominal current is based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current is based on: 14/9 °C entering/leaving evaporator water temperature and 44°C ambient temp.

(4) Inrush current of biggest compressor + 75 % of nominal absorbed current of the other compressor + fans current.

(5) Compressor FLA + fans current.

1

1.16 Electrical Specifications: EWAD-BJYNN/A with OPLN

Electrical specifications

The table below contains the electrical specifications

Model		EWAD-BJYNN/A with OPLN				
Unit size		**650**	**700**	**800**	**850**	**900**
Standard voltage (1)		400 V - 3f - 50 Hz				
Nominal unit current (2)	A	403	428	459	490	484
Max compressor current (3)	A	443	470	510	550	547
Fans current	A	22	24	26	28	28
Max unit current (3)	A	465	494	536	578	575
Max unit inrush current (4)	A	796	815	817	843	843
Max unit current for wires sizing (5)	A	516	566	607	648	648

Model		EWAD-BJYNN/A with OPLN					
Unit size		**950**	**C10**	**C11**	**C12**	**C13**	**C14**
Standard voltage (1)		400 V - 3f - 50 Hz					
Nominal unit current (2)	A	472	484	614	633	669	705
Max compressor current (3)	A	528	543	678	705	745	785
Fans current	A	32	32	36	36	40	40
Max unit current (3)	A	560	575	714	741	785	825
Max unit inrush current (4)	A	843	843	971	988	992	1015
Max unit current for wires sizing (5)	A	652	652	801	849	892	931

Model		EWAD-BJYNN/A with OPLN						
Unit size		**C15**	**C16**	**C17**	**C18**	**C19**	**C20**	**C21**
Standard voltage (1)		400 V - 3ph - 50 Hz						
Nominal unit current (2)	A	729	716	704	918	980	967	1000
Max compressor current (3)	A	825	807	783	1020	1100	1094	1116
Fans current	A	44	44	52	52	56	56	56
Max unit current (3)	A	869	851	835	1072	1156	1150	1172
Max unit inrush current (4)	A	1043	1043	1043	1234	1238	1238	1238
Max unit current for wires sizing (5)	A	974	974	982	1214	1296	1296	1296

Notes:

(1) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.

(2) Nominal current is based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current is based on: 14/9 °C entering/leaving evaporator water temperature and 44°C ambient temp.

(4) Inrush current of biggest compressor + 75 % of nominal absorbed current of the other compressor + fans current.

(5) Compressor FLA + fans current.

1

1.17 Electrical Specifications: EWAD-BJYNN/Z

Electrical specifications

The table below contains the electrical specifications

Model		**EWAD-BJYNN/Z**						
Unit size		**600**	**650**	**700**	**850**	**900**	**950**	**C10**
Standard voltage (1)		400 V - 3ph - 50 Hz						
Nominal unit current (2)	A	392	420	444	585	604	636	652
Max compressor current (3)	A	416	447	474	618	640	678	705
Fans current	A	12	13	14	18	20	20	22
Max unit current (3)	A	428	460	488	636	660	698	727
Max unit inrush current (4)	A	790	791	812	943	945	965	986
Max unit current for wires sizing (5)	A	458	507	556	687	737	785	835

Notes:

(1) Allowed voltage tolerance ± 10%. Voltage unbalance between phases must be within ± 3%.

(2) Nominal current is based on: 12/7 °C entering/leaving evaporator water temperature and 35°C ambient temp.

(3) Maximum current is based on: 14/9 °C entering/leaving evaporator water temperature and 40°C ambient temp.

(4) Inrush current of biggest compressor + 75 % of nominal absorbed current of the other compressor + fans current.

(5) Compressor FLA + fans current.

1.18 Correction Factors

Evaporator fouling factors

The table below gives the evaporator fouling factors.

Fouling factors m2°C / kW	Cooling capacity correction factor	Power input corretion factor	COP correction factor
0.0176	1.000	1.000	1.000
0.0440	0.978	0.986	0.992
0.0880	0.957	0.974	0.983
0.1320	0.938	0.962	0.975

Altitude correction factors

The table below gives the altitude correction factors.

Elvation above sea level (m)	0	300	600	900	1200	1500	1800
Barometric pressure (mbar)	1013	977	942	908	875	843	812
Cooling cap.correction factor	1.000	0.993	0.986	0.979	0.973	0.967	0.960
Power input correction factor	1.000	1.005	1.009	1.015	1.021	1.026	1.031

Ethylene glycol and low ambient temperature correction factors

The table below gives the ethylene glycol and low ambient temperature correction factors.

Air ambient temperature °C	-3	-8	-15	-23	-35
% of ethylene glycol by weight	10	20	30	40	50
Cooling capacity correction factor	0.991	0.982	0.972	0.961	0.946
Power input correction factor	0.996	0.992	0.986	0.976	0.966
Flow rate correction factor	1.013	1.040	1.074	1.121	1.178
Water pressure drops correction factor	1.070	1.129	1.181	1.263	1.308

Low temperature operation performance factors

The table below gives the low temperature operation performance factors.

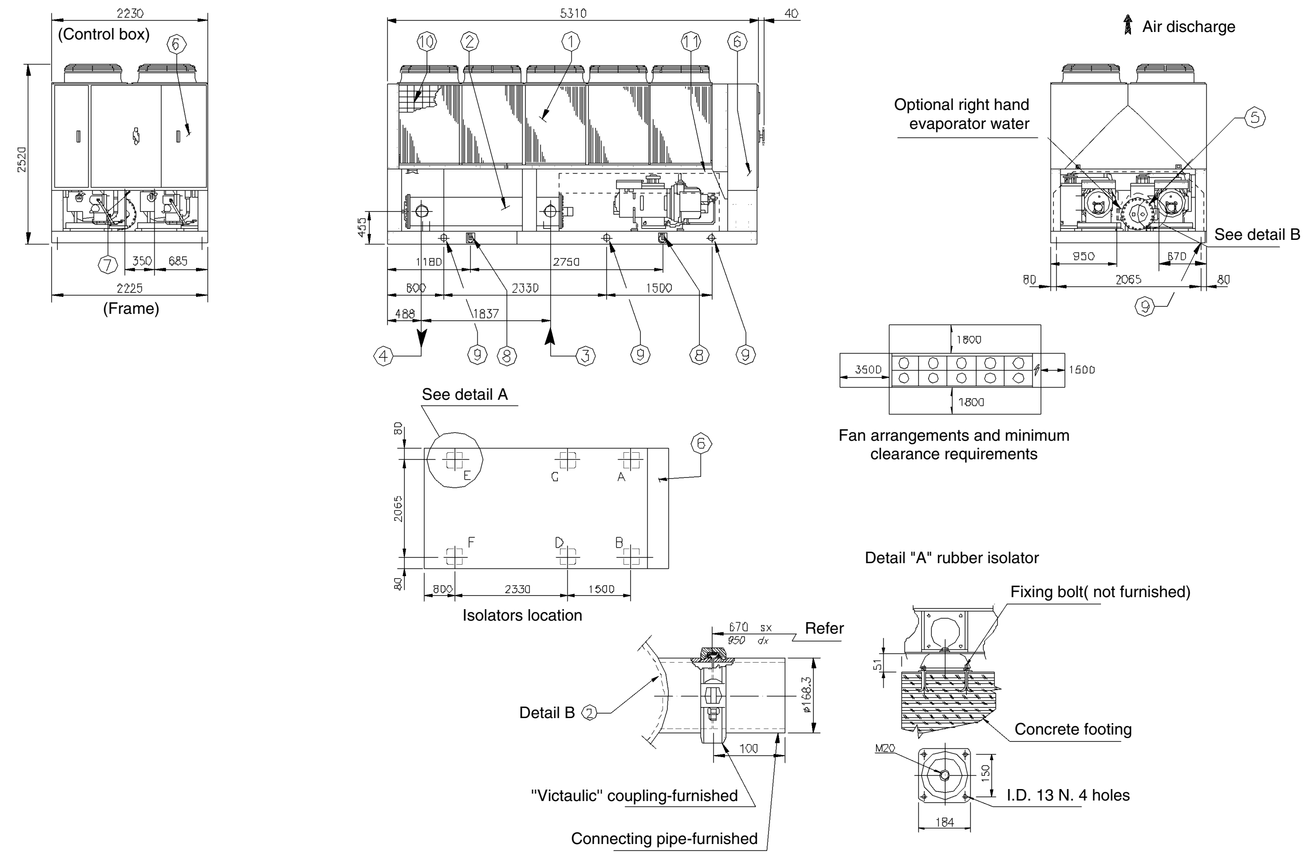
Ethylene glycol/water leaving temperature °C	2	0	-2	-4	-6	-8
Max air ambient temperature °C (EWAD-BJYNN)	40	39	38	37	36	35
Max air ambient temp.°C (with OPRN/OPLN & /Q)	36	35	34	33	32	31
Max air ambient temperature °C (/A)	44	43	42	41	40	39
Max air ambient temperature°C (/A with OPRN/OPLN)	40	39	38	37	36	35
Max air ambient temperature (/Z)	36	35	34	33	32	31
Cooling capacity correction factor	0.842	0.785	0.725	0.670	0.613	0.562
Power input compressors correction factor	0.95	0.94	0.92	0.89	0.87	0.84
Min. % of ethylene glycol	10	20	20	30	30	30

Low temperature operation performance factors must be applied to the nominal performance data to have the adjusted value (12/7°C, design ambient temperature).

1

1.19 Outlook Drawing: EWAD550BJYNN/Q

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type		Weight KG		Isolators load KG					
			Shipping	Operating	A	B	C	D	E	F
EWAD550BJYNN/Q	Aluminum		5230	5440	1070	1150	850	820	890	750
	Acrylic coated									
EWAD550BJYNN/Q	Rubber isolators	Type (q/ty)			786010-h (4 Pz.)				786010-v (2 Pz.)	

1

Components

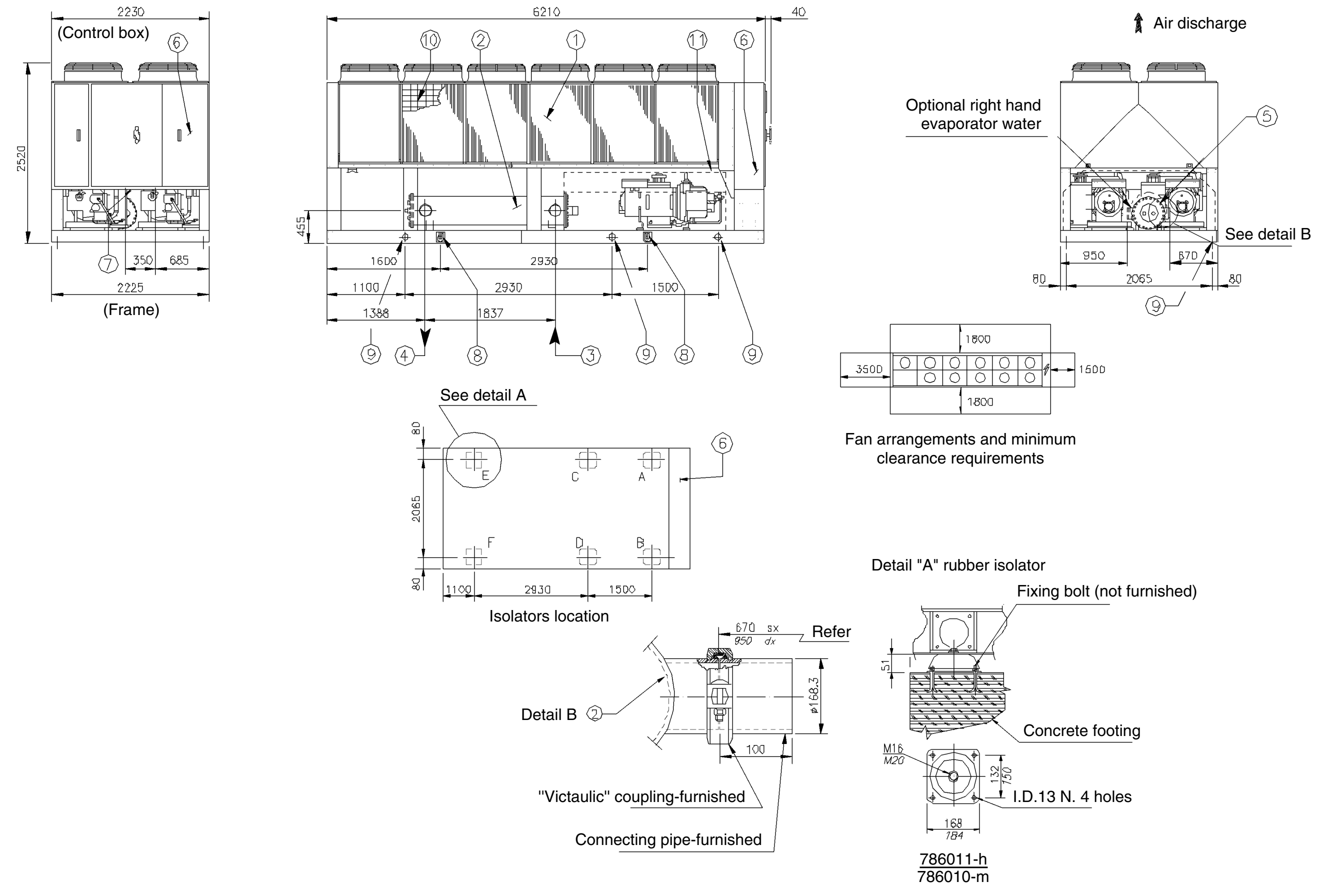
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure

1

1.20 Outlook Drawing: EWAD600BJYNN/Q

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type	Weight KG		Isolators load KG					
	Shipping	Operating	A	B	C	D	E	F
Aluminum / Acrylic coated	5445	5650	1130	1190	920	960	750	700
Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-h (2 Pz.)	

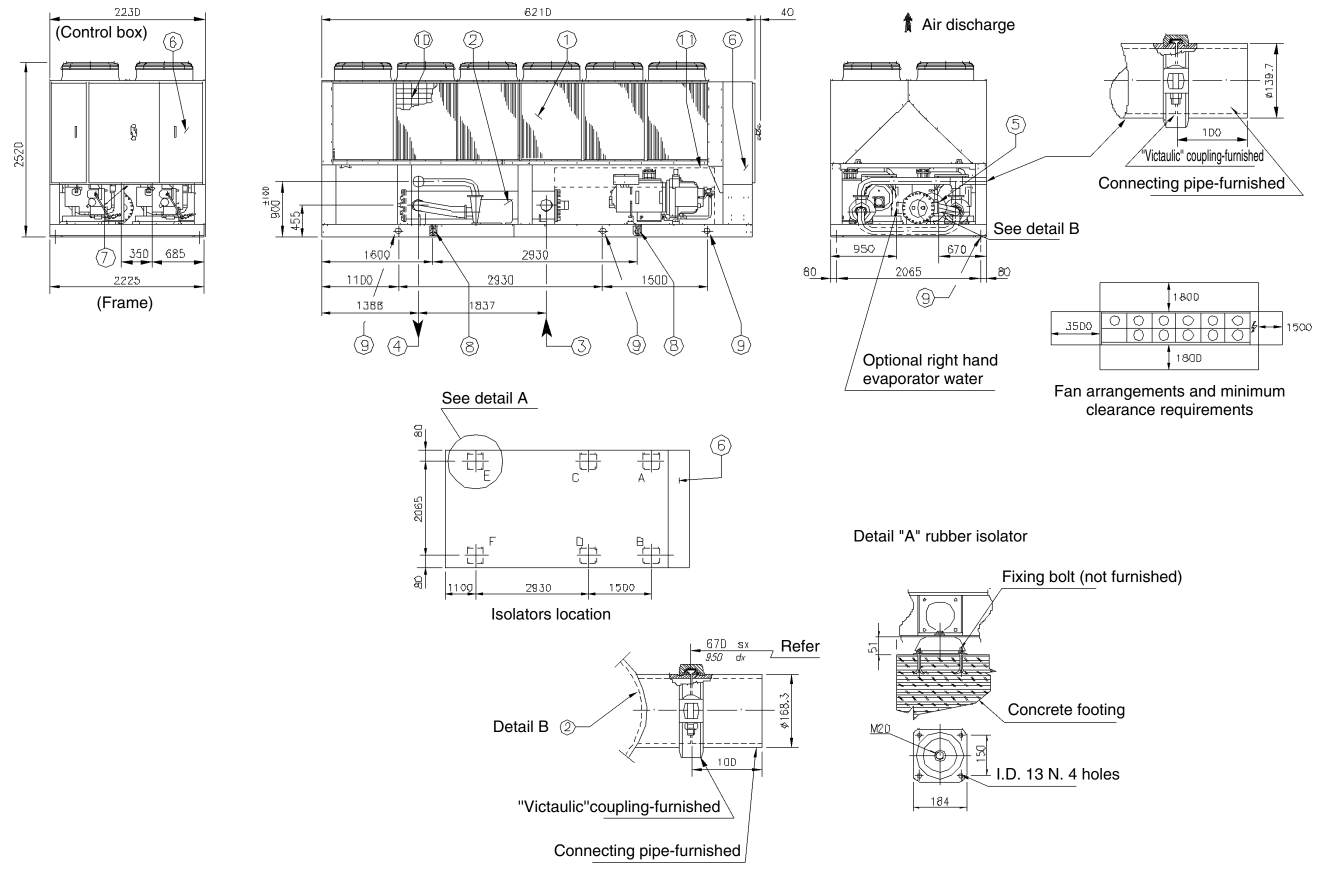
Components

The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure

1.21 Outlook Drawing: EWAD600BJYNN/Q+OPTP

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type	Weight KG		Isolators load KG					
	Shipping	Operating	A	B	C	D	E	F
Aluminum Acrylic coated	6045	6250	1130	1190	985	1025	985	935
Rubber isolators	Type (q/ty)		786010-m (6 Pz.)					

Components

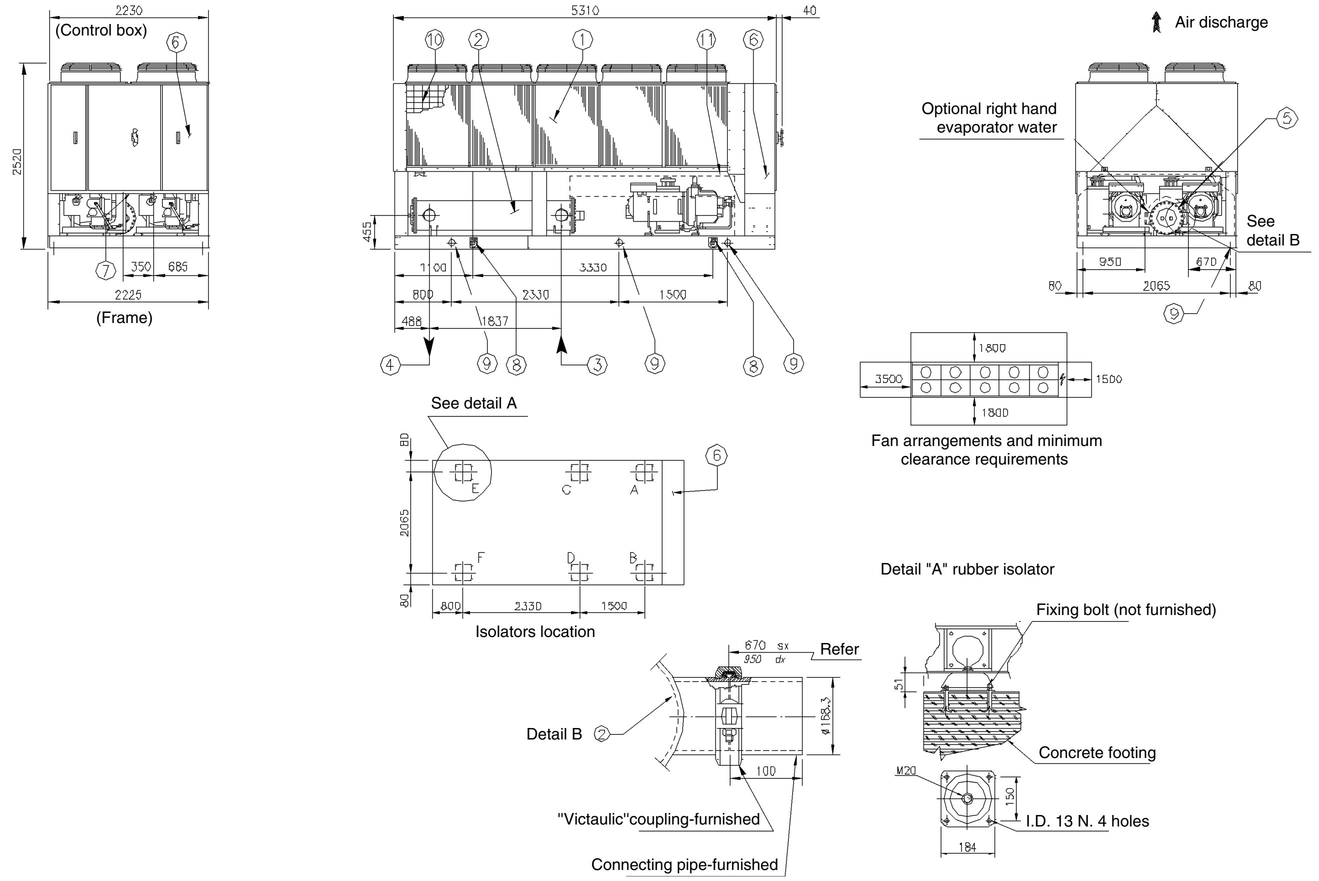
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Evaporator-pump water outlet victaulic connection for 139.7 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	6 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure

1

1.22 Outlook Drawing: EWAD700BJYNN, EWAD700BJYNN+OPRN and EWAD700BJYNN+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG					
		Shipping	Operating	A	B	C	D	E	F
EWAD700BJYNN EWAD700BJYNN+OPRN	Aluminum Acrylic coated	4990	5200	1010	1090	800	860	690	750
EWAD700BJYNN+OPLN	Aluminum Acrylic coated	5230	5440	1070	1150	880	920	690	750
EWAD700BJYNN EWAD700BJYNN+OPRN EWAD700BJYNN+OPLN	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-w (2 Pz.)	

Components

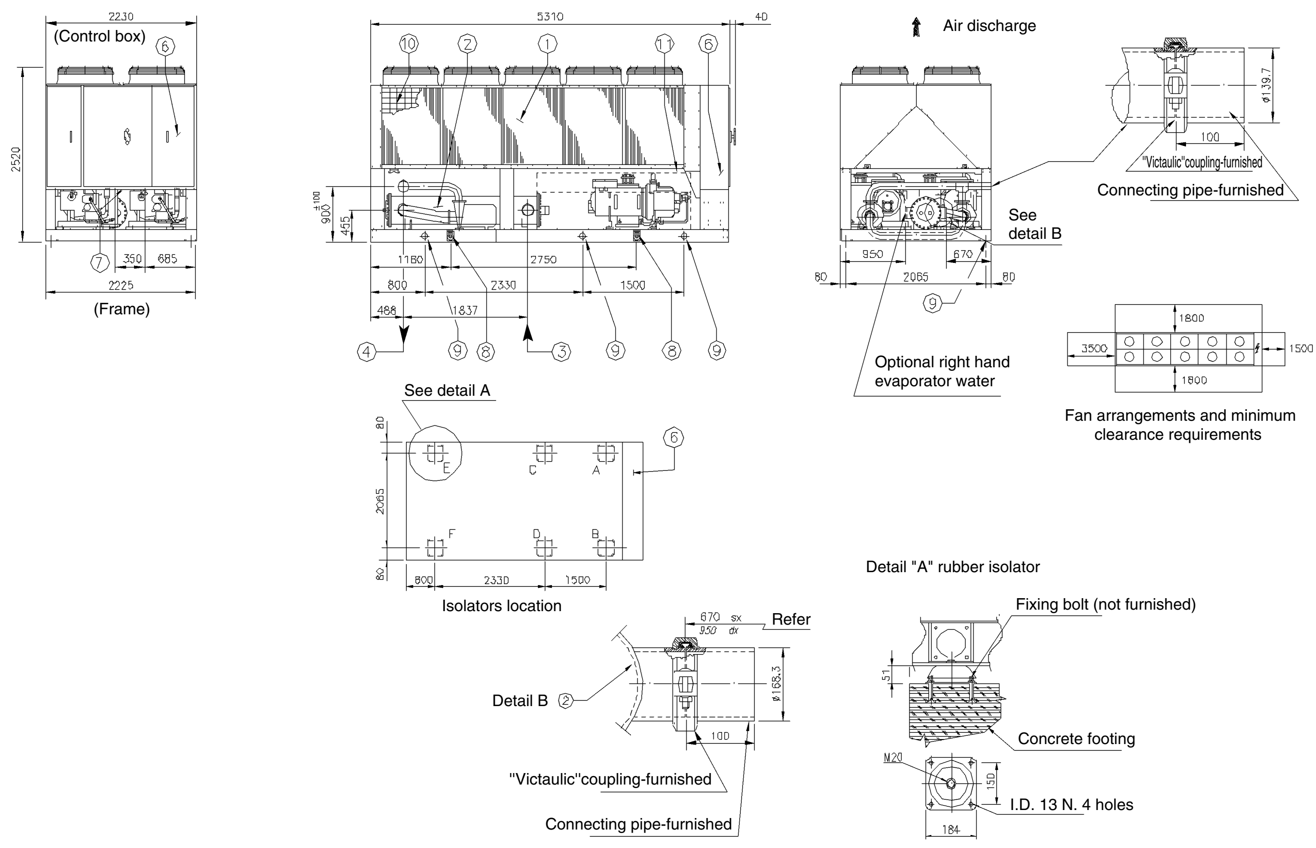
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	6 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.23 Outlook Drawing: EWAD700BJYNN+OPTP, EWAD700BJYNN+OPRN+OPTP and EWAD700BJYNN+OPLN+OPTP

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG					
		Shipping	Operating	A	B	C	D	E	F
EWAD700BJYNN+OPTP EWAD700BJYNN+OPRN+OPTP	Aluminum Acrylic coated	5630	5840	1010	1090	885	945	925	985
EWAD700BJYNN+OPLN+OPTP	Aluminum Acrylic coated	5870	6080	1070	1150	945	1005	925	985
EWAD700BJYNN+OPTP EWAD700BJYNN+OPRN+OPTP EWAD700BJYNN+OPLN+OPTP	Rubber isolators	Type (q/ty)		786010-m (5 Pz.)					

Components

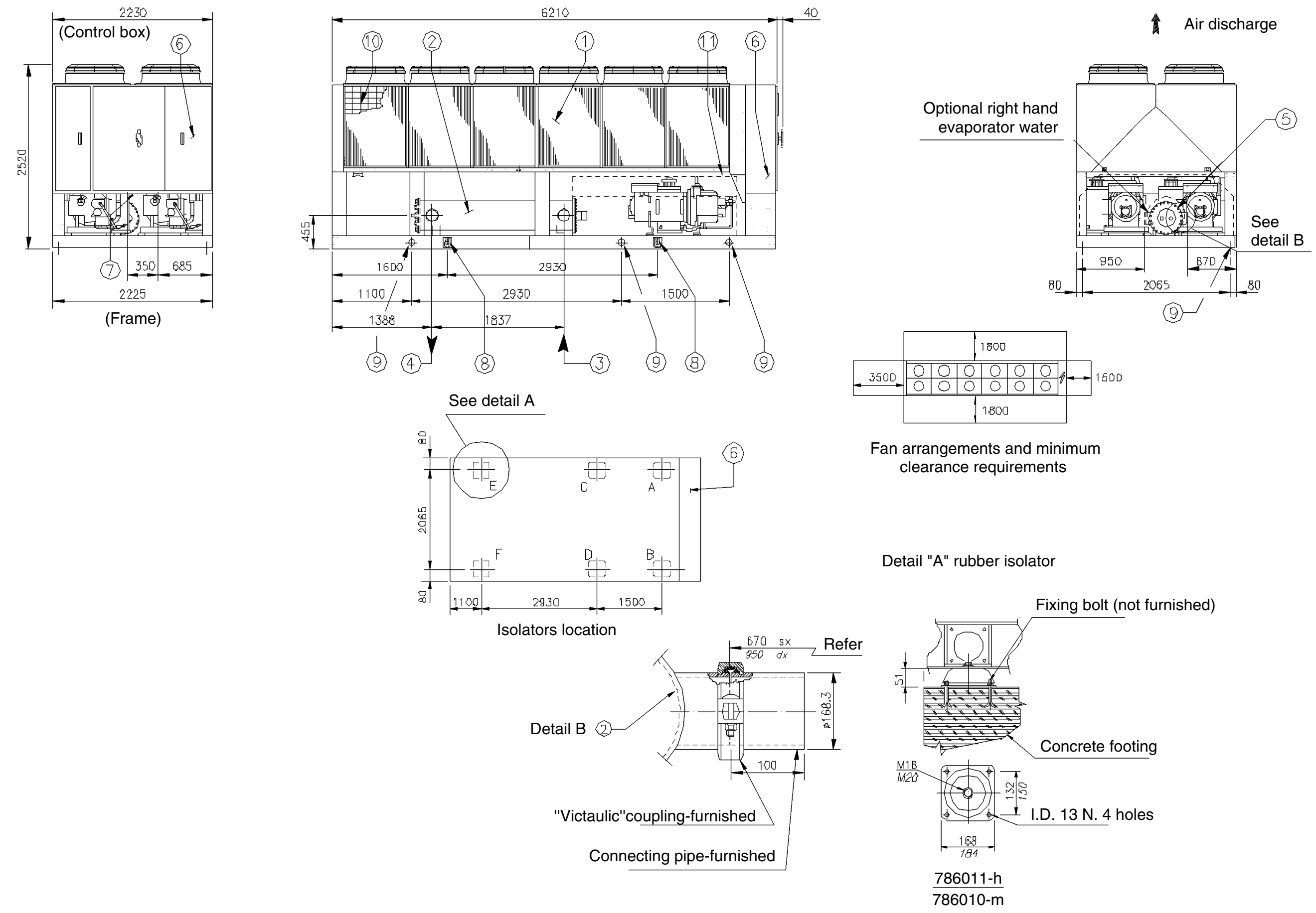
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator-pump water outlet victaulic connection for 139.7 O.D. tube
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	6 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.24 Outlook Drawing: EWAD700BJYNN/A, EWAD700BJYNN/A+OPRN and EWAD700BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type		Weight KG		Isolators load KG					
			Shipping	Operating	A	B	C	D	E	F
EWAD70BJYNN/A EWAD70BJYNN/A+OPRN	Aluminum		5419	5624	1080	1165	870	935	762	812
	Acrylic coated									
EWAD70BJYNN/A+OPLN	Aluminum		5659	5884	1140	1225	930	995	762	812
	Acrylic coated									
EWAD70BJYNN/A EWAD70BJYNN/A+OPRN EWAD70BJYNN/A+OPLN	Rubber isolators	Type (q/ty)			786010-m (4 Pz.)				786010-h (2 Pz.)	

Components

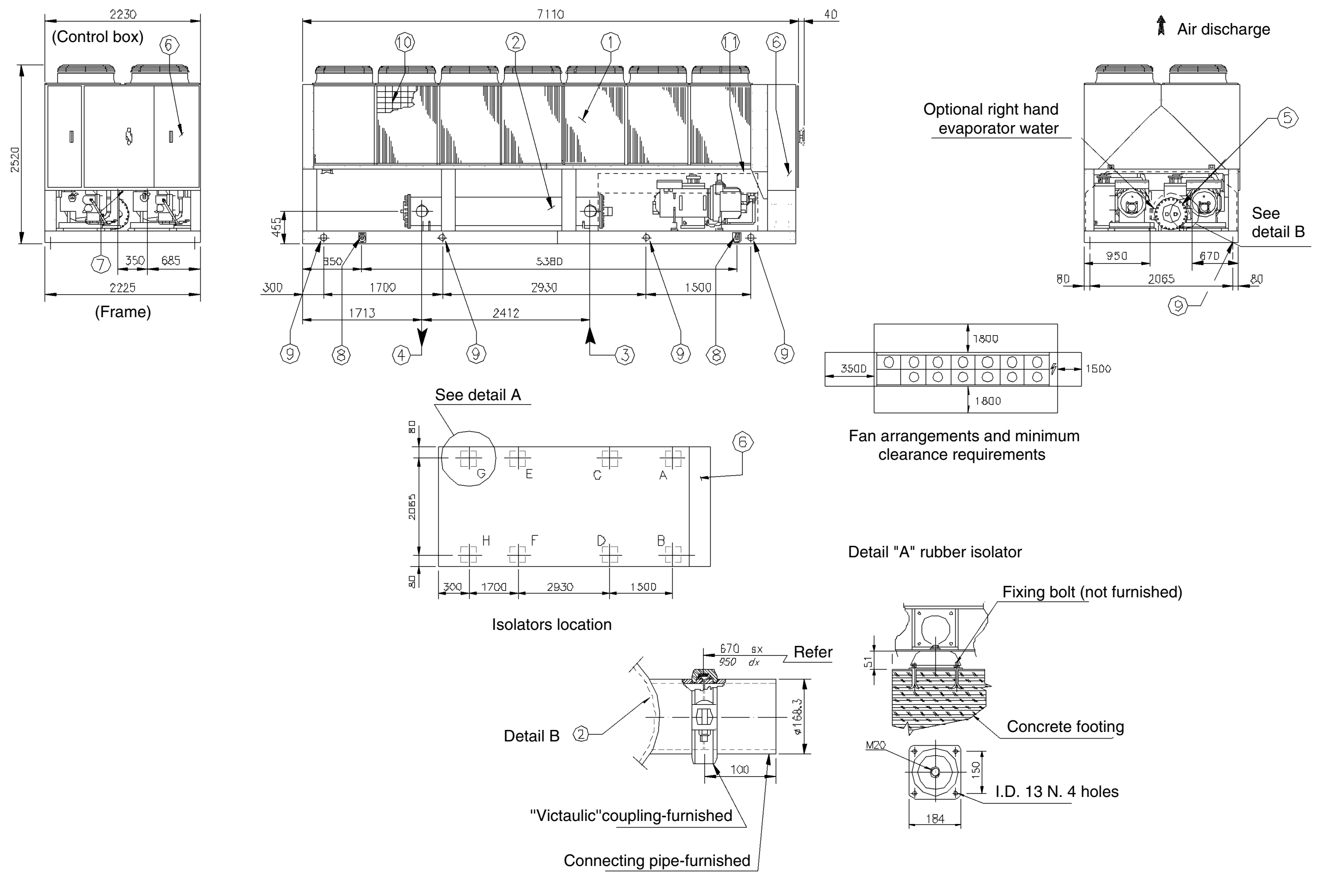
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.25 Outlook Drawing: EWAD700BJYNN/Q and EWAD650BJYNN/Z

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type	Weight KG		Isolators load KG							
	Shipping	Operating	A	B	C	D	E	F	G	H
Aluminum	5900	6150	1080	1175	900	975	675	695	330	320
Acrylic coated										
Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-v (4 Pz.)			

Components

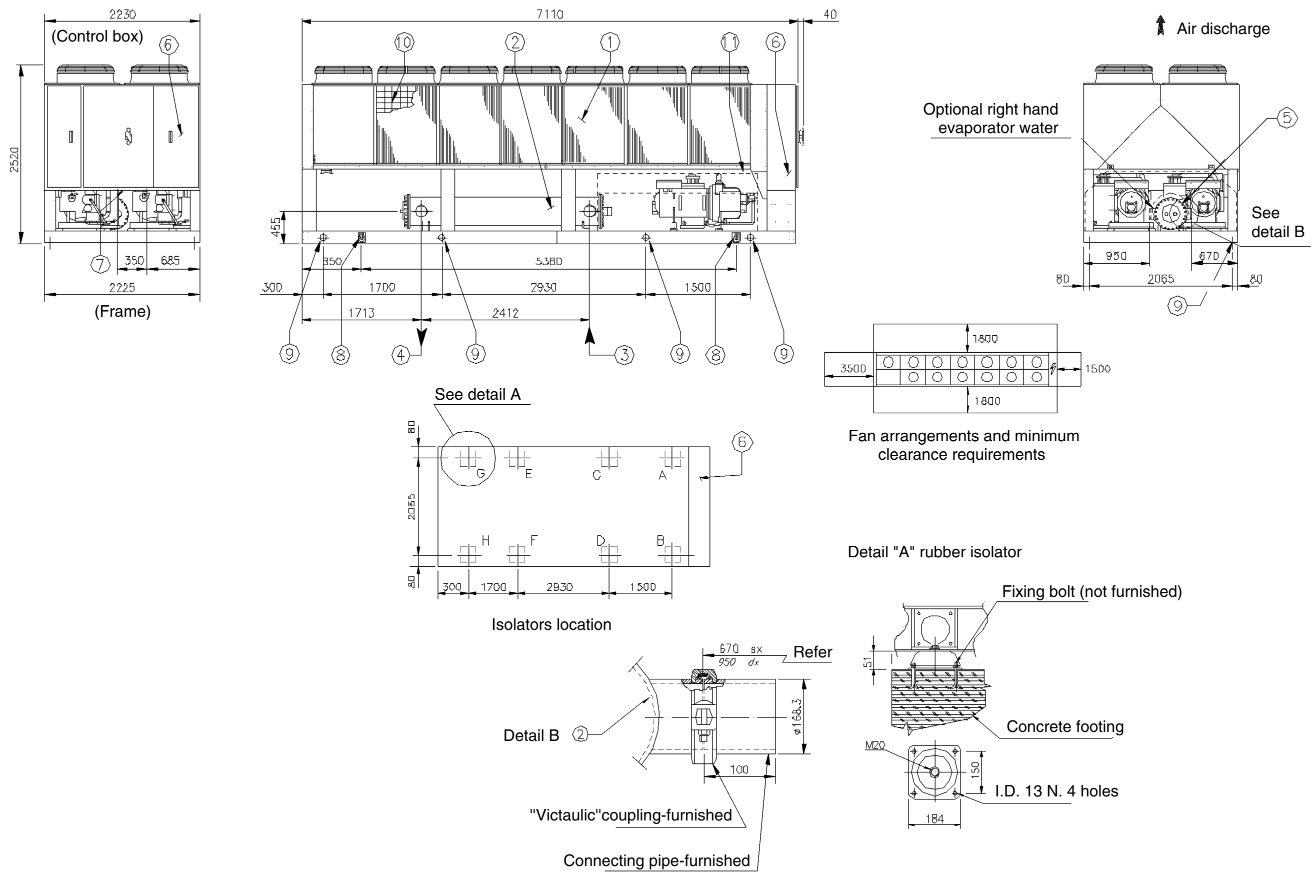
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure

1

1.26 Outlook Drawing: EWAD750BJYNN/Q and EWAD700BJYNN/Z

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type	Weight KG		Isolators load KG							
	Shipping	Operating	A	B	C	D	E	F	G	H
Aluminum Acrylic coated	5900	6150	1080	1175	900	975	675	695	330	320

Rubber isolators	Type (q/ty)	786010-m (4 Pz.)	786010-v (4 Pz.)

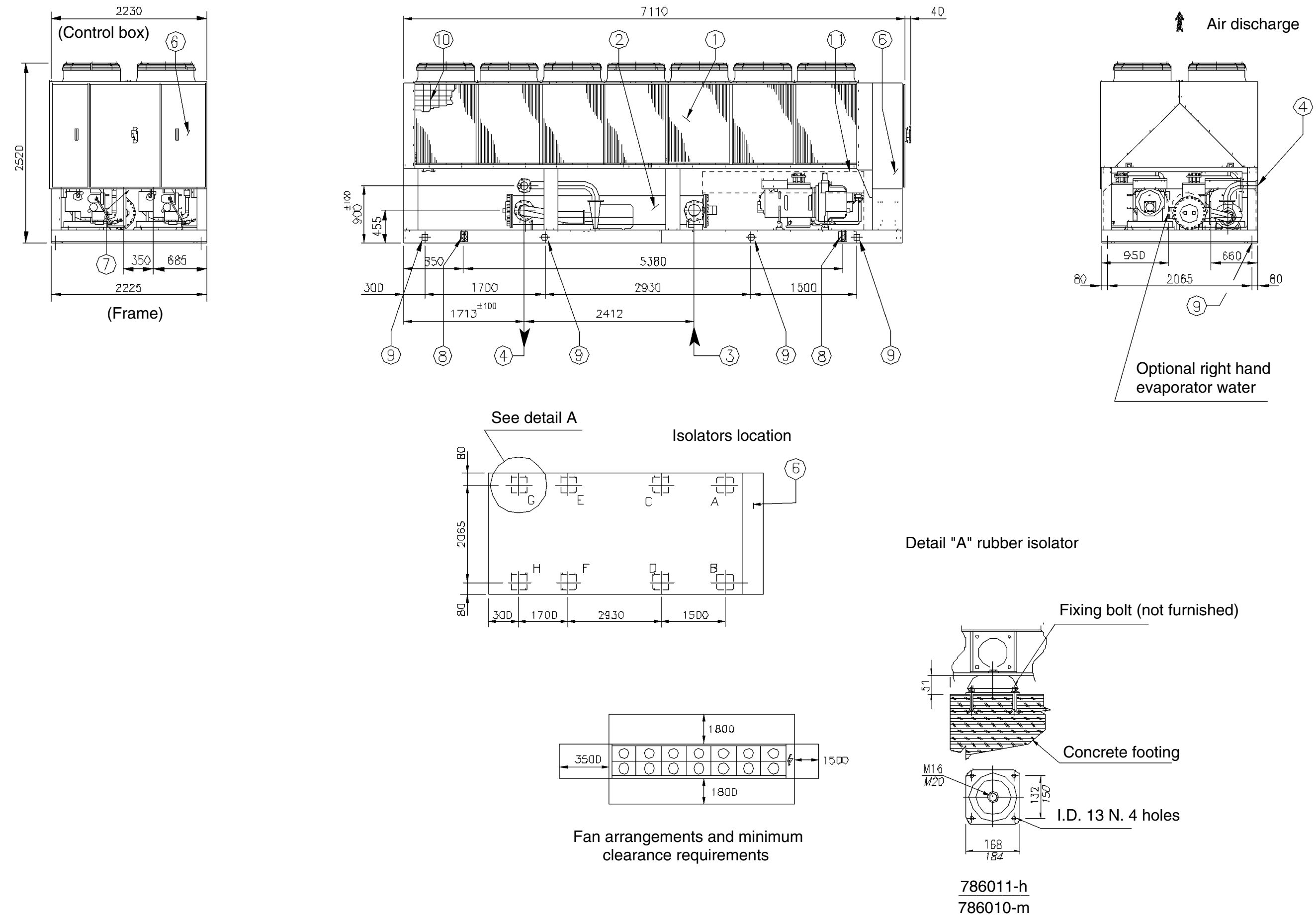
Components

The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure

1.27 Outlook Drawing: EWAD750BJYNN/Q+OPSP

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type	Weight KG		Isolators load KG							
	Shipping	Operating	A	B	C	D	E	F	G	H
Aluminum / Acrylic coated	6480	6730	1080	1175	915	1080	730	1035	345	370
Rubber isolators	Type (q/ty)		786010-m (6 Pz.)						786011-m (2 Pz.)	

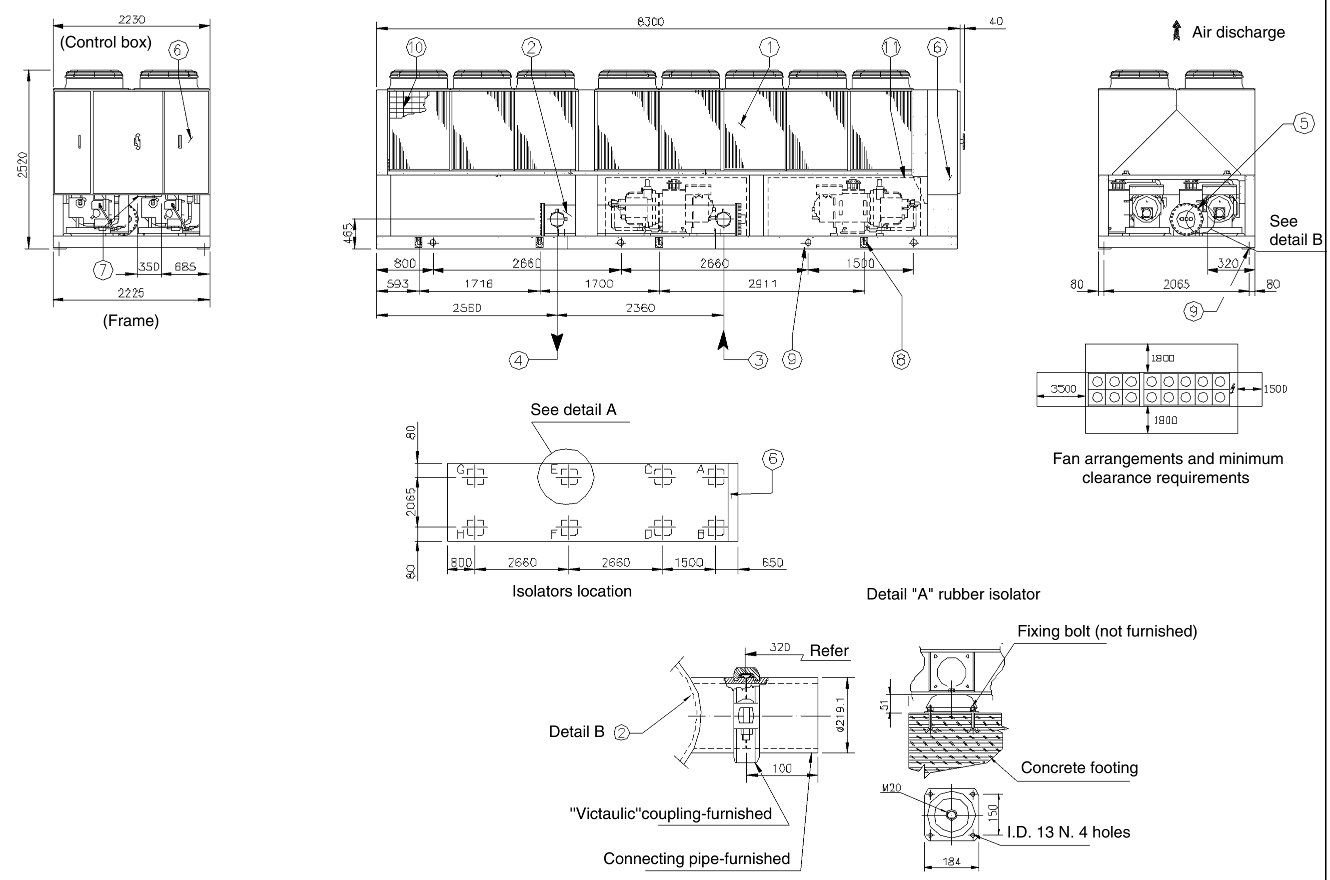
Components

The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	DN 150 PN 10 flange connection for 168.3 O.D. tube evaporator water inlet
4	DN 125 PN 10 flange connection for 139.7 O.D. tube evaporator-pump water outlet
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1.28 Outlook Drawing: EWAD800-850BJYNN/Q

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type	Weight KG		Isolators load KG							
	Shipping	Operating	A	B	C	D	E	F	G	H
Aluminum Acrylic coated	8190	8610	1195	1195	970	970	1445	1445	695	695
Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-w (2 Pz.)			

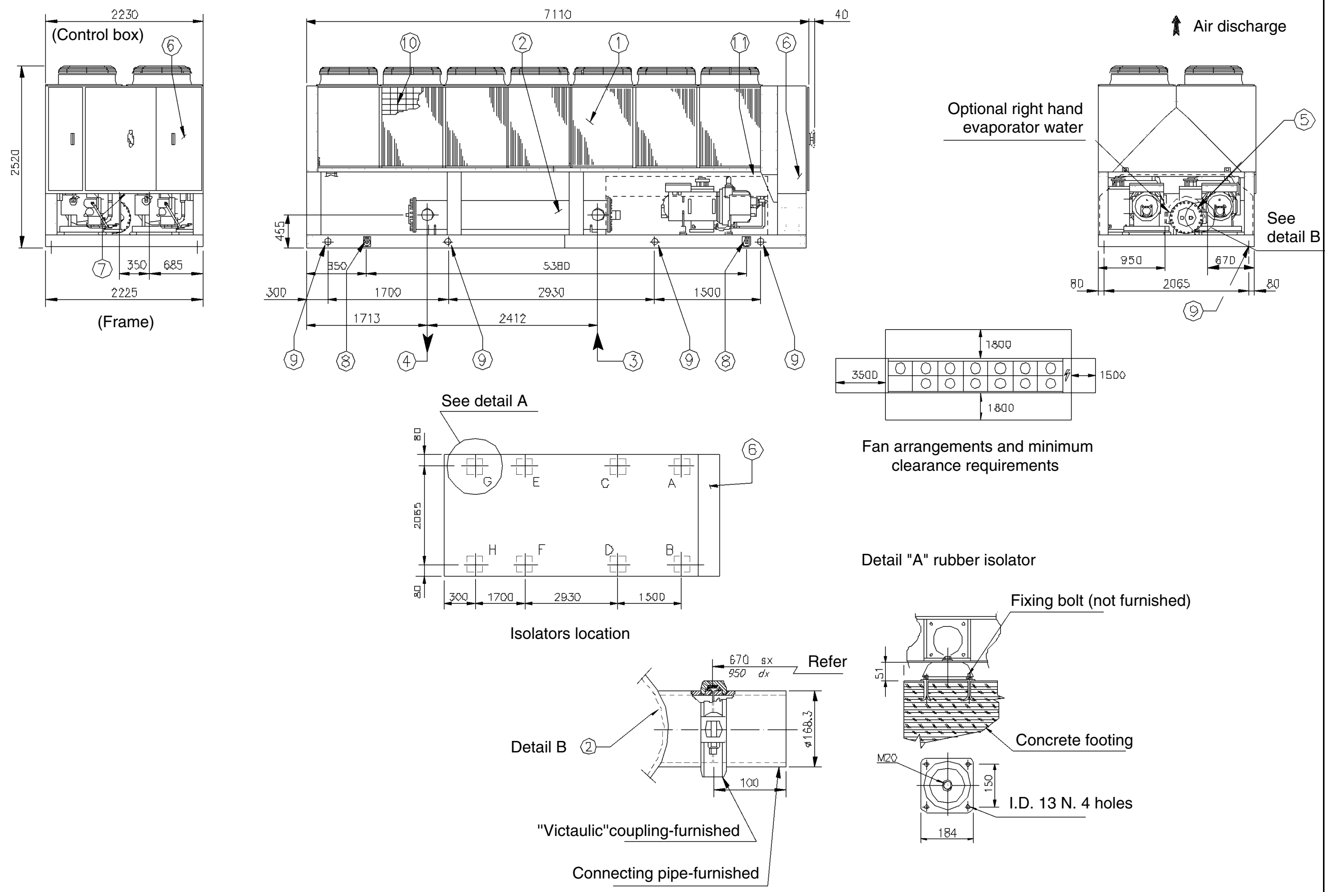
Components

The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure

1.29 Outlook Drawing: EWAD800BJYNN/A, EWAD800BJYNN/A+OPRN and EWAD800BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG							
		Shipping	Operating	A	B	C	D	E	F	C	D
EWAD800BJYNN/A EWAD800BJYNN/A+OPRN	Aluminum Acrylic coated	5660	5910	1020	1115	840	915	675	695	330	320
EWAD800BJYNN/A+OPLN	Aluminum Acrylic coated	5900	6150	1080	1175	900	975	675	695	330	320
EWAD800BJYNN/A EWAD800BJYNN/A+OPRN EWAD800BJYNN/A+OPLN	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-w (4 Pz.)			

Components

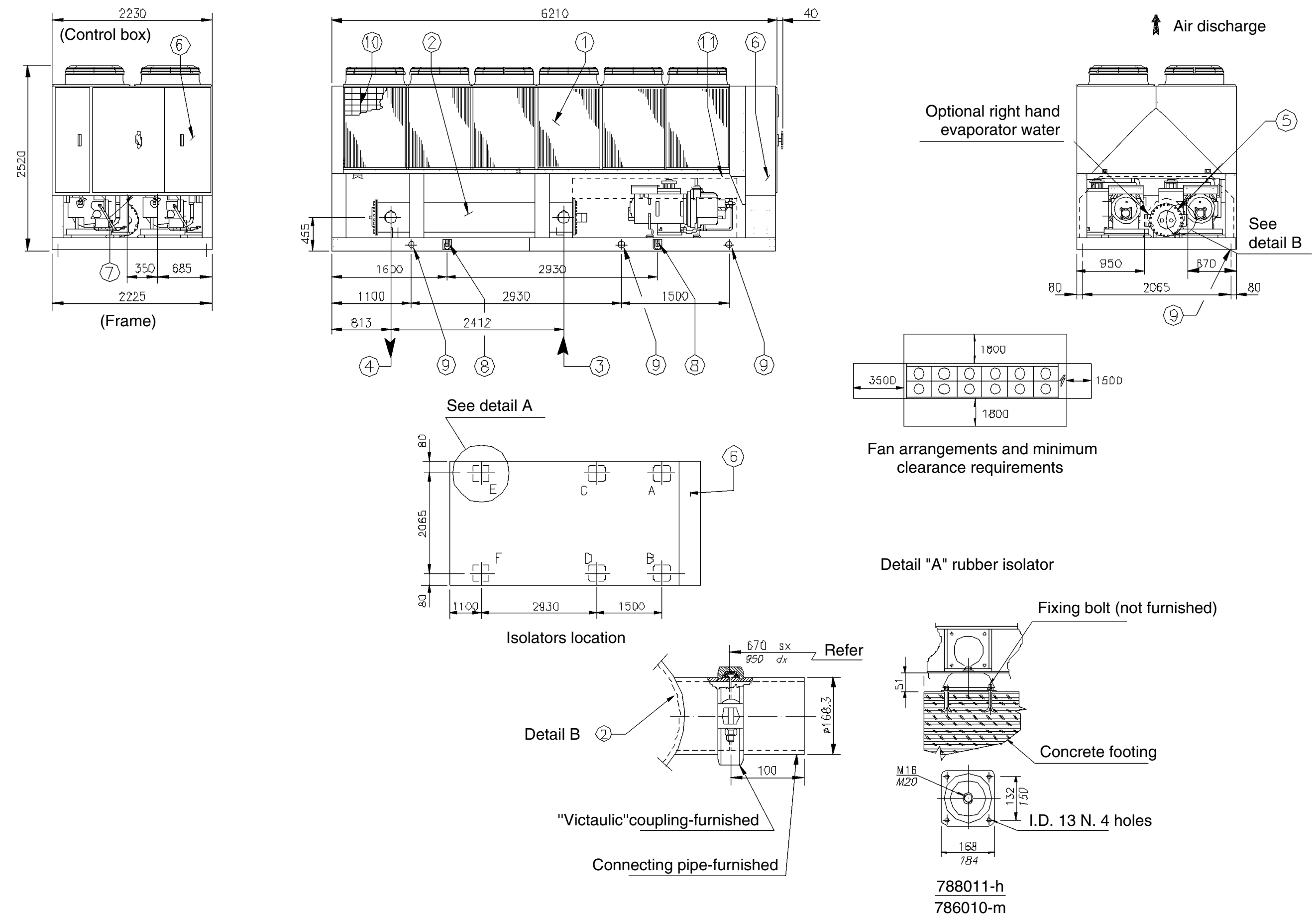
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.30 Outlook Drawing: EWAD850BJYNN, EWAD850BJYNN+OPRN and EWAD850BJYNN+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG					
		Shipping	Operating	A	B	C	D	E	F
EWAD850BJYNN EWAD850BJYNN+OPRN	Aluminum	5480	5734	1080	1165	895	960	792	842
	Acrylic coated								
EWAD850BJYNN+OPLN	Aluminum	5720	5974	1140	1225	955	1020	792	892
	Acrylic coated								
EWAD850BJYNN EWAD850BJYNN+OPRN EWAD850BJYNN+OPLN	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786011-h (2 Pz.)	

Components

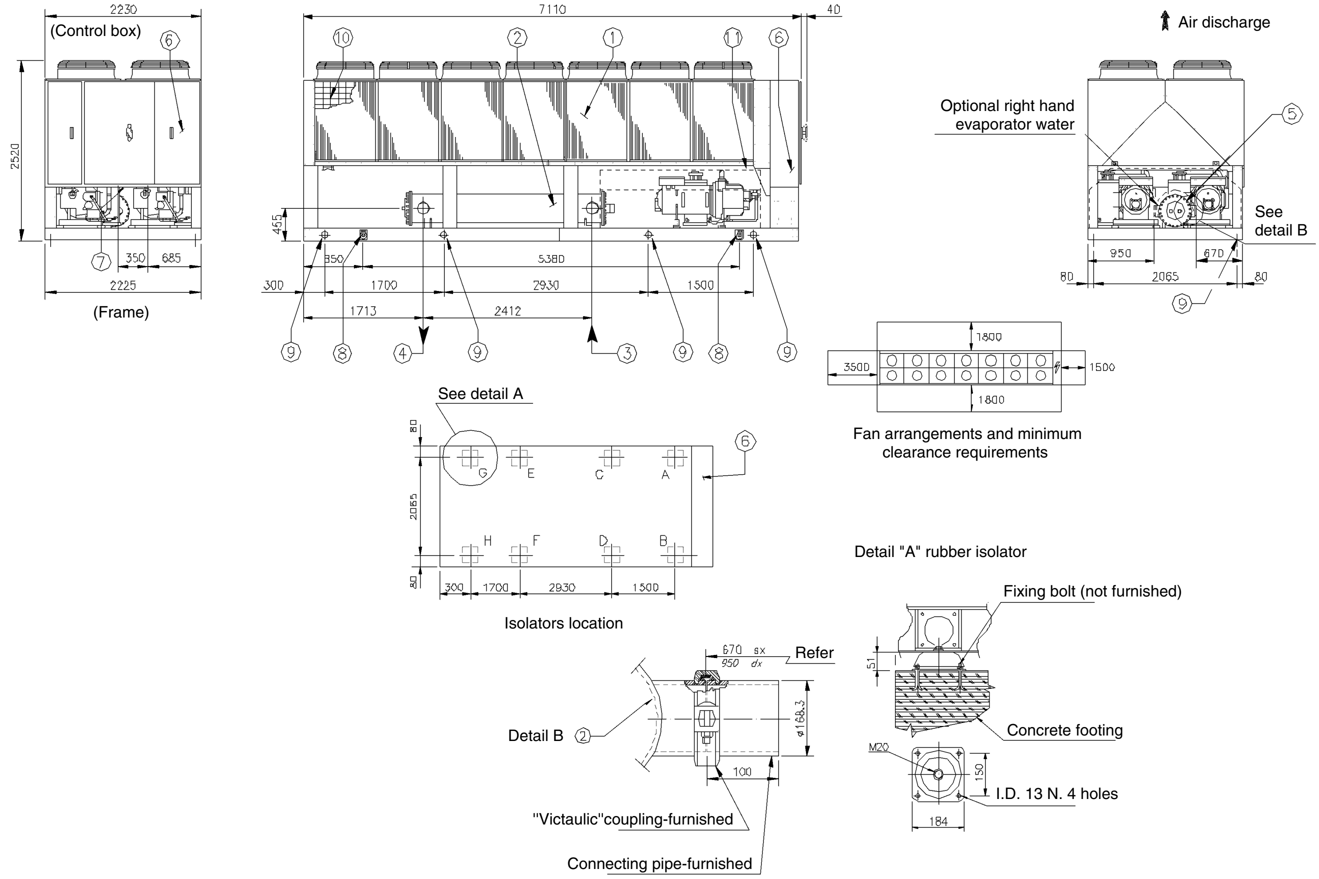
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.31 Outlook Drawing: EWAD850BJYNN/A, EWAD850BJYNN/A+OPRN and EWAD850BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type		Weight KG		Isolators load KG							
			Shipping	Operating	A	B	C	D	E	F	G	H
EWAD850BJYNN/A EWAD850BJYNN/A+OPRN	Aluminum Acrylic coated		5790	6040	1020	1115	840	915	690	745	345	370
EWAD850BJYNN/A+OPLN	Aluminum Acrylic coated		6030	6280	1080	1175	900	975	690	745	345	370
EWAD850BJYNN/A EWAD850BJYNN/A+OPRN EWAD850BJYNN/A+OPLN	Rubber isolators	Type (q/ty)			786010-m (4 Pz.)				786010-w (4 Pz.)			

Components

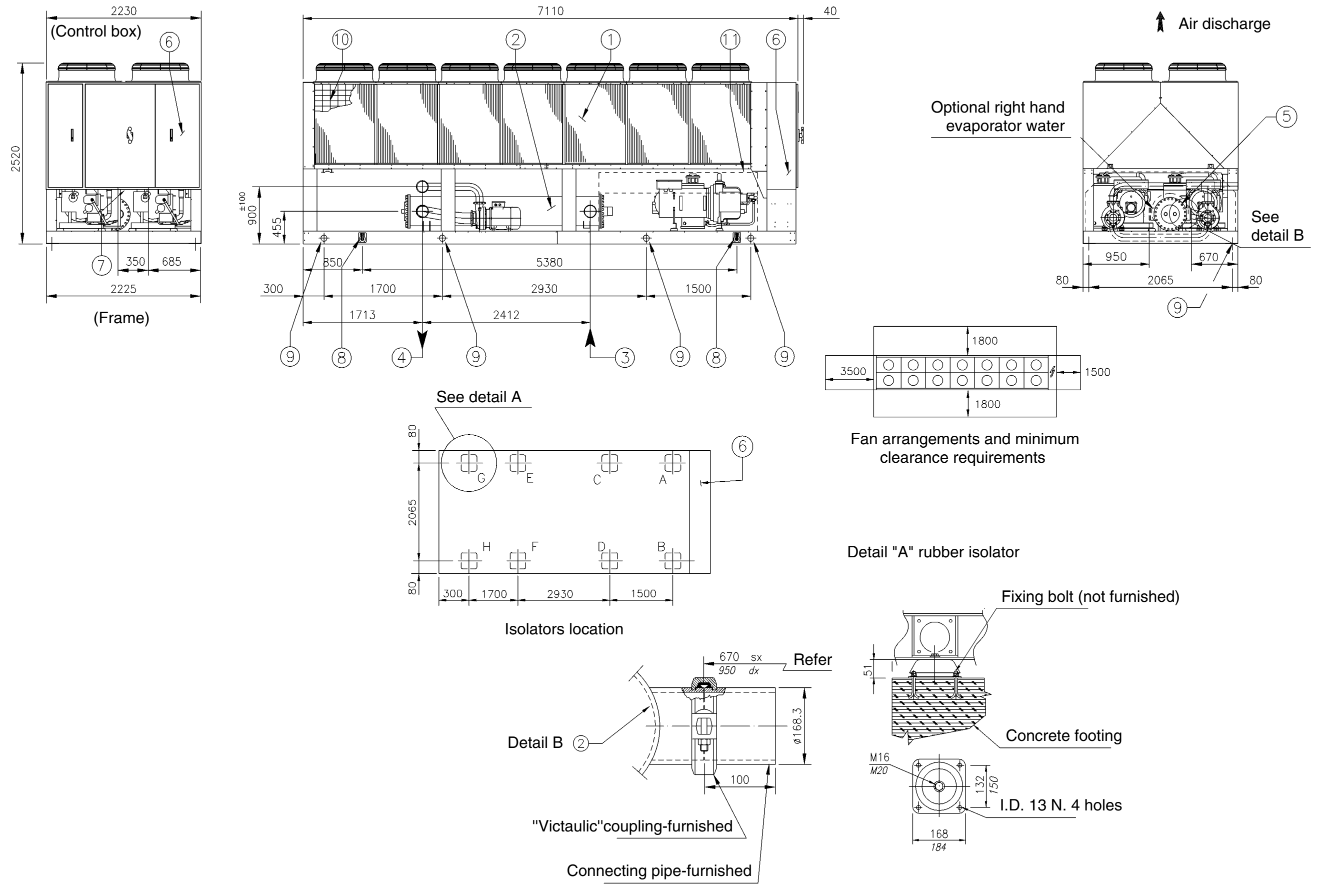
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.32 Outlook Drawing: EWAD850BJYNN/A+OPTP, EWAD850BJYNN/A+OPRN+OPTP, EWAD850BJYNN/A+OPLN+OPTP, EWAD900BJYNN/A+OPTP, EWAD900BJYNN/A+OPRN+OPTP and EWAD900BJYNN/A+OPLN+OPTP

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



<table>
<tr><td rowspan="2">Version</td><td rowspan="2" colspan="2">Condenser Type</td><td colspan="2">Weight KG</td><td colspan="8">Isolators load KG</td></tr>
<tr><td>Shipping</td><td>Operating</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td>H</td></tr>
<tr><td rowspan="2">EWAD850BJYNN/A+OPTP
EWAD850BJYNN/A+OPRN+OPTP
EWAD900BJYNN/A+OPTP
EWAD900BJYNN/A+OPRN+OPTP</td><td colspan="2">Aluminum</td><td rowspan="2">6580</td><td rowspan="2">6830</td><td rowspan="2">1090</td><td rowspan="2">1185</td><td rowspan="2">1000</td><td rowspan="2">1075</td><td rowspan="2">890</td><td rowspan="2">845</td><td rowspan="2">360</td><td rowspan="2">385</td></tr>
<tr><td colspan="2">Acrylic coated</td></tr>
<tr><td rowspan="2">EWAD850BJYNN/A+OPLN+OPTP
EWAD900BJYNN/A+OPLN+OPTP</td><td colspan="2">Aluminum</td><td rowspan="2">6820</td><td rowspan="2">7070</td><td rowspan="2">1150</td><td rowspan="2">1245</td><td rowspan="2">1060</td><td rowspan="2">1135</td><td rowspan="2">890</td><td rowspan="2">845</td><td rowspan="2">360</td><td rowspan="2">385</td></tr>
<tr><td colspan="2">Acrylic coated</td></tr>
<tr><td>EWAD850BJYNN/A+OPTP
EWAD850BJYNN/A+OPRN+OPTP
EWAD850BJYNN/A+OPLN+OPTP
EWAD900BJYNN/A+OPTP
EWAD900BJYNN/A+OPRN+OPTP
EWAD900BJYNN/A+OPLN+OPTP</td><td>Rubber isolators</td><td colspan="3">Type (q/ty)</td><td colspan="4">786010-m
(4 Pz.)</td><td colspan="2">786011-h
(2 Pz.)</td><td colspan="2">786011-m
(2 Pz.)</td></tr>
</table>

Components

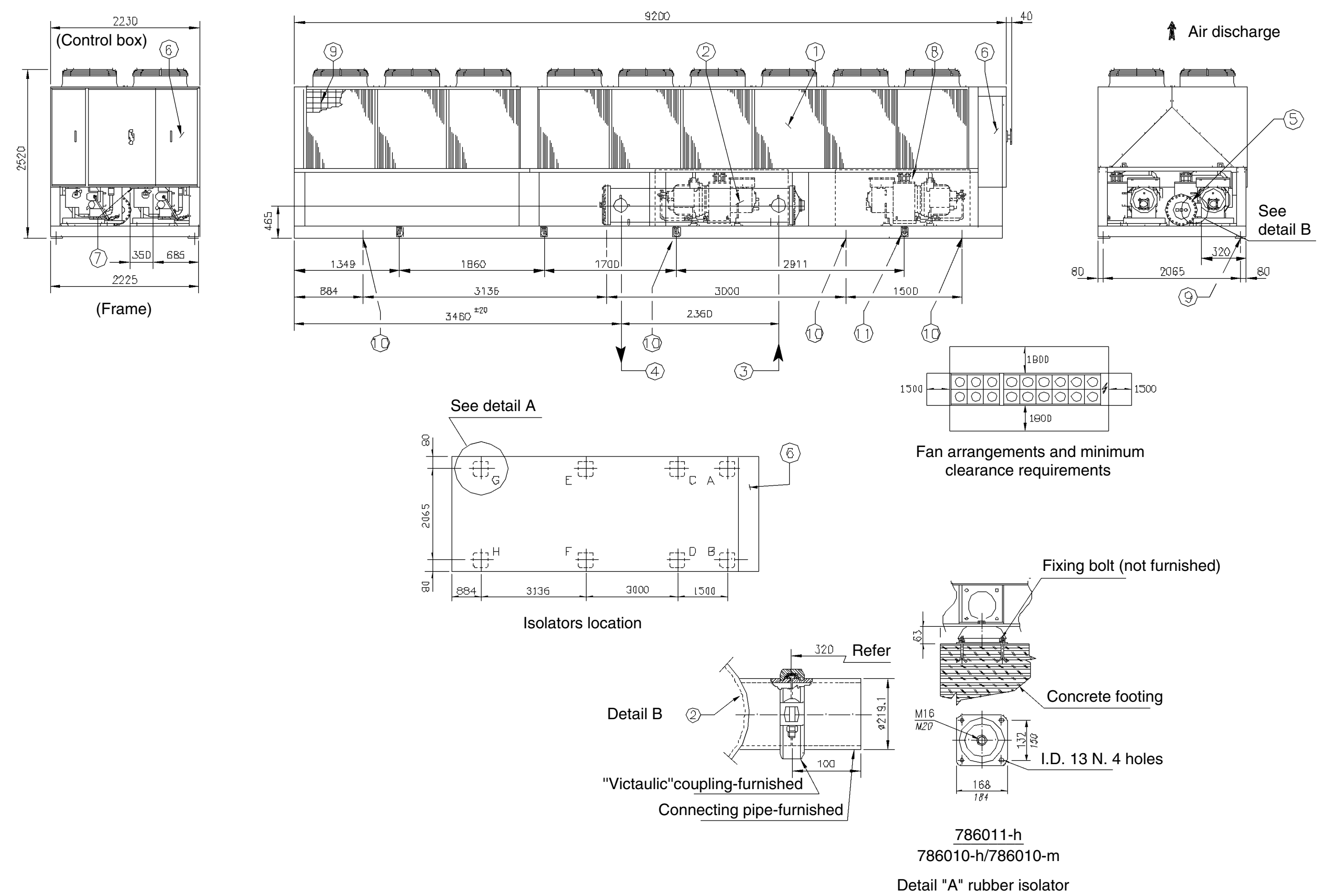
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator-pump water outlet victaulic connection for 139.7 O.D. tube
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.33 Outlook Drawing: EWAD900-950BJYNN/Q and EWAD850BJYNN/Z

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type	Weight KG		Isolators load KG							
	Shipping	Operating	A	B	C	D	E	F	G	H
Aluminum	8725	9150	1270	1270	1090	1090	1545	1545	670	670
Acrylic coated										
Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-h		786011-h (2 Pz.)	

Components

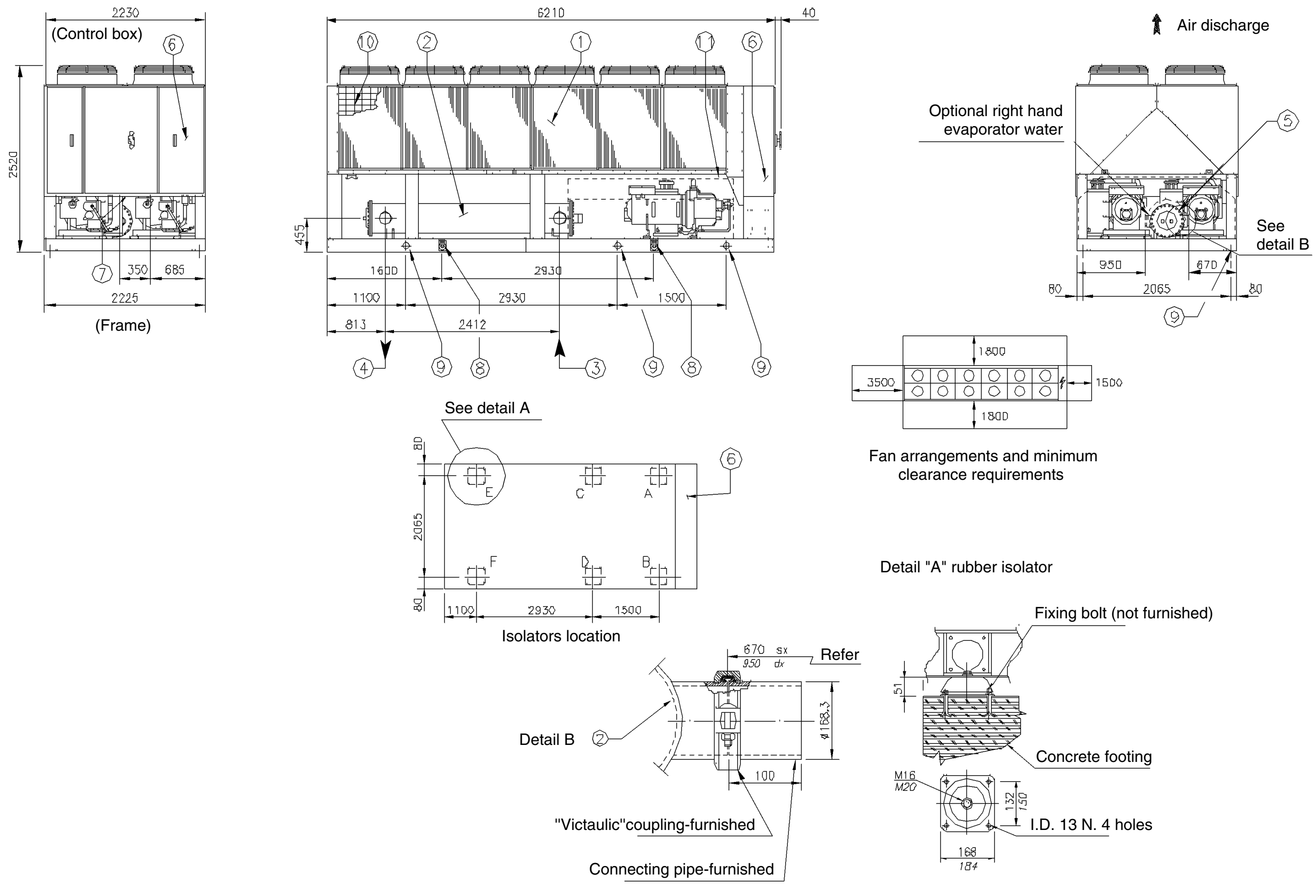
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	Compressor enclosure
9	Coil protection guards (optional)
10	8 isolator mounting holes 25 mm DIA.
11	8 lifting shackles

1

1.34 Outlook Drawing: EWAD900BJYNN, EWAD900BJYNN+OPRN and EWAD900BJYNN+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG					
		Shipping	Operating	A	B	C	D	E	F
EWAD900BJYNN EWAD900BJYNN+OPRN	Aluminum Acrylic coated	5580	5834	1080	1165	895	960	842	892
EWAD900BJYNN+OPLN	Aluminum Acrylic coated	5820	6074	1140	1225	955	1020	842	892
EWAD900BJYNN EWAD900BJYNN+OPRN EWAD900BJYNN+OPLN	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786011-h (2 Pz.)	

Components

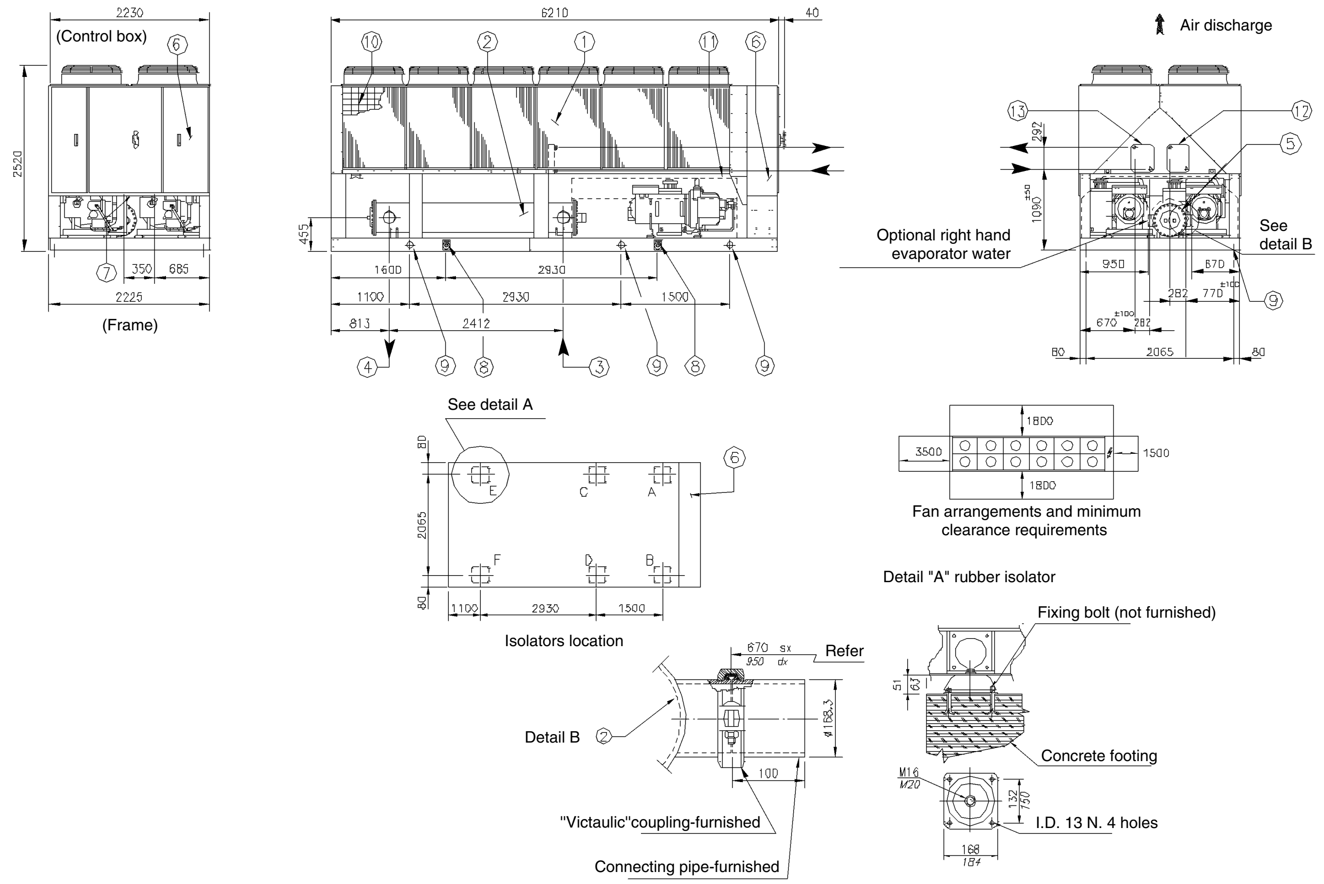
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.35 Outlook Drawing: EWAD900BJYNN+OPPR, EWAD900BJYNN+OPPR+OPRN and EWAD900BJYNN+OPPR+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG					
		Shipping	Operating	A	B	C	D	E	F
EWAD900BJYNN+OPPR EWAD900BJYNN+OPPR+OPRN	Aluminum	5680	5834	1080	1165	920	985	867	917
	Acrylic coated								
EWAD900BJYNN+OPPR+OPLN	Aluminum	5920	6174	1140	1225	980	1045	867	917
	Acrylic coated								
EWAD900BJYNN+OPPR EWAD900BJYNN+OPPR+OPRN EWAD900BJYNN+OPPR+OPLN	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786011-h (2 Pz.)	

Components

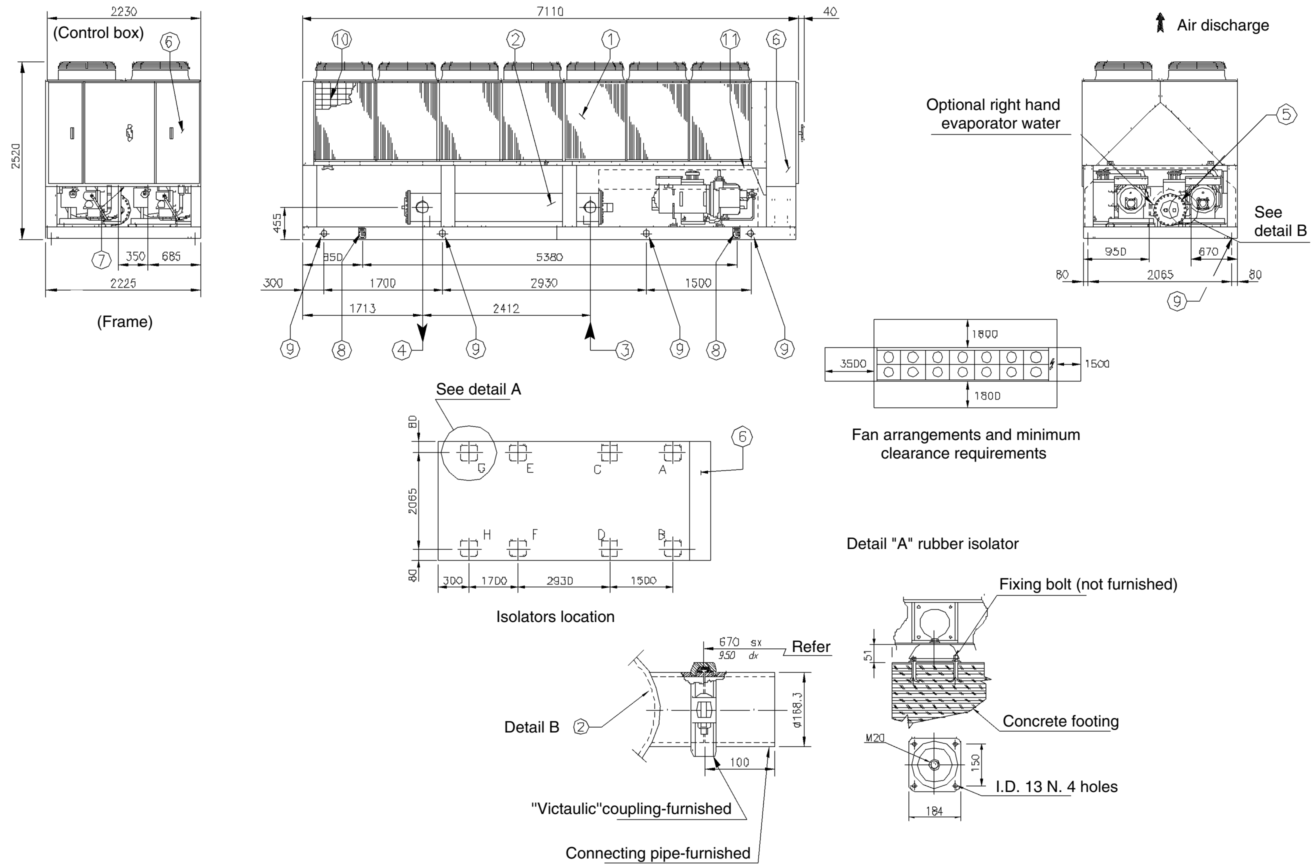
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure
12	Desuperheater circ. 1 (2” gas male connection)
13	Desuperheater circ. 2 (2” gas male connection)

1

1.36 Outlook Drawing: EWAD900BJYNN/A, EWAD900BJYNN/A +OPRN and EWAD900BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG							
		Shipping	Operating	A	B	C	D	E	F	G	H
EWAD900BJYNN/A EWAD900BJYNN/A+OPRN	Aluminum Acrylic coated	5890	6140	1020	1115	840	915	690	745	395	420
EWAD900BJYNN/A+OPLN	Aluminum Acrylic coated	6130	6380	1080	1175	900	975	690	745	395	420
EWAD900BJYNN/A EWAD900BJYNN/A+OPRN EWAD900BJYNN/A+OPLN	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-w (4 Pz.)			

Components

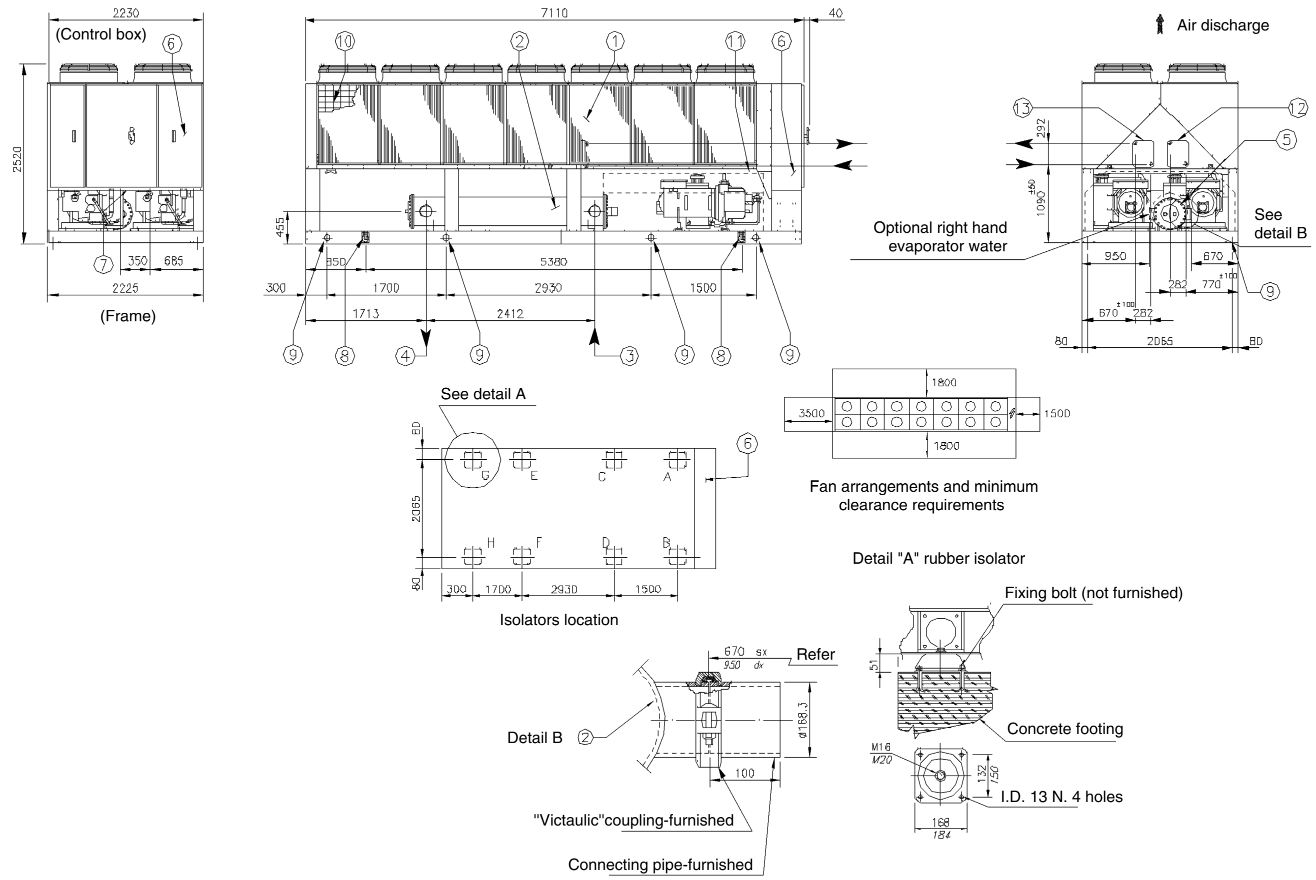
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.37 Outlook Drawing: EWAD900BJYNN/A+OPPR, EWAD900BJYNN/A+OPRN+OPPR and EWAD900BJYNN/A+OPLN+OPPR

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG							
		Shipping	Operating	A	B	C	D	E	F	G	H
EWAD900BJYNN/A+OPPR EWAD900BJYNN/A+OPRN+OPPR	Aluminum Acrylic coated	6090	6340	1020	1115	890	965	715	770	420	445
EWAD900BJYNN/A+OPLN+OPPR	Aluminum Acrylic coated	6330	6580	1080	1175	950	1025	715	770	420	445
EWAD900BJYNN/A+OPPR EWAD900BJYNN/A+OPRN+OPPR EWAD900BJYNN/A+OPLN+OPPR	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786011-h (2 Pz.)		786010-w (2 Pz.)	

Components

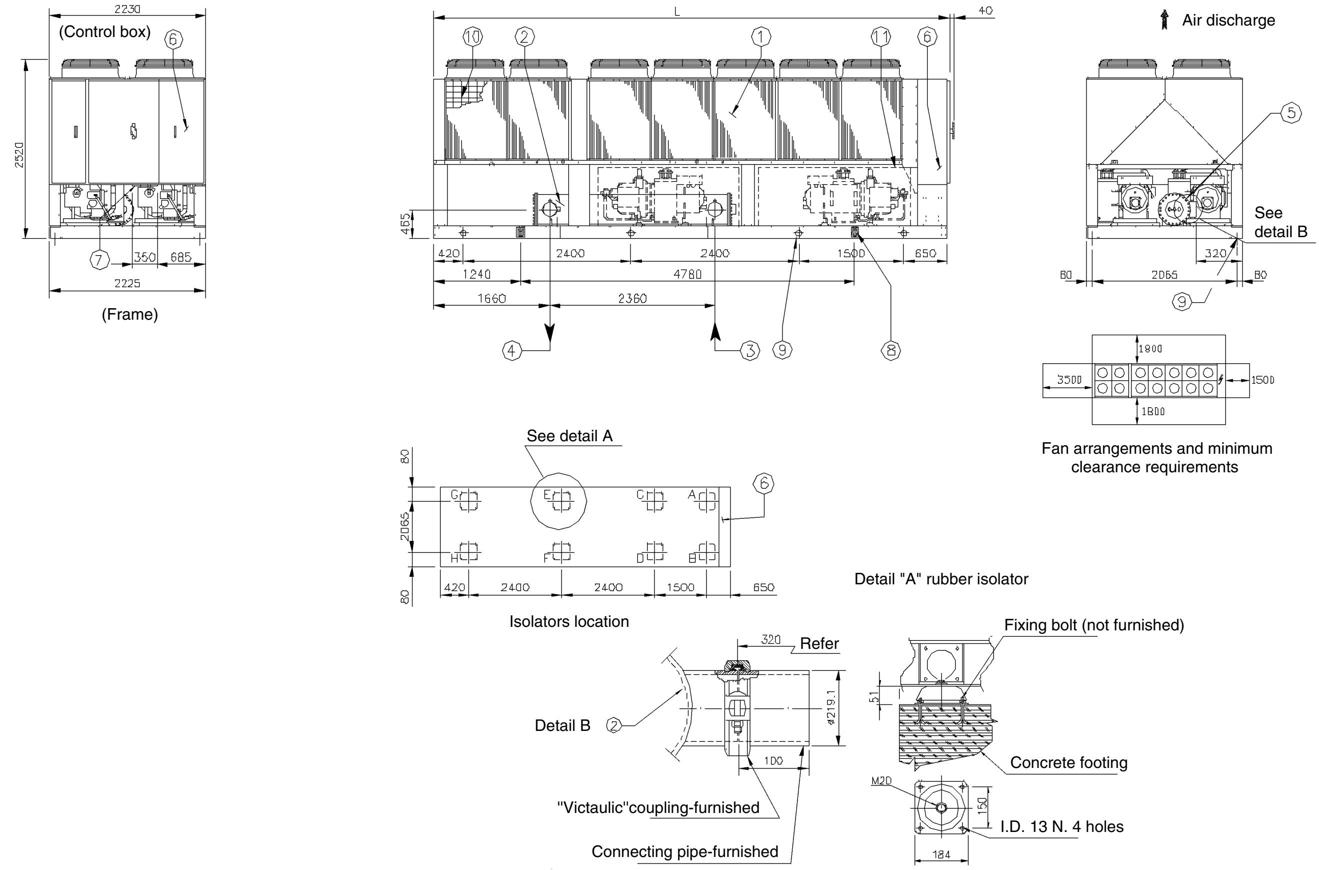
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)
12	Desuperheater circ. 1 (2” gas male connection)
13	Desuperheater circ. 2 (2” gas male connection)

1

1.38 Outlook Drawing: EWAD950BJYNN, EWAD950BJYNN+OPRN and EWAD950BJYNN+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG							
		Shipping	Operating	A	B	C	D	E	F	G	H
EWAD950BJYNN EWAD950BJYNN+OPRN	Aluminum Acrylic coated	7550	7970	1135	1135	890	890	1310	1310	650	650
EWAD950BJYNN+OPLN	Aluminum Acrylic coated	7910	8330	1195	1195	970	970	1350	1350	650	650
EWAD950BJYNN EWAD950BJYNN+OPRN EWAD950BJYNN+OPLN	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-m (2 Pz.)		786010-w (2 Pz.)	

Components

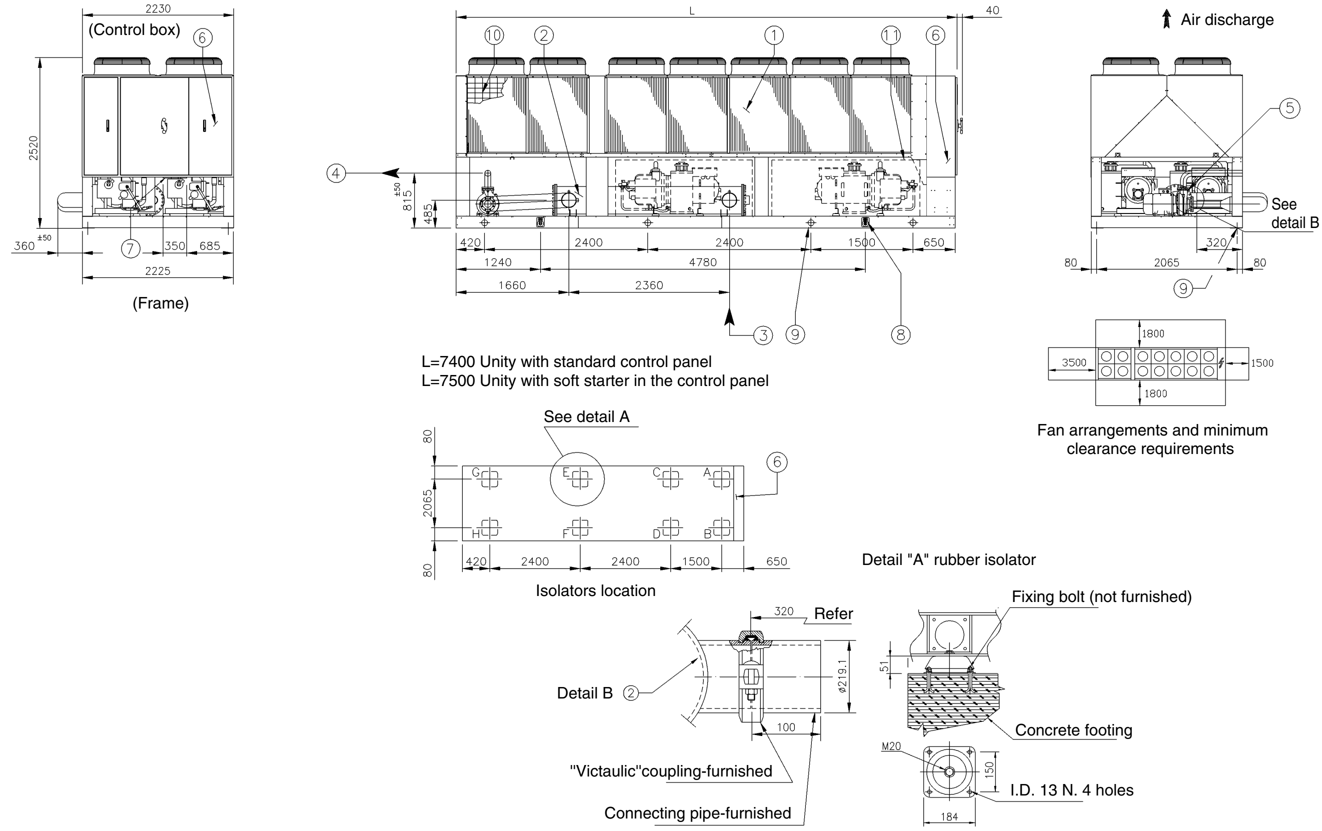
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure

1

1.39 Outlook Drawing: EWAD950BJYNN+OPSP, EWAD950BJYNN+OPRN+OPSP and EWAD950BJYNN+OPLN+OPSP

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG							
		Shipping	Operating	A	B	C	D	E	F	G	H
EWAD950BJYNN+OPSP EWAD950BJYNN+OPRN+OPSP	Aluminum Acrylic coated	7750	8170	1135	1135	890	890	1310	1310	750	750
EWAD950BJYNN+OPLN+OPSP	Aluminum Acrylic coated	8110	8530	1195	1195	970	970	1350	1350	750	750
EWAD950BJYNN+OPSP EWAD950BJYNN+OPRN+OPSP EWAD950BJYNN+OPLN+OPSP	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-m (2 Pz.)		786010-w (2 Pz.)	

1

Components

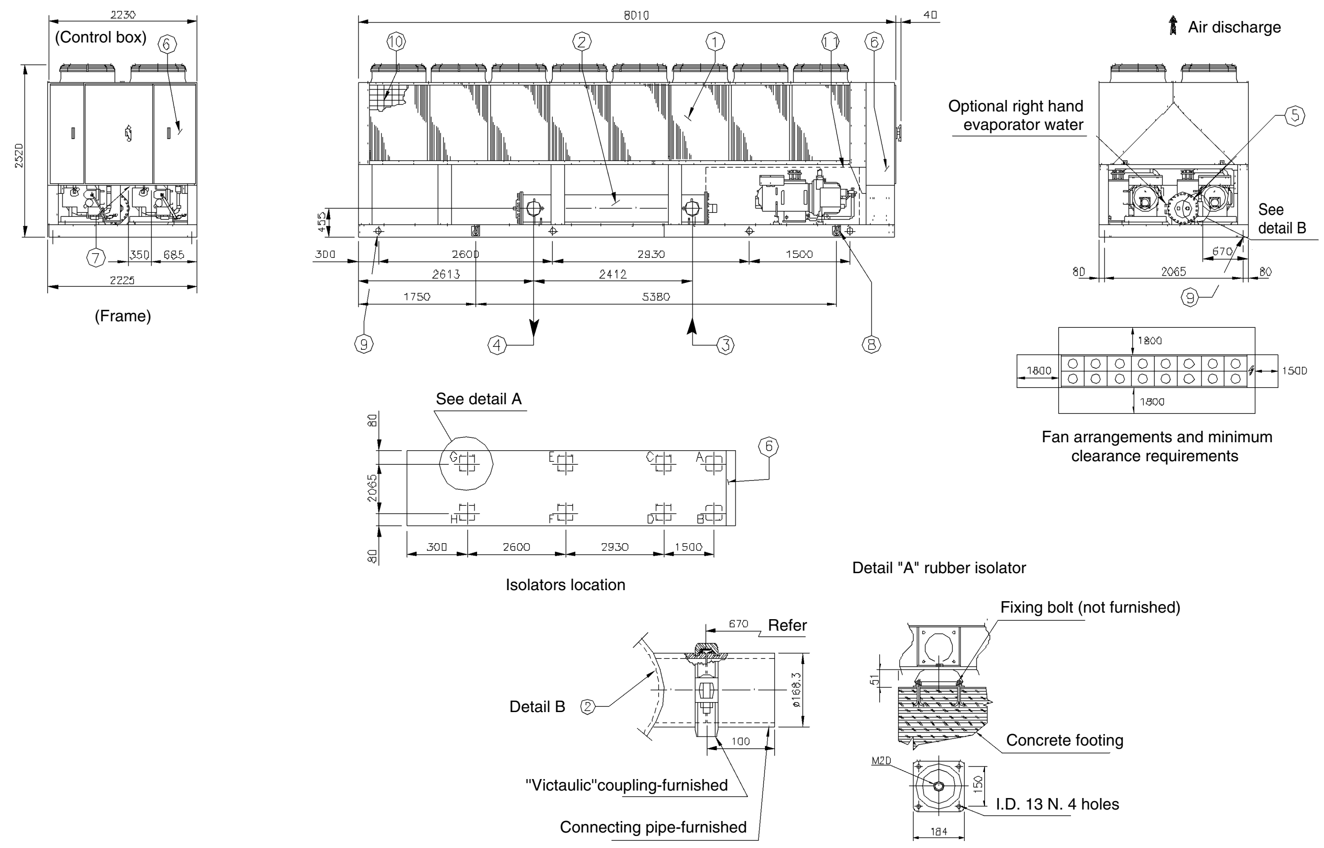
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator-pump water outlet victaulic connection for 114.3 O.D. tube
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure

1

1.40 Outlook Drawing: EWAD950BJYNN/A, EWAD950BJYNN/A+OPRN and EWAD950BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG							
		Shipping	Operating	A	B	C	D	E	F	G	H
EWAD950BJYNN/A EWAD950BJYNN/A+OPRN	Aluminum Acrylic coated	6155	6400	1065	1150	875	950	750	765	430	415
EWAD950BJYNN/A+OPLN	Aluminum Acrylic coated	6395	6640	1125	1210	935	1010	750	765	430	415
EWAD950BJYNN/A EWAD950BJYNN/A+OPRN EWAD950BJYNN/A+OPLN	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-w (4 Pz.)			

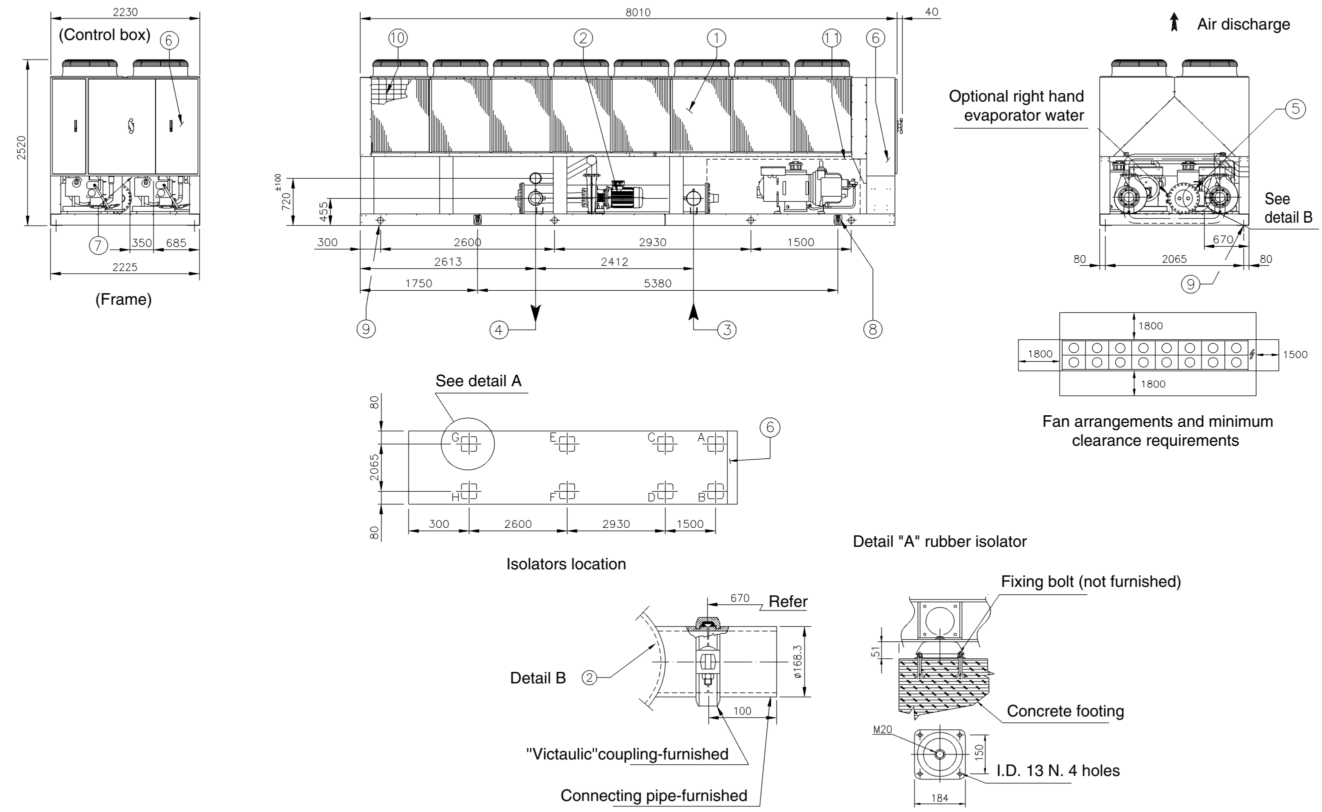
Components

The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1.41 Outlook Drawing: EWAD950BJYNN/A+OTPT, EWAD950BJYNN/A+OPRN+OPTP and EWAD950BJYNN/A+OPLN+OPTP

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG							
		Shipping	Operating	A	B	C	D	E	F	G	H
EWAD950BJYNN/A+OPTP EWAD950BJYNN/A+OPRN+OPTP	Aluminum Acrylic coated	6695	6940	1044	1129	1110	1185	832	847	404	389
EWAD950BJYNN/A+OPLN+OPTP	Aluminum Acrylic coated	6935	7180	1104	1189	1170	1245	832	847	404	389
EWAD950BJYNN/A+OPTP EWAD950BJYNN/A+OPRN+OPTP EWAD950BJYNN/A+OPLN+OPTP	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786011-h (2 Pz.)		786011-m (2 Pz.)	

Components

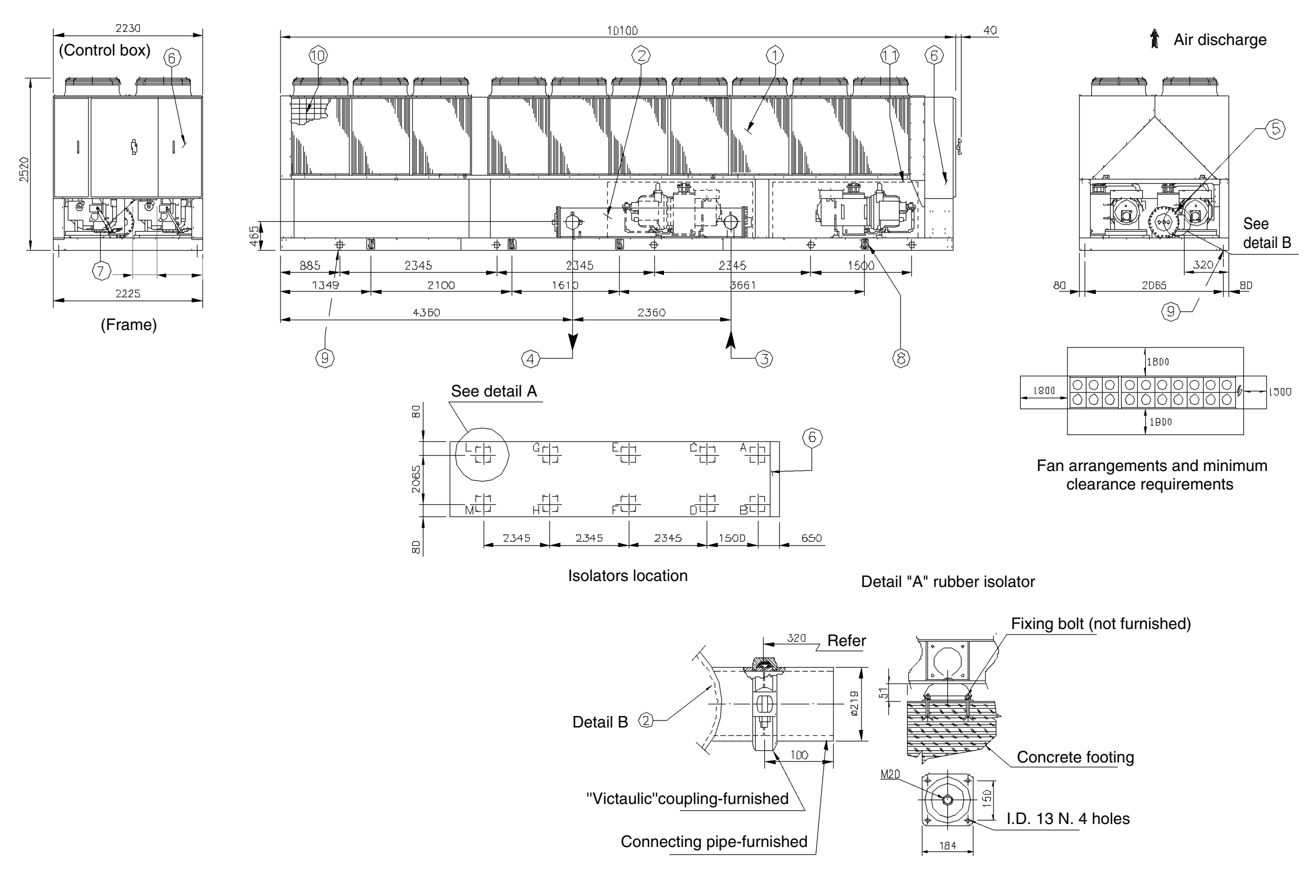
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator-pump water outlet connection for 139.7 O.D. tube
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.42 Outlook Drawing: EWAD950BJYNN/Z and EWADC11BJYNN/Q

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type	Weight KG		Isolators load KG									
	Shipping	Operating	A	B	C	D	E	F	G	H	L	M
Aluminum / Acrylic coated	9310	9720	1335	1335	1105	1105	1290	1290	535	535	595	595
Rubber isolators	Type (q/ty)		786010-h (6 Pz.)						786010-v (4 Pz.)			

Components

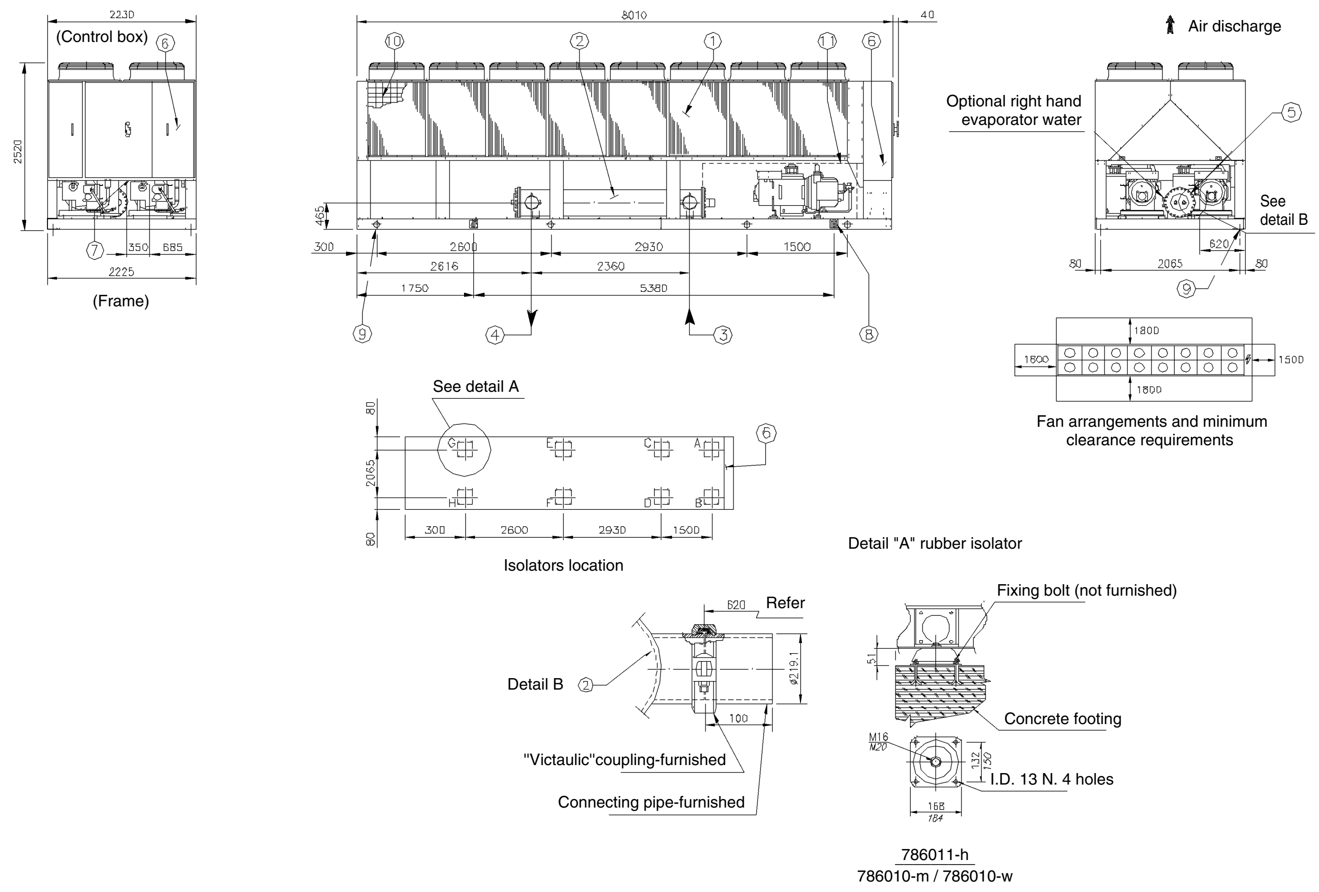
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	10 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.43 Outlook Drawing: EWADC10BJYNN/A, EWADC10BJYNN/A+OPRN and EWADC10BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG							
		Shipping	Operating	A	B	C	D	E	F	G	H
EWADC10BJYNN/A EWADC10BJYNN+OPRN	Aluminum	6345	6750	1065	1150	945	1020	855	870	430	415
	Acrylic coated										
EWADC10BJYNN/A+OPLN	Aluminum	8585	6990	1125	1210	1005	1080	855	870	430	415
	Acrylic coated										
EWADC10BJYNN/A EWADC10BJYNN/A+OPRN EWADC10BJYNN/A+OPLN	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786011-h (2 Pz.)		786010-w (2 Pz.)	

1

Components

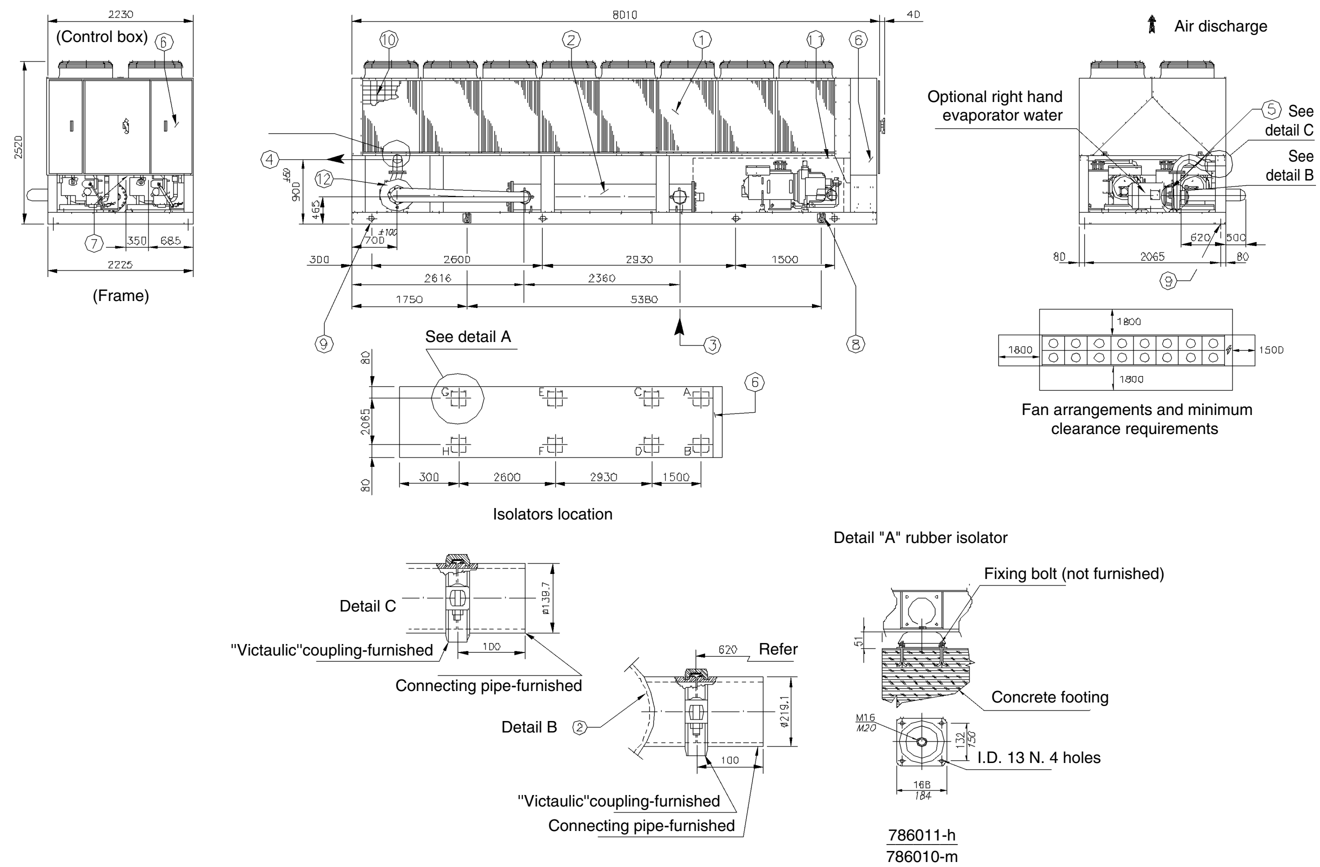
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.44 Outlook Drawing: EWADC10BJYNN/A+OPSP, EWADC10BJYNN/A+OPRN+OPSP and EWADC10BJYNN/A+OPLN+OPSP

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG							
		Shipping	Operating	A	B	C	D	E	F	G	H
EWADC10BJYNN/A+OPSP EWADC10BJYNN/A+OPRN+OPSP	Aluminum	6945	7400	1065	1150	945	1020	905	920	705	690
	Acrylic coated										
EWADC10BJYNN/A+OPLN+OPSP	Aluminum	7185	7640	1125	1210	1005	1080	905	920	705	690
	Acrylic coated										
EWADC10BJYNN/A+OPSP EWADC10BJYNN/A+OPRN+OPSP EWADC10BJYNN/A+OPLN+OPSP	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786011-h (4 Pz.)			

Components

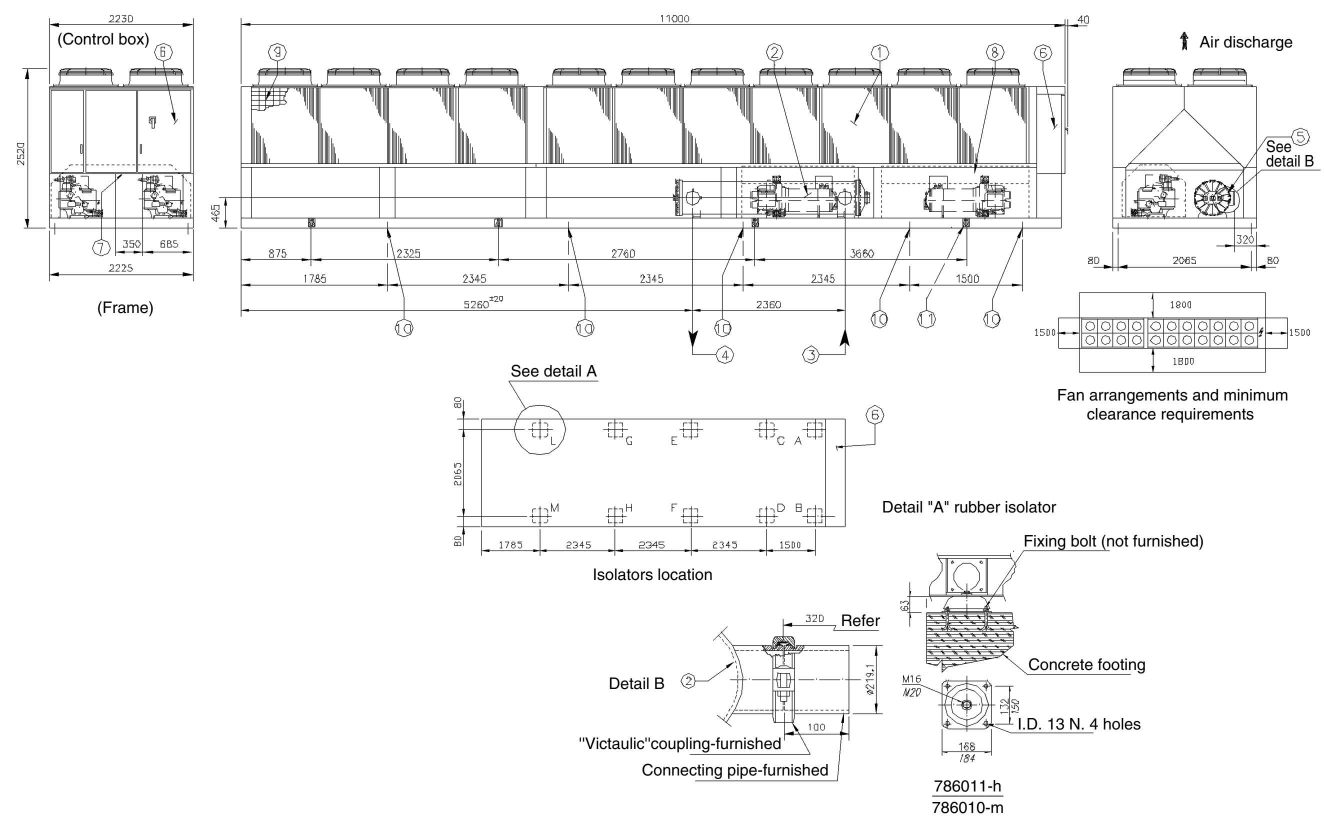
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Victaulic connection for tube 139.7 (evaporator) water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	MM4 125/315 BE pump

1

1.45 Outlook Drawing: EWADC10BJYNN/Z-C12BJYNN/Q

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type	Weight KG		Isolators load KG									
	Shipping	Operating	A	B	C	D	E	F	G	H	L	M
Aluminum / Acrylic coated	9750	10160	1285	1285	1080	1080	1280	1280	535	535	900	900
Rubber isolators	Type (q/ty)		786010-m (6 Pz.)						786011-h (4 Pz.)			

Components

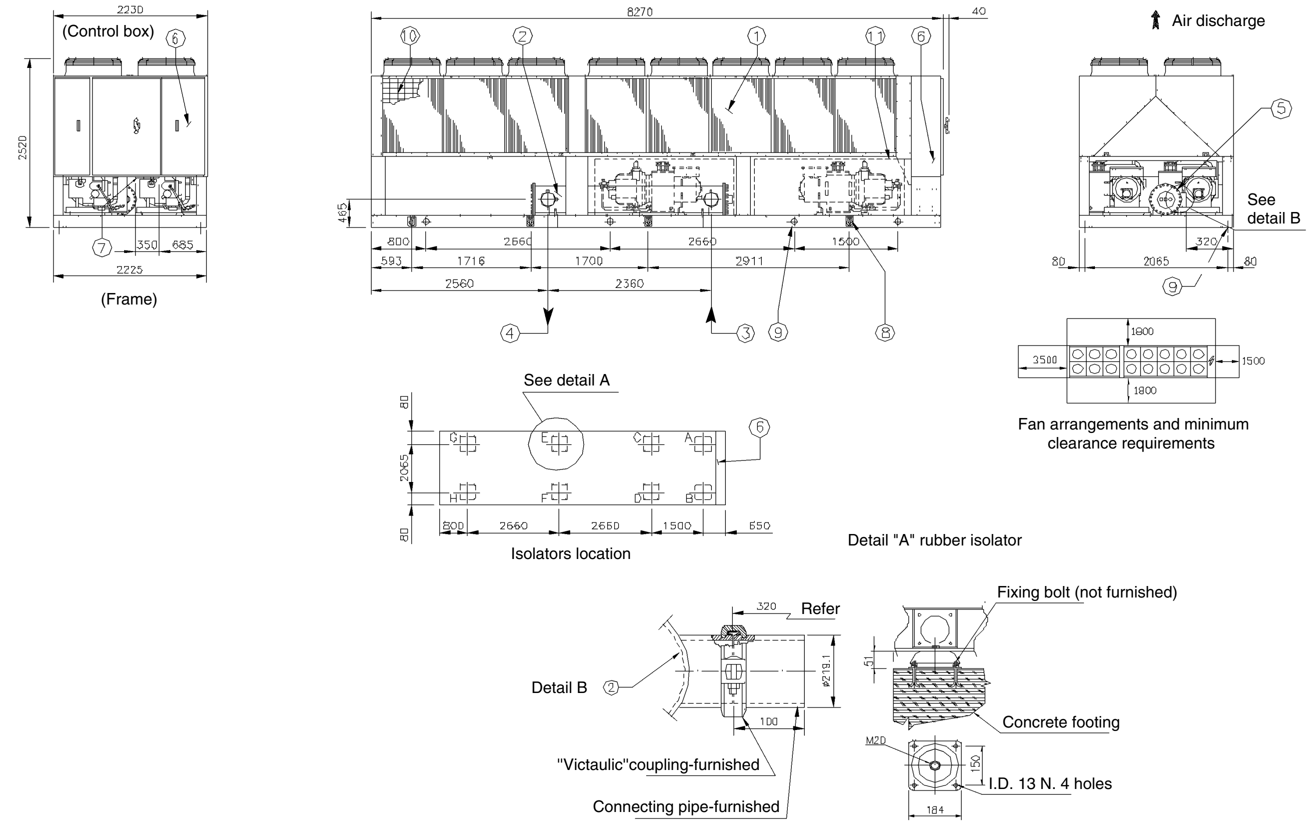
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	Compressor enclosure (optional)
9	Coil protection guards (optional)
10	10 isolator mounting holes 25 mm DIA.
11	8 lifting shackles

1

1.46 Outlook Drawing: EWADC10-C11BJYNN, EWADC10-C11BJYNN+OPRN and EWADC10-C11BJYNN+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG							
		Shipping	Operating	A	B	C	D	E	F	G	H
EWADC10-C11BJYNN EWADC10-C11BJYNN+OPRN	Aluminum Acrylic coated	7830	8250	1135	1135	890	890	1405	1405	695	695
EWADC10-C11BJYNN+OPLN	Aluminum Acrylic coated	8190	8610	1195	1195	970	970	1445	1445	895	695
EWADC10-C11BJYNN EWADC10-C11BJYNN+OPRN EWADC10-C11BJYNN+OPLN	Rubber isolators	Type (q/ty)		786010-m (6 Pz.)						786010-w (2 Pz.)	

Components

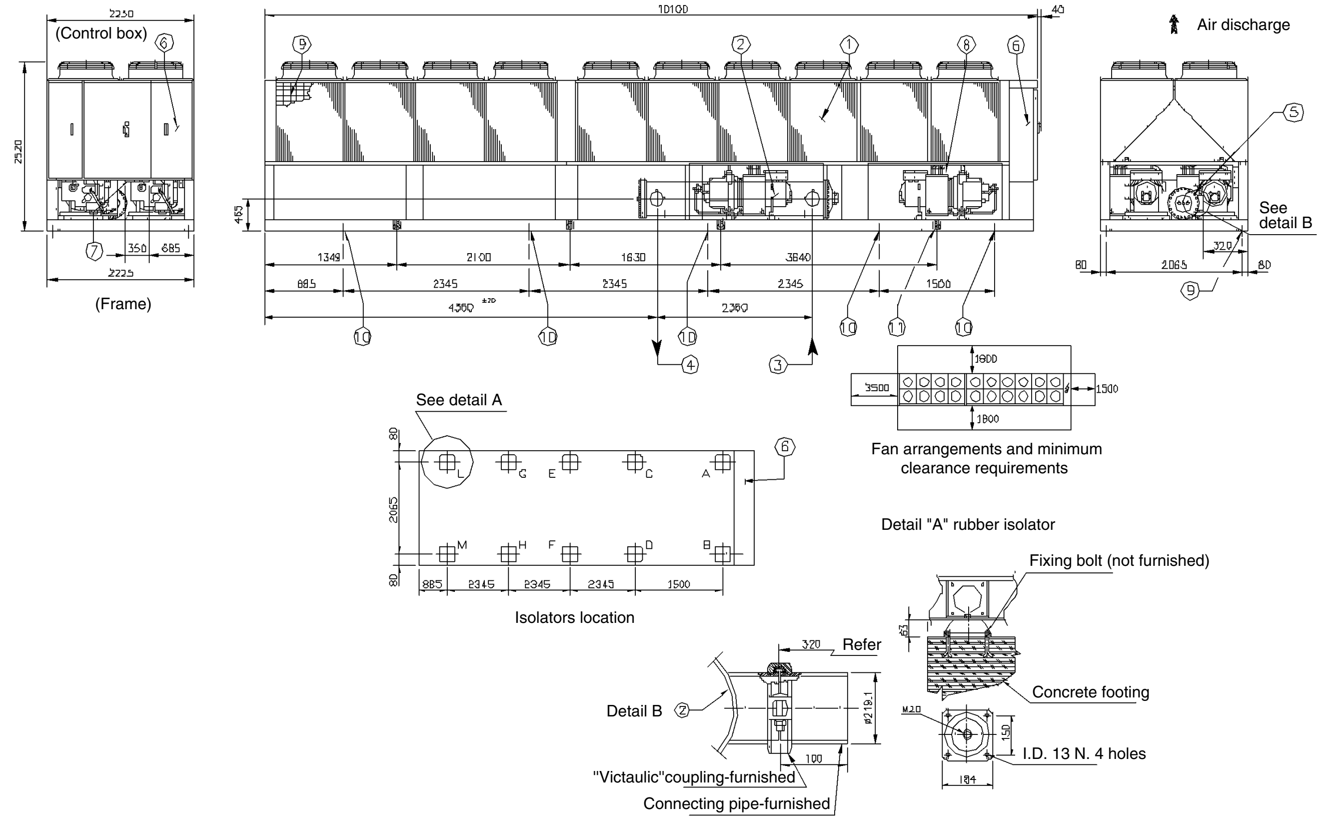
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressor enclosure (optional)

1

1.47 Outlook Drawing: EWADC11BJYNN and EWAD900BJYNN/Z

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type	Weight KG		Isolators load KG									
	Shipping	Operating	A	B	C	D	E	F	G	H	L	M
Aluminum / Acrylic coated	9310	9720	1335	1335	1105	1105	1290	1290	535	535	595	595
Rubber isolators	Type (q/ty)		786010-m (6 Pz.)						786010-m (4 Pz.)			

Components

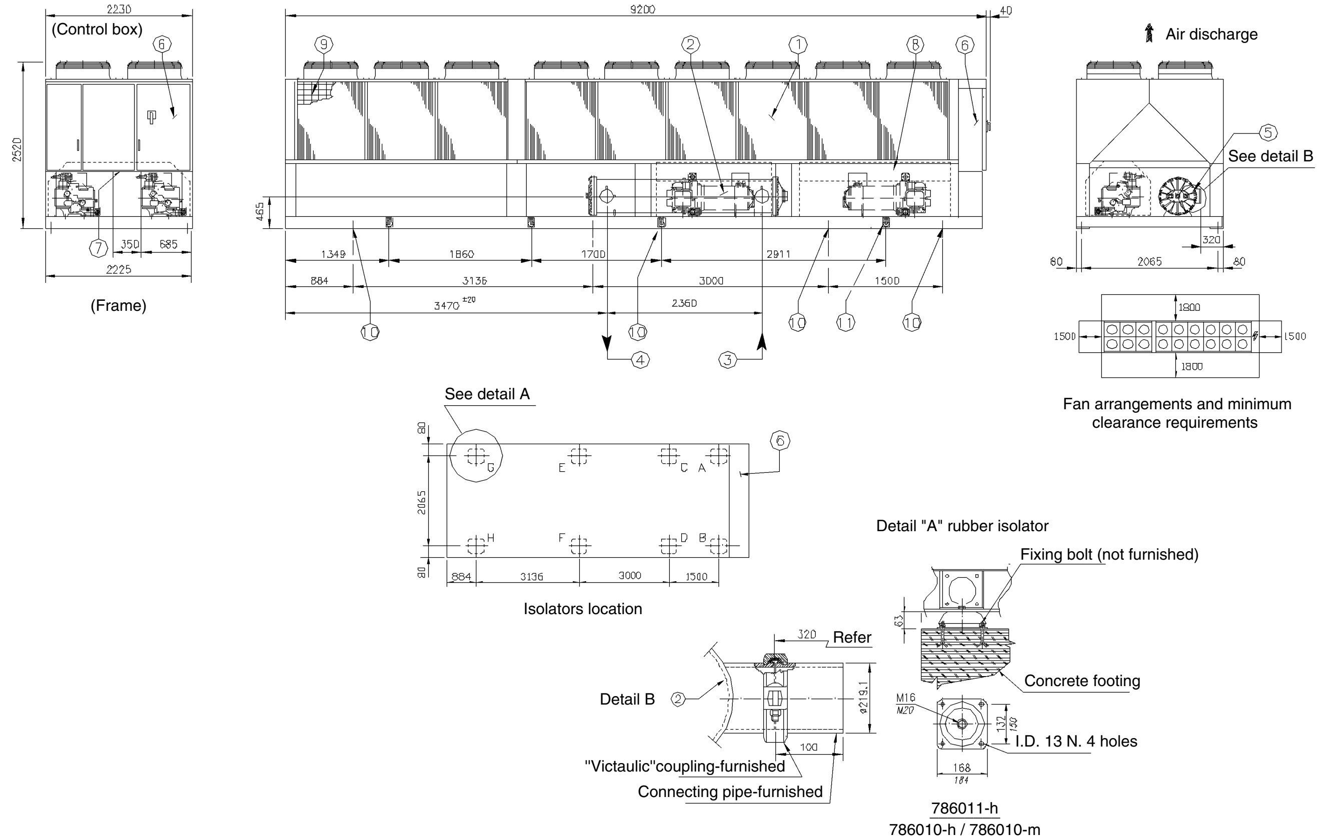
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	Compressor enclosure
9	Coil protection guards (optional)
10	10 isolator mounting holes 25 mm DIA.
11	8 lifting shackles

1

1.48 Outlook Drawing: EWADC11-C12BJYNN/A, EWADC11-C12BJYNN/A+OPRN, EWADC11-C12BJYNN/A+OPLN, EWADC12-C13BJYNN, EWADC12-C13BJYNN+OPRN and EWADC12-C13BJYNN+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG							
		Shipping	Operating	A	B	C	D	E	F	G	H
EWADC11-C12BJYNN/A EWADC11-C12BJYNN/A+OPRN EWADC12-C13BJYNN EWADC12-C13BJYNN+OPRN	Aluminum Acrylic coated	8420	8830	1215	1215	1015	1015	1510	1510	675	675
EWADC11-C12BJYNN/A+OPLN EWADC12-C13BJYNN+OPLN	Aluminum Acrylic coated	8780	9190	1215	1275	1095	1095	1550	1550	675	675
EWADC11-C12BJYNN/A EWADC11-C12BJYNN/A+OPRN EWADC11-C12BJYNN/A+OPLN EWADC12-C13BJYNN EWADC12-C13BJYNN+OPRN EWADC12-C13BJYNN+OPLN	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-h (2 Pz.)		786011-h (2 Pz.)	

Components

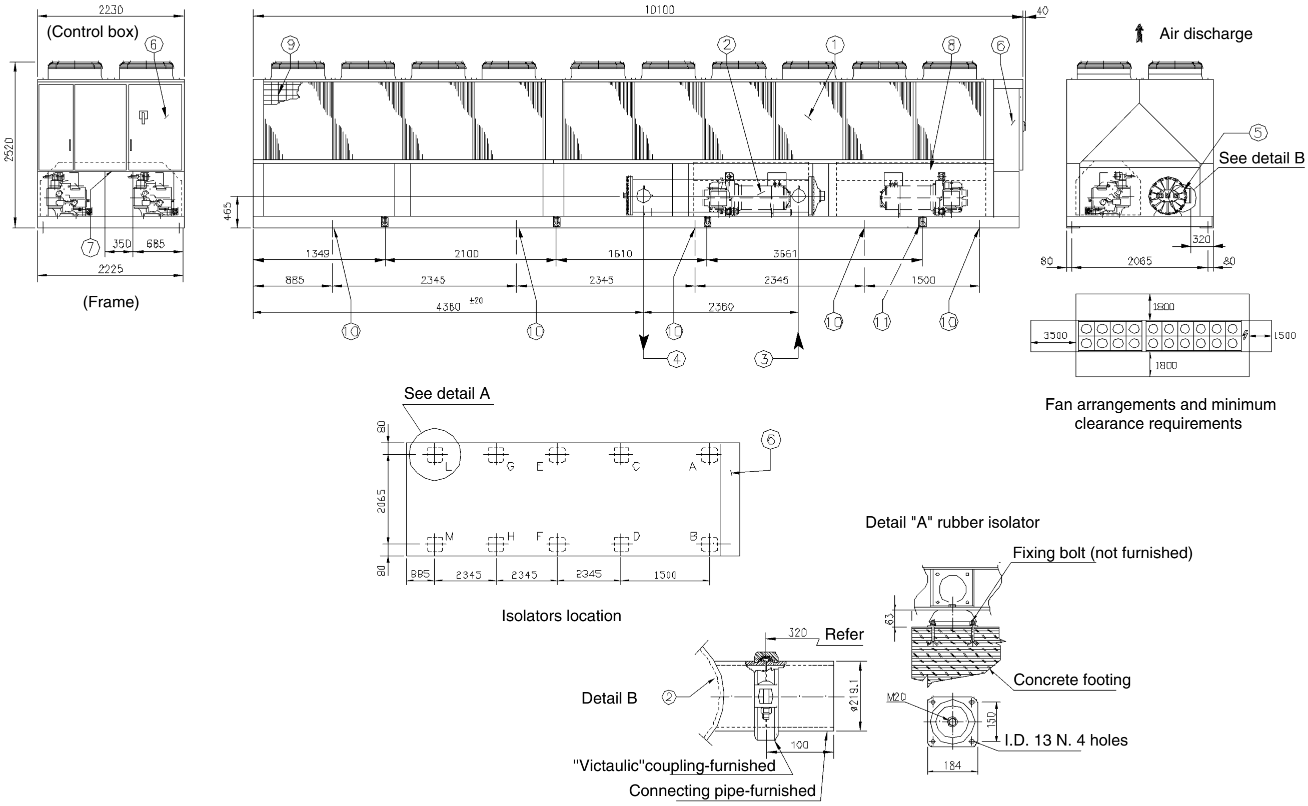
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	Compressor enclosure
9	Coil protection guards (optional)
10	8 isolator mounting holes 25 mm DIA.
11	8 lifting shackles

1

1.49 Outlook Drawing: EWADC13BJYNN/A, EWADC13BJYNN/A+OPRN and EWADC13BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG									
		Shipping	Operating	A	B	C	D	E	F	G	H	L	M
EWADC13BJYNN/A EWADC13BJYNN/A+OPRN	Aluminum Acrylic coated	8950	9360	1275	1275	1025	1025	1250	1250	535	535	595	595
EWADC13BJYNN/A+OPLN	Aluminum Acrylic coated	9310	9720	1335	1335	1105	1105	1290	1290	535	535	595	595
EWADC13BJYNN/A EWADC13BJYNN/A+OPRN EWADC13BJYNN/A+OPLN	Rubber isolators	Type (q/ty)		786010-m (6 Pz.)						786010-w (4 Pz.)			

Components

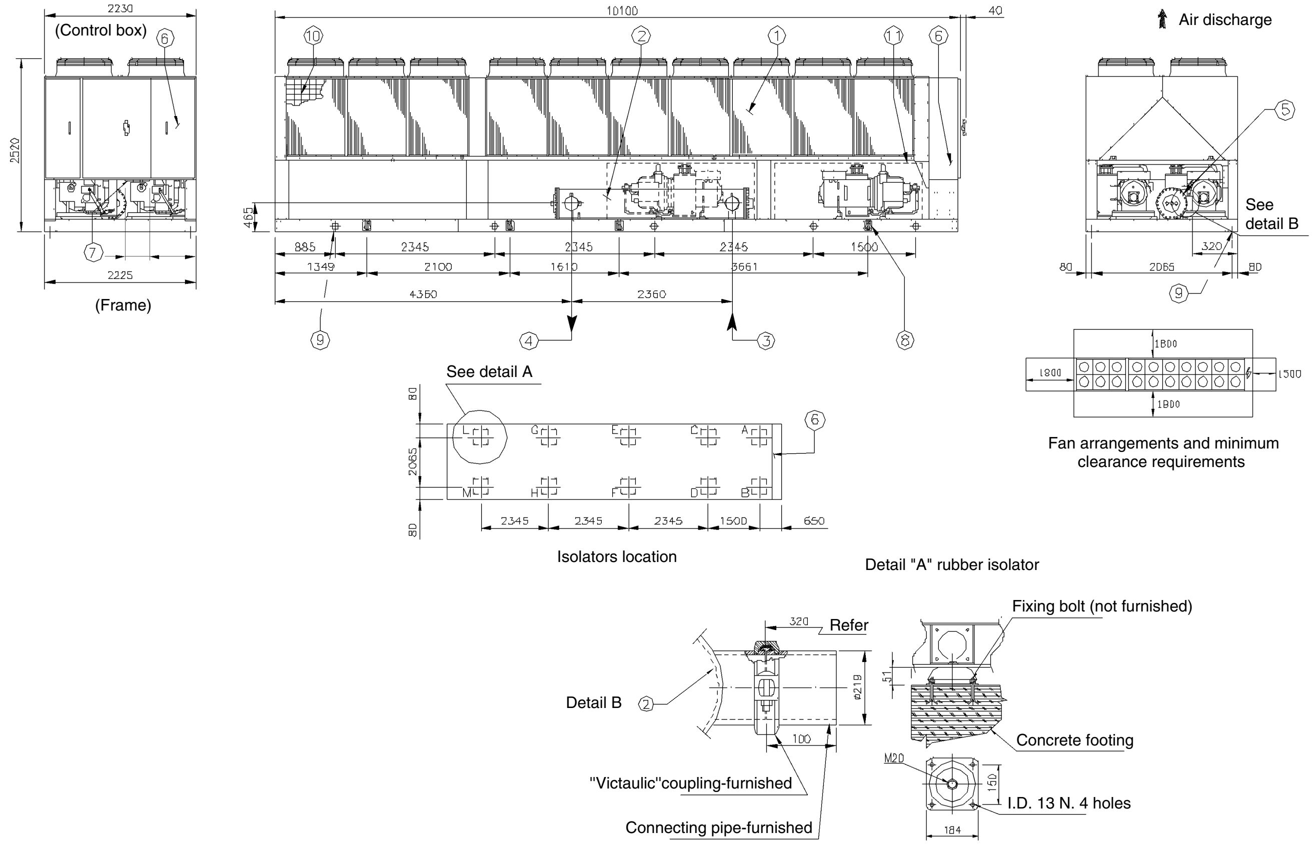
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	Compressor enclosure (optional)
9	Coil protection guards (optional)
10	10 isolator mounting holes 25 mm DIA.
11	8 lifting shackles

1

1.50 Outlook Drawing: EWADC14BJYNN/A, EWADC14BJYNN/A+OPRN and EWADC14BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG									
		Shipping	Operating	A	B	C	D	E	F	G	H	L	M
EWADC14BJYNN/A EWADC14BJYNN/A+OPRN EWADC14BJYNN/A+OPLN	Aluminum	8950	9360	1275	1275	1025	1025	1250	1250	535	535	595	595
	Acrylic coated												
EWADC14BJYNN/A+OPLN	Aluminum	9310	9720	1335	1335	1105	1105	1290	1290	535	535	595	595
	Acrylic coated												
EWADC14BJYNN/A EWADC14BJYNN/A+OPRN EWADC14BJYNN/A+OPLN	Rubber isolators	Type (q/ty)		786010-m (6 Pz.)						786010-w (4 Pz.)			

Components

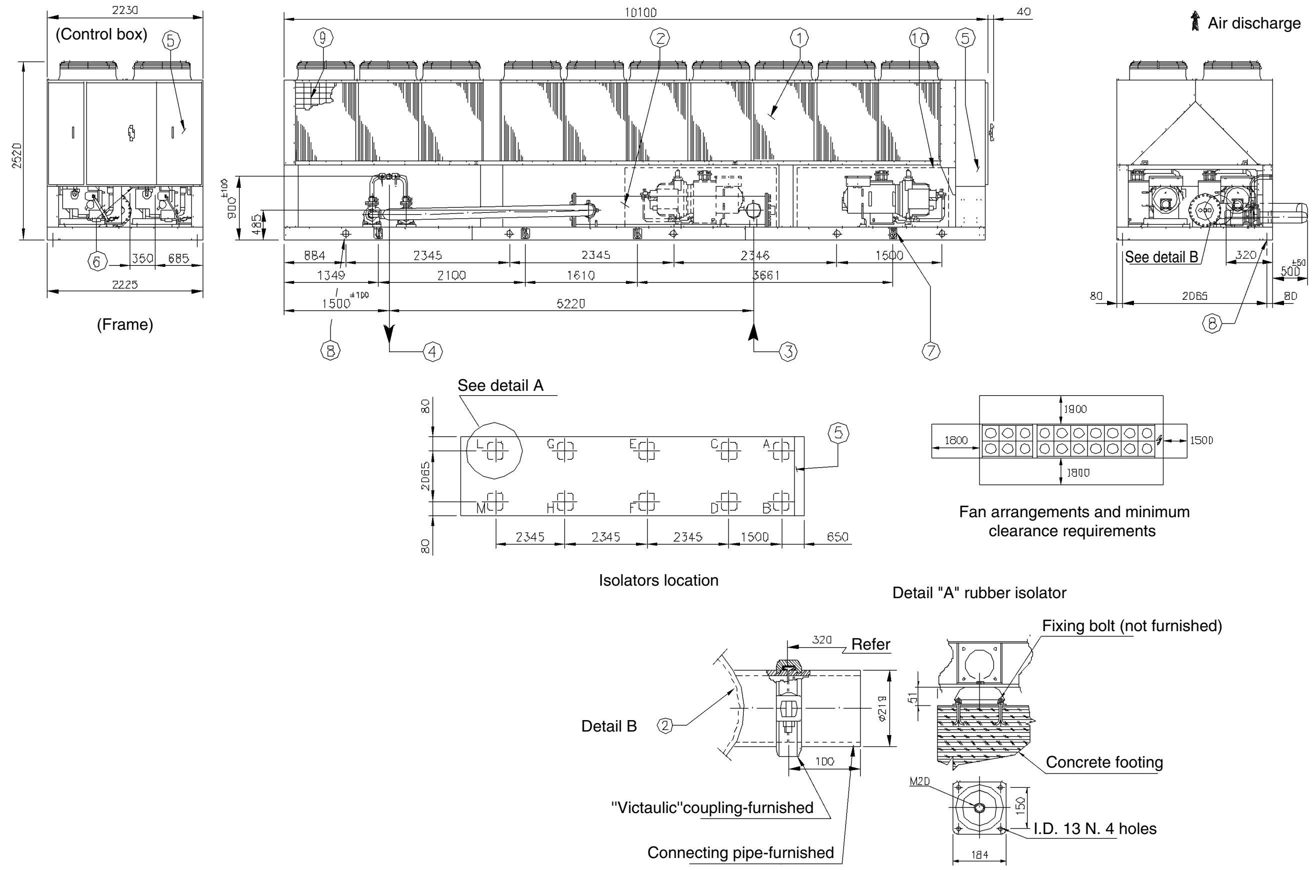
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	10 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressor enclosure (optional)

1

1.51 Outlook Drawing: EWADC14BJYNN/A+OPSP, EWADC14BJYNN/A+OPRN+OPSP and EWADC14BJYNN/A+OPLN+OPSP

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG									
		Shipping	Operating	A	B	C	D	E	F	G	H	L	M
EWADC14BJYNN/A+OPSP EWADC14BJYNN/A+OPRN+OPSP	Aluminum Acrylic coated	10120	10570	1275	1275	1025	1025	1250	1250	735	735	1000	1000
EWADC14BJYNN/A+OPLN+OPSP	Aluminum Acrylic coated	10480	10930	1335	1335	1105	1105	1290	1290	735	735	1000	1000
EWADC14BJYNN/A+OPSP EWADC14BJYNN/A+OPRN+OPSP EWADC14BJYNN/A+OPLN+OPSP	Rubber isolators	Type (q/ty)		786010-m (6 Pz.)						786011-h (4 Pz.)			

Components

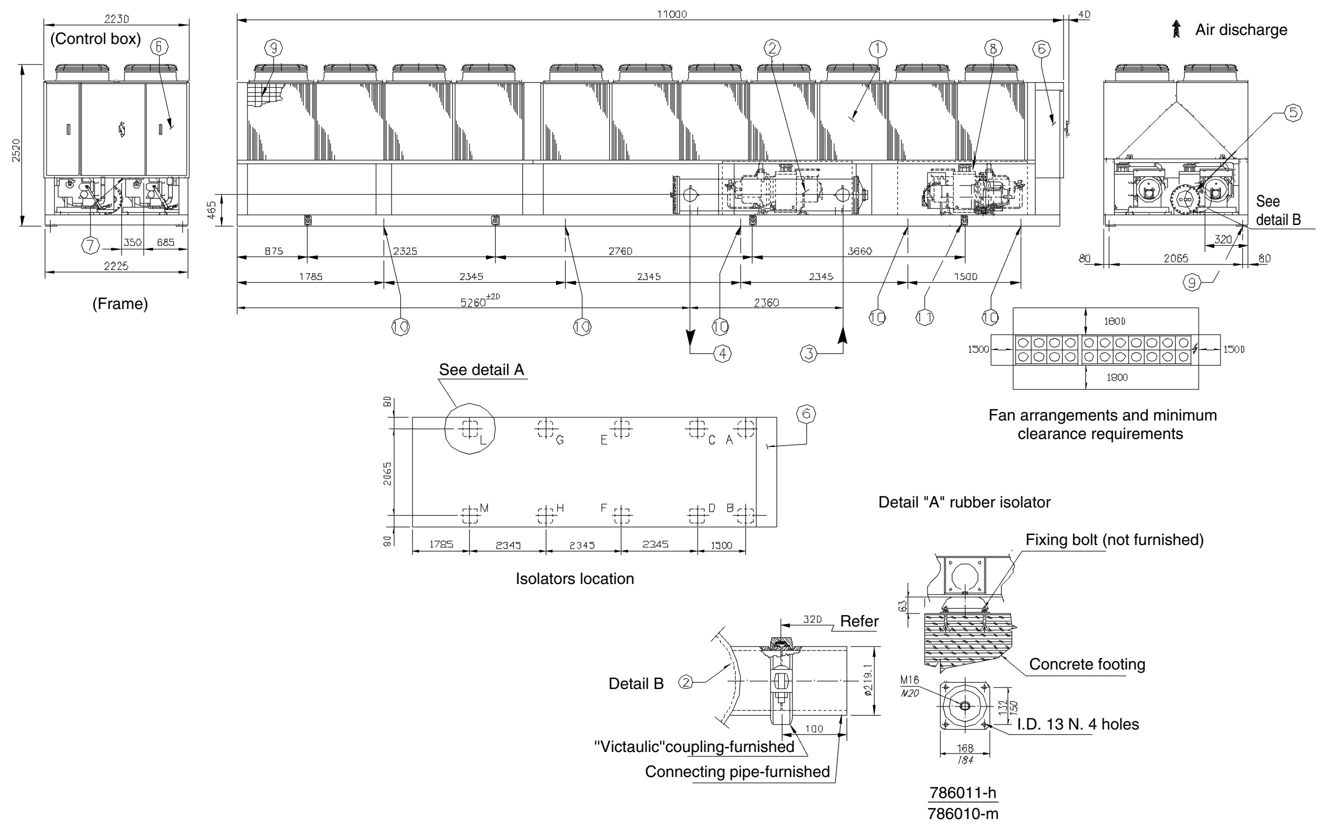
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Victaulic connection for 219.1 O.D. tube evaporator water inlet
4	Victaulic connection for 168.3 O.D. tube evaporator-pump water outlet
5	Operating and control panel
6	360 x 150 slot for power and control panel connection
7	8 lifting shackles
8	10 isolator mounting holes 25 mm DIA.
9	Coil protection guards (optional)
10	Compressor enclosure (optional)

1

1.52 Outlook Drawing: EWADC15BJYNN/A, EWADC15BJYNN/A+OPRN and EWADC15BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG									
		Shipping	Operating	A	B	C	D	E	F	G	H	L	M
EWADC15BJYNN/A EWADC15BJYNN/A+OPRN	Aluminum Acrylic coated	9390	9800	1225	1225	1000	1000	1240	1240	535	535	900	900
EWADC15BJYNN/A+OPLN	Aluminum Acrylic coated	9750	10160	1285	1285	1080	1080	1280	1280	535	535	900	900
EWADC15BJYNN/A EWADC15BJYNN/A+OPRN EWADC15BJYNN/A+OPLN	Rubber isolators	Type (q/ty)		786010-m (6 Pz.)						786011-h (4 Pz.)			

Components

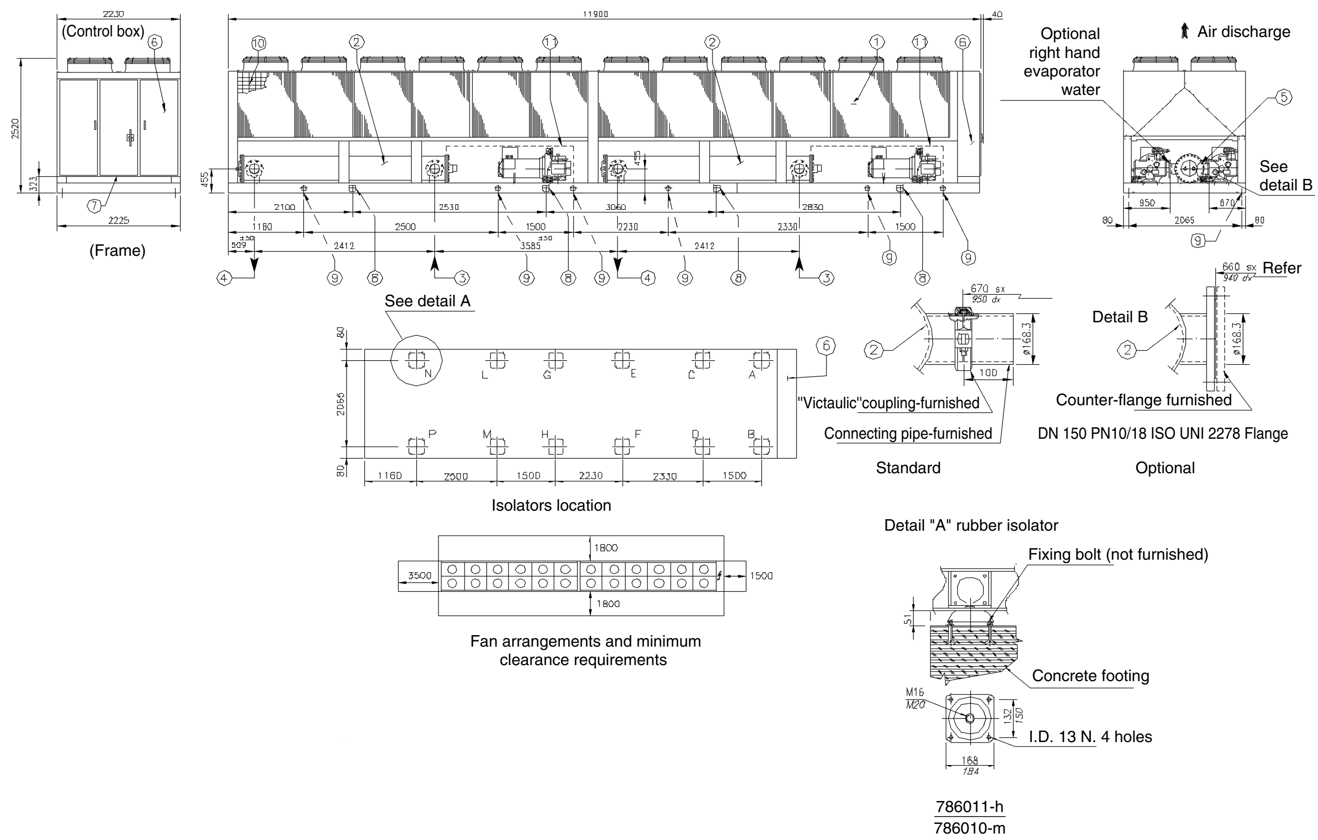
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	Compressor enclosure (optional)
9	Coil protection guards (optional)
10	10 isolator mounting holes 25 mm DIA.
11	8 lifting shackles

1

1.53 Outlook Drawing: EWADC16BJYNN, EWADC16BJYNN+OPRN and EWADC16BJYNN+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG											
		Shipping	Operating	A	B	C	D	E	F	G	H	L	M	N	P
EWADC16BJYNN EWADC16BJYNN+OPRN	Aluminum Acrylic coated	11340	11844	1180	1265	928	993	943	993	980	1065	883	948	808	858
EWADC16BJYNN+OPLN	Aluminum Acrylic coated	11820	12324	1240	1325	988	1053	943	993	1040	1125	943	1008	808	858
EWADC16BJYNN EWADC16BJYNN+OPRN EWADC16BJYNN+OPLN	Rubber isolators	Type (q/ty)		786010-m (8 Pz.)								786011-h (4 Pz.)			

1

Components

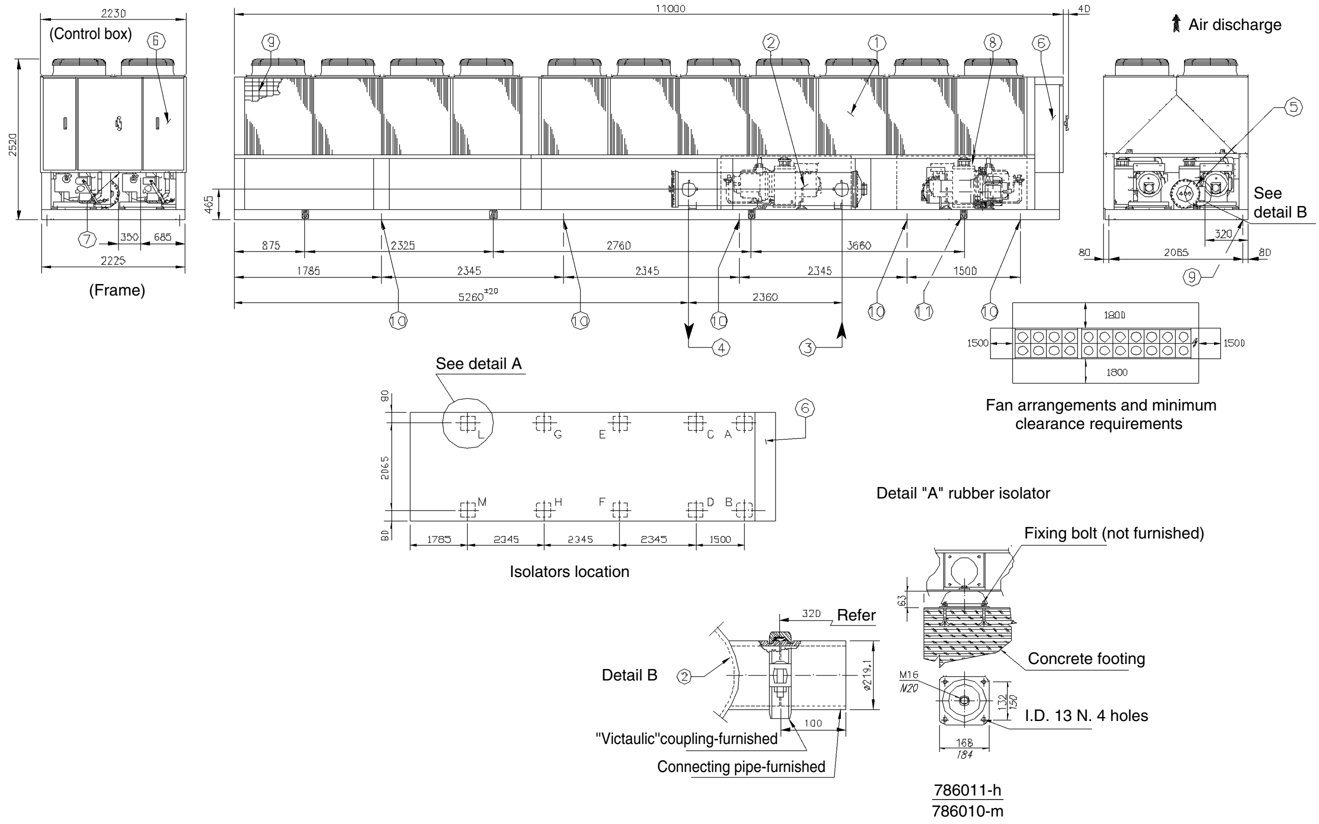
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	12 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressor enclosure (optional)

1

1.54 Outlook Drawing: EWADC16BJYNN/A, EWADC16BJYNN/A+OPRN and EWADC16BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



<table>
<tr><th rowspan="2">Version</th><th rowspan="2" colspan="2">Condenser Type</th><th colspan="2">Weight KG</th><th colspan="10">Isolators load KG</th></tr>
<tr><th>Shipping</th><th>Operating</th><th>A</th><th>B</th><th>C</th><th>D</th><th>E</th><th>F</th><th>G</th><th>H</th><th>L</th><th>M</th></tr>
<tr><td rowspan="2">EWADC16BJYNN/A
EWADC16BJYNN/A+OPRN</td><td colspan="2">Aluminum</td><td rowspan="2">9590</td><td rowspan="2">10000</td><td rowspan="2">1225</td><td rowspan="2">1225</td><td rowspan="2">1000</td><td rowspan="2">1000</td><td rowspan="2">1240</td><td rowspan="2">1240</td><td rowspan="2">585</td><td rowspan="2">585</td><td rowspan="2">950</td><td rowspan="2">950</td></tr>
<tr><td colspan="2">Acrylic coated</td></tr>
<tr><td rowspan="2">EWADC16BJYNN/A+OPLN</td><td colspan="2">Aluminum</td><td rowspan="2">9950</td><td rowspan="2">10360</td><td rowspan="2">1285</td><td rowspan="2">1285</td><td rowspan="2">1080</td><td rowspan="2">1080</td><td rowspan="2">1280</td><td rowspan="2">1280</td><td rowspan="2">585</td><td rowspan="2">585</td><td rowspan="2">950</td><td rowspan="2">950</td></tr>
<tr><td colspan="2">Acrylic coated</td></tr>
<tr><td>EWADC16BJYNN/A
EWADC16BJYNN/A+OPRN
EWADC16BJYNN/A+OPLN</td><td>Rubber isolators</td><td colspan="3">Type (q/ty)</td><td colspan="6">786010-m
(6 Pz.)</td><td colspan="4">786011-h
(4 Pz.)</td></tr>
</table>

Components

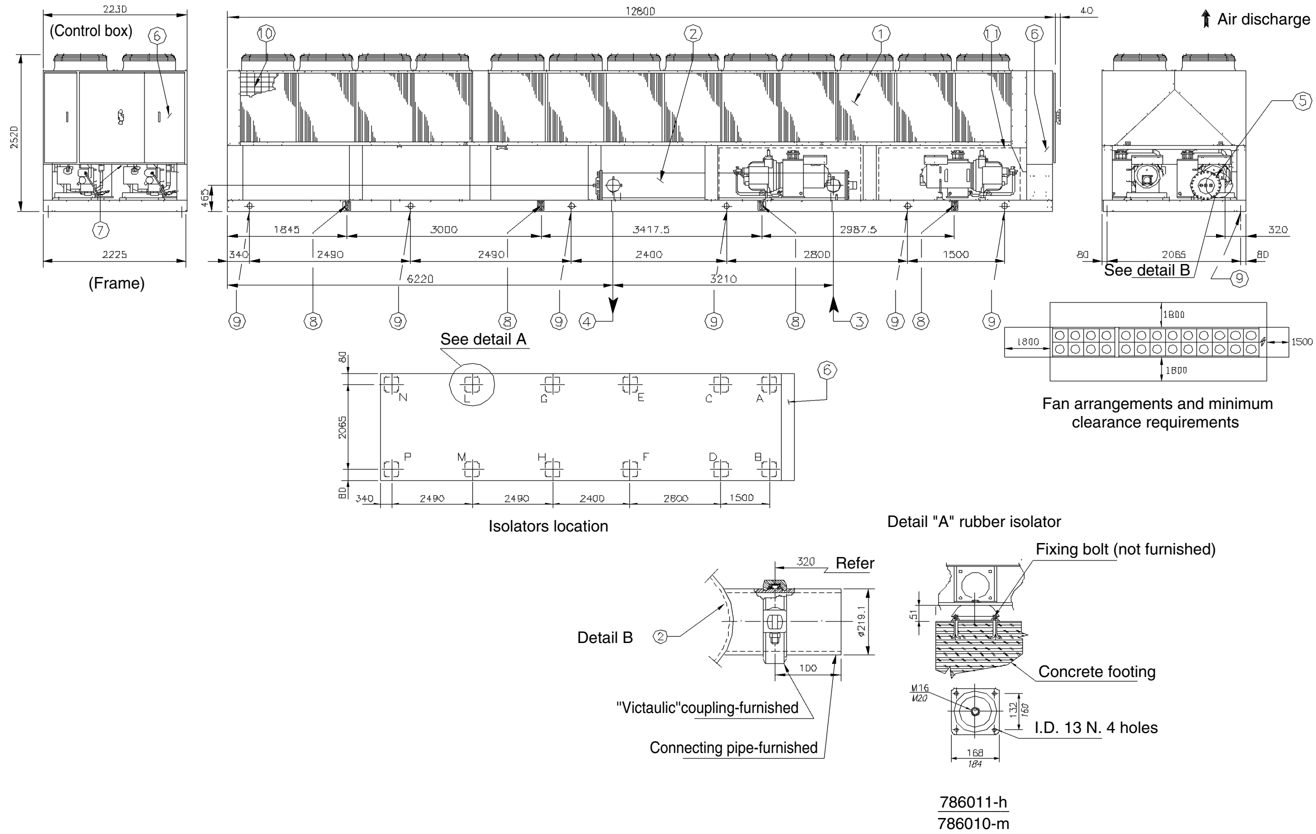
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	Compressor enclosure
9	Coil protection guards (optional)
10	10 isolator mounting holes 25 mm DIA.
11	8 lifting shackles

1

1.55 Outlook Drawing: EWADC17BJYNN/A, EWADC17BJYNN/A+OPRN and EWADC17BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG											
		Shipping	Operating	A	B	C	D	E	F	G	H	L	M	N	P
EWADC17BJYNN/A EWADC17BJYNN/A+OPRN	Aluminum Acrylic coated	10335	10960	1140	1140	955	955	1410	1410	780	780	555	555	640	640
EWADC17BJYNN/A+OPLN	Aluminum Acrylic coated	10715	11320	1200	1200	1035	1035	1450	1450	780	780	555	555	640	640
EWADC17BJYNN/A EWADC17BJYNN/A+OPRN EWADC17BJYNN/A+OPLN	Rubber isolators	Type (q/ty)		786010-m (6 Pz.)						786011-h (4 Pz.)					

Components

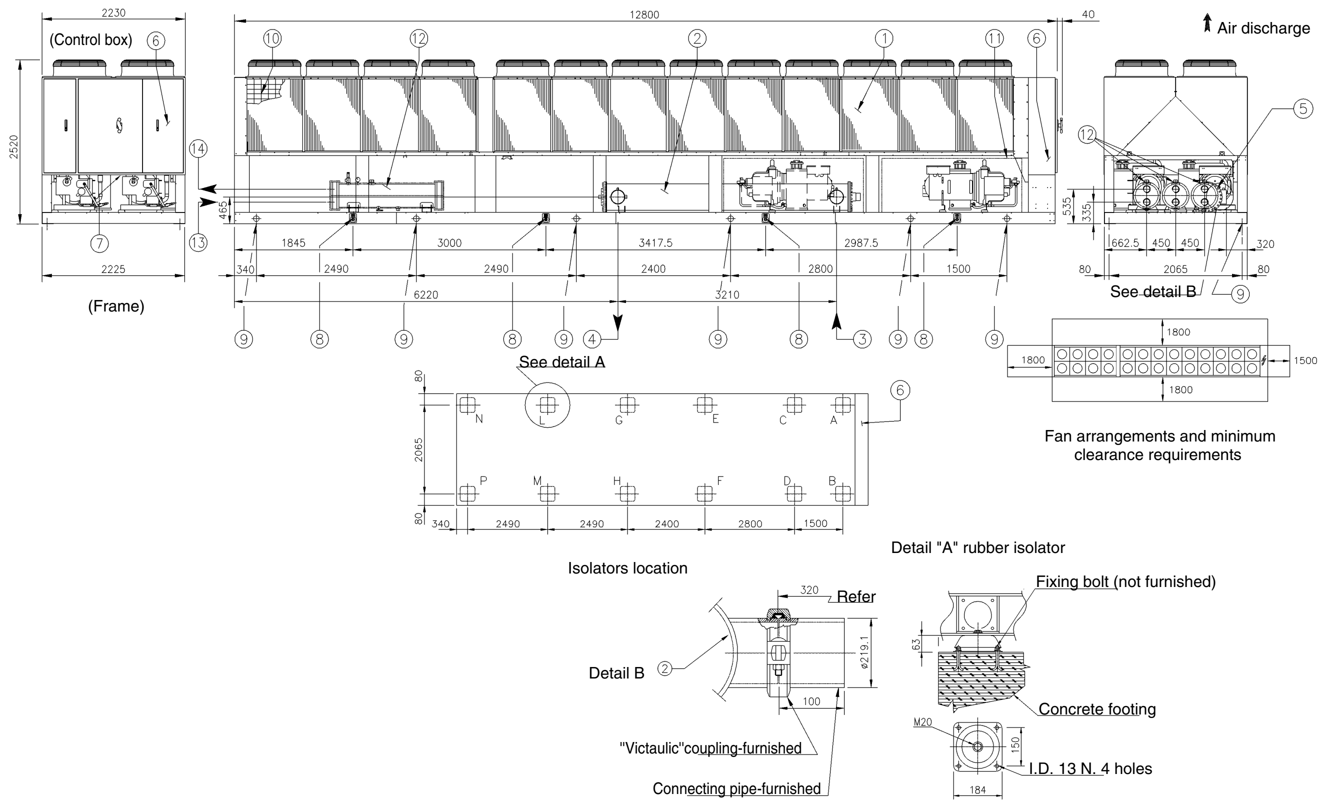
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	12 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressor enclosure (optional)

1

1.56 Outlook Drawing: EWADC17BJYNN/A+OPTR, EWADC17BJYNN/A+OPRN+OPTR and EWADC17BJYNN/A+OPLN+OPTR

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG											
		Shipping	Operating	A	B	C	D	E	F	G	H	L	M	N	P
EWADC17BJYNN/A+OPTR EWADC17BJYNN/A+OPRN+OPTR	Aluminum Acrylic coated	11875	12600	1140	1140	995	995	1420	1420	835	835	1145	1145	765	765
EWADC17BJYNN/A+OPLN+OPTR	Aluminum Acrylic coated	12335	12960	1200	1200	1075	1075	1460	1460	835	835	1145	1145	765	765
EWADC17BJYNN/A+OPTR EWADC17BJYNN+OPRN+OPTR EWADC17BJYNN/A+OPLN+OPTR	Rubber isolators	Type (q/ty)		786010-m (12 Pz.)											

Components

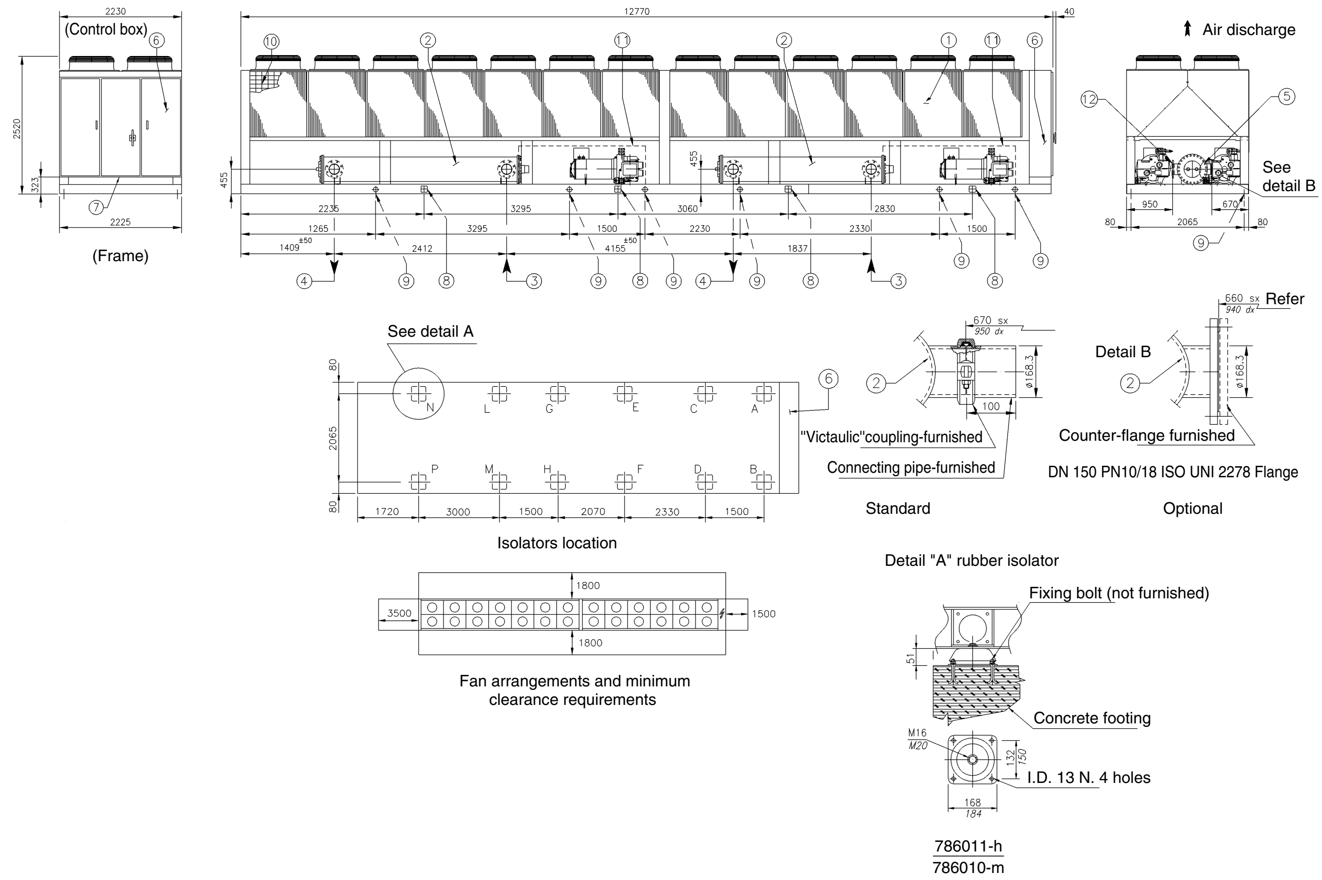
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	12 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressor enclosure (optional)
12	Heat recovery condenser
13	Heat recovery condenser water inlet 5” female connection
14	Heat recovery condenser water outlet 5” female connection

1

1.57 Outlook Drawing: EWADC18BJYNN/A, EWADC18BJYNN/A+OPRN and EWADC18BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG											
		Shipping	Operating	A	B	C	D	E	F	G	H	L	M	N	P
EWADC18BJYNN/A EWADC18BJYNN/A+OPRN	Aluminum Acrylic coated	11606	11986	1180	1265	922	987	882	932	1051	1136	712	777	1046	1096
EWADC18BJYNN/A+OPLN	Aluminum Acrylic coated	12086	12324	1240	1325	982	1047	882	932	1111	1196	772	837	1046	1096
EWADC18BJYNN/A EWADC18BJYNN/A+OPRN EWADC18BJYNN/A+OPLN	Rubber isolators	Type (q/ty)		786010-m (8 Pz.)								786011-h (4 Pz.)		786010-m (8 Pz.)	

Components

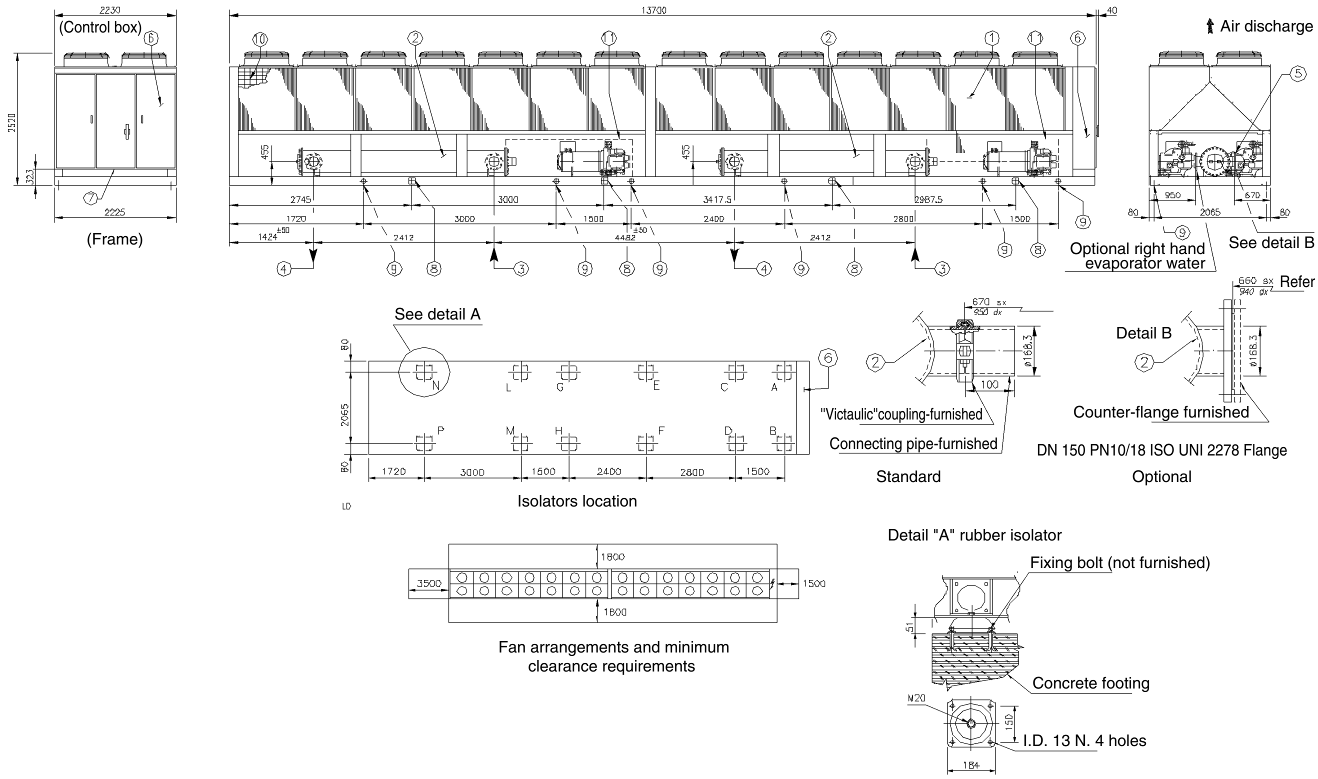
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	12 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)
12	Optional right hand evaporator water

1

1.58 Outlook Drawing: EWADC19BJYNN/A, EWADC19BJYNN/A+OPRN and EWADC19BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG											
		Shipping	Operating	A	B	C	D	E	F	G	H	L	M	N	P
EWADC19BJYNN/A EWADC19BJYNN/A+OPRN	Aluminum Acrylic coated	11850	12350	1220	1305	970	1035	985	1035	1025	1110	925	990	850	900
EWADC19BJYNN/A+OPLN	Aluminum Acrylic coated	12330	12830	1280	1365	1030	1095	985	1035	1085	1170	985	1050	850	900
EWADC19BJYNN/A EWADC19BJYNN/A+OPRN EWADC19BJYNN/A+OPLN	Rubber isolators	Type (q/ty)		786010-m (12 Pz.)											

Components

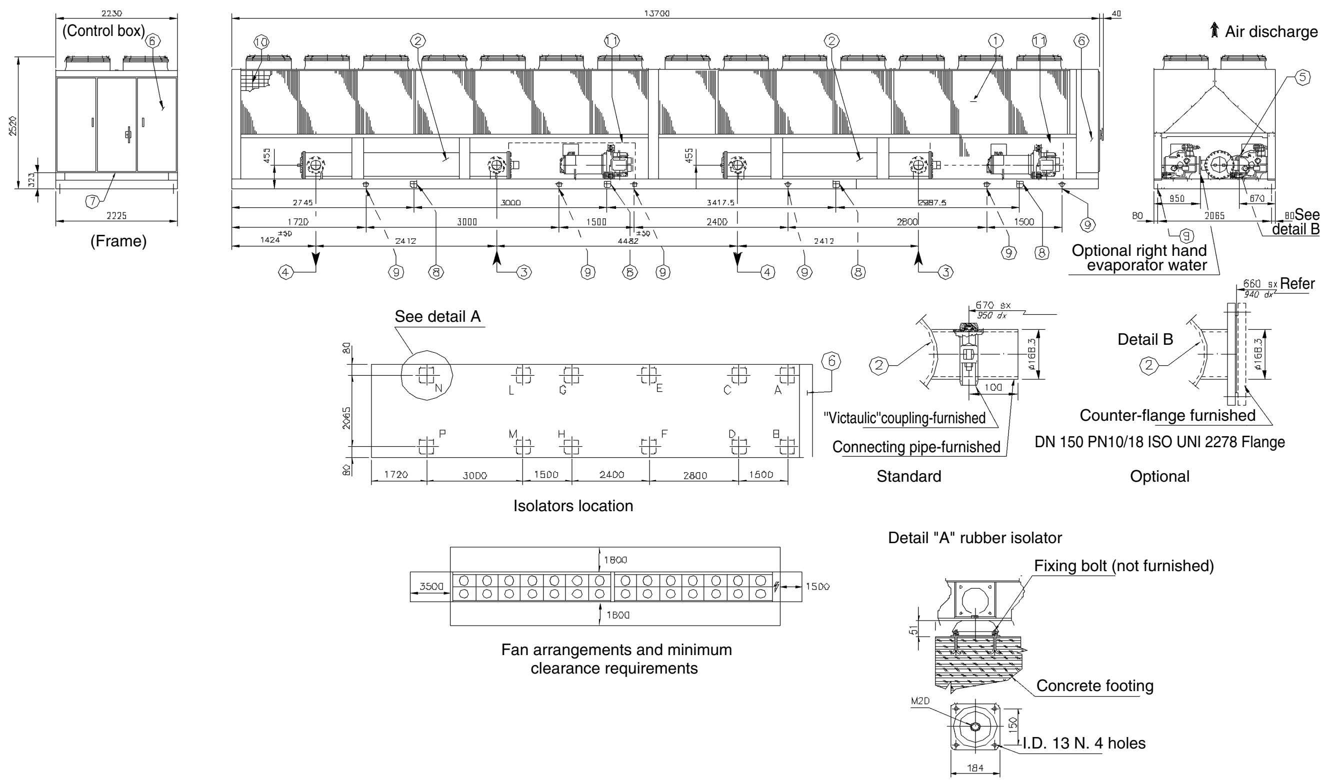
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	12 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.59 Outlook Drawing: EWADC20BJYNN/A, EWADC20BJYNN/A+OPRN and EWADC20BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG											
		Shipping	Operating	A	B	C	D	E	F	G	H	L	M	N	P
EWADC20BJYNN/A EWADC20BJYNN/A+OPRN	Aluminum Acrylic coated	12050	12550	1220	1305	980	1045	1025	1075	1025	1110	925	990	900	950
EWADC20BJYNN/A+OPLN	Aluminum Acrylic coated	12530	13030	1280	1385	1040	1105	1025	1075	1085	1170	985	1050	900	950
EWADC20BJYNN/A EWADC20BJYNN/A+OPRN EWADC20BJYNN/A+OPLN	Rubber isolators	Type (q/ty)		786010-m (12 Pz.)											

Components

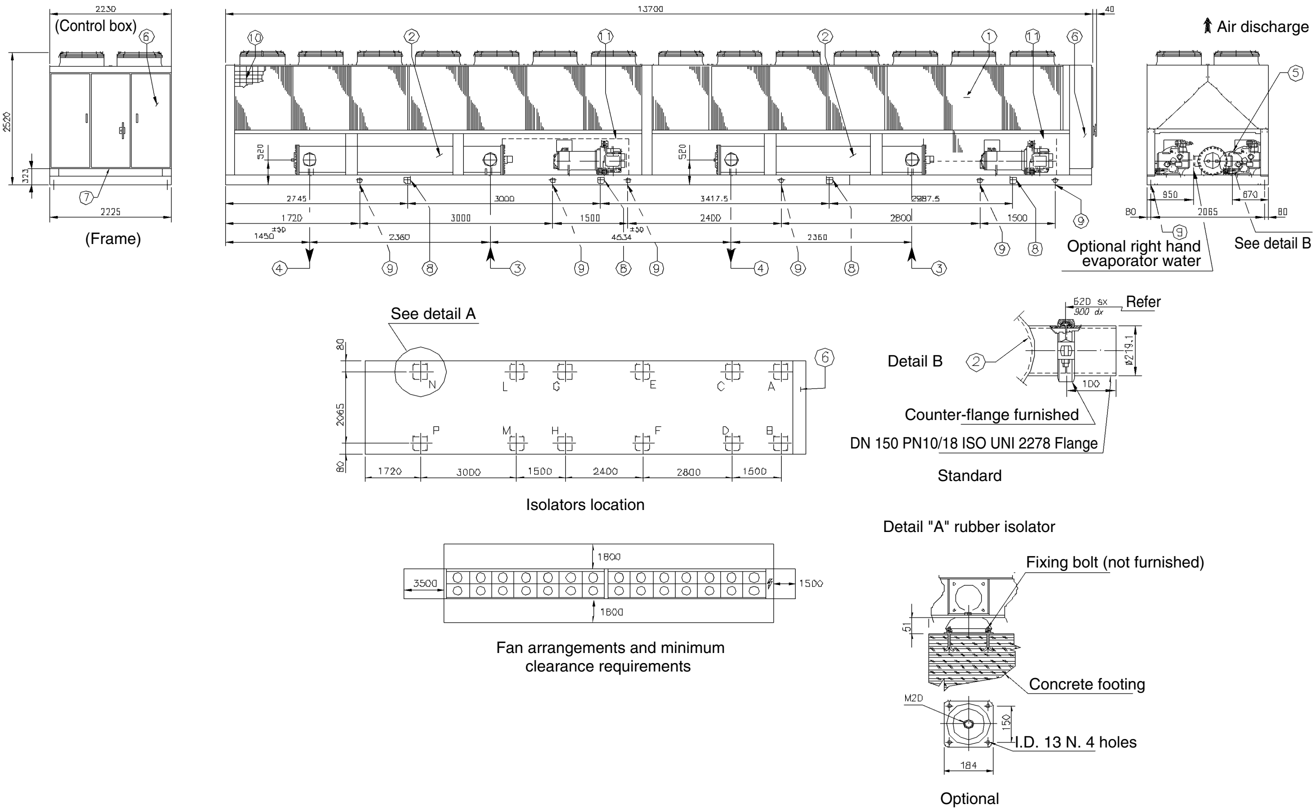
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	12 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.60 Outlook Drawing: EWADC21BJYNN/A, EWADC21BJYNN/A+OPRN and EWADC21BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG											
		Shipping	Operating	A	B	C	D	E	F	G	H	L	M	N	P
EWADC20BJYNN/A EWADC20BJYNN/A+OPRN	Aluminum Acrylic coated	12510	13290	1220	1305	1040	1105	1150	1200	1025	1110	985	1050	1025	1075
EWADC20BJYNN/A+OPLN	Aluminum Acrylic coated	12990	13770	1280	1385	1100	1165	1150	1200	1085	1170	1045	1110	1025	1075
EWADC20BJYNN/A EWADC20BJYNN/A+OPRN EWADC20BJYNN/A+OPLN	Rubber isolators	Type (q/ty)		786010-m (12 Pz.)											

Components

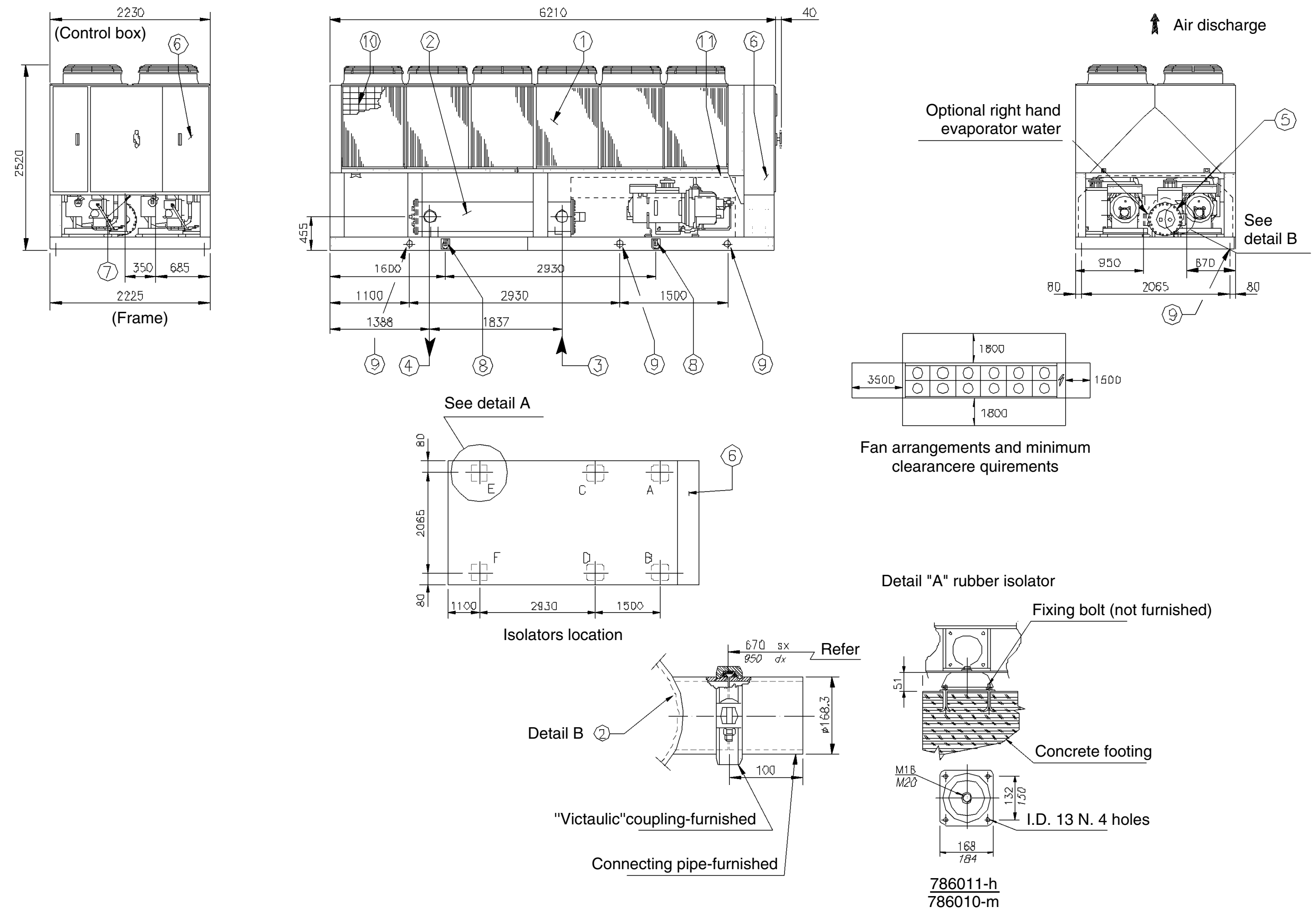
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	8 lifting shackles
9	12 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.61 Outlook Drawing: EWAD600BJYNN/Z

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type		Weight KG		Isolators load KG					
		Shipping	Operating	A	B	C	D	E	F
Aluminum / Acrylic coated		5858	5864	1140	1225	930	995	782	812
Rubber isolators	Type (q/ty)			786010-m (4 Pz.)				786010-h (2 Pz.)	

1

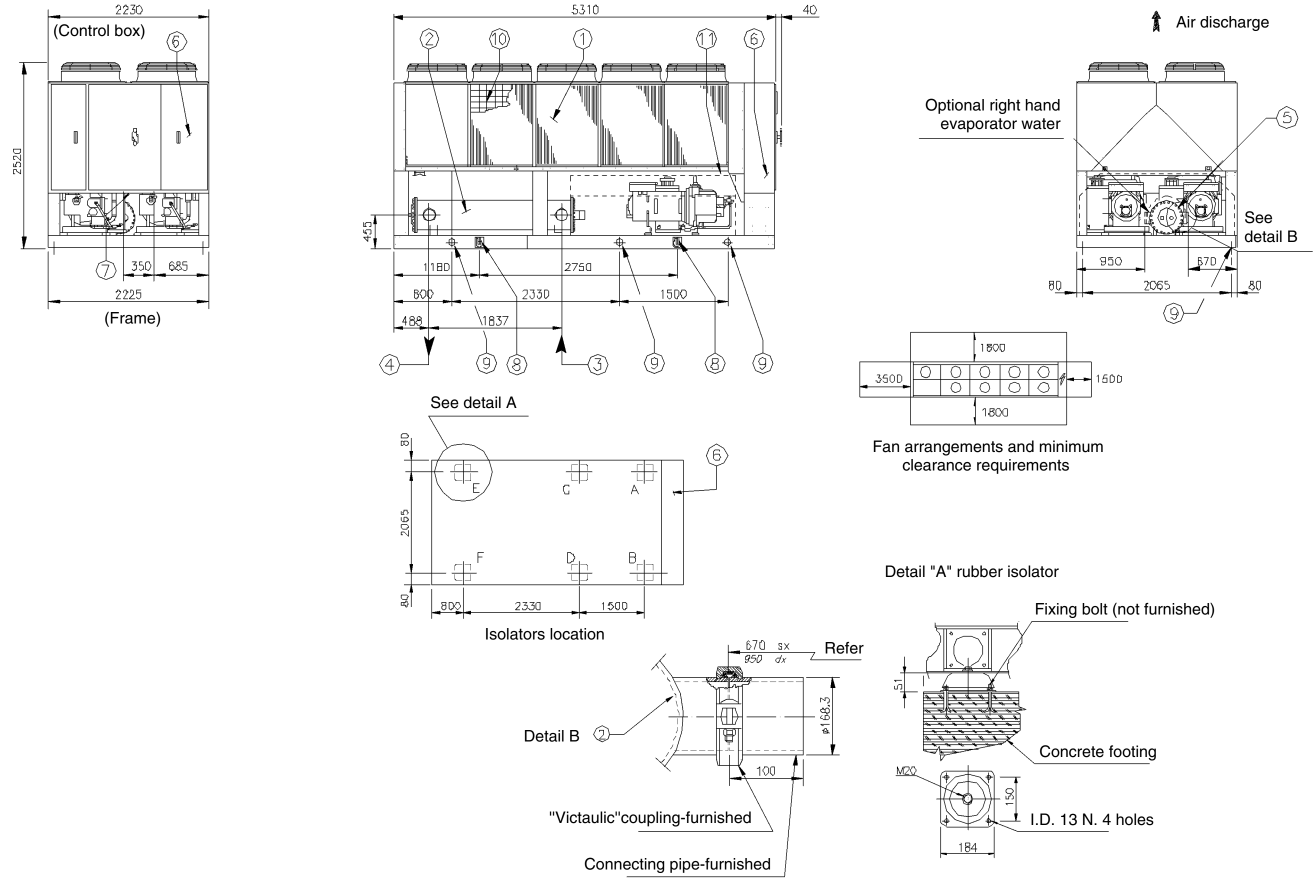
Components

The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure

1.62 Outlook Drawing: EWAD650BJYNN, EWAD650BJYNN+OPRN and EWAD650BJYNN+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG					
		Shipping	Operating	A	B	C	D	E	F
EWAD650BJYNN EWAD650BJYNN+OPRN	Aluminum Acrylic coated	4810	5130	1010	1090	800	860	690	680
EWAD650BJYNN+OPLN	Aluminum Acrylic coated	5150	5370	1070	1150	860	920	690	680
EWAD650BJYNN+OPLN EWAD650BJYNN EWAD650BJYNN+OPRN	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-v (2 Pz.)	

1

Components

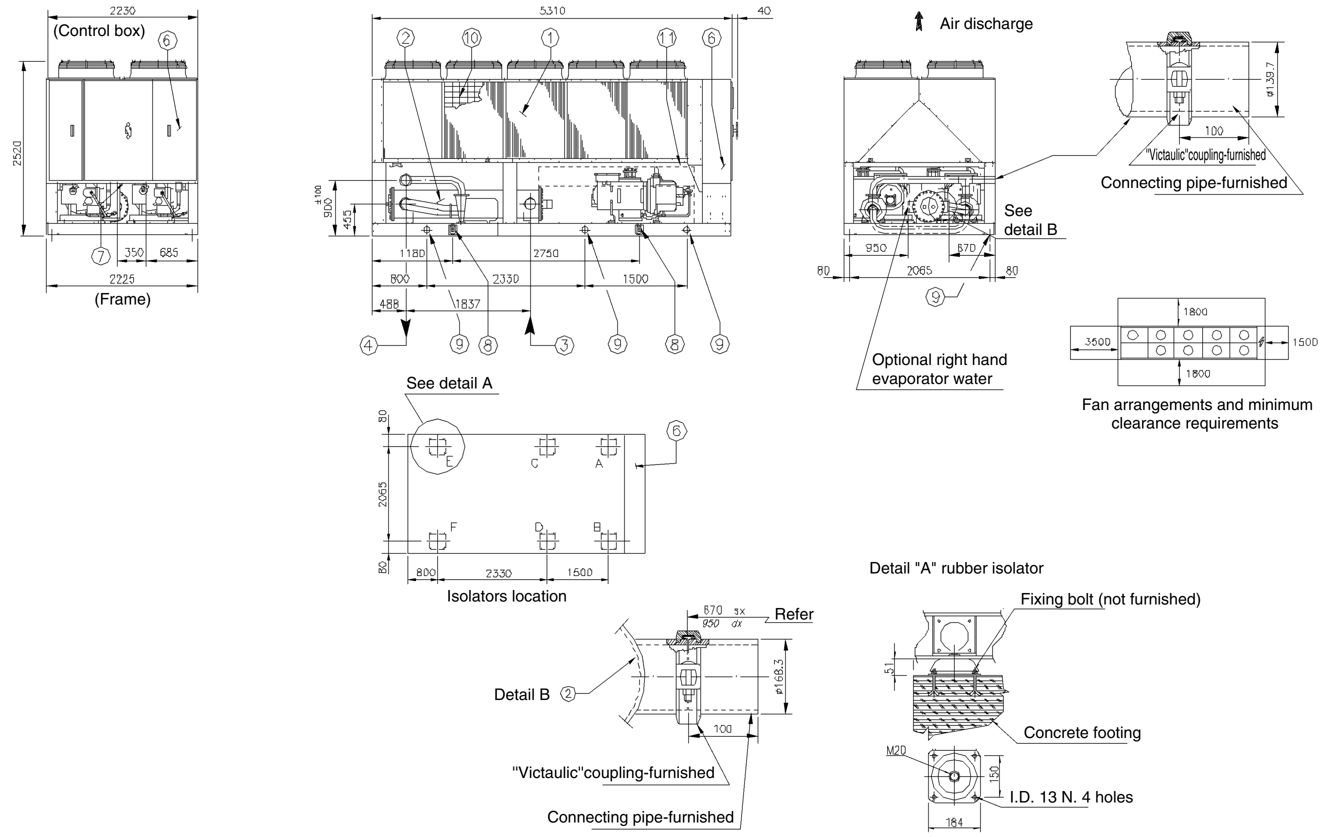
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	6 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure

1

1.63 Outlook Drawing: EWAD650BJYNN+OPTP, EWAD650BJYNN+OPRN+OPTP and EWAD650BJYNN+OPLN+OPTP

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG					
		Shipping	Operating	A	B	C	D	E	F
EWAD650BJYNN+OPTP EWAD650BJYNN+OPTP+OPRN	Aluminum Acrylic coated	5510	5730	1010	1090	865	925	925	915
EWAD650BJYNN+OPLN	Aluminum Acrylic coated	5750	5970	1070	1150	925	965	925	915
EWAD650BJYNN+OPLN EWAD650BJYNN+OPTP EWAD650BJYNN+OPTP+OPRN	Rubber isolators	Type (q/ty)		786010-m (5 Pz.)					

Components

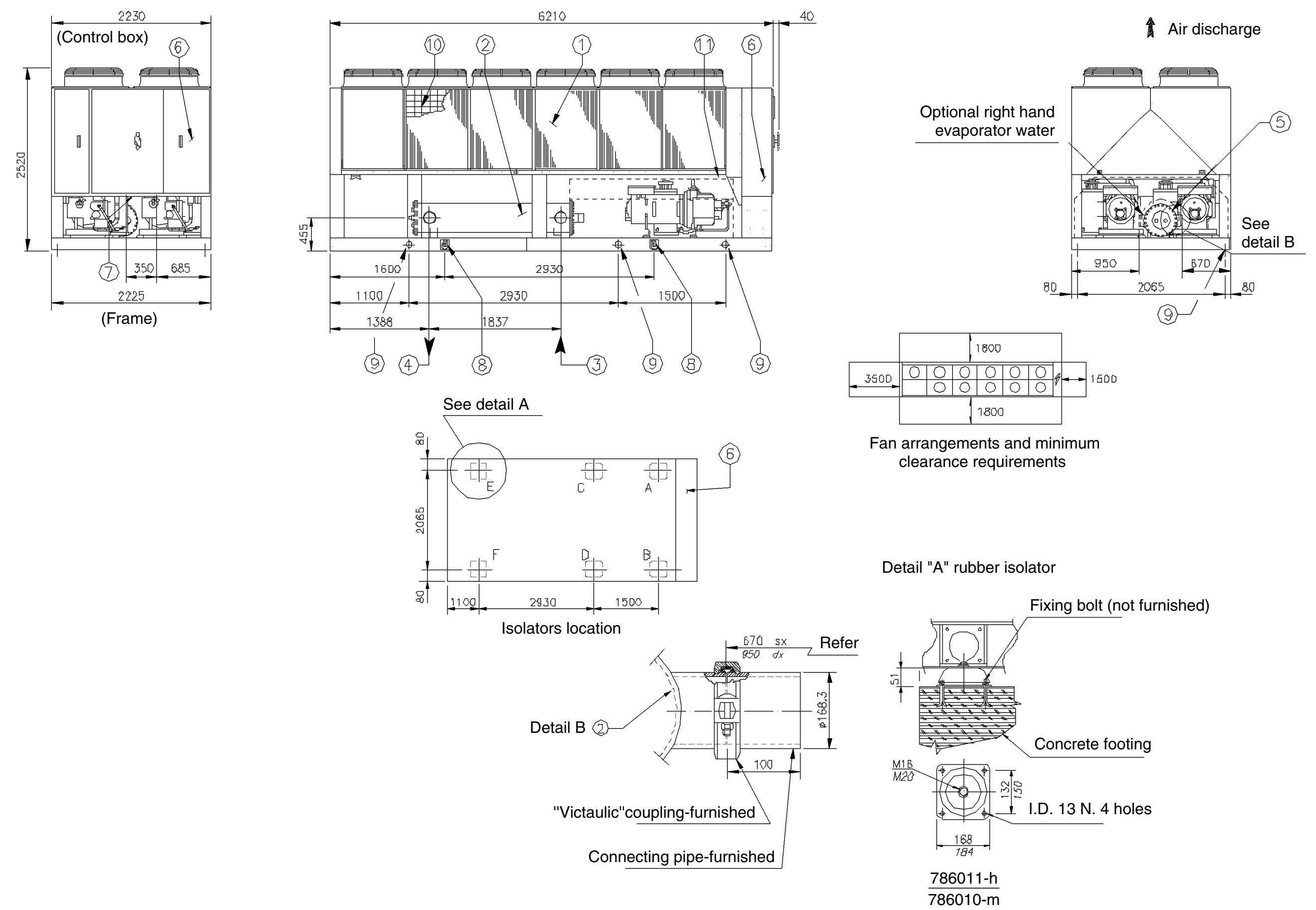
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 219.1 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	6 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.64 Outlook Drawing: EWAD650BJYNN/A, EWAD650BJYNN/A+OPRN and EWAD650BJYNN/A+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type		Weight KG		Isolators load KG					
			Shipping	Operating	A	B	C	D	E	F
EWAD650BJYNN/A EWAD650BJYNN/A+OPRN	Aluminum Acrylic coated		5205	5410	1070	1130	880	900	750	700
EWAD650BJYNN/A+OPLN	Aluminum Acrylic coated		5445	5850	1130	1190	920	980	750	700
EWAD650BJYNN/A EWAD650BJYNN/A+OPRN EWAD650BJYNN/A+OPLN	Rubber isolators	Type (q/ty)			786010-m (4 Pz.)				786010-h (2 Pz.)	

Components

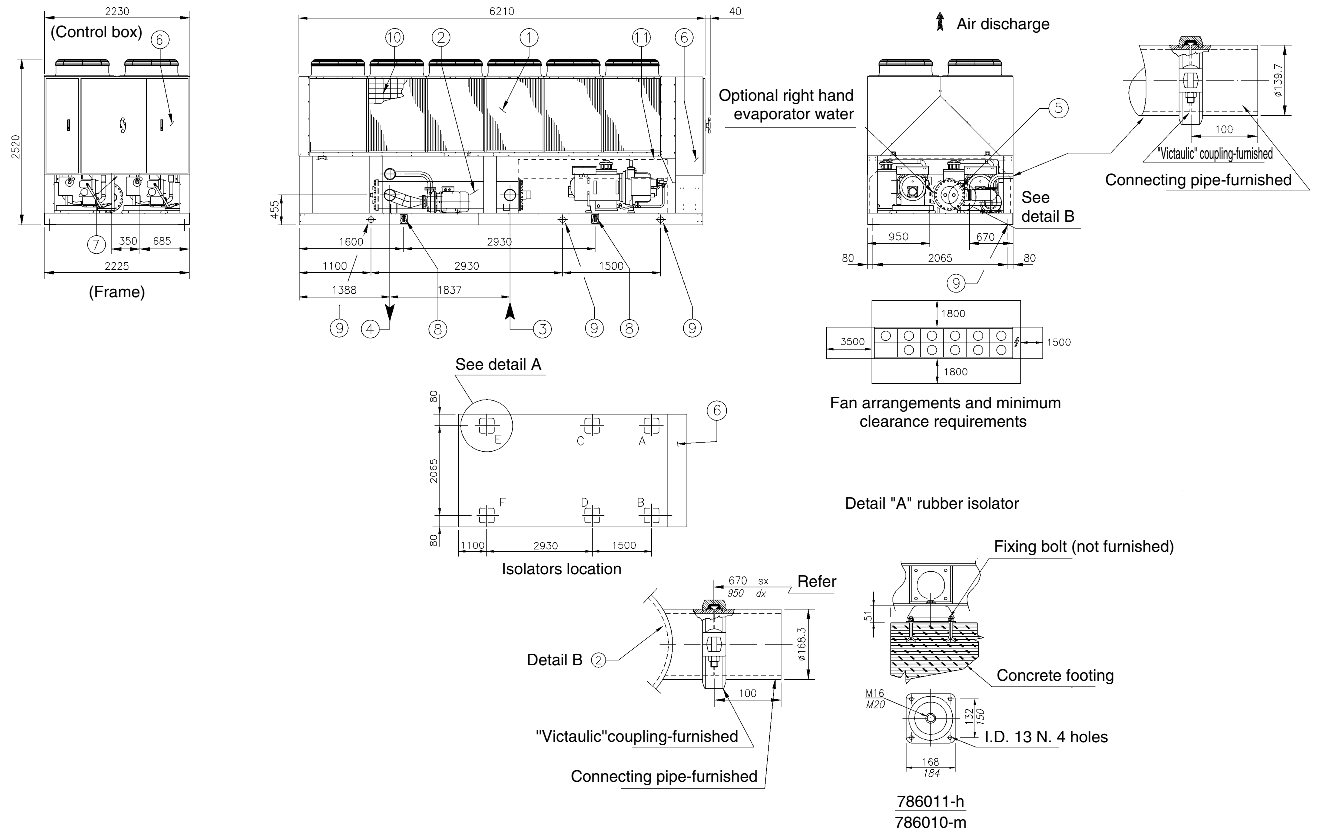
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	6 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.65 Outlook Drawing: EWAD650BJYNN/A+OPSP, EWAD650BJYNN/A+OPSP+OPRN and EWAD650BJYNN/A+OPSP+OPLN

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Version	Condenser Type	Weight KG		Isolators load KG					
		Shipping	Operating	A	B	C	D	E	F
EWAD650BJYNN/A+OPSP EWAD650BJYNN/A+OPSP+OPRN	Aluminum Acrylic coated	5455	5660	1063	1081	883	1065	765	803
EWAD650BJYNN/A+OPSP+OPLN	Aluminum Acrylic coated	5695	5900	1123	1141	943	1125	765	803
EWAD650BJYNN/A+OPSP EWAD650BJYNN/A+OPSP+OPRN EWAD650BJYNN/A+OPSP+OPLN	Rubber isolators	Type (q/ty)		786010-m (4 Pz.)				786010-h (2 Pz.)	

Components

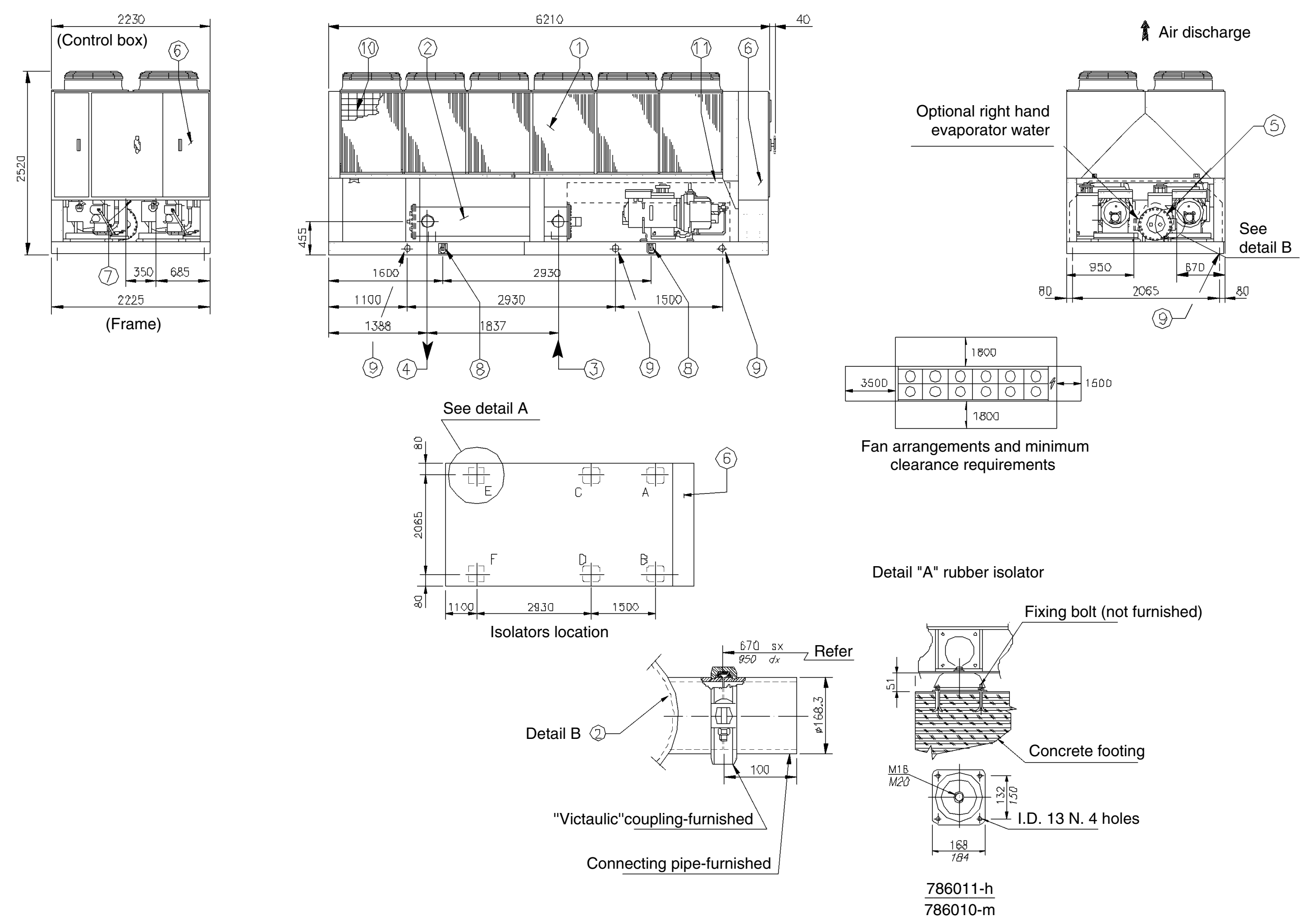
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	6 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure (optional)

1

1.66 Outlook Drawing: EWAD650BJYNN/Q

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type	Weight KG		Isolators load KG					
	Shipping	Operating	A	B	C	D	E	F
Aluminum Acrylic coated	5859	5864	1140	1225	930	995	762	812

Rubber isolators	Type (q/ty)	786010-m (4 Pz.)	786010-h (2 Pz.)

Components

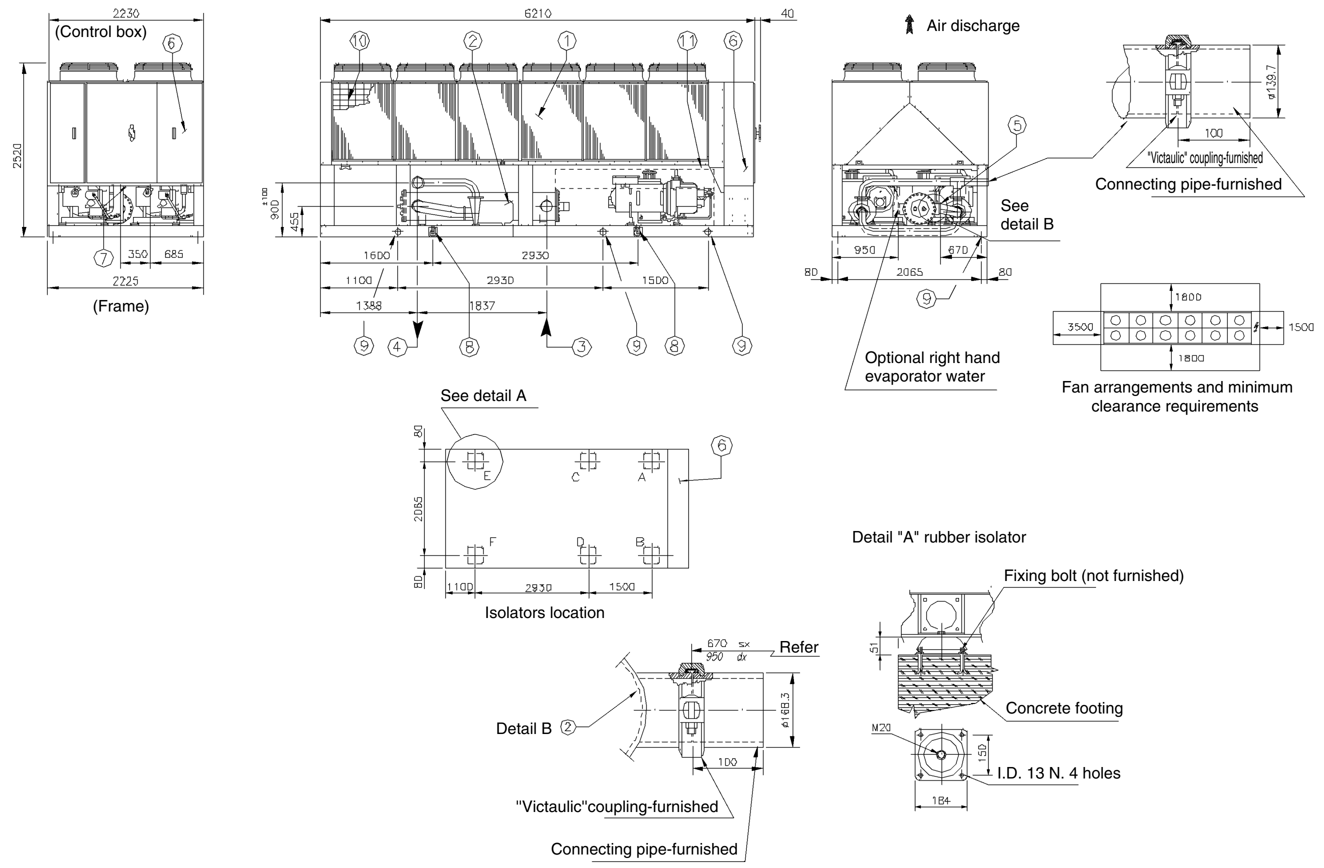
The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Victaulic connections for 168.3 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	8 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure

1

1.67 Outlook Drawing: EWAD650BJYNN/Q+OPTP

The illustration below shows the outlook, the dimensions and the installation and service space of the unit (mm).



Condenser Type	Weight KG		Isolators load KG					
	Shipping	Operating	A	B	C	D	E	F
Aluminum	8475	8680	1150	1260	1005	1095	1010	1160
Acrylic coated								
Rubber isolators	Type (q/ty)		786010-m (6 Pz.)					

Components

The table below lists the components.

No.	Component
1	Condenser coil
2	Evaporator
3	Evaporator water inlet
4	Evaporator water outlet
5	Evaporator-pump water outlet victaulic connection for 139.7 O.D. tube
6	Operating and control panel
7	360 x 150 slot for power and control panel connection
8	4 lifting shackles
9	6 isolator mounting holes 25 mm DIA.
10	Coil protection guards (optional)
11	Compressors enclosure

Part 2
Functional Description

2

Introduction

This part gives more detailed information on the functions and controls of the unit. This information is used as background information for troubleshooting. An extensive overview of the functioning of the controller is also given in this part. Knowledge of the controller is essential to gather information prior to servicing and troubleshooting.

What is in this part?

This part contains the following chapters:

2

1 Operation Range

2

1.1 What Is in This Chapter?

Introduction

This chapter contains information on the functions used to control the system. Understanding these functions is vital when diagnosing a malfunction that is related to the functional control.

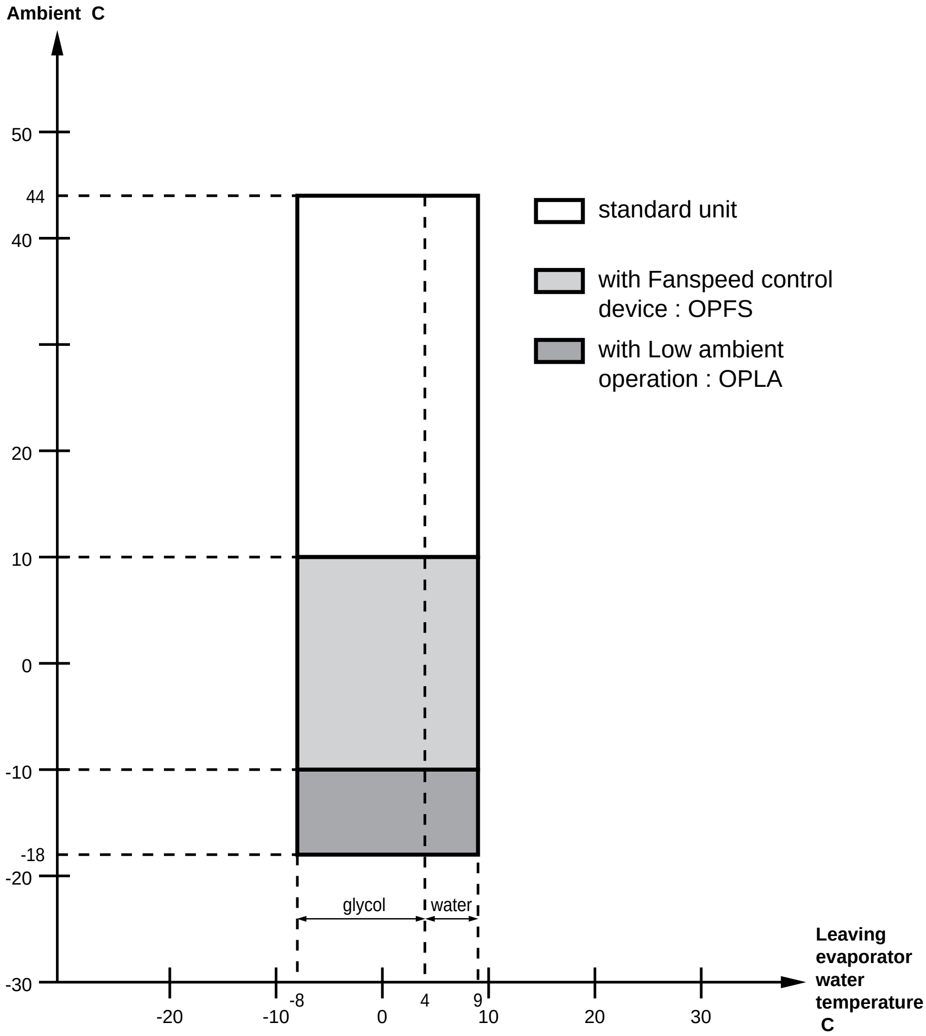
Overview

This chapter contains the following topics:

2

1.2 Operational Range: EWAD-BJYNN

Operational range The illustration below shows the operational range of EWAD-BJYNN.



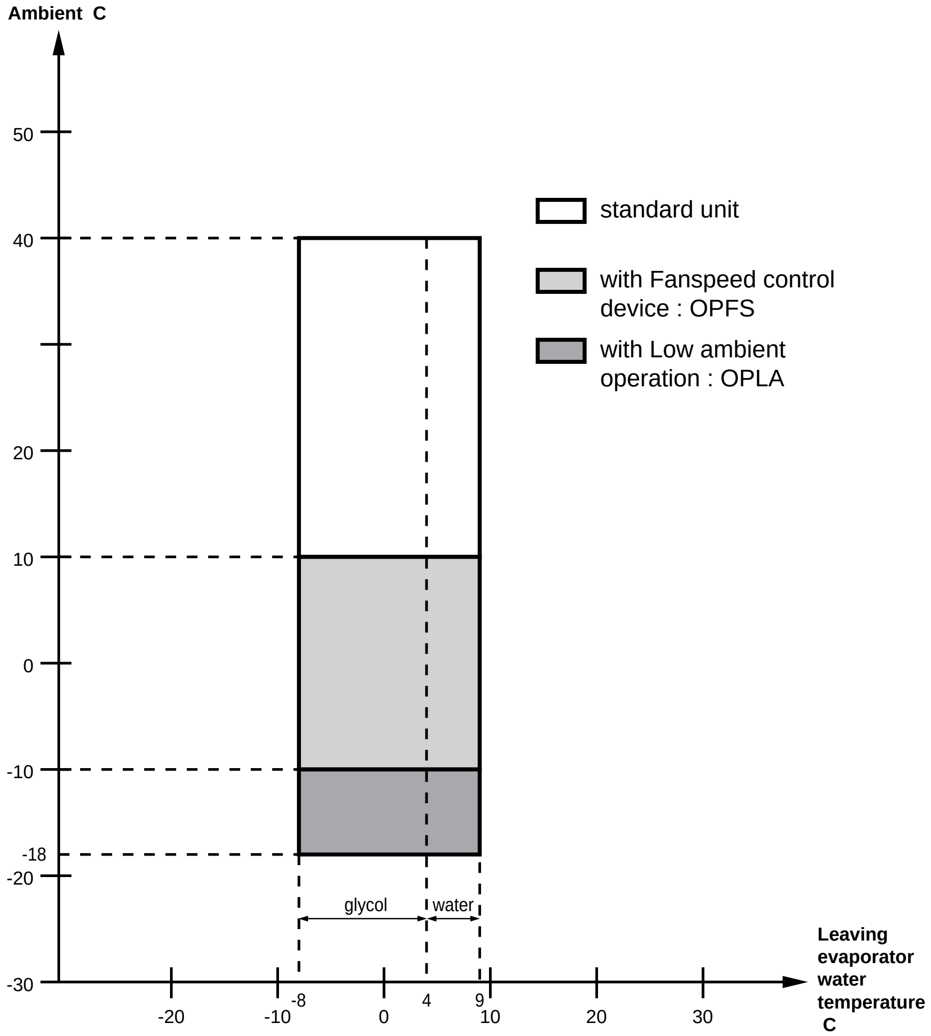
Unit version	EWAD-BJYNN
Max ambient temperature	+44°C
Min ambient temperature	+10°C (1)
Max leaving evaporator water temperature	+9°C
Min leaving evaporator water temperature (without glycol)	+4°C
Min leaving evaporator water temperature (with glycol)	-8°C
Max evaporator ΔT	8°C
Min evaporator ΔT	4°C

Notes (1) When air temperature is lower than +10°C, the fan speed control device (OPFS) should be used. It allows the unit to work with air temperature down to -10°C. Low ambient operation (OPLA) allows to reach -18°C.

1.3 Operational Range: EWAD-BJYNN with option OPRN/OPLN

Operational range

The illustration below shows the operational range of EWAD-BJYNN with option OPRN and EWAD-BJYNN with option OPLN.



Unit version	EWAD-BJYNN
Max ambient temperature	+40°C
Min ambient temperature	+10°C (1)
Max leaving evaporator water temperature	+9°C
Min leaving evaporator water temperature (without glycol)	+4°C
Min leaving evaporator water temperature (with glycol)	-8°C
Max evaporator ΔT	8°C
Min evaporator ΔT	4°C

Notes

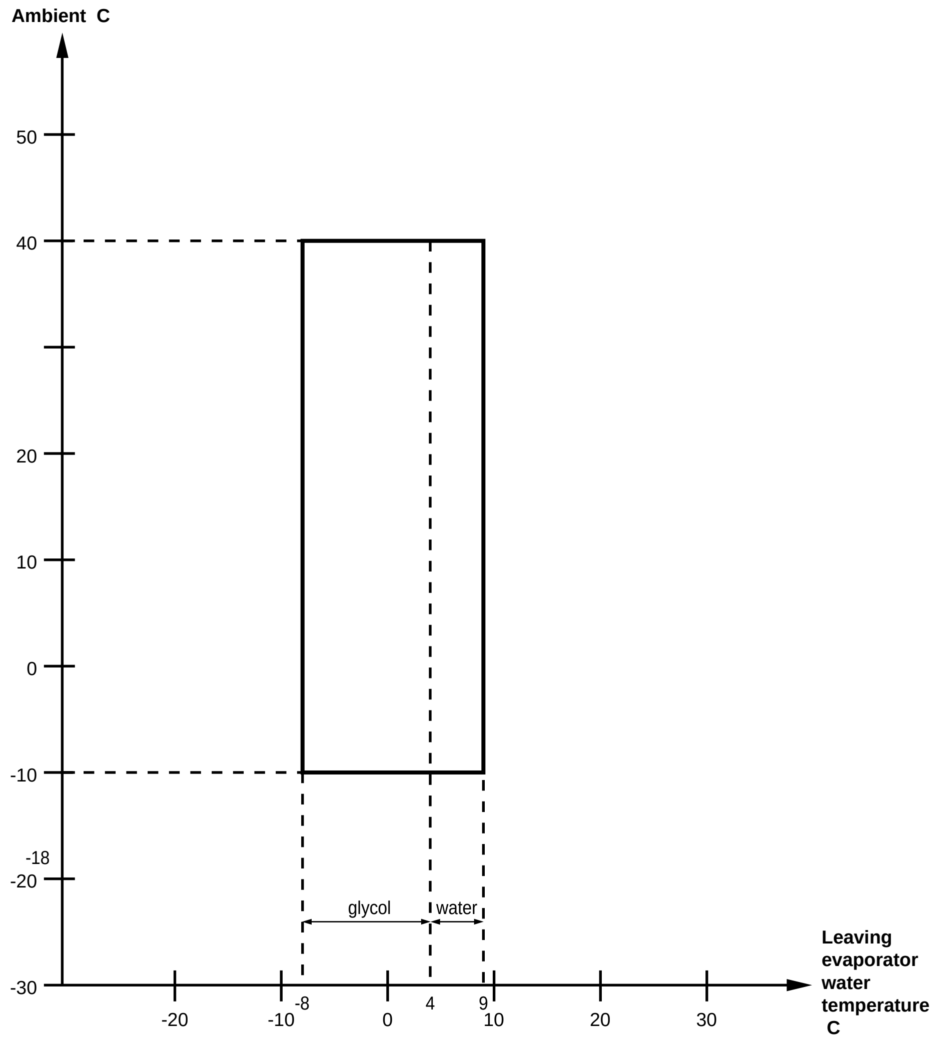
(1) When air temperature is lower than +10°C, the fan speed control device (OPFS) should be used. It allows the unit to work with air temperature down to -10°C. Low ambient operation (OPLA) allows to reach -18°C.

2

1.4 Operational Range: EWAD-BJYNN/Q

Operational range

The illustration below shows the operational range of EWAD-BJYNN/Q.



Unit version	EWAD-BJYNN	
Max ambient temperature	+40°C	(1)
Min ambient temperature	-10°C	(2)
Max leaving evaporator water temperature	+9°C	
Min leaving evaporator water temperature (without glycol)	+4°C	
Min leaving evaporator water temperature (with glycol)	-8°C	
Max evaporator ΔT	8°C	
Min evaporator ΔT	4°C	

Notes

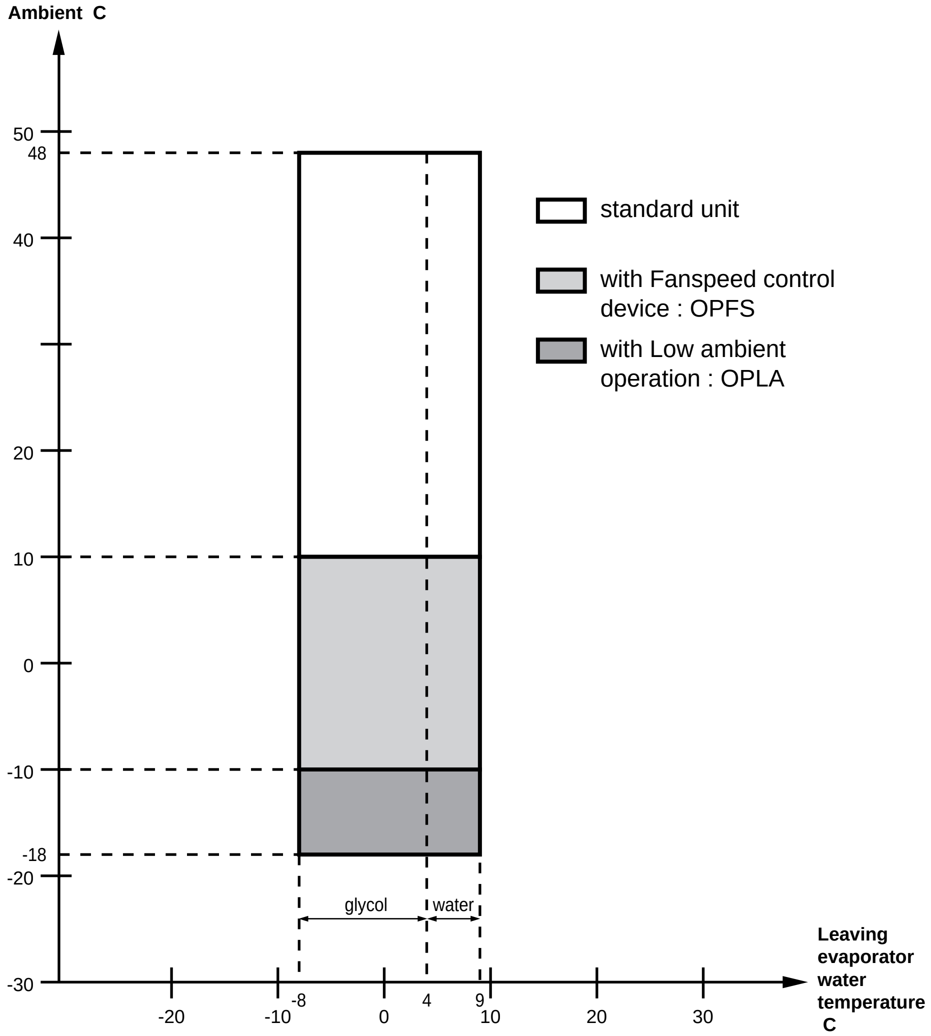
(1) When air temperature is higher than +32°C, the fan speed control device (standard on /Q units) sets up speed rotation increasing cooling capacity and sound pressure level.

(2) Fan speed control device (OPFS) is standard equipment on the /Q units.

1.5 Operational Range: EWAD-BJYNN/A

Operational range

The illustration below shows the operational range of EWAD-BJYNN/A.



Unit version	EWAD-BJYNN
Max ambient temperature	+48°C
Min ambient temperature	+10°C (1)
Max leaving evaporator water temperature	+9°C
Min leaving evaporator water temperature (without glycol)	+4°C
Min leaving evaporator water temperature (with glycol)	-8°C
Max evaporator ΔT	8°C
Min evaporator ΔT	4°C

Notes

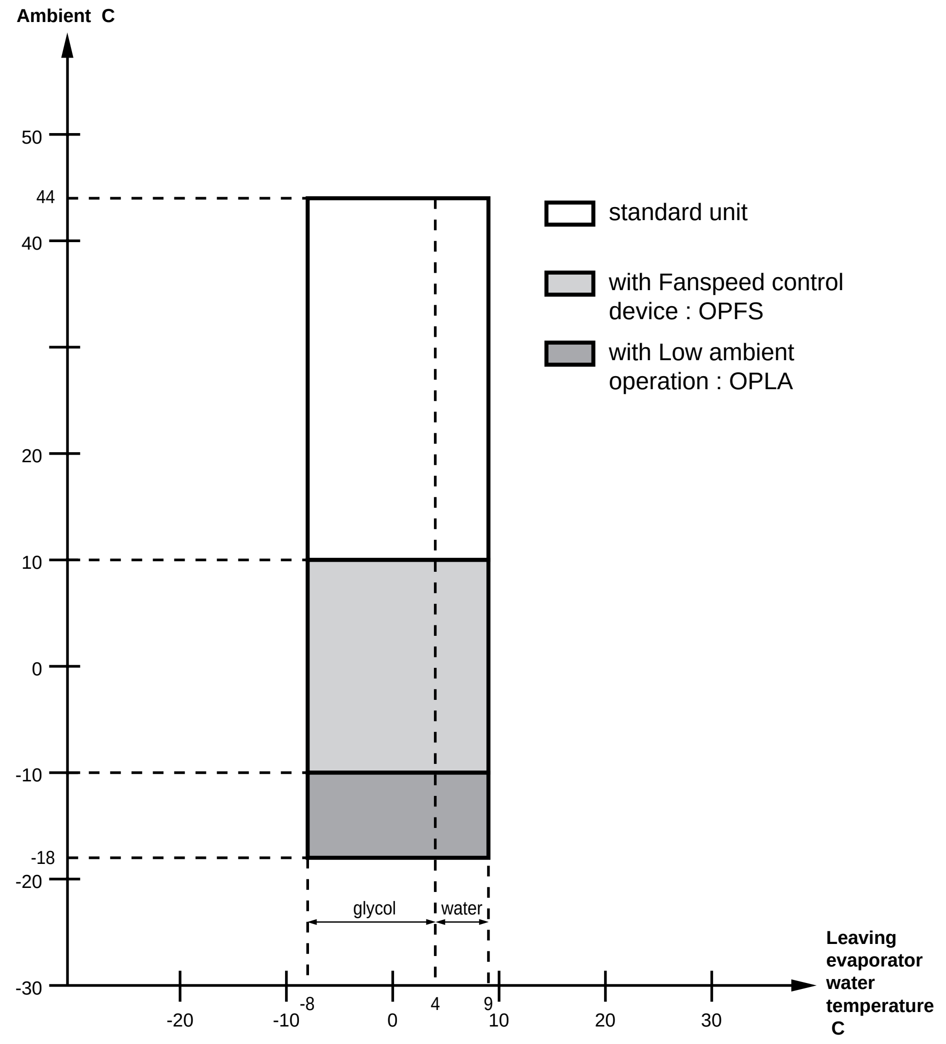
(1) When air temperature is lower than +10°C, the fan speed control device (OPFS) should be used. It allows the unit to work with air temperature down to -10°C. Low ambient operation (OPLA) allows to reach -18°C.

2

1.6 Operational Range: EWAD-BJYNN/A with option OPRN/OPLN

Operational range

The illustration below shows the operational range of EWAD-BJYNN/A with option OPRN and EWAD-BJYNN/A with option OPLN.



Unit version	EWAD-BJYNN	
Max ambient temperature	+44°C	
Min ambient temperature	+10°C	(1)
Max leaving evaporator water temperature	+9°C	
Min leaving evaporator water temperature (without glycol)	+4°C	
Min leaving evaporator water temperature (with glycol)	-8°C	
Max evaporator ΔT	8°C	
Min evaporator ΔT	4°C	

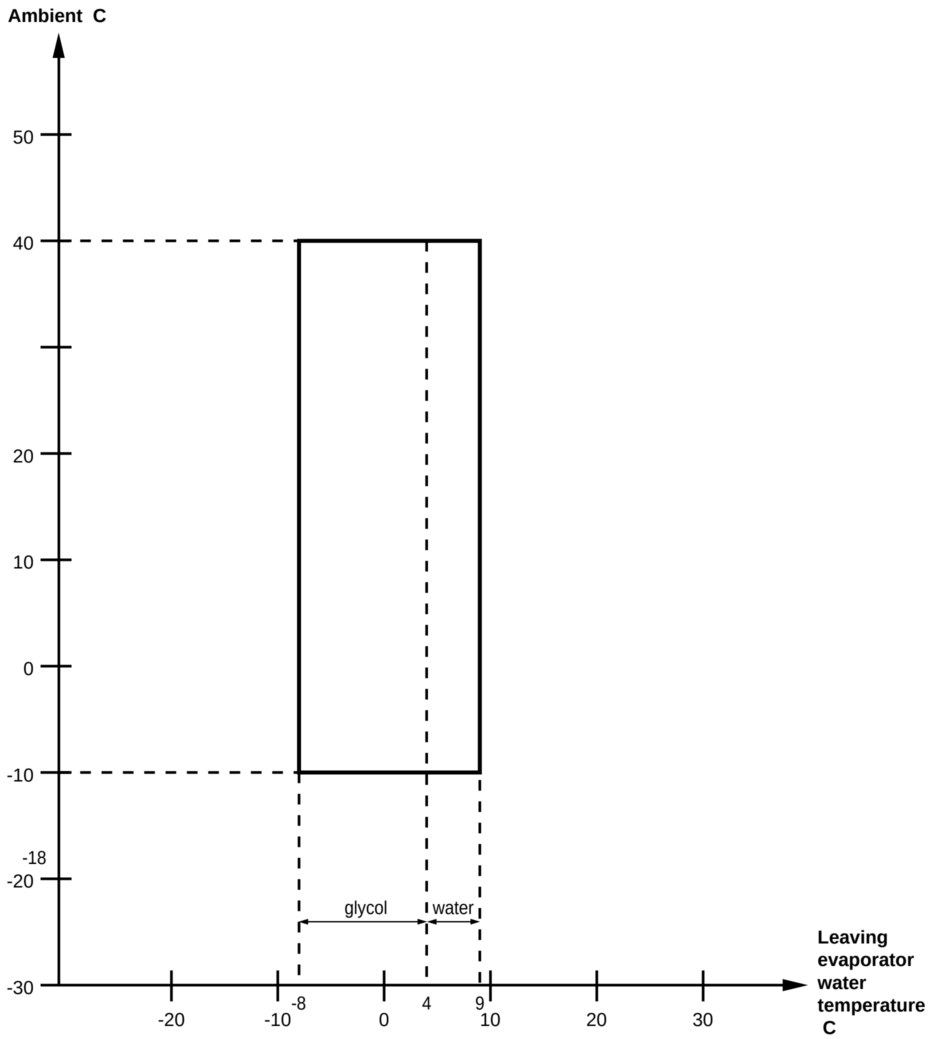
Notes

(1) When air temperature is lower than +10°C, the fan speed control device (OPFS) should be used. It allows the unit to work with air temperature down to -10°C. Low ambient operation (OPLA) allows to reach -18°C.

1.7 Operational Range: EWAD-BJYNN/Z

Operational range

The illustration below shows the operational range of EWAD-BJYNN/Z.



Unit version	EWAD-BJYNN
Max ambient temperature	+40°C
Min ambient temperature	-10°C (1)
Max leaving evaporator water temperature	+9°C
Min leaving evaporator water temperature (without glycol)	+4°C
Min leaving evaporator water temperature (with glycol)	-8°C
Max evaporator ΔT	8°C
Min evaporator ΔT	4°C

Notes

(1) Fan speed control device (OPFS) is standard equipment on the /Z units.

2

2

2 The Digital Controller

2.1 What Is in This Chapter?

Introduction

This chapter gives more detailed information about the controller and the software. Understanding these functions is vital when diagnosing a malfunction, which is related to system architecture or software.

Overview

This chapter contains the following topics:

2.2 System Architecture

General description

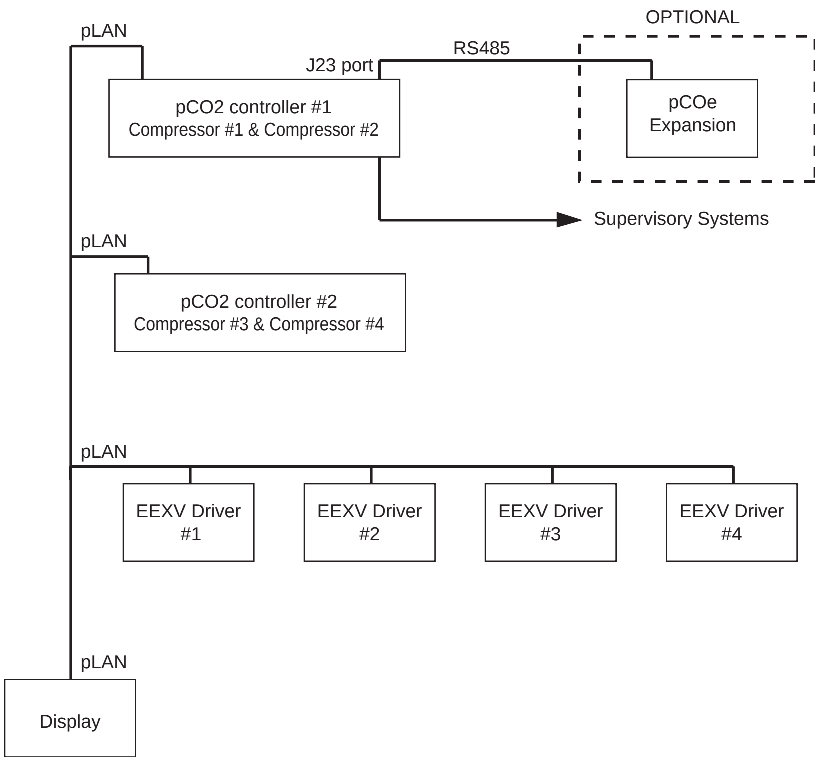
The Microtech II C Plus control panel contains a microprocessor based controller which provides all monitoring and control functions required for the safe, efficient operation of the Chiller. The operator can monitor all operating conditions by using the panel's built in 4 line by 20 character keypad/display or by using an IBM compatible computer running MicroPlant monitor software release 2.0 and later. In addition to providing all normal operating controls, the PlantVisor 1.0 controller monitors all safety devices on the unit and will take corrective action if the chiller is operating of it's normal design conditions. If a fault condition develops, the controller will shut the system down and activate an alarm output. Important operating conditions at the time an alarm condition occurs are retained in the controller's memory to aid in troubleshooting and fault analysis.

The system is protected by a password scheme which only allows access by authorized personnel. A password must be entered into the panel keypad by the operator before any configuration may be altered

Flow chart

The system architecture is based on the use of one PCO² Carel controller to manage two compressors; an additional PCOe expansion board is used to manage economizer when required.

The system is able to control units equipped with electronic expansion valve; in this case the use of an electronic Carel Driver for each valve is required.



2.3 Costumer Interfaces

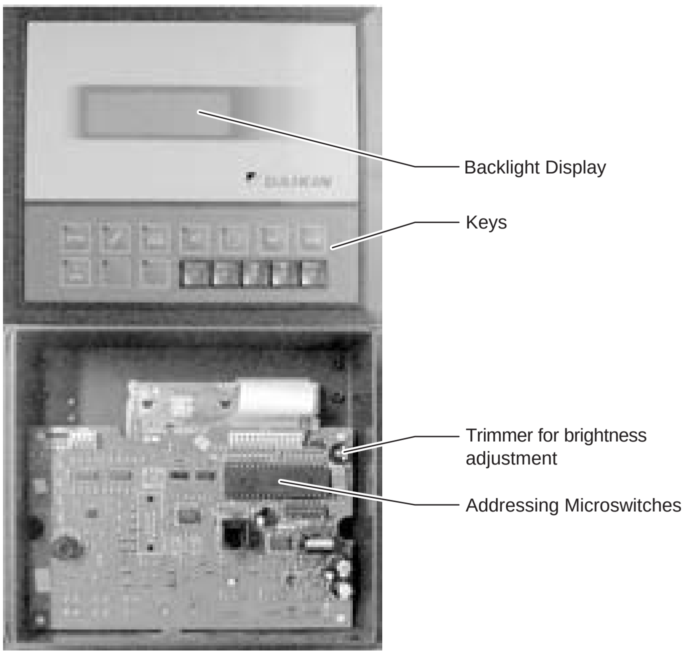
Overview

This chapter contains the following topics:

2.3.1 Control Panel

General description

The Control Panel is constituted by the backlight display 4 line, by 20 character and by the 15 key keypad whose functions will be illustrated in “2.4–Display and Keypad”.

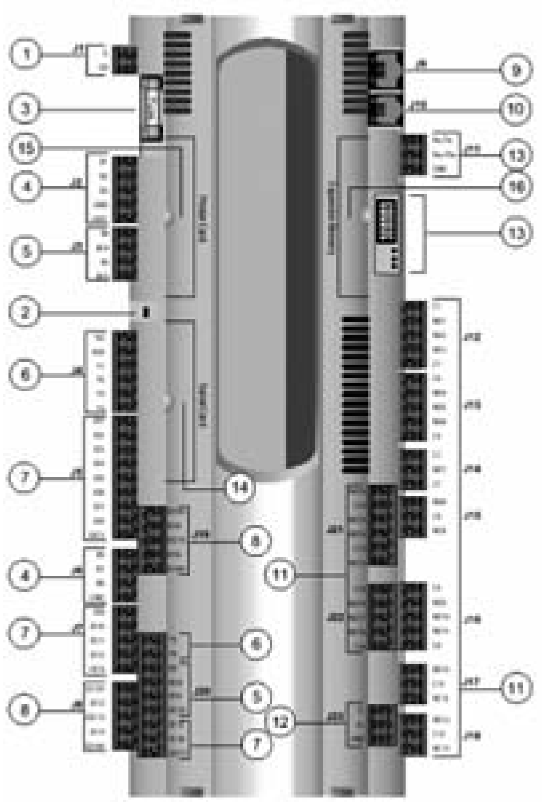


2.3.2 Main board

General description

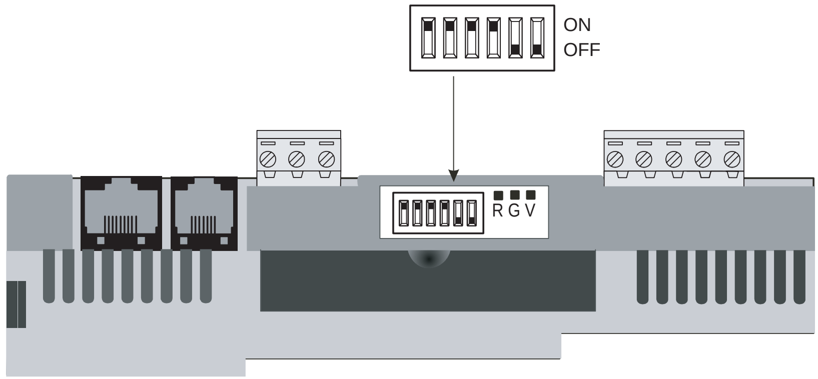
The control board contains the hardware and the software necessary to monitor and to control the unit.

The figure below shows the main board:



1	Power supply G (+), G0 (-)
2	Status LED
3	Fuse 250Vac
4	Universal analog inputs (NTC, 0/1V, 0/10V,0/20mA, 4/20mA)
5	Passive analog inputs (NTC, PT1000, On- off)
6	Analog outputs 0/10V
7	24Vac/Vdc Digital inputs
8	230Vac or 24Vac/Vdc Digital inputs
9	Synoptic terminal connection
10	Standard terminal (and program download) connector
11	Digital outputs (relays)
12	Expansion board connection
13	pLAN connection and microswitches
14	Serial card connection
15	Printer card connection
16	Memory expansion connection

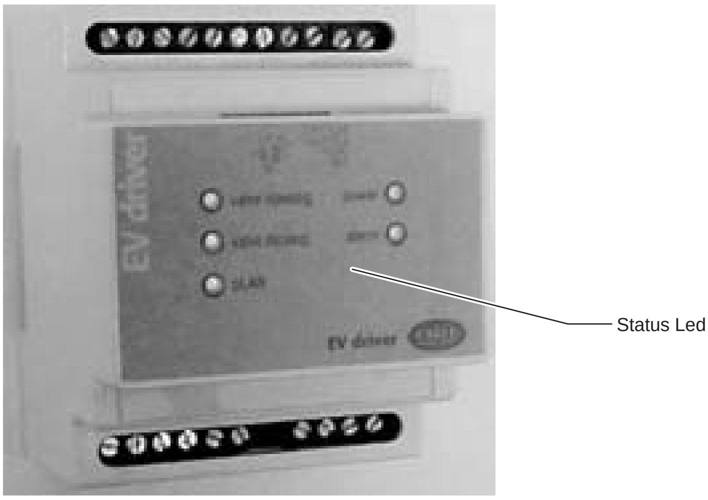
pLAN addressing microswitches



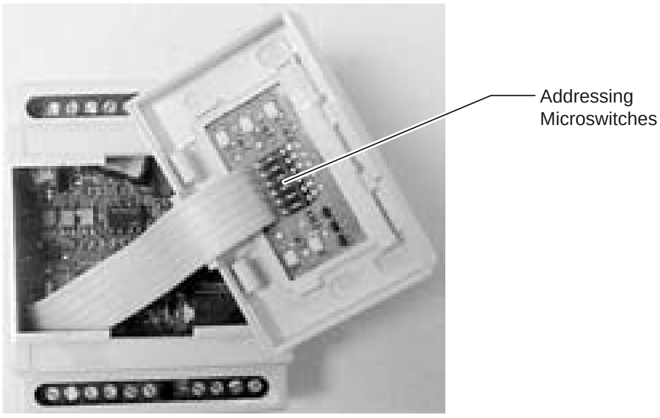
2.3.3 EEXV Valve Driver

General description

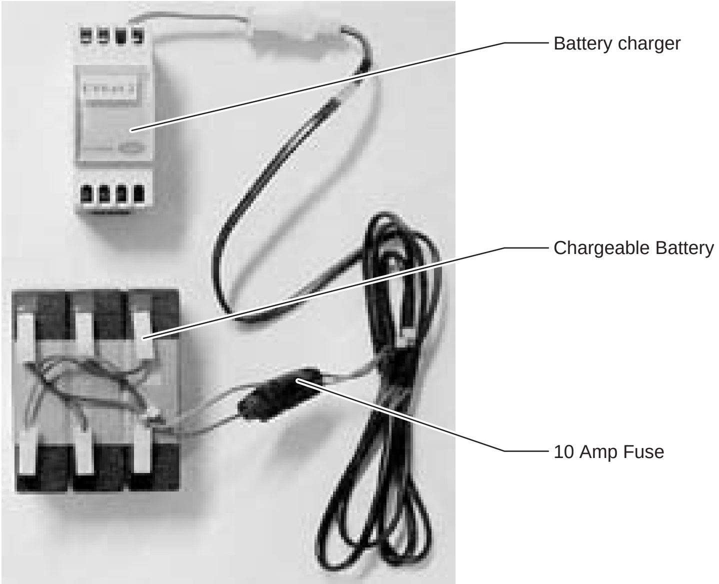
The valve drivers contain the software for the control of the electronic expansion valve and are connected to the battery group, which provides power to close valve in case of power failure.



Inside view driver



Battery assembly



2.3.4 Meaning of the Driver EEXV Status LEDs

Normal conditions

Under normal conditions five(5) LED indicates:

- POWER: (yellow) remains On in presence of supply. Remains Off in case of battery operation
- OPEN: (green) Flashing during the valve opening. On when valve is fully open.
- CLOSE: (green) Flashing during the valve closing. On when valve is fully close.
- Alarm: (red) On or flashing in case of hardware alarm.
- pLAN: (green) On during the normal working of pLAN.

Alarm situations

In presence of critical alarm situations, the combination of the LED's will identify the alarm as shown below. In case more than one alarm is present, the alarm with the highest priority will be visualized. Highest priority is level 7.

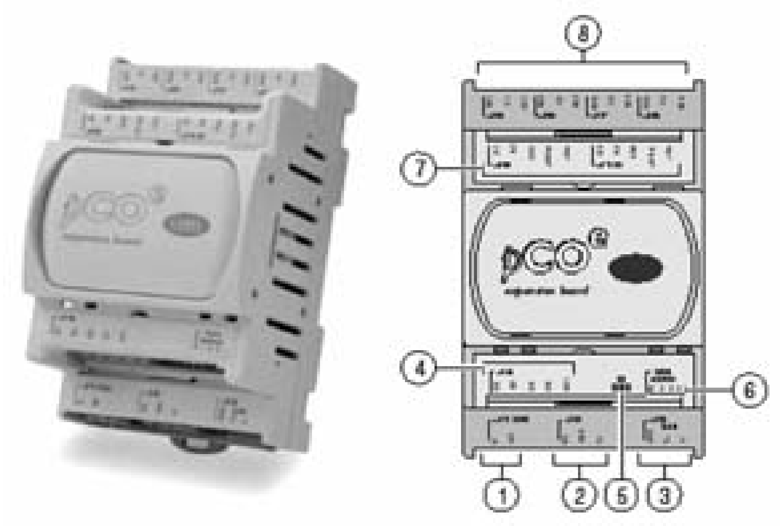
Alarms that stop the system	**PRIORITY**	**LED OPEN**	**LED CLOSE**	**LED POWER**	**LED ALARM**
Eprom reading error	7	Off	Off	On	Flashing
Valve open in case of lack of supply	6	Flashing	Flashing	On	Flashing
At start up, wait for battery loading (parameter……….)	5	Of	On	Flashing	Flashing
Other alarms	**PRIORITY**	**LED OPEN**	**LED CLOSE**	**LED POWER**	**LED ERROR**
Motor connection error	4	Flashing	Flashing	On	On
Probe error	3	Off	Flashing	On	On
Eeprom writing error	2	-	-	On	On
Battery error	1	-	-	Flashing	On

pLAN	**LED pLAN**
Connection OK	On
Driver connection or address error = 0	Off

2.3.5 pCO Expansion

Carel expansion board

The introduction of the Economizer functionality in the software requires the use of Carel expansion board shown in the figure below.

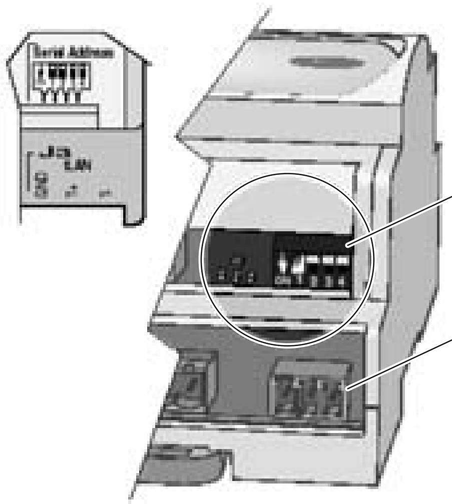


1	Power supply connector (G(+), G0 (-))
2	Analogue output 0 to 10 V
3	Network connector for expansions in RS485 (GND, T+, T-) or tLAN (GND, T+)
4	24 Vac/Vdc digital inputs
5	Yellow LED showing power supply voltage and 3 signalling LEDs
6	Serial address
7	Analogue inputs and probe supply
8	Relay digital outputs

This device needs to be addressed to ensure correct communication with controller via RS485 protocol. Addressing microswitches are placed nearby status LEDs (refer to key 6 inthe figure above). Once the address is correctly set the expansion could be linked with PCO² board #1. The correct connection is achieved connecting J23 pin on board #1 with J3 pin on the expansion board (note that expansion board connector is different from the controller one, but wires must be placed in the same positions of connectors). Expansion boards are only I/O extensions for the controller and don’t need any software.

2

Expansion board lan setup details



As shown in the figure above, expansion boards have only four microswitches to set the net address. For more details on microswitches configuration refer to"2.3.6–Addressing of plan/RS485".

Status LEDs

Three status LEDs are present, their status represents different statuses of the expansion board.

RED	YELLOW	GREEN	Meaning
-	-	ON	Active CAREL/tLAN supervisor protocol
-	ON	-	Probe error
ON	-	-	"I/O mis-match" error caused by the inhibition matrix
flashing	-	-	Lack of communication
-	-	-	Waiting for the system startup by the master (max. 30 s)

2.3.6 Addressing of plan/RS485

To get the correct functionality of the pLAN net system, it is necessary to address correctly all the installed components. Each component, as previously described, has a series of microswitches that must be set as specified in the following table.

pLAN component	**Microswitch**					
	1	**2**	**3**	**4**	**5**	**6**
Local DISPLAY	**ON**	**ON**	**ON**	OFF	OF	OFF
Remote DISPLAY (if available)	OFF	OFF	OFF	**ON**	OFF	OFF
COMP. BOARD #1	**ON**	OFF	OFF	OFF	OFF	OFF
COMP. BOARD #2	OFF	**ON**	OFF	OFF	OFF	OFF
DRIVER EXV #1	**ON**	**ON**	OFF	OFF	OFF	OFF
DRIVER EXV #2	OFF	OFF	**ON**	OFF	OFF	OFF
DRIVER EXV #3	**ON**	OFF	**ON**	OFF	OFF	OFF
DRIVER EXV #4	OFF	**ON**	**ON**	OFF	OFF	OFF
RS485 component	**Microswitch**					
	1	**2**	**3**	**4**		
EXP. BOARD #1	**ON**	OFF	**ON**	OFF		

2.4 Display and Keypad

Overview

This chapter contains the following topics:

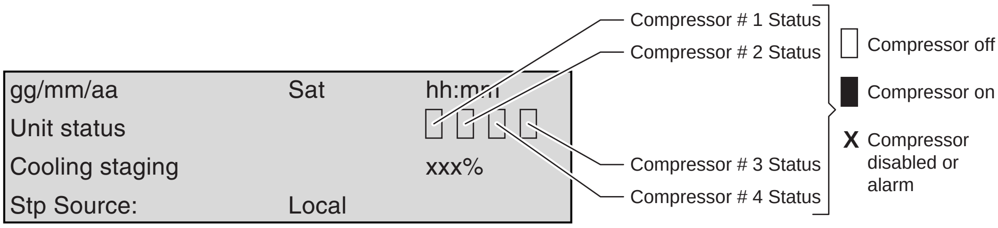
2.4.1 General Description

Introduction

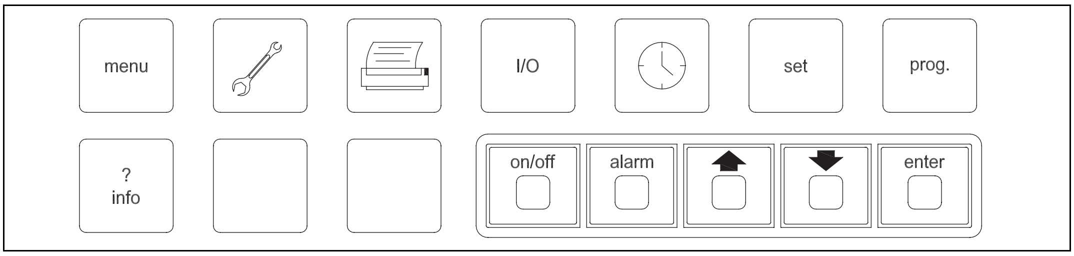
The display and the keypad are the main elements of the interface between the operator and the unit. All the operational conditions, the alarms and the setpoints can be monitored with this display and all the values of setpoint can be modified though the keypad.

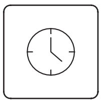
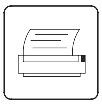
Description

The keypad MicroTech II constitutes 15 keys of access to the operational conditions of the unit and to the functions of the program.



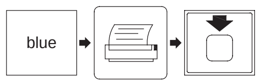
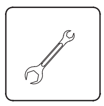
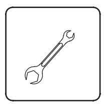
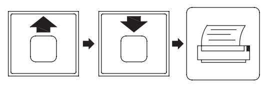
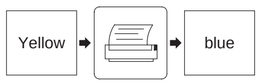
2.4.2 Keypad Keys and their Functions



prog.	User parameters, by password it is possible to set the following parameters: ➤ Setpoints reset parameters ➤ Enable double setpoint ➤ Soft load parameters ➤ Unit load limiting parameters ➤ Compressor sequencing logic ➤ Fan Silent Mode values ➤ Main pump timing ➤ Digital and supervisor inputs enabling ➤ Auto restart after power failure and external alarm behaviour ➤ Time scheduling ➤ Supervisor communication parameters ➤ Interface language
set	Setpoints adjustment within the limits set under maintenance password
	Date and time setting
I/O	Input/Output and corresponding circuit functions visualization
 (=print)	Print (not available)

(=maint)	Maintenance parameters; by Password it is possible to set the following parameters : ➤ Hour and start counters reset ➤ Water regulation parameters ➤ Condensation regulation parameters ➤ Setpoint limits ➤ Probes enabling ➤ Probes offset
menu	It allows to visualize the main menu
? info	It allows the passage from a control board to the other one (visualizing parameters of corresponding compressors, more precisely compressors # 1 and # 2 for board # 1 and compressors # 3 and # 4 for board # 2)
on/off	Key On/Off unit
alarm	It indicates the presence of possible anomalies and their causes
(=up)	It allows the passage to the previous display screen
(=down)	It allows the passage to the next display screen
enter	It enables the set values

Using the keypad it is possible to access the different sections of the program. In particular there are 9 screen categories, shown in the following table with the keys to use to access them and with the type of operation they allow.

Category	Description	Keys	Password
Main	Operating parameters access (output)	menu	NO
User	Parameters setting by user (input)	prog.	0003
Setting	Setpoint setting (input/output)	set	NO
Input/Output	Compressors working parameters display (output)	I/O	NO
Manufacturer	Manufacturer parameters setting (input)	menu + prog.	
EXV Setting	EXV working parameter settings (input)	menu + prog.	0013
Maintenance Output	Maintenance parameter access (output)		NO
Maintenance Input	Maintenance parameter access (input)		
Service	Service (input)	menu + 	
Alarm	Alarms (output)	alarm	NO
Alarm history	Storage of last 10 alarms (output)	menu + alarm	NO

2.4.3 Main Menu

Operational information

Using this menu you can read the operational information, such as the cooling setpoint, the inlet and outlet water temperatures, the circuit status, etc.

Key :	menu
Password :	NO
Switching between control board # 1 and # 2 :	? info

Main screen 1

This screen shows information about the compressor status, unit status and setpoint.

DD/MM/YY	Sat	hh/mm
Unit status:		□ □ □ □
Cooling staging		xx%
Stp Source:	Local	

Line 1 gives current date and time

Line 2 gives the compressor status :

- □ Compressor OFF
- ■ Compressor ON
- x Compressor disabled or alarm

Line 3 gives the unit status in percent with the following possibilities :

- **Cooling staging xx%**
- **Off Alarm** : Unit OFF for alarm
- **Off Rem Comm** : Unit OFF by remote communication (supervisor or BMS)
- **Off Time Schedule** : Unit OFF by time schedule
- **Off Loc/Remote Sw** : Unit OFF through switch
- **Off Keypad** : Unit OFF through keypad (key on/off)
- **Waiting Flow** : Unit ON waiting for evaporator water flow
- **Waiting Load** : Unit ON without compressors working because not required by load
- **No comps available** : Unit ON with no compressors available for automatic management (compressor switch OFF or alarm or in manual mode)
- **FSM Operation** : Unit working in Fan Silent Mode

2

Line 4 gives the setpoint origin :

- **STP Source** : Local
  : Double
  : 4-20 mA
- **Soft Load** : xx min (remaining soft load time)

Unit limiting

This screen is only visible when unit limiting (demand limit) is enabled in the user menu.

Unit Limiting	
Demand Limit	xx%

- **Demand Limit** : Read-out of the selected capacity limitation according to the supplied 4-20 mA signal.

Water temperatures

This screen shows the water temperatures.

Water Temperatures	
ENT Evap =	00.0˚C
LVG Evap =	00.0˚C

- **ENT Evap** : Entering water temperature
- **LVG Evap** : Leaving water temperature (common leaving water if 2 evaps. are present)

Compressor status

This screen shows the compressor status.

Comp. # 01	
Status :	Off Ready

Possible status :

- ➤ **Off Alarm** : Compressor OFF for alarm
- ➤ **Off Switch** : Compressor OFF by local switch
- ➤ **Off Ready** : Compressor OFF ready to start
- ➤ **Oil Heating** : Compressor waiting for oil heating
- ➤ **Manual Off** : Compressor disabled by keypad
- ➤ **Recycle Time** : Compressor waiting for timing
- ➤ **Starting** : Compressor starting
- ➤ **Pre Purge** : Compressor unloading at starting
- ➤ **Auto xx%** : Automatic control of compressor with percent load
- ➤ **Manual xx%** : Manual control of compressor with percent load
- ➤ **Downl.** : Compressor download before stop
- ➤ **Pumping down** : Compressor pump down

Refrigerant pressures

This screen shows the high and low pressure of this circuit.

Evap Press =	00.0 bar g
Evap Temp =	00.0 ˚C
Cond Press =	00.0 bar g
Cond Temp =	00.0 ˚C

- ➤ **Evap Press** : Evaporating Pressure
- ➤ **Evap Temp** : Evaporating Temperature
- ➤ **Cond Press** : Condensing Pressure
- ➤ **Cond Temp** : Condensing Temperature

2

Refrigerant temperatures

This screen shows the refrigerant temperatures.

Suction Temp =	00.0 ˚C
Suct Superheat =	00.0 ˚C
Deliv Superheat =	00.0 ˚C
Valve Position =	0000

- **Suction Temp** : Suction Temperature
- **Suct Superheat** : Suction Superheat
- **Deliv Superheat** : Discharge Superheat
- **Valve Position** : Position of the electronic expansion valve
  - **0** : Fully closed
  - **2600** : Fully open (Alco EXV8)

Load request

This screen shows the load request of this circuit.

Staging Up	☐
Staging Down	☐
Staging Fixed	☐
Compressor Off	■

- **Staging Up** : PID requests a load up of this circuit
- **Staging Down** : PID requests a load down of this circuit
- **Staging Fixed** : No actions are needed
- **Compressor Off** : Compressor is switched off

Comp 2 information

The following screens will appear for compressor 2 (see previous screens)

- Compressor status
- Refrigerant pressures
- Refrigerant temperatures
- Load request

Water temperatures

If 2 evaporators are present, you can scroll between circuits 1, 2 (evap 1) and circuits 3, 4 (evap 2) with the info button.

When you press the info button, the following screen will appear, showing the leaving water temperature of each evaporator:

Water Temperatures	
LVG Evap 1 =	00.0˚C
LVG Evap 2 =	00.0˚C

- **LVG Evap 1** : Leaving water temperature of evaporator 1
- **LVG Evap 2** : Leaving water temperature of evaporator 2

Comp 3 and 4 information

The following screens will appear for compressor 3 and compressor 4 (if present in the unit)

- Compressor status (see page 2–29)
- Refrigerant pressures (see page 2–29)
- Refrigerant temperatures (see page 2–30)
- Load request (see page 2–30)

2.4.4 User Menu

Operational information

Using this menu you can enable or disable additional function in the unit.

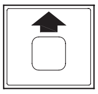
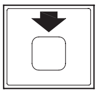
Key : prog.

Password : 0003

Remark : User menu is present in control board # 1 only.

Press the program button to go to the user menu. The following screen will appear:

Insert
User password
0000

- Press enter and the cursor will move to the first field of the password.
- Pressing  or  will increase the value from 0 to 9999.
- Press enter to confirm password.

Setpoint reset

This screen allows you to enable/disable the setpoint reset.

Lvg Water Temp.
Setpoint Reset
None

Possible Settings :

- **None**
- **OAT** : Setpoint reset with ambient temperature
- **4-20mA** : Setpoint reset with external signal
- **Return** : Setpoint reset with entering water temperature

2

Setpoint reset 4-20mA

This screen is only visible when setpoint reset : 4-20mA is selected.

This screen allows you to set the parameters used for the 4-20mA setpoint reset (see page 2–32).

chLWT Setpoint	
Override Limits	
Set. diff	3.0 ˚C

Setpoint reset return

This screen is only visible when setpoint reset return is selected.

This screen allows you to set the parameters used for the setpoint reset (see page 2–32).

chLWT Return Reset	
Start DT	03.0 ˚C
Max Reset	03.0 ˚C

Double setpoint

This screen allows you to enable/disable double setpoint.

Enable Double	
Setpoint	N/Y

When this function is enabled additional screen will appear in the setting menu.

Soft load

This screen allows you to enable/disable the soft load function.

When soft load is enabled, Line 2 and 3 will appear.

Enable Soft Load	Y
Max Stage	50 %
Max Time	020 min

This screen allows you to set the parameters used for the soft load function (see page 2–42).

Unit limiting

This screen allows you to enable/disable the unit limiting function.

Unit Limiting
None

Possible settings :

- **None**
- **Demand Limit** : Unit limiting with external signal
- **Current Limit** : Only available on SPN unit
- **Superv. Demand** : Unit limiting with external signal coming from BMS system
- **Superv. Current** : Unit limiting with external signal coming from BMS system

Unit limiting current limit / Superv. current limit

This screen is only visible when current limit or superv. current limit is selected.

Current Limit Set	
4m A	000 A
20 mA	400 A
Max Curr.	300 A

This function is only available on SPN units (special request).

Compressor sequencing

This screen allows you to set the compressors sequencing.

Compressors
Sequencing
Auto

Possible settings :

- **Auto** : Automatic rotation according to the running hours of each compressor
- **Manual** : Manual set sequence for each compressor stage

Manual compressor sequencing

This screen is only visible when manual compressor sequencing is selected.

This screen allows you to set the sequence of the compressors. When selected the sequence is fixed and the controller will no longer look for the running hours of each compressor.

Set Compressor Stage			
C # 1	1st	C # 2	2nd
C # 3	3rd	C # 4	4th

Pump lead time

This screen allows you to set the time between the main pump and the compressor start.

```
Time  Between  Main
Pump  /  Fan  and  Comp.
Start
                                        030  s
```

- **Time 30s** : Pump lead time, the pump will operate for 30 seconds (changeable) before the compressor can start

Pump lag time

This screen allows you to set the delay on switching off the pump.

```
Delay  on  Switching
the Main Pump Off

                                        180  s
```

- **Delay 180 s** : Pump lag time, the pump will operate for another 180 seconds (changeable) when the unit is requested to shut down (local / remote / thermostat)

Supervisory remote

This screen allows you to enable/disable supervisory remote on/off function.

```
Supervisory Remote
On / Off                                N
```

- **N** : The unit will be controlled on/off by local/remote switch/keypad
- **Y** : Allows supervisor or BMS to control the on/off function of the unit

Auto restart

This screen allows you to enable/disable the auto restart after power failure.

```
Autorestart  After
Power  Failure                          Y
```

- **N** : After a power failure, the unit will not automatically restart
- **Y** : After a power failure, the unit will automatically restart

2

External alarm

This screen allows you to enable/disable the external alarm function.

Switch Off Unit		
On External	Alarm	Y
Reset Type	Auto	

- **External Alarm** :
  - **N** : External alarm is disabled
  - **Y** : An external alarm signal (open closed contact) can be used to switch off the unit (external alarm)
- **Reset Type** :
  - **Auto** : When the external alarm signal is reset (closed contact), the controller will reset and restart the unit.
  - **Manual** : When the external alarm signal is reset (closed contact), the controller will not reset the alarm. A manual reset on the controller is needed to reset the unit.

Time scheduling

This screen allows you to enable/disable the time schedule.

Enable Time	
Scheduling	Y

- **N** : Time scheduling is not used
- **Y** : Time scheduling is enabled, additional screens will appear

This screen allows you to enter the start and stop time of the unit.

	Start	Stop
Mon - Fri	00:00	23:59
Sat	00:00	23:59
Sun	00:00	23:59

This screen allows you to enter the holidays (unit will not operate on these days).

	Holidays		(1) or (2)
00/00		00/00	00/00
00/00		00/00	00/00
00/00		00/000	00/00

Remark : To enter the date, please enter first the day and second the month. Example : 31/01

Communication

This screen allows you to select the supervisory communication.

Communication Supervisor

Possible settings :

- **Supervisor** : A supervisor (BMS) system will be used to control the chiller
- **CSC** : The option EKDICN will control the chiller

Communication CSC

These screens are only visible when CSC communication is selected.

This function can only be used when the EKDICN is installed.

Communication	CSC
On Comm Loss	Local/Alarm

- **Local** : When communication is lost, the chiller will operate with local settings
- **Alarm** : When communication is lost, the chiller will go into alarm

This screen allows you to set the identification number of the chiller.

Protocol :	
Supervisor Com. Speed	
Identificat. No. :	001

2

Communication supervisor

This screen is only visible when supervisor communication is selected.

Protocol : CAREL
Supervisor Com Speed
19200 (RS485 only)
Identificat. No. : 001

➤ **Protocol** :

CAREL	:	For BACnet communication (with gateway)
LONWORKS	:	Direct communication to BMS (Xif pre-loaded)
MODBUS	:	Direct communication to BMS
MODEM	:	

➤ **Com speed** :

19200	:	RS485 only
9600	:	RS485 only
4800	:	RS485 / RS422
2400	:	RS485 / RS422
1200	:	RS485 / RS422

➤ **Identification No** : Number (address) of the chiller in the BMS system

Language

This screen allows you to select the language of the controller.

Choose Language
ENGLISH

➤ Possible settings :

- **ENGLISH**
- **FRENCH**
- **GERMAN**
- **ITALIAN**
- **SPANISH**

Change user password

This screen allows you to change the user password.

Change User Password
0000

2.4.5 Setting Menu

Operational information

Using this menu it is possible to set and display the setpoint values.

Key : set

Password : NO

Remark : Setting menu is only present on control board # 1.

Cooling setpoint

This screen allows you to change the cooling setpoint. The setpoint can be selected between the chilled water setpoint limits as specified in the maintenance menu.

```
Cooling Setpoint                07.0 ˚C
```

Double setpoint

This screen is only visible when the function double setpoint is enabled in the user menu.

This screen allows you to change the cooling double setpoint. The setpoint can be selected between the chilled water setpoint limits as specified in the maintenance menu.

```
Cooling Double Setpoint         04.0 ˚C
```

Actual setpoint

This screen shows the actual cooling setpoint.

```
Actual Setpoint Cooling         08.5 ˚C
```

This actual cooling setpoint is the cooling setpoint of the unit at the moment.

This actual cooling setpoint will change if local or dual setpoint is selected or if setpoint is reset.

2

2.4.6 Input / Output Menu

Operational information

Using this menu you can read the inputs and outputs from the controller, software information and EEV driver information.

Key : I/O

Password : NO

Switching between control board # 1 and # 2 : ? info

I/O expansion board

The screens below are only visible when the unit has economizer (units /A and /Z).

These screens show you the status of the digital output of the I/O expansion board.

I/O Exp E		
DO 1 : Economizer	# 1	N
DO 2 : Economizer	# 2	N

I/O Exp E		
DO 3 : Economizer	# 3	N
DO 4 : Economizer	# 4	N

- **N** : Economizer of this circuit is not active
- **Y** : Economizer of this circuit is active

Software

This screen shows the software version installed in the controller.

	Code :	Air
V. 21.307		13/10/06

Digital inputs and outputs

This screen shows the status (O = open, C = closed) of the digital inputs and outputs.

Digital Inputs
C C C C C C C C C C C C C C C C C C C C C C
Digital Outputs
O O O O O O O O O O O O O O O O O O O O O O

2

Analog inputs

These screens show you the values of the analog inputs.

Analog Inputs :		
B1 :	Oil pr. 1	00.0 bar
B2 :	Oil pr.2	00.0 bar

- ➤ **B1** : Oil pressure of compressor circuit 1
- ➤ **B2** : Oil pressure of compressor circuit 2

Remark : The oil pressure is measured by a pressure transducer connected to the oil supply chamber of the compressor.

Analog Inputs :		
B3 :		00.0 mA
B4 :	Del. Tem. 1	00.0 ˚C
B5 :	Del. Tem. 2	00.0 ˚C

- ➤ **B3** : Read-out of the external signal used for setpoint reset (4-20 mA)
- ➤ **B4 Del. Tem. 1** : Oil temperature (delivery temperature) of circuit 1
- ➤ **B5 Del. Tem. 2** : Oil temperature (delivery temperature) of circuit 2

Remark : The oil temperature (delivery temperature) is measured in the oil separator with a PT1000 sensor.

Analog Inputs :		
B6 :	Cond Pr. 1	00.0 bar
B7 :	Cond Pr. 2	00.0 bar
B8 :		00.0 mA

- ➤ **B6** : Condensing pressure of circuit 1
- ➤ **B7** : Condensing pressure of circuit 2
- ➤ **B8** : Read-out of external signal used for demand limit (4-20 mA) or current limit if unit is SPN unit.

Remark : The condensing pressure is measured by a pressure transducer connected to the oil separator (B8).

Analog Inputs :		
B9 :	In Wtr	00.0 ˚C
B9 :	Out Wtr	00.0 ˚C

- ➤ **B9** : Inlet water temperature, measured in the inlet of the evaporator 1
- ➤ **B10** : Outlet water temperature, measured in the outlet or common outlet (of evap 1 and 2) if unit has 2 evaporators

If consulting this screen or controller # 2 :

- **B9 : O W ev1** : Outlet water temperature of evaporator 1
- **B10 : O W ev2** : Outlet water temperature of evaporator 2

Analog outputs

These screens show you the value of the analog outputs (VFD output signal).

Analog Outputs :	
Y1 :	00.0 V
Y2 :	00.0 V

- **Y1** : Read-out of the VFD output signal of circuit # 1
- **Y2** : Read-out of the second VFD output signal of circuit # 1

Remark : Y1 and Y2 are used only if unit has VFD fans.

Analog Outputs :	
Y4 :	00.0 V
Y5 :	00.0 V

- **Y4** : Read-out of the VFD output signal of circuit # 2
- **Y5** : Read-out of the second VFD output signal of circuit # 12

Remark : Y4 and Y5 are used only if unit has VFD fans.

Soft load

This screen is only visible when soft load function is enabled.

This screen shows you the parameters of the soft load function.

Soft Load	Off
Max Stage	50 %
Rem. Time	000 min
Max Time	020 min

- **Soft Load** :
  - **Off** : Soft load is not active
  - **On** : Soft load is active
- **Max Stage** : Max unit capacity during the soft load function
- **Rem. Time** : Remaining time that the soft load function is active
- **Max Time** : Time of the soft load function

Boot / Bios info

This screen shows you the Boot and Bios of the software.

Bios Version	003.64
Bios Date	18/05/05
Boot Version	003.01
Boot Date	15/04/02

Driver firmware version

These screens show you the EEV driver hardware and software version.

Driver Firmware Version	C : 1
H.W.	000
S.W.	000

- **C : 1** : Driver firmware version of circuit # 1
- **H.W.** : Hardware version of the EEV driver
- **S.W.** : Software version of the EEV driver

Driver Firmware Version	C : 2
H.W.	000
S.W.	000

- **C : 2** : Driver firmware version of circuit # 2
- **H.W.** : Hardware version of the EEV driver
- **S.W.** : Software version of the EEV driver

I/O parameters for control board # 2 (comp 3 and 4)

If the compressor 3 or 4 are present, you can scroll between control board # 1 (comp 1 and 2) and control board # 2 (comp 3 and 4) with the info button.

When you press the info button, the following screens will appear for control board # 2 :

- Software (see page 2–40)
- Digital inputs and outputs (see page 2–40)
- Analog inputs (see page 2–41)
- Analog outputs (see page 2–42)
- Boot / Bios info (see page 2–43)
- Driver firmware version (see page 2–43)

2.4.7 Manufacturer Menu

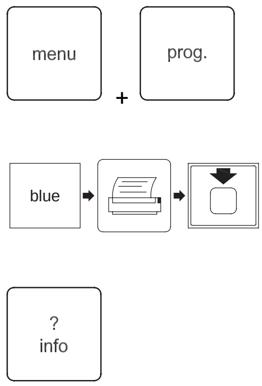
Operational information

Using this menu you can set all manufacturer data. Password is required to enter this menu. The parameters can only be modified by trained individuals.

Key :

Password :

Switching between control board # 1 and # 2 :



Warning : Improper setpoints or values can cause erratic chiller operation and damage to the chiller. Please use caution whenever changing setpoints or values.

Expansion valve type

This screen allows you to select the expansion valve type.

Expansion Valve	
Electronic Gas Type	– – – –

Possible settings :

- **Electronic**
- **Thermostatic** (not used)

Economizer setting

This function is only used on EWAD-BJYNN/A and EWAD-BJYNN/Z.

This screen allows you to enable/disable the economizer.

En. Economizer	N/Y
Economizer On	090 %
Economizer Off	075 %

- When **N** is selected, the economizer function is disabled. (EWAD-BJYNN and EWAD-BJYNN/Q)
- When **Y** is selected, the economizer function is enabled. (EWAD-BJYNN/A and EWAD-BJYNN/Z)
- When **En. Economizer Y** is selected, line 3 and line 4 will appear.
- **Economizer on** : economizer activation point
- **Economizer off** : economizer switch off point

2

Economizer motor protection

This function is used only in EWAD-BJYNNA/A and EWAD-BJYNN/Z.

This screen allows you to set the economizer motor protection settings.

Economizer Motor Protection	
Setp	065.0 ˚C
Diff	05.0 ˚C

- ➤ **Motor protection setp.** : Economizer function is disabled when saturated discharge temperature gets above setpoint
- ➤ **Motor protection diff.** : Economizer function is allowed again when saturated discharge temperature gets below setp. – diff.

Temp regulation

This screen allows you to set the settings of the PID regulation.

Temp. Regulation	
Integral Time	200 s
Derivative Time	060 s

Integral time and derivative time are used by the PID regulation to calculate the actions needed to reach the setpoint.

Unit configuration

This screen allows you to set the compressor / unit configuration.

Compressors Config.	
N. of Compressors	4
N. of Evaporators	2

- ➤ **N. of Compressors** : Number of compressors in the unit
- ➤ **N. of Evaporators** : Number of evaporators in the unit. This line is visible only when number of compressors is >2.

Compressor timers

These screens allow you to set the compressor timers.

Min T between some	
Comp. Start	0600 s
Min T between diff.	
Comp. Start	0120 s

Min Time Compressor	
ON	0120 s
Min Time Compressor	
OFF	0180 s

2

Interstage timer

This screen allows you to set the interstage time and the double pulse setpoint.

Interstage Time	0210 s
Double Pulse Under	035 %

- ➤ **Interstage Time** : Interstage time used for temperature regulation
- ➤ **Double Pulse under** : Double load pulses are given below setpoint

Pressure safety prevention

These screens allow you to set the high and low pressure safety preventions.

Cond. P. Hold	016.5 bar
Cond. P. Down	017.5 bar
Cond. P. Hold	001.5 bar
Cond. P. Down	001.3 bar

- ➤ **Cond. P. Hold** : Condenser pressure hold capacity
- ➤ **Cond. P. Down** : Condenser pressure load down
- ➤ **Evap. P. Hold** : Evaporator pressure hold capacity
- ➤ **Evap. P. Down** : Evaporator pressure load down

High discharge alarm

This screen allows you to set the discharge temperature alarm setpoint.

Disch Temp Alarm	
Setpoint	110.0 ˚C

Remark : discharge temperature = delivery temperature (PT1000 sensor in oil separator)

Flow switch alarm

This screen allows you to set the flow switch alarm delay timers.

Evaporat. Flow Alarm Delays	
Start-Up Delay	20 s
Run Delay	05 s

- ➤ **Start-Up Delay** : When the flow switch is not closed for 20 seconds (default) during pump lead time, alarm will be displayed
- ➤ **Run Delay** : When the flow switch is not closed for 5 seconds (default) during operation of the unit, alarm will be displayed

2

Freeze prevention

This screen allows you to set the freeze prevention parameters.

Freeze Prevent	
Setpoint	03.0 ˚C
Diff.	01.0 ˚C

Freeze Prevent :

- **Setpoint** : Freeze prevention activation setpoint (for evaporator leaving water)
- **Diff.** : Freeze prevention reset difference

Anti-freeze alarm, 1 evap.

This screen allows you to set the anti-freeze alarm parameters.

Anti-Freeze Alarm	
Setpoint	02.0 ˚C
Diff.	01.0 ˚C

Anti-freeze Alarm :

- **Setpoint** : Anti-freeze alarm activation setpoint
- **Diff.** : Anti-freeze alarm reset difference

Anti-freeze alarm, 2 evaps.

These screens are visible only when the unit has 2 evaporators.

These screens allow you to set the anti-freeze alarm parameters per evaporator.

Anti Freeze Alarm	EV 1
Setpoint	02.0 ˚C
Diff.	01.0 ˚C

Anti Freeze Alarm	EV 2
Setpoint	02.0 ˚C
Diff.	01.0 ˚C

Anti-freeze Alarm :

- **EV 1** : Anti-freeze alarm settings of evaporator 1
- **EV 2** : Anti-freeze alarm settings of evaporator 2
- **Setpoint** : Anti-freeze alarm activation setpoint of the particular evaporator
- **Diff.** : Anti-freeze alarm reset difference

Compressor load/unload pulses

This screen allows you to set the compressor load and unload pulses.

Number of Pulses to Load Comp.	015
Number of Pulses to Unload Comp.	015

Unloading parameters

This screen allows you to set the unloading parameters.

Unloading	
Pulse Time	00.3 s
Min Pulse Period	01 s
Max Pulse Period	090 s

- **Pulse Time** : Time of the unload pulses
- **Min Pulse Period** : Minimum time between two unload pulses
- **Max Pulse Period** : Maximum time between two unload pulses

Warning : Verify during commissioning.

Loading parameters

This screen allows you to set the loading parameters.

Loading	
Pulse Time	00.3 s
Min Pulse Period	05 s
Max Pulse Period	090 s

- **Pulse Time** : Time of the load pulses
- **Min Pulse Period** : Minimum time between two load pulses
- **Max Pulse Period** : Maximum time between two load pulses

Warning : Verify during commissioning.

Pump down configuration

This screen allows you to set the pump down parameters (pump down at shut down)

Pump Down Config.	
Enable	Y
Max time	030 s
Min Press.	0.5 bar g

- **Enable** :
  - **N** : Pump down is disabled
  - **Y** : Pump down is enabled
- **Max Time** : Maximum time of pump down function
- **Min Press** : Minimum pressure during pump down function

Fan configuration

This screen allows you to set the fan setup of the unit.

Condensation	
Enable	PRES.
Type	STEPS
Fan Steps	4

- **Enable PRES.** : Fan regulation on condensing pressure setpoints
- **Type** :
  - **Steps** : Fan regulation with on/off fans steps
  - **VFD** : Fan regulation with phase cut fans (only in units with OPFS)
  - **SPEEPTR** : Fan regulation with 1 VFD fan and all other fans on/off (only in units with OPLA)
- **Fan Steps** : Number of on/off fan steps in the unit

  Possible settings : 1 – 4

Fan settings for option OPLA

These screens are not visible when VFD is selected.

These screens allow you to set the setpoints of the different fan steps of a circuit. These settings are applicable for all circuits.

The fan settings for an OPLA unit is a combination of on/off fan steps and one VFD fan.

Condensation	
Fan Step N.	1
Setpoint	00.0 bar
Diff.	00.0 bar

- **Fanstep N.** : Number of this fan step
- **Setpoint** : Setpoint of fanstep, at this setpoint this fan step will switch on
- **Diff.** : Differential of fanstep to switch off this fan step (setpoint – diff.)

This screen can be found back in each fan step present in the unit (VFD fan has other setpoints, see next screen). Each fan step has its own setpoint and diff. setting. See Table below for fan step settings.

	Setpoint / Diff.			
Available Steps	**Step 1**	**Step 2**	**Step 3**	**Step 4**
1	12 / 3.0	–	–	–
2	12 / 3.0	14 / 3.0	–	–
3	12 / 3.0	13 / 3.0	14 / 3.0	–
4	12 / 3.0	13 / 3.0	13.5 / 3.0	14.5 / 3.0

2

Fan step settings

These screens are not?? visible when VFD is selected.

This screen allows you to set the setpoints of the different fan steps of a circuit. These settings are applicable for all circuits.

Condensation	
Fan Step N.	1
Setpoint	00.0 bar
Diff.	00.0 bar

- **Fanstep N.** : Number of this fan step
- **Setpoint** : Setpoint of fanstep, at this setpoint this fan step will switch on
- **Diff.** : Differential of fanstep to switch off this fan step (setpoint – diff.)

This screen can be found back in each fan step present in the unit. Each fan step has its own setpoint and diff. setting. See table below for fan step settings.

	Setpoint / Diff.			
Available Steps	**Step 1**	**Step 2**	**Step 3**	**Step 4**
1	Not available	–	–	–
2	11 / 4.0	14 / 5.0	–	–
3	10 / 3.0	12 / 2.0	14 / 2.0	–
4	8.5 / 1.5	10 / 2.0	12 / 2.5	14 / 2.0

2

Fan settings for units with option OPLA and OPFS

This screen is visible only when VFD or SPEEDTR is selected.

If the unit is with option OPLA, these settings will be used to control the VFD fan.

If the unit is with option OPFS, these settings will be used to control all the fans of the circuit.

Inverter Config.	
Max. Speed	10.0 V
Min. Speed	0.0 V
Speed Up Time	1 s

- **Max. Speed** : When 10.0 V output signal is given, fans will work at maximum speed
- **Min. Speed** : When 0.0 V output signal is given, fans will work at minimum speed (switched off)
- **Speed Up Time** : Time that full speed signal is given to the fan to speed up at fan start-up

Condensation setpoints for units with option OPLA and OPFS

These screens are visible only when VFD or SPEEDTR is selected.

These screens allow you to set the condensation regulations setpoints.

Cond Regulation	
Regul. Band	05.0 bar
Neutral Band	00.0 bar

- **Regul. Band** : Condensation regulation band around the condensation setpoint
- **Neutral Band** : Condensation neutral band around the condensation setpoint

Cond. Regulation	
Integral Time	600 s
Derivative Time	001 s

Integral time and derivative time are used by the PID regulation to calculate the actions needed to reach the condensation setpoint.

Oil heating

This screen allows you to enable/disable the oil heating control.

Enable Oil Heating Control	Y

- **Y** : Oil heating function is enabled
- **N** : Oil heating function is disabled

HP alarm settings

This screen allows you to set the high pressure alarm settings.

Transducers High Pressure Alarm	
Setpoint	20.0 bar
Diff.	05.0 bar

- ➤ **Setpoint** : High pressure alarm setpoint to activate high pressure alarm
- ➤ **Diff.** : High pressure alarm differential to be able to reset high pressure alarm (setpoint – diff.)

LP alarm settings

This screen allows you to set the low pressure alarm settings.

Transducers Low Pressure Alarm	
Setpoint	01.2 bar
Diff.	00.1 bar

- ➤ **Setpoint** : Low pressure alarm setpoint to activate low pressure alarm
- ➤ **Diff.** : Low pressure alarm differential to be able to reset low pressure alarm (setpoint + diff.)

LP alarm delay

This screen allows you to set the low pressure alarm delay timers

Low Press. Alarm Delays	
Start-Up Delay :	060 s
Run Delay :	040 s

- ➤ **Start-Up Delay** : Low pressure bypass timer during start-up of compressor
- ➤ **Run Delay** : Low pressure delay time before unit goes into LP alarm when unit is in operation

Pressure ratio alarm

This screen allows you to set the pressure ratio alarm setpoints.

Pressure Ratio Alarm	
Min Load Setp	1.4
Max Load Setp	1.8

- ➤ **Min Load Setp** : Pressure ratio alarm setpoint when compressor is operating at minimum load
- ➤ **Max Load Setp** : Pressure ratio alarm setpoint when compressor is operating at full load

Remark : The actual pressure ratio alarm setpoint will be calculated according to the actual compressor capacity.

2

Pressure ratio alarm delay

This screen allows you to set the pressure ratio alarm delay timers.

Pressure Ratio Alarm	
Start-Up Delay	180 s
Run Delay	90 s

- **Start-Up Delay** : Pressure ratio alarm bypass timer during start-up of compressor
- **Run Delay** : Pressure ratio alarm delay time before unit goes into pressure ratio alarm when unit is in operation

Oil high pressure diff. alarm

This screen allows you to set the oil high pressure diff. alarm settings.

Oil High Pressure Diff. Alarm	
Setp	2.5 bar
Delay	020 s

- **Setp** : When the pressure drop over the oil filter is bigger than 2.5 bar (default), the unit will go into alarm (after delay timer)
- **Delay** : Oil high pressure diff. alarm delay time before unit goes into alarm

Remark : Oil high pressure diff = pressure drop over oil filter (measured by: high pressure transducer and oil pressure transducer).

Liquid injection

This screen allows you to set the liquid injection settings.

Liquid Injection	
Setpoint	085 ˚C
Diff.	10.0 ˚C

- **Setpoint** : Liquid injection setpoint to activate the liquid injection.

  Temperature is measured by the oil temperature sensor PT1000.
- **Diff** : Liquid injection differential to switch off liquid injection function (setpoint – diff.)

2

EXV pre-opening

This screen allows you to set the EXV pre-opening setting.

EXV PreOpening	
	50 %

- ➤ **EXV pre-opening** : Pre-opening of the electronic expansion valve during pre-purge (compressor startup)

RS485 net refresh

This screen allows you to reset the RS485 net (communication to expansion board).

RS485 Net	
Time Check	045
Refresh	N

- ➤ **Time check** : Time that the controller will refresh the RS485 net
- ➤ **Refresh** : Start the refreshing of the R485 net

During the RS485 net refreshing, following screens will appear.

Wait Please
. . . .
Exp Recognized

Refresh procedure is busy.

Wait Please
Exp Recognized
Press Enter to Exit

Refresh procedure is finished and expansion board is found.

When there is a problem with the RS485 communication, the following screen will appear after the refresh procedure.

Wait Please
Exp Not Linked
Press Enter to Exit

Reset all parameters to default values

This screen allows you to reset all parameters to the default values.

	U : 1
Reset all Parameters	
to Default Values	N

- **U : 1** : Reset all parameters on control board # 1
- **Y** : Reset all parameters of this control board to the default values

EXV settings

This screen allows you to enter the EXV setting password.

EXV Setting	
Insert Password	0000

Manufacturer settings on control board # 2 (comp 3 and 4)

If compressor 3 or 4 is present, you can scroll between control board # 1 (comp 1 and 2) and control board # 2 (comp 3 and 4) with the info button.

When you press the info button, the following screens will appear for control board # 2 in the manufacturer menu.

Freeze Prevent	
Setpoint	00.0 ˚C
Diff.	00.0 ˚C

- **Setpoint** : Freeze prevention activation setpoint (for evaporator 2 leaving water)
- **Diff** : Freeze prevention reset difference

RS485 Net	
Time Check	045
Refresh	N

- **Time Check** : Time that the controller will refresh the RS485 net
- **Refresh Y** : Start the refreshing of the RS485 net

	U : 2
Reset all Parameters	
to Default Values	N

2

- ➤ **U : 2** : Reset all parameters on control board # 2
- ➤ **Y** : Reset all parameters of this control board to the default values

2.4.8 EXV Setting Menu

Operational information

Using this menu you can set all EXV parameters. The parameters can only be modified by trained individuals.

```
EXV Setting
Insert Password              0000
```

Password : 0013

Switching between control board # 1 and # 2 : ? info

Warning screen

These screens show you the warnings of the EXV driver.

```
EXV Settings 1

NO WARNINGS
```

```
EXV Settings 2

NO WARNINGS
```

Actual / Manual positions

These screens show you the actual EXV position, and allows you to manually control the EXV.

```
EXV Settings 1
Actual Position              0000
Manual Position              0500
En. EXV Manual               AUTO
```

```
EXV Settings 4
Actual Position              0000
Manual Position              0500
En. EXV Manual               AUTO
```

- **EXV Setting** : Indicates the EXV settings from circuit 1 or 2 (3 or 4)
- **Actual Position** : Actual position of the expansion valve
- **Manual Position** : Setpoint in EXV manual mode for the expansion value
- **En. EXV Manual**
  - **Auto** : Automatic expansion regulation
  - **Manual** : Manual control of the expansion valve (only during trouble shooting)

EXV type

This screen allows you to set the valve type and gas type.

EXV Settings	
Value Type	
ALCO EX8	
Gas Type	R134a

- **Valve Type** : Type of valve used in unit
- **Gas Type** : Refrigerant used in unit

Opening / Closing extra steps

This screen allows you to enable / disable the extra steps at closing or opening of the expansion valve.

EXV Settings		
Opening	EXTRAs	Y
Closing	EXTRAs	Y
Time	EXTRAs	0000 s

- **Opening EXTRAs Y** : Extra opening pulses are given when fully open position is reached
- **Closing EXTRAs Y** : Extra closing pulses are given when fully closed position is reached
- **Time EXTRAs** : Function to be confirmed

Superheat setpoint

This screen allows you to set the superheat setpoint and superheat dead band.

EXV Settings	
SHeat Setp.	06.0 ˚C
Dead Zone	00.0 ˚C

- **SHeat Setp** : Superheat setpoint
- **Dead Zone** : Dead band around the superheat setpoint

EXV PID factors

This screen allows you to set the EXV regulation PID factors.

EXV Settings	
Prop. Factor	80.0
Int. Factor	030 s
Diff. Factor	00.5 s

Low SH protections

This screen allows you to set the low superheat protection settings.

EXV Settings	
Low SHeat Protection	
Low Limit	–1.0 ˚C
Int. Time	01.0 ˚C

- ➤ **Low Limit** : Setpoint of the low limit function
- ➤ **Int. Time** : Integral time used for the low limit function

LOP protection

This screen allows you to set the LOP protection parameters.

EXV Settings	
LOP Protection	
LOP Limit	– 30.0 ˚C
Int. Time	04.0 ˚C

- ➤ **LOP Limit** : Setpoint of the LOP protection function
- ➤ **Int. time** : Integral time used for the LOP function

MOP protection

These screens allow you to set the MOP protection parameters

EXV Settings	
MOP Protection	
MOP Limit	12.0 ˚C
Int. Time	04.0 ˚C

- ➤ **MOP Limit** : Setpoint of the MOP protection function
- ➤ **Int. Time** : Integral time used for the MOP function

EXV Settings	
MOP Protection	
Start-Up Delay	090 s

- ➤ **Start-Up Delay** : Start-up delay of the MOP functions at start-up

2

High temperature condensing protection

This screen allows you to set the high temperature condensing protection setpoints.

EXV Settings		
HiTcond	PROTECTION	
HiTcond	Limit	90.0 ˚C
Int. Time		04.0 ˚C

- **HiTcond Limit** : Setpoint of the high temperature condensing protection
- **Int. Time** : Integral time used for the high temperature condensing protection

Suction temperature high limit

This screen allows you to set the suction temperature high limit setpoint.

EXV Settings	
Suction Temperature	
High Limit	
	060.0 ˚C

EXV pressure probe values

This screen allows you to set the pressure probe minimum and maximum values.

EXV Settings	
Press. Probe	
Min Value	–00.5 bar g
Max Value	07.0 bar g

- **Min Value** : Minimum value of the low pressure probe operation range
- **Max Value** : Maximum value of the low pressure probe operation range

Battery / Plan setting

These screens allow you to enable / disable the EXV battery and plan.

EXV Setting 1	
BATTERY PRESENT	Y
PLAN PRESENT	Y

EXV Setting 2	
BATTERY PRESENT	Y
PLAN PRESENT	Y

Change driver password

This screen allows you to change the driver password.

Change	
Driver	
Password	
	0013

2.4.9 Maintenance Output Menu

Operational information

Using this menu you can read-out all the maintenance parameters.

Key : 

Password : NO

Switching between control board # 1 and # 2 : ? info

Evaporator pump hours

This screen shows you the total evaporator pump running hours

Hour Counter	
Pump Evap.	000000

Compressor running data

This screen shows you the total running hours of a compressor and the number of compressor starts.

Compressor	C : 1
Hour Counter	000000
Number of Starts	00002

- **C : 1** : Compressor running data of compressor # 1
- **Hour Counter** : Total running hours of this compressor
- **Number of Starts** : Total number of compressor starts

This screen shows you the last compressor start and compressor stop.

Last Comp. Start	C : 1
DD/MM/YY	hh:mm
Last Comp. Stop	
DD/MM/YY	hh:mm

2

This screen shows you the EXV driver battery state.

EXV Driver State	C : 1
Batt. Resist.	000.0
Batt. Voltage	00.0

- **C : 1** : EXV driver state of circuit 1
- **Batt. Resist.** : Battery resistance
- **Batt. Voltage** : Battery voltage

Remark : Same compressor running data screens (3 previous screens) will be displayed for compressor 2 (C : 2)

Cooling PID errors

This screen shows the cooling PID errors used for the temperature regulations.

Cooling PID Errors	
Prop.	00.0 ˚C
Int.	0000.0 ˚ C x sec
Der.	000.0 ˚ C / min

- **Prop.** : Proportional error read-out
- **Int.** : Integral error read-out
- **Der.** : Derivation error read-out

Cooling PID actions

This screen shows the cooling PID actions.

Cooling PID Act	0000
Proportional	0000
Integral	0000
Derivative	0000

Read-out of the calculated PID actions:

Cooling Reg.	
Disable Stop	N / Y
Increase Stop	N / Y

2

Global PID request

This screen shows you the global PID request.

Global PID Request	
Load	Y
Unload	N
Stand-by	N

- **Load** :
  - **N** : No load requested
  - **Y** : Load requested
- **Unload** :
  - **N** : No unload requested
  - **Y** : Unload requested
- **Stand-by** :
  - **N** : No stand-by requested
  - **Y** : Stand-by requested

Remark : Only one action can be requested at a time.

Maintenance password

This screen allows you to enter the maintenance password.

Digit
maintenance password

Maintenance read-out menu on control board # 2 (comp 3 and 4)

If compressor 3 or 4 is present, you can scroll between control board # 1 (comp 1 and 2) and control board # 2 (comp 3 and 4).

When you press the info button, the following screens will appear for control board # 2 :

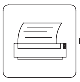
- Compressor running data screens for comp 3 (see page 2–61)
- Compressor running data screens for com 4 (see page 2–61)
- Maintenance password screen (see page 2–63)

2.4.10 Maintenance Input Menu

Operational information

Using this menu you can set all maintenance parameters. The parameters can only be modified only by trained individuals.

Screen : Digit
maintenance password

Password : Yellow ➡  ➡ blue

Switching between control board # 1 and # 2 : ? info

Evaporator pump timers

This screen allows you to settle the evaporator threshold (maintenance) and running hours.

Evap. Pump h. Count.	
Threshold	010 x 1000
Reset	N
Adjust	000000

- ➤ **Threshold** : Running hour when unit will show “Evaporator Pump Maintenance” Alarm
- ➤ **Reset Y** : Reset evaporator pump hours
- ➤ **Adjust** : Enter the running hours of the pump. This has to be done whenever software or controller is changed.

Compressor running data setting

This screen allows you to set the compressor threshold (maintenance) and running hours.

Comp. h. Count		C : 1
Threshold	010 x 1000	
Reset	N	
Adjust	000000	

- ➤ **C : 1** : Compressor information of compressor circuit 1
- ➤ **Threshold** : Running hour of this compressor when unit shows “Compressor # 1 Maintenance” alarm
- ➤ **Reset Y** : Reset compressor running hours
- ➤ **Adjust** : Enter the running hours of this compressor. This has to be done whenever software or controller is changed.

This screen allows you to set the number of compressor starts.

	C : 1
Comp. Starts	
Reset	N
Adjust	000000

- **C : 1** : Compressor information of compressor circuit 1
- **Reset Y** : Reset compressor starts
- **Adjust** : Enter the compressor starts of this compressor. This has to be done whenever software or controller is changed.

Remark : Same compressor timers screens (two previous screens) will be displayed for compressor 2 (C : 2)

Temperature regulation settings

These screens allow you to set the parameters for the temperature regulation function.

Regul. Band	03.0 ˚C
Neutral Band	00.2 ˚C
Max Pull Down Rate	00.6 ˚C / min

- **Regul. Band** : Regulation band
- **Neutral Band** : Neutral band around setpoint
- **Max Pull Down Rate** : Maximum pull down rate

Start-Up DT	02.6 ˚C
Shut Down DT	01.7 ˚C

Remark : These parameters are vital for a proper temperature regulation.

High chilled water start

This screen allows you to set the high chilled leaving water start parameters.

High ChLWT start	
LWT	25.0 ˚C
Max Comp. Stage	070 %

- **LWT** : Leaving water temperature setpoint to activate the high chilled leaving water
- **Max Comp. Stage** : Maximum compressor stage of the compressor if leaving water temperature is higher than LWT setpoint

2

Condensation setpoint

This screen is only visible if fan type VFD or SPEEDTR is selected (units option OPFS or OPLA).

This screen allows you to set the condensation setpoint.

Condensation	
Setpoint	09.0 bar

- **Condensation Setpoint** : Condensation setpoint for phase cut fans (VFD or SPEEDTR)

Temperature setpoint limits

This screen allows you to set the minimum and maximum setpoint limits.

ChLWT Temperature	
Setpoint Limits	
Low	04.0 ˚C
High	10.0 ˚C

- **Low** : Minimum chilled outlet water temperature setpoint you can enter in the setting menu (MOW)
- **High** : Maximum chilled outlet water temperature setpoint you can enter in the setting menu

Probes enable screen

This screen allows you to enable or disable the analog inputs.

Probes enable			U : 1
B1 : Y	B2 : Y	B3 : Y	B4 : Y
B5 : Y	B6 : Y	B7 : Y	B8 : Y
B9 : Y	B10 : Y		

- **U : 1** : Analog inputs of control board # 1
- **Bx : Y** : Analog input x is enabled
- **Bx : N** : Analog input x is disabled

Remark : When using setpoint override (4-20 mA), probe B3 has to be enabled. When using demand limit, probe B8 has to be enabled.

Expansion board probe screen

This screen allows you to enable or disable the analog input (from the expansion board).

This screen is only visible when the unit has an expansion board (units /A and /Z). The ambient sensor which can be connected to the expansion board analog input B1 is used for setpoint reset OAT. This sensor is not standard (SPN unit).

```
EXP Probes enable
              B1 : Y
EXP Probes Offs
B1 Offs :                            00.0 ˚C
```

- **B1 : Y** : Analog input is enabled
- **B1 : N** : Analog input is disabled
- **B1 Offs** : Offset of sensor B1, adjust if needed

Controller probes offset

These screens allow you to set the offset of the analog inputs.

```
Inputs Probes Offset

B1 : 0.0      B2 : 0.0
B4 : 0.0      B5 : 0.0
```

```
Input Probes Offset

B6 : 0.0      B7 : 0.0
B9 : 0.0      B10 : 0.0
```

Time to down load compressor

This screen allows you to set the time to down load compressor before the pump down procedure starts.

```

Time to Download Compressor
                                          30 s

```

Reload and re-unload comp

This screen allows you to set the reload and re-unload ΔT.

```
DT to Reload and Re-unload Comp
                                          0.7 ˚C


```

- **DT** : ΔT above and below setpoint to reload or re-unload compressor

Maintenance input menu on control board # 2 (comp 3 and 4)

If compressor 3 or 4 is present, you can scroll between control board # 1 (comp 1 and 2) and control board # 2 (comp 3 and 4).

When you press the info button, the following screens will appear for control board # 2 :

➤ Compressor running data settings for comp 3 (see page 2–64)

➤ Compressor running data settings for comp 4 (see page 2–64)

➤ Probes enable screen (see page 2–66)

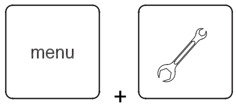
➤ Controller probes offset (see page 2–67)

2.4.11 Service Menu

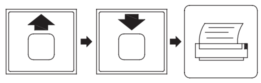
Operational information

Using this menu you can operate the different circuits in manual mode. When the chiller is working in manual mode and a safety prevention is met (LP prevention / HP prevention / Freeze prevention / ...), the chiller will automatically switch over to normal (auto) mode. This is to prevent the unit from tripping. This function can only be used during commissioning or troubleshooting.

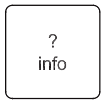
Key :



Password :



Switching between control board # 1 and # 2 :



Compressor manual mode

These screens allow you to operate a compressor in manual mode.

Compressor # 1		
Manual Load		050 %
State	Auto	

Compressor # 2		
Manual Load		050 %
State	Auto	

- ➤ **Compressor # 1** : Compressor circuit 1
- ➤ **Manual Load** : The requested load during manual mode (25% till 100%)
- ➤ **State** :
  - **Auto** : Manual mode is disabled
  - **Manual** : Manual mode is enabled, unit will work with manual load setpoint
  - **Off** : Compressor is disabled (switched off)

Remark : Switching between auto and manual mode can be done without compressor stop.

Service menu on control board # 2 (comp 3 and 4)

If compressor 3 or 4 is present, you can scroll between control board # 1 (comp 1 and 2) and control board # 2 (comp 3 and 4).

When you press the info button, the following screens will appear for control board # 2 :

- ➤ Compressor manual mode screens (see page 2–69)

2.4.12 Alarm Menu

Operational information

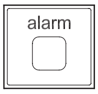
Using this menu you can read out the actual alarm.

When an alarm condition occurs, the display buzzer starts. Pressing the alarm key displays the current fault. Pressing the alarm key twice stops the buzzer while pressing it thrice removes the alarm.

Remark : Sometimes, when an alarm occurs, another spurious alarm of star/delta transition failure also occurs. In this case, solve the spurious alarm first. If the spurious alarm occurs again, check the electrical connections.

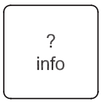
If the alarm is not removed even after pressing the alarm key again, it means that faulty conditions still exist.

Key :



Password : NO

Switching between control board # 1 and # 2 :



Alarm screen

This screen shows you the actual alarm.

AL : 16	U : 1
Compressor # 1 Overload	

- **AL : 16** : Alarm code
- **U : 1** : Alarm on controller board # 1
- **Compressor # 1 Overload** : Alarm description with indication of circuit

Alarm menu on control board # 2 (comp 3 and 4)

If compressor 3 or 4 is present, you can scroll between control board # 1 (comp 1 and 2) and control board # 2 (comp 3 and 4)

When you press the info button, the following screen will appear for control board # 2 :

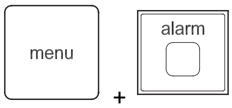
- Alarm screen (see page 2–70)

2.4.13 Buffer Alarm Menu

Operational information

Using this menu you can consult the last ten alarms of every chiller circuit.

Each mask displays the date, time and description of the alarm. Pressing the enter key when an alarm description is displayed shows the operating conditions at the time the alarm occurred (temperatures, pressures, expansion valve status and compressor load).

Key : 

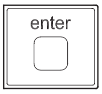
Password : NO

Buffer alarm screens

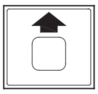
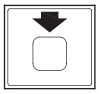
These screens allow you to consult all the running parameters of the circuit/unit at the moment of the alarm.

```
DD/MM/YY                    mm:hh

Comp Overload # 1
```

➤ Press 

to consult the running conditions.

➤ Press  or  to scroll through all the running data screens.

Buffer alarm menu on control board # 2 (comp 3 and 4)

If compressor 3 or 4 is present, you can scroll between control board # 1 (comp 1 and 2) and control board # 2 (comp 3 and 4).

When you press the info button, the following screen will appear for control board # 2

➤ Buffer alarm screens (see page 2–71)

3 Functional Control

3.1 What Is In This Chapter?

Introduction

This chapter will give more detailed information about the functions used to control the system. Understanding these functions is vital when diagnosing a malfunction, which is related to functional control.

Overview

This chapter contains the following topics:

2

3.2 ON / OFF Management

Introduction

There are four ways of switching the unit on and off:

- Through the local key of the controller
- Through a remote switch
- Through a supervision system (BMS)
- Through a time schedule

Power on

- The initialization takes 10 seconds.
- The controller automatically goes to the first screen.

Remark: An auto restart function is integrated. This means that the on/off status is remembered after a power failure of the unit. This auto restart function can be disabled in the user menu.

On/Off local

Unit shutdown through the controller (on/off key).

If the switch is enabled, “off keypad” will appear on the display of the unit status.

Remote on/off

Unit shutdown through a digital contact.

If the panel switch is in the “0” position the unit is off by local switch and on the display “Off Loc/Rem Sw” will appear.

- If the switch is in “Loc” position, the unit is on (unless there are other shutdown conditions).
- If the switch is in the “Rem” position, the digital contact control allows the start up and the shutdown of the unit from a remote switch. When the unit is stopped from remote, “Off Loc/Rem Sw” will appear on the display of the unit status.

Remark: The remote on/off switch is field supply.

On/Off network

This function allows the start up and the shutdown of the unit through Supervision System Plant Visor 1.0.

In case this function is enabled, the display of the unit status shows “Off Rem. Comm”.

On/Off time schedule

This function, if enabled, allows the start up and the shutdown of the unit based on a user defined time schedule. In case the function is enabled, “Off Time Schedule” will appear on the display of the unit status.

Emergency stop

In the even of an emergency, switch off the unit by pushing the emergency button.

When the problem is solved, do not forget to reset the emergency button.

3.3 Thermostat Control

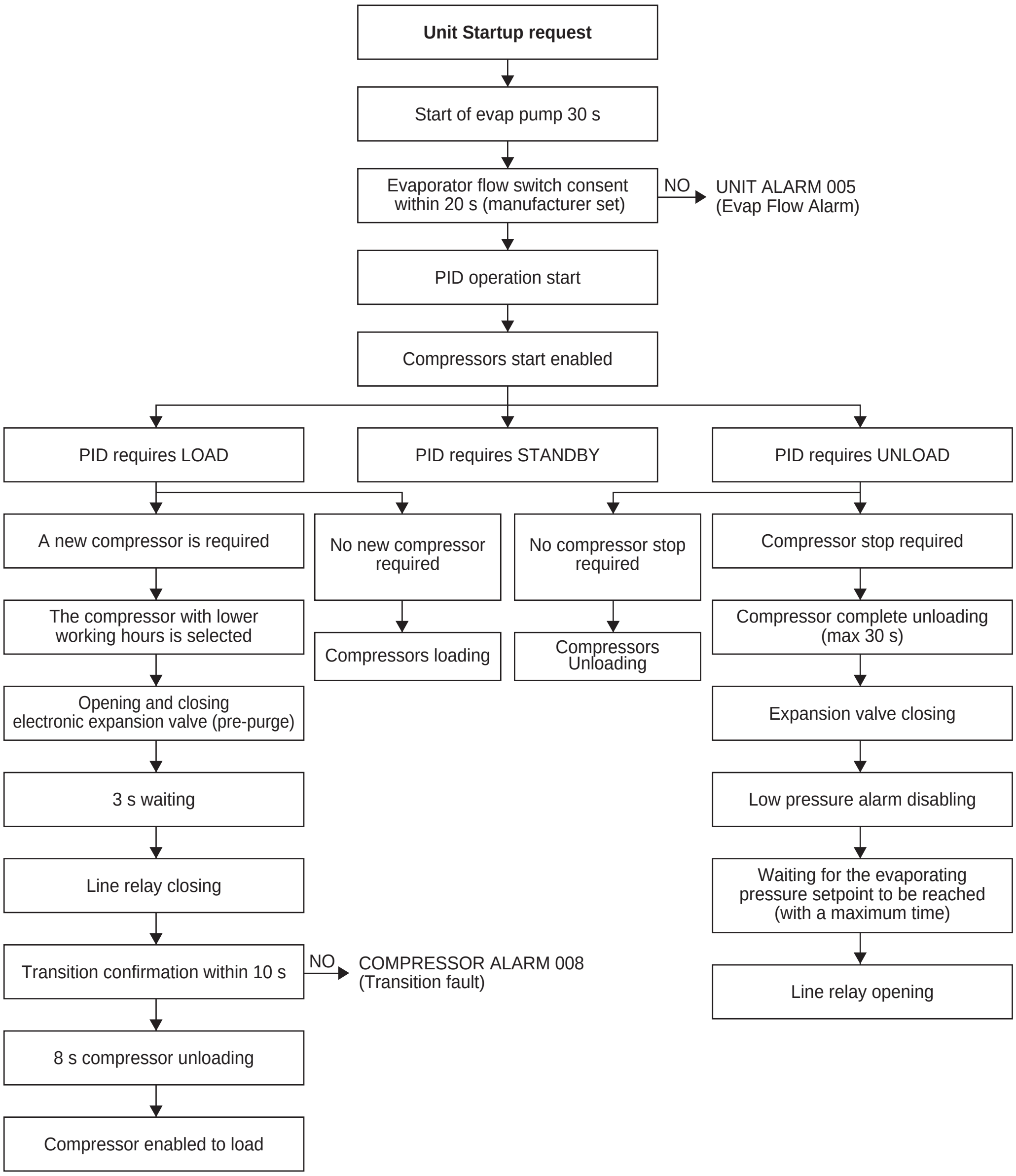
Introduction

The thermostat control is used to generate a load-up or load-down according to the active PID regulation.

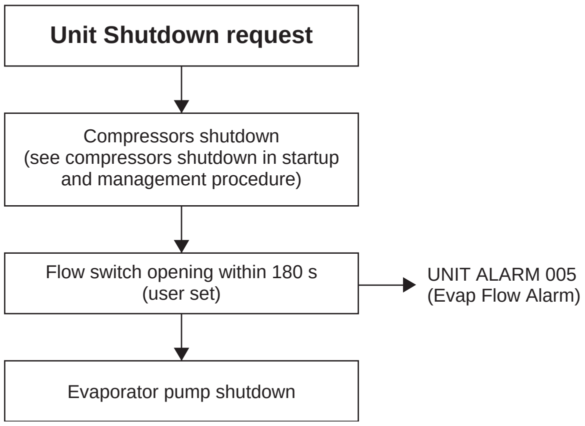
Continuous loading and unloading uses 2 solenoid valves to control the screw compressor slide and thus its capacity. Control is performed by outlet temperature.

Unit and compressor start up and shutdown procedure

In the following flow chart the unit startup, management and shutdown procedures are shown, as well as the compressors loading and unloading strategy.



Unit shutdown



Compressors start up and loading management (4 compressors)

Step n.	Leader Comp.	Lag 1 Comp.	Lag 2 Comp.	Lag 3 Comp.
0	Off	Off	Off	Off
1	If (T – SetP) < Start up DT & Cooling or (SetP – T) < Start up DT & Heating Waiting			
2	Start	Off	Off	Off
3	Load up to 75%	Off	Off	Off
4	If T in Regulation Band Wait interstage time			
5	If T is approaching SetP – Waiting			
6a (T in unload band)	Unload up to 50%	Start	Off	Off
6b (T not in unload band)	Fixed at 75%	Start	Off	Off
6	Fixed at 75% or 50%	Load up to 50%	Off	Off
7 (If leader at 50%)	Load up to 75%	Fixed at 50%	Off	Off
8	Fixed at 75%	Load up to 75%	Off	Off
9	If T in Regulation Band Wait interstage time			
10	If T is approaching SetP – Waiting			
10a (T inun load band	Fixed at 75%	Unload up to 50%	Start	Off
10b (T not in unload band)	Fixed at 75%	Fixed at 75%	Start	Off
11	Fixed at 75%	Fixed at 75% or 50%	Load up to 50%	Off
12 (If lag 1 at 50%)	Fixed at 75%	Load up to 75%	Fixed at 50%	Off
13	Fixed at 75%	Fixed at 75%	Load up to 75%	Off
14	If T in Regulation Band Wait interstage time			
15	If T is approaching SetP – Waiting			

Step n.	Leader Comp.	Lag 1 Comp.	Lag 2 Comp.	Lag 3 Comp.
16a (T in unload band)	Fixed at 75%	Fixed at 75%	Unload up to 50%	Start
16b (T out unload band)	Fixed at 75%	Fixed at 75%	Fixed at 75%	Start
17	Fixed at 75%	Fixed at 75%	Fixed at 75% or 50%	Load up to 50%
18 (if lag 2 at 50%)	Fixed at 75%	Fixed at 75%	Load up to 75%	Fixed at 50%
19	Fixed at 75%	Fixed at 75%	Fixed at 75%	Load up to 75%
20	Load up to 100%	Fix a/Fixed at 75%	Fix a/Fixed at 75%	Fix a/Fixed at 75%
21	Fixed at 100%	Fixed at 100%	Fixed at 100%	Fixed at 75%
22	Fixed at 100%	Fixed at 100%	Load up to 100%	Fixed at 75%
23	Fixed at 100%	Fixed at 100%	Fixed at 100%	Load up to 100%
24	Fixed at 100%	Fixed at 100%	Fixed at 100%	Fixed at 100%

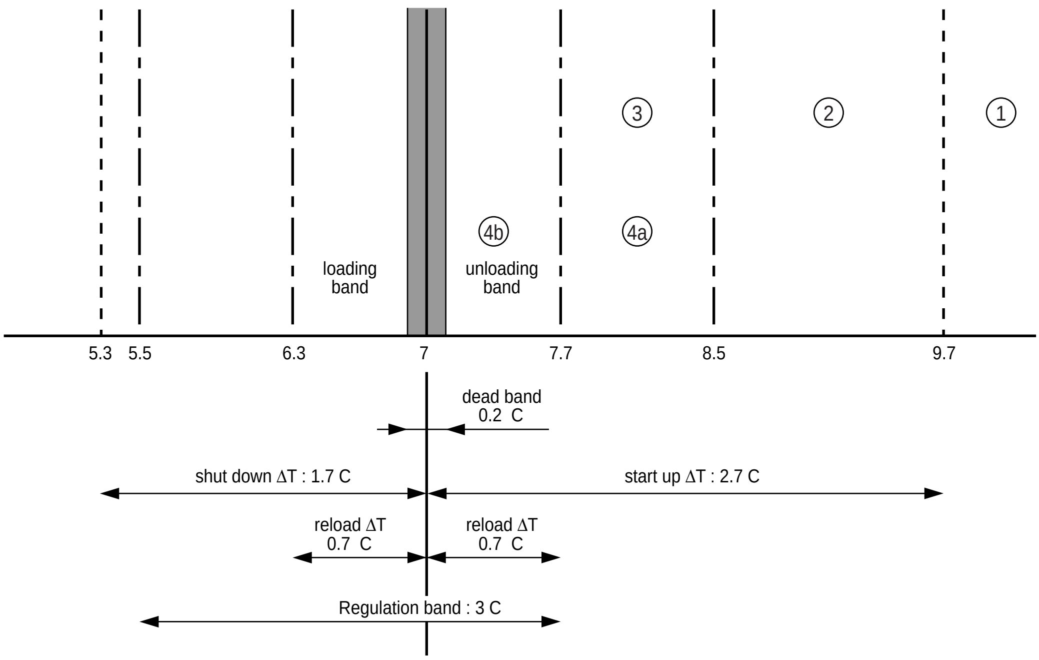
Compressors unload and shutdown management (4 compressors)

Step n.	Leader Comp.	Lag 1 Comp.	Lag 2 Comp.	Lag 3 Comp.
0	100%	100%	100%	100%
1	Fixed at 100%	Fixed at 100%	Fixed at 100%	Unload up to 75%
2	Fixed at 100%	Fixed at 100%	Unload up to 75%	Fixed at 75%
3	Fixed at 100%	Unload up to 75%	Fixed at 75%	Fixed at 75%
4	Unload up to 75%	Fixed at 75%	Fixed at 75%	Fixed at 75%
5	Fixed at 75%	Fixed at 75%	Fixed at 75%	Unload up to 50%
6	Fixed at 75%	Fixed at 75%	Unload up to 50%	Fixed at 50%
7	Fixed at 75%	Fixed at 75%	Fixed at 50%	Unload up to 25%
8	If T is approaching SetP – Waiting			
8a (T in load band)	Fixed at 75%	Fixed at 75%	Load up to 75%	Stop
8b (T not in load band)	Fixed at 75%	Fixed at 75%	Fixed at ??	Stop
9 (if lag 2 at 75%)	Fixed at 75%	Fixed at 75%	Fixed at ??	Off
10	Fixed at 75%	Unload up to 50%	Fixed at 50%	Off
11	Fixed at 75%	Fixed at 50%	Fixed at 25%	Off
12	If T is approaching SetP – Waiting			
13a (T in load band)	Fixed at 75%	Load up to 75%	Stop	Off
13b (T not in load band)	Fixed at 75%	Fixed at 50%	Stop	Off
14 (lag 1 at 75%)	Fixed at 75%	Unload up to 50%	Off	Off
15	Unload up to 50%	Fixed at 50%	Off	Off
16	Fixed at 50%	Unload up to 25%	Off	Off
17	If T is approaching SetP – Waiting			

Step n.	Leader Comp.	Lag 1 Comp.	Lag 2 Comp.	Lag 3 Comp.
18a (T in load band)	Load up to 75%	Stop	Off	Off
18b (T not in load band)	Fixed at 50%	Stop	Off	Off
19	Unload up to 25%	Off	Off	Off
20	If T is approaching SetP – Waiting			
21	If (SetP – T) < Shutdown DT & Cooling or (T – SetP) < Shutdown DT & Heating Waiting			
22	Stop	Off	Off	Off
23	Off	Off	Off	Off

Loading and unloading zones

The graph below shows the different loading and unloading zones.



Settings

Do not change:

- Max pull down : 0.7° / min
- Dead band : 0.2°C
- Reload ΔT : 0.7°C
- Interstage : 210 s

2

Other settings

- Start up ΔT : 2.7°C
- Shutdown ΔT : 1.7°C
- Regulation band : 3°C

EXAMPLE: Upload

1)

- If the water temperature is above 9.7°C the chiller can start (below 9.7°C the chiller will wait)
- Unit will start leader compressor

2)

- Unit will load leader compressor till 75%

3)

- If temperature is in Regulation Band

  → wait interstage time (default 210 sec)
- If temperature is approaching setpoint (after interstage time)

  → wait (no need to start new comperrors (compressors?) because chilled water temperature is decreasing, prevent undershoot)
- After interstage time check if temperature is in unloading band

4a)

No: Unit will add next compressor (25% capacity) and keep the leader compressor at 75%

Leader comp : 75%
Next comp : 28%

4b)

Yes: Unit will first unload leader compressor to 50%, when this is done the next compressor will start (25%)

Leader comp : 50%
Next comp : 25%

This will give you again 75% capacity but now the unit is able to upload in small steps.

- Unit will upload the running compressors to 75%
  - If another compressor is present and there is still demand for food, the regulation cycle will continue from point **3.**
  - If no other compressors are present and there is still demand for load, the compressors will upload to 100% capacity according to the PID regulation (if needed).
- When the temperature is in the dead band, the unit will operate with the same capacity (no upload or download)

3.4 Setpoint Reset of the Chilled Water

Introduction

Among the MicroTech NC controllers options, there are also several possibilities to regulate the unit with particular logics or outside signals. The setpoint reset function gives the possibility to modify the local setpoint of the chilled water according to the following logics:

- double setpoint
- external signal
- OAT (outdoor ambient temperature) reset
- return water reset

Double setpoint

Through an external contact (optionally a switch is installed on the electric panel control), it is possible to vary the local setpoint of control between two well defined values. Such option results are advantageously applicable in case of installation with ice bank. When the temperatures of evaporator outgoing water are inferior to 4°C, the introduction of the correct quantity of Anti-freeze in the hydraulic system is required.

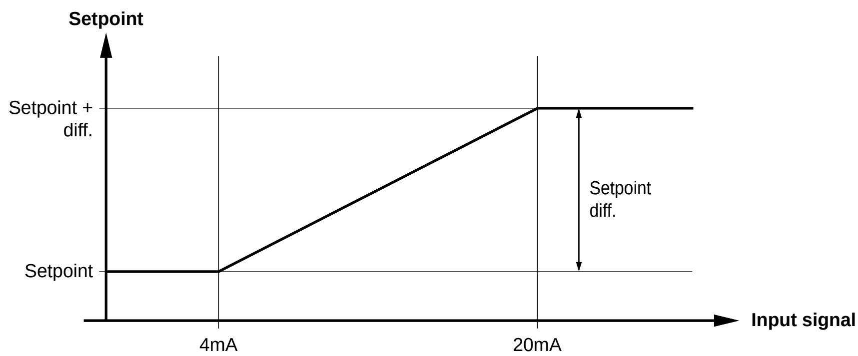
Enable Double	
Setpoint	Y

Cooling Double	
Setpoint	12.0 ˚C
Heating Double	
Setpoint	---- ˚C

External signal

The setpoint override allows, by use of an external signal, to override the chilled water setpoint.

This function is activated by enabling the analog input B3 of the controller. A 4-20mA signal can be used to change the setpoint.



- For inputs lower than 4mA, the water setpoint is set to the local setpoint
- For inputs between 4 and 20mA, the setpoint is obtained by linear interpolation between the setpoint and the setpoint + setpoint diff (entered in the user menu)
- For inputs higher than 20mA, the water setpoint is set to setpoint + diff.

Remark: The value entered for the setpoint diff can also be negative.

Lvg Water Temp	
Setpoint Reset	
	4-20mA

chLWT Setpoint	
Override Limits	
Setp. Diff.	03.0 ˚C

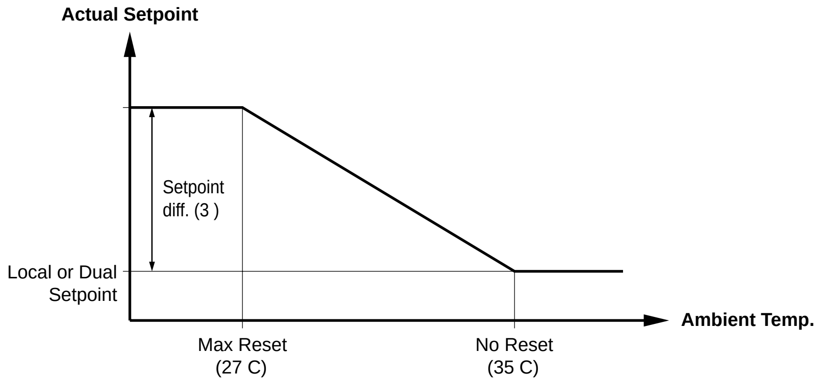
Outdoor ambient temperature reset

The OAT mode can be used to modify the setpoint in function of the ambient temperature. The user is able to choose to use the OAT mode or not. The result of using the ambient mode is that the unit will be used more efficiently and that the modified setpoint will be displayed under the normal setpoint.

The OAT setpoint parameters and function can be set in the user menu.

This function is only available when the optional pCOe (expansion board) is present. This is because the ambient sensor is connected to this pCOe.

Function description



OAT chWT Reset	
Setpoint Diff.	3 ˚C
Max Reset	27 ˚C
No Reset	35 ˚C

- ➤ Above 35°C Ambient Temperature, there is no reset. The unit will operate with the local or dual setpoint.
- ➤ Between 27°C and 35°C Ambient Temperature, the unit will change the actual setpoint according to the offset.
- ➤ Below 27°C Ambient Temperature, the unit will operate with actual setpoint equal to the local or dual setpoint + setpoint diff.

Explanation

When the load of the unit drops (by drop in outdoor temperature), then the setpoint will be changed upwards by the setpoint diff value. Because of this the unit will evaporate at a higher temperature and thus the performance of the tunit will be better.

Remark: When you use the OAT setpoint reset, the actual setpoint will show in the setting menu.

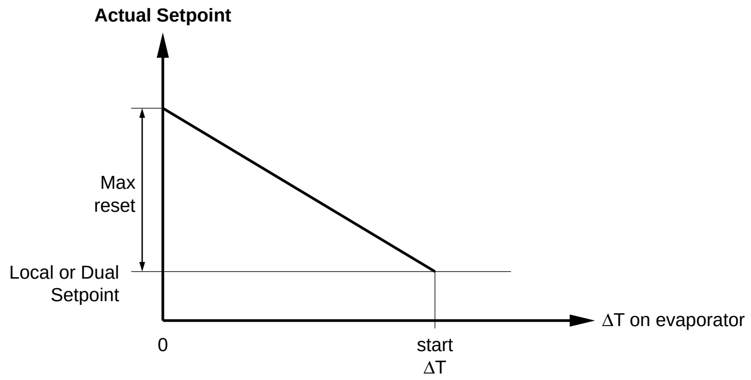
2

3.5 Return Water Reset

Introduction

When return water is selected as the reset mode, the MicroTech controller will adjust the leaving chilled water setpoint to maintain a constant return water temperature equal to the return water setpoint. The return water temperature is sampled every 5 minutes and a proportional correction is made to the leaving chilled water setpoint. The corrected leaving water setpoint is never set to a value greater than the return water setpoint and is never set to a value less than the actual leaving chilled water setpoint.

Function description



chLWT Return Reset	
Start dT	3 ˚C
Max Reset	3 ˚C

Remark: When the unit is designed for a ΔT of 5°C (at 100% capacity), then the start ΔT and Max Reset should should also be set to 5°C.

Explanation

The return water reset will adjust the leaving chilled water setpoint according to the evaporator ΔT. In this way the chiller can maintain a constant return water temperature.

3.6 Freeze-up Control

Introduction

Freeze up control is used to protect the evaporator against accidentally freezing.

Two protections are present: freeze-up prevention and Anti-freeze alarm.

Freeze-up prevention

Freeze-up prevention will request a load-down when the temperature of the evaporator outlet gets below 3°C (freeze prevention setpoint).

The unit will go back to normal operation (possibility to load up) when the outlet temperature gets above freeze prevention setpoint + diff.

Characteristics	**Freeze-up prevention**
Control device	Sensor (1 sensor at each evaporator outlet)
Diagram name	
Activation Result	Outlet water temp < Freeze prevention setpoint (3°C) Load down compressor
Reset Result	Outlet water temp > Freeze prevention setpoint + diff (4°C) Normal mode

Anti-freeze alarm

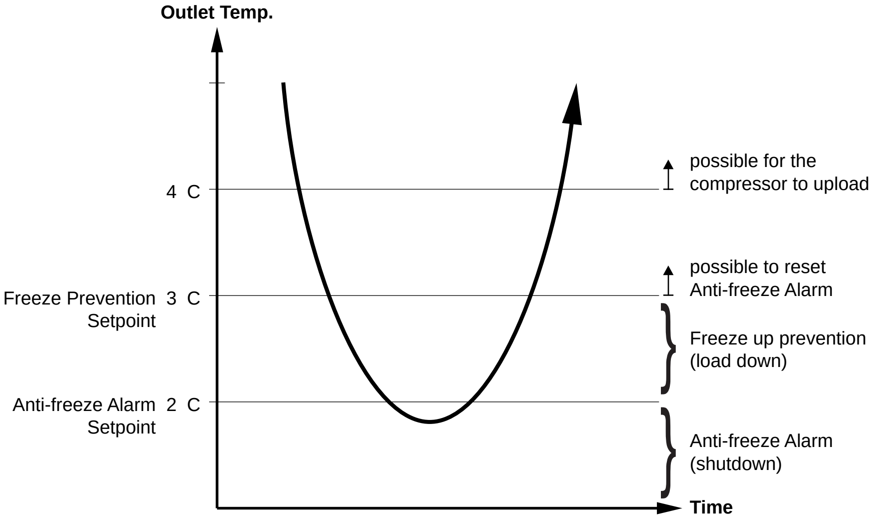
When the evaporator outlet water temperature drops below Anti-freeze alarm setpoint (2°C) the Anti-freeze protection is activated and the unit will shutdown. When the temperature rises above the Anti-freeze setpoint + diff (3°C) it is possible to reset the Anti-freeze alarm.

Characteristics	**Anti-freeze alarm**
Control device	Sensor (1 sensor at each evaporator outlet)
Diagram name	
Activation Result	Outlet water temp < Anti-freeze setpoint (2°C for standard unit) Unit disabled
Result	Manual reset Manual reset possible when outlet temp is above Anti-freeze setpoint + diff.

Remark: In case of 2 evaporators, each evaporator has its own Anti-freeze alarm setpoints

2

Function description



Anti-Freeze Alarm	
Setpoint	02.0 ˚C
Diff.	01.0 ˚C

In case the unit has 2 evaporators:

Evap 1 Anti-Freeze Alarm	
Setpoint	2.0 ˚C
Diff.	1.0 ˚C

Evap 2 Anti-Freeze Alarm	
Setpoint	2.0 ˚C
Diff.	1.0 ˚C

3.7 Enable Soft Load

Function description

The Soft load function can be enabled by keyboard in the user menu. The Soft load function limits the unit load to a predetermined value (Max stage) for a set period (Max time). This function finds wide application where the water temperature is high at the start up but without having a consistent thermal load. This function allows energy saving during unit start up avoiding compressors useless loading.

Enable Soft Load	Y

Enable Soft Load	Y
Max stage	50 %
Max Time	20 min

3.8 Unit Load Limiting

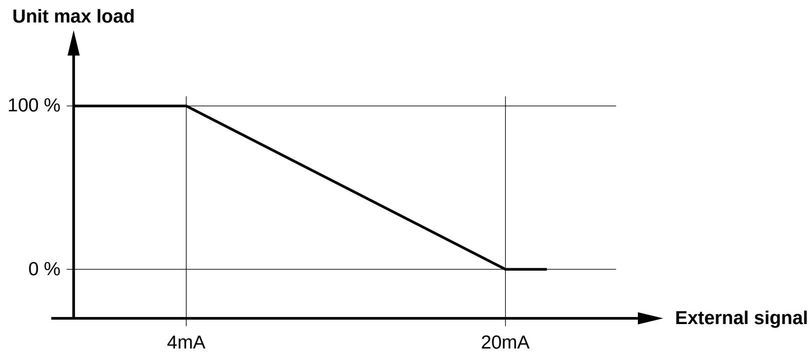
Introduction

The Unit load limiting function finds application in all those situations when it is necessary to reduce the electric absorption of the unit, in determined periods of the day.

Load limiting

It is possible to limit the unit absorption using one of the two options available under user menu.

- The first way, called “Demand Limit” requires a 40mA - 20mA external signal (connections 37 and 38 on M3). The unit max load decreases from 100% to 0% as the input increases from 4mA to 20mA.



Unit Limiting	
Demand Limit	

- The second way, called “Current Limit” needs a direct measure of the current absorbed by the unit and the set of the maximum current to be absorbed. (Option: SPN unit)

Remark: Current limit screen appears only if b8 probe is enable under maintenance menu.

Unit Limiting	
Current Limit	

Current Limit Set	
4m A	000 A
20 mA	400 A
Max Curr.	300 A

3.9 Start Up With High Evaporator Water Temperature

Function description

This function limits the load of each compressor to a set value (default 70%) until the outlet water temperature is over the set value (default 25°C). This function helps the start up of the unit when the water temperature is very high (35°C - 40°C) avoiding dangerous overheating of the motor and disagreeable interventions for high pressure protection.

The value of maximum load of the compressors and the limit water temperature are modifiable under the user menu.

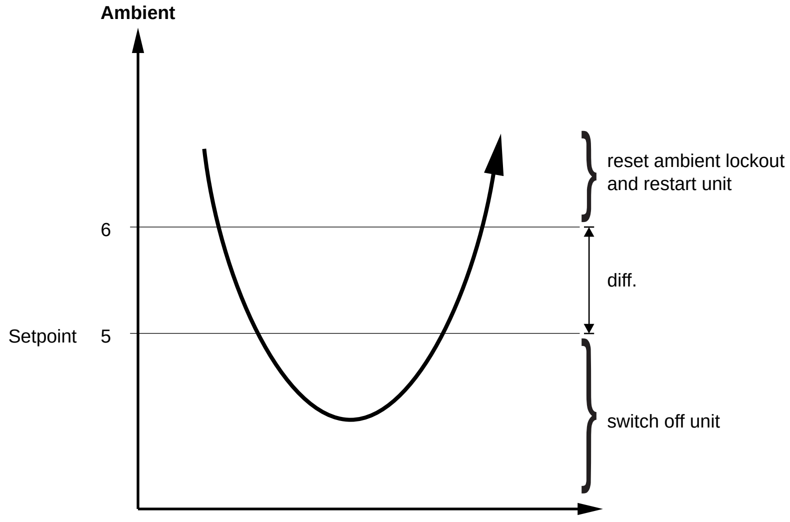
High chLWT Start	
LWT	25.0 ˚C
Max Comp. Stage	70 %

3.10 Ambient Lockout

Introduction

The Ambient lockout function will allow you to disable the unit below a specified Ambient temperature.

Function description



En. Ambient Lockout	
Setpoint	05.0 ˚C
Diff.	01.0 ˚C

- ➤ When the ambient temperature gets below the ambient lockout set point, the unit will be switched off.
- ➤ When the unit is off by ambient lockout, and the temperature rises above 6°C, the unit will restart and continue operation.

3.11 Pump Control

Introduction

To prevent the chiller to start up without flow, safety checks are performed.

First there is a check to make sure that water flows through the system.

The pump control of the user menu allows the user to define the pump lead and the pump lag time.

2

Pump lead time

Time Between Main
Pump / Fan and Comp.
Start
030 s

When the unit is switched on, the pump will run for 30 seconds before the chiller (compressors) can start. During this 30 seconds pump lead time you also need a closed flow switch for 20 seconds.

Pump lag time

Delay on Switching
the Main Pump Off
180 s

When an off signal is given to the controller (thermostat, local/remote switch,...) the pump will run for another 180 seconds before switching off (pump lag time). During this 180 seconds, the unit will execute the pump down procedure.

3.12 Auto Restart after Power Failure Function

Function description

The Auto restart after power failure allows the unit to restart after a power failure.

- When the Auto restart is enabled the unit will automatically restart after the power failure.
- When the Auto restart is disabled the unit will not automatically restart after the power failure. The unit needs to be restarted manually.

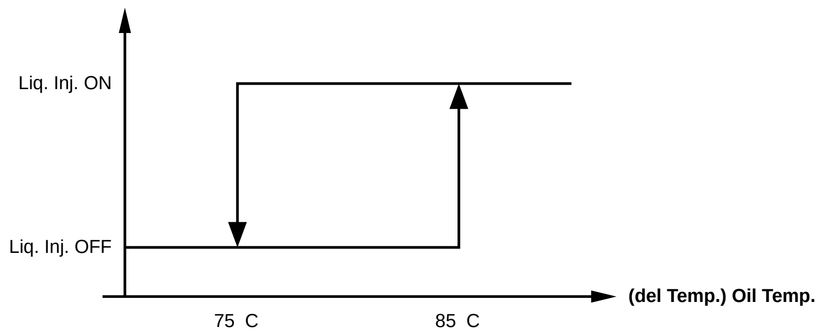
This function can be enabled/disabled in the user menu.

Autorestart After	
Power Failure	Y / N

2

3.13 Liquid Injection

Function description



- ➤ When the oil temperature (PT1000; del. temp.) is higher than 85°C (default) the liquid injection will be activated.
- ➤ When the oil temperature decreases to 75% the loquid injection will be disabled.

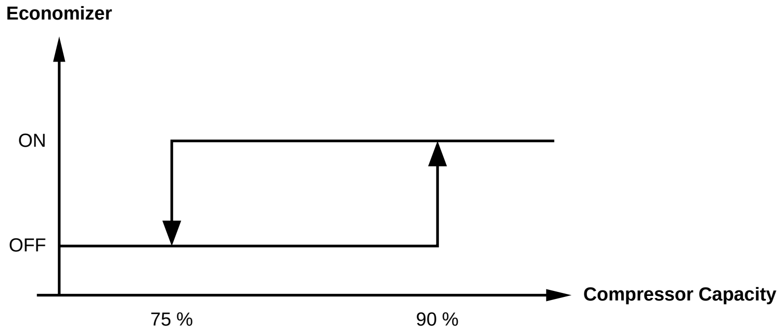
Liquid Injection	
Setpoint	085 ˚C
Diff.	10.0 ˚C

3.14 Economizer Function

This economizer function is only present on the EWAD650-C21BJYNN/A and EWAD600-C10BJYNN/Z units.

2

Function description



- When the compressor capacity reaches 90% the economizer will be activated.
- When the economizer is active, and the compressor capacity drops to 75%, then the economizer will be deactivated.

Enable Economizer	Y / N
Economizer ON	90 %
Economizer OFF	75 %

3.15 EXV Pre Opening

Function description

Because the unit stops with a pump down, it will restart with a pre-purge (opening - closing of the expansion valve).

At start up the valve will open (up to 50%) and close to the evaporator with a certain amount of liquid.

```
EXV  PreOpening

                                 50 %
```

2

3.16 Compressor Configuration

Function description

This controller screen will allow you to modify the number of compressors and evaporators on the unit. The selection of the compressors and evaporators has to be done according to the unit.

Compressor Configuration	
Numbers of Compressors	2 - 4
Numbers of Evaporators	1 - 2

3.17 Compressor Management

Introduction

The compressor sequencing mode determines which circuit starts up first in case of a capacity demand. It prevents the unit from always starting the same circuit. Also, compressor timers are implemented to avoid too many compressor starts in 1 hour.

2

Compressor sequence

The compressor sequence of starting up can be selected in the user menu.

Compressors
Sequencing
Auto / Manual

- Auto: The selection of the compressor sequence will be done by the controller depending on the running hours.
- Manual: The selection of the compressor sequence is fixed according to the entered sequence. When manual is selected, the following screen will appear.

Set Compressor Stage	
C # 1 1st	C # 2 2nd
C # 3 3rd	C # 4 4th

Compressor timers

The compressor timers are implemented to prevent too many compressor starts.

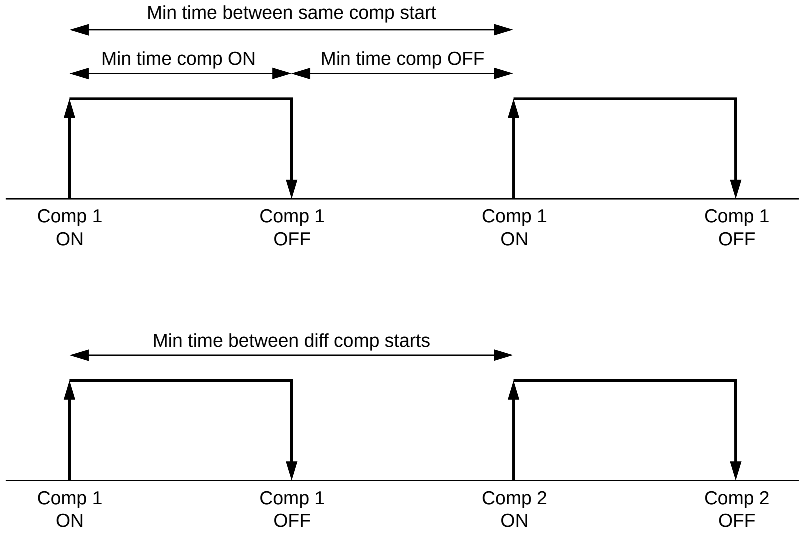
The time set for the compressor to start is 600 seconds. This is to prevent breakdown of the compressor.

Min T Between Same	
Comp. Starts	600 s
Min T Between Diff.	Diff.
Comp. Starts	120 s

Min Time Comp ON	120 s
Min Time Comp OFF	180 s

2

Function description

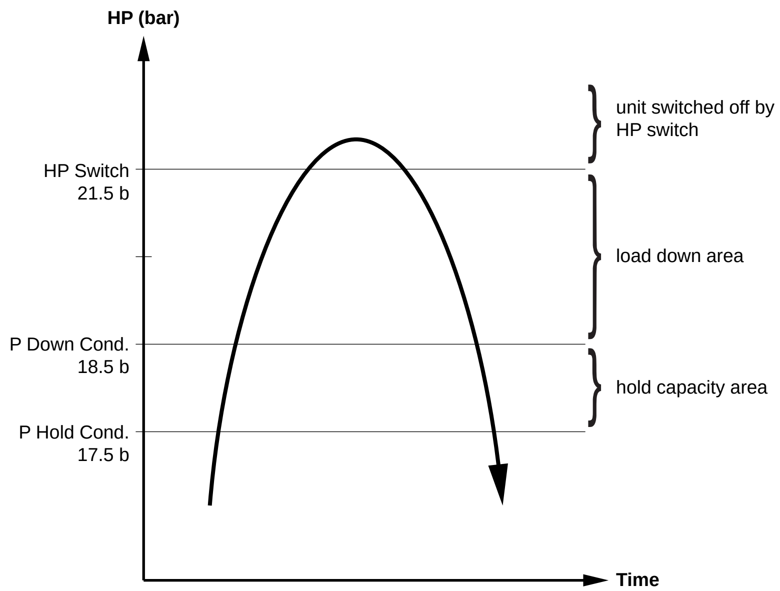


3.18 High Pressure Setback

Introduction

This is a safety prevention function, when high pressure is near to the high pressure switch setpoint. The unit will hold same capacity or will load-down to prevent the unit from tripping on the high pressure switch or transducer high pressure alarm.

Function description



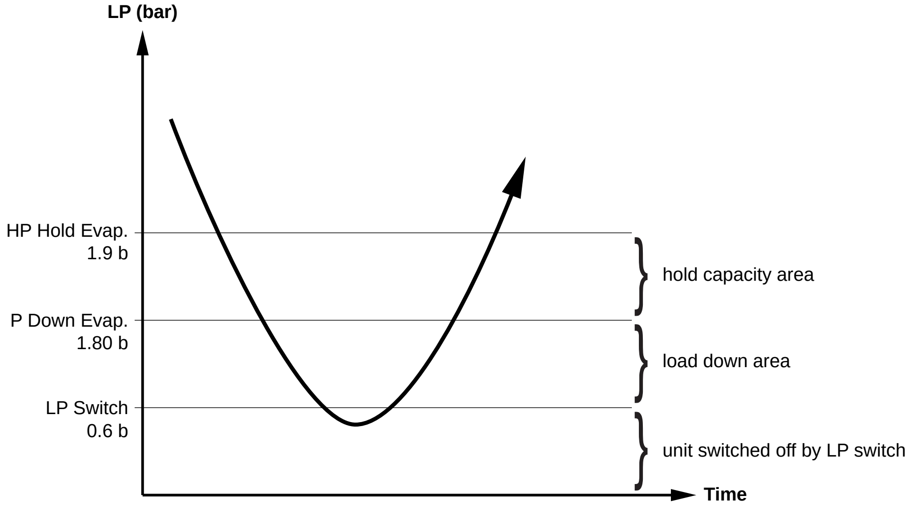
- ➤ Hold capacity area: if the HP is above the “P hold cond” setpoint (default 17.5 bar) the compressor will hold the same capacity (no load-up possible)
- ➤ Load down area: if the HP is above the “P down cond” setpoint (default 18.5 bar) the compressor will load down in order to decrease the high pressure
- ➤ Above HP switch: the unit will shutdown safely

3.19 LP Prevention

Introduction

This is a safety prevention function, when the low pressure is near to the low pressure switch. The unit will hold same capacity or will load down to prevent the unit from tripping on the low pressure switch.

Function description



- ➤ hold capacity area: if the LP is below the “P hold evap” setpoint (default 1.9 bar) the compressor will hold same capacity (no load up possible)
- ➤ load down area: if the LP is below the “P down evap” setpoint (default 4.8 bar) the compressor will load down in order to increase the low pressure
- ➤ below LP switch: the unit will shutdown safely

3.20 Capacity Control

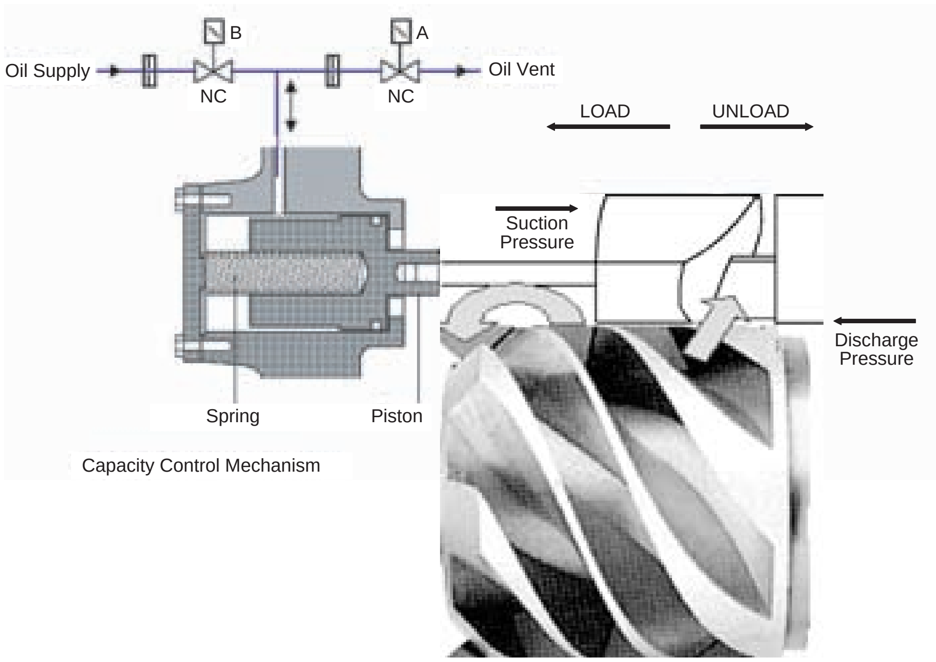
Introduction

Cooling capacity control is infinitely variable by means of a capacity slide controlled by a microprocessor system. Each unit has infinitely variable capacity control from 100% down to 6.25% (four compressor units), to 8.3% (three compressor units) to 12.5% (two compressor units). This modulation allows the compressor capacity to exactly match the building-cooling load. The result is a decrease in chiller energy costs, particularly at the part-load conditions at which the chiller operates most of the time. Additionally, in some cases there should be the possibility to avoid inertial tank in the water circuit.

2

Function description

The compressor capacity, moving of the sliding vane, is done by oil pressure. The controller will decide to feed or to drain oil from the capacity control pisto compartment in order to load or download.



- ➤ When the unload valve (B) is energized, the valve will feed oil to the piston and the slide will move to the right (loading down).
- ➤ When the load valve (A) is energized, the valve (A) will open. The discharge pressure will push the sliding vane to the left and the oil will drain via the loading valve.

Number of pulses

The compressor load regulation is controlled by a fixed number of pulses to the two solenoid valves, draining and feeding oil in the slide valve chamber.

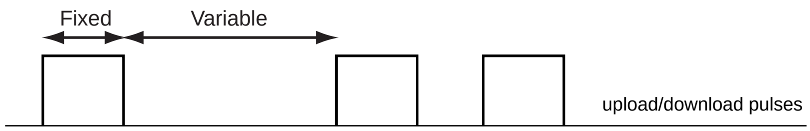
With the default settings, the compressor will load from 25% capacity to 100% capacity in 15 pulses.

Number of Pulses To Load Comp.	15
Number of Pulses To Unload Comp.	15

2

Pulse time

The time of the pulse time is fixed (default 0.3 s). The interval time between two pulses is proportional to the PID (proportional + integral + derivative) unit request.

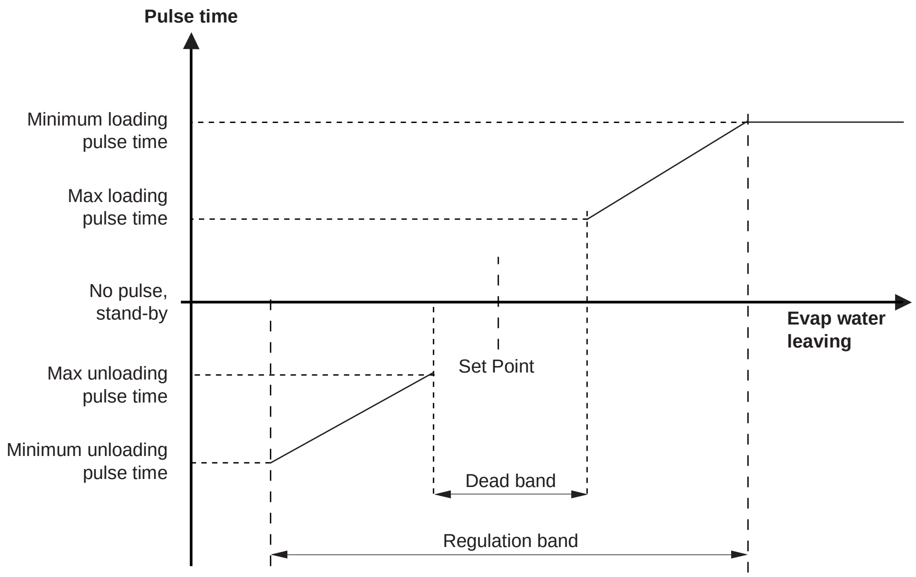


Compressor Unloading	
Pulse Time	00.3 s
Min Pulse Period	01 s
Max Pulse Period	90 s

Compressor Loading	
Pulse Time	00.3 s
Min Pulse Period	05 s
Max Pulse Period	90 s

Graph 1

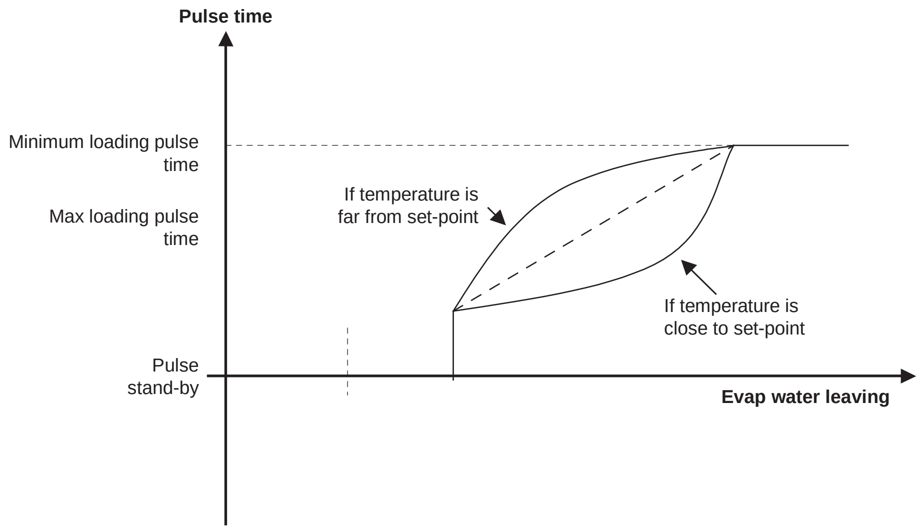
A pure proportional logic will load or unload with a frequency related to the set-point distance.



Graph 2

The derivative part of the logic controls how the temperature reaches the setpoint. If it is getting closer – increases the time between intervals, or if it is far from the setpoint – decreases the time between intervals. The result is having the controller act differently whenever the water temperature changes.

If the derivative time is increased, the control will be more sensitive to temperature changes. For example: the derivative time can be increased when a chiller is working with a very variable load. The integral time stores the memory on how the P+1 controls the temperature.



2

3.21 Pump Down Configuration at Compressor Stop

Introduction

When the unit is switched off (local, remote, thermostat) the pump down procedure will be executed.

Function description

Pump down prodecure:

- ➤ request to shut down compressor
- ➤ close electronic expansion valve
- ➤ stop compressor or when one of the two conditions is met:
  - ➤ max time of pump down = 30 seconds
  - ➤ LP is below 1.2 bar

Pump Down Config	
Enable	
Max time	30 s
Min Press.	1.2 bar

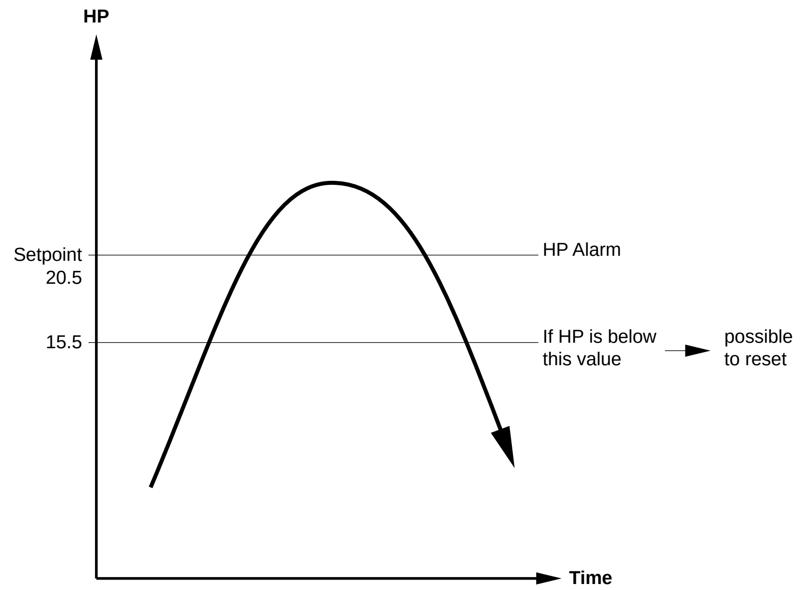
3.22 Pressure Safeties

3.22.1 Transducer high pressure alarm

Introduction

This is a software safety function. When high pressure is near to the high pressure switch setpoint, the unit will shutdown and trip on transducer high pressure alarm.

Function description

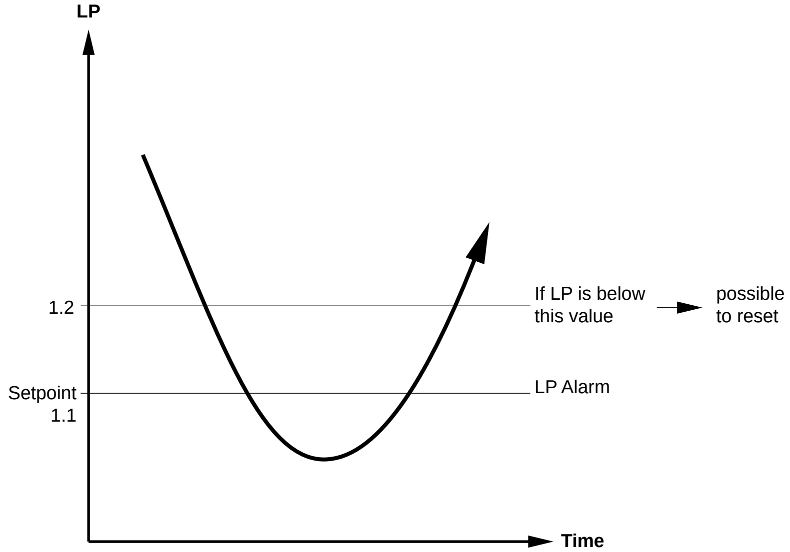


- When the pressure is above the HP setpoint, the unit will go into HP alarm.
- When the high pressure alarm is activated and the HP sinks below HP setpoint-diff, it is possible to reset the transducer high pressure alarm.
- When the high pressure rises above the high pressure switch setpoint (21.5 bar), the unit will go into alarm and a manual reset on the high pressure switch is needed.

Transducers High	
Pressure Alarm	
Setpoint	20.5 bar
Diff.	5.0 bar

3.22.2 Transducer low pressure alarm

Function description



- ➤ When the low pressure is below the LP setpoint (for the LP alarm delay time), the unit will go into LP alarm.
- ➤ When the low pressure alarm is activated and the LP rises above the LP setpoint + diff, it will be possible to reset the transducer low pressure alarm.
- ➤ When the low pressure sinks below the low pressure switch setpoint (0.6 bar), the unit will go into alarm and a manual reset on the low pressure switch is needed.

3.23 LP alarm delay

Function description

Delay timer before the unit goes into LP alarm.

➤ start delay: At start up the unit has a delay of 120 seconds before the unit can trip on LP alarm (low pressure bypass timer)

➤ run delay: When the unit is in operation, the low pressure can be below the LP alarm setpoint for a specified time before the unit will trip on LP alarm.

Low Press. Alarm Delays	
Start-Up Delay :	060 s
Run Delay :	040 s

2

3.24 Oil Management Safeties

3.24.1 Pressure ratio alarm

2

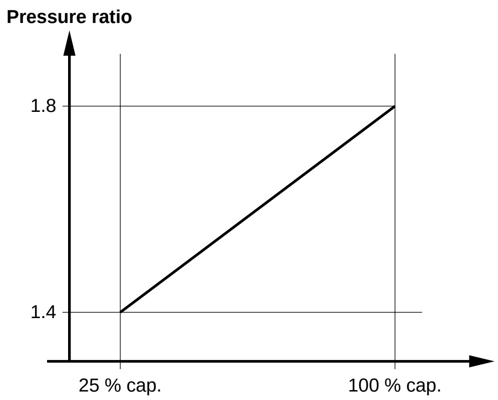
Introduction

Because the capacity control is done by oil pressure it is very important to have a minimum pressure difference between LP and HP to be able to move the sliding vane.

Function description

When the pressure ratio is too small for a specified time, the controller will give an alarm.

$$\text{pressure ratio} = \frac{\text{discharge pressure (Abs)}}{\text{suction pressure (Abs)}}$$



- ➤ When the unit is at 25% capacity, the unit will go into alarm when the pressure ratio is below 1.4 for a specified time.
- ➤ When the unit is at 100% capacity, the unit will go into alarm when the pressure ratio is below 1.8 for a specified time.
- ➤ When the unit is between 25% and 100% capacity the unit will go into alarm when the pressure ratio is below the calculated value for a specified time.

Pressure Ratio Alarm	
Min Load Setp	1.4
Max Load Setp	1.8

3.24.2 Pressure ratio alarm delay

Function description

Delay time before the unit goes into pressure ratio alarm.

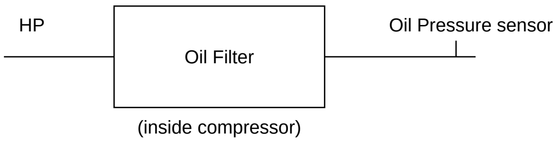
- ➤ start up delay: At start up the unit will start to check the pressure ratio after the 180 seconds start up delay timer.
- ➤ run delay: When the unit is in operation, the pressure ratio can be below the setpoint for a specified time before the unit will trip on pressure ratio alarm.

Pressure Ratio Alarm	
Start-Up Delay	180 s
Run Delay	90 s

3.24.3 High Oil DP Alarm

Function description

When the pressure drop across the oil filter becomes too big (higher than 2.5 bar) the unit will shut down and generate the high oil DP alarm.



Alarm activates when DP is higher than 2.5 bar (default) for 20 seconds (default).

DP = (HP – oil pressure)

High Oil DP Alarm	
Setpoint	2.5 bar
Delay	20 s

3.25 Head Pressure Control

3.25.1 Fan Management

2

Purpose

To regulate the high pressure

There are 3 possible setting depending on the unit and options:

- Fan steps on/off management
- Phase cut fan management on all fans
- On/off fans + phase cut fan management

Function description

In the controller, the fan management has to be specified. First of all the fan type and fan steps have to be selected.

Condensation	
Enable	Press.
Type	Steps
Fan Steps	1 - 4

Explanation: enable

- None: not used
- Press: fan management is based on the high pressure of the unit
- Temp: not used

Type:

- VFD (variable fan drive) - when the unit is equipped with phase cut fans, this type of fan should be selected.
- Steps - when the unit is equipped with on/off fans, this type of fan should be selected.
- Speedtr - when the unit is equiped with the option OPLA (Option Low Ambient), this type of fan should be selected.

Fan steps:

According to the unit the number of fan steps has to be entered. This setting is only present when the unit is equipped with on/off fans.

3.25.2 Phase cut fan management

Function description

The fan will work according to regulation.

➤ Through a signal 0-10 VdC (coming from the controller), it is possible to control an external regulator of speed (phase cut device). The MicroTech II controller, besides regulating the fan speed in accordance with the corresponding pressures, enables the on/off function.

The screen is only visible when VFD is selected.

Inverter Config.	
Max. Speed	10.0 V
Min. Speed	0.0 V
Speed Up Time	1 s

➤ The fans will operate at maximum speed when the controller gives a signal of 10V and at a minimum speed when the controller gives a signal of 0V

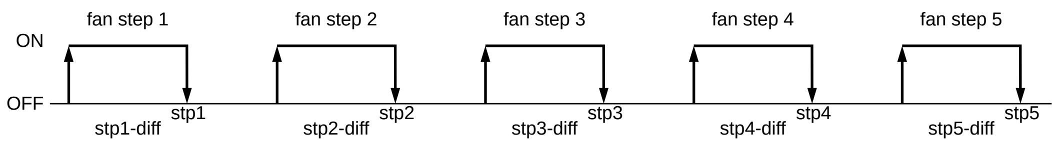
➤ When the fan has to start, the controller will give a maximum speed signal (10V) for 1 second. This is to speed up the fan at fan start. After this speed up time the fan will go to the required fan speed.

3.25.3 Fan steps on/off management

Function description

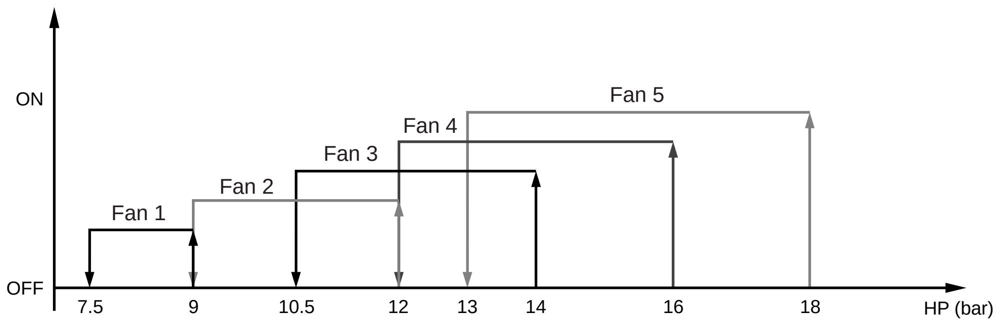
The fan will work according to regulation.

Below is an example for 5 fan steps:



Each step has a different setpoint and differential to cut in and out. These settings can be entered in the manufacturer menu.

Condensation					
Fan step n°	1	2	3	4	5
Setpoint	9.0 bar	12.0 bar	14.0 bar	16.0 bar	18.0 bar
Diff	1.5 bar	3.0 bar	3.5 bar	4.0 bar	5.0 bar



2

Manufacturer menu

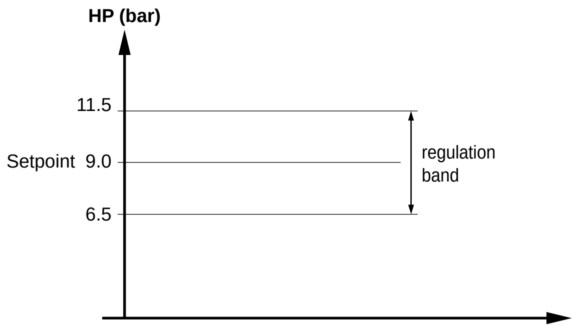
Cond Regulation	
Regul. Band	05.0 bar
Neutral Band	00.0 bar

Cond. Regulation	
Integral Time	600 s
Derivative Time	001 s

These parameters are used for the PID function

Maintenance menu

Condensation	
Setpoint	09.0 bar



The controller will calculate the fan speed according to the HP to match the entered HP setpoint.

3.25.4 On/off fans + phase cut (OPLA) management

Function description

The logic of regulation of this system is only present in the units with OPLA and is similar to the two previously described functions. The speed regulator is applied only to some fans while the others are controlled with the steps system. Such system allows the operation of the units in very low air temperatures without the necessity to install complex and more expensive solutions.

3.25.5 Fan silent mode

Function description

This function is only available when the unit is equipped with VFD fans.

The fan silent mode function allows to reduce the unit noise limiting the maximum fan speed according to a time schedule. The function may operate only if a continuous speed regulation is adopted. Its parameters may be set under “User” password. The function is bypassed anytime the condensation pressure exceeds the condenser pressure stage hold threshold.

This function will allow to limit the maximum fan speed in certain periods of a day or some days of the year. It is accessible under the user menu and bypass in case of high pressure problems (stage hold or stage down).

Fan Silent Mode		S
Max Inv. Out		06.0 V

_FSM Monday–Friday		
	Start	Stop
1st	00:00	06:00
2nd	18:00	23:59

_ FSM Saturday		
	Start	Stop
1st	00:00	23:59
2nd	14:00	00:00

FSM Force On Days (1)		
00/00	00/00	00/00
00/00	00/00	00/00
00/00	00/00	00/00

FSM Force On Days (2)		
00/00	00/00	00/00
00/00	00/00	00/00
00/00	00/00	00/00

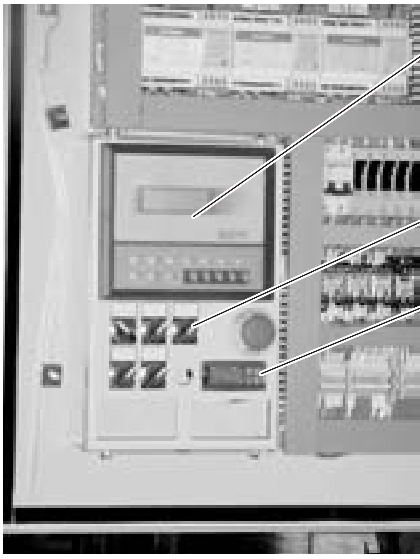
2

3.26 Heat Recovery Microprocessor Control

Function description

All the units equipped with the heat recovery water condensers have an additional “microprocessor control” to manage the heat recovery function of the unit.

The microprocessor is installed inside the main control box below the MicroTech key pad as shown below.



Microtech Key Pad
Chiller Operation

HEAT RECOVERY OPERATION

Switch Selector "Q7"
"0" Cooling Mode
"1" Heat Recovery Mode

Heat Recovery
Microprocessor
Control

Carel type "IR32"

Two different models of microprocessor control are used:

- ➤ **IR32W** units with two heat recovery condensers
- ➤ **IR32Z** units with three or four heat recovery condensers

Both models are equipped with the temperature sensors NTC and PR100 to control the entering water temperature to the heat recovery condenser, and measuring the temperature of leaving hot water. Temperature sensors are supplied electrically and are connected to the microprocessor but not installed in the pipe well pocket. The activation of this device must be done locally by the installer.

The specifications of the sensors are the following:

- ➤ **W10** to be installed at the entrance of the condenser
- ➤ **W11** to be installed at the exit of the condenser

When the selector switch Q7 enables the heat recovery mode, the sensor “W10” measures the hot water temperature value. If the value is below the setpoint temperature value, it allows the first step to switch the four-way valve from chiller to heat recovery cycle. If the setpoint temperature is not achieved the microprocessor control inserts all the other steps available according to the number of refrigerant circuits. On the contrary, if the water temperature exceeds the setpoint value the microprocessor control switches off the steps until the correct temperature is achieved inside the band.

It is of course mandatory that the heat recovery condenser flow switch is on, otherwise the unit will never switch the heat recovery cycle on.

The microprocessor control is normally set at the factory. To verify or change the setpoints, see the user manual supplied with the unit.

3.27 Heat Recovery Operation

Function description

The unit supplied with the heat recovery condensers is equipped with an additional microprocessor TC10 (see electrical wiring diagram) with two, three or four steps to control the hot water temperature according to the number of heat exchangers installed in the unit (one step for each compressor). For reference on how to set this microprocessor, see the specific manual supplied with the unit. The heat recovery mode is avaliable only if there is a request for cooling load and the capacity depends on the number of compressors running and their unloading positions.

To run the unit in heat recovery mode, follow the items listed below:

1. Verify the installation of the water flow switch done by the installer and check the electrical connections at M3.426 and M3.427 terminal blocks inside the electrical panel.
2. Verify the installation of the microprocessor sensor in the pocket well of the water return common header (done by the installer).
3. Check the setpoint of the return water temperature on the display of the microprocessor TC10 (Carel IR32). Do not exceed the maximum water temperature allowed (see the operating limits) to avoid shutdown of the unit due to high pressure.
4. Switch the water pump on.
5. Switch “ON” the selector “Q7” which allows the unit to run in heat recovery mode. If the microprocessor TC10 asks for hot water, the four-way valve changes the refrigerant circuits from the condenser coil to the heat recovery condenser (first step) and inserts the other circuits until the return hot water is matching the setpoint. In this condition, the fan motors of the respective condenser coils are switched “OFF”. Inversely, when the microprocessor reduces the steps, the four-way valve changes the refrigerant circuits from the heat recovery condenser to the condenser coil and switches on the respective fan motors.
6. In case of lack of water in the heat recovery condenser, the unit automatically switches to cooling mode only.

3.28 Heat Recovery Microprocessor Set-up

Function description

The unit supplied with the heat recovery condensers is equipped with an additional microprocessor TC10 (see electric wiring diagram) with two, three or four steps to control the hot water temperature according to the number of heat exchangers installed in the unit (one step for each compressor). For reference on how to set this microprocessor, see the specific manual supplied with the unit.

Below are important setup values (for references, see the microprocessor manual):

Item	Description	Setpoint
St1	Inlet water temperature setpoint	Max 50
St2		N/A
CO	Operating Mode	1
P1	Differential Setpoint	2
P2		N/A
C4	Authority	0.5
C5		1
C6		0
C7		3
C8		5
C9		0
C10		0
C11		0
C12		20
C13		1
C14		0
C15		0
C16		100
C17		5
C18		0
C19		0
C21		30
C22		43
C23		N/A
C24		N/A
P25		8
P26		55
P27		2
P28		20
C29		4
C30		N/A
C31		0
C32		1
C33		0
C50		4
C51		0

Part 3
Troubleshooting

3

Introduction

When a problem occurs, all possible faults have to be checked. This chapter gives a general idea of where to look for faults. Furthermore the general procedures for refrigeration circuit repair and for electrical circuit repair are explained.

Remark

Not all repair procedures are described. Some procedures are considered common practice.

What is in this part?

This part contains the following chapters:

3

1 Overview of Fault Indications and Safeties

1.1 What Is in This Chapter?

3

Introduction

In the first stage of trouble shooting sequence it is important to interpret the fault indication on the controller display. This will help you to find the cause of the problem.

Overview

This chapter contains the following topics:

1.2 What to do in the Event of an Alarm?

In the event of an alarm or a warning, the following must be done..

Step	Action	Result
1	Press Alarm button to acknowledge the alarm.	➤ The Alarm button LED lights up. ➤ A unit, circuit or network safety is displayed.
2	Find the cause of the alarm and correct it.	The system is repaired.
3	Press Alarm button to reset the alarm.	➤ The Alarm button LED goes out and the alarm screen is deactivated. ➤ “No alarm detected” is displayed on the screen. ➤ Press Menu button to go back to normal screen. **Remark:** After resetting the alarm it is possible to consult the safety information by using the buffer alarm menu.
4	After the error is corrected and and the alarm reset, the unit will automatically restart.	The unit starts again.

1.3 Overview of Safeties

The following table shows the list of possible alarms with the identifier number, the cause and the reset type (A = auto, M = manual).

Alarm		Alarm cause	Reset
001	Phase monitor	Intervention of the device control of phases. The phases are not correctly sequenced or the supply voltage is out of acceptable limits.	M
002	Freeze alarm	Anti-freeze protection. The outlet water temperature is equal to the anti-freeze value.	M
005	Evaporator Flow Alarm	Intervention of Evaporator Flow switch. The water pump could be off.	M
006	Low pressure alarm (transducer)	Low pressure intervention by microchip	M
007	High discharge temperature alarm (temperature switch)	Intervention of the discharge temperature switch	M
008	Fault transition	Starting procedure is not complete. Verify the contactors.	M
009	Low oil pressure	The oil pressure is not enough for the correct lubrication of compressor. Verify if the condensing pressure is at least 3 times the suction pressure.	M
011	High oil pressure difference	High oil differential pressure. The oil filter could be dirty or the solenoid valve doesn’t work correctly.	M
012	High pressure alarm (pressure switch)	Intervention of the high pressure mechanical switch	M
016	Compressor overload	Intervention of the compressor thermal motor or intervention of the high temperature switch	M
023	High pressure alarm (transducer)	Intervention high pressure by microchip	M
030	B1 probe fault or not connected	Sensor B1 error	M
031	B2 probe fault or not connected	Sensor B2 error	M
032	B3 probe fault or not connected	Sensor B3 error	M
033	B4 probe fault or not connected	Sensor B4 error	M
034	B5 probe fault or not connected	Sensor B5 error	M
035	B6 probe fault or not connected	Sensor B6 error	M
036	B7 probe fault or not connected	Sensor B7 error	M
037	B8 probe fault or not connected	Sensor B8 error	M
039	Evaporator pump maintenance	Request of evaporator pump maintenance	M
040	Condenser pump maintenance	Request of condenser pump maintenance	M
041	Compressor maintenance	Request of compressor maintenance	M
050	Unit 1 offline	Compressor # 1 network error	A
051	Unit 2 offline	Compressor # 2 network error	A
052	Unit 3 offline	Compressor # 3 network error	A
053	Unit 4 offline	Compressor # 4 network error	A
D01	EXV Driver Probe fault	Driver EXV probe error	A
D02	EXV Step motor error	EXV valve motor error	A

Alarm		Alarm cause	Reset
D03	EXV Driver Eeprom error	Driver EXV Eeprom error	M
D04	EXV Driver battery error	Drive EXV battery error	A
D08	EXV not closed during power off	Valve doesn't close without power	M
[redacted]	Alarms Expansion E	Expansion Board Offline or not recognized	M

2 Checking the Inputs and Outputs

2.1 What is in This Chapter?

Introduction

This chapter gives information of the configuration of the unput and output channels of the MicroTech II controller.

3

Overview

This chapter contains the following topics:

2.2 List of Digital Inputs

The table below gives an overview of all the digital inputs.

N	BOARD # 1	BOARD # 2
1	Compressor # 1 On/Off	Compressor # 3 On/Off
2	Compressor # 2 On/Off	Compressor # 4 On/Off
3	Evaporator Flow Switch	---
4	Phase monitor	---
5	Double Setpoint (Ice Mode)	---
6	High pressure Switch # 1	High Pressure Switch # 3
7	High pressure Switch # 2	High Pressure Switch # 4
8		---
9	Current Limit enable	---
10	Low Pressure Switch # 1	Low Pressure Switch # 3
11	Low Pressure Switch # 2	Low Pressure Switch # 4
12	Transition Fault # 1	Transition Fault # 3
13	Transition Fault # 2	Transition Fault # 4
14	Overload # 1	Overload # 3
15	Overload # 2	Overload # 4
16	On/Off Unit	---
17	Remote Start/Stop	---
18	External alarm	---

2.3 List of Analog Inputs

The table below gives an overview of all the analog inputs.

N	BOARD # 1	BOARD # 2
B1	Oil pressure # 1	Oil pressure # 3
B2	Oil pressure # 2	Oil pressure # 4
B3	Setpoint Override	---
B4	Gas temperature on compressor discharge # 1	Gas temperature on compressor discharge # 3
B5	Gas temperature on compressor discharge # 2	Gas temperature on compressor discharge # 4
B6	Gas pressure on compressor discharge # 1	Gas pressure on compressor discharge # 3
B7	Gas pressure on compressor discharge # 2	Gas pressure on compressor discharge # 4
B8	Demand limit/Current limit	---
B9	In water Temperature (common on 2 Evap unit)	In water Temperature (common on 2 Evap unit)
B10	Evaporator Out water Temperature (Common on 2 Evap unit)	Evaporator Out water Temperature (Common on 2 Evap unit)

2.4 List of Digital Outputs

3

The table below gives an overview of all the digital outputs.

N	BOARD # 1	BOARD # 2
1	Start Compressor # 1	Start Compressor # 3
2	Load Compressor # 1	Load Compressor # 3
3	Unload Compressor # 1	Unload Compressor # 3
4	Liquid Injection # 1	Liquid Injection # 3
5	Liquid Line # 1 (*)	Liquid Line # 3 (***)
6	First step fan # 1	First step fan # 3
7	Second step fan # 1	Second step fan # 3
8	Third step fan # 1	Third step fan # 3
9	Start Compressor # 2	Start Compressor # 4
10	Load Compressor # 2	Load Compressor # 4
11	Unload Compressor # 2	Unload Compressor # 4
12	Evaporator water pump	---
13	Unit Alarm	---
14	Liquid Injection # 2	Liquid Injection # 4
15	Liquid Line # 2 (**)	Liquid Line # 4 (****)
16	First step fan # 2	First step fan # 4
17	Second step fan # 2	Second step fan # 4
18	Third step fan # 2	Third step fan # 4

Notes

(*) If Thermostatic expansion valve is used. Fourth step fan # 1 if electronic expansion valve is used

(**) If Thermostatic expansion valve is used. Fourth step fan # 2 if electronic expansion valve is used

(***) If Thermostatic expansion valve is used. Fourth step fan # 3 if electronic expansion valve is used

(****) If Thermostatic expansion valve is used. Fourth step fan # 4 if electronic expansion valve is used

2.5 List of Analog Outputs

The table below gives an overview of all the analog outputs.

N	BOARD # 1	BOARD # 2
1	VFD output signal # 1	VFD output signal # 3
2	Second VFD output signal # 1	Second VFD output signal # 3
3	SPARE	SPARE
4	VFD output signal # 2	VFD output signal # 4
5	Second VFD output signal # 2	Second VFD output signal # 4
6	SPARE	SPARE

2.6 List of Input and Output Channels of the Expansion Board # 1 (Option Economizer)

The table below gives an overview of all the inputs and outputs of the expansion board.

Analog Input

N	Expansion BOARD # 1	TYPE
1	SPARE	---
2	SPARE	---
3	SPARE	---
4	SPARE	---

Digital Input

N	Expansion BOARD # 1
1	SPARE
2	SPARE
3	SPARE
4	SPARE

Analog Output

N	Expansion BOARD # 1
1	SPARE

Digital Output

N	Expansion BOARD # 1
1	Economizer # 1
2	Economizer # 2
3	Economizer # 3
4	Economizer # 4

3 Procedure for Software Upload/Download

3.1 What is in This Chapter?

Overview

This chapter contains the following topics:

3

3.2 Copy from the Software Key to pCO²

- Switch off the pCO^2 and remove the "expansion memory" cover with a screwdriver (see "Copy from pCO² to the Software Key" on page 3–15/Fig. 1)
- Set the key selector on
- Insert the key in the corresponding pin connector as shown. (see "Copy from pCO² to the Software Key" on page 3–15/Fig. 2)
- Press simultaneously the buttons UP an DOWN then supply power to the pCO^2
- Check the LED on the key is on (red color)
- Wait until the request of copying appears on the LCD display, then release the buttons and confirm by pressing ENTER.
- The data transfer operation takes about 50s using the 1MB key and 100s using the 2MB one.the display will show a progressive series of numbers.
- Once copied the application program starts, then switch off the pCO^2, remove the key, put the cover in its place and switch on the pCO^2 again,
- Now the pCO^2 works with the program transferred by the key.

3.3 Copy from pCO² to the Software Key

- Switch off the pCO^2 and remove the "expansion memory" cover with a screwdriver (see Fig. 1)
- Set the key selector on
- Insert the key in the corresponding pin connector as shown. (see Fig. 2)
- Press simultaneously the buttons UP an DOWN then supply the pCO^2
- Check the LED on the key is on (green color)
- Wait until the request of copying appears on the LCD display, then release the buttons and confirm by pressing ENTER.
- If the application includes a password to protect the software, use the UP and DOWN buttons on the terminal to enter the correct password. Then press enter.
- The data transfer operation takes about 50s using the 1MB key and 100s using the 2MB one.the display will show a progressive series of numbers.
- Once copied the application program starts, then switch off the pCO^2, remove the key, put the cover in its place and switch on the pCO^2 again,
- Now the key has the program transferred by the pCO^2.

3

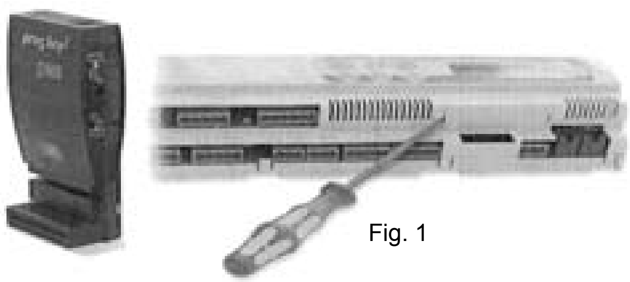


Fig. 1

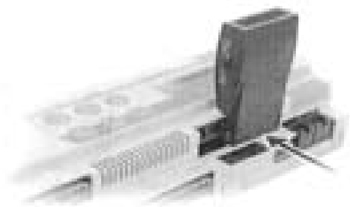
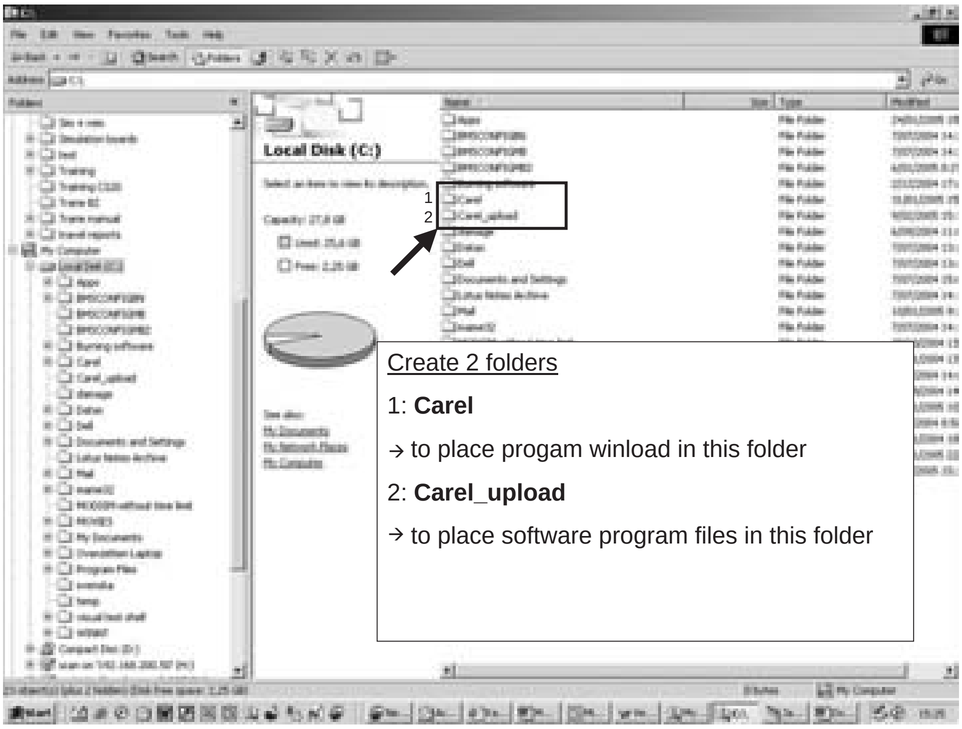
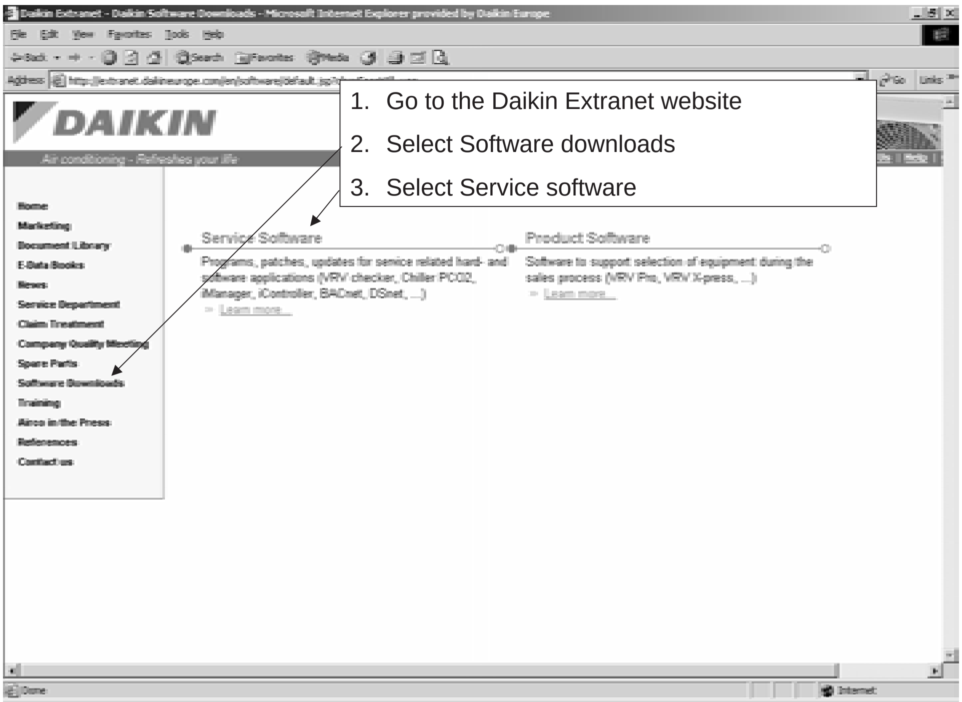
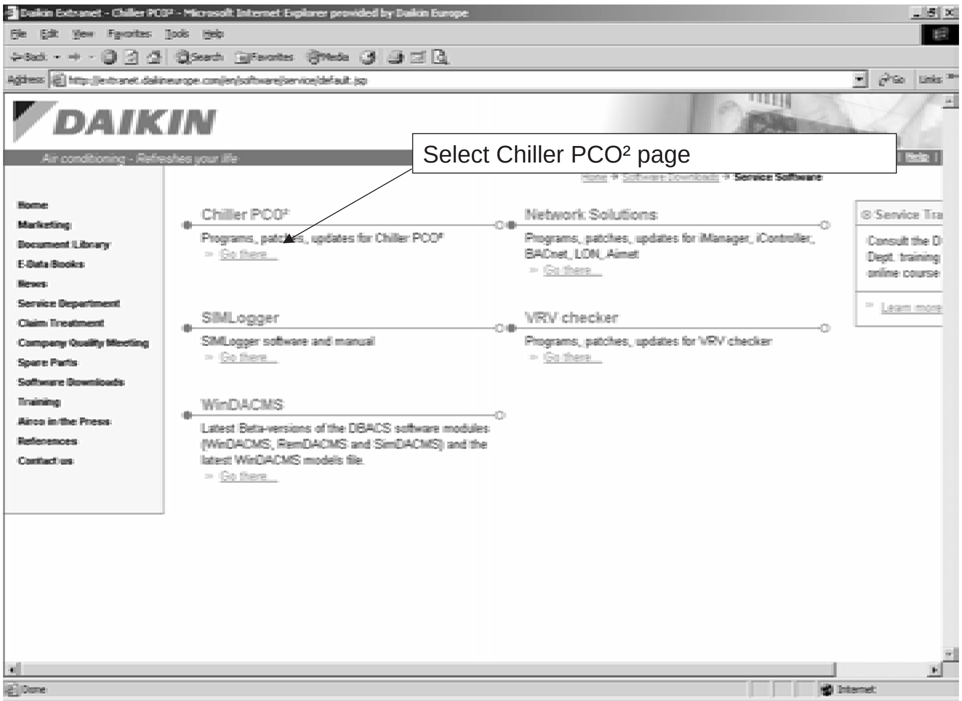
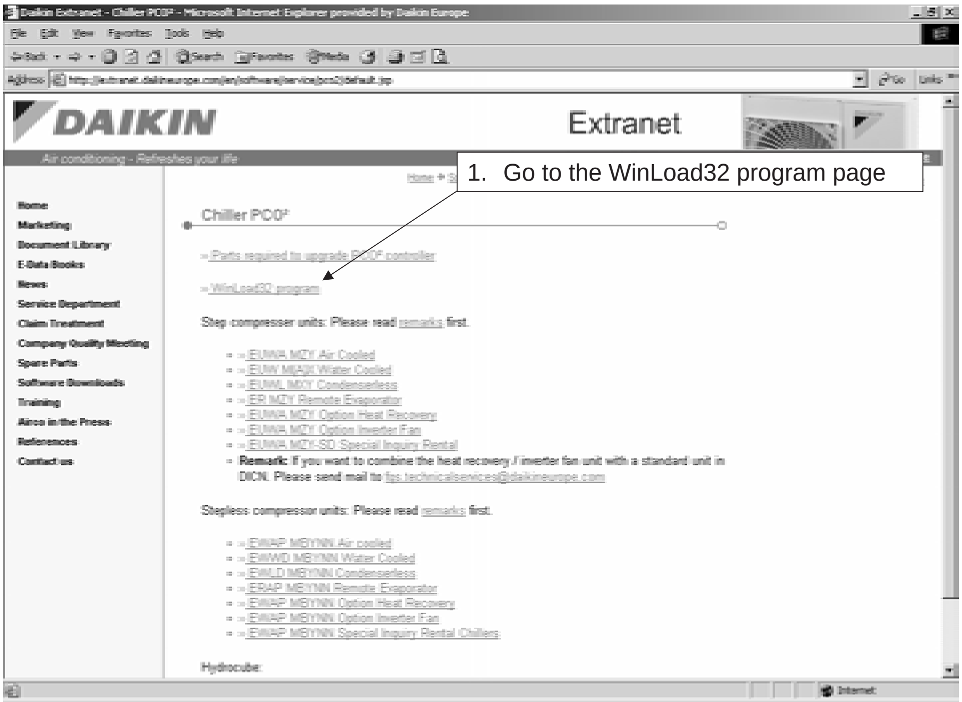


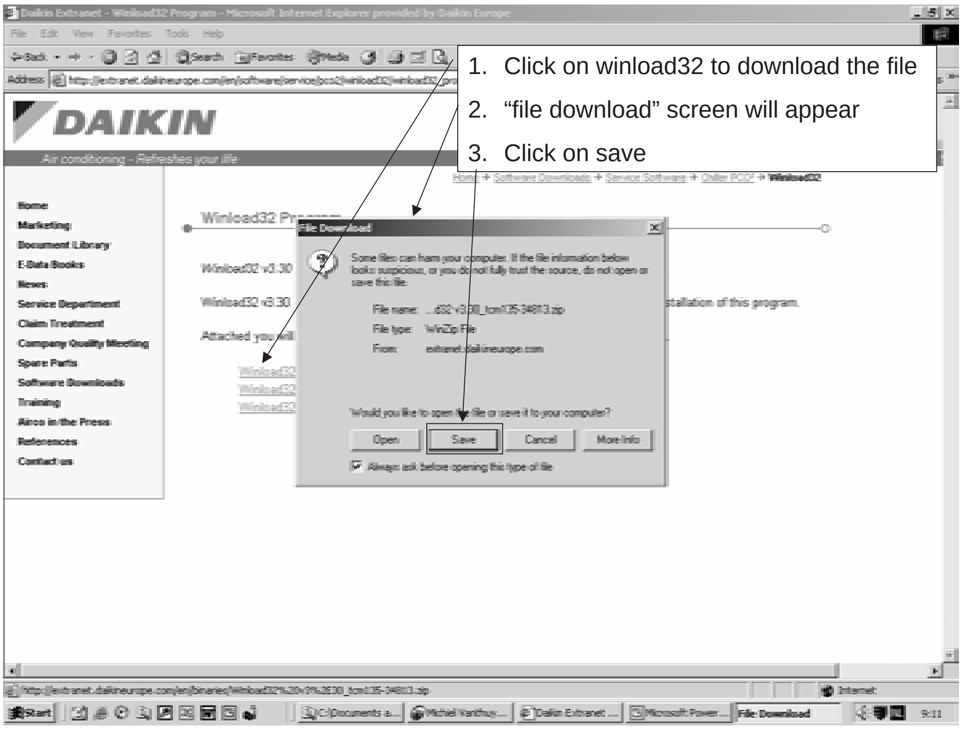
Fig. 2

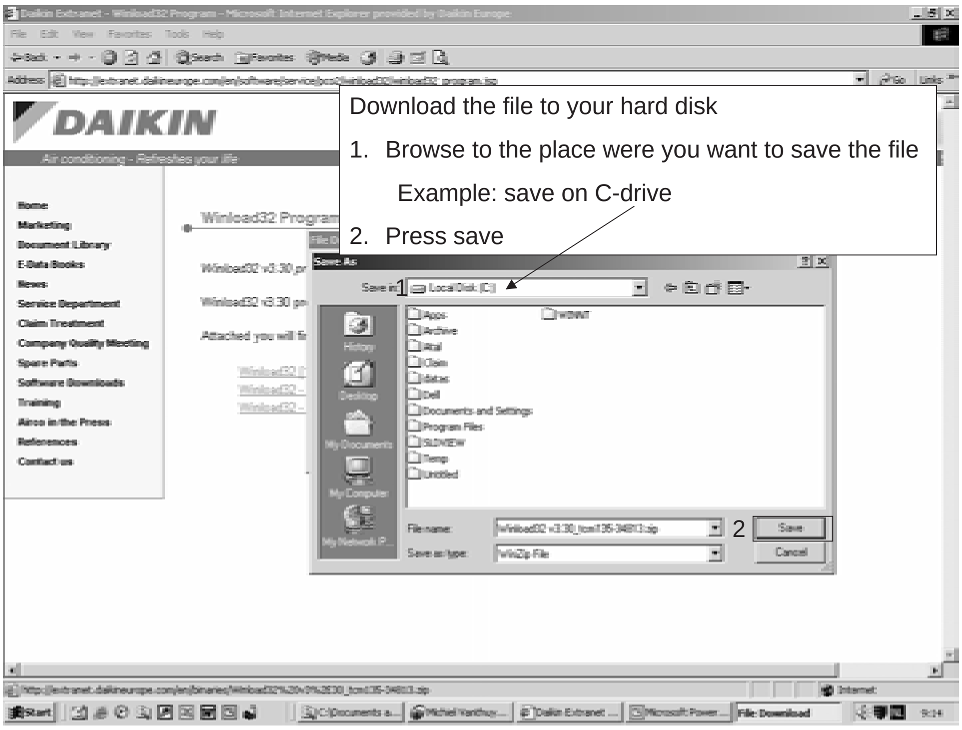
3

3.4 Installation of Winload32 on the PC and Programming a Controller

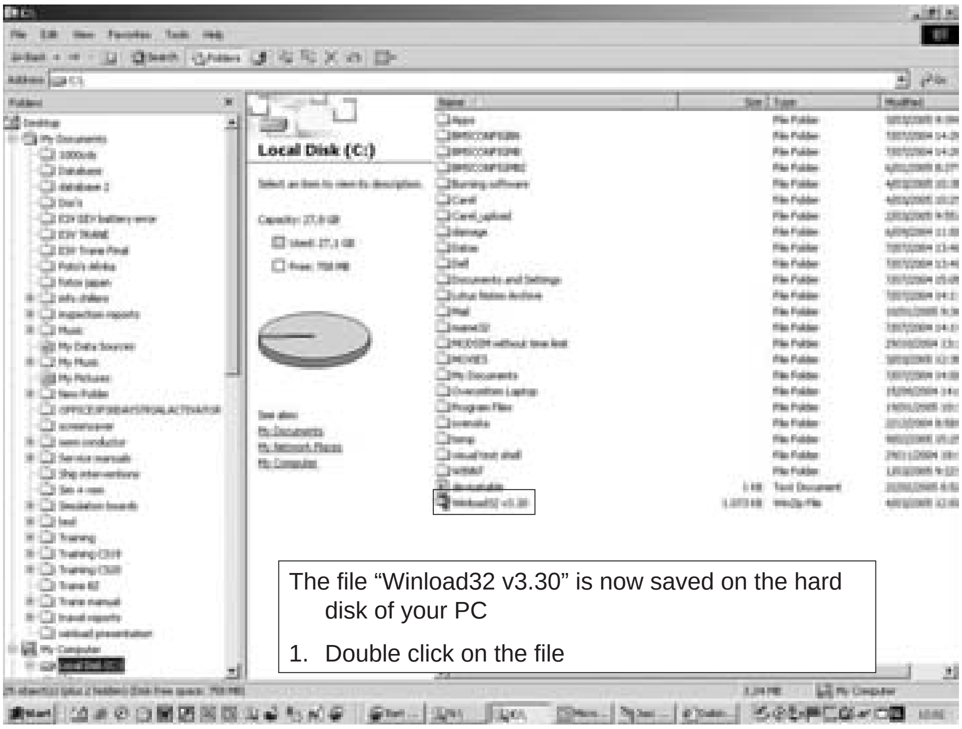
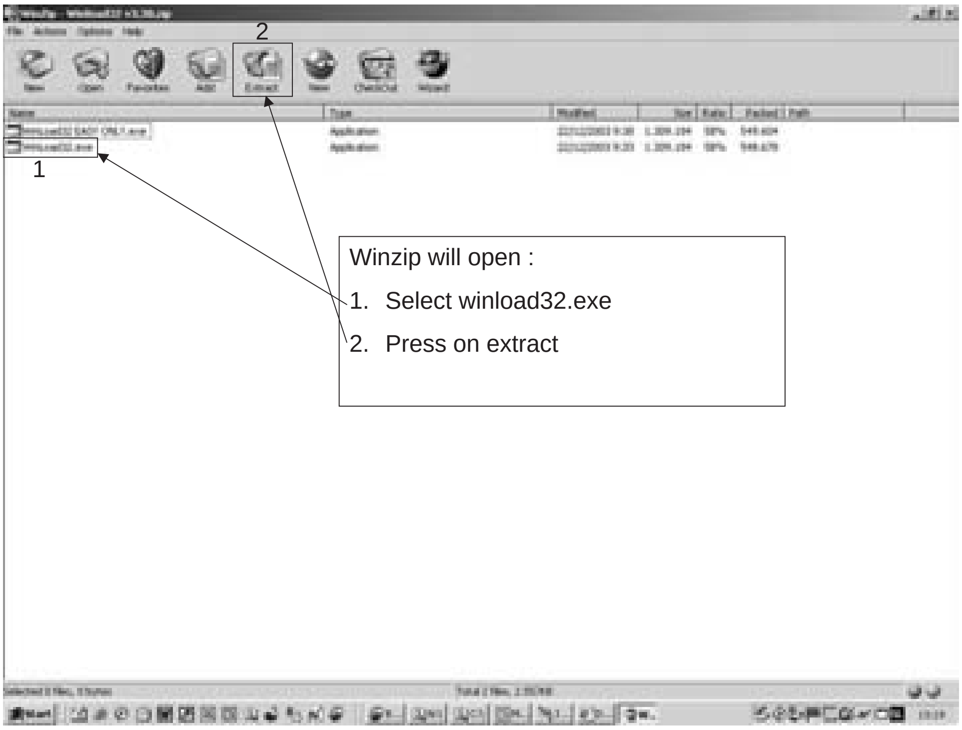
Step	Action
1	
2	

Step	Action
3	
4	

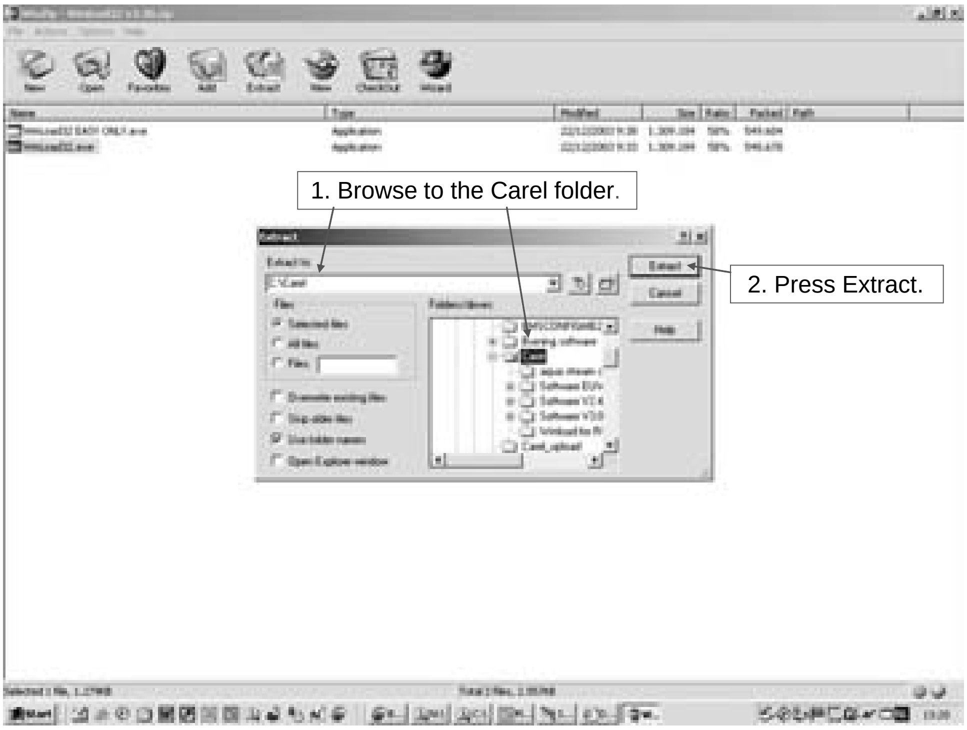
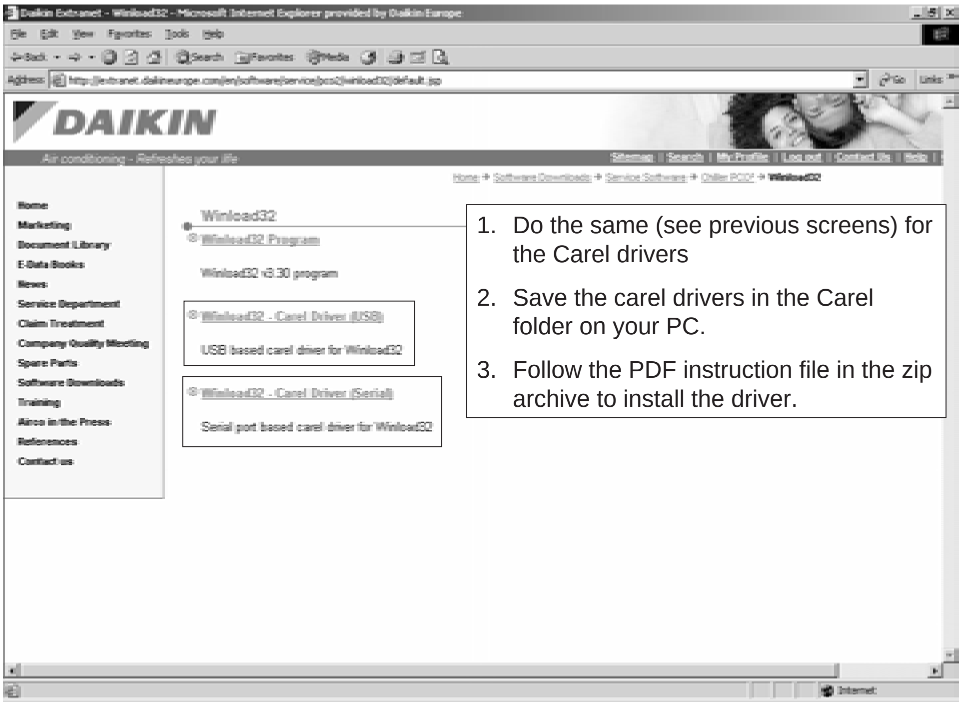
<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>5</td><td>


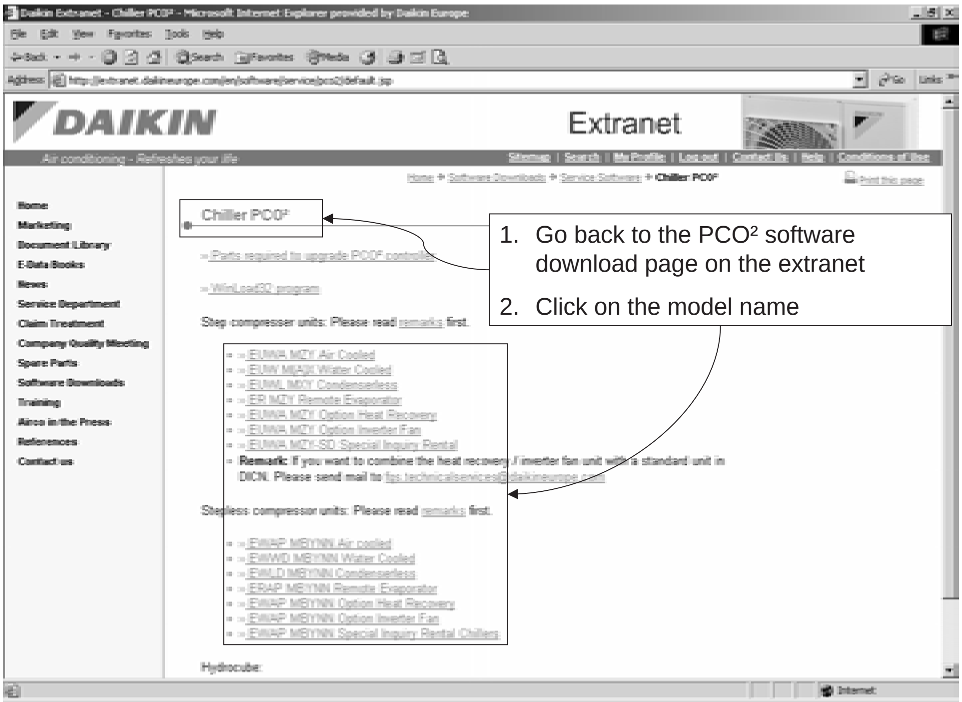
</td></tr>
<tr><td>6</td><td>


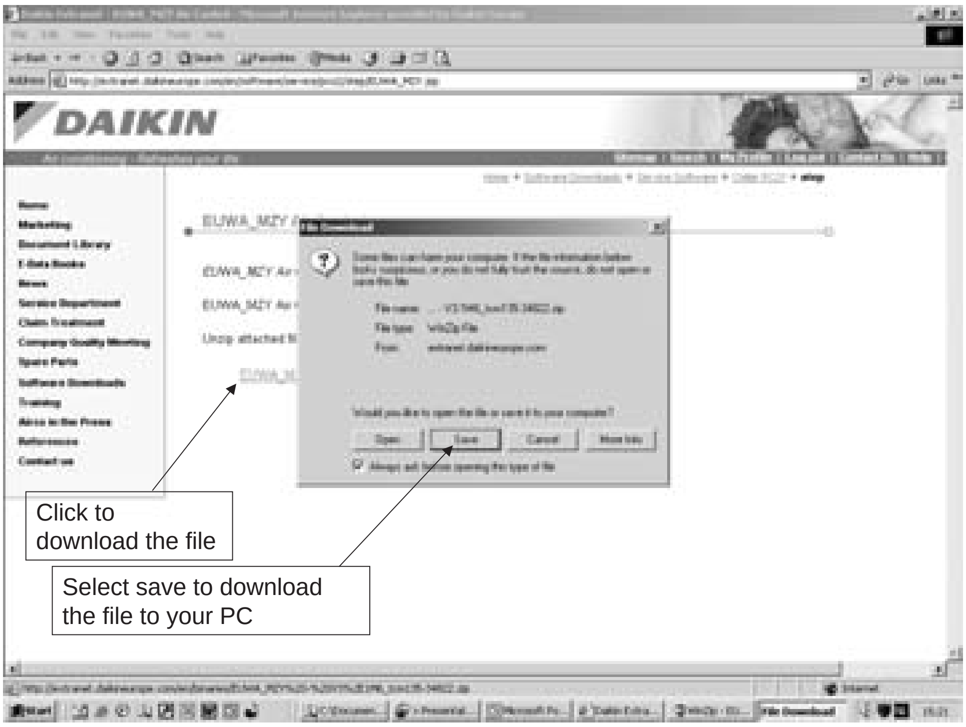
</td></tr>
</table>

Step	Action
7	
8	

3

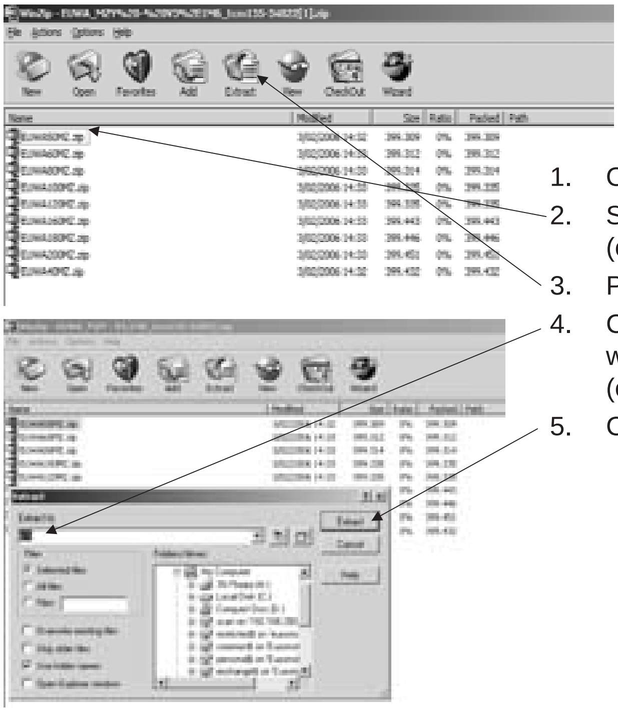
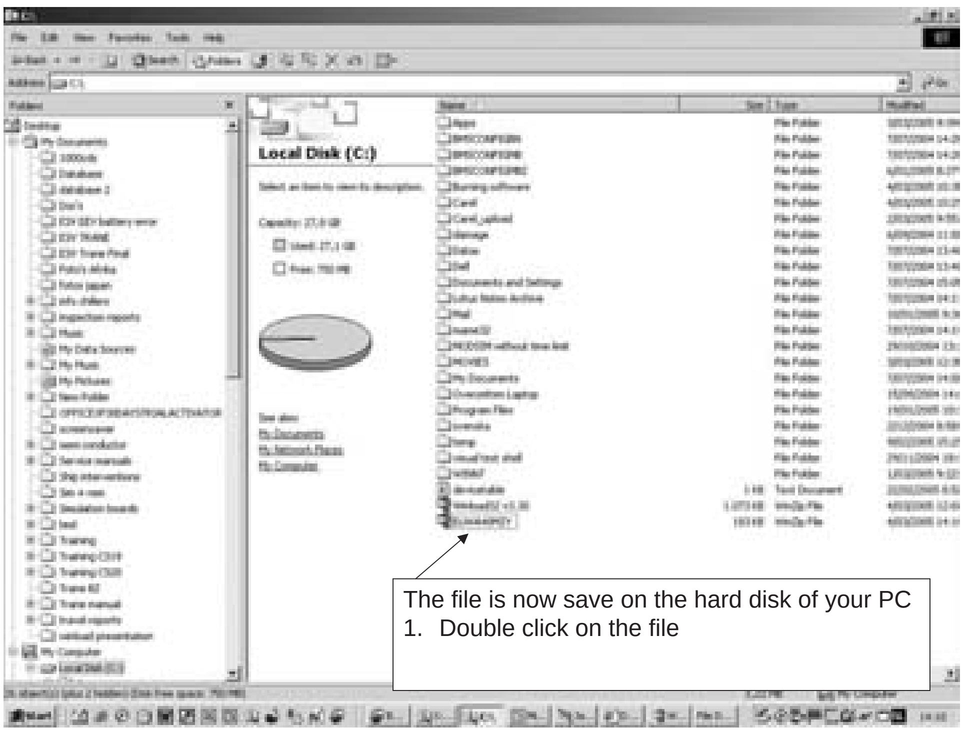
Step	Action
9	
10	

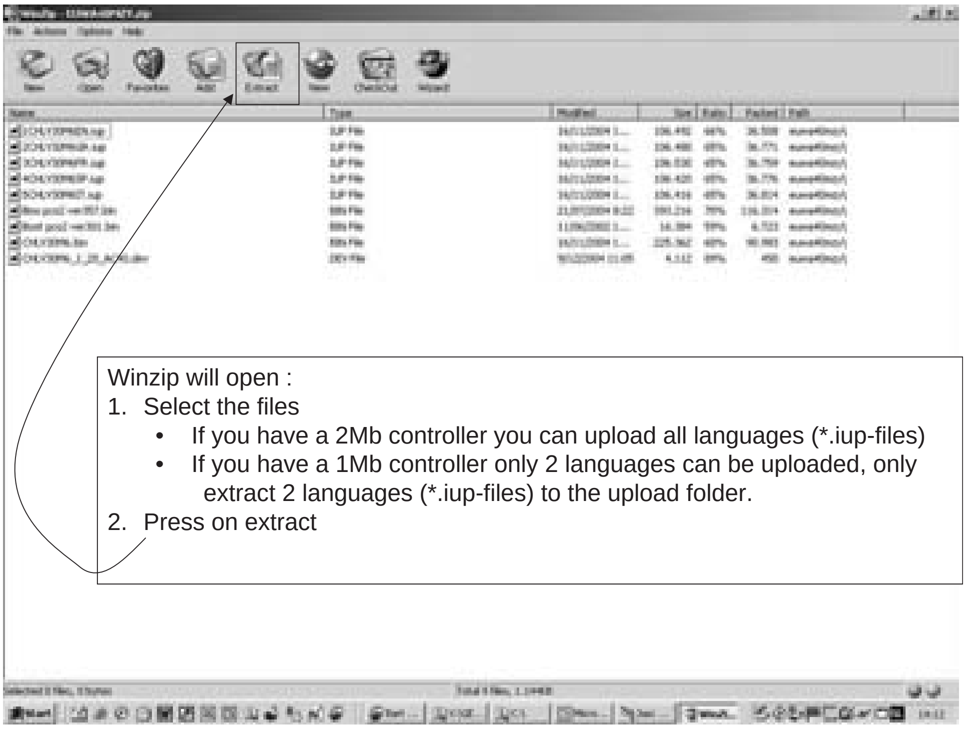
<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>11</td><td>


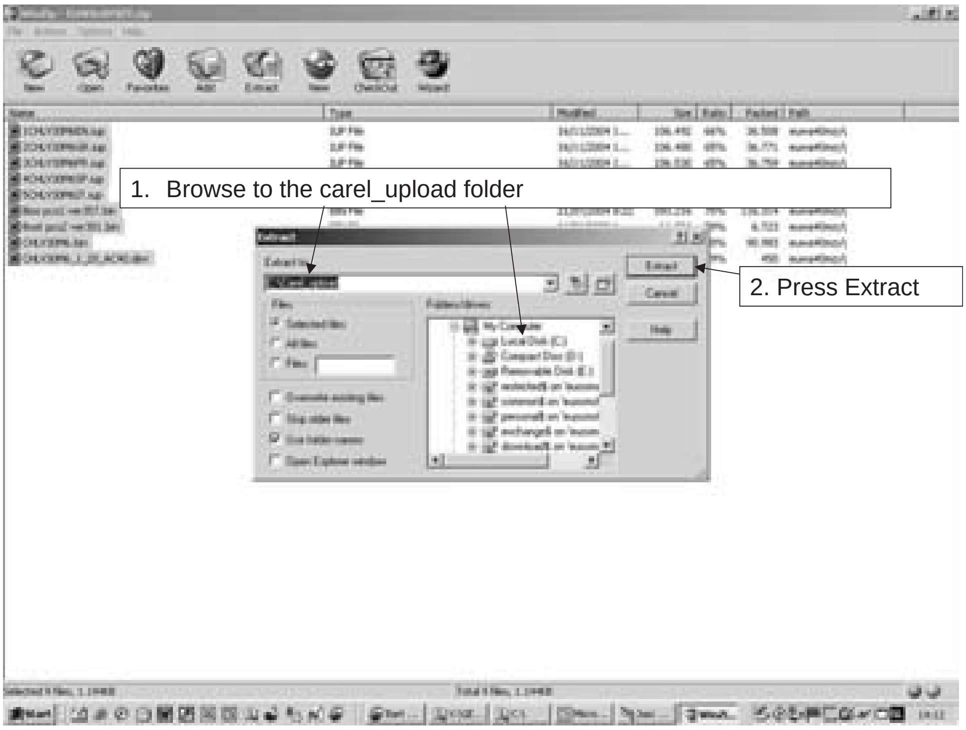
</td></tr>
<tr><td>12</td><td>


</td></tr>
</table>

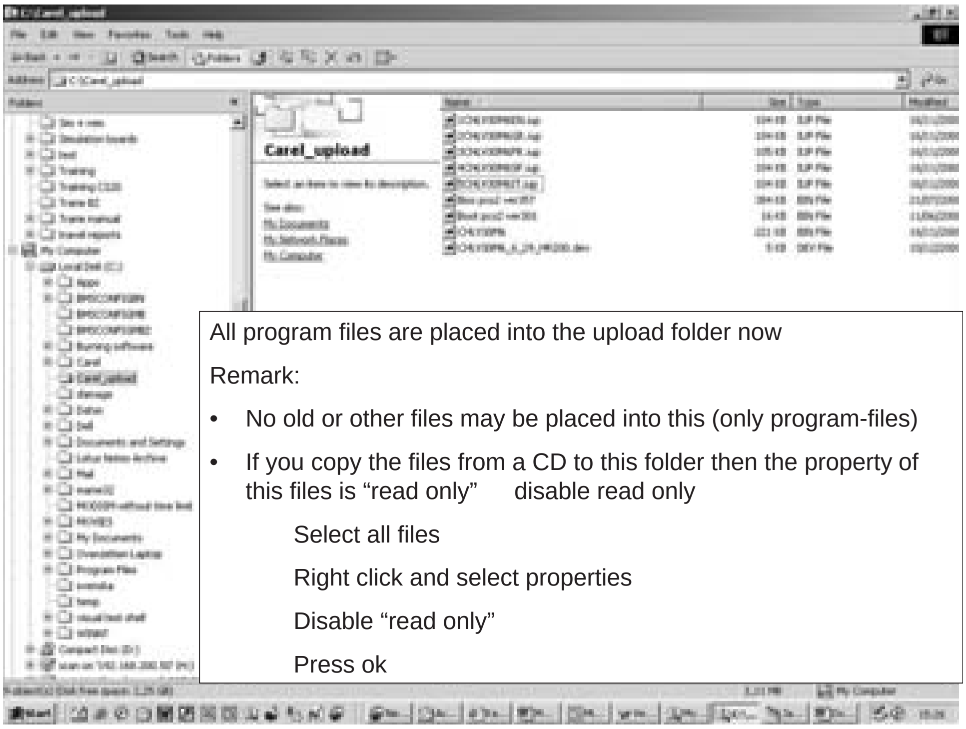
3

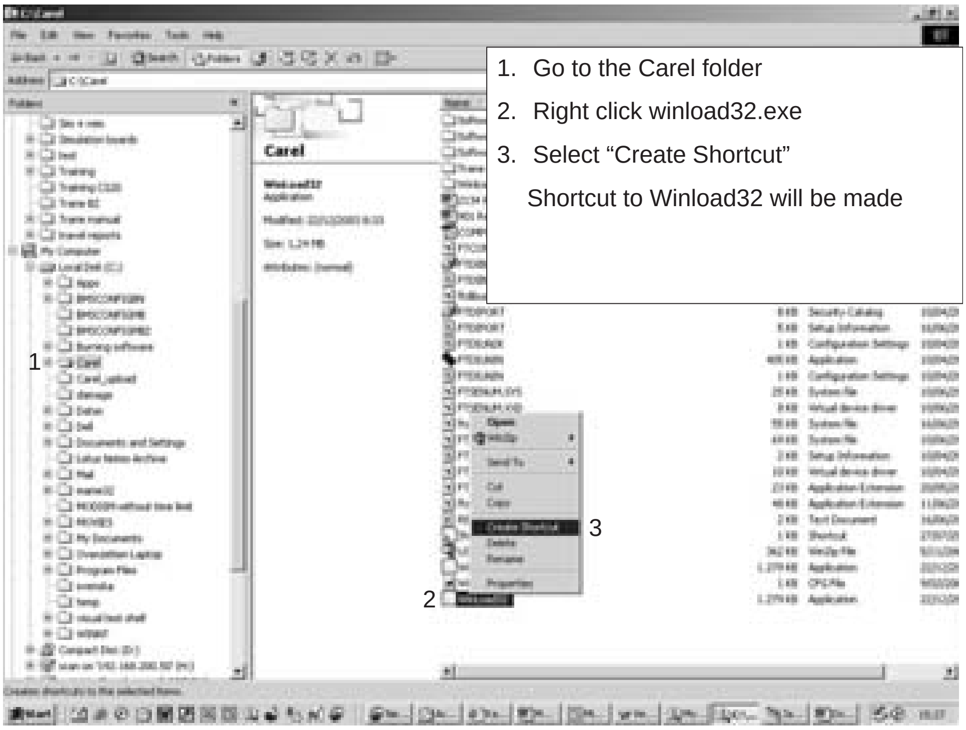
Step	Action
13	 1. Open the saved zip file 2. Select the file for the unit (capacity 3. Press extract 4. Choose a location where you want to save the file (example: C-drive) 5. Click extract
14	 The file is now save on the hard disk of your PC 1. Double click on the file

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>15</td><td>


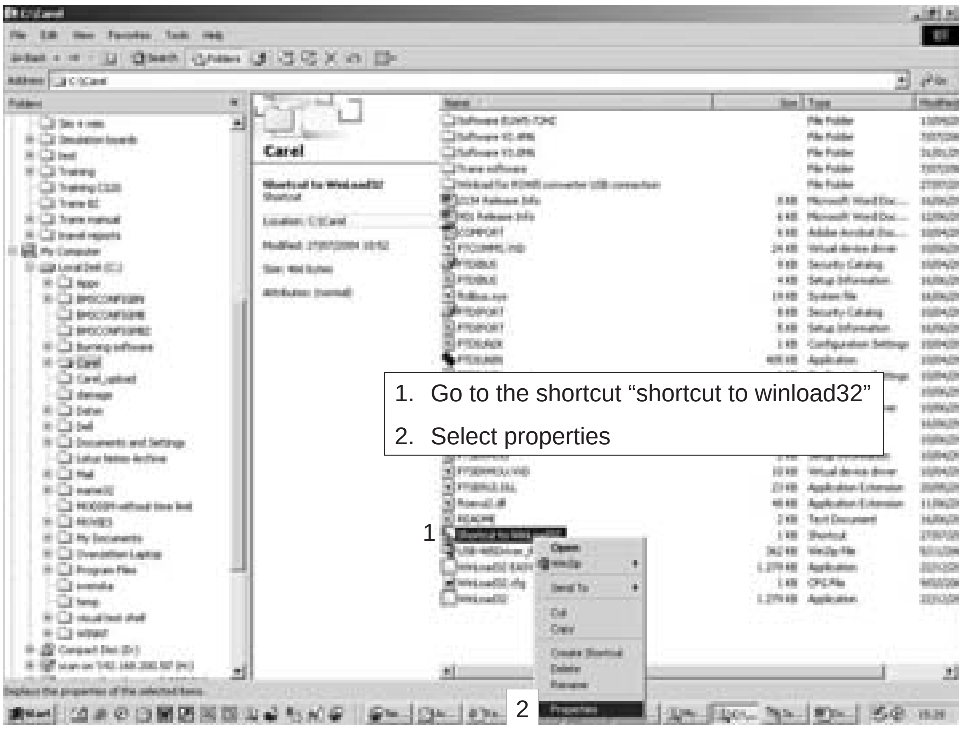
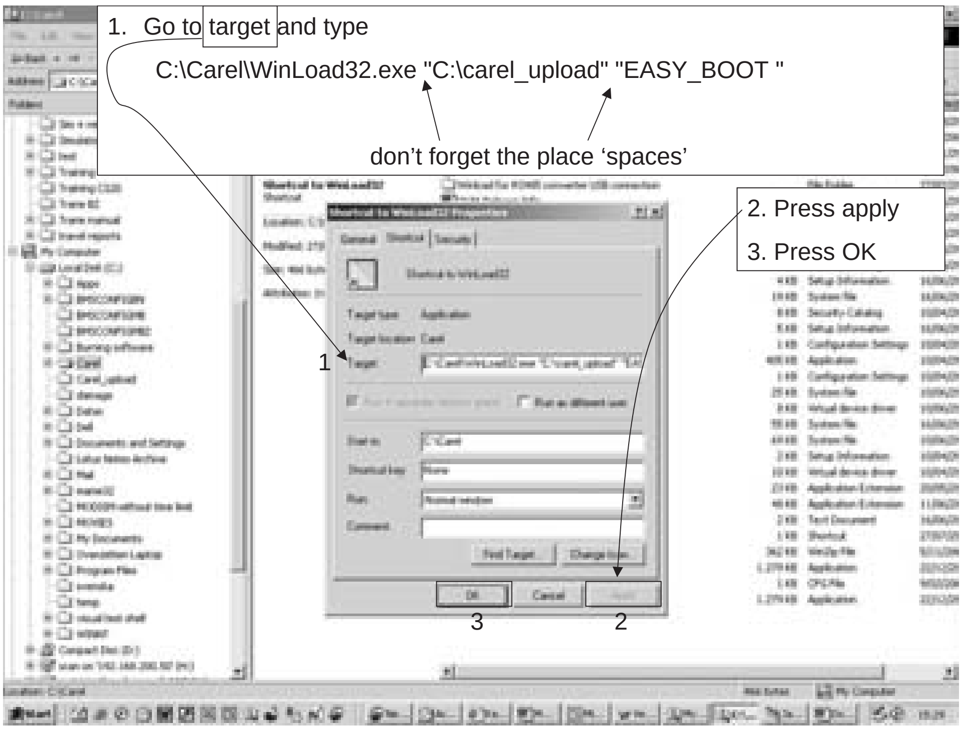
</td></tr>
<tr><td>16</td><td>


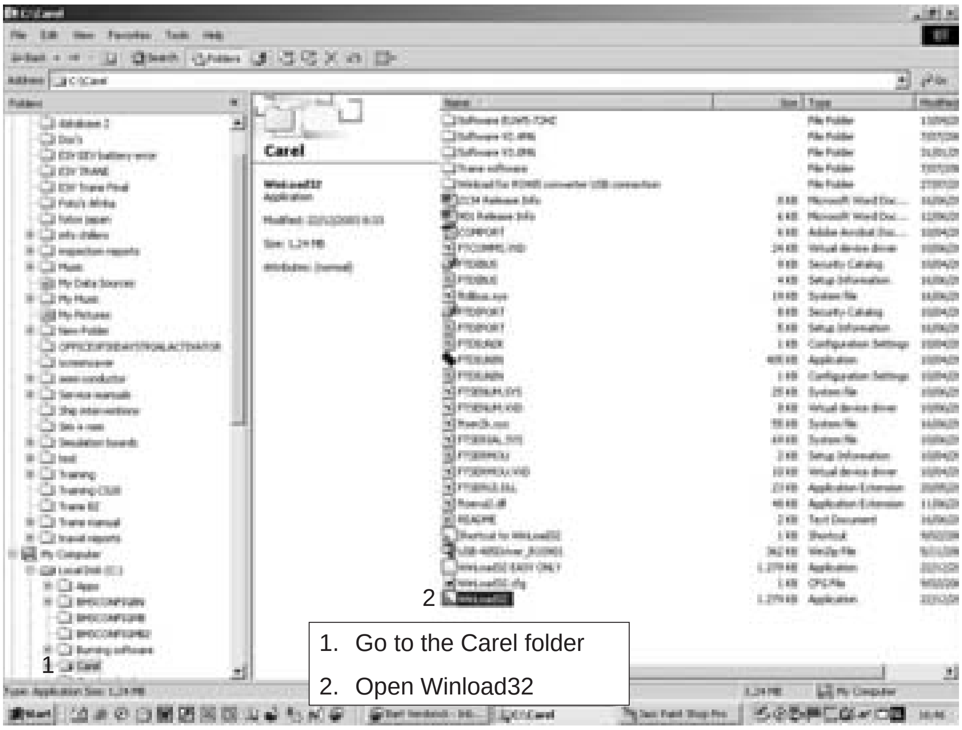
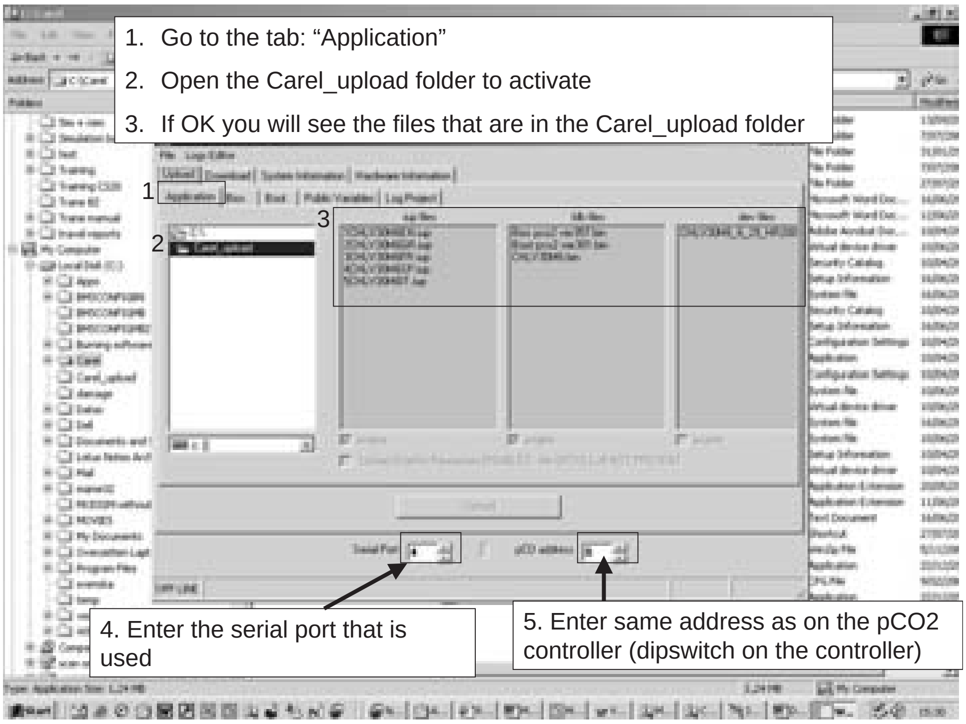
</td></tr>
</table>

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>17</td><td>


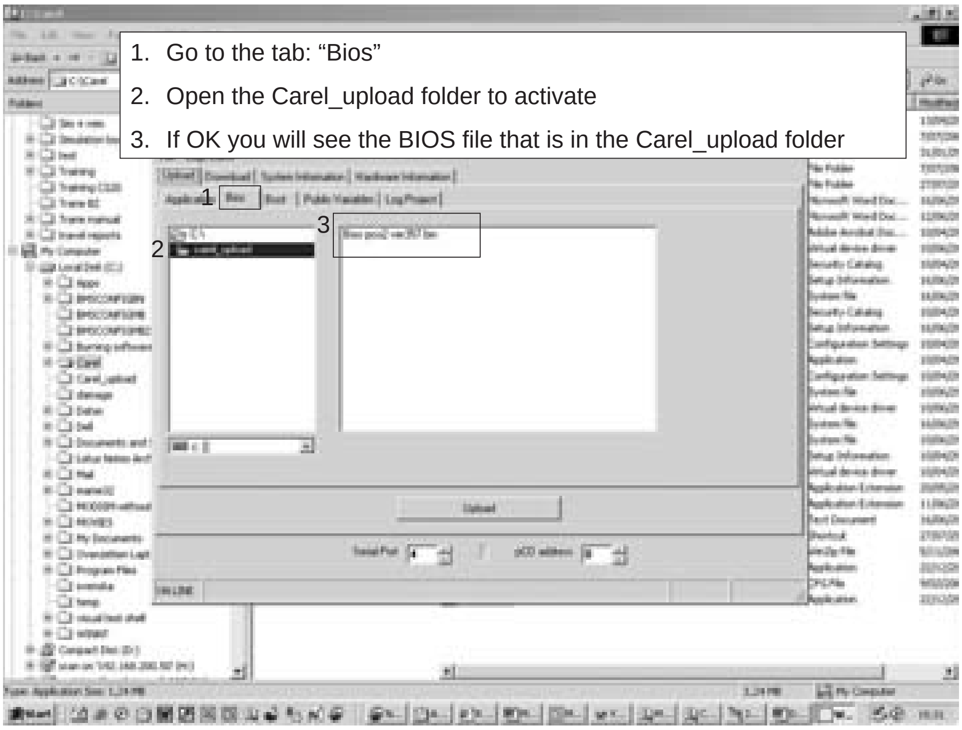
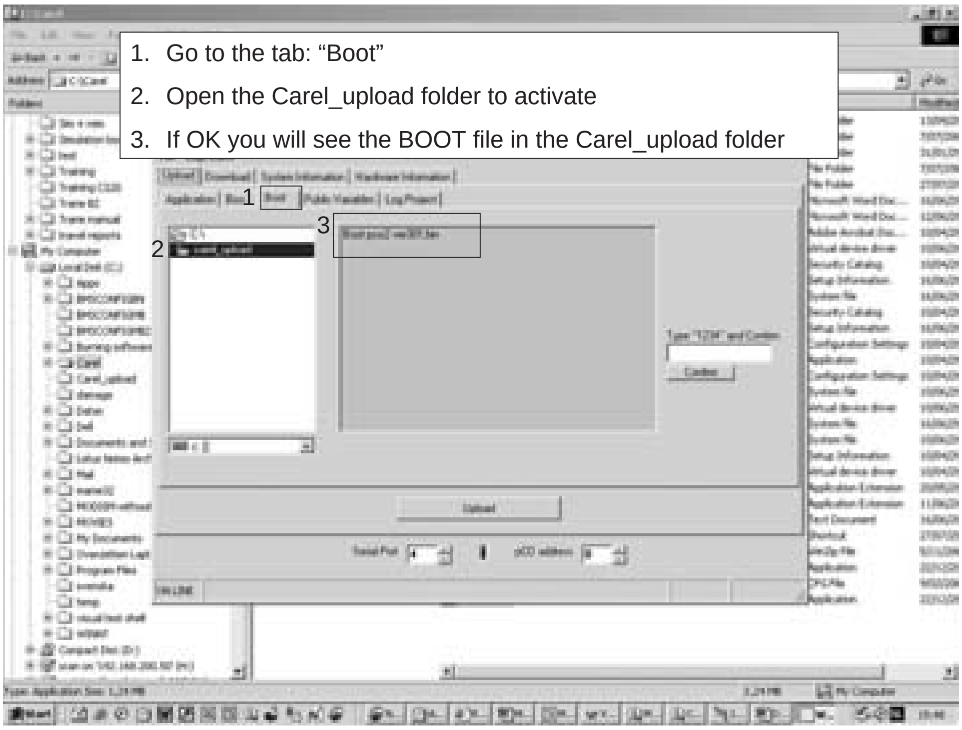
</td></tr>
<tr><td>18</td><td>


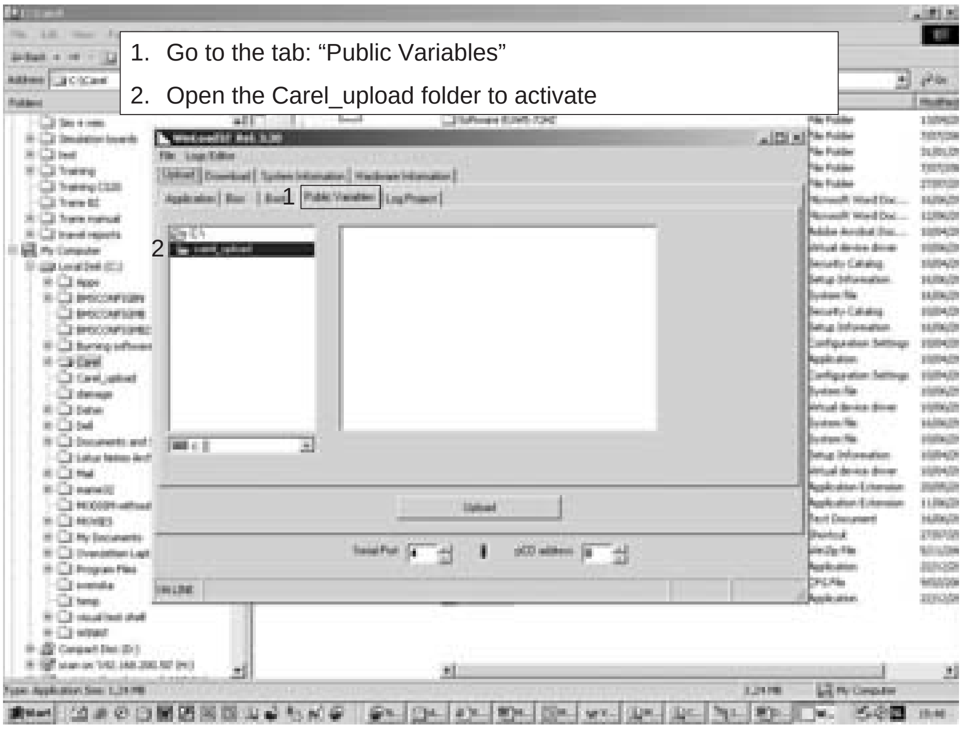
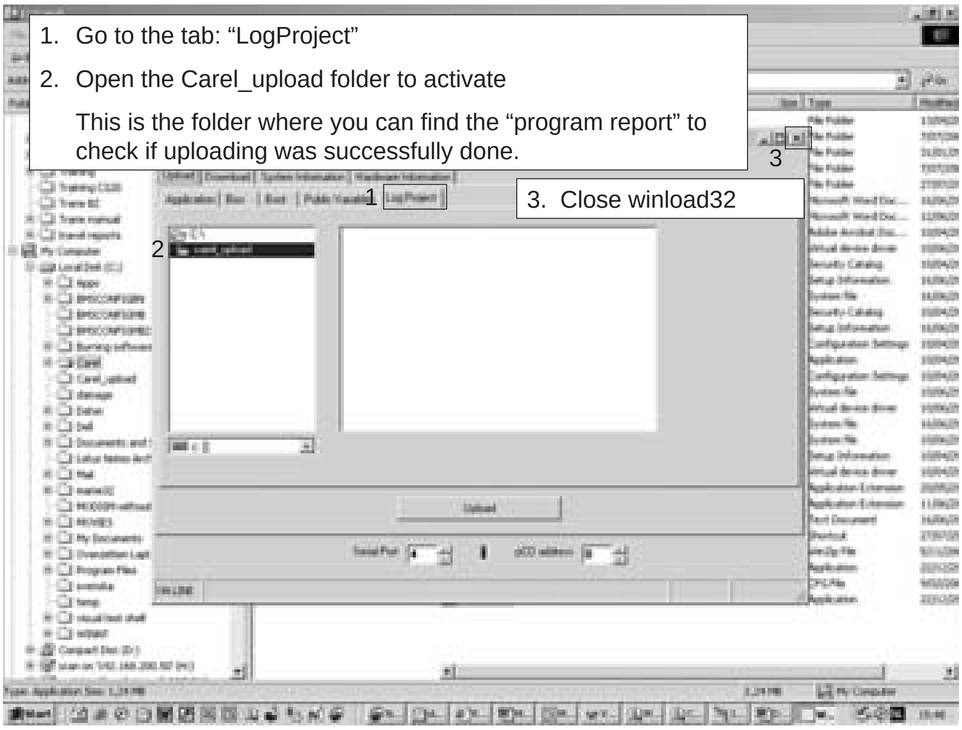
</td></tr>
</table>

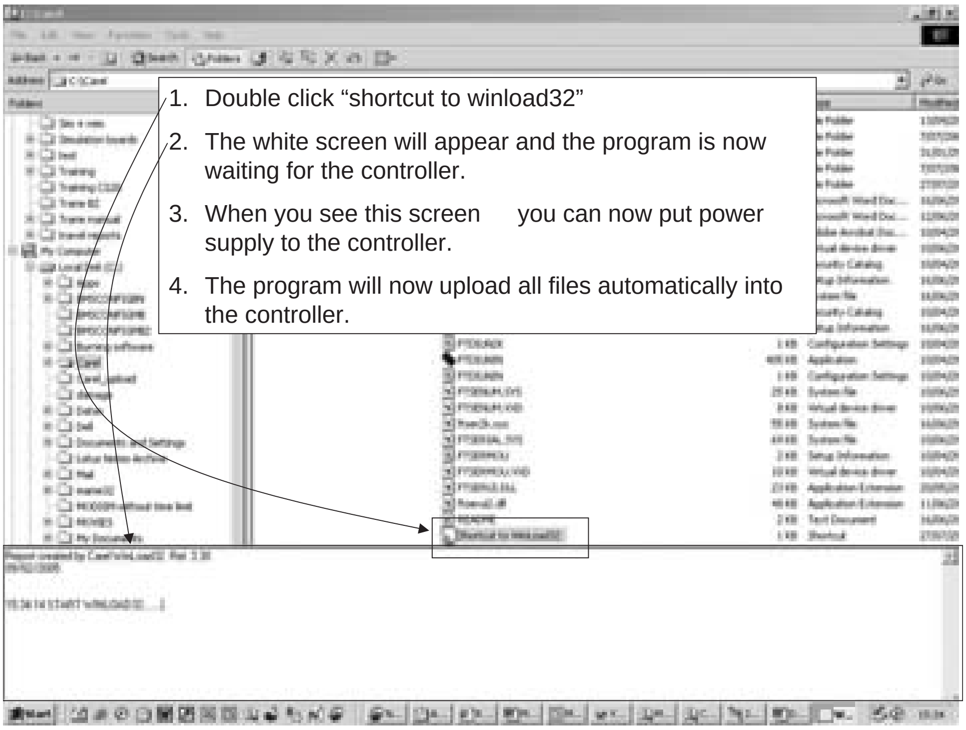
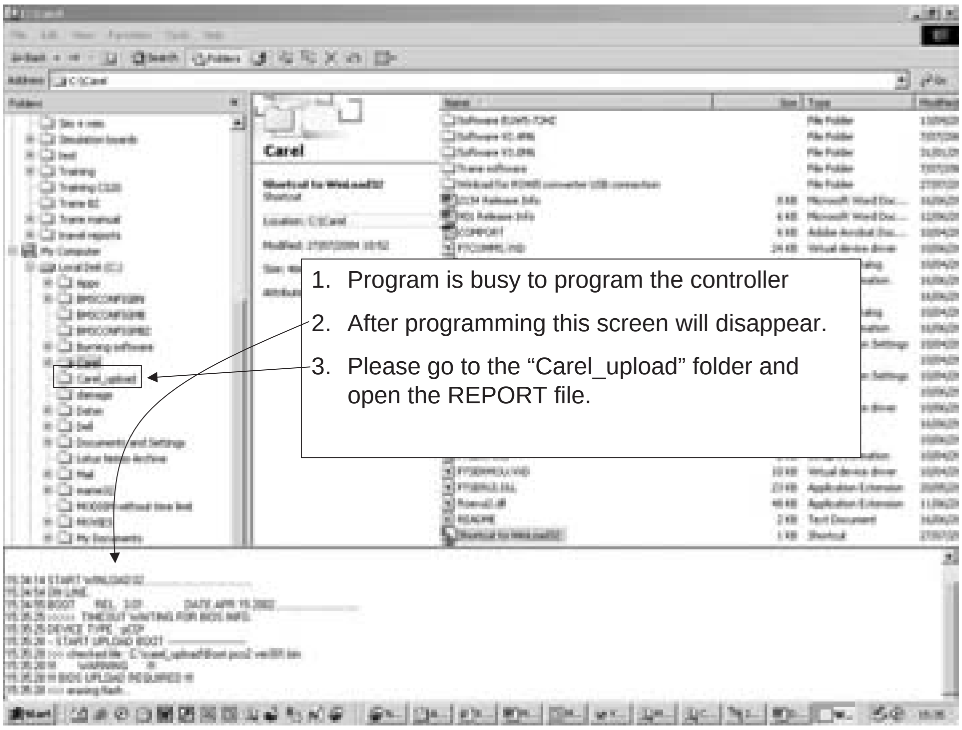
Step	Action
19	
20	

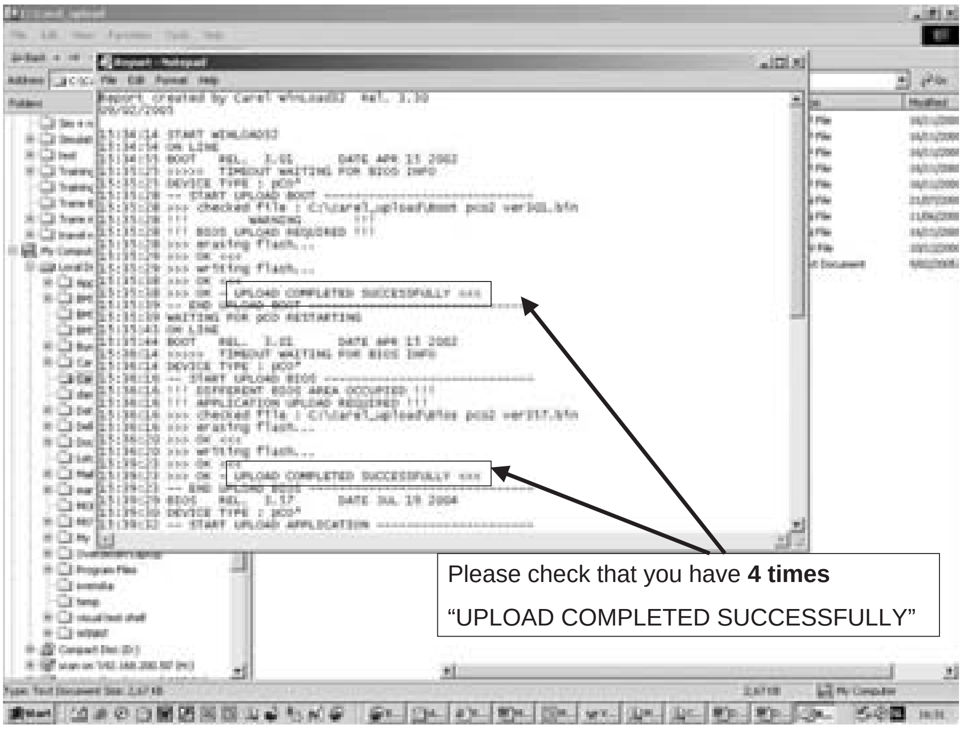
Step	Action
21	
22	

3

Step	Action
23	
24	

Step	Action
25	
26	

Step	Action
27	
28	

Step	Action
29	

3.5 Copy Software from WinLoad32 to the Software key

Optional: Carel RS Converter (software Winload + drivers: are available on intranet)

- Switch off the pCO^2 and remove the "expansion memory" cover with a screwdriver (see "Copy from pCO² to the Software Key" on page 3–15/Fig. 1)
- Set the key selector on (from key to pCO^2)
- Insert the key in the corresponding pin connector as shown. (see "Copy from pCO² to the Software Key" on page 3–15/Fig. 2)
- Prepare the connection for downloading the program for WinLoad32. (see also previous chapter)
- Supply power to the pCO^2 (check the red LED on the key is on)
- Make the upload
- Once finished, switch off the pCO^2, remove the key and put the cover in its place.
- Now the key has the program transferred from WinLoad32.

3

4 Procedure to Protect Compressor in Case of Frozen Evaporator

4.1 What is in This Chapter?

3

Overview

This chapter contains the following topics:

4.2 Procedure to Protect Compressor in Case of Frozen Evaporator

If water is detected in the compressor after an evaporator damage, the following procedure should be executed within the first day.

Step	Action
1	Supply the compressor crank case heater.
2	Insulate the compressor from the rest of the refrigerant circuit. If there is no suction valve available on the compressor, use a plate to close the suction of the compressor.
3	Open the oilplugs to drain the oil and the water out of the compressor.
4	Blow-dry nitrogen through the compressor using the service ports on the HP and LP side of the compressor.
5	Close the drain plugs and vacuum the compressor for a few hours while the crank case heater is on.
6	If the vacuum oil becomes coloured (milky colour) replace the vacuum oil.
7	Repeat step 6 each time the vacuum oil becomes milky.
8	After 4 hours break the vacuum using step 3.
9	Repeat step 5 till step 7 until the oil of the vacuum pump becomes clear.
10	If the vacuum oil remains clear fill the compressor with the necessary compressor oil.
11	Charge the compressor with nitrogen.

5 Procedure to Clear the Refrigerant Circuit in Case of Frozen Evaporators

5.1 What Is in This Chapter?

3

Overview

This chapter contains the following topics:

5.2 Procedure to Clean the Refrigerant Circuit in Case of Frozen Evaporators

If water is detected in the refrigerant circuit after an evaporator damage, the following procedure should be executed to clear the system.

Step	Action
1	Inspection and cleaning of compressor. Vacuum and heat-up the compressor to remove moisture. Fill with oil and N_2.
2	Cleaning & drying refrigerant circuit. Cleaning components: ➤ Expansion valve body. ➤ Liquid line solenoid valve. ➤ Suction and liquid line. Replace components: ➤ Sight glass ➤ Drier filter element by high density filter ➤ Compressor oil Actions: ➤ Drill a hole on the bottom of the condenser headers to remove water. ➤ Braze the drilled holes. ➤ Draw the rags through the suction and liquid line. ➤ Blow-**dry** N_2 through all the pipes. ➤ Drain compressor oil ➤ Vacuum the whole installation: Check on a regular basis the condition of the oil of the vacuum pump. If the vacuum oil becomes milky, it should be replaced by new vacuum oil. The crankcase heater must be activated. It is advisable to connect a second heater tape at the suction of the compressor. ➤ Stop the vacuum and purge with dry nitrogen. ➤ Restart the vacuum of the installation; check after a couple of hours the condition of the vacuum oil. If OK the unit can be recharged. ➤ Charge the unit with R134a. ➤ Start the unit & re-commisioning. ➤ After 24 hours replace HD filter by new HD filter & replace compressor oil. ➤ Check oil contamination with measuring kit. ➤ After 48 hours replace HD filter by normal filter drier + check sight glass and pressures.
3	Find the cause of this evaporator breakdown and take the necessary actions to prevent recurrence in the future.

6 Procedure for the Changing and Configuration of the Display

6.1 What Is in This Chapter?

Overview

This chapter contains the following topics:

3

6.2 Changing the Display

To change the display, proceed as follows:

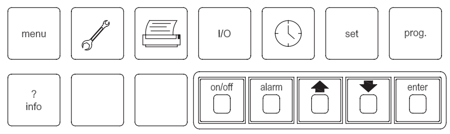
Step	Action
1	Switch off the power supplly to the chiller.
2	Remove the old display
3	Put the dipswitches of the new display on the right address.
4	Place the new display in the same way as the old display.

3

6.3 Configuration Procedure for the pLan Settings

This procedure must be done in case a terminal is replaced or added (remote controller) in the pLan or if settings are changed.

To start configuration, proceed as follows:

Step	Action	Result
1	Turn on the power supply	Nothing will appear on the screen because no configuration has been made.
2	Hold down ⬆ , ⬇ and enter simultaneously for five seconds. 	A screen will appear with the terminal address and with the address of the board in examination: Terminal Addr: 7 I/O Board Addr: n Using the "up" and "down" keys it is possible to choose the different boards (1 and 2 for pCO² controller and 3, 4, 5 and 6 for the electronic valve drivers.
3	Select in correspondence with "I/O Board Addr" the number 1 (Board with address 1) and push "enter".	In about two seconds the following screen will appear: Terminal Config Press ENTER To continue
4	Push "enter" again.	The following screen will appear:will appear: P: 01 Addr Priv/Shared Trm1 7 Sh Trm2 None --- Trm3 None ---Ok? No
5	If you want to add a second terminal (remote terminal), change the line "Trm2 None-" with the line "Trm2 8 Sh'	The following screen will be displayed on the screen: P: 01 Addr Priv/Shared Trm1 7 Sh Trm2 8 Sch Trm3 None ---Ok? No
6	To enable the new configuration put the pointer on "No" (using the key "enter" and with "up" and "down" change it to "Yes" and push enter.	The new configuration is enabled.
	Remarks: ➤ The operations from 1 to 4 must be repeated for all compressor boards ("I/O Board" 1 and 2). ➤ The operations from 1 to 5 must be repeated for all compressor boards ("I/O Board" 1 and 2) if remote terminal is connected.	

Step	Action	Result
7	At the end of the operations turn off and restart the system.	

Remark:

It is possible after restart that the terminal is stuck in a unit. This is due to the fact that the memory of the drivers remains fed by the buffer battery and keeps on processing the data contained in the preceding configuration. In this case, with the system not fed, it is sufficient to disconnect batteries from all the drivers and then connect them again.

3

7 Procedure for the Changing and Configuration of the PCO² (“I/O Board”)

7.1 What Is in This Chapter?

Overview

This chapter contains the following topics:

3

7.2 Changing the PCO^2 controller

To change the PCO^2 Controller, proceed as follows:

Step	Action
1	Switch off the power supply to the chiller.
2	Remove the old PCO^2 controller
3	Place the new PCO^2 controller in the same way as the old PCO^2 controller.
4	Change the PCO^2 controller dipswitches to the right address.
5	Execute the configuration procedure for the pLan settings (see previous chapter).
6	Enter the I/O board address of the controller you changed (see step 2 of the configuration procedure for the pLan settings.
7	Finish the configuration procedure. Now you are able to change the default setting of the I/O board you selected in the previous step.
8	Go to the manufacturer menu (menu + prog).
9	To to the screen: Reset all parameters to default values N and select “Yes”.
10	Change all the needed parameters according to the unit and application.

8 Procedure for the Changing of the Electronic Expansion Valve Driver

8.1 What is in This Chapter?

3

Overview

This chapter contains the following topics:

8.2 Changing the Expansion Valve Driver

To change the expansion valve driver, proceed as follows:

Step	Action
1	Switch off the power supply to the driller.
2	Remove the old EV driver
3	Place the new EV driver in the same way as the old EV driver.
4	Change the EV driver dipswitches to the right address.
5	Execute the configuration procedure for the pLan settings (see "Configuration Procedure for the pLan Settings" on page 3–39).

3

9 Procedure for the Changing and Configuration of the Expansion I/O Board (Optional)

9.1 What is in This Chapter?

3

Overview

This chapter contains the following topics:

9.2 Changing the PCO² Expansion Board

To change the PCO² expansion board, proceed as follows:

Step	Action
1	Switch off the power supply to the chiller.
2	Remove the old expansion board driver
3	Place the new expansion board in the same way as the old expansion board.
4	Check if the dipswitch address is on 5 (on/off/on/off).
5	Switch on the power to the chiller.
6	Go to the manufacturer menu (menu + prog)
7	Go to the screen: RS484 net Time check 000 Refresh N
8	Select refresh – “Yes” Next screen will appear: Wait please . . . . . Exp Recognized When “press enter to exit” appears, the configuration is finished.
9	Press enter to exit.

Remark:

If the following screen appears:

```
Wait please

Exp not linked
Press enter to exit
```

please check:

- ➤ dipswitch address of the expansion board
- ➤ wiring of the tLAN.

10 Manual Upload or Download Control Test Procedure

10.1 What is in This Chapter?

Overview

This chapter contains the following topics:

10.2 Manual Upload or Download Control Test Procedure

Introduction

This function must only be used for testing of the unit, e.g. during commissioning or trouble shooting.

Description

This function allows setting the compressor to a fixed capacity step, without thermostat control. The unit is still protected by the normal safeties.

When the unit is near to a safety prevention (LP down, HP down, Freeze-prevention,...) it will skip manual mode and dontinue in normal operation. This is to prevent the unit from tripping on a safety.

This function can be enabled in the service menu (menu + maintenance).

Please enter digit password to get access to this menu digit.

Compressor # 1		Compressor # 3	
Manual Load	25%	Manual Load	25%
State	Manual	State	Manual
Compressor # 2		**Compressor # 4**	
Manual Load	25%	Manual Load	25%
State	Manual	State	Manual

- ➤ Manual load 25 - 100%: this parameter can be changed to the required compressor capacity.
- ➤ State OFF: this compressor will be disabled
  Auto: the PID function will calculate the needed capacity
  Manual: the selected manual load capacity will be used, compressor is fixed to this capacity

11 Troubleshooting Chart

11.1 What is in This Chapter?

Overview

This chapter contains the following topics:

11.2 Troubleshooting Chart

3

Problem	Possible causes	Possible corrective steps
Compressor will not run	**1** Main power switch is open.	**1** Close switch.
	2 Unit system switch is open.	**2** Check the unit status on the control panel. Close switch.
	3 Circuit switch is in pump-down position.	**3** Check the circuit status on the control panel. Close switch.
	4 Evaporator flow switch is not closed.	**4** Check the unit status on the control panel. Close switch.
	5 Circuit breakers are open.	**5** Close circuit breakers.
	6 Fuse is blown or circuit breakers are tripped.	**6** Check the electrical circuits and motor windings for shorts or grounds. Investigate for possible overloading. Check for loose or corroded connections. Reset breakers or replace fuses after fault is corrected.
	7 Unit phase voltage monitor is not satisfied.	**7** Check unit power wiring to unit for correct phasing. Check voltage.
	8 Compressor overload is tripped.	**8** Overloads are manual reset. Reset overload at button on overload.
	9 Compressor contactor or contactor coil is defective.	**9** Check wiring. Repair or replace contactor.
	10 System was shut down by safety devices.	**10** Determine the type and cause of the shutdown and correct the problem before attempting to restart.
	11 There is no cooling required.	**11** Check control settings. Wait until unit calls for cooling.
	12 There is motor electrical trouble.	**12** See 6, 7, 8 above.
	13 There is loose wiring.	**13** Check circuits for voltage at required points. Tighten all power wiring terminals.

Compressor overload relay tripped or circuit breaker trip or fuses blown	**1** There is low voltage during high load condition. **2** There is loose power wiring. **3** There is a power line fault causing unbalanced voltage. **4** There is defective or grounded wiring in the motor. **5** There is high discharge pressure.	**1** Check the supply voltage for excessive voltage drop. **2** Check and tighten all connections. **3** Check the supply voltage. **4** Check the motor and replace if defective. **5** See corrective steps for high discharge pressure.
Compressor noisy or vibrating	**1** There is a compressor internal problem. **2** The oil injection is not adequate.	**1** Contact Daikin. **2** Contact Daikin.
Compressor will not load or unload	**1** The capacity control is defective. **2** The unloader mechanism is defective. **3** The control solenoids are defective.	**1** See capacity control section. **2** Replace. **3** Replace.
High discharge pressure	**1** Discharge shut-off valve is partially closed. **2** Non condensable is in the system. **3** Fans are not running. **4** Fan control is out of adjustment. **5** Heat recovery condensers are dirty. **6** System is overcharged with refrigerant. **7** The condenser coil is dusty. **8** The air recircultates from the outlet into the unit coils. **9** Air entering the unit is restricted.	**1** Open the shut-off valve. **2** Purge the non-condensable from the condenser coil after shutdown. **3** Check the fan fuses and electrical circuits. **4** Check if the unit set-up in the microprocessor matches the unit model number. Check the microprocessor condenser pressure sensor for proper operation. **5** Clean the condenser tubes by mechanical or chemical tools. **6** Check for excessive sub-cooling. Remove the excess charge. **7** Clean the condenser coil. **8** Remove the cause of recirculation. **9** Remove any obstructions near the unit.

3

3

Low discharge pressure	**1** There is wind effect at low ambient. **2** The condenser fan control is not correct. **3** There is low suction pressure. **4** The compressor is operating unloaded.	**1** Protect the unit against excessive wind into the vertical coils. **2** Check if the unit set-up in the microprocessor matches the unit model number. **3** See the corrective steps for low suction pressure. **4** See the corrective steps for failure to load.
Low suction pressure	**1** The refrigerant charge quantity is inadequate. **2** The evaporator is dirty. **3** The liquid line filter-drier is clogged. **4** The expansion valve is malfunctioning. **5** The water flow to the evaporator is insufficient. **6** The water temperature leaving the evaporator is too low. **7** There is an evaporator head ring gasket slippage.	**1** Check the liquid line sight-glass. Check the unit for leaks. **2** Clean chemically. **3** Replace. **4** Check the expansion valve superheat and valve opening positions. Replace only the valve that is not working. **5** Check the water pressure drop across the evaporator and adjust the flow. **6** Adjust the water temperature to a higher value. **7** If the suction pressure **and** the superheat are both low, it may indicate an internal problem. (What's the corrective step here?)
High suction pressure	**1** There is excessive load - high water temperature. **2** The compressor unloaders are open. **3** The superheat is too low.	**1** Reduce the load or add additional equipment **2** See corrective steps below for failure of compressor to load. **3** check the superheat on the microprocessor display. Check the suction line sensor installation and sensor.

Unit does not switch to heat recovery operation mode	**1** The “Q7” selector switch doesn’t work.	**1** Replace the selector switch.
	2 There is no heating load required.	**2** Add additional equipment.
	3 The flow switch is not operating.	**3** Check the water pump.
	4 The 4-way solenoid valve is not working.	**4** Check the solenoid valve and if the 4-way valve is blocked. Replace the wrong components.
	5 The “W10” sensor element is not fixed in the well pocket.	**5** Fix the element in the well pocket properly.
	6 The “W10” sensor element gives a wrong signal.	**6** Replace the element.
	7 The “TC10” microprocessor control doesn’t work.	**7** Check the supply connections or replace it.

3

12 Prestart System Checklist

12.1 What is in This Chapter?

Overview

This chapter contains the following topics:

3

12.2 Prestart System Checklist

	Yes	No	N/A
Chilled water			
Piping complete			
Water system filled, vented			
Pump installed, (rotation checked), strainers cleaned			
Controls (3 way valves, face and bypass dampers, bypass valves, etc) operable			
Water system operated and flow balanced to meet unit design requirements			

	Yes	No	N/A
Heat recovery condensers			
Piping and headers complete			
Water system filled, vented			
Temperature sensors installed in the water pockets			
Pump installed, (rotation checked), strainers cleaned			
Controls (3 way valves, face and bypass dampers, bypass valves, etc) operable			
Water system operated and flow balanced to meet unit design requirements			

	Yes	No	N/A
Electrical			
Power leads connected to starter			
All interlock wiring compete between control panel and complies with specification			
Pump starter and interlock wired			
Wiring complies with local codes			

	Yes	No	N/A
Miscellaneous			
Thermometer wells, thermometers, gauges, control wells, controls, etc., installed			
Minimum system load of 60% or machine capacity available for testing			
Adjusting controls			

Part 4
Commissioning and Test Run

Introduction

Commissioning and test run are well known practices in service engineering. This part contains a systematic approach on test run checks and test values, which guarantees a high quality installation and operation of the units.

What is in this part?

This part contains the following chapters:

4

4

1 Pre-Test Run Checks

1.1 What Is in This Chapter?

Introduction

This chapter contains checks you have to carry out before every test run.

Overview

This chapter contains the following topics:

1.2 General Checks

Checklist

The table below contains the general checklist.

Step	Check whether...
1	There is external damage.
2	The unit is properly supported and/or has a proper foundation.
3	The unit is installed horizontally with a deviation of maximum 1°.
4	Anti-vibration pads are required.
5	Check for remaining metal dust of burrs. Metal dust or burrs from grinding or drilling in the metal parts during construction facilitates the rust process and shortens the lifetime of the unit.
6	The operator has received the operation manual.
7	The installer has received the installation manual.
8	The air volume over the coil is adequate; there is no blockage (from paper, plastic...) or air short circuit due to wrong positioning.

1.3 Water Piping Checks

Checklist

The table below contains the water piping checklist.

Step	Check whether...
1	A filter is installed in front (less than 1 meter) of the water inlet of the heat exchanger. The heat exchangers are sensitive to dirt and small particles (maximum filter mesh of 1mm).
2	The water volume is within the limits.
3	There is adequate water flow.
4	The water quality meets the standards.
5	The water piping is properly insulated.
6	Measurement points for temperature and pressure are available on the water circuit.
7	The flow switch and pump are properly working.
8	Air purge points are installed on the high parts of the water piping.
9	Drain taps are installed at the low points of the water piping.
10	Other parts of the water circuit are properly mounted and installed (e.g. buffer tank, expansion tank...).
11	Vibration compensators are mounted at the water connections if the unit is positioned on anti-vibration pads.

Water volume, flow and pressure

The table below shows the operation range of water volume and water flow for proper operation of the unit.

	Evaporator			Condenser	
Chiller type	**Minimum water volume**	**Minimum water flow**	**Maximum water flow**	**Minimum water flow**	**Maximum water flow**

4

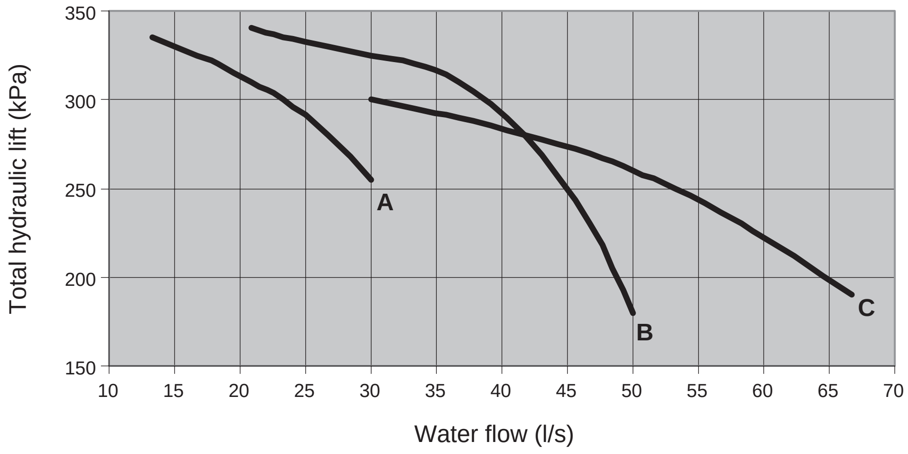
	Evaporator			Condenser	

The water pressure should not exceed the maximum working pressure of 10 bar.

1.4 Water Pump Diagram

Water pump diagram

The illustration below shows the water pump diagrams for the different pumps (option OPSP or OPTP).



Note: For an effective hydraulic lift, subtract the evaporator pressure drop from the total hydraulic lift.

Pump A

STANDARD	650
/A	650
/Q	550-600
/Z	600-650

Pump B

STANDARD	700-950
/A	700-C11
/Q	650-900
/Z	700-950

Pump C

STANDARD	C10-C13
/A	C12-C15
/Q	950-C12
/Z	C10

4

1.5 Water Pressure Drop: Table for Matching Unit Sizes

Table

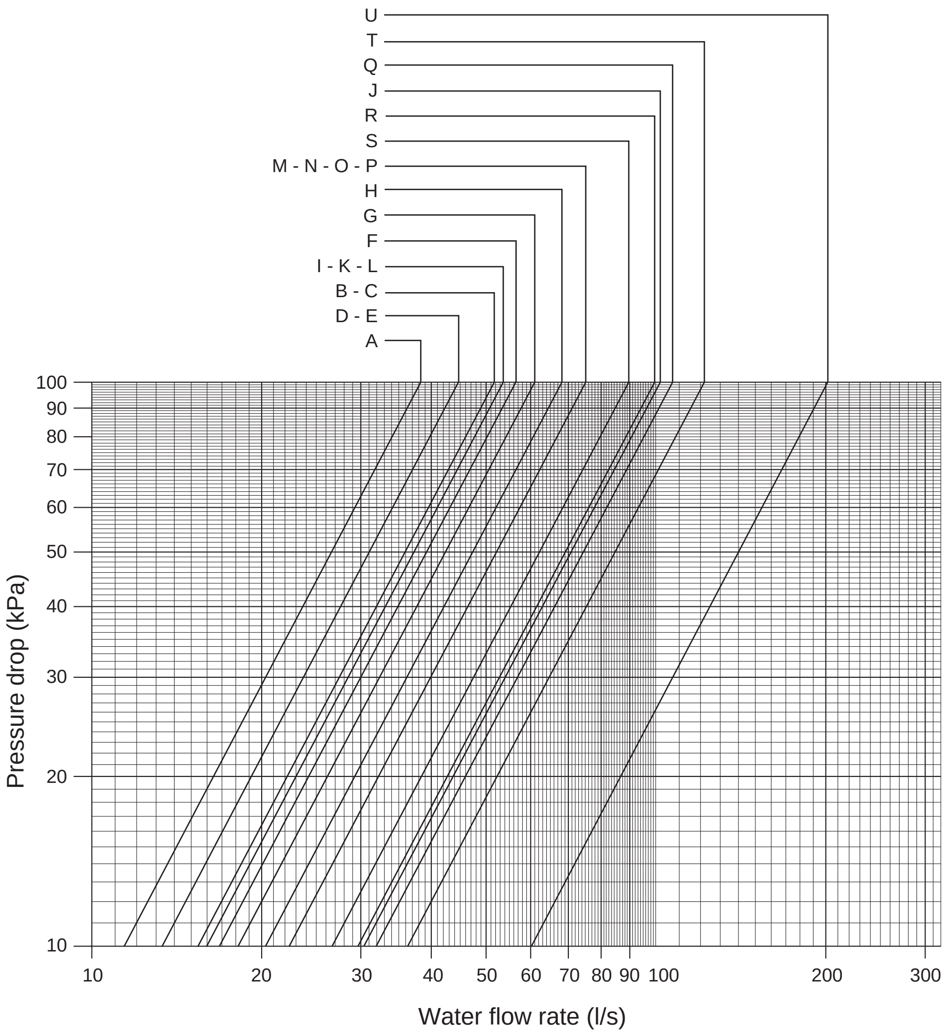
Unit size	ST	/A	/Q	/Z
A	-	-	550	600
B	650	650	600	650
C	700	700	650	700
D	750	800	700	-
E	850	850	750	-
F	-	800	850	
G	900	900	-	-
H	-	950	-	-
I	-	850	900	
J	-	C10	-	-
K	950	C11	900	950
L	C10	C12	950	C10
M	C11	C13	C10	-
N	C12	C14	C11	-
O	C13	C15	C12	-
P	C14	C16	-	-
Q	-	C17	-	-
R	C15	C18	-	-
S	C16	C19	-	-
T	C18	C20	-	-
U	-	C21	-	-

Note: Unit size matching system used for evaporator pressure drop curves, partial heat recovery ratings and pressure drop curves for partial and total heat recovery.

1.6 Evaporator Pressure Drop: EWAD-BJYNN, EWAD-BJYNN/Q and EWAD-BJYNN/A

Evaporator pressure drop

The illustration below shows the water pressure drop through evaporator for EWAD-BJYNN, EWAD-BJYNN/Q and EWAD-BJYNN/A.



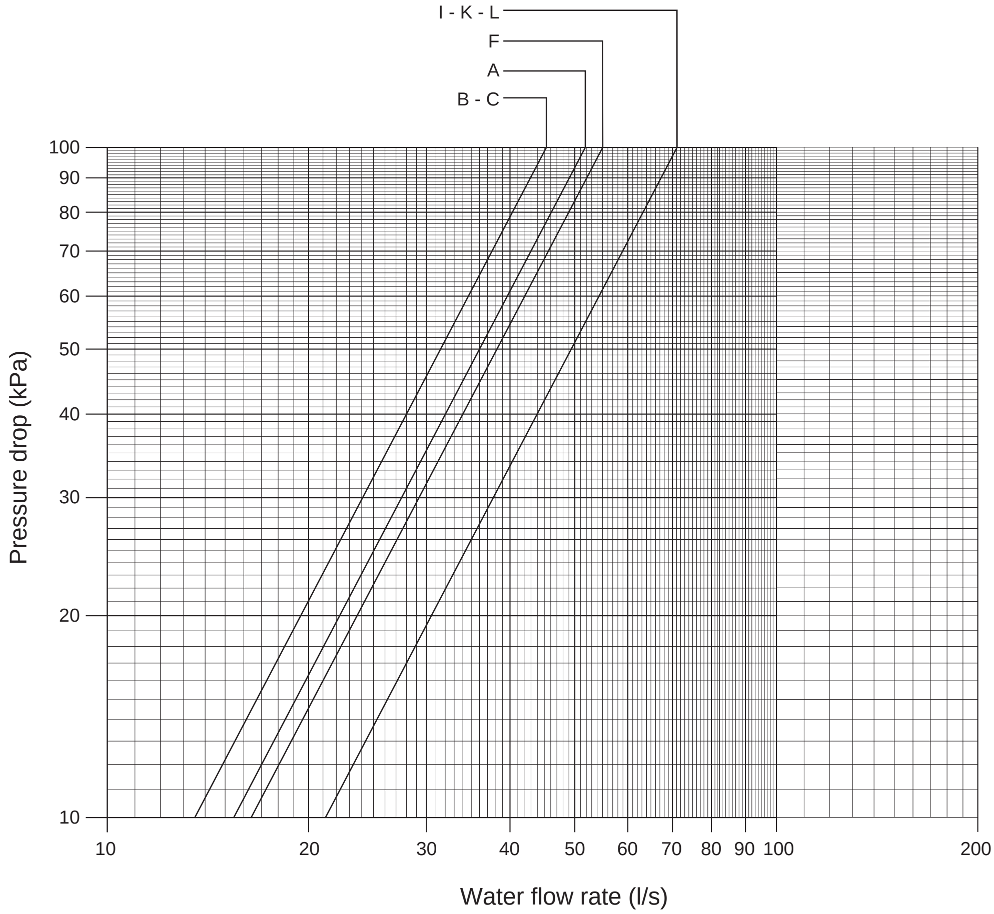
Note:

For matching unit size, see table on page 4–8.

1.7 Evaporator Pressure Drop: EWAD-BJYNN/Z

Evaporator pressure drop

The illustration below shows the water pressure drop through evaporator for EWAD-BJYNN/Z.



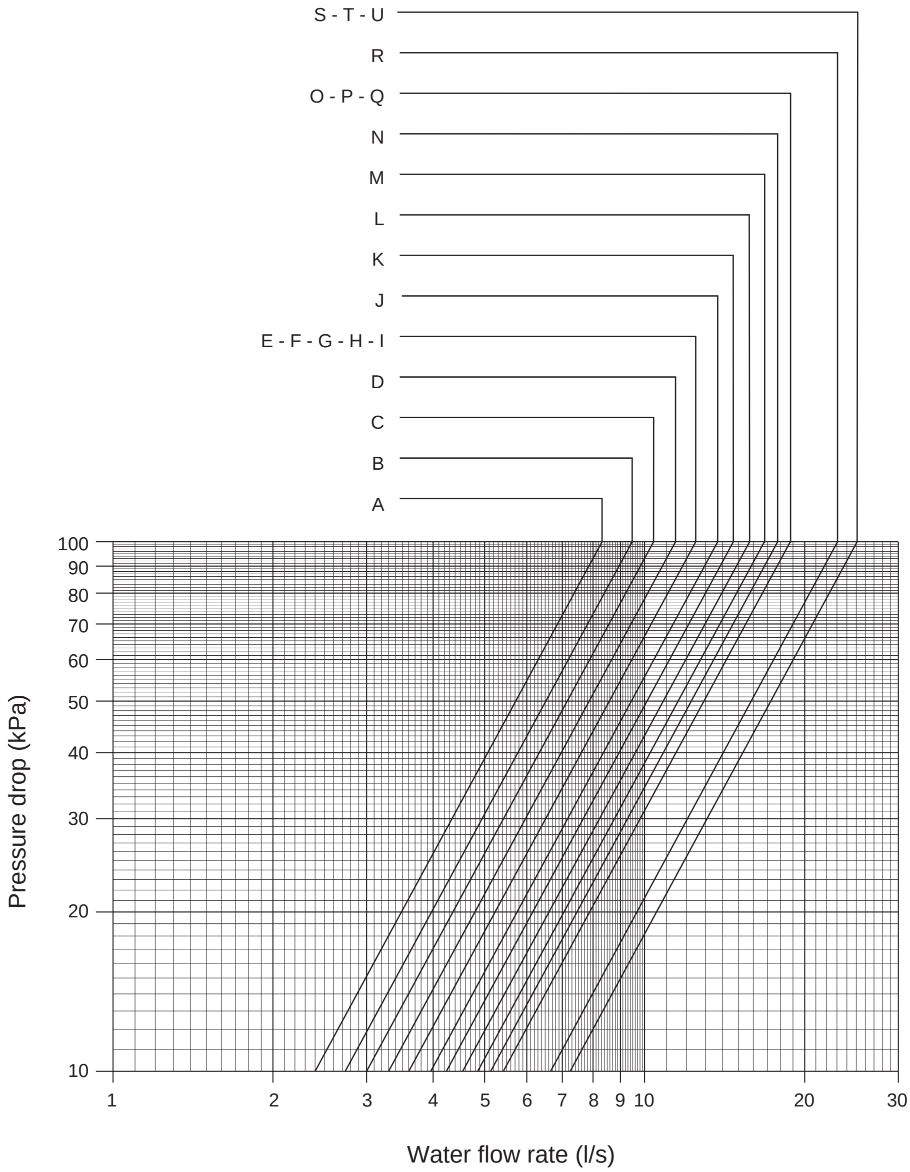
Note: For matching unit size, see table on page 4–8.

4

1.8 Pressure Drop for Partial Heat Recovery: EWAD-BJYNN

Pressure drop for partial heat recovery

The illustration below shows the water pressure drop through evaporator for EWAD-BJYNN.

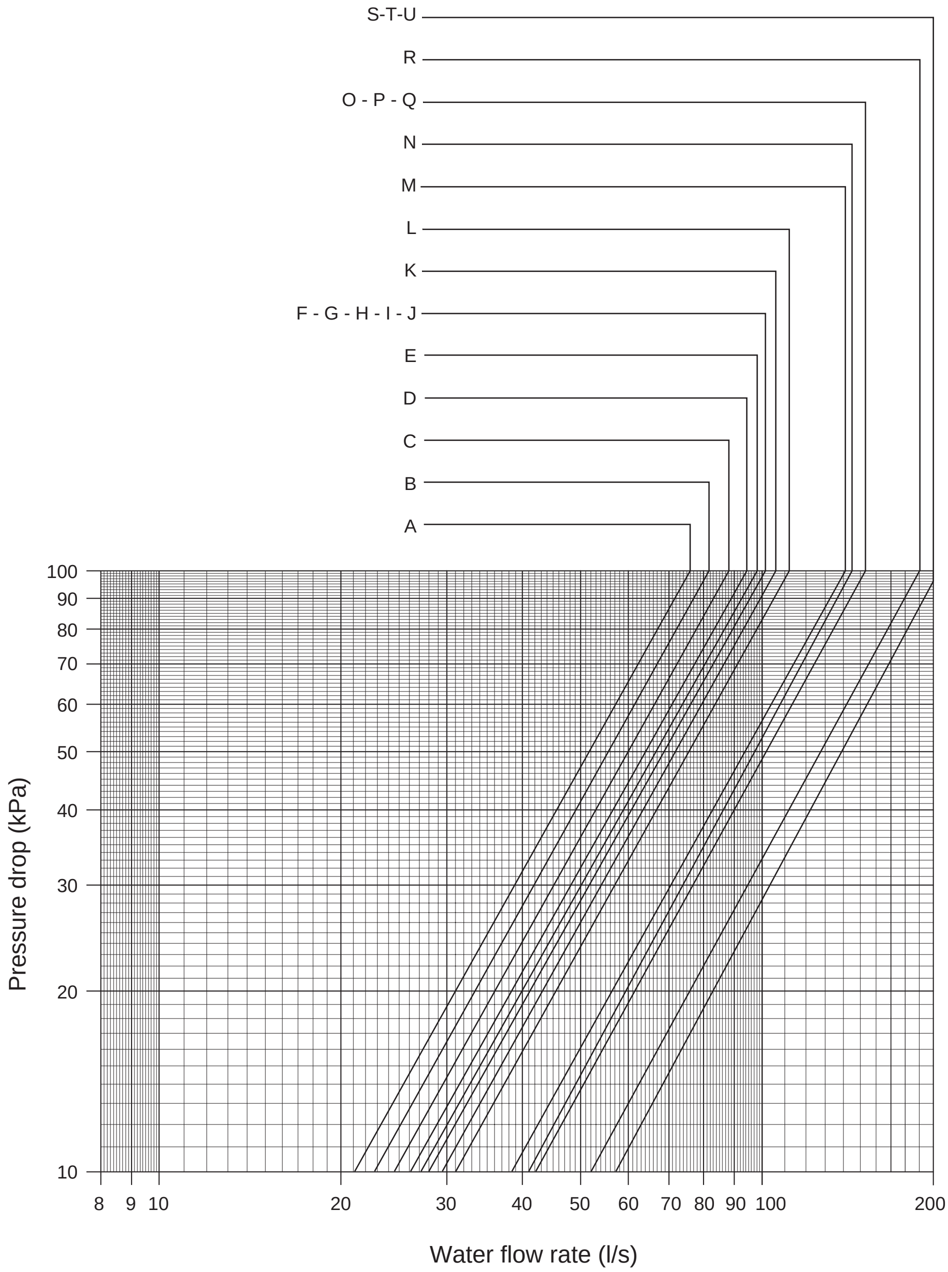


Note: For matching unit size, see table on page 4–8.

1.9 Pressure Drop for Total Heat Recovery: EWAD-BJYNN, EWAD-BJYNN/Q, EWAD-BJYNN/A and EWAD-BJYNN/Z

Pressure drop for total heat recovery

The illustration below shows the water pressure drop through evaporator for EWAD-BJYNN, EWAD-BJYNN/Q, EWAD-BJYNN/A and EWAD-BJYNN/Z.



Note: For matching unit size, see table on page 4–8.

1.10 Water Flow and Pressure Drop Precautions

Evaporator water flow and pressure drop

Balance the chilled water flow through the evaporator. The flow rates must fall between the minimum and maximum values. Flow rates below the minimum values shown will result in laminar flow that will reduce efficiency, cause erratic operation of the electronic expansion valve and could cause low temperature cut-out. On the other hand flow rates exceeding the maximum values shown can cause erosion, vibration and may cause the break on the evaporator water connections and tubes. Measure the chilled water pressure drop through the evaporator at field installed pressure taps. It is important not to include valve or strainer pressure drop in these readings.

Variable chilled water flow through the evaporator while the compressors are operating is not recommended. Set points are based upon a constant flow and variable temperature.

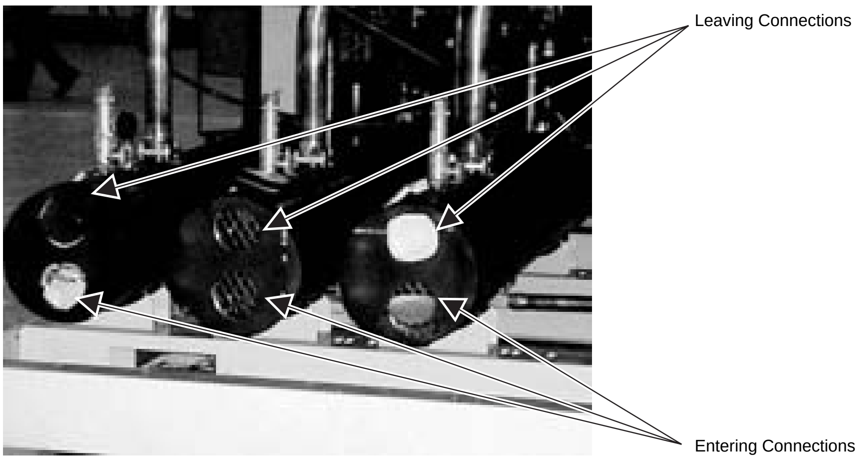
Heat recovery condenser water flow and pressure drop

Heat recovery condensers are supplied without the headers connection on both water side, entering and leaving.

These Headers must be provided by the installer locally , including the wells pockets for microprocessor control sensors.

Balance the hot water flow through the heat recovery condenser. The flow rates must fall between the minimum and maximum values. Flow rates below the minimum values shown will result in laminar flow that will reduce efficiency, cause erratic operation of the unit and could cause high pressure cut-out. On the other hand flow rates exceeding the maximum values shown can cause erosion on the condenser water connections and tubes.

Measure the hot water pressure drop through the condenser at field installed pressure taps. It is important not to include header, valve or strainer pressure drop in these readings. Variable hot water flow through the condenser while the compressors are operating is not recommended. Set points are based upon a constant flow and variable temperature.



4

1.11 Electrical Checks

Checklist

The table below contains the electrical checklist.

Step	Check whether...
1	The main fuses, earth leak detector and main isolator are installed.
2	The main power supply voltage deviates less than 10% from the nominal value.
3	The flow switch and pump contact are properly wired.
4	The optional wiring for pump control is installed.
5	The optional wiring for remote start/stop is installed. Make sure that the controller is correctly programmed.

Part 5
Maintenance

Introduction

Preventive maintenance should be set up for operation at maximum capacity or to avoid damage. The following chapters explain how to or when to maintain the units.

It is also applicable on other types of Daikin chillers.

What is in this part?

This part contains the following chapters:

5

5

1 Maintenance

1.1 What Is in This Chapter

Introduction

As shown in the table below, we have grouped the maintenance in maintenance of the main parts (condenser, compressor and evaporator) and periodical checks.

Precautions

Correct choices and decisions have to be made before any maintenance is done. Opening the refrigerant circuit may cause a loss of refrigerant or lead to system contamination.

- ➤ Avoid high gas concentrations.
  While the heavy concentration of the refrigerant gas will remain on the floor level, good ventilation is a must.
- ➤ Avoid all contact with open fires or hot surfaces.
  By high temperatures, the refrigerant gas R 134a may decompose into irritating and poisonous gas. Avoid skin and hand contact with the liquid refrigerant and protect your eyes against liquid splashes.

5

Overview

This chapter covers the following topics:

1.2 System Maintenance

General

To ensure proper operation at peak capacity and to avoid damage to package components, a program of periodic inspections should be set up and followed. The following items are intended as a guide and are to be used during inspection and must be combined with sound coming from compressor and electrical practices to ensure troublefree performance. The liquid line sightglass indicator on all circuits must be checked to be sure the glass is full and clear. If the indicator shows that a wet condition exists and/or there are bubbles in the glass, even with a full refrigerant charge, the filter-drier element must be changed.

Compressor maintenance

The screw Frame 4 compressor does not required frequent maintenance. However, vibration test is an excellent check for proper mechanical operation. Compressor vibration is an indicator of the requirement for maintenance and contributes to a decrease in unit performance and efficiency. It is recommended that the compressor be checked with a vibration analyser at or shortly after start-up and again on an annual basis. When performing the test the load should be maintained as closely as possible to the load of the original test. The vibration analyser test provides a fingerprint of the compressor and when performed routinely can give a warning of impending problems.

The compressor is supplied with a cartridge oil filter. It is a good policy to replace this filter anytime the compressor is opened for servicing.

Electrical control

Warning: Electric shock hazard. Turn off all electrical power supplies before continuing with following service.

Caution: It is necessary to de-energise the complete electrical panel, including crankcase heater, before doing any servicing inside.
Prior to attempting any service on the control centre it is advisable to study the wiring diagram so that you understand the operation system of the water chiller. Electrical components do not require particular maintenance other than a monthly tightening of cables.

Warning: The warranty becomes void if the wiring connection to the unit is not in accordance with the specification. A blown fuse or tripped protector indicates a short ground or overload. Before replacing the fuse or restarting the compressor, the problem must be found and corrected. It is important to have a qualified electrician to service this panel. Unqualified tampering with the controls can cause serious damage to equipment and void the warranty.

Refrigerant sight-glass

The refrigerant sight-glasses should be observed periodically (a weekly observation should be adequate). A clear liquid sight-glass indicates the right refrigerant charge in the system to insure proper feed through the expansion valve. Bubbling refrigerant in the sight-glass, during stable run conditions, indicates that the system may be short of refrigerant charge. Refrigerant gas flashing in the sight-glass could also indicate an excessive pressure drop in the liquid line, possibly due to a clogged filter-drier or a restriction elsewhere in the liquid line. If sub-cooling is low add charge to clear the sight-glass. If sub-cooling is normal and flashing is visible in the sight-glass replace the filter-drier. An element inside the sight-glass indicates the moisture condition corresponding to a given element colour. If the sight-glass does not indicate a dry condition after about 3 hours of operation, the unit should be pumped down and the filter-dryers changed.

The following table is a guide to determinate the dry or wet condition of the system:

COLOUR	MEANS
Green (Sky Blue)	Dry
Yellow (Pink)	Wet

Evaporator

The units are supplied with new optimised counter-flow evaporator, single refrigerant pass. It is direct expansion (2 evaporators for units with 4 compressors) with refrigerant inside the tubes and water outside (shell side) with carbon steel tube sheets, with straight copper tubes that are spirally wound internally for higher efficiencies, expanded on the tube plates. The external shell, is linked with an electrical heater to prevent freezing to -28 C ambient temperature, energised by a thermostat and is covered with a closed cell insulation material. Each evaporator has 2 or 3 refrigerant circuits one for each compressor. Each evaporator is manufactured in accordance to PED approval. Normally no service work is required on the evaporator.

Filter-dryers

A replacement of the filter-drier is recommended during scheduled service maintenance of the unit when bubbles occur in the sight-glass with normal sub-cooling temperature. The filter-drier should also be changed if the moisture indicator in the sight-glass indicates excess moisture by the wet system colour indicators. During the first few months of operation the filter-drier replacement may be necessary if you have bubbles in liquid line as explained before. Any residual particles from the unit working process, compressor and miscellaneous components are swept by the refrigerant into the liquid line and are caught by the filter-drier.

To change the filter drier, close the manual liquid line shutoff valve, pump the unit down by opening the switches Q1, Q2 (ON/OFF switches compressors) in “off” position.

Move the ON/OFF switch unit Q0 to the “off” position.

Close the suction line valve. Remove and replace the filter-drier. Evacuate the liquid line through the manual shutoff valve removing non-condensable that may have entered during filter replacement.

Open the suction line valve; open the manual liquid line of shutoff valve. A leak check is recommended before returning the unit to operation.

Electronic expansion valve

EWAD-BJ air-cooled chiller is equipped with the most advanced electronic expansion valve to achieve precise control of refrigerant mass flow. As today’s system requires improved energy efficiency, tighter temperature control, wider range of operating conditions and incorporate new features like remote monitoring and diagnostics, the application of electronic expansion valves becomes mandatory. EWAD-BJ electronic expansion valve proposes features that makes it unique: short opening and closing time, high resolution, positive shut-off function to eliminate use of additional solenoid valve, highly linear flow capacity, continuous modulation of mass flow without stress in the refrigerant circuit and corrosion resistance stainless steel body.

Heat recovery condensers

Condensers are shell and clearable, through-tube types. Standard configuration is 2 passes. The unit has independent exchangers, one per circuit completely assembled. Each heat recovery condenser has a carbon steel and seamless, integrally finned high efficiency copper tubes, roll expanded into heavy carbon steel tube sheets.

Water heads are removable and include vent and drain plugs. Condensers are equipped spring loaded relief valves.

Condenser is designed to comply with PED. Waterside working pressure is designed for 10.5 bar. Standard configuration on water connection side is 2 passes.

The installer has to supply the water header connection for all heat recovery condensers installed on the unit, both at the entering and leaving water connections and provide the flow switch. All the heat recovery condenser must be connected together in parallel. At the entering water pipe, must be installed the temperature sensor, supplied spare with the unit, to control the heat recovery cycle.

Condenser coil fans

The condenser fans are helical types with wing-profile blades to achieve a better performance. The direct coupling with the electrical motor reducing vibrations caused by the functioning. The three-phase type motors are supplied as standard with IP54 protection (Insulation class F); they are protected against overloading and short circuits by circuit breakers located inside the electrical control panel.

Air-cooled condenser (Condensing coil)

The condensing coils are constructed with internally enhanced seamless copper tubes arranged in a staggered row pattern and mechanically expanded into lanced and rippled aluminum condenser fins with full fin collars. An integral sub-cooler circuit provides sub-cooling to effectively eliminate liquid flashing and increases in cooling capacity without increasing the power input.

No maintenance is ordinary required except the occasional removal of dirt and debris from the outside surface of the fins. Daikin recommends the use of foaming coil cleaners available at air conditioning supply outlets. Use caution when selecting such cleaners as some may contain potentially harmful chemical. Care should be taken not to damage the fins during cleaning.

Lubricating oils

Besides lubricating the bearing and other moving parts, the oil has the equally important task of sealing the clearances between the rotors and other potential leakage paths thereby improving pumping efficiency; the oil also assists in dissipating the heat of compression. The amount of oil injected is therefore well in excess of that required for lubrication alone. To reduce the oil circulation in the refrigerant circuit, the oil separator is installed on the compressor discharge line

Lubricating oil approved for use with the compressor used in this type of unit is POE Emkarate RL68H.

The oil pressure transducer monitors the oil injection pressure on the compressor. If the oil pressure value is below the setting point inside the microprocessor control the compressor stops.

The oil pressure is generated by discharge pressure, a minimum discharge pressure must be maintained; this minimum pressure increases, as the suction pressure increases in order to maintain the pressure difference required.

Crankcase and oil separator heaters

The function of the Oil separator heaters is to prevent oil dilution with refrigerant during compressor shutdown, which would cause foaming and consequent reduction in lubricating oil flow to the moving parts. Electric heaters are energised every time the compressors shuts-down.

Warning: Verify if the heaters have been energised at least 12 hours, prior the start-up.

Refrigerant

Refrigerant charging

EWAD-BJ air cooled screw chillers are shipped factory charged with a full operating charge of refrigerant but there may be times that a unit must be recharged at the jobsite. Follow these recommendations when field charging.

Refer to the unit operating charge found in the data tables on pages 1–6 to 1–28 according to the version of the unit, chiller or heat recovery . The optimum charge is the charge which allows the unit to run with no flashing in the liquid line at all operating conditions. When the liquid line temperature does not drop with the addition of 2.0- 4.0 Kg of charge and the discharge pressure goes up 20-35 kPa then the sub-cooler is nearly full and proper charge has been reached. Unit can be charged at any steady load condition, at any outdoor ambient temperature.

Unit must be allowed to run 5 minutes or longer so that the condenser fan staging is stabilized at normal operating discharge pressure. For best results charge the unit with 2 or more condenser fans operating per refrigerant.

In case of moisture is noticed in the system, through the moisture indicator, the system must be evacuated to eliminate the cause of trouble. After the trouble solved, the system must be dried by making an almost perfect vacuum. For this purpose, a displacement vacuum pump should be used.

5

When the system has been opened for extensive repairs, as for an overhaul, it is advisable to use the method of the evacuation as follows:

1. Evacuate the refrigerant system by the vacuum pump reaching the value of 200 Pa (1.5 mm Hg).
2. Break the vacuum with nitrogen until the atmospheric pressure is reached.
3. Repeat operation 1 and 2 for two times.
4. Evacuate the refrigerant system reaching the value of 66.5 Pa.

The dry nitrogen, used to break the vacuum will absorb any moisture and air left in the system, and they will be almost completely removed by the three evacuations. If burnt oil or sludge are found in the refrigerant circuit (caused by the compressor motor burn-out), before the vacuum operation it will be necessary to carefully clean the system using the filter dryer clean-out method; which basically involves the use of special filter dryers including a suitable desiccant in both the liquid and suction lines.

Excessive refrigerant losses can also cause leak of oil from the system. Check the oil level during operation and ensure that oil is visible in the top sight-glass of the oil separator.

1. If the unit is slightly undercharged the unit will show bubbles in the sight-glass. Recharge the unit.
2. If the unit is moderately undercharged the unit will most likely trip on freeze protection. Recharge the unit as described in the charging procedure below.

Procedure to charge a moderately undercharged EWAD-BJ unit

1. If a unit is low on refrigerant you must first determine the cause before attempting to recharge the unit. Locate and repair any refrigerant leak. Evidence of oil is a good indicator of leakage however, oil may not be visible at all leaks. Liquid leak detector fluids work well to show bubbles at medium size leaks but electronic leak detector may be needed to locate small leaks.
2. Add the charge to the system through the valve on evaporator entering pipe between the expansion valve and the evaporator head. Follow the procedure reported on “Refrigerant charging”.
3. 3. The charge can be added at any load condition.

Charging the refrigerant

1. Connect the refrigerant bottle with a filling pipe to the filling valve on the evaporator head. Before firmly tightening the refrigerant bottle valve, open it and force the air out from the filling pipe. Tighten the charging valve connection and fill the refrigerant.
2. When the refrigerant stops to enter the system, start the compressor and complete the refrigerant charge.
3. If you do not know how much refrigerant has to be added, shut off the bottle valve every 5 minutes and continue to charge the refrigerant until the sight glass is clear and free from bubbles.

Note: Do not discharge the refrigerant into the atmosphere. To recover it, use empty, clean and dry bottles. The liquid refrigerant recovery can be made through the valve provided on the condenser coil sub-cooler outlet. To facilitate the recovery of refrigerant, put the bottle inside a container full of ice; avoid excessive filling of the bottle (70÷80% max).

1.3 Preventive Maintenance Schedule

Overview

Operation Ref. No.	TYPE OF OPERATION	SCHEDULE			
		Weekly	Monthly	Six-Monthly	Yearly
1	Reading and recording of suction pressure	x			
2	Reading and recording of discharge pressure	x			
3	Reading and recording of supply voltage	x			
4	Reading and recording of current intensity	x			
5	Check refrigerant charge and possible moisture in the circuit refrigerant through the liquid sight glass	x			
6	Check the suction temperature and the superheating		x		
7	Check setting and operation of safety devices		x		
8	Check setting and proper operation of control devices			x	
9	Inspect the condenser for possible scaling or damages				x

1.4 Start-up and Shut-down

Start-up

- Verify that all shut-off valves are open.
- Prior to starting the unit, open the water circulation pump(s) and regulate the flow through the evaporator and through the heat recovery condensers (if supplied) in accordance to the setting conditions of the unit.

  If in the water system is not available the flow meter, the practice suggests to fix the water flow as first step by reaching the differential pressure drops values at the entering/leaving connections of the heat exchangers as reported on the diagram pressure drops. The final set up will be done, when the unit is running, adjusting the water flow to reach the water "DT" at full load.
- Verify that the evaporator inlet and outlet water temperature sensors indicate the same temperature or the difference between them and the thermometer does not exceed 0.1°C.
- Verify that the inlet water temperature sensors of the heat recovery condenser (if supplied) has been installed in a well pocket on the common pipe and indicate the same temperature or the difference between it and the thermometer does not exceed 0.1°C.
- Verify that the flow switch(es) is(are) connected to the electrical panel at the terminal blocks M3.8 – M3.23 for the evaporator and M3.426 – M3.427 for heat recovery condensers (if supplied)
- Verify the electrical power connection to the electrical panel and put in “OFF” position all the switches. Switch “ON” the main switch isolator “Q10” and the selector “Q12” . In this way the electric heaters of the compressors and the oil separators are energised.
- Check if the software installed on the microprocessor is corresponding to the unit type and the set point are correct.
- Turn the selector switch Q0 in position ” Local ”. For normal unit operation condition, if the unit is handled by remote place switch Q0 in position “remote”.
- Push the “on/off” button on the keypad and wait for the green light on.
- Before turn the Q1 selector to ON position, check that the Q10 and Q12 has been switched ON at least 12 hours before. The controller , if there is a cooling load demand, will start the corresponding compressor. Repeat the sequence for Q2,Q3, Q4 selectors according to the number of compressors installed.

Operational shut-down

- Push the “On/Off” button on the keypad, or by remote switch, to de-energise the unit, green light become off, all the compressors will carry out its pump-down cycle and then stop.
- Switch off the water pumps

1.5 Seasonal Shut-down

Procedure

- ➤ Turn the Q1 selector to Off position. The compressor will carry out its pump-down cycle and then stop.
- ➤ Repeat the sequence for all the selectors Q2, (Q3 and Q4) to stop all the other compressors.
- ➤ Switch the “Q0” selector from “Local” to off position.
- ➤ Push the “On/Off” button on the keypad to de-energise the unit, green light become off.
- ➤ Open the circuit breaker Q12 to stop the auxiliary circuit.
- ➤ Open the main switch Q10 to remove the power supplier to the unit. In this condition the oil electric heater is off. When you restart the unit before switching on the compressors wait at least 12 hours to heat the oil.
- ➤ Close the shut-off valves of the refrigerant circuits.
- ➤ Switch off the water pumps
- ➤ Empty the water heat exchangers or fill them with glycol for freeze protection.

1.6 Maintenance Shut-down

Procedure

- Turn the Q1 selector to Off position. The compressor will carry out its pump-down cycle and then stop.
- Repeat the sequence for all the selectors Q2, (Q3 and Q4) to stop all the other compressors.
- Switch the “Q0” selector from “Local” to off position.
- Push the “On/Off” button on the keypad to de-energise the unit, green light become off.
- Open the circuit breaker Q12 to stop the auxiliary circuit.
- Open the main switch Q10 to remove the power supplier to the unit. In this condition the oil electric heater is off. When you restart the unit before switching on the compressors wait at least 12 hours to heat the oil.
- Close the shut-off valves of the refrigerant circuits.
- Switch off the water pumps
- Service the unit accordingly to the program

1.7 Periodical Checks

Electrical checks

The table below contains the electrical checks.

Inspection checks and actions	Remarks
Check that all electrical wiring is properly connected and securely tightened.	—
Check the electrical components for damage or loss.	—
Check if the power supply corresponds with the identification label of the unit.	—
Check the operation of the circuit breaker and the earth leak detector of the local supply panel.	—
Check the operation of the safety devices.	No operation can cause damage of the unit.

Refrigerant checks

The table below contains the refrigerant checks.

Inspection checks and actions	Remarks
Check the refrigerant circuit. ➤ If the unit leaks, contact your dealer.	—

5

Water checks

The table below contains the water checks.

Inspection checks and actions	Remarks
Check the water condition. ➤ Drain the water from the air release plug. ➤ If the water is dirty, replace all the water in the system.	Dirty water causes a cooling capacity drop as well as corrosion of the water heat exchanger and pipe.
Check the water connection.	—
Check the water velocity.	—
Check the function of the flow switch.	The evaporator can freeze up if the flow switch is not able to operate.
Make sure that there is no air mixed in the water pipes.	Even if air is removed at the beginning, air can sometimes enter later. Bleed therefore the system regularly.
Check the water filter.	—

Noise checks

The table below contains the noise checks.

Inspection checks and actions	Remarks
Check for any abnormal noise. ➤ Locate the noise producing section and search the cause. ➤ If the cause of the noise cannot be located, contact your dealer.	—

Index

C

O

P

S

T

W